March 25, 2022
File No. 96060.200

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP RGP Applications Coordinator
5 Post Office Square, Suite 100 (OEP06-4)
Boston, Massachusetts 02109-3912

Re: Notice of Intent (NOI) - Remediation General Permit (RGP)
Lawrence Oliver K-8 Education Complex
183 Haverhill Street
Lawrence, Massachusetts

Dear Sir/Madam:

Nobis Engineering, Inc. d/b/a as Nobis Group® (Nobis), with support from Lockwood Remediation Technologies, LLC (LRT) has prepared this Notice of Intent (NOI) on behalf of Consigli Construction Co., Inc. (Consigli) to request a determination of coverage under the United States Environmental Protection Agency's (EPA's) Remediation General Permit (RGP), pursuant EPA's National Pollutant Discharge Elimination System (NPDES) program. This NOI was prepared in accordance with the general requirements of the NPDES RGP and related guidance documentation provided by EPA. The completed NOI Form is provided in Appendix A.

SITE INFORMATION

Nobis prepared this NOI for the management groundwater that will be generated during dewatering activities associated with construction activities proposed at 183 Haverhill Street, Lawrence, MA (the Site). The work is anticipated to be completed within twelve months. A Site Locus is provided as Figure 1 and a Site Plan satisfying the requirements of RGP Appendix IV Part I.B and I.D is provided as Figure 2. A map illustrating the path of discharge to its final outfall is provided as Figure 2A.

Nobis Group®
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

REGULATORY STATUS

Nobis conducted soil and groundwater investigations for soil disposal pre-characterization and dewatering planning. Semi-Volatile Organic Compounds (SVOCs) and metals were detected in soil samples above applicable MCP Method 1 soil standards and Total Petroleum Hydrocarbons (TPH) were detected in groundwater samples above applicable groundwater samples. The City notified reported these conditions to the Massachusetts Department of Environmental Protection (MassDEP) on November 30, 2021, and MassDEP subsequently assigned Release tracking number (RTN) 3-0037182. A Release Abatement Measure (RAM) Plan will be required for earthwork activities to be compliant with the MCP.

WORK SUMMARY

The work includes the renovation of existing structures and construction of an addition to the existing elementary school. To complete excavations in the dry, dewatering will be required to lower the groundwater table as work is being performed. To do this, a wellpoint dewatering system will be installed around the excavation area. Water generated during dewatering (Source Water) will be pumped to a water treatment system prior to direct discharge to the Spicket River. The discharge location is depicted on Figure 2A.

Nobis provided data from the analysis of representative groundwater samples and of the receiving water to LRT to support this NOI on behalf of Consigli. The samples were analyzed for various parameters in accordance with the NPDES RGP Activity Category III-G and are summarized in Table 1.

DISCHARGE AND RECEIVING SURFACE WATER INFORMATION

A summary of the analytical results is provided in the NOI Form included within Appendix A, and copies of the laboratory data reports are provided in Appendix B. Concentrations of Total Suspended Solids and metals including copper, iron, and lead were detected in groundwater at concentrations above the respective NPDES RGP Effluent Limitations. To meet these standards, source water will undergo treatment that includes bag filtration prior to discharge. Details of the water treatment system are provided below.

WATER TREATMENT SYSTEM

A water treatment system schematic is provided as Figure 3. Cutsheets of the system components, product information and Safety Data Sheets (SDS) are included in Appendix C.

Source water will be pumped to a treatment system with a design flow rate of up to 300 gallons per minute (gpm); the average effluent flow of the system is estimated to be 225 gpm, and the maximum flow will not exceed 300 gpm. Source water will enter two weir tanks at the head of the system. The weir tanks will be connected by a gravity feed to facilitate both tanks being pumped down by one pump. From the weir tanks water will be pumped to a multi-bag filter skid (consisting of two multi-bag filter housings) before being discharged to the approved discharge point. If required, contingency treatment items will include a pH adjustment system (sulfuric acid) mixed inside the weir tank, carbon treatment and ion exchange media.

Discharge from the water treatment system will pass through a flow/totalizer meter prior to indirect discharge into the receiving water, as depicted on Figure 2A. Effluent sampling will correspond with this discharge location.

CHEMICAL AND ADDITIVE INFORMATION

The pH adjustment system includes an automated feed system with a mix tank, chemical feed pumps and setpoint controls that maintain the pH to within discharge permit parameters. The maximum application concentration for sulfuric acid or sodium hydroxide would be 111 mg/L.

The addition of pH conditioners will 1) not add any pollutants in concentrations which exceed permit effluent limitations; 2) not result in the exceedance of any applicable water quality standard; and 3) not add any pollutants that would justify the application of permit conditions that are different from or absent in this permit. The addition of sulfuric acid or sodium hydroxide to control pH is a standard treatment for temporary construction dewatering and is not expected to exceed applicable permit limitations and water quality standards or alter conditions in the receiving water. No additional testing is considered necessary for use of this product or to demonstrate that use of this product will not adversely affect the receiving water.

CONSULTATION WITH FEDERAL SERVICES

LRT reviewed online electronic data viewers and databases from the Massachusetts Geographical Information System (MassGIS), the Massachusetts Division of Fisheries and Wildlife (MassWildlife; Natural Heritage and Endangered Species Program), and the U.S. National Parks Service Natural Historic Places (NPS). Based on this review, the Site, and the point where the proposed discharge reaches the receiving surface water body are not located within an Area of Critical Environmental Concern (ACEC). The Site and the proposed discharge point are not

located within Habitats of Rare Wetland Wildlife, Habitats of Rare Species, Estimated Habitats of Rare Wildlife, or listed as a National Historic Place. Documentation is included in Appendix D.

COVERAGE UNDER NPDES RGP

It is our opinion that the proposed discharge is eligible for coverage under the NPDES RGP. On behalf of Consigli, Nobis is requesting coverage under the NPDES RGP for the discharge of treated wastewater to the Spicket River in support of construction dewatering activities that are to take place at 183 Haverhill Street Lawrence, MA.

The enclosed NOI form provides required information on the general site conditions, discharge, treatment system, receiving water, and consultation with federal services. For this project, Consigli is considered the operator and has operational control over the construction plans and specifications, including the ability to make modifications to those plans and specifications.

Please contact Jeff Brunelle at 978-703-6038 or jbrunelle@nobiseng.com with any questions.

Sincerely,

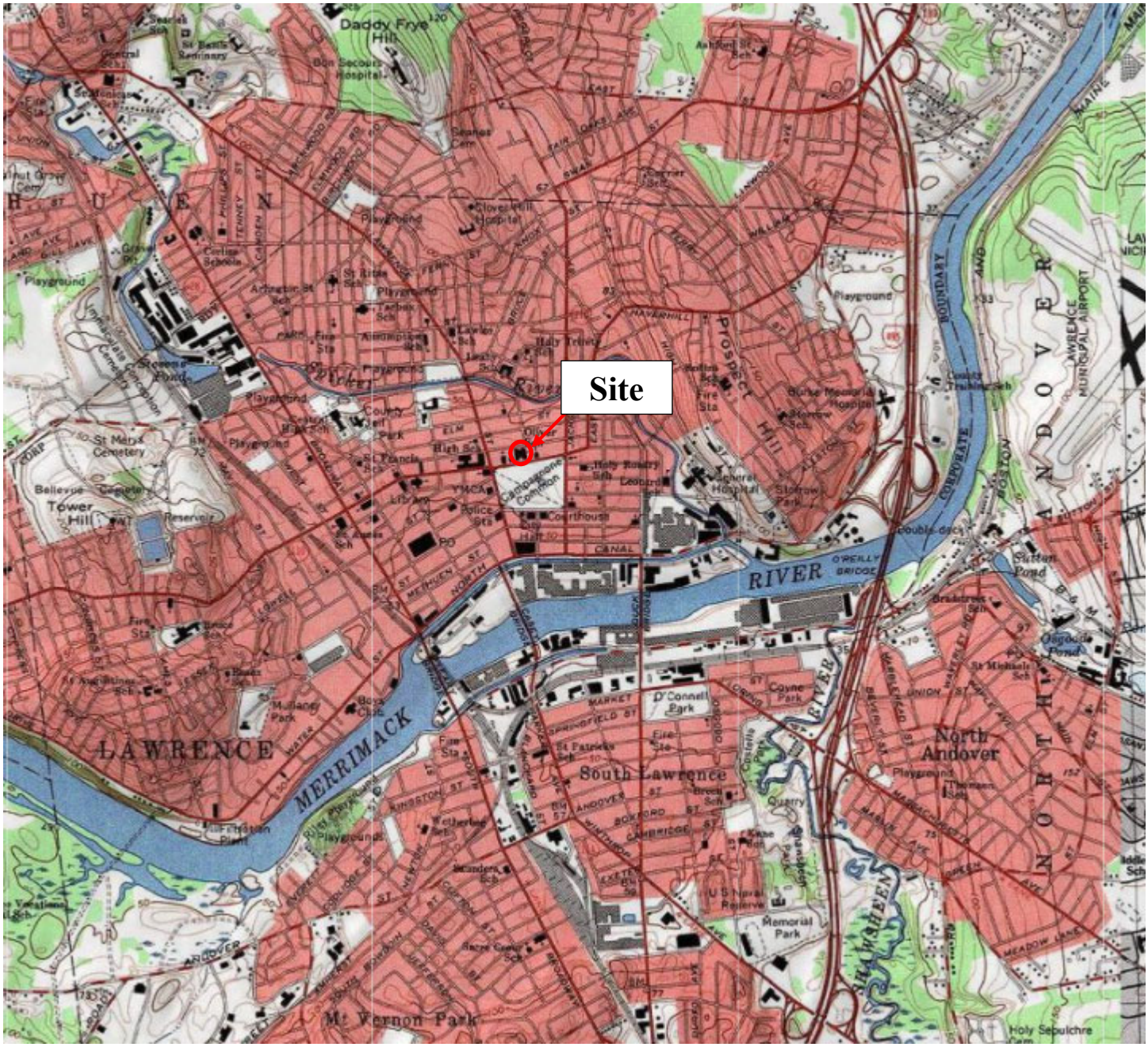
NOBIS GROUP®

Jeff Brunelle, CPG
Senior Project Manager

Attachments: Figure 1 - Locus Plan
Figure 2 - Site Plan and Discharge Location
Figure 3 - Water Treatment System Schematic
Appendix A - NOI Form
Appendix B – Laboratory Reports
Appendix C – Water Treatment System Cutsheets and SDSs
Appendix D – Supplementary Information
Appendix E – Town of Lawrence Department of Public Works Correspondence

cc: Cathy Vakalopoulos – Massachusetts Department of Environmental Protection
Daniel Geary – Consigli Construction Co., Inc.
Felix Garcia – City of Lawrence
Kim Gravelle - LRT

FIGURES



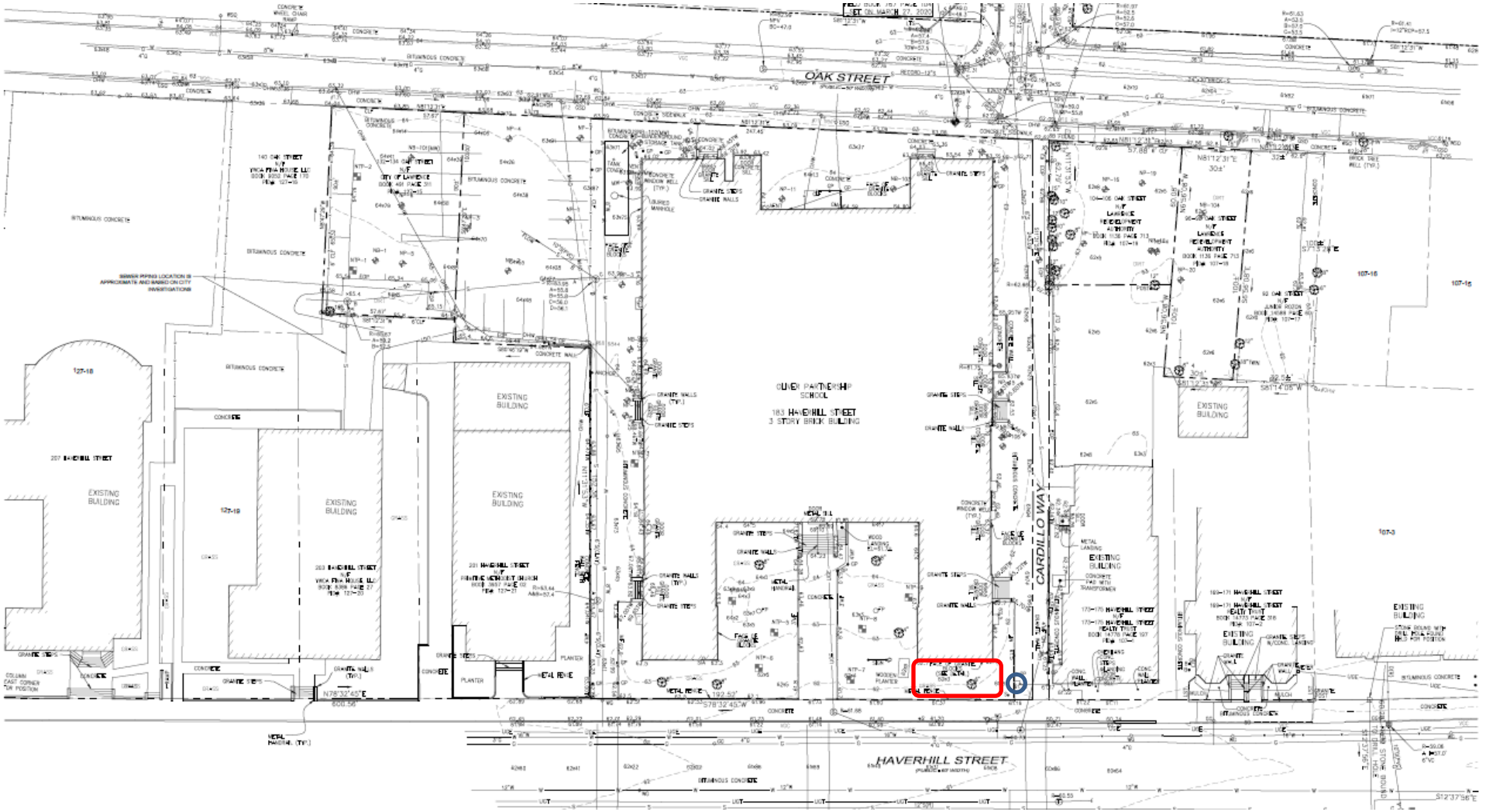
Source: ArcGIS Map Viewer

Notes

1. Figure is not to scale.

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

Figure 1 – Locus Plan
183 Haverhill Street
Lawrence, MA



Notes

1. Figure is not to scale.

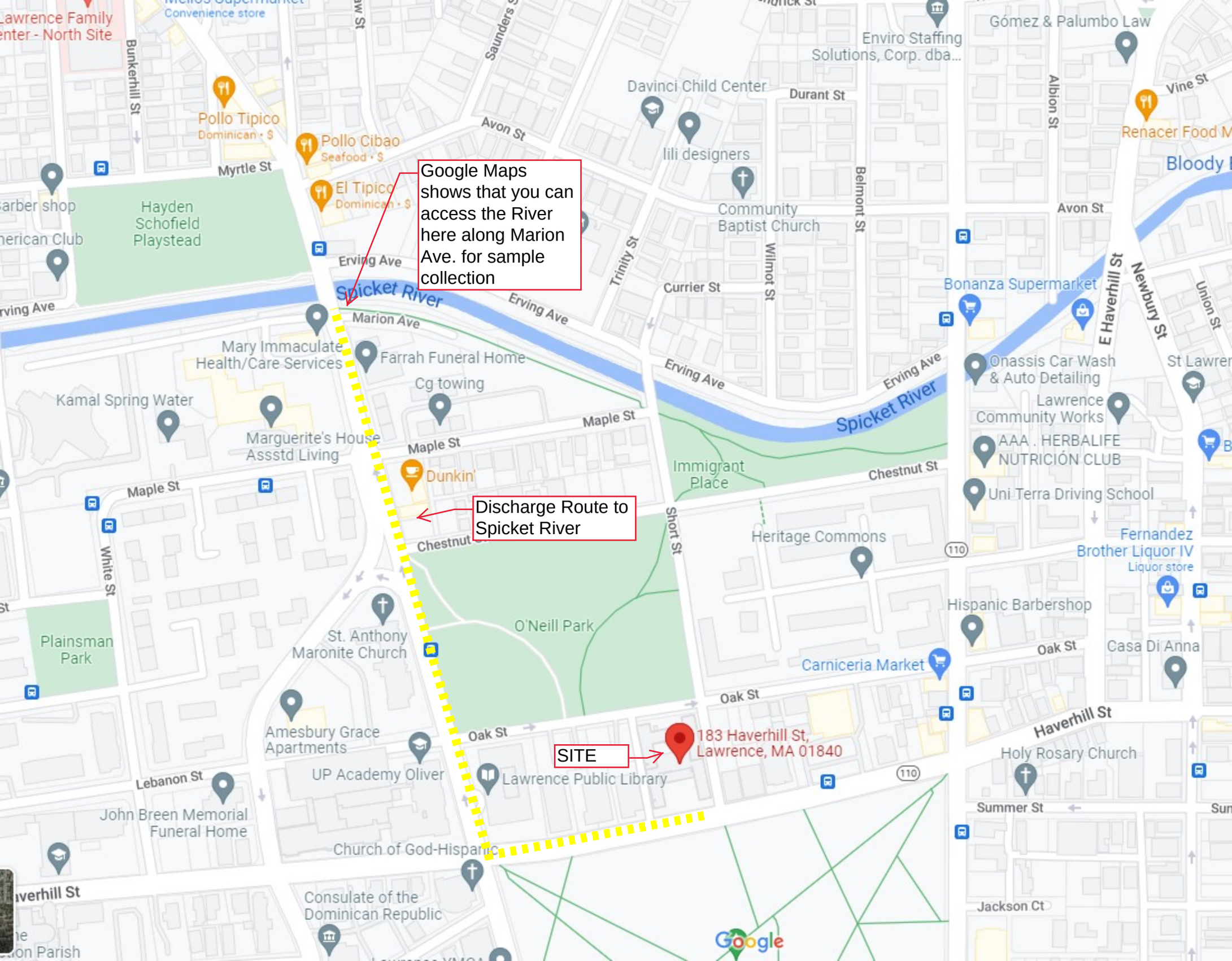
Key

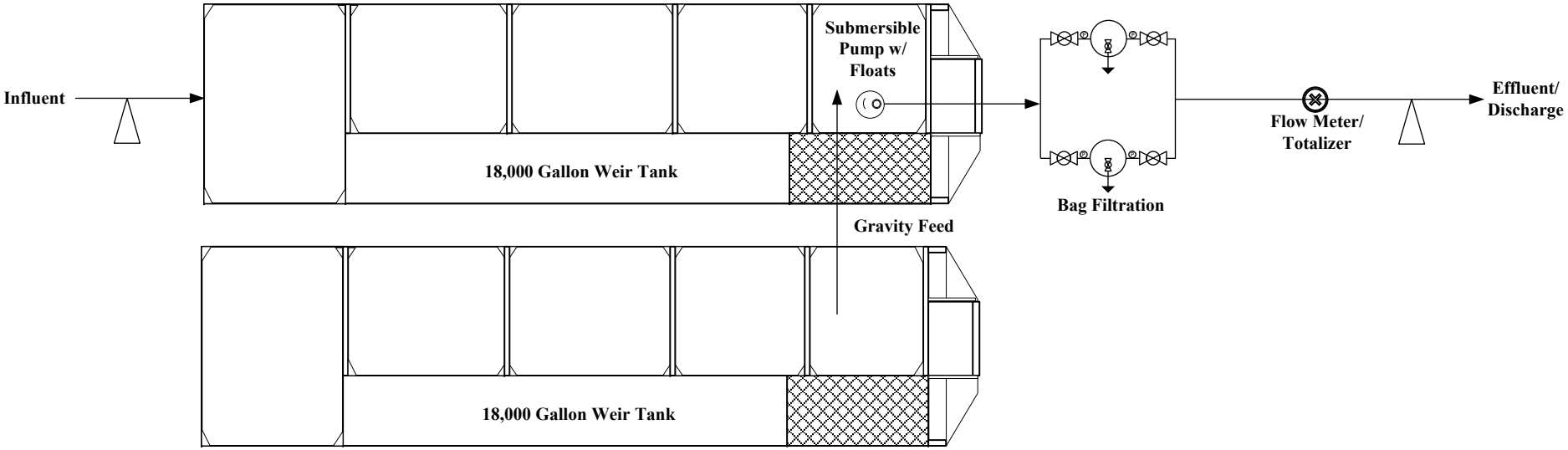
Proposed Catch Basin

System Footprint

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

Figure 2 – Site Layout
183 Haverhill Street
Lawrence, MA


Google Maps shows that you can access the River here along Marion Ave. for sample collection
Discharge Route to Spicket River
SITE
183 Haverhill St, Lawrence, MA 01840
Spicket River
Erving Ave
Marion Ave
Maple St
Chestnut St
Oak St
Haverhill St
Avon St
Durant St
Currier St
Myrtle St
Lebanon St
Summer St
Jackson Ct
Bunkerhill St
Trinity St
Wilmot St
Belmont St
Albion St
Short St
White St
Newbury St
E Haverhill St
Union St
Vine St
Pollo Tipico
Dominican · $
Pollo Cibao
Seafood · $
El Tipico
Dominican · $
Hayden Schofield Playstead
Davinci Child Center
lili designers
Community Baptist Church
Enviro Staffing Solutions, Corp. dba...
Gómez & Palumbo Law
Renacer Food M
Bonanza Supermarket
Onassis Car Wash & Auto Detailing
Lawrence Community Works
AAA . HERBALIFE NUTRICIÓN CLUB
Uni Terra Driving School
Immigrant Place
Heritage Commons
Fernandez Brother Liquor IV
Liquor store
Hispanic Barbershop
Casa Di Anna
Carniceria Market
Holy Rosary Church
Mary Immaculate Health/Care Services
Farrah Funeral Home
Cg towing
Kamal Spring Water
Marguerite's House Assstd Living
Dunkin'
St. Anthony Maronite Church
O'Neill Park
Plainsman Park
Amesbury Grace Apartments
UP Academy Oliver
Lawrence Public Library
John Breen Memorial Funeral Home
Church of God-Hispanic
Consulate of the Dominican Republic
Google



Key:

Piping/Hose	——→
Sample Port	▷
Ball Valve	⊗
Butterfly Valve	⋈
Pressure Gauge	Ⓟ
Contingency	- - - - - - - - - - - -

Notes:

1.) Figure is not to scale
2.) System rated for 300 GPM
3.) Winterization and temporary power equipment not depicted

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453
Office: 774-450-7177

DESIGNED BY: LRT **DRAWN BY: JHJ**

CHECKED BY: **DATE: 03/09/22**

Water Treatment System Schematic

Oliver Elementary School

PROJECT No. 2-2363

FIGURE No. 3

NOI Form

APPENDIX A

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:
Oliver Elementary School</td><td colspan="3">Site address: 183 Haverhill Street
Street:</td></tr>
<tr><td>City: Lawrence</td><td>State: MA</td><td>Zip: 01840</td></tr>
<tr><td rowspan="4">2. Site owner
City of Lawrence, Board of Education

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="3">Contact Person: Odanis Hernandez, Chief Operating Officer</td></tr>
<tr><td colspan="2">Telephone: 978-975-5905 x25729</td><td>Email: odanis.hernandes@lawrence.k12</td></tr>
<tr><td colspan="3">Mailing address: 237 Essex Street
Street:</td></tr>
<tr><td>City: Lawrence</td><td>State: MA</td><td>Zip: 01840</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner
Consigli Construction Company</td><td colspan="3">Contact Person: Dan Geary</td></tr>
<tr><td colspan="2">Telephone: 508-328-2699</td><td>Email: dgeary@consigli.com</td></tr>
<tr><td colspan="3">Mailing address:
Street: 313 Congress Street</td></tr>
<tr><td>City: Boston</td><td>State: MA</td><td>Zip: 02210</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): 3-0037182
☐ 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):
Spicket River	MA84A-10	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. Debris/Floatables/Trash, Physical Substrate Habitat Alterations, Benthic Macroinvertebrates, Copper, E.Coli, Nutrient

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.	1.894 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.	5.38

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:

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: TSS, Ammonia, Metals (Arsenic, Chromium, Copper, Lead, Nickle, and Zinc), and VOCs	
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): 001	Outfall location(s): (Latitude, Longitude) 42.71350, -71.17053
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Discharge from the treatment system will be directed into a stormwater culvert with a final outfall into the Spicket 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: Permission will be obtained concurrent with submission of this NOI 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): September/2022 - October/2023 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		✔	2	350.1	100	2900	2900	Report mg/L	---
Chloride	✔		2	300.0	25	<25	<25	Report µg/l	---
Total Residual Chlorine	✔		2		0.02	<0.02	<0.02	0.2 mg/L	59
Total Suspended Solids		✔	2	2540	1000	7300000	7300000	30 mg/L	---
Antimony	✔		2	200.8	1.0	<1.0	<1.0	206 µg/L	3446
Arsenic		✔	2	200.8	0.80	54	7.9	104 µg/L	54
Cadmium		✔	2	200.8	0.20	9.2	4.6	10.2 µg/L	1.0768
Chromium III		✔	2	200.8	1.0	160	80	323 µg/L	332.2
Chromium VI	✔		2	SM21-23	4	<0.010	<0.010	323 µg/L	61.6
Copper		✔	2	200.8	1.0	340	46	242 µg/L	29.7
Iron		✔	2	200.7	50	4700	2200	5,000 µg/L	3937
Lead		✔	2	200.8	0.50	190	7.6	160 µg/L	10.19
Mercury	✔		2	245.1	0.1	<0.1	<0.1	0.739 µg/L	4.88
Nickel		✔	2	200.8	5	180	28	1,450 µg/L	198.8
Selenium	✔		2	200.8	0.95	<0.95	<0.95	235.8 µg/L	26.9
Silver		✔	2	200.8	0.20	0.33	<0.20	35.1 µg/L	10.1
Zinc		✔	2	200.8	10	370	33	420 µg/L	456.5
Cyanide		✔	2	121	0.001	6.0	3.0	178 mg/L	28.0
B. Non-Halogenated VOCs									
Total BTEX						4.96		100 µg/L	---
Benzene		✔	2	624.1	0.999	3.34	1.5	5.0 µg/L	---
1,4 Dioxane	✔		2	624.1	0.25	<0.25	<0.25	200 µg/L	---
Acetone		✔	2	624.1	10.1	15.5		7.97 mg/L	---
Phenol	✔		2	624.1	50	<50	<50	1,080 µg/L	1615

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride	✔		2	624.1	0.3	<0.3	<0.3	4.4 µg/L	8.6
1,2 Dichlorobenzene	✔		2	624.1	0.122	<0.122	<0.122	600 µg/L	---
1,3 Dichlorobenzene	✔		2	624.1	0.118	<0.118	<0.118	320 µg/L	---
1,4 Dichlorobenzene	✔		2	624.1	0.130	<0.130	<0.130	5.0 µg/L	---
Total dichlorobenzene	✔		2	624.1		<1.0	<1.0	763 µg/L in NH	---
1,1 Dichloroethane	✔		2	624.1	0.142	<0.142	<0.142	70 µg/L	---
1,2 Dichloroethane	✔		2	624.1	0.308	<0.308	<0.308	5.0 µg/L	---
1,1 Dichloroethylene	✔		2	624.1	0.141	<0.141	<0.141	3.2 µg/L	---
Ethylene Dibromide	✔		2	624.1	0.015	<0.015	<0.015	0.05 µg/L	---
Methylene Chloride		✔	2	624.1	1.17	2.15	2.15	4.6 µg/L	---
1,1,1 Trichloroethane	✔		2	624.1	0.169	<0.169	<0.169	200 µg/L	---
1,1,2 Trichloroethane	✔		2	624.1	0.183	<0.183	<0.183	5.0 µg/L	---
Trichloroethylene	✔		2	624.1	0.5	<0.5	<0.5	5.0 µg/L	---
Tetrachloroethylene	✔		2	624.1	0.187	<0.187	<0.187	5.0 µg/L	17.8
cis-1,2 Dichloroethylene	✔		2	624.1	0.147	<0.147	<0.147	70 µg/L	---
Vinyl Chloride	✔		2	624.1	0.208	<0.208	<0.208	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates	✔		2	625.1		<1.0	<1.0	190 µg/L	---
Diethylhexyl phthalate	✔		2	625.1	5.0	<5.0	<5.0	101 µg/L	11.8
Total Group I PAHs	✔		2	625.1		<1.0	<1.0	1.0 µg/L	---
Benzo(a)anthracene	✔		2	625.1	0.15	<0.15	<0.15	As Total PAHs	0.0205
Benzo(a)pyrene	✔		2	625.1	0.15	<0.15	<0.15		0.0205
Benzo(b)fluoranthene	✔		2	625.1	0.17	<0.17	<0.17		0.0205
Benzo(k)fluoranthene	✔		2	625.1	0.13	<0.13	<0.13		0.0205
Chrysene	✔		2	625.1	0.13	<0.13	<0.13		0.0205
Dibenzo(a,h)anthracene	✔		2	625.1	0.19	<0.19	<0.19		0.0205
Indeno(1,2,3-cd)pyrene	✔		2	625.1	0.19	<0.19	<0.19		0.0205

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
Total Group II PAHs		✔	2	625.1		3.19	3.19	100 µg/L	---
Naphthalene	✔		2	625.1	0.28	<0.28	<0.28	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✔		2	608.3	0.00005	<0.00005	<0.00005	0.000064 µg/L	---
Pentachlorophenol	✔		2	608.3	0.08	<0.08	<0.08	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons	✔		2	624.1		<4.7	<4.7	5.0 mg/L	---
Ethanol	✔		2	624.1	26.5	<26.5	<26.5	Report mg/L	---
Methyl-tert-Butyl Ether	✔		2	624.1	0.172	<0.172	<0.172	70 µg/L	108
tert-Butyl Alcohol	✔		2	624.1	4.69	<4.69	<4.69	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✔		2	624.1	1.0	<1.0	<1.0	90 µg/L in MA 140 µg/L in NH	---
Other (i.e., pH, temperature, hardness, salinity, LC_{50}, additional pollutants present); if so, specify:									
pH		✔				7.6	7.4		
Receiving Water:									
pH		✔				7.1			
Copper		✔				1.3			
Iron		✔				330			

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.

Source water from construction dewatering will be pumped into two (2) 18,000 gallon weir tank. Water will then be pumped through a multi bag filter skid (with two, six bag filter housings), and then through a flow/totalizer meter prior to discharge into a catch basin with a final outfall in the Spicket River. If required, contingency treatment items will include a pH adjustment system, carbon treatment and ion exchange media.

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: Contingent activated carbon, ion exchange, pH adjustment

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: Bag filters Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification: N/A	300
Provide the proposed maximum effluent flow in gpm.	300
Provide the average effluent flow in gpm.	225
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	N/A

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:
Refer to cover letter
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.

Cut Sheets, Site Maps, Analytical Data, and reports are all located in the Appendices of the application for review.

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 will be developed and maintained to meet the requirements of this permit. The BMPP will be implemented on-site prior to the initiation of discharge.
Notification provided to the appropriate State, including a copy of this NOI, if required.	Check one: Yes ■ No ☐
Notification provided to the municipality in which the discharge is located, including a copy of this NOI, if requested.	Check one: Yes ■ No ☐
Notification provided to the owner of a private or municipal storm sewer system, if such system is used for site discharges, including a copy of this NOI, if requested.	Check one: Yes ■ No ☐ NA ☐
Permission obtained from the owner of a private or municipal storm sewer system, if such system is used for site discharges. If yes, attach additional conditions. If no, attach explanation and timeframe for obtaining permission.	Check one: Yes ☐ No ■ NA ☐
Notification provided to the owner/operator of the area associated with activities covered by an additional discharge permit(s). Additional discharge permit is (check one): ☐ RGP ☐ DGP ☐ CGP ☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:	Check one: Yes ☐ No ☐ NA ■
Signature: Daniel Gleary, CCM	Date: 3/25/2022
Print Name and Title: DANIEL GLEARY, SR. PROJECT SUPERINTENDENT, CONSIGLI	

Laboratory Data

APPENDIX B

TABLE 1
Summary of RGP Analytical Data
Oliver Elementary School
Lawrence, Massachusetts

NPDES Remediation General Permit Precharacterization

Sample Date		3/2/2022	
Initial Flow Meter Reading (gallons)	--	--	
Flow Meter Reading (gallons)	--	--	
Total Flow (gallons)	--	--	
Analysis	NPDES RGP Discharge Standard	--	
		Groundwater	Recieveing
Daily Flow (MGD)	0.144	--	--
pH	6.5 - 8.5	7.6	7.1
A. Inorganics			
Ammonia (mg/L)	Report	2.9	<0.10
Hardness	Report		
Total Residual Chlorine (TRC) (mg/L)	0.2	<0.02	
Total Suspended Solids (TSS) (mg/L)	30	7,300	
Antimony	206	<1.0	
Arsenic	104	54	<0.8
Cadmium	10.2	9.2	<0.2
Chromium III	323	160.0	<1.0
Chromium VI	323	<10.0	<0.010
Copper	242	340	1.3
Iron	5,000	4,700	330
Lead	160	190	<0.5
Mercury	0.739	<0.00010	<0.00010
Nickel	1,450	180	<5.0
Selenium	235.8	<5.0	<5.0
Silver	35.1	0.33	<0.20
Zinc	420	370	<10
Cyanide	178	6.0	<5.0
B. Non-Halogenated VOCs			

Total BTEX	100	4.96	
Benzene	5.0	3.34	
1,4 Dioxane	200	<0.25	
Acetone	7,970	15.5	
Phenol	1,080	<50	
C. Halogenated VOCs			
Carbon Tetrachloride	4.4	<0.3	
1,2 Dichlorobenzene	600	<0.122	
1,3 Dichlorobenzene	320	<0.118	
1,4 Dichlorobenzene	5.0	<0.130	
Total Dichlorobenzene	--	<1.0	
1,1 Dichloroethane	70	<0.142	
1,2 Dichloroethane	5.0	<0.308	
1,1 Dichloroethylene	3.2	<0.141	
Ethylene Dibromide	0.05	<0.015	
Methylene Chloride	4.6	2.15	
1,1,1 Trichloroethane	200	<0.169	
1,1,2 Trichloroethane	5.0	<0.183	
Trichloroethylene	5.0	<0.5	
Tetrachloroethylene	5.0	<0.187	
cis-1,2 Dichloroethylene	70	<0.147	
Vinyl Chloride	2.0	<0.208	
D. Non-Halogenated SVOCs			
Total Phthalates	190	<1.0	
Diethylhexyl Phthalate	101	<5.0	
Total Group I PAHs	1.0	<1.0	
Benzo(a)anthracene	1.0	<0.15	
Benzo(a)pyrene	1.0	<0.15	
Benzo(b)fluoranthene	1.0	<0.17	
Benzo(k)fluoranthene	1.0	<0.13	
Chrysene	1.0	<0.13	
Dibenzo(a,h)anthracene	1.0	<0.19	
Indeno(1,2,3-cd)pyrene	1.0	<0.19	
Total Group II PAHs	100	3.19	

Naphthalene	20	<0.28	
E. Halogenated SVOCs			
Total Polychlorinated Biphenyls	0.000064	<0.00005	
Pentachlorophenol	1.0	<0.8	
F. Fuels Parameters			
Total Petroleum Hydrocarbons	5.0	<4.7	
Ethanol	Report	<26.5	
Methyl-tert-Butyl Ether	70	<0.172	
tert-Butyl Alcohol	120	<4.69	
tert-Amyl Methyl Ether	90	<1.0	

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March 8, 2022

Jeff Brunelle
Nobis Engineering
585 Middlesex Street
Lowell, MA 01851

Project Location: Lawrence, MA
Client Job Number:
Project Number: 96060.200/100
Laboratory Work Order Number: 22B0885

Enclosed are results of analyses for samples as received by the laboratory on February 15, 2022. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jessica L. Hoffman
Project Manager

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Nobis Engineering
585 Middlesex Street
Lowell, MA 01851
ATTN: Jeff Brunelle

REPORT DATE: 3/8/2022

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 96060.200/100

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 22B0885

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Lawrence, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
TP-GW3	22B0885-02	Ground Water		-	MA M-MA-086/CT PH-0574/NY11148
				121,4500CN-CE	MA M-MA-086/CT PH-0574/NY11148
				608.3	
				624.1	
				625.1	
				EPA 1664B	
				EPA 200.7	
				EPA 200.8	
				EPA 245.1	
				EPA 350.1	
				SM21-23 2540D	
				SM21-23 3500 Cr B	
				Tri Chrome Calc.	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

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624.1

Qualifications:

L-04

Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.

Analyte & Samples(s) Qualified:

Acetone
22B0885-02[TP-GW3], B301318-BLK1, B301318-BS1, B301318-BSD1

625.1

Qualifications:

B

Analyte is found in the associated laboratory blank as well as in the sample.

Analyte & Samples(s) Qualified:

Acenaphthylene (SIM)
22B0885-02[TP-GW3], B301628-BLK1

B-05

Data is not affected by elevated level in laboratory blank since sample(s) result is "Not Detected".

Analyte & Samples(s) Qualified:

Acenaphthene (SIM)
B301628-BLK1

Fluorene (SIM)
B301628-BLK1

Naphthalene (SIM)
B301628-BLK1

V-04

Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.

Analyte & Samples(s) Qualified:

2,4-Dinitrophenol
S068450-CCV1

Benzidine
S068450-CCV1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

1,2-Diphenylhydrazine/Azobenzen
S068450-CCV1

Benzidine
S068450-CCV1

V-35

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Benzidine
S068450-CCV1

EPA 200.8

Qualifications:

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

Selenium
B301898-BSD1

EPA 350.1

Qualifications:

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MS-07

Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.

Analyte & Samples(s) Qualified:

Ammonia as N

22B0885-02[TP-GW3], B301537-MS1

SM21-23 3500 Cr B

Qualifications:

H-03

Sample received after recommended holding time was exceeded.

Analyte & Samples(s) Qualified:

Hexavalent Chromium

22B0885-02[TP-GW3], B301284-MS1, B301284-MSD1

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Technical Representative

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0885

Date Received: 2/15/2022

Field Sample #: TP-GW3 | Sampled: 2/14/2022 12:15

Sample ID: 22B0885-02

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	<2.03	50.0	2.03	µg/L	1	L-04	624.1	2/16/22	2/16/22 14:36	MFF
Benzene	<0.200	1.00	0.200	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
tert-Butyl Alcohol (TBA)	<4.69	20.0	4.69	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
1,2-Dichlorobenzene	<0.122	2.00	0.122	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
1,3-Dichlorobenzene	<0.118	2.00	0.118	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
1,4-Dichlorobenzene	<0.130	2.00	0.130	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
1,2-Dichloroethane	<0.308	2.00	0.308	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
cis-1,2-Dichloroethylene	<0.147	1.00	0.147	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
1,1-Dichloroethane	<0.142	2.00	0.142	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
1,1-Dichloroethylene	<0.141	2.00	0.141	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
1,4-Dioxane	<20.6	50.0	20.6	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
Ethanol	<26.5	50.0	26.5	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
Ethylbenzene	<0.215	2.00	0.215	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
Methyl tert-Butyl Ether (MTBE)	<0.172	2.00	0.172	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
Methylene Chloride	<0.235	5.00	0.235	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
Tetrachloroethylene	<0.187	2.00	0.187	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
Toluene	<0.224	1.00	0.224	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
1,1,1-Trichloroethane	<0.169	2.00	0.169	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
1,1,2-Trichloroethane	<0.183	2.00	0.183	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
Trichloroethylene	<0.189	2.00	0.189	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
Xylenes (total)	<	3.00		µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
Vinyl Chloride	<0.208	2.00	0.208	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
m+p Xylene	<0.459	2.00	0.459	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF
o-Xylene	<0.230	1.00	0.230	µg/L	1		624.1	2/16/22	2/16/22 14:36	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	91.6	70-130		2/16/22 14:36
Toluene-d8	103	70-130		2/16/22 14:36
4-Bromofluorobenzene	96.9	70-130		2/16/22 14:36

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0885

Date Received: 2/15/2022

Field Sample #: TP-GW3 | Sampled: 2/14/2022 12:15

Sample ID: 22B0885-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	<0.020	0.31	0.020	µg/L	1		625.1	2/16/22	2/21/22 12:42	IMR
Acenaphthylene (SIM)	0.019	0.31	0.016	µg/L	1	J, B	625.1	2/16/22	2/21/22 12:42	IMR
Anthracene (SIM)	0.021	0.21	0.013	µg/L	1	J	625.1	2/16/22	2/21/22 12:42	IMR
Benzo(a)anthracene (SIM)	0.055	0.052	0.015	µg/L	1		625.1	2/16/22	2/21/22 12:42	IMR
Benzo(a)pyrene (SIM)	0.065	0.10	0.015	µg/L	1	J	625.1	2/16/22	2/21/22 12:42	IMR
Benzo(b)fluoranthene (SIM)	0.085	0.052	0.017	µg/L	1		625.1	2/16/22	2/21/22 12:42	IMR
Benzo(g,h,i)perylene (SIM)	0.043	0.52	0.019	µg/L	1	J	625.1	2/16/22	2/21/22 12:42	IMR
Benzo(k)fluoranthene (SIM)	0.028	0.21	0.013	µg/L	1	J	625.1	2/16/22	2/21/22 12:42	IMR
Bis(2-ethylhexyl)phthalate (SIM)	<0.50	1.0	0.50	µg/L	1		625.1	2/16/22	2/21/22 12:42	IMR
Chrysene (SIM)	0.051	0.21	0.013	µg/L	1	J	625.1	2/16/22	2/21/22 12:42	IMR
Dibenz(a,h)anthracene (SIM)	<0.019	0.10	0.019	µg/L	1		625.1	2/16/22	2/21/22 12:42	IMR
Fluoranthene (SIM)	0.082	0.52	0.014	µg/L	1	J	625.1	2/16/22	2/21/22 12:42	IMR
Fluorene (SIM)	<0.018	1.0	0.018	µg/L	1		625.1	2/16/22	2/21/22 12:42	IMR
Indeno(1,2,3-cd)pyrene (SIM)	0.049	0.10	0.019	µg/L	1	J	625.1	2/16/22	2/21/22 12:42	IMR
Naphthalene (SIM)	<0.028	1.0	0.028	µg/L	1		625.1	2/16/22	2/21/22 12:42	IMR
Pentachlorophenol (SIM)	<0.25	1.0	0.25	µg/L	1		625.1	2/16/22	2/21/22 12:42	IMR
Phenanthrene (SIM)	0.032	0.052	0.016	µg/L	1	J	625.1	2/16/22	2/21/22 12:42	IMR
Pyrene (SIM)	0.081	1.0	0.015	µg/L	1	J	625.1	2/16/22	2/21/22 12:42	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol (SIM)	39.3	15-110		2/21/22 12:42
Phenol-d6 (SIM)	34.6	15-110		2/21/22 12:42
Nitrobenzene-d5	80.1	30-130		2/21/22 12:42
2-Fluorobiphenyl	71.2	30-130		2/21/22 12:42
2,4,6-Tribromophenol (SIM)	98.2	15-110		2/21/22 12:42
p-Terphenyl-d14	102	30-130		2/21/22 12:42

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0885

Date Received: 2/15/2022

Field Sample #: TP-GW3 | Sampled: 2/14/2022 12:15

Sample ID: 22B0885-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Butylbenzylphthalate	<0.729	10.5	0.729	µg/L	1		625.1	2/16/22	2/19/22 0:37	BGL
Di-n-butylphthalate	<0.520	10.5	0.520	µg/L	1		625.1	2/16/22	2/19/22 0:37	BGL
Diethylphthalate	<0.504	10.5	0.504	µg/L	1		625.1	2/16/22	2/19/22 0:37	BGL
Dimethylphthalate	<0.421	10.5	0.421	µg/L	1		625.1	2/16/22	2/19/22 0:37	BGL
Di-n-octylphthalate	<5.86	10.5	5.86	µg/L	1		625.1	2/16/22	2/19/22 0:37	BGL
Bis(2-Ethylhexyl)phthalate	<0.968	10.5	0.968	µg/L	1		625.1	2/16/22	2/19/22 0:37	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual		
2-Fluorophenol	47.9	15-110		2/19/22 0:37	
Phenol-d6	32.9	15-110		2/19/22 0:37	
Nitrobenzene-d5	64.6	30-130		2/19/22 0:37	
2-Fluorobiphenyl	79.1	30-130		2/19/22 0:37	
2,4,6-Tribromophenol	81.3	15-110		2/19/22 0:37	
p-Terphenyl-d14	92.1	30-130		2/19/22 0:37	

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0885

Date Received: 2/15/2022

Field Sample #: TP-GW3 | Sampled: 2/14/2022 12:15

Sample ID: 22B0885-02

Sample Matrix: Ground Water

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	<0.0293	0.111	0.0293	µg/L	1		608.3	2/17/22	2/19/22 16:17	JMB
Aroclor-1221 [1]	<0.0439	0.111	0.0439	µg/L	1		608.3	2/17/22	2/19/22 16:17	JMB
Aroclor-1232 [1]	<0.0403	0.111	0.0403	µg/L	1		608.3	2/17/22	2/19/22 16:17	JMB
Aroclor-1242 [1]	<0.0423	0.111	0.0423	µg/L	1		608.3	2/17/22	2/19/22 16:17	JMB
Aroclor-1248 [1]	<0.0491	0.111	0.0491	µg/L	1		608.3	2/17/22	2/19/22 16:17	JMB
Aroclor-1254 [1]	<0.0433	0.111	0.0433	µg/L	1		608.3	2/17/22	2/19/22 16:17	JMB
Aroclor-1260 [1]	<0.0345	0.111	0.0345	µg/L	1		608.3	2/17/22	2/19/22 16:17	JMB

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	73.8	30-150		2/19/22 16:17
Decachlorobiphenyl [2]	70.5	30-150		2/19/22 16:17
Tetrachloro-m-xylene [1]	72.8	30-150		2/19/22 16:17
Tetrachloro-m-xylene [2]	69.7	30-150		2/19/22 16:17

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0885

Date Received: 2/15/2022

Field Sample #: TP-GW3 | Sampled: 2/14/2022 12:15

Sample ID: 22B0885-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0		µg/L	1		EPA 200.8	2/22/22	2/24/22 16:14	MJH
Arsenic	25	0.80		µg/L	1		EPA 200.8	2/22/22	2/24/22 16:14	MJH
Cadmium	0.33	0.20		µg/L	1		EPA 200.8	2/22/22	2/24/22 16:14	MJH
Chromium	14	1.0		µg/L	1		EPA 200.8	2/22/22	2/24/22 16:14	MJH
Chromium, Trivalent	0.011			mg/L	1		Tri Chrome Calc.	2/22/22	2/24/22 16:14	MJH
Copper	15	1.0		µg/L	1		EPA 200.8	2/22/22	2/24/22 16:14	MJH
Iron	9.4	0.050		mg/L	1		EPA 200.7	2/22/22	2/26/22 23:38	MJH
Lead	46	0.50		µg/L	1		EPA 200.8	2/22/22	2/24/22 16:14	MJH
Mercury	ND	0.00010		mg/L	1		EPA 245.1	2/19/22	2/20/22 7:39	MJH
Nickel	16	5.0		µg/L	1		EPA 200.8	2/22/22	2/24/22 16:14	MJH
Selenium	2.7	5.0	0.95	µg/L	1	J	EPA 200.8	2/22/22	2/24/22 16:14	MJH
Silver	ND	0.20		µg/L	1		EPA 200.8	2/22/22	2/24/22 16:14	MJH
Zinc	31	10		µg/L	1		EPA 200.8	2/22/22	2/24/22 16:14	MJH

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0885

Date Received: 2/15/2022

Field Sample #: TP-GW3 | Sampled: 2/14/2022 12:15

Sample ID: 22B0885-02

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0		µg/L	1		EPA 200.8	2/23/22	2/27/22 20:24	MJH
Arsenic	0.91	0.80		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:06	MJH
Cadmium	ND	0.20		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:06	MJH
Chromium	ND	1.0		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:06	MJH
Copper	3.7	1.0		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:06	MJH
Iron	ND	0.050		mg/L	1		EPA 200.7	2/23/22	2/25/22 23:34	MJH
Lead	ND	0.50		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:06	MJH
Mercury	ND	0.00010		mg/L	1		EPA 245.1	2/19/22	2/20/22 8:18	MJH
Nickel	ND	5.0		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:06	MJH
Selenium	2.5	5.0	0.95	µg/L	1		EPA 200.8	2/23/22	2/25/22 18:06	MJH
Silver	ND	0.20		µg/L	1		EPA 200.8	3/1/22	3/2/22 18:25	QNW
Zinc	ND	10		µg/L	1		EPA 200.8	2/23/22	2/27/22 20:24	MJH

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0885

Date Received: 2/15/2022

Field Sample #: TP-GW3 | Sampled: 2/14/2022 12:15

Sample ID: 22B0885-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ammonia as N	ND	0.10		mg/L	1	MS-07	EPA 350.1	2/18/22	2/18/22 17:11	IS
Hexavalent Chromium	ND	0.010		mg/L	1	H-03	SM21-23 3500 Cr B	2/15/22	2/15/22 20:30	CB2
Total Suspended Solids	3200	14		mg/L	1		SM21-23 2540D	2/16/22	2/16/22 13:37	LL
Silica Gel Treated HEM (SGT-HEM)	ND	5.6		mg/L	1		EPA 1664B	2/18/22	2/18/22 9:45	LL

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0885

Date Received: 2/15/2022

Field Sample #: TP-GW3 | Sampled: 2/14/2022 12:15

Sample ID: 22B0885-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Cyanide	0.008	0.005	0.001	mg/L	1		121,4500CN-CE	2/17/22	2/17/22 9:47	AAL

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Sample Extraction Data

Prep Method: SW-846 3510C **Analytical Method: 608.3**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301406	900	5.00	02/17/22

Prep Method: SW-846 5030B **Analytical Method: 624.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301318	5	5.00	02/16/22

Prep Method: SW-846 3510C **Analytical Method: 625.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301300	955	1.00	02/16/22

Prep Method: SW-846 3510C **Analytical Method: 625.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301628	955	1.00	02/16/22

EPA 1664B

Lab Number [Field ID]	Batch	Initial [mL]	Date
22B0885-02 [TP-GW3]	B301493	250	02/18/22

Prep Method: EPA 200.7 **Analytical Method: EPA 200.7**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301798	50.0	50.0	02/22/22

Prep Method: EPA 200.7 Dissolved **Analytical Method: EPA 200.7**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301897	50.0	50.0	02/23/22

Prep Method: EPA 200.8 **Analytical Method: EPA 200.8**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301835	50.0	50.0	02/22/22

Prep Method: EPA 200.8 Dissolved **Analytical Method: EPA 200.8**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301898	50.0	50.0	02/23/22

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Sample Extraction Data

Prep Method: EPA 200.8 Dissolved **Analytical Method: EPA 200.8**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02RE1 [TP-GW3]	B302248	50.0	50.0	03/01/22

Prep Method: EPA 245.1 **Analytical Method: EPA 245.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301586	10.0	10.0	02/19/22

Prep Method: EPA 245.1 Dissolved **Analytical Method: EPA 245.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301587	10.0	10.0	02/19/22

EPA 350.1

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301537	50.0	50.0	02/18/22

SM21-23 2540D

Lab Number [Field ID]	Batch	Initial [mL]	Date
22B0885-02 [TP-GW3]	B301296	35.0	02/16/22

SM21-23 3500 Cr B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0885-02 [TP-GW3]	B301284	50.0	50.0	02/15/22

Prep Method: EPA 200.8 **Analytical Method: Tri Chrome Calc.**

Lab Number [Field ID]	Batch	Initial [mL]	Date
22B0885-02 [TP-GW3]	B301835	50.0	02/22/22

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B301318 - SW-846 5030B												
Blank (B301318-BLK1)				Prepared & Analyzed: 02/16/22								
Acetone	ND	50.0	µg/L								L-04	
Benzene	ND	1.00	µg/L									
tert-Butyl Alcohol (TBA)	ND	20.0	µg/L									
1,2-Dichlorobenzene	ND	2.00	µg/L									
1,3-Dichlorobenzene	ND	2.00	µg/L									
1,4-Dichlorobenzene	ND	2.00	µg/L									
1,2-Dichloroethane	ND	2.00	µg/L									
cis-1,2-Dichloroethylene	ND	1.00	µg/L									
1,1-Dichloroethane	ND	2.00	µg/L									
1,1-Dichloroethylene	ND	2.00	µg/L									
1,4-Dioxane	ND	50.0	µg/L									
Ethanol	ND	50.0	µg/L									
Ethylbenzene	ND	2.00	µg/L									
Methyl tert-Butyl Ether (MTBE)	ND	2.00	µg/L									
Methylene Chloride	ND	5.00	µg/L									
Tetrachloroethylene	ND	2.00	µg/L									
Toluene	ND	1.00	µg/L									
1,1,1-Trichloroethane	ND	2.00	µg/L									
1,1,2-Trichloroethane	ND	2.00	µg/L									
Trichloroethylene	ND	2.00	µg/L									
Xylenes (total)	ND	3.00	µg/L									
Vinyl Chloride	ND	2.00	µg/L									
m+p Xylene	ND	2.00	µg/L									
o-Xylene	ND	1.00	µg/L									
Surrogate: 1,2-Dichloroethane-d4	*23.2*		µg/L	25.0		92.6		70-130				
Surrogate: Toluene-d8	*25.6*		µg/L	25.0		102		70-130				
Surrogate: 4-Bromofluorobenzene	*24.7*		µg/L	25.0		98.6		70-130				
LCS (B301318-BS1)				Prepared & Analyzed: 02/16/22								
Acetone	140	50.0	µg/L	200		**68.7**	*	70-160			L-04	†
Benzene	19	1.00	µg/L	20.0		97.4		65-135				
tert-Butyl Alcohol (TBA)	140	20.0	µg/L	200		68.1		40-160				†
1,2-Dichlorobenzene	22	2.00	µg/L	20.0		110		65-135				
1,3-Dichlorobenzene	23	2.00	µg/L	20.0		114		70-130				
1,4-Dichlorobenzene	21	2.00	µg/L	20.0		105		65-135				
1,2-Dichloroethane	18	2.00	µg/L	20.0		88.3		70-130				
cis-1,2-Dichloroethylene	19	1.00	µg/L	20.0		94.0		70-130				
1,1-Dichloroethane	19	2.00	µg/L	20.0		94.2		70-130				
1,1-Dichloroethylene	16	2.00	µg/L	20.0		82.4		50-150				
1,4-Dioxane	150	50.0	µg/L	200		75.3		40-130				†
Ethanol	140	50.0	µg/L	200		68.2		40-160				
Ethylbenzene	21	2.00	µg/L	20.0		106		60-140				
Methyl tert-Butyl Ether (MTBE)	20	2.00	µg/L	20.0		97.6		70-130				
Methylene Chloride	16	5.00	µg/L	20.0		82.2		60-140				
Tetrachloroethylene	21	2.00	µg/L	20.0		104		70-130				
Toluene	21	1.00	µg/L	20.0		104		70-130				
1,1,1-Trichloroethane	20	2.00	µg/L	20.0		97.5		70-130				
1,1,2-Trichloroethane	22	2.00	µg/L	20.0		109		70-130				
Trichloroethylene	20	2.00	µg/L	20.0		101		65-135				
Vinyl Chloride	14	2.00	µg/L	20.0		71.8		5-195				
m+p Xylene	42	2.00	µg/L	40.0		105		70-130				
o-Xylene	22	1.00	µg/L	20.0		110		70-130				

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes	
Batch B301318 - SW-846 5030B												
LCS (B301318-BS1)				Prepared & Analyzed: 02/16/22								
Surrogate: 1,2-Dichloroethane-d4	*22.5*		µg/L	25.0		90.1		70-130				
Surrogate: Toluene-d8	*26.1*		µg/L	25.0		104		70-130				
Surrogate: 4-Bromofluorobenzene	*25.2*		µg/L	25.0		101		70-130				
LCS Dup (B301318-BSD1)				Prepared & Analyzed: 02/16/22								
Acetone	140	50.0	µg/L	200		**67.9**	*	70-160	1.13	25	L-04	†
Benzene	19	1.00	µg/L	20.0		95.4		65-135	2.08	20		
tert-Butyl Alcohol (TBA)	140	20.0	µg/L	200		69.3		40-160	1.86	25		†
1,2-Dichlorobenzene	22	2.00	µg/L	20.0		110		65-135	0.318	20		
1,3-Dichlorobenzene	22	2.00	µg/L	20.0		111		70-130	2.45	20		
1,4-Dichlorobenzene	21	2.00	µg/L	20.0		106		65-135	0.903	20		
1,2-Dichloroethane	17	2.00	µg/L	20.0		84.6		70-130	4.34	20		
cis-1,2-Dichloroethylene	19	1.00	µg/L	20.0		93.6		70-130	0.480	25		
1,1-Dichloroethane	19	2.00	µg/L	20.0		92.6		70-130	1.61	20		
1,1-Dichloroethylene	16	2.00	µg/L	20.0		81.8		50-150	0.792	20		
1,4-Dioxane	150	50.0	µg/L	200		75.9		40-130	0.814	50		† ‡
Ethanol	130	50.0	µg/L	200		66.4		40-160	2.67	25		
Ethylbenzene	20	2.00	µg/L	20.0		102		60-140	3.08	20		
Methyl tert-Butyl Ether (MTBE)	19	2.00	µg/L	20.0		96.8		70-130	0.823	20		
Methylene Chloride	16	5.00	µg/L	20.0		80.4		60-140	2.27	20		
Tetrachloroethylene	20	2.00	µg/L	20.0		98.8		70-130	5.22	20		
Toluene	20	1.00	µg/L	20.0		100		70-130	3.77	20		
1,1,1-Trichloroethane	19	2.00	µg/L	20.0		96.2		70-130	1.34	20		
1,1,2-Trichloroethane	20	2.00	µg/L	20.0		102		70-130	6.20	20		
Trichloroethylene	19	2.00	µg/L	20.0		97.2		65-135	3.98	20		
Vinyl Chloride	14	2.00	µg/L	20.0		71.2		5-195	0.770	20		
m+p Xylene	41	2.00	µg/L	40.0		102		70-130	2.60	25		
o-Xylene	21	1.00	µg/L	20.0		106		70-130	3.30	20		
Surrogate: 1,2-Dichloroethane-d4	*22.6*		µg/L	25.0		90.4		70-130				
Surrogate: Toluene-d8	*25.5*		µg/L	25.0		102		70-130				
Surrogate: 4-Bromofluorobenzene	*24.8*		µg/L	25.0		99.3		70-130				

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301628 - SW-846 3510C										
Blank (B301628-BLK1)				Prepared: 02/16/22 Analyzed: 02/21/22						
Acenaphthene (SIM)	0.021	0.30	µg/L							J, B-05
Acenaphthylene (SIM)	0.022	0.30	µg/L							J, B
Anthracene (SIM)	ND	0.20	µg/L							
Benzo(a)anthracene (SIM)	ND	0.050	µg/L							
Benzo(a)pyrene (SIM)	ND	0.10	µg/L							
Benzo(b)fluoranthene (SIM)	ND	0.050	µg/L							
Benzo(g,h,i)perylene (SIM)	ND	0.50	µg/L							
Benzo(k)fluoranthene (SIM)	ND	0.20	µg/L							
Bis(2-ethylhexyl)phthalate (SIM)	ND	1.0	µg/L							
Chrysene (SIM)	ND	0.20	µg/L							
Dibenz(a,h)anthracene (SIM)	ND	0.10	µg/L							
Fluoranthene (SIM)	ND	0.50	µg/L							
Fluorene (SIM)	0.017	1.0	µg/L							J, B-05
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.10	µg/L							
Naphthalene (SIM)	0.087	1.0	µg/L							J, B-05
Pentachlorophenol (SIM)	ND	1.0	µg/L							
Phenanthrene (SIM)	ND	0.050	µg/L							
Pyrene (SIM)	ND	1.0	µg/L							
Surrogate: 2-Fluorophenol (SIM)	*86.9*		µg/L	200		43.4	15-110			
Surrogate: Phenol-d6 (SIM)	*76.5*		µg/L	200		38.2	15-110			
Surrogate: Nitrobenzene-d5	*95.9*		µg/L	100		95.9	30-130			
Surrogate: 2-Fluorobiphenyl	*78.8*		µg/L	100		78.8	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*208*		µg/L	200		104	15-110			
Surrogate: p-Terphenyl-d14	*121*		µg/L	100		121	30-130			
LCS (B301628-BS1)				Prepared: 02/16/22 Analyzed: 02/21/22						
Acenaphthene (SIM)	36.7	6.0	µg/L	50.0		73.3	47-145			
Acenaphthylene (SIM)	39.1	6.0	µg/L	50.0		78.2	33-145			
Anthracene (SIM)	39.9	4.0	µg/L	50.0		79.8	27-133			
Benzo(a)anthracene (SIM)	39.4	1.0	µg/L	50.0		78.8	33-143			
Benzo(a)pyrene (SIM)	39.7	2.0	µg/L	50.0		79.3	17-163			
Benzo(b)fluoranthene (SIM)	41.7	1.0	µg/L	50.0		83.3	24-159			
Benzo(g,h,i)perylene (SIM)	38.1	10	µg/L	50.0		76.3	10-219			
Benzo(k)fluoranthene (SIM)	45.5	4.0	µg/L	50.0		90.9	11-162			
Bis(2-ethylhexyl)phthalate (SIM)	52.3	20	µg/L	50.0		105	8-158			
Chrysene (SIM)	36.4	4.0	µg/L	50.0		72.8	17-168			
Dibenz(a,h)anthracene (SIM)	38.2	2.0	µg/L	50.0		76.4	10-227			
Fluoranthene (SIM)	37.3	10	µg/L	50.0		74.5	26-137			
Fluorene (SIM)	39.9	20	µg/L	50.0		79.7	59-121			
Indeno(1,2,3-cd)pyrene (SIM)	35.3	2.0	µg/L	50.0		70.6	10-171			
Naphthalene (SIM)	34.8	20	µg/L	50.0		69.5	21-133			
Pentachlorophenol (SIM)	41.4	20	µg/L	50.0		82.8	14-176			
Phenanthrene (SIM)	37.8	1.0	µg/L	50.0		75.6	54-120			
Pyrene (SIM)	36.7	20	µg/L	50.0		73.3	52-120			
Surrogate: 2-Fluorophenol (SIM)	*80.8*		µg/L	200		40.4	15-110			
Surrogate: Phenol-d6 (SIM)	*74.8*		µg/L	200		37.4	15-110			
Surrogate: Nitrobenzene-d5	*71.2*		µg/L	100		71.2	30-130			
Surrogate: 2-Fluorobiphenyl	*71.0*		µg/L	100		71.0	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*170*		µg/L	200		85.2	15-110			
Surrogate: p-Terphenyl-d14	*94.2*		µg/L	100		94.2	30-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301628 - SW-846 3510C										
LCS Dup (B301628-BSD1)				Prepared: 02/16/22 Analyzed: 02/21/22						
Acenaphthene (SIM)	33.3	6.0	µg/L	50.0		66.6	47-145	9.67	48	
Acenaphthylene (SIM)	35.7	6.0	µg/L	50.0		71.4	33-145	9.14	74	
Anthracene (SIM)	35.9	4.0	µg/L	50.0		71.8	27-133	10.6	66	
Benzo(a)anthracene (SIM)	35.9	1.0	µg/L	50.0		71.8	33-143	9.29	53	
Benzo(a)pyrene (SIM)	36.3	2.0	µg/L	50.0		72.7	17-163	8.74	72	
Benzo(b)fluoranthene (SIM)	38.3	1.0	µg/L	50.0		76.6	24-159	8.35	71	
Benzo(g,h,i)perylene (SIM)	36.2	10	µg/L	50.0		72.3	10-219	5.33	97	
Benzo(k)fluoranthene (SIM)	41.6	4.0	µg/L	50.0		83.2	11-162	8.92	63	
Bis(2-ethylhexyl)phthalate (SIM)	45.1	20	µg/L	50.0		90.2	8-158	14.9	82	
Chrysene (SIM)	32.9	4.0	µg/L	50.0		65.8	17-168	9.99	87	
Dibenz(a,h)anthracene (SIM)	35.9	2.0	µg/L	50.0		71.8	10-227	6.20	126	
Fluoranthene (SIM)	32.7	10	µg/L	50.0		65.4	26-137	13.0	66	
Fluorene (SIM)	35.6	20	µg/L	50.0		71.2	59-121	11.3	38	
Indeno(1,2,3-cd)pyrene (SIM)	33.4	2.0	µg/L	50.0		66.8	10-171	5.65	99	
Naphthalene (SIM)	30.7	20	µg/L	50.0		61.4	21-133	12.3	65	
Pentachlorophenol (SIM)	41.0	20	µg/L	50.0		82.0	14-176	1.02	86	
Phenanthrene (SIM)	34.1	1.0	µg/L	50.0		68.2	54-120	10.2	39	
Pyrene (SIM)	33.9	20	µg/L	50.0		67.7	52-120	7.94	49	
Surrogate: 2-Fluorophenol (SIM)	*69.9*		µg/L	200		34.9	15-110			
Surrogate: Phenol-d6 (SIM)	*66.2*		µg/L	200		33.1	15-110			
Surrogate: Nitrobenzene-d5	*70.7*		µg/L	100		70.7	30-130			
Surrogate: 2-Fluorobiphenyl	*71.7*		µg/L	100		71.7	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*152*		µg/L	200		76.0	15-110			
Surrogate: p-Terphenyl-d14	*85.2*		µg/L	100		85.2	30-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by - GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301300 - SW-846 3510C										
Blank (B301300-BLK1)				Prepared: 02/16/22 Analyzed: 02/18/22						
Butylbenzylphthalate	ND	10.0	µg/L							
Di-n-butylphthalate	ND	10.0	µg/L							
Diethylphthalate	ND	10.0	µg/L							
Dimethylphthalate	ND	10.0	µg/L							
Di-n-octylphthalate	ND	10.0	µg/L							
Bis(2-Ethylhexyl)phthalate	ND	10.0	µg/L							
Surrogate: 2-Fluorophenol	*102*		µg/L	200		51.0	15-110			
Surrogate: Phenol-d6	*71.2*		µg/L	200		35.6	15-110			
Surrogate: Nitrobenzene-d5	*64.1*		µg/L	100		64.1	30-130			
Surrogate: 2-Fluorobiphenyl	*78.0*		µg/L	100		78.0	30-130			
Surrogate: 2,4,6-Tribromophenol	*160*		µg/L	200		79.9	15-110			
Surrogate: p-Terphenyl-d14	*80.0*		µg/L	100		80.0	30-130			
LCS (B301300-BS1)				Prepared: 02/16/22 Analyzed: 02/18/22						
Butylbenzylphthalate	36.6	10.0	µg/L	50.0		73.1	10-152			
Di-n-butylphthalate	33.5	10.0	µg/L	50.0		67.0	10-120			
Diethylphthalate	34.6	10.0	µg/L	50.0		69.3	10-120			
Dimethylphthalate	36.7	10.0	µg/L	50.0		73.4	10-120			
Di-n-octylphthalate	31.4	10.0	µg/L	50.0		62.8	4-146			
Bis(2-Ethylhexyl)phthalate	35.6	10.0	µg/L	50.0		71.2	8-158			
Surrogate: 2-Fluorophenol	*107*		µg/L	200		53.5	15-110			
Surrogate: Phenol-d6	*75.6*		µg/L	200		37.8	15-110			
Surrogate: Nitrobenzene-d5	*68.0*		µg/L	100		68.0	30-130			
Surrogate: 2-Fluorobiphenyl	*81.0*		µg/L	100		81.0	30-130			
Surrogate: 2,4,6-Tribromophenol	*172*		µg/L	200		85.9	15-110			
Surrogate: p-Terphenyl-d14	*83.8*		µg/L	100		83.8	30-130			
LCS Dup (B301300-BSD1)				Prepared: 02/16/22 Analyzed: 02/18/22						
Butylbenzylphthalate	35.2	10.0	µg/L	50.0		70.5	10-152	3.65	60	
Di-n-butylphthalate	33.3	10.0	µg/L	50.0		66.7	10-120	0.538	47	
Diethylphthalate	34.3	10.0	µg/L	50.0		68.6	10-120	1.04	100	
Dimethylphthalate	36.0	10.0	µg/L	50.0		71.9	10-120	2.09	183	
Di-n-octylphthalate	30.6	10.0	µg/L	50.0		61.3	4-146	2.48	69	
Bis(2-Ethylhexyl)phthalate	33.8	10.0	µg/L	50.0		67.5	8-158	5.33	82	
Surrogate: 2-Fluorophenol	*102*		µg/L	200		50.8	15-110			
Surrogate: Phenol-d6	*73.9*		µg/L	200		37.0	15-110			
Surrogate: Nitrobenzene-d5	*66.4*		µg/L	100		66.4	30-130			
Surrogate: 2-Fluorobiphenyl	*78.5*		µg/L	100		78.5	30-130			
Surrogate: 2,4,6-Tribromophenol	*171*		µg/L	200		85.6	15-110			
Surrogate: p-Terphenyl-d14	*78.8*		µg/L	100		78.8	30-130			

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QUALITY CONTROL

Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301406 - SW-846 3510C										
Blank (B301406-BLK1)				Prepared: 02/17/22 Analyzed: 02/19/22						
Aroclor-1016	ND	0.100	µg/L							
Aroclor-1016 [2C]	ND	0.100	µg/L							
Aroclor-1221	ND	0.100	µg/L							
Aroclor-1221 [2C]	ND	0.100	µg/L							
Aroclor-1232	ND	0.100	µg/L							
Aroclor-1232 [2C]	ND	0.100	µg/L							
Aroclor-1242	ND	0.100	µg/L							
Aroclor-1242 [2C]	ND	0.100	µg/L							
Aroclor-1248	ND	0.100	µg/L							
Aroclor-1248 [2C]	ND	0.100	µg/L							
Aroclor-1254	ND	0.100	µg/L							
Aroclor-1254 [2C]	ND	0.100	µg/L							
Aroclor-1260	ND	0.100	µg/L							
Aroclor-1260 [2C]	ND	0.100	µg/L							
Surrogate: Decachlorobiphenyl	*0.940*		µg/L	2.00		47.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.930*		µg/L	2.00		46.5	30-150			
Surrogate: Tetrachloro-m-xylene	*1.45*		µg/L	2.00		72.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.41*		µg/L	2.00		70.4	30-150			
LCS (B301406-BS1)				Prepared: 02/17/22 Analyzed: 02/19/22						
Aroclor-1016	0.409	0.200	µg/L	0.500		81.7	50-140			
Aroclor-1016 [2C]	0.422	0.200	µg/L	0.500		84.4	50-140			
Aroclor-1260	0.401	0.200	µg/L	0.500		80.1	8-140			
Aroclor-1260 [2C]	0.403	0.200	µg/L	0.500		80.5	8-140			
Surrogate: Decachlorobiphenyl	*1.78*		µg/L	2.00		89.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.76*		µg/L	2.00		88.1	30-150			
Surrogate: Tetrachloro-m-xylene	*1.67*		µg/L	2.00		83.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.67*		µg/L	2.00		83.4	30-150			
LCS Dup (B301406-BSD1)				Prepared: 02/17/22 Analyzed: 02/19/22						
Aroclor-1016	0.364	0.200	µg/L	0.500		72.8	50-140	11.5		
Aroclor-1016 [2C]	0.382	0.200	µg/L	0.500		76.4	50-140	9.98		
Aroclor-1260	0.371	0.200	µg/L	0.500		74.3	8-140	7.60		
Aroclor-1260 [2C]	0.374	0.200	µg/L	0.500		74.8	8-140	7.32		
Surrogate: Decachlorobiphenyl	*1.49*		µg/L	2.00		74.7	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.51*		µg/L	2.00		75.4	30-150			
Surrogate: Tetrachloro-m-xylene	*1.44*		µg/L	2.00		71.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.44*		µg/L	2.00		72.1	30-150			
Matrix Spike (B301406-MS1)	**Source: 22B0885-02**			Prepared: 02/17/22 Analyzed: 02/19/22						
Aroclor-1016	0.413	0.211	µg/L	0.526	ND	78.4	50-140			
Aroclor-1016 [2C]	0.429	0.211	µg/L	0.526	ND	81.5	50-140			
Aroclor-1260	0.397	0.211	µg/L	0.526	ND	75.5	8-140			
Aroclor-1260 [2C]	0.394	0.211	µg/L	0.526	ND	75.0	8-140			
Surrogate: Decachlorobiphenyl	*1.60*		µg/L	2.11		75.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.56*		µg/L	2.11		74.3	30-150			
Surrogate: Tetrachloro-m-xylene	*1.63*		µg/L	2.11		77.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.59*		µg/L	2.11		75.7	30-150			

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QUALITY CONTROL

Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301406 - SW-846 3510C										
Matrix Spike Dup (B301406-MSD1)		**Source: 22B0885-02**		Prepared: 02/17/22 Analyzed: 02/19/22						
Aroclor-1016	0.423	0.217	µg/L	0.543	ND	77.9	50-140	2.54	36	
Aroclor-1016 [2C]	0.443	0.217	µg/L	0.543	ND	81.6	50-140	3.27	36	
Aroclor-1260	0.412	0.217	µg/L	0.543	ND	75.9	8-140	3.71	38	
Aroclor-1260 [2C]	0.409	0.217	µg/L	0.543	ND	75.2	8-140	3.59	38	
Surrogate: Decachlorobiphenyl	*1.69*		µg/L	2.17		77.7	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.66*		µg/L	2.17		76.2	30-150			
Surrogate: Tetrachloro-m-xylene	*1.71*		µg/L	2.17		78.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.66*		µg/L	2.17		76.4	30-150			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301586 - EPA 245.1										
Blank (B301586-BLK1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	ND	0.00010	mg/L							
LCS (B301586-BS1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	0.00405	0.00010	mg/L	0.00402		101	85-115			
LCS Dup (B301586-BSD1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	0.00402	0.00010	mg/L	0.00402		100	85-115	0.592	20	
Batch B301798 - EPA 200.7										
Blank (B301798-BLK1)				Prepared: 02/22/22 Analyzed: 02/26/22						
Iron	ND	0.050	mg/L							
LCS (B301798-BS1)				Prepared: 02/22/22 Analyzed: 02/26/22						
Iron	4.13	0.050	mg/L	4.00		103	85-115			
LCS Dup (B301798-BSD1)				Prepared: 02/22/22 Analyzed: 02/26/22						
Iron	4.18	0.050	mg/L	4.00		105	85-115	1.19	20	
Batch B301835 - EPA 200.8										
Blank (B301835-BLK1)				Prepared: 02/23/22 Analyzed: 02/24/22						
Antimony	ND	1.0	µg/L							
Arsenic	ND	0.80	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	1.0	µg/L							
Copper	ND	1.0	µg/L							
Lead	ND	0.50	µg/L							
Nickel	ND	5.0	µg/L							
Selenium	ND	5.0	µg/L							
Silver	ND	0.20	µg/L							
Zinc	ND	10	µg/L							
LCS (B301835-BS1)				Prepared: 02/23/22 Analyzed: 02/24/22						
Antimony	551	10	µg/L	500		110	85-115			
Arsenic	526	8.0	µg/L	500		105	85-115			
Cadmium	515	2.0	µg/L	500		103	85-115			
Chromium	527	10	µg/L	500		105	85-115			
Copper	997	10	µg/L	1000		99.7	85-115			
Lead	514	5.0	µg/L	500		103	85-115			
Nickel	497	50	µg/L	500		99.3	85-115			
Selenium	506	50	µg/L	500		101	85-115			
Silver	485	2.0	µg/L	500		97.0	85-115			
Zinc	994	100	µg/L	1000		99.4	85-115			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301835 - EPA 200.8										
LCS Dup (B301835-BSD1)				Prepared: 02/23/22 Analyzed: 02/24/22						
Antimony	538	10	µg/L	500		108	85-115	2.30	20	
Arsenic	514	8.0	µg/L	500		103	85-115	2.33	20	
Cadmium	504	2.0	µg/L	500		101	85-115	2.30	20	
Chromium	511	10	µg/L	500		102	85-115	3.02	20	
Copper	970	10	µg/L	1000		97.0	85-115	2.74	20	
Lead	508	5.0	µg/L	500		102	85-115	1.22	20	
Nickel	480	50	µg/L	500		96.0	85-115	3.36	20	
Selenium	494	50	µg/L	500		98.8	85-115	2.40	20	
Silver	458	2.0	µg/L	500		91.5	85-115	5.85	20	
Zinc	976	100	µg/L	1000		97.6	85-115	1.91	20	

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QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301587 - EPA 245.1 Dissolved										
Blank (B301587-BLK1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	ND	0.00010	mg/L							
LCS (B301587-BS1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	0.00407	0.00010	mg/L	0.00402		101	85-115			
LCS Dup (B301587-BSD1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	0.00426	0.00010	mg/L	0.00402		106	85-115	4.67	20	
Batch B301897 - EPA 200.7 Dissolved										
Blank (B301897-BLK1)				Prepared: 02/23/22 Analyzed: 02/25/22						
Iron	ND	0.050	mg/L							
LCS (B301897-BS1)				Prepared: 02/23/22 Analyzed: 02/25/22						
Iron	4.07	0.050	mg/L	4.00		102	85-115			
LCS Dup (B301897-BSD1)				Prepared: 02/23/22 Analyzed: 02/25/22						
Iron	3.98	0.050	mg/L	4.00		99.5	85-115	2.23	20	
Batch B301898 - EPA 200.8 Dissolved										
Blank (B301898-BLK1)				Prepared: 02/23/22 Analyzed: 02/27/22						
Antimony	ND	1.0	µg/L							
Arsenic	ND	0.80	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	1.0	µg/L							
Copper	ND	1.0	µg/L							
Lead	ND	0.50	µg/L							
Nickel	ND	5.0	µg/L							
Selenium	ND	5.0	µg/L							
Zinc	ND	10	µg/L							
LCS (B301898-BS1)				Prepared: 02/23/22 Analyzed: 02/27/22						
Antimony	518	10	µg/L	500		104	85-115			
Arsenic	461	8.0	µg/L	500		92.2	85-115			
Cadmium	466	2.0	µg/L	500		93.3	85-115			
Chromium	487	10	µg/L	500		97.5	85-115			
Copper	937	10	µg/L	1000		93.7	85-115			
Lead	479	5.0	µg/L	500		95.8	85-115			
Nickel	479	50	µg/L	500		95.8	85-115			
Selenium	433	50	µg/L	500		86.6	85-115			
Zinc	947	100	µg/L	1000		94.7	85-115			

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QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B301898 - EPA 200.8 Dissolved											
LCS Dup (B301898-BSD1)				Prepared: 02/23/22 Analyzed: 02/27/22							
Antimony	502	10	µg/L	500		100		85-115	3.15	20	
Arsenic	426	8.0	µg/L	500		85.3		85-115	7.83	20	
Cadmium	431	2.0	µg/L	500		86.1		85-115	7.94	20	
Chromium	449	10	µg/L	500		89.8		85-115	8.21	20	
Copper	871	10	µg/L	1000		87.1		85-115	7.29	20	
Lead	442	5.0	µg/L	500		88.5		85-115	7.95	20	
Nickel	443	50	µg/L	500		88.6		85-115	7.77	20	
Selenium	402	50	µg/L	500		**80.3**	*	85-115	7.49	20	L-07
Zinc	925	100	µg/L	1000		92.5		85-115	2.33	20	
Batch B302248 - EPA 200.8 Dissolved											
Blank (B302248-BLK1)				Prepared: 03/01/22 Analyzed: 03/02/22							
Silver	ND	0.20	µg/L								
LCS (B302248-BS1)				Prepared: 03/01/22 Analyzed: 03/02/22							
Silver	499	2.0	µg/L	500		99.8		85-115			
LCS Dup (B302248-BSD1)				Prepared: 03/01/22 Analyzed: 03/02/22							
Silver	493	2.0	µg/L	500		98.5		85-115	1.25	20	

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301284 - SM21-23 3500 Cr B										
Blank (B301284-BLK1)				Prepared & Analyzed: 02/15/22						
Hexavalent Chromium	ND	0.010	mg/L							
LCS (B301284-BS1)				Prepared & Analyzed: 02/15/22						
Hexavalent Chromium	0.11	0.010	mg/L	0.100		106	90-114			
LCS Dup (B301284-BSD1)				Prepared & Analyzed: 02/15/22						
Hexavalent Chromium	0.11	0.010	mg/L	0.100		109	90-114	2.39	5	
Matrix Spike (B301284-MS1)	**Source: 22B0885-02**			Prepared & Analyzed: 02/15/22						
Hexavalent Chromium	0.095	0.010	mg/L	0.100	0.0032	91.5	60.5-130			H-03
Matrix Spike Dup (B301284-MSD1)	**Source: 22B0885-02**			Prepared & Analyzed: 02/15/22						
Hexavalent Chromium	0.092	0.010	mg/L	0.100	0.0032	88.9	60.5-130	2.76	7.53	H-03
Batch B301296 - SM21-23 2540D										
Blank (B301296-BLK1)				Prepared & Analyzed: 02/16/22						
Total Suspended Solids	ND	2.5	mg/L							
LCS (B301296-BS1)				Prepared & Analyzed: 02/16/22						
Total Suspended Solids	189		mg/L	200		94.5	53.8-124			
Batch B301493 - EPA 1664B										
Blank (B301493-BLK1)				Prepared & Analyzed: 02/18/22						
Silica Gel Treated HEM (SGT-HEM)	ND	1.4	mg/L							
Blank (B301493-BLK2)				Prepared & Analyzed: 02/18/22						
Silica Gel Treated HEM (SGT-HEM)	ND	5.6	mg/L							
LCS (B301493-BS1)				Prepared & Analyzed: 02/18/22						
Silica Gel Treated HEM (SGT-HEM)	8.7	1.4	mg/L	10.0		87.0	64-132			
LCS (B301493-BS2)				Prepared & Analyzed: 02/18/22						
Silica Gel Treated HEM (SGT-HEM)	34	5.6	mg/L	40.0		84.0	64-132			
Duplicate (B301493-DUP1)	**Source: 22B0885-02**			Prepared & Analyzed: 02/18/22						
Silica Gel Treated HEM (SGT-HEM)	ND	5.6	mg/L		ND			NC	18	
Batch B301537 - EPA 350.1										
Blank (B301537-BLK1)				Prepared & Analyzed: 02/18/22						
Ammonia as N	ND	0.10	mg/L							

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B301537 - EPA 350.1											
LCS (B301537-BS1)				Prepared & Analyzed: 02/18/22							
Ammonia as N	1.9	0.10	mg/L	2.00		96.2		90-110			
LCS Dup (B301537-BSD1)				Prepared & Analyzed: 02/18/22							
Ammonia as N	1.9	0.10	mg/L	2.00		95.4		90-110	0.887	20	
Matrix Spike (B301537-MS1)	**Source: 22B0885-02**			Prepared & Analyzed: 02/18/22							
Ammonia as N	1.8	0.10	mg/L	2.00	ND	**89.2**	*	90-110			MS-07

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

LCS

Lab Sample ID: B301406-BS1

Date(s) Analyzed: 02/19/2022 02/19/2022

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.409	
	2	0.000	0.000	0.000	0.422	2.9
Aroclor-1260	1	0.000	0.000	0.000	0.401	
	2	0.000	0.000	0.000	0.403	0.7

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

LCS Dup

Lab Sample ID: B301406-BSD1 Date(s) Analyzed: 02/19/2022 02/19/2022

Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.364	
	2	0.000	0.000	0.000	0.382	5.9
Aroclor-1260	1	0.000	0.000	0.000	0.371	
	2	0.000	0.000	0.000	0.374	1.1

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

Matrix Spike

Lab Sample ID: B301406-MS1 Date(s) Analyzed: 02/19/2022 02/19/2022

Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.413	
	2	0.000	0.000	0.000	0.429	4.5
Aroclor-1260	1	0.000	0.000	0.000	0.397	
	2	0.000	0.000	0.000	0.394	1.5

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

Matrix Spike Dup

Lab Sample ID: B301406-MSD1

Date(s) Analyzed: 02/19/2022 02/19/2022

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.423	
	2	0.000	0.000	0.000	0.443	5.3
Aroclor-1260	1	0.000	0.000	0.000	0.412	
	2	0.000	0.000	0.000	0.409	0.2

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
B	Analyte is found in the associated laboratory blank as well as in the sample.
B-05	Data is not affected by elevated level in laboratory blank since sample(s) result is "Not Detected".
H-03	Sample received after recommended holding time was exceeded.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-04	Laboratory fortified blank/laboratory control sample recovery and duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the low side.
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
MS-07	Matrix spike recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.Possibility of sample matrix effects that lead to low bias for reported result or non-homogeneous sample aliquot cannot be eliminated.
V-04	Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
V-35	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
- in Water	
Cyanide	CT,MA,NH,NY,RI,NC,ME,VA
608.3 in Water	
Aroclor-1016	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1016 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1221	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1221 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1232	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1232 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1242	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1242 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1248	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1248 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1254	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1254 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1260	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1260 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
624.1 in Water	
Acetone	CT,NY,MA,NH
Benzene	CT,NY,MA,NH,RI,NC,ME,VA
tert-Butyl Alcohol (TBA)	NY,MA
1,2-Dichlorobenzene	CT,NY,MA,NH,RI,NC,ME,VA
1,3-Dichlorobenzene	CT,NY,MA,NH,RI,NC,ME,VA
1,4-Dichlorobenzene	CT,NY,MA,NH,RI,NC,ME,VA
1,2-Dichloroethane	CT,NY,MA,NH,RI,NC,ME,VA
cis-1,2-Dichloroethylene	NY,MA
1,1-Dichloroethane	CT,NY,MA,NH,RI,NC,ME,VA
1,1-Dichloroethylene	CT,NY,MA,NH,RI,NC,ME,VA
1,4-Dioxane	MA
Ethanol	NY,MA,NH
Ethylbenzene	CT,NY,MA,NH,RI,NC,ME,VA
Methyl tert-Butyl Ether (MTBE)	NY,MA,NH,NC
Methylene Chloride	CT,NY,MA,NH,RI,NC,ME,VA
Tetrachloroethylene	CT,NY,MA,NH,RI,NC,ME,VA
Toluene	CT,NY,MA,NH,RI,NC,ME,VA
1,1,1-Trichloroethane	CT,NY,MA,NH,RI,NC,ME,VA
1,1,2-Trichloroethane	CT,NY,MA,NH,RI,NC,ME,VA
Trichloroethylene	CT,NY,MA,NH,RI,NC,ME,VA
Xylenes (total)	NY,MA,NH,VA
Vinyl Chloride	CT,NY,MA,NH,RI,NC,ME,VA
m+p Xylene	CT,NY,MA,NH,RI,NC
o-Xylene	CT,NY,MA,NH,RI,NC
625.1 in Water	
Butylbenzylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
Di-n-butylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
1,3-Dichlorobenzene	MA,NC
1,4-Dichlorobenzene	MA,NC

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
625.1 in Water	
1,2-Dichlorobenzene	MA,NC
Diethylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
Dimethylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
Di-n-octylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
Bis(2-Ethylhexyl)phthalate	CT,MA,NH,NY,NC,RI,ME,VA
2-Fluorophenol	NC
2-Fluorophenol	NC,VA
Phenol-d6	VA
Nitrobenzene-d5	VA
EPA 200.7 in Water	
Iron	CT,MA,NH,NY,RI,NC,ME,VA
Iron	CT,MA,NH,NY,RI,NC,ME,VA
EPA 200.8 in Water	
Antimony	CT,MA,NH,NY,RI,NC,ME,VA
Antimony	CT,MA,NH,NY,RI,NC,ME,VA
Arsenic	CT,MA,NH,NY,RI,NC,ME,VA
Arsenic	CT,MA,NH,NY,RI,NC,ME,VA
Cadmium	CT,MA,NH,NY,RI,NC,ME,VA
Cadmium	CT,MA,NH,NY,RI,NC,ME,VA
Chromium	CT,MA,NH,NY,RI,NC,ME,VA
Chromium	CT,MA,NH,NY,RI,NC,ME,VA
Copper	CT,MA,NH,NY,RI,NC,ME,VA
Copper	CT,MA,NH,NY,RI,NC,ME,VA
Lead	CT,MA,NH,NY,RI,NC,ME,VA
Lead	CT,MA,NH,NY,RI,NC,ME,VA
Nickel	CT,MA,NH,NY,RI,NC,ME,VA
Nickel	CT,MA,NH,NY,RI,NC,ME,VA
Selenium	CT,MA,NH,NY,RI,NC,ME,VA
Selenium	CT,MA,NH,NY,RI,NC,ME,VA
Silver	CT,MA,NH,NY,RI,NC,ME,VA
Silver	CT,MA,NH,NY,RI,NC,ME,VA
Zinc	CT,MA,NH,NY,RI,NC,ME,VA
Zinc	CT,MA,NH,RI,NY,NC,ME,VA
EPA 245.1 in Water	
Mercury	CT,MA,NH,RI,NY,NC,ME,VA
Mercury	CT,MA,NH,RI,NY,NC,ME,VA
EPA 350.1 in Water	
Ammonia as N	NC,NY,MA,NH,RI,ME,VA
SM21-23 2540D in Water	
Total Suspended Solids	CT,MA,NH,NY,RI,NC,ME,VA
SM21-23 3500 Cr B in Water	
Hexavalent Chromium	NY,CT,NH,RI,ME,VA,NC

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Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2024
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2023
RI	Rhode Island Department of Health	LAO00373	12/30/2022
NC	North Carolina Div. of Water Quality	652	12/31/2022
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2022
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

22B0885

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CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page ____ of ____

Company Name: NMRS
Address: 585 Middlesex St
Phone:
Project Name: Clark School
Project Location: Lawrence MA
Project Number: 960660.200/100
Project Manager: Jeff Brunelle
Pace Quote Name/Number:
Invoice Recipient: AP@nmrsgroup.com
Sampled By: AE

Required Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5day

Rush Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Data Delivery
Format: PDF ☑ EXCEL ☑
Other:
CLP Like Data Pkg Required: ☐
Email To: JBrunelle@nmrsgroup.com
Fax To #:

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1]Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	H	I	N	N	X	I	S	I	I	S
1	NB-101(MW)	2/14/22	1300	G	GW	U	2	10	5			X	X	X	X	X	X	X	X	X	X
2	TP-GW3		1215	1	1	1	2	10	5			X	X	X	X	X	X	X	X	X	X
3	TB-01		800				2					X									

H = VOC 624+Ethanol+MTBE; I = SVOC 625; N = total metals; N = dissolved metals; X = CN SM4500; I = total suspended solids 160.2; S = Ammonia SM4500; I = TP 365.1; I = PCB 8082; S = Oil & Grease (HEM) 1664B

[2] Preservation Code

Courier Use Only
Total Number Of:
VIALS____
GLASS____
PLASTIC____
BACTERIA____
ENCORE____

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time:
	2/15/22 1:50
Received by: (signature)	Date/Time:
	2/15/22 1350
Relinquished by: (signature)	Date/Time:
	2/15/22 1838
Received by: (signature)	Date/Time:
SS	2/15/22 1838
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: Metals Sb, As, Cd, Cr III, Cu, Fe, Pb, Hg, Ni, Se, Ag, Zn EPA 200.8

Lab Comments:

TPH by O+G per RGP and PCBS via 608. JLH 2/16/22

Reporting Limit Requirements
PA
GW1
Other:

Special Requirements
☐ MA MCP Required
☐ MCP Certification Form Required
☐ CT RCP Required
☐ RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Red & Blue Coolers

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Nobis

Received By OK Date 2-15-22 Time 1838

How were the samples received? In Cooler 4 No Cooler ____ On Ice T No Ice ____ Direct from Sampling ____ Ambient ____ Melted Ice ____

Were samples within Temperature? 2-6°C T By Gun # 3 Actual Temp - 5.8

By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T F 2/15/22

Did COC include all pertinent Information? Client T Project T Analysis T ID's T Sampler Name T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? ____

Are there Rushes? F Who was notified? ____

Are there Short Holds? F Who was notified? ____

Is there enough Volume? T

Is there Headspace where applicable? F MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? T On COC? F

Do all samples have the proper pH? Acid T Base T

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	20	1 Liter Plastic	2	16 oz Amb.	
HCL-	10	500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic	8	4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

Hex Chrome past hold.

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March 8, 2022

Jeff Brunelle
Nobis Engineering
585 Middlesex Street
Lowell, MA 01851

Project Location: Lawrence, MA
Client Job Number:
Project Number: 96060.200/100
Laboratory Work Order Number: 22B0961

Enclosed are results of analyses for samples as received by the laboratory on February 16, 2022. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jessica L. Hoffman
Project Manager

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Nobis Engineering
585 Middlesex Street
Lowell, MA 01851
ATTN: Jeff Brunelle

REPORT DATE: 3/8/2022

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 96060.200/100

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 22B0961

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Lawrence, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
NB-2 (MW)	22B0961-01	Ground Water		-	MA M-MA-086/CT PH-0574/NY11148
				121,4500CN-CE	MA M-MA-086/CT PH-0574/NY11148
				608.3	
				624.1	
				625.1	
				EPA 1664B	
				EPA 200.7	
				EPA 200.8	
				EPA 245.1	
				EPA 350.1	
				SM21-23 2540D	
				SM21-23 3500 Cr B	
				Tri Chrome Calc.	
NB-102 (MW)	22B0961-02	Ground Water		-	MA M-MA-086/CT PH-0574/NY11148
				121,4500CN-CE	MA M-MA-086/CT PH-0574/NY11148
				608.3	
				624.1	
				625.1	
				EPA 1664B	
				EPA 200.7	
				EPA 200.8	
				EPA 245.1	
				EPA 350.1	
				SM21-23 2540D	
				SM21-23 3500 Cr B	
				Tri Chrome Calc.	
TB-02	22B0961-03	Ground Water		624.1	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

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624.1

Qualifications:

DL-01

Elevated reporting limits for all volatile compounds due to foaming sample matrix.

Analyte & Samples(s) Qualified:

22B0961-02[NB-102 (MW)]

625.1

Qualifications:

B-05

Data is not affected by elevated level in laboratory blank since sample(s) result is "Not Detected".

Analyte & Samples(s) Qualified:

Benzo(a)anthracene (SIM)
B301624-BLK1

Benzo(b)fluoranthene (SIM)
B301624-BLK1

Benzo(k)fluoranthene (SIM)
B301624-BLK1

Chrysene (SIM)
B301624-BLK1

Naphthalene (SIM)
B301624-BLK1

RL-12

Elevated reporting limit due to matrix interference.

Analyte & Samples(s) Qualified:

22B0961-01[NB-2 (MW)], 22B0961-02[NB-102 (MW)]

S-07

One associated surrogate standard recovery is outside of control limits but the other(s) is/are within limits. All recoveries are > 10%.

Analyte & Samples(s) Qualified:

2,4,6-Tribromophenol
22B0961-01[NB-2 (MW)], B301513-BLK1, B301513-BS1, B301513-MS1, B301513-MSD1

2,4,6-Tribromophenol (SIM)
B301624-BLK1

V-04

Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.

Analyte & Samples(s) Qualified:

Benzidine
S068495-CCV1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Benzidine
S068495-CCV1

V-06

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.

Analyte & Samples(s) Qualified:

Bis(2-ethylhexyl)phthalate (SIM)
S068500-CCV1

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V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:

Bis(2-ethylhexyl)phthalate (SIM)
22B0961-01[NB-2 (MW)]

V-35

Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

Analyte & Samples(s) Qualified:

Benzidine
S068495-CCV1

EPA 200.8

Qualifications:

DL-03

Elevated reporting limit due to matrix interference.

Analyte & Samples(s) Qualified:

Selenium
22B0961-01[NB-2 (MW)], B302336-DUP1

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:

Selenium
B301898-BSD1

SM21-23 3500 Cr B

Qualifications:

H-03

Sample received after recommended holding time was exceeded.

Analyte & Samples(s) Qualified:

Hexavalent Chromium
22B0961-01[NB-2 (MW)]

L-07A

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD outside of control limits. Reduced precision anticipated for any reported result for this compound.

Analyte & Samples(s) Qualified:

Hexavalent Chromium
B301386-BSD1

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Technical Representative

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-2 (MW) | Sampled: 2/14/2022 14:00

Sample ID: 22B0961-01

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	2.67	50.0	2.03	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Benzene	3.34	1.00	0.200	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
tert-Butyl Alcohol (TBA)	<4.69	20.0	4.69	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
1,2-Dichlorobenzene	<0.122	2.00	0.122	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
1,3-Dichlorobenzene	<0.118	2.00	0.118	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
1,4-Dichlorobenzene	<0.130	2.00	0.130	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
1,2-Dichloroethane	<0.308	2.00	0.308	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
cis-1,2-Dichloroethylene	<0.147	1.00	0.147	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
1,1-Dichloroethane	<0.142	2.00	0.142	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
1,1-Dichloroethylene	<0.141	2.00	0.141	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
1,4-Dioxane	<20.6	50.0	20.6	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Ethanol	<26.5	50.0	26.5	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Ethylbenzene	0.740	2.00	0.215	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Methyl tert-Butyl Ether (MTBE)	<0.172	2.00	0.172	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Methylene Chloride	<0.235	5.00	0.235	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Tetrachloroethylene	<0.187	2.00	0.187	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Toluene	<0.224	1.00	0.224	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
1,1,1-Trichloroethane	<0.169	2.00	0.169	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
1,1,2-Trichloroethane	<0.183	2.00	0.183	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Trichloroethylene	<0.189	2.00	0.189	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Xylenes (total)	<	3.00		µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
Vinyl Chloride	<0.208	2.00	0.208	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
m+p Xylene	0.460	2.00	0.459	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF
o-Xylene	0.420	1.00	0.230	µg/L	1		624.1	2/17/22	2/17/22 21:14	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	94.4	70-130		2/17/22 21:14
Toluene-d8	102	70-130		2/17/22 21:14
4-Bromofluorobenzene	97.0	70-130		2/17/22 21:14

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-2 (MW) | Sampled: 2/14/2022 14:00

Sample ID: 22B0961-01

Sample Matrix: Ground Water

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	0.72	3.1	0.20	µg/L	10	J	625.1	2/18/22	2/22/22 10:46	IMR
Acenaphthylene (SIM)	<0.16	3.1	0.16	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Anthracene (SIM)	<0.13	2.1	0.13	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Benzo(a)anthracene (SIM)	<0.15	0.52	0.15	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Benzo(a)pyrene (SIM)	<0.15	1.0	0.15	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Benzo(b)fluoranthene (SIM)	<0.17	0.52	0.17	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Benzo(g,h,i)perylene (SIM)	<0.19	5.2	0.19	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Benzo(k)fluoranthene (SIM)	<0.13	2.1	0.13	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Bis(2-ethylhexyl)phthalate (SIM)	<5.0	10	5.0	µg/L	10	V-20	625.1	2/18/22	2/22/22 10:46	IMR
Chrysene (SIM)	<0.13	2.1	0.13	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Dibenz(a,h)anthracene (SIM)	<0.19	1.0	0.19	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Fluoranthene (SIM)	<0.14	5.2	0.14	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Fluorene (SIM)	1.5	10	0.18	µg/L	10	J	625.1	2/18/22	2/22/22 10:46	IMR
Indeno(1,2,3-cd)pyrene (SIM)	<0.19	1.0	0.19	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Naphthalene (SIM)	<0.28	10	0.28	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Pentachlorophenol (SIM)	<2.5	10	2.5	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Phenanthrene (SIM)	0.97	0.52	0.16	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR
Pyrene (SIM)	<0.15	10	0.15	µg/L	10		625.1	2/18/22	2/22/22 10:46	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol (SIM)	38.6	15-110		2/22/22 10:46
Phenol-d6 (SIM)	35.4	15-110		2/22/22 10:46
Nitrobenzene-d5	77.5	30-130		2/22/22 10:46
2-Fluorobiphenyl	63.4	30-130		2/22/22 10:46
2,4,6-Tribromophenol (SIM)	94.6	15-110		2/22/22 10:46
p-Terphenyl-d14	101	30-130		2/22/22 10:46

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-2 (MW) | Sampled: 2/14/2022 14:00

Sample ID: 22B0961-01

Sample Matrix: Ground Water

Sample Flags: RL-12

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Butylbenzylphthalate	<1.46	20.9	1.46	µg/L	2		625.1	2/18/22	2/21/22 22:10	BGL
Di-n-butylphthalate	<1.04	20.9	1.04	µg/L	2		625.1	2/18/22	2/21/22 22:10	BGL
Diethylphthalate	<1.01	20.9	1.01	µg/L	2		625.1	2/18/22	2/21/22 22:10	BGL
Dimethylphthalate	<0.842	20.9	0.842	µg/L	2		625.1	2/18/22	2/21/22 22:10	BGL
Di-n-octylphthalate	<11.7	20.9	11.7	µg/L	2		625.1	2/18/22	2/21/22 22:10	BGL
Bis(2-Ethylhexyl)phthalate	<1.94	20.9	1.94	µg/L	2		625.1	2/18/22	2/21/22 22:10	BGL

Surrogates	% Recovery		Recovery Limits	Flag/Qual	
2-Fluorophenol	62.7		15-110		2/21/22 22:10
Phenol-d6	45.8		15-110		2/21/22 22:10
Nitrobenzene-d5	101		30-130		2/21/22 22:10
2-Fluorobiphenyl	95.4		30-130		2/21/22 22:10
2,4,6-Tribromophenol	**112**	*	15-110	S-07	2/21/22 22:10
p-Terphenyl-d14	105		30-130		2/21/22 22:10

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-2 (MW) | Sampled: 2/14/2022 14:00

Sample ID: 22B0961-01

Sample Matrix: Ground Water

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	<0.0269	0.102	0.0269	µg/L	1		608.3	2/17/22	2/21/22 13:06	TG
Aroclor-1221 [1]	<0.0403	0.102	0.0403	µg/L	1		608.3	2/17/22	2/21/22 13:06	TG
Aroclor-1232 [1]	<0.0370	0.102	0.0370	µg/L	1		608.3	2/17/22	2/21/22 13:06	TG
Aroclor-1242 [1]	<0.0389	0.102	0.0389	µg/L	1		608.3	2/17/22	2/21/22 13:06	TG
Aroclor-1248 [1]	<0.0451	0.102	0.0451	µg/L	1		608.3	2/17/22	2/21/22 13:06	TG
Aroclor-1254 [1]	<0.0398	0.102	0.0398	µg/L	1		608.3	2/17/22	2/21/22 13:06	TG
Aroclor-1260 [1]	<0.0317	0.102	0.0317	µg/L	1		608.3	2/17/22	2/21/22 13:06	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	84.2	30-150		2/21/22 13:06
Decachlorobiphenyl [2]	91.1	30-150		2/21/22 13:06
Tetrachloro-m-xylene [1]	81.6	30-150		2/21/22 13:06
Tetrachloro-m-xylene [2]	80.1	30-150		2/21/22 13:06

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-2 (MW) | Sampled: 2/14/2022 14:00

Sample ID: 22B0961-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:48	QNW
Arsenic	7.9	0.80		µg/L	1		EPA 200.8	2/23/22	3/7/22 20:04	QNW
Cadmium	9.2	0.20		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:48	QNW
Chromium	23	1.0		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:48	QNW
Chromium, Trivalent	0.023			mg/L	1		Tri Chrome Calc.	2/23/22	3/3/22 14:48	QNW
Copper	46	1.0		µg/L	1		EPA 200.8	2/23/22	3/7/22 20:04	QNW
Iron	2.2	0.050		mg/L	1		EPA 200.7	2/28/22	2/28/22 16:38	QNW
Lead	7.6	0.50		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:48	QNW
Mercury	ND	0.00010		mg/L	1		EPA 245.1	2/19/22	2/20/22 7:45	MJH
Nickel	28	5.0		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:48	QNW
Selenium	ND	5.0	0.95	µg/L	1		EPA 200.8	2/23/22	3/3/22 14:48	QNW
Silver	ND	0.20		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:48	QNW
Zinc	33	10		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:48	QNW

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-2 (MW) | Sampled: 2/14/2022 14:00

Sample ID: 22B0961-01

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0		µg/L	1		EPA 200.8	3/2/22	3/3/22 14:19	QNW
Arsenic	ND	0.80		µg/L	1		EPA 200.8	3/2/22	3/7/22 11:39	MJH
Cadmium	7.0	0.20		µg/L	1		EPA 200.8	3/2/22	3/3/22 14:19	QNW
Chromium	ND	1.0		µg/L	1		EPA 200.8	3/2/22	3/3/22 14:19	QNW
Copper	190	1.0		µg/L	1		EPA 200.8	3/2/22	3/7/22 11:39	MJH
Iron	2.3	0.050		mg/L	1		EPA 200.7	2/23/22	2/25/22 23:40	MJH
Lead	2.9	0.50		µg/L	1		EPA 200.8	3/2/22	3/3/22 14:19	QNW
Mercury	ND	0.00010		mg/L	1		EPA 245.1	2/19/22	2/20/22 8:20	MJH
Nickel	16	5.0		µg/L	1		EPA 200.8	3/2/22	3/3/22 14:19	QNW
Selenium	ND	25	4.7	µg/L	5	DL-03	EPA 200.8	3/2/22	3/3/22 15:25	QNW
Silver	ND	0.20		µg/L	1		EPA 200.8	3/2/22	3/3/22 14:19	QNW
Zinc	20	10		µg/L	1		EPA 200.8	3/2/22	3/3/22 14:19	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-2 (MW) | Sampled: 2/14/2022 14:00

Sample ID: 22B0961-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ammonia as N	1.1	0.10		mg/L	1		EPA 350.1	2/18/22	2/18/22 17:12	IS
Hexavalent Chromium	ND	0.010		mg/L	1	H-03	SM21-23 3500 Cr B	2/16/22	2/16/22 19:35	IS
Total Suspended Solids	2500	5.0		mg/L	1		SM21-23 2540D	2/17/22	2/17/22 13:46	LL
Silica Gel Treated HEM (SGT-HEM)	ND	5.6		mg/L	1		EPA 1664B	2/18/22	2/18/22 9:45	LL

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-2 (MW) | Sampled: 2/14/2022 14:00

Sample ID: 22B0961-01

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Cyanide	ND	0.005	0.001	mg/L	1		121,4500CN-CE	2/18/22	2/18/22 11:20	AAL

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-102 (MW) | Sampled: 2/16/2022 09:15

Sample ID: 22B0961-02

Sample Matrix: Ground Water

Sample Flags: DL-01

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	15.5	250	10.1	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Benzene	<0.999	5.00	0.999	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
tert-Butyl Alcohol (TBA)	<23.5	100	23.5	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
1,2-Dichlorobenzene	<0.609	10.0	0.609	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
1,3-Dichlorobenzene	<0.591	10.0	0.591	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
1,4-Dichlorobenzene	<0.651	10.0	0.651	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
1,2-Dichloroethane	<1.54	10.0	1.54	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
cis-1,2-Dichloroethylene	<0.734	5.00	0.734	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
1,1-Dichloroethane	<0.708	10.0	0.708	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
1,1-Dichloroethylene	<0.707	10.0	0.707	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
1,4-Dioxane	<103	250	103	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Ethanol	<132	250	132	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Ethylbenzene	<1.07	10.0	1.07	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Methyl tert-Butyl Ether (MTBE)	<0.861	10.0	0.861	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Methylene Chloride	2.15	25.0	1.17	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Tetrachloroethylene	<0.935	10.0	0.935	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Toluene	<1.12	5.00	1.12	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
1,1,1-Trichloroethane	<0.845	10.0	0.845	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
1,1,2-Trichloroethane	<0.913	10.0	0.913	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Trichloroethylene	<0.947	10.0	0.947	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Xylenes (total)	<	15.0		µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
Vinyl Chloride	<1.04	10.0	1.04	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
m+p Xylene	<2.29	10.0	2.29	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF
o-Xylene	<1.15	5.00	1.15	µg/L	5		624.1	2/17/22	2/17/22 21:38	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	94.0	70-130		2/17/22 21:38
Toluene-d8	103	70-130		2/17/22 21:38
4-Bromofluorobenzene	96.3	70-130		2/17/22 21:38

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-102 (MW) | Sampled: 2/16/2022 09:15

Sample ID: 22B0961-02

Sample Matrix: Ground Water

Sample Flags: RL-12

Semivolatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene (SIM)	<0.25	3.9	0.25	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Acenaphthylene (SIM)	<0.20	3.9	0.20	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Anthracene (SIM)	<0.16	2.6	0.16	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Benzo(a)anthracene (SIM)	<0.19	0.66	0.19	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Benzo(a)pyrene (SIM)	<0.19	1.3	0.19	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Benzo(b)fluoranthene (SIM)	<0.21	0.66	0.21	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Benzo(g,h,i)perylene (SIM)	<0.23	6.6	0.23	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Benzo(k)fluoranthene (SIM)	<0.16	2.6	0.16	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Bis(2-ethylhexyl)phthalate (SIM)	<6.3	13	6.3	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Chrysene (SIM)	<0.17	2.6	0.17	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Dibenz(a,h)anthracene (SIM)	<0.24	1.3	0.24	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Fluoranthene (SIM)	<0.18	6.6	0.18	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Fluorene (SIM)	0.22	13	0.22	µg/L	10	J	625.1	2/18/22	2/21/22 15:21	IMR
Indeno(1,2,3-cd)pyrene (SIM)	<0.24	1.3	0.24	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Naphthalene (SIM)	<0.35	13	0.35	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Pentachlorophenol (SIM)	<3.1	13	3.1	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Phenanthrene (SIM)	<0.21	0.66	0.21	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR
Pyrene (SIM)	<0.19	13	0.19	µg/L	10		625.1	2/18/22	2/21/22 15:21	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol (SIM)	31.9	15-110		2/21/22 15:21
Phenol-d6 (SIM)	29.4	15-110		2/21/22 15:21
Nitrobenzene-d5	63.1	30-130		2/21/22 15:21
2-Fluorobiphenyl	43.3	30-130		2/21/22 15:21
2,4,6-Tribromophenol (SIM)	70.8	15-110		2/21/22 15:21
p-Terphenyl-d14	65.0	30-130		2/21/22 15:21

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-102 (MW) | Sampled: 2/16/2022 09:15

Sample ID: 22B0961-02

Sample Matrix: Ground Water

Sample Flags: RL-12

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Butylbenzylphthalate	<3.66	52.6	3.66	µg/L	4		625.1	2/18/22	2/21/22 22:37	BGL
Di-n-butylphthalate	<2.62	52.6	2.62	µg/L	4		625.1	2/18/22	2/21/22 22:37	BGL
Diethylphthalate	<2.53	52.6	2.53	µg/L	4		625.1	2/18/22	2/21/22 22:37	BGL
Dimethylphthalate	<2.12	52.6	2.12	µg/L	4		625.1	2/18/22	2/21/22 22:37	BGL
Di-n-octylphthalate	<29.5	52.6	29.5	µg/L	4		625.1	2/18/22	2/21/22 22:37	BGL
Bis(2-Ethylhexyl)phthalate	<4.86	52.6	4.86	µg/L	4		625.1	2/18/22	2/21/22 22:37	BGL

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	49.5	15-110		2/21/22 22:37
Phenol-d6	38.1	15-110		2/21/22 22:37
Nitrobenzene-d5	74.1	30-130		2/21/22 22:37
2-Fluorobiphenyl	67.2	30-130		2/21/22 22:37
2,4,6-Tribromophenol	88.1	15-110		2/21/22 22:37
p-Terphenyl-d14	75.3	30-130		2/21/22 22:37

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-102 (MW) | Sampled: 2/16/2022 09:15

Sample ID: 22B0961-02

Sample Matrix: Ground Water

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	<0.0293	0.111	0.0293	µg/L	1		608.3	2/17/22	2/21/22 13:24	TG
Aroclor-1221 [1]	<0.0439	0.111	0.0439	µg/L	1		608.3	2/17/22	2/21/22 13:24	TG
Aroclor-1232 [1]	<0.0403	0.111	0.0403	µg/L	1		608.3	2/17/22	2/21/22 13:24	TG
Aroclor-1242 [1]	<0.0423	0.111	0.0423	µg/L	1		608.3	2/17/22	2/21/22 13:24	TG
Aroclor-1248 [1]	<0.0491	0.111	0.0491	µg/L	1		608.3	2/17/22	2/21/22 13:24	TG
Aroclor-1254 [1]	<0.0433	0.111	0.0433	µg/L	1		608.3	2/17/22	2/21/22 13:24	TG
Aroclor-1260 [1]	<0.0345	0.111	0.0345	µg/L	1		608.3	2/17/22	2/21/22 13:24	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	40.7	30-150		2/21/22 13:24
Decachlorobiphenyl [2]	39.0	30-150		2/21/22 13:24
Tetrachloro-m-xylene [1]	41.2	30-150		2/21/22 13:24
Tetrachloro-m-xylene [2]	38.9	30-150		2/21/22 13:24

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-102 (MW) | Sampled: 2/16/2022 09:15

Sample ID: 22B0961-02

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:51	QNW
Arsenic	54	0.80		µg/L	1		EPA 200.8	2/23/22	3/7/22 20:07	QNW
Cadmium	4.6	0.20		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:51	QNW
Chromium	160	1.0		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:51	QNW
Chromium, Trivalent	0.16			mg/L	1		Tri Chrome Calc.	2/23/22	3/3/22 14:51	QNW
Copper	340	1.0		µg/L	1		EPA 200.8	2/23/22	3/7/22 20:07	QNW
Iron	4.7	0.050		mg/L	1		EPA 200.7	2/28/22	2/28/22 18:01	QNW
Lead	190	0.50		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:51	QNW
Mercury	ND	0.00010		mg/L	1		EPA 245.1	2/19/22	2/20/22 7:47	MJH
Nickel	180	5.0		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:51	QNW
Selenium	ND	5.0	0.95	µg/L	1		EPA 200.8	2/23/22	3/3/22 14:51	QNW
Silver	0.33	0.20		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:51	QNW
Zinc	370	10		µg/L	1		EPA 200.8	2/23/22	3/3/22 14:51	QNW

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-102 (MW) | Sampled: 2/16/2022 09:15

Sample ID: 22B0961-02

Sample Matrix: Ground Water

Metals Analyses (Dissolved)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Antimony	ND	1.0		µg/L	1		EPA 200.8	2/23/22	2/27/22 20:30	MJH
Arsenic	12	0.80		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:13	MJH
Cadmium	ND	0.20		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:13	MJH
Chromium	11	1.0		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:13	MJH
Copper	38	1.0		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:13	MJH
Iron	6.1	0.050		mg/L	1		EPA 200.7	2/23/22	2/25/22 23:46	MJH
Lead	5.5	0.50		µg/L	1		EPA 200.8	2/23/22	2/27/22 20:30	MJH
Mercury	ND	0.00010		mg/L	1		EPA 245.1	2/19/22	2/20/22 8:22	MJH
Nickel	16	5.0		µg/L	1		EPA 200.8	2/23/22	2/25/22 18:13	MJH
Selenium	ND	5.0	0.95	µg/L	1		EPA 200.8	2/23/22	2/25/22 18:13	MJH
Silver	ND	0.20		µg/L	1		EPA 200.8	3/1/22	3/2/22 18:28	QNW
Zinc	17	10		µg/L	1		EPA 200.8	2/23/22	2/27/22 20:30	MJH

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-102 (MW) | Sampled: 2/16/2022 09:15

Sample ID: 22B0961-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Ammonia as N	2.9	0.10		mg/L	1		EPA 350.1	2/18/22	2/18/22 17:13	IS
Hexavalent Chromium	ND	0.010		mg/L	1		SM21-23 3500 Cr B	2/16/22	2/16/22 19:35	IS
Total Suspended Solids	7300	50		mg/L	1		SM21-23 2540D	2/17/22	2/17/22 13:46	LL
Silica Gel Treated HEM (SGT-HEM)	ND	5.6		mg/L	1		EPA 1664B	2/22/22	2/22/22 9:00	LL

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: NB-102 (MW) | Sampled: 2/16/2022 09:15

Sample ID: 22B0961-02

Sample Matrix: Ground Water

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Cyanide	0.006	0.005	0.001	mg/L	1		121,4500CN-CE	2/18/22	2/18/22 11:21	AAL

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Project Location: Lawrence, MA | Sample Description: | Work Order: 22B0961

Date Received: 2/16/2022

Field Sample #: TB-02 | Sampled: 2/16/2022 08:00

Sample ID: 22B0961-03

Sample Matrix: Ground Water

Volatile Organic Compounds by GC/MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acetone	32.4	50.0	2.03	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Benzene	<0.200	1.00	0.200	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
tert-Butyl Alcohol (TBA)	<4.69	20.0	4.69	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
1,2-Dichlorobenzene	<0.122	2.00	0.122	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
1,3-Dichlorobenzene	<0.118	2.00	0.118	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
1,4-Dichlorobenzene	<0.130	2.00	0.130	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
1,2-Dichloroethane	<0.308	2.00	0.308	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
cis-1,2-Dichloroethylene	<0.147	1.00	0.147	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
1,1-Dichloroethane	<0.142	2.00	0.142	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
1,1-Dichloroethylene	<0.141	2.00	0.141	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
1,4-Dioxane	<20.6	50.0	20.6	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Ethanol	326	50.0	26.5	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Ethylbenzene	<0.215	2.00	0.215	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Methyl tert-Butyl Ether (MTBE)	<0.172	2.00	0.172	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Methylene Chloride	<0.235	5.00	0.235	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Tetrachloroethylene	<0.187	2.00	0.187	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Toluene	<0.224	1.00	0.224	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
1,1,1-Trichloroethane	<0.169	2.00	0.169	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
1,1,2-Trichloroethane	<0.183	2.00	0.183	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Trichloroethylene	<0.189	2.00	0.189	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Xylenes (total)	<	3.00		µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
Vinyl Chloride	<0.208	2.00	0.208	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
m+p Xylene	<0.459	2.00	0.459	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF
o-Xylene	<0.230	1.00	0.230	µg/L	1		624.1	2/17/22	2/17/22 13:12	MFF

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	95.7	70-130		2/17/22 13:12
Toluene-d8	106	70-130		2/17/22 13:12
4-Bromofluorobenzene	99.9	70-130		2/17/22 13:12

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Sample Extraction Data

Prep Method: SW-846 3510C **Analytical Method: 608.3**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301406	980	5.00	02/17/22
22B0961-02 [NB-102 (MW)]	B301406	900	5.00	02/17/22

Prep Method: SW-846 5030B **Analytical Method: 624.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301422	5	5.00	02/17/22
22B0961-02 [NB-102 (MW)]	B301422	1	5.00	02/17/22
22B0961-03 [TB-02]	B301422	5	5.00	02/17/22

Prep Method: SW-846 3510C **Analytical Method: 625.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301513	955	1.00	02/18/22
22B0961-02 [NB-102 (MW)]	B301513	760	1.00	02/18/22

Prep Method: SW-846 3510C **Analytical Method: 625.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301624	955	1.00	02/18/22
22B0961-02 [NB-102 (MW)]	B301624	760	1.00	02/18/22

EPA 1664B

Lab Number [Field ID]	Batch	Initial [mL]	Date
22B0961-01 [NB-2 (MW)]	B301493	250	02/18/22

EPA 1664B

Lab Number [Field ID]	Batch	Initial [mL]	Date
22B0961-02 [NB-102 (MW)]	B301718	250	02/22/22

Prep Method: EPA 200.7 Dissolved **Analytical Method: EPA 200.7**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301897	50.0	50.0	02/23/22
22B0961-02 [NB-102 (MW)]	B301897	50.0	50.0	02/23/22

Prep Method: EPA 200.7 **Analytical Method: EPA 200.7**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B302066	50.0	50.0	02/28/22
22B0961-02 [NB-102 (MW)]	B302066	50.0	50.0	02/28/22

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Sample Extraction Data

Prep Method: EPA 200.8 **Analytical Method: EPA 200.8**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301882	50.0	50.0	02/23/22
22B0961-02 [NB-102 (MW)]	B301882	50.0	50.0	02/23/22

Prep Method: EPA 200.8 Dissolved **Analytical Method: EPA 200.8**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-02 [NB-102 (MW)]	B301898	50.0	50.0	02/23/22

Prep Method: EPA 200.8 Dissolved **Analytical Method: EPA 200.8**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-02RE1 [NB-102 (MW)]	B302248	50.0	50.0	03/01/22

Prep Method: EPA 200.8 Dissolved **Analytical Method: EPA 200.8**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B302336	50.0	50.0	03/02/22

Prep Method: EPA 245.1 **Analytical Method: EPA 245.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301586	10.0	10.0	02/19/22
22B0961-02 [NB-102 (MW)]	B301586	10.0	10.0	02/19/22

Prep Method: EPA 245.1 Dissolved **Analytical Method: EPA 245.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301587	10.0	10.0	02/19/22
22B0961-02 [NB-102 (MW)]	B301587	10.0	10.0	02/19/22

EPA 350.1

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301537	50.0	50.0	02/18/22
22B0961-02 [NB-102 (MW)]	B301537	50.0	50.0	02/18/22

SM21-23 2540D

Lab Number [Field ID]	Batch	Initial [mL]		Date
22B0961-01 [NB-2 (MW)]	B301392	100		02/17/22
22B0961-02 [NB-102 (MW)]	B301392	10.0		02/17/22

SM21-23 3500 Cr B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date

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Sample Extraction Data

SM21-23 3500 Cr B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22B0961-01 [NB-2 (MW)]	B301386	50.0	50.0	02/16/22
22B0961-02 [NB-102 (MW)]	B301386	50.0	50.0	02/16/22

Prep Method: EPA 200.8 **Analytical Method: Tri Chrome Calc.**

Lab Number [Field ID]	Batch	Initial [mL]	Date
22B0961-01 [NB-2 (MW)]	B301882	50.0	02/23/22
22B0961-02 [NB-102 (MW)]	B301882	50.0	02/23/22

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301422 - SW-846 5030B										
Blank (B301422-BLK1)				Prepared & Analyzed: 02/17/22						
Acetone	ND	50.0	µg/L							
Benzene	ND	1.00	µg/L							
tert-Butyl Alcohol (TBA)	ND	20.0	µg/L							
1,2-Dichlorobenzene	ND	2.00	µg/L							
1,3-Dichlorobenzene	ND	2.00	µg/L							
1,4-Dichlorobenzene	ND	2.00	µg/L							
1,2-Dichloroethane	ND	2.00	µg/L							
cis-1,2-Dichloroethylene	ND	1.00	µg/L							
1,1-Dichloroethane	ND	2.00	µg/L							
1,1-Dichloroethylene	ND	2.00	µg/L							
1,4-Dioxane	ND	50.0	µg/L							
Ethanol	ND	50.0	µg/L							
Ethylbenzene	ND	2.00	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	2.00	µg/L							
Methylene Chloride	ND	5.00	µg/L							
Tetrachloroethylene	ND	2.00	µg/L							
Toluene	ND	1.00	µg/L							
1,1,1-Trichloroethane	ND	2.00	µg/L							
1,1,2-Trichloroethane	ND	2.00	µg/L							
Trichloroethylene	ND	2.00	µg/L							
Xylenes (total)	ND	3.00	µg/L							
Vinyl Chloride	ND	2.00	µg/L							
m+p Xylene	ND	2.00	µg/L							
o-Xylene	ND	1.00	µg/L							
Surrogate: 1,2-Dichloroethane-d4	*23.7*		µg/L	25.0		94.9	70-130			
Surrogate: Toluene-d8	*25.8*		µg/L	25.0		103	70-130			
Surrogate: 4-Bromofluorobenzene	*24.8*		µg/L	25.0		99.4	70-130			
LCS (B301422-BS1)				Prepared & Analyzed: 02/17/22						
Acetone	160	50.0	µg/L	200		81.8	70-160			†
Benzene	21	1.00	µg/L	20.0		105	65-135			
tert-Butyl Alcohol (TBA)	180	20.0	µg/L	200		87.6	40-160			†
1,2-Dichlorobenzene	22	2.00	µg/L	20.0		111	65-135			
1,3-Dichlorobenzene	23	2.00	µg/L	20.0		114	70-130			
1,4-Dichlorobenzene	21	2.00	µg/L	20.0		106	65-135			
1,2-Dichloroethane	19	2.00	µg/L	20.0		93.2	70-130			
cis-1,2-Dichloroethylene	20	1.00	µg/L	20.0		102	70-130			
1,1-Dichloroethane	21	2.00	µg/L	20.0		103	70-130			
1,1-Dichloroethylene	18	2.00	µg/L	20.0		89.5	50-150			
1,4-Dioxane	180	50.0	µg/L	200		90.7	40-130			†
Ethanol	170	50.0	µg/L	200		85.5	40-160			
Ethylbenzene	22	2.00	µg/L	20.0		110	60-140			
Methyl tert-Butyl Ether (MTBE)	21	2.00	µg/L	20.0		107	70-130			
Methylene Chloride	18	5.00	µg/L	20.0		88.0	60-140			
Tetrachloroethylene	22	2.00	µg/L	20.0		108	70-130			
Toluene	22	1.00	µg/L	20.0		110	70-130			
1,1,1-Trichloroethane	21	2.00	µg/L	20.0		106	70-130			
1,1,2-Trichloroethane	22	2.00	µg/L	20.0		112	70-130			
Trichloroethylene	22	2.00	µg/L	20.0		110	65-135			
Vinyl Chloride	15	2.00	µg/L	20.0		76.9	5-195			
m+p Xylene	44	2.00	µg/L	40.0		110	70-130			
o-Xylene	23	1.00	µg/L	20.0		113	70-130			

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QUALITY CONTROL

Volatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301422 - SW-846 5030B										
LCS (B301422-BS1)				Prepared & Analyzed: 02/17/22						
Surrogate: 1,2-Dichloroethane-d4	*23.6*		µg/L	25.0		94.2	70-130			
Surrogate: Toluene-d8	*26.3*		µg/L	25.0		105	70-130			
Surrogate: 4-Bromofluorobenzene	*25.0*		µg/L	25.0		99.9	70-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301624 - SW-846 3510C										
Blank (B301624-BLK1)				Prepared: 02/18/22 Analyzed: 02/21/22						
Acenaphthene (SIM)	ND	0.30	µg/L							
Acenaphthylene (SIM)	ND	0.30	µg/L							
Anthracene (SIM)	ND	0.20	µg/L							
Benzo(a)anthracene (SIM)	0.016	0.050	µg/L							J, B-05
Benzo(a)pyrene (SIM)	ND	0.10	µg/L							
Benzo(b)fluoranthene (SIM)	0.016	0.050	µg/L							J, B-05
Benzo(g,h,i)perylene (SIM)	ND	0.50	µg/L							
Benzo(k)fluoranthene (SIM)	0.012	0.20	µg/L							J, B-05
Bis(2-ethylhexyl)phthalate (SIM)	ND	1.0	µg/L							
Chrysene (SIM)	0.014	0.20	µg/L							J, B-05
Dibenz(a,h)anthracene (SIM)	ND	0.10	µg/L							
Fluoranthene (SIM)	ND	0.50	µg/L							
Fluorene (SIM)	ND	1.0	µg/L							
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.10	µg/L							
Naphthalene (SIM)	0.064	1.0	µg/L							J, B-05
Pentachlorophenol (SIM)	ND	1.0	µg/L							
Phenanthrene (SIM)	ND	0.050	µg/L							
Pyrene (SIM)	ND	1.0	µg/L							
Surrogate: 2-Fluorophenol (SIM)	*62.8*		µg/L	200		31.4	15-110			
Surrogate: Phenol-d6 (SIM)	*58.2*		µg/L	200		29.1	15-110			
Surrogate: Nitrobenzene-d5	*70.5*		µg/L	100		70.5	30-130			
Surrogate: 2-Fluorobiphenyl	*59.8*		µg/L	100		59.8	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*196*		µg/L	200		97.8	15-110			S-07
Surrogate: p-Terphenyl-d14	*102*		µg/L	100		102	30-130			
LCS (B301624-BS1)				Prepared: 02/18/22 Analyzed: 02/21/22						
Acenaphthene (SIM)	32.6	6.0	µg/L	50.0		65.1	47-145			
Acenaphthylene (SIM)	34.8	6.0	µg/L	50.0		69.6	33-145			
Anthracene (SIM)	35.4	4.0	µg/L	50.0		70.8	27-133			
Benzo(a)anthracene (SIM)	36.1	1.0	µg/L	50.0		72.1	33-143			
Benzo(a)pyrene (SIM)	35.8	2.0	µg/L	50.0		71.6	17-163			
Benzo(b)fluoranthene (SIM)	36.6	1.0	µg/L	50.0		73.1	24-159			
Benzo(g,h,i)perylene (SIM)	35.3	10	µg/L	50.0		70.5	10-219			
Benzo(k)fluoranthene (SIM)	38.4	4.0	µg/L	50.0		76.8	11-162			
Bis(2-ethylhexyl)phthalate (SIM)	53.0	20	µg/L	50.0		106	8-158			
Chrysene (SIM)	32.0	4.0	µg/L	50.0		64.0	17-168			
Dibenz(a,h)anthracene (SIM)	35.2	2.0	µg/L	50.0		70.5	10-227			
Fluoranthene (SIM)	32.7	10	µg/L	50.0		65.4	26-137			
Fluorene (SIM)	34.3	20	µg/L	50.0		68.6	59-121			
Indeno(1,2,3-cd)pyrene (SIM)	34.0	2.0	µg/L	50.0		68.1	10-171			
Naphthalene (SIM)	30.1	20	µg/L	50.0		60.2	21-133			
Pentachlorophenol (SIM)	44.1	20	µg/L	50.0		88.2	14-176			
Phenanthrene (SIM)	33.3	1.0	µg/L	50.0		66.7	54-120			
Pyrene (SIM)	32.3	20	µg/L	50.0		64.7	52-120			
Surrogate: 2-Fluorophenol (SIM)	*69.6*		µg/L	200		34.8	15-110			
Surrogate: Phenol-d6 (SIM)	*66.5*		µg/L	200		33.2	15-110			
Surrogate: Nitrobenzene-d5	*64.0*		µg/L	100		64.0	30-130			
Surrogate: 2-Fluorobiphenyl	*68.6*		µg/L	100		68.6	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*160*		µg/L	200		80.1	15-110			
Surrogate: p-Terphenyl-d14	*82.4*		µg/L	100		82.4	30-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301624 - SW-846 3510C										
LCS Dup (B301624-BSD1)				Prepared: 02/18/22 Analyzed: 02/21/22						
Acenaphthene (SIM)	29.8	6.0	µg/L	50.0		59.6	47-145	8.85	48	
Acenaphthylene (SIM)	32.0	6.0	µg/L	50.0		64.0	33-145	8.45	74	
Anthracene (SIM)	32.6	4.0	µg/L	50.0		65.2	27-133	8.30	66	
Benzo(a)anthracene (SIM)	32.9	1.0	µg/L	50.0		65.8	33-143	9.16	53	
Benzo(a)pyrene (SIM)	33.4	2.0	µg/L	50.0		66.8	17-163	6.94	72	
Benzo(b)fluoranthene (SIM)	33.8	1.0	µg/L	50.0		67.6	24-159	7.90	71	
Benzo(g,h,i)perylene (SIM)	32.5	10	µg/L	50.0		65.0	10-219	8.21	97	
Benzo(k)fluoranthene (SIM)	35.3	4.0	µg/L	50.0		70.5	11-162	8.53	63	
Bis(2-ethylhexyl)phthalate (SIM)	45.0	20	µg/L	50.0		90.0	8-158	16.4	82	
Chrysene (SIM)	29.2	4.0	µg/L	50.0		58.4	17-168	9.16	87	
Dibenz(a,h)anthracene (SIM)	32.4	2.0	µg/L	50.0		64.8	10-227	8.34	126	
Fluoranthene (SIM)	29.4	10	µg/L	50.0		58.8	26-137	10.6	66	
Fluorene (SIM)	31.0	20	µg/L	50.0		62.1	59-121	9.92	38	
Indeno(1,2,3-cd)pyrene (SIM)	31.2	2.0	µg/L	50.0		62.4	10-171	8.71	99	
Naphthalene (SIM)	26.9	20	µg/L	50.0		53.8	21-133	11.1	65	
Pentachlorophenol (SIM)	40.2	20	µg/L	50.0		80.5	14-176	9.20	86	
Phenanthrene (SIM)	31.0	1.0	µg/L	50.0		61.9	54-120	7.40	39	
Pyrene (SIM)	29.1	20	µg/L	50.0		58.2	52-120	10.5	49	
Surrogate: 2-Fluorophenol (SIM)	*58.1*		µg/L	200		29.1	15-110			
Surrogate: Phenol-d6 (SIM)	*55.8*		µg/L	200		27.9	15-110			
Surrogate: Nitrobenzene-d5	*56.9*		µg/L	100		56.9	30-130			
Surrogate: 2-Fluorobiphenyl	*57.9*		µg/L	100		57.9	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*137*		µg/L	200		68.4	15-110			
Surrogate: p-Terphenyl-d14	*73.7*		µg/L	100		73.7	30-130			
Matrix Spike (B301624-MS1)	**Source: 22B0961-01**			Prepared: 02/18/22 Analyzed: 02/21/22						
Acenaphthene (SIM)	37.8	6.2	µg/L	51.5	0.723	71.9	47-145			
Acenaphthylene (SIM)	39.3	6.2	µg/L	51.5	ND	76.3	33-145			
Anthracene (SIM)	42.1	4.1	µg/L	51.5	ND	81.8	27-133			
Benzo(a)anthracene (SIM)	43.5	1.0	µg/L	51.5	ND	84.4	33-143			
Benzo(a)pyrene (SIM)	43.3	2.1	µg/L	51.5	ND	84.0	17-163			
Benzo(b)fluoranthene (SIM)	44.6	1.0	µg/L	51.5	ND	86.6	24-159			
Benzo(g,h,i)perylene (SIM)	41.5	10	µg/L	51.5	ND	80.4	10-219			
Benzo(k)fluoranthene (SIM)	46.7	4.1	µg/L	51.5	ND	90.5	11-162			
Bis(2-ethylhexyl)phthalate (SIM)	74.3	21	µg/L	51.5	ND	144	8-158			
Chrysene (SIM)	37.9	4.1	µg/L	51.5	ND	73.6	17-168			
Dibenz(a,h)anthracene (SIM)	41.6	2.1	µg/L	51.5	ND	80.7	10-227			
Fluoranthene (SIM)	41.0	10	µg/L	51.5	ND	79.5	26-137			
Fluorene (SIM)	40.8	21	µg/L	51.5	1.55	76.2	59-121			
Indeno(1,2,3-cd)pyrene (SIM)	40.1	2.1	µg/L	51.5	ND	77.7	10-171			
Naphthalene (SIM)	37.9	21	µg/L	51.5	ND	73.5	21-133			
Pentachlorophenol (SIM)	57.5	21	µg/L	51.5	ND	111	14-176			
Phenanthrene (SIM)	39.9	1.0	µg/L	51.5	0.974	75.6	54-120			
Pyrene (SIM)	40.7	21	µg/L	51.5	ND	79.0	52-120			
Surrogate: 2-Fluorophenol (SIM)	*82.6*		µg/L	206		40.1	15-110			
Surrogate: Phenol-d6 (SIM)	*76.6*		µg/L	206		37.1	15-110			
Surrogate: Nitrobenzene-d5	*83.5*		µg/L	103		81.0	30-130			
Surrogate: 2-Fluorobiphenyl	*66.4*		µg/L	103		64.4	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*195*		µg/L	206		94.5	15-110			
Surrogate: p-Terphenyl-d14	*95.3*		µg/L	103		92.5	30-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301624 - SW-846 3510C										
Matrix Spike Dup (B301624-MSD1)	**Source: 22B0961-01**			Prepared: 02/18/22 Analyzed: 02/21/22						
Acenaphthene (SIM)	32.1	6.2	µg/L	51.3	0.723	61.2	47-145	16.2	48	
Acenaphthylene (SIM)	33.5	6.2	µg/L	51.3	ND	65.3	33-145	16.0	74	
Anthracene (SIM)	35.5	4.1	µg/L	51.3	ND	69.2	27-133	17.2	66	
Benzo(a)anthracene (SIM)	36.5	1.0	µg/L	51.3	ND	71.2	33-143	17.5	53	
Benzo(a)pyrene (SIM)	36.1	2.1	µg/L	51.3	ND	70.5	17-163	18.0	72	
Benzo(b)fluoranthene (SIM)	37.8	1.0	µg/L	51.3	ND	73.7	24-159	16.6	71	
Benzo(g,h,i)perylene (SIM)	36.1	10	µg/L	51.3	ND	70.3	10-219	13.9	97	
Benzo(k)fluoranthene (SIM)	39.0	4.1	µg/L	51.3	ND	76.1	11-162	17.8	63	
Bis(2-ethylhexyl)phthalate (SIM)	60.2	21	µg/L	51.3	ND	117	8-158	20.9	82	
Chrysene (SIM)	32.2	4.1	µg/L	51.3	ND	62.8	17-168	16.2	87	
Dibenz(a,h)anthracene (SIM)	35.9	2.1	µg/L	51.3	ND	70.0	10-227	14.7	126	
Fluoranthene (SIM)	34.0	10	µg/L	51.3	ND	66.2	26-137	18.7	66	
Fluorene (SIM)	34.2	21	µg/L	51.3	1.55	63.6	59-121	17.8	38	
Indeno(1,2,3-cd)pyrene (SIM)	35.2	2.1	µg/L	51.3	ND	68.6	10-171	13.0	99	
Naphthalene (SIM)	31.0	21	µg/L	51.3	ND	60.4	21-133	20.2	65	
Pentachlorophenol (SIM)	51.2	21	µg/L	51.3	ND	99.9	14-176	11.4	86	
Phenanthrene (SIM)	33.9	1.0	µg/L	51.3	0.974	64.3	54-120	16.3	39	
Pyrene (SIM)	34.4	21	µg/L	51.3	ND	67.0	52-120	16.9	49	
Surrogate: 2-Fluorophenol (SIM)	*66.6*		µg/L	205		32.5	15-110			
Surrogate: Phenol-d6 (SIM)	*61.3*		µg/L	205		29.9	15-110			
Surrogate: Nitrobenzene-d5	*66.3*		µg/L	103		64.7	30-130			
Surrogate: 2-Fluorobiphenyl	*60.3*		µg/L	103		58.8	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*163*		µg/L	205		79.3	15-110			
Surrogate: p-Terphenyl-d14	*83.0*		µg/L	103		80.9	30-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by - GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B301513 - SW-846 3510C											
Blank (B301513-BLK1)				Prepared: 02/18/22 Analyzed: 02/21/22							
Butylbenzylphthalate	ND	10.0	µg/L								
Di-n-butylphthalate	ND	10.0	µg/L								
Diethylphthalate	ND	10.0	µg/L								
Dimethylphthalate	ND	10.0	µg/L								
Di-n-octylphthalate	ND	10.0	µg/L								
Bis(2-Ethylhexyl)phthalate	ND	10.0	µg/L								
Surrogate: 2-Fluorophenol	*105*		µg/L	200		52.4		15-110			
Surrogate: Phenol-d6	*82.1*		µg/L	200		41.0		15-110			
Surrogate: Nitrobenzene-d5	*81.2*		µg/L	100		81.2		30-130			
Surrogate: 2-Fluorobiphenyl	*89.5*		µg/L	100		89.5		30-130			
Surrogate: 2,4,6-Tribromophenol	*241*		µg/L	200		**121**	*	15-110			S-07
Surrogate: p-Terphenyl-d14	*106*		µg/L	100		106		30-130			
LCS (B301513-BS1)				Prepared: 02/18/22 Analyzed: 02/21/22							
Butylbenzylphthalate	42.2	10.0	µg/L	50.0		84.4		10-152			
Di-n-butylphthalate	39.6	10.0	µg/L	50.0		79.2		10-120			
Diethylphthalate	39.8	10.0	µg/L	50.0		79.6		10-120			
Dimethylphthalate	40.2	10.0	µg/L	50.0		80.5		10-120			
Di-n-octylphthalate	43.4	10.0	µg/L	50.0		86.8		4-146			
Bis(2-Ethylhexyl)phthalate	41.5	10.0	µg/L	50.0		83.0		8-158			
Surrogate: 2-Fluorophenol	*111*		µg/L	200		55.7		15-110			
Surrogate: Phenol-d6	*84.7*		µg/L	200		42.3		15-110			
Surrogate: Nitrobenzene-d5	*87.0*		µg/L	100		87.0		30-130			
Surrogate: 2-Fluorobiphenyl	*85.8*		µg/L	100		85.8		30-130			
Surrogate: 2,4,6-Tribromophenol	*224*		µg/L	200		**112**	*	15-110			S-07
Surrogate: p-Terphenyl-d14	*92.1*		µg/L	100		92.1		30-130			
LCS Dup (B301513-BSD1)				Prepared: 02/18/22 Analyzed: 02/21/22							
Butylbenzylphthalate	43.4	10.0	µg/L	50.0		86.8		10-152	2.80	60	
Di-n-butylphthalate	39.7	10.0	µg/L	50.0		79.4		10-120	0.252	47	
Diethylphthalate	39.6	10.0	µg/L	50.0		79.1		10-120	0.605	100	
Dimethylphthalate	40.3	10.0	µg/L	50.0		80.6		10-120	0.149	183	
Di-n-octylphthalate	43.9	10.0	µg/L	50.0		87.8		4-146	1.08	69	
Bis(2-Ethylhexyl)phthalate	42.3	10.0	µg/L	50.0		84.7		8-158	1.93	82	
Surrogate: 2-Fluorophenol	*104*		µg/L	200		52.1		15-110			
Surrogate: Phenol-d6	*82.0*		µg/L	200		41.0		15-110			
Surrogate: Nitrobenzene-d5	*86.7*		µg/L	100		86.7		30-130			
Surrogate: 2-Fluorobiphenyl	*84.5*		µg/L	100		84.5		30-130			
Surrogate: 2,4,6-Tribromophenol	*220*		µg/L	200		110		15-110			
Surrogate: p-Terphenyl-d14	*92.2*		µg/L	100		92.2		30-130			
Matrix Spike (B301513-MS1)	**Source: 22B0961-01**			Prepared: 02/18/22 Analyzed: 02/21/22							
Butylbenzylphthalate	55.2	20.6	µg/L	51.5	ND	107		10-152			
Di-n-butylphthalate	51.6	20.6	µg/L	51.5	ND	100		10-120			
Diethylphthalate	51.2	20.6	µg/L	51.5	ND	99.4		10-120			
Dimethylphthalate	51.7	20.6	µg/L	51.5	ND	100		10-120			
Di-n-octylphthalate	57.5	20.6	µg/L	51.5	ND	111		4-146			
Bis(2-Ethylhexyl)phthalate	53.5	20.6	µg/L	51.5	ND	104		8-158			
Surrogate: 2-Fluorophenol	*143*		µg/L	206		69.4		15-110			
Surrogate: Phenol-d6	*107*		µg/L	206		51.8		15-110			
Surrogate: Nitrobenzene-d5	*119*		µg/L	103		115		30-130			
Surrogate: 2-Fluorobiphenyl	*109*		µg/L	103		106		30-130			

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QUALITY CONTROL

Semivolatile Organic Compounds by - GC/MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B301513 - SW-846 3510C											
Matrix Spike (B301513-MS1)	**Source: 22B0961-01**			Prepared: 02/18/22 Analyzed: 02/21/22							
Surrogate: 2,4,6-Tribromophenol	*271*		µg/L	206		**132**	*	15-110			S-07
Surrogate: p-Terphenyl-d14	*113*		µg/L	103		110		30-130			
Matrix Spike Dup (B301513-MSD1)	**Source: 22B0961-01**			Prepared: 02/18/22 Analyzed: 02/21/22							
Butylbenzylphthalate	46.7	20.5	µg/L	51.3	ND	91.0		10-152	16.8	60	
Di-n-butylphthalate	43.4	20.5	µg/L	51.3	ND	84.6		10-120	17.2	47	
Diethylphthalate	42.5	20.5	µg/L	51.3	ND	82.9		10-120	18.6	100	
Dimethylphthalate	43.8	20.5	µg/L	51.3	ND	85.4		10-120	16.5	183	
Di-n-octylphthalate	47.3	20.5	µg/L	51.3	ND	92.3		4-146	19.4	69	
Bis(2-Ethylhexyl)phthalate	44.8	20.5	µg/L	51.3	ND	87.4		8-158	17.8	82	
Surrogate: 2-Fluorophenol	*115*		µg/L	205		56.3		15-110			
Surrogate: Phenol-d6	*87.4*		µg/L	205		42.6		15-110			
Surrogate: Nitrobenzene-d5	*97.3*		µg/L	103		94.8		30-130			
Surrogate: 2-Fluorobiphenyl	*92.6*		µg/L	103		90.3		30-130			
Surrogate: 2,4,6-Tribromophenol	*228*		µg/L	205		**111**	*	15-110			S-07
Surrogate: p-Terphenyl-d14	*94.0*		µg/L	103		91.7		30-130			

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QUALITY CONTROL

Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301406 - SW-846 3510C										
Blank (B301406-BLK1)				Prepared: 02/17/22 Analyzed: 02/19/22						
Aroclor-1016	ND	0.100	µg/L							
Aroclor-1016 [2C]	ND	0.100	µg/L							
Aroclor-1221	ND	0.100	µg/L							
Aroclor-1221 [2C]	ND	0.100	µg/L							
Aroclor-1232	ND	0.100	µg/L							
Aroclor-1232 [2C]	ND	0.100	µg/L							
Aroclor-1242	ND	0.100	µg/L							
Aroclor-1242 [2C]	ND	0.100	µg/L							
Aroclor-1248	ND	0.100	µg/L							
Aroclor-1248 [2C]	ND	0.100	µg/L							
Aroclor-1254	ND	0.100	µg/L							
Aroclor-1254 [2C]	ND	0.100	µg/L							
Aroclor-1260	ND	0.100	µg/L							
Aroclor-1260 [2C]	ND	0.100	µg/L							
Surrogate: Decachlorobiphenyl	*0.940*		µg/L	2.00		47.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*0.930*		µg/L	2.00		46.5	30-150			
Surrogate: Tetrachloro-m-xylene	*1.45*		µg/L	2.00		72.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.41*		µg/L	2.00		70.4	30-150			
LCS (B301406-BS1)				Prepared: 02/17/22 Analyzed: 02/19/22						
Aroclor-1016	0.409	0.200	µg/L	0.500		81.7	50-140			
Aroclor-1016 [2C]	0.422	0.200	µg/L	0.500		84.4	50-140			
Aroclor-1260	0.401	0.200	µg/L	0.500		80.1	8-140			
Aroclor-1260 [2C]	0.403	0.200	µg/L	0.500		80.5	8-140			
Surrogate: Decachlorobiphenyl	*1.78*		µg/L	2.00		89.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.76*		µg/L	2.00		88.1	30-150			
Surrogate: Tetrachloro-m-xylene	*1.67*		µg/L	2.00		83.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.67*		µg/L	2.00		83.4	30-150			
LCS Dup (B301406-BSD1)				Prepared: 02/17/22 Analyzed: 02/19/22						
Aroclor-1016	0.364	0.200	µg/L	0.500		72.8	50-140	11.5		
Aroclor-1016 [2C]	0.382	0.200	µg/L	0.500		76.4	50-140	9.98		
Aroclor-1260	0.371	0.200	µg/L	0.500		74.3	8-140	7.60		
Aroclor-1260 [2C]	0.374	0.200	µg/L	0.500		74.8	8-140	7.32		
Surrogate: Decachlorobiphenyl	*1.49*		µg/L	2.00		74.7	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.51*		µg/L	2.00		75.4	30-150			
Surrogate: Tetrachloro-m-xylene	*1.44*		µg/L	2.00		71.8	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.44*		µg/L	2.00		72.1	30-150			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301586 - EPA 245.1										
Blank (B301586-BLK1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	ND	0.00010	mg/L							
LCS (B301586-BS1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	0.00405	0.00010	mg/L	0.00402		101	85-115			
LCS Dup (B301586-BSD1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	0.00402	0.00010	mg/L	0.00402		100	85-115	0.592	20	
Batch B301882 - EPA 200.8										
Blank (B301882-BLK1)				Prepared: 02/23/22 Analyzed: 03/03/22						
Antimony	ND	1.0	µg/L							
Arsenic	ND	0.80	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	1.0	µg/L							
Copper	ND	1.0	µg/L							
Lead	ND	0.50	µg/L							
Nickel	ND	5.0	µg/L							
Selenium	ND	5.0	µg/L							
Silver	ND	0.20	µg/L							
Zinc	ND	10	µg/L							
LCS (B301882-BS1)				Prepared: 02/23/22 Analyzed: 03/03/22						
Antimony	540	10	µg/L	500		108	85-115			
Arsenic	479	8.0	µg/L	500		95.9	85-115			
Cadmium	515	2.0	µg/L	500		103	85-115			
Chromium	491	10	µg/L	500		98.3	85-115			
Copper	1070	10	µg/L	1000		107	85-115			
Lead	501	5.0	µg/L	500		100	85-115			
Nickel	537	50	µg/L	500		107	85-115			
Selenium	486	50	µg/L	500		97.3	85-115			
Silver	510	2.0	µg/L	500		102	85-115			
Zinc	1010	100	µg/L	1000		101	85-115			
LCS Dup (B301882-BSD1)				Prepared: 02/23/22 Analyzed: 03/03/22						
Antimony	497	10	µg/L	500		99.5	85-115	8.23	20	
Arsenic	428	8.0	µg/L	500		85.5	85-115	11.4	20	
Cadmium	475	2.0	µg/L	500		94.9	85-115	8.17	20	
Chromium	456	10	µg/L	500		91.3	85-115	7.39	20	
Copper	979	10	µg/L	1000		97.9	85-115	9.00	20	
Lead	464	5.0	µg/L	500		92.7	85-115	7.84	20	
Nickel	493	50	µg/L	500		98.7	85-115	8.52	20	
Selenium	442	50	µg/L	500		88.4	85-115	9.57	20	
Silver	466	2.0	µg/L	500		93.2	85-115	9.10	20	
Zinc	929	100	µg/L	1000		92.9	85-115	8.02	20	

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301882 - EPA 200.8										
Duplicate (B301882-DUP1)		**Source: 22B0961-01**		Prepared: 02/23/22 Analyzed: 03/03/22						
Antimony	ND	1.0	µg/L		ND			NC	20	
Arsenic	8.64	0.80	µg/L		7.90			8.94	20	
Cadmium	9.10	0.20	µg/L		9.20			1.04	20	
Chromium	22.8	1.0	µg/L		23.0			0.590	20	
Copper	42.3	1.0	µg/L		45.8			7.96	20	
Lead	7.42	0.50	µg/L		7.59			2.27	20	
Nickel	27.1	5.0	µg/L		27.9			2.71	20	
Selenium	ND	5.0	µg/L		ND			NC	20	
Silver	ND	0.20	µg/L		ND			NC	20	
Zinc	32.4	10	µg/L		32.7			0.762	20	
Matrix Spike (B301882-MS1)		**Source: 22B0961-01**		Prepared: 02/23/22 Analyzed: 03/03/22						
Antimony	376	10	µg/L	500	ND	75.1	70-130			
Arsenic	485	8.0	µg/L	500	7.90	95.4	70-130			
Cadmium	487	2.0	µg/L	500	9.20	95.5	70-130			
Chromium	486	10	µg/L	500	23.0	92.6	70-130			
Copper	965	10	µg/L	1000	45.8	91.9	70-130			
Lead	482	5.0	µg/L	500	7.59	95.0	70-130			
Nickel	503	50	µg/L	500	27.9	95.0	70-130			
Selenium	435	50	µg/L	500	ND	87.0	70-130			
Silver	459	2.0	µg/L	500	ND	91.7	70-130			
Zinc	948	100	µg/L	1000	32.7	91.5	70-130			
Batch B302066 - EPA 200.7										
Blank (B302066-BLK1)				Prepared & Analyzed: 02/28/22						
Iron	ND	0.050	mg/L							
LCS (B302066-BS1)				Prepared & Analyzed: 02/28/22						
Iron	3.92	0.050	mg/L	4.00		98.1	85-115			
LCS Dup (B302066-BSD1)				Prepared & Analyzed: 02/28/22						
Iron	3.76	0.050	mg/L	4.00		94.0	85-115	4.26	20	
Duplicate (B302066-DUP1)		**Source: 22B0961-01**		Prepared & Analyzed: 02/28/22						
Iron	2.20	0.050	mg/L		2.17			1.19	20	
Matrix Spike (B302066-MS1)		**Source: 22B0961-01**		Prepared & Analyzed: 02/28/22						
Iron	5.98	0.050	mg/L	4.00	2.17	95.1	70-130			

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QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301587 - EPA 245.1 Dissolved										
Blank (B301587-BLK1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	ND	0.00010	mg/L							
LCS (B301587-BS1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	0.00407	0.00010	mg/L	0.00402		101	85-115			
LCS Dup (B301587-BSD1)				Prepared: 02/19/22 Analyzed: 02/20/22						
Mercury	0.00426	0.00010	mg/L	0.00402		106	85-115	4.67	20	
Batch B301897 - EPA 200.7 Dissolved										
Blank (B301897-BLK1)				Prepared: 02/23/22 Analyzed: 02/25/22						
Iron	ND	0.050	mg/L							
LCS (B301897-BS1)				Prepared: 02/23/22 Analyzed: 02/25/22						
Iron	4.07	0.050	mg/L	4.00		102	85-115			
LCS Dup (B301897-BSD1)				Prepared: 02/23/22 Analyzed: 02/25/22						
Iron	3.98	0.050	mg/L	4.00		99.5	85-115	2.23	20	
Batch B301898 - EPA 200.8 Dissolved										
Blank (B301898-BLK1)				Prepared: 02/23/22 Analyzed: 02/27/22						
Antimony	ND	1.0	µg/L							
Arsenic	ND	0.80	µg/L							
Cadmium	ND	0.20	µg/L							
Chromium	ND	1.0	µg/L							
Copper	ND	1.0	µg/L							
Lead	ND	0.50	µg/L							
Nickel	ND	5.0	µg/L							
Selenium	ND	5.0	µg/L							
Zinc	ND	10	µg/L							
LCS (B301898-BS1)				Prepared: 02/23/22 Analyzed: 02/27/22						
Antimony	518	10	µg/L	500		104	85-115			
Arsenic	461	8.0	µg/L	500		92.2	85-115			
Cadmium	466	2.0	µg/L	500		93.3	85-115			
Chromium	487	10	µg/L	500		97.5	85-115			
Copper	937	10	µg/L	1000		93.7	85-115			
Lead	479	5.0	µg/L	500		95.8	85-115			
Nickel	479	50	µg/L	500		95.8	85-115			
Selenium	433	50	µg/L	500		86.6	85-115			
Zinc	947	100	µg/L	1000		94.7	85-115			

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QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B301898 - EPA 200.8 Dissolved											
LCS Dup (B301898-BSD1)				Prepared: 02/23/22 Analyzed: 02/27/22							
Antimony	502	10	µg/L	500		100		85-115	3.15	20	
Arsenic	426	8.0	µg/L	500		85.3		85-115	7.83	20	
Cadmium	431	2.0	µg/L	500		86.1		85-115	7.94	20	
Chromium	449	10	µg/L	500		89.8		85-115	8.21	20	
Copper	871	10	µg/L	1000		87.1		85-115	7.29	20	
Lead	442	5.0	µg/L	500		88.5		85-115	7.95	20	
Nickel	443	50	µg/L	500		88.6		85-115	7.77	20	
Selenium	402	50	µg/L	500		**80.3**	*	85-115	7.49	20	L-07
Zinc	925	100	µg/L	1000		92.5		85-115	2.33	20	
Batch B302248 - EPA 200.8 Dissolved											
Blank (B302248-BLK1)				Prepared: 03/01/22 Analyzed: 03/02/22							
Silver	ND	0.20	µg/L								
LCS (B302248-BS1)				Prepared: 03/01/22 Analyzed: 03/02/22							
Silver	499	2.0	µg/L	500		99.8		85-115			
LCS Dup (B302248-BSD1)				Prepared: 03/01/22 Analyzed: 03/02/22							
Silver	493	2.0	µg/L	500		98.5		85-115	1.25	20	
Batch B302336 - EPA 200.8 Dissolved											
Blank (B302336-BLK1)				Prepared: 03/02/22 Analyzed: 03/03/22							
Antimony	ND	1.0	µg/L								
Arsenic	ND	0.80	µg/L								
Cadmium	ND	0.20	µg/L								
Chromium	ND	1.0	µg/L								
Copper	ND	1.0	µg/L								
Lead	ND	0.50	µg/L								
Nickel	ND	5.0	µg/L								
Selenium	ND	5.0	µg/L								
Silver	ND	0.20	µg/L								
Zinc	ND	10	µg/L								
LCS (B302336-BS1)				Prepared: 03/02/22 Analyzed: 03/03/22							
Antimony	512	10	µg/L	500		102		85-115			
Arsenic	542	8.0	µg/L	500		108		85-115			
Cadmium	477	2.0	µg/L	500		95.4		85-115			
Chromium	482	10	µg/L	500		96.4		85-115			
Copper	1050	10	µg/L	1000		105		85-115			
Lead	469	5.0	µg/L	500		93.7		85-115			
Nickel	486	50	µg/L	500		97.2		85-115			
Selenium	465	50	µg/L	500		93.0		85-115			
Silver	441	2.0	µg/L	500		88.1		85-115			
Zinc	913	100	µg/L	1000		91.3		85-115			

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QUALITY CONTROL

Metals Analyses (Dissolved) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B302336 - EPA 200.8 Dissolved										
LCS Dup (B302336-BSD1)				Prepared: 03/02/22 Analyzed: 03/03/22						
Antimony	522	10	µg/L	500		104	85-115	1.95	20	
Arsenic	487	8.0	µg/L	500		97.3	85-115	10.8	20	
Cadmium	485	2.0	µg/L	500		96.9	85-115	1.66	20	
Chromium	495	10	µg/L	500		99.1	85-115	2.71	20	
Copper	964	10	µg/L	1000		96.4	85-115	8.93	20	
Lead	476	5.0	µg/L	500		95.1	85-115	1.47	20	
Nickel	500	50	µg/L	500		99.9	85-115	2.78	20	
Selenium	485	50	µg/L	500		97.0	85-115	4.15	20	
Silver	448	2.0	µg/L	500		89.7	85-115	1.74	20	
Zinc	937	100	µg/L	1000		93.7	85-115	2.62	20	
Duplicate (B302336-DUP1)	**Source: 22B0961-01**			Prepared: 03/02/22 Analyzed: 03/03/22						
Antimony	ND	1.0	µg/L		ND			NC	20	
Arsenic	ND	0.80	µg/L		ND			NC	20	
Cadmium	7.17	0.20	µg/L		7.02			2.19	20	
Chromium	ND	1.0	µg/L		ND			NC	20	
Copper	164	1.0	µg/L		187			12.9	20	
Lead	2.90	0.50	µg/L		2.91			0.306	20	
Nickel	14.9	5.0	µg/L		15.9			6.68	20	
Selenium	ND	25	µg/L		ND			NC	20	DL-03
Silver	ND	0.20	µg/L		ND			NC	20	
Zinc	20.2	10	µg/L		19.7			2.59	20	
Matrix Spike (B302336-MS1)	**Source: 22B0961-01**			Prepared: 03/02/22 Analyzed: 03/03/22						
Antimony	499	5.0	µg/L	500	ND	99.7	70-130			
Arsenic	496	8.0	µg/L	500	ND	99.1	70-130			
Cadmium	457	1.0	µg/L	500	7.02	90.1	70-130			
Chromium	450	5.0	µg/L	500	ND	89.9	70-130			
Copper	977	10	µg/L	1000	187	79.0	70-130			
Lead	452	2.5	µg/L	500	2.91	89.8	70-130			
Nickel	456	25	µg/L	500	15.9	88.0	70-130			
Selenium	446	25	µg/L	500	ND	89.3	70-130			
Silver	434	1.0	µg/L	500	ND	86.8	70-130			
Zinc	878	50	µg/L	1000	19.7	85.9	70-130			

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD		RPD Limit	Notes
Batch B301386 - SM21-23 3500 Cr B												
Blank (B301386-BLK1)				Prepared & Analyzed: 02/16/22								
Hexavalent Chromium	ND	0.010	mg/L									
LCS (B301386-BS1)				Prepared & Analyzed: 02/16/22								
Hexavalent Chromium	0.11	0.010	mg/L	0.100		109		90-114				
LCS Dup (B301386-BSD1)				Prepared & Analyzed: 02/16/22								
Hexavalent Chromium	0.12	0.010	mg/L	0.100		**115**	*	90-114	**5.81**	*	5	L-07A
Batch B301392 - SM21-23 2540D												
Blank (B301392-BLK1)				Prepared & Analyzed: 02/17/22								
Total Suspended Solids	ND	2.5	mg/L									
LCS (B301392-BS1)				Prepared & Analyzed: 02/17/22								
Total Suspended Solids	237		mg/L	200		118		53.8-124				
Batch B301493 - EPA 1664B												
Blank (B301493-BLK1)				Prepared & Analyzed: 02/18/22								
Silica Gel Treated HEM (SGT-HEM)	ND	1.4	mg/L									
Blank (B301493-BLK2)				Prepared & Analyzed: 02/18/22								
Silica Gel Treated HEM (SGT-HEM)	ND	5.6	mg/L									
LCS (B301493-BS1)				Prepared & Analyzed: 02/18/22								
Silica Gel Treated HEM (SGT-HEM)	8.7	1.4	mg/L	10.0		87.0		64-132				
LCS (B301493-BS2)				Prepared & Analyzed: 02/18/22								
Silica Gel Treated HEM (SGT-HEM)	34	5.6	mg/L	40.0		84.0		64-132				
Matrix Spike (B301493-MS1)	**Source: 22B0961-01**			Prepared & Analyzed: 02/18/22								
Silica Gel Treated HEM (SGT-HEM)	78	14	mg/L	100	ND	78.0		64-132				
Batch B301537 - EPA 350.1												
Blank (B301537-BLK1)				Prepared & Analyzed: 02/18/22								
Ammonia as N	ND	0.10	mg/L									
LCS (B301537-BS1)				Prepared & Analyzed: 02/18/22								
Ammonia as N	1.9	0.10	mg/L	2.00		96.2		90-110				

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QUALITY CONTROL

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B301537 - EPA 350.1										
LCS Dup (B301537-BSD1)				Prepared & Analyzed: 02/18/22						
Ammonia as N	1.9	0.10	mg/L	2.00		95.4	90-110	0.887	20	
Batch B301718 - EPA 1664B										
Blank (B301718-BLK1)				Prepared & Analyzed: 02/22/22						
Silica Gel Treated HEM (SGT-HEM)	ND	1.4	mg/L							
Blank (B301718-BLK2)				Prepared & Analyzed: 02/22/22						
Silica Gel Treated HEM (SGT-HEM)	ND	5.6	mg/L							
LCS (B301718-BS1)				Prepared & Analyzed: 02/22/22						
Silica Gel Treated HEM (SGT-HEM)	8.5	1.4	mg/L	10.0		85.0	64-132			
LCS (B301718-BS2)				Prepared & Analyzed: 02/22/22						
Silica Gel Treated HEM (SGT-HEM)	33	5.6	mg/L	40.0		82.0	64-132			

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

LCS

Lab Sample ID: B301406-BS1

Date(s) Analyzed: 02/19/2022 02/19/2022

Instrument ID (1): ECD3

Instrument ID (2): ECD3

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.409	
	2	0.000	0.000	0.000	0.422	2.9
Aroclor-1260	1	0.000	0.000	0.000	0.401	
	2	0.000	0.000	0.000	0.403	0.7

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

LCS Dup

Lab Sample ID: B301406-BSD1 Date(s) Analyzed: 02/19/2022 02/19/2022

Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.364	
	2	0.000	0.000	0.000	0.382	5.9
Aroclor-1260	1	0.000	0.000	0.000	0.371	
	2	0.000	0.000	0.000	0.374	1.1

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
B-05	Data is not affected by elevated level in laboratory blank since sample(s) result is "Not Detected".
DL-01	Elevated reporting limits for all volatile compounds due to foaming sample matrix.
DL-03	Elevated reporting limit due to matrix interference.
H-03	Sample received after recommended holding time was exceeded.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
L-07A	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD outside of control limits. Reduced precision anticipated for any reported result for this compound.
RL-12	Elevated reporting limit due to matrix interference.
S-07	One associated surrogate standard recovery is outside of control limits but the other(s) is/are within limits. All recoveries are > 10%.
V-04	Initial calibration did not meet method specifications. Compound was calibrated using a response factor where %RSD is outside of method specified criteria. Reported result is estimated.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
V-06	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side for this compound.
V-20	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.
V-35	Initial calibration verification (ICV) did not meet method specifications and was biased on the high side for this compound. Reported result is estimated.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
- in Water	
Cyanide	CT,MA,NH,NY,RI,NC,ME,VA
608.3 in Water	
Aroclor-1016	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1016 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1221	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1221 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1232	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1232 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1242	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1242 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1248	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1248 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1254	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1254 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1260	CT,MA,NH,NY,RI,NC,ME,VA
Aroclor-1260 [2C]	CT,MA,NH,NY,RI,NC,ME,VA
624.1 in Water	
Acetone	CT,NY,MA,NH
Benzene	CT,NY,MA,NH,RI,NC,ME,VA
tert-Butyl Alcohol (TBA)	NY,MA
1,2-Dichlorobenzene	CT,NY,MA,NH,RI,NC,ME,VA
1,3-Dichlorobenzene	CT,NY,MA,NH,RI,NC,ME,VA
1,4-Dichlorobenzene	CT,NY,MA,NH,RI,NC,ME,VA
1,2-Dichloroethane	CT,NY,MA,NH,RI,NC,ME,VA
cis-1,2-Dichloroethylene	NY,MA
1,1-Dichloroethane	CT,NY,MA,NH,RI,NC,ME,VA
1,1-Dichloroethylene	CT,NY,MA,NH,RI,NC,ME,VA
1,4-Dioxane	MA
Ethanol	NY,MA,NH
Ethylbenzene	CT,NY,MA,NH,RI,NC,ME,VA
Methyl tert-Butyl Ether (MTBE)	NY,MA,NH,NC
Methylene Chloride	CT,NY,MA,NH,RI,NC,ME,VA
Tetrachloroethylene	CT,NY,MA,NH,RI,NC,ME,VA
Toluene	CT,NY,MA,NH,RI,NC,ME,VA
1,1,1-Trichloroethane	CT,NY,MA,NH,RI,NC,ME,VA
1,1,2-Trichloroethane	CT,NY,MA,NH,RI,NC,ME,VA
Trichloroethylene	CT,NY,MA,NH,RI,NC,ME,VA
Xylenes (total)	NY,MA,NH,VA
Vinyl Chloride	CT,NY,MA,NH,RI,NC,ME,VA
m+p Xylene	CT,NY,MA,NH,RI,NC
o-Xylene	CT,NY,MA,NH,RI,NC
625.1 in Water	
Butylbenzylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
Di-n-butylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
1,3-Dichlorobenzene	MA,NC
1,4-Dichlorobenzene	MA,NC

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
625.1 in Water	
1,2-Dichlorobenzene	MA,NC
Diethylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
Dimethylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
Di-n-octylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
Bis(2-Ethylhexyl)phthalate	CT,MA,NH,NY,NC,RI,ME,VA
2-Fluorophenol	NC
2-Fluorophenol	NC,VA
Phenol-d6	VA
Nitrobenzene-d5	VA
EPA 200.7 in Water	
Iron	CT,MA,NH,NY,RI,NC,ME,VA
Iron	CT,MA,NH,NY,RI,NC,ME,VA
EPA 200.8 in Water	
Antimony	CT,MA,NH,NY,RI,NC,ME,VA
Antimony	CT,MA,NH,NY,RI,NC,ME,VA
Arsenic	CT,MA,NH,NY,RI,NC,ME,VA
Arsenic	CT,MA,NH,NY,RI,NC,ME,VA
Cadmium	CT,MA,NH,NY,RI,NC,ME,VA
Cadmium	CT,MA,NH,NY,RI,NC,ME,VA
Chromium	CT,MA,NH,NY,RI,NC,ME,VA
Chromium	CT,MA,NH,NY,RI,NC,ME,VA
Copper	CT,MA,NH,NY,RI,NC,ME,VA
Copper	CT,MA,NH,NY,RI,NC,ME,VA
Lead	CT,MA,NH,NY,RI,NC,ME,VA
Lead	CT,MA,NH,NY,RI,NC,ME,VA
Nickel	CT,MA,NH,NY,RI,NC,ME,VA
Nickel	CT,MA,NH,NY,RI,NC,ME,VA
Selenium	CT,MA,NH,NY,RI,NC,ME,VA
Selenium	CT,MA,NH,NY,RI,NC,ME,VA
Silver	CT,MA,NH,NY,RI,NC,ME,VA
Silver	CT,MA,NH,NY,RI,NC,ME,VA
Zinc	CT,MA,NH,NY,RI,NC,ME,VA
Zinc	CT,MA,NH,RI,NY,NC,ME,VA
EPA 245.1 in Water	
Mercury	CT,MA,NH,RI,NY,NC,ME,VA
Mercury	CT,MA,NH,RI,NY,NC,ME,VA
EPA 350.1 in Water	
Ammonia as N	NC,NY,MA,NH,RI,ME,VA
SM21-23 2540D in Water	
Total Suspended Solids	CT,MA,NH,NY,RI,NC,ME,VA
SM21-23 3500 Cr B in Water	
Hexavalent Chromium	NY,CT,NH,RI,ME,VA,NC

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Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2024
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2022
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2023
RI	Rhode Island Department of Health	LAO00373	12/30/2022
NC	North Carolina Div. of Water Quality	652	12/31/2022
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2022
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

22B0961

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CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 5_07/13/2021

Page ____ of ____

Company Name:	Nobis
Address:	585 Middlesex St Lowell
Phone:	
Project Name:	Oliver School
Project Location:	Lawrence MA
Project Number:	96660.200/100
Project Manager:	Jeff Brunelle
Pace Quote Name/Number:	
Invoice Recipient:	
Sampled By:	AE

Requested Turnaround Time
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5day

Rush-Approval Required
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Dissolved Metals Samples
☒ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Data Delivery
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: JBrunelle@nobis-group.com
Fax To #:

PCB ONLY
SOXHLET ☐
NON SOXHLET ☐

ANALYSIS REQUESTED

Pace Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	[1] Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	H: VOC 624 + Ethanol + MTBE	H: SVOC 625	N: Total metals	N: dissolved metals	X: CN SM4500	I: Total suspended solids 1002	S: Ammonia 4500	I: TPH 8100	H: PCB 608	S: Oil + Grease (Hem) 1664A	
1	NB-2 MW	2/14/22	1400	G	GW	U	2	10	5			X	X	X	X	X	X	X	X	X	X	
2	NB-102(MW)	2/16/22	915	|	|	|	2	10	5			X	X	X	X	X	X	X	X	X	X	
3	TB-02	2/16/22	800				2					X										

[2] Preservation Code

Courier Use Only

Total Number Of:
VIALS ____
GLASS ____
PLASTIC ____
BACTERIA ____
ENCORE ____

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Pace Analytical is not responsible for missing samples from prepacked coolers

[1] **Matrix Codes:**
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] **Preservation Codes:**
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

Relinquished by: (signature)	Date/Time:
[signature]	2/16/22 @ 12:58 pm
Received by: (signature)	Date/Time:
[signature]	2/16/22 1258
Relinquished by: (signature)	Date/Time:
[signature]	2/16/22 1735
Received by: (signature)	Date/Time:
[signature] 3.8	2/16/22 1735
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments:
Metals Sb, As, Cd, Cr III, Cu, Fe, Pb, Hg, Ni, Se, Ag, Zn EPA 200.8

Detection Limit Requirements
MA
CT
Other:

Special Requirements
☒ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

Lab Comments:

TPH 8100 not needed, this requirement is fullfilled via Oil and grease. JLH 2/17/22

Disclaimer: Pace Analytical is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Pace Analytical values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client Nob's

Received By OH Date 2-16-22 Time 1735

How were the samples received? In Cooler T No Cooler _____ On Ice T No Ice _____ Direct from Sampling _____ Ambient _____ Melted Ice _____

Were samples within Temperature? 2-6°C T By Gun # 5 Actual Temp - 3.8 By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? NA Were Samples Tampered with? NA

Was COC Relinquished ? T Does Chain Agree With Samples? T

Are there broken/leaking/loose caps on any samples? F

Is COC in ink/ Legible? T Were samples received within holding time? T

Did COC include all pertinent Information? Client T Project T Analysis T ID's T Sampler Name T Collection Dates/Times T

Are Sample labels filled out and legible? T

Are there Lab to Filters? F Who was notified? _____

Are there Rushes? F Who was notified? _____

Are there Short Holds? F Who was notified? _____

Is there enough Volume? T

Is there Headspace where applicable? F MS/MSD? F

Proper Media/Containers Used? T Is splitting samples required? F

Were trip blanks received? TT On COC? F

Do all samples have the proper pH? Acid T Base _____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	20	1 Liter Plastic	2	16 oz Amb.	
HCL-	6	500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic	8	4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

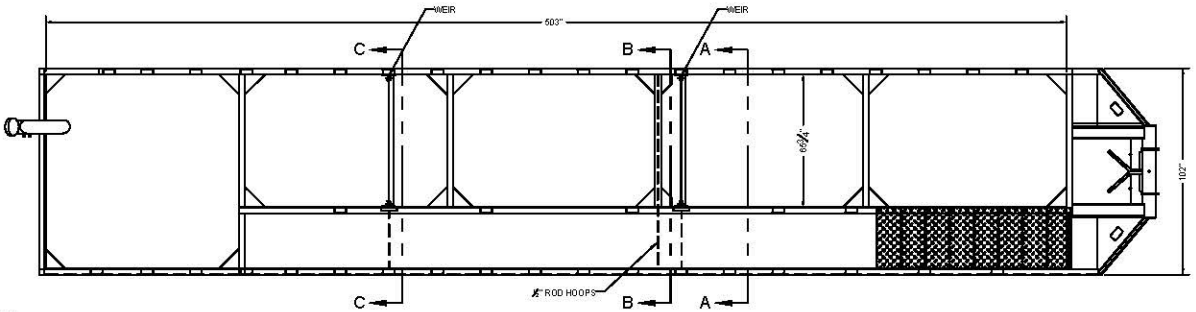
Unused Media

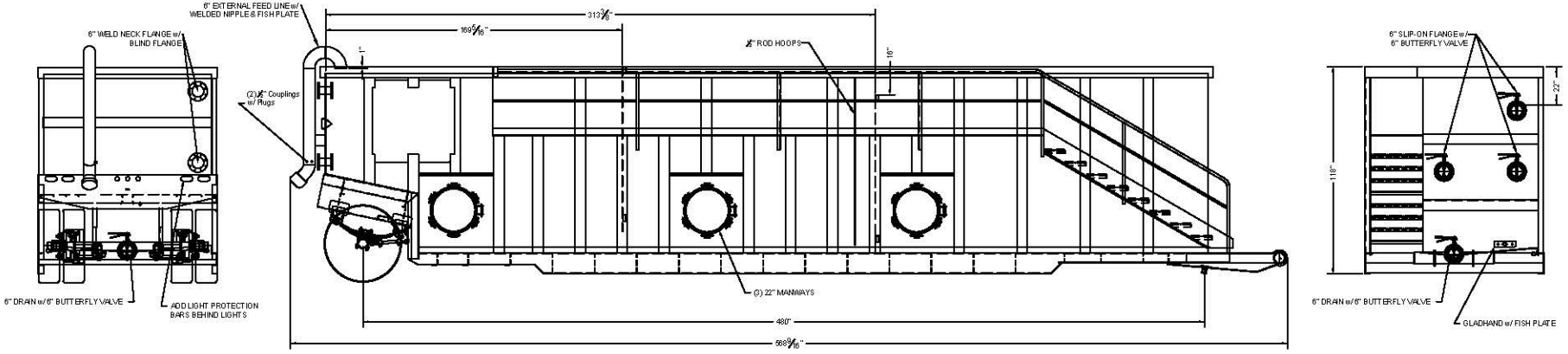
Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

Cutsheets and SDSs

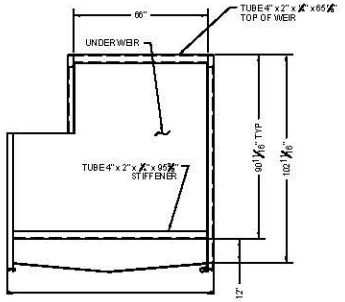
APPENDIX C



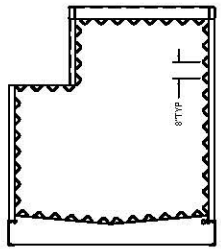


STANDARD SPECIFICATION

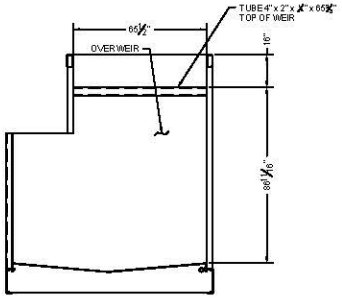
CAPACITY: .... 18,480 GALLONS (440 BBL)
SIDE SHEETS: .... 1/4" A36 PLATE
FRONT SHEET: .... 1/4" A36 PLATE
REAR SHEET: .... 1/4" A36 PLATE
FLOOR: .... 1/4" A36 PLATE
MAIN FLOOR RAILS: .... 12" x 20.7# STRUCTURAL CHANNEL
FLOOR CROSSMEMBERS: .... 1/4" A36 PLATE
SIDE STAKES: .... ONE PIECE 3/16" A36 PLATE
SUSPENSION: .... 3 LEAF SPRING, 22,500 LBS. CACPACITY
AXLE: .... 77.5" TRACK, 22,500 LBS. CAPACITY
TIRES: .... 11R22.5 RADIAL
WHEELS: .... 8.25 x 22.5 STEEL
MANWAYS: .... 3 - 22" DIA. CURB SIDE
VALVES: .... 3 - 6" BUTTERFLY VALVE (FRONT)
1 - 6" DRAIN BUTTERFLY VALVE (FRONT)
1 - 6" DRAIN BUTTERFLY VALVE (REAR)
2 - 6" BLIND FLANGE CONNECTION (REAR)
INLET PIPING: .... 1 - 6" PIPE SYSTEM (REAR)



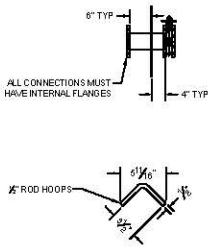
SECTION VIEW "C-C"



SECTION VIEW "B-B"



SECTION VIEW "A-A"

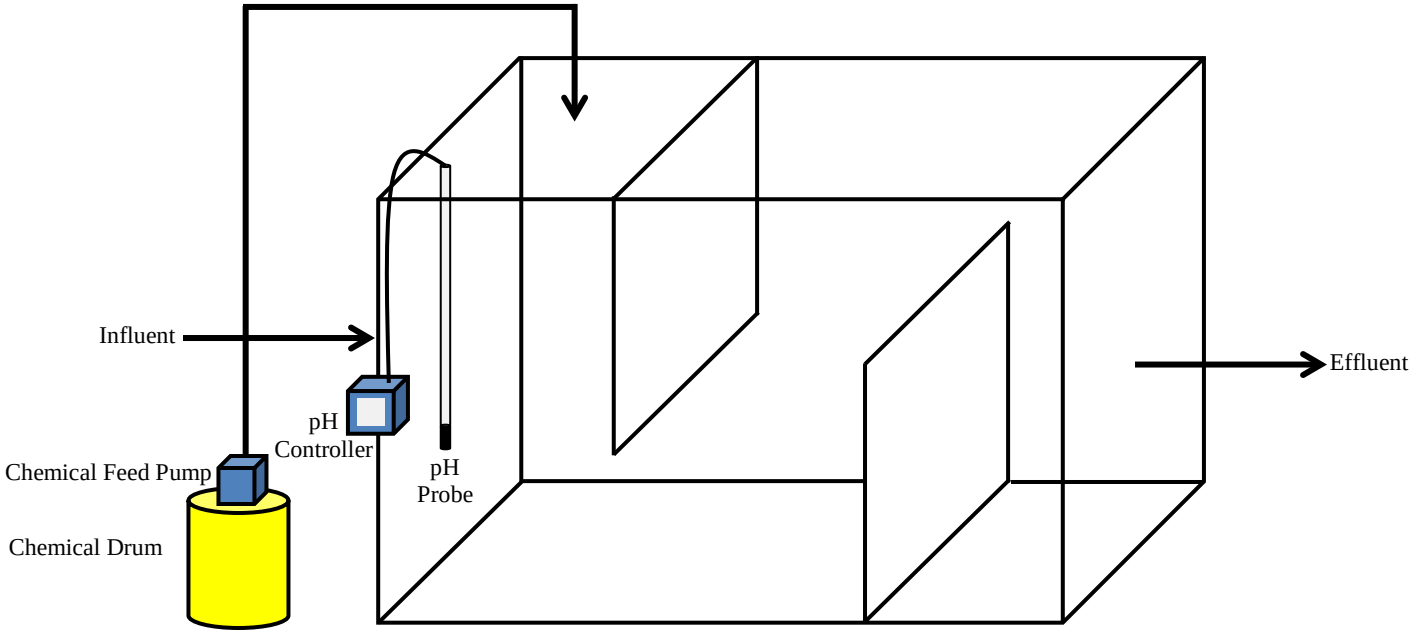


NOTE:
This drawing is a representation baseline for this model of tank. Variations between this drawing and the actual equipment do exist, primarily with appurtenance locations, sizes and quantities.

18,000 gal. Weir Tank

Lockwood Remediation Technologies, LLC

89 Crawford Street
Leominster, Massachusetts 01453
O: 774-450-7177
F: 888-835-0617



Notes:

1.) Figure is not to scale.
2.) System layout can vary with site conditions.

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

Configuration of pH Adjustment System

One Controller or the roade t an e o Sen or .

Choo e rom 30 di ital and analo en or amilie or u to 17 di:erent arameter .

a imum er atility

he c200 controller allow the u e o di ital and analo en or , either alone or in combination, to rovide com atibility with Hach broad ran e o en or , eliminatin the need or dedicated, arameter eci ic controller .

a e o e and Con idence in e ult

Lar e, hi h re olution, tran re lective di lay rovide o timal viewin re olution in any li htin condition. Guided calibration rocedure in 19 lan ua e minimi e com le ity and reduce o erator error. a word rotected SD card reader o:er a im le olution or data download and tran er. i ual warnin y tem rovide critical alert .

Wide ariety o Communication O tion

tili e two to ive analo out ut to tran mit rimary and econdary value or each en or, or inte rate Hach en or and analy er into OD S S232/ S 8 , ro ibu D , and HA networ .

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

Controller Com ari on

eatures	Previous Mo els sc Controller	l Controller	sc Controller	ene its
Display	6 128 i el 33 66 mm 1.3 2.6 in.	6 128 i el 33 66 mm 1.3 2.6 in.	160 2 0 i el 8 68 mm 1.89 2.67 in. ran re lective	m roved u er inter ace 0 bi er a ier to read in dayli ht and unli ht
Data Management	irDA ort/ DA Service Cable	N/A	SD Card Service Cable	Sim li ie data tran er Standardi ed acce orie / ma com atibility
Sensor Inputs	2 a Direct Di ital Analo via ternal Gateway	2 a Analo De endin on arameter	2 a Di ital and/or Analo with Sen or Card	Sim li ie analo en or connection Wor with analo and di ital en or
Analog Inputs	N/A	N/A	1 Analo n ut Si nal Analo 20mA Card	nable non c analy er monitorin Acce t mA i nal rom other analy er or local di lay Con olidate analo mA i nal to a di ital out ut
mA utputs	2 Standard	2 Standard	2 Standard O tional 3 Additional	otal o ive 20 mA out ut allow multi le mA out ut er en or in ut
Digital Communication	OD S S232/ S 8 ro ibu D 1.0	HA	OD S S232/ S 8 ro ibu D 1.0 HA 7.2	n recedented combination o en or breadth and di ital communication o tion

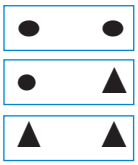
Choo e rom Hach road an e o Di ital and Analo Sen or

Parameter	Sensor	Digital or Analog
Ammonia	A A c, NH D c, A S c, AN S c	●
Chlorine	CL 10 c, CL 10 c, 918 c	●
Chlorine Dio ide	918 c	●
Conductivity	GL 3 00 Contactin , GL 3700 nductive	▲
Di olved O y en	LDO odel 2, 7 0 c	●
Di olved O y en	00	▲
low	3, 3 Sen or	▲
Nitrate	N A A c, NO3D c, N S c, AN S c	●
Oil in Water	360 c	●
Or anic	AS c	●
O one	9187 c	●
H/O	HD	●
H/O	HD, H Combination, LC	▲
ho hate	HOS HA c	●
Slud e Level	SONA A c	●
Su ended Solid	SOL A c, SS c	●
urbidity	1720 , 660 c, SS7 c, L A c, SOL A c, SS c	●
ltra ure Conductivity	8310, 8311, 8312, 831 , 8316, 8317 Contactin	▲
ltra ure H/O	8362	▲

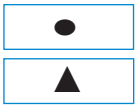
● Di ital ▲ Analo

Connect u to two o any o the en or li ted above, in any combination, to meet your a lication need . he dia ram below demon trate the otential con i uration . O eration o analo en or re uire the controller to be e ui ed with the a ro riate en or module. Contact Hach echnical Su ort or hel with electin the a ro riate module.

Channel Con igurations



Channel Con igurations



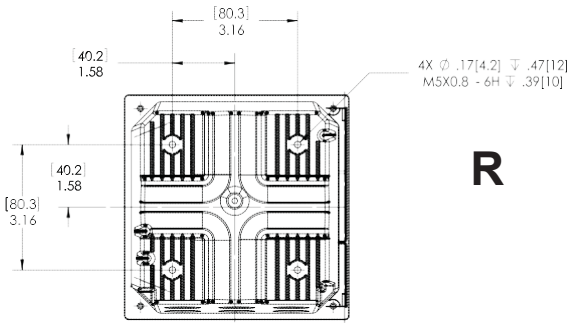
S eci ication

Dimensions D	.7 in .7 in 7.1 in 1 mm 1 mm 181 mm
Display	Gra hic dot matri LCD with L D bac li htin , tran re lective
Display Si e	1.9 2.7 in. 8 mm 68 mm
Display Resolution	2 0 160 i el
eight	3.7 lb . 1.70
Power Re uirements oltage	100 2 0 AC, 2 DC
Power Re uirements	0/60 H
perating Temperature Range	20 to 60 C , 0 to 9 H non conden in
Analog utputs	wo ive with o tional e an ion module to i olated current out ut , ma 0 Ω , Accuracy: 0.1 o S 20mA at 2 C, 0. o S over 20 C to 60 C ran e O erational ode: mea urement or calculated value
Analog utput unctional Mo e	Linear, Lo arithmic, i linear, D
Security evels	2 a word rotected level
Mounting Con igurations	Wall, ole, and anel mountin
nclosure Rating	N A / 66
Con uit penings	1/2 in N Conduit
Relay perational Mo e	rimary or econdary mea urement, calculated value dual channel only or timer
Relay unctions	Scheduler imer , Alarm, eeder Control, vent Control, ul e Width odulation, re uency Control, and Warnin
Relays	our electromechanical S D orm C contact , 1200 W, A
Communication	OD S S232/ S 8 , O SD 1, or HA 7.2 o tional
Memory ac up	la h memory
lectrical Certi ications	C C com liant or conducted and radiated emi ion : C S 11 Cla A limit C mmunity N 61326 1 ndu trial limit Sa ety c Lu a ety mar or: General Location er ANS / L 61010 1 CAN/CSA C22.2. No. 61010 1 Ha ardou Location Cla , Divi ion 2, Grou A, ,C D one 2, Grou C er 3600 / 3611 CSA C22.2 No. 213 1987 with a roved o tion and a ro riately rated Cla , Divi ion 2 or one 2 en or c Lu a ety mar General Location er L 61010 1 CAN/CSA C22.2. No. 61010 1

**Subject to change without notice.*

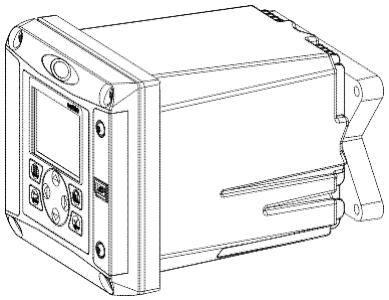
Dimen ion

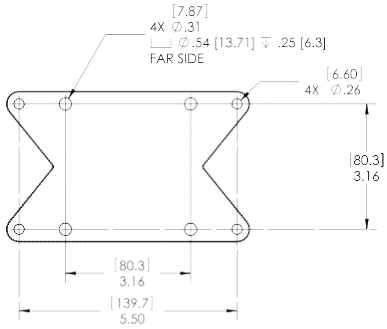
Surface Mounting Dimensions



Mounting Dimensions
(Rear View)

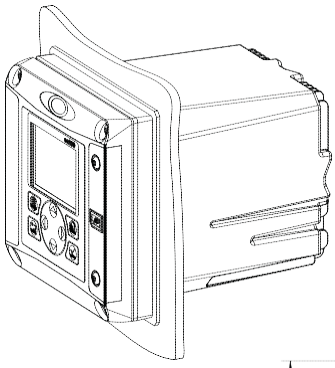
R

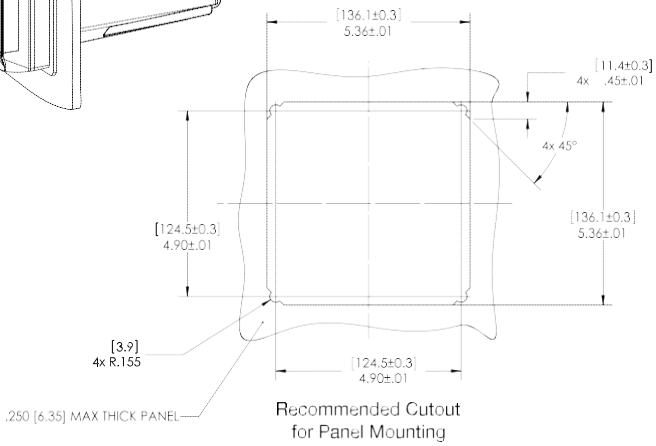




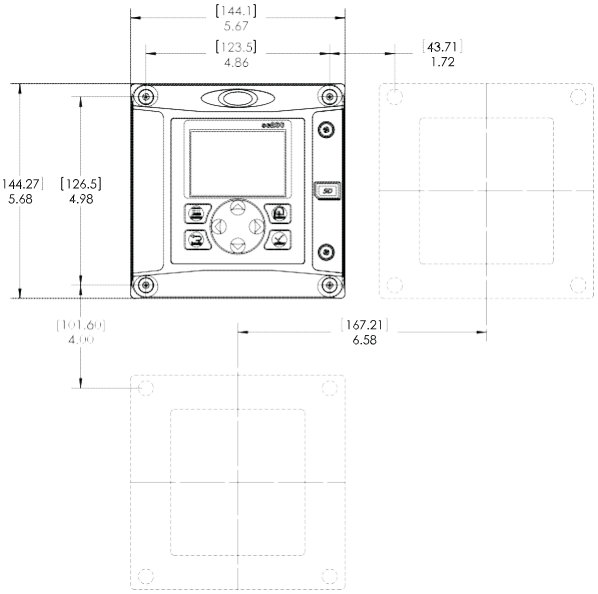
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield
p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



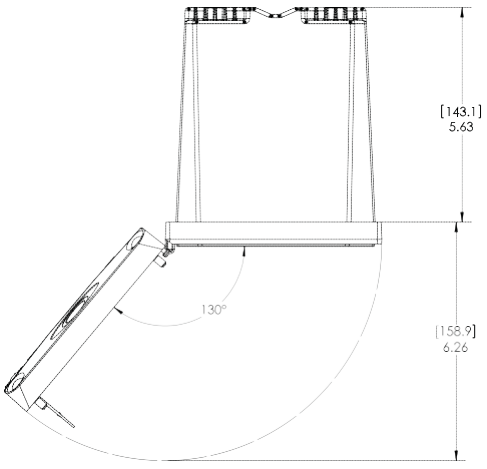


Recommended Cutout
for Panel Mounting

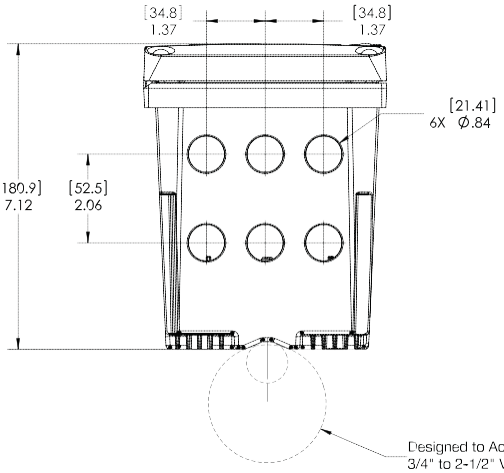


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views

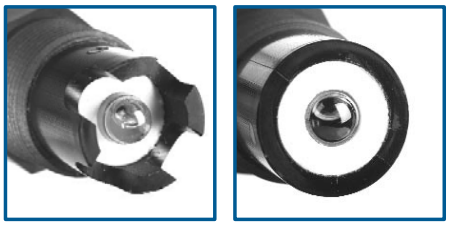


Door Opening Details



inch Com ination p an RP Sensor its

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



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

Features and Benefits

ow Price igh Per ormance

he e combination en or are de i ned or ecialty a lication or immer ion or in line mountin . he re erence cell eature a double unction de i n or e tended ervice li e, and a built in olution round. he body i molded rom chemically re i tant yton or D , and the re erence unction i coa ial orou e lon . All en or are rated 0 to 10 C u to 100 i , and have inte ral . m 1 t. cable with tinned lead . he C erie or H and C erie or O combination en or are ideal or mea urin mild and a re ive media.

Special lectro e Con igurations

Sen or with ru ed dome electrode , ea y to clean lat la electrode , and even H hydro luoric acid re i tant la electrode are available or a wide variety o roce olution .

Temperature Compensation lement ption

he C erie combination H en or are available with or without a t 1000 ohm D tem erature element. he C erie combination O en or are u lied without a tem erature element.

ersatile Mounting Styles

Sen or are available in three mountin tyle convertible, in ertion, and anitary. lea e turn to a e 3 or more in ormation.

ull eature Plug an Play ach sc Digital Controllers

here are no com licated wirin or et u rocedure with any Hach c controller. u t lu in any combination o Hach di ital en or and it ready to u e it lu and lay.

ne or multiple sensors he c controller amily allow you to receive data rom u to ei ht Hach di ital en or in any combination u in a in le controller.

Communications ulti le alarm/control cheme are available u in the relay and D control out ut . Available communication include analo 20 mA, di ital OD S S 8 and S232 or ro ibu D rotocol . Other di ital rotocol are available. Contact your Hach re re entative or detail .

Data logger A built in data lo er collect mea urement data, calibration, veri ication oint , and alarm hi tory.

DW = drinking water WW = wastewater municipal PW = pure water / power
IW = industrial water E = environmental C = collections FB = food and beverage

Specifications*

o t H a lication all in the 2. 12. H ran e. General ur o e H la electrode er orm well in thi ran e. Some indu trial a lication re uire accurate mea urement and control at H value below 2 or above 12. Con ult Hach echnical Su ort or detail on the e a lication .

Com ination p Sensors

Measuring Range
0 to 1 H

Accuracy
Le than 0.1 H under re erence condition

Temperature Range
0 to 10 C 32 to 221

Flow Rate
0 to 2 m/ 0 to 6.6 t./ ; non abra ive

Pressure Range
0 to 6.9 bar at 100 C 0 to 100 i at 212

Signal Transmission Distance
100 m 328 t. when u ed with the Hach Di ital Gateway and a Hach c Di ital Controller.

1000 m 3280 t. when u ed with the Hach Di ital Gateway, ermination o , and a Hach c Di ital Controller.

Sensor Cable
nte ral coa ial cable lu two conductor or tem erature com en ator o tion ; . m 1 t. lon

Wetted Materials

Convertible style: yton body la illed

Insertion style: D body Kynar

Sanitary style: 316 tainle teel leeved D body

Common material or all en or tyle include e lon double unction, la roce electrode, and iton O rin

Warranty
90 day

Com ination RP Sensors

Measuring Range
2000 to 2000 millivolt

Accuracy
Limited to calibration olution accuracy 20 m

Temperature Range
0 to 10 C 32 to 221

Flow Rate
0 to 2 m/ 0 to 6.6 t./ ; non abra ive

Pressure Range
0 to 6.9 bar at 100 C 0 to 100 i at 212

Signal Transmission Distance
100 m 328 t. when u ed with the Hach Di ital Gateway and a Hach c Di ital Controller.

1000 m 3280 t. when u ed with the Hach Di ital Gateway, ermination o , and a Hach c Di ital Controller.

Sensor Cable
nte ral coa ial cable; . m 1 t. lon ; terminated with tri ed and tinned wire

Wetted Materials

Convertible style: yton body la illed

Insertion style: D body Kynar

Common material or all en or tyle include e lon double unction, la with latinum roce electrode, and iton O rin

Warranty
90 day

**Specifications subject to change without notice.*

Ryton® is a registered trademark of Phillips 66 Co.; Viton® is a registered trademark of E.I. DuPont de Nemours + Co.; Kynar® is a registered trademark of Pennwalt Corp.

Engineering Specifications

1. he H en or hall be available in convertible, in ertion or anitary tyle . he O en or hall be available in only convertible or in ertion tyle .
2. he convertible tyle en or hall have a yton body. he in ertion tyle en or hall have a D body. he anitary tyle en or hall have a 316 tainle teel leeved D body. Common material or all en or tyle hall include a e lon double unction, and iton O rin . he H en or hall have a la H electrode. he O en or hall have a latinum O electrode.
3. he convertible tyle H en or hall be available with or without a built in t 1000 ohm D tem erature element. n ertion and anitary tyle H en or hall have a built in t 1000 ohm D tem erature element. Convertible and in ertion tyle O en or hall not have a built in tem erature element.
. he en or hall communicate via OD S S 8 to a Hach c Di ital Controller.
. he en or hall be Hach Com any odel C c or C erie or H mea urement or odel C c or C erie or O mea urement.

Dimensions

Converti le Style Sensor

he convertible tyle en or ha a yton body that eature 3/ inch N thread on both end . he en or can be directly mounted into a tandard 3/ inch i e tee or low throu h mountin or a tened onto the end o a i e or immer ion mountin . he convertible tyle en or enable inventory con olidation, thereby reducin a ociated co t . ountin tee and immer ion mountin hardware are o ered in a variety o material to uit a lication re uirement .

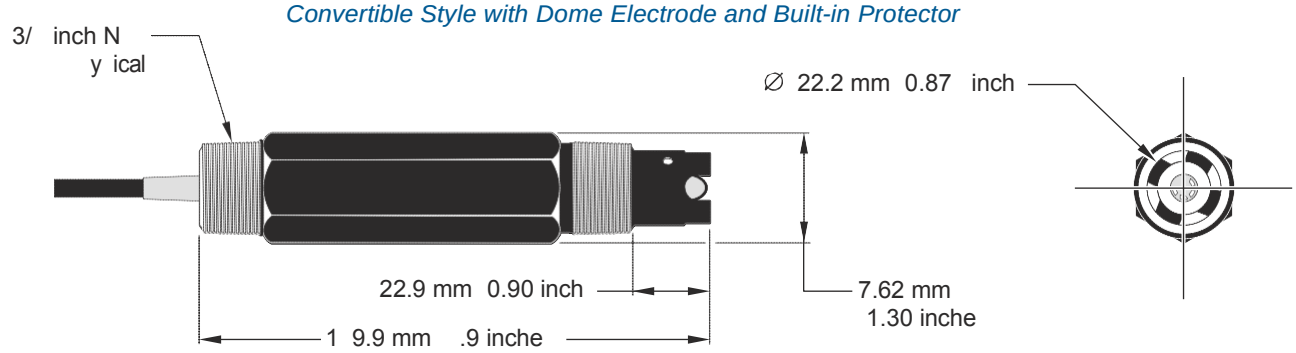
Insertion Style Sensor

n ertion tyle en or eature a lon er, non threaded D body with two iton O rin , rovidin a eal when u ed with the o tional Hach in ertion mount hardware a embly. hi ball valve hardware enable en or in ertion and retraction rom a i e or ve el without havin to to the roce low.

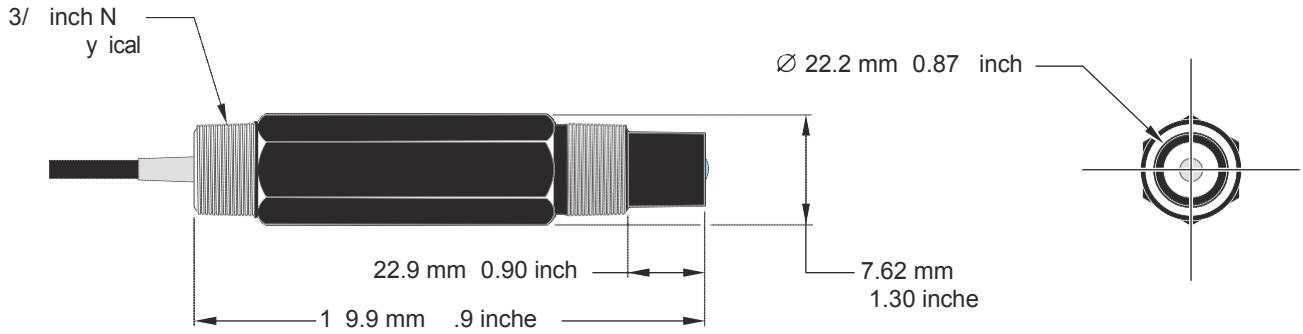
Sanitary Style Sensor

he anitary tyle en or, o ered or H mea urement, ha a 316 tainle teel leeved D body with a 2 inch lan e. he en or mate to a tandard 2 inch ri Clover ittin . he o tional Hach anitary mountin hardware include a tandard 2 inch anitary tee, anitary clam , and iton anitary a et.

Convertible Style with Dome Electrode and Built-in Protector



Convertible Style with Flat Electrode



Lockwood Remediation Technologies, LLC

he ul atron Serie A lu o er manual unction control over tro e len th and tro e rate a tandard with the o tion to elect e ternal ace or automatic control.

en di tinct model are available, havin re ure ca abilitie to 2 0 S G 17 A 12 G O 1.9 l h , and low ca acitie to 8 G O 9.1 l h 100 S G 7.0 A , with a tandard turndown ratio o 100:1, and o tional ratio o 1000:1. eterin er ormance i re roducible to within 3 o ma imum ca acity.

Features

- anual Control by on line ad u table tro e rate and tro e len th.
- Hi hly eliable timin circuit.
- Circuit rotection a ain t volta e and current u et .
- Solenoid rotection by thermal overload with auto re et.
- Water e i tant, or outdoor and indoor a lication .
- nternally Dam ened o educe Noi e.
- Guided all Chec alve Sy tem , to reduce bac low and enhance out tandin rimin characteri tic .
- ew ovin art and Wall ountable.
- Sa e a y rimin with durable lea ree bleed valve a embly tandard .
- O tional Control: ternal ace with auto/manual election.

Controls

Manual Stroke Rate

Manual Stroke Length

External Pacing - Optional

External Pace With Stop - Optional (125 SPM only)

Control O tion		
eature	Standard Con i uration	O tional Con i uration [1]
ternal acin	--	Auto / anual Selection /
ternal ace w/ Sto 12 S only	--	Auto / anual Selection [2]
anual Stro e ate	10:1 atio	100:1 aio
anual Stro e Len th	10:1 atio	10:1 atio
otal urndown atio	1001 atio	1000:1 atio

Note 1:On S2,S3 S i e only.

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

Operating Benefits

- eliable meterin er ormance.
- ated hot or continuou duty.
- Hi h vi co ity ca ability.
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Aftermarket

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LSAblue, icro i ion

Series A Plus lectronic Metering Pumps

Lockwood Remediation Technologies, LLC

Series A Plus

Specifications and Model Selection

OD L			L C2	L 02	L C3	L 03	L 0	L 6	L C	L S2	L S3	L S
Ca acity nominal ma .		G H	0.2	0.2	0. 2	0. 0	1.00	12	2.00	0. 0	1.38	2. 2
		G O	6	6	10	12	2	30	8	12	33	8
		L H	0.9	0.9	1.6	1.9	3.8	.7	7.6	1.9	.2	9.1
re ure[3] ma .	G , D ,316SS or C<;/Ncode wl Seat	S G	2 0 17	1 0 10	2 0 17	1 0 10	100 7	100 (7)	0 33	2 0 17	1 0 10	100 7
	C code tion or CS Seat De a Li uid nd	ar	1 0 10							1 0 10		
Connection :		ubina	11 D 318 OD						318 D 112 OD	11 D 318 OD		
		ioina	11 N									
Stro e / inute		S	12							2 0		

Note 3: um with rated re ure above 1 0 S will be de rated to 1 0 S a .when electin certain valve o tion , ee rice oo or detail .

Engineering Data

um Head aterial Available:	G L C D 316 SS
Dia hra m:	aced CS bac ed
Chec alve aterial Available:	
Seat /0 in :	CS iton
all :	Ceramic 316 SS Alloy C
ittin aterial Available:	G L C D
leed alve:	Same a ittin and chec valve elected, e ce t 316SS
n ection alve oot alve A y:	Same a ittin and chec valve elected
ubin :	Clear C White

m ortant: aterial Code G L Gla illed oly ro ylene, C olyvinyl Chloride, olyethylene, D olyvinylidene luoride, CS Generic ormulation o Hy alon, a re i tered trademar o . . Du ont Com any. iton i a re i tered trademar o . . Du ont Com any. C wetted end recommended or odium hy ochlorite.

Engineering Data

e roducibility:	/ 3 at ma imum ca acty
i co ity a C S:	1000 C S
Stro e re uency a S :	12 /2 0 by odel
Stro e re uency urn Down atio:	10:1/100:1 by odel
Stro e Len th urn Down atio:	10:1
ower n ut:	11 AC/ 0 60 H /1 h 230 AC/ 0 60 H /1 h
Avera e Current Draw:	
11 AC; Am :	0.6 Am
230 AC; Am :	0.3 Am
ea n ut ower:	130 Watt
Avera e n ut ower a S :	0 Watt

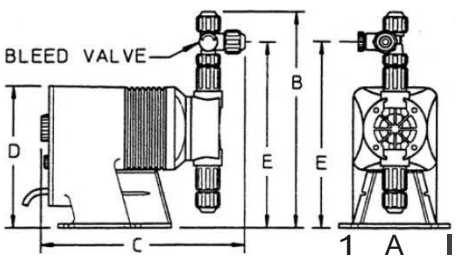
Custom Engineered Designs - Pre-Engineered Systems

re n ineered Sy tem ul a eeder re n ineered Sy tem are de i ned to rovide com lete chemical eed olution or all electronic meterin a lication . rom tand alone im le H control a lication to ull eatured, redundant odium hy ochlorite di in ection meterin , the e ru ed abricated a emblie o erturn ey im licity and indu trial rade durability. he tabili ed, hi h rade HO rame o er ma imum chemical com atibility and tructural ri idity. ach y tem i actory a embled and hydro tatically te ted rior to hi ment.

Dimensions

Serie A L S Dimen ion inche						
odel No.	A		C	D		Shi in Wei ht
L 02 S2	.0	9.6	9.	6.	8.2	10
L C2	.0	9.9	9.	6.	8.	10
L C3	.0	9.9	9.	6.	8.	10
L 03 S3	.0	9.9	9.	6.	8.	10
L 0S	.0	9.9	9.	6.	8.	10
L 6	.0	9.9	9.	6.	8.	10
L C	.0	9.9	9.	6.	8.	10

NO : nche 2. cm



allon verPac ia . each pac age

Stoc a S ill ech Over ac with orbent or emer ency ill re on e, or u e it a a alva e drum to hi dama ed container or ha ardou wa te.

DO A roved or Salva e: All S ill ech Over ac are DO a roved and rated or u e a alva e drum . Hel com anie con orm to ederal re ulation when hi in dama ed or lea in container o ha ardou material , or ab orbent contaminated with ha ardou ub tance .

er ect or S ill Kit : Store orbent roduct not included or ea y acce a needed or ill control. Save time when uic re on e i nece ary.

Sturdy Con truction: 100 olyethylene Over ac re i t chemical , ru t and corro ion or year o u e. nte rated handle ma e them ea y to li t, move or carry with tandard material handlin e ui ment. wi t on, double wall lid with clo ed cell a et rovide ealed, ecure clo ure to revent lea and rotect content rom moi ture, dirt and dama e. Durable to with tand rou h handlin .

Cu tomi ed or ou: We can cu tomi e a S ill Kit to your e act eci ication , includin the container, it content and acce orie , with no u char e Contact your local Di tributor or detail .

A R Speci ications

Dimensions	e t. dia. 32 1. H
Shipping Dimensions	31.7 W 1. L 31.7 H
Sol as	1 er ac a e
Color	ellow
Composition	olyethylene
per Pallet	3
Incinera le	No
Ship Class	2 0

Metric uivalent Speci ications

Dimensions	e t. dia. 81.3cm 10 . cm H
Shipping Dimensions	80.6cm W 10 . cm L 80.6cm H

A R Technical In ormation

arnings Restrictions

here are no nown warnin and re triction or thi roduct.

Regulations an Compliance

9 C 173.3 c 1 a container o ha ardou wa te i dama ed or lea in , it can be laced in a com atible alva e drum that meet N criteria or hi in

9 C 173.12 b 2 iv When lab ac in , nner ac a in mu t be urrounded by a chemically com atible ab orbent material in u icient uantity to ab orb the total li uid content .

9 C 173.12 b A container u ed or lab ac in mu t be a N 1A2 or N 1 2 metal drum, a N 1D lywood drum, a N 1G iber drum or a N 1H2 la tic drum te ted and mar ed at lea t or the ac in Grou er ormance level or li uid or olid .

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SECTION 1. IDENTIFICATION

Product identifier used on the label

: **Sodium Hydroxide Solution 10% to 50%**

Product Code(s) : Not available.

Recommended use of the chemical and restrictions on use

: Chemical intermediate.;Reagent
Use pattern: Professional Use Only
Recommended restrictions: No restrictions on use known.

Chemical family : Inorganic acid

Name, address, and telephone number of the supplier:

Borden & Remington Corp

63 Water St.
PO Box 2573
Fall River, MA, USA
02722

Supplier's Telephone # : 508-675-0096

Name, address, and telephone number of the manufacturer:

Refer to supplier

24 Hr. Emergency Tel # : Chemtrec: 1-800-424-9300 (Within Continental U.S.); 703-527-3887.

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

Clear, colorless liquid.

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).

Hazard classification:

Corrosive to Metals - Category 1
Skin Corrosion/Irritation - Category 1
Eye Damage/Irritation - Category 1
Specific Target Organ Toxicity, Single Exposure -Category 3 (respiratory)

Label elements

Hazard pictogram(s)

Signal Word

DANGER!

Hazard statement(s)

May be corrosive to metals.
Causes severe skin burns and eye damage.
May cause respiratory irritation.

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Precautionary statement(s)

Keep only in original container.
Do not breathe mist.
Wash thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/clothing and eye/face protection.

If swallowed: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Immediately call a POISON CENTER or doctor/physician.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
Immediately call a POISON CENTER or doctor/physician.
Absorb spillage to prevent material damage.

Store in corrosive resistant container with a resistant inner liner.
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.

Dispose of contents/container in accordance with local regulation.

Other hazards

Other hazards which do not result in classification:
Contact with most metals will generate flammable hydrogen gas. Contact with water gives off heat. Burning produces obnoxious and toxic fumes. Chronic skin contact with low concentrations may cause dermatitis.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance;solution

Chemical name	Common name and synonyms	CAS #	Concentration
sodium hydroxide	Caustic soda Sodium hydrate soda lye	1310-73-2	**10.0 - 50.0**
Water	H2O	7732-18-5	**Balance**

SECTION 4. FIRST-AID MEASURES

Description of first aid measures

Ingestion : Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Have victim rinse mouth with water, then give one to two glasses of water to drink. Seek immediate medical attention/advice.

Inhalation : Immediately remove person to fresh air. If breathing is difficult, give oxygen by qualified medical personnel only. If breathing has stopped, give artificial respiration. Seek immediate medical attention/advice.

Skin contact : Wear appropriate protective equipment. Remove/Take off immediately all contaminated clothing. Immediately flush skin with gently flowing, running water for at least 20 minutes. Do not rub area of contact. Obtain medical attention immediately. Wash contaminated clothing before reuse. Contaminated leather may require disposal.

Eye contact : Wear appropriate protective equipment. Protect unharmed eye. If in contact with eyes, immediately flush eyes with running water for at least 20 minutes. If contact lens is present, DO NOT delay flushing or attempt to remove the lens until flushing is done. Obtain medical attention immediately.

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Most important symptoms and effects, both acute and delayed

: Causes severe skin irritation. Symptoms may include redness, blistering, pain and swelling. Causes serious eye damage. Symptoms may include severe pain, blurred vision, redness and corrosive damage. May cause respiratory irritation. Symptoms may include coughing, choking and wheezing. Could result in pulmonary edema (fluid accumulation). Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed. Ingestion may cause severe burns to the mucous membranes of the digestive tract. Symptoms may include abdominal pain, vomiting, burns, perforations and bleeding.

Indication of any immediate medical attention and special treatment needed

: Immediate medical attention is required. Causes chemical burns. Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media

: Use media suitable to the surrounding fire such as water fog or fine spray, alcohol foams, carbon dioxide and dry chemical. May react with water. Use water spray with caution.

Unsuitable extinguishing media

: Use water spray with caution. Do not use a solid water stream as it may scatter and spread fire.

Special hazards arising from the substance or mixture / Conditions of flammability

: Not considered flammable. Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure.

Flammability classification (OSHA 29 CFR 1910.106)

: Not flammable.

Hazardous combustion products

: Sodium oxides.

Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

Special fire-fighting procedures

: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. Move containers from fire area if safe to do so. Use water to cool fire-exposed containers. Prevent runoff from fire control or dilution from entering sewers, drains, drinking water supply or any natural waterway. Dike for water control.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

: Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate protective equipment including self-contained breathing apparatus. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

Environmental precautions : Ensure spilled product does not enter drains, sewers, waterways, or confined spaces. If necessary, dike well ahead of the spill to prevent runoff into drains, sewers, or any natural waterway or drinking supply.

Methods and material for containment and cleaning up

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: Remove all sources of ignition. Ventilate area of release. Stop the spill at source if it is safe to do so. Dike for water control. Dilute acid with water and neutralize with Sodium Carbonate (soda ash) or lime. Contain and absorb spilled liquid with non-combustible, inert absorbent material (e.g. sand), then place absorbent material into a container for later disposal (see Section 13). Notify the appropriate authorities as required.

Special spill response procedures

: If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8802).
US CERCLA Reportable quantity (RQ): sodium hydroxide (1000 lbs / 454 kg).

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling

: Wear protective gloves/clothing and eye/face protection. Use only in well-ventilated areas. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment. Do not breathe fumes or mists. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Keep away from heat and flame. Keep away from incompatibles. May react with water, generating heat. When diluting, always add the product to water. Never add water to the product. When mixing with water, stir small amounts in slowly. Use cold water to prevent excessive heat generation. The addition of caustic soda to liquid will cause a rise in temperature. Keep containers tightly closed when not in use. Empty containers retain residue (liquid and/or vapour) and can be dangerous.

Conditions for safe storage : Store in a well-ventilated place. Keep container tightly closed. Store locked up. Keep away from incompatibles.Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. Do not freeze. Store in corrosion-resistant containers. Avoid contact with aluminum.

Incompatible materials : Acids; Water; Metals (e.g. tin, aluminum, zinc and alloys containing these metals); Halogenated compounds; Nitrogen compounds.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

Chemical Name	ACGIH TLV		OSHA PEL	
	TWA	STEL	PEL	STEL
sodium hydroxide	2 mg/m³ (Ceiling)	N/Av	2 mg/m³	N/Av
Water	N/Av	N/Av	N/Av	N/Av

Exposure controls

Ventilation and engineering measures

: Use only in well-ventilated areas. Use general or local exhaust ventilation to maintain air concentrations below recommended exposure limits.

Respiratory protection : Respiratory protection is required if the concentrations exceed the TLV. NIOSH-approved respirators are recommended. A self contained breathing apparatus should be used in emergency situations or instances where exposure levels are not known. Seek advice from respiratory protection specialists. Respirators should be selected based on the form and concentration of contaminants in air, and in accordance with OSHA (29 CFR 1910.134) or CSA Z94.4-02.

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Skin protection	:	Impervious gloves must be worn when using this product. Advice should be sought from glove suppliers. Wear as appropriate: Neoprene; Polyvinylchloride; Viton; Butyl rubber; Nitrile rubber; Polyethylene. Unsuitable material: polyvinyl alcohol. Wear chemically protective gloves (impervious), boots, aprons, and gauntlets to prevent prolonged or repeated skin contact.
Eye / face protection	:	Chemical splash goggles must be worn when handling this material. A full face shield may also be necessary.
Other protective equipment	:	An eyewash station and safety shower should be made available in the immediate working area. Other equipment may be required depending on workplace standards.
General hygiene considerations	:	Do not breathe fumes or mists. Do not ingest. Avoid contact with skin, eyes and clothing. Do not eat, drink, smoke or use cosmetics while working with this product. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Remove soiled clothing and wash it thoroughly before reuse.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Colourless liquid.
Odour	:	No odour.
Odour threshold	:	Not applicable.
pH	:	14
Melting/Freezing point	:	Not available.
Initial boiling point and boiling range	:	111°C (231.8°F)
Flash point	:	Not applicable.
Flashpoint (Method)	:	Not applicable.
Evaporation rate (BuAe = 1)	:	N/Av
Flammability (solid, gas)	:	Not applicable.
Lower flammable limit (% by vol.)	:	Not applicable.
Upper flammable limit (% by vol.)	:	Not applicable.
Oxidizing properties	:	None known.
Explosive properties	:	Not explosive
Vapour pressure	:	negligible
Vapour density	:	Not available.
Relative density / Specific gravity	:	1.27-1.48
Solubility in water	:	Very soluble
Other solubility(ies)	:	Not available.
Partition coefficient: n-octanol/water or Coefficient of water/oil distribution	:	N/Ap (dissociates)
Auto-ignition temperature	:	N/Ap
Decomposition temperature	:	Not available.
Viscosity	:	N/Av
Volatiles (% by weight)	:	Not available.
Volatile organic Compounds (VOC's)	:	N/Av
Absolute pressure of container	:	N/Ap
Flame projection length	:	N/Ap

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Other physical/chemical comments
: None known or reported by the manufacturer.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not normally reactive. May be corrosive to metals. Contact with most metals will generate flammable hydrogen gas. Contact with water will generate considerable heat.

Chemical stability : Material is stable under normal conditions.

Possibility of hazardous reactions
: Hazardous polymerization does not occur.

Conditions to avoid : Avoid heat and open flame. Keep away from incompatibles. Keep container tightly closed when not in use. Avoid contact with water.

Incompatible materials : Acids; Water; Metals (e.g. tin, aluminum, zinc and alloys containing these metals); Halogenated compounds; Nitrogen compounds.

Hazardous decomposition products
: None known, refer to hazardous combustion products in Section 5.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Routes of entry inhalation : YES

Routes of entry skin & eye : YES

Routes of entry Ingestion : YES

Routes of exposure skin absorption
: NO

Potential Health Effects:

Signs and symptoms of short-term (acute) exposure

Sign and symptoms Inhalation
: May cause severe irritation to the nose, throat and respiratory tract. Symptoms may include coughing, choking and wheezing. Could result in pulmonary edema (fluid accumulation). Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed.

Sign and symptoms ingestion
: May cause severe irritation and corrosive damage in the mouth, throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, bleeding and eventually death.

Sign and symptoms skin : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification: Skin Irritation - Category 1 Causes severe skin burns and eye damage.

Sign and symptoms eyes : This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Classification: Eye Damage/Irritation - Category 1 Causes serious eye damage.

Potential Chronic Health Effects
: Chronic skin contact with low concentrations may cause dermatitis.

Mutagenicity : Not expected to be mutagenic in humans.

Carcinogenicity : No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.

Reproductive effects & Teratogenicity
: Not expected to have other reproductive effects.

Sensitization to material : Not expected to be a skin or respiratory sensitizer.

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Specific target organ effects : Target Organs: Eyes, skin, respiratory system and digestive system.

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).
Classification: Specific Target Organ Toxicity, Single Exposure -Category 3 (respiratory) May cause respiratory irritation.

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Medical conditions aggravated by overexposure
: Pre-existing skin, eye and respiratory disorders.

Synergistic materials : Not available.

Toxicological data : There is no data available for this product.

Chemical name	LC_{50}(4hr) inh, rat	LD_{50} (Oral, rat)	LD_{50} (Rabbit, dermal)
sodium hydroxide	N/Av	N/Av	N/Av
Water	N/Av	>90 mL/kg	N/Av

Other important toxicological hazards
: None known or reported by the manufacturer.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity : The ecological characteristics of this product have not been fully investigated.
The product should not be allowed to enter drains or water courses, or be deposited where it can affect ground or surface waters.
Toxicity is primarily associated with pH.

Ecotoxicity data:

Ingredients	CAS No	Toxicity to Fish		
		LC50 / 96h	NOEC / 21 day	M Factor
sodium hydroxide	1310-73-2	125 mg/L (Mosquito fish)	N/Av	None.
Water	7732-18-5	No information available.	No information available.	Not applicable.

Ingredients	CAS No	Toxicity to Daphnia		
		EC50 / 48h	NOEC / 21 day	M Factor
sodium hydroxide	1310-73-2	40 mg/L Water flea	N/Av	None.
Water	7732-18-5	No information available.	No information available.	Not applicable.

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Ingredients	CAS No	Toxicity to Algae		
		EC50 / 96h or 72h	NOEC / 96h or 72h	M Factor
sodium hydroxide	1310-73-2	N/Av	N/Av	None.
Water	7732-18-5	No information available.	No information available.	Not applicable.

Persistence and degradability
: The methods for determining biodegradability are not applicable to inorganic substances.

Bioaccumulation potential : No data is available on the product itself.

Components	Partition coefficent n-octanol/ater (log Kow)	Bioconcentration factor (BCF)
sodium hydroxide (CAS 1310-73-2)	N/Ap	N/Ap
Water (CAS 7732-18-5)	N/Ap	N/Ap

Mobility in soil : No data is available on the product itself.

Other Adverse Environmental effects
: No data is available on the product itself.

SECTION 13. DISPOSAL CONSIDERATIONS

Handling for Disposal : Handle waste according to recommendations in Section 7.

Methods of Disposal : Dispose in accordance with all applicable federal, state, provincial and local regulations.

RCRA : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261.
It is the responsibility of the waste generator to determine the proper waste identification and disposal method.
For disposal of unused or waste material, check with local, state and federal environmental agencies.

SECTION 14. TRANSPORTATION INFORMATION

Regulatory Information	UN Number	UN proper shipping name	Transport hazard class(es)	Packing Group	Label
TDG	UN1824	SODIUM HYDROXIDE SOLUTION	8	II	
TDG Additional information	May be shipped as LIMITED QUANTITY when transported in containers no larger than 1.0 Litre, in packages not exceeding 30 kg gross mass. Under the TDGR, refer to Section 1.17 for additional exemption information, if shipping under this exemption.				
49CFR/DOT	UN1824	Sodium hydroxide solution	8	II	
49CFR/DOT Additional information	May be shipped as LIMITED QUANTITY when transported in containers no larger than 1.0 Litre, in packages not exceeding 30 kg gross mass. Refer to 49 CFR Section 173.154.				
ICAO/IATA	UN1824	Sodium hydroxide solution	8	II	

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ICAO/IATA Additional information	Refer to ICAO/IATA Packing Instruction				
IMDG	UN1824	SODIUM HYDROXIDE SOLUTION	8	II	
IMDG Additional information	May be shipped as Limited Quantity, consult the IMDG regulations for details.				

Special precautions for user : None reported by the manufacturer.
Environmental hazards : See ECOLOGICAL INFORMATION, Section 12.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
: Not available.

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

Components listed below are present on the following U.S. Federal chemical lists:

Ingredients	CAS #	TSCA Inventory	CERCLA Reportable Quantity(RQ) (40 CFR 117.302):	SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355:	SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical	
					Toxic Chemical	de minimus Concentration
sodium hydroxide	1310-73-2	Yes	1000 lb/ 454 kg	None.	No	N/Ap
Water	7732-18-5	Yes	N/Ap	N/Av	No	N/Ap

SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes: Immediate (Acute) health hazard; Chronic Health Hazard. Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

US State Right to Know Laws:

The following chemicals are specifically listed by individual States:

Ingredients	CAS #	California Proposition 65		State "Right to Know" Lists					
		Listed	Type of Toxicity	CA	MA	MN	NJ	PA	RI
sodium hydroxide	1310-73-2	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes
Water	7732-18-5	No	N/Ap	No	No	No	No	No	No

Canadian Information:

WHMIS information: Refer to Section 2 for a WHMIS Classification for this product.

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

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International Information:

Components listed below are present on the following International Inventory list:

Ingredients	CAS #	European EINECs	Australia AICS	Philippines PICCS	Japan ENCS	Korea KECI/KECL	China IECSC	NewZealand IOC
sodium hydroxide	1310-73-2	215-185-5	Present	Present	(2)-1972; (1)-410	KE-31487	Present	HSR001547
Water	7732-18-5	231-791-2	Present	Listed	Listed	KE-35400	Present	Listed

SECTION 16. OTHER INFORMATION

Legend : ACGIH: American Conference of Governmental Industrial Hygienists
CA: California
CAS: Chemical Abstract Services
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
CSA: Canadian Standards Association
DOT: Department of Transportation
EPA: Environmental Protection Agency
HMIS: Hazardous Materials Identification System
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
IATA: International Air Transport Association
ICAO: International Civil Aviation Organisation
IMDG: International Maritime Dangerous Goods
Inh: Inhalation
LC: Lethal Concentration
LD: Lethal Dose
MA: Massachusetts
MN: Minnesota
N/Ap: Not Applicable
N/Av: Not Available
NFPA: National Fire Protection Association
NIOSH: National Institute of Occupational Safety and Health
NJ: New Jersey
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PA: Pennsylvania
PEL: Permissible exposure limit
RCRA: Resource Conservation and Recovery Act
RI: Rhode Island
RTECS: Registry of Toxic Effects of Chemical Substances
SARA: Superfund Amendments and Reauthorization Act
STEL: Short Term Exposure Limit
TDG: Canadian Transportation of Dangerous Goods Act & Regulations
TLV: Threshold Limit Values
TWA: Time Weighted Average
WHMIS: Workplace Hazardous Materials Identification System

References : Canadian Centre for Occupational Health and Safety, CCInfoWeb Databases, 2015 (Chempendium, RTECs, HSDB, INCHEM).
European Chemicals Agency, Classification Legislation, 2015
Material Safety Data Sheet from manufacturer.
OECD: Organisation for Economic Co-operation and Development, 2015

Preparation Date (mm/dd/yyyy) : 10/09/2015

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Telephone: (508) 675 0096

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Other special considerations for handling

: Provide adequate information, instruction and training for operators.

HMIS Rating : *- Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

Health: *3 *Flammability:* 0 *Reactivity:* 1

NFPA Rating

0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

: *Health:* 3 *Flammability:* 0 *Instability:* 1 *Special Hazards:* None.

Prepared for: Borden & Remington Corp 63 Water St. Fall River, MA 02722 Telephone: 508-675-0096	
Prepared by: ICC The Compliance Center Inc. Telephone: (888) 442-9628 (U.S.): (888) 977-4834 (Canada) http://www.thecompliancecenter.com	

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END OF DOCUMENT

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SECTION 1. IDENTIFICATION

Product identifier used on the label

: **Sulfuric Acid 71-100%**

Product Code(s) : Not available.

Recommended use of the chemical and restrictions on use

: Reagent ;Chemical intermediate.
Use pattern: Professional Use Only
Recommended restrictions: None known.

Chemical family : Inorganic acid

Name, address, and telephone number of the supplier:

Borden & Remington Corp

63 Water St.
PO Box 2573
Fall River, MA, USA
02722

Supplier's Telephone # : 508-675-0096

Name, address, and telephone number of the manufacturer:

Refer to supplier

24 Hr. Emergency Tel # : Chemtrec: 1-800-424-9300 (Within Continental U.S.); 703-527-3887.

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

Clear to cloudy liquid. Odorless.

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).

Hazard classification :

Corrosive to metals: Category 1
Acute toxicity, inhalation - Category 2 (mist)
Eye damage/irritation: Category 1
Skin corrosion/irritation: Category 1
Specific Target Organ Toxicity, Single Exposure -Category 3 (respiratory)

Label elements

Hazard pictogram(s)

Signal Word

DANGER!

Hazard statement(s)

May be corrosive to metals.
Fatal if inhaled.
Causes severe skin burns and eye damage.
May cause respiratory irritation.

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Precautionary statement(s)

Keep only in original container.
Wash thoroughly after handling.
Do not breathe mists.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/clothing and eye/face protection.
[In case of inadequate ventilation] wear respiratory protection.

If swallowed: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Immediately call a POISON CENTER or doctor/physician.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
Immediately call a POISON CENTER or doctor/physician.
Absorb spillage to prevent material damage.

Store in corrosive resistant container with a resistant inner liner.
Store locked up.
Store in a well-ventilated place. Keep container tightly closed.

Dispose of contents/container in accordance with local/regional/national/international regulations.

Other hazards

Other hazards which do not result in classification:

Ingestion may cause severe irritation to the mouth, throat and stomach.Contact with metals may release small amounts of flammable hydrogen gas.Prolonged skin contact may cause dermatitis (rash), characterized by red, dry, itching skin.Prolonged or repeated inhalation of fumes or vapours, may cause chronic lung effects, such as bronchitis, and tooth enamel erosion. Chronic skin contact with low concentrations may cause dermatitis.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance

Chemical name	Common name and synonyms	CAS #	Concentration
Sulfuric acid	Battery acid; Hydrogen sulfate; Oil of vitriol	7664-93-9	**71.0 - 100.0**
Water	H2O	7732-18-5	**Balance**

SECTION 4. FIRST-AID MEASURES

Description of first aid measures

Ingestion : Do NOT induce vomiting. Have victim rinse mouth with water, then give one to two glasses of water to drink. Seek immediate medical attention/advice. Never give anything by mouth if victim is unconscious.

Inhalation : Immediately remove person to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen by qualified medical personnel only. Seek immediate medical attention/advice.

Skin contact : Take off all contaminated clothing immediately. Immediately flush skin with gently flowing, running water for at least 20 minutes. Do not rub area of contact. Cover wound with sterile dressing. Seek immediate medical attention/advice. Wash contaminated clothing before reuse. Leather and shoes that have been contaminated with the solution may need to be destroyed.

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Eye contact : Immediately flush eyes with running water for at least 20 minutes. Protect unharmed eye. Seek immediate medical attention/advice.

Most important symptoms and effects, both acute and delayed

: May cause serious eye irritation or damage. Symptoms may include redness, pain, tearing and conjunctivitis. Direct skin contact may cause corrosive skin burns, deep ulcerations and possibly permanent scarring. May cause severe irritation and corrosive damage in the mouth, throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, bleeding and eventually death. May cause severe irritation to the nose, throat and respiratory tract. Symptoms may include coughing, choking and wheezing. Could result in pulmonary edema (fluid accumulation). Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed. Prolonged or repeated inhalation of fumes or vapours, may cause chronic lung effects, such as bronchitis, and tooth enamel erosion.

Indication of any immediate medical attention and special treatment needed

: Immediate medical attention is required. Causes burns. Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media

: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water with caution. Contact with water will generate considerable heat.

Unsuitable extinguishing media

: Do not use a solid water stream as it may scatter and spread fire.

Special hazards arising from the substance or mixture / Conditions of flammability

: Not considered flammable. Burning produces obnoxious and toxic fumes. Contact with metals may release small amounts of flammable hydrogen gas. Reacts violently with a wide variety of organic and inorganic chemicals including alcohol, carbides, chlorates, picrates, nitrates and metals. Contact with water will generate considerable heat.

Flammability classification (OSHA 29 CFR 1910.106)

: Non-flammable.

Hazardous combustion products

: Sulphur oxides. Carbon dioxide and carbon monoxide. Oxygen.

Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

Special fire-fighting procedures

: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. A full-body chemical resistant suit should be worn. Move containers from fire area if safe to do so. Water spray may be useful in cooling equipment exposed to heat and flame. Dike for water control. Do not allow run-off from fire fighting to enter drains or water courses.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

: All persons dealing with clean-up should wear the appropriate protective equipment including self-contained breathing apparatus. Keep all other personnel upwind and away from the spill/release. Restrict access to area until completion of clean-up. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

Environmental precautions : Do not allow material to contaminate ground water system. For large spills, dike the area to prevent spreading.

Methods and material for containment and cleaning up

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: Remove all sources of ignition. Ventilate area of release. Stop spill or leak at source if safely possible. Dike for water control. Neutralize with sodium bicarbonate or a mixture of soda ash/slaked lime. Contain and absorb spilled liquid with non-combustible, inert absorbent material (e.g. sand), then place absorbent material into a container for later disposal (see Section 13). Contact the proper local authorities.

Special spill response procedures

: If a spill/release in excess of the EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8802).
US CERCLA Reportable quantity (RQ): Sulfuric acid (1000 lbs / 454 kg)

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling

: Use in a well-ventilated area. Wear protective gloves/clothing and eye/face protection. See Section 8 for additional personal protection advice when handling this product. Do not ingest. Avoid breathing vapour or mist. Avoid contact with skin, eyes and clothing. Keep away from extreme heat and flame. Keep away from bases, metals and other incompatibles. Keep container tightly closed when not in use. Keep only in original container. Wash thoroughly after handling. During preparation or dilution, always add liquid slowly to water and with constant stirring.

Conditions for safe storage : Store in a cool, dry, well-ventilated area. Store locked up. Store away from incompatibles and out of direct sunlight. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. Store in corrosion-resistant containers. Keep only in original container.

Incompatible materials : Strong oxidizing agents;Metals (e.g. Aluminum, brass, copper); Alkalies; Aldehydes ; Reducing agents; Water; Organic materials; Acids Chlorate . .

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

Chemical Name	ACGIH TLV		OSHA PEL	
	TWA	STEL	PEL	STEL
Sulfuric acid	0.2 mg/m³ (thoracic fraction)	N/Av	1 mg/m³	N/Av
Water	N/Av	N/Av	N/Av	N/Av

Exposure controls

Ventilation and engineering measures

: Use general or local exhaust ventilation to maintain air concentrations below recommended exposure limits.

Respiratory protection : If the TLV is exceeded, a NIOSH/MSHA-approved respirator is advised. Confirmation of which type of respirator is most suitable for the intended application should be obtained from respiratory protection suppliers. Respirators should be selected based on the form and concentration of contaminants in air, and in accordance with OSHA (29 CFR 1910.134) or CSA Z94.4-02.

Skin protection : Wear chemically protective gloves (impervious), boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear impervious gloves, such as butyl rubber. Unsuitable material: polyvinyl alcohol. Advice should be sought from glove suppliers.

Eye / face protection : Chemical splash goggles must be worn when handling this material. A full face shield may also be necessary.

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Other protective equipment	:	Other equipment may be required depending on workplace standards. An eyewash station and safety shower should be made available in the immediate working area.
General hygiene considerations	:	Do not breathe mist or vapor. Avoid contact with skin, eyes and clothing. Do not eat, drink, smoke or use cosmetics while working with this product. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Remove and wash contaminated clothing before re-use. Do not take contaminated clothing home.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Clear, oily, colourless liquid
Odour	:	Odorless.
Odour threshold	:	N/Av
pH	:	<1.0
Melting/Freezing point	:	-40°C (-40°F)
Initial boiling point and boiling range	:	102°C (215.6°F)
Flash point	:	Not applicable.
Flashpoint (Method)	:	Not applicable.
Evaporation rate (BuAe = 1)	:	Slower than ether.
Flammability (solid, gas)	:	Not applicable.
Lower flammable limit (% by vol.)	:	Not applicable.
Upper flammable limit (% by vol.)	:	Not applicable.
Oxidizing properties	:	None known.
Explosive properties	:	Not explosive
Vapour pressure	:	<0.3 mmHg @75°F
Vapour density	:	3.4
Relative density / Specific gravity	:	1.84
Solubility in water	:	Soluble
Other solubility(ies)	:	None known.
Partition coefficient: n-octanol/water or Coefficient of water/oil distribution	:	N/Av
Auto-ignition temperature	:	N/Ap
Decomposition temperature	:	Not available.
Viscosity	:	N/Av
Volatiles (% by weight)	:	Not available.
Volatile organic Compounds (VOC's)	:	Not available.
Absolute pressure of container	:	N/Ap
Flame projection length	:	N/Ap
Other physical/chemical comments	:	None.

SECTION 10. STABILITY AND REACTIVITY

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Reactivity	:	Contact with metals may release small amounts of flammable hydrogen gas. Corrosive in contact with metals Avoid contact with incompatible materials. Contact with water will generate considerable heat. Reacts vigorously, violently or explosively with many organic and inorganic chemicals, such as strong acids, acid chlorides, acid anhydrides, ketones, glycols, and organic peroxides.
Chemical stability	:	Stable under the recommended storage and handling conditions prescribed.
Possibility of hazardous reactions	:	Hazardous polymerization does not occur. Contact with metals may release small amounts of flammable hydrogen gas.
Conditions to avoid	:	Avoid heat and open flame. Ensure adequate ventilation, especially in confined areas. Avoid contact with incompatible materials.
Incompatible materials	:	Strong oxidizing agents;Metals (e.g. Aluminum, brass, copper); Alkalies; Aldehydes ; Reducing agents; Water; Organic materials; Acids Chlorate . .
Hazardous decomposition products	:	Decomposes at 340 deg C into sulfur trioxide and water.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Routes of entry inhalation	:	YES
Routes of entry skin & eye	:	YES
Routes of entry Ingestion	:	YES
Routes of exposure skin absorption	:	NO

Potential Health Effects:

Signs and symptoms of short-term (acute) exposure

Sign and symptoms Inhalation	:	Fatal if inhaled. Inhalation of high concentrations of fumes or mists may cause severe irritation and corrosive damage to the nose, throat and upper respiratory tract. Symptoms may include coughing, choking and wheezing. Could result in pulmonary edema (fluid accumulation). Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed.
Sign and symptoms ingestion	:	May be harmful if swallowed. May cause severe irritation and corrosive damage in the mouth, throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, bleeding and eventually death.
Sign and symptoms skin	:	This material is classified as hazardous under OSHA regulations (29CFR 1910.1200) (Hazcom 2012). Classification: Skin corrosion/irritation: Category 1 Causes severe skin burns and eye damage. Direct skin contact may cause corrosive skin burns, deep ulcerations and possibly permanent scarring.
Sign and symptoms eyes	:	This material is classified as hazardous under OSHA regulations (29CFR 1910.1200) (Hazcom 2012). Classification: Eye damage/irritation: Category 1 Causes serious eye damage. Symptoms may include severe pain, tearing, redness, swelling and blurred vision. Contact may lead to permanent injury and blindness.
Potential Chronic Health Effects	:	Chronic skin contact with low concentrations may cause dermatitis. Prolonged or repeated inhalation of fumes or vapours, may cause chronic lung effects, such as bronchitis, and tooth enamel erosion.
Mutagenicity	:	Not expected to be mutagenic in humans.

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Carcinogenicity : This material is not classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015). Strong inorganic acid mist containing sulfuric acid is classified as a Group 1 Human Carcinogen by the IARC. However, this classification does not apply to liquid forms of sulfuric acid.

Reproductive effects & Teratogenicity

: Not expected to cause reproductive effects.

Sensitization to material : Not expected to be a skin or respiratory sensitizer.

Specific target organ effects : Target Organs:: Eyes, skin, respiratory system and digestive system.

This material is classified as hazardous under OSHA regulations (29CFR 1910.1200) (Hazcom 2012). Classification:
Specific target organ toxicity, single exposure -Category 3
May cause respiratory irritation.

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Medical conditions aggravated by overexposure

: Pre-existing skin, eye and respiratory disorders.

Synergistic materials : Not available.

Toxicological data : See below for toxicological data on the substance.
The calculated ATE values for this mixture are:
ATE inhalation (mists) = 0.5 mg/L (75%)

Chemical name	LC_{50}(4hr) inh, rat	LD_{50} (Oral, rat)	LD_{50} (Rabbit, dermal)
Sulfuric acid	0.375mg/L	2140 mg/kg	N/Av
Water	N/Av	>90 mL/kg	N/Av

Other important toxicological hazards

: None known or reported by the manufacturer.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity : Because of the low pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems. The product should not be allowed to enter drains or water courses, or be deposited where it can affect ground or surface waters.

Ecotoxicity data:

Ingredients	CAS No	Toxicity to Fish		
		LC50 / 96h	NOEC / 21 day	M Factor
Sulfuric acid	7664-93-9	N/Av	N/Av	None.
Water	7732-18-5	No information available.	No information available.	Not applicable.

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Ingredients	CAS No	Toxicity to Daphnia		
		EC50 / 48h	NOEC / 21 day	M Factor
Sulfuric acid	7664-93-9	N/Av	N/Av	None.
Water	7732-18-5	No information available.	No information available.	Not applicable.

Ingredients	CAS No	Toxicity to Algae		
		EC50 / 96h or 72h	NOEC / 96h or 72h	M Factor
Sulfuric acid	7664-93-9	>100mg/L(Green algae)	N/Av	None.
Water	7732-18-5	No information available.	No information available.	Not applicable.

Persistence and degradability

: Biodegradation is not applicable to inorganic materials.

Bioaccumulation potential : No data is available on the product itself.

Components	Partition coefficent n-octanol/ater (log Kow)	Bioconcentration factor (BCF)
Sulfuric acid (CAS 7664-93-9)	N/Ap	no bioaccumulation
Water (CAS 7732-18-5)	N/Ap	N/Ap

Mobility in soil : No data is available on the product itself.

Other Adverse Environmental effects

: No additional information.

SECTION 13. DISPOSAL CONSIDERATIONS

Handling for Disposal : Handle waste according to recommendations in Section 7. Empty containers retain residue (liquid and/or vapour) and can be dangerous.

Methods of Disposal : Dispose in accordance with all applicable federal, state, provincial and local regulations.

RCRA : If this product, as supplied, becomes a waste in the United States, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

SECTION 14. TRANSPORTATION INFORMATION

Regulatory Information	UN Number	UN proper shipping name	Transport hazard class(es)	Packing Group	Label
49CFR/DOT	UN1830	SULFURIC ACID ; or SULPHURIC ACID	8	II	
49CFR/DOT Additional information	May be shipped as a limited quantity in receptacles not exceeding 1.0 Liters, according to 49 CFR 173.154.				
TDG	UN1830	SULPHURIC ACID	8	II	

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TDG Additional information	May be shipped as LIMITED QUANTITY when transported in containers no larger than 1.0 Litre, in packages not exceeding 30 kg gross mass.				
ICAO/IATA	UN1830	Sulphuric acid	8	II	
ICAO/IATA Additional information	Refer to ICAO/IATA Packing Instruction				
IMDG	UN1830	SULFURIC ACID or SULPHURIC ACID	8	II	
IMDG Additional information	May be shipped as a limited quantity. Consult the IMDG regulations for more information.				

Special precautions for user : None known.

Environmental hazards : See ECOLOGICAL INFORMATION, Section 12.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable.

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

Components listed below are present on the following U.S. Federal chemical lists:

Ingredients	CAS #	TSCA Inventory	CERCLA Reportable Quantity(RQ) (40 CFR 117.302):	SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355:	SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical	
					Toxic Chemical	de minimus Concentration
Sulfuric acid	7664-93-9	Yes	1000 lb/ 454 kg	1000 lb TPQ	Yes	1%
Water	7732-18-5	Yes	N/Ap	N/Av	No	N/Ap

SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes: Acute Health Hazard. Chronic Health Hazard

Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds for the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

US State Right to Know Laws:

The following chemicals are specifically listed by individual States:

Ingredients	CAS #	California Proposition 65		State "Right to Know" Lists					
		Listed	Type of Toxicity	CA	MA	MN	NJ	PA	RI
Sulfuric acid	7664-93-9	No	N/Ap	Yes	Yes	Yes	Yes	Yes	Yes
Water	7732-18-5	No	N/Ap	No	No	No	No	No	No

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Canadian Information:

Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

WHMIS information: Refer to Section 2 for a WHMIS Classification for this product.

International Information:

Components listed below are present on the following International Inventory list:

Ingredients	CAS #	European EINECs	Australia AICS	Philippines PICCS	Japan ENCS	Korea KECI/KECL	China IECSC	NewZealand IOC
Sulfuric acid	7664-93-9	231-639-5	Present	Present	(1)-724; (1)-430	KE-32570	Present	HSR001572, HSR001573, HSR001588 (dilution)
Water	7732-18-5	231-791-2	Present	Listed	Listed	KE-35400	Present	Listed

SECTION 16. OTHER INFORMATION

Legend : ACGIH: American Conference of Governmental Industrial Hygienists
CA: California
CAS: Chemical Abstract Services
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: Code of Federal Regulations
DOT: Department of Transportation
EPA: Environmental Protection Agency
HMIS: Hazardous Materials Identification System
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
Inh: Inhalation
IUCLID: International Uniform ChemicaL Information Database
MA: Massachusetts
MN: Minnesota
MSHA: Mine Safety and Health Administration
N/Ap: Not Applicable
N/Av: Not Available
NFPA: National Fire Protection Association
NIOSH: National Institute of Occupational Safety and Health
NJ: New Jersey
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PA: Pennsylvania
PEL: Permissible exposure limit
RCRA: Resource Conservation and Recovery Act
RI: Rhode Island
RTECS: Registry of Toxic Effects of Chemical Substances
SARA: Superfund Amendments and Reauthorization Act
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TWA: Time Weighted Average
WHMIS: Workplace Hazardous Materials Identification System

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European Chemicals Agency, Classification Legislation, 2015
Material Safety Data Sheet from manufacturer
OECD - The Global Portal to Information on Chemical Substances - eChemPortal, 2015

Preparation Date (mm/dd/yyyy)

: 10/13/2015

Other special considerations for handling

: Provide adequate information, instruction and training for operators.

HMIS Rating : *- Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

Health: 3 *Flammability:* 0 *Reactivity:* 2

NFPA Rating

0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

: *Health:* 3 *Flammability:* 0 *Instability:* 2 *Special Hazards:* None.

Prepared for: Borden & Remington Corp 63 Water St. Fall River, MA 02722 Telephone: 508-675-0096	
Prepared by: ICC The Compliance Center Inc. Telephone: (888) 442-9628 (U.S.): (888) 977-4834 (Canada) http://www.thecompliancecenter.com	

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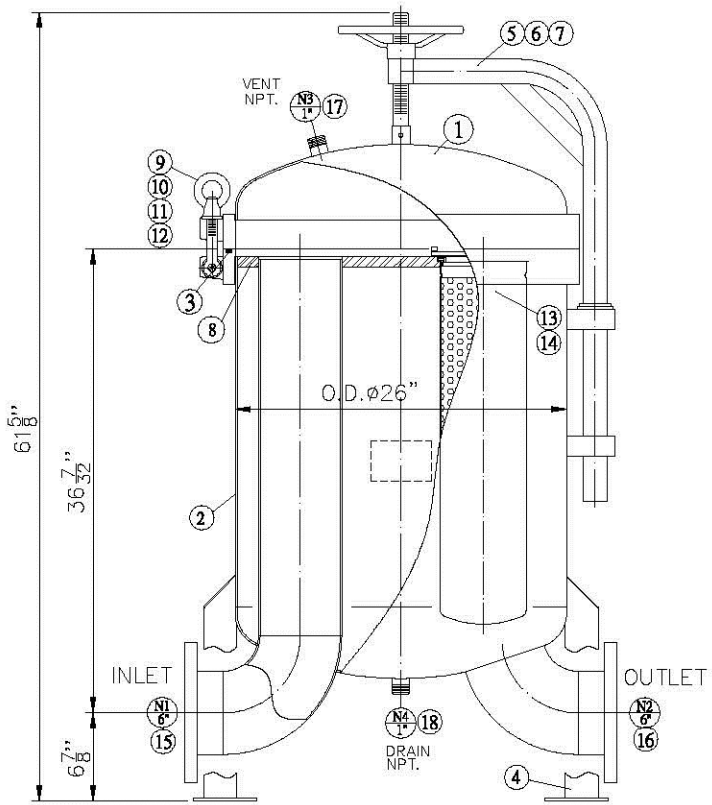
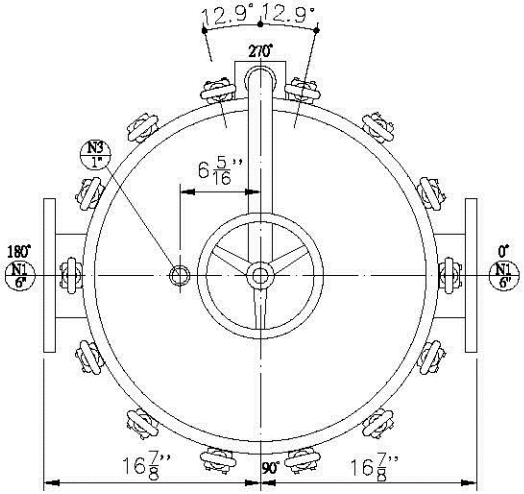
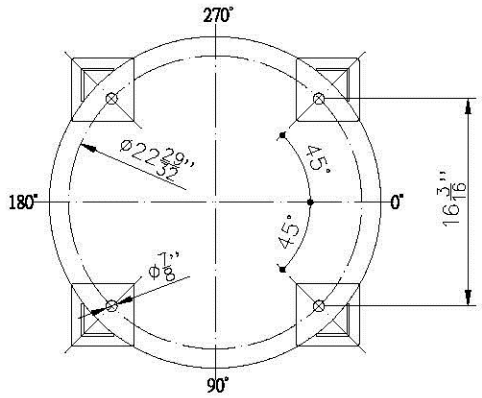


SIDE VIEW



TOP VIEW



ANCHOR

BILL OF MATERIALS
(QUANTITY PER UNIT)

PROD ORDER_____S.O_____ MFG. SERIAL NO._____

CUSTOMER_____ DESIGN __150__ PSIG __90__ °C

DESTINATION_____ MAX. A.W.P._150__ PSIG __90__ °C

CUST. P.O._____ HYDROSTATIC TESTED _225_ PSIG

CUST.EQUIP_____ CODE _____

CODE STAMP_____ N.B._____

NO OF UNITS _____ SCH SHIP DATE _____

WEIGHT EMPTY _____ KG. FULL _____ KG

NO.	DESCRIPTION	MATERIAL	UNIT	QUAN.	PART NO.
1	FILTER COVER	304		1	
2	FILTER SHELL	304		1	
3	GASKET	EPDM		1	
4	LEG WELDMENT	304		4	
5	DAVIT HANDWHEEL	304		1	
6	DAVIT SCREW	304		1	
7	DAVIT ARM	304		1	
8	SEPARATE PLATE	304		1	
9	EYENUT	304		14	
10	WASHER	304		14	
11	EYEBOLT	304		14	
12	BOLT SUPPORT	304		14	
13	BASKET	304		6	
14	BAG-LOCK DEVICE	304		6	
15	INLET 6" ANSI 150B RF	304		1	
16	OUTLET 6" ANSI 150B RF	304		1	
17	VENT NPT 1"	304		1	
18	DRAIN NPT 1"	304		1	

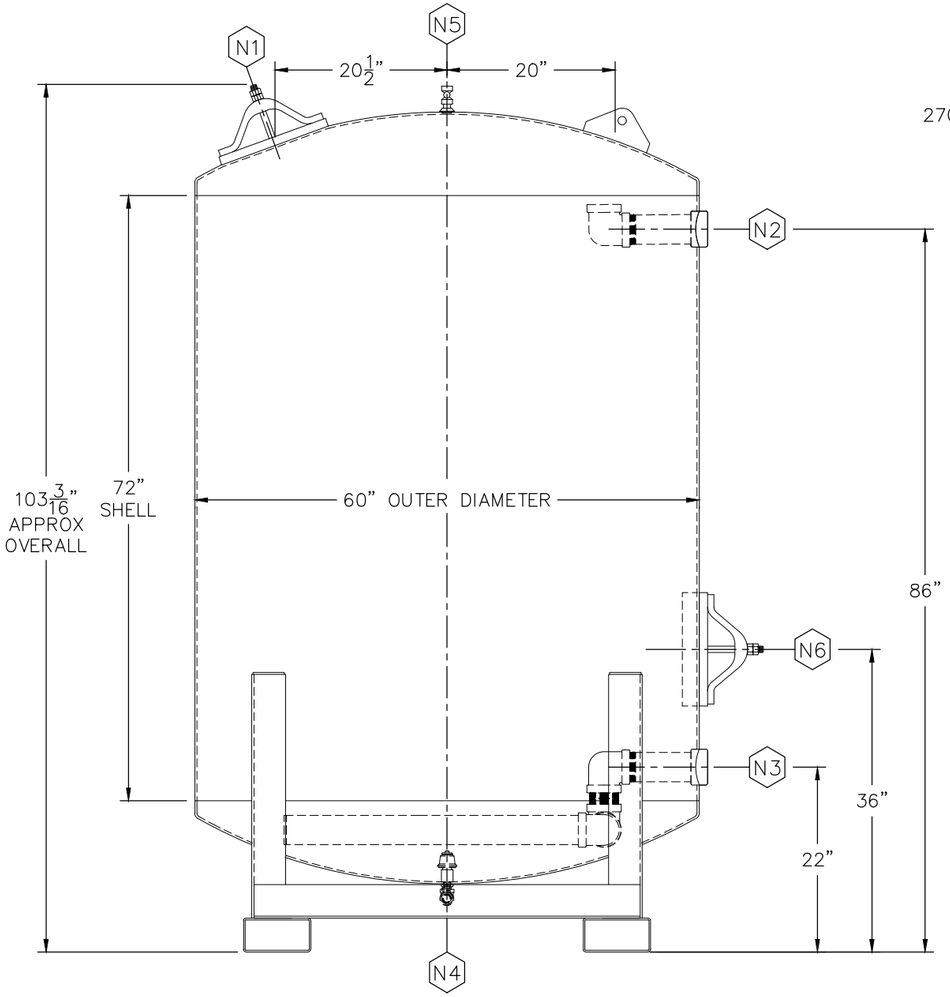
Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA

NAME	REV: A
Multi-Bag Filter Vessel	SCALE: NONE

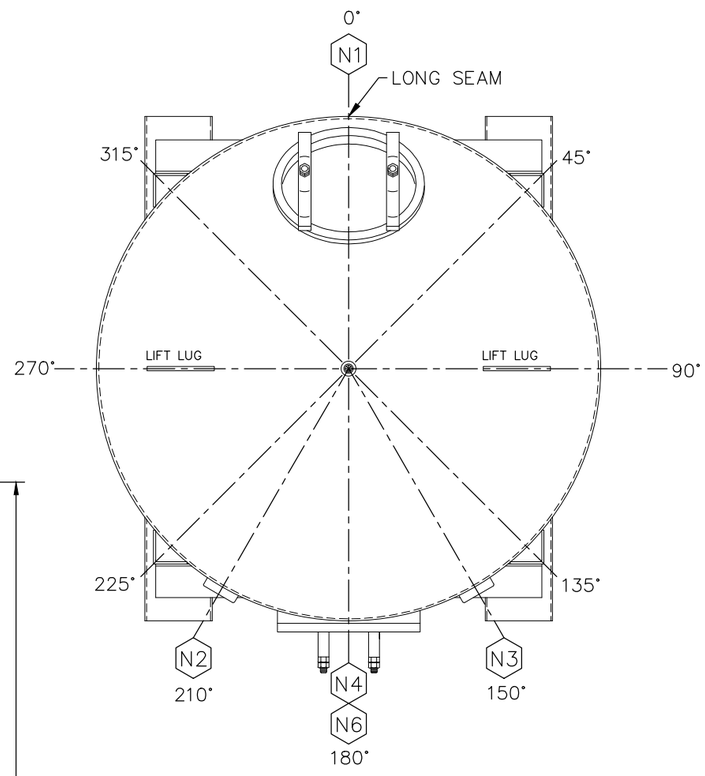
PROJECT NO.	ORDER NO.	ITEM NO.

DATE: UNIT: INCH

SCHEDULE OF OPENINGS		
ID	*DESCRIPTION*	*SERVICE*
N1	14" x 18" ELLIPTICAL MANWAY	UPPER BED ACCESS
N2	3" 3000# FNPT FULL COUPLING	PROCESS INFLUENT
N3	3" 3000# FNPT FULL COUPLING	PROCESS EFFLUENT
N4	1/2" 3000# FNPT FULL COUPLING	DRAIN w/ BALL VALVE
N5	1/4" 150# FNPT TANK FLANGE	VENT w/ VALVE
N6	14" x 18" ELLIPTICAL MANWAY	LOWER BED ACCESS



ELEVATION VIEW
NOT TRUE ORIENTATION



PLAN VIEW
TRUE ORIENTATION

VESSEL DESIGN DATA			
VESSEL REGISTRATION	N/A	YEAR BUILT	NOT YET BUILT
VESSEL CONSTRUCTION	NON-CODE	VESSEL SERIAL NUMBER	TBD
INTERNAL DESIGN PRESSURE	75 PSIG	CAPACITY (VOLUME)	1064.00 gal
INTERNAL DESIGN TEMP.	140 DEG. F	WEIGHT (EMPTY)	1922 lbs
EXTERNAL DESIGN PRESSURE	ATMOSPHERIC	WEIGHT (FULL)	12924 lbs
OPERATING PRESSURE	N/A	SHELL 1 MATERIAL	SA-36 ROLLED PLATE NOM. TH. = 0.25"
OPERATING TEMP.	N/A	SHELL 2 MATERIAL	N/A
MIN. DESIGN METAL TEMP.	-20 DEG. F @ 75 PSIG	TOP HEAD MATERIAL	SA-36 HOT FORMED NOM. TH. = 0.25"
MAWP (NEW & COLD)	TBD	BOTTOM HEAD MATERIAL	SA-36 HOT FORMED NOM. TH. = 0.25"
MAWP (HOT & CORRODED)	TBD	NOZZLES NECKS/FLANGES	SA-106-B, SA-105, SA-312-304
HYDROSTATIC TEST PRESSURE	N/A	GASKETS	BUNA-N
HYDROSTATIC TEST MEDIUM	N/A	INTERNALS	STAINLESS STEEL
CORROSION ALLOWANCE	NONE	SURFACE PREP INTERNAL	SSPC-SP10
RADIOGRAPHY	NONE	SURFACE PREP EXTERNAL	SSPC-SP6
POST WELD HEAT TREAT.	N/A	INTERNAL COATING	CARBOLINE CARBOGUARD 635 5-10 MILS DFT
MATERIAL IMPACT TESTS	N/A	EXTERNAL PRIMER	CARBOLINE CARBOGUARD 635 5-10 MILS DFT
MATERIAL HARDNESS	N/A	EXTERNAL PAINT/COATING	CARBOLINE CARBOTHANE 8845(GREEN)3-5 MILS DFT

REV NO	REVISION NOTE	DATE	SIGNATURE
1			
2			
3			
4			
5			

LRT
Lockwood Remediation Technologies LLC

CUSTOMER	JOB #	DATE	SCALE NTS
DESIGNED BY	HPAF-3000		
APPROVED BY	QUANTITY	UNITS	DRAWING #

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

FILTRATION MEDIA :
8x30 RE-ACTIVATED CARBON
4x10 RE-ACTIVATED CARBON

GENERAL DESCRIPTION

Select Re-Activated carbon from domestic sources is quality screened during our purchasing process for activity, density and fines. The use of re-activated carbon is recommended as a lower cost alternative for most sites where drinking water quality is not necessary. In many cases our re-activated carbon meets and exceeds imported virgin carbon. In addition all carbon either sold by itself or installed in our filtration units traced by lot number to the installation or sale.

8x30 (Liquid Phase) Standard Specifications:	Standard	Value
Iodine Number	ASTM D-4607	800 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	8x30 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

4*10 (Vapor Phase) Standard Specifications:	Standard	Value
Carbon Tetrachloride Activity Level	ASTM D-3467	40 Minimum
Moisture Content	ASTM D-2867	5% Maximum (as packed)
Particle Size	ASTM D-2862	4x10 US Mesh
Ash		10% Maximum
Total Surface Area (N2BET)		1050 Minimum
Pore Volume (cc/g)		0.75

RESINTECH INC
INNOVATIONS IN ION EXCHANGE

CGS

CATION EXCHANGE RESIN
SOFTENING GRADE
Na FORM

RESINTECH CGS is a sodium form standard crosslinked gel strong acid cation resin. *CGS* is optimized for residential applications that require good regeneration efficiency and high capacity. *RESINTECH CGS* is intended for use in all residential and commercial softening applications that do not have significant amounts of chlorine in the feedwater. *CGS* is supplied in the sodium form.

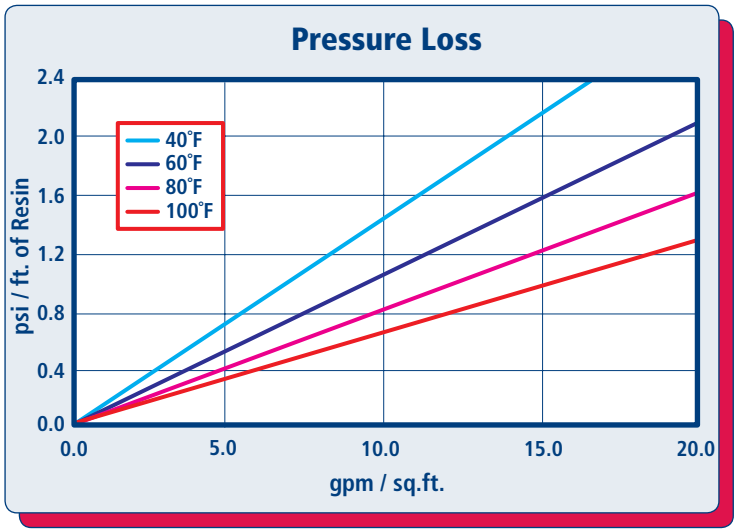
NSF/ANSI 44-61 CERTIFIED FOR MATERIAL SAFETY

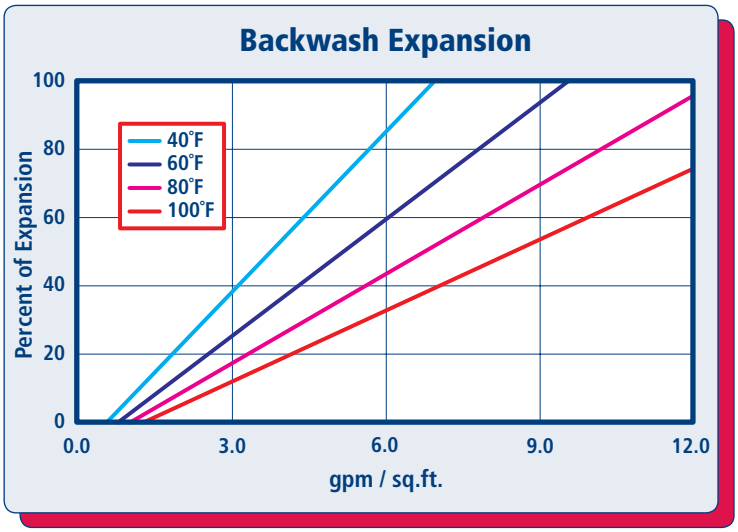
FEATURES & BENEFITS

- **RESIDENTIAL SOFTENING APPLICATIONS**
  Resin parameters are optimized for residential softeners
- **LOW COLOR THROW**
- **SUPERIOR PHYSICAL STABILITY**
  93% plus sphericity and high crush strengths together with carefully controlled particle distribution provides long life and low pressure drop
- **COMPLIES WITH US FDA REGULATIONS**
  Conforms to paragraph 21CFR173.25 of the Food Additives Regulations of the US FDA

Prior to first use for potable water, resin should be backwashed for a minimum of 20 minutes, followed by 10 bed volumes of downflow rinse.

HYDRAULIC PROPERTIES





PRESSURE LOSS

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

BACKWASH

The graph above shows the expansion characteristics of *ResinTech CGS* as a function of flow rate at various temperatures.

160 Cooper Road • West Berlin, NJ 08091 USA • p: 856.768.9600 • f: 856.768.9601 • e: ixresin@resintech.com • w: resintech.com

RESINTECH® CGS

PHYSICAL PROPERTIES

Polymer Structure	Styrene/DVB
Polymer Type	Gel
Functional Group	Sulfonic Acid
Physical Form	Spherical beads
Ionic Form as shipped	Sodium
Total Capacity	
Sodium form	>1.8 meq/mL
Water Retention	
Sodium form	40 to 52 percent
Approximate Shipping Weight	
Sodium form	50 lbs./cu.ft.
Screen Size Distribution (U.S. mesh)	16 to 50
Maximum Fines Content (<50 mesh)	1 percent
Minimum Sphericity	90 percent
Uniformity Coefficient	1.6 approx.
Resin Color	Amber

Note: Physical properties can be certified on a per lot basis, available upon request

SUGGESTED OPERATING CONDITIONS

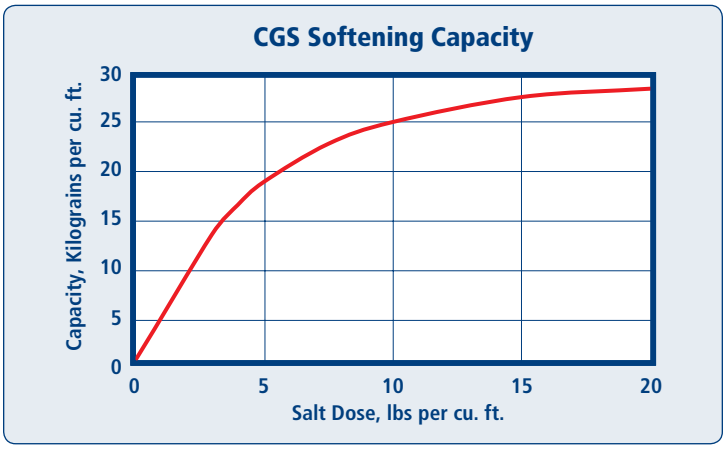
Maximum continuous temperature	
Sodium form	250˚F
Minimum bed depth	24 inches
Backwash expansion	25 to 50 percent
Maximum pressure loss	25 psi
Operating pH range	0 to 14 SU
Regenerant Concentration	
Salt cycle	10 to 15 percent NaCl
Regenerant level	4 to 15 lbs./cu.ft.
Regenerant flow rate.	0.5 to 1.5 gpm/cu.ft.
Regenerant contact time	>20 minutes
Displacement flow rate	Same as dilution water
Displacement volume	10 to 15 gallons/cu.ft.
Rinse flow rate	Same as service flow
Rinse volume	35 to 60 gallons/cu.ft.
Service flow rate	1 to 10 gpm/cu.ft.

Note: These guidelines describe average low risk operating conditions. They are not intended to be absolute minimums or maximums.
For operation outside these guidelines, contact ResinTech Technical Support

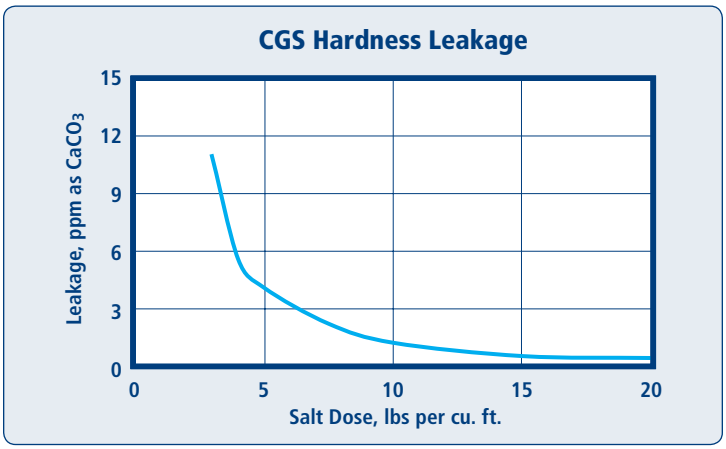
APPLICATIONS

SOFTENING

ResinTech CGS is a standard crosslinked cation resin optimized for residential and commercial applications. This type of resin is easier to regenerate than the higher crosslinked resins. CGS has marginal resistance to chlorine and other oxidants and is not ideal for high temperature and other high stress applications.



Capacity and leakage data are based on the following: 2:1 Ca:Mg ratio, 500 ppm TDS as CaCO3, 0.2% hardness in the salt and 10% brine concentration applied co-currently through the resin over 30 minutes. No engineering downgrade has been applied.



RESINTECH INC.
INNOVATIONS IN ION EXCHANGE

East Coast - West Berlin, NJ p:856.768.9600 • Midwest - Chicago, IL p:708.777.1167 • West Coast - Los Angeles, CA p:323.262.1600

GROOVED & SMOOTH-END FLOWMETER MODEL MG/MS100

SPECIFICATIONS

PERFORMANCE

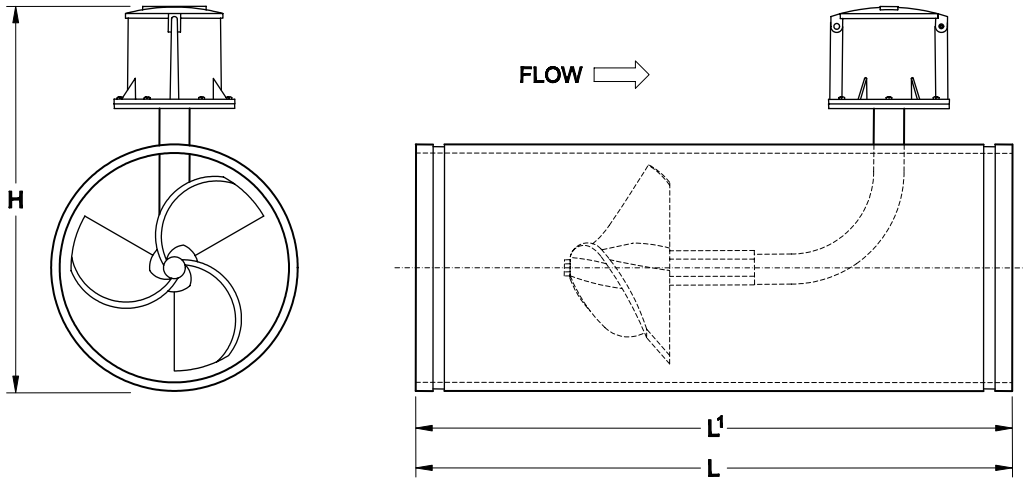
ACCURACY/REPEATABILITY: ±2% of reading guaranteed throughout full range. ±1% over reduced range. Repeatability 0.25% or better.
RANGE: (see dimensions chart below)
HEAD LOSS: (see dimensions chart below)
MAXIMUM TEMPERATURE: (Standard Construction) 160°F constant
PRESSURE RATING: 150 psi

MATERIALS

TUBE: Epoxy-coated carbon steel.
BEARING ASSEMBLY: Impeller shaft is 316 stainless steel. Ball bearings are 440C stainless steel.
MAGNETS: (Permanent type) Cast or sintered alnico
BEARING HOUSING: Brass; Stainless Steel optional
IMPELLER: Impellers are manufactured of high-impact plastic, retaining their shape and accuracy over the life of the meter. High temperature impeller is optional.
REGISTER: An instantaneous flowrate indicator and six-digit straight-reading totalizer are standard. The register is hermetically sealed within a die cast aluminum case. This protective housing includes a domed acrylic lens and hinged lens cover with locking hasp.
COATING: Fusion-bonded epoxy

OPTIONS

- Forward/reverse flow measurement
- High temperature construction
- "Over Run" bearing assembly for higher-than-normal flowrates
- Electronic Propeller Meter available in all sizes of this model
- A complete line of flow recording/control instrumentation
- Straightening vanes and register extensions available
- Certified calibration test results



McCrometer reserves the right to change design or specifications without notice.

MG100 / MS100	DIMENSIONS												
Meter Size (inches)	**2**	**2 ½**	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**24**
Maximum Flow U.S. GPM	250	250	250	600	1200	1500	1800	2500	3000	4000	5000	6000	8500
Minimum Flow U.S. GPM	40	40	40	50	90	100	125	150	250	275	400	475	700
Head Loss in Inches at Max. Flow	29.50	29.50	29.50	23.00	17.00	6.75	3.75	2.75	2.00	1.75	1.50	1.25	1.00
Shipping Weight, lbs.	* See Special Note		17	40	54	68	87	106	140	144	172	181	223
H (inches)			10.9	12.78	13.84	14.84	16.91	18.90	20.53	22.53	25.53	26.53	30.53
L (inches) MG100			13	20	20	20	20	20	20	22	22	22	22
L^1 (inches) MS100			13	20	22	22	22	22	22	24	24	24	24
O.D. of Meter Tube			3.50	4.500	6.625	8.625	10.750	12.750	14.00	16.00	18.00	20.00	24.00

Special Note—
Reducing fittings incorporating grooves are supplied to adapt the 3-inch model to smaller line sizes.

Larger flowmeters on special order.

Supporting Information

APPENDIX D

DILUTION CALCULATIONS
Oliver Elementary School
Lawrence, MA

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

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

ASSUMPTIONS FOR 300 GPM SYSTEM

7Q10 is 0.205 cubic feet per second (cfs) - from StreamStats 4.6.1
A conversion of 7.48 is used to convert cubic feet to gallons
A design flow rate of 300 gallons per minute (gpm) is assumed

CALCULATIONS

7q10 Low Flow Value (Q_S)

$$Q_S = \frac{2.93 ft^3}{sec} \times \frac{7.48 \text{ gallons}}{ft^3} \times \frac{86{,}400 \text{ sec}}{day} \times \frac{1 \text{ MG}}{1{,}000{,}000 \text{ gallons}} = 1.894 \text{ MGD}$$

Discharge Flow Rate (Q_D)

$$Q_D = \frac{300 \text{ gallons}}{min} \times \frac{1{,}440 \text{ min}}{day} \times \frac{1MG}{1{,}000{,}000 \text{ gallons}} = 0.432 \text{ MGD}$$

Dilution Factor (DF)

$$DF = \frac{Q_S + Q_D}{Q_D} = \frac{1.894 \text{ MGD} + 0.432 \text{ MDG}}{0.432 \text{ MGD}} = 5.38$$

Energy & Environmental Affairs
Data Portal

Waste Site & Reportable Releases Information

Related links

Supporting Documents
(https://eeaonline.eea.state.ma.us/EEA/fileviewer/Rtn.aspx?rtn=3-0037182)
LSP Lookup

Site Number ?
3-0037182

Category ?
120 DY

Site Name ?
LAWRENCE OLIVER PARTNERSHIP SCHOOL

AUL Info ?

Compliance Status ?
UNCLASSIFIED

Address ?
183 HAVERHILL STREET

Compliance Date ?
11/30/2021

Town ?
LAWRENCE

Phase ?

Zip Code ?
01840

RAO Class ?

Official Notification Date ?
11/30/2021

Location Type ?

Initial Status Date ?
11/30/2022

Source ?

Location

EEA Site Policies (https://www.mass.gov/site-policies)

MassDEP - Bureau of Waste Site Cleanup

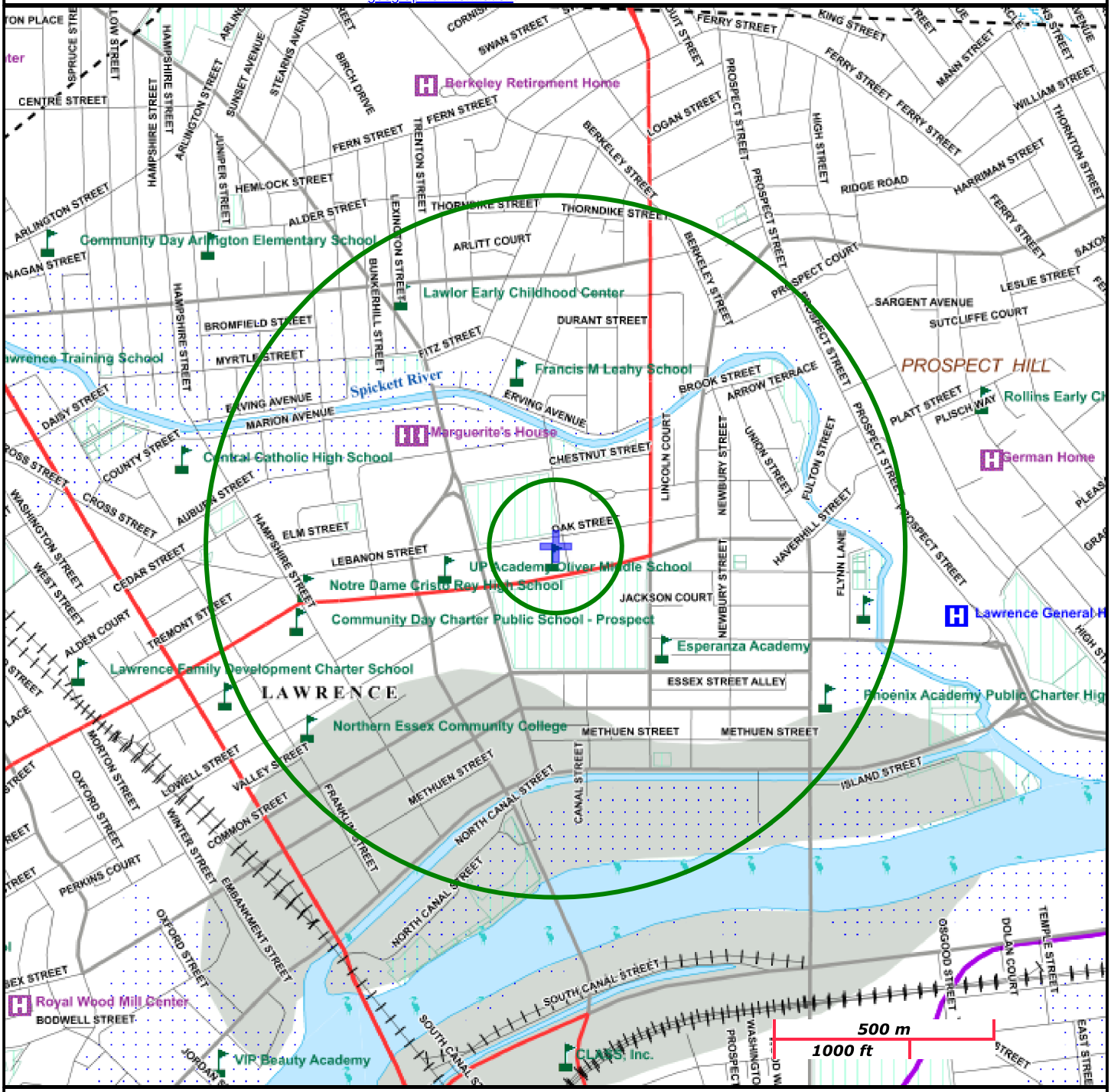
Phase 1 Site Assessment Map: 500 feet & 0.5 Mile Radii

Site Information:
OLIVER ELEMENTARY SCHOOL
183 HAVERHILL STREET LAWRENCE, MA

NAD83 UTM Meters:
4730995mN , 323071mE (Zone: 19)
March 9, 2022

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: https://www.mass.gov/orgs/massgis-bureau-of-geographic-information

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.

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Date: 3/9/2022

Search Criteria: Street Name and Number: 183 Haverhill;

Inv. No.	Property Name	Street	Town	Year	Designations
LAW.688	Oliver, Gen. Henry K. Grammar School	183 Haverhill St	Lawrence	1917	LHD;

United States Department of the Interior

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

In Reply Refer To: March 09, 2022
Project Code: 2022-0017681
Project Name: Oliver Elementary School

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

To Whom It May Concern:

Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

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

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/newengland/endangeredspecies/project-review/index.html

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

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

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/birds/policies-and-regulations.php

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Project Code: 2022-0017681
Event Code: None
Project Name: Oliver Elementary School
Project Type: New Constr - Above Ground
Project Description: Construction of new addition to the Oliver Elementary School
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.7108803,-71.16060057988358,14z

Counties: Essex County, Massachusetts

Endangered Species Act Species

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

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

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

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

---

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

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

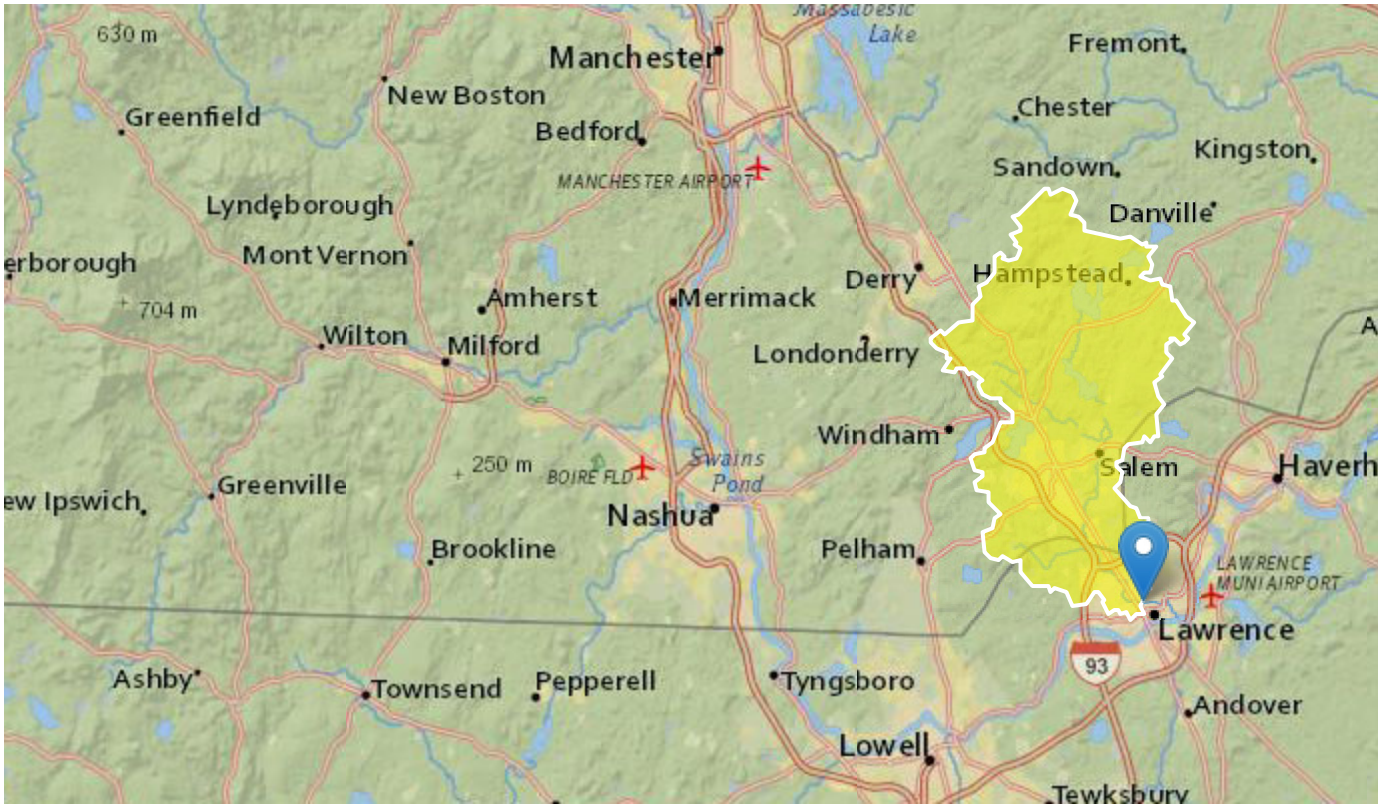
THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: Lockwood Remediation Technologies LLC
Name: Carlo Lombardo
Address: 89 Crawford Street
City: Leominster
State: MA
Zip: 01453
Email clombardo@lrt-llc.net
Phone: 8604810701

Oliver School Lawrence, MA

Region ID: MA
Workspace ID: MA20220309181351883000
Clicked Point (Latitude, Longitude): 42.71350, -71.17053
Time: 2022-03-09 13:14:17 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	75.6	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.347	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.1	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

Low-Flow Statistics Parameters [100.0 Percent (75.6 square miles) Statewide Low Flow WRIR00 4135]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	75.6	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.347	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.1	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

Low-Flow Statistics Flow Report [100.0 Percent (75.6 square miles) Statewide Low Flow WRIR00 4135]

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

Statistic	Value	Unit	PIl	PIu	SE	ASEp
7 Day 2 Year Low Flow	7.28	ft^3/s	1.92	26.7	49.5	49.5
7 Day 10 Year Low Flow	2.93	ft^3/s	0.641	12.5	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/)

Application Version: 4.7.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

City of Lawrence DPW Correspondence

APPENDIX E

CITY OF

LAWRENCE

STORMWATER MANAGEMENT PROGRAM PLAN

UPDATED JUNE 2021

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APPENDICES

1. STORMWATER PROGRAM OVERVIEW

WHY IS THIS IMPORTANT?

Stormwater runoff frequently transports pollutants through municipal separate storm sewer systems (MS4s), where it is discharged, often untreated, into local water bodies. To the public, the MS4 is more commonly known as a stormwater drainage system or simply as the "drain." These stormwater drains have been constructed in developed areas to reduce the risk of flooding and damage to our infrastructure. Unfortunately, stormwater drainage systems carry pollution during rain events and snow melt – this can include oil, trash, and any other materials found on lawns, streets, and parking lots.

In the City of Lawrence, Massachusetts (City), stormwater runoff discharges that are conveyed by the MS4 to the environment are regulated under the Clean Water Act and require a Permit. Lawrence is one of thousands of communities and institutions across the country that must comply with these regulations. The stormwater drainage system discharge Permit is known as the "MS4 General Permit" and is issued and managed jointly by the U.S. Environmental Protection Agency (EPA) and the State of Massachusetts Department of Environmental Protection (MassDEP).

WHAT DOES LAWRENCE HAVE TO DO?

The City has had MS4 Permit coverage since 2003. As part of the Permitting requirements, the City is required to develop a written Stormwater Management Program (SWMP). This SWMP (or Plan) is a "living" reference document that will guide the City's implementation of requirements within the Permit. The City is required to keep records of, and report on, the activities and measures that are implemented and consistent with this Plan. MS4 General Permit requirements are summarized (and simplified) as follows:

Implement public education programs to help City residents, business owners, and developers understand their role in keeping stormwater clean.

Engage the public in decision-making throughout the program.

Find and fix leaky or unauthorized sanitary sewer lines that might be discharging into the drainage system.

Ensure that construction projects do not pollute runoff with sediments and debris.

Ensure that new development and redevelopment control and treat runoff before it leaves the property.

Engage in pollution prevention actions like road and parking area best practices (cleaning drainage systems and sweeping pavements), and ensure that municipal activities like vehicle washing, lawn maintenance, and materials storage do not contribute to stormwater pollution.

The City is located within the Merrimack River watershed, with the Merrimack River running directly through the City. The Merrimack River has played a significant role in City's history, starting with colonial settlement in the 1600s. The City also contains the Spicket River and Shawsheen River, both of which are tributaries to the Merrimack River.

The Lawrence Department of Public Works maintains approximately 40 miles of drainage pipe, thousands of drainage structures (catch basins and manholes) and discharges stormwater to the environment in over 100 locations. The City continues to strive at making improvements to its stormwater management program every year to protect its water resources. A map of the City's water resources is shown in Appendix C of this Plan.

1.1 CONTROL MEASURES AND MEASUREABLE GOALS

The MS4 General Permit is structured around the following six control measures (CMs).

1. Public Education and Outreach
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination (IDDE)
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management
6. Pollution Prevention/Good Housekeeping

Permittees are required to prepare a SWMP describing specific actions they will implement to reduce stormwater pollution that align with the Permit requirements for each CM. These actions, called Best Management Practices (BMPs), are described in this Plan, along with the measurable goal for each BMP and deadline for development and implementation. Section 1.5 of this SWMP identifies the person(s) or department(s) responsible for implementing the BMPs identified in this SWMP.

The Permit Year (PY) referenced within this document corresponds to each regulatory year starting on July 1, 2018. Updates to the original version of this SWMP, dated September 7, 2018, have been incorporated into this document to reflect the City of Lawrence's stormwater management program achievements through PY 3 (ending June 30, 2021). A revision log tracking these updates is located in Appendix E.

The original SWMP and this most recent SWMP amendment are available for public access on the City's website.

CM 1: Public Education and Outreach (Permit Part 2.3.2)

Objective: Implement an education program that addresses stormwater issues of significance. The ultimate objective of a public education program is to increase knowledge of and help change behaviors of the public so that pollutants in stormwater are reduced. The "public" as defined in the MS4 General Permit are residents, businesses/institutions, developers/contractors, and industrial facilities. All written public outreach will be in English and Spanish.

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
1.1	Develop public education program plan (Education and Outreach Plan)	2.3.2.a	Develop an Education & Outreach (E&O) program which will outline an implementation approach that is inclusive of all education requirements across the Permit and for all impaired waters' special provisions. • Develop educational messages to be distributed to target audiences, considering the topics listed in Part 2.3.2.d of the MS4 General Permit. • Develop educational messages specific to the areas that discharge to priority waters, impaired waters, and drinking water supplies (where applicable). • Plan to provide educational web content and other publicly accessible resources. • Consider needs specific to the community: language, types of businesses, etc. • Develop methods to evaluate effectiveness of the messages and overall education program.	End of Permit Year (PY) 1
1.2	Deliver targeted/timed educational messages	2.3.2.c	Post educational messages on the City website or similar web-based forum. Maintain educational content throughout the Permit term.	End of PY 1

			Distribute a minimum of 2 educational messages to each of the 4 target audiences (residents, commercial, construction, industrial) on Permit-specified topics during the Permit term. Ensure that messages to each audience are at least 1 year apart.
			• Suggested residential topics:
			  ○ Lawn care effects on water quality (pesticide/herbicide/fertilizer application);
			  ○ Benefits of onsite stormwater infiltration;
			  ○ Vehicle/equipment washing effects on water quality;
			  ○ Proper disposal of swimming pool water;
			  ○ Proper management of pet waste; and
			  ○ Septic system maintenance.
			• Suggested Business/Commercial/Institutional topics:
			  ○ Lawn care effects on water quality
				End of PY 5

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
			(pesticide/herbicide/fertilizer application); ○ Benefits of onsite stormwater infiltration; ○ Use of detergents in building maintenance, vehicle/equipment washing; ○ Use of de-icing/anti-icing materials, including proper storage; ○ Proper storage of materials/waste/dumpster maintenance; ○ Proper management of parking lot surfaces; and ○ Proper disposal of swimming pool water. • Suggested Developer/Construction topics: ○ Proper sediment and erosion control practices; ○ Use of low impact development; and ○ Information about the EPA Construction General Permit. • Suggested Industrial topics: ○ Equipment inspection/maintenance; ○ Proper storage of materials; ○ Dumpster management; ○ Use of de-icing/anti-icing materials, including proper storage; ○ Benefits of onsite stormwater infiltration; Information about the EPA Multisector General Permit.	
1.3	Deliver supplemental educational messages in areas that discharge to Total Phosphorus impaired waterbodies. (Merrimack River Segment ID: MA84A-04 and MA84A-03)	2.2.2.b.i.1 & Appendix F Part A.V.	For areas that discharge to waterbodies with a Total Phosphorus impairment, distribute one educational message in the June/July timeframe of each PY that pertains to proper pet waste management, noting any existing regulations where appropriate.	Annual (June/July)
			For areas that discharge to waterbodies with a Total Phosphorus impairment, distribute one educational message in August/September/October timeframe of each PY that pertains to proper disposal of leaf litter.	Annual (Aug/Sept/ Oct)
			For areas that discharge to waterbodies with a Total Phosphorus impairment, distribute one educational message in March/April timeframe of each PY that pertains to proper disposal of grass clippings and using slow-release and phosphorus-free fertilizers.	Annual (March/ April)
1.4	Deliver supplemental educational messages in areas that discharge to bacteria or pathogen impaired waterbodies	2.2.2.c.i.1 & Appendix H	For areas that discharge to bacteria or pathogen impaired water bodies, provide educational materials to dog owners at the time of issuance or renewal of a dog license, or other appropriate time. These education materials describe the	Through-out Permit term

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
	(Spicket River – Segment ID: MA84A-10, Merrimack River Segment ID: MA84A-04 and MA84A-03, and Shawsheen River Segment ID: MA83-19)	Part III	detrimental impacts of improper management of pet waste, requirements for waste collection and disposal, and penalties for noncompliance, noting any existing regulations where appropriate.	
			For areas that discharge to bacteria or pathogen impaired water bodies, provide educational materials to owners of septic systems about proper maintenance (as applicable).	Annual
1.5	Assess educational program and modify if needed	2.3.2.e	Assess effectiveness of the educational program and modify messages if needed. Modify ineffective messages, if any, prior to next message delivery.	Annual

CM 2: Public Involvement and Participation (Permit Part 2.3.3)

Objective: Provide opportunities to engage the public in the review and implementation of the SWMP.

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
2.1	Conduct Public Participation Activities	2.3.3.b	Allow public participation in the implementation of the SWMP, annually. All public involvement activities will comply with state public notice requirements. Document and report on activities.	Annual
2.2	Provide Opportunity for Public to Review SWMP	2.3.3.b & c	Allow public participation in review of the SWMP annually. Facilitate public review of SWMP, annually. Allow public to comment on SWMP, annually. All public involvement activities will comply with state public notice requirements. Document public review and public comments. This will be accomplished in partnership with the City of Lawrence Conservation Commission. The Conservation Commission will hold a presentation that is open to the public. The SWMP and Annual MS4 Report updates will be open for review by the public for every September.	Annual
2.3	Make program documents available to the public	2.3.3.a	Post the SWMP and all Annual Reports on City website (following public notice requirements).	Annual

CM 3: Illicit Discharge Detection and Elimination (IDDE) (Permit Part 2.3.4)

Objective: Implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges.

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
3.1	Conduct Sanitary Sewer Overflow (SSO) Reporting and Inventory	2.3.4.4	After identifying new SSOs, notify EPA within 24 hours and provide written notice to EPA and MassDEP within five days. • Document and file SSO reports and corrective measures implemented for annual reporting. Maintain database or summary of SSOs through Permit term.	Throughout Permit Term
			Obtain and assess historic SSO reports. • Develop inventory of all identified SSOs (discharged to the MS4 within the past 5 years) indicating location, date/time, volume, suspected causes, and corrective measures.	End of PY 1
3.2	Continue MS4 System Mapping	2.3.4.5	Phase I – Update the system map required by the MS4-2003 Permit to include: outfalls and receiving waters, open channel conveyances, interconnections with other MS4s and other storm sewer systems, municipally-owned stormwater treatment structures, waterbodies (name and use impairments), and initial catchment delineations.	End of PY 2
			Phase II – Update separate storm sewer system map annually, include information for all MS4 outfalls (catchments) within 10 years of the Permit effective date. • Update the system map annually as the following information becomes available during implementation of catchment investigation procedures: outfall spatial location, pipes, manholes, catch basins, refined catchment delineations, municipal sanitary sewer, and combined sewer systems (if available or applicable).	Update: Annually Info for all drainage infrastructure: End of PY 10
3.3	Develop Written IDDE Program Manual	2.3.4.6	Develop a written IDDE Program document that includes at a minimum: • Legal authority, statement of responsibilities, outfall/interconnection inventory and initial priority ranking, outfall/interconnection screening and sampling procedures, follow-up ranking, catchment investigation procedures, illicit discharge confirmation and removal procedures, indicators or IDDE Program progress, ongoing screening, and training.	End of PY 1

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
		2.3.4.7.a & Appendix H	Designate catchments draining to any waterbody impaired for bacteria or pathogens as either Problem or High Priority catchments in implementation of the IDDE program. Also prioritize catchments that drain to surface public drinking water supplies and waterbodies with recreational use as High Priority.	End of PY 1
		2.3.4.8	Outline Catchment Investigation Procedures: Develop a written systematic procedure to investigate each catchment associated with an outfall or interconnection within the MS4 system, that: • Identifies maps, historic plans and records, and other sources of data that will be used in identifying system vulnerability factors (SVFs) within each catchment. • Includes a description of manhole inspection methodology that involves systematically and progressively observing, sampling, and evaluating key junction manholes to determine location of suspected illicit discharges and SSOs. • Establishes procedures to isolate and confirm sources of illicit discharges. Available data to be used for SVFs will be listed in the IDDE Program Manual.	End of PY 1
3.4	Conduct dry weather Outfall/ Interconnection screening and sampling	2.3.4.7.b	Conduct dry-weather Outfall/Interconnection screening annually to meet Permit requirements of all outfalls screened by the end of PY 3. Dry weather screening and sampling (no more than 0.1-inch of rainfall in past 24 hours): • Record condition and information for inventory and priority ranking. • If flow, sample for ammonia, chlorine, conductivity, salinity, E. coli (freshwater) or enterococcus (salt water), surfactants, temperature, and pollutants of concern. • If no flow but evidence of illicit flow exists, revisit within one week to perform screening/sampling.	All outfalls screened by end of PY 3

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
3.6	Reprioritize Outfalls and Interconnections	2.3.4.7.c	Update outfall and interconnection ranking (2.3.4.7.a) based on information gathered during dry weather screening. Ranking can be updated continuously as new screening information becomes available. Update IDDE Program Manual with refined prioritization for catchment investigations based on dry weather screening results collected through PY 3.	Update prioritization by end of PY 3
3.7	Conduct catchment investigations	2.3.4.8	For each catchment, conduct investigations consistent with IDDE Program Manual; inspect key junction manholes and refine mapping information on the location of pipes, manholes, and extent of catchment. • Dry weather investigation in manholes: if flow, sample for ammonia, chlorine, and surfactants. If no flow, but visual/olfactory evidence of illicit discharges are present, conduct sandbag placement during dry weather. Return to verify presence or absence of flow. Sample as needed.	• Complete investigation of problem outfalls by end of PY 7 • Investigate all catchments by end of PY 10
3.5	Conduct wet weather Outfall/Interconnection screening and sampling	2.3.4.8	Conduct wet-weather Outfall/Interconnection screening in catchments with SVFs prior to initiation of catchment investigation. Provide data annually. • Wet weather screening and sampling will be conducted during or after a precipitation event of sufficient intensity to produce a discharge. Recommended in the Spring. Sample for ammonia, chlorine, conductivity, salinity, E. coli or enterococcus, surfactants, temperature, and pollutants of concern.	Complete all wet-weather screening in identified catchments by end of PY 7
3.8	Conduct expeditious removal of verified sources of illicit discharge or SSO, and confirmatory screening	2.3.4.8	Upon verification of an illicit discharge, locate, identify, and eliminate the illicit discharge as expeditiously as possible. Where elimination of an illicit discharge within 60 days is not possible, establish an expeditious schedule and report the dates of identification and schedule for removal in annual report. • Confirm removal of verified illicit discharges through dry (and/or wet) bracket sampling.	During Permit term, document annually

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
3.9	Evaluate the overall effectiveness of the IDDE Program	2.3.4.9	Evaluate the overall effectiveness of the IDDE Program using the indicators for tracking program success as defined in the IDDE Program Manual. Indicators include: number of SSOs and illicit discharges identified and removed, number and percent of total catchments investigated, dry and wet weather screening and sampling results, and volume of sewage removed. • Provide evaluation of IDDE program annually via annual report.	During Permit term, document annually
3.10	Ongoing screening	2.3.4.10	Reprioritize each outfall and interconnection upon completion of all catchment investigations (2.3.4.8) and schedule ongoing screening once every 5 years that includes dry weather screening and sampling. Ongoing wet weather screening and sampling is also required at outfalls where previous wet weather screening was required due to SVFs. • Conduct outfall screening once every five years upon completion of all catchment investigations.	Upon completion of all catchment investigations, then ongoing screening once every five years
3.11	Conduct employee training	2.3.4.11	Provide annual training (at a minimum) to employees involved in the IDDE Program. Report on the frequency and type of employee training in annual report.	Annually (at a minimum)

CM 4: Construction Site Stormwater Runoff Control (Permit Part 2.3.5)

Objective: The objective of an effective construction stormwater runoff control program is to minimize or eliminate erosion on regulated construction sites within the regulated MS4 area and to ensure that sediments and other pollutants are not transported in stormwater from construction sites and allowed to discharge to a water of the United States through the MS4.

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
4.1	Ensure construction stormwater runoff control ordinances, local site development, and wetland protection Permit application process are consistent with MS4 General Permit	2.3.5.c.i.	Review City Stormwater Control Ordinance/Bylaw and regulations, wetland protection, and local Permit application process to ensure that site development applicants meet Construction General Permit obligations. • Continue to implement an effective construction stormwater runoff control program. An ordinance or other regulatory mechanism that requires the use of sediment and erosion control and waste management practices at construction sites that disturb greater than one acre (or common plan of development) was required to be in place by May 1, 2008 under the MS4-2003 Permit. • Continue to require construction site operators performing land disturbance activities that exceed one acre (or common plan of development) to implement an erosion and sediment control program consistent with the Construction General Permit.	End of PY 1
4.2	Develop written construction site stormwater runoff control program procedures	2.3.5.c.ii. & 2.3.5.c.v.	Develop written Construction and Post-Construction Program Manual (Manual) or independent documentation for the following procedures: • Procedures and workflow for site plan review, pre-construction review, receipt and consideration of information submitted by the public, inspections, responsible parties, and data tracking. • Procedures for enforcement of sediment and erosion control measures. • Procedures to consider potential water quality impacts to impaired waters, construction waste handling, and evaluation of opportunities for use of LID and green infrastructure. Include references to local ordinance/bylaw and regulations	End of PY 1
4.3	Track, inspect, and document applicable construction projects	2.3.5.c.v.	Track the number of erosion and sediment control plan reviews, construction site inspections, and enforcement actions and include in annual report.	Throughout Permit term, annually

CM 5: Stormwater Management in New Development and Redevelopment (Post-Construction Stormwater Management) (Permit Part 2.3.6)

Objective: The objective of this control measure is to reduce the discharge of pollutants found in stormwater through the retention or treatment of stormwater on regulated new or redevelopment sites within the regulated MS4 area.

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
5.1	Develop written post-construction stormwater runoff program procedures	2.3.6.a	Develop written Construction and Post-Construction Program Manual (Manual) or standalone documentation meeting the following requirements: • Include references to City Stormwater Control Ordinance/Bylaw and regulations. • Document procedures and workflow for site plan review, post-construction installation inspections, responsible parties, and stormwater control structure tracking. • During development of the Manual or independent procedures: - Review City Stormwater Control Ordinance/Bylaw and regulations, wetland protection, and local Permit application process to ensure that site development applicants meet Post-Construction General Permit obligations consistent with Permit requirements in Part 2.3.6.a (see BMP 5.2) and provisions related to management of Phosphorus in discharges to impaired waters. - Evaluate the effectiveness of City Stormwater Control Ordinance/Bylaw related to Permit Part 2.3.6.a.iii requirements (see BMP 5.2). - Recommend and implement changes to Ordinance/Bylaw (or Regulations), as necessary.	End of PY 1
5.2	Update Local Ordinance/Bylaw (or regulations) on Stormwater Management in New & Redevelopment. This includes the BMP for areas that discharge to waterbodies impaired by solids, oils, and grease (hydrocarbons), or metals.	2.3.6.a.ii	Based on outcome of BMP 5.1, update the Ordinance/Bylaw or other regulatory mechanism (as needed). • Require LID site planning and design strategies be implemented to the maximum extent feasible. • Require that design of stormwater management systems be consistent with, or more stringent than, the requirements of the 2008 Massachusetts Stormwater Handbook. • Require that stormwater management systems on new development sites be designed to meet an average annual pollutant removal equivalent to 90% of the annual average load of Total Suspended Solids (TSS) and 60% of Total Phosphorus (TP) generated from the total post-construction impervious area on the site. • Require that stormwater management systems on redevelopment sites be designed to meet an	End of PY 3

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
			average annual pollutant removal equivalent to 80% of the average annual load of TSS and 50% of TP generated from the total post-construction impervious area on the site. • Provide options for offsite mitigation meeting the same standards as the new/redevelopment sites within the same United States Geological Survey (USGS) Hydrologic Unit Code 12 (HUC12) as the new/redevelopment site.	
		2.3.6.a.ii & Appendix H Part V	• Design stormwater management systems on commercial and industrial land such that designs incorporate for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event.	
		2.3.6.a.iii & Appendix H Part II	• Require the submission of as-built drawings no later than two years after completion of construction projects. Document in the Annual Report the measures/procedures utilized to meet this requirement. • Establish a mechanism to ensure that long-term operation and maintenance (O&M) of BMPs will occur. This can be accomplished by establishing dedicated accounts or funds, maintenance contracts, annual certification or assumed ownership of the BMPs. Document in the Annual Report the measures/procedures utilized to meet this requirement. • Require that new development or redevelopment stormwater management BMPs be optimized for Phosphorus removal for areas that discharge to waterbodies with a Total Phosphorus impairment.	
5.3	Assess Local Standards	2.3.6.b	During review of Ordinance/Bylaw (or other regulatory mechanism) in PY 3 (see BMP 5.2). • Evaluate existing zoning or other municipal standards to determine if the requirements are stormwater-friendly, per Permit Part 2.3.6.b and 2.3.6.c. • Recommend changes to zoning or other municipal standards.	End of PY 3
			Street Design and Parking Lot Requirements Assessment. • Develop a report assessing street design and parking lot requirements that affect the creation of impervious cover. • Involve the local planning board and local transportation board and include recommendations for policies that will minimize impervious area attributable to parking areas and	End of PY 4, document status annually

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
			street designs, schedules for implementing recommendations, and subsequent assessment. • Document status of the assessment and planned or completed changes to local regulations/guidelines in annual report.	
		2.3.6.c	Assessment of local regulation's effect on integration of infiltration/water reuse practices: • Develop a report assessing how local regulations affect the ability of development to include infiltration practices (e.g. green roofs, rain gardens, curb extensions, planter gardens, and porous & pervious pavement) and water harvesting devices (e.g. rain barrels and cisterns) that promote the use of stormwater for non-potable uses. • Create a schedule for revising regulations, if necessary. • Include this schedule, assessment findings, and progress towards making infiltration and water harvesting practices feasible in the annual report.	End of PY 4, document status annually
5.4	Identify BMP Retrofits for Reduction of Impervious Area	2.3.6.d	During municipal facility inventory conducted in PY 2 (BMP 6.1), identify sites with likely reconstruction activity during the Permit term. Where appropriate, these facilities with planned reconstruction will include stormwater control measures. • Complete an inventory of at least five municipal properties/ roadways that could be modified through the reduction of Impervious Areas by end of PY 4 and include in annual report. • Retrofits to municipal properties with significant Impervious Areas should be considered at a minimum. • Conduct retrofit assessment on facilities without planned improvements and within impaired watersheds (as applicable) in PY 4. Also see Section 1.2.1 Impaired Waters. • Continue to identify additional municipal properties/infrastructure that could be retrofitted such that a minimum of five sites are maintained in the inventory, until such a time as when there are less than five sites remaining. Update inventory annually beginning with PY 5 annual report. • Report on inventoried MS4 properties that have been retrofitted with BMPs that mitigate Impervious Areas. Non-MS4 retrofitted properties may also be included. Report on retrofits annually beginning with PY 5 annual report.	End of PY 4, document status annually

CM 6: Pollution Prevention and Good Housekeeping for Municipal Operations (Permit Part 2.3.7)

Objective: To implement a *Pollution Prevention & Good Housekeeping Program* for municipal operations that has a goal of preventing or reducing pollutant runoff and protecting water quality from all municipal operations and municipal facilities.

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
6.1	Develop Operations & Maintenance (O&M) Program documentation	2.3.7.a	Develop written O&M procedures per Part 2.3.7.a of the Permit. • Develop Clean Water Best Practices Manual or standalone standard operating procedures (SOPs, Procedures) inclusive of all City facilities, drainage system operations activities, inspection obligations, and including specific impaired waters provisions. Program procedures will include the following: - Municipal facilities/equipment inventory by watersheds/catchments - Proper use, storage, and disposal of potential stormwater pollutants such as pesticides, herbicides, fertilizers, and petroleum products - Pet waste management - Waterfowl congregation area management - Management of trash receptacles - Vehicle and equipment maintenance, including wash water management - Municipal infrastructure maintenance: street sweeping and catch basin cleaning - Road salt use and optimization - Stormwater treatment structures O&M - Landscape maintenance (including grass clippings and leaf litter) • Report on status of inventory and program documentation.	End of PY 2
6.2	Implement O&M Program	2.3.7.a	Report on status of O&M programs, maintenance activities, best practices, and provide documentation in annual report consistent with reporting requirements outlined in 2.3.7.a.	End of PY 2, document status annually
6.3	Infrastructure Operation and Maintenance Plan in areas that discharge to solids, oils, and grease (hydrocarbons), or metals impaired waterbodies	2.3.7.a.iii & Appendix H Part V	• Develop a program detailing the routine inspections, cleaning, and maintenance of catch basins such that no catch basins at any time will be more than 50% full. • Establish and implement procedures for increased street sweeping frequency of all municipal owned streets and parking lots while targeting areas with potential for high pollutant loads.	End of PY 2
6.4	Develop/Refine Stormwater Pollution Prevention Plan (SWPPP) for	2.3.7. b	Develop SWPPP (and SPCC as needed) for maintenance garage, public works yard, transfer station, and waste handling facilities. SWPPP will include the elements listed in Part 2.3.7.b. ii. Keep all	End of PY 2, document annually thereafter

BMP ID #	BMP Description	Permit Part Reference	Measurable Goal(s)	Deadline(s)
	maintenance garages, public works yards, transfer stations, and waste handling facilities		records associated with the development and implementation of the SWPPP. Report status of SWPPP annually.	
6.5	Conduct site inspection procedures consistent with SWPPP for maintenance garages, public works yards, transfer stations, and waste handling facilities	2.3.7.b.iii.	Inspect all areas exposed to stormwater and all stormwater control measures at each facility at least once per calendar quarter and report findings in annual report.	Once per quarter upon completion of BMP 6.3, document annually.
6.6	Conduct employee training program consistent with SWPPP	2.3.7. h.	Conduct employee training consistent with SWPPP.	Every other Permit Year

1.2 WATER QUALITY STANDARDS

1.2.1 Impaired Waters

Discharges to waterbodies with approved Total Maximum Daily Load (TMDL) or to water quality limited water bodies, or discharges causing or contributing to impairments have additional requirements in Parts 2.1, 2.2, and Appendix F of the MS4 General Permit. According to MassDEP's 2016 Integrated List of Waters, the City of Lawrence's MS4 discharges to waterbodies that have an approved TMDL and waterbodies that are considered impaired but do not have an approved TMDL. A list of impaired waters that are within the City of Lawrence and their TMDL/impairment causes is provided in Table 1-1 in this Section. A map showing MassDEP's 2016 Integrated List of Waters located in the City of Lawrence is provided in Appendix C of this SWMP.

Additional Requirements for Discharges to Impaired Waterbodies with an Approved TMDL

City of Lawrence is located within the Merrimack River watershed. As noted in Table 1-1, the City discharges to the Shawsheen River, which has a TMDL. There are additional requirements for areas that discharge into this waterbody segment in the General Permit, which are discussed in this Section.

Shawsheen River TMDL for Fecal Coliform and Escherichia Coli

The following is a summary of the additional requirements associated with the Shawsheen River Fecal Coliform and Escherichia Coli TMDLs, per Appendix F Part A.III of the General Permit:

- Enhancement of BMPs required by Part 2.3 of the permit that will be implemented during this permit term:
  - Public Education and Outreach
    - Once per year, the City will produce a message to pet owners, encouraging the proper management of pet waste. Educational materials will be distributed to dog owners at the time of issuance or renewal of a dog license, or other appropriate time. Education materials will describe the detrimental impacts of improper management of pet waste, requirements for waste collection and disposal, and penalties for non-compliance, noting any existing regulations where appropriate.
    - Once per year, the City will provide information to owners of septic systems in catchments that discharge to the Shawsheen River, about proper maintenance (as applicable). There are very limited, if any, septic systems within the City.
  - Illicit Discharge
    - Catchments draining the Shawsheen River will be designated either Problem Catchments or HIGH priority in implementation of the IDDE program.

Additional Requirements for Discharges to Impaired Waterbodies Without an Approved TMDL

For the areas within the City that directly discharge to impaired waterbody segments without an approved TMDL, there are additional BMPs that have been established, in Parts 2.1, 2.2, and Appendix H of the MS4 General Permit. Among the impairment causes are the following:

- Total Phosphorus
- Bacteria or pathogens (i.e. Escherichia Coli or Fecal Coliform)
- Aquatic Macroinvertebrate Bioassessments
- Copper

- Polychlorinated biphenyls (PCBs) in Fish Tissue
- Mercury in Fish Tissue
- Mercury in Water Column

A description of the Permit requirements and BMPs related to impaired waters and measurable goal(s) for each BMP have been integrated into Section 1.1 of this Plan and are summarized below:

For the areas that discharge to waters impaired by **Total Phosphorus** or **Nutrients** where stormwater or combined sewer overflows are the cause of the nutrient impairment but have no approved phosphorus TMDL (Merrimack River, Spicket River):

- Public Education and Outreach
    - The City will supplement annual messages to the public in the springtime (March/April) on disposal of yard waste and use of slow-release and phosphorus-free fertilizers.
    - The City will supplement annual messages to the public in the summertime (June/July) on pet waste management, noting any existing regulations where appropriate.
    - The City will supplement annual messages to the public in the fall (September/October) on proper disposal of leaf litter.
- Stormwater Management in New Development and Redevelopment
    - The City will require that new development or redevelopment stormwater management BMPs be optimized for phosphorus removal.
    - Consider BMPs that infiltrate stormwater where feasible in retrofit inventory and priority ranking of municipal properties/infrastructure.
- Good House Keeping and Pollution Prevention
    - The City will establish housekeeping procedures to manage grass cuttings and leaf litter on municipal property.
    - The City will increase street sweeping frequencies on municipally owned streets and parking lots.
- Phosphorous Source Identification Report
    - Within four years of the permit effective date, the City will develop a Phosphorous Source Identification Report (that will be submitted to EPA as part of the year 4 annual report) that includes:
        - Calculation of total MS4 area draining to the water quality limited receiving water segments or their tributaries
        - Incorporation of updated mapping of the MS4 and catchment delineations produced pursuant to Part 2.3.4.5
        - All screening and monitoring results pursuant to Part 2.3.4.7.b., targeting the receiving water segment(s)
        - Impervious area and DCIA for the target catchment
        - Identification, delineation and prioritization of potential catchments with high phosphorus loading
        - Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment, including the removal of impervious area

- The City will post the Phosphorus Source Identification Report and any related progress reports to their City website annually.

- Potential Structural BMPs
  - Within five years of the permit effective date, the City will evaluate all of its properties identified as presenting retrofit opportunities or areas for structural BMP installation under permit Part 2.3.6.d.ii or identified in the Phosphorus Source Identification Report that are within the drainage area of the water quality limited water or its tributaries. The evaluation will include:
    - The next planned infrastructure, resurfacing or redevelopment activity planned for the property (if applicable) OR planned retrofit date
    - The estimated cost of redevelopment or retrofit BMPs
    - The engineering and regulatory feasibility of redevelopment or retrofit BMPs.
  - The City will provide a listing of planned structural BMPs and a plan and schedule for implementation in the year five annual report.
  - The City will plan and install a minimum of one structural BMP as a demonstration project within the drainage area of the water quality limited water or its tributaries within six years of the permit effective date. The demonstration project will be installed targeting a catchment with high phosphorus load potential.
  - The City will install the remainder of the structural BMPs in accordance with the plan and schedule provided in the year five annual report.

For the areas that discharge to waters impaired by **bacteria or pathogens** but have no approved bacteria TMDL (Merrimack River and Spicket River):

- Public Education and Outreach
  - The City will supplement residential public education and outreach program with an annual message encouraging the proper management of pet waste and proper maintenance of septic systems, noting any existing regulations where appropriate.

- IDDE Program
  - Designate catchments draining to any waterbody impaired for bacteria or pathogens as either Problem or High Priority catchments in implementation of the IDDE program.

For the areas that discharge to waters impaired by **solids, oils, and grease (hydrocarbons), or metals**, but have no approved TMDL (Spicket River):

- Stormwater Management in New Development and Redevelopment:
  - The City will ensure that stormwater management systems designed on commercial and industrial land use area draining to the water quality limited waterbody will incorporate designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event.

- Good House Keeping and Pollution Prevention
  - The City will increase street sweeping frequency of all municipal owned streets and parking lots to target areas with potential for high pollutant loads. This may include, but is not limited to, increased street sweeping frequency in commercial areas and high-density residential areas, or drainage areas with a large amount of impervious area.
  - The City will prioritize inspection and maintenance for catch basins to ensure that no sump will be

more than 50 percent full.

This section will be updated to incorporate additional Appendix H requirements associated with excess algal growth, dissolved oxygen, and/or nutrient/eutrophication biological indicators if these impairments are identified in receiving waterbodies during future iterations of the Massachusetts Integrated List of Waters and the impairment source is stormwater related. The City will continue to analyze samples for these parameters during outfall and interconnection screening activities, as needed.

Table 1-1: Impaired Waters in Lawrence, MA (Based on Approved Integrated List – 2016)

Segment ID	Waterbody	Impairment Category Classification	Impairment Cause	Impairment Source	EPA TMDL Control No.	Pollutant of Concern Sampling Requirements (Permit Appendix G)
Waterbodies in the Merrimack Watershed:						
MA84A-03 MA84A-04	Merrimack River	Category 5	Escherichia coli	Combined Sewer Overflows Unknown Wet Weather Discharges	NA	- E. coli
			PCB in Fish Tissue (only for segment MA84A-03)	Unknown	NA	- NMR*
			Phosphorus (total)	Municipal Point Source Discharges Unspecified Urban Stormwater Upstream/Downstream Source	NA	- Phosphorus, Total
			Mercury in Fish Tissue	Unknown Atmospheric Deposition - Toxics	NA	- NMR
MA83-19	Shawsheen River	Category 5	Fecal Coliform	Discharges from MS4 Illicit Connections/Hook-ups to Storm Sewers	2587	- Fecal Coliform
			Escherichia coli	Discharges from MS4 Illicit Connections/Hook-ups to Storm Sewers	2587	- E. coli
MA84A-10	Spicket River	Category 5	(Debris/Floatables/Trash*)	Unspecified Urban Stormwater	NA	- NMR
			(Physical substrate habitat alterations*)	Unspecified Urban Stormwater Channelization Loss of Riparian Habitat	NA	- NMR
			Benthic Macroinvertebrates	Loss of Riparian Habitat Municipal Point Source Discharges Channelization Unspecified Urban Stormwater	NA	- Contact MassDEP

Segment ID	Waterbody	Impairment Category Classification	Impairment Cause	Impairment Source	EPA TMDL Control No.	Pollutant of Concern Sampling Requirements (Permit Appendix G)
MA84A-10	Spicket River	Category 5	Copper	Combined Sewer Overflows Unspecified Urban Stormwater	NA	- Copper, Total
			Escherichia coli	Unknown Combined Sewer Overflows Discharges from MS4	NA	- E. coli
			Nutrients	Combined Sewer Overflows Unspecified Urban Stormwater	NA	- Phosphorus, Total

*Note: Future reissuance and/or approval of the Massachusetts Integrated List of Waters may necessitate additional modifications to this Plan to maintain compliance with applicable requirements.

1.2.2 Surface Public Drinking Water Supplies

The City of Lawrence Water Treatment Facility draws water from the upstream portion of the Merrimack River, a Class B surface water. The City will continue to take measures to minimize impacts to surface public drinking water supply sources through the use of the BMPs discussed in Section 1.1 and 1.2 of this SWMP. In addition, the City's IDDE Program Plan prioritizes investigating the potential for illicit stormwater discharges proximate to drinking water supplies.

In addition to the stormwater BMPs discussed in this plan, the City maintains a drinking water supply emergency response plan to manage emergencies and inform citizens of drinking water emergencies.

A list of known waterbody segments that receive discharge from Lawrence's MS4 is included in the City's MS4 General Permit Notice of Intent (NOI) submission to the EPA dated December 18, 2018, which can be accessed on the EPA's website. Any updates to the waterbody segments receiving discharge from Lawrence's MS4 will be included in future revisions of this document, if necessary.

1.2.3 Increased Discharges

The City will comply with the provisions of 314 CMR 4.04 including information submittal requirements and obtaining authorization for increased discharges where appropriate. Any authorization of an increased discharge by MassDEP will be incorporated within this SWMP.

There will be no increased discharges, including increased pollutant loading(s) from the MS4 to impaired waters listed in categories 5 or 4b on the most recent Massachusetts Integrated Report of waters listed pursuant to Clean Water Act Section 303(d) and 305(b) unless the discharger demonstrates that there is no net increase in loading from the MS4 to the impaired water of the pollutant(s) for which the waterbody is impaired.

Unless otherwise determined by the EPA or MassDEP, compliance with the Part 2.2.2 and 2.3.6 requirements of the MS4 General Permit, including all reporting and documentation requirements, are considered as demonstrating no net increase or increased discharge. Part 2.2.2 and 2.3.6 requirements have been included in the BMPs outlined in Section 1.1 of this SWMP.

If necessary, the City will demonstrate compliance with this provision by either:

- Documenting that the pollutant(s) for which the waterbody is impaired is not present in the MS4's discharge and retaining documentation of this finding with the SWMP; or
- Documenting that the total load of the pollutant(s) of concern from the MS4 to any impaired portion of the receiving water will not increase as a result of the activity and retaining documentation of this finding in the SWMP.

1.3 SPECIAL ELIGIBILTY DETERMINATIONS

Consistent with Part 1.9 of the 2016 MS4 General Permit, the City has completed an assessment of both Endangered Species and Historic Properties. The Information, Planning and Conservation (IPaC) online system process was completed, and the Northern Long-Eared Bat was identified in Lawrence. However, since the action area does not contain one or more of the species listed in Appendix C, Part B, Step 2 for determination of Criterion B, and discharges from the City's MS4 are not likely to adversely affect the Northern Long-Eared Bat habitat, Criterion C is applicable. Therefore, the stormwater discharges and discharge related activities will have "no effect" on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the USFWS.

Appendix D of the MS4 General Permit was consulted for guidance regarding the National Historic Preservation Act. It was determined that Criterion A is applicable: The discharges authorized under this permit do not have the potential to cause effects to historic properties.

If during Permit implementation the City initiates a project that will result in ground or vegetation disturbance, additional consultation with the appropriate agencies will be initiated. See Appendix B for determination letters.

1.4 ANNUAL PROGRAM SELF-EVALUATION, RECORD KEEPING & ANNUAL REPORTING

Covered entities are required to collect and report information about the development and implementation of their SWMP. The City conducts annual evaluations of its program compliance, the appropriateness of its identified BMPs, meeting new Permit requirements, and progress towards achieving its identified measurable goals, which include reducing the discharge of pollutants to the maximum extent practicable ("MEP").

The City will keep records required by the MS4 General Permit for at least five years after they are generated. Records include but are not limited to: information used in the development of written (hardcopy or electronic) programs required by this Permit, monitoring results, copies of reports, records of screening, follow-up and elimination of illicit discharges; maintenance records; inspection records; and data used in the development of the notice of intent, SWMP, SWPPP, and annual reports. Records will be available for public observation upon request. Records will be submitted to the EPA or MassDEP as requested.

Annual reports are due to the EPA and MassDEP each year within 90 days of the close of the Permit year on June 30 (September 28). The annual reports shall include the following content:

- Self-assessment review of compliance with Permit conditions;
- An assessment/evaluation of:
  - The appropriateness of the identified BMPs
  - Progress towards achieving the statutory goal of reducing the discharge of pollutants to the MEP
  - The identified measurable goals for each of the CMs
- All outfall screening and sampling results;
- Summary of stormwater activities planned to be undertaken during the next reporting cycle;
- Any change in identified BMPs or measurable goals and justification for those changes; and
- The information specified under the reporting requirements for each CM.

Changes to the City's stormwater permit compliance program do not need to be updated in their NOI, however, this

information will be included in the City's annual reports and SWMP updates. Annual reports are also made available for public access on the City's and the EPA's website.

1.5 RESPONSIBLE PARTIES FOR STORMWATER PROGRAM IMPLEMENTATION

Title/ Position of Responsible Person	Name of Responsible Person	Role/Program Element(s)
Water and Sewer Commissioner	Milagros Puello	Control Measure 1, 2, 3, 6 and all TMDL and Impaired Water Provisions
City Engineer	Felix Garcia Jr.	Control Measure 4, 5
Acting DPW Director	Franklin Miguel	Facility Inventory and Standards of Practice for Operations

2. PROGRAM DOCUMENTS: PLANS, PROCEDURES, INVENTORIES, AND MAPS

The General Permit requires certain documents to be included in the SWMP. These documents will be developed consistent with the schedule outlined in Section 1.1. This Section provides information on where these documents can be accessed. Some of these documents have been appended to this SWMP, while others are provided in a location external to the SWMP due to size or complexity. Digital copies can be found on the City website and hard copies will be made available by the City, as detailed in the sections below.

2.1 IDDE PROGRAM

2.1.1 IDDE Program Manual

The City has developed a written IDDE Program Manual consistent with the requirements of Part 2.3.4.6 of the MS4 General Permit. The IDDE Program Manual includes:

- Responsible parties
- Regulatory authority
- Dry weather and wet-weather outfall screening and sampling procedures
- Interconnection screening procedures
- Initial assessment and priority ranking of outfalls/interconnections
- Catchment investigation procedures
- Enforcement procedures
- Training resources and modules

The IDDE Program Manual can be accessed at City Hall.

2.1.2 Separate Storm Sewer System Map

The City has developed a Separate Stormwater Sewer System Map consistent with the requirements of Part 2.3.4.5.a of the MS4 General Permit. The map, provided in Appendix A of this SWMP, includes the following information:

- Outfalls and receiving waters
- Open channel conveyances
- Interconnections with other MS4s and other storm sewer systems
- Municipally-owned stormwater treatment structures
- Waterbodies identified by name and indication of all use impairments per the 2016 Massachusetts Integrated List of Waters report
- Initial catchment delineations
- Drain pipes, manholes, and catch basins

The map is updated annually and/or upon receipt of new information relating to the MS4 drainage network.

2.1.3 SSO Inventory

The City has developed a Sanitary Sewer Overflow (SSO) Inventory consistent with the requirements of Part 2.3.4.4 of the MS4 General Permit. The SSO inventory is updated annually and submitted along with the MS4 annual report.

2.1.4 Receiving Waterbodies

Consistent with the requirements of Part 1.10.2 of the MS4 General Permit, a list of all Integrated List waterbody segments that receive discharge from the City's MS4 is provided in Table 1-1. The table also includes estimated number of outfalls that discharge directly to each Integrated List of waterbody segment. The City's MS4 General Permit NOI submission to the EPA dated December 18, 2018 included the estimated number of outfalls that discharge directly to each Integrated List waterbody segment. A copy of the original NOI can be accessed on the EPA's website. Any updates to the numbers reported in the NOI will be included in future revisions of this document, if necessary.

2.1.5 Interconnected Separate Storm Sewer Systems

Consistent with the requirements of Part 1.10.2 of the MS4 General Permit, a list of all known interconnected MS4s and other separate storm sewer systems receiving a discharge from the City's MS4, as well as the waterbody segment(s) that ultimately receive the discharge, are shown on the updated Separate Storm Sewer System Map in Appendix A.

2.2 CONSTRUCTION AND POST-CONSTRUCTION STORMWATER MANAGEMENT PROGRAM

2.2.1 Site Plan Review, Site Inspections, and Erosion &Sediment Control Procedures

Consistent with the requirements of Part 2.3.5 of the MS4 General Permit, the City has developed written procedures for site plan review, site inspections, and enforcement of sediment and erosion control measures. These procedures are detailed in the City's Land Development Program Manual, which can be accessed at City Hall.

2.2.2 New Development/ Redevelopment Ordinance

Consistent with the requirements of Part 2.3.6.a.iii of the MS4 General Permit, the City has developed a regulatory mechanism to require submission of as-built drawings and ensure long-term O&M of post-construction stormwater BMPs. The regulations can be found on the City's website. A paper copy can be accessed at City Hall. The City of Lawrence is finalizing updates to these regulations to comply with all construction and post-construction phase Permit requirements.

2.2.3 Street Design and Parking Lot Report

Consistent with the requirements of Part 2.3.6.b and 2.3.6.c. of the MS4 General Permit, the City will develop a report assessing current street design, parking lot guidelines, and other "code" requirements to ensure that the creation of impervious cover is minimized and that innovative stormwater management is not constrained by local code. This report will be developed in Permit Year 4.

2.2.4 Green Infrastructure Report

Consistent with the requirements of Part 2.3.6.c of the MS4 General Permit, the City will develop a report assessing how local regulations affect the ability of development projects to include infiltration practices (e.g. green roofs, rain gardens, curb extensions, planter gardens, and porous and pervious pavement) and water harvesting devices (e.g. rain barrels and cisterns) that promote use of stormwater for non-potable uses. This report will be developed in Permit Year 4.

2.2.5 Retrofit Properties Inventory

Consistent with the requirements of Part 2.3.6.d of the MS4 General Permit, the City will develop a report assessing their existing stormwater BMPs, identifying sites where impervious areas can be reduced, and assessing the likelihood

and potential impacts of completing such retrofits. This report will be developed in Permit Year 4.

2.3 MUNICIPAL FACILITIES AND OPERATIONS PROGRAMS

2.3.1 Clean Water Best Practices Manual

The City has developed a Clean Water Best Practices (CWBP) Manual consistent with the requirements of Part 2.3.7.a.ii of the MS4 General Permit. The objectives of the CWBP Manual are to provide a general guidance document to the City detailing ways to reduce stormwater-transported pollution during typical activities on municipally-owned properties and to promote behavior that will improve water quality in the City of Lawrence. The manual includes general best practices for managing the following assets:

- Parks and open space
- Vehicles and equipment
- Buildings and facilities
- MS4 infrastructure

The CWBP Manual can be accessed at City Hall.

2.3.2 Municipal Facility Inventory

The City has developed a Municipal Facility Inventory consistent with the requirements of Part 2.3.7.a.ii of the MS4 General Permit. The inventory includes all municipally-owned facilities with the potential for stormwater polluting activities, including, but not limited to:

- Parks and open space
- Buildings where pollutants are exposed to runoff (e.g., schools, City offices, fire stations, garages, etc.)
- Vehicle and equipment storage areas

The Municipal Facility Inventory is located in Appendix A of the CWBP Manual, which can be accessed at City Hall.

2.3.3 O&M Standard Operating Procedures

The City has developed written Operations and Maintenance (O&M) Standard Operating Procedures (SOPs) consistent with the requirements of Part 2.3.7.a of the MS4 General Permit. The objectives of the O&M SOPs are to establish procedures for MS4 infrastructure maintenance that will help reduce the discharge of pollutants from municipally-owned facilities. The O&M SOPs include:

- Winter road maintenance procedures targeting minimal use and proper storage of sodium chloride and other salts
- Catch basin inspection, cleaning, and maintenance procedures, and a plan for optimization of these routine activities
- Street sweeping and cleaning procedures to ensure all City-owned roadways are swept at least once per year
- Management and disposal of catch basin cleanings and street sweepings to avoid discharge into receiving waters
- Stormwater treatment structure inspections and maintenance procedures

The O&M SOPs are located in Appendix B of the CWBP Manual, which can be accessed at City Hall.

2.3.4 Stormwater Pollution Prevention Plan

The City has developed a written Stormwater Pollution Prevention Plan (SWPPP) for the Department of Public Works Facility consistent with the requirements of Part 2.3.7.b of the MS4 General Permit. The SWPPP includes:

- Pollution and prevention team
- Description of the facility and identification of potential pollutant sources
- Identification of stormwater controls
- Material exposure prevention, good housekeeping, preventative maintenance, spill prevention and response, erosion and sediment control, management of runoff, salt storage pile or salt-containing pile management, employee training, and maintenance of control measure practices

The SWPPP can be accessed at City Hall.

CERTIFICATION

"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 am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signature **Date**

June 25, 2021

Name Milagros Puello, P.E.

Appendices

APPENDIX A: SEPARATE STORM SEWER MAP

Stormwater Collection System Overview

City of Lawrence, MA

Legend

- Stormwater Pipe
- Stormwater Open Drain
- Stormwater Catch Basin
- Stormwater Manhole
- Stormwater Interconnection
- Stormwater BMP
- Lawrence Boundary
- Urbanized Area

Outfall

Ownership

- Lawrence
- Other
- State
- No Ownership Assigned

0 0.125 0.25 0.5 Miles

N

WOODARD &CURRAN

Project #: 227206
Map Created: March 2021

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Figure Exported: 3/19/2021 By: staytsin Using: \\wc\shared\Projects\227206 Lawrence MA City of - SSES\wip\004 Compliance Support\GIS\Projects\Lawrence_Stormwater System Overview_20210317.mxd

APPENDIX B: SPECIAL ELIGIBILITY DETERMINATION LETTERS

CITY OF LAWRENCE
WATER & SEWER DEPARTMENT
City Hall • 200 Common Street, Suite 204 • Lawrence, MA 01840
Tel: (978) 620-3110 • www.cityoflawrence.com

BRIAN PEÑA
COMMISSIONER

Established 1872

August 17, 2018

Newton Tedder
US Environmental Protection Agency
Stormwater and Construction Permits Section (OEP06-1)
Five Post Office Square, Suite 100
Boston, MA 02109

Re: Endangered Species Determination for Lawrence, MA Associated with the MA MS4 General Permit

Dear Mr. Newton Tedder:

The City of Lawrence, MA is a non-federal representative designated by the Environmental Protection Agency (EPA) for conducting formal or informal consultation with the U.S. Fish and Wildlife Service.

I have evaluated the United States Fish & Wildlife Service iPAC Biological and Conservation Data System files in response to new regulation promulgation under the 2016 Massachusetts Municipal Separate Sewer System (MS4) General Permit. The objective of this review is to determine the presence of endangered or threatened species within the program implementation area in Lawrence, MA.

Our review evaluated the area of impact of required program activities, analysis of these program activity areas within the iPaC database, examining maps, other sources of information, and the personal knowledge of staff or cooperating experts.

According to the information currently in the IPaC database, there is one threatened species within the proposed project area (Northern Long-Eared Bat) and no critical habitat. Please see Attachment 1 as the official species list.

The proposed stormwater program activities are a continuation of previous permitted activities and include non-structural management of stormwater runoff as required by the MA MS4 General Permit. These activities will include education, investigation, and pollutant source control on existing municipal facilities and roadways and will not disturb terrestrial vegetation. Both listed species are sensitive to land disturbance and as the program implementation will not disturb vegetation we have therefore determined that our programmatic activities will have “no affect” on the listed species.

CITY OF LAWRENCE
WATER & SEWER DEPARTMENT
City Hall • 200 Common Street, Suite 204 • Lawrence, MA 01840
Tel: (978) 620-3110 • www.cityoflawrence.com

BRIAN PEÑA
COMMISSIONER

Established 1872

If during the course of the permit term we plan to install structural stormwater treatment practices or engage in other land disturbing activities as a result of compliance within the MS4 General Permit, the Town of Lawrence will initiate further informal or formal consultation with the USFWS.

Based on this review and an evaluation of determination requirements outlined in Appendix C of the MA MS4 General Permit, we have determined that we meet Criterion C. We request EPA's concurrence of this determination for inclusion in our Stormwater Management Program Plan.

Please do not hesitate to contact me if you have further questions about Lawrence's stormwater management program.

Sincerely,

Brian Pena, Water and Sewer Commissioner
City of Lawrence, MA

United States Department of the Interior

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

In Reply Refer To: July 25, 2018
Consultation Code: 05E1NE00-2018-SLI-2509
Event Code: 05E1NE00-2018-E-05857
Project Name: Lawrence MA MS4 General Permit Implementation

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

To Whom It May Concern:

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

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

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

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

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

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

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

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

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2509

Event Code: 05E1NE00-2018-E-05857

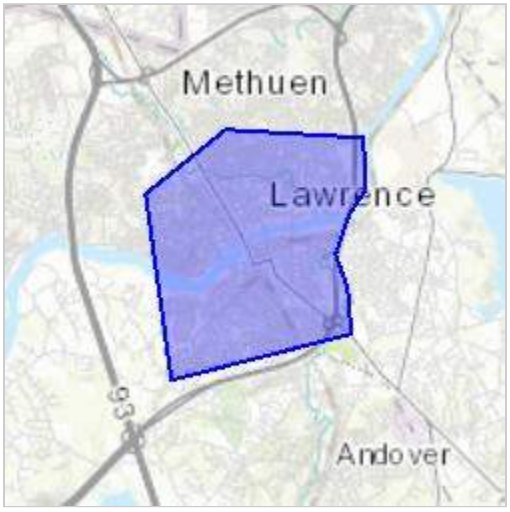
Project Name: Lawrence MA MS4 General Permit Implementation

Project Type: Regulation Promulgation

Project Description: Lawrence MA is required to conduct planning, policy and other non-structural stormwater management activities associated with the MA MS4 General Permit.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/42.69895983875216N71.16562126715468W



Counties: Essex, MA

Endangered Species Act Species

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

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

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

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

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

Mammals

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

Critical habitats

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

APPENDIX C: IMPAIRED WATERS AND SPECIAL RESOURCE WATERS

Spicket River - MA84A-10
Impairments:
Debris/Floatables/Trash
Physical Substrate Habitat Alterations
Benthic Macroinvertebrates
Copper
E. Coli
Nutrient

Merrimack River - MA84A-03
Impairments:
E. Coli
PCB in Fish Tissue
Total Phosphorus
Mercury in Fish Tissue

Shawsheen River - MA83-19
Impairments:
Fecal Coliform
E. Coli

City of Lawrence Water Resources

City of Lawrence, MA

Legend

- Surface Water Protection Area Zone A
- Outstanding Resource Waters
- MassDEP Approved Zone II
- Lawrence Boundary

Outfalls with Direct Discharge to Impaired Waters

Ownership

- Lawrence
- No Ownership Assigned

2016 Integrated List Data - 305(b)/303(d) Category

- 2 - Attaining some uses; other uses not assessed
- 3 - No uses assessed
- 4A -Impaired - TMDL is completed
- 4C - Impairment not caused by a pollutant
- 5 - Impaired - TMDL required

0 0.125 0.25 0.5 Miles

N

WOODARD &CURRAN

Project #: 227206
Map Created: March 2021

Figure Exported: 6/24/2021 By: ktwining Using: \\woodardcurran.net\shared\Projects\227206 Lawrence MA\City of - SSESwip\004 Compliance Support\GIS\Projects\Lawrence_Impaired Waters_20210624.mxd

APPENDIX D: DEFINITIONS

Definitions, Abbreviations and Acronyms

Best Management Practices (BMPs) – Schedules of activities, practices (and prohibitions of practices), structures, vegetation, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Common Plan of Development – A "larger common plan of development or sale" is a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan. For example, if a developer buys a 20-acre lot and builds roads, installs pipes, and runs electricity with the intention of constructing homes or other structures sometime in the future, this would be considered a larger common plan of development or sale. If the land is parceled off or sold, and construction occurs on plots that are less than one acre by separate, independent builders, this activity still would be subject to stormwater Permitting requirements if the smaller plots were included on the original site plan.

Control Measure – Refers to any BMP or other method (including effluent limitations) used to prevent or reduce the discharge of pollutants to waters of the United States.

Discharge – When used without qualification, means the "discharge of a pollutant."

Discharge of a Pollutant – Any addition of any “pollutant” or combination of pollutants to “waters of the United States” from any “point source”. This includes additions of pollutants into waters of the United States from surface runoff which is collected or channeled by man; or discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works.

Discharge-related Activities – Activities which cause, contribute to, or result in stormwater and allowable non-stormwater point source discharges, and measures such as the siting, construction and operation of BMPs to control, reduce, or prevent pollution in the discharges.

Disturbance – Action to alter the existing vegetation and/or underlying soil of a site, such as clearing, grading, site preparation (e.g., excavating, cutting, and filling), soil compaction, and movement and stockpiling of top soils.

Existing Discharger – An operator applying for coverage under this Permit for discharges covered previously under an NPDES general or individual Permit.

Facility or Activity – Any NPDES “point source” or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

Illicit Discharge – Any discharge to a municipal separate storm sewer that is not composed entirely of stormwater except discharges pursuant to a NPDES Permit (other than the NPDES Permit for discharges from the municipal separate storm sewer) and discharges resulting from firefighting activities.

Impaired Water – A water is impaired if it does not meet one or more of its designated use(s). For purposes of this Permit, “impaired” refers to categories 4 and 5 of the five- part categorization approach used for classifying the water quality standards attainment status for water segments under the TMDL program. Impaired waters compilations are also sometimes referred to as “303(d) lists.” Category 5 waters are impaired because at least one designated use is not being supported or is threatened and a TMDL is needed. Category 4 waters indicate that at least one designated use is not being supported but a TMDL is not needed (4a indicates that a TMDL has been approved or established by EPA; 4b indicates other required control measures are expected in result in the attainment of water quality standards in a reasonable period of time; and 4c indicates that the non- attainment of the water quality standard is the result of pollution (e.g. habitat) and is not caused by a pollutant). See USEPA’s 2006 Integrated Report Guidance, July 29, 2005

for more detail on the five part categorization of waters [under EPA National TMDL Guidance http://www.epa.gov/owow/tmdl/policy.html]).

Impervious Surface – Any surface that prevents or significantly impedes the infiltration of water into the underlying soil. This can include but is not limited to: roads, driveways, parking areas and other areas created using non-porous material; buildings, rooftops, structures, artificial turf and compacted gravel or soil.

Industrial Activity – The ten categories of industrial activities included in the definition of "stormwater discharges associated with industrial activity," as defined in 40 CFR 122.26(b)(14)(i)-(ix) and (xi).

Industrial Stormwater – Stormwater runoff associated with the definition of "stormwater discharges associated with industrial activity."

Interconnection – The point (excluding sheet flow over impervious surfaces) where the Permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is eventually conveyed to a water of the United States. Interconnections will be treated similarly to outfalls throughout the Permit.

Junction Manhole – For the purposes of this plan, a junction manhole is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

Key Junction Manhole – For the purposes of this plan, key junction manholes are those junction manholes that can represent one or more junction manhole without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the Permittee's ability to determine the possible presence of an upstream illicit discharge. A Permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

Municipal Separate Storm Sewer – A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man- made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the CWA that discharges to waters of the United States;
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a combined sewer; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

Municipal Separate Storm Sewer System (MS4) – Means all separate storm sewers that are defined as "large" or "medium" or "small" municipal storm sewer systems pursuant to paragraphs 40 CFR 122.26 (b)(4) and (b)(7), or designated under paragraph 40 126.26(a) (1)(v). For the purposes of this Permit "MS4" may also refer to the Permittee with jurisdiction over the sewer system.

New Development – Any construction activities or land alteration resulting in total earth disturbances greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) on an area that has not previously been developed to include impervious cover (see Part 2.3.6. of the Permit).

Outfall Catchment – The land area draining to a single outfall or interconnection. The extent of an outfall's catchment is determined not only by localized topography and impervious cover but also by the location of drainage structures

and the connectivity of MS4 pipes.

Owner or Operator – The owner or operator of any "facility or activity" subject to regulation under the NPDES program.

Point Source – Any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

Pollutant – Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal and agricultural waste discharged into water.

Pollutant of Concern – A pollutant which causes or contributes to a violation of a water quality standard, including a pollutant which is identified as causing an impairment in a State's 303(d) list.

Redevelopment – For the purposes of this plan, any construction, land alteration, or improvement of impervious surfaces resulting in total earth disturbances greater than 1-acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) that does not meet the definition of new development (see above).

Site – For the purposes of this plan, the area extent of construction activities, including but not limited to the creation of new impervious cover and improvement of existing impervious cover.

Stormwater – Stormwater runoff, snow melt runoff, and surface runoff and drainage.

Stormwater Discharges Associated with Construction Activity – A discharge of pollutants in stormwater runoff from areas where soil disturbing activities (e.g., clearing, grading, or excavating), construction materials, or equipment storage or maintenance (e.g., fill piles, borrow areas, concrete truck washout, fueling), or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located. (See 40 CFR 122.26(b)(14)(x) and 40 CFR 122.26(b)(15).

Total Maximum Daily Loads (TMDLs) – A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL includes waste load allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources and/or natural background and must include a margin of safety (MOS) and account for seasonal variations. (See Section 303(d) of the Clean Water Act and 40 CFR 130.2 and 130.7.)

Urbanized Area – US Census designated area comprised of a densely settled core of census tracts and/or census blocks that meet minimum population density requirements, along with adjacent territory containing non-residential urban land uses as well as territory with low population density included to link outlying densely settled territory with the densely settled core. For the purposes of this Permit, Urbanized Areas as defined by any Census since 2000 remain subject to stormwater regulation even if there is a change in the reach of the Urbanized Area because of a change in more recent Census data.

Water Quality Limited Water – For the purposes of this Permit, a water quality limited water is any waterbody that does not meet applicable water quality standards, including but not limited to waters listed in categories 5 or 4b on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act Section 303(d) and 305(b).

Water Quality Standards – A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States and EPA adopt WQS to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (See CWA Sections 101(a)2 and 303(c)).

Abbreviations and Acronyms

BMP – Best Management Practice
CGP – Construction General Permit
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DCIA – Directly Connected Impervious Area
EPA – U. S. Environmental Protection Agency
ESA – Endangered Species Act
USFWS – U. S. Fish and Wildlife Service
IA – Impervious Area
IDDE – Illicit Discharge Detection and Elimination
LA – Load Allocations
MOS – Margin of Safety
MS4 – Municipal Separate Storm Sewer System
MSGP – Multi-Sector General Permit
NHPA – National Historic Preservation Act
NMFS – U. S. National Marine Fisheries Service
NOI – Notice of Intent
NPDES – National Pollutant Discharge Elimination System
NRHP – National Register of Historic Places
PCP – Phosphorus Control Plan (pertaining to Charles River Watershed phosphorus)
POTW – Publicly Owned Treatment Works
SHPO – State Historic Preservation Officer
SPCC – Spill Prevention, Control, and Countermeasure
SWMP – Stormwater Management Program
SWPPP – Stormwater Pollution Prevention Plan
TBD – To Be Determined
TMDL – Total Maximum Daily Load
USGS – United States Geological Survey
WLA – Wasteload Allocation
WQS – Water Quality Standard

APPENDIX E: REVISION LOG

Revision No.	Revision Date	Section of SWMP	Revision(s) Made/Reasoning
00	09/07/2018	--	--
01	6/17/2020	1.2.1	Note added to address how the approved 2016 Massachusetts List of Integrated Waters will be incorporated into this SWMP; reference added related to updates for potential future additional Appendix H requirements for nutrient related impairments during future Massachusetts Integrated List of Waters issuances.
		1.2.2	Revised language to reflect that receiving waterbodies are listed in the City's MS4 General Permit NOI submission to the EPA
		1.5	Revised Responsible Parties table to reflect personnel changes
		2.1.4	Revised language to reflect that receiving waterbodies are listed in the City's MS4 General Permit NOI submission to the EPA
		2.2.1	Revised language to reflect that a Land Development Program Manual has been completed
		2.2.4	NEW SECTION: Added language to reflect that the City will develop a Green Infrastructure Report in PY4
		2.2.5	NEW SECTION: Added language to reflect that the City will develop a Retrofit Properties Inventory in PY4
		2.3.1	NEW SECTION: Added language to reflect that the City has developed a Clean Water Best Practices Manual
		2.3.2	Revised language to reflect that a Municipal Facility Inventory has been completed
		2.3.3	Revised language to reflect that O&M SOPs have been completed
		2.3.4	NEW SECTION: Added Language to reflect that the City has developed a SWPPP for its of Public Works Facility
		Appendix A	Revised Separate Storm Sewer Map
		Appendix E	Replaced SSO Inventory Table with Revision Log. SSO Inventory is updated annually and can be found in the MS4 annual report.
02	6/22/2021	1.1	Revised BMP 5.2 language to reflect MS4 General Permit modifications effective January 6, 2021
		1.2.1	Revised section text and Table 1-1 to reflect any changes between the MassDEP's 2014 and 2016 Integrated List of Waters
		1.5	Revised Responsible Parties for Stormwater Program Implementation table
		Appendix A	Revised Separate Storm Sewer Map
		Appendix C	Revised Impaired Waters and Special Resource Waters Map

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Benthic Macroinvertebrates
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E. Coli
Nutrient

Sample Here - Spicket River

Site

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PCB in Fish Tissue
Total Phosphorus
Mercury in Fish Tissue

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Impairments:
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City of Lawrence Water Resources

City of Lawrence, MA

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0 0.125 0.25 0.5 Miles

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WOODARD &CURRAN

Project #: 227206
Map Created: March 2021

Figure Exported: 6/24/2021 By: ktwining Using: \\woodardcurran.net\shared\Projects\227206 Lawrence MA\City of - SSESwip\004 Compliance Support\GIS\Projects\Lawrence_Impaired Waters_20210624.mxd