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

February 14, 2022

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

Reference: **Notice of Intent (NOI) - Remediation General Permit (RGP)**
80 First Street
Cambridge, Massachusetts

Dear Sir/Madam:

On behalf of John Moriarty & Associates, Inc (JMA) Lockwood Remediation Technologies, LLC (LRT) has prepared this Notice of Intent (NOI) requesting 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

This NOI has been prepared for the management groundwater that will be generated during dewatering activities associated with drilling activities. The project is to take place in the existing lower garage of the retail building located at 80 First Street in Cambridge, Massachusetts (the Site). Work will take place beneath the existing mall in the lowest level of the parking garage. 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**.

Work Summary

The work includes installation of new micro piles below the existing garage floor to reinforce the garage foundations. LRT understands that the subsurface beneath the garage has the potential for artesian conditions during drilling and therefore the installation of depressurization wells is planned. The water generated during depressurization/dewatering (Source water) will be pumped to a water treatment system. Treated water will discharge to one of two catch basins, both with final outfalls in the Lechmere Canal. LRT collected representative groundwater samples on December 17, 2021, to characterize groundwater from the proposed dewatering/depressurization area. The samples were collected from a deep monitoring well drilled into bedrock located at the intersection of Edwin Land Boulevard and Cambridgeside Place.

Samples of the receiving water (Lechmere Canal) were also taken December 17, 2021. The samples were analyzed for various parameters in accordance with the NPDES RGP Activity Category III-G.

Discharge and Receiving Surface Water Information

A summary of the analytical results is provided in **Tables 1 and 2** included within **Appendix A**, and copies of the laboratory data reports are provided in **Appendix B**. Concentrations of Arsenic, Copper, Iron, VOCs and Total Suspended Solids were detected in groundwater at concentrations above the respective NPDES RGP Effluent Limitations. To meet these standards, Source water will undergo treatment that includes chemical aided settling, pH adjustment and bag filtration prior to discharge. It is assumed that metal concentrations will be handled by settling and bag filtration. Carbon filtration and ion exchange have been provided as contingency options if additional analytes are encountered. 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 the primary water treatment system with a design flow of up to 300 gallons per minute (gpm); the average effluent flow of the system is estimated to be 150 gpm, and the maximum flow will not exceed 300 gpm. Source water will enter two 5,000-gallon weir tanks, plumbed in parallel, at the head of the system, the water will be treated with pH adjustment for metals precipitation (50% sodium hydroxide), LRT E50 coagulant and LRT 823 flocculant inside the weir tanks. From the weir tanks, water will then be pumped to a second pair of 5,000-gallon weir tanks for primary settling, then through a multi-bag filter skid (made up of two multi bag filter housings each housing containing six bag filters). Water will be treated with pH adjustment (sulfuric acid) to within pH discharge limits and through a flow/totalizer meter prior to discharge.

If required, contingency treatment will include carbon and/or ion exchange media after bag filtration. Discharge from the media vessels will pass through a pH adjustment system and flow/totalizer meter prior to discharge into the Lechmere Canal. The discharge will be at one location (Discharge Location 1) as depicted on **Figure 2**. Effluent sampling will correspond with this discharge location.

Chemical and Additive Information

Due to the use of bentonite grout during drilling activities, it is possible the pH of the Source water will become elevated. Therefore, a pH adjustment system will be included to maintain discharge pH to within discharge limits.

The pH reduction system includes an automatic metered acid feed system with a mix tank, acid feed pumps and setpoint controls that maintain the pH to within discharge parameters. The maximum application concentration for sulfuric acid would be 333 mg/L.

The addition of pH conditioners will not add any pollutants in concentrations which exceed permit effluent limitations; 2) The use of these chemicals will not result in the exceedance of any applicable water quality standard; and 3) These chemicals will 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 to control pH is a standard treatment for temporary construction dewatering; it 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.

Based on groundwater samples collected from the site and in efforts to meet the expected effluent limitations, the following chemicals and additives have been proposed for the treatment system: chemical aided settling system through coagulants/flocculants. Product names, chemical formulas, manufacturer information and Chemical Abstract Services (CAS) registry numbers have been provided on Safety Data Sheets (SDSs) included in **Appendix C**.

The chemical aided settling system which includes coagulant (LRT-E-50) and flocculant (LRT-823) will be added into the influent stream in the primary weir tank. The coagulant and flocculant continually dose as dewatering activities occur at the maximum dosage rate of 25 parts per million (ppm). Although dosage rate for the coagulant and flocculant will be 25ppm, the detected concentration in the post bag filter (carryover) has been recorded in the parts per trillion (ppt) range, (about 6 order of magnitude less than the dosing concentration). This is because nearly all the chemical becomes incorporated in the sludge and removed from the waste stream as solids from the frac and weir tanks.

The addition of chemical aided settling system chemicals will not add any pollutant in contractions which exceed permit effluent limitations, will not exceed any applicable water quality standard, and will not add any pollutants that would be justify the application of permit conditions that different from or absent in this permit.

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 John Moriarty & Associates, Inc., we are requesting coverage under the NPDES RGP for the discharge of treated wastewater to the Lechmere Canal in support of dewatering activities that are to take place at the 80 First Street development.

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, JMA 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 feel free to contact us at 774-450-7177 if you have any questions or if you require additional information.

Sincerely,
Lockwood Remediation Technologies, LLC

Carlo Lombardo *Neil Schofield*

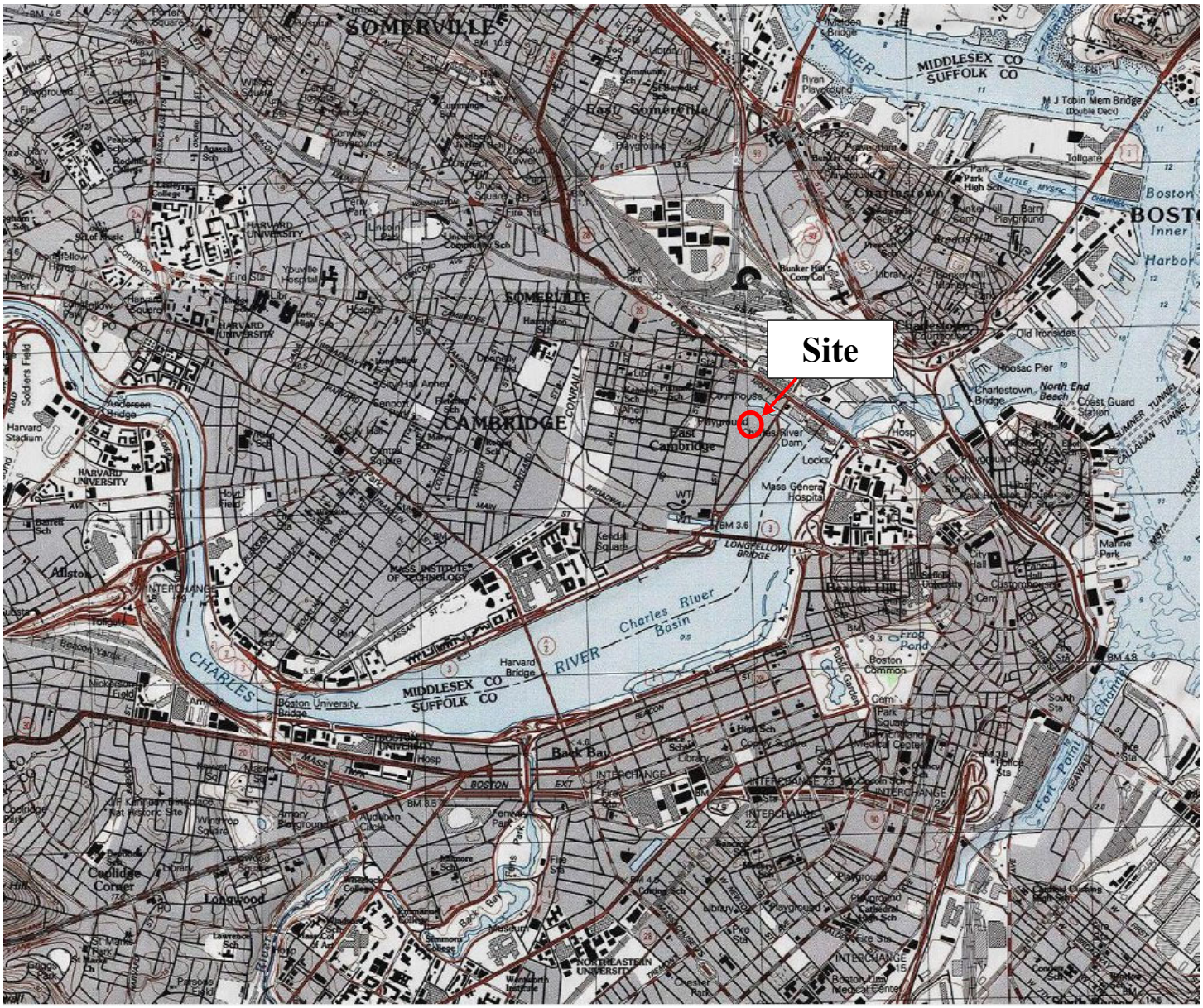
Carlo Lombardo
Staff Scientist

Neil Schofield
Project Manager

Encl: Figure 1 - Locus Plan
Figure 2 - Site Plan
Figure 3 - Water Treatment System Schematic
Lechmere Canal Dilution Calculation Correspondence
Appendix A - NOI Form
Appendix B - Laboratory Data
Appendix C – Cut Sheets
Appendix D – Supplemental Information

cc: Cathy Vakalopoulos – Mass DEP
Neil Schofield – LRT
Eric Harstad – JMA

Figures



Source: ArcGIS Map Viewer

N

Notes

1. Figure is not to scale.

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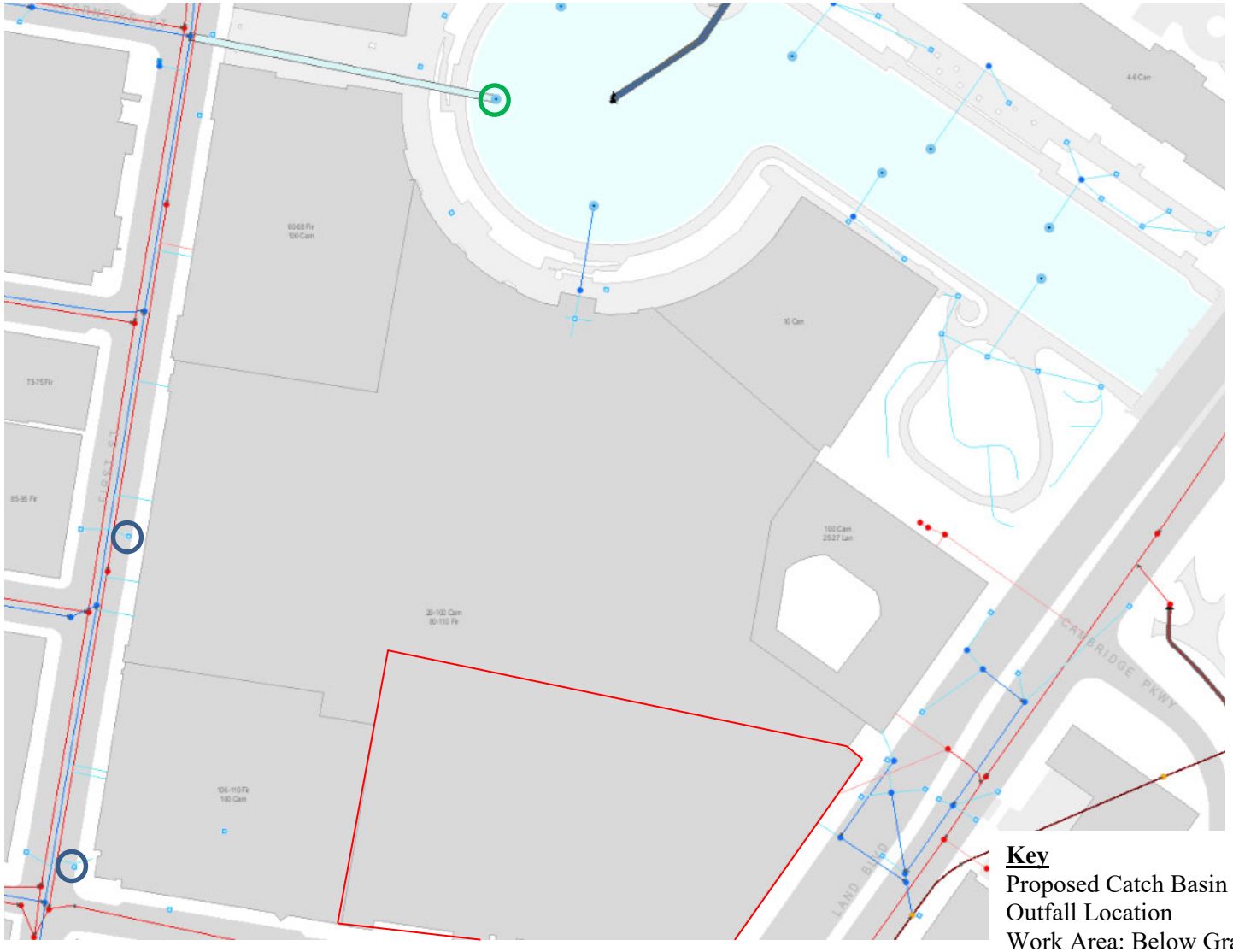
Figure 1 – Locus Plan
80 First Street
Cambridge, MA



Key

Proposed Catch Basin

Outfall Location

Work Area: Below Grade
In Lowest Level Garage

Notes

1. Figure is not to scale.

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Figure 2 – Site Layout
80 First Street
Cambridge, Massachusetts

Influent

pH Adjustment System

5,000 Gallon Weir Tank

5,000 Gallon Weir Tank

Chemical Aided Settling System

5,000 Gallon Weir Tank

5,000 Gallon Weir Tank

Chemical Aided Settling System

Centrifugal Pump Skid

Bag Filtration

Ion Exchange Media Vessel

Ion Exchange Media Vessel

Liquid Phase Carbon Media Vessels

Ion Exchange Media Vessel

Ion Exchange Media Vessel

Liquid Phase Carbon Media Vessels

Effluent/Discharge

Flow Meter/ Totalizer

Key:

- Piping/Hose
- Butterfly Valve
- Pressure Gauge
- Ball Valve
- Sample Port
- Check Valve
- Gate Valve
- Contingency

Notes:

1.) Figure is not to scale
2.) System rated for 150 GPM

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

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

CHECKED BY: **DATE:** 01/05/22

Water Treatment System Schematic

80 First Street
Cambridge, MA

PROJECT No. 2-2317

FIGURE No. 3

Dilution Calcs

From: Ruan, Xiaodan (DEP)
To: Neil Schofield
Cc: Carlo Lombardo; Vakalopoulos, Catherine (DEP)
Subject: RE: [External] Dilution Calculations - Lechmere Canal and 80 First Street
Date: Tuesday, January 18, 2022 10:54:33 AM

Hi Neil,

Thank you for being so patient. Sorry for the delayed response because I had to take Friday off and Monday was a State holiday.

There will be no dilution allowed in the Lechmere Canal for the project at 80 First Street, Cambridge.

Here is water quality information in assisting you in filling out the NOI; you already know some of the information:

> Waterbody and ID: Charles River (MA72-38) within Charles River Watershed
> Classification: B
> Outstanding Resource Water?: no
> State's most recent Integrated List is located here: https://www.epa.gov/sites/production/files/2020-01/documents/2016-ma-303d-list-report.pdf, search for "MA72-38" to see the causes of impairments.
> TMDLs: there are two approved TMDL (pathogen and nutrients) for this segment.

As you know, if this is not a *current* MCP site, then in addition to submitting the NOI to EPA, you need to apply with MassDEP and submit a $500 fee (unless fee exempt, e.g., municipality). For MassDEP's application, please use ePLACE, an online application submittal process where you will set up a user ID and be able to submit NOIs for various projects as well as pay by credit card. The instructions are located on this page: https://www.mass.gov/how-to/wm-15-npdes-general-permit-notice-of-intent. Technical assistant information is available on the front page of the ePLACE application webpage.

Please let me know if you have any questions.

Thanks,
Xiaodan

Xiaodan Ruan
Environmental Engineer
Massachusetts Department of Environmental Protection
One Winter Street, Boston, MA 02108
(857)-256-4172
xiaodan.ruan@mass.gov

From: Neil Schofield <NSchofield@lrt-llc.net>
Sent: Thursday, January 13, 2022 4:54 PM
To: Ruan, Xiaodan (DEP) <xiaodan.ruan@mass.gov>; zzzKeohane, Kathleen (DEP)

<Kathleen.Keohane@mass.gov>
Cc: Carlo Lombardo <CLombardo@lrt-llc.net>
Subject: RE: [External] Dilution Calculations - Lechmere Canal and 80 First Street

Thank you Xiaodan.

Neil Schofield, LSP
(978) 962-6707

From: Ruan, Xiaodan (DEP) <xiaodan.ruan@state.ma.us>
Sent: Thursday, January 13, 2022 4:53 PM
To: Neil Schofield <NSchofield@lrt-llc.net>; zzzKeohane, Kathleen (DEP) <Kathleen.Keohane@mass.gov>
Subject: RE: [External] Dilution Calculations - Lechmere Canal and 80 First Street

Hi Neil,

I will look at this and send you the water quality information tomorrow.

Thanks,
Xiaodan

Xiaodan Ruan
Environmental Engineer
Massachusetts Department of Environmental Protection
One Winter Street, Boston, MA 02108
(857)-256-4172
xiaodan.ruan@mass.gov

From: Neil Schofield <NSchofield@lrt-llc.net>
Sent: Monday, January 10, 2022 4:19 PM
To: zzzKeohane, Kathleen (DEP) <Kathleen.Keohane@mass.gov>
Cc: Ruan, Xiaodan (DEP) <xiaodan.ruan@mass.gov>
Subject: Dilution Calculations - Lechmere Canal and 80 First Street

Good afternoon Kathleen,

I'm looking to determine if the Lechmere Canal located in the vicinity of 80 First Street in Cambridge (Charles River MA72-38) has developed 7 Day 10 year flow calculations or if we should assume 0 due to insufficient flow.

Would you be able to confirm that.
Thank you,

Neil Schofield, LSP
Project Manager

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453
O: 774-450-7177 x 115
C: 978.962-6707
nschofield@lrt-llc.net

Appendix A

NOI Form

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

A. General site information:

<table>
<tr><td rowspan="4">1. Name of site:
80 First Street</td><td colspan="3">Site address: 80 First Street
Street:</td></tr>
<tr><td colspan="2">City: Cambridge</td><td>State: MA</td><td>Zip: 02141</td></tr>
<tr><td rowspan="4">2. Site owner
Cambridgeside Galleria Associates Trust
C/O New England Development

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="4">Contact Person: John Twohig</td></tr>
<tr><td colspan="2">Telephone: 617-965-8700</td><td colspan="2">Email: jtwohig@nedevelopment.com</td></tr>
<tr><td colspan="4">Mailing address: 75 Park Plaza
Street:</td></tr>
<tr><td colspan="2">City: Boston</td><td>State: MA</td><td>Zip: 02116</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner
John Moriarty & Associates</td><td colspan="4">Contact Person: Eric Harstad</td></tr>
<tr><td colspan="2">Telephone: 781-729-3900</td><td colspan="2">Email: eharstad@jm-a.com</td></tr>
<tr><td colspan="4">Mailing address:
Street: 3 Church Street</td></tr>
<tr><td colspan="2">City: Winchester</td><td>State: MA</td><td>Zip: 01890</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="4">5. Other regulatory program(s) that apply to the site (check all that apply):
☐ MA Chapter 21e; list RTN(s):
☐ NH Groundwater Management Permit or Groundwater Release Detection Permit:
☐ CERCLA
☐ UIC Program
☐ POTW Pretreatment
☐ CWA Section 404</td></tr>
</table>

B. Receiving water information:

1. Name of receiving water(s):	Waterbody identification of receiving water(s):	Classification of receiving water(s):
Lechmere Canal	MA72-38	Class B

Receiving water is (check any that apply): ☐ Outstanding Resource Water ☐ Ocean Sanctuary ☐ territorial sea ☐ Wild and Scenic River

2. Has the operator attached a location map in accordance with the instructions in B, above? (check one): ■ Yes ☐ No

Are sensitive receptors present near the site? (check one): ☐ Yes ■ No
If yes, specify:

3. Indicate if the receiving water(s) is listed in the State's Integrated List of Waters (i.e., CWA Section 303(d)). Include which designated uses are impaired, and any pollutants indicated. Also, indicate if a final TMDL is available for any of the indicated pollutants. For more information, contact the appropriate State as noted in Part 4.6 of the RGP. See attached impairments at the end of Appendix A Fillable Form.

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.	See Attached Correspondence
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.	See Attached Correspondence

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: 1/18/2022

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: Inorganics, Halogenated and Non-Halogenated 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) 42.369145, -71.076297
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Treated water will be discharged into a stromwater catch basin with a final outfall in the Lechmere Canal ☐ 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: notification and permission will be provided congruently with the submittal 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): 4/1/2022 to 4/1/2023 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		✔	1	4500	560	560	560	Report mg/L	---
Chloride		✔	1	300.0	25000	660000	660000	Report µg/l	---
Total Residual Chlorine	✔		1	4500	<20	<20	<20	0.2 mg/L	11
Total Suspended Solids		✔	1	2540	1000	2800	2800	30 mg/L	---
Antimony	✔		1	200.8	<1	<1.0	<1.0	206 µg/L	
Arsenic		✔	1	200.8	0.8	1.3	1.3	104 µg/L	
Cadmium	✔		1	200.8	0.2	<0.2	<.2	10.2 µg/L	
Chromium III	✔		1	200.8	1.0	<1	<1	323 µg/L	
Chromium VI	✔		1	3500	4	<4	<4	323 µg/L	
Copper		✔	1	200.8	1	6.3	6.3	242 µg/L	
Iron		✔	1	200.7	50	60	60	5,000 µg/L	
Lead	✔		1	200.8	0.5	<0.5	<0.5	160 µg/L	
Mercury	✔		1	245.1	0.1	<0.1	<0.1	0.739 µg/L	
Nickel	✔		1	200.8	<5.0	<5.0	<5.0	1,450 µg/L	
Selenium	✔		1	200.8	0.78	<5.0	<5.0	235.8 µg/L	
Silver	✔		1	200.8	0.2	<0.20	<0.20	35.1 µg/L	
Zinc	✔		1	200.8	10	<10	<10	420 µg/L	
Cyanide	✔		1	SM4500	0.000001	0.000001	0.000001	178 mg/L	
B. Non-Halogenated VOCs									
Total BTEX		✔	1	624.1		0.92	0.92	100 µg/L	---
Benzene		✔	1	624.1	0.13	0.170	0.170	5.0 µg/L	---
1,4 Dioxane	✔		1	624.1	21.5	<21.5	<21.5	200 µg/L	---
Acetone		✔	1	624.1	2.35	35.9	35.9	7.97 mg/L	---
Phenol	✔		1	624.1	9.62	<9.62	<9.62	1,080 µg/L	

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
C. Halogenated VOCs									
Carbon Tetrachloride	✔		1	624.1	0.170	<0.170	<0.170	4.4 µg/L	
1,2 Dichlorobenzene	✔		1	624.1	0.100	<0.100	<0.100	600 µg/L	---
1,3 Dichlorobenzene	✔		1	624.1	0.090	<0.090	<0.090	320 µg/L	---
1,4 Dichlorobenzene	✔		1	624.1	0.110	<0.110	<0.110	5.0 µg/L	---
Total dichlorobenzene	✔		1					763 µg/L in NH	---
1,1 Dichloroethane	✔		1	624.1	0.160	<0.160	<0.160	70 µg/L	---
1,2 Dichloroethane	✔		1	624.1	0.320	<0.320	<0.320	5.0 µg/L	---
1,1 Dichloroethylene	✔		1	624.1	0.160	<0.160	<0.160	3.2 µg/L	---
Ethylene Dibromide	✔		1	504.1	0.0083	<0.0083	<0.0083	0.05 µg/L	---
Methylene Chloride	✔		1	624.1	0.300	<0.300	<0.300	4.6 µg/L	---
1,1,1 Trichloroethane	✔		1	624.1	0.170	<0.170	<0.170	200 µg/L	---
1,1,2 Trichloroethane	✔		1	624.1	0.150	<0.150	<0.150	5.0 µg/L	---
Trichloroethylene	✔		1	624.1	0.180	<0.180	<0.180	5.0 µg/L	---
Tetrachloroethylene		✔	1	624.1	0.200	4.85	4.85	5.0 µg/L	3.3
cis-1,2 Dichloroethylene	✔		1	624.1	0.15	<0.150	<0.150	70 µg/L	---
Vinyl Chloride		✔	1	624.1	0.200	0.440	0.440	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates	✔		1	625.1		<190	<190	190 µg/L	
Diethylhexyl phthalate	✔		1	625.1	9.62	<9.62	<9.62	101 µg/L	
Total Group I PAHs	✔		1	625.1		<1.0	<1.0	1.0 µg/L	---
Benzo(a)anthracene	✔		1	625.1	0.034	<0.034	<0.034	As Total PAHs	
Benzo(a)pyrene	✔		1	625.1	0.021	<0.021	<0.021		
Benzo(b)fluoranthene	✔		1	625.1	0.027	<0.027	<0.027		
Benzo(k)fluoranthene	✔		1	625.1	0.017	<0.017	<0.017		
Chrysene	✔		1	625.1	0.021	<0.021	<0.021		
Dibenzo(a,h)anthracene	✔		1	625.1	0.028	<0.028	<0.028		
Indeno(1,2,3-cd)pyrene	✔		1	625.1	0.027	<0.027	<0.027		

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	✔					<100	<100	100 µg/L	---
Naphthalene	✔		1	625.1	4.81	<4.81	<4.81	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✔		1	608.3	0.158	<0.000064	<0.000064	0.000064 µg/L	---
Pentachlorophenol	✔		1	625.1	0.38	<0.38	<0.38	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons	✔		1	1664B	1.4	<1.4	<1.4	5.0 mg/L	---
Ethanol	✔		1	624.1	34.2	<34.2	<34.2	Report mg/L	---
Methyl-tert-Butyl Ether	✔		1	624.1	0.170	<0.170	<0.17	70 µg/L	
tert-Butyl Alcohol	✔		1	624.1	5.34	<5.34	<5.34	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✔		1	624.1	0.150	<0.150	<0.15	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 SH-1/MW				Field		7.7			
Hardness				200.7	1400	240000	240000		
Toluene				624.1	0.75	0.75	0.75		
Receiving Water									
Ammonia as N				4500	220	280	280		
Copper				200.8	1.0	3.3	3.3		
Iron				200.7	50	460	460		
Lead				200.8	0.50	1.2	1.2		
Hardness				Field	1400	120000	120000		

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 split into two 5,000-gallon weir tanks plumbed in parallel, at the head of the system, the water will be treated with pH adjustment for metals precipitation (50% sodium hydroxide), LRT E50 coagulant and LRT 823 flocculant inside the weir tanks. From the weir tanks, water will then be pumped through two additional weir tanks for primary settling, prior to a multi-bag filter skid (made up of two multi bag filter housings each housing containing six bag filters). If required water will split into two treatment trains following the bag filters each trains will consist of the following. Two carbon vessels plumbed in parallel with reactivated liquid-phase carbon, followed by cation 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:

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:	300
Provide the proposed maximum effluent flow in gpm.	300
Provide the average effluent flow in gpm.	150
If Activity Category IV applies, indicate the estimated total volume of water that will be discharged:	

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

F. Chemical and additive information

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

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

2. Provide the following information for each chemical/additive, using attachments, if necessary:
50% Sodium Hydroxide to raise pH for precipitation of metals. LRT E50 Coagulant and LRT 823 Polymer to aid in settling of sediment as needed low doses 24/7. 50
a. Product name, chemical formula, and manufacturer of the chemical/additive;
b. Purpose or use of the chemical/additive or remedial agent;
c. Material Safety Data Sheet (MSDS) and Chemical Abstracts Service (CAS) Registry number for each chemical/additive;
d. The frequency (hourly, daily, etc.), duration (hours, days), quantity (maximum and average), and method of application for the chemical/additive;
e. Any material compatibility risks for storage and/or use including the control measures used to minimize such risks; and
f. If available, the vendor's reported aquatic toxicity (NOAEL and/or LC50 in percent for aquatic organism(s)).

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

G. Endangered Species Act eligibility determination

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

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

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

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

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

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

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

H. National Historic Preservation Act eligibility determination

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

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

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

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

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

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

I. Supplemental information

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

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

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

J. Certification requirement

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

BMPP certification statement:	A BMPP 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: 	Date: 2/10/22
Print Name and Title: Kurt D Sjostedt, VP Construction Operations	

(Flow Regime Modification*)	
Cause Unknown (Sediment Screening Value (Exceedence))	
Chlorophyll-a	33826
Combined Biota/Habitat Bioassessments	
DDT in Fish Tissue	
Dissolved Oxygen	
Dissolved Oxygen Supersaturation	33826
Escherichia Coli (E. Coli)	32371
Harmful Algal Blooms	33826
Nutrient/Eutrophication Biological Indicators	33826
Odor	33826
Oil and Grease	
PCBs In Fish Tissue	
Phosphorus, Total	33826
Salinity	
Temperature	
Transparency / Clarity	33826

MA Limits

WQBEL

Enter number values in green boxes below

Enter values in the units specified

↓

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

Enter a dilution factor, if other than zero

↓

0

Enter values in the units specified

↓

240	C_d = Enter influent hardness in **mg/L** $CaCO_3$
120	C_s = Enter receiving water hardness in **mg/L** $CaCO_3$

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

↓

7.3	pH in **Standard Units**
17.1	Temperature in **°C**
0.28	Ammonia in **mg/L**
120	Hardness in **mg/L** $CaCO_3$
0	Salinity in **ppt**
0	Antimony in **µg/L**
0	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
3.3	Copper in **µg/L**
460	Iron in **µg/L**
1.2	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
0	Zinc in **µg/L**

Enter **influent** concentrations in the units specified

↓

0	TRC in **µg/L**
0.56	Ammonia in **mg/L**
0	Antimony in **µg/L**
1.3	Arsenic in **µg/L**
0	Cadmium in **µg/L**
0	Chromium III in **µg/L**
0	Chromium VI in **µg/L**
6.3	Copper in **µg/L**
60	Iron in **µg/L**
0	Lead in **µg/L**
0	Mercury in **µg/L**
0	Nickel in **µg/L**
0	Selenium in **µg/L**
0	Silver in **µg/L**
0	Zinc in **µg/L**
1	Cyanide in **µg/L**
0	Phenol in **µg/L**
0	Carbon Tetrachloride in **µg/L**
4.85	Tetrachloroethylene in **µg/L**
0	Total Phthalates in **µg/L**
0	Diethylhexylphthalate in **µg/L**
0	Benzo(a)anthracene in **µg/L**
0	Benzo(a)pyrene in **µg/L**
0	Benzo(b)fluoranthene in **µg/L**
0	Benzo(k)fluoranthene in **µg/L**
0	Chrysene in **µg/L**
0	Dibenzo(a,h)anthracene in **µg/L**
0	Indeno(1,2,3-cd)pyrene in **µg/L**
0	Methyl-tert butyl ether in **µg/L**

Dilution Factor	1.0			
	TBEL applies if bolded		WQBEL applies if bolded	
A. Inorganics				
Ammonia	**Report**	mg/L	---	
Chloride	**Report**	µg/L	---	
Total Residual Chlorine	0.2	mg/L	**11**	µg/L
Total Suspended Solids	**30**	mg/L	---	
Antimony	**206**	µg/L	640	µg/L
Arsenic	**104**	µg/L	10	µg/L
Cadmium	**10.2**	µg/L	0.5177	µg/L
Chromium III	**323**	µg/L	176.5	µg/L
Chromium VI	**323**	µg/L	11.4	µg/L
Copper	**242**	µg/L	19.7	µg/L
Iron	**5000**	µg/L	1000	µg/L
Lead	**160**	µg/L	9.70	µg/L
Mercury	**0.739**	µg/L	0.91	µg/L
Nickel	**1450**	µg/L	109.4	µg/L
Selenium	**235.8**	µg/L	5.0	µg/L
Silver	**35.1**	µg/L	17.1	µg/L
Zinc	**420**	µg/L	251.6	µg/L
Cyanide	**178**	mg/L	5.2	µg/L
B. Non-Halogenated VOCs				
Total BTEX	**100**	µg/L	---	
Benzene	**5.0**	µg/L	---	
1,4 Dioxane	**200**	µg/L	---	
Acetone	**7970**	µg/L	---	
Phenol	**1,080**	µg/L	300	µg/L
C. Halogenated VOCs				
Carbon Tetrachloride	**4.4**	µg/L	1.6	µg/L
1,2 Dichlorobenzene	**600**	µg/L	---	
1,3 Dichlorobenzene	**320**	µg/L	---	
1,4 Dichlorobenzene	**5.0**	µg/L	---	
Total dichlorobenzene	**---**	µg/L	---	
1,1 Dichloroethane	**70**	µg/L	---	
1,2 Dichloroethane	**5.0**	µg/L	---	
1,1 Dichloroethylene	**3.2**	µg/L	---	
Ethylene Dibromide	**0.05**	µg/L	---	
Methylene Chloride	**4.6**	µg/L	---	
1,1,1 Trichloroethane	**200**	µg/L	---	
1,1,2 Trichloroethane	**5.0**	µg/L	---	
Trichloroethylene	**5.0**	µg/L	---	
Tetrachloroethylene	5.0	µg/L	**3.3**	µg/L

cis-1,2 Dichloroethylene	**70**	µg/L	---	
Vinyl Chloride	**2.0**	µg/L	---	
D. Non-Halogenated SVOCs				
Total Phthalates	**190**	µg/L	---	µg/L
Diethylhexyl phthalate	**101**	µg/L	2.2	µg/L
Total Group I Polycyclic Aromatic Hydrocarbons	**1.0**	µg/L	---	
Benzo(a)anthracene	**1.0**	µg/L	0.0038	µg/L
Benzo(a)pyrene	**1.0**	µg/L	0.0038	µg/L
Benzo(b)fluoranthene	**1.0**	µg/L	0.0038	µg/L
Benzo(k)fluoranthene	**1.0**	µg/L	0.0038	µg/L
Chrysene	**1.0**	µg/L	0.0038	µg/L
Dibenzo(a,h)anthracene	**1.0**	µg/L	0.0038	µg/L
Indeno(1,2,3-cd)pyrene	**1.0**	µg/L	0.0038	µg/L
Total Group II Polycyclic Aromatic Hydrocarbons	**100**	µg/L	---	
Naphthalene	**20**	µg/L	---	
E. Halogenated SVOCs				
Total Polychlorinated Biphenyls	**0.000064**	µg/L	---	
Pentachlorophenol	**1.0**	µg/L	---	
F. Fuels Parameters				
Total Petroleum Hydrocarbons	**5.0**	mg/L	---	
Ethanol	**Report**	mg/L	---	
Methyl-tert-Butyl Ether	**70**	µg/L	20	µg/L
tert-Butyl Alcohol	**120**	µg/L	---	
tert-Amyl Methyl Ether	**90**	µg/L	---	

Appendix B

Laboratory Data

con-test®
A Pace Analytical® Laboratory

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

January 5, 2022

Neil Schofield
Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453

Project Location: 80 First Street, Cambridge
Client Job Number:
Project Number: 2-2317
Laboratory Work Order Number: 21L1350

Enclosed are results of analyses for samples as received by the laboratory on December 17, 2021. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kerry K. McGee
Project Manager

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

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453
ATTN: Neil Schofield

REPORT DATE: 1/5/2022

PURCHASE ORDER NUMBER: 2-2317

PROJECT NUMBER: 2-2317

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 21L1350

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

PROJECT LOCATION: 80 First Street, Cambridge

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
SH-1/MW	21L1350-01	Ground Water		-	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 300.0	
				EPA 504.1	
				SM19-23 4500 NH3 C	
				SM21-23 2540D	
				SM21-23 3500 Cr B	
				SM21-23 4500 CL G	
				SM4500	MA M-MA-086/CT PH-0574/NY11148
				Tri Chrome Calc.	
Receiving Water	21L1350-02	Ground Water		EPA 200.7	
				EPA 200.8	
				EPA 245.1	
				SM19-23 4500 NH3 C	
				SM21-23 3500 Cr B	
				Tri Chrome Calc.	

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

CASE NARRATIVE SUMMARY

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

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

608.3

Qualifications:

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:

Aroclor-1016
21L1350-01RE1[SH-1/MW], B298172-BLK1, B298172-BS1, B298172-BSD1

Aroclor-1016 [2C]
21L1350-01RE1[SH-1/MW], B298172-BLK1, B298172-BS1, B298172-BSD1

Aroclor-1260
21L1350-01RE1[SH-1/MW], B298172-BLK1, B298172-BS1, B298172-BSD1

Aroclor-1260 [2C]
21L1350-01RE1[SH-1/MW], B298172-BLK1, B298172-BS1, B298172-BSD1

624.1

Qualifications:

L-03

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

Analyte & Samples(s) Qualified:

Acetone
21L1350-01[SH-1/MW], B297420-BLK1, B297420-BS1, B297420-MS1, B297420-MSD1, S066689-CCV1

MS-22

Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.

Analyte & Samples(s) Qualified:

Acetone
B297420-MS1

MS-24

Either matrix spike or matrix spike duplicate is outside of control limits, but the other is within limits. Analysis is in control based on laboratory fortified blank recovery.

Analyte & Samples(s) Qualified:

tert-Butyl Alcohol (TBA)
B297420-MS1

625.1

Qualifications:

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
S066860-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:

Pentachlorophenol (SIM)
B297777-BS1, B297777-BSD1, S066798-CCV1

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:

Pentachlorophenol (SIM)
21L1350-01[SH-1/MW], B297777-BLK1

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

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

S066860-CCV1

EPA 300.0

Qualifications:

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:

Chloride

21L1350-01[SH-1/MW], B297358-MS1

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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A Pace Analytical® Laboratory

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

Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: SH-1/MW | Sampled: 12/17/2021 08:00

Sample ID: 21L1350-01

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	35.9	50.0	2.35	µg/L	1	L-03, J	624.1	12/21/21	12/22/21 2:19	LBD
tert-Amyl Methyl Ether (TAME)	<0.150	0.500	0.150	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Benzene	0.170	1.00	0.130	µg/L	1	J	624.1	12/21/21	12/22/21 2:19	LBD
tert-Butyl Alcohol (TBA)	<5.34	20.0	5.34	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Carbon Tetrachloride	<0.170	2.00	0.170	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
1,2-Dichlorobenzene	<0.100	2.00	0.100	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
1,3-Dichlorobenzene	<0.0900	2.00	0.0900	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
1,4-Dichlorobenzene	<0.110	2.00	0.110	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
1,2-Dichloroethane	<0.320	2.00	0.320	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
cis-1,2-Dichloroethylene	<0.150	1.00	0.150	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
1,1-Dichloroethane	<0.160	2.00	0.160	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
1,1-Dichloroethylene	<0.160	2.00	0.160	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
1,4-Dioxane	<21.5	50.0	21.5	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Ethanol	<34.2	50.0	34.2	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Ethylbenzene	<0.0900	2.00	0.0900	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Methyl tert-Butyl Ether (MTBE)	<0.170	2.00	0.170	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Methylene Chloride	<0.300	5.00	0.300	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Tetrachloroethylene	4.85	2.00	0.200	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Toluene	0.750	1.00	0.110	µg/L	1	J	624.1	12/21/21	12/22/21 2:19	LBD
1,1,1-Trichloroethane	<0.170	2.00	0.170	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
1,1,2-Trichloroethane	<0.150	2.00	0.150	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Trichloroethylene	<0.180	2.00	0.180	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
Vinyl Chloride	0.440	2.00	0.200	µg/L	1	J	624.1	12/21/21	12/22/21 2:19	LBD
m+p Xylene	<0.180	2.00	0.180	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD
o-Xylene	<0.0900	1.00	0.0900	µg/L	1		624.1	12/21/21	12/22/21 2:19	LBD

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,2-Dichloroethane-d4	80.2	70-130		12/22/21 2:19
Toluene-d8	95.7	70-130		12/22/21 2:19
4-Bromofluorobenzene	96.0	70-130		12/22/21 2:19

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

Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: SH-1/MW | Sampled: 12/17/2021 08:00

Sample ID: 21L1350-01

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
Benzo(a)anthracene (SIM)	<0.034	0.048	0.034	µg/L	1		625.1	12/22/21	12/27/21 11:05	IMR
Benzo(a)pyrene (SIM)	<0.021	0.096	0.021	µg/L	1		625.1	12/22/21	12/27/21 11:05	IMR
Benzo(b)fluoranthene (SIM)	<0.027	0.048	0.027	µg/L	1		625.1	12/22/21	12/27/21 11:05	IMR
Benzo(k)fluoranthene (SIM)	<0.017	0.19	0.017	µg/L	1		625.1	12/22/21	12/27/21 11:05	IMR
Bis(2-ethylhexyl)phthalate (SIM)	<0.45	0.96	0.45	µg/L	1		625.1	12/22/21	12/27/21 11:05	IMR
Chrysene (SIM)	<0.021	0.19	0.021	µg/L	1		625.1	12/22/21	12/27/21 11:05	IMR
Dibenz(a,h)anthracene (SIM)	<0.028	0.096	0.028	µg/L	1		625.1	12/22/21	12/27/21 11:05	IMR
Indeno(1,2,3-cd)pyrene (SIM)	<0.027	0.096	0.027	µg/L	1		625.1	12/22/21	12/27/21 11:05	IMR
Pentachlorophenol (SIM)	<0.38	0.96	0.38	µg/L	1	V-20	625.1	12/22/21	12/27/21 11:05	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol (SIM)	33.5	15-110		12/27/21 11:05
Phenol-d6 (SIM)	30.2	15-110		12/27/21 11:05
Nitrobenzene-d5	62.9	30-130		12/27/21 11:05
2-Fluorobiphenyl	51.7	30-130		12/27/21 11:05
2,4,6-Tribromophenol (SIM)	72.9	15-110		12/27/21 11:05
p-Terphenyl-d14	74.4	30-130		12/27/21 11:05

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

Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: SH-1/MW | Sampled: 12/17/2021 08:00

Sample ID: 21L1350-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - GC/MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Acenaphthene	<4.81	4.81	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Acenaphthylene	<4.81	4.81	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Anthracene	<4.81	4.81	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Benzo(g,h,i)perylene	<4.81	4.81	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Butylbenzylphthalate	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
4-Chloro-3-methylphenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
2-Chlorophenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Di-n-butylphthalate	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
2,4-Dichlorophenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Diethylphthalate	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
2,4-Dimethylphenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Dimethylphthalate	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
4,6-Dinitro-2-methylphenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
2,4-Dinitrophenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Di-n-octylphthalate	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Bis(2-Ethylhexyl)phthalate	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Fluoranthene	<4.81	4.81	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Fluorene	<4.81	4.81	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Naphthalene	<4.81	4.81	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
2-Nitrophenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
4-Nitrophenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Pentachlorophenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Phenanthrene	<4.81	4.81	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
2-Methylphenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Phenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
3/4-Methylphenol	<19.2	19.2	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
Pyrene	<4.81	4.81	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR
2,4,6-Trichlorophenol	<9.62	9.62	µg/L	1		625.1	12/22/21	12/28/21 2:41	IMR

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
2-Fluorophenol	46.6	15-110		12/28/21 2:41
Phenol-d6	33.1	15-110		12/28/21 2:41
Nitrobenzene-d5	74.4	30-130		12/28/21 2:41
2-Fluorobiphenyl	81.9	30-130		12/28/21 2:41
2,4,6-Tribromophenol	109	15-110		12/28/21 2:41
p-Terphenyl-d14	118	30-130		12/28/21 2:41

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Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: SH-1/MW | Sampled: 12/17/2021 08:00

Sample ID: 21L1350-01

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]	<0.171	0.192	0.171	µg/L	1	R-05	608.3	1/3/22	1/4/22 19:36	TG
Aroclor-1221 [1]	<0.159	0.192	0.159	µg/L	1		608.3	1/3/22	1/4/22 19:36	TG
Aroclor-1232 [1]	<0.162	0.192	0.162	µg/L	1		608.3	1/3/22	1/4/22 19:36	TG
Aroclor-1242 [1]	<0.169	0.192	0.169	µg/L	1		608.3	1/3/22	1/4/22 19:36	TG
Aroclor-1248 [1]	<0.161	0.192	0.161	µg/L	1		608.3	1/3/22	1/4/22 19:36	TG
Aroclor-1254 [1]	<0.181	0.192	0.181	µg/L	1		608.3	1/3/22	1/4/22 19:36	TG
Aroclor-1260 [1]	<0.158	0.192	0.158	µg/L	1	R-05	608.3	1/3/22	1/4/22 19:36	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
Decachlorobiphenyl [1]	89.5	30-150		1/4/22 19:36
Decachlorobiphenyl [2]	99.0	30-150		1/4/22 19:36
Tetrachloro-m-xylene [1]	79.5	30-150		1/4/22 19:36
Tetrachloro-m-xylene [2]	82.4	30-150		1/4/22 19:36

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Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: SH-1/MW | Sampled: 12/17/2021 08:00

Sample ID: 21L1350-01

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	12/21/21	12/23/21 12:55	QNW
Arsenic	1.3	0.80		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:37	QNW
Cadmium	ND	0.20		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:37	QNW
Chromium	ND	1.0		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:37	QNW
Chromium, Trivalent	0.0			mg/L	1		Tri Chrome Calc.	12/21/21	12/22/21 12:37	QNW
Copper	6.3	1.0		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:37	QNW
Iron	0.060	0.050		mg/L	1		EPA 200.7	12/20/21	12/23/21 19:37	MJH
Lead	ND	0.50		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:37	QNW
Mercury	ND	0.00010		mg/L	1		EPA 245.1	12/21/21	12/22/21 9:12	DRL
Nickel	ND	5.0		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:37	QNW
Selenium	ND	5.0	0.78	µg/L	1		EPA 200.8	12/21/21	12/22/21 12:37	QNW
Silver	ND	0.20		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:37	QNW
Zinc	ND	10		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:37	QNW
Hardness	240	1.4		mg/L	1		EPA 200.7	12/20/21	12/21/21 22:50	MJH

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Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: SH-1/MW | Sampled: 12/17/2021 08:00

Sample ID: 21L1350-01

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	0.56	0.30	0.22	mg/L	1		SM19-23 4500 NH3 C	12/22/21	12/24/21 10:15	EC
Chloride	660	25		mg/L	25	MS-07	EPA 300.0	12/20/21	12/20/21 20:54	CB2
Chlorine, Residual	ND	0.020		mg/L	1		SM21-23 4500 CL G	12/18/21	12/18/21 0:15	DJM
Hexavalent Chromium	ND	0.0040		mg/L	1		SM21-23 3500 Cr B	12/17/21	12/17/21 19:45	CB2
Total Suspended Solids	2.8	1.0		mg/L	1		SM21-23 2540D	12/20/21	12/20/21 13:05	LL
Silica Gel Treated HEM (SGT-HEM)	ND	1.4		mg/L	1		EPA 1664B	12/23/21	12/23/21 9:01	LL

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

Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: SH-1/MW | Sampled: 12/17/2021 08:00

Sample ID: 21L1350-01

Sample Matrix: Ground Water

Drinking Water Organics EPA 504.1

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
1,2-Dibromoethane (EDB) (1)	ND	0.021	0.0083	µg/L	1		EPA 504.1	12/29/21	12/29/21 21:43	TG

Surrogates	% Recovery	Recovery Limits	Flag/Qual	
1,3-Dibromopropane (1)	99.2	70-130		12/29/21 21:43

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Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: SH-1/MW | Sampled: 12/17/2021 08:00

Sample ID: 21L1350-01

Sample Matrix: Ground Water

Sample Flags: J

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	0.001	0.005	0.001	mg/L	1	J	SM4500	12/30/21	12/30/21 16:38	AAL

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Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: Receiving Water | Sampled: 12/17/2021 11:30

Sample ID: 21L1350-02

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	12/21/21	12/23/21 12:59	QNW
Arsenic	ND	0.80		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:39	QNW
Cadmium	ND	0.20		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:39	QNW
Chromium	ND	1.0		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:39	QNW
Chromium, Trivalent	0.0			mg/L	1		Tri Chrome Calc.	12/21/21	12/22/21 12:39	QNW
Copper	3.3	1.0		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:39	QNW
Iron	0.46	0.050		mg/L	1		EPA 200.7	12/20/21	12/23/21 19:55	MJH
Lead	1.2	0.50		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:39	QNW
Mercury	ND	0.00010		mg/L	1		EPA 245.1	12/21/21	12/22/21 9:14	DRL
Nickel	ND	5.0		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:39	QNW
Selenium	ND	5.0	0.78	µg/L	1		EPA 200.8	12/21/21	12/22/21 12:39	QNW
Silver	ND	0.20		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:39	QNW
Zinc	ND	10		µg/L	1		EPA 200.8	12/21/21	12/22/21 12:39	QNW
Hardness	120	1.4		mg/L	1		EPA 200.7	12/20/21	12/21/21 22:56	MJH

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Project Location: 80 First Street, Cambridge | Sample Description: | Work Order: 21L1350

Date Received: 12/17/2021

Field Sample #: Receiving Water | Sampled: 12/17/2021 11:30

Sample ID: 21L1350-02

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	0.28	0.30	0.22	mg/L	1	J	SM19-23 4500 NH3 C	12/22/21	12/24/21 10:15	EC
Hexavalent Chromium	ND	0.0040		mg/L	1		SM21-23 3500 Cr B	12/17/21	12/17/21 19:45	CB2

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

Sample Extraction Data

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

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01RE1 [SH-1/MW]	B298172	1040	10.0	01/03/22

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

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297420	5	5.00	12/21/21

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

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297508	1040	1.00	12/22/21

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

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297777	1040	1.00	12/22/21

EPA 1664B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297623	1000		12/23/21

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

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297354	50.0	50.0	12/20/21
21L1350-01 [SH-1/MW]	B297354	50.0		12/20/21
21L1350-02 [Receiving Water]	B297354	50.0	50.0	12/20/21
21L1350-02 [Receiving Water]	B297354	50.0		12/20/21

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

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297450	50.0	50.0	12/21/21
21L1350-02 [Receiving Water]	B297450	50.0	50.0	12/21/21

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

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297431	10.0	10.0	12/21/21
21L1350-02 [Receiving Water]	B297431	10.0	10.0	12/21/21

Prep Method: EPA 300.0 **Analytical Method: EPA 300.0**

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

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

Sample Extraction Data

Prep Method: EPA 300.0 **Analytical Method: EPA 300.0**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297358	10.0	10.0	12/20/21

Prep Method: EPA 504 water **Analytical Method: EPA 504.1**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297992	33.8	35.0	12/29/21

SM19-23 4500 NH3 C

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297511	100	100	12/22/21
21L1350-02 [Receiving Water]	B297511	100	100	12/22/21

SM21-23 2540D

Lab Number [Field ID]	Batch	Initial [mL]	Date
21L1350-01 [SH-1/MW]	B297282	500	12/20/21

SM21-23 3500 Cr B

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297207	50.0	50.0	12/17/21
21L1350-02 [Receiving Water]	B297207	50.0	50.0	12/17/21

SM21-23 4500 CL G

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
21L1350-01 [SH-1/MW]	B297185	100	100	12/18/21

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

Lab Number [Field ID]	Batch	Initial [mL]	Date
21L1350-01 [SH-1/MW]	B297450	50.0	12/21/21
21L1350-02 [Receiving Water]	B297450	50.0	12/21/21

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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 B297420 - SW-846 5030B												
Blank (B297420-BLK1)				Prepared: 12/21/21 Analyzed: 12/22/21								
Acetone	ND	50.0	µg/L								L-03	
tert-Amyl Methyl Ether (TAME)	ND	0.500	µg/L									
Benzene	ND	1.00	µg/L									
tert-Butyl Alcohol (TBA)	ND	20.0	µg/L									
Carbon Tetrachloride	ND	2.00	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									
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	*19.9*		µg/L	25.0		79.6		70-130				
Surrogate: Toluene-d8	*24.0*		µg/L	25.0		96.0		70-130				
Surrogate: 4-Bromofluorobenzene	*24.2*		µg/L	25.0		96.9		70-130				
LCS (B297420-BS1)				Prepared: 12/21/21 Analyzed: 12/22/21								
Acetone	140	50.0	µg/L	200		**69.9**	*	70-160			L-03	†
tert-Amyl Methyl Ether (TAME)	18	0.500	µg/L	20.0		88.9		70-130				
Benzene	19	1.00	µg/L	20.0		93.6		65-135				
tert-Butyl Alcohol (TBA)	140	20.0	µg/L	200		70.8		40-160				†
Carbon Tetrachloride	19	2.00	µg/L	20.0		96.9		70-130				
1,2-Dichlorobenzene	20	2.00	µg/L	20.0		98.2		65-135				
1,3-Dichlorobenzene	20	2.00	µg/L	20.0		101		70-130				
1,4-Dichlorobenzene	19	2.00	µg/L	20.0		97.4		65-135				
1,2-Dichloroethane	18	2.00	µg/L	20.0		88.8		70-130				
cis-1,2-Dichloroethylene	18	1.00	µg/L	20.0		89.8		70-130				
1,1-Dichloroethane	19	2.00	µg/L	20.0		95.3		70-130				
1,1-Dichloroethylene	18	2.00	µg/L	20.0		89.8		50-150				
1,4-Dioxane	190	50.0	µg/L	200		92.6		40-130				†
Ethanol	140	50.0	µg/L	200		67.6		40-160				
Ethylbenzene	21	2.00	µg/L	20.0		104		60-140				
Methyl tert-Butyl Ether (MTBE)	18	2.00	µg/L	20.0		87.8		70-130				
Methylene Chloride	16	5.00	µg/L	20.0		79.8		60-140				
Tetrachloroethylene	21	2.00	µg/L	20.0		107		70-130				
Toluene	20	1.00	µg/L	20.0		101		70-130				
1,1,1-Trichloroethane	19	2.00	µg/L	20.0		93.8		70-130				
1,1,2-Trichloroethane	21	2.00	µg/L	20.0		103		70-130				
Trichloroethylene	21	2.00	µg/L	20.0		105		65-135				

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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 B297420 - SW-846 5030B											
LCS (B297420-BS1)				Prepared: 12/21/21 Analyzed: 12/22/21							
Vinyl Chloride	15	2.00	µg/L	20.0		74.0		5-195			
m+p Xylene	42	2.00	µg/L	40.0		104		70-130			
o-Xylene	21	1.00	µg/L	20.0		103		70-130			
Surrogate: 1,2-Dichloroethane-d4	*19.2*		µg/L	25.0		77.0		70-130			
Surrogate: Toluene-d8	*24.2*		µg/L	25.0		96.9		70-130			
Surrogate: 4-Bromofluorobenzene	*24.7*		µg/L	25.0		98.8		70-130			
Matrix Spike (B297420-MS1)	**Source: 21L1350-01**			Prepared: 12/21/21 Analyzed: 12/22/21							
Acetone	160	50.0	µg/L	200	36	**59.7**	*	70-130			L-03, MS-22
tert-Amyl Methyl Ether (TAME)	17	0.500	µg/L	20.0	ND	86.0		70-130			
Benzene	18	1.00	µg/L	20.0	0.17	89.1		37-151			
tert-Butyl Alcohol (TBA)	120	20.0	µg/L	200	ND	**59.5**	*	70-130			MS-24
Carbon Tetrachloride	19	2.00	µg/L	20.0	ND	94.7		70-140			
1,2-Dichlorobenzene	19	2.00	µg/L	20.0	ND	95.0		18-190			
1,3-Dichlorobenzene	19	2.00	µg/L	20.0	ND	97.2		59-156			
1,4-Dichlorobenzene	19	2.00	µg/L	20.0	ND	94.2		18-190			
1,2-Dichloroethane	18	2.00	µg/L	20.0	ND	88.0		49-155			
cis-1,2-Dichloroethylene	17	1.00	µg/L	20.0	ND	85.1		70-130			
1,1-Dichloroethane	18	2.00	µg/L	20.0	ND	91.8		59-155			
1,1-Dichloroethylene	17	2.00	µg/L	20.0	ND	87.0		20-234			
1,4-Dioxane	160	50.0	µg/L	200	ND	78.1		70-130			
Ethanol	140	50.0	µg/L	200	ND	70.5		70-130			
Ethylbenzene	20	2.00	µg/L	20.0	ND	99.6		37-162			
Methyl tert-Butyl Ether (MTBE)	17	2.00	µg/L	20.0	ND	85.6		70-130			
Methylene Chloride	16	5.00	µg/L	20.0	ND	78.5		20-221			
Tetrachloroethylene	26	2.00	µg/L	20.0	4.8	107		64-148			
Toluene	20	1.00	µg/L	20.0	0.75	97.3		47-150			
1,1,1-Trichloroethane	18	2.00	µg/L	20.0	ND	90.5		52-162			
1,1,2-Trichloroethane	20	2.00	µg/L	20.0	ND	99.4		52-150			
Trichloroethylene	20	2.00	µg/L	20.0	ND	100		70-157			
Vinyl Chloride	16	2.00	µg/L	20.0	0.44	76.2		20-251			
m+p Xylene	40	2.00	µg/L	40.0	ND	101		70-130			
o-Xylene	20	1.00	µg/L	20.0	ND	99.8		70-130			
Surrogate: 1,2-Dichloroethane-d4	*19.7*		µg/L	25.0		79.0		70-130			
Surrogate: Toluene-d8	*24.5*		µg/L	25.0		98.0		70-130			
Surrogate: 4-Bromofluorobenzene	*25.1*		µg/L	25.0		100		70-130			
Matrix Spike Dup (B297420-MSD1)	**Source: 21L1350-01**			Prepared: 12/21/21 Analyzed: 12/22/21							
Acetone	190	50.0	µg/L	200	36	77.8		70-130	20.9	30	L-03
tert-Amyl Methyl Ether (TAME)	19	0.500	µg/L	20.0	ND	92.6		70-130	7.50	30	
Benzene	19	1.00	µg/L	20.0	0.17	94.8		37-151	6.19	61	
tert-Butyl Alcohol (TBA)	150	20.0	µg/L	200	ND	76.8		70-130	25.3	30	
Carbon Tetrachloride	20	2.00	µg/L	20.0	ND	98.2		70-140	3.63	41	
1,2-Dichlorobenzene	21	2.00	µg/L	20.0	ND	103		18-190	7.79	57	
1,3-Dichlorobenzene	21	2.00	µg/L	20.0	ND	105		59-156	7.52	43	
1,4-Dichlorobenzene	20	2.00	µg/L	20.0	ND	101		18-190	7.31	57	
1,2-Dichloroethane	18	2.00	µg/L	20.0	ND	92.3		49-155	4.83	49	
cis-1,2-Dichloroethylene	18	1.00	µg/L	20.0	ND	88.6		70-130	3.97	30	
1,1-Dichloroethane	19	2.00	µg/L	20.0	ND	96.8		59-155	5.36	40	
1,1-Dichloroethylene	18	2.00	µg/L	20.0	ND	88.8		20-234	2.05	32	
1,4-Dioxane	200	50.0	µg/L	200	ND	101		70-130	25.5	30	
Ethanol	170	50.0	µg/L	200	ND	85.2		70-130	18.9	30	

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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 B297420 - SW-846 5030B										
Matrix Spike Dup (B297420-MSD1)	**Source: 21L1350-01**			Prepared: 12/21/21 Analyzed: 12/22/21						
Ethylbenzene	22	2.00	µg/L	20.0	ND	108	37-162	7.77	63	
Methyl tert-Butyl Ether (MTBE)	18	2.00	µg/L	20.0	ND	92.4	70-130	7.75	20	
Methylene Chloride	16	5.00	µg/L	20.0	ND	81.5	20-221	3.75	28	
Tetrachloroethylene	32	2.00	µg/L	20.0	4.8	137	64-148	21.0	39	
Toluene	21	1.00	µg/L	20.0	0.75	103	47-150	5.30	41	
1,1,1-Trichloroethane	19	2.00	µg/L	20.0	ND	96.4	52-162	6.37	36	
1,1,2-Trichloroethane	21	2.00	µg/L	20.0	ND	106	52-150	6.05	45	
Trichloroethylene	22	2.00	µg/L	20.0	ND	109	70-157	8.47	48	
Vinyl Chloride	16	2.00	µg/L	20.0	0.44	79.0	20-251	3.45	66	
m+p Xylene	43	2.00	µg/L	40.0	ND	108	70-130	7.40	20	
o-Xylene	21	1.00	µg/L	20.0	ND	107	70-130	6.73	20	
Surrogate: 1,2-Dichloroethane-d4	*19.2*		µg/L	25.0		76.7	70-130			
Surrogate: Toluene-d8	*24.1*		µg/L	25.0		96.5	70-130			
Surrogate: 4-Bromofluorobenzene	*25.0*		µg/L	25.0		100	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 B297777 - SW-846 3510C										
Blank (B297777-BLK1)				Prepared: 12/22/21 Analyzed: 12/27/21						
Benzo(a)anthracene (SIM)	ND	0.025	µg/L							
Benzo(a)pyrene (SIM)	ND	0.050	µg/L							
Benzo(b)fluoranthene (SIM)	ND	0.025	µg/L							
Benzo(k)fluoranthene (SIM)	ND	0.10	µg/L							
Bis(2-ethylhexyl)phthalate (SIM)	ND	0.50	µg/L							
Chrysene (SIM)	ND	0.10	µg/L							
Dibenz(a,h)anthracene (SIM)	ND	0.050	µg/L							
Indeno(1,2,3-cd)pyrene (SIM)	ND	0.050	µg/L							
Pentachlorophenol (SIM)	ND	0.50	µg/L							V-20
Surrogate: 2-Fluorophenol (SIM)	*61.8*		µg/L	200		30.9	15-110			
Surrogate: Phenol-d6 (SIM)	*58.1*		µg/L	200		29.1	15-110			
Surrogate: Nitrobenzene-d5	*57.1*		µg/L	100		57.1	30-130			
Surrogate: 2-Fluorobiphenyl	*44.8*		µg/L	100		44.8	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*137*		µg/L	200		68.7	15-110			
Surrogate: p-Terphenyl-d14	*74.7*		µg/L	100		74.7	30-130			
LCS (B297777-BS1)				Prepared: 12/22/21 Analyzed: 12/27/21						
Benzo(a)anthracene (SIM)	37.7	1.0	µg/L	50.0		75.4	33-143			
Benzo(a)pyrene (SIM)	40.6	2.0	µg/L	50.0		81.2	17-163			
Benzo(b)fluoranthene (SIM)	41.5	1.0	µg/L	50.0		82.9	24-159			
Benzo(k)fluoranthene (SIM)	41.1	4.0	µg/L	50.0		82.2	11-162			
Bis(2-ethylhexyl)phthalate (SIM)	38.6	20	µg/L	50.0		77.2	8-158			
Chrysene (SIM)	35.9	4.0	µg/L	50.0		71.9	17-168			
Dibenz(a,h)anthracene (SIM)	39.9	2.0	µg/L	50.0		79.8	10-227			
Indeno(1,2,3-cd)pyrene (SIM)	39.2	2.0	µg/L	50.0		78.4	10-171			
Pentachlorophenol (SIM)	39.1	20	µg/L	50.0		78.1	14-176			V-06
Surrogate: 2-Fluorophenol (SIM)	*85.0*		µg/L	200		42.5	15-110			
Surrogate: Phenol-d6 (SIM)	*80.6*		µg/L	200		40.3	15-110			
Surrogate: Nitrobenzene-d5	*76.4*		µg/L	100		76.4	30-130			
Surrogate: 2-Fluorobiphenyl	*73.4*		µg/L	100		73.4	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*202*		µg/L	200		101	15-110			
Surrogate: p-Terphenyl-d14	*101*		µg/L	100		101	30-130			
LCS Dup (B297777-BSD1)				Prepared: 12/22/21 Analyzed: 12/27/21						
Benzo(a)anthracene (SIM)	35.7	1.0	µg/L	50.0		71.3	33-143	5.51	53	
Benzo(a)pyrene (SIM)	38.6	2.0	µg/L	50.0		77.2	17-163	5.15	72	
Benzo(b)fluoranthene (SIM)	39.2	1.0	µg/L	50.0		78.3	24-159	5.71	71	
Benzo(k)fluoranthene (SIM)	38.6	4.0	µg/L	50.0		77.3	11-162	6.17	63	
Bis(2-ethylhexyl)phthalate (SIM)	37.4	20	µg/L	50.0		74.9	8-158	3.00	82	
Chrysene (SIM)	34.0	4.0	µg/L	50.0		68.0	17-168	5.55	87	
Dibenz(a,h)anthracene (SIM)	37.9	2.0	µg/L	50.0		75.7	10-227	5.25	126	
Indeno(1,2,3-cd)pyrene (SIM)	37.3	2.0	µg/L	50.0		74.6	10-171	4.97	99	
Pentachlorophenol (SIM)	38.0	20	µg/L	50.0		76.0	14-176	2.80	86	V-06
Surrogate: 2-Fluorophenol (SIM)	*80.6*		µg/L	200		40.3	15-110			
Surrogate: Phenol-d6 (SIM)	*75.8*		µg/L	200		37.9	15-110			
Surrogate: Nitrobenzene-d5	*71.4*		µg/L	100		71.4	30-130			
Surrogate: 2-Fluorobiphenyl	*70.3*		µg/L	100		70.3	30-130			
Surrogate: 2,4,6-Tribromophenol (SIM)	*193*		µg/L	200		96.6	15-110			
Surrogate: p-Terphenyl-d14	*94.3*		µg/L	100		94.3	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 B297508 - SW-846 3510C										
Blank (B297508-BLK1)				Prepared: 12/22/21 Analyzed: 12/26/21						
Acenaphthene	ND	2.50	µg/L							
Acenaphthylene	ND	2.50	µg/L							
Anthracene	ND	2.50	µg/L							
Benzo(g,h,i)perylene	ND	2.50	µg/L							
Butylbenzylphthalate	ND	5.00	µg/L							
4-Chloro-3-methylphenol	ND	5.00	µg/L							
2-Chlorophenol	ND	5.00	µg/L							
Di-n-butylphthalate	ND	5.00	µg/L							
2,4-Dichlorophenol	ND	5.00	µg/L							
Diethylphthalate	ND	5.00	µg/L							
2,4-Dimethylphenol	ND	5.00	µg/L							
Dimethylphthalate	ND	5.00	µg/L							
4,6-Dinitro-2-methylphenol	ND	5.00	µg/L							
2,4-Dinitrophenol	ND	5.00	µg/L							
Di-n-octylphthalate	ND	5.00	µg/L							
Bis(2-Ethylhexyl)phthalate	ND	5.00	µg/L							
Fluoranthene	ND	2.50	µg/L							
Fluorene	ND	2.50	µg/L							
Naphthalene	ND	2.50	µg/L							
2-Nitrophenol	ND	5.00	µg/L							
4-Nitrophenol	ND	5.00	µg/L							
Pentachlorophenol	ND	5.00	µg/L							
Phenanthrene	ND	2.50	µg/L							
2-Methylphenol	ND	5.00	µg/L							
Phenol	ND	5.00	µg/L							
3/4-Methylphenol	ND	10.0	µg/L							
Pyrene	ND	2.50	µg/L							
2,4,6-Trichlorophenol	ND	5.00	µg/L							
Surrogate: 2-Fluorophenol	*69.5*		µg/L	200		34.7	15-110			
Surrogate: Phenol-d6	*54.4*		µg/L	200		27.2	15-110			
Surrogate: Nitrobenzene-d5	*55.7*		µg/L	100		55.7	30-130			
Surrogate: 2-Fluorobiphenyl	*61.2*		µg/L	100		61.2	30-130			
Surrogate: 2,4,6-Tribromophenol	*182*		µg/L	200		91.0	15-110			
Surrogate: p-Terphenyl-d14	*86.3*		µg/L	100		86.3	30-130			
LCS (B297508-BS1)				Prepared: 12/22/21 Analyzed: 12/26/21						
Acenaphthene	36.6	5.00	µg/L	50.0		73.2	47-145			
Acenaphthylene	37.7	5.00	µg/L	50.0		75.4	33-145			
Anthracene	39.5	5.00	µg/L	50.0		79.0	27-133			
Benzo(g,h,i)perylene	39.8	5.00	µg/L	50.0		79.7	10-219			
Butylbenzylphthalate	37.2	10.0	µg/L	50.0		74.3	10-152			
4-Chloro-3-methylphenol	37.4	10.0	µg/L	50.0		74.9	22-147			
2-Chlorophenol	31.4	10.0	µg/L	50.0		62.9	23-134			
Di-n-butylphthalate	38.5	10.0	µg/L	50.0		77.0	10-120			
2,4-Dichlorophenol	35.3	10.0	µg/L	50.0		70.6	39-135			
Diethylphthalate	39.3	10.0	µg/L	50.0		78.7	10-120			
2,4-Dimethylphenol	34.4	10.0	µg/L	50.0		68.8	32-120			
Dimethylphthalate	37.9	10.0	µg/L	50.0		75.9	10-120			
4,6-Dinitro-2-methylphenol	37.4	10.0	µg/L	50.0		74.7	10-181			
2,4-Dinitrophenol	35.8	10.0	µg/L	50.0		71.6	10-191			
Di-n-octylphthalate	36.8	10.0	µg/L	50.0		73.5	4-146			
Bis(2-Ethylhexyl)phthalate	37.7	10.0	µg/L	50.0		75.4	8-158			

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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 B297508 - SW-846 3510C										
LCS (B297508-BS1)				Prepared: 12/22/21 Analyzed: 12/26/21						
Fluoranthene	40.4	5.00	µg/L	50.0		80.9	26-137			
Fluorene	39.7	5.00	µg/L	50.0		79.5	59-121			
Naphthalene	34.6	5.00	µg/L	50.0		69.3	21-133			
2-Nitrophenol	34.7	10.0	µg/L	50.0		69.4	29-182			
4-Nitrophenol	21.3	10.0	µg/L	50.0		42.6	10-132			
Pentachlorophenol	34.8	10.0	µg/L	50.0		69.7	14-176			
Phenanthrene	39.0	5.00	µg/L	50.0		78.0	54-120			
2-Methylphenol	32.9	10.0	µg/L	50.0		65.8	40-140			
Phenol	15.4	10.0	µg/L	50.0		30.9	5-120			
3/4-Methylphenol	31.8	20.0	µg/L	50.0		63.6	40-140			
Pyrene	39.5	5.00	µg/L	50.0		79.1	52-120			
2,4,6-Trichlorophenol	36.8	10.0	µg/L	50.0		73.5	37-144			
Surrogate: 2-Fluorophenol	*94.0*		µg/L	200		47.0	15-110			
Surrogate: Phenol-d6	*68.8*		µg/L	200		34.4	15-110			
Surrogate: Nitrobenzene-d5	*70.2*		µg/L	100		70.2	30-130			
Surrogate: 2-Fluorobiphenyl	*77.0*		µg/L	100		77.0	30-130			
Surrogate: 2,4,6-Tribromophenol	*199*		µg/L	200		99.6	15-110			
Surrogate: p-Terphenyl-d14	*90.2*		µg/L	100		90.2	30-130			
LCS Dup (B297508-BSD1)				Prepared: 12/22/21 Analyzed: 12/26/21						
Acenaphthene	34.6	5.00	µg/L	50.0		69.2	47-145	5.53	48	
Acenaphthylene	36.2	5.00	µg/L	50.0		72.4	33-145	4.03	74	
Anthracene	37.7	5.00	µg/L	50.0		75.3	27-133	4.79	66	
Benzo(g,h,i)perylene	38.5	5.00	µg/L	50.0		77.1	10-219	3.32	97	
Butylbenzylphthalate	36.4	10.0	µg/L	50.0		72.8	10-152	2.12	60	
4-Chloro-3-methylphenol	37.0	10.0	µg/L	50.0		74.0	22-147	1.21	73	
2-Chlorophenol	30.4	10.0	µg/L	50.0		60.9	23-134	3.26	61	
Di-n-butylphthalate	37.0	10.0	µg/L	50.0		73.9	10-120	4.03	47	
2,4-Dichlorophenol	33.7	10.0	µg/L	50.0		67.4	39-135	4.61	50	
Diethylphthalate	37.6	10.0	µg/L	50.0		75.1	10-120	4.66	100	
2,4-Dimethylphenol	33.4	10.0	µg/L	50.0		66.7	32-120	3.07	58	
Dimethylphthalate	36.6	10.0	µg/L	50.0		73.1	10-120	3.68	183	
4,6-Dinitro-2-methylphenol	35.8	10.0	µg/L	50.0		71.6	10-181	4.21	203	
2,4-Dinitrophenol	34.1	10.0	µg/L	50.0		68.1	10-191	4.98	132	
Di-n-octylphthalate	35.0	10.0	µg/L	50.0		70.1	4-146	4.82	69	
Bis(2-Ethylhexyl)phthalate	36.5	10.0	µg/L	50.0		73.0	8-158	3.18	82	
Fluoranthene	38.3	5.00	µg/L	50.0		76.6	26-137	5.41	66	
Fluorene	38.1	5.00	µg/L	50.0		76.2	59-121	4.16	38	
Naphthalene	32.2	5.00	µg/L	50.0		64.4	21-133	7.30	65	
2-Nitrophenol	33.0	10.0	µg/L	50.0		66.0	29-182	5.11	55	
4-Nitrophenol	21.1	10.0	µg/L	50.0		42.2	10-132	0.755	131	
Pentachlorophenol	31.7	10.0	µg/L	50.0		63.5	14-176	9.31	86	
Phenanthrene	37.9	5.00	µg/L	50.0		75.8	54-120	2.94	39	
2-Methylphenol	32.2	10.0	µg/L	50.0		64.5	40-140	2.00	30	
Phenol	15.6	10.0	µg/L	50.0		31.2	5-120	1.16	64	
3/4-Methylphenol	31.7	20.0	µg/L	50.0		63.4	40-140	0.284	30	
Pyrene	38.6	5.00	µg/L	50.0		77.2	52-120	2.33	49	
2,4,6-Trichlorophenol	34.5	10.0	µg/L	50.0		69.0	37-144	6.34	58	
Surrogate: 2-Fluorophenol	*90.2*		µg/L	200		45.1	15-110			
Surrogate: Phenol-d6	*68.1*		µg/L	200		34.1	15-110			
Surrogate: Nitrobenzene-d5	*67.3*		µg/L	100		67.3	30-130			
Surrogate: 2-Fluorobiphenyl	*70.8*		µg/L	100		70.8	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 B297508 - SW-846 3510C										
LCS Dup (B297508-BSD1)				Prepared: 12/22/21 Analyzed: 12/26/21						
Surrogate: 2,4,6-Tribromophenol	*180*		µg/L	200		89.9	15-110			
Surrogate: p-Terphenyl-d14	*84.3*		µg/L	100		84.3	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 B297417 - SW-846 3510C										
Blank (B297417-BLK1)				Prepared: 12/21/21 Analyzed: 12/22/21						
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	*1.86*		µg/L	2.00		93.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	*2.14*		µg/L	2.00		107	30-150			
Surrogate: Tetrachloro-m-xylene	*1.74*		µg/L	2.00		87.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.92*		µg/L	2.00		95.9	30-150			
LCS (B297417-BS1)				Prepared: 12/21/21 Analyzed: 12/22/21						
Aroclor-1016	0.446	0.200	µg/L	0.500		89.2	50-140			
Aroclor-1016 [2C]	0.458	0.200	µg/L	0.500		91.5	50-140			
Aroclor-1260	0.408	0.200	µg/L	0.500		81.7	8-140			
Aroclor-1260 [2C]	0.450	0.200	µg/L	0.500		90.0	8-140			
Surrogate: Decachlorobiphenyl	*1.56*		µg/L	2.00		77.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.74*		µg/L	2.00		87.1	30-150			
Surrogate: Tetrachloro-m-xylene	*1.51*		µg/L	2.00		75.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.64*		µg/L	2.00		82.2	30-150			
LCS Dup (B297417-BSD1)				Prepared: 12/21/21 Analyzed: 12/22/21						
Aroclor-1016	0.452	0.200	µg/L	0.500		90.5	50-140	1.46		
Aroclor-1016 [2C]	0.465	0.200	µg/L	0.500		93.1	50-140	1.67		
Aroclor-1260	0.409	0.200	µg/L	0.500		81.7	8-140	0.0514		
Aroclor-1260 [2C]	0.452	0.200	µg/L	0.500		90.3	8-140	0.390		
Surrogate: Decachlorobiphenyl	*1.68*		µg/L	2.00		84.2	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.89*		µg/L	2.00		94.7	30-150			
Surrogate: Tetrachloro-m-xylene	*1.53*		µg/L	2.00		76.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.68*		µg/L	2.00		83.8	30-150			
Batch B298172 - SW-846 3510C										
Blank (B298172-BLK1)				Prepared: 01/03/22 Analyzed: 01/04/22						
Aroclor-1016	ND	0.200	µg/L							R-05
Aroclor-1016 [2C]	ND	0.200	µg/L							R-05
Aroclor-1221	ND	0.200	µg/L							
Aroclor-1221 [2C]	ND	0.200	µg/L							
Aroclor-1232	ND	0.200	µg/L							
Aroclor-1232 [2C]	ND	0.200	µg/L							
Aroclor-1242	ND	0.200	µg/L							
Aroclor-1242 [2C]	ND	0.200	µg/L							
Aroclor-1248	ND	0.200	µg/L							
Aroclor-1248 [2C]	ND	0.200	µg/L							
Aroclor-1254	ND	0.200	µg/L							

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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 B298172 - SW-846 3510C										
Blank (B298172-BLK1)				Prepared: 01/03/22 Analyzed: 01/04/22						
Aroclor-1254 [2C]	ND	0.200	µg/L							
Aroclor-1260	ND	0.200	µg/L							R-05
Aroclor-1260 [2C]	ND	0.200	µg/L							R-05
Surrogate: Decachlorobiphenyl	*1.37*		µg/L	2.00		68.4	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.53*		µg/L	2.00		76.5	30-150			
Surrogate: Tetrachloro-m-xylene	*1.81*		µg/L	2.00		90.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.90*		µg/L	2.00		95.0	30-150			
LCS (B298172-BS1)				Prepared: 01/03/22 Analyzed: 01/04/22						
Aroclor-1016	0.310	0.200	µg/L	0.500		61.9	50-140			R-05
Aroclor-1016 [2C]	0.347	0.200	µg/L	0.500		69.4	50-140			R-05
Aroclor-1260	0.286	0.200	µg/L	0.500		57.2	8-140			R-05
Aroclor-1260 [2C]	0.327	0.200	µg/L	0.500		65.3	8-140			R-05
Surrogate: Decachlorobiphenyl	*1.16*		µg/L	2.00		57.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.31*		µg/L	2.00		65.4	30-150			
Surrogate: Tetrachloro-m-xylene	*0.974*		µg/L	2.00		48.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.05*		µg/L	2.00		52.4	30-150			
LCS Dup (B298172-BSD1)				Prepared: 01/03/22 Analyzed: 01/04/22						
Aroclor-1016	0.401	0.200	µg/L	0.500		80.1	50-140	25.6		R-05
Aroclor-1016 [2C]	0.457	0.200	µg/L	0.500		91.4	50-140	27.3		R-05
Aroclor-1260	0.419	0.200	µg/L	0.500		83.9	8-140	37.7		R-05
Aroclor-1260 [2C]	0.486	0.200	µg/L	0.500		97.2	8-140	39.2		R-05
Surrogate: Decachlorobiphenyl	*1.23*		µg/L	2.00		61.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	*1.37*		µg/L	2.00		68.7	30-150			
Surrogate: Tetrachloro-m-xylene	*1.59*		µg/L	2.00		79.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	*1.68*		µg/L	2.00		84.2	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 B297354 - EPA 200.7										
Blank (B297354-BLK1)				Prepared: 12/20/21 Analyzed: 12/23/21						
Iron	ND	0.050	mg/L							
Hardness	ND	1.4	mg/L							
LCS (B297354-BS1)				Prepared: 12/20/21 Analyzed: 12/23/21						
Iron	4.20	0.050	mg/L	4.00		105	85-115			
Hardness	27	1.4	mg/L	26.4		103	85-115			
LCS Dup (B297354-BSD1)				Prepared: 12/20/21 Analyzed: 12/23/21						
Iron	4.17	0.050	mg/L	4.00		104	85-115	0.628	20	
Hardness	28	1.4	mg/L	26.4		105	85-115	2.48	20	
Batch B297431 - EPA 245.1										
Blank (B297431-BLK1)				Prepared: 12/21/21 Analyzed: 12/22/21						
Mercury	ND	0.00010	mg/L							
LCS (B297431-BS1)				Prepared: 12/21/21 Analyzed: 12/22/21						
Mercury	0.00409	0.00010	mg/L	0.00402		102	85-115			
LCS Dup (B297431-BSD1)				Prepared: 12/21/21 Analyzed: 12/22/21						
Mercury	0.00412	0.00010	mg/L	0.00402		103	85-115	0.897	20	
Batch B297450 - EPA 200.8										
Blank (B297450-BLK1)				Prepared: 12/21/21 Analyzed: 12/23/21						
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 (B297450-BS1)				Prepared: 12/21/21 Analyzed: 12/23/21						
Antimony	570	10	µg/L	500		114	85-115			
Arsenic	514	8.0	µg/L	500		103	85-115			
Cadmium	508	2.0	µg/L	500		102	85-115			
Chromium	515	10	µg/L	500		103	85-115			
Copper	1000	10	µg/L	1000		100	85-115			
Lead	505	5.0	µg/L	500		101	85-115			
Nickel	495	50	µg/L	500		98.9	85-115			
Selenium	519	50	µg/L	500		104	85-115			
Silver	495	2.0	µg/L	500		99.0	85-115			
Zinc	1030	100	µg/L	1000		103	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 B297450 - EPA 200.8										
LCS Dup (B297450-BSD1)				Prepared: 12/21/21 Analyzed: 12/23/21						
Antimony	569	10	µg/L	500		114	85-115	0.190	20	
Arsenic	527	8.0	µg/L	500		105	85-115	2.61	20	
Cadmium	526	2.0	µg/L	500		105	85-115	3.56	20	
Chromium	530	10	µg/L	500		106	85-115	2.77	20	
Copper	1030	10	µg/L	1000		103	85-115	2.51	20	
Lead	520	5.0	µg/L	500		104	85-115	2.79	20	
Nickel	511	50	µg/L	500		102	85-115	3.35	20	
Selenium	530	50	µg/L	500		106	85-115	2.23	20	
Silver	507	2.0	µg/L	500		101	85-115	2.50	20	
Zinc	1060	100	µg/L	1000		106	85-115	2.17	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 B297185 - SM21-23 4500 CL G										
Blank (B297185-BLK1)				Prepared & Analyzed: 12/18/21						
Chlorine, Residual	ND	0.020	mg/L							
LCS (B297185-BS1)				Prepared & Analyzed: 12/18/21						
Chlorine, Residual	0.68	0.020	mg/L	0.643		106	80.3-122			
LCS Dup (B297185-BSD1)				Prepared & Analyzed: 12/18/21						
Chlorine, Residual	0.71	0.020	mg/L	0.643		110	80.3-122	4.07	10.7	
Duplicate (B297185-DUP1)		**Source: 21L1350-01**		Prepared & Analyzed: 12/18/21						
Chlorine, Residual	ND	0.020	mg/L		ND			NC	27.6	
Matrix Spike (B297185-MS1)		**Source: 21L1350-01**		Prepared & Analyzed: 12/18/21						
Chlorine, Residual	0.30	0.020	mg/L	0.300	ND	100	10-169			
Batch B297207 - SM21-23 3500 Cr B										
Blank (B297207-BLK1)				Prepared & Analyzed: 12/17/21						
Hexavalent Chromium	ND	0.0040	mg/L							
LCS (B297207-BS1)				Prepared & Analyzed: 12/17/21						
Hexavalent Chromium	0.10	0.0040	mg/L	0.100		101	90-114			
LCS Dup (B297207-BSD1)				Prepared & Analyzed: 12/17/21						
Hexavalent Chromium	0.10	0.0040	mg/L	0.100		103	90-114	1.26	5	
Batch B297282 - SM21-23 2540D										
Blank (B297282-BLK1)				Prepared & Analyzed: 12/20/21						
Total Suspended Solids	ND	2.5	mg/L							
LCS (B297282-BS1)				Prepared & Analyzed: 12/20/21						
Total Suspended Solids	156		mg/L	200		78.0	53.8-124			
Batch B297358 - EPA 300.0										
Blank (B297358-BLK1)				Prepared & Analyzed: 12/20/21						
Chloride	ND	1.0	mg/L							
LCS (B297358-BS1)				Prepared & Analyzed: 12/20/21						
Chloride	9.7	1.0	mg/L	10.0		97.0	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 B297358 - EPA 300.0											
LCS Dup (B297358-BSD1)				Prepared & Analyzed: 12/20/21							
Chloride	9.7	1.0	mg/L	10.0		97.0		90-110	0.0618	20	
Duplicate (B297358-DUP1)		**Source: 21L1350-01**		Prepared & Analyzed: 12/20/21							
Chloride	660	25	mg/L		660				1.33	20	
Matrix Spike (B297358-MS1)		**Source: 21L1350-01**		Prepared & Analyzed: 12/20/21							
Chloride	840	25	mg/L	250	660	**75.1**	*	80-120			MS-07
Batch B297511 - SM19-23 4500 NH3 C											
Blank (B297511-BLK1)				Prepared: 12/22/21 Analyzed: 12/24/21							
Ammonia as N	ND	0.30	mg/L								
LCS (B297511-BS1)				Prepared: 12/22/21 Analyzed: 12/24/21							
Ammonia as N	4.5	0.30	mg/L	5.00		89.6		86.2-110			
LCS Dup (B297511-BSD1)				Prepared: 12/22/21 Analyzed: 12/24/21							
Ammonia as N	4.8	0.30	mg/L	5.00		95.2		86.2-110	6.06	10	
Batch B297623 - EPA 1664B											
Blank (B297623-BLK1)				Prepared & Analyzed: 12/23/21							
Silica Gel Treated HEM (SGT-HEM)	ND	1.4	mg/L								
LCS (B297623-BS1)				Prepared & Analyzed: 12/23/21							
Silica Gel Treated HEM (SGT-HEM)	9.6	1.4	mg/L	10.0		96.0		64-132			
Duplicate (B297623-DUP1)		**Source: 21L1350-01**		Prepared & Analyzed: 12/23/21							
Silica Gel Treated HEM (SGT-HEM)	ND	1.4	mg/L		ND				NC	18	
Matrix Spike (B297623-MS1)		**Source: 21L1350-01**		Prepared & Analyzed: 12/23/21							
Silica Gel Treated HEM (SGT-HEM)	94	14	mg/L	100	ND	94.0		64-132			

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QUALITY CONTROL

Drinking Water Organics EPA 504.1 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B297992 - EPA 504 water										
Blank (B297992-BLK1)				Prepared & Analyzed: 12/29/21						
1,2-Dibromoethane (EDB)	ND	0.021	µg/L							
Surrogate: 1,3-Dibromopropane	*1.03*		µg/L	1.05		98.6	70-130			
LCS (B297992-BS1)				Prepared & Analyzed: 12/29/21						
1,2-Dibromoethane (EDB)	0.225	0.020	µg/L	0.255		88.0	70-130			
Surrogate: 1,3-Dibromopropane	*1.03*		µg/L	1.02		101	70-130			
LCS Dup (B297992-BSD1)				Prepared & Analyzed: 12/29/21						
1,2-Dibromoethane (EDB)	0.238	0.021	µg/L	0.264		90.4	70-130	5.89		
Surrogate: 1,3-Dibromopropane	*1.11*		µg/L	1.05		105	70-130			
Matrix Spike (B297992-MS1)	**Source: 21L1350-01**			Prepared & Analyzed: 12/29/21						
1,2-Dibromoethane (EDB)	0.191	0.020	µg/L	0.251	ND	76.0	65-135			
Surrogate: 1,3-Dibromopropane	*1.07*		µg/L	1.00		107	70-130			

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

LCS

Lab Sample ID: B297417-BS1

Date(s) Analyzed: 12/22/2021 12/22/2021

Instrument ID (1): ECD5

Instrument ID (2): ECD5

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	0.446	
	2	0.000	0.000	0.000	0.458	1.8
Aroclor-1260	1	0.000	0.000	0.000	0.408	
	2	0.000	0.000	0.000	0.450	9.3

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

LCS Dup

Lab Sample ID: B297417-BSD1 Date(s) Analyzed: 12/22/2021 12/22/2021

Instrument ID (1): ECD5 Instrument ID (2): ECD5

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	0.452	
	2	0.000	0.000	0.000	0.465	3.3
Aroclor-1260	1	0.000	0.000	0.000	0.409	
	2	0.000	0.000	0.000	0.452	9.7

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA 504.1

LCS

Lab Sample ID: B297992-BS1

Date(s) Analyzed: 12/29/2021 12/29/2021

Instrument ID (1):

Instrument ID (2):

GC Column (1): ID: (mm)

GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
1,2-Dibromoethane (EDB)	1	3.360	0.000	0.000	0.225	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA 504.1

LCS Dup

Lab Sample ID: B297992-BSD1 Date(s) Analyzed: 12/29/2021 12/29/2021

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

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

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
1,2-Dibromoethane (EDB)	1	3.368	0.000	0.000	0.238	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA 504.1

Matrix Spike

Lab Sample ID: B297992-MS1 Date(s) Analyzed: 12/29/2021 12/29/2021

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

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

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
1,2-Dibromoethane (EDB)	1	3.365	0.000	0.000	0.191	

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

LCS

Lab Sample ID: B298172-BS1

Date(s) Analyzed: 01/04/2022 01/04/2022

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	0.310	
	2	0.000	0.000	0.000	0.347	11.3
Aroclor-1260	1	0.000	0.000	0.000	0.286	
	2	0.000	0.000	0.000	0.327	12.0

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

608.3

LCS Dup

Lab Sample ID: B298172-BSD1 Date(s) Analyzed: 01/04/2022 01/04/2022

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	0.401	
	2	0.000	0.000	0.000	0.457	13.3
Aroclor-1260	1	0.000	0.000	0.000	0.419	
	2	0.000	0.000	0.000	0.486	14.6

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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.

J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
L-03	Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the low side.
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.
MS-22	Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.
MS-24	Either matrix spike or matrix spike duplicate is outside of control limits, but the other is within limits. Analysis is in control based on laboratory fortified blank recovery.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
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
tert-Amyl Methyl Ether (TAME)	MA
Benzene	CT,NY,MA,NH,RI,NC,ME,VA
tert-Butyl Alcohol (TBA)	NY,MA
Carbon Tetrachloride	CT,NY,MA,NH,RI,NC,ME,VA
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
Naphthalene	NY,MA,NC
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
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	
Acenaphthene	CT,MA,NH,NY,NC,RI,ME,VA
Acenaphthylene	CT,MA,NH,NY,NC,RI,ME,VA

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
625.1 in Water	
Anthracene	CT,MA,NH,NY,NC,RI,ME,VA
Benzo(g,h,i)perylene	CT,MA,NH,NY,NC,RI,ME,VA
Butylbenzylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
4-Chloro-3-methylphenol	CT,MA,NH,NY,NC,RI,VA
2-Chlorophenol	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
1,2-Dichlorobenzene	MA,NC
2,4-Dichlorophenol	CT,MA,NH,NY,NC,RI,ME,VA
Diethylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
2,4-Dimethylphenol	CT,MA,NH,NY,NC,RI,ME,VA
Dimethylphthalate	CT,MA,NH,NY,NC,RI,ME,VA
4,6-Dinitro-2-methylphenol	CT,MA,NH,NY,NC,RI,ME,VA
2,4-Dinitrophenol	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
Fluoranthene	CT,MA,NH,NY,NC,RI,ME,VA
Fluorene	CT,MA,NH,NY,NC,RI,ME,VA
Naphthalene	CT,MA,NH,NY,NC,RI,ME,VA
2-Nitrophenol	CT,MA,NH,NY,NC,RI,ME,VA
4-Nitrophenol	CT,MA,NH,NY,NC,RI,ME,VA
Pentachlorophenol	CT,MA,NH,NY,NC,RI,ME,VA
Phenanthrene	CT,MA,NH,NY,NC,RI,ME,VA
2-Methylphenol	NY,NC
Phenol	CT,MA,NH,NY,NC,RI,ME,VA
3/4-Methylphenol	NY,NC
Pyrene	CT,MA,NH,NY,NC,RI,ME,VA
2,4,6-Trichlorophenol	CT,MA,NH,NY,NC,RI,ME,VA
2-Fluorophenol	NC,VA
2-Fluorophenol	NC
Phenol-d6	VA
Nitrobenzene-d5	VA
EPA 200.7 in Water	
Iron	CT,MA,NH,NY,RI,NC,ME,VA
Hardness	CT,MA,NH,NY,RI,VA
EPA 200.8 in Water	
Antimony	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
Chromium	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
Nickel	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

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Zinc	CT,MA,NH,NY,RI,NC,ME,VA
EPA 245.1 in Water	
Mercury	CT,MA,NH,RI,NY,NC,ME,VA
EPA 300.0 in Water	
Chloride	NC,NY,MA,VA,ME,NH,CT,RI
SM19-23 4500 NH3 C in Water	
Ammonia as N	NY,MA,CT,RI,VA,NC,ME
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
SM21-23 4500 CL G in Water	
Chlorine, Residual	CT,MA,RI,ME

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	02/5/2022
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

con-test® ANALYTICAL LABORATORY
21L1350
Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

Doc # 381 Rev 1_03242017

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Company Name: LRT
Address: 89 Crawford Street Leominster, MA
Phone: 774-450-7177
Project Name: 100 Cambridgeside Place
Project Location: 80 First Street, Cambridge
Project Number: 2-2317
Project Manager: Neil Schofield
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By:

Requested Turnaround Time
7-Day ☐ 10-Day ☐
Due Date: 5-day

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

Data Delivery
Format: PDF ☑ EXCEL ☐
Other:
CLP Like Data Pkg Required: ☐
Email To: clombardo@lrt-llc.net
nschofield@lrt-llc.net

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	[1]Matrix Code	Conc Code	Ammonia	Chloride	TRC	Total Metals (Sb,As,Cd, Cr III, Cu, Fe, Pb, Hg, Ni, Se, Ag, Zn)	Cyanide	Voc's	Semi-Voc's	PCB's	TPH	TSS	EDB	Hardness	Chromium VI
1	SH-1/MW	12/17/21	0800		X	GW	U	X	X	X	X	X	X	X	X	X	X	X	X	X
2	Receiving Water	12/17/21	1130		X	GW	U	X			X								X	X

ANALYSIS REQUESTED

# of Containers	2	1	1	1	1	3	2	2	2	1	3	2	2
[2] Preservation Code	S	I	I	N	X	H	I	I	S	I	T	N	I
[3] Container Code	P	P	P	P	P	V	A	A	A	P	V	P	P

Dissolved Metals Samples
○ Field Filtered
○ Lab to Filter

Orthophosphate Samples
○ Field Filtered
○ Lab to Filter

Comments: pH In: 17.7 / 18.1 pH RW 7.3 / 17.1°C

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

[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)

[3] **Container Codes:**
A = Amber Glass
G = Glass
P = Plastic
ST = Sterile
V = Vial
S = Summa Canister
T = Tedlar Bag
O = Other (please define)

Samples are for NPDES RGP Parameters.

Relinquished By: (signature)	Date/Time: 12/17/21	
Received By: (signature) 3.30	Date/Time: 12.17.21	
Relinquished by: (signature) 1900	Date/Time: 12.17.21	
Received by: (signature) 48,2.2	Date/Time: 12/17/21 1800	
Relinquished by: (signature)	Date/Time:	
Received by: (signature)	Date/Time:	

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 #

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NELAC and AIHA-LAP, LLC Accredited

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

Other
☐ Chromatogram
☐ *AIHA-LAP,LLC*

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

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 LRT

Received By _____ Date 12/7/21 Time 1400

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 # 3 Actual Temp - 4.8, 2.2

By Blank # _____ Actual Temp - _____

Was Custody Seal Intact? N/a Were Samples Tampered with? N/a

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 Analysis T Sampler Name T

Project T ID's 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? T Who was notified? Cassie

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? F On COC? F

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

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.	6	1 Liter Plastic	1	16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic	3	8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic	10	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:

Appendix C

Cutsheets

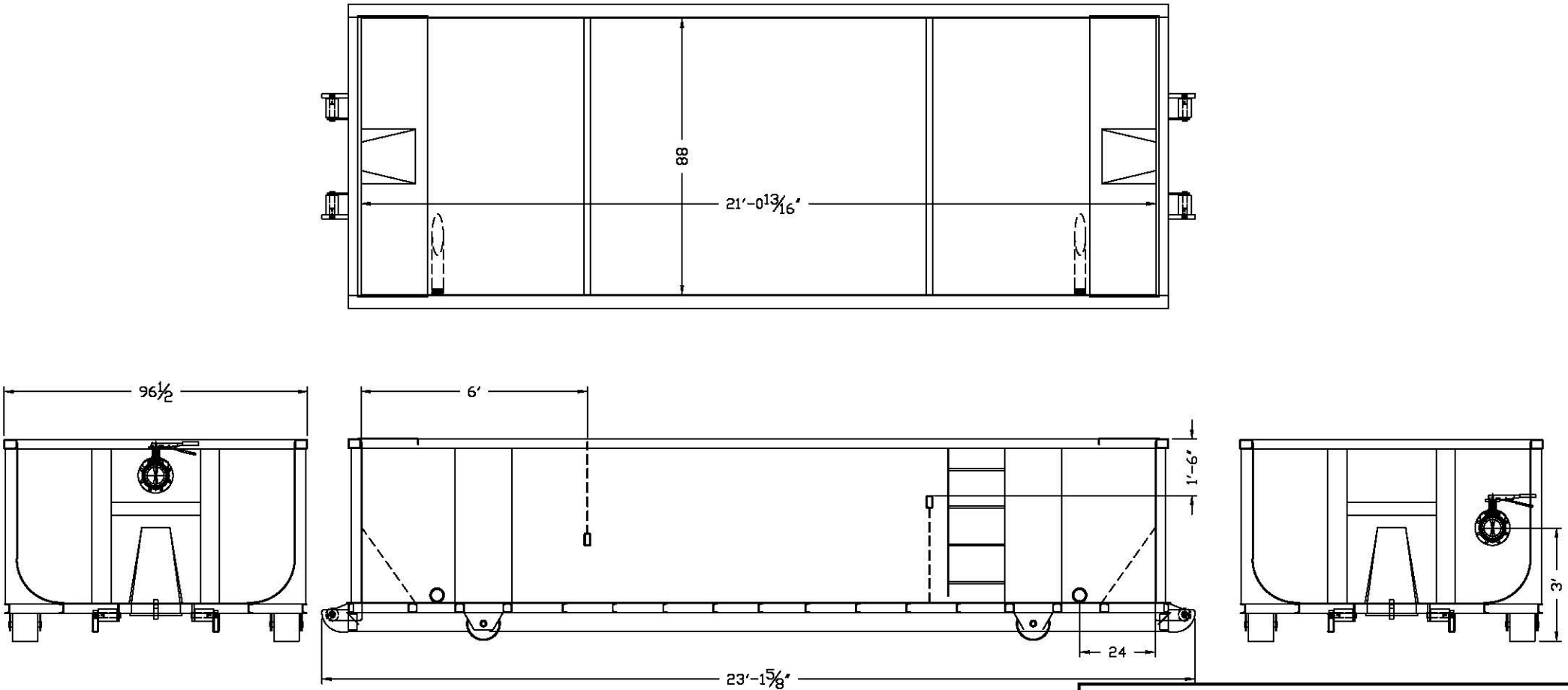
SPECIFICATION

CAPACITY: 25 CUBIC YARD
3/16" A36 PLATE WALLS
1/4" A36 PLATE FLOOR CONSTRUCTION
6" X 2" X 1/4" TUBING RAILS
WHEELS: 10" STEEL
SPLASH GUARDS
OVER UNDER WEIRS
PORTS: (2) 6" FLANGE W/BUTTERFLY VALVE
(2) 4" THD NIPPLE W/MERCHANT CPLR

BLAST: SSPC-SP-6 (COMMERCIAL BLAST)
PAINT: DTM POLURETHANE 3.0 TO 4.0 D.F.T.

CUSTOMER SPECIFICATION

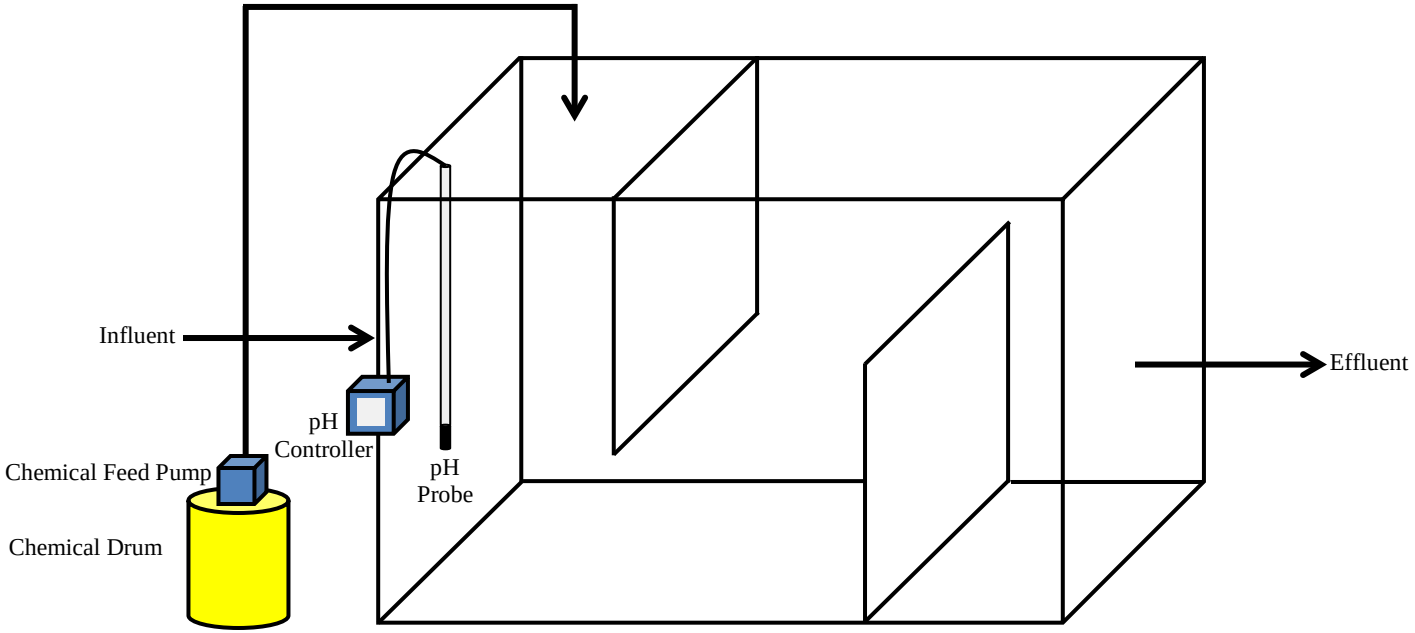
PAINT: 1300 GREEN
CARBOLINE 310 LINER



5,000 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 for the Broadest Range of Sensors.

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

Maximum Versatility

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

Ease of Use and Confidence in Results

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

Wide Variety of Communication Options

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

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

Controller Comparison

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

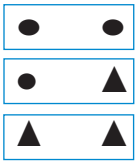
Choose from Hach's Broad Range of Digital and Analog Sensors

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

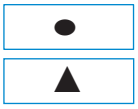
● = Digital ▲ = Analog

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

2 Channel Configurations



1 Channel Configurations



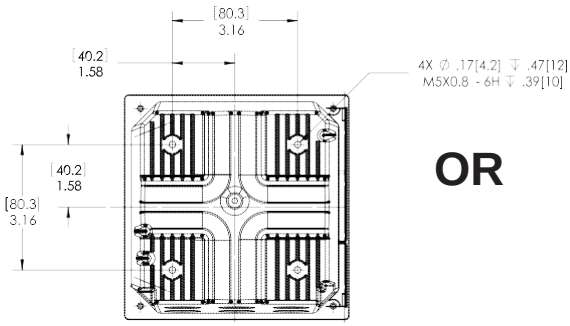
Specifications*

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

**Subject to change without notice.*

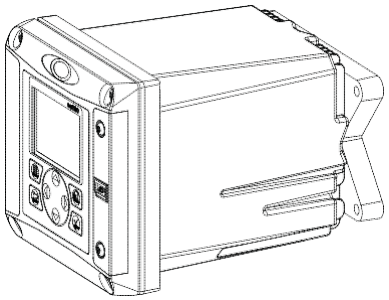
Dimensions

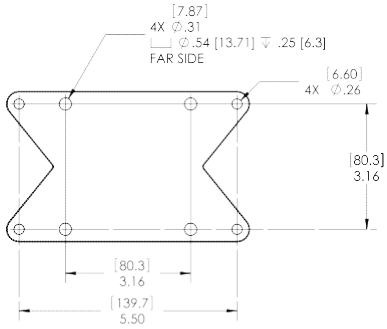
Surface Mounting Dimensions



Mounting Dimensions
(Rear View)

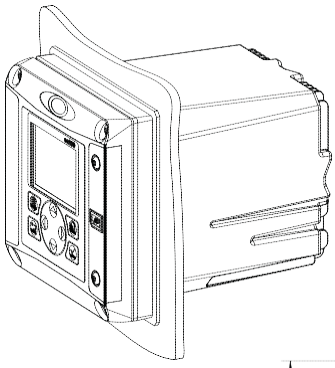
OR

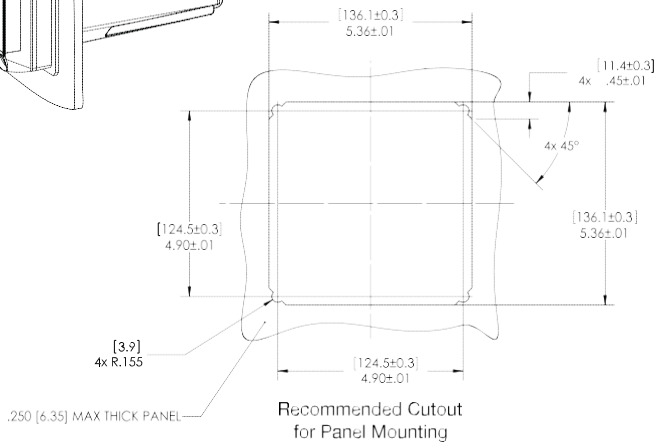




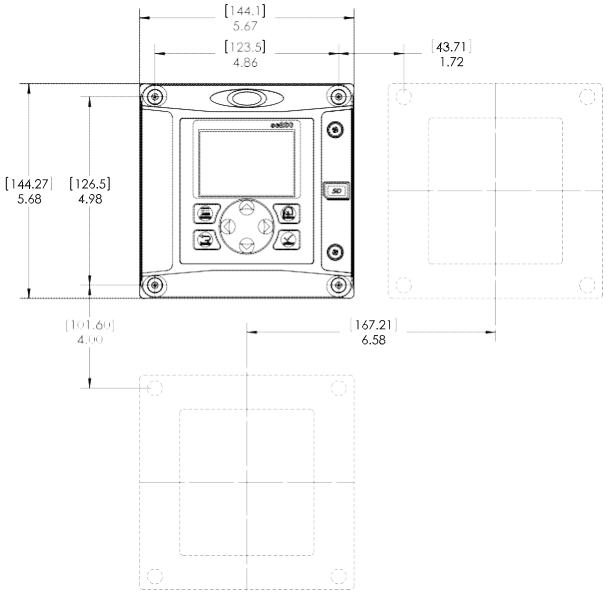
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield
p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



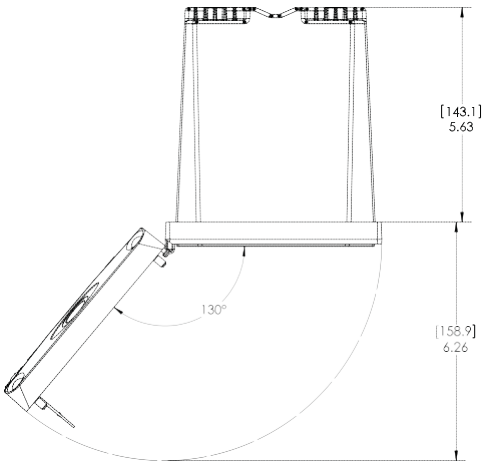


Recommended Cutout
for Panel Mounting

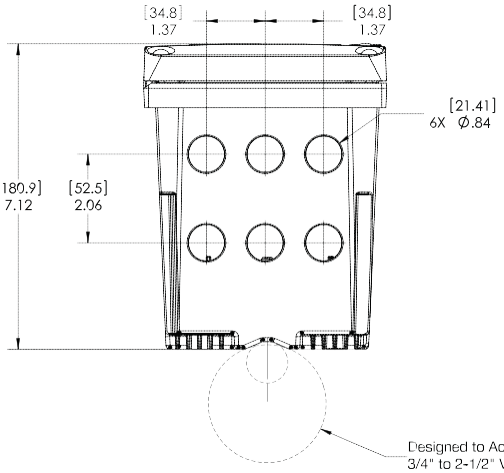


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views



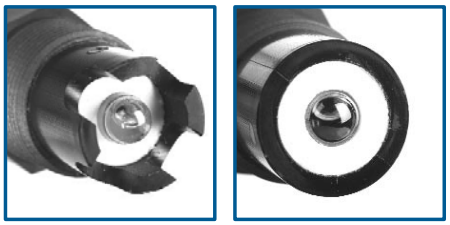
Door Opening Details



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

3/4-inch Combination pH and ORP Sensor Kits

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



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

Features and Benefits

Low Price—High Performance

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

Special Electrode Configurations

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

Temperature Compensation Element Option

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

Versatile Mounting Styles

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

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

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

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

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

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

Specifications*

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

Combination pH Sensors

Measuring Range
0 to 14 pH

Accuracy
Less than 0.1 pH under reference conditions

Temperature Range
0 to 105ºC (32 to 221ºF)

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

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

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

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

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

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

Sanitary style: 316 stainless steel sleeved PVDF body

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

Warranty
90 days

Combination ORP Sensors

Measuring Range
-2000 to +2000 millivolts

Accuracy
Limited to calibration solution accuracy (± 20 mV)

Temperature Range
0 to 105ºC (32 to 221ºF)

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

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

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

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

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

Wetted Materials

Convertible style: Ryton® body (glass filled)

Insertion style: PVDF body (Kynar®)

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

Warranty
90 days

**Specifications subject to change without notice.*

Engineering Specifications

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

Dimensions

Convertible Style Sensor

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

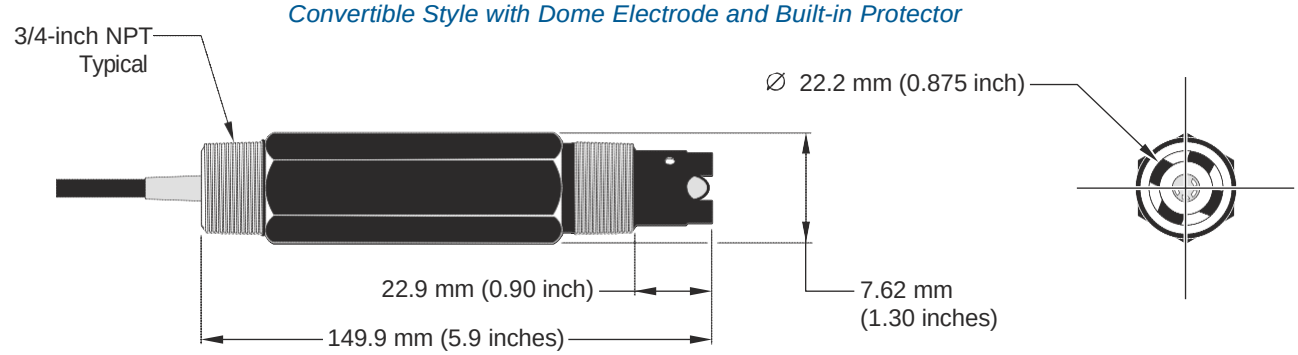
Insertion Style Sensor

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

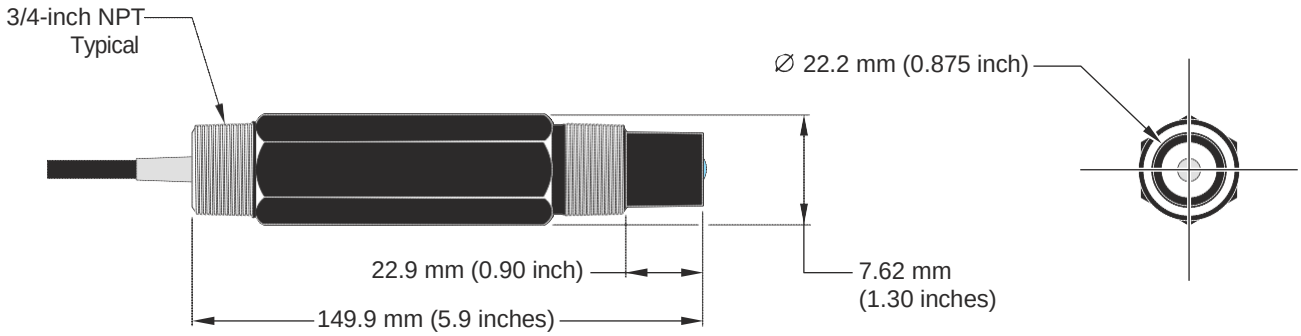
Sanitary Style Sensor

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

Convertible Style with Dome Electrode and Built-in Protector



Convertible Style with Flat Electrode



Lockwood Remediation Technologies, LLC

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

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

Features

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

Controls

Manual Stroke Rate

Manual Stroke Length

External Pacing - Optional

External Pace With Stop - Optional (125 SPM only)

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

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

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

Operating Benefits

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

Aftermarket

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

Series A Plus
Electronic Metering Pumps

Lockwood Remediation Technologies, LLC

Series A Plus

Specifications and Model Selection

MODEL			LBC2	LB02	LBC3	LB03	LB04	LB64	LBC4	LBS2	LBS3	LBS4
Capacity nominal (max.)		GPH	0.25	0.25	0.42	0.50	1.00	1.25	2.00	0.50	1.38	2.42
		GPO	6	6	10	12	24	30	48	12	33	58
		LPH	0.9	0.9	1.6	1.9	3.8	4.7	7.6	1.9	5.2	9.14
Pressure[3] (max.)	GFPP, PVDF, 316SS or PVC <;N code) wITFE Seats)	PSIG (Bar)	250 (17)	150 (10)	250 (17)	150 (10)	100 (7)	100 (7)	50 (3.3)	250 (17)	150 (10)	100 (7)
	PVC (V code) Viton or CSPE Seats IDegas Liquid End		150 (10)							150 (10)		
Connections:		Tubina	1.14" ID X 3.8" OD						3.8" D X 1.2" OD	1.14" D X 3.8" OD		
		Pioina	1.14" FNPT									
Strokes/Minute		SPM	125							250		

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

Engineering Data

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

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

Engineering Data

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

Custom Engineered Designs - Pre-Engineered Systems

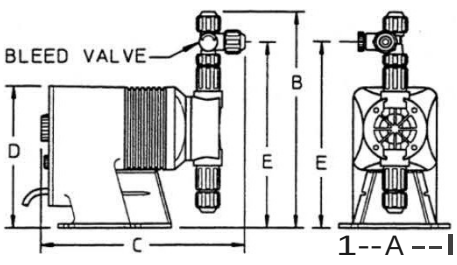
Pre-Engineered Systems

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

Dimensions

Series A PLUS Dimensions (inches)						
Model No.	A	B	C	D	E	Shipping Weight
LB02 IS2	5.0	9.6	9.5	6.5	8.2	10
LBC2	5.0	9.9	9.5	6.5	8.5	10
LBC3	5.0	9.9	9.5	6.5	8.5	10
LB03 IS3	5.0	9.9	9.5	6.5	8.5	10
LB0B4	5.0	9.9	9.5	6.5	8.5	10
LB64	5.0	9.9	9.5	6.5	8.5	10
LBC4	5.0	9.9	9.5	6.5	8.5	10

NOTE: Inches X 2.54 cm



95-Gallon OverPack - 32" dia x 41.5", 1 each/package

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

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

A95OVER Specifications

Dimensions:	ext. dia. 32" x 41.5" H
Shipping Dimensions:	31.75" W x 41.5" L x 31.75" H
Sold as:	1 per package
Color:	Yellow
Composition:	Polyethylene
# per Pallet:	3
Incinerable:	No
Ship Class:	250

Metric Equivalent Specifications

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

A95OVER Technical Information

Warnings & Restrictions:
There are no known warnings and restrictions for this product.

Regulations and Compliance:
49 CFR 173.3(c)(1) - If a container of hazardous waste is damaged or leaking, it can be placed in a compatible salvage drum that meets UN criteria for shipping

49 CFR 173.12(b)(2)(iv) - When labpacking, "Inner packagings…must be surrounded by a chemically compatible absorbent material in sufficient quantity to absorb the total liquid contents."

49 CFR 173.12(b) - A container used for labpacking must be "a UN 1A2 or UN 1B2 metal drum, a UN 1D plywood drum, a UN 1G fiber drum or a UN 1H2 plastic drum tested and marked at least for the Packing Group III performance level for liquids or solids."

Sulfuric Acid, 70-100%

Safety Data Sheet

According to U.S. Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations and according to Canada's Hazardous Products Regulation, February 11, 2015.

Revision Date: 05/07/2018 Date of Issue: 05/31/2016 Version: 4.0

SECTION 1: IDENTIFICATION

Product Identifier

Product Form: Mixture

Product Name: Sulfuric Acid, 70-100%

Formula: H_2-O_4-S

Intended Use of the Product

Use Of The Substance/Mixture: Industrial use.

Name, Address, and Telephone of the Responsible Party

Manufacturer

CHEMTRADE LOGISTICS INC.
155 Gordon Baker Road
Suite 300
Toronto, Ontario M2H 3N5
For SDS Info: (416) 496-5856
www.chemtradelogistics.com

Emergency Telephone Number

Emergency Number : Canada: CANUTEC +1-613-996-6666 / US: CHEMTREC +1-800-424-9300
INTERNATIONAL: +1-703-741-5970
Chemtrade Emergency Contact: (866) 416-4404
For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call CHEMTREC – Day or Night

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

GHS Classification

Met. Corr. 1	H290
Skin Corr. 1A	H314
Eye Dam. 1	H318
Carc. 1A	H350
Aquatic Acute 3	H402

Full text of hazard classes and H-statements : see section 16

Label Elements

GHS Labeling

Hazard Pictograms :


GHS05


GHS08

Signal Word : Danger

Hazard Statements : H290 - May be corrosive to metals.
H314 - Causes severe skin burns and eye damage.
H318 - Causes serious eye damage.
H350 - May cause cancer (Inhalation).
H402 - Harmful to aquatic life.

Precautionary Statements : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P234 - Keep only in original container.
P260 - Do not breathe vapors, mist, or spray.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P273 - Avoid release to the environment.
P280 - Wear protective gloves, protective clothing, and eye protection.
P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P310 - Immediately call a POISON CENTER or doctor.
P321 - Specific treatment (see section 4 on this SDS).
P363 - Wash contaminated clothing before reuse.
P390 - Absorb spillage to prevent material damage.
P405 - Store locked up.
P406 - Store in corrosive resistant container with a resistant inner liner.
P501 - Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

Other Hazards

Exposure may aggravate pre-existing eye, skin, or respiratory conditions.

Unknown acute toxicity

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product Identifier	%*	GHS Ingredient Classification
Sulfuric acid**	(CAS-No.) 7664-93-9	70 - 100	Met. Corr. 1, H290 Skin Corr. 1A, H314 Eye Dam. 1, H318 Carc. 1A, H350 Aquatic Acute 3, H402
Water	(CAS-No.) 7732-18-5	0.1 - 30	Not classified

Full text of H-phrases: see section 16

*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).

**Strong inorganic acid aerosols/mists containing this substance are carcinogenic to humans via inhalation. Under normal conditions of use this route of exposure is not expected.

SECTION 4: FIRST AID MEASURES

Description of First-aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

Skin Contact: Remove contaminated clothing. Immediately flush skin with plenty of water for at least 30 minutes. Get immediate medical advice/attention. Wash contaminated clothing before reuse.

Eye Contact: Rinse cautiously with water for at least 30 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

Ingestion: Rinse mouth. Do NOT induce vomiting. Obtain medical attention.

Most Important Symptoms and Effects Both Acute and Delayed

General: Corrosive to eyes, respiratory system and skin. May cause cancer.

Inhalation: May be corrosive to the respiratory tract.

Skin Contact: Causes severe irritation which will progress to chemical burns.

Eye Contact: Causes permanent damage to the cornea, iris, or conjunctiva.

Ingestion: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract.

Chronic Symptoms: Strong inorganic acid mists containing sulfuric acid are carcinogenic to humans. Prolonged inhalation of fumes or mists may cause erosion of the teeth.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Foam, carbon dioxide, dry chemical.

Unsuitable Extinguishing Media: Do not use water. Do not get water inside containers. Do not apply water stream directly at source of leak.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not flammable.

Explosion Hazard: Product is not explosive.

Reactivity: May be corrosive to metals. Contact with metals may evolve flammable hydrogen gas. May react exothermically with water releasing heat. Adding an acid to a base or base to an acid may cause a violent reaction. This product may act as an oxidizer.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use water spray or fog for cooling exposed containers.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Toxic fumes are released.

Other Information: Do not allow run-off from fire fighting to enter drains or water courses.

Reference to Other Sections

Refer to Section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Do not get in eyes, on skin, or on clothing. Do not breathe vapor, mist or spray. Do not handle until all safety precautions have been read and understood.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protective equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit. Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up

For Containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. As an immediate precautionary measure, isolate spill or leak area in all directions.

Methods for Cleaning Up: Clean up spills immediately and dispose of waste safely. Absorb spillage to prevent material damage. Cautiously neutralize spilled liquid. Transfer spilled material to a suitable container for disposal. Contact competent authorities after a spill.

Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Handle empty containers with care because they may still present a hazard. Do not get in eyes, on skin, or on clothing. Do not breathe vapors, mist, spray. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

Additional Hazards When Processed: May be corrosive to metals. May release corrosive vapors. NEVER pour water into this substance; when dissolving or diluting always add it slowly to the water.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations.

Storage Conditions: Keep container closed when not in use. Store in a dry, cool place. Keep/Store away from extremely high or low temperatures and incompatible materials. Store in original container or corrosive resistant and/or lined container.

Incompatible Materials: Combustible materials. Reducing agents. Strong oxidizers. Strong bases. Metals. Water.

Specific End Use(s)

Industrial use.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government.

Sulfuric acid (7664-93-9)		
Mexico	OEL TWA (mg/m³)	1 mg/m³
USA ACGIH	ACGIH TWA (mg/m³)	0.2 mg/m³ (thoracic particulate matter)
USA ACGIH	ACGIH chemical category	Suspected Human Carcinogen contained in strong inorganic acid mists
USA OSHA	OSHA PEL (TWA) (mg/m³)	1 mg/m³
USA NIOSH	NIOSH REL (TWA) (mg/m³)	1 mg/m³
USA IDLH	US IDLH (mg/m³)	15 mg/m³
Alberta	OEL STEL (mg/m³)	3 mg/m³
Alberta	OEL TWA (mg/m³)	1 mg/m³
British Columbia	OEL TWA (mg/m³)	0.2 mg/m³ (Thoracic, contained in strong inorganic acid mists)
Manitoba	OEL TWA (mg/m³)	0.2 mg/m³ (thoracic particulate matter)
New Brunswick	OEL STEL (mg/m³)	3 mg/m³
New Brunswick	OEL TWA (mg/m³)	1 mg/m³
Newfoundland & Labrador	OEL TWA (mg/m³)	0.2 mg/m³ (thoracic particulate matter)
Nova Scotia	OEL TWA (mg/m³)	0.2 mg/m³ (thoracic particulate matter)
Nunavut	OEL STEL (mg/m³)	0.6 mg/m³ (thoracic fraction)
Nunavut	OEL TWA (mg/m³)	0.2 mg/m³ (thoracic fraction)
Northwest Territories	OEL STEL (mg/m³)	0.6 mg/m³ (thoracic fraction, strong acid mists only)
Northwest Territories	OEL TWA (mg/m³)	0.2 mg/m³ (thoracic fraction, strong acid mists only)
Ontario	OEL TWA (mg/m³)	0.2 mg/m³ (thoracic)
Prince Edward Island	OEL TWA (mg/m³)	0.2 mg/m³ (thoracic particulate matter)
Québec	VECD (mg/m³)	3 mg/m³
Québec	VEMP (mg/m³)	1 mg/m³
Saskatchewan	OEL STEL (mg/m³)	0.6 mg/m³ (thoracic fraction)
Saskatchewan	OEL TWA (mg/m³)	0.2 mg/m³ (thoracic fraction)
Yukon	OEL STEL (mg/m³)	1 mg/m³
Yukon	OEL TWA (mg/m³)	1 mg/m³

Exposure Controls

Appropriate Engineering Controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed.

Personal Protective Equipment: Gloves. Protective clothing. Protective goggles. Face shield. Insufficient ventilation: wear respiratory protection.

Materials for Protective Clothing: Acid-resistant clothing.

Hand Protection: Wear protective gloves.

Eye Protection: Chemical safety goggles and face shield.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Liquid
Appearance	:	Clear, Colorless to Amber, Oily
Odor	:	Pungent
Odor Threshold	:	Not available
pH	:	0.3
Evaporation Rate	:	Not available
Melting Point	:	10.56 °C (51.01 °F)
Freezing Point	:	Not available
Boiling Point	:	290 °C (554 °F)
Flash Point	:	Not applicable
Auto-ignition Temperature	:	Not applicable
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Not applicable
Lower Flammable Limit	:	Not applicable
Upper Flammable Limit	:	Not applicable
Vapor Pressure	:	0.00027 - 0.16 kPa at 25 °C (77 °F)
Relative Vapor Density at 20°C	:	3.4 (air = 1)
Relative Density	:	Not available
Specific Gravity	:	1.84 g/l
Solubility	:	Water: Miscible
Partition Coefficient: N-Octanol/Water	:	Not available
Viscosity	:	Not available

SECTION 10: STABILITY AND REACTIVITY

Reactivity: May be corrosive to metals. Contact with metals may evolve flammable hydrogen gas. May react exothermically with water releasing heat. Adding an acid to a base or base to an acid may cause a violent reaction. This product may act as an oxidizer.

Chemical Stability: Stable under recommended handling and storage conditions (see section 7).

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Extremely high or low temperatures and incompatible materials.

Incompatible Materials: Combustible materials. Reducing agents. Strong bases. Strong oxidizers. Metals. Water.

Hazardous Decomposition Products: Thermal decomposition generates: Corrosive vapors.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity (Oral): Not classified

Acute Toxicity (Dermal): Not classified

Acute Toxicity (Inhalation): Not classified

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Causes severe skin burns and eye damage.

pH: 0.3

Eye Damage/Irritation: Causes serious eye damage.

pH: 0.3

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: May cause cancer (Inhalation).

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Effects After Inhalation: May be corrosive to the respiratory tract.

Symptoms/Effects After Skin Contact: Causes severe irritation which will progress to chemical burns.

Symptoms/Effects After Eye Contact: Causes permanent damage to the cornea, iris, or conjunctiva.

Symptoms/Effects After Ingestion: May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract.

Chronic Symptoms: Strong inorganic acid mists containing sulfuric acid are carcinogenic to humans. Prolonged inhalation of fumes or mists may cause erosion of the teeth.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Water (7732-18-5)	
LD50 Oral Rat	> 90000 mg/kg

Sulfuric acid (7664-93-9)	
LD50 Oral Rat	2140 mg/kg
LC50 Inhalation Rat	510 mg/m³ (Exposure time: 2 h)

Sulfuric acid (7664-93-9)	
IARC Group	1
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list.

Strong inorganic acid mists containing sulfuric acid	
National Toxicology Program (NTP) Status	Known Human Carcinogens.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Ecology - General: Harmful to aquatic life.

Sulfuric acid (7664-93-9)	
LC50 Fish 1	500 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static])
LC50 Fish 2	42 mg/l (Exposure time: 96 h - Species: Gambusia affinis [static])

Persistence and Degradability

Sulfuric Acid, 70-100%	
Persistence and Degradability	Not established.

Bioaccumulative Potential

Sulfuric Acid, 70-100%	
Bioaccumulative Potential	Not established.

Sulfuric acid (7664-93-9)	
BCF Fish 1	(no bioaccumulation)

Mobility in Soil Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

Additional Information: Container may remain hazardous when empty. Continue to observe all precautions.

Ecology - Waste Materials: Avoid release to the environment. This material is hazardous to the aquatic environment. Keep out of sewers and waterways.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

TRANSPORTATION CLASSIFICATION	DOT	TDG	IMDG	IATA
Identification Number	UN1830	UN1830	UN1830	UN1830
Proper Shipping Name	SULFURIC ACID	SULFURIC ACID	SULPHURIC ACID	SULPHURIC ACID
Transport Hazard Class(es)	8	8	8	8
				
Packing Group	II	II	II	II
Environmental Hazards	**Marine Pollutant :** No	**Marine Pollutant** : No	**Marine Pollutant** : No	**Marine Pollutant**: N/A
Emergency Response	**ERG Number :** 137	**ERAP Index:** 3 000	**EMS:** F-A, S-B	**ERG code (IATA):** 8L
Additional Information	Not applicable	Not applicable	Not applicable	Not applicable

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Chemical Name (CAS No.)	CERCLA RQ	EPCRA 304 RQ	SARA 302 TPQ	SARA 313
Sulfuric acid (7664-93-9)	1000 lb	1000 lb	1000 lb	Yes

SARA 311/312

Sulfuric Acid, 70-100%
Immediate (acute) health hazard. Delayed (chronic) health hazard. Reactive hazard

US TSCA Flags Not present

US State Regulations

California Proposition 65

Chemical Name (CAS No.)	Carcinogenicity	Developmental Toxicity	Female Reproductive Toxicity	Male Reproductive Toxicity
Sulfuric acid (7664-93-9)	Yes	No	No	No
Strong inorganic acid mists containing sulfuric acid	Yes	No	No	No

State Right-To-Know Lists

Sulfuric acid (7664-93-9)
U.S. - Massachusetts - Right To Know List - Yes U.S. - New Jersey - Right to Know Hazardous Substance List - Yes U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List - Yes U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances - No U.S. - Pennsylvania - RTK (Right to Know) List - Yes

Canadian Regulations

Sulfuric acid (7664-93-9)
Listed on the Canadian DSL (Domestic Substances List) Not listed on the Canadian NDSL (Non-Domestic Substances List)

International Inventories/Lists

Chemical Name (CAS No.)	Australia AICS	Turkey CICR	Korea ECL	EU EINECS	EU ELINCS	EU SVHC	EU NLP	Mexico INSQ
Sulfuric acid (7664-93-9)	Yes	No	Yes	Yes	No	No	No	No

Chemical Name (CAS No.)	China IECSC	Japan ENCS	Japan ISHL	Japan PDSCL	Japan PRTR	Philippines PICCS	New Zealand NZIOC	US TSCA
Sulfuric acid (7664-93-9)	Yes	Yes	No	Yes	No	Yes	Yes	Yes

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Date of Preparation or Latest Revision : 05/07/2018

Revision Summary

Section	Change	Date Changed
16	Data modified	05/07/2018

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada's Hazardous Products Regulations (HPR).

GHS Full Text Phrases:

Aquatic Acute 3	Hazardous to the aquatic environment - Acute Hazard Category 3
Carc. 1A	Carcinogenicity Category 1A
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Met. Corr. 1	Corrosive to metals Category 1
Skin Corr. 1A	Skin corrosion/irritation Category 1A
H290	May be corrosive to metals
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H350	May cause cancer
H402	Harmful to aquatic life

NFPA 704

NFPA Health Hazard : 3
NFPA Fire Hazard : 0
NFPA Reactivity Hazard : 2
NFPA Specific Hazards : W

HMIS Rating

Health : 3
Flammability : 0
Physical : 2
PPE See Section 8

Abbreviations and Acronyms

AICS – Australian Inventory of Chemical Substances
ACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
ATE - Acute Toxicity Estimate
BCF - Bioconcentration factor
BEI - Biological Exposure Indices (BEI)
CAS No. - Chemical Abstracts Service number
CERCLA RQ - Comprehensive Environmental Response, Compensation, and Liability Act - Reportable Quantity
CICR - Turkish Inventory and Control of Chemicals
DOT – 49 CFR – US Department of Transportation – Code of Federal Regulations Title 49 – Transportation.
EC50 - Median effective concentration
ECL - Korea Existing Chemicals List
EINECS - European Inventory of Existing Commercial Chemical Substances
ELINCS - European List of Notified Chemical Substances
EmS - IMDG Emergency Schedule Fire & Spillage
ENCS - Japanese Existing and New Chemical Substances Inventory
LC50 - Median Lethal Concentration
LD50 - Median Lethal Dose
LOAEL - Lowest Observed Adverse Effect Level
LOEC - Lowest-observed-effect Concentration
Log Pow - Octanol/water Partition Coefficient
NFPA 704 – National Fire Protection Association - Standard System for the Identification of the Hazards of Materials for Emergency Response
NIOSH - National Institute for Occupational Safety and Health
NLP - Europe No Longer Polymers List
NOAEL - No-Observed Adverse Effect Level
NOEC - No-Observed Effect Concentration
NZIOC - New Zealand Inventory of Chemicals
OEL - Occupational Exposure Limits
OSHA – Occupational Safety and Health Administration
PEL - Permissible Exposure Limits
PICCS - Philippine Inventory of Chemicals and Chemical Substances
PDSCL - Japan Poisonous and Deleterious Substances Control Law
PPE – Personal Protective Equipment

EPA – Environmental Protection Agency
EPCRA 304 RQ – EPCRA 304 Extremely Hazardous Substance Emergency Planning and Community Right-to-Know-Act – Reportable Quantity
ERAP Index – Emergency Response Assistance Plan Quantity Limit
ErC50 - EC50 in Terms of Reduction Growth Rate
ERG code (IATA) - Emergency Response Drill Code as found in the International Civil Aviation Organization (ICAO)
ERG No. - Emergency Response Guide Number
HCCL - Hazard Communication Carcinogen List
HMIS – Hazardous Materials Information System
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association – Dangerous Goods Regulations
IDLH - Immediately Dangerous to Life or Health
IECSC - Inventory of Existing Chemical Substances Produced or Imported in China
IMDG - International Maritime Dangerous Goods Code
INSQ - Mexican National Inventory of Chemical Substances
ISHL - Japan Industrial Safety and Health Law
PRTR - Japan Pollutant Release and Transfer Register
REL - Recommended Exposure Limit
SADT - Self Accelerating Decomposition Temperature
SARA - Superfund Amendments and Reauthorization Act
SARA 302 - Section 302, 40 CFR Part 355
SARA 311/312 - Sections 311 and 312, 40 CFR Part 370 Hazard Categories
SARA 313 - Section 313, 40 CFR Part 372
SRCL - Specifically Regulated Carcinogen List
STEL - Short Term Exposure Limit
SVHC – European Candidate List of Substance of Very High Concern
TDG – Transport Canada Transport of Dangerous Goods Regulations
TLM - Median Tolerance Limit
TLV - Threshold Limit Value
TPQ - Threshold Planning Quantity
TSCA – United StatesToxic Substances Control Act
TWA - Time Weighted Average
WEEL - Workplace Environmental Exposure Levels

Handle product with due care and avoid unnecessary contact. This information is supplied under U.S. OSHA'S "Right to Know" (29 CFR 1910.1200) and Canada's WHMIS regulations. Although certain hazards are described herein, we cannot guarantee these are the only hazards that exist. The information contained herein is based on data available to us and is believed to be true and accurate but it is not offered as a product specification. No warranty, expressed or implied, regarding the accuracy of this data, the hazards connected with the use of the product, or the results to be obtained from the use thereof, is made and Chemtrade and its affiliates assume no responsibility. Chemtrade is a member of the CIAC (Chemistry Industry Association of Canada) and adheres to the codes and principles of Responsible Care™.

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Chemtrade NA GHS SDS 2015

Safety Data Sheet

Revision Date Feb-23-2015 **Item #** 10927 **Safety Data Sheet** 1683

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name Sodium Hydroxide (Caustic) 50%
UN/ID No. UN1824
Synonyms Caustic soda Caustic Lye [Sodium hydroxide]
Recommended Use pH adjustment, Manufacture of pulp, paper and paper products, Detergent, Soap
Uses advised against Consumer uses: Private households (= general public = consumers).

Company Name
PVS-Nolwood Chemicals, Inc
10900 Harper Ave.
Detroit, MI 48213
(800) 284-9735

24 Hour Emergency Phone Number CHEMTREC 1-800-424-9300

2. HAZARDS IDENTIFICATION

Classification

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 1 Sub-category A
Serious eye damage/eye irritation	Category 1
May be corrosive to metals	Category 1

Emergency Overview

DANGER

Hazard statements
Causes severe skin burns and eye damage
Causes serious eye damage
May be corrosive to metals
Harmful if swallowed

Physical hazards
Corrosive
Corrosive to metals

Precautionary statements

Prevention

- Wear eye/face protection
- Wear protective gloves/protective clothing/eye protection/face protection
- Do not breathe dust/fume/gas/mist/vapors/spray
- Wash face, hands and any exposed skin thoroughly after handling
- Do not eat, drink or smoke when using this product

Response
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- Immediately call a POISON CENTER or doctor/physician
- IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
- Wash contaminated clothing before reuse
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Storage
- Store locked up

Disposal
- Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
None known.

Other Information

Other hazards
- May be harmful in contact with skin
- Harmful to aquatic life with long lasting effects
- Harmful to aquatic life

Unknown Acute Toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	EC No.	Weight-% *
Water	7732-18-5	231-791-2	50
Sodium hydroxide	1310-73-2	215-185-5	50

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

General advice
- Immediate medical attention is required

Eye contact
- Immediate medical attention is required
- Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes
- Keep eye wide open while rinsing
- Do not rub affected area

Skin Contact
- Immediate medical attention is required
- Take off contaminated clothing
- Wash off immediately with plenty of water for at least 15 minutes
- Wash contaminated clothing before reuse

Inhalation
- Remove to fresh air
- Call a physician or poison control center immediately
- If not breathing, give artificial respiration
- If breathing is difficult, give oxygen

Ingestion
- Immediate medical attention is required
- Do NOT induce vomiting
- Rinse mouth
- Drink plenty of water
- Never give anything by mouth to an unconscious person

Note to physician
Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure. Treat symptomatically.

Self-protection of the first aider Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
- Water spray (fog)
- Water
- Foam
- Dry chemical
- Carbon dioxide (CO2)
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment

Unsuitable extinguishing media
- Do not use halogenated extinguishing agents or foam

Specific hazards arising from the chemical
- The product causes burns of eyes, skin and mucous membranes
- Thermal decomposition can lead to release of irritating and toxic gases and vapors
- In the event of fire and/or explosion do not breathe fumes

Protective equipment and precautions for firefighters
- Wear a self-contained breathing apparatus and chemical protective clothing

Flammable properties
- No information available

Explosive properties
- No information available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
- Evacuate personnel to safe areas
- Use personal protective equipment as required
- Avoid contact with skin, eyes or clothing
- Keep people away from and upwind of spill/leak

Environmental precautions
- Collect contaminated fire extinguishing water separately. Do not allow to enter drains or surface water

Methods for cleaning up
- Dike far ahead of liquid spill for later disposal
- Soak up with inert absorbent material
- Take up mechanically, placing in appropriate containers for disposal
- Clean contaminated surface thoroughly
- Prevent product from entering drains
- Dam up

Other Information
- No information available

7. HANDLING AND STORAGE

Advice on safe handling
- Use personal protective equipment as required
- Avoid contact with skin, eyes or clothing
- Ensure adequate ventilation, especially in confined areas
- In case of insufficient ventilation, wear suitable respiratory equipment
- Use only with adequate ventilation and in closed systems

Storage Conditions
- Keep container tightly closed in a dry and well-ventilated place
- Keep out of the reach of children
- Keep containers tightly closed in a dry, cool and well-ventilated place
- Keep in properly labeled containers

Incompatible materials Aluminum, Zinc, Tin, Oxidizers, Acetaldehyde, Acrolein, Acrylonitrile

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium hydroxide 1310-73-2	Ceiling: 2 mg/m^3	TWA: 2 mg/m^3 (vacated) Ceiling: 2 mg/m^3	IDLH: 10 mg/m^3 Ceiling: 2 mg/m^3

Exposure Guidelines .

Engineering Controls Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Respiratory protection
- A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respriator.

Eye/face protection
- Tight sealing safety goggles
- Face protection shield

Skin and body protection
- Wear suitable protective clothing
- Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact

General Hygiene Considerations
- When using do not eat, drink or smoke
- Wash contaminated clothing before reuse
- Keep away from food, drink and animal feeding stuffs
- Contaminated work clothing should not be allowed out of the workplace
- Regular cleaning of equipment, work area and clothing is recommended
- Avoid contact with skin, eyes or clothing
- Take off all contaminated clothing and wash it before reuse
- Wear suitable gloves and eye/face protection

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	Clear to slightly hazy
Color	colorless
Odor	Odorless
Odor threshold	No information available

Property	**Values**	**Remarks • Method**
pH	14	
Melting point/Freezing Point	10-11.7	
Boiling point / boiling range	130-140	
Flash point	No information available	
Evaporation rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit (%)	No information available	
Lower flammability limit (%):	No information available	
Vapor pressure	23.76 mm Hg	@ 25 °C
Vapor density	No information available	
Specific Gravity	1.529	
Water solubility	Miscible in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point °C	No information available
Molecular weight	40.1
VOC Content (%)	No information available

Density No information available
Bulk density 12.75186 Pounds per gallon (lb/gal)

10. STABILITY AND REACTIVITY

Stability • Stable under recommended storage conditions

Conditions to avoid • Strong acids
• Strong oxidizing agents

Incompatible materials Aluminum, Zinc, Tin, Oxidizers, Acetaldehyde, Acrolein, Acrylonitrile

Hazardous Decomposition Products • Thermal decomposition can lead to release of irritating and toxic gases and vapors
• Contact with metals may evolve flammable hydrogen gas

Possibility of Hazardous Reactions • None under normal processing and storage

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principle Routes of Exposure Inhalation Skin Contact Eye contact
Inhalation May cause irritation of respiratory tract. Avoid breathing vapors or mists.
Ingestion No data available.
Skin Contact No data available.
Eye contact Contact with eyes may cause irritation.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Sodium hydroxide 1310-73-2	300-500 mg/kg (rat) 40 mg/kg (mouse)(Intraperitoneal)	= 1350 mg/kg (Rabbit)	-

Information on toxicological effects

Symptoms No information available
Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.
Germ cell mutagenicity No information available.
Carcinogenicity No information available.
Reproductive toxicity No information available.
STOT - single exposure No information available.
STOT - repeated exposure No information available.
Chronic toxicity Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. Avoid repeated exposure. Possible risk of irreversible effects.
Target Organ Effects Eyes, Respiratory system, Skin.
Aspiration hazard No information available.

Numerical measures of toxicity - Product Information

Unknown Acute Toxicity 0% of the mixture consists of ingredient(s) of unknown toxicity
The following values are calculated based on chapter 3.1 of the GHS document . mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity Harmful to aquatic life with long lasting effects
0% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Chemical Name	Algae/aquatic plants	Fish	Crustacea

Sodium hydroxide 1310-73-2	-	45.4: 96 h Oncorhynchus mykiss mg/L LC50 static	-

Persistence and degradability No information available.
Bioaccumulation The product is not expected to bioaccumulate.

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Disposal of wastes • This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261)
Contaminated packaging • Do not reuse container
US EPA Waste Number • D002

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste Status
Sodium hydroxide 1310-73-2	Toxic Corrosive

14. TRANSPORT INFORMATION

DOT

Proper shipping name	SODIUM HYDROXIDE SOLUTION
Hazard Class	8
UN/ID No.	UN1824
Packing Group	II
Reportable Quantity (RQ) (lbs)	1000
RQ as is (lbs)	2000
Description	UN1824, Sodium hydroxide solution, 8, II
Special Provisions	B2, IB2, N34, T7, TP2
Emergency Response Guide Number	154

IATA

UN/ID No.	UN1824
Proper shipping name	SODIUM HYDROXIDE SOLUTION
Hazard Class	8
Packing Group	II
ERG Code	8L
Special Provisions	A3

IMDG

UN/ID No.	UN1824
Proper shipping name	SODIUM HYDROXIDE SOLUTION
Hazard Class	8
Packing Group	II
EmS-No.	F-A, S-B

15. REGULATORY INFORMATION

US Federal Regulations

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	Yes

SARA 313 Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

CWA (Clean Water Act) This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium hydroxide 1310-73-2	1000 lb	-	-	X

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ) (lbs)
Sodium hydroxide 1310-73-2	1000 lb	-	RQ 1000 lb final RQ RQ 454 kg final RQ

US State Regulations

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Sodium hydroxide 1310-73-2	X	X	X

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Does not comply
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

16. OTHER INFORMATION

NFPA	**Health hazards** 3	**Flammability** 0	**Instability** 1	**Physical and Chemical Properties** -
HMIS	**Health hazards** 3	**Flammability** 0	**Physical hazards** 1	**Personal protection** X

Item #	**10927**
Safety Data Sheet	**1683**
Revision Date	Feb-23-2015
Issue Date	Feb-23-2015
Version	1
Revision Note	*** Updated value on SDS.

Disclaimer

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End of Safety Data Sheet

The Pulsatron Series HV designed for high viscosity applications for precise and accurate metering control. The Series HV offers manual control over stroke length and stroke rate as standard with the option to choose between 4-20mA and external pace inputs for automatic control.

Five distinct models are available, having pressure capabilities to 150 PSIG (10 BAR) @ 12 GPD (1.9 lph), and flow capacities to 240 GPD (37.9 lph) @ 80 PSIG (5.6 BAR), with a turndown ratio of 100:1. Metering performance is reproducible to within ± 2% of maximum capacity.

Features

- Automatic Control, available with 4-20mADC direct or external pacing, with stop function.
- Manual Control by on-line adjustable stroke rate and stroke length.
- Auto-Off-Manual switch.
- Highly Reliable timing circuit.
- Circuit Protection against voltage and current upsets.
- Panel Mounted Fuse.
- Solenoid Protection by thermal overload with auto-reset.
- Water Resistant, for outdoor and indoor applications.
- Indicator Lights, panel mounted.
- Guided Ball Check Valve Systems, to reduce back flow and enhance outstanding priming characteristics.
- Viscosities to 20,000 CPS.

Controls

Manual Stroke Rate

- Turn-Down Ratio 10:1

Manual Stroke Length

- Turn-Down Ratio 10:1

4-20mA or 20-4mA Input

- Automatic Control

Operating Benefits

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

Aftermarket

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

Series HV

Specifications and Model Selection

MODEL		LVB3	LVF4	LVG4	LVG5	LVH7
Capacity	GPH	0.50	1.00	2.00	4.00	10.00
nominal	GPD	12	24	48	96	240
(max.)	LPH	1.9	3.8	7.6	15.1	37.9
Pressure	PSIG	150	150	110	110	80
(max.)	BAR	10	10	7	7	5.6
Connections:	Tubing	(S) .50" I.D. X .75" O.D. .38" I.D. X .50" OD (LVB3 & F4 only) (S & D) .50" I.D. X .75" O.D. (LVG4,G5 & H7 only)				

Engineering Data

Pump Head Materials Available: GFPPL, PVC, PVDF, 316 SS

Diaphragm: PTFE-faced CSPE-backed

Check Valves Materials Available:

Seats/O-Rings: PTFE, CSPE, Viton

Balls: Ceramic, PTFE, 316 SS, Alloy C

Fittings Materials Available: GFPPL, PVC, PVDF

Bleed Valve: Same as fitting and check valve selected, except 316SS

Injection Valve & Foot Valve Assy: Same as fitting and check valve selected

Tubing: Clear PVC, White PE

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

Engineering Data

Reproducibility: +/- 2% at maximum capacity

Viscosity Max CPS: 20,000 CPS

Stroke Frequency Max SPM: 125

Stroke Frequency Turn-Down Ratio: 10:1

Stroke Length Turn-Down Ratio: 10:1

Power Input: 115 VAC/50-60 HZ/1 ph, 230 VAC/50-60 HZ/1 ph

Average Current Draw:

@ 115 VAC; Amps: 1.0 Amps

@ 230 VAC; Amps: 0.5 Amps @ 230 VAC

Peak Input Power: 300 Watts

Average Input Power @ Max SPM: 130 Watts

Custom Engineered Designs – Pre-Engineered Systems

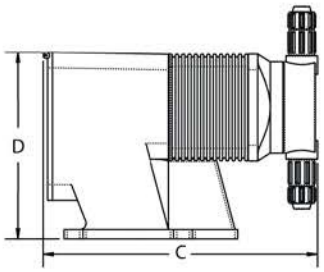
Pre-Engineered Systems

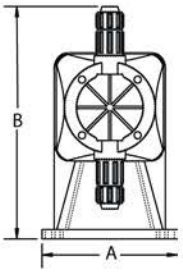
Pulsafeeder's Pre-Engineered Systems are designed to provide complete chemical feed solutions for all electronic metering applications. From stand alone simplex pH control applications to full-featured, redundant sodium hypochlorite disinfection metering, these rugged fabricated assemblies offer turn-key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

Dimensions

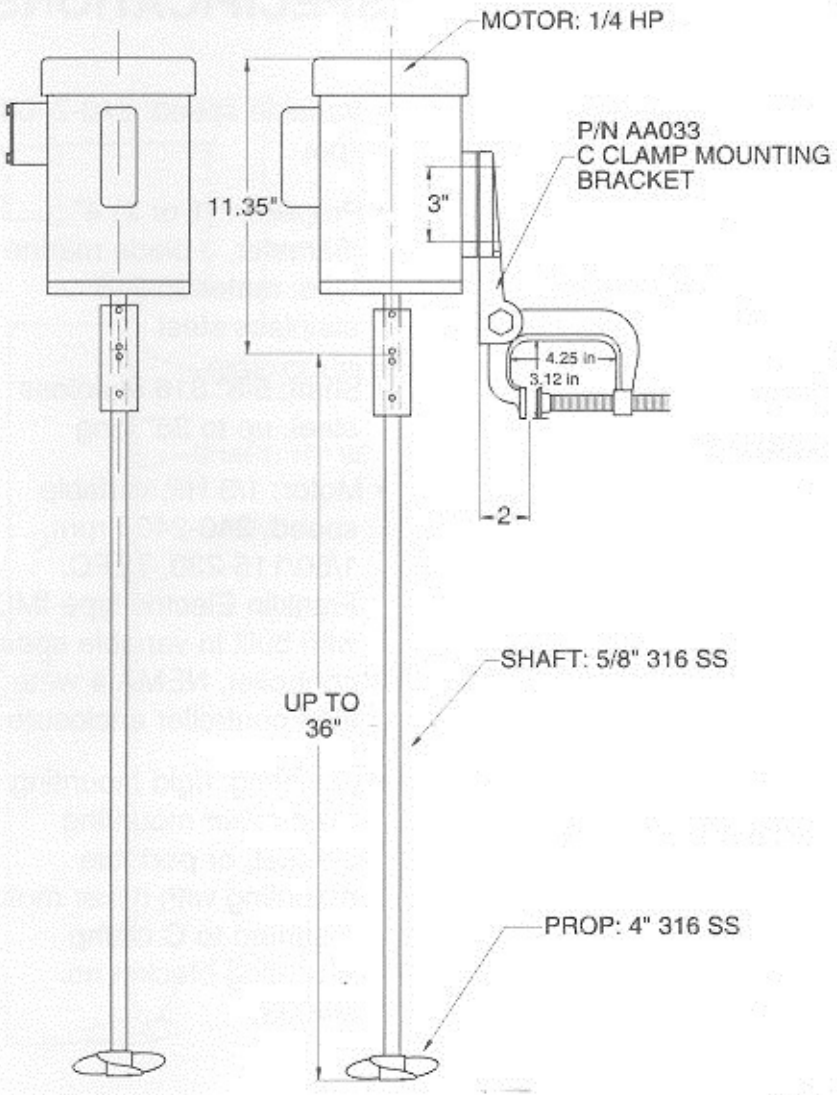
Series HV Dimensions (inches)					
Model No.	A	B	C	D	Shipping Weight
LVB3	5.4	9.3	9.5	7.5	13
LVF4	5.4	10.8	10.8	7.5	18
LVG4	5.4	9.5	10.6	7.5	18
LVG5	5.4	10.8	10.8	7.5	18
LVH7	6.1	11.5	11	8.2	25

NOTE: Inches X 2.54 = cm





MIXER MODEL NO. AA102A



AA102A

SPECIFICATIONS

- Speed: 1,725 rpm
- Propeller: (1 or 2) 4" diameter, 3 blade marine type, material: 316 stainless steel
- Shaft: 5/8" 316 stainless steel, up to 36" long
- Motor: 1/4 HP, 1,725 rpm, 1/60/115-230, capacitor start, or 3/60/230-460, TEFC
- Mounting: rigid mounting to fixed mixer mounting bracket, or portable mounting with mixer motor mounted to C clamp mounting bracket no. AA033.

SAFETY DATA SHEET

Revision date 2018-06-11 **Revision number** 2

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product name Redux E50

Other means of identification

Product code
Synonyms Water And Wastewater Treatment Coagulant/Flocculant

Recommended use of the chemical and restrictions on use

Recommended use [RU] No information available
Uses advised against No information available

Details of the supplier of the safety data sheet

Supplier

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, Massachusetts 01453
Tel: (774) 450-7177
Hours: Monday-Friday 9:00-5:00 EST

Emergency telephone number

24 Hour Emergency Phone Number CHEMTREC: (800) 424-9300
Outside USA - +1 (703) 527-3887 collect calls accepted

Contact Point info@reduxtech.com

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2
Corrosive to metals	Category 1

GHS Label elements, including precautionary statements

EMERGENCY OVERVIEW

Physical state	Color	Appearance	Odor
liquid	colorless to yellow	clear	no appreciable odor

WARNING

Hazard statements
Causes skin irritation
Causes serious eye irritation
May be corrosive to metals

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Keep only in original container

Precautionary Statements - Response
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Absorb spillage to prevent material damage

Precautionary Statements - Storage
Store in corrosive resistant container with a resistant inner liner

Other information
• May be harmful in contact with skin

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	weight-%	TRADE SECRET
Trade Secret Ingredient	PROPRIETARY	45 - 55%	*

*The exact percentage (concentration) of composition has been withheld as a trade secret

4. FIRST AID MEASURES

First Aid Measures

Eye contact
Immediately flush with plenty of water for at least 20 minutes, holding eyelids apart to ensure flushing of the entire surface. Washing within one minute is essential to achieve maximum effectiveness. Seek immediate medical attention.

Skin contact
Immediately wash thoroughly with soap and water, remove contaminated clothing and footwear. Wash clothing before reuse. Get medical attention if irritation should develop.

Ingestion
Seek medical attention immediately. Give large amounts of water to drink. If vomiting should occur spontaneously, keep airway clear. Never give anything by mouth to an unconscious person.

Inhalation
Remove to fresh air.

Most important symptoms and effects, both acute and delayed

Acute effects
Possible eye, skin and respiratory tract irritation.

Chronic effects
May aggravate existing skin, eye, and lung conditions. Persons with kidney disorders have an increased risk from exposure based on general information found on aluminum salts.

Indication of any immediate medical attention and special treatment needed

Note to physicians
Aluminum soluble salts may cause gastroenteritis if ingested. Treatment includes the use of demulcents. Note: Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media
Water Spray, Carbon Dioxide, Foam, Dry Chemical.

Extinguishing media which must not be used for safety reasons
No information available

Special hazards arising from the substance or mixture

Special Hazard
May produce hazardous fumes or hazardous decomposition products.

Advice for firefighters

Firefighting measures
Product is a water solution and nonflammable. In a fire, this product may build up pressure and rupture a sealed container; cool exposed containers with water spray. Use self-contained breathing apparatus in confined areas; avoid breathing mist or spray.

Special protective equipment for firefighters
Not determined

Explosion data

Sensitivity to Mechanical Impact
None.

Sensitivity to Static Discharge
None.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions
Wear suitable protective clothing and gloves.

Environmental precautions

Environmental precautions
Do not permit run-off to get into sewers or surface waterways.

Methods and material for containment and cleaning up

Methods for containment
Prevent further leakage or spillage if safe to do so. Dike to collect large liquid spills.

Methods for cleaning up
Clear spills immediately. Contain large spill and remove using a vacuum truck. Soak up small spills with inert absorbent material and place in a labeled waste container for disposal. Ventilate area of leak or spill. Spills of solution are extremely slippery so all residue must be removed promptly.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling
Keep container closed when not in use
Keep away from heat and open flame.
Avoid contact with eyes, skin and clothing
Wash thoroughly after handling
Wear chemical splash goggles, gloves, and protective clothing when handling.
Avoid breathing vapor or mist
Use with adequate ventilation and employ respiratory protection where mist or spray may be generated.
FOR INDUSTRIAL USE ONLY.

Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions
Do not store in unlined metal containers.
Product may slowly corrode iron, brass, copper, aluminum, mild steel, and stainless steel.
Store in a cool, dry place away from direct heat.
Keep in tightly closed container.

Incompatible products
Oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines
This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Appropriate engineering controls

Engineering controls
Local exhaust ventilation as necessary to maintain exposures to within applicable limits. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details. If there are no applicable or established exposure limit requirements or guidelines, general ventilation should be sufficient.

Individual protection measures, such as personal protective equipment

Eye/face Protection
Wear chemical splash goggles and face shield (when eye and face contact is possible due to splashing or spraying of material).

Hand Protection
Appropriate chemical resistant gloves should be worn.

Skin and body protection
Standard work clothing and work shoes.

Respiratory protection
If exposures exceed the PEL or TLV, use NIOSH/MSHA approved respirator in accordance with OSHA Respiratory Protection Requirements under 29 CFR 1910.134.

Other personal protection data
Eyewash fountains and safety showers must be easily accessible.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	liquid
Color	colorless to yellow
Appearance	clear
Odor	no appreciable odor
Odor threshold	No information available

Property	Values	Remarks / Method
pH	3.5	as is
Melting / freezing point	-7 °C / 19 °F	No information available
Boiling point / boiling range	No information available	No information available
Flash point	Not applicable	No information available
Evaporation rate	No information available	No information available

Flammability (solid, gas)	Not applicable	No information available
Flammability Limit in Air		
Upper flammability limit	Not applicable	No information available
Lower flammability limit	Not applicable	No information available
Vapor pressure	No information available	No information available
Vapor density	No information available	No information available
Specific gravity	1.33 - 1.35	No information available
Solubility (water)	Soluble	No information available
Solubility in other solvents	No information available	No information available
Partition coefficient: n-octanol/water	No information available	No information available
Autoignition temperature	Not applicable	No information available
Decomposition temperature	No information available	No information available
Kinematic viscosity	No information available	No information available
Dynamic viscosity	< 100 cps @ 20 °C	No information available

Other information

Density	11.0 - 11.3 lb/gal
Bulk Density	No information available
Explosive properties	No information available.
Oxidizing properties	No information available
Softening point	No information available
Molecular weight	No information available
Volatile organic compounds (VOCs) content	No information available
Percent Volatile, wt.%	40 - 50%

10. STABILITY AND REACTIVITY

Reactivity

Reactivity
No data available.

Chemical stability

Chemical stability
Stable.

Possibility of hazardous reactions

Possibility of hazardous reactions
None under normal processing.

Hazardous polymerization
No.

Conditions to avoid

Conditions to avoid
None

Incompatible materials

Materials to avoid
Oxidizing agents.

Hazardous decomposition products

Hazardous decomposition products
Thermal decomposition may release toxic and/or hazardous gases such as Cl_2 and HCl.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Eye contact
May cause moderate eye irritation that can become severe with prolonged contact. Prolonged exposure to Aluminum salts may cause conjunctivitis.

Skin contact
May be harmful in contact with skin. Prolonged and/or repeated contact may cause skin irritation.

Ingestion
May cause irritation of the mouth, throat and stomach. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Inhalation
Inhalation of mist or vapor may cause respiratory tract irritation.

Acute toxicity - Product Information

Oral LD50 No information available

Dermal LD50 No information available

Inhalation LC50 No information available

Acute toxicity - Component Information

Component	weight-%	Oral LD50	Dermal LD50	Inhalation LC50
Trade Secret Ingredient	45 - 55%	= 9187 mg/kg (Rat)	> 2000 mg/kg (Rat)	--

Information on toxicological effects

Symptoms
No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation
Irritating to skin

Serious eye damage/eye irritation
Causes serious eye irritation

Sensitization
No information available

Germ cell mutagenicity
No information available

Carcinogenicity
This product does not contain any components in concentrations greater than or equal to 0.1% that are listed as known or suspected carcinogens by NTP, IARC, ACGIH, or OSHA.

Reproductive toxicity
No information available

Specific target organ toxicity - Single exposure
No information available.

Specific target organ toxicity - Repeated exposure
No information available

Aspiration hazard
No information available.

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	18374 mg/kg
ATEmix (dermal)	4004 mg/kg

Other information
Conclusions are drawn from sources other than direct testing.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic toxicity - Product Information

Fish	LC 50 (96 hour, static) 776.4 mg/L *Pimephales promelas* (Fathead Minnow) [1] EC 50 (96 hour, static) 265.5 mg/L *Pimephales promelas* (Fathead Minnow) [1]
Crustacea	LC 50 (48 hour, static) 803.8 mg/L *Ceriodaphnia dubia* (Water Flea) [1] NOEC (7 day chronic, static) 200 mg/L *Ceriodaphnia dubia* (Water Flea) [1]
Algae/aquatic plants	No information available

Acute aquatic toxicity - Component Information

Component	weight-%	Algae/aquatic plants	Fish	Toxicity to daphnia and other aquatic invertebrates
Trade Secret Ingredient	45 - 55%	--	LC50 (96 h static) 100 - 500 mg/L (Brachydanio rerio)	--

Persistence and degradability

Persistence and degradability
No information available

Bioaccumulative potential

Bioaccumulative potential
No information available.

Mobility

Mobility
No information available

Results of PBT and vPvB assessment

PBT and vPvB assessment
No information available

Other adverse effects

Other information
[1] Generated from tests conducted by ECT-Superior Laboratories May 2010

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes
Do NOT mix with other chemical wastes. Do not put solutions containing this product into sewer systems. Dispose of product in an approved chemical waste landfill or incinerate in accordance with applicable Federal, state and local regulations. Do not re-use empty containers.

Contaminated packaging
Since empty containers retain product residue, follow label warnings even after container is emptied.

14. TRANSPORT INFORMATION

DOT

NOT REGULATED FOR TRANSPORTATION
This product is excepted from DOT regulations under 49 CFR 173.154(d) when shipped by road or railway. The product exception is referenced in 49 CFR 172.101 Table. Packaging material must not be aluminum, steel or be degraded by this product

ICAO/IATA

Regulated

UN number	UN3264
Proper shipping name	Corrosive Liquid, Acidic, Inorganic, N.O.S. (Polyaluminum Chloride Solution)
Hazard class	8
Packing group	III
ERG Code	8L

IMDG

Regulated

UN number	UN3264
Proper shipping name	Corrosive Liquid, Acidic, Inorganic, N.O.S. (Polyaluminum Chloride Solution)
Hazard class	8
Packing group	III
EmS	F-A, S-B

Harmonized Tariff Number 2827.32

15. REGULATORY INFORMATION

International Inventories

TSCA (United States)
All ingredients are on the inventory or exempt from listing

Australia (AICS)
All ingredients are on the inventory or exempt from listing

Canada (DSL)
All ingredients are on the inventory or exempt from listing

Canada (NDSL)
None of the ingredients are on the inventory.

China (IECSC)
All ingredients are on the inventory or exempt from listing

EINECS (European Inventory of Existing Chemical Substances)
All ingredients are on the inventory or exempt from listing

ELINCS (European List of Notified Chemical Substances)
None of the ingredients are on the inventory.

ENCS (Japan)
All ingredients are on the inventory or exempt from listing

South Korea (KECL)
All ingredients are on the inventory or exempt from listing

Philippines (PICCS)
All ingredients are on the inventory or exempt from listing

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
AICS - Australian Inventory of Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
IECSC - China Inventory of Existing Chemical Substances
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

U.S. Federal Regulations

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic health hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive hazard	No

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

This product does not contain any substances regulated under applicable state right-to-know regulations

16. OTHER INFORMATION

NFPA Rating	Health - 1	Flammability - 0	Instability - 0	Special Hazard -
HMIS Rating	Health - 1	Flammability - 0	Physical hazard - 0	Personal protection - B

Product code

Revision date 2015-03-12

Revision number 1

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

SAFETY DATA SHEET

I. Chemical Product and Company Identification

Product Name: Nonionic / Anionic Polymer
Product #s: LRT- 800 Series Polymers

Distributor: Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774-450-7177
Fax: 885-835-0617
Email: plockwood@lrt-llc.net

For Chemical Emergency - Spill, Leak, Fire, Exposure or Accident
Call **CHEMTEL** - Day or Night – 1800-255-3924

II. Composition and Ingredient Information

Components:	CAS #:
Anionic Polyacrylamide	25085-02-3
Permissible Exposure Limit (PEL):	No information available.
Threshold Limit Value (TLV):	Information not available.

III. Hazard Identification

Primary Routes of Exposure: Skin Contact - Eye Contact - Inhalation

Skin Contact: May cause irritation, especially after prolonged or repeated contact.

Eye Contact: Dust contact and solution may cause irritation.

Ingestion: May cause discomfort or gastrointestinal disturbance. Low oral toxicity.

Inhalation: Dust contact and solution may cause irritation.

Unusual Chronic Toxicity: None Known.

IV. First Aid Measures

Skin Contact: Flush with plenty of soap and water for at least 15 minutes. If irritation persists, get medical attention.

Eyes Contact: Immediately flush with water, continuing for 15 minutes. Immediately contact a physician for additional treatment.

Ingestion: If conscious, immediately give 2 to 4 glasses of water, and induce vomiting by touching finger to back of throat or giving syrup of Ipecac.

CAUTION: If unconscious, having breathing or in convulsions, do not induce vomiting or give water.

Inhalation: Remove to fresh air.

V. Fire-Fighting Measures

Flammability Classification: NFPA - Minimal - Will not burn under normal conditions.

Flash Point: Not flammable.

Flammable and Explosive Limits: UEL: ND LEL: ND

Hazardous Combustion Byproducts:

Thermal decomposition expected to produce carbon monoxide, carbon dioxide, and various nitrous oxides and some HCl vapors.

Extinguishing Media: Foam - Carbon Dioxide - Dry Chemical

AVOID USING WATER - MAY CAUSE EXTREMELY SLIPPERY CONDITIONS.

Special Fire-Fighting Procedures: Wear self-contained breathing apparatus.
Solutions of product are extremely slippery.

Unusual Fire and Explosion Hazards: Material and its solutions are extremely slippery.

VI. Accidental Release Measures

Procedures: Sweep up or shovel into metal or plastic container. Do not use water to clean area; product is very slippery when wet.

Waste Disposal: Incineration and/or disposal in a chemical landfill. Disposer must comply with Federal, State, and Local disposal or discharge laws.

VII. Handling and Storage Avoid contact with skin, eyes, or clothing.
Do not inhale mist if formed.
Use normal personal hygiene and housekeeping.
Store in a cool dry place.

VIII. Exposure Controls and Personal Protection

Eye Protection: Safety glasses for normal handling conditions.
Splash-proof goggles when handling solutions.
Do not wear contact lens.

Hand Protection: Rubber gloves.

Ventilation: Local exhaust - if dusting occurs. Natural ventilation adequate in absence of dust.

Respiratory Protection: If dusty conditions are encountered, wear NIOSH approved respirator.

Other Protection: Eye wash recommended, full work clothing, add protective rubber clothing if splashing or repeated contact with solution is likely.

IX. Physical and Chemical Properties

Appearance	White granular
State	Solid
Specific Gravity (Water = 1)	0.8 - 1.0
Solubility in Water	Complete

X. Stability and Reactivity

Stability: Product is stable as supplied.

Incompatibility: Oxidizing Agents may cause exothermic reaction.

Hazardous Decomposition or Byproducts:

Thermal decomposition expected to produce carbon oxides, and various nitrous oxides.

Hazardous Polymerization: Will not occur.

XI. Toxicological Information Not listed as a carcinogen by IARC, NTP, OSHA or ACGIH.

XII. Ecological Information

XIII. Disposal Considerations

Incineration and/or disposal in chemical landfill. Disposer must comply with federal, state, and local disposal or discharge laws.

RCRA Status of Unused Material if Discarded: Not a hazardous waste.

Hazardous Waste Number: N/A

XIV. Transport Information

Not DOT regulated. Not a RCRA hazardous waste.

Label Instructions: Signal Word: **"Caution! Products are extremely slippery! "**

XV. Regulatory Information

Reportable Quantity (EPA 40 CFR 302): N/A

Threshold Planning Quantity (EPA 40 CFR 355): N/A

Toxic Chemical Release Reporting (EPA 40 CFR 372): N/A

SARA TITLE 3: Section 311 Hazard Categorizations (40CFR 370): N/A

SARA TITLE 3: Section 313 Information (40CFR 372): N/A

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Information (40CFR 302.4) N/A

US TSCA: Product is manufactured in compliance with all provisions of the Toxic Substances Control Act, 15 U.S.C.

XVI. Other Information

		Scale
Health	0	4 = Severe
Flammability	1	3 = Serious
Reactivity	0	2 = Moderate
Personal Protection	**F**	1 = Slight
		0 = Insignificant

Personal Protective Equipment Guide

A = Safety Glasses

B = Safety Glasses, Gloves

C = Safety Glasses, Gloves, Apron

D = Gloves, Apron, Face shield

E = Safety Glasses, Gloves, and Dust Respirator

F = Safety Glasses, Gloves, Apron and Dust Respirator

G = Safety Glasses, Gloves, and Vapor Respirator

H = Splash Goggles, Gloves, Apron, Vapor Respirator

I = Safety Glasses, Gloves, and Dust & Vapor Respirator

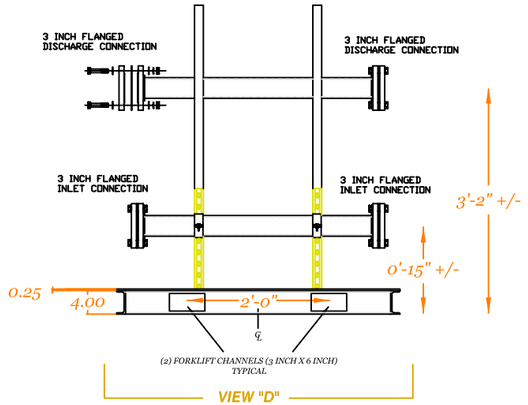
J = Splash Goggles, Gloves, Apron, and Dust & Vapor Respirator

K = Air Line Hood/Mask, Gloves, Full Suit, Boots

X = Ask supervisor for special handling instructions

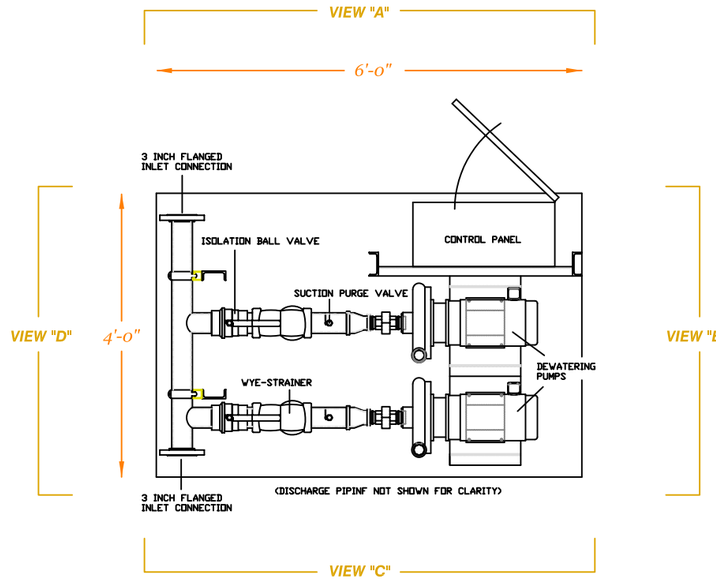
ABBREVIATIONS:

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TLV - Threshold Limit Value
PEL - Permissible Exposure Limit
TWA - Time Weighted Average
STEL - Short-Term Exposure Limit
ANSI - American National Standard Institute
MSHA - Mine Safety and Health Administration
NIOSH - National Institute for Occupational Safety & Health
NA - Not Applicable
NE - Not Established
NR - Not Required
PPE - Personal Protective Equipment
LEL - Lower Exposure Level
UEL - Upper Exposure Level



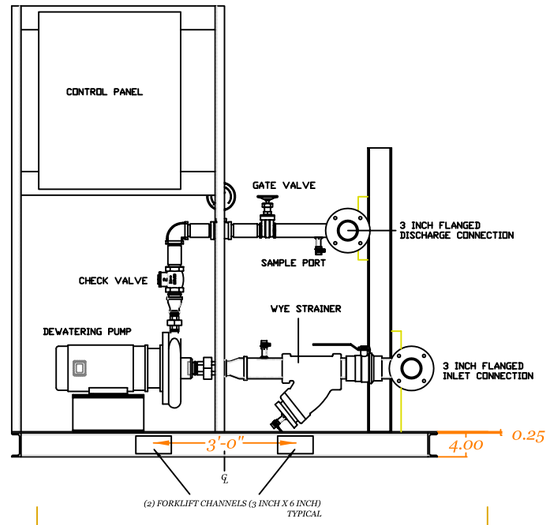
5 HP DEWATERING PUMPSKID

ELEVATIONAL VIEW



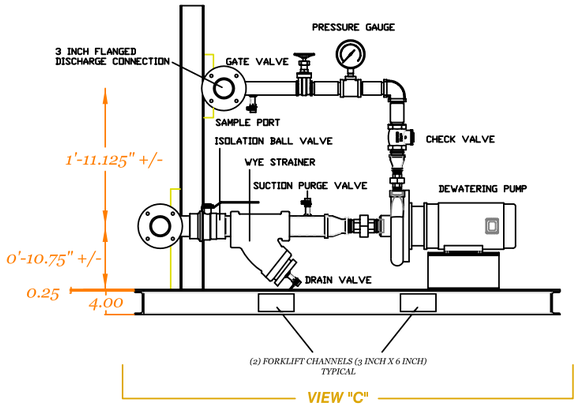
5 HP DEWATERING PUMPSKID

TOP VIEW



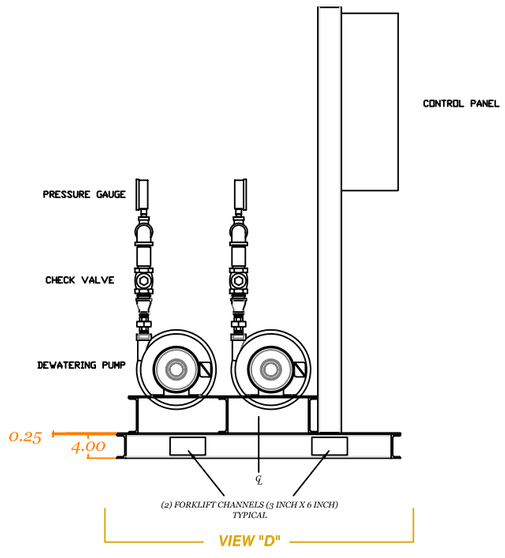
5 HP DEWATERING PUMPSKID

ELEVATIONAL VIEW



5 HP DEWATERING PUMPSKID

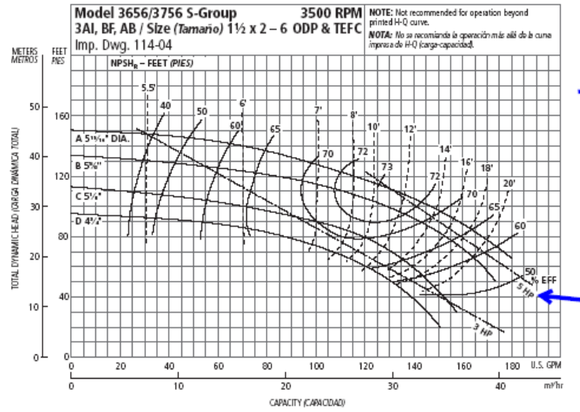
ELEVATIONAL VIEW



5 HP DEWATERING PUMPSKID

ELEVATIONAL VIEW

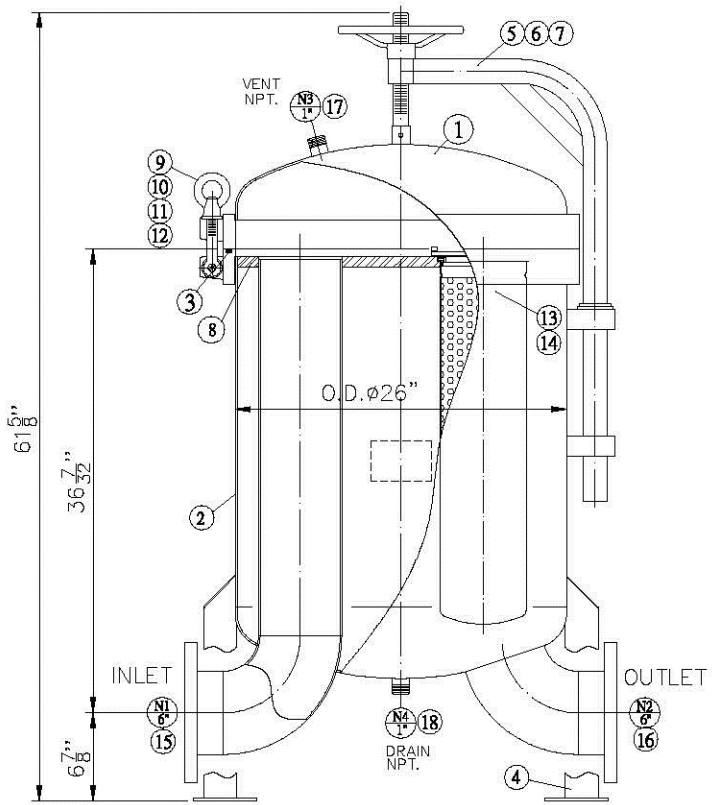
Performance Curves – 60 Hz, 3500 RPM
Curvas de desempeño – 60 Hz, 3500 RPM



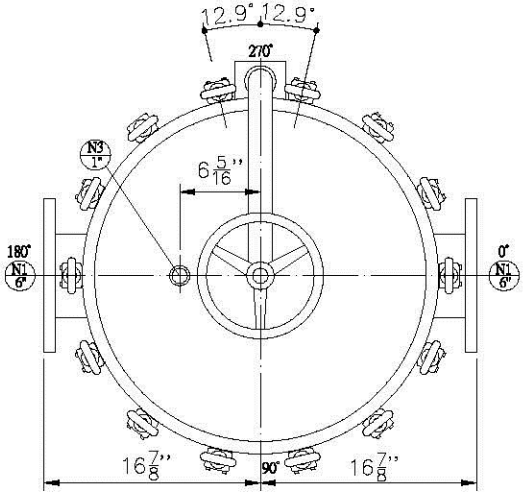
Optional Impeller / Impulsor optativo	
Ordering Code / Código de pedido	Dia. / Diá.
A	5¹¹⁵/₁₆"
B	5⅝"
C	5¼"
D	4⅞"

NOTE: Pump will pass a sphere to ⅜" diameter.

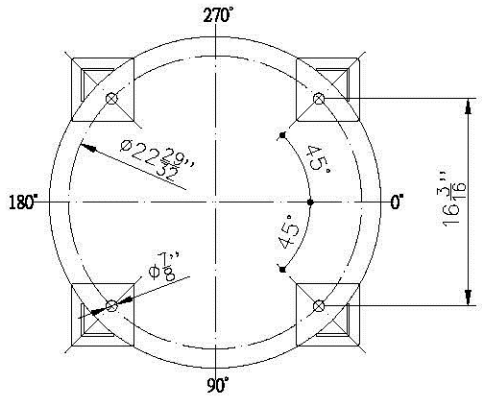
NOTA: *La bomba dejará pasar una esfera de hasta ⅜ de pulgada de diámetro.*



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

Polyester Liquid Filter Bag

Features

* Polyester liquid bag filter are available with a carbon steel ring, stainless steel ring or plastic flanges.
* Heavy-duty handle eases installation and removal
* Metal ring sewn into bag top for increased durability and positive sealing
* Wide array of media fibers to meet needed temperature and micron specifications

Applications

Polyester liquid filter bags can be used in the filtering of a wide array of industrial and commercial process fluids

Sizes

Our liquid filter bags are available for all common liquid bag housings. Dimensions range from 4.12" diameter X 8" length thru 9" diameter X 32" length.

Micron Ratings

Available fibers range from 1 to 1500 microns

Options

* Bag finish or covers for strict migration requirements.
* Plastic top O.E.M. replacements
* Multi-layered filtering capabilities for higher dirt holding capacities

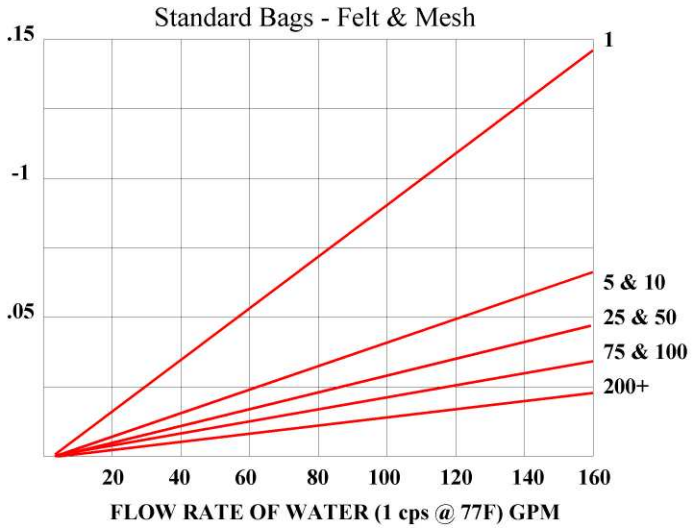
Optional Filter Media

Felt: Nomex, Polyester, Polypropylene

Monofilament: Nylon, Polyester, Polypropylene

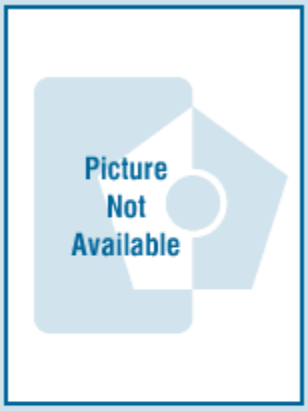
Multifilament: Nylon, Polyester

Polypropylene: Oil Removal



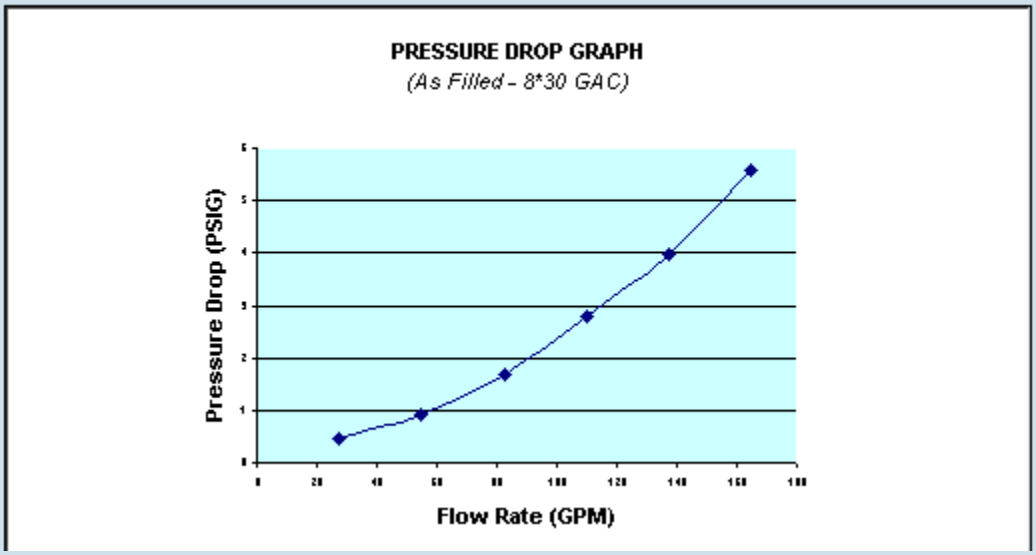
89 Crawford Street
Leominster, Massachusetts 01453
Tel: 774.450.7177
Fax: 888.835.0617
www.lrt-llc.net

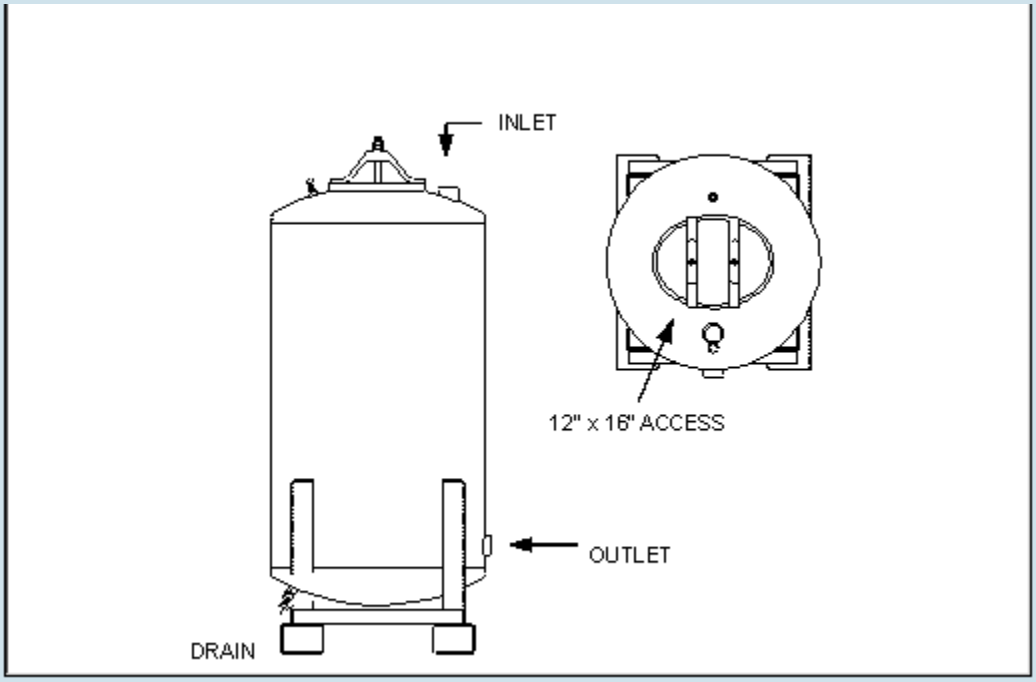
HPAF SERIES FILTERS
MODEL HPAF-3000



The HPAF-3000 filter is a media filter vessel designed to treat liquid streams. While the typical design application is a activated carbon adsorbtion unit, the filter can easily accommodate many medias. Some applications include:

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





HPAF-3000 SPECIFICATIONS			
Overall Height	8'11"	Vessel/Internal Piping Materials	CS (SA-36) / SCH 40 PVC
Diameter	60"	Internal Coating	Polyamide Epoxy Resin
Inlet / Outlet (FNPT)	3"	External Coating	Epoxy Mastic
Drain / Vent (FNPT)	1" / 1/2"	Maximum Pressure / Temp	75 PSIG / 140° F
GAC Fill (lbs)	3,000	Cross Sectional Bed Area	19.5 FT^2
Shipping / Operational Weight (lbs)	3,525/10,635	Bed Depth/Volume	5.5 FT / 107 FT^3

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.

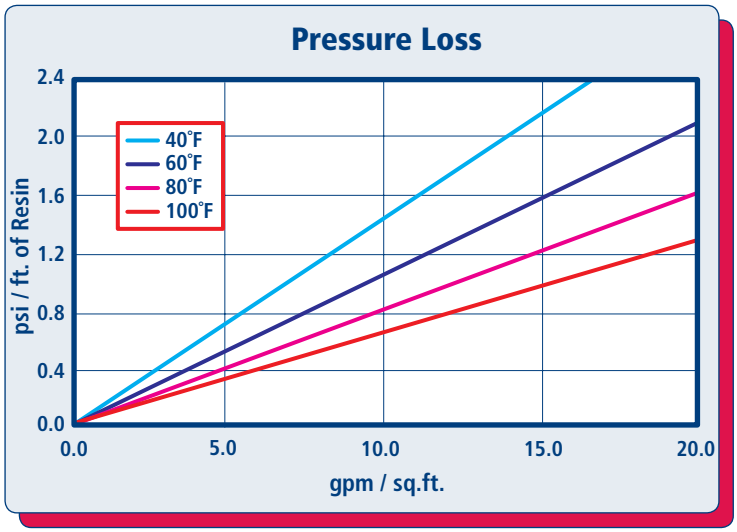
NSF/ANSI 44-61 CERTIFIED FOR MATERIAL SAFETY

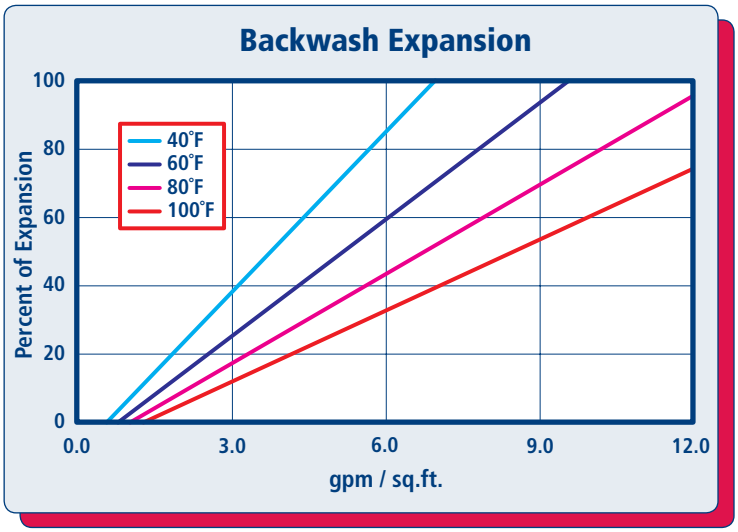
FEATURES & BENEFITS

- **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

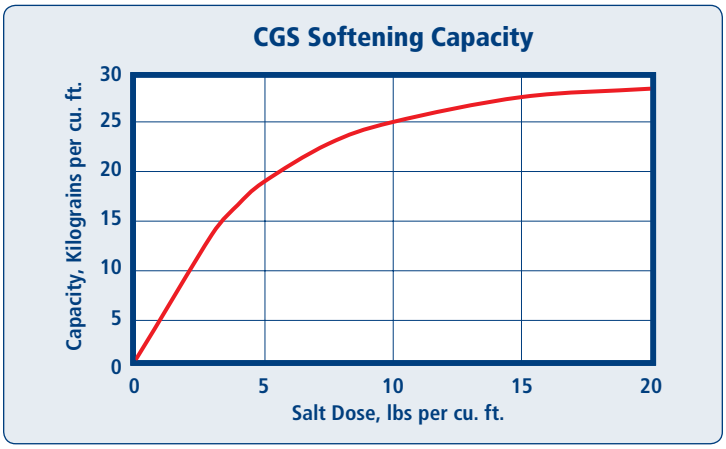
Maximum continuous temperature	
Sodium form	250˚F
Minimum bed depth	24 inches
Backwash expansion	25 to 50 percent
Maximum pressure loss	25 psi
Operating pH range	0 to 14 SU
Regenerant Concentration	
Salt cycle	10 to 15 percent NaCl
Regenerant level	4 to 15 lbs./cu.ft.
Regenerant flow rate.	0.5 to 1.5 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

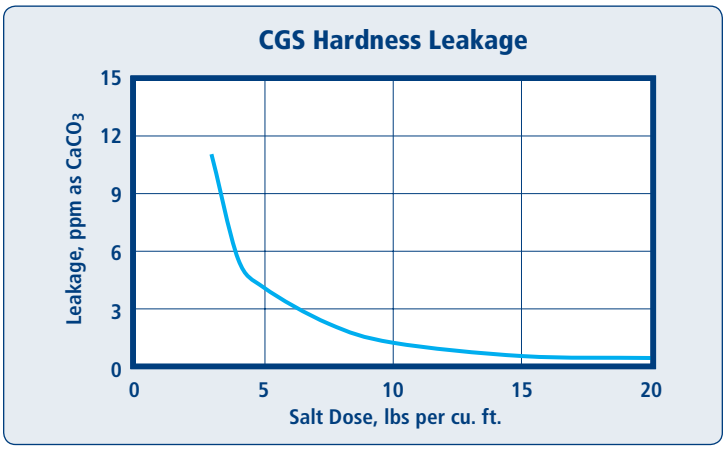
APPLICATIONS

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

SBG1

ANION EXCHANGE RESIN TYPE ONE GEL Cl OR OH FORM

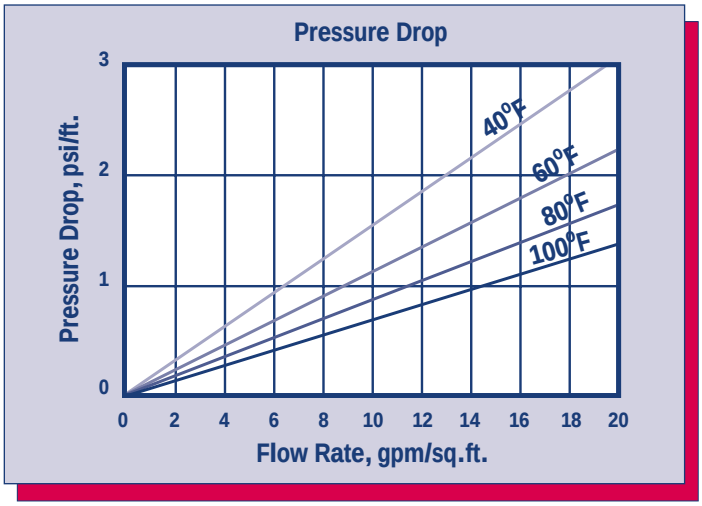
ResinTech SBG1 is a high capacity, shock resistant, gelular, Type 1, strongly basic anion exchange resin supplied in the chloride or hydroxide form as moist, tough, uniform, spherical beads. *ResinTech SBG1* is intended for use in all types of deionization systems and chemical processing applications.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

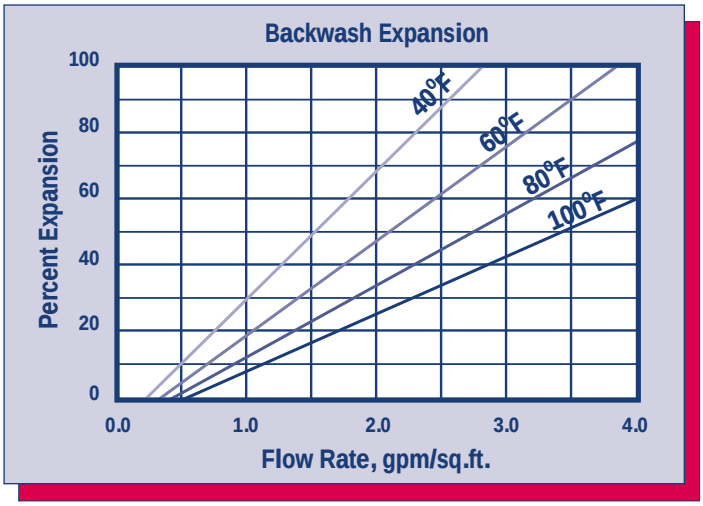
FEATURES & BENEFITS

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

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

HYDRAULIC PROPERTIES





PRESSURE DROP

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

BACKWASH

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

RESINTECH® SBG1

PHYSICAL PROPERTIES

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

SUGGESTED OPERATING CONDITIONS

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

OPERATING CAPACITY

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

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

APPLICATIONS

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

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

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

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

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

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

GROOVED & SMOOTH-END FLOWMETER MODEL MG/MS100

SPECIFICATIONS

PERFORMANCE

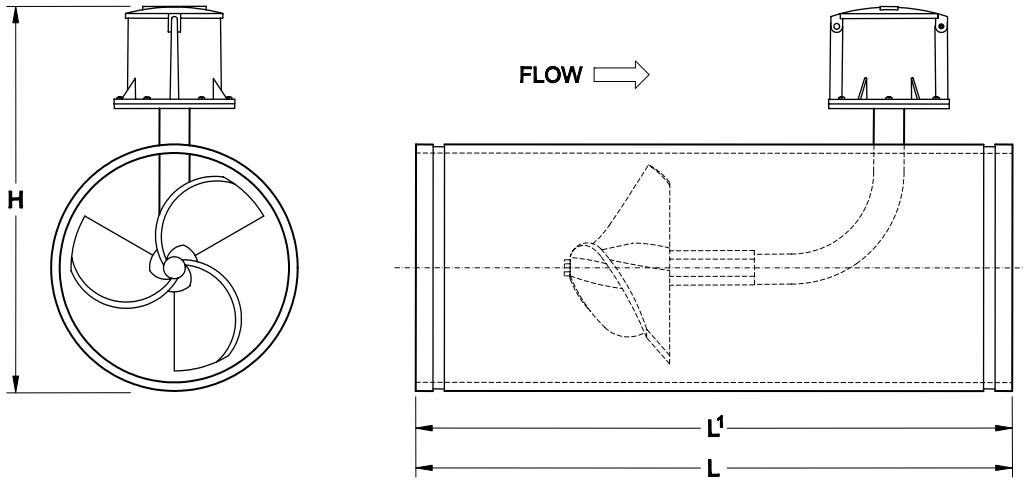
ACCURACY/REPEATABILITY: ±2% of reading guaranteed throughout full range. ±1% over reduced range. Repeatability 0.25% or better.
RANGE: (see dimensions chart below)
HEAD LOSS: (see dimensions chart below)
MAXIMUM TEMPERATURE: (Standard Construction) 160°F constant
PRESSURE RATING: 150 psi

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.

Appendix D

Supporting Information

MassDEP - Bureau of Waste Site Cleanup

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

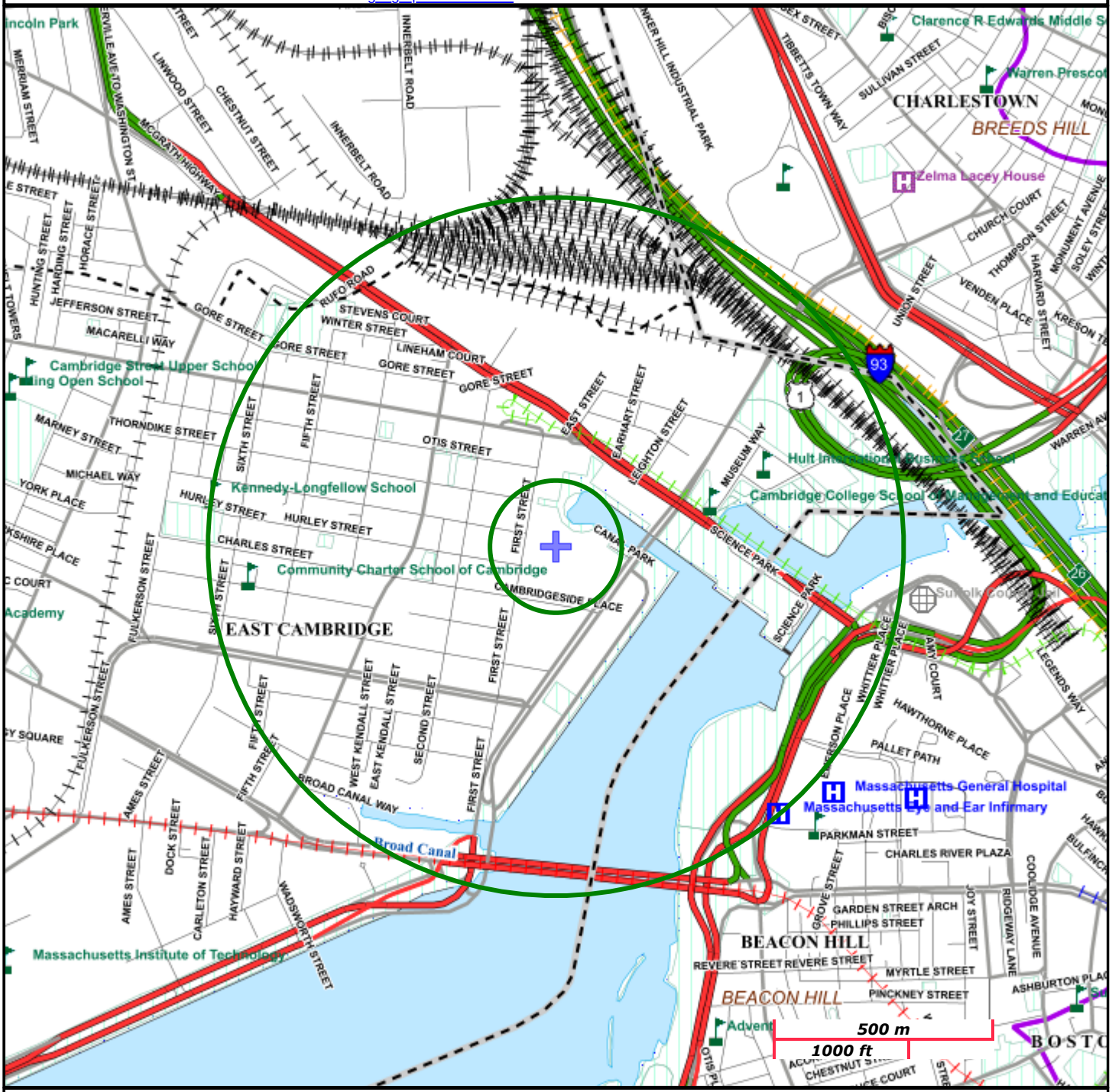
Site Information:

80 FIRST STREET CAMBRIDGE, MA

NAD83 UTM Meters:
4692758mN , 329015mE (Zone: 19)
December 30, 2021

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.

Documentation of the National Historic Preservation Act Eligibility Determination:

As part of this permit, a determination was made as to whether there were any historic properties or places listed on the national register in the path of the discharge or in the vicinity of the construction of treatment systems or BMPs related to the discharge. A search on the Massachusetts Cultural Resource Information System Database and the National Register of Historic Places did not list any potential historic properties near the project site in the databases. Therefore, the proposed discharge will not have the potential to cause effects on historical properties.

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

Search Criteria: Town(s): Cambridge; Street No: 80; Street Name: First St; Resource Type(s): Area, Building, Burial Ground, Object, Structure;

Inv. No.	Property Name	Street	Town	Year

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: December 30, 2021
Consultation Code: 05E1NE00-2022-SLI-0987
Event Code: 05E1NE00-2022-E-03498
Project Name: Cambridgeside Phase 2

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:

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: 05E1NE00-2022-SLI-0987
Event Code: Some(05E1NE00-2022-E-03498)
Project Name: Cambridgeside Phase 2
Project Type: DEVELOPMENT
Project Description: Continuation of improvements to the Cambridgeside Gallaria
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.368114250000005,-71.07617813220097,14z

Counties: Middlesex 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.

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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.

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.

Documentation of the Results of the ESA Eligibility Determination:

Using information in Appendix II of the NPDES RGP, the project located at 80 First Street Cambridge, MA is eligible for coverage under this general permit under FWS Criterion A. This project is located in Middlesex County. No designated critical habitats were listed in the project area. An Endangered Species Consultation was conducted on the U.S. Fish & Wildlife Service New England Field Office ECOS IPaC webpage for the Site:

One insect was found at this location.

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

The developed nature of the project area and limited habitat in relation to work being undertaken in the basement will not likely affect the habitat of the Monarch Butterfly.