May 13, 2020

US Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP RGP Applications Coordinator
5 Post Office Square – Suite 100 (OEP06-01)
Boston, Massachusetts 02109-3912

RE: Notice of Intent (NOI)
Temporary Construction Dewatering
200 Exchange Street
Malden, Massachusetts 02148
Release Tracking Number (RTN) 3-29649
VERTEX Project No. 56587

To whom it may concern:

The Vertex Companies, Inc. (VERTEX) has been retained by 200 Exchange, LLC (the "Owner") to obtain approval to discharge water from construction dewatering at a property located at 200 Exchange Street in Malden, Massachusetts (the "site"). On behalf of the Owner, and in accordance with the National Pollutant Discharge Elimination System (NPDES) Remediation General Permit for Dewatering Activities – Massachusetts General Permit, MAG910000, included herewith are the Notice of Intent (NOI) and applicable documentation as required by the US Environmental Protection Agency (USEPA) and Massachusetts Department of Environmental Protection (MassDEP) for the discharge of water generated from construction site dewatering under the Remediation General Permit. This submittal is organized according to the suggested format for the Remediation General Permit NOI.

The following attachments are provided in support of this submittal:

- Attachment A: Map of Proposed Drainage Path
- Attachment B: Notice of Intent
- Attachment C: Treatment System Design and Specifications
- Attachment D: Stream Statistics
- Attachment E: Areas of Critical Environmental Concern Documentation
- Attachment F: National Register of Historic Places and Massachusetts Historical Commission Documentation
- Attachment G: Endangered Species Act Documentation
- Attachment H: TMDL Information

- Attachment I: Laboratory Analytical Reports

Construction dewatering is planned in support of redevelopment of the property located at 200 Exchange Street in Malden, Massachusetts (the "site"), as shown on the attached United States Geological Survey – Topographic Map – Boston North (Figure 1). Redevelopment activities which will require dewatering include excavation for the installation of underground plumbing features.

SITE DESCRIPTION

The Site consists of approximately 2.4 acres of land and is situated on the southern side of Exchange Street, in Malden, Massachusetts. According to the City of Malden Assessors database, the Site is designated as Parcel ID No. 051 278 801. The Site is bordered by Exchange Street to the north, Commercial Street to the west, Centre Street to the south and the Jackson Street Parking Garage to the East.

One four-story building is currently present on-site. The building is currently vacant and undergoing renovation for proposed use as a multi-tenant commercial retail and office space.

Construction dewatering is proposed to support the installation of underground plumbing features, including two underground tanks and associated lines. The general layout of site, and the location of these proposed storage tanks is displayed on Figure 2.

The proposed point of discharge is a stormwater catch basin located along Centre Street adjoining the site. This catch basin follows underground lines that eventually lead to the Malden River. The proposed drainage path is depicted on the map included in Attachment A.

SITE HISTORY AND REGUALTORY COMPLIANCE

The site historically consisted of undeveloped marshland until approximately 1904. Historical uses of the site included a former auto body shop, gas station, parking garage, contractor storage, truck service and sales, and a former roofing company. The current building was constructed in 1985 and has been utilized for commercial office related operations prior to its vacancy and the initiation of ongoing renovation and redevelopment activities.

Based on a review of documentation available on the Massachusetts Department of Environmental Protection's (MassDEP's) Searchable Sites database, there are three separate releases identified in connection with the site which are summarized as follows.

Release Tracking Number (RTN) 3-17903

In January 1999, a release of diesel fuel was discovered during the replacement of two 10,000-gallon underground storage tanks (USTs) located beneath the paved driveway to the east of the building. Response actions conducted under an Immediate Response Action (IRA) included the

removal of the two USTs and excavation and off-site disposal of approximately 730 tons of petroleum-impacted soil. Based the post-excavation soil sampling, an IRA Completion Statement was submitted to MassDEP in July 1999. A Class A-2 Response Action Outcome was subsequently submitted to MassDEP in February 2000. Although some residual petroleum contamination may be present in soil, the proposed excavation and dewatering activities are not planned in this area. Therefore, there are no anticipated concerns relevant to RTN 3-17903 in the area proposed for excavation and subsequent construction dewatering.

RTN 3-18614

During an April 1999 subsurface investigation to assess the UST release associated with RTN 3-17903, vinyl chloride was detected at a concentration greater than its applicable Massachusetts Contingency Plan (MCP) Reportable Concentration in a groundwater sample collected from a monitoring well. This detection triggered a 120-day notification condition and a Release Notification Form (RNF) was submitted to MassDEP on August 4, 1999. The MassDEP subsequently assigned RTN 3-18614 to the release condition.

During subsequent assessment of the vinyl chloride release, several additional chlorinated volatile organic compounds (VOCs), including trichloroethylene (TCE), tetrachloroethylene (PCE), and 1,2-dichloroethylene (1,2-DCE), were detected in groundwater samples collected from monitoring wells located east of the building. Based on a human health risk characterization, it was determined that the chlorinated VOCs did not originate on site and that detected concentrations did not present a risk. Based on this information, a Class B-1 Response Action Outcome (RAO) was submitted to MassDEP, thereby closing out the release.

The area of impacted groundwater is located at a distance greater than 175-feet in an assumed cross to downgradient direction of the proposed underground storage tank installation area. Therefore, there are no anticipated concerns relevant to RTN 3-18614 in the area proposed for excavation and subsequent construction dewatering.

RTN 3-29649

This RTN is associated with the presence of petroleum, petroleum-related VOCs, and metals in soil and groundwater on the western and southwestern portion of the site. Exceedances of applicable MCP Reportable Concentrations were identified and reported to MassDEP in November 2010. In February and March 2011, subsurface investigations were conducted along the western side of the site including the advancement of soil borings and installation of groundwater monitoring wells. Soil samples collected from approximately 11 to 16 feet below grade exhibited a “creosote-type” petroleum odor. Soil analytical data showed exceedances of the applicable MCP Method 1 standards for lead, arsenic, various polycyclic aromatic hydrocarbon (PAH) compounds, and several extractable and volatile petroleum hydrocarbon (EPH/VPH) compounds. Groundwater analytical results showed exceedances of the MCP Method

1 risk-based standards for naphthalene and C11-C22 aromatic hydrocarbons (via EPH analysis). Groundwater was inferred to flow to the southeast in the area of investigation.

In October 2011, a Downgradient Property Status (DPS) Opinion was submitted to the MassDEP which indicated that: (i) the petroleum compounds and metals identified at the site are likely attributable to coal tar releases originating at the former Manufactured Gas Plant (MGP) facility located adjacent to the site (specifically at 51, 100 and 129 Commercial Street located south of the site); (ii) the on-site contaminants had likely migrated onto the site along subsurface utilities which acted as preferential pathways; and (iii) no source of heavier-end type petroleum (i.e., coal tar) were known to have historically been used or stored on the site.

April 2020 Soil Characterization Efforts

In April 2020, VERTEX implemented a soil characterization program at the site to support the proposed excavation and export of soils in the proposed location of the underground plumbing features. Composite samples of soil were collected and submitted for laboratory analysis of VOCs, semi-volatile organic compounds (SVOCs), Resource Conservation and Recovery Act (RCRA) 8 Metals, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), corrosivity, ignitability, conductivity, and reactivity. The results of these sampling efforts indicated the presence of TPH, select petroleum related VOCs and SVOCs, arsenic, barium, cadmium, chromium, lead, mercury, selenium, and PCBs at levels above their respective laboratory reporting limits. In addition, petroleum odors and sheen were observed in soils collected at depth in the area of proposed excavation.

In addition to the soil characterization efforts, two groundwater monitoring wells were installed in the area of proposed excavation to support the collection of a groundwater sample as outlined below.

SOURCE AND RECEIVING WATER SAMPLING AND ANALYSIS

The proposed point of discharge will be a stormwater catch basin located to the east-southeast of the proposed excavation as shown in Figure 2. This catch basin is connected to underground stormwater drain lines that eventually discharge to the Malden River via an outfall. The location of the proposed point of discharge and outfall are shown on the Map of Proposed Drainage Path included in Attachment A.

On April 29, 2020, a representative of VERTEX visited the site to collect representative samples of the source and receiving water to support this NOI application. A sample of groundwater was collected from the two groundwater monitoring wells that were installed as part of the April 2020 soil characterization efforts, which was identified as 200EX-RGP-SRC. In addition, a sample of water (200EX-RGP-REC) was obtained at the location of the proposed stormwater outfall located on the Malden River. The samples were collected within laboratory supplied glassware, stored

on ice, and were submitted under laboratory chain of custody to ESS Laboratories, Inc. Samples were submitted for analysis of the following parameters:

- Volatile organic compounds (VOCs) via USEPA Method 524.2;
- Semi-volatile organic compounds (SVOCs) via USEPA Method 625.1;
- Total metals (including antimony, arsenic, cadmium, chromium (total), copper, iron, lead, mercury, nickel, selenium, silver, and zinc) via USEPA Methods 200.7, 200.8, 3113B, 3500Cr, and 245.1 (as appropriate);
- PCBs via USEPA Method 608.3;
- Ethanol via American Standard Testing Materials (ASTM) Method D3695;
- Chloride via USEPA Method 300.0;
- Total Residual Chlorine via USEPA Method 4500CL-D;
- Cyanide via USEPA Method 4500CN-C;
- Ammonia (as Nitrogen) via USEPA Method 350.1;
- Total phenols via USEPA Method 524.2;
- Total suspended solids (TSS) via Method 2540D;
- Total hardness;
- Chromium (Hexavalent and Trivalent) via USEPA Methods 200.7 and 3500Cr respectively;
- Corrosivity – pH (recorded in the field); and
- Temperature (recorded in the field).

The results of the source and receiving water analyses are summarized in Table 1. The source water analytical results indicated concentrations of TSS, TPH, naphthalene, Group I and II PAHs, select metals (arsenic, copper, iron, lead, and zinc), and total benzene, toluene, ethylbenzene, and xylenes (BTEX) at levels exceeding either the Technology Based or Water Quality Based Effluent Limitations(TBEL/WQBEL). In addition, the source water was measured to have a pH of 5.93 specific units (S.U.) which is slightly below (more acidic) than the acceptable range of 6.5-8.5 S.U. The receiving water analytical results indicated that TPH were present at a concentration of 5 milligrams per liter which is equal to the TBEL/WQBEL concentration.

PROPOSED CONTRUCTION AND MANAGEMENT OF DEWATERING EFFLUENT

Excavation will be performed in the location shown on Figure 2. At this time, it is assumed that dewatering of the excavation will be conducted over the course of approximately 21 days to facilitate the installation efforts.

The site contractor will treat the groundwater prior to discharging the dewatering effluent to the existing storm drain system. Site work and associated dewatering are anticipated to begin sometime between June 2020 and September 2020 depending on contractor schedules. Once dewatering is initialed it is estimated to be completed within 21 days.

The site contractor will provide and maintain the dewatering and treatment system. The system will be designed to meet the permit requirements for suspended solids, pH, and other

constituents (as required) in the effluent stream prior to discharge into the on-site storm drain. The treatment system will consist of:

- a 18,000-gallon sedimentation tank/Frac tank;
- a pH adjustment system (if required, see below);
- an oil-water separator system;
- bag filters;
- flow meter and totalizer to monitor the discharge volume; and
- various test ports for the collection of samples.

A pH adjustment system that is capable of raising pH will be implemented if required to meet the permit requirements. The pH system is designed to raise the pH with sodium hydroxide and includes an automatic metered acid feed system with a mix tank, acid feed pumps and setpoint controls that maintain the pH approved by the permit, usually set between 6.5 and 8.3. The pH is monitored continuously, and the sodium hydroxide will only be added if the setpoints are exceeded. The sodium hydroxide will be stored in 55-gallon drums with secondary containment systems in place (overpack drum). Please note that the estimated average use of sodium hydroxide/day will be 0.5 gallons or less. The maximum application concentration for sodium hydroxide would be 333 milligrams per liter (mg/L). The calculations are as follows to obtain the max concentration of sodium hydroxide:

- Assuming a max pumping rate of 50 gallons per minute (gpm) and using 24 gallons of sodium hydroxide per day (based on a 1 gallon per hour metering rate)
    - 50 gpm = 72,000 gallons per day (gpd)
    - Sodium hydroxide use (one day) = 24 gpd
    - 24 gal / 72,000 gal =3.3 x 10-4 gal
    - 3.3 x 10-4 gal * 100% = 0.03%
    - 1% = 10,000 parts per million (ppm), therefore;
    - 0.03% * 10,000 ppm = 333 ppm

The EC50 for fish is 340.7-469.2 mg/l (also ppm) listed on the safety date sheet included in Attachment C. Assuming a worst-case scenario (i.e. a constant flow rate of 50 gpm), the addition of sodium hydroxide is less than the EC50.

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

1. The addition of a pH conditioner will not add any pollutants in concentrations which exceed permit effluent limitations;
2. The addition of a pH conditioner will not result in the exceedance of any applicable water quality standard; and
3. The addition of a pH conditioner will not add any pollutants that would justify the application of permit conditions that are different from or absent in the permit."

The addition of sodium hydroxide to control and adjust pH is a standard treatment technique 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.

As a contingency, a carbon vessel treatment system and a cation resin system will be available and the relevant information for these system components are included in the specifications in Attachment C. However, these will only be implemented, if necessary, based upon the results of effluent testing during system startup.

Once operations begin, a licensed wastewater treatment plant operator will conduct system monitoring, as required. On behalf of the Owner, VERTEX will perform the required sampling and testing of the dewatering influent and effluent and will report the results as required by the permit. Results will be provided to the site contractor, and sedimentation and treatment system and/or dewatering procedures will be modified as necessary to comply with the Permit Discharge Criteria.

SUPPORTING DOCUMENTATION & PUBLIC CORRESPONDENCE

A copy of the NOI to conduct construction site dewatering is provided in Attachment B. The NOI indicates that the proposed discharge point is The Malden River (Segment MA71-05, Class B) which is classified as a Category 5 water subject to a Total Maximum Daily Load (TMDL) included in Attachment H. Impairment causes include debris, trash, chlordane in fish tissue, Dichlorodiphenyltrichloroethane (DDT) in fish tissue, dissolved oxygen, Escherichia coli (E. Coli.), fecal coliform, flocculant masses, odor, oil and grease, PCBs in fish tissue, pH (high), total phosphorus, scum/foam, sediment bioassay, TSS, and transparency/clarity.

Based on the proposed discharge rate of 50 gallons per minute, and correspondence with the MassDEP, a dilution factor of 4.9 has been calculated and approved by the MassDEP for this proposed discharge.

The site is not known to be or located within the limits of a known Massachusetts Area of Critical Environmental Concern (ACEC), a historic place, or within a critical habitat for endangered species. Please refer to the supporting correspondence and research documentation, attached to the NOI, which was used to determine the status of the site.

CONTACT INFORMATION

Owner:
200 Exchange, LLC
125 High Street, Suite 531
Boston, Massachusetts 02110

Representative preparing this application:
The Vertex Companies, Inc.
100 N. Washington St, Suite 302
Boston, Massachusetts 02114

Attention: Mr. John Karoff
Tel: 617.439.0088

Attention: Frank Calandra, PE, LSP
Tel: 617.275.5407

Operator:
Dellbrook JKS
One Adams Place
859 Willard Street
Quincy, Massachusetts 02169
Attention: Jesse Ercoli – Site Superintendent
Tel: 845.519.7211

ANALYTICAL TESTING

Analytical testing of water will be performed prior to discharge and will be monitored at the frequency specified by the permit. If the results of analytical testing determine that the system is not meeting the specific effluent limits, discharge will be ceased and further evaluation will be made to determine if modifications to the system will be required. A Notice of Change (NOC) will be prepared and submitted if any new design components will be required to be implemented.

BEST MANAGEMENT PRACTICES PLAN

Prior to the initiation of dewatering activities or discharge of dewatering effluent, a Best Management Practices Plan (BMPP) will be prepared and implemented. At this time, it is anticipated that the BMPP will be incorporated within the site's existing Spill Prevention Control & Counter Measures (SPCC) Plan.

CLOSING

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

Sincerely,

The Vertex Companies, Inc.

Benjamin Sivonen, EIT
Project Manager

Frank Calandra, PE, LSP
Regional Vice President

Attachments:

Figures

Figure 1: Site Locus
Figure 2: Site Schematic

Tables

Table 1: RGP Analytical Results

Appendices

Attachment A: Map of Proposed Drainage Path
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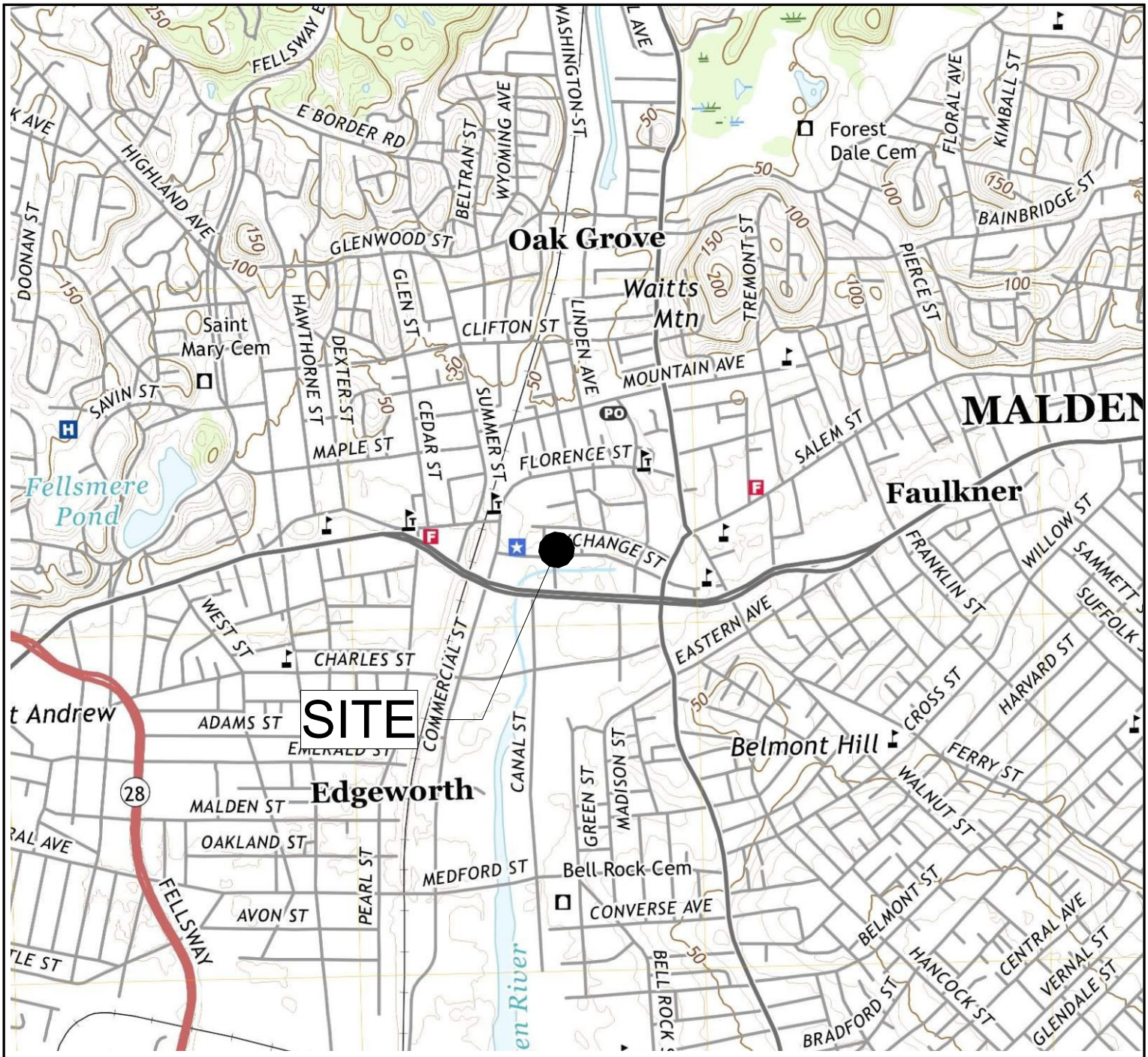
FIGURES



SOURCE: UNITED STATES GEOLOGICAL SURVEY MAP
Boston North QUADRANGLE 7.5 MINUTE SERIES (2018)

SITE LOCUS
REDEVELOPMENT SITE

200 Exchange Street
Malden, Massachusetts

File No.:	
Date:	06/13/2019
Drawn:	RNM
Checked:	FC
Job No.:	56587

FIGURE 1

VERTEX®
100 NORTH WASHINGTON STREET, SUITE 302
BOSTON, MA 02114
781.952.6000
VERTEXENG.COM

200 Pleasant Street

EXCHANGE STREET

APPROXIMATE SITE BOUNDARY

180 EXCHANGE STREET

COMMERCIAL STREET

200 EXCHANGE STREET
BUILDING

APPROXIMATE LIMITS OF
PROPOSED EXCAVATION

APPROXIMATE LOCATION
OF CATCHBASIN &
PROPOSED DISCHARGE

CENTRE STREET

N

Not To Scale

SITE SCHEMATIC

REDEVELOPMENT SITE

200 Exchange Street
Malden, Massachusetts

File No.:	N/A
Date:	5/6/2020
Drawn:	BNS
Checked:	FC
Job No.:	56587

FIGURE 2

REVISIONS

BASED OFF "SITE PLAN" BY RICHARD BURCK ASSOCIATES, INC FOR BERKELEY INVESTMENTS, INC DATED 10/24/2018

VERTEXENG.COM

VERTEX

100 NORTH WASHINGTON STREET, SUITE 302
BOSTON, MA 02114
617.275.5407

TABLES

Table 1
RGP Analytical Results
200 Exchange Street
Malden, MA
Vertex Project No. 56587

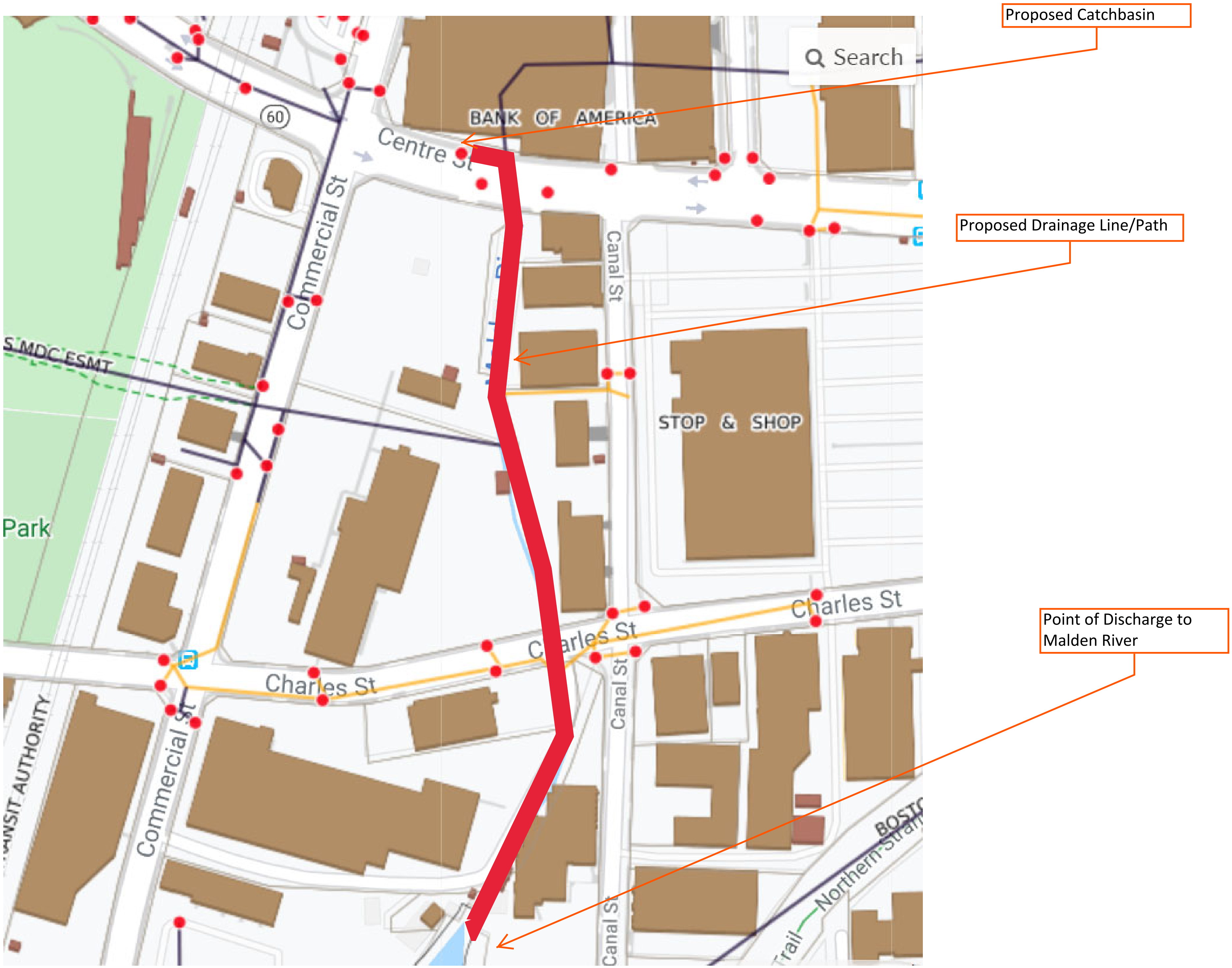
LOCATION	CasNum	NPDES Effluent Limitation		Units	200EX-RGP-SRC	200EX-RGP-REC
SAMPLING DATE					4/29/2020	4/29/2020
LAB SAMPLE ID		TBEL	WQBEL		20D0796-02	20D0796-0
Alcohol Analysis						
Ethyl Alcohol	64-17-5	Report		mg/l	ND(10)	ND(10)
Anions						
Chloride	16887-00-6	Report		mg/l	166	170
General Chemistry						
Chlorine, Total Residual	NONE	0.2	0.215	mg/l	ND(0.02)	ND(0.02)
Cyanide, Total	57-12-5	178	0.1015	mg/l	ND(0.005)	ND(0.005)
Nitrogen, Ammonia	7664-41-7	Report		mg/l	17.4	0.14
pH (H)*	12408-02-5	6.5-8.5		SU	5.93	7.75
Phenolics, Total	NONE	1.08	5.854	mg/l	0.075	ND(0.05)
Solids, Total Suspended	NONE	30		mg/l	45	ND(5)
Temperature*	NONE	NC	NC	Celsius	13.8	10.4
TPH	NONE	5		mg/l	6	5
Total Hardness	NONE	NC	NC	mg/l	640	58.3
Chromium, Hexavalent	18540-29-9	0.323	0.2231	mg/l	ND(0.01)	ND(0.01)
Semivolatile Organic Compounds (SVOCs)						
1,2-Dichlorobenzene	95-50-1	NC	NC	mg/l	ND(500)	ND(500)
1,3-Dichlorobenzene	541-73-1	NC	NC	mg/l	ND(500)	ND(500)
1,4-Dichlorobenzene	106-46-7	NC	NC	mg/l	ND(500)	ND(500)
Bis(2-ethylhexyl)phthalate	117-81-7	0.101	0.0429	mg/l	ND(0.0117)	ND(0.0025)
Butyl benzyl phthalate	85-68-7	NC	NC	mg/l	ND(0.0117)	ND(0.0025)
Di-n-butylphthalate	84-74-2	NC	NC	mg/l	ND(0.0117)	ND(0.0025)
Di-n-octylphthalate	117-84-0	NC	NC	mg/l	ND(0.0117)	ND(0.0025)
Diethyl phthalate	84-66-2	NC	NC	mg/l	ND(0.0117)	ND(0.0025)
Dimethyl phthalate	131-11-3	NC	NC	mg/l	ND(0.0117)	ND(0.0025)
Total Phthalates	Multiple	0.19	NC	mg/L	ND(0.0117)	ND(0.0025)
SVOCs by SIM						
Acenaphthene	83-32-9	NC	NC	mg/l	0.0484	ND(0.0002)
Acenaphthylene	208-96-8	NC	NC	mg/l	0.00394	ND(0.0002)
Anthracene	120-12-7	NC	NC	mg/l	0.0207	ND(0.0002)
Benzo(a)anthracene	56-55-3	As Total Group I	0.0000742	mg/l	0.00927	ND(0.00005)
Benzo(a)pyrene	50-32-8	As Total Group I	0.0000742	mg/l	0.00802	ND(0.00005)
Benzo(b)fluoranthene	205-99-2	As Total Group I	0.0000742	mg/l	0.00839	ND(0.00005)
Benzo(ghi)perylene	191-24-2	NC	NC	mg/l	0.00417	ND(0.0002)
Benzo(k)fluoranthene	207-08-9	As Total Group I	0.0000742	mg/l	0.00283	ND(0.00005)
Chrysene	218-01-9	As Total Group I	0.0000742	mg/l	0.00825	ND(0.00005)
Dibenzo(a,h)anthracene	53-70-3	As Total Group I	0.0000742	mg/l	0.00105	ND(0.00005)
Fluoranthene	206-44-0	NC	NC	mg/l	0.0312	ND(0.0002)
Fluorene	86-73-7	NC	NC	mg/l	0.04	ND(0.0002)
Indeno(1,2,3-cd)pyrene	193-39-5	As Total Group I	0.0000742	mg/l	0.00467	ND(0.00005)
Naphthalene	91-20-3	0.02		mg/l	0.804	0.00056
Pentachlorophenol	87-86-5	0.001		mg/l	ND(0.00421)	ND(0.0009)
Phenanthrene	85-01-8	NC	NC	mg/l	0.0908	ND(0.0002)
Pyrene	129-00-0	NC	NC	mg/l	0.0293	ND(0.0002)
Total Group I PAHs	Multiple	0.001	As Individual	mg/l	0.04248	ND(0.00005)
Total Group II PAHs	Multiple	0.1		mg/l	1.07251	0.00056
Total Metals						
Antimony, Total	7440-36-0	0.206	12.489	mg/l	ND(0.025)	ND(0.005)
Arsenic, Total	7440-38-2	0.104	0.195	mg/l	0.138	ND(0.001)
Cadmium, Total	7440-43-9	0.0102	0.002312	mg/l	0.0013	ND(0.0002)
Chromium, Total	7440-47-3	0.323	0.074	mg/l	0.0348	ND(0.002)
Chromium, Trivalent	NONE	0.323	0.6749	mg/l	0.0348	ND(0.002)
Copper, Total	7440-50-8	0.242	0.0702	mg/l	0.0793	0.0021
Iron, Total	7439-89-6	5	19.514	mg/l	22.7	0.434
Lead, Total	7439-92-1	0.16	0.01502	mg/l	0.41	ND(0.002)
Mercury, Total	7439-97-6	0.000739	0.01768	mg/l	0.0006	ND(0.0002)
Nickel, Total	7440-02-0	1.45	0.3964	mg/l	ND(0.025)	ND(0.005)
Selenium, Total	7782-49-2	0.2358	0.0976	mg/l	ND(0.02)	ND(0.002)
Silver, Total	7440-22-4	0.0351	0.0109	mg/l	ND(0.0025)	ND(0.0005)
Zinc, Total	7440-66-6	0.42	0.9091	mg/l	0.777	0.0164
Volatile Organic Compounds (VOCs)						
1,1,1-Trichloroethane	71-55-6	0.2		mg/l	ND(0.0005)	ND(0.0005)
1,1,2-Trichloroethane	79-00-5	0.005		mg/l	ND(0.0005)	ND(0.0005)
1,1-Dichloroethane	75-34-3	0.07		mg/l	ND(0.0005)	ND(0.0005)
1,1-Dichloroethene	75-35-4	0.0032		mg/l	ND(0.0005)	ND(0.0005)
1,2-Dibromo-3-chloropropane	96-12-8	NC	NC	mg/l	ND(0.000015)	ND(0.000015)
1,2-Dibromoethane	106-93-4	0.00005		mg/l	ND(0.000015)	ND(0.000015)
1,2-Dichloroethane	107-06-2	0.005		mg/l	ND(0.0005)	ND(0.0005)
1,4-Dioxane	123-91-1	0.2		mg/l	ND(0.00025)	ND(0.00025)
Acetone	67-64-1	7.97		mg/l	0.0218	ND(0.005)
Benzene	71-43-2	0.005		mg/l	0.0362	ND(0.0005)
Carbon tetrachloride	56-23-5	0.0044	0.0312	mg/l	ND(0.0003)	ND(0.0003)
cis-1,2-Dichloroethene	156-59-2	0.07		mg/l	ND(0.0005)	ND(0.0005)
Ethylbenzene	100-41-4	NC	NC	mg/l	0.0298	ND(0.0005)
Methyl tert butyl ether	1634-04-4	0.07	0.39	mg/l	0.001	ND(0.0005)
Methylene chloride	75-09-2	0.0046	NC	mg/l	ND(0.0005)	ND(0.0005)
Naphthalene	91-20-3	0.02		mg/l	1.77	ND(0.0005)
o-Xylene	95-47-6	NC	NC	mg/l	0.0224	ND(0.0005)
p/m-Xylene	179601-23-1	NC	NC	mg/l	0.0488	ND(0.0005)
Tert-Butyl Alcohol	75-65-0	0.12		mg/l	ND(0.025)	ND(0.025)
Tertiary-Amyl Methyl Ether	994-05-8	0.09		mg/l	ND(0.001)	ND(0.001)
Tetrachloroethene	127-18-4	0.005	0.0644	mg/l	ND(0.0005)	ND(0.0005)
Toluene	108-88-3	NC	NC	mg/l	0.0103	ND(0.0005)
Trichloroethene	79-01-6	0.005		mg/l	ND(0.0005)	ND(0.0005)
Vinyl chloride	75-01-4	0.002		mg/l	ND(0.0002)	ND(0.0002)
Xylenes, Total	1330-20-7	NC	NC	mg/l	0.0712	ND(0.0005)
Total BTEX	Multiple	0.1		mg/l	0.1475	ND(0.0005)
Polychlorinated Biphenyls (PCBs)						
Aroclor 1016	12674-11-2	NC	NC	mg/l	ND(0.00009)	ND(0.00009)
Aroclor 1221	11104-28-2	NC	NC	mg/l	ND(0.00009)	ND(0.00009)
Aroclor 1232	11141-16-5	NC	NC	mg/l	ND(0.00009)	ND(0.00009)
Aroclor 1242	53469-21-9	NC	NC	mg/l	ND(0.00009)	ND(0.00009)
Aroclor 1248	12672-29-6	NC	NC	mg/l	ND(0.00009)	ND(0.00009)
Aroclor 1254	11097-69-1	NC	NC	mg/l	ND(0.00009)	ND(0.00009)
Aroclor 1260	11096-82-5	NC	NC	mg/l	ND(0.00009)	ND(0.00009)
Total PCBs	Multiple	0.000000064		mg/l	ND(0.0009)	ND(0.00009)

Notes:
- Units presented in milligrams per liter (mg/l) unless otherwise noted
- National Pollutant Discharge Elimination System (NPDES) Effluent Limitations
- Technology-Based Effluent Limitation (TBEL)
- Water-Quality Based Effluent Limitation (WQBEL)
- SU= Specific Units
- ND = Not Detected (laboratory reporting limits in parentheses)
- NC = No criterion for analyte
- NA = Not Analyzed
- CS = Compound Specific
- Bold and yellow highlighting indicates an exceedance of either the TBEL or WQBEL Standard

* = Parameter was measured in the field

ATTACHMENT A:

MAP OF PROPOSED DRAINAGE PATH


Proposed Catchbasin
Proposed Drainage Line/Path
Point of Discharge to Malden River
Search
BANK OF AMERICA
Centre St
Commercial St
Canal St
STOP & SHOP
Charles St
Park
S MDC ESMT
Northern Strand
Trail

ATTACHMENT B:

NOTICE OF INTENT

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

A. General site information:

<table>
<tr><td rowspan="2">1. Name of site:
200 Exchange</td><td colspan="3">Site address: 200 Exchange Street
Street:</td></tr>
<tr><td>City: Malden</td><td>State: MA</td><td>Zip: 02148</td></tr>
<tr><td rowspan="4">2. Site owner
200 Exchange LLC

Owner is (check one): ☐ Federal ☐ State/Tribal ■ Private
☐ Other; if so, specify:</td><td colspan="3">Contact Person: John Karoff</td></tr>
<tr><td colspan="2">Telephone: 617-439-0088</td><td>Email: jkaroff@berkinv.com</td></tr>
<tr><td colspan="3">Mailing address: 125 High Street, Suite 531
Street:</td></tr>
<tr><td>City: Boston</td><td>State: MA</td><td>Zip: 02110</td></tr>
<tr><td rowspan="4">3. Site operator, if different than owner
Dellbrook JKS</td><td colspan="3">Contact Person: Jesse Ercoli - Site Superintendent</td></tr>
<tr><td colspan="2">Telephone: 845-519-7211</td><td>Email: jercoli@dellbrookjks.com</td></tr>
<tr><td colspan="3">Mailing address:
Street: One Adams Place, 859 Willard Street</td></tr>
<tr><td>City: Quincy</td><td>State: MA</td><td>Zip: 02169</td></tr>
<tr><td>4. NPDES permit number assigned by EPA:
NA

NPDES permit is (check all that apply: ■ RGP ☐ DGP ☐ CGP
☐ MSGP ☐ Individual NPDES permit ☐ Other; if so, specify:</td><td colspan="3">5. Other regulatory program(s) that apply to the site (check all that apply):
■ MA Chapter 21e; list RTN(s):
3-17903, 3-18614, 3-29649
☐ 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):
Malden River	MA71-05	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. TMDL available, Refer to Summary Letter and Attachment F

4. Indicate the seven day-ten-year low flow (7Q10) of the receiving water determined in accordance with the instructions in Appendix V for sites located in Massachusetts and Appendix VI for sites located in New Hampshire.	0.281 MGD
5. Indicate the requested dilution factor for the calculation of water quality-based effluent limitations (WQBELs) determined in accordance with the instructions in Appendix V for sites in Massachusetts and Appendix VI for sites in New Hampshire.	4.9

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: 5/8/2020

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: Metals, petroleum	
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): City of Malden outlet MR-0 to Malden River (MA71-03)	Outfall location(s): (Latitude, Longitude) 42.422259, -71.073094
Discharges enter the receiving water(s) via (check any that apply): ☐ Direct discharge to the receiving water ■ Indirect discharge, if so, specify: Effluent will enter an existing storm water drainage system that discharges directly into the Malden River at the approximate Lat/Long specified ☐ 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: Prior to discharge, the operator will obtain the necessary City of Malden approval(s)/permit(s) 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): Start 7/2020 End 10/2020 Indicate if the discharge is expected to occur over a duration of: ■ less than 12 months ☐ 12 months or more ☐ is an emergency discharge	
Has the operator attached a site plan in accordance with the instructions in D, above? (check one): ■ Yes ☐ No	

<table>
<tr><td>2. Activity Category: (check all that apply)</td><td colspan="2">3. Contamination Type Category: (check all that apply)</td></tr>
<tr><td rowspan="5">☐ I – Petroleum-Related Site Remediation
☐ II – Non-Petroleum-Related Site Remediation
■ III – Contaminated Site Dewatering
☐ IV – Dewatering of Pipelines and Tanks
☐ V – Aquifer Pump Testing
☐ VI – Well Development/Rehabilitation
☐ VII – Collection Structure Dewatering/Remediation
☐ VIII – Dredge-Related Dewatering</td><td colspan="2">a. If Activity Category I or II: (check all that apply)

☐ A. Inorganics
☐ B. Non-Halogenated Volatile Organic Compounds
☐ C. Halogenated Volatile Organic Compounds
☐ D. Non-Halogenated Semi-Volatile Organic Compounds
☐ E. Halogenated Semi-Volatile Organic Compounds
☐ F. Fuels Parameters</td></tr>
<tr><td colspan="2">b. If Activity Category III, IV, V, VI, VII or VIII: (check either G or H)</td></tr>
<tr><td>■ G. Sites with Known Contamination</td><td>☐ H. Sites with Unknown Contamination</td></tr>
<tr><td>c. If Category III-G, IV-G, V-G, VI-G, VII-G or VIII-G: (check all that apply)

■ A. Inorganics
■ B. Non-Halogenated Volatile Organic Compounds
☐ C. Halogenated Volatile Organic Compounds
■ D. Non-Halogenated Semi-Volatile Organic Compounds
☐ E. Halogenated Semi-Volatile Organic Compounds
■ F. Fuels Parameters</td><td>d. If Category III-H, IV-H, V-H, VI-H, VII-H or VIII-H Contamination Type Categories A through F apply</td></tr>
</table>

4. Influent and Effluent Characteristics

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
A. Inorganics									
Ammonia		✓	1	350.1	1000	17400	17400	Report mg/L	---
Chloride		✓	1	300.0	20000	166000	166000	Report µg/l	---
Total Residual Chlorine	✓		1	4500CL-D	0.02	ND	ND	0.2 mg/L	215
Total Suspended Solids		✓	1	2540D	5000	45000	45000	30 mg/L	---
Antimony	✓		1	200.7	25	ND	ND	206 µg/L	12489
Arsenic		✓	1	3113B	1	138	138	104 µg/L	195
Cadmium		✓	1	200.8	0.2	1.3	1.3	10.2 µg/L	2.312
Chromium III		✓	1	200.7	2	34.8	34.8	323 µg/L	674.9
Chromium VI	✓		1	3500Cr	10	ND	ND	323 µg/L	223.1
Copper		✓	1	200.7	2	79.3	79.3	242 µg/L	70.2
Iron		✓	1	200.7	20	22700	22700	5,000 µg/L	19514
Lead		✓	1	200.7	2	410	410	160 µg/L	15.02
Mercury		✓	1	245.1	0.2	0.6	0.6	0.739 µg/L	17.68
Nickel	✓		1	200.7	25	ND	ND	1,450 µg/L	396.4
Selenium	✓		1	3113B	20	ND	ND	235.8 µg/L	97.6
Silver	✓		1	200.7	2.5	ND	ND	35.1 µg/L	10.9
Zinc		✓	1	200.7	0.025	0.777	0.777	420 µg/L	909.1
Cyanide	✓		1	4500CN-C	5	ND	ND	178 mg/L	101.5
B. Non-Halogenated VOCs									
Total BTEX		✓	1	524.2	0.5	147.5	147.5	100 µg/L	---
Benzene		✓	1	524.2	0.5	36.2	36.2	5.0 µg/L	---
1,4 Dioxane	✓		1	524.2	0.25	ND	ND	200 µg/L	---
Acetone		✓	1	524.2	0.5	21.8	21.8	7.97 mg/L	---
Phenol		✓	1	524.2	50	75	75	1,080 µg/L	5854

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	524.2	0.3	ND	ND	4.4 µg/L	31.2
1,2 Dichlorobenzene	✓		1	524.2	0.5	ND	ND	600 µg/L	---
1,3 Dichlorobenzene	✓		1	524.2	0.5	ND	ND	320 µg/L	---
1,4 Dichlorobenzene	✓		1	524.2	0.5	ND	ND	5.0 µg/L	---
Total dichlorobenzene	✓		1	524.2	2	ND	ND	763 µg/L in NH	---
1,1 Dichloroethane	✓		1	524.2	0.5	ND	ND	70 µg/L	---
1,2 Dichloroethane	✓		1	524.2	0.5	ND	ND	5.0 µg/L	---
1,1 Dichloroethylene	✓		1	524.2	0.5	ND	ND	3.2 µg/L	---
Ethylene Dibromide	✓		1	524.2	0.015	ND	ND	0.05 µg/L	---
Methylene Chloride	✓		1	524.2	0.5	ND	ND	4.6 µg/L	---
1,1,1 Trichloroethane	✓		1	524.2	0.5	ND	ND	200 µg/L	---
1,1,2 Trichloroethane	✓		1	524.2	0.5	ND	ND	5.0 µg/L	---
Trichloroethylene	✓		1	524.2	0.5	ND	ND	5.0 µg/L	---
Tetrachloroethylene	✓		1	524.2	0.5	ND	ND	5.0 µg/L	64.4
cis-1,2 Dichloroethylene	✓		1	524.2	0.5	ND	ND	70 µg/L	---
Vinyl Chloride	✓		1	524.2	0.2	ND	ND	2.0 µg/L	---
D. Non-Halogenated SVOCs									
Total Phthalates	✓		1	625.1	11.7	ND	ND	190 µg/L	---
Diethylhexyl phthalate	✓		1	625.1	11.7	ND	ND	101 µg/L	42.9
Total Group I PAHs		✓	1	625.1	0.05	42.48	42.48	1.0 µg/L	---
Benzo(a)anthracene		✓	1	625.1	0.05	9.27	9.27	As Total PAHs	0.0742
Benzo(a)pyrene		✓	1	625.1	0.05	8.02	8.02		0.0742
Benzo(b)fluoranthene		✓	1	625.1	0.05	8.39	8.39		0.0742
Benzo(k)fluoranthene		✓	1	625.1	0.05	2.83	2.83		0.0742
Chrysene		✓	1	625.1	0.05	8.25	8.25		0.0742
Dibenzo(a,h)anthracene		✓	1	625.1	0.05	1.05	1.05		0.0742
Indeno(1,2,3-cd)pyrene		✓	1	625.1	0.05	4.67	4.67		0.0742

Parameter	Known or believed absent	Known or believed present	# of samples	Test method (#)	Detection limit (µg/l)	Influent		Effluent Limitations	
						Daily maximum (µg/l)	Daily average (µg/l)	TBEL	WQBEL
Total Group II PAHs		✓	1	625.1	0.2	1072.51	1072.51	100 µg/L	---
Naphthalene		✓	1	625.1	0.5	1770	1770	20 µg/L	---
E. Halogenated SVOCs									
Total PCBs	✓		1	608.3	0.09	ND	ND	0.000064 µg/L	---
Pentachlorophenol	✓		1	625.1	4.21	ND	ND	1.0 µg/L	---
F. Fuels Parameters									
Total Petroleum Hydrocarbons		✓	1	1664A	5000	6000	6000	5.0 mg/L	---
Ethanol	✓		1	D3695	10000	ND	ND	Report mg/L	---
Methyl-tert-Butyl Ether		✓	1	524.2	0.5	1	1	70 µg/L	390
tert-Butyl Alcohol	✓		1	524.2	25	ND	ND	120 µg/L in MA 40 µg/L in NH	---
tert-Amyl Methyl Ether	✓		1	524.2	1	ND	ND	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 (SU)		✓	1	Field	-	5.93	5.93		
Temperature		✓	1	Field	-	6	6		
Hardness		✓	1	CALC	-	640000	640000		

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:

The baseline treatment system will consist of solids removal via gravity separation, pH adjustment, oil-water separation, and bag filtration.

2. Provide a written description of all treatment system(s) or processes that will be applied to the effluent prior to discharge.

The first element of the treatment system will be a weir tank where solids will settle out followed by pH adjustment. The effluent will then pass through an oil-water separator followed by bag filters. As a contingency, a granular activated carbon vessel and a cation resin vessel are being proposed as a contingency, but will only be implemented following the results of effluent testing. The effluent will be discharged to an existing catch basin on-site which discharges to the existing storm drain system.

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: pH adjustment, cation resin vessel, and/or carbon vessels, (if needed)

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: Weir tank Is use of a flow meter feasible? (check one): ■ Yes ☐ No, if so, provide justification:	50
Provide the proposed maximum effluent flow in gpm.	50
Provide the average effluent flow in gpm.	25
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:
Refer to Attachment C
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

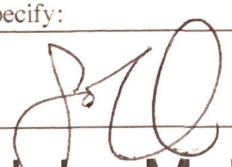
I. Supplemental information

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

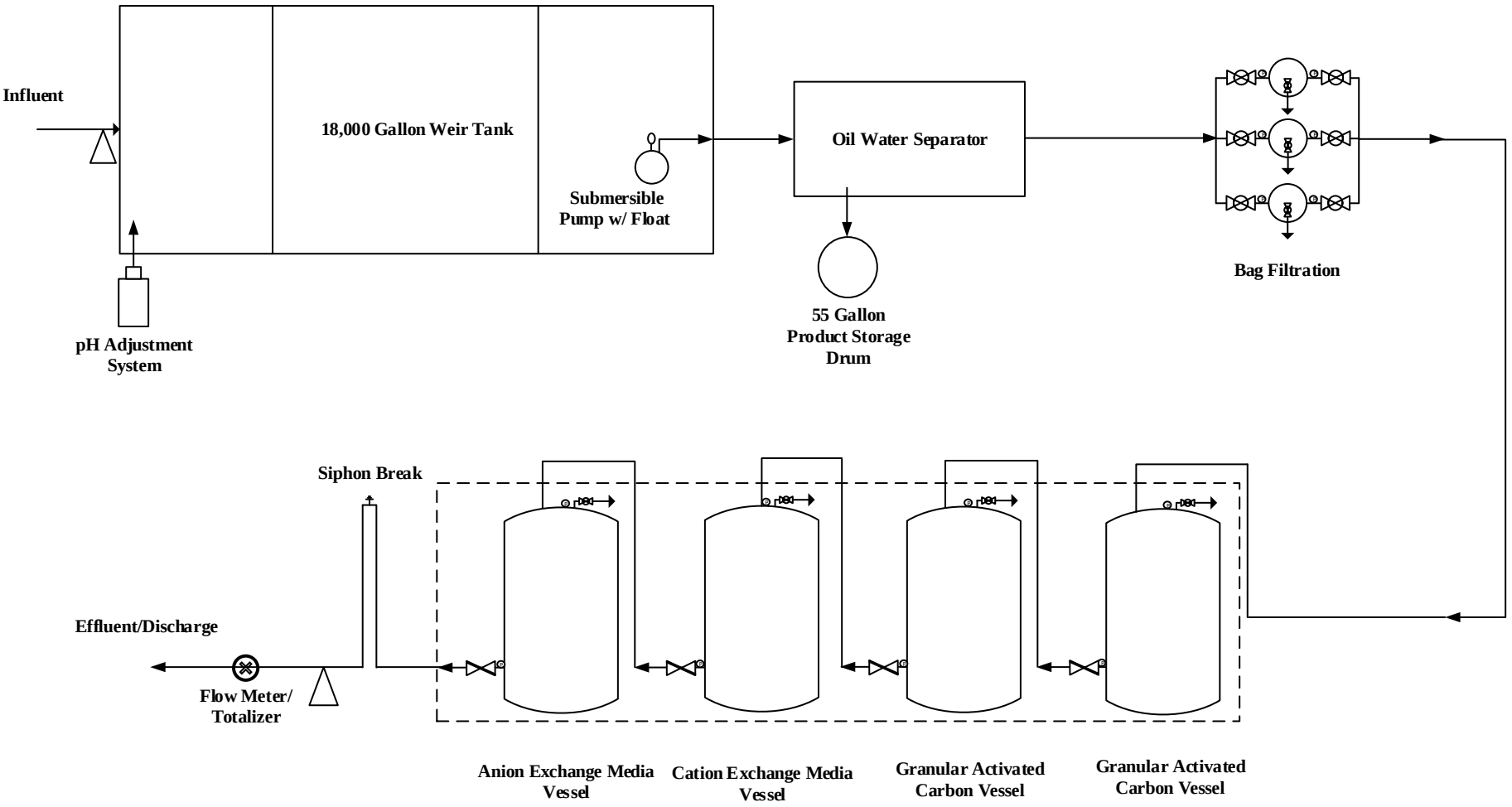
Has the operator attached the certification requirement for the Best Management Practices Plan (BMPP)? (check one): ■ Yes ☐ No

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 implemented prior to initiation of discharge as part of the proposed redevelopment activities.
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: 05-13-20
Print Name and Title: John M. Karoff (Senior Vice President)

ATTACHMENT C:

TREATMENT SYSTEM DESIGN AND SPECIFICATIONS



Notes:

1.) Figure is not to scale
2.) System rated for 50 GPM

Key:
Piping/Hose
Butterfly Valve
Pressure Gauge
Ball Valve
Contingency
Sample Port

Water Treatment System Schematic

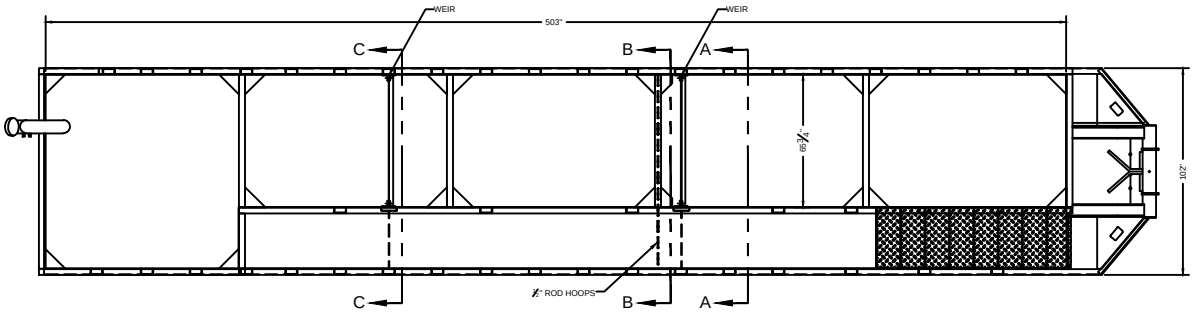
DESIGNED BY: BNS **DRAWN BY:** BNS
CHECKED BY: **DATE:**

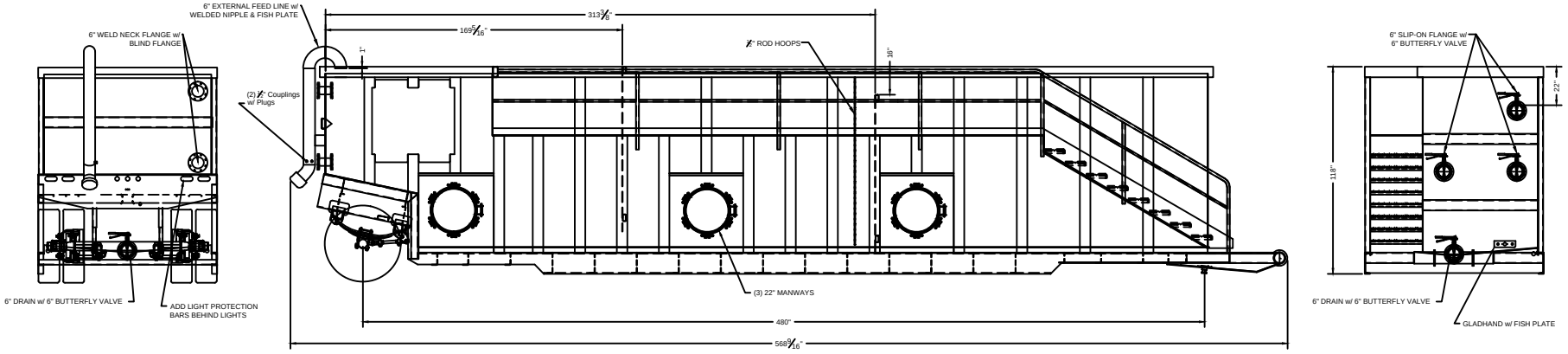
200 Exchange Street
Malden, MA

PROJECT No.

FIGURE No.

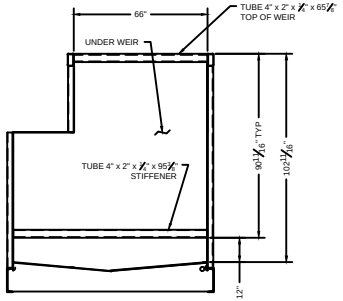
Cut Sheets



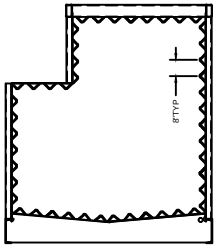


STANDARD SPECIFICATION

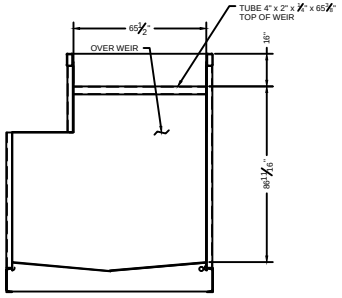
CAPACITY: .... 18,480 GALLONS (440 BBL)
SIDE SHEETS: .... 1/4" A36 PLATE
FRONT SHEET: .... 1/4" A36 PLATE
REAR SHEET: .... 1/4" A36 PLATE
FLOOR: .... 1/4" A36 PLATE
MAIN FLOOR RAILS: .... 12" x 20.7# STRUCTURAL CHANNEL
FLOOR CROSSMEMBERS: .... 1/4" A36 PLATE
SIDE STAKES: .... ONE PIECE 3/16" A36 PLATE
SUSPENSION: .... 3 LEAF SPRING, 22,500 LBS. CACPACITY
AXLE: .... 77.5" TRACK, 22,500 LBS. CAPACITY
TIRES: .... 11R22.5 RADIAL
WHEELS: .... 8.25 x 22.5 STEEL
MANWAYS: .... 3 - 22" DIA. CURB SIDE
VALVES: .... 3 - 6" BUTTERFLY VALVE (FRONT)
1 - 6" DRAIN BUTTERFLY VALVE (FRONT)
1 - 6" DRAIN BUTTERFLY VALVE (REAR)
2 - 6" BLIND FLANGE CONNECTION (REAR)
INLET PIPING: .... 1 - 6" PIPE SYSTEM (REAR)
BLAST: .... (INTERIOR) SSPC-SP-10 (NEAR WHITE)
(EXTERIOR) SSPC-SP-6 (COMMERCIAL BLAST)
PAINT: .... (INTERIOR) EPOXYPHENOLIC 100% SOLID 20.0 MILS D.F.T.
(EXTERIOR) FINISH COAT POLURETHANE 4.0 TO 5.0 D.F.T.



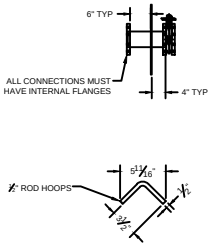
SECTION VIEW "C-C"



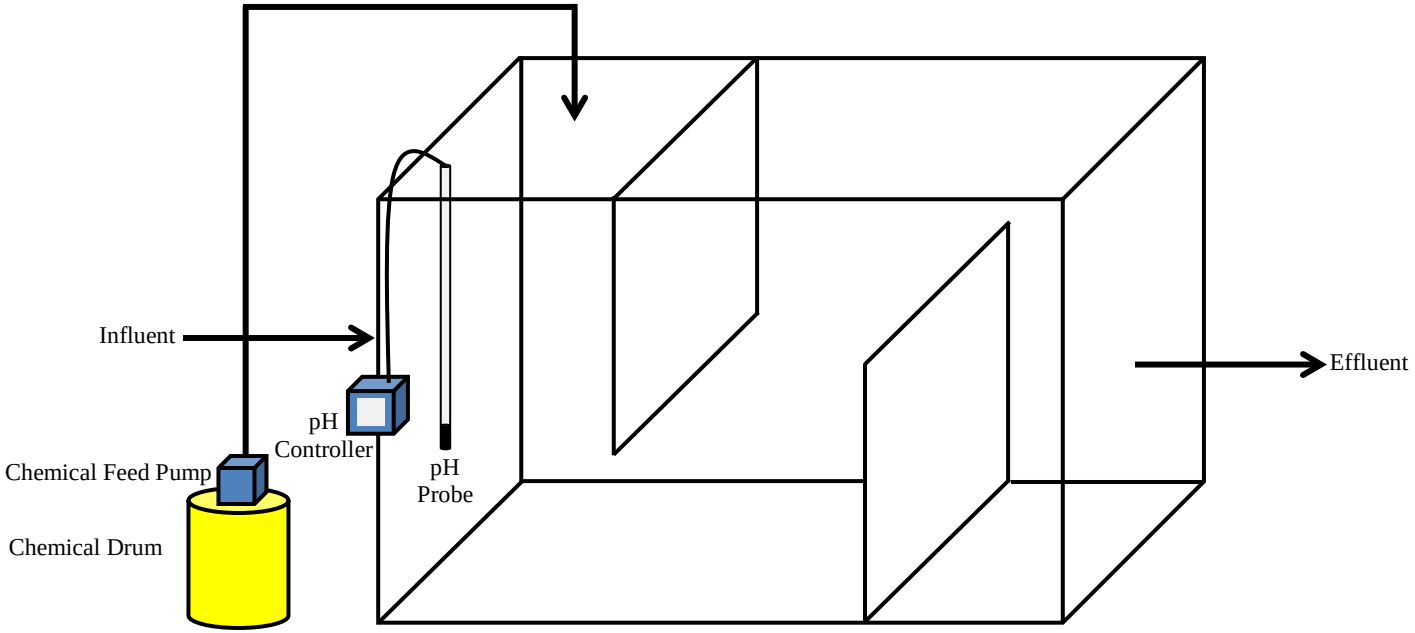
SECTION VIEW "B-B"



SECTION VIEW "A-A"



18,000 Gal. Weir Tank



Notes:

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

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

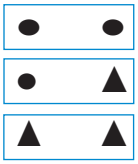
Choose from Hach's Broad Range of Digital and Analog Sensors

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	▲

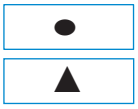
● = Digital ▲ = Analog

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



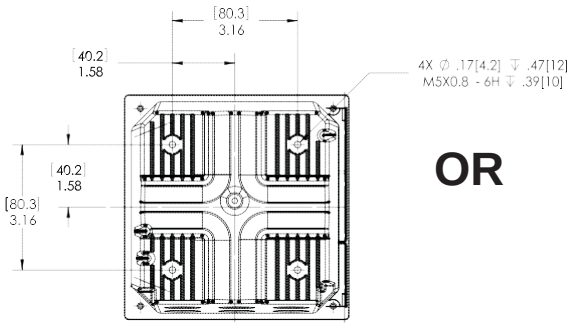
Specifications*

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.*

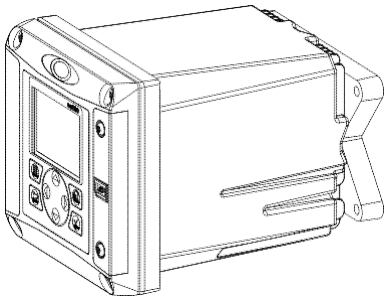
Dimensions

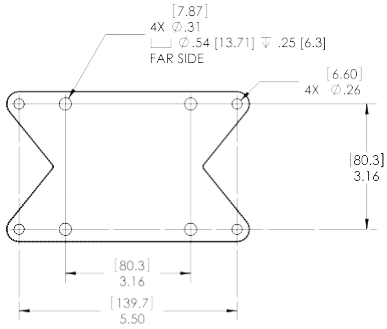
Surface Mounting Dimensions



Mounting Dimensions
(Rear View)

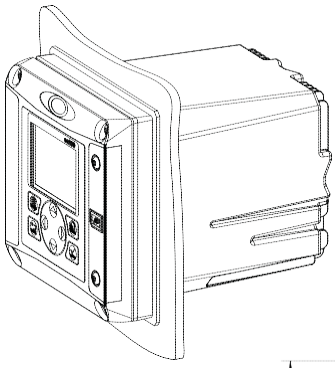
OR

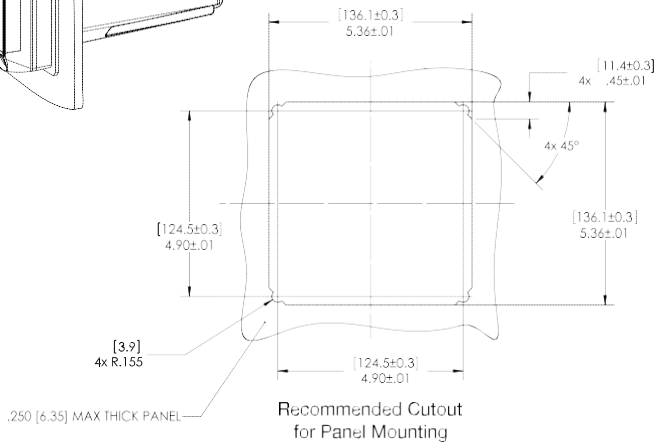




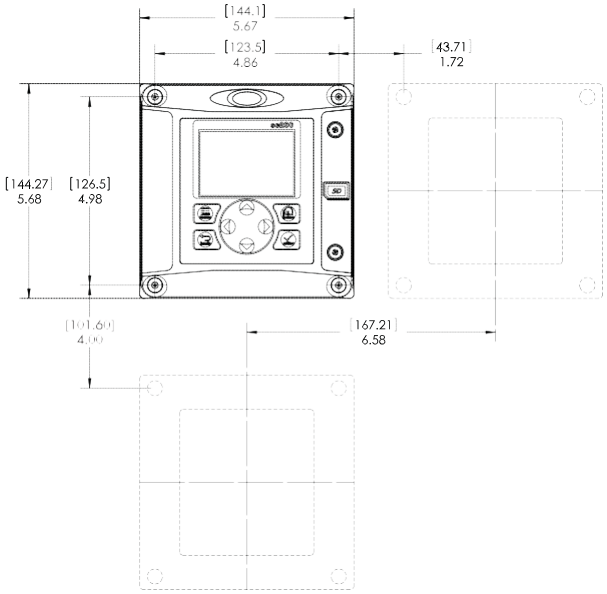
Bracket (supplied) for Surface Mounting
(Not compatible with Weather and Sun Shield p/n 9220600 when surface mounting.)

Panel Mounting Dimensions



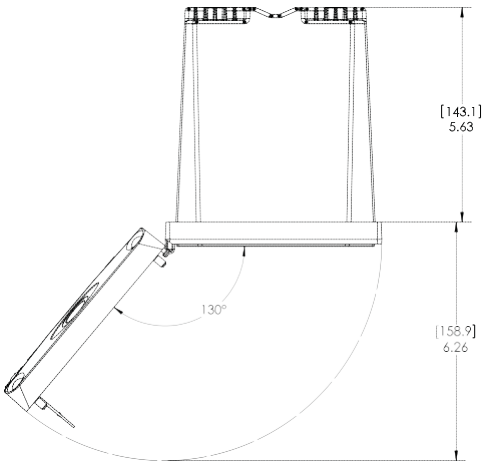


Recommended Cutout
for Panel Mounting

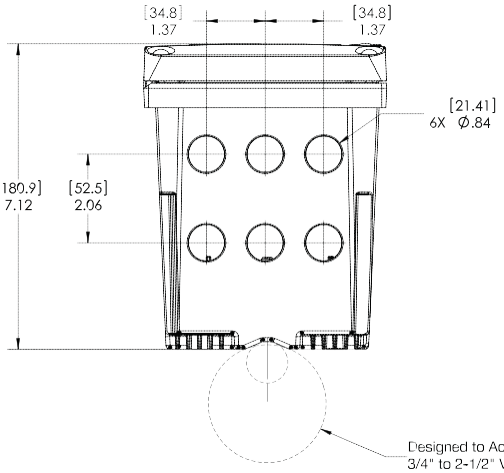


Minimum Spacing Dimensions
for Group Mounting

Top and Bottom Views

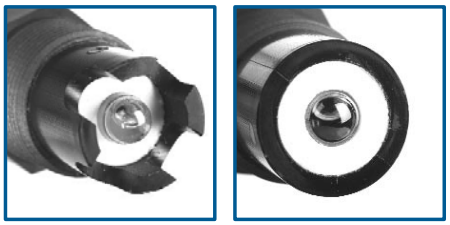


Door Opening Details



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.

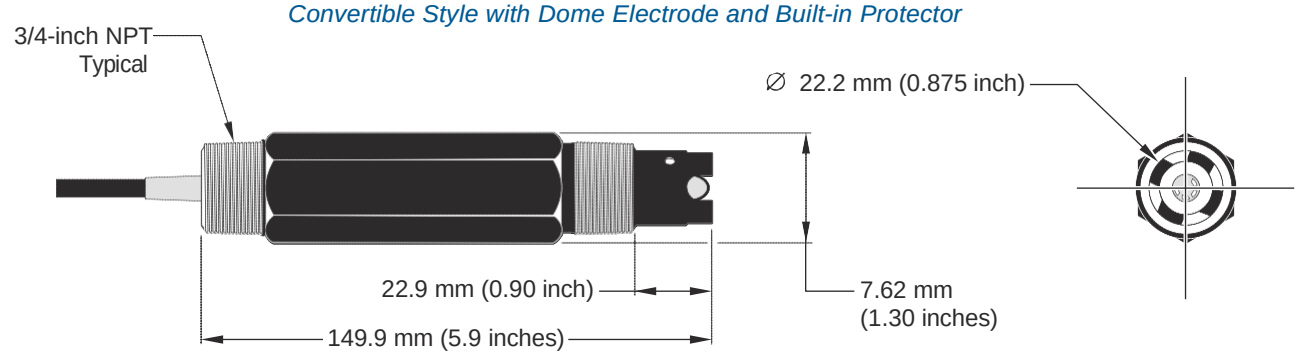
Insertion Style Sensor

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.

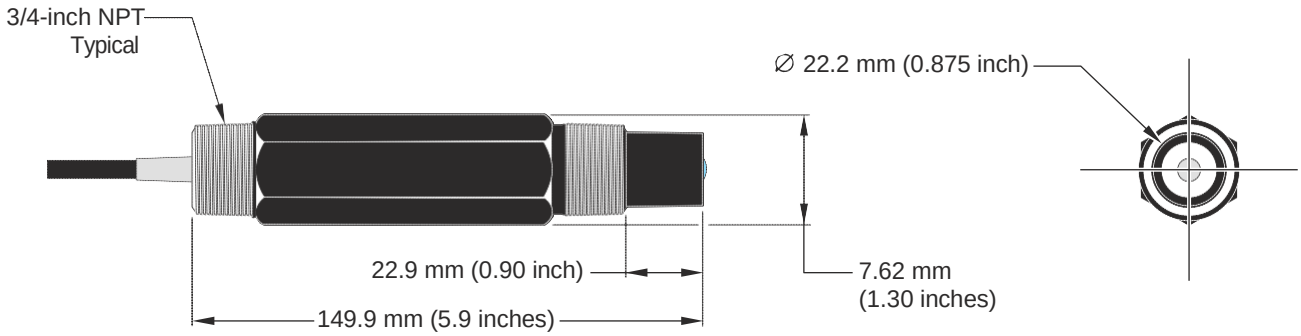
Sanitary Style Sensor

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



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

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 3.18" OD						3.18" D X 1.12" OD	1.14" D X 3.18" 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

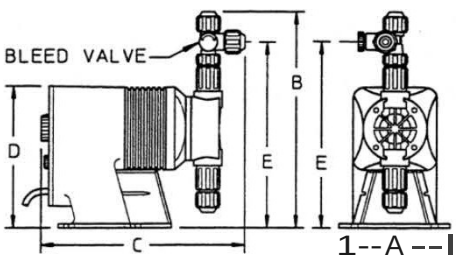
Pre-Engineered Systems

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
LB0&4	5.0	9.9	9.5	6.5	8.5	10
LB64	5.0	9.9	9.5	6.5	8.5	10
LBC4	5.0	9.9	9.5	6.5	8.5	10

NOTE: Inches X 2.54 cm



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."

LB Series

Top discharge provides maximum motor cooling while allowing continuous duty operation.

Available in single-phase or three-phase. Pumps fit into 8-inch pipes.

LB Series Features

LB(T)-1500:

High chrome semi-open impeller resists wear for adhesive particles.

Diode motor protectors prevent stator damage in high amperage or run-dry situations.

Up to 70' shut off head

Slimline design allows pumps to fit into 8" pipes.

LB Series Features

LB-800:

Designed to fit an 8" pipe.

Up to 60' shut off head.

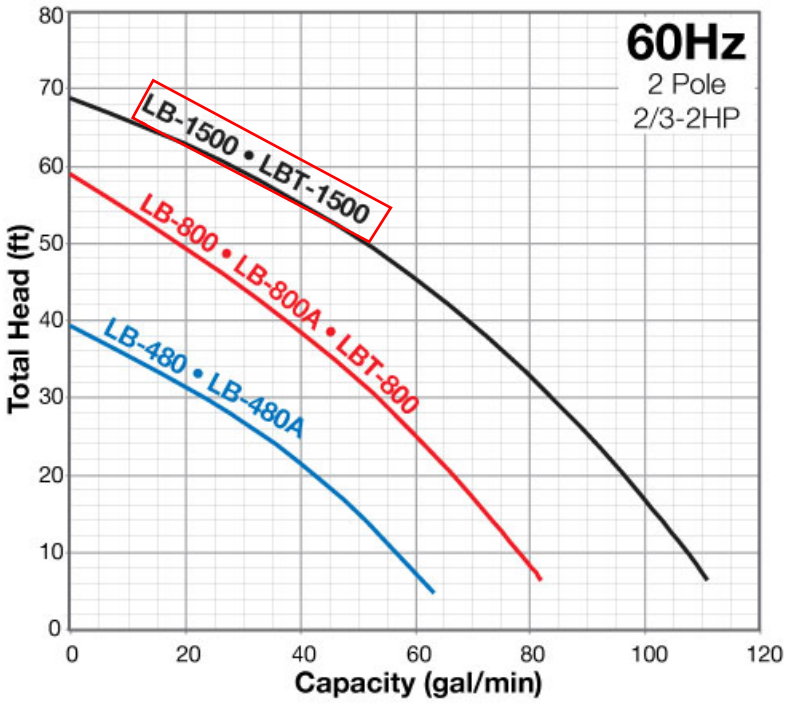
Available in 110V and 220V single-phase with 50 foot cables.

Double Inside Mechanical Seal With SiC faces provides the longest operational life.

Oil Lifter provides lubrication of the seal faces.

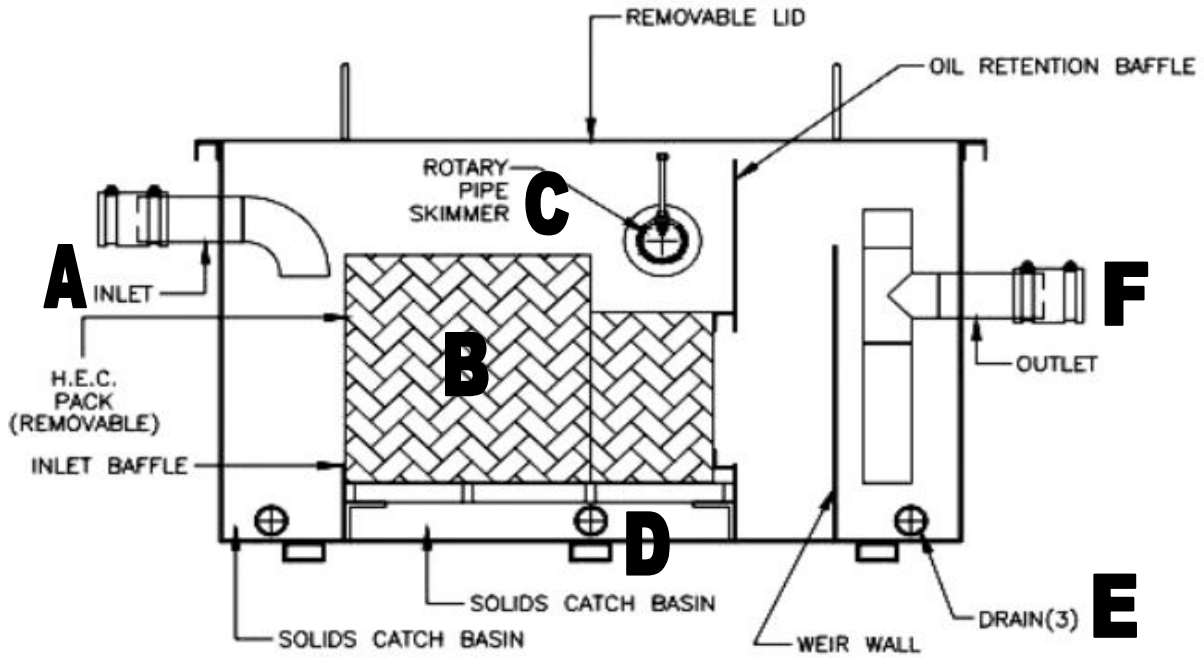
OPTIONAL ACCESSORIES
Float Switch for automatic operation
TS-302 for 110V, TS-303 for 220V.

Performance Range



Model	Discharge Size (in.)	Motor Output (HP)	Voltage (V)	Cable Length (ft.)	Diameter (in.)	Height (in.)	Weight (lbs.)
LB-1500	3	2	110V or 220V	50	7 3/8	23 5/16	72
LB-480	2	2/3	110V	32	7 3/8	11 1/4	28
LB-480A	2	2/3	110V	32	8 3/4	11 1/4	30
LB-800	2	1	115V or 230V	50	7 3/8	13 7/16	35
LB-800A	2	1	115 or 230	50	8 3/4	23 5/16	38
LBT-1500	2 or 3	2	230 or 460 or 575V	50	7 3/8	23 5/16	85
LBT-800	2	1	230 or 460 or 575V	50	7 3/8	13 7/16	35

Environmental
Oil Water Separator



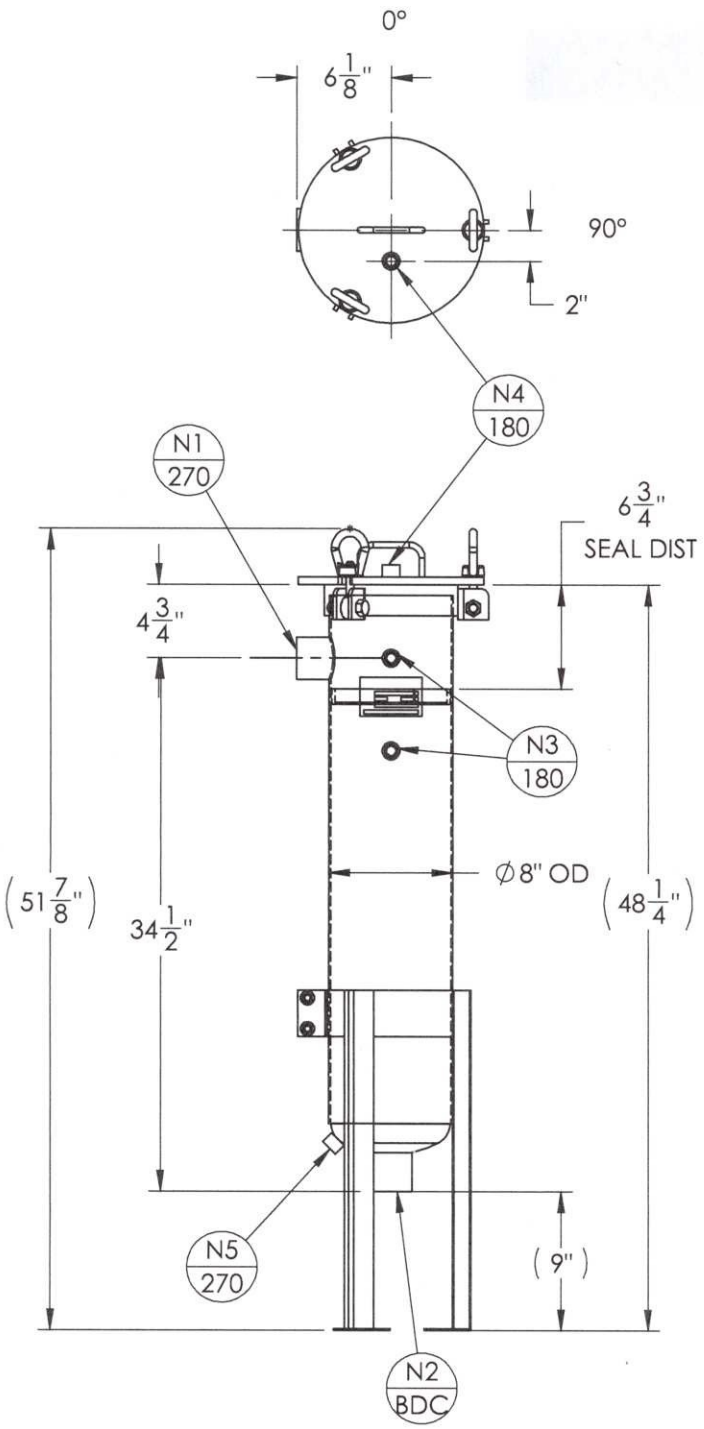
Specifications:

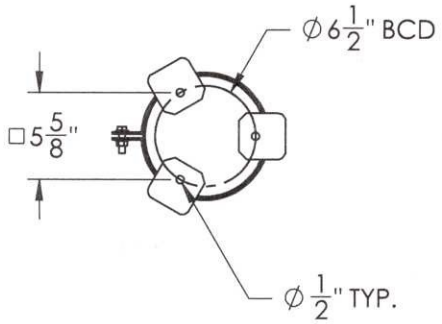
- Rated for 100 gpm
- Manual drain line for NAPL
- Coalescing Media

A: Inlet
B: Separation Chamber with Coalescing Media
C: Drain Line for Oil/NAPL
D: Clarifier with Sludge Drain Line
E: Clean Water Chamber

NOZZLE SCHEDULE			
MARK	QTY	SIZE / RATING	DESCRIPTION
N1	1	2" 150# NPT	INLET
N2	1	2" 150# NPT	OUTLET
N3	2	1/2" 3000# NPT	PRESS GA
N4	1	1/2" 3000# NPT	VENT
N5	1	1/2" 3000# NPT	CLEAN DRAIN
N6	-	-	DIRTY DRAIN

VESSEL DESIGN CONDITIONS			
CODE:	BEST COMMERCIAL PRACTICE		
M.A.W.P.:	150 PSI @ 250°F	M.D.M.T.:	-20° F @ 150 PSI
M.A.E.P.:	15 PSI @ 250°F		
CORROSION ALLOWANCE:	NONE	HYDROTEST PRESS:	195 PSI
STAMP:	'NC'	SERVICE:	NON LETHAL
PWHT:	N/A	RADIOGRAPHY:	N/A
MATERIAL:	SS 304/L	GASKET:	BUNA-N





1:1

DRY WEIGHT: 77.62 #'s
FLOODED WEIGHT: 140 #'s
SHIPPING WEIGHT: 100 #'s
VESSEL VOLUME: 1.0 C.F.

NOTES:
- VESSEL WILL HOUSE (QTY=1) DOUBLE LENGTH BASKET.

THIRD ANGLE PROJECTION

TOLERANCES-UNLESS OTHERWISE NOTED
DECIMAL .X =±.1" .XX =±.02" .XXX =±.005"
FRACTIONAL ≤24" =±1/16" >24" =±1/8"
ANGULAR =± 1°
MAX. MACHINED SURFACE FINISH 125

REV.	DATE	REVISION	DRAWN	APP'D

Provided Bag Filter Housing

EQUIPMENT:	BAG FILTER HOUSING (EB SERIES)
MODEL NO:	S4EB112-2P-SW
CUSTOMER:	-

PARENT: NONE	DRAWN: CR	DATE: JAN 13 2011	JOB No. V-	DWG. No. 001-0123	REV. No. 0
PAGE: 1 OF 4	CHK'D: JM	SCALE: NTS			

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

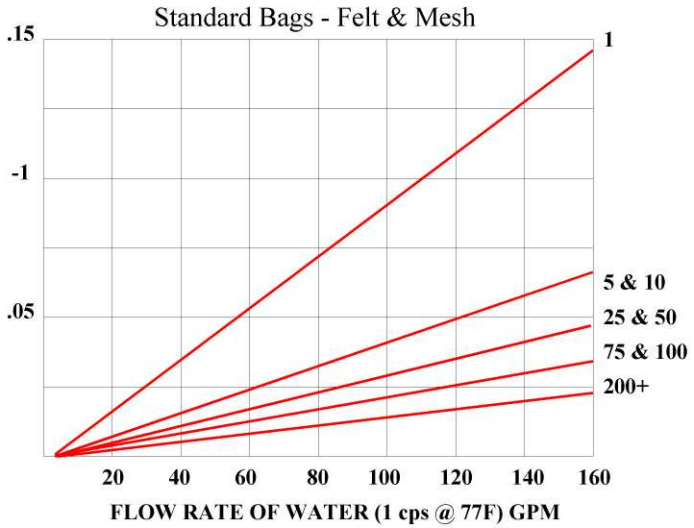
Optional Filter Media

Felt: Nomex, Polyester, Polypropylene

Monofilament: Nylon, Polyester, Polypropylene

Multifilament: Nylon, Polyester

Polypropylene: Oil Removal



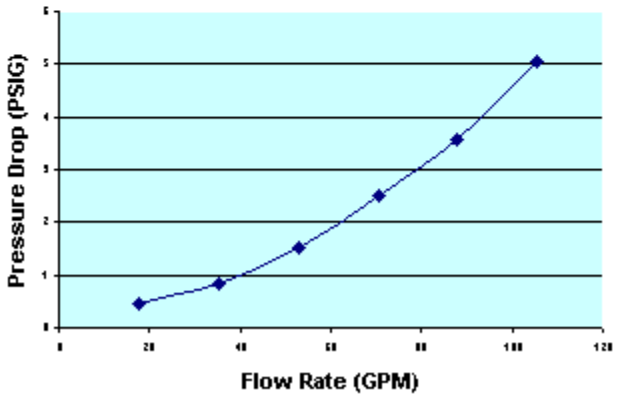
HPAF SERIES FILTERS
MODEL HPAF-2000

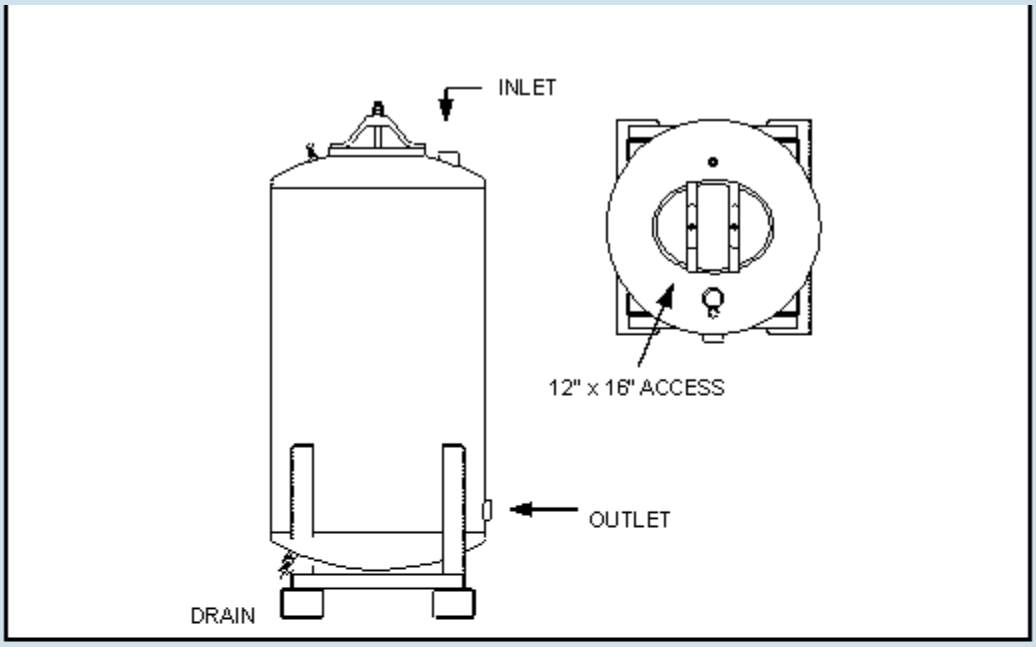
The HPAF-2000 filter is a media filter vessel designed to treat liquid streams. While the typical design application is a activated carbon adsorbtion unit, the filter can easily accommodate many medias. Some applications include:

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

PRESSURE DROP GRAPH

*(As Filled - 8*30 GAC)*





HPAF-2000 SPECIFICATIONS			
Overall Height	8'6"	Vessel/Internal Piping Materials	CS (SA-36) / SCH 40 PVC
Diameter	48"	Internal Coating	Polyamide Epoxy Resin
Inlet / Outlet (FNPT)	3"	External Coating	Epoxy Mastic
Drain / Vent (FNPT)	3/4" / 1/2"	Maximum Pressure / Temp	75 PSIG / 140° F
GAC Fill (lbs)	2,000	Cross Sectional Bed Area	12.5 FT^2
Shipping / Operational Weight (lbs)	1,295 / 3,295	Bed Depth/Volume	5.5 FT / 68.7 FT^3

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.

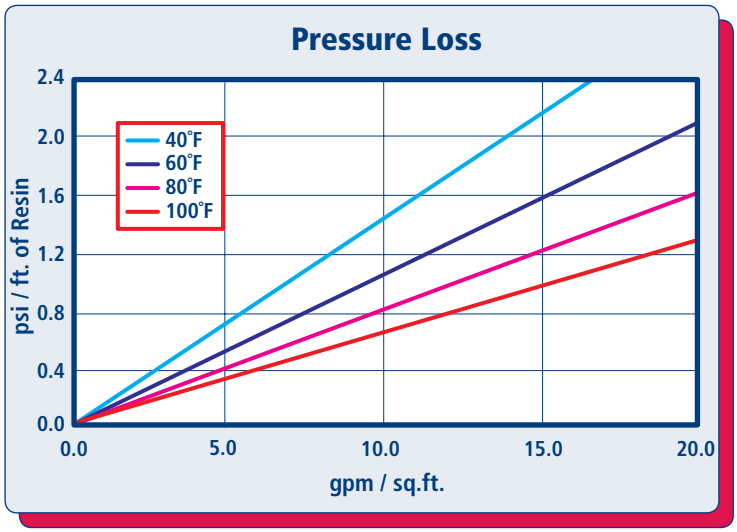
NSF/ANSI 44-61 CERTIFIED FOR MATERIAL SAFETY

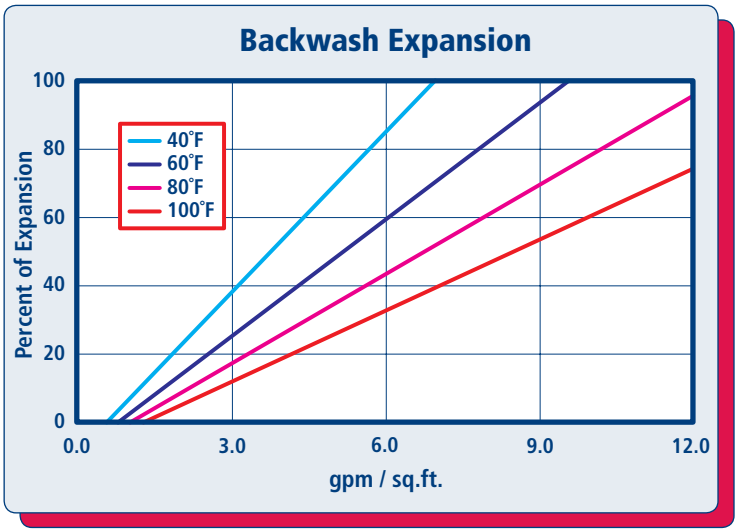
FEATURES & BENEFITS

- **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

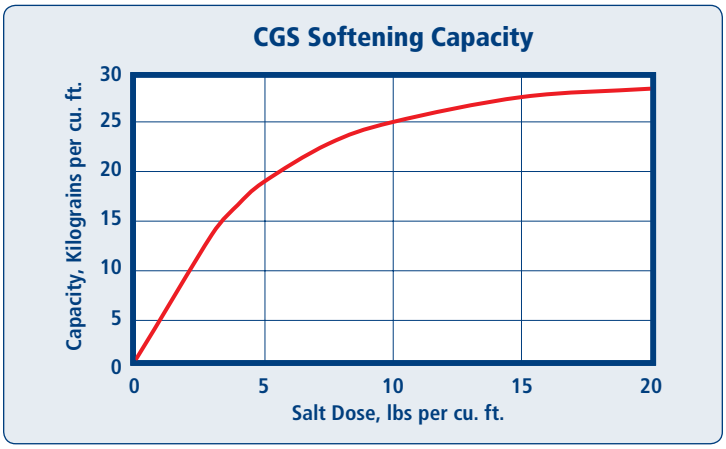
Maximum continuous temperature	
Sodium form	250˚F
Minimum bed depth	24 inches
Backwash expansion	25 to 50 percent
Maximum pressure loss	25 psi
Operating pH range	0 to 14 SU
Regenerant Concentration	
Salt cycle	10 to 15 percent NaCl
Regenerant level	4 to 15 lbs./cu.ft.
Regenerant flow rate.	0.5 to 1.5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

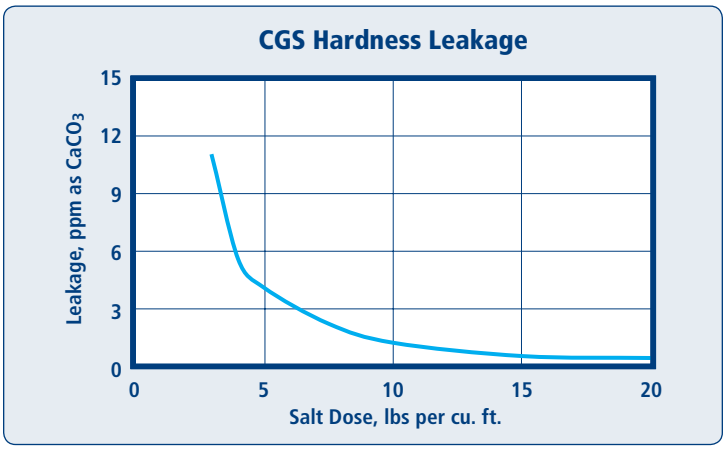
APPLICATIONS

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

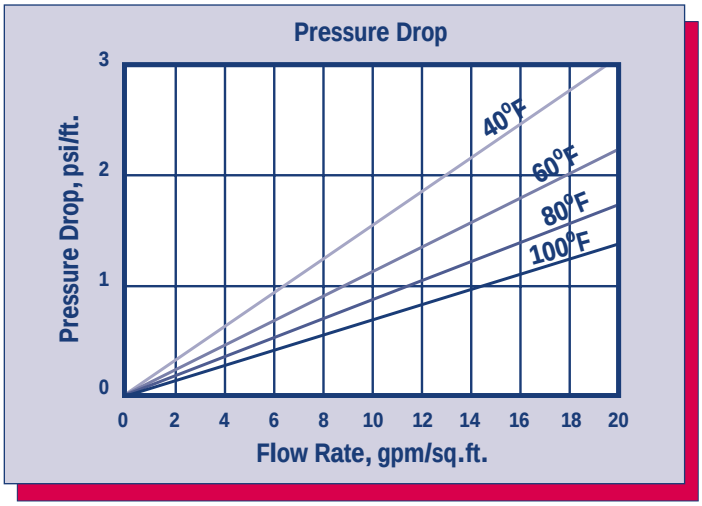
RESINTECH SBG1 is a high capacity, shock resistant, gelular, Type 1, strongly basic anion exchange resin supplied in the chloride or hydroxide form as moist, tough, uniform, spherical beads. *RESINTECH SBG1* is intended for use in all types of deionization systems and chemical processing applications.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

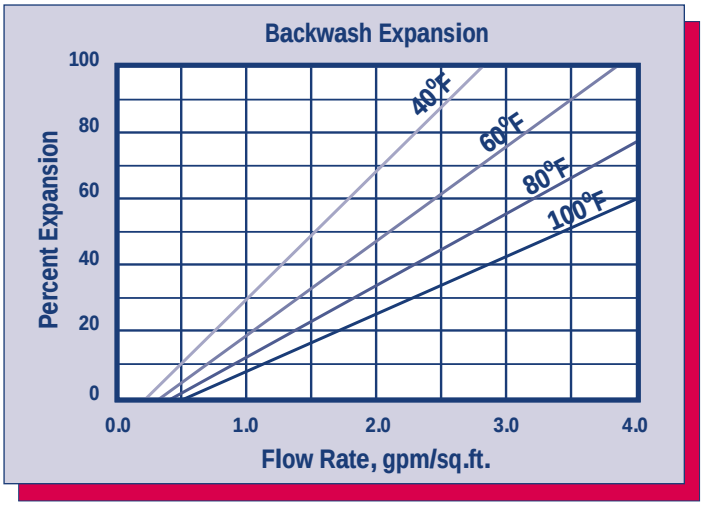
FEATURES & BENEFITS

- **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 $NaOH/ft^3$	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.

GROOVED & SMOOTH-END FLOWMETER MODEL MG/MS100

SPECIFICATIONS

PERFORMANCE

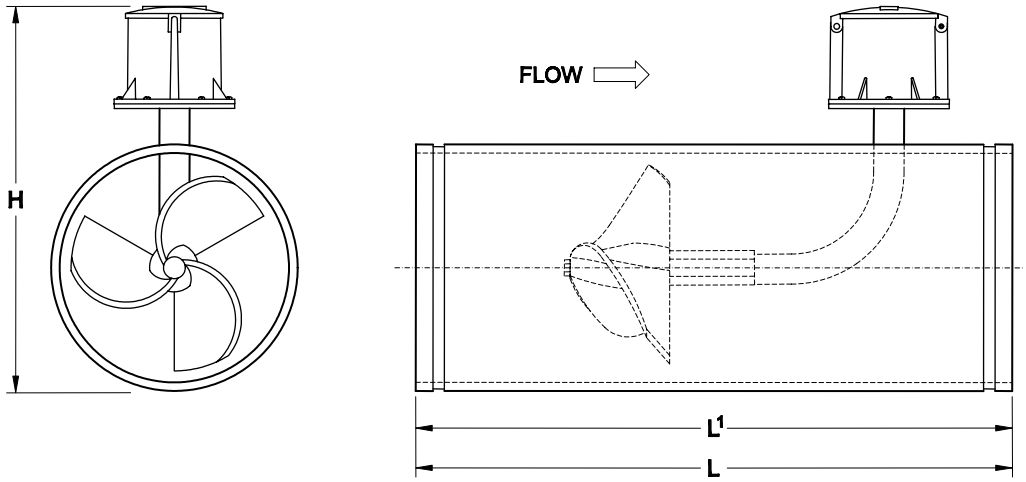
ACCURACY/REPEATABILITY: ±2% of reading guaranteed throughout full range. ±1% over reduced range. Repeatability 0.25% or better.
RANGE: (see dimensions chart below)
HEAD LOSS: (see dimensions chart below)
MAXIMUM TEMPERATURE: (Standard Construction) 160°F constant
PRESSURE RATING: 150 psi

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.

Safety Data Sheets
(SDS)

SAFETY DATA SHEET

M32415 - ANSI - EN

CAUSTIC SODA LIQUID (ALL GRADES)

SDS No.: M32415 **SDS Revision Date:** 13-Jan-2016

SECTION 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Identification:	Occidental Chemical Corporation 5005 LBJ Freeway P.O. Box 809050 Dallas, TX 75380-9050 1-800-752-5151
24 Hour Emergency Telephone Number:	1-800-733-3665 or 1-972-404-3228 (USA); CANUTEC (Canada): 1-613-996-6666; CHEMTREC (within USA and Canada): 1-800-424-9300; CHEMTREC (outside USA and Canada): +1 703-527-3887; CHEMTREC Contract No: CCN16186
To Request an SDS:	MSDS@oxy.com or 1-972-404-3245
Customer Service:	1-800-752-5151 or 1-972-404-3700 (55) 55959542 (Mexico)
Product Identifier:	**CAUSTIC SODA LIQUID (ALL GRADES)**
Trade Name:	Caustic Soda Diaphragm Grade 10%, 15%, 18%, 20%, 25%, 30%, 35%, 40%, 50%, Caustic Soda Membrane 6%, 18%, 20%, 25%, 30%, 48%, 50%, 50% Caustic Soda Membrane OS, 50% Caustic Soda Diaphragm OS, Caustic Soda Low Salt 50%, Membrane Blended, 50% Caustic Soda Diaphragm (West Coast), Membrane Cell Liquor
Synonyms:	Sodium hydroxide solution, Liquid Caustic, Lye Solution, Caustic, Lye, Soda Lye, Secondary Caustic Soda Liquids
Product Use:	Metal finishing, Cleaner, Process chemical, Petroleum Industry
Uses Advised Against:	None identified

SECTION 2. HAZARDS IDENTIFICATION

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

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EMERGENCY OVERVIEW:

Color: Colorless to slightly colored
Physical State: Liquid
Appearance: Clear to opaque
Odor: Odorless

Signal Word: **DANGER**

MAJOR HEALTH HAZARDS: CORROSIVE. CAUSES SERIOUS EYE DAMAGE. CAUSES SEVERE SKIN BURNS AND EYE DAMAGE. MAY CAUSE RESPIRATORY IRRITATION. EFFECTS OF CONTACT OR INHALATION MAY BE DELAYED.

PHYSICAL HAZARDS: MAY BE CORROSIVE TO METALS. Mixing with water, acid or incompatible materials may cause splattering and release of heat. Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen gas may be generated.

ECOLOGICAL HAZARDS: This material has exhibited moderate toxicity to aquatic organisms. Keep out of water supplies and sewers. This material is alkaline and may raise the pH of surface waters.

PRECAUTIONARY STATEMENTS: Do not get in eyes, on skin, or on clothing. Wear eye protection, face protection, protective gloves. Do not breathe mist, vapors, or spray. Do not ingest. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling- exposure can cause burns which are not immediately painful or visible.

ADDITIONAL HAZARD INFORMATION: This material is corrosive. It may cause severe burns and permanent damage to any tissue with which it comes into contact. Toxicity may be delayed, and may not be readily visible. To treat contacted tissue, flush with water to dilute. There is no specific antidote. Significant exposures must be referred for medical attention immediately.

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GHS CLASSIFICATION:

GHS: PHYSICAL HAZARDS:	Corrosive to Metals Mixing with water may cause splattering and release of heat
GHS: CONTACT HAZARD - SKIN:	Category 1B - Causes severe skin burns and eye damage.
GHS: CONTACT HAZARD - EYE:	Category 1 - Causes serious eye damage

GHS: TARGET ORGAN TOXICITY (SINGLE EXPOSURE):	Category 3 - May cause respiratory irritation
GHS: CARCINOGENICITY:	Not classified as a carcinogen per GHS criteria. This product is not classified as a carcinogen by NTP, IARC or OSHA.
GHS: HAZARDOUS TO AQUATIC ENVIRONMENT - ACUTE HAZARD:	Category 3 - Harmful to aquatic life

UNKNOWN ACUTE TOXICITY: 100% of the mixture consists of ingredient(s) of unknown toxicity. There is no acute toxicity data available for this product.

GHS SYMBOL: Corrosive

GHS SIGNAL WORD: **DANGER**

GHS HAZARD STATEMENTS:

GHS - Physical Hazard Statement(s)
• May be corrosive to metals

GHS - Health Hazard Statement(s)
• Causes serious eye damage
• Causes severe skin burns and eye damage
• May cause respiratory irritation

GHS - Precautionary Statement(s) - Prevention
• Do not breathe mist, vapors, or spray
• Wear protective gloves, protective clothing, eye, and face protection
• Wash thoroughly after handling
• Keep only in original container
• Use only outdoors or in a well-ventilated area

GHS - Precautionary Statement(s) - Response
• IF ON SKIN (or hair): Remove/Take off Immediately all contaminated clothing. Rinse SKIN with water/shower
• Wash contaminated clothing before reuse
• 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 INHALED: Remove person to fresh air and keep comfortable for breathing
• Immediately call a POISON CENTER or doctor/physician
• IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
• IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
• Specific treatment (see First Aid information on product label and/or Section 4 of the SDS)
• Absorb spillage to prevent material damage

GHS - Precautionary Statement(s) - Storage
• Store locked up
• Store in a well-ventilated place. Keep container tightly closed
• Store in corrosive resistant and NON-ALUMINUM container with a resistant inner liner (NOTE: flammable hydrogen gas may be generated if aluminum container and/or aluminum fittings are used)

GHS - Precautionary Statement(s) - Disposal
• Dispose of contents and container in accordance with applicable local, regional, national, and/or international regulations

Hazards Not Otherwise Classified (HNOC)
Mixing with water may cause splattering and release of heat

Additional Hazard Information
Mixing with water may cause splattering and release of heat.

See Section 11: TOXICOLOGICAL INFORMATION

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: Sodium hydroxide solution, Liquid Caustic, Lye Solution, Caustic, Lye, Soda Lye, Secondary Caustic Soda Liquids

Component	Percent [%]	CAS Number
Water	48.5 - 94.5	7732-18-5
Sodium Hydroxide	5.5 - 51.5	1310-73-2
Sodium Chloride	0 - 35	7647-14-5

Notes: *All hazardous and non-hazardous components of product composition are listed.*

SECTION 4. FIRST AID MEASURES

INHALATION: If inhalation of mists, vapors, or spray occurs and adverse effects result, remove to uncontaminated area. Evaluate ABC's (is Airway constricted, is Breathing occurring, and is blood Circulating) and treat symptomatically. GET MEDICAL ATTENTION IMMEDIATELY. There is no specific antidote, treat symptomatically.

SKIN CONTACT: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with large amounts of water. GET MEDICAL ATTENTION IMMEDIATELY. Thoroughly clean and dry contaminated clothing before reuse. Discard contaminated leather goods.

EYE CONTACT: Immediately flush contaminated eyes with a directed stream of water for as long as possible. Remove contact lenses, if present and easy to do. Continue rinsing. GET MEDICAL ATTENTION IMMEDIATELY. Washing eyes within several seconds is essential to achieve maximum effectiveness.

INGESTION: If swallowed, do not induce vomiting. For definite or probable ingestion, do not administer oral fluids. If vomiting occurs spontaneously, keep airway clear. Monitor airway. Volume resuscitation (IV fluids) and circulatory support (CPR) may be required. Never give anything by mouth to an unconscious or convulsive person. GET MEDICAL ATTENTION IMMEDIATELY.

Most Important Symptoms/Effects (Acute and Delayed) Corrosive. This material may be corrosive to any tissue it comes in contact with. It can cause serious burns and extensive tissue destruction resulting in: liquefaction, necrosis, and/or perforation.

Acute Symptoms/Effects: Listed below.
Inhalation (Breathing): Respiratory System Effects: Exposure to airborne material may cause irritation, redness of upper and lower airways, coughing, laryngeospasm, shortness of breath, bronchoconstriction, and possible pulmonary edema. Severe and permanent scarring may occur. Pulmonary edema may develop several hours after a severe acute exposure. Aspiration of this material may cause the same conditions.
Skin: Skin Corrosion. Exposure to skin may cause redness, itching, irritation, swelling, burns (first, second, or third degree), liquefaction of skin, and damage to underlying tissues (deep and painful wounds).
Eye: Serious Eye Damage. Eye exposures may cause eye lid burns, conjunctivitis, corneal edema, corneal burn, corneal perforation, damage to internal contents of the eye, permanent visual defects, and blindness and/or loss of the eye.
Ingestion (Swallowing): Gastrointestinal System Effects: Exposure by ingestion may cause irritation, swelling, and perforation of upper and lower gastrointestinal tissues. Permanent scarring may occur.

Delayed Symptoms/Effects:
- Skin: Repeated and prolonged skin contact may cause a chronic dermatitis

Interaction with Other Chemicals Which Enhance Toxicity: None known.

Medical Conditions Aggravated by Exposure: May aggravate preexisting conditions such as: eye disorders that decrease tear production or have reduced integrity of the eye; skin disorders that compromise the integrity of the skin; and respiratory conditions including asthma and other breathing disorders.

Protection of First-Aiders: Protect yourself by avoiding contact with this material. Avoid contact with skin and eyes. Do not breathe vapors or spray mist. Do not ingest. Use personal protective equipment. Refer to Section 8 for specific personal protective equipment recommendations. At minimum, treating personnel should utilize PPE sufficient for prevention of bloodborne pathogen transmission.

Notes to Physician: Medical observation and assessment is recommended for all ingestions, all eye exposures, and symptomatic inhalation and dermal exposures. For symptomatic ingestion, do not administer oral fluids and consider investigation by endoscopy, X-ray, or CT scan. Esophageal perforation, airway compromise, hypotension, and shock are possible. For prolonged exposures and significant exposures, consider delayed injury to exposed tissues. There is no antidote. Treatment is supportive care. Follow normal parameters for airway, breathing, and circulation. Surgical intervention may be required.

SECTION 5. FIRE-FIGHTING MEASURES

Fire Hazard: Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. May react with chemically reactive metals such as aluminum, zinc, magnesium, copper, etc. to release hydrogen gas which can form explosive mixtures in air.

Extinguishing Media: Use extinguishing agents appropriate for surrounding fire.

Fire Fighting: Move container from fire area if it can be done without risk. Cool containers with water. Do not apply water directly on this product. Heat is generated when mixed with water. Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode. Avoid contact with skin.

Component	Immediately Dangerous to Life/ Health (IDLH)
Sodium Hydroxide 1310-73-2	10 mg/m^3 IDLH

Hazardous Combustion Products: Sodium hydroxide fumes can be generated by thermal decomposition at elevated temperatures

Sensitivity to Mechanical Impact: Not sensitive.

Sensitivity to Static Discharge: Not sensitive.

Lower Flammability Level (air): Not flammable

Upper Flammability Level (air): Not flammable

Flash point: Not flammable

Auto-ignition Temperature: Not applicable

GHS: PHYSICAL HAZARDS:
- Corrosive to Metals
- Mixing with water may cause splattering and release of heat

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Do not get in eyes, on skin or on clothing. Avoid breathing mist, vapor, or spray. Do not ingest. Wear appropriate personal protective equipment recommended in Section 8 of the SDS.

Methods and Materials for Containment and Cleaning Up:
In case of spill or leak, stop the leak as soon as possible, if safe to do so. Completely contain spilled materials with dikes, sandbags, etc. Shovel dry material into suitable container. Liquid material may be removed with a vacuum truck. Remaining material may be diluted with water and neutralized with dilute acid, then absorbed and collected. Flush spill area with water, if appropriate.

Environmental Precautions:
Keep out of water supplies and sewers. Do not flush into surface water or sanitary sewer system. This material is alkaline and may raise the pH of surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling:
Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not ingest. Do not eat, drink or smoke in areas where this material is used. Wear personal protective equipment as described in Exposure Controls/Personal Protection (Section 8) of the SDS. NEVER add water to product. When mixing, slowly add to water to minimize heat generation and spattering.

Safe Storage Conditions:
Store and handle in accordance with all current regulations and standards. Keep container tightly closed and properly labeled. Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen gas may be generated. Keep separated from incompatible substances (see below or Section 10 of the Safety Data Sheet).

Incompatibilities/ Materials to Avoid:
Acids and halogenated compounds, Prolonged contact with aluminum, brass, bronze, copper, lead, tin, zinc or other alkali sensitive metals or alloys, Releases heat when diluted in water

GHS: PHYSICAL HAZARDS:
- Corrosive to Metals
- Mixing with water may cause splattering and release of heat

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Regulatory Exposure Limit(s): Listed below for the product components that have regulatory occupational exposure limits (OEL's).

Component	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PELCeiling
Sodium Hydroxide 1310-73-2	2 mg/m^3	-----	-----

OEL: Occupational Exposure Limit; OSHA: United States Occupational Safety and Health Administration; PEL: Permissible Exposure Limit; TWA: Time Weighted Average; STEL: Short Term Exposure Limit

NON-REGULATORY EXPOSURE LIMIT(S): Listed below for the product components that have non-regulatory occupational exposure limits (OEL's).

Component	ACGIH TWA	ACGIH STEL	ACGIH Ceiling	OSHA TWA (Vacated)	OSHA STEL (Vacated)	OSHA Ceiling (Vacated)
Sodium Hydroxide	-----	-----	2 mg/m^3	-----	-----	2 mg/m^3

- The Non-Regulatory United States Occupational Safety and Health Administration (OSHA) limits, if shown, are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).

- The American Conference of Governmental Industrial Hygienists (ACGIH) is a voluntary organization of professional industrial hygiene personnel in government or educational institutions in the United States. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLVs) for hundreds of chemicals, physical agents, and biological exposure indices.

Component	OXY REL 8 hr TWA	OXY REL STEL	OXY REL Ceiling
Sodium Chloride 7647-14-5 (0 - 35)	-----	-----	-----

ENGINEERING CONTROLS: Provide local exhaust ventilation where dust or mist may be generated. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear chemical safety goggles with a face-shield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin and Body Protection: Wear protective clothing to minimize skin contact. Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Always place pants legs over boots. Contaminated clothing should be removed, then discarded or laundered. Discard contaminated leather goods.

Hand Protection: Wear appropriate chemical resistant gloves. Consult a glove supplier for assistance in selecting an appropriate chemical resistant glove.

Protective Material Types:
- Natural rubber
- Neoprene
- Nitrile
- Polyvinyl chloride (PVC)
- Tyvek®
- Tychem®

Respiratory Protection: A NIOSH approved respirator with N95 (dust, fume, mist) cartridges may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure. If eye irritation occurs, a full face style mask should be used. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

Component	Immediately Dangerous to Life/ Health (IDLH)
Sodium Hydroxide 1310-73-2	10 mg/m^3 IDLH

HYGIENE MEASURES: Handle in accordance with good industrial hygiene and safety practices. Wash hands and affected skin immediately after handling, before breaks, and at the end of the workday. When using do not eat or drink. When using do not smoke.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Appearance:	Clear to opaque
Color:	Colorless to slightly colored
Odor:	Odorless
Odor Threshold [ppm]:	No data available.
Molecular Weight:	40.01
Molecular Formula:	NaOH
Decomposition Temperature:	No data available
Boiling Point/Range:	215 - 291°F (102 - 144°C)
Freezing Point/Range:	-26 to 59°F (-32 to 15 °C).
Vapor Pressure:	13 - 135 mmHg @ 60 °C
Vapor Density (air=1):	No data available
Relative Density/Specific Gravity (water=1):	1.05 – 1.56 @ 15.6 °C
Density:	8.8 - 13.0 lbs/gal @ 15.6 °C
Water Solubility:	100%
pH:	14.0 (theoretical value of 7.5% solution)
Volatility:	No data available
Evaporation Rate (ether=1):	No data available
Partition Coefficient (n-octanol/water):	No data available
Flash point:	Not flammable
Flammability (solid, gas):	Not flammable
Lower Flammability Level (air):	Not flammable
Upper Flammability Level (air):	Not flammable
Auto-ignition Temperature:	Not applicable
Viscosity:	About 24cp for 50% solution at 40 °C (104 °F)

SECTION 10. STABILITY AND REACTIVITY

Reactivity: Soluble in water, releasing heat sufficient to ignite combustibles. Reacts with metals, and may form hydrogen gas.

Chemical Stability: Stable at normal temperatures and pressures.

Possibility of Hazardous Reactions:
Mixing with water, acid, or incompatible materials may cause splattering and release of large amounts of heat. Will react with some metals forming flammable hydrogen gas. Carbon monoxide gas may form upon contact with reducing sugars, food and beverage products in enclosed spaces.

Conditions to Avoid: (e.g., static discharge, shock, or vibration) -. None known.

Incompatibilities/ Materials to Avoid: Acids and halogenated compounds. Prolonged contact with aluminum, brass, bronze, copper, lead, tin, zinc or other alkali sensitive metals or alloys. Releases heat when diluted in water.

Hazardous Decomposition Products: Toxic fumes of sodium oxide

Hazardous Polymerization: Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

IRRITATION DATA: PRIMARY SKIN IRRITATION: Severe Irritation, Corrosive (rabbit, 24 hr)
PRIMARY EYE IRRITATION: Severe Irritation, Corrosive (rabbit, 24 hr)

TOXICITY DATA:

PRODUCT TOXICITY DATA: CAUSTIC SODA LIQUID (ALL GRADES)

LD50 Oral:	LD50 Dermal:	LC50 Inhalation:
No reliable data available	No reliable data available	No data available

COMPONENT TOXICITY DATA:
Note: The component toxicity data is populated by the LOLI database and may differ from the product toxicity data given.

Component	LD50 Oral:	LD50 Dermal:	LC50 Inhalation:
Water 7732-18-5	90 mL/kg (Rat)	-----	-----
Sodium Hydroxide 1310-73-2	140-3400 mg/kg	1350 mg/kg (Rabbit)	-----
Sodium Chloride 7647-14-5	3 g/kg (Rat)	-----	42 g/m^3 (1 hr-Rat)

****

POTENTIAL HEALTH EFFECTS:

Eye contact: Corrosive. Causes serious eye damage which can result in: severe irritation, pain and burns, and permanent damage including blindness.

Skin contact: Corrosive. Causes severe skin burns. Prolonged or repeat skin exposures can result in dermatitis.

Inhalation: Corrosive. Inhalation injury may result from ingestion and/or aspiration of this material. May cause severe irritation of the respiratory tract with potential airway compromise, coughing, choking, pain, and burns of the mucous membrane and respiratory system. This material can be extremely destructive to the tissue of the mucus membranes and respiratory system. Aspiration may cause chemical pneumonitis, pulmonary edema, damage to lung tissue, death.

Ingestion: Corrosive. If swallowed, may cause severe oral and esophageal, mucus membrane, and gastrointestinal burns and possible perforation. If swallowed, may pose a lung aspiration hazard during vomiting.

Chronic Effects: Repeated or prolonged skin contact may result in dermatitis.

SIGNS AND SYMPTOMS OF EXPOSURE:
This material may cause severe burns and permanent damage to any tissue with which it comes into contact. It can cause serious burns and extensive tissue destruction resulting in liquefaction, necrosis and/or perforation. Signs and symptoms of exposure vary, and are dependent on the route of exposure, degree of exposure, and duration of exposure.

Inhalation (Breathing): Respiratory System Effects: Exposure to airborne material may cause irritation, redness of upper and lower airways, coughing, laryngeospasm, shortness of breath, bronchoconstriction, and possible pulmonary edema. Severe and permanent scarring may occur. Pulmonary edema may develop several hours after a severe acute exposure. Aspiration of this material may cause the same conditions.
Skin: Skin Corrosion. Exposure to skin may cause redness, itching, irritation, swelling, burns (first, second, or third degree), liquefaction of skin, and damage to underlying tissues (deep and painful wounds).
Eye: Serious Eye Damage. Eye exposures may cause eye lid burns, conjunctivitis, corneal edema, corneal burn, corneal perforation, damage to internal contents of the eye, permanent visual defects, and blindness and/or loss of the eye.
Ingestion (Swallowing): Gastrointestinal System Effects: Exposure by ingestion may cause irritation, swelling, and perforation of upper and lower gastrointestinal tissues. Permanent scarring may occur.

TOXICITY:
When in solution, this material will affect all tissues with which it comes in contact. The severity of the tissue damage is a function of its concentration, the length of tissue contact time, and local tissue conditions. After exposure there may be a time delay before irritation and other effects occur. This material is a strong irritant and is corrosive to the skin, eyes, and mucus membranes. This material may cause severe burns and permanent damage to any tissue with which it comes into contact.

Interaction with Other Chemicals Which Enhance Toxicity: None known.

****

GHS HEALTH HAZARDS:

GHS: CONTACT HAZARD - EYE: Category 1 - Causes serious eye damage

GHS: CONTACT HAZARD - SKIN: Category 1B - Causes severe skin burns and eye damage

Skin Absorbent / Dermal Route? No.

GHS: CARCINOGENICITY:
Not classified as a carcinogen per GHS criteria. This product is not classified as a carcinogen by NTP, IARC or OSHA.

SPECIFIC TARGET ORGAN TOXICITY (Single Exposure):
Category 3 - Respiratory Irritation

SECTION 12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

Aquatic Toxicity:
This material has exhibited moderate toxicity to aquatic organisms. Data provided are for sodium hydroxide

Component	Freshwater Fish	Invertebrate Toxicity:	Algae Toxicity:	Other Toxicity:
Sodium Chloride 7647-14-5 (0 - 35)		340.7 - 469.2 mg/L EC50 = 1000 mg/L EC50	-----	

FATE AND TRANSPORT:

BIODEGRADATION: This material is inorganic and not subject to biodegradation

PERSISTENCE: This material is alkaline and may raise the pH of surface waters with low buffering capacity This material is believed to exist in the disassociated state in the environment

BIOCONCENTRATION: This material is not expected to bioconcentrate in organisms.

BIOACCUMULATIVE POTENTIAL: Does not bioaccumulate.

MOBILITY IN SOIL: No data available.

ADDITIONAL ECOLOGICAL INFORMATION: This material has exhibited slight toxicity to terrestrial organisms. This material has exhibited moderate toxicity to aquatic organisms.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste from material:
Reuse or reprocess, if possible. May be subject to disposal regulations. Dispose in accordance with all applicable regulations.

Container Management:
Dispose of container in accordance with applicable local, regional, national, and/or international regulations. Container rinsate must be disposed of in compliance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

LAND TRANSPORT

U.S. DOT 49 CFR 172.101:

UN NUMBER: UN1824
PROPER SHIPPING NAME: Sodium Hydroxide Solution
HAZARD CLASS/ DIVISION: 8

PACKING GROUP: II
LABELING REQUIREMENTS: 8
RQ (lbs): RQ 1000 lbs. (Sodium Hydroxide)

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

UN NUMBER: UN1824
SHIPPING NAME: Sodium hydroxide solution
CLASS OR DIVISION: 8
PACKING/RISK GROUP: II
LABELING REQUIREMENTS: 8

MARITIME TRANSPORT (IMO / IMDG) :

UN NUMBER: UN1824
PROPER SHIPPING NAME: Sodium hydroxide solution
HAZARD CLASS / DIVISION: 8
Packing Group: II
LABELING REQUIREMENTS: 8

SECTION 15. REGULATORY INFORMATION

U.S. REGULATIONS

OSHA REGULATORY STATUS:
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 426-2675.

Component	CERCLA Reportable Quantities:
Sodium Hydroxide	1000 lb (final RQ)

SARA EHS Chemical (40 CFR 355.30)
No components are listed

EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.10):
Acute Health Hazard

EPCRA SECTION 313 (40 CFR 372.65):
No components are listed

DEPARTMENT OF HOMELAND SECURITY (DHS)- Chemical Facility Anti-Terrorism Standards (6 CFR 27):
No components in this material are regulated under DHS

OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119):
Not regulated

FDA: This material has Generally Recognized as Safe (GRAS) status under specific FDA regulations. Additional information is available from the Code of Federal Regulations which is accessible on the FDA's website. This product is not produced under all current Good Manufacturing Practices (cGMP) requirements as defined by the Food and Drug Administration (FDA).

NATIONAL INVENTORY STATUS

U.S. INVENTORY STATUS: Toxic Substance Control Act (TSCA): All components are listed or exempt

Component	U.S. INVENTORY STATUS: Toxic Substance Control Act (TSCA):
Water 7732-18-5 (48.5 - 94.5)	Listed
Sodium Hydroxide 1310-73-2 (5.5 - 51.5)	Listed
Sodium Chloride 7647-14-5 (0 - 35)	Listed

TSCA 12(b): This product is not subject to export notification.

Canadian Chemical Inventory: All components of this product are listed on either the DSL or the NDSL.

STATE REGULATIONS

California Proposition 65:
This product and its ingredients are not listed, but it may contain impurities/trace elements known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act. For additional information, contact OxyChem Technical Services at 1-800-733-1165.

Component	California Proposition 65 Cancer WARNING:	California Proposition 65 CRT List - Male reproductive toxin:	California Proposition 65 CRT List - Female reproductive toxin:	Massachusetts Right to Know Hazardous Substance List	New Jersey Right to Know Hazardous Substance List	New Jersey Special Health Hazards Substance List
Sodium Hydroxide 1310-73-2	Not Listed	Not Listed	Not Listed	Listed	1706	corrosive

Component	New Jersey - Environmental Hazardous Substance List	Pennsylvania Right to Know Hazardous Substance List	Pennsylvania Right to Know Special Hazardous Substances	Pennsylvania Right to Know Environmental Hazard List	Rhode Island Right to Know Hazardous Substance List
Water 7732-18-5	Not Listed	Listed	Not Listed	Not Listed	Not Listed
Sodium Hydroxide 1310-73-2	Not Listed	Listed	Not Listed	Present	Listed

CANADIAN REGULATIONS

• This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations

Component	Water
WHMIS - Classifications of Substances: Uncontrolled product according to WHMIS classification criteria	
Component	Sodium Hydroxide
WHMIS - Classifications of Substances: E	
Component	Sodium Chloride
WHMIS - Classifications of Substances: Uncontrolled product according to WHMIS classification criteria	

SECTION 16. OTHER INFORMATION

Prepared by: OxyChem Corporate HESS - Product Stewardship

Rev. Date: 13-Jan-2016

Other information:
The Safety Data Sheet for Caustic Soda Liquid (ALL Grades) can be used for hazard communication purposes for off-specification, secondary caustic soda liquids generated when cleaning caustic soda storage tanks, including the general disclaimer found in section 16 of the Safety Data Sheet

HMIS: (SCALE 0-4) (Rated using National Paint & Coatings Association HMIS: Rating Instructions, 2nd Edition)

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

NFPA 704 - Hazard Identification Ratings (SCALE 0-4) : Listed below.

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

Reason for Revision:
• Changed GHS Classification: SEE SECTION 2
• Toxicological Information has been revised: SEE SECTION 11

CAUSTIC SODA LIQUID (ALL GRADES)

SDS No.: M32415 **SDS Revision Date:** 13-Jan-2016

IMPORTANT:
The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESSED OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and OxyChem assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patents or to violate any Federal, State, local or foreign laws

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Safety Data Sheet available to your employees

End of Safety Data Sheet

SAFETY DATA SHEET

Revision Date: 11/11

1.1 IDENTIFICATION OF PRODUCT.

Designation: - Activated carbon

1.2 COMPANY.

Lockwood Remediation Technologies, LLC
89 Crawford Street
Leominster, MA 01453
Phone: 774-450-7177
Fax: 888-835-0617

2 HAZARDOUS AND OTHER INGREDIENTS.

Exposure limits may vary. It is recommended that information about locally applicable exposure limits be obtained.

%w/w	Compound	CAS No	MAK mg/m^3	TLV mg/m^3	PEL mg/m^3
			(Germany)	(ACGIH)	(OSHA)
100	Bituminous Carbon	7440-44-0		2 mg/m3	15 mg/m3
			T Dust	T dust	

3 PHYSICAL DATA.

State:	Solid
Appearance:	Black granule, extradite, or powder
pH:	Not applicable
Boiling point or range:	Sublimes
Melting point or range:	3550 C (6422 F)
Vapor pressure:	1 @3586 C (6487 F)
Vapor density:	0.4
Density relative to water:	1.5 – 1.8 Specific gravity
Solubility in water:	Insoluble in water
Partition coefficient: (n-octanol/water):	
Other data:	odorless

4 FIRE AND EXPLOSION HAZARD DATA.

Fire, explosion and reactivity hazards:	Flammable.
Flammability and flammability limits:	Flammable.
Autoflammability:	Not applicable.
Explosive properties:	Non explosive.
Oxidizing properties:	Non oxidizing.

Fire fighting measures:
As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.

Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Minimum explosible concentration 0.140 g/l.

Fire Extinguishing Media:
Water or water spray.

Unusual Fire and Explosion Hazards:
Contact with strong oxidize such as ozone, liquid oxygen, chlorine, permanganate, etc., may result in fire.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

5 STABILITY AND REACTIVITY DATA.

The product is stable under normal handling and storage conditions.

Conditions to avoid:	Incompatibilities.
Materials to avoid:	Liquid air and oxidizing materials. Strong oxidizers such as ozone, liquid oxygen, chlorine, permanganate, etc
Hazardous decomposition products:	Involvement in a fire causes formation of carbon dioxide and carbon monoxide.

Emergency Overview

WARNING! FLAMMABLE SOLID. ACTIVATED CARBON AFFECTS THE RESPIRATORY AND CARDIOVASCULAR SYSTEMS.

CAUTION!!! Wet activated carbon removes oxygen from air causing a severe hazard to workers inside carbon vessels and enclosed or confined spaces. Before entering such an area, sampling and work procedures for low oxygen levels should be taken to ensure ample oxygen availability, observing all local, state, and federal regulations.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; CLASS B EXTINGUISHER
Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
May cause mild irritation to the respiratory tract. The acute inhalation LC50 (Rat) is >64.4 mg/l (nominal concentration) for activated carbon.

Ingestion:
No adverse effects expected. May cause mild irritation to the gastrointestinal tract. The acute oral LD50 (Rat) is >10g/kg.

Skin Contact:
Not expected to be a health hazard from skin exposure. May cause mild irritation and redness. The primary skin irritation index (Rabbit) is 0.

Eye Contact:
No adverse effects expected. May cause mild irritation, possible reddening.

Chronic Exposure:
Prolonged inhalation of excessive dust may produce pulmonary disorders. The effects of long-term, low-level exposures to this product have not been determined. Safe handling of this material on a long-term basis should emphasize the avoidance of all effects from repetitive acute exposures.

Aggravation of Pre-existing Conditions:
No information found.

6. First Aid Measures

Inhalation:
Remove to fresh air. Get medical attention for any breathing difficulty.

Ingestion:
Give several glasses of water to drink to dilute. If large amounts were swallowed, seek medical attention.

Skin Contact:
Not expected to require first aid measures. Wash exposed area with soap and water. Seek medical attention if irritation develops.

Eye Contact:
Wash thoroughly with running water for at least 15 minutes. Seek medical attention if irritation develops.

7. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. Warning! Spent product may have absorbed hazardous materials.

8. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

CAUTION!! Wet activated carbon removes oxygen from air causing a severe hazard to workers inside carbon vessels and enclosed or confined spaces. Before entering such an area, sampling and work procedures for low oxygen levels should be taken to ensure ample oxygen availability, observing all local, state, and federal or national regulations.

9. Exposure Controls/Personal Protection

Exposure Guidelines:
OSHA PEL*:
5mg/M3 (Respirable)
ACGIH TLV*:
10 mg/M3 (Total)
*PELs and TLVs are 8-hour TWAs unless otherwise noted.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
For conditions of use where exposure to the dust or mist is apparent, a half-face dust/mist respirator may be worn. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear protective gloves and clean body-covering clothing.

Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

10. Toxicological Information

Investigated as a reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Activated Carbon (7440-44-0)	No	No	None

11. Ecological Information

Environmental Fate:
No information found.

Environmental Toxicity:
No information found.

12. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

13. Transport Information

Proper Shipping Name:
NOT REGULATED
Hazard Class:
N/A
Identification Number:
N/A
Packing Group:
N/A
This product has been tested according to the United Nations *Transport of Dangerous Goods* test protocol for spontaneously combustible materials. It has been specifically determined that this product does not meet the definition of a self heating substance or any hazard class, and therefore is not a hazardous material and not regulated.

14. Regulatory Information

SARA TITLE III:
N/A
TSCA:
The ingredients of this product are on the TSCA Inventory List.
OSHA:
Nonhazardous according to definitions of health hazard and physical hazard provided in the Hazard Communication Standard (29 CFR 1910.1200)
CANADA

WHMIS CLASSIFICATION:
Not Classified
DSL#:
6798
EEC
Council Directives relating to the classification, packaging, and labeling of dangerous substances and preparations.
Risk (R) and Safety (S) phrases:
May be irritating to eyes (R36).

15. Other Information

NFPA Ratings: Health: 0 **Flammability:** 1 **Reactivity:** 0

Label Hazard Warning:
WARNING! FLAMMABLE SOLID. ACTIVATED CARBON AFFECTS THE RESPIRATORY AND CARDIOVASCULAR SYSTEMS.

Label Precautions:
Keep away from heat, sparks and flame. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Label First Aid:
If inhaled, remove to fresh air. Get medical attention for any breathing difficulty.

Safety Data Sheet

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

(Type I Strong Base Anion Exchange Resin Chloride Form)

Effective date 31 March 2015

Section 1: Identification

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

Section 2: Hazard Identification

2a Hazard classification — Not hazardous or dangerous

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

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

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

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

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

Section 2A: Hazard classification UN OSHA globally harmonized system

WARNING

(contains ion exchange resin)

H320: Causes eye irritation

Precautionary Statements

P264: Wash hands thoroughly after handling.

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

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

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

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

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

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

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

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

Section 3: Composition/ Information on Ingredients

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

Section 4: First Aid Measures

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

Section 5: Fire Fighting Measures

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

Section 6: Accidental Release Measures

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

Section 7: Handling and Storage

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

Section 8: Exposure Controls/Personal Protection

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

Section 9: Physical and Chemical Properties

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

Section 10: Stability and Reactivity

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

Section 11: Toxicological Information

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

Section 12: Ecological information

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

Section 13: Disposal Considerations

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

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

Section 14: Transportation Information

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

Section 15: Regulatory Information

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

Section 16: Other Information

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

16a Date of Revision 31 March 2015

Safety Data Sheet

Product Names: CGS, CGS-BL, CG8, CG8-BL, CG8-C, CG8-F, CG8-UPS, CG8-HP, CG8-NS, CG10, CG10-BL, CG10-UPS, CG10-HP, SACMP, SACMP-UPS

(Cation Exchange Resin in the Sodium Form)

Effective date 31 March 2015

Section 1: Identification

1a	Product Names	ResinTech CGS, CGS-BL, CG8, CG8-BL, CG8-C, CG8-F, CG8-UPS, CG8-HP, CG8-NS, CG10, CG10-BL, CG10-UPS, CG10-HP, SACMP, SACMP-UPS
1b	Common Name	Cation exchange resin in the sodium form.
1c	Intended use	All general purpose cation exchange for general use including water softening and demineralization.
1d	Manufacturer Address	ResinTech, Inc. 160 Cooper Road, West Berlin, NJ 08091 USA
	Phone Email	856-768-9600 ixresin@resintech.com

Section 2: Hazard Identification

2a	OSHA Hazard classification	Not hazardous or dangerous

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

2b	Product description	Amber, tan or black colored solid beads with little or no odor.
2c	Precautions for use	Safety glasses and gloves recommended. Slipping hazard if spilled.
2c	Potential health effects	Will cause eye irritation. Ingestion is not likely to pose a health risk.
2d	Environmental effects	Little or none.

Section 2A: Hazard classification UN OSHA globally harmonized system

Warning (contains ion exchange resin)

H320: Causes eye irritation (Category 2B)

Precautionary Statements

P264: Wash hands thoroughly after handling.

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

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

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

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

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

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

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

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

Section 3: Composition/ Information on Ingredients

3a	Chemical name	Polystyrene sulfonate in the sodium form
3b	Ingredients Polystyrene sulfonate in the sodium form	CAS# 69011-22-9 (40 - 60%)
	Water	CAS# 7732-18-5 (40 – 60%)

Section 4: First Aid Measures

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

Section 5: Fire Fighting Measures

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

Section 6: Accidental Release Measures

6a	Personal Precautions	Keep people away, spilled resin can be a slipping hazard, wear gloves and safety glasses to minimize skin or eye contact.
6b	Incompatible Chemicals	Strong oxidants can create risk of combustion products similar to burning.
6c	Environmental Precautions	Keep out of public sewers and waterways.
6d	Containment Materials	Use plastic, paper, or metal containers.
6e	Methods of Clean-up	Sweep up material and transfer to containers.

Section 7: Handling and Storage

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

Section 8: Exposure Controls/Personal Protection

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

Section 9: Physical and Chemical Properties

Appearance	Amber, tan, or black beads.
Flammability or explosive limits	Flammable above 500º C
Odor	None
Physical State	Solid
Vapor pressure	Not available
Odor threshold	Not available
Vapor density	Not available
pH	Near neutral (6 to 8 typical)
Relative density	Approx 800 grams/Liter
Melting point/freezing point	Does not melt, freezes at approx. 0 C
Solubility	Insoluble in water and most solvents
Boiling point	Does not boil
Flash point	Approx 500º C
Evaporation rate	Does not evaporate
Partition Coefficient (n-octonol/water)	Not applicable
Auto-ignition temperature	Approx 500º C
Decomposition temperature	Above 230º C
Viscosity	Not applicable

Section 10: Stability and Reactivity

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

Section 11: Toxicological Information

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

Section 12: Ecological information

12a	Eco toxicity	Not harmful to plant or animal life.
12b	Mobility	Insoluble.
12c	Biodegradability	Not biodegradable.
12d	Bioaccumulation	Insignificant.
12e	Other adverse effects	Not Harmful to the environment.

Section 13: Disposal Considerations

13a General considerations	Material is non-hazardous.
13b Disposal Containers	Most plastic and paper containers are suitable.
13c Disposal methods	No specific method necessary
13d Sewage Disposal	Not recommended
13e Precautions for incineration	May release toxic vapors when burned
13f Precautions for landfills	Resins used to remove hazardous materials may then become hazardous mixtures.

Section 14: Transportation Information

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

Section 15: Regulatory Information

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

Section 16: Other Information

The information provided in this safety data sheet is presented in good faith and believed to be accurate as of the effective data shown above. However, no warranty or guarantee of accuracy, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another. It is the buyer's responsibility to ensure that their activities comply with federal, state, and local laws.

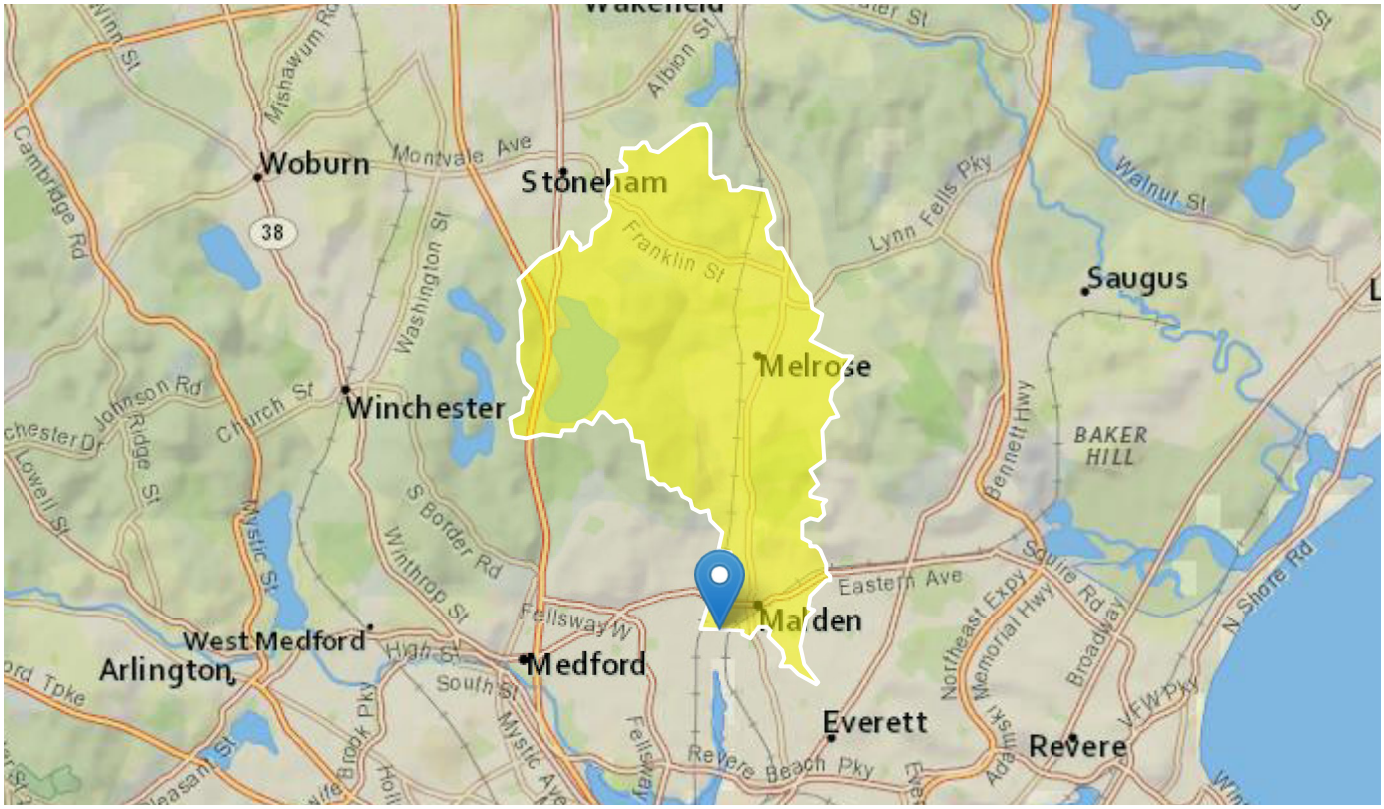
16a Date of Revision 31 March 2015

ATTACHMENT D:

STREAM STATS

StreamStats Report

Region ID: MA
Workspace ID: MA20200430221213499000
Clicked Point (Latitude, Longitude): 42.42186, -71.07311
Time: 2020-04-30 18:12:29 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	7.26	square miles
BSLDEM250	Mean basin slope computed from 1:250K DEM	2.91	percent
DRFTPERSTR	Area of stratified drift per unit of stream length	0.27	square mile per mile
MAREGION	Region of Massachusetts 0 for Eastern 1 for Western	0	dimensionless

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

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	7.26	square miles	1.61	149
BSLDEM250	Mean Basin Slope from 250K DEM	2.91	percent	0.32	24.6
DRFTPERSTR	Stratified Drift per Stream Length	0.27	square mile per mile	0	1.29
MAREGION	Massachusetts Region	0	dimensionless	0	1

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

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

Statistic	Value	Unit	PII	PIu	SE	SEp
7 Day 2 Year Low Flow	0.926	ft^3/s	0.323	2.55	49.5	49.5
7 Day 10 Year Low Flow	0.436	ft^3/s	0.119	1.48	70.8	70.8

Low-Flow Statistics Citations

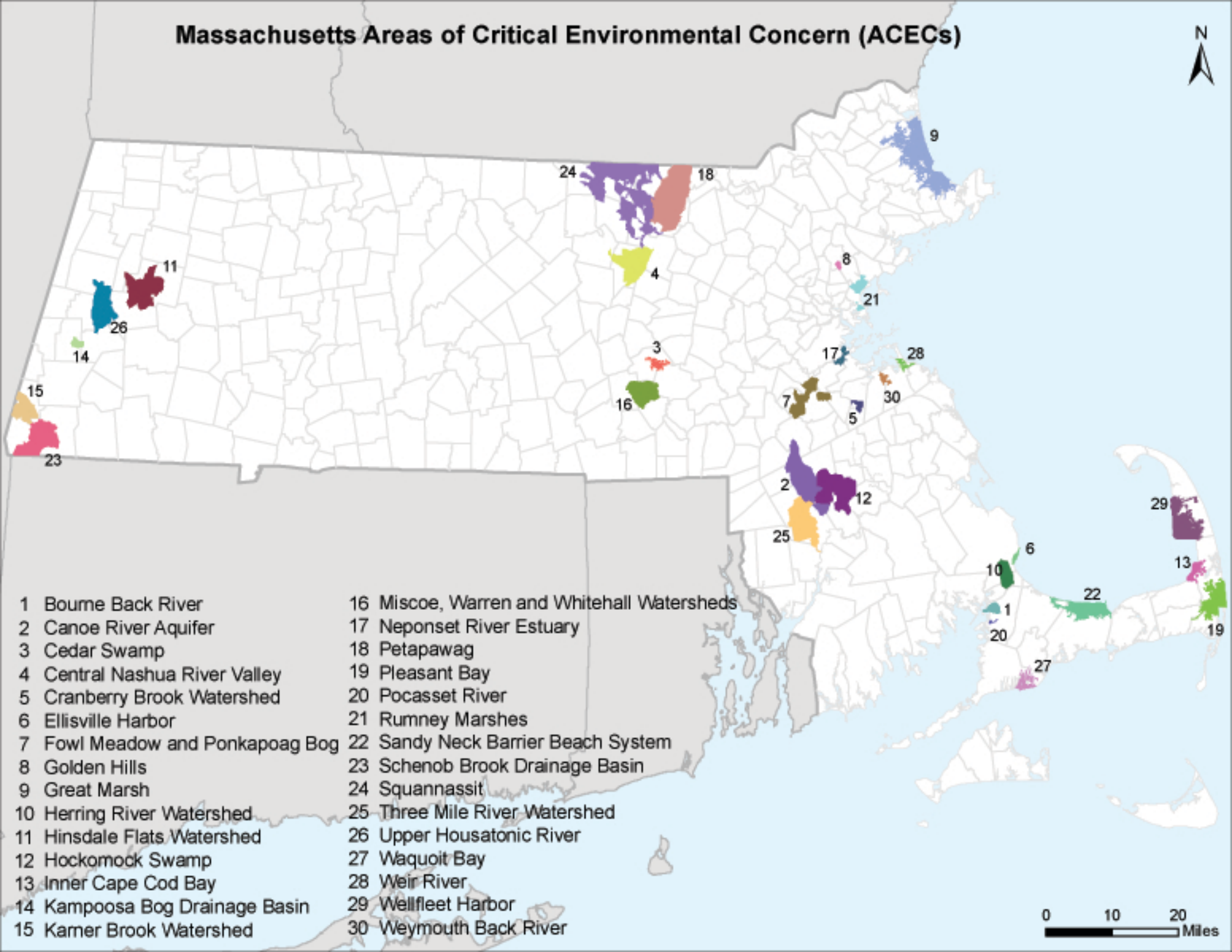
Ries, K.G., III,2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p. (http://pubs.usgs.gov/wri/wri004135/)

Application Version: 4.3.11

ATTACHMENT E:

AREAS OF CRITICAL ENVIRONMENTAL CONCERN DOCUMENTATION

Massachusetts Areas of Critical Environmental Concern (ACECs)



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

MASSACHUSETTS AREAS OF CRITICAL ENVIRONMENTAL CONCERN
November 2010

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

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

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

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

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

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

Ellisville Harbor
(600 acres, 1980) Plymouth

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

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

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

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

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

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

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

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

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

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

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

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

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

Pocasset River
(160 acres, 1980) Bourne

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

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

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

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

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

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

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

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

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

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

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

Towns with ACECs within their Boundaries — November 2010

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

.

ATTACHMENT F:

NATIONAL REGISTER OF HISTORIC PLACES AND MASSACHUSETTS HISTORICAL COMMISSION DOCUMENTATION

Massachusetts Cultural Resource Information System

MACRIS

MACRIS Search Results

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

Inv. No.	Property Name	Street	Town	Year
MAL.A	Converse Square		Malden	
MAL.B	Greystone Road		Malden	
MAL.C	Beachview Terrace		Malden	
MAL.D	Metropolitan Park System of Greater Boston		Malden	
MAL.E	Water Supply System of Metropolitan Boston		Malden	
MAL.F	Middlesex Fells Reservoirs Historic District		Malden	
MAL.G	Salem Street Civic Area		Malden	
MAL.H	Bell Rock Memorial Park		Malden	
MAL.I	Summer Street Area		Malden	
MAL.J	Middlesex Fells Reservation Parkways		Malden	
MAL.K	Fellsmere Park Parkways		Malden	
MAL.L	Fells Connector Parkways		Malden	
MAL.M	Rowe Quarry		Malden	
MAL.N	Pine Banks Park		Malden	
MAL.O	Corey Road Area		Malden	
MAL.P	Maplewood Square Area		Malden	
MAL.Q	Newman Road Area - Regent Gardens Area		Malden	
MAL.R	Pearl Street Area		Malden	
MAL.905	B & M Railroad Bridge over Adams Street	Adams St	Malden	c 1973
MAL.911	Adams Street Railroad Bridge	Adams St	Malden	c 1890
MAL.367	Murphy, Dennis - Ferino, Michael A. House	81 Adams St	Malden	r 1880
MAL.368	Murphy, Dennis - Ferino, Michael A. Garage	81 Adams St	Malden	
MAL.369	Murphy, Dennis - Ferino, Michael A. Shed	81 Adams St	Malden	
MAL.35	Gould, George L. House	24 Alpine St	Malden	1899
MAL.34	Fuller, Allen Tufts House	Appleton St	Malden	1894
MAL.50	Belmont Fire Station	Ashland St	Malden	1889
MAL.490	Welch, Annie D. B. House	9-11 Baldwin St	Malden	1914

Inv. No.	Property Name	Street	Town	Year
MAL.914	Barrett Lane Gate Posts	Barrett Ln	Malden	c 1896
MAL.88	Fuller, Lorin Tenant House	7 Barrett Ln	Malden	c 1861
MAL.282	Whitemore, Charles A. House	18 Bartlett St	Malden	c 1862
MAL.283	Ramsdell, Charles - Steck, James E. House	36 Bartlett St	Malden	1874
MAL.284	Ramsdell, Charles - Cefrey, Edward G. House	46 Bartlett St	Malden	1874
MAL.285	Wheeler, Albert M. House	60 Bartlett St	Malden	1884
MAL.182	Lodi, Angelo House	23 Beachview Terr	Malden	1900
MAL.183	Lodi, Alcesti House	29 Beachview Terr	Malden	1904
MAL.184	Fish, Bernardo House	47 Beachview Terr	Malden	1907
MAL.185	Pratt, George H. House	3 Beacon St	Malden	1851
MAL.21	Griffin, Tristram House	Bell Rock St	Malden	c 1870
MAL.466	Regent Gardens Apartment Building #1	57 Bell Rock St	Malden	1943
MAL.467	Regent Gardens Apartment Building #2	69 Bell Rock St	Malden	1943
MAL.468	Regent Gardens Apartment Building #3	73-79 Bell Rock St	Malden	1943
MAL.286	Ballard, Harry P. House	30 Beltran St	Malden	c 1855
MAL.287	Brown, Joseph T. House	31 Beltran St	Malden	1888
MAL.288	Burbank, Mary O. - Horne, Frederick E. House	37 Beltran St	Malden	1888
MAL.289	Graffam, William H. - Drew, Joseph W. House	49 Beltran St	Malden	1883
MAL.290	Wellman, Edward W. House	54 Beltran St	Malden	1884
MAL.28	Lemon, Edward R. House	82 Beltran St	Malden	1893
MAL.186	Turpee, David House	84 Beltran St	Malden	1893
MAL.164	Davis, Pearl - Heath, William House	1 Bickford Rd	Malden	1892
MAL.89	Vinton, John Jr. - Fall, Gershem L. House	2-4 Bickford Rd	Malden	1838
MAL.165	LaBlanc, Fred House	3 Bickford Rd	Malden	1892
MAL.166	LaFreneire, Joseph House	5 Bickford Rd	Malden	1892
MAL.90	Barrett, Robert Tenant House	7 Bickford Rd	Malden	c 1866
MAL.91		9 Bickford Rd	Malden	r 1900
MAL.92	Pitts, Frank House	11 Bickford Rd	Malden	1886
MAL.93	Carter Tenant Double House	15-17 Bickford Rd	Malden	c 1871
MAL.934	Fellsmere Park Parkway - Boundary Road	Boundary Rd	Malden	r 1880
MAL.77	Esso Station	Broadway	Malden	c 1928
MAL.268	Holy Cross Cemetery Administration Building	175 Broadway	Malden	1908
MAL.802	Holy Cross Cemetery	175 Broadway	Malden	1868
MAL.187	Clapp, Timothy House	273 Broadway	Malden	c 1847
MAL.87	Browne, Marcia P. Junior High School	295 Broadway	Malden	1905
MAL.6	Hunt House	406 Broadway	Malden	c 1800
MAL.188	Congregation Ezrath Israel Synagogue	333 Bryant St	Malden	1928
MAL.10	Odiorne, Thomas House	15 Cedar St	Malden	c 1825

Inv. No.	Property Name	Street	Town	Year
MAL.903	B & M Railroad Bridge over Center Street	Center St	Malden	1973
MAL.189	Malden Electric Power Plant	63 Centre St	Malden	1903
MAL.904	B & M Railroad Bridge over Charles Street	Charles St	Malden	1973
MAL.910	Charles Street Railroad Bridge	Charles St	Malden	c 1895
MAL.190	Malden Ford Motor Company Showroom	11 Charles St	Malden	1925
MAL.370	Hibernian Hall	257-261 Charles St	Malden	1894
MAL.371	Farmer, Thomas - Morrison, Angus House	267 Charles St	Malden	c 1875
MAL.372	Hogan, James - Treanor, John J. House	271 Charles St	Malden	r 1880
MAL.373	Murphy, Michael - Skerry, William J. House	291 Charles St	Malden	r 1880
MAL.191	Malden First Swedish Lutheran Church	52 Church St	Malden	1897
MAL.901	Clifton Street Bridge over B & M Railroad	Clifton St	Malden	1899
MAL.192	Cox, Capt. Unite - Haven, Gilbert Double House	35-37 Clifton St	Malden	c 1811
MAL.193	Jordan, Lyman B. House	65 Clifton St	Malden	r 1820
MAL.31		181 Clifton St	Malden	c 1885
MAL.194	Graffam, Peter House	181 Clifton St	Malden	1881
MAL.195	Holmes, Edward O. - Spofford, Philip A. House	279 Clifton St	Malden	1884
MAL.94	Barrett, Harry House	5 Concord St	Malden	1899
MAL.95	Barrett, Henry House	11 Concord St	Malden	1837
MAL.96	Robbins, Dr. Horace House	17 Concord St	Malden	1923
MAL.97		21 Concord St	Malden	1899
MAL.98	Russell Apartments	27-29 Concord St	Malden	1902
MAL.196	Ryder, Frederick T. House	20 Converse Ave	Malden	1904
MAL.197	Ryder, Frederick T. House	26 Converse Ave	Malden	1896
MAL.198	Stevens, Edward A. House	30 Converse Ave	Malden	1873
MAL.199	Worcester, Henry House	36 Converse Ave	Malden	c 1874
MAL.291	Brass, Oscar G. House	11 Corey Rd	Malden	1958
MAL.292	Brudnick, Irving s. House	16 Corey Rd	Malden	1957
MAL.293	Reinherz, Samuel E. House	17 Corey Rd	Malden	1955
MAL.406	Reinherz, Samuel E. Garage	17 Corey Rd	Malden	1955
MAL.407	Steinberg, Howard House	24 Corey Rd	Malden	1956
MAL.294	Goodman, Robert - Hoffman, Irving House	29 Corey Rd	Malden	1956
MAL.408	Slater, Samuel House	30 Corey Rd	Malden	1956
MAL.409	Brown, Aaron House	48 Corey Rd	Malden	1961
MAL.410	Pressman, Samuel D. House	51 Corey Rd	Malden	1956
MAL.295	Lapin, Mason I. House	54 Corey Rd	Malden	1960
MAL.411	Chernov, Max A. House	63 Corey Rd	Malden	1957
MAL.54	Belmont School	Cross St	Malden	1889
MAL.200	Fuller, Gov. Alvan T. House	74-76 Cross St	Malden	1895

Inv. No.	Property Name	Street	Town	Year
MAL.270	Fuller, Gov. Alvan T. Bicycle Shop	74-76R Cross St	Malden	1898
MAL.201	Tufts, Benjamin A. House	80 Cross St	Malden	c 1845
MAL.913	Hitchings Field - Ferryway Green - Newman Park	150 Cross St	Malden	c 1895
MAL.85	Lincoln Elementary School	305 Cross St	Malden	c 1923
MAL.57	Daniels, Charles A. School	Daniels St	Malden	1906
MAL.374	Congregation Beth Israel (West) Synagogue	10 Dexter St	Malden	1964
MAL.36		41 Dexter St	Malden	c 1902
MAL.296	Denne, G. B. - Upton, Eugene C. House	55 Dexter St	Malden	1889
MAL.298	Foque, T. N. - Waterman, Arthur O. House	57-59 Dexter St	Malden	1883
MAL.297	Damon, Alexander T. House	58 Dexter St	Malden	1885
MAL.299	Bradley, Arthur L. - Miliken, Francis R. House	67 Dexter St	Malden	c 1882
MAL.300	Wingate, George E. House	83-85 Dexter St	Malden	1888
MAL.301	Crocker, Mathias E. House	86 Dexter St	Malden	1888
MAL.302	Eaton, Nathan L. House	89 Dexter St	Malden	1888
MAL.303	Carter, Sarah P. - Collins, Francis S. House	95 Dexter St	Malden	1884
MAL.304	Merrill, B. B. - Middleby, Joseph House	96 Dexter St	Malden	1889
MAL.202	Swazy, George H. - Burlen, Robert House	107 Dexter St	Malden	1885
MAL.306	Clapp, Frank E. - Osgood, Robert G. House	126 Dexter St	Malden	1892
MAL.307	Russell, George W. - James, Lewis E. House	134 Dexter St	Malden	1897
MAL.308	Seavey, Edward E. - Oaks, Milton P. House	148 Dexter St	Malden	1898
MAL.309	Noyes, Edward W. - Hobart, Frank E. House	1 Earl St	Malden	1893
MAL.310	Ball, Charles E. House	14 Earl St	Malden	1893
MAL.311	Lord, Edwin R. - Chisholm, Harold W. House	34 Earl St	Malden	1912
MAL.930	Middlesex Fells Reservation - East Border Road	East Border Rd	Malden	c 1896
MAL.8		Eastern Ave	Malden	c 1820
MAL.203	Boston Dye House - Golden Bell Cleaners	22-28 Eastern Ave	Malden	1927
MAL.204	Revere Knitting Mills	124 Eastern Ave	Malden	1921
MAL.375	Grossman, L. Sons Inc.	260 Eastern Ave	Malden	1949
MAL.81	Malden Knitting Mills	323 Eastern Ave	Malden	1915
MAL.376	Continental Baking Company Truck Depot	420 Eastern Ave	Malden	1965
MAL.377	Malden Auto Wash	435 Eastern Ave	Malden	1965
MAL.378	Shohet, Frederick Realty Trust Building	471 Eastern Ave	Malden	1971
MAL.379	First Church of the Nazarene	529 Eastern Ave	Malden	1971
MAL.380	Continental Can Company Cannery	698 Eastern Ave	Malden	1936
MAL.381	Friend Brothers Cannery and Bakery	730 Eastern Ave	Malden	1927
MAL.382	Baldau, Fred W. Meat Packing Business - Water Works Supply Building	869 Eastern Ave	Malden	1969
MAL.179	Judy's Diner	906 Eastern Ave	Malden	r 1935

Inv. No.	Property Name	Street	Town	Year
MAL.46	First Parish Universalist Church	2 Elm St	Malden	1909
MAL.488	New England Telephone and Telegraph Central Dial Exchange Building	7 Elm St	Malden	1947
MAL.312	Gage, George E. - Blakeslee, George E. House	65 Elm St	Malden	1892
MAL.313	Libby, Levi L. - Halsey, E. Abby House	75 Elm St	Malden	1896
MAL.383	Kilbride Dairy Barn	162 Emerald St	Malden	c 1917
MAL.803	Saint Mary's Roman Catholic Cemetery	Fellsway East	Malden	1854
MAL.907	Fellsmere Park - Boston Rubber Shoe Co. Reservoir	Fellsway East	Malden	1893
MAL.908	Cradock Field	Fellsway East	Malden	1898
MAL.928	Fellsmere Park	Fellsway East	Malden	1893
MAL.929	Middlesex Fells Reservation - Fellsway East	Fellsway East	Malden	c 1930
MAL.935	Fells Connector Parkway - Fellsway East	Fellsway East	Malden	1895
MAL.936	Fells Connector Parkway - Fellsway East Miter	Fellsway East	Malden	r 1920
MAL.937	Fellsway Connector Parkway - Fellsway East Medians	Fellsway East	Malden	1895
MAL.938	Fellsway Connector - Fellsway East Tree Canopy	Fellsway East	Malden	r 1935
MAL.205	Immaculate Conception Convent	2 Fellsway East	Malden	1926
MAL.941	Fells Connector Parkway - Fellsway West	Fellsway West	Malden	1897
MAL.942	Fells Connector Parkway - Fellsway West Median	Fellsway West	Malden	1897
MAL.275		13 Fenwick St	Malden	c 1900
MAL.276		16 Fenwick St	Malden	c 1900
MAL.280		27 Fenwick St	Malden	c 1900
MAL.277		46 Fenwick St	Malden	c 1900
MAL.278		46R Fenwick St	Malden	c 1900
MAL.491	Malden Industrial Aid Association Building	15 Ferry St	Malden	1906
MAL.206	Waitt, Charles G. Building	115-125 Ferry St	Malden	1892
MAL.25	Holmes, William A. House	240 Ferry St	Malden	c 1870
MAL.18	Faulkner, David House	410 Ferry St	Malden	1849
MAL.44	First Church, Congregational	Forest St	Malden	1893
MAL.804	Forest Dale Cemetery	150 Forest St	Malden	1885
MAL.11	Pratt, John House	152 Forest St	Malden	c 1828
MAL.269	Forest Dale Cemetery Office and Garage	152 Forest St	Malden	1935
MAL.364	Malden Almshouse	341 Forest St	Malden	1871
MAL.314	King, Caleb B. House	47 Francis St	Malden	1883
MAL.315	Bascom, Henry A. - Burbank, Edward House	50 Francis St	Malden	1883
MAL.207	Malden Knitting Mills	89 Franklin St	Malden	1915
MAL.99	Murray, Frederick - McGrath, Mary House	1 Gellineau St	Malden	1905

Inv. No.	Property Name	Street	Town	Year
MAL.100	Soulee, William - Johnson, Alden Double House	5 Gellineau St	Malden	1911
MAL.9	Simonds, George House	9 Gellineau St	Malden	c 1841
MAL.316	Holmes, Charles M. - Bunnell, Graves W. House	11 Glen St	Malden	1895
MAL.317	Holmes, Charles M. House	36 Glen St	Malden	c 1870
MAL.318	Holmes, Charles M. Carriage House	44 Glen St	Malden	c 1870
MAL.208	Barnes, Levi House	70 Glen St	Malden	1859
MAL.56	Glenwood School	Glenwood St	Malden	1898
MAL.209	Mansfield, George S. House	57 Glenwood St	Malden	1889
MAL.210	Corse, William A. - Carmichael, Henry House	67 Glenwood St	Malden	1884
MAL.211	Staples, John E. House	101 Glenwood St	Malden	1892
MAL.212	Page, Gilman House	176 Glenwood St	Malden	1867
MAL.213	Bayley, Elizabeth - Currier, Frederick G. House	15 Gould Ave	Malden	1876
MAL.214	Crie, Issaac H. House	19 Gould Ave	Malden	1878
MAL.215	Dexter, James H. House	27 Gould Ave	Malden	1878
MAL.216	Craig, David W. House	35 Gould Ave	Malden	1877
MAL.217	Abbott, George E. - Dwinnell, Frank F. House	43 Gould Ave	Malden	1877
MAL.319	Pratt, Ezra F. - Thompson, Henry M. House	39 Grace St	Malden	1896
MAL.320	Pratt, Ezra F. - Wilson, Adrian House	41 Grace St	Malden	c 1897
MAL.321	Pratt, Ezra F. - Norris, Charles House	47 Grace St	Malden	1897
MAL.322	Sammet, Benjamin F. House	51 Grace St	Malden	1904
MAL.412	Swedish (Covenant) Congregational Church	2 Granite St	Malden	1911
MAL.78	Malden City Stables	Green St	Malden	1887
MAL.218	Reeve, Isabella A. - Bacall, William F. House	21 Greystone Rd	Malden	1896
MAL.29	Holmes, Edward O. - Prior, Dr. Charles E. House	25 Greystone Rd	Malden	c 1899
MAL.219	Keen, William C. - Barrett, Harry G. House	28 Greystone Rd	Malden	1897
MAL.220	Holmes, Edward O. House	31 Greystone Rd	Malden	1895
MAL.221	Brewerton, James House	34 Greystone Rd	Malden	1896
MAL.222	Butler, James H. House	45 Greystone Rd	Malden	1904
MAL.485	Oak Grove Community Hall	6 Grove St	Malden	1927
MAL.323	Hilton, John A. House	40 Hawthorne St	Malden	1891
MAL.324	Clark, John L. House	61 Hawthorne St	Malden	1909
MAL.325	Tilson, James W. - Westcott, Charles H. House	135 Hawthorne St	Malden	1895
MAL.326	Porter, Dwight House	149 Hawthorne St	Malden	1895
MAL.385	Cannarozzo, Joseph Building	225-229 Highand Ave	Malden	1931
MAL.86	Emerson Elementary School	Highland Ave	Malden	1939
MAL.939	Fells Connector Parkway - Highland Avenue Island	Highland Ave	Malden	r 1920
MAL.327	Powers, Patrick H. House	131-137 Highland Ave	Malden	1876

Inv. No.	Property Name	Street	Town	Year
MAL.384	Kelley Building	180-182 HIghland Ave	Malden	c 1890
MAL.328	Driscoll, Jeremiah F. Block	185-187 Highland Ave	Malden	1894
MAL.386	Mauro Tricca Building	254-256 Highland Ave	Malden	c 1922
MAL.387	Sbracci, Enea Barber Shop and House	260-262 Highland Ave	Malden	c 1890
MAL.388	O'Connell, Edward J. House and Barber Shop	266-268 highland Ave	Malden	c 1897
MAL.389	Immaculate Conception Boys Catholic High School	306 Highland Ave	Malden	1931
MAL.390	Immaculate Conception Boys Catholic Grammar School	306 Highland Ave	Malden	1946
MAL.223	Bailey, Charles C. - Kelly, John J. House	472 Highland Ave	Malden	1892
MAL.329	Roberts, Walter H. House	490 Highland Ave	Malden	1896
MAL.224	Peabody, Augustus V. - Swett, J. Parker House	2 Highland Terr	Malden	c 1908
MAL.38	First Unitarian Meeting House	Hillside Ave	Malden	1878
MAL.17	Morey, David B. House	34 Hillside Ave	Malden	c 1845
MAL.330	O'Donnell, Michael S. - DiSanzio, Sabatino House	10 Hubbard St	Malden	r 1870
MAL.331	Metcalf, George - Belliveau, William S. House	18 Hubbard St	Malden	c 1872
MAL.332	Gooch, Joseph - McShane, Patrick House	20 Hubbard St	Malden	c 1883
MAL.333	Gooch, Joseph - McShane, Patrick House	24-28 Hubbard St	Malden	c 1882
MAL.334	Branigan, Michael House	30 Hubbard St	Malden	1895
MAL.335	Hastings, Albert W. House	34 Hubbard St	Malden	c 1875
MAL.336	Neville, Daniel J. - Dianto, Francis House	36 Hubbard St	Malden	1884
MAL.337	Palmer, Margaret A. - Gately, John House	48 Hubbard St	Malden	1896
MAL.338	Palmer, Margaret A. - Mahoney, Mary House	52 Hubbard St	Malden	1895
MAL.339	O'Brien, Timothy House	58 Hubbard St	Malden	1873
MAL.167	Knight, Ralph Two-family House	7-9 Hudson St	Malden	1905
MAL.168	Gold, William - Whidden, Catherine House	11-13 Hudson St	Malden	1906
MAL.169	Lily, Josiah - Benjamin, Philip House	15-17 Hudson St	Malden	1905
MAL.225	Cheverus Centennial School	30 Irving St	Malden	1910
MAL.340	Russell, George D. House	33 Ivy Rd	Malden	c 1847
MAL.226	Patch, Hamilton House	49 Las Casas St	Malden	1897
MAL.227	Robinson, Arthur L. - Bunker, Ernest House	54 Las Casas St	Malden	1898
MAL.228	Steer, Emily - Shaw, Edgar D. House	62 Las Casas St	Malden	1896
MAL.52	Maplewood Fire House	4 Laurel St	Malden	1903
MAL.413	Saint Joseph School #2	50 Laurel St	Malden	1961
MAL.39	Linden Congregational Church	146 Lawrence St	Malden	1879
MAL.229	Hawkridge, John Lloyd House	155 Lawrence St	Malden	1916
MAL.801	Hebrew Cemetery - Hebrew Charitable Burial Ground	Lebanon St	Malden	1851

Inv. No.	Property Name	Street	Town	Year
MAL.415	Nelson's Bakery - Great Atlantic and Pacific Tea Comapny	12-24 Lebanon St	Malden	1910
MAL.416	Malden Savings Bank	28 Lebanon St	Malden	1954
MAL.417		29-31 Lebanon St	Malden	1875
MAL.418	Maplewood Block - Columbian Hall	35-45 Lebanon St	Malden	1894
MAL.419		36-40 Lebanon St	Malden	c 1930
MAL.420	Hazen Garage	42-44 Lebanon St	Malden	c 1920
MAL.421		53 Lebanon St	Malden	c 1890
MAL.422		60 Lebanon St	Malden	c 1940
MAL.423		63-65 Lebanon St	Malden	c 1890
MAL.424		71-73 Lebanon St	Malden	c 1890
MAL.425		75-77 Lebanon St	Malden	c 1890
MAL.426		99 Lebanon St	Malden	c 1900
MAL.427		107 Lebanon St	Malden	c 1900
MAL.428		115 Lebanon St	Malden	c 1900
MAL.429	Martin's Flower Shop and Greenhouse	119 Lebanon St	Malden	1946
MAL.1	Trading Post, Old	380 Lebanon St	Malden	c 1723
MAL.341	Baxter, Sylvester House	11 Ledgewood Terr	Malden	c 1882
MAL.926	Waitts Mount Park	Leonard St	Malden	1885
MAL.230	Saint Luke's Episcopal Church	388 Lynn St	Malden	1892
MAL.4	Bailey, Timothy House	20 Madison St	Malden	c 1796
MAL.231	Massachusetts Wire Company Building	121 Madison St	Malden	1891
MAL.47	Malden City Hall, Old	Main St	Malden	1857
MAL.917	Bell Rock Memorial Park	Main St	Malden	1908
MAL.918	Bell Rock Memorial Park - The Flag Defenders	Main St	Malden	1910
MAL.919	Bell Rock Park - Revolutionary War Memorial	Main St	Malden	1905
MAL.920	Bell Rock Memorial Park - Malden Founders Memorial	Main St	Malden	1910
MAL.921	Bell Rock Park - Wigglesworth, Michael Memorial	Main St	Malden	1930
MAL.922	Bell Rock Park - 1st and 2nd Meetinghouse Marker	Main St	Malden	1930
MAL.923	Spanish War Veterans - G. A. R. Memorial	Main St	Malden	1941
MAL.924	Bell Rock Park - Robinson, John Victor Memorial	Main St	Malden	1944
MAL.925	Bell Rock Park - World War II Memorial Gateway	Main St	Malden	1953
MAL.2	Parsonage, The	145 Main St	Malden	1724
MAL.232	Rogers, Jonathan House	287 Main St	Malden	1846
MAL.43	Church of the Sacred Hearts	315 Main St	Malden	1893
MAL.76	Jack in the Box	375 Main St	Malden	1926
MAL.73	Malden Savings Bank	397 Main St	Malden	1921

Inv. No.	Property Name	Street	Town	Year
MAL.72	Riley's Roast Beef	409 Main St	Malden	c 1920
MAL.71	Jerry's Army Navy Store	415 Main St	Malden	1926
MAL.70	Neipris Building	417 Main St	Malden	1923
MAL.58	Waitt Brick Block	422-424 Main St	Malden	c 1848
MAL.62		423-425 Main St	Malden	c 1875
MAL.67		425-427 Main St	Malden	c 1912
MAL.69	Trafton Building	428-436 Main St	Malden	1921
MAL.66	Odd Fellows Building	442 Main St	Malden	1907
MAL.61	Barrett's Opera House	454 Main St	Malden	1886
MAL.42	First Baptist Church of Malden	485 Main St	Malden	1890
MAL.101	First Baptist Church Parish House	493 Main St	Malden	1914
MAL.170	Silas Chevrolet - Saywood Motors Showroom	507-519 Main St	Malden	1924
MAL.171	Malden Auto Sales - Hall's Auto Service	521-535 Main St	Malden	1925
MAL.102	Damon, Charles House	543 Main St	Malden	1846
MAL.103	Faulkner, Joseph House	555 Main St	Malden	1886
MAL.104	Malden Christian Science Church	575 Main St	Malden	c 1920
MAL.105	Arnold, Frank S. - Fehr, Dr. Allen House	585 Main St	Malden	1891
MAL.106	Stevens, Dr. Andrew - Weltman, Leon House	599 Main St	Malden	1894
MAL.233	Pine Banks Park Gatekeeper Lodge	1079 Main St	Malden	1888
MAL.271	Pine Banks Park Zoo Monkey House	1079 Main St	Malden	c 1915
MAL.272	Middlesex Fells Park Concession Stand	1079 Main St	Malden	
MAL.365	Pine Banks Park Toolhouse and Garage	1079 Main St	Malden	1940
MAL.366	Pine Banks Park - Santa's Workshop	1079 Main St	Malden	c 1950
MAL.927	Pine Banks Park	1079 Main St	Malden	1884
MAL.945	Pine Banks Park Concrete Letters Sign	1079 Main St	Malden	1940
MAL.915	Main Street Park Gate Posts	Main Street Pk	Malden	c 1889
MAL.172	Van Buskirk, James House	15 Main Street Pk	Malden	1889
MAL.175	Fuller, Henry L. House	16 Main Street Pk	Malden	1889
MAL.173	Brigham, Harry House	19 Main Street Pk	Malden	1889
MAL.176	Hutchins, John House	20 Main Street Pk	Malden	1889
MAL.174	Gay, George House	25 Main Street Pk	Malden	1889
MAL.177	Fison, Herbert W. House	26 Main Street Pk	Malden	1889
MAL.107	Fuller, Lorin L. House	29-30 Main Street Pk	Malden	c 1861
MAL.342	Mooney, John House	53 Malden St	Malden	c 1854
MAL.343	McShane, John House	79 Malden St	Malden	r 1855
MAL.19	Redpath, James House	54 Maple St	Malden	c 1850
MAL.234	Cobb, Elisha House	117 Maple St	Malden	1890
MAL.344	Mathews, Richard - Morse, James H. House	143 Maple St	Malden	c 1882

Inv. No.	Property Name	Street	Town	Year
MAL.345	Marshall, James House	147 Maple St	Malden	c 1883
MAL.346	Merrill, Frederick T. House	158 Maple St	Malden	c 1886
MAL.235	Kelly, John J. Carriage House	198-200 Maple St	Malden	1903
MAL.433	Cooke, S. M. House	18 Maplewood Rd	Malden	c 1875
MAL.430		2-8 Maplewood St	Malden	
MAL.431	Barker, George House	12 Maplewood St	Malden	c 1875
MAL.432	Cotton, Lewis E. House	15 Maplewood St	Malden	c 1875
MAL.434	Gould, George L. House	24 Maplewood St	Malden	c 1875
MAL.236	Ayers, Orlando H. House	48 Maplewood St	Malden	1864
MAL.80	Alumno Skating Shoe Factory	67 Maplewood St	Malden	1924
MAL.59	Boston & Maine Railroad - Maplewood Street Station	81 Maplewood St	Malden	c 1853
MAL.79	Robinson Soap Company Building	Medford St	Malden	1892
MAL.800	Bell Rock Cemetery	Medford St	Malden	c 1649
MAL.906	B & M Railroad Bridge over Medford Street	Medford St	Malden	c 1973
MAL.3		22 Meridian St	Malden	c 1780
MAL.912	Middlesex Fells Reservoir	Middlesex Fells	Malden	c 1898
MAL.82	Boston Elevated Railway Power Station	Middlesex St	Malden	1911
MAL.237	Welch, Franklin I. House	197 Mount Vernon St	Malden	1894
MAL.900	Mountain Avenue Bridge over MBTA Railroad	Mountain Ave	Malden	1890
MAL.48	Malden Ward Three Fire Station	22 Mountain Ave	Malden	1895
MAL.486	Wilcox, William Henry and Annie Holmes Goodenow House	80 Mountain Ave	Malden	1879
MAL.180	Malden National Guard Armory	129 Mountain Ave	Malden	1907
MAL.391	Holmes, Chester W. Elementary School	240 Mountain Ave	Malden	1962
MAL.347	O'Donnell, Michael S. - Tribble, A. Roy House	31 Murray Hill Rd	Malden	c 1878
MAL.469	Regent Gardens Apartment Building #4	20-30 Newman Rd	Malden	1943
MAL.470	Regent Gardens Apartment Building #5	23-33 Newman Rd	Malden	1943
MAL.471	Regent Gardens Apartment Building #6	32-42 Newman Rd	Malden	1943
MAL.472	Regent Gardens Apartment Building #7	43-51 Newman Rd	Malden	1943
MAL.473	Regent Gardens Apartment Building #8	46-54 Newman Rd	Malden	1943
MAL.474	Regent Gardens Apartment Building #9	55-63 Newman Rd	Malden	1943
MAL.475	Regent Gardens Apartment Building #10	56-64 Newman Rd	Malden	1943
MAL.348	Hunter, Thomas - Hittl, Erhard House	45 Oakland St	Malden	c 1849
MAL.349	Finn, John House	49 Oakland St	Malden	c 1863
MAL.350	Foley, Cornelius House	55 Oakland St	Malden	1889
MAL.351	Donovan, Patrick House	57 Oakland St	Malden	c 1855
MAL.487	Malden Fire Department - Linden Fire House	139 Oliver St	Malden	1907

Inv. No.	Property Name	Street	Town	Year
MAL.12	Waitt, Darius House	14-16 Orchard St	Malden	c 1830
MAL.108	Faulkner, David - Corey, George House	21 Park St	Malden	c 1850
MAL.109	Corey, George - Hall, Charles House	23 Park St	Malden	1878
MAL.110	Gilchrist, John - Wilmarth, Melina Double House	27-29 Park St	Malden	c 1858
MAL.111	Rich, Mary House	28 Park St	Malden	r 1890
MAL.112	Majestic Apartments	33 Park St	Malden	1929
MAL.113	Hanson, George - Rich, Richard House	34 Park St	Malden	1850
MAL.114	Erickson, Leonard House	35 Park St	Malden	1923
MAL.115	Waite, Caleb House	37-39 Park St	Malden	c 1850
MAL.116	Shepard, David R. House	38 Park St	Malden	c 1847
MAL.117	Wilmarth, Seth Carriage House	42 Park St	Malden	c 1871
MAL.118	Rich, Henry - Greene, John House	43 Park St	Malden	c 1850
MAL.22	Whitehouse - Wilmarth, Seth House	44 Park St	Malden	c 1852
MAL.119	Park Apartments	46-50 Park St	Malden	1928
MAL.238	Millett, Joshua H. House	22 Parker St	Malden	1896
MAL.476	Clinton, Ann House	99 Pearl St	Malden	c 1870
MAL.478	Cardillo, Augustino House	103 Pearl St	Malden	c 1870
MAL.479	Marangiello House	105 Pearl St	Malden	c 1870
MAL.480	DiGiandomenico, Giovanni House	107 Pearl St	Malden	c 1870
MAL.481	Magliochetti, Frank House	109 Pearl St	Malden	c 1870
MAL.482	Gianquitto, John House	111 Pearl St	Malden	c 1870
MAL.483	Papile, John Grocery Store	113 Pearl St	Malden	c 1870
MAL.392	McCarthy, John J. Apartments	133-137 Pearl St	Malden	c 1900
MAL.393	Foster, Julius A. Block	141-145 Pearl St	Malden	r 1880
MAL.394	Donahue, John J. Block	142-144 Pearl St	Malden	c 1897
MAL.395	Donahue, John J. - Rizzo, Giuseppe House	146 Pearl St	Malden	r 1880
MAL.396	Gibney, Sylvester - Giuseppe Tamasi House	150 Pearl St	Malden	c 1875
MAL.397	Santoro House	165 Pearl St	Malden	c 1875
MAL.51	Edgeworth Fire House	176 Pearl St	Malden	1891
MAL.239	Edgeworth Mission Congregational Society Chapel	257 Pearl St	Malden	1866
MAL.477	Gianatassio House	477 Pearl St	Malden	c 1870
MAL.53	Leonard, Laura A. School	Pleasant St	Malden	1884
MAL.902	B & M Railroad Bridge over Pleasant Street	Pleasant St	Malden	c 1973
MAL.64		1-3A Pleasant St	Malden	c 1902
MAL.75	Pleasant Building	5 Pleasant St	Malden	1961
MAL.74	Dowling Building	6 Pleasant St	Malden	1921
MAL.60	Barrett Building - Red Men's Hall	15-23 Pleasant St	Malden	1884

Inv. No.	Property Name	Street	Town	Year
MAL.240	West, Alonzo A. Building	31-35 Pleasant St	Malden	1925
MAL.241	Malden First National Bank	46-50 Pleasant St	Malden	1901
MAL.242	Bailey Block - Kresge, S. S. Company	54-60 Pleasant St	Malden	1926
MAL.243	Woolworth, F. W. Department Store	62-68 Pleasant St	Malden	1940
MAL.244	Grant, William T. Department Store	80-86 Pleasant St	Malden	1941
MAL.178	Malden Y. M. C. A. Building	83 Pleasant St	Malden	1895
MAL.245	Malden Trust Company Bank	94-96 Pleasant St	Malden	1913
MAL.916	Dandy Donuts Sign	101 Pleasant St	Malden	1965
MAL.247	Browne Building	126-150 Pleasant St	Malden	1894
MAL.181	Kaulback Building	154-172 Pleasant St	Malden	1909
MAL.246	Morgan, A. B. Block	169-185 Pleasant St	Malden	1920
MAL.83	Haven, Wilbur Fiske House	339 Pleasant St	Malden	c 1866
MAL.484	Bradley, Ira and Marietta R. Bailey House	368 Pleasant St	Malden	1864
MAL.84	Beebe Junior High School	403 Pleasant St	Malden	1927
MAL.248	Prescott, Calvin S. House	467 Pleasant St	Malden	1856
MAL.249	Miller, Joseph - Clapp, Austin M. House	479 Pleasant St	Malden	c 1876
MAL.398	Immaculate Conception Roman Catholic Church	594 Pleasant St	Malden	1961
MAL.14	Pratt, Henry House	19 Pratt St	Malden	c 1837
MAL.250	Johnson, Benjamin House	22 Pratt St	Malden	1880
MAL.279	Anthony - Marshall House	29 Ricker St	Malden	c 1900
MAL.251	Turner, William G. A. House	5 Ridgewood Rd	Malden	1909
MAL.352	Seaver, William D. House	105 Rockland Ave	Malden	1888
MAL.353	Kelley, James H. - Snow, William B. House	109 Rockland Ave	Malden	c 1876
MAL.354	Nute, John H. House	134 Rockland Ave	Malden	1887
MAL.909	Route 1 Bridge over Lynn Street	Rt 1	Malden	1937
MAL.355	Massa, Michael - Mouradjian, Tatios House	47 Russell St	Malden	1928
MAL.399	Russell, Hubbard - Schiavone, Ralph House	62 Russell St	Malden	c 1865
MAL.400	Renzullo House	68-70 Russell St	Malden	r 1865
MAL.401	Sullivan - Norton House	73 Russell St	Malden	r 1865
MAL.252	Haushaller, Augustus House	76 Russell St	Malden	c 1886
MAL.253	Fitzpatrick, Edward House	77 Russell St	Malden	1882
MAL.254	Palmer, Anthony B. - McCarthy, James F. House	84 Russell St	Malden	1883
MAL.255	Neville, Abraham J. House	87 Russell St	Malden	1885
MAL.402	Sullivan, Cornelius House	93 Russell St	Malden	r 1880
MAL.453	Maplewood Baptist Church	729 Salem St	Malden	1937
MAL.45	Faulkner Methodist Church	Salem St	Malden	1907
MAL.55	Malden High School	Salem St	Malden	1899
MAL.68	Sargent Block	1-11 Salem St	Malden	1916

Inv. No.	Property Name	Street	Town	Year
MAL.49	Converse Memorial Building	36 Salem St	Malden	c 1884
MAL.33	Davenport, Albert H. House	70 Salem St	Malden	1891
MAL.256	Malden High School	77 Salem St	Malden	1939
MAL.120	Central Fire Station	80 Salem St	Malden	1918
MAL.805	Salem Street Cemetery	155 Salem St	Malden	1832
MAL.13	Small, George A. Insurance Company	243 Salem St	Malden	c 1830
MAL.403	Salem Towers	280 Salem St	Malden	1964
MAL.461	Kearns, Hugh B. House	461 Salem St	Malden	r 1895
MAL.404	Temple Tifereth Isarel	549 Salem St	Malden	1954
MAL.435	Christ United Methodist Church	577 Salem St	Malden	1966
MAL.436		603 Salem St	Malden	c 1875
MAL.437		609 Salem St	Malden	c 1890
MAL.438		615 Salem St	Malden	c 1890
MAL.439		627 Salem St	Malden	c 1875
MAL.440		635 Salem St	Malden	c 1900
MAL.441		649 Salem St	Malden	c 1979
MAL.442		660-668 Salem St	Malden	c 1910
MAL.65	Converse, F. E. Knights of Pythias Lodge	661-671 Salem St	Malden	1896
MAL.443		672-676 Salem St	Malden	c 1875
MAL.444	Lodie, Benjamin Fruit Store and Lunch	678 Salem St	Malden	c 1875
MAL.445		688-698 Salem St	Malden	c 1930
MAL.446		689-695 Salem St	Malden	c 1910
MAL.447		697-705 Salem St	Malden	1927
MAL.448		700-714 Salem St	Malden	c 1920
MAL.449		718 Salem St	Malden	c 1910
MAL.450	Carroll and Son Funeral Home	721 Salem St	Malden	c 1890
MAL.451		722-724 Salem St	Malden	c 1875
MAL.452		728-732 Salem St	Malden	c 1910
MAL.454		738 Salem St	Malden	1970
MAL.455		740 Salem St	Malden	c 1890
MAL.456		763 Salem St	Malden	1890
MAL.457		767-769 Salem St	Malden	c 1910
MAL.458	Gill, Thomas H. House	779 Salem St	Malden	c 1875
MAL.40	Maplewood Methodist Episcopal Church	787 Salem St	Malden	1863
MAL.459		795 Salem St	Malden	c 1900
MAL.460	Saint Joseph Roman Catholic Church	796 Salem St	Malden	1962
MAL.462	Saint Joseph Roman Catholic Parochial School	796 Salem St	Malden	1948
MAL.463		801 Salem St	Malden	c 1890

Inv. No.	Property Name	Street	Town	Year
MAL.32		806-808 Salem St	Malden	c 1890
MAL.464		808 Salem St	Malden	c 1890
MAL.16	Fernald, William R. Tannery Workers Housing	864-870 Salem St	Malden	c 1843
MAL.15	Fernald, William R. Tannery Workers Housing	879-885 Salem St	Malden	c 1843
MAL.274		1440 Salem St	Malden	c 1900
MAL.273		1460 Salem St	Malden	c 1900
MAL.121	Burnham, Robert House	9 Sprague Ct	Malden	1871
MAL.122	Lovejoy, Alexander - Chapman, Joseph House	10 Sprague Ct	Malden	1871
MAL.123	Wolcott, Francis D. House	18 Sprague St	Malden	1868
MAL.124	Sprague, John House	19 Sprague St	Malden	1888
MAL.125	Fisk, Henry A. House	22 Sprague St	Malden	1867
MAL.126	Crawford, Festus House	26 Sprague St	Malden	1867
MAL.127	Soule, John W. House	27 Sprague St	Malden	1888
MAL.128	Fellows, Jabez House	29-31 Sprague St	Malden	1872
MAL.129	Russell, Charles House	32 Sprague St	Malden	1847
MAL.130	Rymes, Leonard House	35 Sprague St	Malden	c 1875
MAL.131	Slate, William H. House	36 Sprague St	Malden	c 1880
MAL.132	Lincoln, Marvin House	38 Sprague St	Malden	1847
MAL.133	Hutchins, W. House	39 Sprague St	Malden	c 1883
MAL.134	Unrah, Joseph - Cutter, Susan D. House	44 Sprague St	Malden	1854
MAL.135	Simonds, William House	45 Sprague St	Malden	1855
MAL.136	Crandall, James L. - Feuerstein, Harry House	46 Sprague St	Malden	1904
MAL.137	Shepard, William H. House	49 Sprague St	Malden	c 1847
MAL.138	Farrar, James - Springall, Cyrus F. House	61-63 Sprague St	Malden	r 1850
MAL.139	Holton, James G. House	62 Sprague St	Malden	1882
MAL.140		64-66 Sprague St	Malden	1911
MAL.141	Jordan, Lyman B. - Greenwood, Orville S. House	69 Sprague St	Malden	1882
MAL.5	Sprague, John - Burditt, Sarah House	73 Sprague St	Malden	r 1735
MAL.142		5 Spring St	Malden	1898
MAL.143	Sawyer, Henry F. House	7 Spring St	Malden	1885
MAL.144		9 Spring St	Malden	c 1899
MAL.145	Berry, Jesse House	11-15 Spring St	Malden	c 1847
MAL.146	Tufts, John - Sawyer, Herbert Double House	12-14 Spring St	Malden	1892
MAL.147	Springall, Dr. Thomas J. House	18 Spring St	Malden	1888
MAL.148		20-22 Spring St	Malden	1983
MAL.149	Bredeen, William O. Three-decker	23 Spring St	Malden	1894
MAL.150		27-29 Spring St	Malden	1895
MAL.151	Harlow, William - Swain, Odiorne House	28 Spring St	Malden	1875

Inv. No.	Property Name	Street	Town	Year
MAL.152	Benjamin, George - Emerson, John Two-Family House	32-34 Spring St	Malden	1895
MAL.153	Brooks, Nelson - Fenn, Henry A. House	33 Spring St	Malden	1882
MAL.154	Odiorne House Apartments	36 Spring St	Malden	1866
MAL.155	Pierce, James House	37 Spring St	Malden	1881
MAL.156	Francis, Lewis - Lanfair, Clarence House	40 Spring St	Malden	1913
MAL.157	Francis, Lewis - Russo, Joseph House	44 Spring St	Malden	1913
MAL.158	Rhoades, Charles - Odiorne, Frederic House	48 Spring St	Malden	c 1866
MAL.159	Harlow, William - Shepard, Edwin House	56 Spring St	Malden	c 1853
MAL.160	Keen, M. E. House	59 Spring St	Malden	1894
MAL.161	Harlow, Solon - Fernald, Lydia House	63 Spring St	Malden	c 1853
MAL.162	Fernald, Charles House	65 Spring St	Malden	1885
MAL.163	Springall, George House	66 Spring St	Malden	1853
MAL.37	Ledges, The	Summer St	Malden	c 1916
MAL.257	Harrison Apartments	50-52 Summer St	Malden	1896
MAL.63	Boston and Maine Railroad Summer Street Station	53 Summer St	Malden	1892
MAL.258	Hotel Victoria Addition	54-58 Summer St	Malden	1929
MAL.259	Hotel Victoria Annex	60-62 Summer St	Malden	1902
MAL.260	Hotel Victoria	64-72 Summer St	Malden	1892
MAL.261	Reddings Flats	74-80 Summer St	Malden	1891
MAL.489	First District Court of Eastern Middlesex	89 Summer St	Malden	1922
MAL.356	Tilson, Jules W. House	187 Summer St	Malden	1892
MAL.27		209 Summer St	Malden	c 1885
MAL.262	Sturtevant, Henry L. - Carey, William A. House	245 Summer St	Malden	1889
MAL.263	Fairneau, Arthur House	256 Summer St	Malden	1921
MAL.264	Barnes, David - Dodge, J. W. House	274 Summer St	Malden	r 1870
MAL.265	Hadleigh, John M. - Murch, John M. House	284 Summer St	Malden	c 1861
MAL.357	Packard Motor Service Garage Quonset Hut	37 Thatcher St	Malden	1947
MAL.940	Fells Connector Parkways Miter	The Fellsway	Malden	r 1920
MAL.943	Fells Connector Parkway - The Fellsway	The Fellsway	Malden	1897
MAL.944	Fells Connector Parkway - Fellsway Median System	The Fellsway	Malden	1897
MAL.281		32 Vining St	Malden	c 1930
MAL.405	Centre United Methodist Church	7 Washington St	Malden	1972
MAL.41	Saint Paul's Parish Church	26 Washington St	Malden	1913
MAL.24		29 Washington St	Malden	c 1875
MAL.30		47 Washington St	Malden	c 1885
MAL.23	Lunt, Andrew House	48 Washington St	Malden	c 1847

Inv. No.	Property Name	Street	Town	Year
MAL.26	Malden Y.W.C.A.	54 Washington St	Malden	c 1885
MAL.465	Webster, The	2 Webster St	Malden	1929
MAL.358	Flanders, Charles W. House	21 Wentworth St	Malden	1883
MAL.266	Rollins, Elijah - Brynes, Lawrence House	31 Wentworth St	Malden	1863
MAL.932	Fellsmere Parkway - West Border Road	West Border Rd	Malden	r 1880
MAL.933	Fellsmere Parkway - West Border Road Granite Wall	West Border Rd	Malden	r 1920
MAL.7	Tufts, David - Russell, Hubbard House	78 West St	Malden	1785
MAL.359	Welsh, Michael - O'Flynn, Mary E. House	121 West St	Malden	c 1870
MAL.360	Welsh, Michael - Garrity, Eugene J. House	125 West St	Malden	1874
MAL.361	Fitzpatrick, Timothy House	129 West St	Malden	c 1883
MAL.362	Doyle, Joanna - Butler, Joseph House	133 West St	Malden	c 1880
MAL.267	Rucci, Anthony House	140 West St	Malden	1922
MAL.363	Stevens, Ezra A. - Sullivan, Helen House	6 Woodland Rd	Malden	1893
MAL.20	Clark, Jonathan House	35 Wyoming Ave	Malden	c 1860

ATTACHMENT G:

ENDANGERED SPECIES ACT DOCUMENTATION

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

IPaC resource list

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

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

Project information

NAME

200 Exchange Street

LOCATION

Middlesex County, Massachusetts

DESCRIPTION

Earthwork for Grease Trap Installation

Local office

New England Ecological Services Field Office

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

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

http://www.fws.gov/newengland

Endangered species

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

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

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

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

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

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

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

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

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

Migratory birds

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

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

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

Additional information can be found using the following links:

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

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

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

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

	BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo Coccyzus erythropthalmus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink Dolichonyx oryzivorus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler Cardellina canadensis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Cerulean Warbler Dendroica cerulea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 29 to Jul 20
Dunlin Calidris alpina arcticola This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Evening Grosbeak Coccothraustes vespertinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Kentucky Warbler Oporornis formosus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Nelson's Sparrow Ammodramus nelsoni This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Sep 5

Prairie Warbler Dendroica discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler Protonotaria citrea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Red-throated Loon Gavia stellata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Snowy Owl Bubo scandiacus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

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

Probability of Presence (■)

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

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

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

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

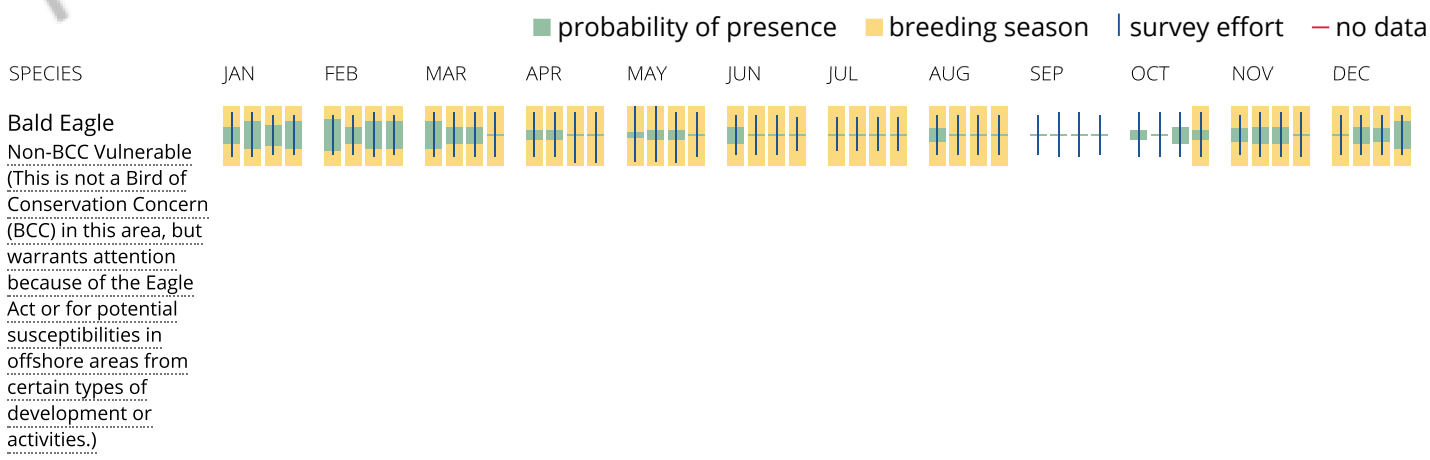
Breeding Season (▬)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

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

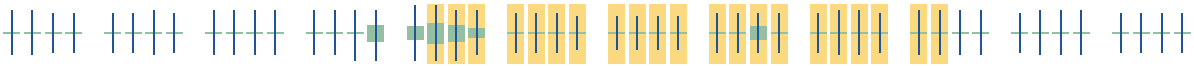
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

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

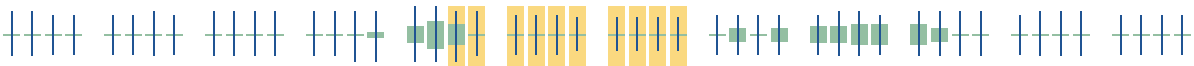
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



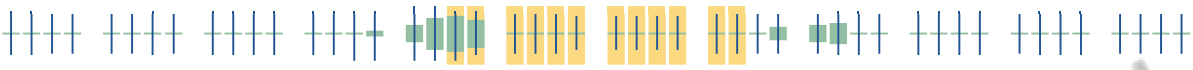
Black-billed Cuckoo
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



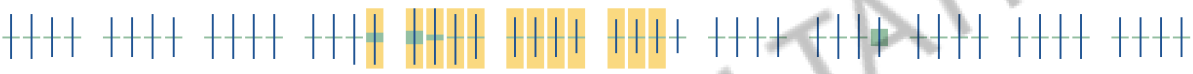
Bobolink
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



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



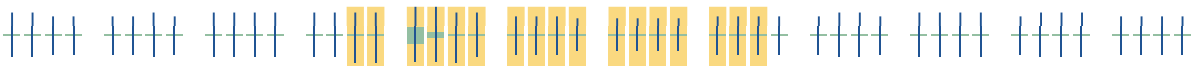
Cerulean Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



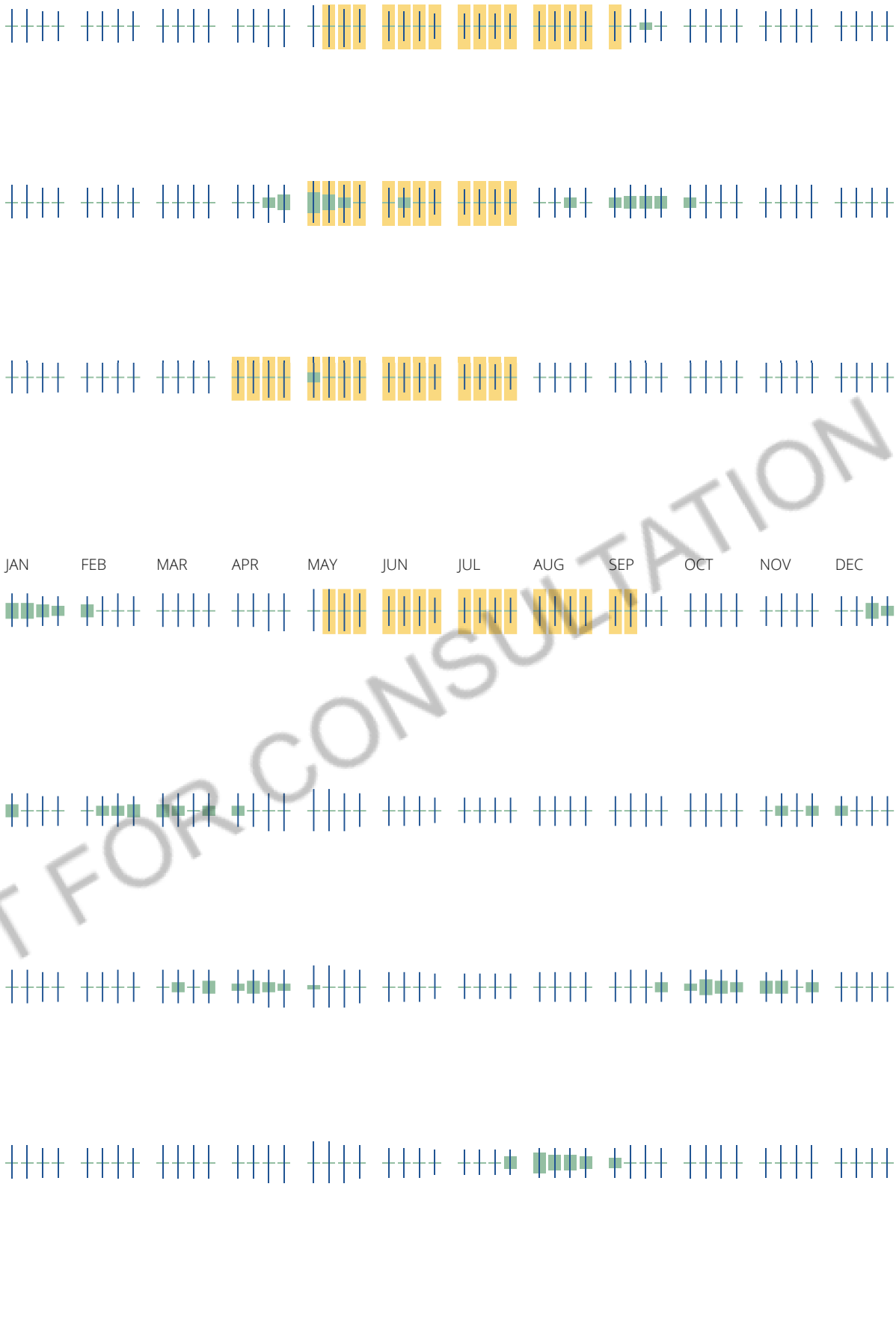
Dunlin
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

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

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

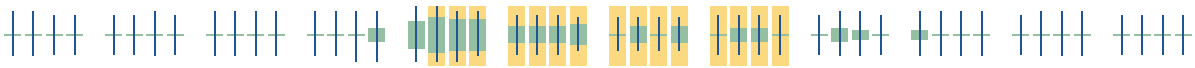


Lesser Yellowlegs
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



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

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



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

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

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

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

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

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

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

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

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

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

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird

on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

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

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

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

Details about birds that are potentially affected by offshore projects

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

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

What if I have eagles on my list?

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

Proper Interpretation and Use of Your Migratory Bird Report

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

Facilities

National Wildlife Refuge lands

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

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

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

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

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

This location overlaps the following wetlands:

RIVERINE

R2UBH

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

Data limitations

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

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

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

Data exclusions

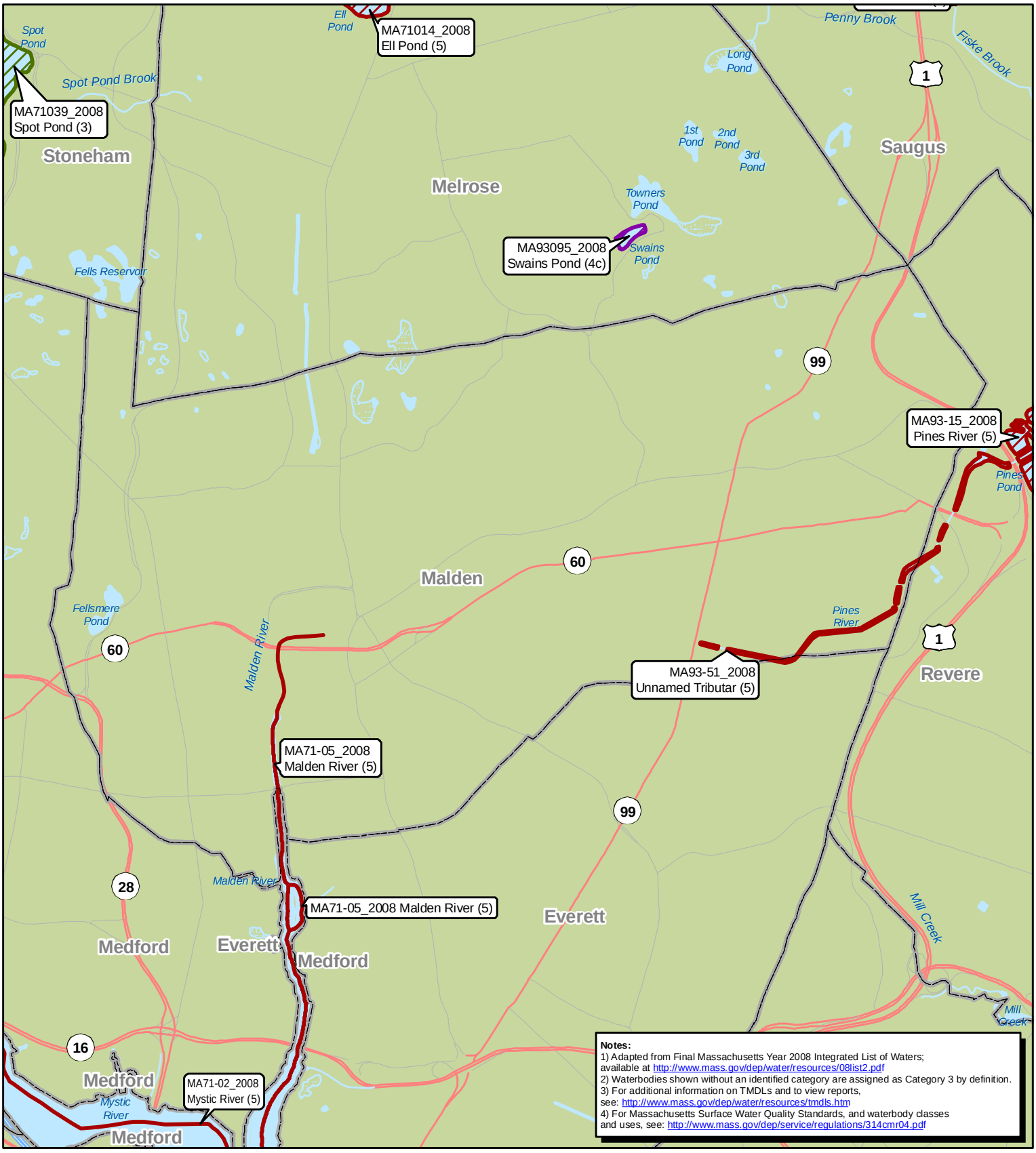
Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and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

Data precautions

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

ATTACHMENT H:

TMDL INFORMATION



Waterbody Assessment and TMDL Status
Malden, MA

N

0 0.5 Miles

EPA

Map produced by EPA Region I GIS Center
Map Tracker ID 6678, February 25, 2010
Data Sources: TeleAtlas, Census Bureau, USGS, MassDEP

Waterbody Label

State ID,
Waterbody Name (Category)
(TMDL(s) approved for this waterbody)

See companion table for a listing of pollutants, non-pollutants, and TMDLs for each waterbody

Assessment of Waterbody Segment

- Category 2: Attaining some uses; other uses not assessed
- Category 3: Insufficient information to make assessments for any use.
- Category 4a: TMDL is completed and approved for one or more pollutants
- Category 4c: Impairment not caused by a pollutant.
- Category 5: Impaired or threatened for one or more uses and requiring a TMDL.

- Waterbodies
- Swamp/Marsh
- MS4 Urbanized Areas (2000 Census)
- Municipal Boundaries

Category 5 waters listed alphabetically by major watershed
The 303(d) List – "Waters requiring a TMDL"

Water Body	Segment ID	Description	Size	Units	Impairment	EPA TMDL No.
Malden River	MA71-05	Headwaters south of Exchange Street, Malden to confluence with Mystic River, Everett/Medford.	2.30	Miles	(Debris*)	
					(Trash*)	
					Chlordane in Fish Tissue	
					DDT in Fish Tissue	
					Dissolved Oxygen	
					Dissolved Oxygen Supersaturation	
					Escherichia Coli (E. Coli)	
					Fecal Coliform	
					Flocculant Masses	
					Odor	
					Oil And Grease	
					PCBs In Fish Tissue	
					pH, High	
					Phosphorus, Total	
					Scum/Foam	
					Sediment Bioassay (Chronic Toxicity Freshwater)	
					Total Suspended Solids (TSS)	
					Transparency / Clarity	
Mill Brook	MA71-07	Headwaters south of Massachusetts Avenue, Lexington to inlet of Lower Mystic Lake, Arlington (portions culverted underground).	3.90	Miles	(Physical substrate habitat alterations*)	
					Escherichia Coli (E. Coli)	
Mill Creek	MA71-08	From Route 1, Chelsea/Revere to confluence with Chelsea River, Chelsea/Revere.	0.02	Square Miles	Cause Unknown (Contaminants in Fish and/or Shellfish)	
					Fecal Coliform	
					PCBs In Fish Tissue	
Munroe Brook	MA71-15	Headwaters, north of Solomon Pierce Road, Lexington to the mouth at inlet Arlington Reservoir, Lexington (includes culverted portion).	1.80	Miles	Escherichia Coli (E. Coli)	

ATTACHMENT I:

LABORATORY ANALYTICAL REPORTS

CERTIFICATE OF ANALYSIS

Ben Sivonen
The Vertex Companies
400 Libbey Parkway
Weymouth, MA 02149

RE: Exchange RGP (56587)
ESS Laboratory Work Order Number: 20D0796

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 3:37 pm, May 07, 2020

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP

ESS Laboratory Work Order: 20D0796

SAMPLE RECEIPT

The following samples were received on April 29, 2020 for the analyses specified on the enclosed Chain of Custody Record.

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

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

Lab Number	Sample Name	Matrix	Analysis
20D0796-01	200EX-RGP-REC	Surface Water	1664A, 200.7, 200.8, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500Cl D, 504.1, 524.2, 608.3, 625.1 SIM, 8270D SIM, ASTM D3695, CALC
20D0796-02	200EX-RGP-SRC	Ground Water	1664A, 200.7, 200.8, 245.1, 2540D, 300.0, 3113B, 350.1, 3500Cr B-2009, 420.1, 4500 CN CE, 4500Cl D, 504.1, 524.2, 608.3, 625.1 SIM, 8270D SIM, ASTM D3695, CALC

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP

ESS Laboratory Work Order: 20D0796

PROJECT NARRATIVE

625.1(SIM) Semi-Volatile Organic Compounds

20D0796-02	**Elevated Method Reporting Limits due to sample matrix (EL).**
20D0796-02	**Surrogate recovery(ies) above upper control limit (S+).** 2,4,6-Tribromophenol (177% @ 15-110%)
D0E0044-CCV1	**Calibration required quadratic regression (Q).** 2,4,6-Tribromophenol (170% @ 80-120%), Pentachlorophenol (134% @ 80-120%)
D0E0044-CCV1	**Continuing Calibration %Diff/Drift is above control limit (CD+).** 2,4,6-Tribromophenol (70% @ 20%), Di-n-octylphthalate (31% @ 20%), Pentachlorophenol (34% @ 20%)
D0E0066-CCV1	**Calibration required quadratic regression (Q).** 2,4,6-Tribromophenol (154% @ 80-120%), Pentachlorophenol (136% @ 80-120%)
D0E0066-CCV1	**Continuing Calibration %Diff/Drift is above control limit (CD+).** 2,4,6-Tribromophenol (54% @ 20%), Di-n-octylphthalate (21% @ 20%), Pentachlorophenol (36% @ 20%)
DE00403-BSD1	**Relative percent difference for duplicate is outside of criteria (D+).** Dibenzo(a,h)Anthracene (21% @ 20%), Indeno(1,2,3-cd)Pyrene (21% @ 20%)

Classical Chemistry

20D0796-01	**The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**
20D0796-02	**The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.**

Total Metals

20D0796-02	**Elevated Method Reporting Limits due to sample matrix (EL).** Selenium

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP

ESS Laboratory Work Order: 20D0796

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH
MADEP 18-2.1 - VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035A - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-REC
Date Sampled: 04/29/20 11:00
Percent Solids: N/A

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-01
Sample Matrix: Surface Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (5.0)		200.7		1	KJK	05/01/20 14:45	100	10	DD03021
Arsenic	ND (1.0)		3113B		2	KJK	05/05/20 15:42	100	10	DD03021
Cadmium	ND (0.2)		200.8		5	NAR	05/04/20 11:50	100	10	DD03021
Chromium	ND (2.0)		200.7		1	KJK	05/01/20 14:45	100	10	DD03021
Chromium III	ND (10.0)		200.7		1	CCP	05/01/20 14:45	1	1	[CALC]
Copper	**2.1** (2.0)		200.7		1	KJK	05/01/20 14:45	100	10	DD03021
Iron	**434** (10.0)		200.7		1	KJK	05/01/20 14:45	100	10	DD03021
Lead	ND (2.0)		200.7		1	KJK	05/01/20 14:45	100	10	DD03021
Mercury	ND (0.2)		245.1		1	MKS	04/30/20 9:25	20	40	DD02925
Nickel	ND (5.0)		200.7		1	KJK	05/01/20 14:45	100	10	DD03021
Selenium	ND (2.0)		3113B		2	KJK	05/06/20 21:34	100	10	DD03021
Silver	ND (0.5)		200.7		1	KJK	05/01/20 14:45	100	10	DD03021
Total Hardness	**58300** (82.3)		CALC		1	KJK	05/01/20 14:45	1	1	[CALC]
Zinc	**16.4** (5.0)		200.7		1	KJK	05/01/20 14:45	100	10	DD03021

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-REC
Date Sampled: 04/29/20 11:00
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-01
Sample Matrix: Surface Water
Units: ug/L
Analyst: MD

524.2 Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1-Trichloroethane	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
1,1,2-Trichloroethane	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
1,1-Dichloroethane	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
1,1-Dichloroethene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
1,2-Dichlorobenzene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
1,2-Dichloroethane	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
1,3-Dichlorobenzene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
1,4-Dichlorobenzene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Acetone	ND (5.0)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Benzene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Carbon Tetrachloride	ND (0.3)		524.2		1	05/01/20 12:37	D0E0014	DE00120
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Ethylbenzene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Methyl tert-Butyl Ether	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Methylene Chloride	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Naphthalene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Tertiary-butyl Alcohol	ND (25.0)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Tetrachloroethene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Toluene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Trichloroethene	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Vinyl Chloride	ND (0.2)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Xylene O	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120
Xylene P,M	ND (0.5)		524.2		1	05/01/20 12:37	D0E0014	DE00120

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*104 %*		*80-120*
Surrogate: 4-Bromofluorobenzene	*105 %*		*80-120*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-REC
Date Sampled: 04/29/20 11:00
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-01
Sample Matrix: Surface Water
Units: ug/L
Analyst: DMC
Prepared: 4/30/20 7:00

608.3 Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.09)		608.3		1	04/30/20 10:31		DD02904
Aroclor 1221	ND (0.09)		608.3		1	04/30/20 10:31		DD02904
Aroclor 1232	ND (0.09)		608.3		1	04/30/20 10:31		DD02904
Aroclor 1242	ND (0.09)		608.3		1	04/30/20 10:31		DD02904
Aroclor 1248	ND (0.09)		608.3		1	04/30/20 10:31		DD02904
Aroclor 1254	ND (0.09)		608.3		1	04/30/20 10:31		DD02904
Aroclor 1260	ND (0.09)		608.3		1	04/30/20 10:31		DD02904
Aroclor 1262	ND (0.09)		608.3		1	04/30/20 10:31		DD02904
Aroclor 1268	ND (0.09)		608.3		1	04/30/20 10:31		DD02904

	%Recovery	*Qualifier*	*Limits*
Surrogate: Decachlorobiphenyl	*83 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*80 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*70 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*84 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-REC
Date Sampled: 04/29/20 11:00
Percent Solids: N/A
Initial Volume: 1000
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-01
Sample Matrix: Surface Water
Units: ug/L
Analyst: VSC
Prepared: 5/4/20 10:31

625.1(SIM) Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Acenaphthene	ND (0.20)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Acenaphthylene	ND (0.20)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Anthracene	ND (0.20)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Benzo(a)anthracene	ND (0.05)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Benzo(a)pyrene	ND (0.05)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Benzo(b)fluoranthene	ND (0.05)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Benzo(g,h,i)perylene	ND (0.20)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Benzo(k)fluoranthene	ND (0.05)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
bis(2-Ethylhexyl)phthalate	ND (2.50)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Butylbenzylphthalate	ND (2.50)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Chrysene	ND (0.05)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Dibenzo(a,h)Anthracene	ND (0.05)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Diethylphthalate	ND (2.50)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Dimethylphthalate	ND (2.50)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Di-n-butylphthalate	ND (2.50)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Di-n-octylphthalate	ND (2.50)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Fluoranthene	ND (0.20)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Fluorene	ND (0.20)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Indeno(1,2,3-cd)Pyrene	ND (0.05)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Naphthalene	**0.56** (0.20)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Pentachlorophenol	ND (0.90)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Phenanthrene	ND (0.20)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403
Pyrene	ND (0.20)		625.1 SIM		1	05/04/20 21:53	D0E0044	DE00403

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*48 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*84 %*		*15-110*
Surrogate: 2-Fluorobiphenyl	*63 %*		*30-130*
Surrogate: Nitrobenzene-d5	*63 %*		*30-130*
Surrogate: p-Terphenyl-d14	*86 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-REC
Date Sampled: 04/29/20 11:00
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-01
Sample Matrix: Surface Water
Units: ug/L
Analyst: VSC
Prepared: 4/29/20 19:30

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

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,4-Dioxane	ND (0.250)		8270D SIM		1	04/30/20 18:41	D0D0562	DD02933

	%Recovery	Qualifier	Limits
Surrogate: 1,4-Dioxane-d8	*46 %*		*15-115*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-REC
Date Sampled: 04/29/20 11:00
Percent Solids: N/A

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-01
Sample Matrix: Surface Water

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Ammonia as N	**0.14** (0.10)		350.1		1	JLK	05/01/20 17:04	mg/L	DD03013
Chloride	**170** (20.0)		300.0		40	EEM	04/30/20 21:19	mg/L	DD03011
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	CCP	04/29/20 19:20	ug/L	DD02920
Phenols	ND (50)		420.1		1	JLK	05/04/20 15:34	ug/L	DE00442
Total Cyanide	ND (5.00)		4500 CN CE		1	EEM	05/01/20 11:45	ug/L	DE00116
Total Petroleum Hydrocarbon	ND (5)		1664A		1	LAB	05/05/20 13:59	mg/L	DE00409
Total Residual Chlorine	ND (20.0)		4500Cl D		1	CCP	04/29/20 17:51	ug/L	DD02922
Total Suspended Solids	ND (5)		2540D		1	CCP	05/01/20 17:31	mg/L	DE00133

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-REC
Date Sampled: 04/29/20 11:00
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-01
Sample Matrix: Surface Water
Units: ug/L
Analyst: CAD
Prepared: 5/1/20 9:00

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

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2-Dibromo-3-Chloropropane	ND (0.015)		504.1		1	05/01/20 10:47		DE00112
1,2-Dibromoethane	ND (0.015)		504.1		1	05/01/20 10:47		DE00112

	%Recovery	Qualifier	Limits
Surrogate: Pentachloroethane	*104 %*		*30-150*
Surrogate: Pentachloroethane [2C]	*108 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-REC
Date Sampled: 04/29/20 11:00
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-01
Sample Matrix: Surface Water
Units: mg/L
Analyst: VSC
Prepared: 4/30/20 15:44

Alcohol Scan by GC/FID

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Ethanol	ND (10)		ASTM D3695		1	VSC	05/01/20 10:37		DD03037

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-SRC
Date Sampled: 04/29/20 12:30
Percent Solids: N/A

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-02
Sample Matrix: Ground Water
Units: ug/L

Extraction Method: 3005A/200.7

Total Metals

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	I/V	F/V	Batch
Antimony	ND (25.0)		200.7		5	KJK	05/01/20 15:47	100	10	DD03021
Arsenic	**138** (25.0)		3113B		50	KJK	05/06/20 18:24	100	10	DD03021
Cadmium	**1.3** (0.8)		200.8		20	KJK	05/04/20 15:52	100	10	DD03021
Chromium	**34.8** (10.0)		200.7		5	KJK	05/01/20 15:47	100	10	DD03021
Chromium III	**34.8** (10.0)		200.7		5	CCP	05/01/20 15:47	1	1	[CALC]
Copper	**79.3** (10.0)		200.7		5	KJK	05/01/20 15:47	100	10	DD03021
Iron	**22700** (50.0)		200.7		5	KJK	05/01/20 15:47	100	10	DD03021
Lead	**410** (10.0)		200.7		5	KJK	05/01/20 15:47	100	10	DD03021
Mercury	**0.6** (0.2)		245.1		1	MKS	04/30/20 9:27	20	40	DD02925
Nickel	ND (25.0)		200.7		5	KJK	05/01/20 15:47	100	10	DD03021
Selenium	**EL** ND (20.0)		200.8		40	BJV	05/07/20 11:12	100	10	DD03021
Silver	ND (2.5)		200.7		5	KJK	05/01/20 15:47	100	10	DD03021
Total Hardness	**640000** (412)		CALC		5	KJK	05/01/20 15:47	1	1	[CALC]
Zinc	**777** (25.0)		200.7		5	KJK	05/01/20 15:47	100	10	DD03021

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-SRC
Date Sampled: 04/29/20 12:30
Percent Solids: N/A
Initial Volume: 25
Final Volume: 25
Extraction Method: 524.2

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: MD

524.2 Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,1,1-Trichloroethane	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
1,1,2-Trichloroethane	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
1,1-Dichloroethane	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
1,1-Dichloroethene	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
1,2-Dichlorobenzene	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
1,2-Dichloroethane	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
1,3-Dichlorobenzene	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
1,4-Dichlorobenzene	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Acetone	**21.8** (5.0)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Benzene	**36.2** (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Carbon Tetrachloride	ND (0.3)		524.2		1	05/01/20 13:10	D0E0014	DE00120
cis-1,2-Dichloroethene	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Ethylbenzene	**29.8** (10.0)		524.2		20	05/04/20 15:11	D0E0014	DE00120
Methyl tert-Butyl Ether	**1.0** (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Methylene Chloride	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Naphthalene	**1770** (50.0)		524.2		100	05/01/20 16:01	D0E0014	DE00120
Tertiary-amyl methyl ether	ND (1.0)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Tertiary-butyl Alcohol	ND (25.0)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Tetrachloroethene	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Toluene	**10.3** (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Trichloroethene	ND (0.5)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Vinyl Chloride	ND (0.2)		524.2		1	05/01/20 13:10	D0E0014	DE00120
Xylene O	**22.4** (10.0)		524.2		20	05/04/20 15:11	D0E0014	DE00120
Xylene P,M	**48.8** (10.0)		524.2		20	05/04/20 15:11	D0E0014	DE00120

	%Recovery	*Qualifier*	*Limits*
Surrogate: 1,2-Dichlorobenzene-d4	*117 %*		*80-120*
Surrogate: 4-Bromofluorobenzene	*109 %*		*80-120*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-SRC
Date Sampled: 04/29/20 12:30
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 1
Extraction Method: 3510C

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: DMC
Prepared: 4/30/20 7:00

608.3 Polychlorinated Biphenyls (PCB)

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Aroclor 1016	ND (0.09)		608.3		1	04/30/20 10:50		DD02904
Aroclor 1221	ND (0.09)		608.3		1	04/30/20 10:50		DD02904
Aroclor 1232	ND (0.09)		608.3		1	04/30/20 10:50		DD02904
Aroclor 1242	ND (0.09)		608.3		1	04/30/20 10:50		DD02904
Aroclor 1248	ND (0.09)		608.3		1	04/30/20 10:50		DD02904
Aroclor 1254	ND (0.09)		608.3		1	04/30/20 10:50		DD02904
Aroclor 1260	ND (0.09)		608.3		1	04/30/20 10:50		DD02904
Aroclor 1262	ND (0.09)		608.3		1	04/30/20 10:50		DD02904
Aroclor 1268	ND (0.09)		608.3		1	04/30/20 10:50		DD02904

	%Recovery	Qualifier	Limits
Surrogate: Decachlorobiphenyl	*65 %*		*30-150*
Surrogate: Decachlorobiphenyl [2C]	*60 %*		*30-150*
Surrogate: Tetrachloro-m-xylene	*67 %*		*30-150*
Surrogate: Tetrachloro-m-xylene [2C]	*74 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-SRC
Date Sampled: 04/29/20 12:30
Percent Solids: N/A
Initial Volume: 1070
Final Volume: 0.25
Extraction Method: 3510C

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 5/4/20 10:31

625.1(SIM) Semi-Volatile Organic Compounds

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
Acenaphthene	**48.4** (0.93)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Acenaphthylene	**3.94** (0.93)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Anthracene	**20.7** (0.93)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Benzo(a)anthracene	**9.27** (0.23)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Benzo(a)pyrene	**8.02** (0.23)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Benzo(b)fluoranthene	**8.39** (0.23)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Benzo(g,h,i)perylene	**4.17** (0.93)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Benzo(k)fluoranthene	**2.83** (0.23)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
bis(2-Ethylhexyl)phthalate	ND (11.7)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Butylbenzylphthalate	ND (11.7)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Chrysene	**8.25** (0.23)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Dibenzo(a,h)Anthracene	**1.05** (0.23)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Diethylphthalate	ND (11.7)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Dimethylphthalate	ND (11.7)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Di-n-butylphthalate	ND (11.7)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Di-n-octylphthalate	ND (11.7)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Fluoranthene	**31.2** (0.93)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Fluorene	**40.0** (0.93)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Indeno(1,2,3-cd)Pyrene	**4.67** (0.23)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Naphthalene	**804** (93.5)		625.1 SIM		500	05/05/20 19:47	D0E0066	DE00403
Pentachlorophenol	ND (4.21)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403
Phenanthrene	**90.8** (9.35)		625.1 SIM		50	05/05/20 17:26	D0E0066	DE00403
Pyrene	**29.3** (0.93)		625.1 SIM		5	05/05/20 16:39	D0E0066	DE00403

	%Recovery	Qualifier	Limits
Surrogate: 1,2-Dichlorobenzene-d4	*51 %*		*30-130*
Surrogate: 2,4,6-Tribromophenol	*177 %*	*S+*	*15-110*
Surrogate: 2-Fluorobiphenyl	*79 %*		*30-130*
Surrogate: Nitrobenzene-d5	*82 %*		*30-130*
Surrogate: p-Terphenyl-d14	*112 %*		*30-130*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-SRC
Date Sampled: 04/29/20 12:30
Percent Solids: N/A
Initial Volume: 500
Final Volume: 0.5
Extraction Method: 3535A

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: VSC
Prepared: 4/29/20 19:30

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

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,4-Dioxane	ND (0.250)		8270D SIM		1	04/30/20 19:14	D0D0562	DD02933

	%Recovery	Qualifier	Limits
Surrogate: 1,4-Dioxane-d8	*45 %*		*15-115*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-SRC
Date Sampled: 04/29/20 12:30
Percent Solids: N/A

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-02
Sample Matrix: Ground Water

Classical Chemistry

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Units	Batch
Ammonia as N	**17.4** (1.00)		350.1		10	JLK	05/01/20 17:11	mg/L	DD03013
Chloride	**166** (20.0)		300.0		40	EEM	04/30/20 22:08	mg/L	DD03011
Hexavalent Chromium	ND (10.0)		3500Cr B-2009		1	CCP	04/29/20 19:20	ug/L	DD02920
Phenols	**75** (50)		420.1		1	JLK	05/04/20 15:34	ug/L	DE00442
Total Cyanide	ND (5.00)		4500 CN CE		1	EEM	05/01/20 11:45	ug/L	DE00116
Total Petroleum Hydrocarbon	**6** (5)		1664A		1	LAB	05/05/20 13:59	mg/L	DE00409
Total Residual Chlorine	ND (20.0)		4500Cl D		1	CCP	04/29/20 17:51	ug/L	DD02922
Total Suspended Solids	**45** (5)		2540D		1	CCP	05/01/20 17:31	mg/L	DE00133

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-SRC
Date Sampled: 04/29/20 12:30
Percent Solids: N/A
Initial Volume: 35
Final Volume: 2
Extraction Method: 504/8011

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-02
Sample Matrix: Ground Water
Units: ug/L
Analyst: CAD
Prepared: 5/1/20 9:00

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

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyzed	Sequence	Batch
1,2-Dibromo-3-Chloropropane	ND (0.015)		504.1		1	05/01/20 11:15		DE00112
1,2-Dibromoethane	ND (0.015)		504.1		1	05/01/20 11:15		DE00112

	%Recovery	Qualifier	Limits
Surrogate: Pentachloroethane	*102 %*		*30-150*
Surrogate: Pentachloroethane [2C]	*92 %*		*30-150*

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP
Client Sample ID: 200EX-RGP-SRC
Date Sampled: 04/29/20 12:30
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: No Prep

ESS Laboratory Work Order: 20D0796
ESS Laboratory Sample ID: 20D0796-02
Sample Matrix: Ground Water
Units: mg/L
Analyst: VSC
Prepared: 4/30/20 15:44

Alcohol Scan by GC/FID

Analyte	Results (MRL)	MDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Ethanol	ND (10)		ASTM D3695		1	VSC	05/01/20 11:22		DD03037

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP

ESS Laboratory Work Order: 20D0796

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Total Metals										
Batch DD02925 - 245.1/7470A										
Blank										
Mercury	ND	0.2	ug/L							
LCS										
Mercury	5.4	0.2	ug/L	6.042		89	85-115			
Batch DD03021 - 3005A/200.7										
Blank										
Antimony	ND	5.0	ug/L							
Calcium	ND	0.020	mg/L							
Chromium	ND	2.0	ug/L							
Copper	ND	2.0	ug/L							
Iron	ND	10.0	ug/L							
Lead	ND	2.0	ug/L							
Magnesium	ND	0.020	mg/L							
Nickel	ND	5.0	ug/L							
Silver	ND	0.5	ug/L							
Zinc	ND	5.0	ug/L							
Blank										
Cadmium	ND	0.2	ug/L							
Selenium	ND	2.50	ug/L							
Blank										
Arsenic	ND	0.5	ug/L							
Selenium	ND	1.0	ug/L							
LCS										
Antimony	47.2	5.0	ug/L	50.00		94	85-115			
Calcium	0.448	0.020	mg/L	0.5000		90	85-115			
Chromium	44.1	2.0	ug/L	50.00		88	85-115			
Copper	45.4	2.0	ug/L	50.00		91	85-115			
Iron	221	10.0	ug/L	250.0		89	85-115			
Lead	46.7	2.0	ug/L	50.00		93	85-115			
Magnesium	0.449	0.020	mg/L	0.5000		90	85-115			
Nickel	45.1	5.0	ug/L	50.00		90	85-115			
Silver	22.7	0.5	ug/L	25.00		91	85-115			
Zinc	46.2	5.0	ug/L	50.00		92	85-115			
LCS										
Cadmium	23.9	1.0	ug/L	25.00		96	85-115			
Selenium	94.0	12.5	ug/L	100.0		94	85-115			
LCS										
Arsenic	48.1	12.5	ug/L	50.00		96	85-115			
Selenium	99.2	25.0	ug/L	100.0		99	85-115			
524.2 Volatile Organic Compounds										
Batch DE00120 - 524.2										
Blank										

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP

ESS Laboratory Work Order: 20D0796

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
524.2 Volatile Organic Compounds										
Batch DE00120 - 524.2										
1,1,1-Trichloroethane	ND	0.5	ug/L							
1,1,2-Trichloroethane	ND	0.5	ug/L							
1,1-Dichloroethane	ND	0.5	ug/L							
1,1-Dichloroethene	ND	0.5	ug/L							
1,2-Dichlorobenzene	ND	0.5	ug/L							
1,2-Dichloroethane	ND	0.5	ug/L							
1,3-Dichlorobenzene	ND	0.5	ug/L							
1,4-Dichlorobenzene	ND	0.5	ug/L							
Acetone	ND	5.0	ug/L							
Benzene	ND	0.5	ug/L							
Carbon Tetrachloride	ND	0.3	ug/L							
cis-1,2-Dichloroethene	ND	0.5	ug/L							
Ethylbenzene	ND	0.5	ug/L							
Methyl tert-Butyl Ether	ND	0.5	ug/L							
Methylene Chloride	ND	0.5	ug/L							
Naphthalene	ND	0.5	ug/L							
Tertiary-amyl methyl ether	ND	1.0	ug/L							
Tertiary-butyl Alcohol	ND	25.0	ug/L							
Tetrachloroethene	ND	0.5	ug/L							
Toluene	ND	0.5	ug/L							
Trichloroethene	ND	0.5	ug/L							
Vinyl Chloride	ND	0.2	ug/L							
Xylene O	ND	0.5	ug/L							
Xylene P,M	ND	0.5	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*4.84*		ug/L	*5.000*		*97*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*5.16*		ug/L	*5.000*		*103*	*80-120*			
LCS										
1,1,1-Trichloroethane	10.3	0.5	ug/L	10.00		103	70-130			
1,1,2-Trichloroethane	10.6	0.5	ug/L	10.00		106	70-130			
1,1-Dichloroethane	9.8	0.5	ug/L	10.00		98	70-130			
1,1-Dichloroethene	10.4	0.5	ug/L	10.00		104	70-130			
1,2-Dichlorobenzene	11.1	0.5	ug/L	10.00		111	70-130			
1,2-Dichloroethane	10.8	0.5	ug/L	10.00		108	70-130			
1,3-Dichlorobenzene	11.1	0.5	ug/L	10.00		111	70-130			
1,4-Dichlorobenzene	11.2	0.5	ug/L	10.00		112	70-130			
Acetone	52.1	5.0	ug/L	50.00		104	70-130			
Benzene	9.4	0.5	ug/L	10.00		94	70-130			
Carbon Tetrachloride	10.7	0.3	ug/L	10.00		107	70-130			
cis-1,2-Dichloroethene	10.5	0.5	ug/L	10.00		105	70-130			
Ethylbenzene	10.0	0.5	ug/L	10.00		100	70-130			
Methyl tert-Butyl Ether	11.1	0.5	ug/L	10.00		111	70-130			
Methylene Chloride	10.5	0.5	ug/L	10.00		105	70-130			
Naphthalene	11.7	0.5	ug/L	10.00		117	70-130			
Tertiary-amyl methyl ether	9.7	1.0	ug/L	10.00		97	70-130			
Tertiary-butyl Alcohol	60.9	25.0	ug/L	50.00		122	70-130			

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP

ESS Laboratory Work Order: 20D0796

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
524.2 Volatile Organic Compounds										
Batch DE00120 - 524.2										
Tetrachloroethene	10.9	0.5	ug/L	10.00		109	70-130			
Toluene	9.7	0.5	ug/L	10.00		97	70-130			
Trichloroethene	10.4	0.5	ug/L	10.00		104	70-130			
Vinyl Chloride	9.1	0.2	ug/L	10.00		91	70-130			
Xylene O	10.7	0.5	ug/L	10.00		107	70-130			
Xylene P,M	21.3	0.5	ug/L	20.00		107	70-130			
Surrogate: 1,2-Dichlorobenzene-d4	*5.41*		ug/L	*5.000*		*108*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*5.20*		ug/L	*5.000*		*104*	*80-120*			
LCS Dup										
1,1,1-Trichloroethane	10.4	0.5	ug/L	10.00		104	70-130	0.7	20	
1,1,2-Trichloroethane	10.5	0.5	ug/L	10.00		105	70-130	1	20	
1,1-Dichloroethane	9.5	0.5	ug/L	10.00		95	70-130	3	20	
1,1-Dichloroethene	10.1	0.5	ug/L	10.00		101	70-130	3	20	
1,2-Dichlorobenzene	10.6	0.5	ug/L	10.00		106	70-130	4	20	
1,2-Dichloroethane	11.1	0.5	ug/L	10.00		111	70-130	4	20	
1,3-Dichlorobenzene	10.2	0.5	ug/L	10.00		102	70-130	8	20	
1,4-Dichlorobenzene	10.7	0.5	ug/L	10.00		107	70-130	4	20	
Acetone	54.6	5.0	ug/L	50.00		109	70-130	5	20	
Benzene	9.9	0.5	ug/L	10.00		99	70-130	5	20	
Carbon Tetrachloride	10.8	0.3	ug/L	10.00		108	70-130	1	20	
cis-1,2-Dichloroethene	10.5	0.5	ug/L	10.00		105	70-130	0.3	20	
Ethylbenzene	9.9	0.5	ug/L	10.00		99	70-130	0.9	20	
Methyl tert-Butyl Ether	10.7	0.5	ug/L	10.00		107	70-130	4	20	
Methylene Chloride	10.3	0.5	ug/L	10.00		103	70-130	1	20	
Naphthalene	11.1	0.5	ug/L	10.00		111	70-130	6	20	
Tertiary-amyl methyl ether	9.6	1.0	ug/L	10.00		96	70-130	1	20	
Tertiary-butyl Alcohol	55.5	25.0	ug/L	50.00		111	70-130	9	25	
Tetrachloroethene	10.2	0.5	ug/L	10.00		102	70-130	7	20	
Toluene	10.5	0.5	ug/L	10.00		105	70-130	7	20	
Trichloroethene	10.5	0.5	ug/L	10.00		105	70-130	0.9	20	
Vinyl Chloride	9.2	0.2	ug/L	10.00		92	70-130	1	20	
Xylene O	9.8	0.5	ug/L	10.00		98	70-130	9	20	
Xylene P,M	20.7	0.5	ug/L	20.00		103	70-130	3	20	
Surrogate: 1,2-Dichlorobenzene-d4	*5.33*		ug/L	*5.000*		*107*	*80-120*			
Surrogate: 4-Bromofluorobenzene	*4.79*		ug/L	*5.000*		*96*	*80-120*			
608.3 Polychlorinated Biphenyls (PCB)										
Batch DD02904 - 3510C										
Blank										
Aroclor 1016	ND	0.10	ug/L							
Aroclor 1016 [2C]	ND	0.10	ug/L							
Aroclor 1221	ND	0.10	ug/L							
Aroclor 1221 [2C]	ND	0.10	ug/L							
Aroclor 1232	ND	0.10	ug/L							
Aroclor 1232 [2C]	ND	0.10	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP

ESS Laboratory Work Order: 20D0796

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
608.3 Polychlorinated Biphenyls (PCB)										
Batch DD02904 - 3510C										
Aroclor 1242	ND	0.10	ug/L							
Aroclor 1242 [2C]	ND	0.10	ug/L							
Aroclor 1248	ND	0.10	ug/L							
Aroclor 1248 [2C]	ND	0.10	ug/L							
Aroclor 1254	ND	0.10	ug/L							
Aroclor 1254 [2C]	ND	0.10	ug/L							
Aroclor 1260	ND	0.10	ug/L							
Aroclor 1260 [2C]	ND	0.10	ug/L							
Aroclor 1262	ND	0.10	ug/L							
Aroclor 1262 [2C]	ND	0.10	ug/L							
Aroclor 1268	ND	0.10	ug/L							
Aroclor 1268 [2C]	ND	0.10	ug/L							
Surrogate: Decachlorobiphenyl	*0.0373*		ug/L	*0.05000*		*75*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0363*		ug/L	*0.05000*		*73*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0342*		ug/L	*0.05000*		*68*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0410*		ug/L	*0.05000*		*82*	*30-150*			
LCS										
Aroclor 1016	0.77	0.10	ug/L	1.000		77	50-140			
Aroclor 1016 [2C]	0.79	0.10	ug/L	1.000		79	50-140			
Aroclor 1260	0.82	0.10	ug/L	1.000		82	1-164			
Aroclor 1260 [2C]	0.82	0.10	ug/L	1.000		82	1-164			
Surrogate: Decachlorobiphenyl	*0.0490*		ug/L	*0.05000*		*98*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0471*		ug/L	*0.05000*		*94*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0399*		ug/L	*0.05000*		*80*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0436*		ug/L	*0.05000*		*87*	*30-150*			
LCS Dup										
Aroclor 1016	0.80	0.10	ug/L	1.000		80	50-140	3	36	
Aroclor 1016 [2C]	0.85	0.10	ug/L	1.000		85	50-140	7	36	
Aroclor 1260	0.83	0.10	ug/L	1.000		83	1-164	1	38	
Aroclor 1260 [2C]	0.84	0.10	ug/L	1.000		84	1-164	2	38	
Surrogate: Decachlorobiphenyl	*0.0480*		ug/L	*0.05000*		*96*	*30-150*			
Surrogate: Decachlorobiphenyl [2C]	*0.0463*		ug/L	*0.05000*		*93*	*30-150*			
Surrogate: Tetrachloro-m-xylene	*0.0401*		ug/L	*0.05000*		*80*	*30-150*			
Surrogate: Tetrachloro-m-xylene [2C]	*0.0442*		ug/L	*0.05000*		*88*	*30-150*			
625.1(SIM) Semi-Volatile Organic Compounds										
Batch DE00403 - 3510C										
Blank										
Acenaphthene	ND	0.20	ug/L							
Acenaphthylene	ND	0.20	ug/L							
Anthracene	ND	0.20	ug/L							
Benzo(a)anthracene	ND	0.05	ug/L							

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
625.1(SIM) Semi-Volatile Organic Compounds										
Batch DE00403 - 3510C										
Benzo(a)pyrene	ND	0.05	ug/L							
Benzo(b)fluoranthene	ND	0.05	ug/L							
Benzo(g,h,i)perylene	ND	0.20	ug/L							
Benzo(k)fluoranthene	ND	0.05	ug/L							
bis(2-Ethylhexyl)phthalate	ND	2.50	ug/L							
Butylbenzylphthalate	ND	2.50	ug/L							
Chrysene	ND	0.05	ug/L							
Dibenzo(a,h)Anthracene	ND	0.05	ug/L							
Diethylphthalate	ND	2.50	ug/L							
Dimethylphthalate	ND	2.50	ug/L							
Di-n-butylphthalate	ND	2.50	ug/L							
Di-n-octylphthalate	ND	2.50	ug/L							
Fluoranthene	ND	0.20	ug/L							
Fluorene	ND	0.20	ug/L							
Indeno(1,2,3-cd)Pyrene	ND	0.05	ug/L							
Naphthalene	ND	0.20	ug/L							
Pentachlorophenol	ND	0.90	ug/L							
Phenanthrene	ND	0.20	ug/L							
Pyrene	ND	0.20	ug/L							
Surrogate: 1,2-Dichlorobenzene-d4	*1.02*		ug/L	*2.500*		*41*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.48*		ug/L	*3.750*		*93*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.46*		ug/L	*2.500*		*59*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.77*		ug/L	*2.500*		*71*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.27*		ug/L	*2.500*		*91*	*30-130*			
LCS										
Acenaphthene	2.68	0.20	ug/L	4.000		67	40-140			
Acenaphthylene	2.91	0.20	ug/L	4.000		73	40-140			
Anthracene	3.32	0.20	ug/L	4.000		83	40-140			
Benzo(a)anthracene	3.11	0.05	ug/L	4.000		78	40-140			
Benzo(a)pyrene	3.36	0.05	ug/L	4.000		84	40-140			
Benzo(b)fluoranthene	3.54	0.05	ug/L	4.000		88	40-140			
Benzo(g,h,i)perylene	3.26	0.20	ug/L	4.000		81	40-140			
Benzo(k)fluoranthene	2.98	0.05	ug/L	4.000		75	40-140			
bis(2-Ethylhexyl)phthalate	3.69	2.50	ug/L	4.000		92	40-140			
Butylbenzylphthalate	3.79	2.50	ug/L	4.000		95	40-140			
Chrysene	3.23	0.05	ug/L	4.000		81	40-140			
Dibenzo(a,h)Anthracene	3.16	0.05	ug/L	4.000		79	40-140			
Diethylphthalate	3.68	2.50	ug/L	4.000		92	40-140			
Dimethylphthalate	3.56	2.50	ug/L	4.000		89	40-140			
Di-n-butylphthalate	3.87	2.50	ug/L	4.000		97	40-140			
Di-n-octylphthalate	3.61	2.50	ug/L	4.000		90	40-140			
Fluoranthene	3.73	0.20	ug/L	4.000		93	40-140			
Fluorene	3.17	0.20	ug/L	4.000		79	40-140			
Indeno(1,2,3-cd)Pyrene	3.42	0.05	ug/L	4.000		85	40-140			
Naphthalene	2.11	0.20	ug/L	4.000		53	40-140			

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
Client Project ID: Exchange RGP

ESS Laboratory Work Order: 20D0796

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
625.1(SIM) Semi-Volatile Organic Compounds										
Batch DE00403 - 3510C										
Pentachlorophenol	3.03	0.90	ug/L	4.000		76	30-130			
Phenanthrene	3.26	0.20	ug/L	4.000		82	40-140			
Pyrene	3.50	0.20	ug/L	4.000		88	40-140			
Surrogate: 1,2-Dichlorobenzene-d4	*0.940*		ug/L	*2.500*		*38*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.41*		ug/L	*3.750*		*91*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.48*		ug/L	*2.500*		*59*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.61*		ug/L	*2.500*		*64*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.18*		ug/L	*2.500*		*87*	*30-130*			
LCS Dup										
Acenaphthene	3.01	0.20	ug/L	4.000		75	40-140	11	20	
Acenaphthylene	3.28	0.20	ug/L	4.000		82	40-140	12	20	
Anthracene	3.58	0.20	ug/L	4.000		90	40-140	7	20	
Benzo(a)anthracene	3.52	0.05	ug/L	4.000		88	40-140	12	20	
Benzo(a)pyrene	3.91	0.05	ug/L	4.000		98	40-140	15	20	
Benzo(b)fluoranthene	4.11	0.05	ug/L	4.000		103	40-140	15	20	
Benzo(g,h,i)perylene	3.89	0.20	ug/L	4.000		97	40-140	18	20	
Benzo(k)fluoranthene	3.46	0.05	ug/L	4.000		86	40-140	15	20	
bis(2-Ethylhexyl)phthalate	4.25	2.50	ug/L	4.000		106	40-140	14	20	
Butylbenzylphthalate	4.40	2.50	ug/L	4.000		110	40-140	15	20	
Chrysene	3.65	0.05	ug/L	4.000		91	40-140	12	20	
Dibenzo(a,h)Anthracene	3.90	0.05	ug/L	4.000		97	40-140	21	20	D+
Diethylphthalate	3.97	2.50	ug/L	4.000		99	40-140	8	20	
Dimethylphthalate	3.84	2.50	ug/L	4.000		96	40-140	8	20	
Di-n-butylphthalate	4.13	2.50	ug/L	4.000		103	40-140	7	20	
Di-n-octylphthalate	4.28	2.50	ug/L	4.000		107	40-140	17	20	
Fluoranthene	4.04	0.20	ug/L	4.000		101	40-140	8	20	
Fluorene	3.49	0.20	ug/L	4.000		87	40-140	9	20	
Indeno(1,2,3-cd)Pyrene	4.22	0.05	ug/L	4.000		106	40-140	21	20	D+
Naphthalene	2.40	0.20	ug/L	4.000		60	40-140	13	20	
Pentachlorophenol	2.95	0.90	ug/L	4.000		74	30-130	3	20	
Phenanthrene	3.52	0.20	ug/L	4.000		88	40-140	8	20	
Pyrene	4.00	0.20	ug/L	4.000		100	40-140	13	20	
Surrogate: 1,2-Dichlorobenzene-d4	*1.26*		ug/L	*2.500*		*50*	*30-130*			
Surrogate: 2,4,6-Tribromophenol	*3.59*		ug/L	*3.750*		*96*	*15-110*			
Surrogate: 2-Fluorobiphenyl	*1.79*		ug/L	*2.500*		*72*	*30-130*			
Surrogate: Nitrobenzene-d5	*1.69*		ug/L	*2.500*		*68*	*30-130*			
Surrogate: p-Terphenyl-d14	*2.47*		ug/L	*2.500*		*99*	*30-130*			
8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution										
Batch DD02933 - 3535A										
Blank										
1,4-Dioxane	ND	0.250	ug/L							
Surrogate: 1,4-Dioxane-d8	*2.77*		ug/L	*5.000*		*55*	*15-115*			
LCS										
1,4-Dioxane	8.25	0.250	ug/L	10.00		82	40-140			

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Client Name: The Vertex Companies
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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
8270D(SIM) Semi-Volatile Organic Compounds w/ Isotope Dilution										
Batch DD02933 - 3535A										
Surrogate: 1,4-Dioxane-d8	*3.01*		ug/L	*5.000*		*60*	*15-115*			
LCS Dup										
1,4-Dioxane	8.54	0.250	ug/L	10.00		85	40-140	4	20	
Surrogate: 1,4-Dioxane-d8	*2.89*		ug/L	*5.000*		*58*	*15-115*			
Classical Chemistry										
Batch DD02920 - General Preparation										
Blank										
Hexavalent Chromium	ND	10.0	ug/L							
LCS										
Hexavalent Chromium	490	10.0	ug/L	499.8		98	90-110			
LCS Dup										
Hexavalent Chromium	500	10.0	ug/L	499.8		100	90-110	2	20	
Batch DD02922 - General Preparation										
Blank										
Total Residual Chlorine	ND	20.0	ug/L							
LCS										
Total Residual Chlorine	1.30		mg/L	1.300		100	85-115			
Batch DD03011 - General Preparation										
Blank										
Chloride	ND	0.5	mg/L							
LCS										
Chloride	9.7		mg/L	10.00		97	90-110			
Batch DD03013 - NH4 Prep										
Blank										
Ammonia as N	ND	0.10	mg/L							
LCS										
Ammonia as N	0.98	0.10	mg/L	0.9994		98	80-120			
Batch DE00116 - TCN Prep										
Blank										
Total Cyanide	ND	5.00	ug/L							
LCS										
Total Cyanide	19.7	5.00	ug/L	20.06		98	90-110			
LCS										
Total Cyanide	148	5.00	ug/L	150.4		98	90-110			
LCS Dup										
Total Cyanide	147	5.00	ug/L	150.4		98	90-110	0.6	20	
Batch DE00133 - General Preparation										
Blank										

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Classical Chemistry										
Batch DE00133 - General Preparation										
Total Suspended Solids	ND	5	mg/L							
LCS										
Total Suspended Solids	94		mg/L	90.70		104	80-120			
Batch DE00409 - General Preparation										
Blank										
Total Petroleum Hydrocarbon	ND	5	mg/L							
LCS										
Total Petroleum Hydrocarbon	16	5	mg/L	19.38		84	66-114			
Batch DE00442 - General Preparation										
Blank										
Phenols	ND	50	ug/L							
LCS										
Phenols	1010	50	ug/L	1000		101	80-120			
504.1 1,2-Dibromoethane / 1,2-Dibromo-3-chloropropane										
Batch DE00112 - 504/8011										
Blank										
1,2-Dibromo-3-Chloropropane	ND	0.015	ug/L							
1,2-Dibromo-3-Chloropropane [2C]	ND	0.015	ug/L							
1,2-Dibromoethane	ND	0.015	ug/L							
1,2-Dibromoethane [2C]	ND	0.015	ug/L							
Surrogate: Pentachloroethane	*0.136*		ug/L	*0.2000*		*68*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.125*		ug/L	*0.2000*		*62*	*30-150*			
LCS										
1,2-Dibromo-3-Chloropropane	0.063	0.015	ug/L	0.08000		79	70-130			
1,2-Dibromo-3-Chloropropane [2C]	0.059	0.015	ug/L	0.08000		74	70-130			
1,2-Dibromoethane	0.064	0.015	ug/L	0.08000		80	70-130			
1,2-Dibromoethane [2C]	0.062	0.015	ug/L	0.08000		77	70-130			
Surrogate: Pentachloroethane	*0.0724*		ug/L	*0.08000*		*91*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.0718*		ug/L	*0.08000*		*90*	*30-150*			
LCS										
1,2-Dibromo-3-Chloropropane	0.199	0.015	ug/L	0.2000		100	70-130			
1,2-Dibromo-3-Chloropropane [2C]	0.185	0.015	ug/L	0.2000		93	70-130			
1,2-Dibromoethane	0.191	0.015	ug/L	0.2000		96	70-130			
1,2-Dibromoethane [2C]	0.186	0.015	ug/L	0.2000		93	70-130			
Surrogate: Pentachloroethane	*0.202*		ug/L	*0.2000*		*101*	*30-150*			
Surrogate: Pentachloroethane [2C]	*0.197*		ug/L	*0.2000*		*99*	*30-150*			
Alcohol Scan by GC/FID										
Batch DD03037 - No Prep										

CERTIFICATE OF ANALYSIS

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Alcohol Scan by GC/FID										
Batch DD03037 - No Prep										
Blank										
Ethanol	ND	10	mg/L							
LCS										
Ethanol	823	10	mg/L	952.8		86	60-140			
LCS Dup										
Ethanol	825	10	mg/L	952.8		87	60-140	0.2	30	

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Notes and Definitions

U	Analyte included in the analysis, but not detected
S+	Surrogate recovery(ies) above upper control limit (S+).
Q	Calibration required quadratic regression (Q).
HT	The maximum holding time listed in 40 CFR Part 136 Table II for pH, Dissolved Oxygen, Sulfite and Residual Chlorine is fifteen minutes.
EL	Elevated Method Reporting Limits due to sample matrix (EL).
D+	Relative percent difference for duplicate is outside of criteria (D+).
D	Diluted.
CD+	Continuing Calibration %Diff/Drift is above control limit (CD+).
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit
MF	Membrane Filtration
MPN	Most Probably Number
TNTC	Too numerous to Count
CFU	Colony Forming Units

CERTIFICATE OF ANALYSIS

Client Name: The Vertex Companies
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ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

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

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

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

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

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

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

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

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

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

ESS Laboratory Sample and Cooler Receipt Checklist

Client: The Vertex Companies - TB

Shipped/Delivered Via: ESS Courier

ESS Project ID: 20D0796
Date Received: 4/29/2020
Project Due Date: 5/6/2020
Days for Project: 5 Day

1. Air bill manifest present? No
   Air No.: NA
2. Were custody seals present? No
3. Is radiation count <100 CPM? Yes
4. Is a Cooler Present? Yes
   Temp: 2.7 Iced with: Ice
5. Was COC signed and dated by client? Yes
6. Does COC match bottles? Yes
7. Is COC complete and correct? Yes
8. Were samples received intact? Yes
9. **Were labs informed about short holds & rushes?** (Yes) / No / NA
10. Were any analyses received outside of hold time? Yes / (No)

11. Any Subcontracting needed? Yes / (No)
    ESS Sample IDs:
    Analysis:
    TAT:
12. Were VOAs received? (Yes) / No
    a. Air bubbles in aqueous VOAs? Yes / (No)
    b. Does methanol cover soil completely? Yes / No / NA

13. Are the samples properly preserved? (Yes) / No
    a. If metals preserved upon receipt: Date: Time: By:
    b. Low Level VOA vials frozen: Date: Time: By:

Sample Receiving Notes:

14. Was there a need to contact Project Manager? Yes / (No)
    a. Was there a need to contact the client? Yes / (No)
    Who was contacted? Date: Time: By:

Sample Number	Container ID	Proper Container	Air Bubbles Present	Sufficient Volume	Container Type	Preservative	Record pH (Cyanide and 608 Pesticides)
1	37764	Yes	No	Yes	VOA Vial	HCl	
1	37765	Yes	No	Yes	VOA Vial	HCl	
1	37766	Yes	No	Yes	VOA Vial	HCl	
1	37767	Yes	No	Yes	VOA Vial	HCl	
1	37768	Yes	No	Yes	VOA Vial	HCl	
1	37769	Yes	No	Yes	VOA Vial	HCl	
1	37776	Yes	No	Yes	VOA Vial	NP	
1	37778	Yes	N/A	Yes	1L Amber	H2SO4	
1	37780	Yes	N/A	Yes	1L Amber	H2SO4	
1	37782	Yes	N/A	Yes	1L Amber	NP	
1	37783	Yes	N/A	Yes	1L Amber	NP	
1	37784	Yes	N/A	Yes	1L Amber	NP	
1	37785	Yes	N/A	Yes	1L Amber	NP	
1	37786	Yes	N/A	Yes	1L Amber	NP	
1	37787	Yes	N/A	Yes	1L Amber	NP	
1	37794	Yes	N/A	Yes	1L Poly	NP	
1	37796	Yes	N/A	Yes	250 mL Poly	NP	

ESS Laboratory Sample and Cooler Receipt Checklist

Client: The Vertex Companies - TB

ESS Project ID: 20D0796
Date Received: 4/29/2020

1	37798	Yes	N/A	Yes	500 mL Poly	H2SO4
1	37800	Yes	N/A	Yes	250 mL Poly	NaOH pH 12 e
1	37802	Yes	N/A	Yes	250 mL Poly	HNO3
1	37804	Yes	N/A	Yes	250 mL Poly	HNO3
1	37805	Yes	N/A	Yes	500 mL Poly	HNO3
2	37770	Yes	No	Yes	VOA Vial	HCl
2	37771	Yes	No	Yes	VOA Vial	HCl
2	37772	Yes	No	Yes	VOA Vial	HCl
2	37773	Yes	No	Yes	VOA Vial	HCl
2	37774	Yes	No	Yes	VOA Vial	HCl
2	37775	Yes	No	Yes	VOA Vial	HCl
2	37777	Yes	No	Yes	VOA Vial	NP
2	37779	Yes	N/A	Yes	1L Amber	H2SO4
2	37781	Yes	N/A	Yes	1L Amber	H2SO4
2	37788	Yes	N/A	Yes	1L Amber	NP
2	37789	Yes	N/A	Yes	1L Amber	NP
2	37790	Yes	N/A	Yes	1L Amber	NP
2	37791	Yes	N/A	Yes	1L Amber	NP
2	37792	Yes	N/A	Yes	1L Amber	NP
2	37793	Yes	N/A	Yes	1L Amber	NP
2	37795	Yes	N/A	Yes	1L Poly	NP
2	37797	Yes	N/A	Yes	250 mL Poly	NP
2	37799	Yes	N/A	Yes	500 mL Poly	H2SO4
2	37801	Yes	N/A	Yes	250 mL Poly	NaOH pH 12 e
2	37803	Yes	N/A	Yes	250 mL Poly	HNO3
2	37806	Yes	N/A	Yes	500 mL Poly	HNO3
2	37807	Yes	N/A	Yes	500 mL Poly	HNO3

2nd Review

Were all containers scanned into storage/lab? Initials

Are barcode labels on correct containers? Yes / No

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

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

Are all QC stickers attached? Yes / No / NA

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

Completed By: Date & Time: 4/29/20 16:57

Reviewed By: Date & Time: 4/29/20 1709

Delivered By: 4/29/20 1709

ESS Laboratory

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

CHAIN OF CUSTODY

ESS LAB PROJECT ID: 20D0796

Turn Time ✓ Standard Rush _____ Approved By: _____

Reporting Limits - ERA RGP

State where samples were collected: MA NH

Discharge into: Fresh Water ☒ Salt Water ☐

Is this project for: RGP

Electonic Deliverable Yes ✓ No _____
Format: Excel ✓ Access ✓ PDF ✓ Other EQUIS

Project Manager: B. Sivonen
Company: The VERTEX Companies, INC.
Address: 100 N. Washington St, Ste 302
Boston MA 02114

Project # 560587
Project Name: Exchange RGP
PO #

ESS Lab Sample ID	Date	Collection Time	Grab -G Composite-C	Matrix	Sample Identification	# of Containers	RGP Metals Total	RGP Metals Dissolved	Hardness (Calculation)	Ethanol ASTM D3695	Chloride 300.0*	Total Cyanide 4500 LL	TPH 1664	TSS 2540D*	TRC 4500-CL D*	Ammonia 350.1	Tri Cr (Calc. MUST run T. Cr)	Hex Cr 3500	Phenol 420.1	RGP VOC Long List 524	1,4-Dioxane 8270-SIM	EDB 504.1	RGP SVOC Log List 625-SIM	PCB 608	Comment #
1	4/29/20	11:00	G	SW	200EX-RGP-REC	22	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1,2
2	4/29/20	12:30	G	GW	200EX-RGP-SRC		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1,2
Preservation Code: 1-NP, 2-HCl, 3-H2SO4, 4-HNO3, 5-NaOH, 6-MeOH, 7-Asorbic Acid, 8-ZnAct, 9-_____							4	4	4	1	1	5	3	1	1	3	-	1	3	2	1	2	1	1	
Container Type: P-Poly G-Glass AG-Amber Glass S-Sterile V-VOA							P	P	P	V	P	P	AG	P	P	P	-	P	AG	V	AG	V	AG	AG	

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

Cooler Present ✓ Yes ___ No
Seals Intact ___ Yes ___ No NA: ✓
Cooler Temperature: Ice temp: 2.7

Sampled by: B.S.

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

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	4/29/20	4/29/20 14:44		4/29/20 16:38	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

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

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