Phase III Remedial Action Plan – RTN 4-601 Former Aerovox Facility New Bedford, MA

Prepared for

AVX Corporation, Fountain Inn, SC

June 2017

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Brown AND Caldwell

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List of Abbreviations

ACO	Administrative Consent Order (DEP)
AEPMM	Active Exposure Pathway Mitigation Measure
AOC	Administrative Order on Consent (EPA)
AP-HP	Hydrogen Peroxide Activated Persulfate
AS	Air Sparging
AST	Aboveground Storage Tank
AUL	Activity and Use Limitation
AVX	AVX Corporation
BC	Brown and Caldwell
bgs	below ground surface
BMPs	Best Management Practices
CAD	Confined Aquatic Disposal
CC	Capital Costs
CDF	Confined Disposal Facility
CEP	Critical Exposure Pathway
CHESI	Clean Harbors Environmental Services, Inc.
CHP	Catalyzed Hydrogen Peroxide
COCs	Constituents of Concern
CRA	Comprehensive Remedial Alternative
CSA	Comprehensive Site Assessment
CSIA	Compound Specific Isotope Analysis
CSM	Conceptual Site Model
CVOCs	Chlorinated Volatile Organic Compounds
DCE	Dichloroethenes
DNAPL	Dense Non-aqueous Phase Liquid
DPS	Downgradient Property Status
EPA	U.S. Environmental Protection Agency
FPRS	Free Product Recovery System
gpm	gallons per minute
GWTS	Groundwater treatment system
HAC	Hydraulic Asphalt Concrete
HPFM	Heat Pulse Flow Meter
IH	Imminent Hazard
IRA	Immediate Response Action
ISCO	In Situ Chemical Oxidation
ISI	Initial Site Investigation
IST	In Situ Thermal Treatment
LPGAC	Liquid Phase Activated Carbon
MassDEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MCP	Massachusetts Contingency Plan
MHW	Mean High Water
MIP	Membrane Interface Probe
MiHpt	Membrane Interface Hydraulic Profiling Tool
MNA	Monitored natural attenuation
NAPL	Non-aqueous Phase Liquid
NBH	New Bedford Harbor
ND	Non-detect
NPW	Net Present Worth
NSR	No Significant Risk
NTCRA	Non-Time-Critical Removal Action
OHM	Oil or Hazardous Material
OMMP	Operations, Maintenance and Monitoring Plan
ORP	oxidation-reduction potential
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethene
POTW	Publicly Owned Treatment Works
ppm	parts per million
PRB	Permeable Reactive Barrier
RAA	Remedial action alternative
RAP	Remedial Action Plan
RAPS	Response Action Performance Standards
RIP	Remedy Implementation Plan
ROS	Remedy Operation Status
RTN	Release Tracking Number
SEE/CA	Supplemental Engineering Evaluation and Cost Analysis
SP	Sodium Persulfate
SRM	Substantial Release Migration
SSDS	Subslab Depressurization System
SVE	Soil Vapor Extraction
TCE	Trichloroethene
TO	Time zero
TS	Treatability Study
TSCA	Toxic Substances Control Act
TSD	Treatment, storage, disposal
UCL	Upper Concentration Limit
USGS	United States Geological Survey
UVOST	Ultraviolet Optical Screening Tool
VC	vinyl chloride
VI	vapor intrusion
WWTP	waste water treatment plant
ZVI	zero valent iron

Section 1

Introduction

1.1 Document Revision

The former Aerovox Facility is located at 740 Belleville Avenue, Bristol County, New Bedford, Massachusetts, where site assessment and remediation is being conducted under Massachusetts General Law Chapter 21E and the Massachusetts Contingency Plan (MCP). The former Aerovox Facility MCP Site (Aerovox Site, Site or Disposal Site) is assigned Release Tracking Number (RTN) 4-601. The Site is also subject to a June 3, 2010 Administrative Consent Order and Notice of Responsibility (identified as ACO-SE-09-3P-016 and referred to herein as the ACO), between AVX Corporation (AVX) and the Massachusetts Department of Environmental Protection (MassDEP) and Massachusetts Office of the Attorney General. The ACO provides for review and approval of each major deliverable under the MCP, including the Phase III Remedial Action Plan (Phase III RAP). AVX submitted the Phase III RAP on August 22, 2016 and MassDEP completed its review of the initial August 2016 Phase III RAP in February 2017. Based on the MassDEP review, conducted in coordination with the U.S. Environmental Protection Agency (EPA) and the City of New Bedford, MassDEP requested that the Phase III RAP be revised. MassDEP's March 8, 2017 letter established June 30, 2017 as the deadline for submittal of this Revised Phase III RAP. This revision supersedes and replaces the prior version submitted via eDEP in August 2016.

1.2 Scope of Phase III Remedial Action Plan

The Phase II Comprehensive Site Assessment (Phase II CSA) for the former Aerovox Facility concluded that comprehensive remedial actions are necessary for the Site to achieve a Condition of No Significant Risk. Under the MCP 310 CMR 40.0850, the Phase III Identification, Evaluation and Selection of Comprehensive Remedial Action Alternatives (Phase III) is based on the findings of the Phase II CSA and Method 3 Risk Assessment contained therein. The MCP requires the following as part of the Phase III:

- Initial screening of likely remedial action alternatives;
- Detailed evaluation of remedial action alternatives (RAAs) using a comparison of the effectiveness, short-term and long-term reliability, difficulty of implementation, cost, risks, benefits, timeliness in eliminating uncontrolled sources of oil and/or hazardous materials (OHM), and effect upon non-pecuniary interests of the remedial action alternatives;
- Evaluation of the feasibility of each of the potential remedial action alternatives, including the feasibility of implementing the alternative, reducing concentrations of OHM to background or levels approaching background and below upper concentration limits (UCLs), eliminating, preventing or mitigating Critical Exposure Pathways (CEP) (if applicable), and eliminating or controlling each source of contamination, contaminant migration, and non-aqueous phase liquid (NAPL); and
- Preparation of a Phase III RAP documenting the evaluation and selection of the Comprehensive Remedial Action(s).

1.3 Purpose and Organization

The purpose of the Phase III process is to identify, through the screening and evaluation process, remedial options for the Disposal Site (as that term is defined in the MCP) that have a high probability of achieving a condition of No Significant Risk, resulting in a Permanent Solution, or where a Permanent

Solution is not feasible, a condition of No Substantial Hazard, resulting in a Temporary Solution. To that end, this Phase III RAP is divided into five main parts consisting of one or more sections in the document:

- A summary of the results of the prior MCP Phases, including Site background information related to the occurrence, assessment and delineation of the release, the results of the Phase II CSA, updates to the Phase II since its submittal and the Conceptual Site Model, (CSM), the response actions completed under the IRA and the identification of preliminary remedial goals;
- Documentation of the Phase III process, including an initial screening of remedial technologies, a detailed evaluation of identified remedial action alternative(s), selection of the remedial action alternative(s) and feasibility evaluation of the selected remedial action alternative(s);
- Proposed schedule, including projected timeframes for achieving a Permanent or Temporary Solution and implementation of the remedial action alternative(s);
- Phase III Completion Statement; and,
- Summary of public notification requirements and activities.

Section 2

Site Description and History

2.1 Agreements

Ongoing work at the former Aerovox Facility is being conducted under Massachusetts General Law Chapter 21E and the MCP. Assessment and remediation of the Site is also subject to the June 3, 2010 Administrative Consent Order and Notice of Responsibility (identified as ACO-SE-09-3P-016 and referred to herein as the ACO), between AVX Corporation (AVX) and the MassDEP and Massachusetts Office of the Attorney General. Five modifications to ACO-SE-09-3P-016 have been authorized by MassDEP, including the following:

- On February 27, 2015, AVX requested a six-month extension to the submittal of the Phase II CSA because of issues with obtaining access to a property north of the Precix property, which was required for delineation of the bedrock groundwater contaminant plume. This request was authorized by MassDEP in a May 2015 Amendment to the ACO.
- As part of the MassDEP's review and approval of the Phase II CSA, ACO Amendment #2 was issued on May 11, 2016, changing the Phase III RAP submission date to July 11, 2016.
- On June 20, 2016, AVX requested an extension to the July 11, 2016 Phase III RAP submittal date, and MassDEP ACO Amendment #3 extended the Phase III RAP deadline to August 22, 2016.
- Amendments #4 and #5, dated 12/22/16 and 1/31/17 respectively, involved dispute resolution associated with submittal of the August 2016 Phase III RAP.

In addition to the ACO, work at the Site is subject to the Administrative Order on Consent (AOC) between the United States Environmental Protection Agency (EPA) and AVX, and the Cooperation and Settlement Agreement between the City of New Bedford (property owner) and AVX. The effective date of these documents is also June 3, 2010, and initiation of work under the ACO was based on completion of the Work under the EPA AOC. Both the AOC and the Cooperation and Settlement Agreement anticipated the final remedial actions for the Site would include as primary components a combined cap and engineered barrier, a source area containment wall, groundwater monitoring and long term operation and maintenance, and the development and evaluation of remedial action alternatives in this Revised Phase III RAP reflect this approach.

2.2 Site Description

The former Aerovox Facility (the Facility) is located at 740 Belleville Avenue, Bristol County, New Bedford, Massachusetts (the Property). Figure 2-1 provides the location of the Site on the United States Geological Survey (USGS) topographic map for New Bedford, Massachusetts. The coordinates of the Site (referenced to the corner of Belleville Avenue and Hadley Street) are latitude 41° 40' 25.12" N and longitude 70° 55' 13.84" W (UTM coordinates 340135.53m E and 4615326.34m N).

The Property is industrially-zoned land that was formerly occupied by a 450,000-square foot manufacturing building, associated ancillary buildings, asphalt paved parking lot and several small landscaped areas. The manufacturing building (the main building) consisted of a 2-story building (the western section), and a 3-story building (the eastern section). The exterior walls of the main building were constructed of brick and the roof was constructed of wood. The first floor, which was the building foundation floor, was constructed of concrete; the second floor consisted of both concrete and wood;

and, the third floor was constructed of wood. Ancillary structures included a brick boiler house that was attached to the south side of the main building; a brick sewer pump station located south of the main building; a pump station located along the Acushnet River (the river) shoreline; and, a brick electrical switching equipment building located near the southwest corner of the main building along Hadley Street. All facility infrastructures on the Property were demolished and removed in 2011 as part of a Non-Time-Critical Removal Action (NTCRA) and pursuant to the EPA AOC. After demolition of the buildings, an asphalt cap was installed across the Property, except for the northwest corner. This area was left as a green space for public use.

Industrial properties are present to the south and north of the Property, and residences are located to the west, across Belleville Avenue. The river borders the eastern end of the Property. The Acushnet River and the area below Mean High Water (MHW) east of the Site is part of the New Bedford Harbor Superfund Site.

The MCP defines the Disposal Site as "…any structure, well, pit, pond, lagoon, impoundment, ditch, landfill or other place or area, excluding ambient air or surface water, where uncontrolled oil and/or hazardous material have come to be located as a result of any spilling, leaking, pouring, abandoning, emitting, emptying, discharging, injecting, escaping, leaching, dumping, discarding or otherwise disposing of such oil and/or hazardous material." Polychlorinated Biphenyls (PCBs) and/or Chlorinated Volatile Organic Compounds (CVOCs) have come to be located in soil and groundwater outside of the Disposal Site boundaries originally defined in the ACO, which were generally defined by the Property boundaries. Based on the Phase II CSA findings, the current Disposal Site boundaries are identified as follows:

- The eastern Disposal Site boundary remains unchanged from the ACO definition and is the existing sheet pile wall (inclusive of the wall itself) running generally in a north-south orientation along the river, and the line formed by the elevation of MHW where the sheet pile wall is not present.
- The western Disposal Site boundary is approximately 115 feet east of and parallel to the western property line along Belleville Avenue;
- The northern Disposal Site boundary extends northeast from the western Disposal Site boundary across the northern abutting property occupied by Precix, Inc. and onto the former Coyne Industrial Laundry property. Approximately 125 feet north of the Precix Property line, the Disposal Site Boundary turns east, extending to the river.
- The southern Disposal Site boundary extends southeast from the western Disposal Site boundary to a point approximately 265 feet south of the southern Aerovox property boundary, then turns northeast paralleling the shoreline until it intersects with the eastern property line.

Refer to Figure 2-2 for the Site Plan, for a graphical depiction of the former main building footprint and the extent of soil and groundwater contamination defining the Disposal Site boundaries as they are currently delineated.

2.3 Site History

Electrical component manufacturing began at the Facility in approximately 1938. Use of PCB containing dielectric fluid in capacitor manufacturing started in the 1940s and was terminated in 1978. Dielectric fluids were stored in above ground storage tanks (ASTs) throughout the building, but mainly in the first floor of the two-story section of the main building. There was no secondary containment associated with the PCB ASTs.

Aerovox also used solvents in the manufacturing process, including trichloroethene (TCE). The TCE was used in a capacitor degreasing operation and was stored in an AST located in the second floor of the two-story building, just outside of the Impregnation Room. The TCE solvent recovery system ASTs were

located in the first floor of the three-story building, and degreasing residues were stored in 55-gallon drums on a concrete floor, reportedly with no secondary containment. Note that the Precix facility on the northern abutting property also historically used TCE for manufacturing operations. The TCE used by Precix was stored in an outdoor AST located directly north of the location of the former Aerovox ASTs.

The use of PCBs in the manufacturing process ceased around October 1978; however, the use of solvents continued through the end of manufacturing operations at the facility. Operations and disposal practices involving the use of PCBs and solvents reportedly resulted in the release of hazardous materials. Records indicate that EPA observed "oil impregnated soil…in the culverts leading to and at both outfalls" during a 1981 compliance inspection of the facility. Culvert, as used here by EPA is believed to refer to the open drainage trenches that were adjacent to and ran parallel to the north and south sides of the three-story section of the building. In addition to the oily soils observed in the drainage trenches, EPA observed oily soils in the "backyard power substation" located between the former Aerovox building and the river. Samples collected from the soils within these two areas contained PCB concentrations of up to 24,000 parts per million (ppm). EPA noted that the backyard power substation was reportedly used for drum storage within the month prior to EPA's collection of the samples and historic aerial photographs reviewed by EPA (dating back to 1951) also indicated probable storage of drums in this area.

Subsequent facility inspections, assessments and sampling programs were undertaken by the former owner and operator, Aerovox, Inc., as well as by EPA from the 1980s through 2010. These investigations confirmed the presence of PCBs in building materials, soils under the concrete foundation and outside the building, in the asphalt used to pave the parking lot and in groundwater. The US Army Corps of Engineers/EPA 2006 Aerovox CSM estimated that a total of 108,900 kg, or roughly 120 tons of PCB mass existed within the soil at the Property. Groundwater analyses summarized in the 2006 CSM, and those completed subsequent to 2006, indicated that CVOCs were comingled with the PCBs. EPA's 2008 near shore dredging program confirmed the presence of comingled PCBs and CVOCs immediately adjacent to the Property.

In 2010, the consent agreements were signed, requiring AVX Corporation to complete a NTCRA to demolish the buildings and cap the Property. The consent agreements, and the Action Memorandum for the NTCRA, included a Toxic Substance Control Act (TSCA) Determination which documented work at the Property as meeting the requirements of a TSCA risk based approval under 40 CFR 761.61(c). NTCRA work included preparation, submittal, and approval of the EPA required work plans and completion of field activities to decommission Property utilities, demolish the buildings and transport the waste for off-site disposal at a permitted TSCA facility, and temporarily cap the Property with a 3-inch asphalt cap. Field activities for the NTCRA were initiated in April 2011 and completed in December 2011. The final report documenting the NTCRA was submitted in May 2012 and approved by EPA in May 2013. The deadlines identified in the ACO between AVX and MassDEP were based upon EPA's approval of the NTCRA final report. Therefore, AVX's receipt of EPA's approval letter triggered initiation of the MCP Phase I Initial Site Investigation (Phase I ISI).

AVX submitted a Phase I ISI, Tier Classification, and Phase II Scope of Work in August 2013. At the time of the Phase I ISI, the Disposal Site boundaries were identified as the property boundaries, except for the eastern boundary, which was defined as the existing sheet pile wall (inclusive of the wall itself) running generally in a north-south orientation along the river, and the line formed by the elevation of MHW where the sheet pile wall is not present. The Disposal Site was ranked as Tier 1B based on the Numerical Ranking System in place at the time. MassDEP issued the Tier 1B Permit for the Site and approved the Phase II Scope of Work in September 2013, triggering the Phase II CSA submittal requirement.

During the period between October 2013 and August 2015, Site investigation activities associated with the Phase II CSA were completed to define the nature and extent of contamination at the Site.

Investigation activities completed as part of this assessment included a seismic refraction survey to determine the depth and configuration of the bedrock surface; high resolution-site characterization using membrane interface probe and hydraulic profiling tool (MiHpt) and ultraviolet optical screening tool (UVOST) to evaluate the presence and extent of dissolved contamination and potential Dense Non-aqueous Phase Liquid (DNAPL); direct push soil borings were advanced to collect soil samples for chemical analysis as part of soil contaminant delineation, and monitoring wells were installed in the shallow overburden, deep overburden, and bedrock aquifers to delineate groundwater contamination. The Phase II CSA confirmed soil and groundwater contaminants of concern (COCs) at the Disposal Site to be PCBs and CVOCs, including chlorinated benzenes and chlorinated ethenes. Both the PCBs and chlorinated benzenes were components of the dielectric fluid used in capacitor manufacturing, and the chlorinated ethenes are due to the use of TCE (and to a lesser extent tetrachloroethene (PCE)) as a solvent, and the reductive dechlorination breakdown (daughter) products of TCE.

During Phase II CSA activities, DNAPL was identified in two monitoring wells (MW-15B/MW-15D) in the northeast corner of the Property. The presence of DNAPL constitutes an IRA MCP reporting condition, and DNAPL recovery activities are ongoing as part of the Immediate Response Action (IRA).

2.4 Phase II Comprehensive Site Assessment Addendum and IRA Summary

MassDEP, in its March 11, 2016 comments on the Phase II CSA requested additional information about specific Site features, including

- The hydrologic conditions of the river which may have impacted distribution of contaminants, such as historic flooding of the harbor and velocity zone along the sheet pile wall;
- The effect of tidal fluctuations and hydraulic gradients on DNAPL mobility, migration and potential discharge to the river;
- The condition and integrity of the sheet pile wall and evaluation of the effectiveness of the sheet pile wall in preventing contamination migration;
- Figures depicting known source areas and suspected DNAPL zones, including in shallow and deep bedrock; and
- Delineation of the northern extent of contamination in the bedrock aquifer.

Similarly, in its review of the initial Phase III RAP submitted in August 2016, MassDEP requested information on these topics, as well as other Phase II CSA related information (contaminant mass estimate, baseline mass flux, etc.) While MassDEP acknowledged that much of the requested information had been previously provided in various submittals, in order to satisfy the requirements of the Phase II Conditional Approval and 310 CMR 40.0810 (3), and for the purpose of having a complete record of the Comprehensive Response Action process, MassDEP requested that the information be included herein. The following sections provide responses to MassDEP's comments and questions, as well as providing an update on the IRA and a summary of an April 2017 groundwater sampling event.

2.4.1 Aerovox Sheet Pile Wall

What is known of the Site history indicates that the primary contaminant migration pathways from the Site to the river were through direct discharge from the two (north and south) Aerovox property building drainage trenches/ditches into the river itself, through the erosion and runoff of contaminated soils that existed in the previously unpaved area between the former building and the shoreline, and the direct dumping of waste into the river from shore (as evidenced by the excavation of capacitors during EPA's Aerovox shoreline dredging). These release mechanisms, plus the migration of dissolved contaminants within groundwater, existed prior to the 1984 construction of the sheet pile wall.

The details of the sheet pile wall construction and as-built diagrams are contained in the administrative record for the New Bedford Harbor Site. These details are of poor quality and date back to the 1984 Gushue and Cummings Report. Additional inferred conditions of the existing wall were provided in the 2013 Jacobs/Army Corps of Engineers Technical Memorandum summarizing their Near-Shore Boring Program Adjacent to the Former Aerovox Property. Jacobs surveyed the top of the sheet pile wall and inferred a depth of between nine and 13 feet below the ground surface (bgs), based on the information in the Gushue and Cummings report.

The 1983 GHR Evaluation of Remedial Alternatives Report and the Gushue & Cummings 1984 On-Site Containment of Contaminated Soils Report that are part of the EPA Administrative Record for the New Bedford Harbor, state that the four objectives of the cap and containment built at the time were "1. Minimization of the potential surface erosion of soils containing PCBs; 2. Minimization of the potential air transport of PCBs from the surface of the study area; 3. Minimization of rainfall infiltration through contaminated soil, and 4. Minimization of groundwater contact with and groundwater discharges from the contaminated soils." The two reports further indicated that "The fourth objective would be achieved by minimizing the flow of estuarine water into the perched water system by installing a vertical barrier along the edge of the river." Thus, while it is accurate to say that the sheet pile wall was installed to mitigate the migration of contaminants to the river, it was intended only to address the shallow perched aquifer above the peat layer and the flow of river water into and out of this layer.

In the development of the EPA-approved cap and containment monitoring and maintenance plan as part of the overall Aerovox settlement, it was agreed that the containment (sheet pile wall) would be inspected annually to the extent it was visible at the surface, to confirm that it remained intact, that it was free of bulges and breaches, that it did not show evidence of pending catastrophic failure, that it continued to function to contain the soil behind it and physically isolate those shallow soils from the river. The annual inspections, including the most recent one of August 2016, have confirmed that the sheet pile wall remains in good condition and has not deteriorated to the point where these functions are compromised.

On September 1, 2016, prior to commencing the IRA excavation of the hot spot areas, test pits were completed adjacent to the existing sheet pile wall within the footprint of the membrane interface probe (MIP) MIP-23 and UV-17 excavations. The objective of the test pits was to visually observe the subsurface condition of the existing sheet pile wall. Excavation of the test pit in the MIP-23 area was extended downward until standing groundwater was observed in the excavation, which occurred at approximately five feet bgs. Standing groundwater was present in the UV-17 test pit at a depth of 1 foot bgs. Excavated material was temporarily staged and bermed on polyethylene sheeting. Photographs of the existing sheet pile wall were taken, and the test pits were backfilled with excavated soils, covered with poly and bermed with straw wattles. The limited observations of the sheet pile wall within these test pits indicate that the wall is currently in good to fair condition. While some aging and corrosion was visible (consistent with a 33-year-old steel structure), the wall remains solid, the joints are intact and no holes, bulges or breaches were observed.

The sheet pile wall will not be included as part of the final Aerovox remediation alternative. While it remains, it continues to serve its intended function to lessen the extent to which contaminants present above the peat layer interact with and/or migrate to the river and overburden groundwater system.

2.4.2 Shoreline Hydrologic Conditions

2.4.2.1 Impact of Storms, Tides, Flooding on Aerovox Shoreline

A full study of the hydrodynamics and hydrologic conditions of the river are beyond the scope of the Phase II CSA; however, a variety of focused hydrologic studies have been completed in support of unrelated projects [including, for example a variety of studies to support the restoration of Acushnet River fish passages, an evaluation of flushing characteristic to support TMDL loading estimates

(NEIWPCC) and an early 1987 USACE study to evaluate in harbor containment areas as part of EPA's planned dredging] The location of the Site in the inner harbor within the Acushnet River estuary represents an area influenced by tides and its associated tidal stream flow. The effect of the tides traveling into the Acushnet River estuary is affected by several different factors such as the prevalent tide in Buzzards Bay, the New Bedford Harbor Hurricane Barrier, the bathymetry of the river and wind. The tidal range inside the estuary has shown little lag or similar ranges to those observed outside of the barrier inlet. The velocities associated with tidal prism near the Aerovox facility are smaller (5 cm/s) when compared with those at the Hurricane Barrier (122 cm/s) due to two main constrictions near the hurricane barrier: the barrier itself and the Coggeshall Street Bridge (Lohse 1997 and ASA 1986).

Flooding may occur under wet-weather events when precipitation and/or snow melt occurs over a short period, increasing the water surface elevation of the river. Flooding could result in river swelling of the river due to upstream riverine inflow from its tributaries and from surface water runoff across the Site. This event of concern occurs under intense wet-weather conditions during spring tides or during the annual high tide (also referred as King tide). During periods of high tide and intense rainfall, flooding has been observed on the eastern end of the Aerovox Property and Hadley Street. The storm water system on the Property and in Hadley Street is unable to drain the Aerovox Property to the river during periods of high tide due to lack of hydraulic head of the storm water system to discharge flow under the elevated water levels of the river. These events have been observed to result in pooling of water on the lower end of the Aerovox Property and Hadley Street.

Since the 1984 capping of the Aerovox Property, installation of the sheet pile wall and armoring of the subtidal areas of the shoreline with rip rap, there have been no known instances of erosion from the shoreline. Construction of these Property features has helped to prevent erosion from occurring. During fair weather periods, the river normally inundates the eastern ends of the existing north and south drainage ditches, a small area along the sheet pile wall south of the southern drainage ditch and within a pavement depression adjacent to on-property storm-sewer discharge point. The tides can be observed to gently lap at the shoreline of the Site, entering the drainage ditches and Property itself through engineered "holes" (scuppers) in the uppermost section of the sheet pile wall. The scuppers aid by draining the area due to water accumulation. High velocity flow has not been observed under normal tide and wet-weather conditions.

Significant storm events (hourly rainfall of up to 2.12 inches - Providence Airport Station) have also occurred during the 33-year period since installation of the cap and barrier system. Storm water runoff across the Site drains to the existing catch basins, which ultimately discharge to the river. At times of high tide, the river water and storm water pools on the low areas of the Property associated with the catch basin outlets. Scouring or erosion of the pavement as a result of these storm events have not been observed. Normal wear and tear on the decades old pavement has been observed and since 2010 the pavement has been inspected and repaired annually. The sheet pile wall remains in place, without evidence of significant heave or failure, and breaching has not occurred as a result of these storm events. As noted above, the sheet pile wall remains in good condition. It will remain in place and be inspected annually until the final comprehensive response actions are constructed, at which time it will be removed.

The original (2006) and updated (MCP Phase II) CSM included potential contaminant migration pathways influenced by the river through historic flooding of the Property through drain lines beneath the Property and within Hadley Street, and through overland flow across paved areas. Both sampling of catch basin man holes and videography of the drainage system were completed in response to this CSM concern, and results of these efforts are included in the Phase II CSA report in Section 2.1.9. The pathway was retained in the CSM discussion (Phase II CSA, Section 8.2) and the conclusions acknowledge that response actions are required to address the storm sewers (Phase II CSA, Section 8.3).

The original (2006) and MCP Phase II CSM also included the potential influence of the river tidal fluctuations within the Property on the flow of groundwater and corresponding contaminant transport. A tidal study to evaluate the effect of the tides on contaminant transport was completed in September 2014 and included in the Phase II CSA, (Reference Section 2.1.8 and Appendix H in the Phase II submittal).

The New Bedford hurricane barrier is located approximately 3.5 miles downriver from the Site. The hurricane barrier was completed in 1966 in response to excessive flooding that occurred from hurricanes in September 1938 and August 1954. The structure was designed to protect the inner areas in New Bedford, Fairhaven and Acushnet from a 16.0 feet-NGVD hurricane tide surge, which is slightly greater than a 500-year tide level. As one of the main protective lines of defense, the potential for flooding associated with storm surge at the Site was mitigated when Hurricane Bob (1991) impacted the barrier with 7.6-foot storm surge. The design also includes coincident Standard Project Flood occurrence along the river behind the barrier for a drainage area of 29.4 sq. mi with an interior runoff pump station capacity of 240 cfs.

2.4.2.2 Storm Water Runoff – Titleist

During periods of heavy rainfall, flooding of the Aerovox Property and Hadley Street has been observed. Migration of potentially impacted storm water through the storm sewer in combination with flooding of Hadley Street due to backup of the storm sewer system is believed to have potentially carried impacts via overland flow to the adjacent property owned by Titleist. As discussed in the Phase II CSA Report, in response to this potential contaminant migration pathway AVX collected surface soil samples on the Titleist property to delineate the extent of PCBs that could have been transported to the Titleist property through this mechanism.

The area east of the Titleist building slopes slightly downward to the river, with the 7 foot NGVD topographic contour running relatively parallel to the east end of the Titleist building as well as creating a slight topographic high off the southeast corner of the building. Based on topography in this area, storm water runoff and associated flooding from Hadley Street could not have migrated via overland flow south of the southeast corner of the building. In the interest of being conservative and for logistical reasons, the area assessed as a potential storm water deposition migration pathway via direct overland flow from the Aerovox Property was extended south and west to include the fenced, locked area southeast of the Titleist building, ending at the asphalt paved area. The southern and southwestern boundary of OU1 is consistent with the edge of pavement south of the Titleist building and per the definition of the Aerovox Property as defined in the ACO, and the mean high water line (approximately the fence line adjacent to the river).

On December 5, 2016, EPA provided MassDEP and BC a figure showing sample locations along the eastern extent of the Titleist property and associated tabulated data for PCB concentrations, including samples both within and outside of the OU1 limits. Of these sampling locations, only six are within the OU1 area. These six sample locations are located above Mean High Water (MHW), which is the designated eastern boundary of Titleist OU1 soil impacts. Based on the depths these samples were taken, two sample results (SS-3304 and SS-3305) indicate that inferred depth of PCB concentrations in soils greater than 1 mg/kg may be approximately one foot deeper than previously known. Identified remedial alternatives for the Titleist property have been revised accordingly. The remaining four samples contain PCB concentrations at depths previously known to contain PCB concentrations greater than 1 mg/kg. Soil samples collected by EPA south of the OU1 boundaries as described above, could not have resulted from surface water runoff from the Aerovox Property; rather, these concentrations are likely associated with contaminants originating in the river (the New Bedford Harbor Site) that may have been deposited as a result of tidal fluctuations and historic flooding.

2.4.3 Bedrock Delineation to the North

Prior to submittal of the Phase II CSA in September 2015, AVX had requested access to the former Coyne Textile Services (Coyne) property at 20 Howard Avenue (north/northeast of Precix) to delineate the northern extent of the CVOC groundwater contamination in the shallow bedrock aquifer. Access to the former Coyne Laundry property was obtained in November 2015, and a shallow bedrock well was drilled and installed on the Coyne property between November 15 and 19, 2015. The exploration boring was drilled using methods consistent with other shallow bedrock wells for this project, using a combination of drive & wash casing advancement through the overburden and air hammer advancement into bedrock via permanently installed casing seated into the bedrock surface. Bedrock drilling via air hammer indicated that the bedrock at this location is fairly competent, as very little water was present in the drilled rock cuttings (i.e., mostly dry). The well could not be developed at the time of installation because little to no water was present in the borehole. A limited amount of groundwater was observed to be entering the borehole after completion of the monitoring well, suggesting that a weak water-bearing bedrock fracture is intercepted by the boring. The well was completed as a 25' open hole bedrock (49 feet to 74 feet bgs) well, designated as MW-36B. Refer to Appendix A for the boring log/monitoring well construction log.

The well was developed and secured with a protective flush-mounted roadbox. On December 17, 2015, MW-36B was purged and sampled via low-flow methods and submitted for analysis of five CVOCs (PCE, vinyl chloride, trans-1,2-Dichloroethene, TCE, and cis-1,2-dichloroethene). Analytical results indicated the presence of TCE and cis-1,2-dichloroethene at concentrations of 100 ug/L. and 30 ug/L, respectively. Monitoring well MW-36B was sampled again on March 16, 2016. This sample contained TCE and cis-1,2-dichloroethene concentrations of 140 ug/l and 44 ug/l, respectively. Refer to Appendix A for copies of the analytical data reports.

TCE was detected on the Coyne property at concentrations below those observed on the Precix property, indicating that the northern edge of the shallow bedrock contamination is within the immediate vicinity of the Coyne property. Based on the risk characterization for the Site, further delineation is not required to evaluate remedial alternatives in the Phase III.

Note that the access agreement with Coyne limited sample analysis to only the chlorinated ethenes that are COCs for the Aerovox Site. Results were not reported for carbon tetrachloride or any other VOCs as part of the two sampling rounds. After the installation and sampling of the well, the property owner submitted a Downgradient Property Status (DPS) submittal in eDEP, claiming to be downgradient of both the Precix property and the Aerovox Site. In the spring of 2016, Coyne entered bankruptcy proceedings and the New Bedford Coyne property was put on the market and sold. The DPS did not transfer to the new property owner.

2.4.4 Baseline Mass Flux

To support the evaluation of potential remedial action alternatives, BC conducted a mass flux evaluation to assess the potential impacts of Site-related constituents in groundwater discharging from the bedrock water-bearing fractures, and the overburden deposits, to the river. The following discussion presents the development of baseline mass flux calculations for bedrock and overburden groundwater. In each case, these baseline calculations estimate the mass flux for the two primary constituents at the Site, TCE and PCBs. The baseline scenarios are then modified to simulate the anticipated reduction in mass flux for each of the groundwater remedial action alternatives.

The Phase II Comprehensive Site Assessment (Phase II CSA) (AECOM, September 2015) indicated that groundwater flow in the bedrock water-bearing fractures and overburden deposits is generally from west to east, and discharges into the river. Although groundwater flow in the bedrock and overburden is affected by the tidally influenced river level (causing flow direction reversals during incoming (high) tide),

the net direction of groundwater flow (and therefore net direction of dissolved contaminant migration) is towards the river. To be conservative, the goal of this mass flux evaluation was to estimate the concentration of Site-related constituents in the pore water within the sediments underlying the river (where benthic organisms are potential receptors) resulting from the migration of groundwater to these sediments, rather than assessing the concentrations in surface water after they have been diluted by flow into the river.

The evaluation was conducted by estimating the rate at which a mass of Site-related constituents dissolved in groundwater may be contributed to the pore water beneath the river, i.e., the mass flux of constituents from groundwater to the pore water, and the resulting concentrations in the pore water. This approach is consistent with that described in "Groundwater Remediation Strategies Tool" (American Petroleum Institute Publication 4730, December 2003). The equation for calculating the mass flux of a constituent is:

$$mf=\Sigma C_i q_i A_i$$

Where: mf = total mass flux from bedrock water-bearing fractures, or overburden deposits (µg/sec)

C_i = concentration of the constituent (µg/mL=µg/cm^3)

q_i = specific discharge through the flow area (cm/sec),

where: $q_i=Ki$, with K= hydraulic conductivity (cm/sec) and i=hydraulic gradient (cm/cm)

A_i = flow area perpendicular to flow (cm^2),

where: $A_i=(L)(b)$, with L=width of constituent plume perpendicular to flow and b=saturated thickness of zone

2.4.4.1 Baseline Bedrock Mass Flux Evaluation

In applying this evaluation to the bedrock, the mass flux was calculated across a cross-sectional flow area of the bedrock water-bearing fractures positioned at the downgradient border of the Site, adjacent to the river, aligned perpendicular to groundwater flow (which in this case is typically parallel or sub-parallel to the shore line).

The horizontal dimension of the flow area, L, is equal to the width of the plume for the Site constituent (TCE) that has the greatest width exceeding Method 1 GW-3 standards (470 feet). Because the concentrations of constituents vary along the flow area, the flow area was divided into two horizontal zones with concentrations of similar magnitude. The horizontal limits of these zones were defined by the midpoint between bedrock wells MW-07B and MW-34B, with the northern zone extending to the northern boundary of the Site, and the southern zone extending approximately 40 feet beyond the southern boundary of the Site (see Appendix B); this extent accounts for the maximum width of the bedrock plume as delineated in the shallow bedrock as shown on Figure 2-11 of the Phase II CSA.

This cross-sectional area is shown in Appendix B, Figure 1 which is a modification of cross section C-C' from Appendix R of the Phase II CSA that has been extended vertically to show the full depth of deep bedrock monitoring wells MW-32B and MW-34B. The vertical dimension of the flow area is equal to the sum of the saturated thickness (b) of bedrock water-bearing fractures to the depth where no flow in bedrock was encountered (discussed below).

Within each of these two zones, the vertical thickness of the bedrock was further subdivided into two depth intervals based on available bedrock concentration data. For the northern zone, this subdivision was at a depth of 160 feet, with the shallower bedrock groundwater characterized by average concentrations of 72,800 ug/l of TCE and 82 ug/l of PCBs, and groundwater in the deeper bedrock zone characterized by average concentrations of 483,330 ug/l of TCE and 0.25 ug/l of PCBs. For the northern zone, heat pulse flow meter (HPFM) data presented on the geophysical logs in Appendix G of the Phase II CSA showed very low flow in bedrock below a depth of 180 feet in MW-34B. This depth limit is further supported by data from the deepest bedrock monitoring well at the Site, MW-33B, which was drilled to a depth of 255 feet, where HPFM data showed no flow below a similar depth of 185 feet. For the southern zone, the vertical subdivision was at a depth of 125 feet, with the shallower bedrock groundwater characterized by average concentrations of 7,040 ug/l of TCE and 11 ug/l of PCBs, and the deeper bedrock groundwater characterized by average concentrations of 26,500 ug/l of TCE and 0.25 ug/l of PCBs. HPFM data showed no flow in bedrock well MW-32B below a depth of 159 feet.

Estimating the horizontal hydraulic gradient in the bedrock water-bearing fractures is complicated by the reversal in flow directions caused by tidal fluctuations on the eastern half of the property. The horizontal gradient was estimated by taking the mean of the horizontal gradient toward the river observed during low tide (Figure 2-16 of the Phase II CSA), and the landward horizontal gradient observed during high tide (Figure 2-19 of the Phase II CSA). This results in a net horizontal hydraulic gradient toward the river of 0.00012 cm/cm.

The geophysical logs of the deep bedrock wells included in Appendix G of the Phase II CSA identified three types of fractures which were characterized as:

- Minor fracture (not distinct and may not be continuous around the borehole);
- Intermediate fracture (distinct and continuous around the borehole with little or no apparent aperture); and
- Major fracture (distinct and continuous around borehole with apparent aperture)

These descriptions, combined with a review of the HPFM data, indicate that only the major fractures are likely to transmit significant quantities of groundwater and Site-related constituents. This interpretation is supported by review of the caliper logs which indicate that essentially all the significant enlargements of the boreholes are associated with the identified major fractures (as shown on Appendix B, Figure 1, most of these significant fractures were targeted for placement of FLUTe® multi-port liner sampling ports). Based on this data, there are large intervals within the deep bedrock which contain no significant fractures and are characterized by no flow or very low flow. Therefore, the saturated thickness (b) used to calculate bedrock flow in the original Phase III for the Site (August, 2016) was the thickness of the well screens and FLUTE® sampling ports. At the request of MassDEP, given that there are relatively few deep bedrock wells, and to be conservative, the estimated thicknesses of the water-bearing zones (b) (which were based on the length of the well screens and FLUTE® sampling ports) were doubled in the baseline (and subsequent) mass flux evaluations for the bedrock. The doubling of the thicknesses of the water-bearing zones in the mass flux calculations was also included for the shallow bedrock to address MassDEP concerns that the uppermost portion of the shallow bedrock has not been adequately characterized (because this portion of the aquifer is generally drilled using a roller bit to install a rock socket). The hydraulic conductivity used for the bedrock water-bearing fractures was the average from slug tests in the shallow bedrock (34.9 feet/day) as identified in Section 2.2.3.3 of the Phase II CSA.

Separate mass flux calculations were made for each of the four sub-areas described above. These calculated values were then summed to arrive at an estimate of total mass flux for the flow area in the bedrock at the downgradient side of the Site.

The concentration of Site-related constituents in the pore water in sediments beneath the river was estimated assuming that bedrock groundwater flow from the Site discharges to the overlying outwash

deposits and sediment within an area that in an east-west direction extends from the river shore adjacent to the Site to the middle of the River, and in a north-south direction extends across the width of the plume. Within this area, groundwater flows upward through the outwash deposits to the river (similar flow from uplands on the east side of the river is anticipated to discharge to the eastern half of the River). The vertical discharge of bedrock groundwater through the outwash deposits was calculated as follows:

$$Q_{vow} = (K_{vow})\ (i_{vow})\ (x * L)$$

Where:

Q_{vow} = Vertical discharge through outwash deposits (cm^3/sec)
K_{vow} = Vertical hydraulic conductivity of outwash deposits (cm/sec)
I_{vow} = Vertical hydraulic gradient from top of bedrock to bottom of River (dimensionless)
X = One-half width of River (feet)
L = Width of bedrock plume (feet)

The horizontal hydraulic conductivity of the deep overburden outwash deposits was characterized in the Phase II CSA as 126.2 feet per day, or 0.044 cm/sec. The vertical hydraulic conductivity of these deposits was assumed to be one-tenth of the horizontal hydraulic conductivity (a typical ratio for sedimentary deposits), or 0.0044 cm/sec. The vertical hydraulic gradient was estimated using hydraulic heads from monitoring well couplets on the western portion of the Site (MW-13D/B, MW-21D/B and MW-101S/B) which are not subject to the large tidal fluctuations observed in monitoring wells near the river. The average of the upward vertical hydraulic gradients observed in these wells was 0.0023. One-half the width of the river (305 feet) was estimated using the midpoint of the average width of the river measured opposite the northern border of the Site, the middle of the Site, and the southern border of the Site. The width of the plume at the Site boundary (470 feet) was described above.

The concentration of bedrock groundwater constituents in the outwash deposits under the river (and therefore in the pore water) adjacent to the Site was calculated as follows:

$$C_{ow} = (Mf_{br})\ (1/\ Q_{vow})$$

Where:

C_{ow} = Concentration of constituent in outwash deposits and pore water (ug/cm^3)
Mf_{br} = Mass flux of constituent from bedrock groundwater (ug/sec)
Q_{vow} = Vertical discharge through outwash deposits (cm^3/sec)

To address some of the uncertainties in this evaluation, conservative assumptions were made in the above-described calculations which result in pore water concentration estimates that are biased high. These assumptions are as follows:

- As noted above, the thickness of the water-bearing zones (initially based on the lengths of the well screens and FLUTE® sampling ports) was doubled in the calculations. This doubled the estimated rate of groundwater flowing out of the bedrock in the calculations, and therefore doubled the estimated mass flux to the river.
- The hydraulic conductivity used for the bedrock water-bearing fractures was the average from slug tests in the shallow bedrock (34.9 feet/day) as identified in Section 2.2.3.3 of the Phase II CSA. However, hydraulic conductivity typically decreases with depth in bedrock and therefore the use of hydraulic conductivity estimates from shallow bedrock wells overestimates the average hydraulic

conductivity of the deeper bedrock water-bearing fractures. The lower the hydraulic conductivity (used to calculate specific discharge through the flow area), the lower the mass flux.

- The upward vertical gradient from the bedrock to the river was estimated using water level data from well couplets on the western side of the Site. However, the net upward vertical gradient is likely greater beneath the river (the regional discharge zone). A greater upward vertical gradient would result in a greater vertical discharge through the outwash under the river and thus a lower estimated concentration in the outwash deposits and pore water of the river sediments.
- The mass flux calculations did not include any adjustments to account for the attenuation of contaminant concentrations which will occur as the plume flows (laterally and vertically) from the deep bedrock water-bearing fractures through the outwash deposits to the river. This may be a significant factor, particularly near monitoring well MW-34B where the highest concentrations (likely indicative of NAPL) were detected in the lowest sampling port, and concentrations decrease by nearly an order of magnitude moving up the well to the shallowest sampling port (possibly caused by attenuation).

To screen for potential impacts to the ecological receptors, the estimated pore water concentrations in sediment beneath the river were compared to Method 1 GW-3 standards. The Method 1 GW-3 standards, which are meant to be protective of all surface water in Massachusetts, are 5,000 ug/l for TCE and 10 ug/l for PCBs. The baseline mass flux calculations for TCE and PCBs migrating from the bedrock water-bearing fractures indicate that the estimated ~~the~~ concentrations of TCE and PCBs in the pore water in sediment beneath the River are approximately 2,980 ug/l, and 1.63 ug/l, respectively. Given the number of conservative assumptions that were used in these calculations, it is anticipated that the actual concentration in the pore water resulting from bedrock groundwater is significantly lower.

2.4.4.2 Baseline Overburden Mass Flux Evaluation

The development of the baseline mass flux calculation for the overburden deposits was similar to that described above for the bedrock. The mass flux was calculated across a cross-sectional flow area of the saturated overburden deposits positioned at the downgradient border of the property, adjacent to the river, aligned perpendicular to groundwater flow. This cross-sectional area is shown in Appendix B, Figure 2 which is a modification of cross section C-C' from Appendix R of the Phase II CSA. The horizontal dimension of the flow area, L, is equal to the width of the property boundary, which based on the Phase II CSA contains the width of the groundwater plume where exceedances of Method 1 GW-3 standards have been detected in the shallow and deep overburden deposits. Because the concentrations of constituents vary along the flow area, the flow area was divided into four zones as shown on Appendix B, Figure 2. A single zone was used for the shallow overburden because similar concentrations were measured in groundwater samples from shallow monitoring wells located near the River. Three separate zones were used for the deep overburden based on significant differences in concentration observed in the deep overburden wells located near the river. The horizontal limits of the deep overburden zones were defined by the northern boundary extending to the midpoint between wells MW-15D and MW-7, from the midpoint between wells MW-15D and MW-7 to MW-2, and from MW-2 to the southern property boundary.

- For the shallow overburden, the average Phase II CSA groundwater concentrations from wells MW-4A, MW-7A, MW-3A and MW-2A (these shallow overburden wells are shown on Figure 2-6 of the Phase II CSA) were 1 ug/l of TCE and 2 ug/l of PCBs.
- For the northern section of the deep overburden, the average Phase II CSA concentrations in well MW-15D (5,133 ug/l of TCE and 69.9 ug/l of PCBs) were used in the mass flux calculation.
- For the central section of the deep overburden, the concentrations in well MW-7 were used: 24,285 ug/l of TCE and 19 ug/l of PCBs.

- For the southern section of the deep overburden, the average concentrations from wells MW-2 and MW-17D were 2,110 ug/l of TCE and 22.4 ug/l of PCBs.

The vertical thickness of the deep overburden zones used in the estimate was the distance from the base of the shallow overburden to the average depth of bedrock within each zone (see Appendix B, Figure 2). The hydraulic conductivity used for the shallow overburden and deep overburden was the average from slug tests in the shallow overburden (39.7 feet/day) and deep overburden (126.2 feet/day) as identified in Sections 2.2.3.1 and 2.2.3.2 of the Phase II CSA, respectively.

The estimated hydraulic gradient for the shallow overburden deposits was taken from Figures 2-14 and 2-17 of the Phase II CSA, for low and high tide conditions, respectively. In both cases, the flow gradient near the River was in a landward direction (presumably caused by the influence of the sheet pile wall which extends across the width of the riverfront and to the bottom of the shallow aquifer). These data indicate that near the riverfront the shallow overburden groundwater likely migrates downward into the deep overburden. Thus, for the mass flux calculation a horizontal gradient of zero was used for the shallow overburden to indicate no flow to the River (presumably there is downward flow from the shallow overburden to the deep overburden near the sheet pile wall – this flux is captured in the calculation for the deep overburden). Estimating the horizontal hydraulic gradient in the deep overburden is complicated by the reversal in flow directions caused by tidal fluctuations on the eastern half of the property. The horizontal gradient was estimated by taking the mean of the horizontal gradient toward the river observed during low tide (Figure 2-15 of the Phase II CSA), and the landward horizontal gradient observed during high tide (Figure 2-18 of the Phase II CSA). This results in a net horizontal hydraulic gradient toward the River of 0.00012 cm/cm.

Separate mass flux calculations were made for each of the four overburden cross-sectional sub-areas described above. These calculated values were then summed to arrive at an estimate of total mass flux for the flow area in the overburden deposits at the downgradient side of the property.

The concentration of Site-related constituents from overburden groundwater in the pore water in sediments beneath the river was estimated assuming that overburden groundwater flow from the property discharges to the overlying outwash deposits and sediment within an area that in an east-west direction extends from the river shore adjacent to the Site to the middle of the river, and in a north-south direction extends across the width of the property. The vertical discharge of overburden groundwater through the outwash deposits was calculated using the same equation described above for the flow from bedrock:

$$Q_{vow} = (K_{vow})\ (i_{vow})\ (x * L)$$

Where:

Q_{vow} = Vertical discharge through outwash deposits (cm^3/sec)
K_{vow} = Vertical hydraulic conductivity of outwash deposits (cm/sec)
I_{vow} = Vertical hydraulic gradient from deep overburden to bottom of River (dimensionless)
X = One-half width of River (feet)
L = Width of property (feet)

The values for K_{VOW}, I_{VOW}, and X are the same as described above for the bedrock. The value for L (width of the property) is 420 feet.

The concentration of overburden groundwater constituents in the outwash deposits under the River (and therefore in the pore water) adjacent to the Site was calculated using the same equation as described above for bedrock:

$$C_{ow} = (Mf_{ob})\ (1/\ Q_{vow})$$

Where:

C_{ow} = Concentration of constituent in outwash deposits and pore water (ug/cm^3)
Mf_{ob} = Mass flux of constituent from overburden groundwater (ug/sec)

Q_{vow} = Vertical discharge through outwash deposits (cm^3/sec)

To address some of the uncertainties in this evaluation, conservative assumptions were made in the above-described calculations which result in pore water concentration estimates that are biased high. These assumptions are as follows:

- The upward vertical gradient from the bedrock to the River was estimated using well couplets on the western side of the Site. However, the net upward vertical gradient is likely greater beneath the River (the regional discharge zone). A greater upward vertical gradient would result in a greater vertical discharge through the outwash under the River and thus a lower estimated concentration in the outwash deposits and pore water of the River sediments
- The mass flux calculations did not include any adjustments to account for the attenuation of contaminant concentrations which will occur as the plume flows (laterally and vertically) from the overburden through the outwash deposits to the River.

As described above for the bedrock baseline evaluation, the estimated pore water concentrations in sediment beneath the River were compared to the Method 1 GW-3 standards (5,000 ug/l for TCE and 10 ug/l for PCBs). Based on the mass flux calculations for TCE and PCBs migrating from the overburden, the resulting concentration of TCE and PCBs in the pore water in sediment beneath the River is calculated at approximately 267.7 ug/l, and 1.02 ug/l, respectively. Given the conservative assumptions that were used in these calculations, it is anticipated that the actual concentration in the pore water resulting from overburden groundwater is significantly lower.

2.4.5 Contaminant Mass Estimates

2.4.5.1 PCBs

The mass of PCBs contained within the soils of the Former Aerovox Facility and southern adjacent Titleist property were calculated based on the data generated during the Phase II CSA. Based on the Site CSM, and supported by Phase II findings, the highest concentrations of PCBs are found within soils on the eastern end of the property. Concentrations generally decrease westward, reaching non-detect or less than the Method 1 S-3/GW-2 and S-3/GW-3 Standards along the western end of the Aerovox property. The depth to bedrock across the Site generally increases eastward, with the thickest overburden deposits just inside the eastern shoreline. For these reasons, the Site was divided into four horizontal zones for estimating PCB mass: The area within 25 feet of the shoreline (i.e., the existing sheet pile wall); the area within 25 to 100 feet of the shoreline; the area between the 100-year flood plain boundary to 100 feet of the shoreline; and, the area outside the 100-year floodplain and within the delineated Disposal Site.

Due to the geology of the Site, which includes urban fill overlying a peat layer (peat is present over approximately one-half of the Aerovox Site) and MCP requirements for categorizing soil for the purposes of risk characterization/remediation, the vertical profile of the Property was divided into three zones: From the ground surface to the average depth of the top of the peat layer (bgs); from the depth of the top of the peat layer to 15 feet bgs; and, from 15 feet bgs to the average depth of the bedrock surface. Average depths to the top of peat and top of bedrock were determined for each zone based on depths identified in the field and provided in boring logs.

PCB analytical data for borings within each of the horizontal zones and three depth intervals were used to average total PCB concentrations for each "box" defined by these zone boundaries. For soil samples from depth intervals bridging two vertical zones, the total PCB average was calculated with and without these samples, and the highest average value was used to calculate the PCB mass. The average bulk density of Site soils collected in August 2015 is 111.23 lb/ft^3, or 3,006.21 lb/yd^3. Note that the use of average concentrations typically overestimates the calculation of total mass (with a targeted non-random sampling program as is the case here), and these values are considered conservative high estimates of source term soils.

Based on these calculations, the total estimated mass of PCBs currently present on the Aerovox Property is 86 tons, roughly 25% less than the total (120 tons) originally estimated in the 2006 CSM. Of this total, 43 tons (53%) are located within 25 feet of the shoreline; 20 tons (23%) are located between 25 and 100 feet of the shoreline; 19 tons (22%) are located between 100 feet of the shoreline and the 100-year floodplain boundary; and, 2 tons (2%) are located between the 100-year floodplain boundary and the west edge of the delineated Disposal Site. A review of Table 2.4.1, which summarizes the PCB mass calculations, indicates that the depth interval from the ground surface down to the top of the peat layer contains the highest mass of PCBs, and the depth interval between the top of the peat layer and 15 feet bgs within100 feet of the shoreline contains the lowest mass of PCBs. An estimated mass of approximately 1 ton of PCBs (representing 1.2% of the total PCB mass on the Site) is present within the uncapped area of the Disposal Site on the Titleist property.

2.4.5.2 TCE

The mass of TCE contained within soils at the Aerovox facility cannot be calculated with a high degree of confidence based on the data available. Biased VOC samples were collected from the Site based on PID readings at the time of collection, with the sample corresponding to the highest PID reading within each boring submitted for VOC analysis. In the case of PCBs, samples were collected from multiple intervals based on an initial grid sampling effort and where visual observation of contamination was identified. PCB samples have a much longer allowable holding time due to their non-volatile nature. This allowed for an iterative analysis of soil samples and a more finely discretized horizontal and vertical delineation. Using widely spaced and highly variable concentrations across zones of the Site would result in a significant overestimate of TCE mass. Similarly, this calculation would not serve to evaluate the effectiveness or reliability of individual alternatives.

2.4.6 Immediate Response Action Update

On April 10, 2014, MassDEP was notified of the presence of DNAPL at a measured thickness of greater than 0.5-inch in overburden monitoring well MW-15D, and an IRA Plan was submitted in June 2014 to address the presence of the DNAPL. The objective of the IRA Plan when submitted was to recover DNAPL to the extent feasible, delineate DNAPL at the Site, and design, install and operate a DNAPL recovery system as an interim measure until the final Site remedy was selected. Delineation of the DNAPL occurred concurrent with the Phase II CSA, and included MiHpt advancement and UVOST evaluations, each followed by advancement of soils borings and collection of soil samples for laboratory analysis. A mise-a-la-masse resistivity survey was also completed in the northeast corner of the Site to assist in the evaluation of DNAPL lateral extent.

DNAPL was measured in MW-15D at a thickness of 7 inches on May 19, 2014, and gauging and DNAPL recovery was initiated at that time. On September 19, 2014, DNAPL was observed for the first time in MW-15B at a thickness of approximately 3 inches, and gauging and recovery of DNAPL from MW-15B was initiated on September 22, 2014. DNAPL gauging and recovery has been completed on a bi-weekly to monthly schedule since recovery commenced. A decrease in the thickness and recovery volume of DNAPL in/from these wells has been observed with time, with short-lived increases associated with events that have interfered with the stability of Site conditions, including pump testing (RW-1D,

discussed below), purging of significant quantities of water for collection of treatability studies (MW-15B), and well redevelopment (MW-15D). After these short-term disruptions to normally static conditions, decreases in DNAPL thickness and recovery volume in the associated well(s) are observed. Through the May 17, 2017 gauging, an estimated 3,315 ml (0.88 gallons) and 2,175 ml (0.57 gallons) of DNAPL have been recovered from monitoring wells MW-15D and MW-15B, respectively.

MassDEP asserted that a condition of Substantial Release Migration (SRM) exists at the Site and requested submittal of an IRA Plan Modification to contain or remove the DNAPL to prevent further migration to the river. Specifically, on March 11, 2016 MassDEP sent AVX correspondence requiring submittal of an IRA Modification by April 15, 2016 that would include "measures to contain or remove the DNAPL to prevent further migration to the river which otherwise meets the requirements of 310 CMR 40.0424, including a detailed schedule for the proposed response actions."

On April 14, 2016, AVX submitted an IRA Plan Modification with two objectives:

- Removal of recoverable DNAPL from shallow and deep overburden, and shallow bedrock in the vicinity of MW-15B/D; and,
- Removal and off-site disposal of visually impacted soils above the peat layer proximate to soil borings UV-17 and MIP-23.

2.4.6.1 DNAPL and Free Product Recovery System

A free product recovery system (FPRS) was designed to remove recoverable DNAPL from the northeastern corner adjacent to existing monitoring wells MW-15B and MW-15D. The system was designed with four wells, including a recirculation well and three recovery wells. The depths of the three recovery wells were chosen based on the three horizons identified in the northeast corner of the Aerovox Property to contain DNAPL blebs in prior soil cores, including the shallow fill material overlying the peat layer (RW-1S), deep overburden soils above the bedrock interface (RW-1D), and shallow competent bedrock well (RW-1B).

The FPRS design included the use of belt skimmers for DNAPL recovery, operated by solar power if feasible, for RW-1S and RW-1B. Because the prior manual removal of DNAPL in the deep overburden (from MW-15D) had tapered off, the design for this well included initial operation of an active pumping well (RW-1D) and a deep overburden recirculation well (RC-1) at the overburden-bedrock interface. RW-1D was to be equipped with a groundwater pump and a DNAPL pump installed at the overburden-bedrock interface). Groundwater pumped from RW-1D would discharge into RC-1, creating an artificial gradient to induce greater DNAPL mobility to and recovery from RW-1D.

On August 11, 2016, drilling of RW-1B was initiated by Cascade Drilling, Inc., subcontractor to Clean Harbors Environmental Services, Inc (CHESI), using a Boart Longyear 600T Sonic Rig. The continuous soil and bedrock core were generated during drilling in 10 foot lengths (or less, as directed by the BC Geologist). Upon completion of each core length, the core was extruded into a core liner. Each core was opened and soil was classified and screened with a photoionization detector (PID). In addition, olfactory and visual observations were recorded. The drilling was completed using a series of decreasing casing sizes to isolate and mitigate cross-contamination between contaminated fill material above the peat layer and cleaner soils immediately underlying the peat layer.

After completion of RW-1B, RW-1D was installed, followed by RW-1S and finally RC-1. RW-1S (the well above and within the top of the peat) was set to a total depth of 14 feet bgs, with the screen interval from seven to 12 feet bgs, and a two-foot sump from 12 feet to14 feet bgs. RW-1B (the well intercepting shallow competent bedrock) was set to a total depth of 65 feet bgs, with a 20-foot screen interval from 43 feet to 63 feet bgs, and a two-foot sump from 63 feet to 65 feet bgs. The overburden well pair, RW-1D and RC-1 (both set over the top of competent bedrock) were installed with a 5-foot screen and a 10-foot screen at depth intervals of 25 feet to 30 feet bgs and 20 feet to 30 feet bgs, respectively. A five-

foot sump was installed at the bottom of RW-1D from 30 feet to 35 feet bgs. Well installation was complete on August 16, 2016. Refer to Appendix C for copies of the recovery well boring/construction logs.

Subsurface conditions observed during recovery well installation were similar to prior soil borings advanced in this area. Industrial historic fill was observed immediately beneath the hydraulic asphalt concrete (HAC) cap. The fill material is underlain by peat and/or silty clay marine-derived sediments. Glacio-fluvial sand and gravel underlie the marine sediment layer, and was observed to be present down to the bedrock surface. The bedrock interface was observed at a depth of approximately 30 feet bgs. A zone of weathered bedrock grades into more competent bedrock at a depth of approximately 36 feet bgs. DNAPL was not observed in any of the four boring locations during drilling activities. PID readings ranged from 0.0 parts per million to a maximum of 115 ppm.

After well installation and curing of the bentonite grout, the recirculation and recovery wells were developed. Development activities were conducted for each well for a minimum of 2 hours and/or the following:

- The well screen and sump were free of accumulated solids;
- The well discharge was visually free of suspended material;
- Turbidity measurements were less than 50 NTU and/or reached stability as defined by a change of less than 10% for two consecutive 15 minute periods. Development water was temporarily stored on-site in a fractionation tank for subsequent transportation and off-site disposal.

Routine measurements in the four newly installed wells and the two existing monitoring wells with prior evidence of DNAPL began on September 20, 2016. Little to no DNAPL had accumulated in the recovery wells since installation in early August 2016. Thus, BC requested approval from MassDEP during the September 28, 2016 IRA progress meeting to delay installation of the belt skimmers and DNAPL and groundwater pumps in RW-1S, RW-1B and RW-1D, respectively, until such time that a sufficient quantity of DNAPL accumulated to warrant installation of the system.

On October 20, 2016, MassDEP requested that a pilot test of the groundwater pumping and recirculation system be attempted to potentially induce DNAPL movement toward the recovery wells. BC prepared a pilot pumping and recirculation procedure and submitted it to MassDEP via email. Subsequently, pilot test activities were conducted to assess if extracting groundwater from the deep overburden at well RW-1D, and reinjecting the extracted groundwater back into the deep overburden at adjacent well RC-1, would effectively increase the rate of DNAPL recovery in RW-1D. The objectives of the pilot testing were as follows:

- Assess if groundwater extraction and recirculation of groundwater effectively increases the rate of DNAPL accumulation in the RW-1D.
- Collect data to determine the preferred groundwater pumping rate/reinjection rate for the deep overburden recovery well system.
- Confirm the hydrogeologic setting and the capacity for the recirculation well to accept the extracted groundwater.

Prior to conducting groundwater pumping and recirculation for the pilot test, water levels in both RW-1D and RC-1 were monitored continuously for an approximately four-day long period to assess the degree to which the tides in the river affect groundwater levels in the deep overburden. This continuous monitoring was conducted from November 10 to November 14, 2016 using data logging pressure transducers installed in RW-1D and RC-1. In addition to the water level data, barometric pressure data was collected for this period using a data logging barometric pressure transducer. The collected data indicates that the timing and magnitude of the tidally-induced groundwater level fluctuations are similar in the two wells. The amount of tidally-induced groundwater level fluctuation varied between approximately 2.5 feet and

3.5 feet during this monitoring period. A relationship between groundwater levels in these wells and barometric pressure was not evident during the monitoring period; this is likely because water level changes due to changes in barometric pressure, if any, are expected to be small and possibly not resolvable relative to the tidally-induced changes.

On November 14, 2016, a step-test was conducted to evaluate the maximum rate that groundwater could be extracted from RW-1D and re-injected into RC-1 without the water level in RC-1 rising to the top of the well casing. Based on a DNAPL mobility assessment presented in IRA Status Report #4 (AECOM, June 2015), it was estimated that the maximum rate at which groundwater could be extracted from RW-1D without risking the potential for DNAPL entering the well screen to flow to the groundwater pump rather than collecting in the well sump is 7 gallons per minute (gpm). Accordingly, 7 gpm was set as the upper limit for the rate at which the groundwater pump could be operated. The step test included pumping groundwater from RW-1D and discharging directly into RC-1 at rates ranging from 1 gpm to a maximum of 6.5 gpm. Collectively, the step testing was conducted over a period of 3.6 hours. The maximum groundwater extraction and reinjection rate achieved, 6.5 gpm, was based on the limit of the submersible pump being used (Grundfos Red-Flo2, with ½ inch outside diameter discharge tubing) and is just below the upper limit (7 gpm) set for groundwater extraction as described above. Reinjection of water into RC-1 during the step testing did not result in the water level in the that well rising to the top of the well casing. Changes in water levels in RW-1D and RC-1 due to starting and stopping the groundwater pump are evident at flow rates ranging from 1 to 6.5 gpm; however, the influence of the tides has a far greater influence on changes in groundwater levels in these wells than does the groundwater pumping.

On November 15 and November 16, 2016, 8-hour long pumping tests were performed with groundwater extracted from RW-1D being re-injected into RC-1. These tests were conducted with the pump and tubing described above. On November 15, 2016, the groundwater pumping rate was set and maintained at 6.5 gpm for the duration of the 8 hours of pumping. At the start of this test (7:55 AM) the river was at slack tide, and was then observed changing to an ebbing tide at approximately 9:40 am. The tide in the river did not begin to rise again until 4:00 PM, well after the time at which ebb tide conditions were predicted (approximately 2 PM) to change to flood tide conditions. This delay in the beginning of the flood tide conditions was due to the closure of the gates for the hurricane barrier at the south end of New Bedford Inner Harbor (the end of the Acushnet River estuary). The gates were temporarily closed due to the higher than normal high tides (King tides) and anticipated precipitation upstream. Thus, the period the step test and pumping tests were undertaken was a period of atypical tide conditions. On November 16, 2016, the groundwater pumping rate was set and maintained at 6 gpm for the duration of the 8 hours of pumping. At the start of this test (6:50 AM) the river was at slack tide, and was then observed changing to ebbing tide at approximately 10:30 AM. The tide in the river began to rise again at approximately 3:00 PM, consistent with the time at which ebb tide conditions were predicted to change to flood tide conditions.

As was observed during the step-test, changes in water levels in RW-1D and RC-1 due to starting and stopping the groundwater pump are evident at flow rates ranging from 1 to 6.5 gpm; however, the influence of the tides, or other factors affecting river levels, has a greater influence on changes in groundwater levels in these wells than does the groundwater pumping. Further, reinjection of water into RC-1 during these tests did not result in the water level in the that well rising to the top of the well casing.

The data was inconclusive on the lag time between river tide changes and well changes. However, evaluation of the continuous water level monitoring in RC-1 and RW-1D between November 10, 2016 and November 14, 2016 indicate that these wells have similar magnitude fluctuations and timing (i.e., no discernable lag). Additionally, the 2014 tidal study discussed in the Phase II CSA report also showed no discernable lag between wells within 180 feet of the river. Therefore, no discernable lag is

anticipated between the timing of the river water level fluctuations and the water level fluctuations in these two wells.

Average hydraulic gradients between RC-1 and RW-1D were evaluated under pumping and non-pumping conditions. The data from the pump test on November 15, 2016 is inconclusive, in that it indicates water levels were lower in RC-1 than RW-1D both before and during the test (negative gradient). The reason for this is not known, but may be the result of closure of the hurricane barrier gates on that day due to King tides and forecasted precipitation. However, it is noted that magnitude of the negative gradient decreased under pumping conditions.

The November 16, 2016 pump test utilized a 6.5 gallon per minute (gpm) pumping rate, within the higher end of the range specified in the IRA modification. The numerically calculated pumping range was specified based on the DNAPL settling velocity. A higher pumping rate would preclude any DNAPL in the water column from settling to the bottom and being recovered.

The data for the November 16th pump test indicates a positive gradient from RC-1 to RW-1D, with elevations in RW-1D lower than RC-1 prior to and during the pump test. Evaluation of the data indicates that there was no apparent increase in gradient between the two wells over the course of the pump test.

During the 13.5-week period between when RW-1D was developed and the start of the activities for the pump testing activities on November 14, 2016, approximately 2 inches of DNAPL (approximately 1,665 ml or 0.44 gallons) accumulated in the sump of RW-1D. During the step tests and the two 8-hour long pumping tests approximately one additional inch of DNAPL (or an additional 830 ml or 0.22 gallons) accumulated in the well sump. After the pumping test, a maximum DNAPL thickness of 3.9 inches was observed on February 22, 2017. On that day, approximately 1,200 ml (0.38 gallons) of DNAPL was recovered from RW-1D. DNAPL recovery was attempted in both MW-15D and MW-15B; which contained just under one-inch of DNAPL; however, only tiny blebs of DNAPL were removed from this well, and the removed quantity was not measurable (the DNAPL blebs were present sporadically across the bottom of the recovery container).

Gauging and recovery were completed weekly for the following three weeks, with DNAPL thickness and recovery volumes in RW-1D decreasing during each event: 3.9 inches/1,200 ml on February 22, 2017; 1.3-inches/100 ml recovered on March 2, 2017; 1.3-inches and 200 ml recovered on March 9, 2017; and, 0.9-inches/50 ml recovered on March 17, 2017. After March 17, 2017, the gauging and recovery frequency was reduced to bi-weekly. During the gauging and recovery round on May 17, 2017, the DNAPL thickness in RW-1D was <1.0 inch with a recovery volume of less than 25 ml. The DNAPL recovered passively after the recovery well installation and during the pilot test are believed to be related to the disturbance/disequilibrium resulting from drilling and well installation, which caused residual DNAPL that was in the immediate vicinity of the well to temporarily move/coalesce, and migrate into the well. Accordingly, continuing decrease of both DNAPL thickness and recovery volume are anticipated.

Refer to Appendix C for copies of the DNAPL gauging and recovery summary tables for both the original monitoring wells with measured DNAPL (MW-15D and MW-15B) and the IRA DNAPL recovery wells through the May 17, 2017 gauging and recovery event.

2.4.6.2 Excavation of Soil Hot Spots

On May 23, 2016 and July 17, 2016 additional soil borings were advanced near UV-17 and MIP-23 with the objective of delineating the limits of planned excavation, i.e., the limits of soils visually impacted with DNAPL. During these investigations, a third area of DNAPL impacted soils was identified near BGP-20, but was determined during implementation of the IRA to be contiguous with the UV-17 area. The maximum dimensions of the combined UV-17/BGP-20 were approximately 20 feet wide by 45 feet long, and the dimensions of the MIP-23 area were approximately 20 feet wide by 45 feet long. The depth of DNAPL impacted soil was confirmed to be the top of the peat layer in the MIP-23 area and within the

thickness of the peat layer in the UV-17/BGP-20 area. As such, the excavation design included removal of the peat (with replacement by low permeability soils) in the UV-17/BGP-20 area. Prior soil sampling results and waste characterization samples indicated that the MIP-23 area was impacted by PCB DNAPL (TSCA), while the UV-17 area contained DNAPL in soil characterized by both PCBs and CVOCs (RCRA/TSCA), predominantly TCE and its degradation products including dichloroethenes (DCE) and vinyl chloride (VC). The IRA soil excavation was successful in removing approximately 950 tons of DNAPL impacted soils from the riverfront area of the Site. An estimated 6 tons of PCBs were removed in the process. Additional details follow regarding the soil hot spot excavations.

2.4.6.2.1 MIP-23 Area

On September 9, 2016, CHESI prepared the MIP-23 excavation area for excavation, including placement of floating boom in the river, installation of erosion control measures, and removal of HAC cap from the excavation footprint. Removed HAC cap material was placed in lined roll-offs to await transportation and off-site disposal as PCB impacted. The initial sheet pile design developed for the IRA incorporated the existing sheet pile wall as the fourth (east) side of the excavation shoring. However, after consultation between CHESI and the shoring designer, United Rentals, it was decided that the east wall of excavation shoring for both MIP-23 and UV-17 would require a sheet pile wall driven to a depth equivalent to the other three sides of the excavation. Angle iron was welded to the existing sheet pile wall along both excavation areas to provide additional structural support to prevent movement of the existing sheet pile wall during temporary sheet pile installation and removal.

Beginning on September 20, 2016, installation of sheet piles at the MIP-23 area commenced. In general, the sheet piles were installed along the northern boundary of the excavation, followed by the east sheet pile wall, the southern sheet pile wall, and the west sheet pile wall. Obstructions to driving sheet piles in the southwest corner of the excavation area were encountered, and test pitting in this area was conducted on September 26, 2016. Several large boulders were observed and removed by CHESI. During excavation of the boulders the target depth of the MIP-23 area excavation (i.e., top of the existing peat layer) was observed to be shallower than the sheet pile excavation support system was designed for. Due to this observation, it was determined by CHESI that the remaining sheet piles were not required for excavation stabilization. Sheet piles were not installed in the southwest corner of the MIP-23 excavation area.

Excavation of contaminated soils to the top of the peat layer in the MIP-23 area was initiated on September 28, 2016 and completed on October 5, 2016. During excavation of MIP-23, dewatering was required on several occasions due to a combination of groundwater infiltration and a precipitation event that occurred mid-completion. Soil excavated after the precipitation event required amendment with Portland cement to absorb excess water prior to loadout. Mixing was completed within the excavation. A total of 381.73 tons of contaminated soil and debris was excavated from MIP-23. Excavated soils were loaded directly into tractor trailer beds lined with polyethylene sheeting. The soils were then transported to the Worcester, MA railyard facility where soils were placed into rail gondolas and shipped to the CHESI Lone Mountain landfill in Waynoka, Oklahoma.

The MIP-23 excavation was surveyed and then backfilled with crushed stone to the top of the standing groundwater table within the excavation. Following placement of the crushed stone, non-woven geotextile was placed above the crushed stone, followed by backfill and compaction of structural fill. Following excavation backfilling on October 6 and 7, 2016, removal of the sheet piles from the MIP23 area commenced.

2.4.6.2.2 UV-17/ BGP-20 Area

As the sheet piles were removed from the MIP-23 excavation, they were re-installed along the perimeter of the UV-17 excavation area, starting with the east side followed with the south side. After completion of the southern section of sheet pile wall at the UV-17 excavation area, a trench box was used to

excavate the BGP-20 area on October 18, 2016, to remove contaminated soils over the peat layer. The peat layer was observed at approximately 6.5 feet bgs. Excavation was continued to a depth of 9 feet bgs, approximately one foot beneath the peat layer. Excavated soils were temporarily stored in a lined roll-off container to await transportation and disposal. Following excavation, low permeability soils were placed in the excavation, hydrated, and mixed to replace the removed peat layer. The low permeability soils were compacted with a sheeps-foot roller until layer was approximately 1.5 feet above the elevation of the peat layer (4 feet bgs). The compacted low permeability soil was overlain with non-woven geotextile fabric, followed by structural fill. The low permeability soil layer placed in the BGP-20 area was not immediately tested for permeability and was temporarily backfilled on October 19, 2016. The structural fill in this area was removed and replaced on November 23, 2016 to allow for a Shelby tube sample to be collected from the low permeability soil. Hydraulic conductivity test of the low permeability soils indicated that the low permeability clay was consistent with that of the peat material.

The specifications for the UV-17 area required removal of impacted peat along the northern extent of the excavation prior to installation of sheet piles. This design specification was required because soils down to the depth of and including the peat layer contained DNAPL saturated soils. Removal of the impacted peat layer and backfilling to grade prior to installation of the sheet piles would create a “clean” zone to drive the sheets through and prevent the potential for dragging down DNAPL saturated materials into the underlying clean zone. Therefore, the original UV-17 area excavation design included use of a bentonite slurry trench to provide support to the northern side of the excavation and overlying concrete drainage trench while the impacted soil/peat layer was removed prior to the excavation being backfilled with low permeability soil and structural fill. After consideration and discussion regarding potential issues with this method, BC and CHESI decided that a trench box would be used to excavate the northern length of the UV-17 excavation area in sections and provide support to the adjacent concrete drainage trench, instead of a bentonite slurry trench.

On October 21, 2016, excavation using the trench box was initiated at the west end of the UV-17 area. Large rocks and concrete rubble encountered in the excavation were removed and stored in a roll-off container. Each section was excavated and backfilled in the same manner used for BGP-20, with the east end of one section and the west end of the next section overlapping slightly. The “clean” zone along the northern trench was completed on October 28, 2016, and sheet pile driving through this area was initiated the following day and continued through November 2, 2016. Sheet piles were not driven all the way along the western extent of the excavation to allow the excavator to remove the easternmost section of the excavation area.

Prior to excavation of the northwest corner of the UV-17 excavation area, large rocks had been identified mainly in one other area, and the rocks were segregated by the excavator operator using the excavator bucket. However, due to concerns that the rocks and debris encountered might be pervasive in the UV-17 excavation area and because CHESI’s Utah Aragonite RCRA/TSCA facility could not accept material with a diameter of greater than 6 inches for incineration, gondola loads known to contain excavated material containing larger rocks and debris would be separated by hand at the Aragonite facility, and the larger debris would be sent to the CHESI Grassy Mountain facility, also in Utah.

Excavation of the east end of the UV-17 area commenced on November 2, 2016. As excavation progressed, dewatering was completed on several occasions due to infiltration of groundwater during periods of high tide. Portland cement was mixed with soil as needed to absorb excess water. Excavated material from above the eastern third of the excavation was temporarily stored in lined roll-off containers until loadout and transportation to the disposal facilities was scheduled. Upon excavation of the peat layer from the eastern third of the excavation, total CVOCs were detected in the work zone and approximately 25 feet downwind of the excavation work zone at concentrations of above Action Levels specified in the Ambient Air Monitoring Plan and Site Health and Safety Plan. Analysis of VOCs with vinyl chloride Drager tubes indicated the presence of VC vapors. Therefore, upgrade to Level B respiratory

protection PPE was required for those working within the exclusion zone per the requirements of the HSP.

Excavation of the remaining impacted soil, debris and peat layer was started under Level B PPE beginning on November 10, 2016 and completed on November 11, 2016. With limited exception, excavated materials were loaded directly into lined tractor trailer beds with odor control foam applied to limit ongoing VOC emissions. The small amount of material that could not fit into the last lined trailer bed was temporarily stored on-site in a lined roll-off to await transportation and disposal. On November 11, 2016, low permeability soils placed as fill were hydrated, mixed and compacted from the bottom of the excavation to a depth of approximately one-foot above the adjacent peat layer. Hydraulic conductivity testing of the low permeability soils indicated that the low permeability clay was consistent with that of the peat material, and is therefore not anticipated to have resulted in changes to the Site groundwater flow regime. The low permeability soils were overlain by woven geotextile fabric, followed by backfill with structural fill on November 23, 2016.

On December 5, 2016, dense graded crushed stone was placed and compacted in the MIP-23. BGP-20 and UV-17 excavations in preparation for pavement. On December 6, 2016, the excavation areas were paved with Massachusetts Department of Transportation (MassDOT) Dense Mix hot asphalt, which is of similar specification to the original HAC cap material. Final excavation limits and paving limits were surveyed.

During the weeks of November 28, 2016 and December 5, 2016, sheet piles remaining in the ground were pulled and placed in the decontamination pad. The sheet piles were decontaminated and wipe tested for PCBs. The sheet piles were removed from the Site after confirmation that the wipe sample analytical results were below 10 micrograms per 100 square centimeters (10 ug/100 cm^2) PCBs.

Ten loads of dewatering and decontamination fluids contained in the fractionation tanks were shipped by tanker truck to the Clean Harbors Spring Grove facility in Cincinnati, Ohio during the weeks of November 28, 2016, December 5, 2016 and December 12, 2016. Following removal of the fluids, the frac tanks were decontaminated by CHESI, wipe sampled, and removed from the Site after confirmation that wipe sample analytical results were below 10 ug/100 cm^2 PCBs.

During the weeks of December 12, 2016 through December 26, 2016, CHESI continued demobilizing from the Site. The final four roll-offs containing oversized debris were transported from the Site and shipped for disposal during the weeks of December 26, 2016 and January 2, 2017.

2.4.7 DNAPL Summary

A DNAPL evaluation was completed for the Site. A detailed discussion of the DNAPL evaluation is provide in Appendix D. The elements of this evaluation were as follows:

- Document and summarize physical properties of the Site soils
- Document and summarize Site-specific physical and chemical properties of collected Site DNAPL
- Provide a Potential and Probable DNAPL source zone evaluation based primarily on the lines of evidence approach provided in the 2009 Kueper and Davies paper entitled *"Assessment and Delineation of DNAPL Source Zones at Hazardous Waste Site"*, and using the information for Site soil and Site DNAPL listed above.
- Evaluate DNAPL mobility potential
- Evaluate DNAPL recovery potential

Potential and probable DNAPL source zones were evaluated based on the lines of evidence approach provided in the 2009 Kueper and Davies paper. The results of this evaluation indicated that probable DNAPL source zones were identified on the Aerovox property portion of the Site, both in unsaturated and saturated soils. The identified DNAPL source zones (see Appendix D Figures 1 and Figure 2) were

generally associated with northern drainage ditch historic discharge, the southern drainage ditch historic discharge, and the former loading dock. These identified DNAPL source zones are consistent with known release history of the Site.

The soils and groundwater source zone evaluation provided evidence that DNAPL has migrated vertically through the shallow and deeper observed materials. Although contiguous or pools of DNAPL may have been present in the past, no pooled DNAPL has been observed during the extensive Site investigations. This is consistent with a site in middle to late stage of a DNAPL release site, where in earlier stages DNAPL had historically pooled and migrated vertically within the underlying soils units (ITRC 2011). At middle to late stage DNAPL sites, DNAPL that previously had migrated both horizontally and vertically in earlier stages has become substantially trapped in the porous medium as residual DNAPL due to interfacial tension: during migration, the DNAPL mass is continually being reduced and ultimately migration is halted once accumulated DNAPL mass can no longer overcome interfacial tensions. The threshold DNAPL saturation calculations presented in Appendix D indicate that DNAPL saturation exceeded 5% of the soil pore space in only three soil samples and exceeded 10% in only one soil sample, which supports the premise that DNAPL at the Site is predominately in the form of residual DNAPL with limited migration potential, which is consistent with a late stage DNAPL site. These three samples were collected from shallow soils. Soils near one of these areas (UV-17) were excavated and disposed off-site as part of the IRA. The other two locations (MIP-53 and MIP-54) are in shallow soils above the peat layer in the northeast corner, where a DNAPL recovery well was installed as part of the IRA. No DNAPL has accumulated in this shallow recovery well. Nine of the eleven remedial alternatives for the Operable Unit (OU) include removal of these soils, and the other two include containment of these soils behind a barrier wall.

The presence of DNAPL primarily in the residual form and its occurrence within the deep overburden as well as bedrock suggest that the Site has progressed to a middle to late stage DNAPL site as described by the Interstate Technology & Regulatory Council's (ITRCs) Integrated DNAPL Site Strategy document (ITRC, 2011). This is supported by several Site-specific observations including: the inability to recover significant volumes of DNAPL from those Site wells in which it is detected; the presence of DNAPL at residual levels within the lowest portions of the unconsolidated materials beneath the Site; the presence of DNAPL at residual levels within the bedrock at the Site; the presence of the higher concentrations in both saturated soils and groundwater at deeper portions of the overburden than in the shallower overburden; and the lack of demonstrated DNAPL accumulations within the source zones.

These observations are supported in various industry studies that describe early stage DNAPL sites as being characterized by higher degree of DNAPL saturation in pore spaces resulting from a more pervasive DNAPL that spreads and sinks through developed short-term finger-like and pipe-like DNAPL bodies, from which contaminants dissolve into the entire thickness of the aquifer giving the impression of a single, thick contaminant plume in the groundwater (Anderson, M.R., Johnson, R.L., and Pankow, J.F., 1992). The vertically discrete sampling network at the Site demonstrates a partitioning of impacts between the shallow and deep overburden materials, that is, the highest dissolved phase concentrations are present in the deeper overburden materials, where the DNAPL has migrated, providing an additional line of evidence that conditions resulting from the DNAPL release have progressed well beyond early stage and are more aptly defined as middle to late stage.

Similarly, the DNAPL measurement and recovery data continue to indicate that Site DNAPL is at residual levels. Based on the lack of recovery, the DNAPL is non-mobile, as it is not believed to be expanding laterally or vertically. Rather, the DNAPL is considered to be stable, but may have micro-scale mobility, defined by the MCP as NAPL with a footprint that is not expanding, but which is visibly present in the subsurface in sufficient quantities to migrate or potentially migrate as a separate phase over a short distance and visibly impact an excavation, boring or monitoring well. The diminishing recovery and minimal recovery volumes at wells MW-15B and MW-15D over time (having reached the point of

diminishing returns based on recovery data collected during the IRA), with a subsequent minor uptick in thickness and recovery immediately after a disturbance/disequilibrium in the immediate area from drilling and installation of the FPRS wells and well redevelopment, followed again by stabilized minimal recovery illustrates a sequence consistent with MCP defined micro-scale mobility.

2.4.8 April 2017 Groundwater Sampling

Although there is currently no regulatory requirement, a groundwater sampling event was conducted in April 2017 to evaluate groundwater concentrations (the last sampling event including wells completed in multiple aquifers was conducted in December 2014). The groundwater sampling event included a subset of Site monitoring wells that were chosen based on historical concentrations and locations within the groundwater plume. Three wells on the Precix property (MW-4S, MW-16S, and MW-18S) were chosen because these wells have CVOC concentrations exceeding the Method 1 GW-2 standards. The data was compared against historic data to determine whether concentrations are still consistent with historic concentrations, and that there are no changes to prior vapor intrusion (VI) assessments. The other wells sampled in April 2017 included MW-2, MW-2A, MW-2B, MW-4B, MW-6, MW-6A, MW-6B, MW-7, MW-7B, MW-10D, MW-13D, MW-15D, MW-17B, MW-17D, MW-19D, MW-32B, MW-33B, and MW-34B, which are all present on the Aerovox property. A sample was collected from MW-15D in March when groundwater was collected for a column study (discussed below).

Groundwater monitoring results from March 2014 through April 2017 are provided in Tables E-1 through E-4 of Appendix E. The April 2017 data was reviewed for acceptability in accordance with Massachusetts *Representativeness Evaluations and Data Usability Assessments* and EPA guidance documents. While some of the laboratory data was qualified during the review, no data were rejected. Laboratory reports and Data Validation reports for the 2017 round of sampling are also included in Appendix E. The following discussion of historic standard exceedences includes only those wells sampled during the April 2017 round.

Several rounds of groundwater sampling took place in 2014 (March, June, September and December) and 2015 (May and August). Constituents which were detected at concentrations exceeding one or more groundwater applicable standards in 2014 include carbon tetrachloride, chloroform, cis-1,2-dichloroethene, trichloroethene, vinyl chloride and total PCBs. Constituents detected above Method 1 GW-3 standards in the Precix property wells (MW-4S, MW-16S, and MW-18S) were cis-1,2-dichloroethene (30 to 690 µg/l), trichloroethene (20 to 1500 µg/l) and vinyl chloride (2.2 to 17 µg/l). In the April 2017 sampling event, concentrations of cis-1,2-dichloroethene and trichloroethene were higher than the previous sampling in MW-4S (110 µg/l and 180 µg/l, respectively), while the vinyl chloride concentration in 2017 was slightly lower (2 µg/l) in this well. In MW-16S, concentrations of cis-1,2-dichloroethene and trichloroethene were in the same range as the 2014 sampling (98 µg/l and 180 µg/l, respectively), but vinyl chloride was slightly higher (9.9 J µg/l). In MW-18S, concentrations of cis-1,2-dichloroethene (44 µg/l) and trichloroethene (77 µg/l) were lower in 2017 than in the 2014 sampling event, and vinyl chloride was not detected in 2017.

In the Aerovox wells, 1,1,2-trichloroethane, 1,2-dichloroethane, cis-1,2-dichloroethene, dichlorobenzene, chlorobenzene, PCE, TCE, and vinyl chloride exceeded Method 1 GW-3 standards in 2014 in one or more of the following wells: MW-4B, MW-7, MW-7B, MW-10D, MW-15D, MW-17B, MW-19D, MW-32B, and MW-34B. Chlorobenzene and 1,4-dichlorobenzene also exceeded the Method 1 GW-3 standards in MW-2 in 2017, but were within the same range of concentrations as in the previous sampling events. Concentrations of cis-1,2-dichloroethene were higher in 2017 in wells MW-6B, MW-19D and MW-34B, but were lower in 2017 in wells MW-32B and MW-33B and within the same range of concentrations as the previous sampling in the remaining wells. TCE concentrations were higher in 2017 in wells MW-6B, MW-2A, and MW-34B but were lower in 2017 in MW-32B and MW-33B and within the same range of concentrations as previously in the remaining wells. The vinyl chloride concentration was higher in 2017

in MW-19D and, PCE was higher in 2017 in MW-2B; concentrations of these constituents were within the same range of concentrations as in the previous sampling in the remaining wells.

In 2014, total PCBs exceeded the Method 1 GW-3 standard in MW-2, MW-2B, MW-6, MW-6B, MW-7, MW-10D, MW-15D, MW-17B, MW-17D, and MW-19D. The PCB concentration in MW-2A (30 µg/l) was higher in 2017 than in previous sampling. Total PCBs were within the same range of concentrations as previous sampling in the remaining wells.

2.5 Current Conditions

The Disposal Site includes portions of the City Property, and the abutting properties to the north (Precix and former Coyne properties) and the south (Titleist property). The City Property is currently predominantly paved and partially fenced. A small unpaved corner remains in the northwest corner as public space and the fence does not extend across the waterfront along the east side. The western portion of the paved area is separated from the remainder of the Property by jersey barriers and is used by the City for parking. The Titleist and Precix properties, to the south and north respectively, are active manufacturing facilities and operate multiple shifts seven days a week. The Coyne Laundry property is closed, fenced and locked and has recently been sold after Coyne went through bankruptcy proceedings.

2.5.1 Updated Conceptual Site Model

A completed CSM was originally submitted as part of the Phase II CSA and has been updated to reflect the additional assessment work and IRA outcomes completed since that time. The updated CSM is provided in Appendix F. The following conclusions section incorporates the CSM findings relative to the nature and source of contamination, primary and secondary release mechanisms, migration pathways and potential receptors.

2.5.2 Conclusions of Phase II CSA and IRA

Based on the results of the Phase II CSA (AECOM, September 2015) and additional activities completed and information obtained since that time, the following conclusions have been documented. Refer to Figures 2-2 and 2.3 for sampling locations referenced below.

- The hazardous materials found in Site media include PCBs, chlorinated benzenes, and chlorinated ethenes.
- The primary source of contaminants at the Site was the dielectric fluids used in capacitor manufacturing and chlorinated solvents used for cleaning and degreasing operations. These sources were reportedly released through improper storage and disposal practices, direct discharge, and from spills and releases from overfilling the raw material ASTs.
- The primary release locations identified in the CSM and supported by the Phase II findings were:
    - Discharge of (NPDES permitted) wastewater (including PCBs and CVOCs) directly to the river through the discharge trenches located on the northern and southern side of the building
    - Direct dumping of waste into the river from shore (as evidenced by the excavation of capacitors during dredging along the Aerovox shoreline)
    - Contaminated soils located beneath the existing HAC cap (from storage of drums containing wastes in between the former building and the river, from excavation of contaminated river sediment and placement as fill behind the existing sheet pile wall, and from releases to a previously unpaved ditch along the north side of the former building)
    - Leakage within the former building of stored virgin and waste PCB-containing oils and TCE through sumps or cracks in the building foundations
    - Surface spills of virgin and waste PCB- and TCE- containing liquids at the loading dock areas of the former building during shipping and deliveries

  - Infiltration of storm water formerly in contact with contaminated building materials
  - Overfills of virgin PCB-containing oil (on the Property) and TCE (on the Property and the Precix property) ASTs to the ground surface on the northern and southern side of Graham Street near the manufacturing buildings during tank filling activities
  - Release of oil from the 2 fuel oil USTs formerly located on the south side of the manufacturing building and associated contaminated soils that were not excavated due to structural concerns associated with adjacent nitrogen cooling system pad and corrugated storm sewer
  - PCBs contained within the former parking lot asphalt placed as part of the fuel oil remediation
  - Erosion and runoff of contaminated soils that existed in the former unpaved areas between the former manufacturing building and the shoreline
  - PCB-containing sediment within the catch basin/surface water runoff system.
- PCBs released at the Site are largely adsorbed to surface soils. However, PCBs and CVOCs are co-mingled and have also migrated from their original release locations downward and resulted in soil and dissolved groundwater contamination and the presence of DNAPL at depth. Groundwater analytical data indicate that CVOCs have a degraded into daughter products.
- Based on the findings of the Phase II CSA and the IRA, and the lines of evidence DNAPL evaluation, the DNAPL groundwater plume is considered mid- to late-stage.
- The nature and extent of contamination in soil is summarized as follows:
  - PCBs in soils are ubiquitous across the Property and the riverfront portion of the Titleist property. Shallow soil above the identified peat layer was found to be impacted with PCBs along the Precix and Titleist riverfronts, with concentrations on the Titleist property exceeding the UCL. Deep soils in the vicinity of the identified DNAPL area (MW-15D) and a limited area of soils centered around boring B04B also exceeded the PCB UCL.
  - An estimated 86 tons of PCBs remain on-site within the soil. More than 50% of the PCB mass that remains is sorbed to soils within the first 25 feet of the shoreline. Approximately 6 tons of PCBs were removed as part of the IRA soil excavation and disposal.
  - The least PCB impacted areas of soil were found immediately beneath the peat layer, where present. Except for a small area beneath the former tank and pump rooms, the soil beneath the building floor slab was also found to be relatively unimpacted.
  - Chlorinated ethenes are present in the 3 feet to 15 feet bgs soil profile in the south-central area of the Property (near boring B04B), within the northeast corner of the Property, and to a minor extent below the former Aerovox building foundation. In general, higher TCE concentrations are detected in deeper soils, except for the TCE concentration at 3.5 feet bgs in boring B04B. The soil interval between 15 feet bgs down to the bedrock surface has a higher concentration of TCE detections in the eastern half of the Property. TCE is the only chlorinated ethene exceeding its corresponding soil UCL, which occurs in the northeast corner of the Property and occurred in the vicinity of UV-17 before the UV-17 area IRA excavation.
- The nature and extent of groundwater contamination is summarized as follows:
  - PCB impacts to shallow overburden groundwater are limited to a small area along the waterfront near the southern culvert discharge location. PCB impacts to deep overburden groundwater extend from the center of the Property to the shoreline, with PCB concentrations increasing toward the river. PCB impacts in deep overburden groundwater extend partially onto the northeast corner of the Titleist property, and low levels of PCBs in deep overburden groundwater were also found in two wells on the south side of the Precix property. PCB impacts to bedrock groundwater are present in wells across the eastern two thirds of the Property, with the highest concentrations centered around the central release area (B04B) and along the waterfront.

Bedrock groundwater concentrations in the northeast corner, in the area of identified DNAPL, (MW-15B) exceed the groundwater UCL for PCBs.

- The extent of chlorinated ethenes in shallow and deep overburden groundwater extends across most of the Site, including the Property, the southern and eastern half of the Precix property and the northeast portion of the Titleist property. The highest TCE concentrations in shallow groundwater were detected in samples collected from monitoring wells along Graham Street and at the discrete central (B04B) release area on the Property. Deep overburden chlorinated ethene concentrations on average are one to two orders of magnitude higher than shallow overburden concentrations; however, neither shallow nor deep overburden groundwater concentrations for TCE exceed groundwater UCL levels.
- Chlorinated ethene impacts to bedrock groundwater extend across the majority of the Site, including all but the westernmost portion of the Property, southerly along the waterfront to the southern end of the Titleist property and northward beneath the Precix property and onto the Coyne property. The highest TCE concentrations in bedrock groundwater are above the UCL, and are present in the deepest fracture zone encountered in the center of the Property (MW-26B), in the deep fracture zone of MW-34B in the northeast corner of the Property, and in the shallow bedrock groundwater associated with the DNAPL area (MW-15B). (Note that carbon tetrachloride was also found above UCL levels in the northernmost bedrock well, MW-24B on the Precix property. This is not a constituent related to or originating from the Aerovox releases.)

- TCE is the dominant detected chlorinated ethene and has a heightened potential for impacting receptors via indoor air; therefore, the presence of TCE in the shallow groundwater adjacent to the Precix and Titleist buildings each required a vapor intrusion evaluation. The evaluation indicated that vapor intrusion is not a pathway of concern for Titleist. The vapor intrusion pathway is complete for Precix, but does not present a risk under current Site uses.
- A peat layer of varying thickness is present across much of the eastern portions of the Site. The sheet pile wall that defines the eastern edge of the Property was keyed into this peat layer to impede the migration of contaminants within shallow groundwater and from shallow soils into the river. However, contaminants in deep overburden groundwater and at the overburden bedrock interface migrate with tidal flow both toward and away from the river.
- Groundwater flow in deep overburden and in bedrock is strongly influenced by the tides, reversing flow direction in response to the tidal cycle. The change in flow direction is exhibited most strongly at the shoreline in the deep overburden and bedrock aquifers. Due to the presence of the sheet pile wall, the shallow overburden aquifer on the Property has a limited tidal response.
- A strong interconnection exists between the shallow overburden, deep overburden and shallow bedrock aquifers, and between groundwater and surface water of the river. Vertical groundwater gradients exist between the three aquifers, and vary between positive (upward) and negative (downward). Where tidal influence on groundwater levels is greatest, reversals in vertical gradient from positive to negative are observed with changing tides. Further inland, these vertical gradients are largely positive, and the magnitude of the gradient is observed to change with the tidal cycle. Based on data collected for the multi-level bedrock sampling devices, a positive vertical gradient is observed in shallow bedrock, whereas negative vertical gradients are observed in deeper bedrock sampling intervals.
- Observed DNAPL is limited in extent, present in monitoring wells MW-15B/MW-15D and two of the four wells installed as part of the IRA FPRS in the northeast corner of the Property near the sheet pile wall. The DNAPL is present over the peat layer and at depth, and likely originated both from the northern culvert discharges and from PCB containing oils released from capacitors dumped near the shoreline. The DNAPL contains both PCBs and chlorinated solvents. Based on soil concentrations, UVOST screening results and additional boring investigations, DNAPL was also observed to be

present in shallow soil above the peat layer near the south culvert, and farther south near former boring MIP-23. Soils with visually identified DNAPL present were excavated and removed from the UV-17 and MIP-23 areas as part of the IRA in Fall 2016.

- Under existing Site use, there are no on-site receptors at the Property. On-site receptors at the Precix former Coyne and Titleist facilities that are part of the Disposal Site include employees, visitors, utility/construction workers, and trespassers. Anticipated receptors under foreseeable future use for the Aerovox and Precix properties will be restricted through the terms of an AUL. The foreseeable future use of the Titleist property is assumed residential.
- The Method 3 Risk Assessment (Method 3) calculated human health risks for current and foreseeable future uses for identified receptors and exposure scenarios. The Method 3 also evaluated Risk to public safety and welfare and included a Stage 1 Environmental Screening. The Method 3 Risk Assessment found a condition of No Significant Risk does not exist for the Site, as summarized below:
    - Concentrations in uncapped Site surface soil on the Titleist property present unacceptable chronic non-cancer and cancer risks for various current (employee, trespasser) and hypothetical future (potential residential) exposure scenarios. (The access control measures that are in place for this area have mitigated any sub-chronic or acute potential impacts until final response actions can be implemented.)
    - Under current conditions, the non-cancer risks and incremental lifetime carcinogenic risks for the Precix property are within acceptable limits for employees. The non-cancer and cancer risks for foreseeable future conditions exceed acceptable limits for hypothetical residents who could be exposed to CVOCs in indoor air via inhalation, but future use is expected to be limited to non-residential once an AUL is in place.
    - The Method 3 results indicate that non-cancer and cancer risks are within acceptable limits for future construction work on the western side of the Property. The non-cancer and cancer risks exceed acceptable limits for future construction work within the eastern half of the Property and in the central area surrounding boring B04BN.
    - The presence of PCBs concentrations in soil above UCLs across some areas of the Property present a risk to public welfare. Additionally, the average concentration of PCBs in groundwater in the vicinity of the DNAPL area (MW-15B) exceeds the groundwater UCL and the average concentration of TCE in select bedrock wells exceeds the groundwater UCL for TCE.

The Stage I Environmental Screening indicated that groundwater concentrations have the potential to migrate to and impact the river[1]. However, the foreseeable migration of groundwater contaminants to surface water is subject to mass flux in both overburden and bedrock flow. Based on baseline mass flux calculations, the bedrock and overburden groundwater contribution to the river sediment porewater will not exceed Method 1 GW-3 standards. It should be noted that because the primary releases occurred through direct discharge to the river, a significant mass of PCBs (comingled with CVOCs) remains in the river in sediment and as DNAPL. This current presence of significant levels of contamination in the river will mask the much smaller groundwater contribution to the river potentially emanating from the Aerovox Site. Nothing in the site specific risk characterization suggests that the primary components of the remedial action (i.e. capping, engineered barrier, source area containment, groundwater monitoring and long term operation and maintenance, as anticipated in the EPA ACO and the City Cooperation and Settlement Agreement) would no longer be applicable. The presence of NAPL, and the risks to public welfare due to the presence of TCE and PCBs in bedrock groundwater above UCL levels are, as

[1] The Acushnet River is part of the NBH Superfund Site, and remedial goals for PCBs were established by EPA in the NBH ROD documents. EPA did not establish criteria for chlorinated ethenes, so Method 1 GW-3 Standards are considered as a reference for these constituents.

anticipated in the City Cooperation and Settlement Agreement, conditions that will require treatment in addition to these primary containment components and may lead to a period of Remedy Operation Status (ROS) prior to achieving a permanent solution.

Section 3

Operable Units and Preliminary Remedial Goals

Remedial action objectives consist of specific goals for protecting health, safety, public welfare and the environment. These objectives will guide the development and evaluation of remedial action alternatives for the Site. The performance standards for Phase III evaluation [310 CMR 40.0853] require that remedial action alternatives be identified and evaluated that are "reasonably likely to achieve a level of No Significant Risk," and that the recommended alternative be a Permanent Solution or a Temporary Solution. "No Significant Risk," as defined in the MCP [310 CMR 40.0006], is "a level of control of each identified substance of concern at a Site or in the surrounding environment such that no such substance of concern shall present a significant risk of harm to health, safety, public welfare or the environment during any foreseeable period of time." A Permanent Solution is any measure or combination of measures which will, when implemented, ensure attainment of a condition of No Significant Risk. Permanent Solutions must also include measures that reduce the levels of oil and hazardous materials in the environment to as close to background as feasible. A Temporary Solution is any measure, or combination of measures, which will, when implemented eliminate any Substantial Hazard which is presented by a Disposal Site until a Permanent Solution is achieved. A Temporary Solution can be selected if a Permanent Solution is not currently feasible or response actions to achieve a Permanent Solution are feasible and shall be continued toward a Permanent Solution.

3.1 Operable Units (OUs)

For evaluating remedial actions, the Site has been divided into four OUs for remediation based on the media and identified exposure pathways where the Method 3 Risk Characterization identified the presence of Significant Risk to human health and/or the environment and a Risk to Public Welfare. These include:

1. The current and future risk associated PCBs in the uncapped soils between the ground surface and an identified peat layer on the east end of the Titleist property, identified as OU1;
2. Potential foreseeable future vapor intrusion risk associated with CVOC contaminated groundwater in shallow overburden in Graham Street adjacent to Precix (OU2);
3. Contact with overburden soil above UCLs, migration of deep overburden groundwater contamination to the river and migration of contamination to the river through on-site storm sewers (collectively, OU3); and
4. Migration of bedrock contamination (including zones of contamination above the UCLs) across the east half of the Disposal Site to the river (OU4).

3.2 Impacted Shallow Uncapped Soils - OU1

OU1 consists of uncapped Site surface soils above the peat layer within the eastern landscaped area of the Acushnet/Titleist property. These soils are believed to have been impacted through migration of contaminated storm water runoff during flooding episodes from Site drainage. A 36-inch storm sewer traverses west to east down the length of Hadley Street, discharging to the river. This segment of the storm sewer derives flow from the City of New Bedford storm sewer within Belleville Avenue and

drainage from two catchment areas on the Aerovox property itself. In addition, Hadley Street is sloped downward toward the east, and surface runoff is directed eastward to the end of Hadley Street, near the river shoreline. During significant storm events, especially during a concurrent high tide, flooding of the Site and Hadley Street occurs, potentially allowing overland flow directly from the Aerovox property to the Acushnet/Titleist property. Thus, the Phase II Scope of Work (Phase II SOW) included evaluation of potential impacts to landscaped area surface soils on the east end of the Titleist property resulting from potential transport of impacted sediment through the Property catch basins and overflow and flooding of Hadley Street during periods of high tide and significant rain events. Note that consistent with the MCP definitions of Disposal Site and Site, and with the terms of the ACO, AOC and City Cooperation and Settlement Agreement, OU1 is limited to the area of the Acushnet/Titleist property that is above the elevation of mean high water and that is impacted with Site related COCs in surface soil that have come to be located there directly from the source (Property) via overland flow.

In December 2013, 10 hand auger soil borings were advanced on the east end of the Titleist property. The samples were collected from the depth interval between the ground surface and 2 feet bgs, and submitted for analysis of PCBs.

The analytical data for these samples indicated total PCB concentrations ranging from 0.51 mg/kg in the westernmost soil boring (B04.5E) to 533 mg/kg in the easternmost soil boring (B08.5F). Based on these concentrations, an Imminent Hazard (IH) evaluation was completed. The IH evaluation considered employees, landscapers, and trespasser exposure scenarios, and concluded that an IH was not present.

In 2014, 18 additional soil borings were advanced at locations around and between the hand auger borings to delineate the lateral impact in the area. In 17 of these borings, soils were collected in 2 foot intervals down to the identified peat layer. The soils samples were submitted for PCB analysis, and analyzed iteratively, beginning with the 0 to two foot interval. If analysis of the 0 to two foot interval at any location indicated the presence of PCBs at a concentration greater than 1.0 mg/kg, the next depth interval would be analyzed for PCBs. In this manner, PCB concentrations were delineated vertically across the area.

Subsequently, to further reduce potential risk posed by the PCB contaminated soils, access restrictions were put in place, including extending existing fencing to completely enclose the area with PCB concentrations above 1 mg/kg and placement of a geotextile fabric marker layer and 6 inches of clean crushed gravel over areas where vehicles and personnel were known to frequent for facility maintenance activities, for the purpose of minimizing the potential to spread PCB contamination beyond the boundaries of the known contamination. The fenced areas are locked to prevent unauthorized access.

On December 5, 2016, EPA provided BC with data for intertidal samples collected on the Titleist property in August 2015 and in 2000-2001. This data was reviewed and compared to the analytical data for the samples collected on Titleist as part of the Phase II CSA. As discussed above, the CSM for transport of contaminants from the Aerovox property to the Titleist property is off-site migration of PCB impacted sediment from storm water directly from the Aerovox Property to Titleist, mostly through overflow of the storm sewer in Hadley Street and associated flooding when rain events occur during periods of high tide. Topography of the eastern portion of the Titleist property is such that flooding from the sewer in Hadley Street could not reach the southernmost portion of this area. Rather, overland flow of water flooding this area would be directed by topography southeasterly toward the river. For delineation purposes and ease of completing security measure installation at the Titleist Property, the elevated PCB concentrations in soil were delineated to the eastern edge of the southern Titleist parking area/loading dock area. Not only would this area not be impacted by temporary flooding of the east end of Hadley Street due to significant rain events at high tide, this area is also paved with asphalt and therefore provides a definitive edge to the area of impact. Of the data provided to AVX by EPA, six sample locations are

located within the OU1 boundaries, and the data was used to support, and where necessary extend the vertical depths associated with the proposed remedial alternatives accordingly.

The Method 3 Risk Assessment for this area of the Disposal Site indicated that non-cancer and cancer risks are unacceptable for the current employee and trespasser exposure scenarios and future potential residential exposure scenarios. The TSCA Determination for the Site, part of the AOC NTCRA Action Memorandum and the settlement agreements, provided that areas of the Site where soil or asphalt PCB concentrations are above 2 mg/kg be covered with an asphalt cap to meet the requirements of a TSCA risk based approval under 40 CRF 761.61(c). The asphalt cap specified in the Action Memorandum[2] includes placement of a visual barrier, followed by placement of a two-inch asphalt binder coarse and a one-inch asphalt wearing course. The MCP standard for PCBs for unrestricted use is 1 mg/kg.

The remedial goals for the Titleist portion of the Disposal Site are to:

- Eliminate or reduce concentrations, to the extent feasible, or control access to areas with soils with contaminant concentrations greater than their respective UCLs (surface soils with PCB concentrations > 100 mg/kg); and
- Eliminate or reduce, to the extent feasible, or control access to surface soils that present unacceptable risk under current or foreseeable future Site use.

3.3 Vapor Intrusion Pathway – OU2

OU2 consists of the potential vapor intrusion pathway for the Precix property where the lines of evidence, including CVOC-contaminated shallow overburden groundwater above Method 1 GW-2 standards beneath Graham Street adjacent to the building, subslab soil gas above screening values beneath the existing building, and indoor air concentrations of CVOCs found in select building areas, suggest a complete vapor intrusion pathway. Three monitoring wells in Graham Street are completed within the shallow aquifer (groundwater within 15 feet bgs) and within 30 lateral feet of the Precix building identified as: MW-4S, MW-16S and MW-18S. Three CVOCs, TCE, cis-1,2-dichloroethene, and vinyl chloride, exceed the Method 1 GW-2 standard in groundwater samples collected from at least one of these three wells. The TCE Method 1 GW-2 standard of 5 ug/l has been exceeded in monitoring wells MW-4S, MW-16S, and MW-18S. TCE concentrations range from 20 ug/l to 47 ug/l in MW-4S; 170 ug/l to 380 ug/l in monitoring well MW-16S; and, 200 ug/l to 1,500 ug/l in monitoring well MW-18s. The concentration of vinyl chloride in groundwater samples collected from monitoring well MW-4S ranges from 2.5 ug/l to 17 ug/l, above the 2 ug/l Method 1 GW-2 Standard for this compound. Similarly, the cis-1,2-dichloroethene concentration detected in groundwater samples collected from MW-18s ranges from 53 ug/l to 690 ug/l, above the Method 1 GW-2 standard of 20 ug/l.

Upon review of the groundwater sampling data from the March 2014 event, a survey of the Precix building was completed with the purpose of identifying locations for installation of subslab soil vapor probes. In May 2014, four subslab soil vapor probes were installed. After an equilibration period, four subslab soil vapor samples and co-located indoor air samples, as well as an ambient air sample, were collected. A second round of samples was collected in December 2014, during the heating season to account for the effect of potential seasonal variations on subslab and indoor air concentrations.

At the time the Phase II was submitted, the data was compared to the subslab soil gas screening values and indoor air threshold values within the 2011 MassDEP *Interim Final Vapor Intrusion Guidance* and the October 2014 MassDEP *Draft Vapor Intrusion Guidance: Public Review Draft (collectively, the VI Guidance).* The screening indicated that TCE exceeds the residential and commercial/industrial screening value in samples collected from each subslab vapor point during both rounds of sampling. Although PCE was not detected in groundwater above Method 1 GW-2 standard, PCE concentrations

[2] Refer to Section VI.B.1.c. of the Action Memorandum for specified cap requirements.

exceeded the residential screening value in samples collected from two locations during the first sampling event, and the commercial/industrial screening value was exceeded in the sample collected from a third location during the second sampling event. The cis-1,2-dichlroethene concentration exceeded the residential value at one location during the first sampling event.

Indoor air sample data indicated that TCE was detected at concentrations above the residential and commercial/industrial threshold values during the first sampling event. The samples from only one of these locations exceeded the threshold values. PCE was also detected at concentrations above the VI Guidance residential screening criteria in samples collected from two locations during the first sampling event and one location during the second.

Based on the vapor intrusion evaluation, the indoor air samples indicated that the concrete slab significantly impedes CVOC vapor intrusion into the building itself. While subslab soil gas concentrations beneath the Precix building were significant as compared to MassDEP screening values, sufficient attenuation is observed under current conditions, and the indoor air concentrations are not greater than the MassDEP IH or more urgent response values for TCE (per the August 2014 MassDEP TCE Toxicity Fact Sheet). Indoor air concentrations for other constituents are not above threshold values published in the VI Guidance.

The remedial goals for OU2 relative to the vapor intrusion pathway are to:

- Reduce CVOC groundwater and subslab soil gas concentrations, to the extent feasible, and control these media as potential sources for vapor intrusion in GW2 areas; and
- Mitigate or control subsurface migration of CVOCs and vapor intrusion to occupied buildings in GW-2 areas so that indoor air concentrations do not exceed risk based levels for the foreseeable future use.

3.4 Source Area Overburden Groundwater and Soils – OU3

OU3 is the source control OU, and is comprised of the Aerovox Property soils, storm sewers, and overburden groundwater. The Phase II CSA confirmed the ubiquitous presence of PCBs in soil at varying concentrations across the Property. Shallow soils along the riverfront and deeper soils in the northeast corner of the Property exhibited PCB concentrations above UCLs. Within the soil profile from three feet bgs down to bedrock, chlorinated ethenes are present in soil across the eastern portion of the Property and more prevalent in deeper inaccessible soils. TCE was the only chlorinated ethene exceeding its UCL, and this occurs both in the northeast corner of the Property and along the riverfront in the vicinity of UV-17. The UV-17 area soils and associated DNAPL were removed and disposed off-site in Fall 2016 as part of the IRA.

In addition to soil contamination, sediments present within the catch basins draining the Property contain PCB concentrations ranging from 4 mg/kg to 696 mg/kg. A video survey of the drainage lines indicates that cracks and breaches in the drainage lines allow groundwater infiltration to occur. In addition, there are a number of structural issues such as crushed sections of pipe, corrosion of corrugated metal pipes, and severe degradation and loss of mortar along the brick drainage line.

Groundwater analytical data indicated that deep overburden groundwater exceeds the Method 1 GW-3[3] standard for PCBs and TCE. Based on the Phase II CSA hydrogeological analysis, there is a strong interconnection between overburden groundwater and the river, which may result in discharge of Site groundwater contaminated above these standards to the river.

[3] The Phase II CSA included a Method 3 Risk Characterization and Stage 1 Ecological Risk Assessment. Method 1 GW-3 Standards are referenced here for comparison purposes. Standards for PCBs in the River were historically established through the EPA CERCLA ROD for the New Bedford Harbor Superfund Site. The EPA ROD did not establish standards for TCE.

The presence of DNAPL in a measurable amount in deep overburden well MW-15D initiated the implementation of the IRA. Ongoing DNAPL recovery, being undertaken manually for MW-15B, MW-15D and RW-1D, will continue in accordance with the IRA Plan until the selected remedial alternative is implemented. The presence of DNAPL in deep overburden in the northeast corner of the Aerovox property represents a potential continuing source of impacts to groundwater. In addition, based on the DNAPL lines of evidence evaluation conducted in conjunction with the IRA and Phase II, probable DNAPL zones exists in unsaturated and saturated soil in areas associated with the north drainage ditch including the northeast corner of the Property, along the shoreline near the south drainage ditch and, in the vicinity of B04B in the central area of the Site. However, current Site conditions indicate that contiguous DNAPL bodies of sufficient lateral extent to migrate horizontally towards the river are not present at the Site and most of the DNAPL present today is in the form of residual DNAPL.

The remedial goals for OU3 are to:

- Eliminate or reduce concentrations, to the extent feasible, or control access to the areas with soils containing contaminants at concentrations greater than their respective UCLs;
- Eliminate or reduce, to the extent feasible, or control access to soils that present unacceptable risk to human health and/or the environment;
- Eliminate or reduce, to the extent feasible, or control soil as a potential source of impacts to overburden GW;
- Reduce concentrations, to the extent practicable, and control migration of overburden GW impacted by PCBs and/or CVOCs at concentrations that could migrate into and present a risk to receptors in surface water after New Bedford Harbor remediation is complete;
- Eliminate, to the extent feasible, and control DNAPL in overburden that may be a continuing source of impacts to overburden GW or that may be non-stable; and
- Eliminate, to the extent practicable, and control the migration of PCB-impacted sediments in the Site storm water system.

3.5 Site Wide Bedrock – OU4

OU4 consists of the impacted bedrock groundwater at the Site. Analytical data indicate that shallow bedrock groundwater exceeds the Method 1 GW-3 standards for PCBs and TCE as shown on Figures 2-8 and 2-11 of the Phase II CSA, respectively. In addition, UCLs for PCBs and TCE are exceeded in the shallow bedrock groundwater in northeast corner of the Property in the vicinity of MW-15B (DNAPL has also been detected in MW-15B). In the deeper bedrock (below 50 feet bgs), groundwater analytical data indicate Method 1 GW-3 standards are exceeded for TCE in the vicinity of MW-26B, MW-32B, and MW-34B. UCLs for TCE are exceeded in deep bedrock groundwater in MW-26B and MW-34B, with the highest concentrations detected between 170 feet and 180 feet bgs in MW-34B. Geophysical logging conducted as part of the Phase II CSA has indicated no flow or very low flow in bedrock water-bearing fractures at depths below approximately 185 feet bgs.

The remedial action goals for the shallow and deep bedrock groundwater at the Site are to:

- Reduce concentrations of CVOCs and PCBs in bedrock groundwater where they exceed corresponding UCLs;
- Eliminate, to the extent feasible, and control the migration of DNAPL in fractured bedrock that may be a source of impacts to groundwater or that may be non-stable;
- Achieve a stable or contracting plume in bedrock groundwater; and
- Reduce concentrations of CVOCs and PCBs in bedrock groundwater, to the extent practicable so that overall contaminant flux to surface water declines over time.

Section 4

Development of Remedial Alternatives

4.1 Initial Screening of Remedial Technologies (310 CMR 40.0856)

The purpose of the initial screening phase is to determine which technologies are to be retained for further evaluation in accordance with the criteria in 310 CMR 40.0855(2)(a). The criteria require that technologies be screened and retained for those that are likely to achieve a level of No Significant Risk. Section 310 CMR 40.0856 provides that technologies are to be considered feasible if they are reasonably likely to achieve a Permanent or Temporary Solution and the expertise needed to implement the technology is available. The categories of remedial technologies/response actions were divided by Site media. A brief description of the categories of remedial technologies and remedial action alternatives are presented in the following sections by media, and additional details regarding the technologies and the screening results are provided in Table 4.1.

4.1.1 Soil

The overall remedial goal for soil as a medium is to reduce to the extent feasible or control the concentrations of PCBs and CVOCs in soil such that:

- Potential exposure to surface soil that is not capped will achieve a level of No Significant Risk
- Potential exposure to surface or subsurface soil beneath the Site cap will achieve a level of No Significant Risk
- Soil is eliminated to the extent feasible or controlled as a source of impacts to groundwater and indoor air
- Soil less than 15 feet bgs with concentrations above UCL levels is eliminated to the extent feasible or controlled using an engineered barrier

The general technology categories applicable for soil remediation and subject to initial screening included treatment, containment, excavation with off-site disposal, excavation with on-site consolidation and activity and use limitations (AULs).

4.1.1.1 In Situ Soil Treatment Technologies

In situ soil treatment includes the treatment of soils for reduction of COCs in place (i.e., excavation of soils is not required). The specific types of technologies that may be implemented in situ include bioremediation, chemical oxidation, soil solidification/stabilization, thermal treatment and air sparging (AS)/soil vapor extraction (SVE).

When combined with other remedy options, some of the in situ treatment techniques have been retained in OU3 although reduction of COC concentrations required for a Permanent Solution will be very challenging, largely due to the difficulties associated with Site conditions. The potential presence of residual DNAPL in some locations, proximity to the river, heterogeneous subsurface conditions (including debris laden urban fill materials and organic rich peat layers) and variable, tide influenced groundwater elevations create limitations for these technologies. In addition, three of the technologies are not effective for PCBs. Finally, thermal treatment requires a higher temperature for PCBs and has the added disadvantage of high energy use.

4.1.1.1.1 In Situ Biological Treatment

The advantages of in situ biological treatment processes include their known effectiveness over time at treating chlorinated ethenes and the limited waste streams generated that would require off-site disposal. However, these processes are considered alternative (not mainstream) for treatment of PCBs. Biological reductive dechlorination processes occur under predominantly anaerobic conditions, making them unsuitable for near surface and unsaturated zone applications. The high organic sorptive capacity of the peat layer, and to a lesser extent the mixed urban fill above it, inhibit dissolution, making aqueous dependent processes less effective. The proximity to the river of the bulk of the contaminant mass in Site soil, and the corresponding tidal influence and inundation with groundwater makes uniform soil amendment distribution challenging. The presence of debris/urban fill material and an organic rich peat layer in the subsurface along with the potential for areas of residual DNAPL within the soil matrix confound the effectiveness of biological treatment as a viable measure to reduce soil COC concentrations. While potentially effective as a groundwater contaminant treatment process, it is not considered reasonably likely to be sufficiently effective as a remedial action for soil COCs, particularly in the vadose zone.

4.1.1.1.2 In Situ Chemical Treatment

Both the advantages and disadvantages of in situ chemical treatment processes are similar to in situ biological treatment, with some added value when aggressive chemical treatments are considered. In situ chemical dehalogenation treatment (for example with zero valent iron) is potentially effective for Site COCs in groundwater but not for PCBs. Similarly, chemical oxidation of VOCs and potentially PCBs may be effective in both soil and groundwater given the proper delivery mechanism that can adequately distribute reagents throughout impacted soil areas. Similar to in situ bioremediation, while potentially effective as a groundwater contaminant treatment process, in situ chemical treatment is not considered reasonably likely to be sufficiently effective as a standalone remedial action for soil COCs. As such, it has been considered when combined with other alternatives for soil and/or groundwater in OU3 and OU4.

4.1.1.1.3 Solidification/Stabilization

The advantages of soil solidification or stabilization techniques, such as the addition of lime, kiln dust or cement, are their effectiveness at stabilizing and solidifying wet soils and reducing the leachability of soil COCs. While this type of soil treatment would reduce contaminant mobility, it would not reduce concentrations. The addition of solidifying agents will swell and increase the volume of soils to be managed. This technology would not likely achieve a Permanent Solution when used alone as an in situ soil treatment process. However, solidification/stabilization process may be useful in conjunction with other excavation based alternatives for the management of wet or sloppy soils and the reduction of potential leachability.

4.1.1.1.4 Thermal Treatment

In situ thermal treatment for overburden soils is confounded by the strong tidal influence on groundwater flow. Maintaining temperatures required for thermal treatment, and in particular the high temperatures needed to address PCBs, would require significantly high energy use and may not be feasible given the heat sink represented by tidal water infiltration. It is not possible to isolate the impacted soils from tidal influence because the overburden and bedrock flows are well connected and the gradients between them reverse with the tides.

4.1.1.1.5 AS/SVE

The tidal influences on groundwater migration would restrict the implementability of AS/SVE as a soil remediation technology at the Site. The method would potentially be useful for treating areas of CVOC impacts under buildings, but the varied groundwater gradients resulting from tidal flux, and minimal depth/thickness of subslab vadose zones at high tide limit the applicability in this regard. While effective for CVOCs, the technology would not be effective on PCB soil impacts as the constituent does not volatilize. AS/SVE is not considered reasonably likely to achieve a Permanent Solution for soil.

4.1.1.2 Ex situ Soil Treatment Technologies

Ex situ soil treatment includes excavation and treatment of COCs using a treatment method, including bioremediation, chemical oxidation, thermal treatment, or soil washing. Ex situ biological treatment and chemical oxidation are effective for CVOCs, do not depend on off-site disposal, and use of these technologies ex situ results in more control over amendment distribution. Chemical oxidation requires management, storage and handling of hazardous chemicals at the Site. Soil washing is complicated to implement, generates an additional waste stream, and requires that the soil be disposed after treatment. Thermal treatment requires a higher temperature for PCBs and has the added disadvantage of high energy use and air emissions. While excavation prior to treatment improves the level of control and contact opportunity for the mixture of soil COCs at the Site, the heterogeneity of the subsurface materials, the materials management and soil processing duration and the lack of a single treatment for all the Site COCs makes ex situ soil treatment unlikely to reasonably achieve a Permanent Solution for soil. Therefore, these technologies were not retained as a required component of a remedial alternative. However, similar to the in situ discussion provided above, ex situ soil stabilization/solidification is retained to potentially provide wet soil conditioning as needed to improve soil management and geotechnical properties.

4.1.1.3 Soil Containment

Containment consists of placement of a physical barrier that prevents direct contact with impacted soil and source material, through use of a cap, vertical barrier, or both. The advantages of a containment remedy are that handling and excavation of contaminated soil is not required, and there is a low degree of difficulty to implement. An AUL is required for use of a cap or engineered barrier containment, and long-term maintenance would be required. Containment technologies are readily available and reasonably likely to achieve a Permanent Solution for the Site. Containment has been retained for OU1 and OU3.

4.1.1.4 Soil Excavation and Off-site Disposal

Excavation and off-site disposal involves excavating contaminated soils and/or source material and disposing of generated wastes off-site. There is a low degree of difficulty to implement this technology, and use results in a decreased mass and volume remaining on-site. There are disadvantages associated with soil excavation and off-site disposal including risks associated with material handling and transportation, generation of an excavation dewatering waste stream and deep excavations proximate to the shoreline. Excavation cannot be used to remove contamination beneath buildings (e.g. Titleist property) without their removal, therefore limiting applicability in the OUs. Excavation and disposal is a readily available technology and is reasonably likely to achieve a Permanent Solution for OU1 and OU3. This technology has been retained.

4.1.1.5 Soil Excavation and On-site Consolidation

Excavation and on-site consolidation includes excavation of impacted soils from the Aerovox and Titleist properties, consolidation of the soils on the Aerovox property, and placement of an engineered barrier (for soils with COCs greater than UCLs) or cap over the consolidated soils. This technology has the same advantages as excavation and disposal, and also has the benefit of removing the risk of transportation

of contaminated material to an off-site disposal facility as well as a lower carbon footprint. Excavation and on-site consolidation has been retained for OU1 and OU3 because it is a technology that is readily available and is reasonably likely to achieve a Permanent Solution.

4.1.1.6 Activity and Use Limitation

An AUL is a legal document recorded with the deed and tied to the property that specifies allowable uses, prohibited uses, and ongoing maintenance requirements associated with any engineered controls (caps, engineered barriers, vertical containment barriers, etc.). The City of New Bedford has already agreed to an AUL for the Aerovox property, if necessary for a condition of No Significant Risk and a Permanent Solution for the Site. Use of an AUL on the Precix or Titleist properties will require agreement of the existing property owners. Use of an AUL is reasonably likely to achieve a Permanent Solution in conjunction with one or more of the other identified technologies, and therefore, has been retained for OU1, OU2, and OU3.

4.1.2 Groundwater

4.1.2.1 Containment

Containment of groundwater functions to isolate contaminated groundwater and prevent migration of contaminants off-site. Containment technologies that were screened include vertical barriers, bedrock jet-grouting, and hydraulic containment using groundwater extraction. Vertical barriers are proven technologies with a low degree of difficulty to implement and are effective for contaminated overburden groundwater.

Jet-grouting the top of the bedrock surface involves injection of a cementitious mixture into the subsurface to fill groundwater transmitting fractures and voids to mitigate migration. This technology is applicable for shallow bedrock, and may reduce, but not completely prevent upward migration of contaminated groundwater from the bedrock aquifer. This technology is available, but implementing this technology in complex Site conditions such as those represented by the type of bedrock at the Site and proximity to the river is not considered technically feasible. Jet-grouting was not retained as a containment technology.

Hydraulic containment and ex situ treatment (pump and treat) includes extraction and treatment of groundwater to capture groundwater contaminants and prevent off-site migration. This technology is proven, has a low degree of difficulty to implement, and is effective for both overburden and bedrock groundwater. However, for bedrock groundwater at the Site, the proximity to the river and influence of the tides provide a limitless source of groundwater infiltration and the volume of pumping to achieve hydraulic containment would be significant. Groundwater modeling indicates that pumping at the required rates to create hydraulic capture would draw contamination down from the overburden soils into bedrock fractures, complicating subsequent removal. Therefore, hydraulic containment was not retained for bedrock (OU4). Refer to section 2.4 of the groundwater modeling report (Appendix G) for a discussion of hydraulic containment in the bedrock aquifer.

Installation of vertical barrier walls reduces the required pumping rates for hydraulic containment of overburden groundwater, and there is a reasonable likelihood that in combination they can achieve a Permanent Solution in conjunction with other technologies. Therefore, they have been retained for OU3.

4.1.2.2 Treatment

Groundwater treatment technologies, similar to soil treatment technologies, include in situ bioremediation, chemical treatment, and thermal treatment, as well as installation of a permeable reactive barrier (PRB) and monitored natural attenuation. Both bioremediation and chemical treatment rely heavily on obtaining a successful distribution of the required groundwater amendments. Proximity of impacted groundwater to the river and Site heterogeneous subsurface conditions pose challenges for

obtaining the needed distribution. Similarly, the location of the Site will result in high energy costs for thermal treatment due to the supply of water from the river to the treatment zones. In the case of hydraulic containment, an ex situ wastewater treatment system could be designed to provide a level of effluent quality needed to meet standards required for discharge to the city's sanitary system, to the river (under a NPDES permit) or for reinjection/recirculation. These groundwater treatment technologies are readily available and may achieve a Permanent Solution. In situ biological and chemical treatment, in situ treatment using a PRB, monitored natural attenuation and ex situ treatment have been retained for OU3. In situ chemical treatment and in situ thermal treatment, both with monitored natural attenuation, have been retained for OU4. Thermal treatment was not retained for OU3 due to the difficulty associated with attaining the required temperatures in a highly saturated porous media, and additional reasons provided in the discussion of soil technologies above.

4.1.3 Soil Gas

Vapor mitigation includes the implementation of measures designed to eliminate or mitigate the vapor intrusion pathway by either preventing the migration of vapors into buildings or treating air inside the buildings. Selection of the best approach depends on consideration of a variety of building construction and site characteristics, as well as the magnitude of the indoor air impact.

4.1.3.1 Monitored Attenuation

Monitored attenuation for soil gas includes indoor air and subslab soil gas monitoring on an on-ongoing basis to record changing conditions over time. This technology has a low degree of difficulty of implementation, and ongoing indoor air monitoring will provide information to determine whether the Condition of No Significant Risk for current occupants has changed, or if additional mitigation would be required in the future. This technology may achieve a Permanent Solution in conjunction with selected remedies for OU3 source control. This technology has been retained for OU2.

4.1.3.2 Vapor Barrier

Implementation of a vapor barrier includes sealing cracks and penetrations in the floor, and placement of a membrane over the entire section of the building floor where vapor migration is of concern. This technology can be moderately difficult to implement, and does not mitigate the source; however, it would provide a Permanent Solution for vapor migration to indoor air if combined with an AUL, and has been retained for OU2.

4.1.3.3 Subslab Depressurization System

There are two options for a subslab system to mitigate soil vapors. A passive subslab system would provide a pathway for discharge of vapors from beneath the building by installing a vent that discharges above the roof of the building. Differences in pressure gradients would create passive ventilation of the subslab area. This type of system has low maintenance requirements and a low degree of difficulty to implement. Similarly, an active subslab system includes installation of a vent system and discharge piping, but uses a blower to assist in removal and discharge of vapors. An active system is generally more effective in reducing subslab soil vapor concentrations. Neither passive nor active systems are effective in saturated conditions or with a minimal vadose zone thickness. The technology for these systems is readily available, and the active subslab depressurization system has been retained for OU2.

4.1.3.4 Activity and Use Limitation

An AUL is a legal document that specifies allowable uses, prohibited uses, and ongoing maintenance requirements associated with any engineered controls, including Active Exposure Pathway Mitigation Measures. Use of an AUL on the Precix property will require agreement of the existing property owners. An AUL is reasonably likely to achieve a Permanent Solution in conjunction with one or more of the other identified technologies, and therefore, has been retained for OU2.

4.1.4 DNAPL

NAPL has been measured only in wells in the northeast corner of the Aerovox property, including one bedrock monitoring well, and observed in limited areas of Site soils. The IRA removed two of the identified shallow soil areas known to contain residual DNAPL. Technologies to address the remaining DNAPL are considered as follows.

4.1.4.1 Excavation

Excavation of soils containing residual DNAPL is effective for removal of contaminant mass and volume and has a low degree of difficulty to implement although deep excavations proximate to the river will be challenging to implement. Disadvantages are similar to those outlined for soil excavation. Since excavation technology is readily available and likely to achieve a Permanent Solution for overburden soils in combination with other technologies, this technology has been retained for OU3.

4.1.4.2 Free Product Recovery System and Off-site Disposal

This technology involves installation of a FPRS to remove mobile DNAPL to the extent feasible. A FPRS was installed as part of the IRA for the northeast corner of the Site, but has not been shown to be effective for removal of residual DNAPL in overburden or bedrock. Limited DNAPL with micro-scale mobility is present, but recovery volumes increase temporarily only when the subsurface is disturbed (e.g. during well installation or well redevelopment), only to return to steady state and de minimis recovery quantities once equilibrium is restored. While there is a low degree of difficulty to implement this technology, which is readily available, based on the results of the IRA this technology is not reasonably likely to achieve a Permanent Solution. The operation of the recovery system (through periodic gauging and when possible recovery via pumping) will continue under the IRA until Phase IV remedy construction is completed, but the technology was not retained for OU3 or OU4 for use in achieving a Permanent Solution.

4.1.5 Mitigation of Contaminant Migration through the Storm Sewer

Two technologies are available for mitigation of the potential for contaminants in groundwater and sediment within storm water to migrate from the catch basins and drainage pipes to the river. These technologies are removal and replacement of the storm sewer lines, or cleaning and lining the existing storm sewer. Each of these technologies will provide successful removal of contaminants in catch basins and lines, and would mitigate or reduce infiltration of contaminated groundwater. These technologies are both available, reasonably likely to achieve a Permanent Solution in combination with other technologies, and have been retained for OU3.

4.2 Summary of Remedial Alternatives

The initial technology screening presented in Section 4.1 provides the basis for development of the remedial action alternatives for each OU. The technologies retained are those that are reasonably likely to be feasible and achieve either a Temporary or a Permanent Solution. The retained technologies were considered alone or in combination to form a range of alternatives for each OU to be evaluated against the criteria in the MCP (310 CMR 40.0858), including effectiveness, reliability, difficulty of implementation, costs, risks associated with implementing the remedial alternative, benefits, timeliness, and non-pecuniary interests. An evaluation of the OU alternatives including cost estimates is presented in Section 5.

The alternatives represent a range of remedial options that are reasonably likely to be feasible, achieve a level of No Significant Risk, and effectively achieve the established remedial action objectives. The horizontal limits and/or vertical depths of the retained remedial technologies were established based on the analytical laboratory results for Site soils and groundwater presented in the Phase II Comprehensive

Site Assessment dated September 18, 2015, and subsequent investigation and/or remedial activities discussed herein. The alternatives developed for each OU are described in the sub-sections below.

4.2.1 OU1

OU1 consists of PCB-contaminated soils located above the peat layer on the eastern side of the Titleist property. Five remedial action alternatives were developed for OU1 and will be retained for detailed evaluation. The five alternatives are:

- OU1-1: Excavation of Two Feet of Surface Soil and All Soils with PCB Concentrations Greater Than the PCB UCL of 100 mg/kg and Off-Site Disposal;
- OU1-2: Excavation of All Soils with PCB Concentrations Greater Than 4 mg/kg and Off-Site Disposal;
- OU1-3A: Excavation of All Soils with PCB Concentrations Greater Than 1 mg/kg and Off-Site Disposal;
- OU1-3B: Excavation of All Soils with PCB Concentrations Greater Than 1 mg/kg and On-Site Consolidation;
- OU1-4: Placement of an Engineered Barrier or Asphalt Cap over All Soils with PCB Concentrations Greater Than 100 mg/kg and 1 mg/kg, respectively.

The alternatives for OU1 are summarized on Table 4.3.1. A description of each potential remedial action alternative is presented below.

Alternatives OU1-1, OU1-2 and OU1-3A and B involve the excavation of PCB-impacted soils. The first three alternatives include transportation and disposal at an approved off-site disposal facility. Alternative OU1-3B includes consolidation beneath an engineered barrier constructed over targeted areas of OU3. The engineered barrier is a containment technology that has been retained for several of the OU3 remedial alternatives.

In order to perform the excavations for Alternatives OU1-1, OU1-2 and OU1-3, the remedial contractor would be required to obtain a Trench Permit from the City of New Bedford taking the following factors into consideration:

- OSHA regulations require benching, sloping, or other excavation support to safely excavate to depths of five feet bgs or greater;
- Excavation activities would occur adjacent to the existing Titleist building;
- Groundwater in the vicinity of the excavation areas is tidal and may be encountered for deeper parts of the excavations.

Soils with PCB concentrations above the unrestricted reuse criteria that are not removed as part of remedial action alternatives OU1-1, OU1-2 and OU1-4 would be covered by a cap or engineered barrier. The layer components and thicknesses vary between alternatives based on the concentrations of PCB-impacted soils remaining on-site. The cap or engineered barrier would be designed to provide separation and prevent exposure of site workers and visitors to the remaining impacted soils.

Following the remedial construction of any alternative, a Final Inspection Report would be completed to document the soil excavation, disposal or consolidation, and cap installation. Additionally, a Permanent Solution Statement would be filed at the conclusion of the remedial actions for the Site.

An AUL would be filed following the remedial construction of alternatives OU1-1, OU1-2 and OU1-4. The AUL would require continued monitoring, maintenance and documentation of the cap and repairs as necessary, limitations that prohibit residential use of the property, and mandate the use of a Soil Management Plan and Health and Safety Plan to mitigate potential direct contact with impacted soils that remain on-site. Because OU1-4 includes an engineered barrier, routine inspection reporting and establishment of a financial assurance mechanism would also be required.

4.2.1.1 Alternative OU1-1

The major components of alternative OU1-1 are:

- Excavation and removal of soils which have PCB concentrations greater than 100 mg/kg and stabilization/solidification as necessary;
- Excavation and removal of the top two feet of soils which have PCB concentrations greater than 1 mg/kg;
- Transportation and disposal of PCB-impacted soils at an approved off-site facility;
- Installing a demarcation layer;
- Backfilling excavation areas with imported clean backfill and soil cap installation;
- Restoring the ground surface in kind (landscaping);
- Placing an AUL on the impacted portions of the property restricting foreseeable future use; and
- Performing ongoing monitoring, maintenance and documentation of the soil cap integrity and repairs (as necessary to maintain compliance with the AUL).

This alternative includes excavation of approximately 5,900 cubic yards of PCB-impacted soils to depths of between two feet and five feet bgs. The approximate horizontal limit of this alternative's excavation areas are presented on Figure 4.3.1-1.

Since this alternative involves excavation to a depth of five feet bgs in only limited areas, dewatering is not anticipated, assuming the deeper excavations and excavations along the river bank can be performed during low tide. Following excavations along the shoreline, the shoreline will be restored in a manner that provides resiliency against potential impacts from storms and flooding.

An AUL would need to be placed on the impacted portions of the property under this alternative. As described above, the AUL would require continued monitoring, maintenance and documentation of the cap and repairs as necessary, limitations prohibiting residential use of the property, and other measures to mitigate potential direct contact with impacted soils that remain on-site. The AUL is an integral part of the alternative; without it, this alternative would not be implementable.

This alternative would require annual monitoring and documentation of the soil cap, and repairs as necessary. This alternative does not require operation of treatment technology or any other equipment. This alternative would require EPA approval of a cap configuration that differs from that described in the EPA TSCA Determination, because the EPA TSCA Determination contained within the AOC required capping of all soils with PCB concentrations > 2 mg/kg with a visual barrier and three inches of asphalt. Note that EPA's original April 2006 Supplemental Engineering Evaluation and Cost Analysis (SEE/CA) included as a requirement for the Site, a cover that would function as a barrier to direct contact exposure to contaminated Site soils, would be as protective as possible and would at a minimum consist of twelve inches of vegetated soil. While this OU1-1 RAA allows for a thicker (deeper) protective cover than that required in EPA's original SEE/CA, it also reduces concentrations in the upper two feet to 1 mg/kg, resulting in a more protective alternative than that chosen by the SEE/CA.

4.2.1.2 Alternative OU1-2

The major components of alternative OU1-2 are:

- Excavation and removal of soils which have PCB concentrations greater than 4 mg/kg, and stabilization/solidification as necessary;
- Transportation and disposal of PCB-impacted soils at an approved facility;
- Installing a demarcation layer;
- Backfilling excavation areas with imported clean backfill and soil cap installation;
- Restoring the ground surface in kind;

- Placing an AUL on the impacted portions of the property restricting foreseeable future use; and
- Performing ongoing monitoring, maintenance and documentation of the soil cap integrity and repairs (as necessary).

This alternative includes excavation of approximately 7,900 cubic yards of PCB-impacted soils to depths of between two feet and six feet bgs. The approximate horizontal limits of this alternative's excavation areas are presented on Figure 4.3.1-2.

For the purpose of cost estimating, it is assumed that interlocking steel sheet piles will be utilized for excavation support and groundwater control in the deeper areas of the excavations. Following excavations along the shoreline, the shoreline will be restored in a manner that provides resiliency against potential impacts from storms and flooding.

An AUL would need to be placed on the impacted portions of the property under this alternative. As with alternative OU1-1, the AUL would require continued monitoring, maintenance and documentation of the cap and repairs as necessary, limitations prohibiting residential use of the property, and other measures to mitigate potential direct contact with impacted soils that remain on-site. The AUL is an integral part of the alternative; without it, this alternative would not be implementable.

This alternative would require annual monitoring and documentation of the soil cap, and repairs as necessary. This alternative does not require operation of treatment technology or any other equipment. This alternative would require EPA approval of a cap configuration that differs from that described in the EPA TSCA Determination, which required capping of all soils with PCB concentrations greater than 2 ppm with a visual barrier and three inches of asphalt.

4.2.1.3 Alternative OU1-3A

The major components of alternative OU1-3A are:

- Excavation and removal of soils which have PCB concentrations greater than 1 mg/kg and stabilization/solidification as necessary;
- Transportation and disposal of PCB-impacted soils at an approved facility;
- Backfilling excavation areas with imported clean backfill; and
- Restoring the ground surface in kind.

This alternative includes excavation of approximately 9,700 cubic yards of PCB-impacted soils to depths of between two feet and seven feet bgs. The approximate horizontal limits of this alternative's excavation areas are presented on Figure 4.3.1-3.

For the purpose of cost estimating, it is assumed that interlocking steel sheet piles will be utilized for excavation support and groundwater control in the deeper areas of the excavations. Excavation dewatering is assumed. Following excavations along the shoreline, the shoreline will be restored in a manner that provides resiliency against potential impacts from storms and flooding.

Since this alternative removes all soils with PCB concentrations greater than unrestricted use risk based concentrations, no AUL would be placed on the Site.

4.2.1.4 Alternative OU1-3B

The major components of alternative OU1-3B are:

- Excavation and removal of soils which have PCB concentrations greater than 1 mg/kg and stabilization/solidification as necessary;
- Transportation and consolidation of PCB-impacted soils beneath an engineered barrier on the Aerovox property;
- Backfilling excavation areas with imported clean backfill; and

- Restoring the ground surface in kind.

This alternative includes excavation of approximately 9,700 cubic yards of PCB-impacted soils to depths of between two feet and seven feet bgs. The approximate horizontal limits of this alternative's excavation areas are presented on Figure 4.3.1-3.

For the purpose of cost estimating, it is assumed that interlocking steel sheet piles will be utilized for excavation support and groundwater control in the deeper areas of the excavations. Excavation dewatering is assumed. Following excavations along the shoreline, the shoreline will be restored in a manner that provides resiliency against potential impacts from storms and flooding.

Since this alternative removes all soils with PCB concentrations greater than unrestricted use risk based concentrations, no AUL would be placed on the OU1 portion of the Site.

4.2.1.5 Alternative OU1-4

The major components of alternative OU1-4 are:

- Installing a demarcation layer;
- Constructing an engineered barrier over soils with PCB concentrations greater than 100 mg/kg;
- Constructing a minimum three-inch thick pavement cap over soils with PCB concentrations greater than 1 mg/kg;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use; and
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier and pavement cap integrity and repairs (as necessary).

This alternative includes containment of PCB-impacted soils by either an engineered barrier or a pavement cap. The approximate horizontal limits of these are presented on Figure 4.3.1-4.

An AUL would need to be placed on the impacted portions of the property under this alternative. As with alternatives OU1-1 and OU1-2, the AUL would require continued monitoring, maintenance and documentation of the cap and repairs as necessary, limitations prohibiting residential use of the property, and other measures to mitigate potential direct contact with impacted soils that remain on-site. The AUL is an integral part of the alternative; without it, this alternative would not be implementable.

This alternative would require annual monitoring and documentation of the soil cap, and repairs as necessary. A financial assurance mechanism will be required for engineered barrier maintenance. This alternative does not require operation of treatment technology or any other equipment. Because the pavement cover meets the requirements as specified in EPA TSCA Determination, additional EPA approval would not be required.

4.2.2 OU2

OU2 is limited to the potential vapor intrusion pathway for the Precix property where the lines of evidence, including CVOC-contaminated shallow overburden groundwater above Method 1 GW-2 standards beneath Graham Street adjacent to the building, subslab soil gas above screening values beneath the existing building and indoor air concentrations of CVOCs found in select building areas, all suggest a complete vapor intrusion pathway. Under current commercial/industrial site uses, a condition of No Significant Risk exists, but changes in foreseeable future Site use may change risk assumptions. Three remedial action alternatives were developed for OU2 and will be retained for detailed evaluation. The three alternatives all include an AUL. The AUL is an integral part of the alternative; without it, this alternative would not be implementable. The monitored natural attenuation of contamination beneath the existing building which will be affected by the selection of a remedial alternative for OU3 (Aerovox property overburden groundwater) that controls or eliminates the adjacent CVOC contamination on the Aerovox property. The three alternatives are:

- OU2-1: Monitored Subslab Soil Gas Attenuation and an AUL;
- OU2-2: Monitored Natural Attenuation of Subslab Soil Gas, an AUL and Installation of a Vapor Barrier Over the Floor Slab; and
- OU2-3: Monitored Natural Attenuation of Subslab Soil Gas, Installation of an Active Subslab Depressurization System (SSDS) and an AUL.

The alternatives are summarized on Table 4.3.2. A description of each potential remedial action alternative is presented below.

The existing building currently houses an active, multi-shift manufacturing business. Alternatives OU2-2 and OU2-3 involve the installation of vapor mitigation measures inside of the building and would require coordination with the existing business schedule of the building owner, which typically operates multiple shifts and every day of the week. Likely, this would require implementation of these two remedial alternatives on weekends and holidays. Additionally, OU2-3 would require routine monitoring and O&M, and could require unscheduled maintenance of the active system.

The current OU2 conditions, including subslab constituent concentrations and attenuation afforded by the present building slab result in indoor air concentrations that satisfy a condition of No Significant Risk for current commercial/industrial uses. As such, all the considered alternatives employ natural degradation processes to address contamination below the Precix building floor slab. Natural degradation is comprised of several different physical, chemical, and biological processes which, under favorable conditions, act to reduce the mass, toxicity, and mobility of subsurface contamination. Natural degradation is an intrinsically slow process. It may require a period of up to or more than thirty years (the timeframe typically used for cost comparison of alternatives) to reduce TCE concentrations in soil and groundwater to levels where a condition of No Significant Risk would be achieved for unrestricted foreseeable future use including residential use.

For each alternative, long-term monitoring would continue until the data demonstrate that the subslab soil gas has been reduced below applicable screening values and/or groundwater concentrations are below Method 1 GW-2. If at any point, evaluation of long-term monitoring data indicated significant negative changes in Site conditions, then contingent remedial alternatives would be evaluated and implemented to supplement or replace the existing systems.

4.2.2.1 Alternative OU2-1

The major components of alternative OU2-1 are:

- Monitored natural attenuation of contaminants in groundwater and soil vapor;
- Placing an AUL on the impacted portions of the property restricting changes to existing and foreseeable future use; and
- Performing groundwater, soil gas and indoor air quality monitoring and documenting the alternative effectiveness.

The extent of alternative OU2-1 is shown on Figure 4.3.2-1. An AUL would be filed and would require continued monitoring and documentation of groundwater, soil gas and indoor air quality, limitations that prohibit disruption of the building floor slab and residential use of the property, and mandate use of a Soil Management Plan and Health and Safety Plan to mitigate potential direct contact with impacted soils that remain on-site.

A Permanent Solution Statement would be filed since current conditions and Site uses combined with an AUL provide a condition of No Significant Risk.

4.2.2.2 Alternative OU2-2

The major components of alternative OU2-2 are:

- Monitored natural attenuation of contaminants in groundwater and soil vapor;
- Installing a vapor barrier over the floor slab;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use; and
- Performing soil gas, groundwater and indoor air quality monitoring and documenting the alternative effectiveness.

The extent of alternative OU2-2 is shown on Figure 4.3.2-2.

This alternative is similar to OU2-1 in that it allows for natural degradation of contaminants and additionally includes the installation of a vapor barrier as a passive mitigation measure. The vapor barrier would be installed over the existing floor slab including floor penetrations to restrict potential future vapor infiltration.

An AUL would be filed and would require continued monitoring and documentation of soil gas, groundwater and indoor air quality, limitations that prohibit residential use of the property, and mandate use of a Soil Management Plan and Health and Safety Plan to mitigate potential direct contact with impacted soils that remain on-site.

A Permanent Solution Statement would be filed since current conditions and Site uses provide a condition of No Significant Risk.

4.2.2.3 Alternative OU2-3

The major components of alternative OU2-3 are:

- Monitored natural attenuation of contaminants in groundwater and soil vapor;
- Installing a subslab depressurization system as an Active Exposure Pathway Mitigation Measure (AEPMM);
- Placing an AUL on the impacted portions of the property restricting foreseeable future use; and
- Performing ongoing monitoring of the SSDS and documenting the alternative effectiveness.

The extent of alternative OU2-3 is shown on Figure 4.3.2-3.

This alternative is similar to OU2-1 in that it allows for natural degradation of contaminants and additionally includes the installation of a subslab depressurization system as an AEPMM. The subslab depressurization system would include sealing floor penetrations and installing a series of vacuum wells at strategic locations within the footprint shown on Figure 4.3.2-3. Blowers attached to the vacuum wells, designed to depressurize the vadose zone below the building slab relative to the building space, would prevent the infiltration of vapors into the building space. The off-gas would be treated as required (e.g., with granular activated carbon filters) and vented outside of the building space.

An AUL would be filed and would require continued operation and maintenance of the subslab depressurization system including monitoring in-line manometers to assure adequate vacuum is provided and monitoring emissions for compliance with 310 CMR 40.0049(5). Procedures for subslab depressurization system monitoring and maintenance would be outlined in an Operations, Maintenance and Monitoring Plan (OMMP) for OU2. Additionally, the AUL would require documentation of the alternative's effectiveness, limitations on future use of the property, and mandate use of a Soil Management Plan and Health and Safety Plan to mitigate potential direct contact with impacted soils that remain.

A Permanent Solution Statement would be filed since current conditions and Site uses combined with an AUL would provide a condition of No Significant Risk.

4.2.3 OU3

OU3 focuses on source control and includes Aerovox property soils, storm sewers, and overburden soil and groundwater. OU3 includes PCB-contaminated soils at several individual areas on the western and central portions of the Aerovox property and much of the eastern portion of the property with both PCBs and CVOCs, and CVOC and/or PCB contaminated overburden groundwater at the Site. Additionally, OU3 includes the existing storm water collection system located on the southern and eastern portion of the Aerovox property which may serve as a preferential migration pathway for contaminants.

The remedial technology retained for the storm water system is independent of the remedial technologies retained to address the contaminated soils and groundwater. It is assumed for all alternatives that the storm water system will be cleaned and lined or replaced in-kind depending upon the condition of the system at the time of remediation. Since one remedial technology is assumed to address the storm water system contamination in all the OU3 remedial action alternatives evaluated, further discussion of the storm water system is not included as part of the description of the RAAs for OU3 discussed below.

One objective of the selected remedial action alternative for OU3 is mitigation, to the extent practicable, of contaminant migration from the Site to the river, part of the New Bedford Harbor (NBH) Superfund Site. Because groundwater is a secondary release mechanism to the river (the primary mechanisms having been direct discharge via on-site trenches and direct dumping from the shoreline), the river currently contains DNAPL and significant levels of soil and sediment contamination which are themselves a continuing source. Tidal fluctuations result in the river impacts serving as a source of contaminants back into the Aerovox Site. Thus, while the remedial action will be selected and designed to mitigate migration from west to east, demonstrating full achievement of this objective will be complicated by the reverse flow from the river into the Site until EPA also completes source removal (including DNAPL found in harbor sediment) in the river as part of the NBH Superfund Site remediation. However, excavation of the NBH sediment by EPA could occur either in coordination with the implementation of the OU3 remedial alternative or a short time after construction of the selected remedy. In the latter case, EPA's intertidal and subtidal excavation efforts would need to include measures to protect the shoreline restoration put in place after completion of the Aerovox remedial alternative. More detailed assessment of the remedial alternatives in terms of EPA's planned harbor remediation is not possible because EPA has not completed and is not able to provide specific plans for the methods or timing of their work.

The following 11 remedial action alternatives were formulated and retained for detailed evaluation for OU3:

- OU3-1: Removal and off-site disposal of soils above UCLs, cap areas with PCB concentrations >2 mg/kg, overburden groundwater containment via vertical barrier wall with hydraulic containment, and in situ treatment of plume hot spot;
- OU3-2: Removal and off-site disposal of soils above UCLs, cap areas with PCB concentrations > 2 mg/kg, overburden groundwater containment via vertical barrier wall with hydraulic containment;
- OU3-3: Removal and off-site disposal of soils within 25 feet of shoreline above peat, within the northeast corner down to bedrock, and above UCLs, cap areas with PCB concentrations >2 mg/kg, partial containment and treatment of groundwater with PRB, in situ treatment of plume hot spot;
- OU3-4: Removal and off-site disposal of soils within 25 feet of shoreline above peat and down to bedrock within the northeast corner, engineered barrier over areas with PCBs >100 mg/kg and asphalt cap over areas with PCBs >2 mg/kg, overburden groundwater containment via vertical barrier wall with hydraulic containment, in situ treatment of plume hot spot;
- OU3-5: Removal and off-site disposal of soils within 25 feet of shoreline above peat and down to bedrock within the northeast corner, engineered barrier over areas with PCBs >100 mg/kg and

asphalt cap over areas with PCBs >2 mg/kg, and overburden groundwater containment via vertical barrier wall with hydraulic containment;

- OU3-6: Removal and off-site disposal of soils within 25 feet of shoreline above peat and down to bedrock within the northeast corner, engineered barrier over areas with PCBs >100 mg/kg and asphalt cap over areas with PCBs >2 mg/kg, partial containment and treatment of groundwater with PRB, in situ treatment of plume hot spot;
- OU3-7: Removal and on-site consolidation of soils within 25 feet of shoreline above peat and down to bedrock within the northeast corner, engineered barrier over areas with PCBs >100 mg/kg and asphalt cap over areas with PCBs > 2 mg/kg, overburden groundwater containment via vertical barrier wall with hydraulic containment, in situ treatment of plume hot spot;
- OU3-8: Removal and on-site consolidation of soils within 25 feet of shoreline above peat and down to bedrock within the northeast corner, engineered barrier over areas with PCBs >100 mg/kg and asphalt cap over areas with PCBs >2 mg/kg, overburden groundwater containment via vertical barrier wall with hydraulic containment;
- OU3-9: Removal and on-site consolidation of soils within 25 feet of shoreline above peat and down to bedrock within the northeast corner, engineered barrier over areas with PCBs >100 mg/kg and asphalt cap over areas with PCBs >2 mg/kg, partial containment and treatment of groundwater with PRB, in situ treatment of plume hot spot;
- OU3-10: Asphalt cap over soils with PCB concentrations >2 mg/kg and engineered barrier over soils with concentrations above UCLs, overburden groundwater containment via vertical barrier wall with hydraulic containment, and in situ treatment of plume hot spot; and
- OU3-11: Asphalt cap over soils with PCB concentrations >2 mg/kg and engineered barrier over soils with concentrations above UCLs, overburden groundwater containment via vertical barrier wall with hydraulic containment.

In order to perform the excavations for alternatives OU3-1 through OU3-9, the remedial contractor would be required to obtain a Trench Permit from the City of New Bedford taking the following factors into consideration:

- OSHA regulations require benching, sloping, or other excavation support to safely excavate to depths of five feet bgs or greater;
- Groundwater in the vicinity of the excavation areas is tidal and will be encountered for deeper parts of the excavations.

Based on groundwater monitoring activities presented in the Phase II Comprehensive Site Assessment dated September 18, 2015 and recent experience with the IRA Implementation, groundwater will be encountered in excavations deeper than approximately 3- 4 feet bgs associated with alternatives OU3-1 through OU3-9, depending on the tide cycle. Additionally, intermittent sheens were observed on the surface of the river during implementation of the IRA. A plan to minimize and/or control migration of sheens would be prepared as part of construction of any alternative that includes removal of soils adjacent to the river. For cost estimating purposes, groundwater control is assumed to be accomplished by a combination of perimeter dewatering well points and interlocking steel sheet piling. The water associated with the dewatering activities would likely be pretreated on-site and discharged to the New Bedford POTW. Following excavations along the shoreline, the shoreline will be restored in a manner that provides resiliency against potential impacts from storms and flooding.

Following the remedial construction of any alternative, a Final Inspection Report would be completed to document the soil excavation, disposal or ex situ treatment, and cap installation. Additionally, a Permanent Solution Statement would be filed following remedial construction.

An AUL would be filed following the remedial construction of each of the alternatives. The AUL would require continued monitoring, maintenance and documentation of the cap and repairs as necessary, limitations that prohibit residential use of the property, and mandate the use of a Soil Management Plan and Health and Safety Plan to mitigate potential direct contact with impacted soils that remain on-site.

To facilitate the evaluation of the potential remedial groundwater action alternatives at the Site, a three-dimensional groundwater flow model was developed using the Modular Three-dimensional Finite Difference Groundwater Flow Model (MODFLOW). The model was developed to simulate groundwater flow conditions in three layers across the Site: artificial fill and peat, glacial outwash and till, and bedrock. After calibrating the model to steady state conditions using existing Site data at low tide, the model was converted to a transient operation to account for the changes in flow (both laterally and vertically) that are caused by the significant tidal fluctuations at the Site. By using the transient operation, the model enabled evaluation of various remedial scenarios under both low tide and high tide conditions. The goal of the modeling was to evaluate the effectiveness of the different scenarios on preventing the migration of impacted groundwater off-property, and estimating the amount of groundwater that might need to be managed to mitigate the off-property migration. The Groundwater Modeling Report with associated output figures demonstrating model setup, calibration, and simulation results is included as Appendix G. The key findings of the groundwater modeling are also incorporated into the discussions of OU3 alternatives.

The 11 alternatives for OU3 are summarized in Table 4.3.3. A description of each potential remedial action alternative is presented below. These descriptions include the results of the groundwater flow modeling.

4.2.3.1 Alternative OU3-1

The major components of alternative OU3-1 are:

- Excavating soils in the top 15 feet bgs which have CVOCs and PCB concentrations greater than their respective UCLs and stabilization/solidification as necessary;
- Transporting and disposing of VOC and PCB-impacted soils at an approved off-site facility;
- Backfilling excavation areas with Site soil or imported clean backfill;
- Restoring the ground surface in kind (i.e., asphalt pavement);
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Installing a vertical containment barrier around all four sides of impacted soils
- Providing hydraulic containment through a groundwater extraction and treatment system;
- Providing in situ treatment of deeper hot spot soils;
- Performing ongoing monitoring, maintenance and documentation of the soil cap integrity and repairs (as necessary); and
- Providing long term operation, maintenance, and monitoring of the groundwater treatment system and long-term monitoring of groundwater.

This alternative includes excavation of approximately 26,600 cubic yards of CVOC and PCB-impacted soils to depths of between three feet and 15 feet bgs. The approximate horizontal limits and depths of this alternative's excavation areas are presented on Figure 4.3.3-1.

The assumption noted above regarding soil volume notwithstanding, during implementation excavated soils would be segregated based on concentrations. Soils with CVOC and PCB concentrations below the UCL would be placed as backfill in the excavation areas. Soils with CVOC and PCB concentrations above the UCL would be transported to and disposed of at an approved off-site disposal facility. For cost estimating purposes, it is assumed that all excavated soil will be transported to and disposed of at an approved off-site facility.

The asphalt cap would be restored at locations where excavation activities do not remove soils with PCB concentrations above 2 mg/kg per the TSCA Determination. The cap would be designed to provide separation and prevent exposure of Site workers and visitors to the remaining impacted soils. Following excavations along the shoreline, the shoreline containment barrier would provide resiliency against potential impacts from storms and flooding.

Alternative OU3-1 also consists of installing a very low permeability vertical barrier wall that would surround the overburden groundwater plume which exceeds Method 1 GW-3 standards. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs and PCBs beyond the containment wall and into the river. To prevent the downward migration of impacted groundwater into the bedrock, hydraulic containment via groundwater pumping and treatment would be implemented to maintain an inward hydraulic gradient within the vertical barrier (both laterally and vertically). An added benefit of the pumping and treatment would be the gradual removal of contaminant mass and a reduction in groundwater concentrations in the overburden groundwater.

The approximate configuration of the vertical barrier wall is shown on Figure 4.3.3-1, and covers approximately 1,700 linear feet. The wall would be constructed to extend from ground surface through the vertical thickness of the overburden deposits to the top of bedrock (approximate depths of 11 to 37 feet bgs which varies based on the depth to bedrock along the footprint of the proposed wall). Based on the estimated depths to bedrock, the alternative would require the construction of approximately 42,500 square feet of vertical barrier. The type of vertical barrier wall would be selected from the following three proven barrier wall technologies: slurry wall, in situ mixed wall, and sealed sheet piling. Slurry walls typically consist of a bentonite trench slurry that is placed within an excavated trench to hold the trench walls open during excavation. After achieving the target excavation depth, a heavier soil-bentonite or cement-bentonite slurry is used to displace the trench slurry and form the final slurry wall. In situ mixed walls are constructed by mixing in situ soils with a cement/bentonite based binder slurry. The mixing would occur in situ using long reach excavators or augers, depending on the depth of the wall. Sealed sheet piling is driven into the ground to the desired depth. The selection of which type of barrier wall would be determined during remedial design based on consideration of various factors such as cost, reliability, effectiveness, ease of installation, etc. Depending on which installation method was selected, there may be excess excavated soils which would need to be handled. These soils could either be direct loaded into trucks for disposal at an approved facility, or consolidated with similar soils for subsequent capping on the property.

Hydraulic containment would be accomplished by the pumping of groundwater from five overburden extraction wells as shown in Figure 4.3.3-1. Based on the model results, to provide containment and prevent downward migration into bedrock, pumping would be needed at a combined rate of approximately 65 gallons per minute (gpm). The groundwater would be pumped from the five extraction wells to an on-site building for above ground treatment. Based on the Site contaminants in overburden groundwater (residual DNAPL, CVOCs and PCBs), the major components of the groundwater treatment system would include an oil water separator, equalization tanks, solids holding tank, bag filters, an air stripper, and liquid phase and vapor phase activated carbon. The treated groundwater would be discharged either to the local publicly owned treatment works (POTW) or a storm drain flowing to the river under a NPDES permit.

In situ treatment of soils acting as a source to groundwater would be conducted to shorten the timeframe needed to achieve a Permanent Solution. This component of the alternative would consist of direct push injection of a slurry (approximately 395,000 lbs of the amendment for the first injection round) consisting of zero-valent iron (ZVI), organic carbon, and microorganisms (Dehalococcoides sp., DHC) or chemical oxidants (hydrogen peroxide, sodium persulfate or permanganate) into the saturated thickness of the overburden aquifer at approximately 408 injection points within the area shown on Figure 4.3.3B-3. ZVI will promote abiotic dechlorination while the organic carbon will promote biotic

dechlorination; bioaugmentation with DHC culture will enhance the dechlorination rates and promote complete dechlorination of TCE to ethene. Chemical oxidants would directly destroy both sorbed and dissolved phase CVOCs and potentially PCBs. Initial treatability study testing discussed in Section 4 indicates that both CVOCs and PCBs may be susceptible to destruction through an oxidation approach. It is anticipated that this alternative would include two rounds of injections of the reagents noted above.

Construction of alternative OU3-1 is anticipated to be complete within 4 to 6 months. Based on the combined in situ treatment and hydraulic containment approach for OU3 groundwater, active operation of the hydraulic containment and treatment system would be required under Remedy Operation Status (ROS). The operating period has been assumed for 20 years, or until groundwater achieves Method 1 GW-3 standards.

This alternative would include long term groundwater monitoring for CVOCs and PCBs to assure that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately six monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the data needed for the Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually. In addition, this alternative would include treatment system influent and effluent monitoring to document that local POTW requirements, or NPDES permit requirements, were met. The alternative would also include monitoring of representative monitoring wells within the containment area to evaluate the effectiveness of the in situ treatment of soils.

This alternative would require annual monitoring and documentation of the asphalt pavement cap, and repairs as necessary. This alternative would also include the filing of an AUL to prevent contact with residual contamination within the vertical barrier. A Permanent Solution Statement would be filed upon completion of the soil and groundwater treatment.

The portion of the vertical barrier wall, extraction wells, and injection points installed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the river would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge treated groundwater to the river, or approval to discharge to the local POTW. This alternative would also require MassDEP approval for the addition of Remedial Additives within 50 feet of the river.

4.2.3.2 Alternative OU3-2

The major components of alternative OU3-2 are:

- Excavating soils in the top 15 feet bgs which have CVOC and PCB concentrations greater than their respective UCLs and stabilization/solidification as necessary;
- Transporting and disposing of CVOC and PCB-impacted soils at an approved off-site facility;
- Backfilling excavation areas with Site soil or imported clean backfill;
- Restoring the ground surface in kind (i.e., asphalt pavement);
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Performing ongoing monitoring, maintenance and documentation of the soil cap integrity and repairs (as necessary);
- Installing a vertical containment barrier around all four sides of impacted soils
- Providing hydraulic containment through a groundwater extraction and treatment system; and
- Providing long term operation, maintenance, and monitoring of the groundwater treatment system and long-term monitoring of groundwater.

This alternative includes excavation of approximately 26,600 cubic yards of CVOC and PCB-impacted soils to depths of between three feet and 15 feet bgs. The approximate horizontal limits and depths of this alternative's excavation areas are presented on Figure 4.3.3-2.

The assumption noted above regarding soil volume notwithstanding, during implementation excavated soils would be segregated based on concentrations. Soils with CVOC and PCB concentrations below the UCL would be placed as backfill in the excavation areas. Soils with CVOC and PCB concentrations above the UCL would be transported to and disposed of at an approved off-site disposal facility. For cost estimating purposes, it is assumed that all excavated soil will be transported to and disposed of at an approved off-site facility.

The asphalt cap would be restored at locations where excavation activities do not remove soils with PCB concentrations above 2 mg/kg per the TSCA Determination. The cap would be designed to provide separation and prevent exposure of Site workers and visitors to the remaining impacted soils. Following excavations along the shoreline, the shoreline containment barrier would provide resiliency against potential impacts from storms and flooding.

Alternative OU3-2 also consists of installing a very low permeability vertical barrier wall that would surround the overburden groundwater plume which exceeds Method 1 GW-3 standards, identical to that described in alternative OU3-1. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs and PCBs beyond the containment wall. To prevent the downward migration of impacted groundwater into the bedrock, hydraulic containment via groundwater pumping and treatment would be implemented to maintain an inward hydraulic gradient within the vertical barrier (both laterally and vertically). An added benefit of the pumping and treatment would be the removal of contaminant mass and a reduction in groundwater concentrations in the overburden groundwater. However, OU3-2 does not include treatment of in situ soil to reduce contaminant mass. Thus, it is anticipated that alternative OU3-2 would need to operate indefinitely and ultimately would not achieve a Permanent Solution.

The configuration, installation and monitoring of the vertical barrier component of the alternative would be the same as described above for alternative OU3-1. Hydraulic containment would be accomplished by the pumping of groundwater from five overburden extraction wells as shown in Figure 4.3.3-2, at a combined rate of approximately 65 gpm (based on the model results). The groundwater would be pumped from the five extraction wells to an on-site building for above ground treatment. Based on the Site contaminants in overburden groundwater (residual DNAPL, CVOCs and PCBs), the major components of the groundwater treatment system would include an oil water separator, equalization tanks, solids holding tank, bag filters, an air stripper, and liquid phase and vapor phase activated carbon. The treated groundwater would be discharged either to the local POTW or a storm drain flowing to the river under a NPDES permit.

Construction of alternative OU3-2 is estimated to be 3 to 5 months, with active operation of the hydraulic containment and treatment system for 30 years minimum, or until groundwater achieves Method 1 GW-3 standards (likely to be indefinitely).

This alternative would require annual monitoring and documentation of the asphalt pavement cap, and repairs as necessary. This alternative does not require operation of treatment technology or any other equipment. This alternative would also include long term groundwater monitoring for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately six monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the data needed for the Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually. In addition,

this alternative would include treatment system influent and effluent monitoring to document that local POTW requirements, or NPDES permit requirements, were met.

The portion of the vertical barrier wall and extraction wells constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the river would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge dewatering water to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.3.3 Alternative OU3-3

The major components of alternative OU3-3 are:

- Excavation and off-site disposal of soils with concentrations above UCLs in the top 15 feet bgs, soils within 25 feet of the shoreline down to the top of the peat layer, and soils within the northeast corner of the Site down to the top of bedrock; stabilization/solidification as necessary;
- Constructing a pavement cap over soils with PCB concentrations greater than 2 mg/kg;
- Backfilling of excavated areas with clean fill;
- Restoring asphalt cap in areas where needed;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Installation of a vertical containment barrier on the northern and southern sides of the impacted area;
- Installation of a PRB in overburden groundwater along the downgradient side of the property;
- Providing in situ treatment of soil hot spots;
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier; pavement cap integrity and repairs (as necessary); and
- Providing long-term monitoring of groundwater.

This alternative includes excavation of approximately 30,800 cubic yards of CVOC and PCB-impacted soils to depths of between three feet and 15 feet bgs. The approximate horizontal limits and depths of this alternative's excavation areas are presented on Figure 4.3.3-3.

The assumption noted above regarding soil volume notwithstanding, during implementation excavated soils would be segregated based on concentrations. Soils with CVOC and PCB concentrations below the UCL would be placed as backfill in the excavation areas. Soils with CVOC and PCB concentrations above the UCL would be transported to and disposed of at an approved off-site disposal facility. For cost estimating purposes, it is assumed that all excavated soil will be transported to and disposed of at an approved off-site facility.

The asphalt cap would be restored at locations where excavation activities do not remove soils with PCB concentrations above 2mg/kg per the TSCA Determination. The cap would be designed to provide separation and prevent exposure of Site workers and visitors to the remaining impacted soils. Following excavations along the shoreline, the shoreline will be restored in a manner that provides resiliency against potential impacts from storms and flooding.

Alternative OU3-3 also consists of installing a very low permeability vertical barrier wall on the northern and southern sides of the impacted area, with a PRB installed within the western portion of the 25 feet shoreline zone through the overburden deposits down to bedrock to treat overburden groundwater along the downgradient side of the property. The PRB likely includes some mixture of ZVI and/or liquid phase granular activated carbon (LPGAC). Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-3. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs

and/or PCBs beyond the containment wall. In situ treatment would be performed by injecting nutrients, organic carbon, microbes and zero valent iron, or chemical oxidants (as described in alternative OU3-1) within the area shown on Figure 4.3.3-3. Thus, it is anticipated that alternative OU3-3 would ultimately achieve a Permanent Solution.

Construction of alternative OU3-3 is estimated to be complete within 4 to 6 months. The PRB would function indefinitely and may require periodic replacement of media. Based upon current estimates, replacement of the reactive media is not anticipated, but for conservative cost estimating purposes replacement through full trenching, similar to the conceptual installation technique used for estimating purposes, has been included at year 10.

This alternative would require annual monitoring and documentation of the asphalt pavement cap, and repairs as necessary. This alternative does not require active operation of treatment technology or any other equipment. This alternative would also include long term groundwater monitoring (estimated at twenty years) for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately 12 monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, and at a minimum for the next two years on a quarterly basis to provide the data needed for the Permanent Solution Statement. This period would be considered Active Remedial Monitoring under ROS. Once conditions meet the requirements for a Permanent Solution, monitoring would be conducted in accordance with the requirements of the AUL.

The portion of the vertical barrier wall constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the river would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge dewatering water to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.3.4 Alternative OU3-4

The major components of alternative OU3-4 are:

- Excavation and off-site disposal of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the Site down to the top of bedrock and stabilization/ solidification as necessary;
- Backfilling of excavated areas with clean fill;
- Installation of an engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet;
- Restoring asphalt cap in areas where needed;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Installing a vertical containment barrier around all four sides of impacted soils
- Providing hydraulic containment through a groundwater extraction and treatment system;
- Providing in situ treatment of soil hot spots;
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier; pavement cap integrity and repairs (as necessary); and
- Providing long term operation, maintenance, and monitoring of the groundwater treatment system and long-term monitoring of groundwater.

This alternative includes excavation of approximately 6,900 cubic yards of CVOC and PCB-impacted soils to depths of between three feet and 15 feet bgs. This volume and the associated cost estimate assumes

all excavated soils are impacted with PCBs greater than 100 mg/kg. The approximate horizontal limits and depths of this alternative's excavation areas are presented on Figure 4.3.3-4.

The assumption noted above regarding soil volume notwithstanding, during implementation excavated soils would be segregated based on concentrations. Soils with CVOC and PCB concentrations below the UCL would be placed as backfill in the excavation areas. Soils with CVOC and PCB concentrations above the UCL would be transported to and disposed of at an approved off-site disposal facility. For cost estimating purposes, it is assumed that all excavated soil will be transported to and disposed of at an approved off-site facility.

An engineered barrier would be constructed where remaining soils contain PCB concentrations greater than 100 mg/kg, and the asphalt cap would be restored at locations where excavation activities do not remove soils with PCB concentrations above 2 mg/kg per the TSCA Determination. The cap would be designed to provide separation and prevent exposure of Site workers and visitors to the remaining impacted soils. Following excavations along the shoreline, the shoreline containment barrier would provide resiliency against potential impacts from storms and flooding.

Alternative OU3-4 also consists of installing a very low permeability vertical barrier wall that would surround the overburden groundwater plume which exceeds Method 1 GW-3 standards, identical to that described in alternative OU3-1. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs and PCBs beyond the containment wall. To prevent the downward migration of impacted groundwater into the bedrock, hydraulic containment via groundwater pumping and treatment would be implemented to maintain an inward hydraulic gradient within the vertical barrier (both laterally and vertically). An added benefit of the pumping and treatment would be the removal of contaminant mass and a reduction in groundwater concentrations in the overburden groundwater. Thus, it is anticipated that alternative OU3-4 would ultimately achieve a Permanent Solution.

The configuration, installation and monitoring of the vertical barrier component of the alternative would be the same as described above for alternative OU3-1. Hydraulic containment would be accomplished by the pumping of groundwater from five overburden extraction wells as shown in Figure 4.3.3-4, at a combined rate of approximately 65 gpm (based on the groundwater model). The groundwater would be pumped from the five extraction wells to an on-site building for above ground treatment. Based on the Site contaminants in overburden groundwater (residual DNAPL, CVOCs and PCBs), the major components of the groundwater treatment system would include an oil water separator, equalization tanks, solids holding tank, bag filters, an air stripper, and liquid phase and vapor phase activated carbon. The treated groundwater would be discharged either to the local POTW or a storm drain flowing to the river under a NPDES permit.

In situ treatment of soils acting as a source to groundwater would be conducted to shorten the timeframe needed to achieve a Permanent Solution. In situ treatment would be performed by injecting nutrients, organic carbon, microbes and zero valent iron, or chemical oxidants (as described above in alternative OU3-1) within the area shown on Figure 4.3.3-4.

Construction of alternative OU3-4 is estimated to be complete within 4 to 6 months. Based on the combined in situ treatment and hydraulic containment approach, active operation of the hydraulic containment and treatment system would be required under ROS. The operating period has been assumed for 20 years, or until groundwater achieves Method 1 GW-3 standards.

This alternative would require annual monitoring and documentation of the asphalt pavement cap, and repairs as necessary. This alternative would also include long term groundwater monitoring for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately six monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the data needed for the

Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually. In addition, this alternative would include treatment system influent and effluent monitoring to document that local POTW requirements, or NPDES permit requirements, were met.

The portion of the vertical barrier wall and extraction wells constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the river would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge treated groundwater to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.3.5 Alternative OU3-5

The major components of alternative OU3-5 are:

- Excavation and off-site disposal of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the Site down to the top of bedrock and stabilization/ solidification as necessary;
- Backfilling of excavated areas with clean fill;
- Installation of an engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet;
- Restoring asphalt cap in areas where needed;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Installing a vertical containment barrier around all four sides of impacted soils
- Providing hydraulic containment through a groundwater extraction and treatment system
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier; pavement cap integrity and repairs (as necessary); and
- Providing long term operation, maintenance, and monitoring of the groundwater treatment system and long-term monitoring of groundwater.

This alternative includes excavation of approximately 6,900 cubic yards of CVOC and PCB-impacted soils to depths of between three feet and 15 feet bgs. This volume and the associated cost estimate assumes all excavated soils are impacted with PCBs greater than 100 mg/kg. The approximate horizontal limits and depths of this alternative's excavation areas are presented on Figure 4.3.3-5.

The assumption noted above regarding soil volume notwithstanding, during implementation excavated soils would be segregated based on concentrations. Soils with CVOC and PCB concentrations below the UCL would be placed as backfill in the excavation areas. Soils with CVOC and PCB concentrations above the UCL would be transported to and disposed of at an approved off-site disposal facility. For cost estimating purposes, it is assumed that all excavated soil will be transported to and disposed of at an approved off-site facility.

An engineered barrier would be constructed where remaining soils contain PCB concentrations greater than 100 mg/kg, and the asphalt cap would be restored at locations where excavation activities do not remove soils with PCB concentrations above 2 mg/kg per the TSCA Determination. The cap would be designed to provide separation and prevent exposure of Site workers and visitors to the remaining impacted soils. Following excavations along the shoreline, the shoreline containment barrier would provide resiliency against potential impacts from storms and flooding.

Alternative OU3-5 also consists of installing a very low permeability vertical barrier wall that would surround the overburden groundwater plume which exceeds Method 1 GW-3 standards, identical to that described in alternative OU3-1. The purpose of the vertical barrier would be to prevent the lateral

migration of CVOCs and PCBs beyond the containment wall. To prevent the downward migration of impacted groundwater into the bedrock, hydraulic containment via groundwater pumping and treatment would be implemented to maintain an inward hydraulic gradient within the vertical barrier (both laterally and vertically). An added benefit of the pumping and treatment would be the gradual removal of contaminant mass and a reduction in groundwater concentrations in the overburden groundwater. However, OU3-5 does not include treatment of in situ soil to reduce contaminant mass. Thus, it is anticipated that alternative OU3-5 would need to operate indefinitely and ultimately would not achieve a Permanent Solution.

The configuration, installation and monitoring of the vertical barrier component of the alternative would be the same as described above for alternative OU3-1. Hydraulic containment would be accomplished by the pumping of groundwater from five overburden extraction wells as shown in Figure 4.3.3-5, at a combined rate of approximately 65 gpm (based on the model results). The groundwater would be pumped from the five extraction wells to an on-site building for above ground treatment. Based on the Site contaminants in overburden groundwater (residual NAPL, CVOCs and PCBs), the major components of the groundwater treatment system would include an oil water separator, equalization tanks, solids holding tank, bag filters, an air stripper, and liquid phase and vapor phase activated carbon. The treated groundwater would be discharged either to the local POTW or a storm drain flowing to the river under a NPDES permit.

Construction of alternative OU3-5 is estimated to be 3 to 5 months, with active operation of the hydraulic containment and treatment system would extend for 30 years minimum, or until groundwater achieves GW-3 standards (likely to be indefinitely).

This alternative would require annual monitoring and documentation of the asphalt pavement cap, and repairs as necessary. This alternative would also include long term groundwater monitoring for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately six monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the data needed for the Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually. In addition, this alternative would include treatment system influent and effluent monitoring to document that local POTW requirements, or NPDES permit requirements, were met.

The portion of the vertical barrier wall and extraction wells constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge treated groundwater, and water extracted and/or generated from construction dewatering, to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.3.6 Alternative OU3-6

The major components of alternative OU3-6 are:

- Excavation and off-site disposal of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the Site down to the top of bedrock and stabilization/ solidification as necessary;
- Backfilling of excavated areas with clean fill;
- Installation of an engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet;
- Restoring asphalt cap in areas where needed;

- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Installing a PRB along the downgradient side of the property, with a vertical containment barrier on the northern and southern sides of the impacted area;
- Conducting in situ treatment of hot spot soils;
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier; pavement cap integrity and repairs (as necessary); and
- Providing long-term monitoring of groundwater.

This alternative includes excavation of approximately 7,600 cubic yards of CVOC and PCB-impacted soils to depths of between three feet and 15 feet bgs. This volume and the associated cost estimate assumes all excavated soils are impacted with PCBs greater than 100 mg/kg. The approximate horizontal limits and depths of this alternative's excavation areas are presented on Figure 4.3.3-6.

The assumption noted above regarding soil volume notwithstanding, during implementation excavated soils would be segregated based on concentrations. Soils with CVOC and PCB concentrations below the UCL would be placed as backfill in the excavation areas. Soils with CVOC and PCB concentrations above the UCL would be transported to and disposed of at an approved off-site disposal facility. For cost estimating purposes, it is assumed that all excavated soil will be transported to and disposed of at an approved off-site facility.

An engineered barrier would be constructed where remaining soils contain PCB concentrations greater than 100 mg/kg, and the asphalt cap would be restored where residual PCB concentrations at any depth exceed 2 mg/kg per the TSCA Determination. The cap would be designed to provide separation and prevent exposure of Site workers and visitors to the remaining impacted soils. Following excavations along the shoreline, the shoreline will be restored in a manner that provides resiliency against potential impacts from storms and flooding.

Alternative OU3-6 also consists of installing a very low permeability vertical barrier wall on the northern and southern sides of the impacted area, with a PRB installed within the western portion of the 25 feet shoreline zone through the overburden deposits down to bedrock to treat overburden groundwater along the downgradient side of the property. The PRB likely includes some mixture of ZVI and/or LPGAC. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-6. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs and PCBs beyond the containment wall. In situ treatment would be performed by injecting nutrients, organic carbon, microbes and zero valent iron, or chemical oxidants (as described above in alternative OU3-1) within the area shown on Figure 4.3.3-6. Thus, it is anticipated that alternative OU3-6 would ultimately achieve a Permanent Solution.

Construction of alternative OU3-6 is estimated to be complete within 4 to 6 months. The PRB would function indefinitely and may require periodic replacement of media. Based upon current estimates, replacement of the reactive media is not anticipated, but to provide a conservative cost estimate, replacement through full trenching, similar to the conceptual installation technique, used for estimating purposes, has been included at year 10.

This alternative would require annual monitoring and documentation of the asphalt pavement cap, and repairs as necessary. This alternative does not require active operation of treatment technology or any other equipment. This alternative would also include long term groundwater monitoring (estimated at twenty years) for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately twelve monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the

data needed for the Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually.

The portion of the vertical barrier wall constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge groundwater to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.3.7 Alternative OU3-7

The major components of alternative OU3-7 are:

- Excavation and on-site consolidation of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the Site down to the top of bedrock and stabilization/ solidification as necessary;
- Backfilling excavated areas with clean fill;
- Installation of engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet;
- Restoring asphalt cap in areas where needed;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Installing a vertical containment barrier around all four sides of impacted soils
- Providing hydraulic containment through a groundwater extraction and treatment system;
- Providing in situ treatment of hot spot soils;
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier; pavement cap integrity and repairs (as necessary); and
- Providing long-term monitoring of groundwater.

This alternative includes excavation of approximately 6,900 cubic yards of CVOC and PCB-impacted soils to the top of the peat layer (average depths of nine feet bgs) within 25 feet of the shoreline, and to the bedrock surface (average depth of 30 feet bgs) in the northeast corner of OU3. This volume and the associated cost estimate assumes all excavated soils are impacted with PCBs greater than 100 mg/kg. The approximate horizontal limits and depths of this alternative's excavation areas are presented on Figure 4.3.3-7. A consolidation cell would be constructed outside of the 100-foot waterfront buffer zone, and in a manner that provides protection against the potential effects of storms and flooding. The consolidation cell will be placed generally within an area of the Site where remaining soils contain PCBs at or great than 100 mg/kg.

An engineered barrier would be constructed where remaining soils contain PCB concentrations greater than 100 mg/kg (including the consolidation cell), and the asphalt cap would be restored where residual PCB concentrations at any depth exceed 2 mg/kg per the TSCA Determination. The cap would be designed to provide separation and prevent exposure of Site workers and visitors to the remaining impacted soils. Following excavations along the shoreline, the shoreline containment barrier would provide resiliency against potential impacts from storms and flooding.

Alternative OU3-7 also consists of installing a very low permeability vertical barrier wall that would surround the overburden groundwater plume which exceeds Method 1 GW-3 standards, identical to that described in alternative OU3-1. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs and PCBs beyond the containment wall. To prevent the downward migration of impacted groundwater into the bedrock, hydraulic containment via groundwater pumping and treatment would be implemented to maintain an inward hydraulic gradient within the vertical barrier (both laterally

and vertically). An added benefit of the pumping and treatment would be the removal of contaminant mass and a reduction in groundwater concentrations in the overburden groundwater. Thus, it is anticipated that alternative OU3-7 would ultimately achieve a Permanent Solution.

The configuration, installation and monitoring of the vertical barrier component of the alternative would be the same as described above for alternative OU3-1. Hydraulic containment would be accomplished by the pumping of groundwater from five overburden extraction wells as shown in Figure 4.3.3-7, at a combined rate of approximately 65 gpm. The groundwater would be pumped from the five extraction wells to an on-site building for above ground treatment. Based on the Site contaminants in overburden groundwater (residual DNAPL, CVOCs and PCBs), the major components of the groundwater treatment system would include an oil water separator, equalization tanks, solids holding tank, bag filters, an air stripper, and liquid phase and vapor phase activated carbon. The treated groundwater would be discharged either to the local POTW or a storm drain flowing to the river under a NPDES permit.

In situ treatment of soils acting as a source to groundwater would be conducted to shorten the timeframe needed to achieve a Permanent Solution. In situ treatment would be performed by injecting nutrients, organic carbon, microbes and zero valent iron, or chemical oxidants (as described above in alternative OU3-1) within the area shown on Figure 4.3.3-7

Construction of alternative OU3-7 is estimated to be complete in 4 to 6 months. Based on the combined in situ treatment and hydraulic containment approach, active operation of the hydraulic containment and treatment system would be required under ROS. The operating period has been assumed for 20 years, or until groundwater achieves Method 1 GW-3 standards.

This alternative would require annual monitoring and documentation of the asphalt pavement cap, and repairs as necessary. This alternative would also include long term groundwater monitoring for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately six monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the data needed for the Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually. In addition, this alternative would include treatment system influent and effluent monitoring to document that local POTW requirements, or NPDES permit requirements, were met.

The portion of the vertical barrier wall and extraction wells constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the river would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge treated groundwater to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.3.8 Alternative OU3-8

The major components of alternative OU3-8 are:

- Excavation and on-site consolidation of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the Site down to the top of bedrock and stabilization/ solidification as necessary;
- Backfilling excavated areas with clean fill;
- Installation of engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet;
- Restoring asphalt cap in areas where needed;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;

- Installing a vertical containment barrier around all four sides of impacted soils
- Providing hydraulic containment through a groundwater extraction and treatment system
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier; pavement cap integrity and repairs (as necessary); and
- Providing long-term monitoring of groundwater.

This alternative includes excavation of approximately 6,900 cubic yards of PCB-impacted soils to the top of the peat layer (average depths of nine feet bgs) within 25 feet of the shoreline, and to the bedrock surface (average depth of 30 feet bgs) in the northeast corner of OU3. This volume and the associated cost estimate assumes all excavated soils are impacted with PCBs greater than 100 mg/kg. The approximate horizontal limits and depths of this alternative's excavation areas are presented on Figure 4.3.3-8. A consolidation cell would be constructed outside of the 100-foot waterfront buffer zone, and in a manner that provides protection against the potential effects of storms and flooding. The consolidation cell will be placed generally within an area of the Site where remaining soils contain PCBs at or great than 100 mg/kg.

An engineered barrier would be constructed where remaining soils contain PCB concentrations greater than 100 mg/kg (including the consolidation cell), and the asphalt cap would be restored where residual PCB concentrations at any depth exceed 2 mg/kg per the TSCA Determination. The cap would be designed to provide separation and prevent exposure of Site workers and visitors to the remaining impacted soils. Following excavations along the shoreline, the shoreline containment barrier would provide resiliency against potential impacts from storms and flooding.

Alternative OU3-8 also consists of installing a very low permeability vertical barrier wall that would surround the overburden groundwater plume which exceeds Method 1 GW-3 standards, identical to that described in alternative OU3-1. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs and PCBs beyond the containment wall. To prevent the downward migration of impacted groundwater into the bedrock, hydraulic containment via groundwater pumping and treatment would be implemented to maintain an inward hydraulic gradient within the vertical barrier (both laterally and vertically). An added benefit of the pumping and treatment would be the gradual removal of contaminant mass and a reduction in groundwater concentrations in the overburden groundwater. However, alternative OU3-8 does not include treatment of in situ soil to reduce contaminant mass. Thus, it is anticipated that alternative OU3-8 would need to operate indefinitely and ultimately would not achieve a Permanent Solution.

The configuration, installation and monitoring of the vertical barrier component of the alternative would be the same as described above for alternative OU3-1. Hydraulic containment would be accomplished by the pumping of groundwater from five overburden extraction wells as shown in Figure 4.3.3-8, at a combined rate of approximately 65 gallons per minute (gpm). The groundwater would be pumped from the five extraction wells to an on-site building for above ground treatment. Based on the Site contaminants in overburden groundwater (residual NAPL, CVOCs and PCBs), the major components of the groundwater treatment system would include an oil water separator, equalization tanks, solids holding tank, bag filters, an air stripper, and liquid phase and vapor phase activated carbon. The treated groundwater would be discharged either to the local POTW or a storm drain flowing to the river under a NPDES permit.

Construction of alternative OU3-8 is estimated to be complete within 3 to 5 months. Active operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years minimum), or until groundwater achieves Method 1 GW-3 standards and the barrier walls can be removed.

This alternative would require annual monitoring and documentation of the asphalt pavement cap, and repairs as necessary. This alternative would also include long term groundwater monitoring for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately six monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the data needed for the Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually. In addition, this alternative would include treatment system influent and effluent monitoring to document that local POTW requirements, or NPDES permit requirements, were met.

The portion of the vertical barrier wall constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge groundwater to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.3.9 Alternative OU3-9

The major components of alternative OU3-9 are:

- Excavation and on-site consolidation of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the Site down to the top of bedrock and stabilization/ solidification as necessary;
- Backfilling excavated areas with clean fill;
- Installation of engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet;
- Restoring asphalt cap in areas where needed;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Installing a PRB along the downgradient side of the property, with a vertical containment barrier on the northern and southern sides of the impacted area;
- Conducting in situ treatment of hot spot soils;
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier; pavement cap integrity and repairs (as necessary); and
- Providing long-term monitoring of groundwater.

This alternative includes excavation of approximately 7,600 cubic yards of CVOC and PCB-impacted soils to the top of the peat layer (average depths of nine feet bgs) within 25 feet of the shoreline, and to the bedrock surface (average depth of 30 feet bgs) in the northeast corner of OU3. This volume and the associated cost estimate assumes all excavated soils are impacted with PCBs greater than 100 mg/kg. The approximate horizontal limits and depths of this alternative's excavation areas are presented on Figure 4.3.3-9. A consolidation cell would be constructed outside of the 100-foot waterfront buffer zone, and in a manner that provides protection against the potential effects of storms and flooding. The consolidation cell will be placed generally within an area of the Site where remaining soils contain PCBs at or great than 100 mg/kg. Excavation of soils, construction of the consolidation cell, backfilling and capping (engineered barrier and asphalt) are estimated to take approximately four to five months.

An engineered barrier would be constructed where remaining soils contain PCB concentrations greater than 100 mg/kg (including the consolidation cell), and the asphalt cap would be restored where residual PCB concentrations at any depth exceed 2 mg/kg per the TSCA Determination. The cap would be designed to provide separation and prevent exposure of Site workers and visitors to the remaining

impacted soils. Following excavations along the shoreline, the shoreline will be restored in a manner that provides resiliency against potential impacts from storms and flooding.

Alternative OU3-9 also consists of installing a very low permeability vertical barrier wall on the northern and southern sides of the impacted area, with a PRB installed within the western portion of the 25 feet for shoreline zone through the overburden deposits down to bedrock to treat overburden groundwater along the downgradient side of the property. The PRB likely includes some mixture of ZVI and/or LPGAC. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-9. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs and PCBs beyond the containment wall. In situ treatment would be performed by injecting nutrients, organic carbon, microbes and zero valent iron, or chemical oxidants (as described above in alternative OU3-1) within the area shown on Figure 4.3.3-9. Thus, it is anticipated that alternative OU3-9 would ultimately achieve a Permanent Solution.

Construction of alternative OU3-9 is anticipated to be complete in 4 to 6 months. The PRB would function indefinitely and may require periodic replacement of media. Based upon current estimates, replacement of the reactive media is not anticipated, but to provide a conservative estimate replacement through full trenching, similar to the conceptual installation technique used for estimating purposes, has been included at year 10.

This alternative would require annual monitoring and documentation of the asphalt pavement cap, and repairs as necessary. This alternative does not require active operation of treatment technology or any other equipment. This alternative would also include long term groundwater monitoring (estimated at twenty years) for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately twelve monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the data needed for the Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually.

The portion of the vertical barrier wall constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the river would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge groundwater to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.3.10 Alternative OU3-10

The major components of alternative OU3-10 are:

- Installing a demarcation layer;
- Constructing an engineered barrier over soils with PCB concentrations greater than 100 mg/kg;
- Constructing a pavement cap over soils with PCB concentrations greater than 2 mg/kg;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Installing a vertical containment barrier around all four sides of impacted soils
- Providing hydraulic containment through a groundwater extraction and treatment system;
- Providing in situ treatment of hot spot soils;
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier; pavement cap integrity and repairs (as necessary); and
- Providing long-term monitoring of groundwater.

This alternative includes containment of PCB-impacted soils by either an engineered barrier or a pavement cap. The existing asphalt cap is suitable for soil with PCB concentrations below the UCL. An engineered barrier would be installed in areas where PCB concentrations are above the UCL. The approximate horizontal limits of the engineered barrier are presented on Figure 4.3.3-10. Soils excavated for the installation of the engineered barrier and vertical barrier wall would be consolidated in other areas of the subsurface and covered with an appropriate barrier. The anticipated areas to be covered with the engineered barrier are also shown on Figure 4.3.3-10.

Alternative OU3-10 also consists of installing a very low permeability vertical barrier wall that would surround the overburden groundwater plume which exceeds Method 1 GW-3 standards, identical to that described in alternative OU3-1. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs and PCBs beyond the containment wall. To prevent the downward migration of impacted groundwater into the bedrock, hydraulic containment via groundwater pumping and treatment would be implemented to maintain an inward hydraulic gradient within the vertical barrier (both laterally and vertically). An added benefit of the pumping and treatment would be the removal of contaminant mass and a reduction in groundwater concentrations in the overburden groundwater. Thus, it is anticipated that alternative OU3-10 would ultimately achieve a Permanent Solution.

The configuration, installation and monitoring of the vertical barrier component of the alternative would be the same as described above for alternative OU3-1. Hydraulic containment would be accomplished by the pumping of groundwater from five overburden extraction wells as shown in Figure 4.3.3-10, at a combined rate of approximately 65 gpm. The groundwater would be pumped from the five extraction wells to an on-site building for above ground treatment. Based on the Site contaminants in overburden groundwater (residual DNAPL, CVOCs and PCBs), the major components of the groundwater treatment system would include an oil water separator, equalization tanks, solids holding tank, bag filters, an air stripper, and liquid phase and vapor phase activated carbon. The treated groundwater would be discharged either to the local POTW or a storm drain flowing to the river under a NPDES permit. The shoreline containment barrier would provide resiliency against potential impacts from storms and flooding.

In situ treatment of soils acting as a source to groundwater would be conducted to shorten the timeframe needed to achieve a Permanent Solution. In situ treatment would be performed by injecting nutrients, organic carbon, microbes and zero valent iron, or chemical oxidants (as described above in alternative OU3-1) within the area shown on Figure 4.3.3-10.

Construction of alternative OU3-10 is estimated to be complete within 2 to 3 months. Based on the combined in situ treatment and hydraulic containment approach, active operation of the hydraulic containment and treatment system would be required under ROS. The operating period has been assumed for 20 years, or until groundwater achieves Method 1 GW-3 standards.

This alternative would require annual monitoring and documentation of the asphalt pavement cap and engineered barrier, and repairs as necessary. A financial assurance mechanism will be required for engineered barrier maintenance. This alternative would also include long term groundwater monitoring for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately six monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the data needed for the Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually. In addition, this alternative would include treatment system influent and effluent monitoring to document that local POTW requirements, or NPDES permit requirements, were met.

The portion of the vertical barrier wall and extraction wells constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the river would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge treated groundwater to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.3.11 Alternative OU3-11

The major components of alternative OU3-11 are:

- Installing a demarcation layer;
- Constructing an engineered barrier over soils with PCB concentrations greater than 100 mg/kg;
- Constructing a pavement cap over soils with PCB concentrations greater than 1 mg/kg;
- Placing an AUL on the impacted portions of the property restricting foreseeable future use;
- Installing a vertical containment barrier around all four sides of impacted soils
- Providing hydraulic containment through a groundwater extraction and treatment system
- Performing ongoing monitoring, maintenance and documentation of the engineered barrier; pavement cap integrity and repairs (as necessary); and
- Providing long-term monitoring of groundwater.

This alternative includes containment of PCB-impacted soils by either an engineered barrier or a pavement cap. The existing asphalt cap is suitable for soil with PCB concentrations below the UCL. An engineered barrier would be installed in areas where PCB concentrations are above the UCL. The approximate horizontal limits of the engineered barrier are presented on Figure 4.3.3-11. Soils excavated for the installation of the engineered barrier and vertical barrier wall would be consolidated in other areas of the subsurface under the Site and covered with an appropriate barrier. The anticipated areas to be covered with the engineered barrier are also shown on Figure 4.3.3-11.

alternative OU3-11 also consists of installing a very low permeability vertical barrier wall that would surround the overburden groundwater plume which exceeds Method 1 GW-3 standards, identical to that described in alternative OU3-1. The purpose of the vertical barrier would be to prevent the lateral migration of CVOCs and PCBs beyond the containment wall. To prevent the downward migration of impacted groundwater into the bedrock, hydraulic containment via groundwater pumping and treatment would be implemented to maintain an inward hydraulic gradient within the vertical barrier (both laterally and vertically). An added benefit of the pumping and treatment would be the gradual removal of contaminant mass and a reduction in groundwater concentrations in the overburden groundwater. However, alternative OU3-11 does not include treatment of in situ soil to reduce contaminant mass. Thus, it is anticipated that alternative OU3-11 would need to operate indefinitely and ultimately would not achieve a Permanent Solution.

The configuration, installation and monitoring of the vertical barrier component of the alternative would be the same as described above for alternative OU3-1. Hydraulic containment would be accomplished by the pumping of groundwater from five overburden extraction wells as shown in Figure 4.3.3-10, at a combined rate of approximately 65 gpm. The groundwater would be pumped from the five extraction wells to an on-site building for above ground treatment. Based on the Site contaminants in overburden groundwater (residual DNAPL, CVOCs and PCBs), the major components of the groundwater treatment system would include an oil water separator, equalization tanks, solids holding tank, bag filters, an air stripper, and liquid phase and vapor phase activated carbon. The treated groundwater would be discharged either to the local POTW or a storm drain flowing to the river under a NPDES permit. The

shoreline containment barrier would provide resiliency against potential impacts from storms and flooding.

Construction of alternative OU3-11 is estimated to be complete in 2 to 3 months. Active operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years for costing.

This alternative would require annual monitoring and documentation of the asphalt pavement cap and engineered barrier, and repairs as necessary. A financial assurance mechanism will be required for engineered barrier maintenance. This alternative would also include long term groundwater monitoring for CVOCs and PCBs to verify that impacted groundwater does not flow off-property to adjacent properties or the river. The monitoring network is assumed to consist of approximately six monitoring wells. It is anticipated that the first year of monitoring would be conducted on a quarterly basis to confirm the effectiveness of the barrier, the last two years on a quarterly basis to provide the data needed for the Permanent Solution Statement, and that during intervening years the samples would be collected semi-annually. In addition, this alternative would include treatment system influent and effluent monitoring to document that local POTW requirements, or NPDES permit requirements, were met.

The portion of the vertical barrier wall and extraction wells constructed in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. In addition, work conducted within 25 feet of the river would need to be designed to support the City of New Bedford's planned Riverwalk. This alternative would also require a NPDES permit to discharge treated groundwater, and water extracted and/or generated from construction dewatering, to the river, or approval to discharge to the local POTW. A Permanent Solution Statement would be filed upon completion of the groundwater treatment.

4.2.4 OU4

The following two remedial action alternatives were formulated and retained for detailed evaluation for OU4 (bedrock groundwater):

- Alternative 1 – In situ Chemical Oxidation of Hot Spots and Monitored Natural Attenuation; and
- Alternative 2 – In situ Thermal Treatment of Deep Bedrock Hot Spots, In situ Chemical Oxidation of Shallow Bedrock Hot Spots, and Monitored Natural Attenuation.

One objective of the selected remedial action alternative for OU4 is mitigation, to the extent practicable, of contaminant migration from the Site to the river, part of the New Bedford Harbor (NBH) Superfund Site. Because groundwater is a secondary release mechanism to the river (the primary mechanisms having been direct discharge via on-site trenches and direct dumping from the shoreline), the river currently contains DNAPL and significant levels of soil and sediment contamination which are themselves a continuing source. Tidal fluctuations result in the river impacts serving as a source of contaminants back into the Aerovox Site. Thus, while the remedial action will be selected and designed to mitigate migration from west to east, demonstrating full achievement of this objective will be complicated by the reverse flow until EPA also completes source removal in the river as part of the NBH Superfund Site remediation. However, excavation of the NBH sediment by EPA could occur any time after construction of the selected remedy.

The two alternatives for OU4 are summarized in Table 4.3.4. A description of each potential remedial action alternative is presented below. While the following evaluation is targeted to the one bedrock location with measured DNAPL (MW-15B) and the identified deep bedrock locations with TCE above UCL levels, it is understood that additional deep bedrock characterization will be required as part of Phase IV remedial design to better define the limits of the selected OU4 remedial action.

4.2.4.1 Alternative OU4-1

Alternative OU4-1 consists of in situ chemical oxidation (ISCO) of hot spot groundwater impacts, including the presence of DNAPL at MW-15B, that have been identified to date in bedrock groundwater. Specifically, these hot spots include TCE and PCBs in the shallow bedrock groundwater above UCL levels, and in measurable DNAPL (30 to 46 feet bgs) in the vicinity of MW-15B; TCE above UCL levels in the deep bedrock (53 to 198 feet bgs) in the vicinity of MW-34B, and TCE above UCL levels in the shallow to deep bedrock (48 to 89 feet bgs) in the vicinity of MW-26B (Figure 4.3.4-1). These locations are presented on Figure 4.3.4-1.

The goal of the ISCO treatment in these areas is to reduce groundwater concentrations in the bedrock groundwater to below UCLs (less than 50,000 ug/l for TCE and less than 100 ug/l for PCBs) to eliminate Significant Risk of harm to public welfare and the environment. Following ISCO treatment, Monitored Natural Attenuation (MNA) would be applied to the bedrock plume. The goal of MNA would be to demonstrate a stable or shrinking groundwater plume.

ISCO is a remedial process where strong chemical agents (oxidants) are introduced into the subsurface to react with and chemically break down the contaminants of concern. The oxidizing agents most commonly used for the treatment of hazardous contaminants in saturated groundwater are hydrogen peroxide, catalyzed hydrogen peroxide, potassium permanganate, sodium permanganate, sodium persulfate, and ozone.

The ISCO reagent tentatively selected, based on the initial bench scale studies, for the areas around MW-26B and MW-34B is sodium permanganate, while for the area around MW-15B, the oxidant is hydrogen peroxide and/or sodium persulfate. Note that groundwater near MW-26B and MW-34B is impacted primarily with TCE, and sodium permanganate oxidant is well suited to destroy TCE. However, at MW-15B the groundwater is impacted with TCE and PCBs and peroxide/persulfate-based oxidant chemistry is a better choice to destroy these COCs. The persulfate injections in the vicinity of MW-15B will be via drilled injection points and not through recirculation as the treatment depth is relatively shallow (30 to 46 feet bgs). For the remaining two hot spots (vicinity of MW-26B and MW-34B), the conceptual approach will be to recirculate the permanganate solution throughout the target treatment zone. This will be accomplished by injecting the permanganate solution into two injections wells located on the upgradient side of the treatment area, and extracting groundwater/oxidant from one downgradient extraction well for reinjection back into the injection wells. Each of the injection and extraction wells will be screened across the entire depth of the proposed treatment zone for each target area. Permanganate is the anticipated oxidant that will be used for injection because it is a more persistent oxidant that would be more effective in a recirculation approach. It is anticipated that two rounds of ISCO injections would be conducted at each of the proposed treatment areas with an injection frequency of approximately once a year.

The portion of the bedrock remedy implemented in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. This alternative would also require MassDEP approval for the addition of Remedial Additives within 50 feet of the river.

Construction of alternative OU4-1 is estimated to be complete within 3 to 5 months, including well installation and initial injections. This alternative would include annual groundwater monitoring from approximately 12 bedrock monitoring wells for CVOCs and PCBs to demonstrate that groundwater concentrations were reduced to below UCLs. A groundwater monitoring program for MNA would also be implemented following treatment to monitor the effectiveness of treatment and to demonstrate a stable or shrinking bedrock groundwater plume across the Site.

Preliminary assessment of MNA parameters during the Phase II CSA indicate natural attenuation processes are taking place. As per the MNA technical guidance documents published by several

agencies, a minimum of eight groundwater sampling events will be performed to determine if MNA is occurring; of the eight, four consecutive quarterly groundwater sampling events will be performed to evaluate the seasonal variations, if any. Sampling will be performed at quarterly intervals for the COCs and geochemical parameters, and semi-annually or annually for the microbial parameters and Compound Specific Isotope Analysis (CSIA), if necessary. The analytical data from these sampling parameters will be evaluated for the occurrence of MNA at the Site based on the following three lines of evidence: i) Historical groundwater contaminant data that demonstrate a clear and meaningful stable or decreasing trend; ii) Geochemical data that demonstrate indirectly the type(s) of natural attenuation processes active at the Site; and iii) Microbiological evidence including CSIA that supports biodegradation. A combination of the three lines of evidence will provide insight regarding whether MNA is occurring at the Site.

It is anticipated that the MNA groundwater monitoring program would provide the data needed for the Permanent Solution Statement. Th second annual injection and MNA monitoring period would be considered Active Remedial Monitoring under ROS. The Permanent Solution Statement that would be filed for the Site would include a demonstration that groundwater concentrations were reduced below UCLs and that the bedrock groundwater plume was stable or shrinking. Once conditions meet the requirements for a Permanent Solution, subsequent bedrock groundwater monitoring would be conducted in accordance with the requirements of the AUL.

Refer to Figure 4.3.4-1 for a depiction of the elements associated with this alternative.

4.2.4.2 Alternative OU4-2

Alternative OU4-2 consists of in situ thermal treatment (IST) of the deep bedrock at several hot spots that have been identified in the deeper bedrock. These hot spots include TCE in the deep bedrock (53 to 198 feet bgs) in the vicinity of MW-34B, and TCE in the shallow to deep bedrock (48 to 89 feet bgs) in the vicinity of MW-26B. Because the bedrock groundwater is tidally influenced, it would be extremely difficult to achieve the very high temperatures that are required to thermally break down the PCBs in the shallow bedrock hot spot at MW-15B. Therefore, the hot spot at MW-15B (which contains both TCE and PCBs) will be treated with ISCO (Figure 4.3.4-2). The goal of the thermal treatment in the deeper bedrock and ISCO treatment in the shallow bedrock is to reduce groundwater concentrations to below UCLs (less than 50,000 ug/l for TCE and less than 100 ug/l for PCBs), to reduce to the extent feasible the presence of DNAPL (at MW-15B) as a source for groundwater impacts. These locations are presented on Figure 4.3.4-2.

IST is a process that supplies heat to the fractured bedrock/groundwater through a series of heater borings and steam injection wells drilled to the target depth at each treatment area. As the CVOC-impacted areas are heated, the contaminants will be destroyed or volatilized. Vapors and groundwater will be captured through a series of multiphase extraction wells and pumped to an above ground treatment system. The treatment system will include liquid phase and vapor phase carbon. The treated groundwater will be discharged either to the POTW or a storm drain flowing to the river under a NPDES permit. For the purposes of this evaluation, it was assumed that operation, maintenance, and monitoring of the groundwater treatment system will continue for the duration of the thermal treatment which is anticipated to be approximately two to three years. ISCO treatment for shallow bedrock is anticipated to be approximately three to four years.

The portion of the bedrock remedy implemented in the Riverfront Area (within 25 feet of the river) and buffer zone (within 100 feet of the river) may require permitting under the Wetlands Protection Act and local ordinances. This alternative would also require a NPDES permit to discharge to treated groundwater to the river, or approval to discharge to the local POTW. MassDEP approval for the addition of Remedial Additives within 50 feet of the river would also be required.

This alternative would include annual groundwater monitoring from approximately twelve bedrock monitoring wells for CVOCs and PCBs to demonstrate that groundwater concentrations were reduced to below UCLs. A groundwater monitoring program for MNA would also be implemented following treatment to monitor the effectiveness of the treatment and to demonstrate a stable or shrinking bedrock groundwater plume across the Site. The MNA program would be the same as that described for alternative OU4-1.

The Permanent Solution Statement that would be filed for the Site would include a demonstration that groundwater concentrations were reduced below UCLs and that the bedrock groundwater plume was stable or shrinking.

Refer to Figure 4.3.4-2 for a depiction of the elements associated with this alternative.

4.3 Common Elements of the Remedial Alternatives

Common elements exist between the remedial action alternatives selected for each of the OUs. For OU1, the element common to four of the five alternatives is excavation of soils with consolidation or off-site disposal to reduce direct contact exposure to soils. While each of these four alternatives requires excavation of impacted soils, they vary in the soil PCB concentrations left in place and the overall quantity of excavated soils. Three of the five remedial action alternatives (OU1-1, OU1-2 and OU1-4 would result in placement of an AUL to identify allowable and prohibited uses, as well as maintenance requirements.

The three remedial action alternatives for OU2 each include a long-term monitoring or maintenance requirement and placement of an AUL to restrict foreseeable future building uses to those that would result in no greater exposure than under current use. The AULs for two of the three remedial action alternatives (OU2-2 and OU2-3) would also require that the AUL provide for long term maintenance of the implemented vapor intrusion mitigation system.

Each of the remedial alternatives for OU3 include capping Site soils that contain PCB concentrations greater than 2 mg/kg (> 2mg/kg) in accordance with the TSCA Determination requirements, cleaning and lining or replacement (as needed) of the existing storm sewer infrastructure, and require that the draft AUL included in the Cooperation and Settlement Agreement be finalized to restrict current and foreseeable future uses of the property and provide for long-term operation and maintenance of the cap. The remedial alternatives for OU3 overburden groundwater include a partial or full vertical barrier wall down to bedrock and a long-term groundwater monitoring component to evaluate the effectiveness of the selected containment. Seven of the eleven remedial action alternative options incorporate source area in situ groundwater treatment as a second technology in conjunction with the vertical barrier wall. Eight OU3 alternatives include hydraulic containment with ex situ treatment, while the other three include a PRB along the downgradient (east) end of the impacted area 25 feet west of the shoreline.

The two remedial action alternatives proposed for evaluation for Site-wide bedrock groundwater both contain treatment of source area hot spots and monitored natural attenuation.

Four of the OU1 alternatives (OU1-1, OU1-2, OU1-3A and OU1-3B) and all eleven OU3 alternatives involve shoreline construction and/or excavation. These alternatives all would require as part of implementation the design and execution of a construction control and monitoring program to address the potential occurrence of sheens within the river. This program cost would be part of the remedial design, and the cost of this program is not a differentiator between proposed alternatives.

4.3.1 Mass Flux for Remedial Alternatives

Each of the remedial alternatives retained for detailed analysis will have an overall effect on the mass flux of COCs to the river. The baseline mass flux evaluations were adjusted to account for the anticipated

subsurface conditions following implementation of the alternatives. The anticipated effects of the remedial alternatives on mass flux are summarized as follows.

4.3.1.1 Estimated Mass Flux for Bedrock Groundwater Alternatives

To estimate the bedrock mass flux for bedrock remedial alternatives OU4-1 and OU4-2 (hot spot treatment with ISCO, and treatment with ISCO/thermal, respectively), the baseline mass flux calculations were modified by decreasing groundwater concentrations that are above UCLs to the UCL concentrations (50,000 ug/l for TCE and 100 ug/l for PCBs). With respect to TCE, only the northern section of the deep bedrock needed to be modified (from 483,330 ug/l to 50,000 ug/l). With respect to PCBs, none of the concentrations used in the baseline scenario exceeded the UCL of 100 ug/l, and therefore no adjustments to the mass flux were required. Under these conditions, the mass flux calculations indicate that for alternatives OU4-1 and OU4-2, the estimated concentrations of TCE and PCBs in the pore water beneath the river resulting from the discharge of impacted bedrock groundwater from the Site are approximately 1,484 ug/l and 1.63 µg/L, respectively. These values are well below the target remedial goals of 5,000 ug/l for TCE and 10 ug/l for PCBs.

4.3.1.2 Estimated Mass Flux for Overburden Groundwater Alternatives

The overburden groundwater remedial alternatives OU3-1 and OU3-2 include groundwater containment via a vertical barrier with hydraulic containment and in situ treatment of soils, and groundwater containment via a vertical barrier with hydraulic containment, respectively. The groundwater flow model indicates that both alternatives achieve complete capture of overburden groundwater within the containment area. Thus, neither of these scenarios would allow mass flux from the overburden aquifer to the River and therefore separate mass flux calculations were not required.

Overburden groundwater remedial alternative OU3-3 includes partial containment via vertical barriers and treatment of groundwater with a PRB, and in situ treatment of soils. Bench scale testing which will provide estimated long-term effective removal rates of contaminants flowing through the PRB is ongoing. Preliminary data from "proof of concept" column study tests indicated that up to 100% removal can be anticipated in the PRB. Although high mass removals were noted, these were obtained under controlled, laboratory conditions, therefore, a conservative assumption (that the PRB will achieve Method 1 GW-3 standards rather than complete 100% reduction) was used in the mass flux calculation for this alternative. The baseline mass flux calculations were modified by reducing the concentrations in each of the four zones in Appendix B, Figure 2, where applicable, to 5,000 ug/l for TCE and 10 ug/l for PCBs. This scenario results in an estimated mass flux to the pore water beneath the river from the overburden deposits of 110.8 ug/l of TCE and 0.32 ug/l of PCBs. These values are well below the target remedial goals of 5,000 ug/l for TCE and 10 ug/l for PCBs.

4.3.2 PCB Mass for OU3 Alternatives

The estimated PCB mass to be removed under each applicable OU3 alternative (OU3-1 through OU3-9) was calculated to allow direct comparison of the "effectiveness of measures to manage residues or control emissions/discharges" section of the reliability evaluation. The PCB mass reduction estimates were calculated similar to the baseline PCB mass estimate. The volume of soil to be excavated from each "box" represented by dividing the Site into four horizontal zones and three depth intervals was calculated. The average PCB concentrations for each "box" and the Site derived bulk density were then used to calculate the PCB mass associated with each alternative.

The total estimated mass removal associated with alternatives OU3-1 through OU3-9 ranges from 14 tons to a maximum of 39 tons, as summarized in Table 4.3.3. These PCB masses represent between 31% and 36% of the total estimated Aerovox property PCB mass. The table also provides the portion of the PCB mass associated with each alternative would be removed from the Aerovox shoreline.

4.4 Treatability Studies

Seven of the 11 OU3 alternatives and one of the OU4 alternatives include in situ treatment of impacted groundwater. The proposed alternatives include in situ treatment of hot spot areas that exceed Method 1 GW-3 concentrations (OU3) or UCL concentrations (OU4). In addition to hot spot treatments, three of the OU3 remedial alternatives include the use of a PRB to contain and treat impacted groundwater. To evaluate the potential for in situ hot spot treatment and PRB treatment methods at a proof of concept level (with further detail to be provided in Phase IV once a basic approach has been identified), preliminary bench scale treatability studies were undertaken. For in situ hot spot treatment processes, bench scale batch testing was undertaken in conjunction with Prima Laboratories, Inc. (El Dorado Hills, California). The proof of concept PRB studies were undertaken as column studies in conjunction with SiREM Laboratories (Ontario, Canada). These studies, and the results below, are considered preliminary and illustrate worst case conditions based on wells with the highest levels of contamination. The batch (in situ) and column (PRB) studies are being maintained at the treatability laboratories, and additional longer term evaluations are planned. Additional studies, including pilot testing, may be incorporated into Phase IV (as discussed in Section 8.2.2).

4.4.1 Treatability Study Sample Collection

4.4.1.1 In Situ Batch Testing Collection

On March 29, 2017, BC mobilized to the Aerovox property to collect soil and groundwater samples for use in the in situ batch testing. Nine potential soil boring locations, identified as BC-40 through BC-48, were precleared to a depth of approximately 5 feet bgs using soil vacuum excavation. Seven soil borings were advanced using a Geoprobe™ drill rig at pre-cleared locations BC-40 through BC-42 and BC-45 through BC-48. The soil borings were located based on proximity to existing soil borings that were located to the west of the area within 25 feet of the shoreline. Soil sample locations were conservatively selected to represent the worst case, highest known levels of contamination at the Site.

At each soil boring location, the Geoprobe™ macrocore was advanced in five-foot intervals. After each interval was sampled, the macrocore was retrieved and opened. The recovered soils were visually assessed for potential impacts (e.g., staining, odor and other indications). The soils were divided into five intervals representing each foot of recovery. A PID equipped with a 10.6 electron-volt lamp was used to screen each of the five sections of macrocore. Soil was then collected from the interval with the highest screening value and placed into a glass jar for screening with the PID using the Jar Headspace Procedure (MassDEP 1994. WSC 94-400 Attachment II). Soils from depths with the highest PID readings or visual evidence of DNAPL impact were containerized and placed on ice.

Also on March 29, 2017, groundwater was collected from monitoring wells MW-15D, MW-15B, and MW-26B. These locations were chosen as representative worst case (higher concentration) locations for the deep overburden, shallow bedrock and deep bedrock aquifers. Prior to collection of groundwater from each well, a minimum of three well volumes were purged using a submersible pump. Water quality parameters, including dissolved oxygen, electrical conductivity, pH, oxidation-reduction potential, and temperature were collected during purging to evaluate groundwater stabilization. Upon completion of purging, groundwater was collected in unpreserved, one-liter amber glass jars and placed on ice. Eight liters each were collected from MW-15B and MW-26B, and 15 liters were collected from MW-15D.

Containerized soils and groundwater were shipped under chain of custody seal by overnight shipment via Federal Express to Prima Environmental, Inc.

4.4.1.2 PRB Column Testing Collection

On March 21, 2017, groundwater was collected from monitoring well MW-15D to conduct the PRB column study. MW-15D is the deep overburden monitoring well with the highest PCB concentrations.

Prior to collection of groundwater from MW-15D, more than three well volumes were purged using a submersible pump. Water quality parameters, including dissolved oxygen, electrical conductivity, pH, oxidation-reduction potential, and temperature were collected during purging to evaluate groundwater stabilization. Upon completion of purging, groundwater was collected in 90 unpreserved, one-liter amber glass jars and placed on ice. The samples were picked up from the Site by an Alpha Analytical laboratory courier under chain-of-custody. Alpha provided sample packing and shipping services and sent the groundwater to SiREM Laboratory of Ontario, Canada.

4.4.2 In Situ Batch Testing to Address Overburden

A batch treatability study using overburden soil and groundwater was conducted as per the work plan developed in April 2017 to represent the alternative in situ treatment of hot spots in the overburden (OU3). The work plan and treatability study (TS) report are provided in Appendix H. The batch reactor testing design and reagents selected to degrade the Site COCs along with the results and summary are described in the sections below.

4.4.2.1 Experimental Design and Reagents

Batch reactor testing was conducted with overburden samples consisting of soil (~300 g) and groundwater (~820 mL). Groundwater from MW-15D was used in the treatability study to represent groundwater conditions within the overburden. Treatment options evaluated to address overburden COCs were ZVI plus lactate plus bioaugmentation (*Dehalococcoides sp.*), hydrogen peroxide activated persulfate (AP-HP), and catalyzed hydrogen peroxide (CHP). The testing was conducted for a 20-day period. Groundwater sampling was performed on Day 6 and Day 20 while soil sampling was performed on Day 20. Time zero (TO) sampling was performed in duplicate on groundwater samples while untreated homogenized soil was sampled to represent pre-treatment soil concentrations. The groundwater and soil samples were analyzed for CVOC (primarily TCE and by-products) and PCBs. Secondary water quality parameters and residual oxidant remaining in the batch reactors were analyzed as necessary. The dosing of reagents was estimated based on standard stoichiometry reactions of the reagents with COCs (TCE and PCBs) as described in Section 1.1 and Table 1 of the TS report attached in Appendix H. The quantity of reagents added to each batch reactor are shown in Table 3 of the TS report (Appendix H). Because soil samples were biased to highly concentrated areas of OU3, the high PCB concentrations required higher oxidant dosing than originally planned (AP-HP and CHP).

4.4.2.2 Results

The soils obtained from the Site contained higher PCB concentrations than anticipated. The average PCB concentration estimated at the overburden hot spots area was on the order of 270 mg/kg but the soils used in the treatability study contained PCBs an order of magnitude higher at 2,100 mg/kg (Table 8 of the TS report; Appendix H). TCE soil and groundwater concentrations were in line with the estimated amounts at 590 ug/kg and 5,200 ug/L, respectively.

Laboratory testing successfully demonstrated that ZVI + biostimulation/bioaugmentation, AP-HP, and CHP could destroy TCE and other chlorinated ethenes, the primary CVOCs at the Site. All treatments successfully reduced the TCE concentrations in both groundwater and soils. ZVI reduced TCE groundwater concentrations from an average of 2,300 µg/L (TO) to 860 µg/L (Day 20), accounting for 63 percent reduction and meeting the Method 1 GW-3 standard of 5,000 ug/L. Both oxidant treatments reduced the TCE concentrations to below the reporting limit (1.0 µg/L) within 6 days of treatment (and well below the Method 1 GW-3 standard of 5,000 ug/L), accounting for greater than 99 percent concentration reduction (Table 10 of the TS report). Although the oxidants (AP-HP and CHP) appear more effective than ZVI, the true measure of ZVI/biostimulation/bioaugmentation performance requires treatment time on the order of months compared to days or weeks for the oxidants. Bioaugmentation with a *Dehalococcoides* mixed culture did not rapidly degrade TCE or PCBs as anticipated, possibly due

to the short test duration or due to toxicity inhibition induced by the high PCB concentrations in the soil used for the test.

The soil concentration data revealed a trend similar to that of groundwater. ZVI reduced the TCE soil concentration from 510 µg/kg (Day 20 Control) to 90 µg/kg (Day 20 Active), accounting for an 82 percent concentration reduction, while treatment AP-HP and CHP reduced TCE concentrations by greater than 99 percent. None of the treatments generated measurable concentrations of vinyl chloride. Some ethene (0.02 mg/L) was detected in the ZVI test at Day 20, indicating that TCE was completely dechlorinated.

The effect of oxidant treatment on PCB degradation in soil appears to be promising. AP-HP and CHP chemistries reduced total PCB (Aroclor) concentrations in soil to 680 mg/kg and 790 mg/kg respectively (Day 20) from an average starting average concentration of 1,600 mg/kg (average of untreated soil and Day 20 Control; Tables 8 and 11 of the TS report). This accounted for 51 percent to 58 percent reduction in PCBs in soil. The effect of oxidants on PCB concentrations in groundwater was less clear and did not seem to exhibit declining trends. This may be due to the presence of small amounts of soil particulates or NAPL in aqueous samples despite efforts to remove them from groundwater prior to analysis, or to desorption of PCBs from soil into water. ZVI did not reduce PCB concentrations in soil or groundwater in the time frame of the study, thus additional time (on the order of months) is likely required, as described previously.

To seek clarity and confirm total PCBs degradation, TO, AP-HP, and CHP overburden groundwater samples were analyzed for total PCB congeners at Alpha Analytical Labs in Mansfield, MA. These data were assessed to clarify whether the treatments can destroy specific PCB congeners, which might not be reflected in Aroclor data. The analytical results shown in table below revealed total PCB congeners concentrations of 790 µg/L, 94.3 µg/L, and 123 µg/L, respectively, in the TO, AP-HP and CHP batch reactors containing overburden groundwater samples after a 20-day treatment. The data indicates total PCB congeners concentration reduction of 88 percent and 84 percent, respectively, due to AP-HP and CHP treatments. AP-HP treatment performed slightly better than CHP likely due to combined treatment by two oxidants (peroxide and persulfate).

Degradation of PCB Congeners Due to AP-HP and CHP Oxidants Treatment in the Overburden Groundwater

Chlorobiphenyls	TO	AP-HP	OB-CHP	Percent Reduction Due to	
	(ug/L)	(ug/L)	(ug/L)	AP-HP Treatment	CHP Treatment
Mono-	3.46	8.30	11.20	0.0	0.0
Di-	143.00	42.20	56.10	70.5	60.8
Tri-	284.00	32.00	43.20	88.7	84.8
Tetra-	189.00	8.13	9.39	95.7	95.0
Penta-	116.00	2.70	2.34	97.7	98.0
Hexa-	46.70	0.91	0.58	98.1	98.7
Hepta-	5.73	0.08	0.04	98.6	99.3
Octa-	0.59	ND	ND	>99	>99
Nona-	ND	ND	ND	-	-
Deca-	ND	ND	ND	-	-
Total PCB Congeners	788.48	94.32	122.85	88.0	84.4
Mono-, Di	146.46	50.50	67.30	65.5	54.0
Tri-, Tetra-	473.00	40.13	52.59	91.5	88.9
Penta-, Hexa-	162.70	3.61	2.92	97.8	98.2
Hepta-, Octa-, Nona-, Deca-	6.33	0.08	0.04	98.7	99.4
Total PCB Congeners	788.49	94.32	122.86	88.0	84.4

Among the different congener fractions (homologs), mono- and dichlorobiphenyls concentrations decreased by 65.5 percent, tri- and tetrachlorobiphenyls decreased by 91.5 percent, penta- and hexachlorobiphenyls decreased by 97.8 percent, and hepta-, octa-, nona, and decachlorobiphenyls decreased by 98.7 percent, during AP-HP oxidation treatment. This destruction trend revealed that AP-HP is capable of oxidizing highly chlorinated biphenyls to a greater extent relative to lower chlorinated biphenyls. Optimizing the dosing of oxidants towards the more recalcitrant, lower chlorinated PCB cogeners in future treatability study work should result in additional destruction. Also, these lower PCB congeners are reported to biodegrade under aerobic conditions which is promoted by this oxidation chemistry.

Similar results and trends were observed with CHP treatment with respect to PCB congener oxidation. The mono- and dichlorobiphenyl concentrations decreased by 54.0 percent, tri- and tetrachlorobiphenyls decreased by 88.9 percent, penta- and hexachlorobiphenyls decreased by 98.2 percent, and hepta-, octa-, nona, and decachlorobiphenyls decreased by 99.4 percent. Like AP-HP, data trends with CHP revealed that the highly chlorinated biphenyls are destroyed to a greater extent relative to lower chlorinated biphenyls.

AP-HP treatment resulted in decreasing the total PCB congeners to less than 100 µg/L, the UCL level for PCBs. Similar to AP-HP, CHP treatment should further decrease the PCB congers (123 µg/L after 20 days treatment) by optimizing the dosing. It should be noted that in groundwater sampling prior to and during the Phase II CSA, none of the Site wells has exhibited a groundwater concentration for PCBs in excess of the UCL with the exception of MW-15B. The control sample for congener analysis, and the resulting treated samples, are anomalously higher than historic groundwater levels, suggesting that the samples may have contained minute unobserved particulates or NAPL which may have biased the complete set of samples high. The samples were not filtered prior to analysis.

All treatments affected the secondary groundwater quality parameters in the manner expected. For example, ZVI generated reducing conditions, which increased the concentration of dissolved iron. AP-HP and CHP both increased dissolved oxygen, oxidation-reduction potential (ORP) and sulfate while decreasing pH (to below pH 3). NaMnO4 had no effect on most parameters except for an increase in ORP.

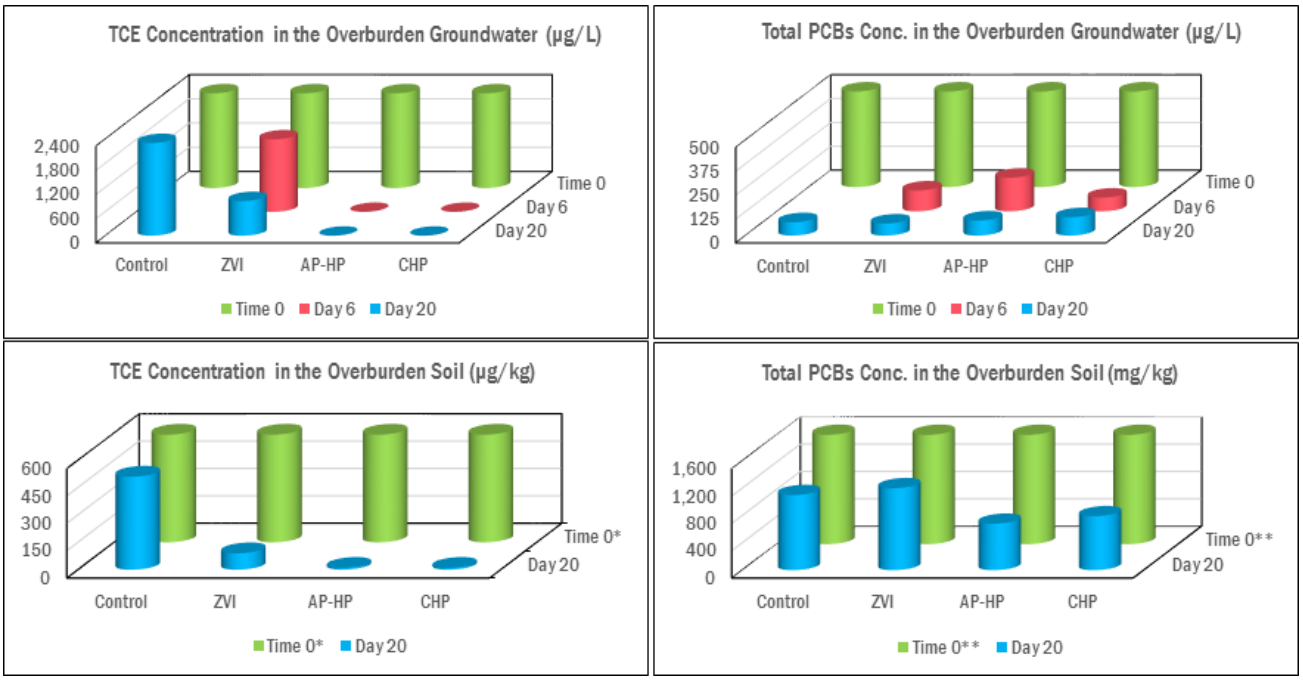
4.4.2.3 Summary

Laboratory testing successfully demonstrated that ZVI + biostimulation/bioaugmentation, AP-HP, and CHP could destroy TCE and other chlorinated ethenes at the Site (Reference Figure 4.4.2). Based on these results, BC recommends that all three treatments evaluated be considered for the in situ treatment of hot spots at the overburden area containing TCE.

The effect of these treatment treatments on PCBs is less clear. While AP-HP and CHP appeared to reduce PCB concentrations in overburden soil, no clear trend was observed in groundwater concentrations, which may have been due to the presence of small amounts of soil particulates in aqueous samples, or to desorption of PCBs from soil into water from incomplete destruction of PCBs in soil. ZVI did not reduce PCB concentrations in soil or groundwater in the three-week time frame of the study and requires treatment time on the order of months to fully evaluate its performance.

Both oxidants, AP-HP and CHP are recommended for further consideration for TCE degradation with additional testing (such as higher oxidant dosing) recommended to evaluate the potential for a greater positive effect on total PCBs destruction (Aroclor and congeners) than was observed in the proof of concept testing (i.e., 51 to 58 percent mass reductions in soil).

Figure 4.4.2. TCE and Total PCBs (Aroclors) Concentration in the Overburden Groundwater and Soil Due to Treatment



Notes:

* Untreated soil data was considered as Time 0.

** Average of PCBs soil concentrations for the untreated and Day 20 were considered as Time 0 soil PCBs concentration.

4.4.3 In Situ Batch Testing to Address Bedrock

A batch treatability study was conducted using bedrock groundwater as per the work plan developed in April 2017 to represent the alternative in situ treatment of hot spots in OU4. The work plan and TS reports are provided as attachments in Appendix H. The batch reactor testing design and reagents selected to degrade the Site COCs along with the results and summary are described in the sections below.

4.4.3.1 Experimental Design and Reagents

Batch reactor testing was conducted with bedrock samples consisting of only groundwater (~900 to 1,100 mL). Groundwater from MW-15B and MW-26B were used in the batch testing to represent the conditions at the shallow bedrock and deep bedrock, respectively. Historic data suggested that the shallow bedrock groundwater is impacted with both TCE and PCBs whereas the deep bedrock groundwater is impacted only with TCE. Therefore, treatment options evaluated to address shallow groundwater TCE and PCBs was AP-HP while for the deep groundwater containing TCE, NaMnO4 was selected. The testing was conducted for a 20-day period. Groundwater sampling was performed on Day 6 and Day 20 while soil sampling was performed on Day 20. Time zero sampling was performed in duplicate on MW-15B groundwater samples from shallow bedrock (Table 13) and untreated groundwater from MW-26B served as the sample representing time zero TCE concentration for deep bedrock (Table 8; TS report). The groundwater samples were analyzed for CVOCs (primarily TCE and by-products) and PCBs. Secondary water quality parameters and residual oxidant remaining in the batch reactors were analyzed as necessary. The dosing of reagents was estimated based on standard stoichiometry reactions of the reagents with COCs (TCE and PCBs) as described in Section 1.1 and Table 1 of the TS report. The quantity of reagents added to each reactor are shown in Table 3 of the TS report.

4.4.3.2 Results

The TCE and PCBs concentrations in groundwater received from the Site were consistent with historic data. Laboratory testing successfully demonstrated that AP-HP and NaMnO4 could destroy TCE and other chlorinated ethenes in shallow and deep bedrock groundwater, the primary COCs at the Site. NaMnO4 completely oxidized all TCE and cis-DCE within 6 days when compared to untreated MW-26B with concentrations of 66,000 µg/l and 4,700 µg/L, respectively (Tables 8 and 13, TS report). AP-HP dramatically reduced TCE concentrations (from 81,000 µg/L at Time 0 to 6 µg/L by Day 6 and 3.3 µg/L by Day 20) and completely removed cis-DCE (Table 13 of the TS report). These results revealed greater than 99 percent TCE concentration reduction meeting the UCL standard due to oxidant treatment.

The effect of AP-HP on PCBs is unclear. The average concentration of total PCBs was 69 µg/L at Time 0 and 70 µg/L in the AP-HP Day 20 reactor, which is similar to the concentration in the Day 20 Control. However, Aroclor 1232 was present in the Day 6 sample of AP-HP treatment, suggesting that some Aroclor 1242 (present in the untreated MW-15B groundwater, Time 0 and Control tests) was transformed to Aroclor 1232. The concentration of Aroclor 1232 was about 4 times higher than in the Time 0 or Control samples (Table 13; TS report), but was comparable to the concentration of Aroclor 1242 in untreated MW-15B groundwater (Table 8; TS report); this suggests that a small amount of free-phase liquid may have been present in the untreated sample and the AP-HP Day 6 samples.

The reason for the poor removal of PCBs from bedrock groundwater was probably due to under dosing of AP-HP, since removal appeared to occur in the overburden tests (58 percent in soil, see Section 4.4.2.2). The concentration of sodium persulfate (SP) in the bedrock test was 0.4 g/L SP, which is approximately 1x stoichiometric dose based on the theoretical demand and the concentrations in untreated MW-15B groundwater (Table 9; TS report), while the concentration in the overburden tests was 8.5 g/L SP. It is possible that groundwater exerted a much higher demand than anticipated and/or that the high salinity reduced the effectiveness of AP-HP. It is recommended that additional testing be conducted to determine whether a higher concentration of AP-HP can destroy PCBs in bedrock groundwater.

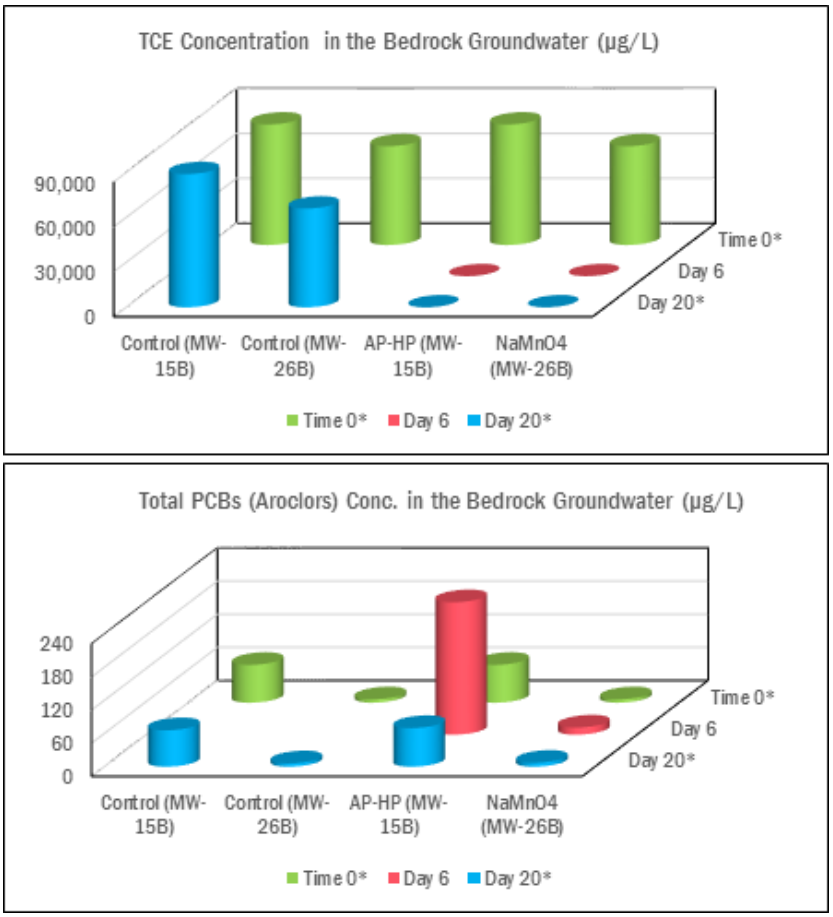
Treatment with NaMnO4 did not reveal a clear declining trend. The concentration of Aroclor 1242 decreased from 13 µg/L at Day 6 to an estimated 7.1 µg/L at Day 20. Note that NaMnO4 is not a choice of oxidant for PCBs at the Site, but is clearly an effective oxidant for TCE destruction. NaMnO4 was considered for its application at the deep bedrock groundwater where the impacts are only due to TCE and not PCBs and could potentially be part of a sequential oxidation program during pilot and full scale implementation.

The effect of AP-HP and NaMnO4 on selected secondary parameters was generally as expected and similar to those observed with overburden batch testing as described in Section 4.4.2.2.

4.4.3.3 Summary

Laboratory testing successfully demonstrated that AP-HP and NaMnO4 could destroy TCE and other chlorinated ethenes at the Site. (Reference Figure 4.4.3). The reason for the poor removal of PCBs due to AP-HP is likely from under-dosing these reactors, given AP-HP degraded significant amounts of PCBs in the overburden soil. It is recommended that additional testing be conducted to determine whether a higher concentration of AP-HP can destroy PCBs in bedrock groundwater. The results indicate AP-HP as the preferred oxidant for the shallow bedrock groundwater (TCE and PCBs impacts) and NaMnO4 for the deep bedrock groundwater (TCE impact).

Figure 4.4.3. TCE and Total PCBs (Aroclors) Concentration in the Bedrock Groundwater Due to Treatment



Note:

* Untreated groundwater PCBs and TCE data from MW-26B were considered as Time 0 Control and Day 20 Control.

4.4.4 PRB Column Testing

To evaluate the proof of concept applicability of the PRB concept in OU3, BC contracted with SiREM Laboratory to implement a column study utilizing commercially available ZVI and LPGAC for treatment of dissolved phase CVOCs and PCBs. The primary objective was to destroy dissolved phase CVOCs, namely PCE, TCE, cis-1,2-DCE and vinyl chloride with the ZVI, while LPGAC was also tested for treatment of PCBs, to less than UCL and/or Method 1 GW-3 standards for all constituents. A summary of the test objectives and results is detailed in this section, while the full report from SiREM, along with analytical data table on VOCs, PCBs and key geochemical parameters is included in Appendix H.

In March 2017, approximately 24 gallons of Site groundwater were collected from MW-15D and shipped on ice (4°C) to SiREM's laboratory. A baseline sample was collected following spiking with TCE to approximately 22,000 ug/L, cis-1,2-DCE to approximately 5 mg/L and vinyl chloride to approximately 1.5 mg/L, along with PCBs at an influent concentration range from below laboratory detection limits (i.e., non-detect (ND)) up to 61 ug/L. Influent PCBs were present in Site groundwater, and also added/spiked with Aroclor 1254.

The study consisted of four columns containing:

1. Control – high conductivity sand;
2. 100% ZVI;

3. A blend of 20% ZVI, 40% sand and 40% LPGAC; and
4. A sequence of distinct layer of ZVI (50% column volume), sand layer (25% column volume) and LPGAC (25% column volume).

Coarse sand (#20 grade) was obtained from Fairmont Santrol (Chardon, OH). ZVI (-12/+200 US Mesh) was obtained from Peerless Metal Powders Inc. (Detroit, Michigan). LPGAC (CC-8x30) was obtained from Continental Carbon Group. Technical specifications for the column materials are included in Appendix H.

The columns were constructed of Plexiglas™ with a length of 1.67 ft. and an internal diameter of 1.5 inches (Appendix H, Figure 1). For the ZVI and ZVI mix columns, seven sampling ports were positioned vertically along the central axis of the column at distances of 0.11, 0.20, 0.36, 0.52, 0.69, 1.02 and 1.35 ft. from the influent end to evaluate for reaction kinetics. For the sand control column, samples were collected only from the influent end to evaluate for potential losses across the entire column length. All sampling ports within the column (excluding influent and effluent) were constructed using a nylon Swagelok compression fitting tapped into the column. A 16-gauge needle was positioned through the fitting and secured by tightening the ferrule. Glass wool was threaded through the needle to minimize the potential for particulates to enter the samples. Each sample port was then fitted with a Luer-Lock™ fitting so that a glass syringe could be attached to the port for collection of water samples.

To ensure a homogeneous column material bed, the columns were packed vertically in 100 gram (g) increments. Values of bulk density, porosity and pore volume were determined by weight and are provided in Appendix H. The column experiment was performed at room temperature (22±1 ºC). A Masterflex® peristaltic pump was used to feed Site groundwater vertically through the columns. The pump tubing consisted of Viton® 2-stop tubing. All other tubing was 1/8 inch inside diameter Teflon® tubing.

Following setup of the columns, water was pumped through the columns at approximately 1.5 feet per day, or a residence time of 24 hours within the column, for 7 weeks. Water samples were collected from the sampling ports detailed above along with columns influent and effluent for analysis of pH, oxidation-reduction potential, VOCs, PCBs, dissolved hydrocarbon gases, cations, anions and alkalinity on a pre-defined schedule noted in Appendix H.

4.4.4.1 Column Study Results

With flow velocities ranging from 1.5 to 1.84 ft/day throughout the duration of the test, approximately 28 to 33 pore volumes of spiked groundwater were passed through the columns during the test. A summary of results per columns are included below, with a full accounting of column testing results and kinetics included in Appendix H.

4.4.4.1.1 Sand Control Column

Influent concentrations from the start to finish within the sand columns for VOCs indicate little to no losses of VOCs through the clean sand throughout the duration of the test. With influent concentrations ranging from 18.56 to 22.30 mg/L TCE, 5.41 to 6.15 mg/L cis-1,2-DCE and 1.19 to 1.50 mg/L VC, limited losses were noted from the control column except during the initial 5 pore volumes where sorption to sand was noted, but quickly saturated available sorption capacity by the 13th pore volume.

PCBs were also monitored at the influent and effluent during the testing with no detections of PCBs at the effluent and variable PCB influent concentrations due to the complexity of maintaining consistent PCB concentrations in water (very low solubility) and their affinity to sorb to virtually all media. Because sand does not react with PCBs to cleave or destroy the PCB molecule, the removal of PCBs within the column is likely due to direct sorption onto the sand.

4.4.4.1.2 100% ZVI Column

Influent VOC concentrations in the 100% ZVI column were consistent with influent concentrations observed in the control column ranging from 18.3 mg/L to 22.0 mg/L TCE throughout the duration of the test. Nearly complete reduction of PCE and TCE was observed at the effluent with low concentrations of cis-1,2-DCE and VC noted. Ethene and ethane were both observed along the length of the column indicating dechlorination of VOCs by the ZVI. Based on the column data, half-lives were calculated through the duration of the test for PCE, TCE, cis-1,2-DCE and VC but ended the test at 7.32, 4.58, 8.34 and 2.17 hours, respectively. The 100% ZVI column attained UCL/Method 1 GW-3 or better concentrations in effluent.

PCBs were also monitored at the influent and effluent during the testing with no detections of PCBs at the effluent. Removal of PCBs within the column is likely due to sorption to the ZVI.

4.4.4.1.3 Blended Column

Similar to the 100% ZVI column, influent concentrations to the blended column of ZVI/LPGAC/Sand were consistent with the ZVI column ranging from 20.82 to 23.3 mg/L TCE, 5.41 to 6.49 mg/L cis-1,2-DCE and 1.02 to 1.50 mg/L VC throughout the duration of testing. Because of the mixed column and sorption effects from carbon, complete removal of all VOCs was noted through the duration of the testing until the 33rd pore volume where a low-level detection of 0.017 mg/L was noted at the first port, likely due to carbon saturation of the LPGAC between the influent and the first column. No ethene and ethane generation was observed in the ZVI/GAC/Sand-Mix column. This indicates that the removal of CVOC in this column was solely due to adsorption onto GAC.

Consistent with the control and ZVI columns, PCBs were not detected in the effluent throughout testing with sorption to both ZVI and carbon as the main removal mechanisms.

4.4.4.1.4 Layered Column

The fourth column, layered with ZVI/Sand/LPGAC also maintained consistent influent concentrations throughout the test with 17.53 to 21.47 mg/L TCE, 5.50 to 5.82 mg/L cis-1,2-DCE and 1.09 to 1.37 mg/L VC. Because the ZVI/GAC/Sand-Layered column contained a 11.5-inch thick ZVI section, VOC degradation was primarily attributed to ZVI-mediated dichlorination with a final VOC removal facilitated by the LPGAC sorption before last sample port. This was validated by the presence of ethene and ethane within the ZVI section of the column. Based on the column data, half-lives were calculated through the duration of the test for PCE, TCE, cis-1,2-DCE and VC but ended the test at 7.9, 3.5, 8.76 and 2.20 hours, respectively, within the ZVI section.

Finally, consistent with the other columns, no PCBs were detected due to sorption to the media in the layered system.

4.4.4.2 Column Study Conclusions

The goal of the column study was to provide a “proof of concept” that high concentrations of VOCs and low level PCBs could be treated through a reactive barrier column. Three different reactive media mixtures, and one control column were constructed and continuously loaded with Site water from MW-15D spiked to approximately 22 mg/L TCE, 5 mg/L cis-1,2-DCE, 1.5 mg/L VC and PCBs with concentrations ranging from ND to 61 ug/L. There are several conclusions that can be drawn from this proof of concept indicating applicability of the mixed media PRB as a viable treatment technology at the Site including:

- VOC concentrations in the Sand Control column remained consistent from influent to effluent throughout the duration of the test except for the first 5 – 10 pore volumes where some sorption of VOCs was noted on the clean sand media.

- Treatment columns containing ZVI, ZVI/GAC/Sand-Mix and ZVI/GAC/Sand-Layered materials removed the VOCs present in the Site groundwater to significantly below the UCL/Method 1 GW-3 standards. The VOCs were dechlorinated by ZVI in the ZVI and ZVI/GAC/Sand-Layered columns. The VOCs were removed in the ZVI/GAC/Sand-Mix column primarily via adsorption onto GAC.
- PCBs were removed from all columns with an influent concentration ranging from ND to 61 ug/L throughout the test period. While not expected due to the low concentrations of PCBs present and their high surface sorption affinity, PCBs likely sorbed to the reactive media in all four columns, including the clean sand control column, resulting in their complete removal to less than laboratory detection limits.
- Degradation half-lives obtained for the ZVI in the ZVI and ZVI/GAC/Sand-Layered columns ranged from 2.2 to 8.8 hrs and were generally higher than the values obtained for these compounds and this type of ZVI in previous testing. In the pure ZVI column, half-lives increased through the test, while the layered column generally resulted in decreasing half-lives (through the 11.5" ZVI zone). This variability may be caused by several factors including the type and grind of iron tested (only one commercially available iron was tested), geochemical buffering of Site water reducing the effectiveness of the ZVI (e.g., less than expected pH increase common with ZVI systems), or the very high concentrations of VOCs tested that represent an absolute worst case scenario condition at the Site.
- Site groundwater inorganic geochemical composition does not contain strong oxidizers (e.g., nitrate), or high concentrations of potential ZVI-passivating constituents, such as silica or TOC, although longer term evaluation of potential secondary byproduct from iron reduction may be warranted to evaluate for potential iron-hydroxide surface passivation of ZVI.

Section 5

Detailed Evaluation of Alternatives (310 CMR 40.0857)

The purpose of this section is to present the detailed comparative evaluation of the Remedial Action Alternatives of each OU that were identified and developed in Section 4 against the criteria specified in 310 CMR 40.0858. The detailed evaluation provides the basis for selection of an alternative for each OU and includes consideration of each alternative's effectiveness, reliability, difficulty of implementation, cost, risks, benefits, timeliness and non-pecuniary interests.

Tables 5.1 through 5.4 provide a detailed comparative evaluation of the ability of each of the alternatives to meet the detailed evaluation criteria (and the subcategories for each criterion as identified in the MCP). For all criteria, the alternatives are given a qualitative rating such as poor, fair, good, or very good relative to each other. Additionally, for all criteria for OU1, OU2 and OU4, the alternatives are assigned a score of 1 to 4 for poor to very good ratings, respectively. For OU3 the alternatives were given a qualitative rating of very poor to very good, with a 5-point numerical rating system. The scores are used to illustrate, when summed, the overall favorability in the selection of the remedial action alternative. All criteria were weighed equally in calculating the overall alternative score. Final recommendations are not necessarily based solely on overall scores, but the use of a numerical system provides a methodology for comparative analysis. Qualitative and corresponding numerical ratings are comparative only, thus a remedial alternative may be qualitatively considered poor when compared to the other alternatives in that OU for that criteria, but that does not mean it is considered poor in a more global sense.

Conceptual-level cost estimates developed for each of the alternatives are included in Appendix I. The estimates include capital costs related to materials, labor, laboratory analysis, engineering design and reporting, oversight, operations, maintenance, monitoring and documentation, as appropriate. Note that where applicable, the cost estimates in Appendix I include a breakdown of the costs associated with the excavation volume and transportation and disposal weight for each assumed waste classification (TSCA, TSCA/RCRA, and non-TSCA). For the purpose of estimating volumes, it was assumed that the volume of soil exceeding 50 mg/kg is equal to the volume of soil with PCB concentrations exceeding 100 mg/kg. A ratio of 1.6 tons to 1 cubic yard of soil was used for conversion of soil volumes to weights. Note that for costing purposes, it was also assumed that a 5% volume increase would result from the addition of amendments to stabilize soils. Lastly, the only non-TSCA soils anticipated to be excavated as part of OU3 are the clean backfill placed in the former Aerovox building foundation as part of the NTCRA. These soils will be re-used as backfill and therefore, do not have associated transportation and disposal costs.

The cost estimates have been developed at a +50/-30 percent level of accuracy, consistent with standard conceptual design/feasibility study level cost estimates. To provide consistency with standard estimating practices, the estimates were prepared using the Remedial Action Cost Engineering and Requirements (RACER) 11.4 software (reference the EPA guidance titled "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study" EPA 540-R-00-002, OSWER 9355.0-75, July 2000). Annual operation, maintenance, and monitoring costs have been considered in the calculation of

the present worth of each alternative based on the anticipated duration of each alternative to achieve No Significant Risk and assuming a discount rate of three percent.[4]

The following discussion is a summary of the evaluation presented in Tables 5.1 through 5.4. As such, the focus of this discussion is to present the key criteria that cause the alternatives to be ranked differently, as opposed to a detailed discussion of each criteria/subcriteria.

The comparative effectiveness of the Remedial Action Alternatives is evaluated in terms of:

- Achieving a Permanent or Temporary Solution;
- Reusing, recycling, destroying, detoxifying, or treating oil and hazardous material; and
- Achieving or approaching background concentrations.

The reliability of the remedial action alternatives is evaluated in terms of:

- Certainty of Success; and
- Effectiveness of measures to manage residues or control emissions/discharges.

The implementability of the remedial action alternatives is evaluated in terms of:

- Technical complexity;
- Integration with facility operations;
- Monitoring, O&M or Site access requirements/limitations;
- Availability of services, materials, equipment or specialists;
- Availability, capacity and location of off-site treatment, storage and disposal facilities; and
- Permits.

The cost of the remedial action alternatives is evaluated in terms of:

- Cost of implementation (not including cost of environmental restoration);
- Cost of environmental restoration and potential damages to natural resources; and
- Cost of energy consumption.

The risk of the remedial action alternatives is evaluated in terms of:

- Risk during implementation;
- Risk during operations; and
- Risk associated with remaining oil and hazardous materials (OHM).

The benefits of the remedial action alternatives are evaluated in terms of:

- Restores natural resources;
- Achieves productive reuse of the Site;
- Avoids cost of relocating people; and
- Avoids lost value of the Site.

The timeliness of the remedial action alternatives is evaluated in terms of:

- Time to eliminate uncontrolled sources and achieve a level of No Significant Risk.

The non-pecuniary considerations of the remedial action alternatives are evaluated in terms of:

- Aesthetics; and
- Community acceptance.

[4] The 3% discount rate was selected and consistently applied in the cost estimates as a reasonably conservative value comparable to nominal treasure interest rates as published by the Office of Management and Budget over the past five years for 10-year to 30-year maturities.

The environmental footprint, or Green Remediation, of the remedial action alternatives is evaluated in terms of the alternative's ability to:

- Eliminate or reduce to the extent practicable total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem impacts, though energy efficiency, renewable energy use, materials management, water reduction, land management, and ecosystem protection. Greener approaches are those that minimize the environmental footprint of the remedy throughout its lifecycle.

5.1 Remedial Alternatives for Impacted Shallow Uncapped Soils (OU1)

The detailed evaluation of remedial alternatives for OU1 is presented in Table 5.1, and discussed below. Comparative OU-1 category ratings range from Very Good (4 points) to Poor (1 point).

5.1.1 Effectiveness

Although none of the five OU1 alternatives will reuse, recycle, destroy, detoxify, or treat OHM, they will all achieve a Permanent Solution in a reasonable timeframe, either with or without an AUL. OU1-1 and OU1-2 both have a Good effectiveness rating since they include the removal of PCB-impacted soils. OU1-3A/3B are both rated Very Good for effectiveness, since these alternatives will approach background concentrations after removal of PCB-impacted soil at concentrations greater than Unrestricted Use Risk Based Concentrations (1 mg/kg). OU1-4 has been rated Fair for effectiveness since this alternative leaves all the PCB-impacted soil in place.

5.1.2 Reliability

OU1-1, OU1-2 and OU1-4 have each been rated good for reliability since they all have potential to be successful due to removal of some portion of the PCB mass in soils and/or isolation beneath an asphalt or clean soil cap. However, their effectiveness is dependent on AUL compliance. OU1-3A/3B are rated very good for reliability since these alternatives include the removal of PCB-impacted soil at concentrations greater than Unrestricted Use Risk Based Concentrations (1 mg/kg) and further management of residuals via an AUL is not required.

5.1.3 Implementability

Alternatives OU1-3A/3B have been rated to have good implementability. These alternatives will have minimal effect on facility operations, but for efficiency sake it is recommended that they be coordinated with EPA's cleanup of the NBH NPL site and the City's construction of the Riverwalk. In addition, the services, materials, equipment and specialists needed for implementation are readily available. Disposal facilities are available for alternative OU1-3A, but are not needed for alternative OU1-3B, since soils will be placed in a consolidation cell on the Aerovox property with OU3 soils. Several permits are required for these alternatives, and neither alternative requires an AUL.

Conversely, alternatives OU1-1, OU1-2 and OU1-4 each require implementation of an AUL. The property owner will not agree to an AUL; therefore, the implementability rating assigned to these alternatives is considered "0" or not implementable.

5.1.4 Cost

Due to current Site conditions and uses, there is no cost associated with these alternatives for environmental restoration or potential damage to natural resources. Estimated capital costs and Net Present Worth (NPW) for each alternative are summarized in the following table:

	Estimated Capital Costs and NPW for Each Alternative	
Remedial Alternative	Estimated Capital Cost	Estimated Total NPW
OU1-1	$3.9 million	$4.0 million
OU1-2	$6.0 million	$6.2 million
OU1-3A	$6.6 million	$6.6 million
OU1-3B	$2.5 million	$2.5 million
OU1-4	$2.6 million	$2.7 million

Alternative OU1-3B is anticipated to have the least construction costs, as this alternative does not include excavation, off-site transportation and disposal of soil. Alternative OU1-4 is the second lowest capital cost because it requires construction costs only associated with construction of the asphalt cap and costs associated with implementation and recording of an AUL. The capital cost of alternatives OU1-1, OU1-2 and OU1-3A are greater due to excavation, transportation, and disposal of increasing volumes of soil. Alternatives OU1-2 and OU1-3A have the highest anticipated energy consumption and associated cost since they have the two highest volumes of soil requiring off-site transportation and disposal, as well as requiring excavation dewatering. Alternatives OU1-1, OU1-3B and OU1-4 require less energy use and cost because they have the lowest off-site transportation and disposal volume, do not require off-site transportation and disposal of wastes, or require energy use only during transportation and placement of cap materials, respectively.

5.1.5 Risk

Review of risk during implementation included comparison of the relative amount of transportation of wastes through the neighborhood and off-site handling. Risk during operations evaluated risks to potential future construction and/or Site workers completing cap inspections and maintenance, and groundwater monitoring. The risk associated with remaining OHM at the Site was assessed based on the overall quantity of off-site waste disposal.

OU1-4 poses a minimal risk to construction workers and no risk to the neighboring public due to no transportation of wastes, while alternatives OU1, OU1-2 and OU1-3B each present a moderate risk to construction workers and neighboring public during implementation. Alternative OU1-3B also poses a moderate risk to construction workers, but low risk to the neighboring public because excavated soils will not be transported off-site. Each of the alternatives achieves a level of No Significant Risk following remedy implementation.

5.1.6 Benefits

OU1-1, OU1-2 and OU1-3A/3B all restore the waterfront area green space and provide greater harmony with the City of New Bedford's intent regarding development of a Riverwalk. Upon implementation of either of these four alternatives, security measures and access control currently in use could be removed, and no property value would be lost. Alternatives OU1-3A/3B would also allow future residential use should the property ever be sold and redeveloped. For these reasons, alternatives OU1-1, OU1-2 and OU1-3A have all been rated Good for benefits. Alternative OU1-3B has been rated as Very Good for Benefits. Alternative OU1-4 is rated Fair because this alternative would have the opposite effect if implemented.

5.1.7 Timeliness

All the alternatives have good timeliness since they will all achieve a level of No Significant Risk in a relatively short period.

5.1.8 Non-pecuniary Considerations

The alternatives most likely to improve the aesthetics of the property and garner community support are those that include retaining a green space along the shoreline while removing contaminated soil. The greater volume of contaminated soil removal, the more an alternative is likely to be accepted by the community.

OU1-1 and OU1-2 have a Good non-pecuniary rating since these alternatives will restore the current landscaping at the Site and are not likely to raise community concerns due to removal of PCB-impacted soil and restoration of green space. OU1-3A/3B have a very good non-pecuniary rating since these alternatives will restore the current landscaping at the Titleist property, are not likely raise community concerns due to removal of PCB-impacted soil and restoration of green space, and provide for potential residential development of the Site. OU1-4 has a poor non-pecuniary rating since this alternative will replace existing landscaping with pavement and is more likely to raise community concerns because PCB-contaminated soil will remain on-site and this area will no longer be a green space along the shoreline.

5.1.9 Green Remediation

Alternatives OU1-1 and OU1-3B are considered to have moderately minimized environmental footprints, and are rated Very Good for green remediation because they utilize the least amount of fuel. One alternative has a lower excavated soil volume for off-site transportation and disposal while the other has a larger excavation volume, but incorporates on-site consolidation on OU3. Both alternatives, along with alternatives OU1-2 and OU1-3A, maintain waterfront green space and provide a permeable surface. For this reason, alternatives OU1-2 and OU1-3A are rated Good for green remediation. OU1-4 is rated Poor for green remediation because it utilizes fuel, utilizes asphalt (i.e., supports tar production), eliminates waterfront green space and creates an impermeable surface thereby increasing storm water runoff from the Site.

5.1.10 Summary

Alternatives OU1-3B has the highest numerical score (33 points) compared to alternative OU1-3A with an overall score of 30. Refer to Table 5.1 for a summary of the scores for each criterion and the total Rating Score for each proposed alternative.

5.2 Remedial Alternatives for Vapor Intrusion Mitigation (OU2)

The detailed evaluation of remedial alternatives for OU2 is presented in Table 5.2, and discussed below.

5.2.1 Effectiveness

All three of the alternatives can result in a Permanent Solution relative to the vapor intrusion pathway. The alternatives have the potential to reduce groundwater concentrations in combination with the source control remedy for OU3 and natural attenuation, but the alternatives are not likely to approach background concentrations in a reasonable amount of time. Only alternative OU2-3 has a Good effectiveness rating, as a result of treatment of vapors extracted by the active subslab depressurization system, whereas alternatives OU2-1 and OU2-2 do not reuse or detoxify OHM.

5.2.2 Reliability

Alternative OU2-3 has a very good reliability rating as it is effective in controlling migration of vapors into the building and treating vapor emissions. This alternative would also be highly successful at mitigation of soil gas in conjunction with source remediation at other OUs.

5.2.3 Implementability

Alternative OU2-1 has a very good implementability rating compared to alternatives OU2-2 and OU2-3, due to low technical complexity and only minor interruption of ongoing facility operations. All three alternatives have the same long term monitoring and/or maintenance requirement, require services, materials, and equipment that are readily available, and no permits are required. Neither alternative OU2-1 nor OU2-2 generate wastes that would require off-site disposal. OU2-2 is in essence not implementable under current Site operations as the shutdown of the facility and movement of equipment would severely interfere with plant production.

5.2.4 Cost

Alternative OU2-1 has a good cost rating compared to the other two alternatives. Estimated capital costs and NPW are summarized in the following table:

Alternative OU2-1 Capital Costs and NPW

Remedial Alternative	Estimated Capital Cost	Estimated Total NPW
OU2-1	$0.1 million	$0.8 million
OU2-2	$1.0 million	$1.6 million
OU2-3	$0.9 million	$1.3 million

The difference in cost ratings is the high capital cost and net present value of alternative OU2-2 and the increased electrical consumption required for alternative OU2-3. Each of the three alternatives would require long term monitoring and/or maintenance and OU2-3 would require installation and maintenance of and response to a remote telemetry system.

5.2.5 Risk

Alternatives OU2-2 and OU2-3 have good risk ratings because of their acceptable risk for future use provided the effectiveness of the barrier and subslab depressurization systems, respectively, are maintained. Alternative OU2-1 has a fair risk rating because although it has low short term risk during implementation and monitoring activities, it does not provide acceptable risk for future Site uses or changed conditions. All three alternatives require an AUL to achieve a condition of No Significant Risk. OU2-1 and OU2-2 require compliance with an AUL that prohibits residential use and OU2-3 requires compliance with an AUL to operate and maintain an AEPMM.

5.2.6 Benefits

Each of the three alternatives would result in continued productive use of the Site and would not result in lost value. Alternative OU2-3 provides for Site uses other than commercial/industrial provided the subslab depressurization system continues to be maintained and operated as required under the AUL. Alternatives OU2-1 and OU2-3 have a good benefits rating. OU2-2 has a fair benefits rating because maintenance of the vapor barrier would interfere with productive operations in the building.

5.2.7 Timeliness

All three alternatives are dependent upon remedial action alternatives for other Site OUs to mitigate contaminated soil and groundwater that are sources of vapor to indoor air. Therefore, the timeliness of all three alternatives is the same, i.e., fair.

5.2.8 Non-Pecuniary Interests

Alternatives OU2-1 and OU2-2 would result in minimal change to the existing building aesthetics due to the presence of permanent subslab monitoring points (four are currently installed) and installation of the vapor barrier over the floor in conjunction with the subslab monitoring points, respectively. Alternative OU2-3 would require moderate changes to the building aesthetics due to the subslab monitoring points and the equipment and piping associated with an active subslab depressurization system. Thus, the non-pecuniary interests score for alternatives OU2-1 and OU2-2 is good, and for alternative OU2-3 is fair.

5.2.9 Green Remediation

OU2-1 has a green remediation rating of very good, due to use of minimal resources for completion of monitoring events with no additional operation required. Alternatives OU2-2 and OU2-3 have good and fair green remediation rankings, respectively, because both require use of materials and fuel for construction of the remedy, and OU2-3 has higher energy use due to continuous operation of the active SSDS.

5.2.10 Summary

Alternative OU2-1 has the highest overall numerical score of 26, compared to overall scores of 21 and 23 for Alternatives OU2-2 and OU2-3, respectively. Refer to Table 5.2 for a summary of the scores for each criterion and the total Rating Score for each proposed alternative.

5.3 Remedial Alternatives for Source Area (OU3)

The detailed evaluation of remedial alternatives for source area OU3 (both overburden soil and overburden groundwater) is presented in Table 5.3 and discussed below.

5.3.1 Effectiveness

Effectiveness was scored based on three factors in concert: the likelihood of achieving a Permanent Solution within a defined, reasonable timeframe; whether the alternative included any components that provided reuse, recycling, destroying, detoxifying or treating Site contaminants; and, how likely the alternative was to achieve or approach background concentrations. Each of these factors was considered individually for each of the alternatives. The relative ratings for all three factors were then combined and allocated to the five Effectiveness Ratings and associated Effectiveness Scores: Very Good (5 points); Good (4 points); Fair (3 points); Poor (2 points) and Very Poor (1 point).

Since Alternatives 1, 3, 4, 6, 7, and 9 all have a moderate to high likelihood of achieving a Permanent Solution within a reasonable timeframe, these alternatives were rated higher than those alternatives that had a lesser or no likelihood of achieving a Permanent Solution. Similarly, for those Alternatives that involved the most destruction, detoxifying or treatment of Site contaminants were ranked higher than those alternatives with lesser or none of these. Lastly, if an alternative was not expected to achieve or approach background concentrations, the alternative was ranked less than those alternatives that have some possibility of achieving or reaching background concentrations. As such, the effectiveness is directly linked to the reduction in mass flux of groundwater constituents to surface water and removal of contaminant mass from the Site.

Based upon the above ranking system, the highest ranking (Very Good, 5 points) was awarded to alternatives OU3-1, OU3-3, OU3-4, and OU3-6, as all these alternatives have the highest likelihood of achieving a Permanent Solution, and include the most detoxifying, destruction and treatment of contaminants through in situ hot spot treatment, a limited amount of off-site soil incineration, and groundwater treatment. Lastly, while they are all unlikely to reach background concentrations in soil or groundwater, they have a marginally higher possibility than some of the other alternatives. Alternatives OU3-7 and OU3-9 were ranked as the alternatives with the second highest Effectiveness. These

alternatives are associated with on-site consolidation and therefore do not include the same limited destruction (through incineration) as alternatives that dispose of soils off-site. Alternatives OU3-2, OU3-5 and OU3-10 are rated as Fair, as these alternatives all have at least one factor that is less than the alternatives with a Good ranking. While alternatives OU3-2 and OU3-5 have groundwater treatment as a component and limited soil incineration associated with off-site disposal, they have a lower likelihood of achieving a Permanent Solution and do not have the potential for reaching background concentrations, as there is no supplemental groundwater treatment and, for alternative OU3-2, the area with the highest mass of PCBs (along the shoreline) would remain in place. Alternative OU3-10, because it includes some in situ treatment, has a slightly higher chance of reaching a Permanent Solution than alternatives OU3-2 and OU3-5, but includes no soil removal or treatment. Alternative OU3-8 was ranked as Poor because even though it has the same expectation for achieving a Permanent Solution and will not reach background concentrations similar to alternatives OU3-2 and OU3-5, and off-site treatment through incineration of soil is not included as part of the alternative. Alternative OU3-11 has the lowest possibility of achieving a Permanent Solution, no chance of achieving background, and has the least amount of reuse, recycling, destroying, detoxifying, or treating contaminants of all the proposed alternatives. In summary:

Rating	Alternatives	Comparative/Relative Attributes
Very Good	1, 3, 4 and 6	Most likely to achieve Permanent Solution, in situ treatment provided for hot spot, treatment for groundwater, potentially some additional soil treatment through incineration off-site, minimally likely to achieve background
Good	7 and 9	Most likely to achieve Permanent Solution, in situ treatment provided for hot spot, treatment for groundwater, minimally likely to achieve background
Fair	2, 5 and 10	Alternative 10 is less likely to achieve Permanent Solution and alternatives 2 and 5 are unlikely to achieve a Permanent Solution, some soil treatment through incineration off-site (2 and 5) or in situ treatment provided for hot spot (10), treatment for groundwater, minimally likely to achieve background
Poor	8	Unlikely to achieve Permanent Solution, treatment for groundwater, not likely to achieve background
Very poor	11	Least likely to achieve Permanent Solution, treatment for groundwater, not likely to achieve background

5.3.2 Reliability

Reliability was scored in a similar fashion to Effectiveness, and is based on two factors: certainty of success and effectiveness of measures to manage residues or control emissions and/or discharges. For certainty of success, factors that were used to assign points included the relative amount of contaminated soil and/or visually identified residual DNAPL removed from the Site or destroyed, and whether a clear endpoint is anticipated for groundwater treatment. The effectiveness of the alternative to manage and/or control contamination over the long term was based on compliance with the AUL and associated cap system maintenance; continued operation and management of the treatment system(s) over the long term in preventing releases of contaminated groundwater to the river; reduction in mass flux to the river; and reduction of CVOC and PCB mass in soils at the Site, and the reduction of CVOC and PCB mass along the shoreline. The results of this two-part evaluation were used to assign the five ratings and rating Scores.

Alternatives OU3-3 through OU3-9 all include similar removal of contaminated soils and residual DNAPL, with no residual DNAPL removed under alternatives OU3-1 and OU3-2. Alternatives OU3-3, OU3-4, and OU3-5 result in the highest CVOC and PCB soil mass removal from the shoreline and Site. Although storm-related erosion has not been observed along the shoreline since installation of the sheet pile wall and HAC cap, removal of contaminated soils from along the shoreline is considered a more reliable alternative in the long-term. The potential for impacts to the river in the event of a catastrophic failure of a cap and barrier installed over impacted soils at the immediate shoreline would be more significant than the potential impacts to the river in the event of a catastrophic failure of a cap and barrier system installed outside the riverfront. Soils behind an engineered barrier in the consolidation cell (OU3-7, OU3-8 and OU3-9) would be more reliably contained and protected from storm events. Active hydraulic containment systems for alternatives OU3-1, OU3-2, OU3-4, OU3-5, OU3-7, and OU3-8 will achieve 100% reduction in mass flux from baseline conditions; however, without in situ reagent application, alternatives OU3-2, OU3-5, and OU3-8 are not as likely to result in Site closure within a reasonable timeframe. Alternatives OU3-10 and OU3-11 do not remove any impacted soil, residual DNAPL, or PCB mass in soils from the Site. In summary,

Rating	Alternatives	Comparative/Relative Attributes
Very Good	3, 4 and 6	Removal of the largest quantity of contaminated soil and residual DNAPL; largest soil CVOC and PCB mass removal from the shoreline and the Site; 100% reduction in mass flux to river; clear estimated timeframe to achieve Method 1 GW-3 standards
Good	5, 7 and 9	Removal of the largest quantity of contaminated soil and residual DNAPL; soil CVOC and PCB mass removed from the shoreline; CVOC and PCB mass remains on-site, but clear estimated timeframe to achieve Method 1 GW-3 Standards (7 and 9) or high mass removal from the Site, but no clear estimated shutdown of groundwater treatment system (5)
Fair	1, 2 and 8	Removal of less CVOC and PCB mass from the Site and shoreline; active groundwater containment system and/or less certainty of timeframe for reaching Method 1 GW-3 standards.
Poor	10	No CVOC or PCB soil mass removed from the Site; 100% reduction in mass flux; clear estimated timeframe to turn off hydraulic control system because of in situ reagent application
Very poor	11	No CVOC or PCB soil mass removed from the Site, although 100% reduction in mass flux; no defined/estimated timeframe to turn off hydraulic control system.

5.3.3 Implementability

The Implementability evaluation considered the technical complexity of all alternatives as low to moderate, as none of the alternatives include methodologies that are not proven or overly technically challenging (e.g., no experimental technologies). Under integration with facility operations, there are no existing Site operations or activities associated with the current Aerovox Site itself; however, there will be coordination with EPA on the planned NBH Superfund dredging work and coordination with the City on the planned Riverwalk. More detailed evaluation of the relative comparative implementablity of the OU3 alternatives in terms of EPA's planned harbor remediation is not possible because at this time EPA has not completed and is not able to provide specific plans for the methods or timing of their work. Again, there are no ongoing activities at the former Aerovox facility that would be impacted by any of the alternatives. All the alternatives will require ongoing operation and maintenance. All of the alternatives in theory could be constructed either using an integrated approach in coordination with EPA, or in advance of EPA's efforts and all the alternatives have potential for adverse impact or limited success

until EPA completes the cleanup of the Aerovox shoreline portion (impacted sediment and DNAPL) of the NBH NPL site. Thus, none of these factors are differentiators. Rather, a point was given to those alternatives which provide a hard vertical barrier wall along the shoreline since this would provide the EPA cleanup (whenever and however it occurs) with a definitive, solid structural surface along the former Aerovox facility shoreline. For the monitoring, O&M or site access requirements or limitations, the following comparisons were made, with the following considered more favorable: alternatives which required a cap (rather than an engineered barrier); alternatives that have regular monitoring (versus enhanced monitoring that would be required for a consolidation cell or PRB), and alternatives that do not require a waste water treatment plant (WWTP) which would require near-constant access (as opposed to the least frequent access being required for long term monitoring/inspection alternatives).

For availability of services, materials, equipment, or specialists, alternatives that do not require a licensed WWTP operator were considered more favorable. Evaluation of the availability, capacity and location of off-site TSD facilities, gave preference to those alternatives requiring the fewest off-site disposal requirements, both at the time of construction and subsequently with long-term waste generation associated with monitoring and/or O&M activities. Lastly, although several permits and approvals are required for most of the alternatives, not all alternatives require a permit for discharge to the POTW or approval from MassDEP for application of remedial additives. Therefore, the differentiator for the permits evaluation was based on whether these permits were required, with neither of these permits/approvals being required as the most desirable, only one of these required being less desirable, and both required as the least desirable.

Since all the proposed alternatives have fairly good implementability due to the availability of technologies, materials and services and fairly equal permitting requirement, only three ratings were given for this category: Very Good (5 points), Good (4 points) and Fair (3 points). Alternatives OU3-9 and OU3-11 were rated as Very Good because these alternatives require the least off-site disposal capacity, and while alternative OU3-9 does not require a WWTP or licensed WWTP operator and only requires a permit/prior approval for remedial additives, alternative OU3-11 provides a vertical barrier wall and requires a standard monitoring/O&M program.

Based on these factors, alternatives OU3-9 and OU3-11 were found to have the highest implementability rating Very Good. Neither of these alternatives requires off-site disposal volume or an engineered barrier, both require one permit. Although alternative OU3-9 does not require a WWTP operator or long time access associated with the same, it requires an enhanced monitoring program due to the consolidation cell. Alternative OU3-11 provides a hard wall barrier that would assist in EPA's dredging activities along the former Aerovox facility shoreline. Alternatives OU3-2, OU3-5, OU3-6, OU3-8, and OU3-10 were all awarded Good ratings. Alternatives OU3-2, OU3-5, and OU3-10 all provide a hard-vertical barrier wall at the shoreline, with alternatives OU3-2, OU3-5, and OU3-10 requiring a standard monitoring schedule, and alternatives OU3-2, OU3-5, and OU3-8 requiring only one permit. Alternatives OU3-5 and OU3-6 both require the second least off-site disposal capacity, with the other three alternatives requiring a higher off-site disposal capacity.

Alternatives OU3-1, OU3-3, OU3-4, and OU3-7 are all rated Fair. Alternatives OU3-1 and OU3-3 require only asphalt caps and a standard monitoring program. Alternatives OU3-4 and OU3-7 provide a hard wall vertical barrier along the shoreline. Three of these alternatives have moderate to significant off-site disposal volumes; three require two permit/approvals. Alternative OU3-7, which requires the least off-site disposal volume has unfavorable characteristics of requiring an engineered barrier as part of the capping system, enhanced monitoring, requires long term access and a licensed operator for the WWTP, and has higher permitting/approval requirements. Alternatives OU3-1 and OU3-3 have the least off-site disposal capacity requirements, but both require multiple permits/approvals or an engineered barrier and enhanced monitoring requirements. Alternative OU3-4 has a lower off-site disposal capacity but

requires an engineered barrier, and requires constant access and a licensed WWTP operator. In summary,

Rating	Alternatives	Comparative/Relative Attributes
Very Good	9 and 11	Off-site disposal not required; one permit/approval required; enhanced monitoring (9) or installation of vertical barrier wall
Good	2, 5, 6, 8 and 10	Generally moderate to low off-site disposal; most provide vertical barrier wall and require only one permit/approval
Fair	1, 3, 4 and 7	Alternatives 1, 3, and 4 require moderate to significant off-site disposal capacity; generally require multiple permits/approvals.

5.3.4 Cost

Cost ratings were assigned using the estimated capital costs (CC), estimated NPW, cost of environmental restoration and potential damage to natural resources, energy use during construction, and long-term energy use associated with associated operations, maintenance, and monitoring. None of the alternatives is anticipated to have costs with environmental restoration or damage to natural resources. Alternatives with the highest energy use were considered less favorable.

The capital costs and NPW for each of the alternatives are summarized in the following table.

OU3 Estimated Cost of Implementation		
Remedial Alternative	Estimated Capital Cost	Estimated NPW*
1	$37.9 million	$52.9 million
2	$36.5 million	$56.3 million
3	$47.3 million	$53.6 million
4	$20.7 million	$35.7 million
5	$19.2 million	$39.0 million
6	$23.5 million	$29.8 million
7	$9.5 million	$24.5 million
8	$8.3 million	$28.1 million
9	$12.0 million	$18.3 million
10	$7.0 million	$22.0 million
11	$5.7 million	$25.5 million

** Net worth different for some alternatives. Refer to costing backup included in Appendix I.*

Alternatives OU3-7 through OU3-11 are anticipated to have some of the lowest capital costs, as these alternatives do not include off-site transportation and disposal. Alternatives OU3-3, OU3-6, and OU3-9 are anticipated to have the least long term costs associated with operation and maintenance of the remedy, largely due to the passive nature of the groundwater alternative associated with these alternatives (e.g., PRB). Alternatives OU3-1, OU3-4, OU3-7 and OU3-11 are anticipated to have the next lowest energy use. While these alternatives include a GWTS, the timeframe for operation of the system is well defined based on anticipated degradation of groundwater contaminant concentrations associated with in situ reagent application. Alternatives OU3-2, OU3-5, OU3-8 and OU3-11 are anticipated to have

the highest energy use due to the unknown timeframe to reach Method 1 GW-3 standards since in-situ treatment is not included in these alternatives. In summary,

Rating	Alternatives	Comparative/Relative Attributes
Very Good	9	Low CC, very low NPW, high to moderate energy consumption during construction, and very low energy use during long term OMM activities
Good	7, 8, 10 and 11	Very low CC, low NPW, high to moderate energy use during construction, and very high to high energy use during long term OMM activities
Fair	6	Moderate CC, low NPW, very high to high energy use during construction, and very high to high energy use during long term OMM activities
Poor	1, 4 and 5	Low to high CC, very high or moderate NPW, very high to high energy use during construction, and high to very high energy use during long term OMM activities
Very Poor	2 and 3	Very high to high CC, very high NPW, very high to high energy use during construction, and high to very high energy use during long term OMM activities, and very low energy use during long term OMM activities

5.3.5 Risk

Review of risk during implementation included comparison of the relative amount of transportation of wastes through the neighborhood and off-site handling. Risk during operations evaluated risks to potential future construction and/or Site workers completing cap inspections and maintenance, groundwater monitoring, O&M of groundwater treatment systems, in situ reagent injections, and transportation and disposal of wastes generated. The risk associated with remaining OHM at the Site was assessed based on removal of residual DNAPL from the shoreline and the overall quantity of off-site waste disposal.

Alternative OU3-9 is considered to have the least risk, based on low truck traffic in the surrounding residential neighborhoods associated with transportation and disposal of wastes and the lowest off-site handling requirements. This alternative removes DNAPL from the shoreline of the river, resulting in less source to groundwater and the river, likely faster overall cleanup times and less long term risk of release of contaminants along the shoreline associated with catastrophic failure due to erosion, flooding, and storm surges.

Alternatives OU3-3, OU3-6, OU3-7 and OU3-8 are all rated Good, because each of these remedies removes DNAPL from the shoreline of the former Aerovox facility and provide reduced vulnerability in the long term relative to the potential for release of contaminants along the shoreline associated with catastrophic failure due to erosion, flooding, and storm surges. In addition, Alternatives OU3-3 and OU3-6 include removal of large quantities of OHM from the Site and do not include a GWTS. While Alternatives OU3-7 and OU3-8 do include a GWTS and do not remove OHM from the Site, they present less risk of exposure to residents in the surrounding neighborhood and elsewhere due to the lack of transportation, off-site handling and disposal of generated wastes.

Alternatives OU3-4, OU3-5, OU3-10, and OU3-11 are rated Fair. All four of these alternatives include a GWTS. Alternatives OU3-4 and OU3-5 remove a large quantity of OHM from the Site, including residual DNAPL along the shoreline, but would involve waste being transported for off-site disposal, resulting in a higher level of exposure risk to surrounding residents within surrounding neighborhoods as well as facility workers at off-site transfer and/or disposal locations. Alternatives OU3-1 and OU3-2 are rated Poor as they are considered to have the highest total risk due to inclusion of a GWTS, off-site disposal, transportation and handling of wastes, and DNAPL present in the northeast corner along the shoreline remaining on-site. There are no alternatives rated as Very Poor. In summary,

Rating	Alternatives	Comparative/Relative Attributes
Very Good	9	Low off-site transportation, handling, and disposal; removal of DNAPL from the shoreline, and no GWTS component.
Good	3, 6, 7 and 8	DNAPL removal from shoreline; additional OHM removal from other areas of the Site; and no GWTS component (3 and 6). Includes GWTS as a component, but requires low off-site transportation, handling, and disposal of wastes (7 and 8).
Fair	4, 5, 10 and 11	Shoreline DNAPL and OHM from other areas of the Site removed, but includes off-site disposal and a GWTS as a component of the remedy (4 and 5). Limited potential for exposure during transportation, handling, or disposal because all residual DNAPL and OHM remain on-site and hydraulic control with a GWTS is the only remedial measures to be undertaken (10 and 11);
Poor	1 and 2	OHM, but not shoreline DNAPL removed from the Site. All generated waste disposed off-site resulting in the highest potential for exposure from off-site transportation, handling and disposal; includes GWTS as a component.

5.3.6 Benefits

None of the potential alternatives results in natural resource restoration or has costs associated with relocation, since the Aerovox facility is currently vacant, except for use of the western section for parking. Therefore, comparison of benefits for OU3 is solely tied to the potential productive reuse of the Site and whether relative property value is lost as a result of implementation of the alternative. Alternatives OU3-3 and OU3-6 are rated Very Good, because these alternatives do not require above-grade construction to the property as part of implementation, and do not require a portion of the property be dedicated to groundwater extraction and treatment, resulting in the smallest reduction of usable footprint. For these alternatives, the entire area of the property is still available for reuse, with the portion of the property outside of the former Aerovox building footprint and PRB area available for construction.

Alternatives OU3-1, OU3-2, OU3-4, OU3-5, OU3-10 and OU3-11 all require construction of a GWTS, which will result in some loss of potential commercial/industrial reuse of the Site and subsequently, property value. These Alternatives are all rated Good. Alternative OU3-9 is rated Fair, because this alternative includes construction of consolidation cells for on-site waste disposal, which is anticipated to result in a greater loss of reusable footprint area compared to the alternatives with a GWTS. Lastly, alternatives OU3-7 and OU3-8, which require construction of both a GWTS and consolidation cell, and thus restrict the largest footprint from future redevelopment, are rated Poor. Very Poor was not used to rate the Benefits category. In summary,

Rating	Alternatives	Comparative/Relative Attributes
Very Good	3 and 6	Minimal decrease in reusable property area or lost value
Good	1, 2, 4, 5, 10 and 11	Second least decrease in reusable property area and lost value due to GWTS construction
Fair	9	Moderate decrease in reusable property area and lost value due to construction of consolidation cells
Poor	7 and 8	Largest decrease in reusable property area and lost value to construction of both GWTS and consolidation cells

5.3.7 Timeliness

Ratings for timeliness are related to the estimated time to complete construction of the remedy and the long term active system O&M for each alternative. Alternatives OU3-6 and OU3-9 are rated Very Good as they have both short construction and long term O&M durations. Alternative OU3-10 is rated Good

because it also has a short construction timeframe and a moderate estimated O&M duration. Alternatives OU3-3, OU3-4, OU3-5, OU3-7 and OU3-11 are all rated Fair due to their generally moderate timeframes. Alternatives OU3-1 and OU3-8 have a Poor rating due to their generally longer estimated durations, and alternative OU3-2 is rated Very Poor because it has the longest duration for both construction and long term O&M.

5.3.8 Non-Pecuniary

Non-Pecuniary considerations were rated based on the aesthetical appeal of the final remedy after implementation, as well as community acceptance of the remedy as a whole.

The alternatives most likely to improve the aesthetics of the property are those that include a PRB as a component of the remedy. For these alternatives, soils within 25 feet of the shoreline down to the peat layer will be removed, enabling the possibility of more change along the shoreline, including restoration of green areas along the Riverwalk portion of the shoreline and /or other plantings and vegetation, or to provide a gradual slope toward the shore. Potential for more than one final restoration is possible. Minimal restoration options are available for alternatives that include hard wall barriers adjacent to the riverfront.

The New Bedford community has historically been and continues to be an active Environmental Justice community. Alternatives for cleanup of both the Aerovox property itself, as well as the New Bedford Harbor NPL site, have resulted in protests from the community. In particular, remedial options that have included on-site consolidation (demolition and on-site disposal of the Aerovox building, and use of Confined Disposal Facility (CDF) and Confined Aquatic Disposal (CAD) cells for disposal of dredged sediments) have historically prompted particularly negative community response. For this reason, those alternatives resulting in the greatest contaminant removal and off-site disposal (outside of New Bedford) are expected to be more preferable to the community than those alternatives with lesser amounts of contaminant destruction or removal and off-site disposal. Consistent with this approach, removal of contamination from the area immediately adjacent to the shoreline is expected to be more acceptable to the community than leaving this material in place.

Based on these considerations, alternatives OU3-3 and OU3-6 are rated Very Good and Good, respectively, as these options include removal of the most and second most volumes of contaminants from the Site and allow multiple reconfiguration options of the shoreline. Additionally, both alternatives also include mass destruction in situ through biological or chemical mechanisms. Alternatives OU3-1, OU3-2, OU3-4, OU3-5 and OU3-9 are rated Fair because these alternatives remove a lesser amount of waste from the Site and with one exception, would result in less options for restoration of the shoreline/Riverwalk. Alternatives OU3-7 and OU3-8, and alternatives OU3-10 and OU3-11, are rated Poor and Very Poor, respectively, because they have the least or no removal and off-site disposal of contaminants, and all would have limited shoreline restoration options. In summary,

Rating	Alternatives	Comparative/Relative Attributes
Very Good	3	Most removal and off-site disposal of contaminants; more options for shoreline restoration and Riverwalk configuration
Good	6	Moderate volume of contaminated soil removed and disposed off-site; more options for shoreline restoration and Riverwalk configuration
Fair	1, 2, 4, 5, and 9	Moderate (1,2) to lesser (4,5,9) volume of contaminated soil removed and disposed off-site; limited options for shoreline restoration and Riverwalk configuration (1,2,4,5)
Poor	7 and 8	Lesser volume of contaminated soil removed and disposed off-site; limited options for shoreline restoration and Riverwalk configuration
Very Poor	10 and 11	No removal of impacted soils from the Site; limited options for shoreline restoration and Riverwalk configuration

5.3.9 Green Remediation

Alternative OU3-9 is rated Very Good for green remediation because energy use associated with removal and on-site disposal of the soil is moderate, and overall energy use is short term due to the PRB being a passive groundwater treatment and more efficient when compared to a GWTS. The PRB option requires less frequent O&M visits, requires less treatment chemical use, and does not generate air emissions. Alternatives OU3-7 and OU3-8 are rated Good, largely because of the decrease in fuel usage due to on-site disposal. Alternatives OU3-3, OU3-6, OU3-10 and OU3-11 score Fair for green remediation. Alternatives OU3-3 and OU3-6 have a PRB component for groundwater treatment, which is the most efficient, uses less treatment chemicals, and does not create air emissions. Although Alternatives OU3-10 and OU3-11 include a GWTS as a component of the remedy, they do not require high fuel consumption because there is limited heavy machinery use during construction and no off-site transportation and disposal. Alternatives OU3-1, OU3-2, OU3-4 and OU3-5 are rated Poor. These alternatives all include a GWTS as part of the remedy and include off-site transportation and disposal of generated wastes. Long term O&M requires significant energy use compared to that for a PRB groundwater treatment option. In summary,

Rating	Alternatives	Comparative/Relative Attributes
Very Good	9	Lowest fuel consumption for construction and low fuel consumption for long term O&M activities; low energy use/high efficiency of PRB for groundwater treatment; no air emissions generated during long-term operation; may utilize recycled materials during PRB construction
Good	7 and 8	Lowest fuel consumption for construction; high fuel consumption for long term O&M activities; high energy/low efficiency GWTS; air emissions during long-term operation.
Fair	3, 6, 10 and 11	Moderate fuel consumption for construction and low fuel consumption for long term O&M with low energy/high efficiency and no air emissions (3 and 6); may utilize recycled materials during PRB construction (3 and 6); Low fuel consumption for construction and high fuel consumption for long term O&M with low efficiency/high energy use and generation of air emissions.
Poor	1, 2, 4, and 5	Highest fuel consumption for construction and long term O&M; high energy/low efficiency GWTS; air emissions during long-term operation; high use of treatment chemicals.

5.3.10 Summary

The three highest overall Rating Scores are for Alternatives OU3-3, OU3-6 and OU3-9, which scored a total of 34 points, 38 points, and 39 points, respectively. Refer to Table 5.3 for a summary of the scores for each criterion and the total Rating Score for each proposed alternative.

5.4 Remedial Alternatives for Bedrock Groundwater (OU4)

The detailed evaluation of remedial alternatives for OU4 is presented in Table 5.4, and discussed below.

5.4.1 Effectiveness

The likelihood of achieving a Permanent Solution in a reasonable timeframe is high for both potential alternatives because under both scenarios, contaminated groundwater reaching the river already meets the Method 1 GW-1 Standards. The addition of treatment serves to further reduce the flux and result in meeting the UCLs in a timely manner. Both alternatives will reduce bedrock groundwater concentrations to below the levels needed to reach a condition of No Significant Risk, but given the nature of

contaminant transport and sequestration in bedrock fractures and matrices, achieving or approaching background concentrations in groundwater is technically impracticable.

5.4.2 Reliability

Alternative OU4-2 has a very good reliability rating compared to alternative OU4-1 which has a good reliability rating because IST has a somewhat higher certainty of success than ISCO. Currently, the OU4 average TCE concentration is below the UCL and Method 1 GW-3 standards. By reducing the groundwater concentrations at monitoring well locations exceeding the UCL using either ISCO or IST, the mass flux of TCE to the river is anticipated to be reduced by approximately 50%. Based on experience implementing ISCO treatment programs at other sites, as well as the results of the May 2017 treatability study, TCE concentrations in groundwater are anticipated to be reduced to significantly less than UCL concentrations such that an anticipated TCE mass flux reduction to the river from ISCO alone should approach 90%, and from a combined IST and ISCO program should be approximately 95%. Both alternatives are considered equally effective in managing wastes or controlling emissions or discharges to the environment since this difference is considered minimal.

5.4.3 Implementability

Alternative OU4-1 has a good implementability rating compared to a poor implementability rating for alternative OU4-2. Both alternatives require a high level of technical complexity to implement; however, alternative OU4-2 has a greater number of technical issues to address because two different in situ technologies would be employed. The construction portion of neither alternative is likely to impact remediation of the NBH cleanup; however, long term MNA groundwater sampling activities (required for both alternatives) may require temporary closure/detouring of the Riverwalk. Alternative OU4-2 would also require an upgrade to the existing electrical service at the property to support the energy requirements of the IST, and would require O&M associated with the IST groundwater treatment system. The IST groundwater treatment system would generate liquid and vapor phase carbon wastes that would require off-site transportation and disposal. The permitting associated with alternative OU4-2 would also be more complicated because in addition to the MassDEP approval that would be required for ISCO applications within 50 feet of the river for both alternatives, Alternative OU4-2 would also require a NPDES permit to discharge treated effluent from the groundwater treatment system to the river or approval to discharge to the local POTW.

5.4.4 Cost

Alternative OU4-1 has a good cost rating compared to a poor cost rating for alternative OU4-2. These ratings were based on two differentiating factors: the estimated cost of implementation and the relative cost of energy consumption. The estimated costs of implementation are summarized below:

OU4-1 Estimated Cost of Implementation

Remedial Alternative	Estimated Capital Cost	Estimated Total NPW
OU4-1 ISCO of Hot Spots and MNA	$3.1 million	$3.8 million
OU4-2 IST of Deep Bedrock Hot Spots, ISCO of Shallow Bedrock Hot Spots, and MNA	$11.2 million	$11.9 million

In addition to these differences in estimated costs, the IST component of alternative OU4-2 would require very high energy (electricity) consumption compared to the low energy consumption that would be required for ISCO under alternative OU4-1.

5.4.5 Risk

Both alternatives have a good rating for the overall risk posed during implementation and operations, and the risk associated with remaining OHM at the Site. Both alternatives have only low short-term risks to workers during installation of the injection/extraction wells and groundwater treatment system. The potential risk to workers and the public during implementation were also considered low for both alternatives, exception for a moderate risk to workers during the transport and handling of chemical oxidants (both alternatives). Both alternatives would achieve a level of No Significant Risk to human health, safety, public welfare and the environment in the bedrock groundwater once the remedial actions had reduced concentrations below UCLs.

5.4.6 Benefits

Both alternatives allow for future commercial/industrial use of the Site, and both avoid lost value to the Site. Therefore, both alternatives have a good benefits rating.

5.4.7 Timeliness

Alternative OU4-1 has a good timeliness rating as it is expected to reduce hot spot concentrations in the bedrock groundwater to below UCLs in approximately three to four years. Alternative OU4-2 would require a similar timeframe for the ISCO treatment in the hot spot at MW-15B, but a shorter timeframe of approximately two years in the remaining hot spots where IST would be applied, and therefore has a very good timeliness rating.

5.4.8 Non-Pecuniary

Both alternatives have good non-pecuniary ratings due to mass removal or destruction technologies employed. There are no aesthetic impacts associated with either alternative; however, both have the potential to raise community concerns during transport of oxidants to the Site.

5.4.9 Green Remediation

Alternative OU4-2 has a poor green remediation rating because of the very high electrical usage during implementation of the IST, compared to a good rating for alternative OU4-1. Both alternatives would have moderate environmental footprints associated with the use of chemical oxidants.

5.4.10 Summary

The overall numerical score of alternative OU4-1 (27) is higher than alternative OU4-2 (23). Refer to Table 5.4 for a summary of the scores for each criterion and the total Rating Score for each proposed alternative

Section 6

Selected Remedial Action Alternatives

As required by 310 CMR 40.0859, the following considerations and requirements apply to selection of the remedial action alternatives:

- With limited exception, the remedial action alternatives must be selected based on the results of the detailed evaluation criteria.
- A remedial action alternative that results in a Permanent Solution must be selected if identified and found to have a more cost-effective and timely solution than that for the implementation of a Temporary Solution. If a Permanent Solution is not feasible, a Temporary Solution that eliminates substantial hazards must be selected and implemented, and a plan for the identification and development of a Permanent Solution must be prepared.
- A selected Permanent Solution must reduce the concentrations of OHM in the environment to levels that achieve or approach background, to the extent feasible.
- An engineered barrier, cap, or other remedial action alternative that relies upon on-site disposal, isolation, or containment of OHM shall not be selected until a Phase III evaluation demonstrates that a feasible alternative does not exist.

Based on the results of the comparative analysis conducted for each of the remedial action alternatives described in Section 5 and summarized in Tables 5.1 through 5.4, the following sections provide the recommended remedial alternatives for the four identified Site OUs. While evaluated independently, the selected alternatives for the four OUs are compatible and complementary and are intended to create a complete Permanent Solution for the Site as a whole.

6.1 Impacted Shallow Uncapped Soils (OU1) – Soil Excavation and Consolidation

The five RAAs identified for OU1 have numerical ranking scores between 19 and 33. The three lowest scoring alternatives, OU1-4, OU1-2 and OU1-1, each require implementation of an AUL. The current owner of the OU1 property does not want to encumber the property with an AUL; therefore; these alternatives have not been selected. The remaining two alternatives, OU1-3A and OU1-3B, vary only in their method of waste disposal: Alternative OU1-3A includes off-site transportation and disposal of remediation wastes, while alternative OU1-3B includes consolidation of generated wastes within the Site boundary on the Aerovox property. These similarities and single difference result in six of the nine comparison criteria, including Effectiveness, Reliability, Implementability, Risk, Benefits and Timeliness, receiving identical ratings for both Alternatives. The off-site disposal alternative (OU1-3A) is likely to garner stronger community support; however, alternative OU1-3A is estimated to cost three times more than alternative OU1-3B and has a lower green remediation rating. The green remediation rating for alternative OU1-3B is higher because it has a much lower anticipated energy expenditure due to the limited trucking required (from one property to the adjacent property within the Site) and does not require use of off-site landfill capacity for disposal. Alternative OU1-3B reduces to the extent practicable total energy use, air emissions, greenhouse gasses, material consumption and ecosystem impacts. Alternative OU1-3B achieves a Permanent Solution and removes associated risk with the Titleist property

without relying on an AUL for that portion of the Disposal Site. It reduces the overall Site contaminant footprint and areal extent of impacted soils, decreasing the area that requires capping and subsequent maintenance. It achieves a condition of No Significant Risk once implementation is complete for that portion of the Site.

The incremental cost for the off-site option, at more than three times the cost of OU1-3B, is substantial and disproportionate to the incremental benefit of risk reduction, considering both the Titleist portion of the property and the Aerovox property will achieve a condition of No Significant Risk. The Titleist portion of the Site will be eligible for unrestricted use and potential future residential development, and environmental restoration, including the City's planned Riverwalk, can proceed without restriction. **Therefore, for all the above detailed reasons, and in consideration of all the MCP criteria, alternative OU1-3B is selected as the remedial action alternative for OU1 Impacted Shallow Uncapped Soils.**

6.2 Vapor Intrusion Mitigation (OU2) – Monitoring and Natural Attenuation

The numerical scores for the three alternatives are 25, 21 and 23 for OU2-1, OU2-2 and OU2-3, respectively. Under existing conditions, a Significant Risk to human health or the environment is not present due to the complete vapor intrusion exposure pathway. Two of the three alternatives are expected to result in a Permanent Solution; however the use of a passive vapor barrier (OU2-2) is not considered a Permanent Solution. The alternatives are considered in conjunction with other response actions for the remainder of the Site. The potential to reduce groundwater concentrations in combination with the source control remedy for OU3 and natural attenuation may ultimately reduce groundwater concentrations in the OU2 area, but the alternatives are not likely to approach background concentrations in a reasonable amount of time. Unlike alternatives OU2-2 and OU2-3, alternative OU2-1 does not require maintenance of engineering controls (vapor barrier or SSDS).

Since OU2-2 does not result in a Permanent Solution and is essentially non-implementable without severe impacts to current plant operations, only OU2-1 and OU2-3 were considered. Neither of these alternatives varies appreciably in outcome for continued commercial/industrial use; the primary difference is cost. The estimated total capital cost and NPW of OU2-1 are $843,000 and $500,000 less, respectively than the total capital cost and NPW for OU2-3. The incremental cost for conducting OU2-3 is substantial and disproportionate to the incremental benefit since a condition of No Significant Risk exists under current conditions and will remain for the foreseeable future with implementation of the AUL. Additionally, OU2-3 has a larger environmental footprint during long-term operations and does not reduce total energy use, air pollution emissions or materials consumption when compared to OU2-1. **Therefore, for all the above detailed reasons, and in consideration of all the MCP criteria, OU2-1 Monitoring and Natural Attenuation is selected as the remedial action alternative for OU2.**

6.3 Source Area (OU3) – Source Area Soil Excavation and Consolidation, Asphalt Cap, Engineered Barrier, Vertical Barrier, In Situ Hot Spot Treatment and PRB

Proposed Remedial alternatives OU3-3, OU3-4, OU3-5, OU3-6, OU3-7, OU3-9 and OU3-10 have the seven highest cumulative scores of 34, 30, 28, 38, 30, 39 and 28, respectively. The remaining four alternatives were eliminated from further consideration because of their relatively lower overall rating, (Alternatives OU3-1, OU3-2, OU3-8, and OU3-11). While alternative OU3-5 does include some source removal through excavation of soil with residual DNAPL and soil above peat along the shoreline, it does not include in situ hot spot treatment to assist in reducing groundwater concentrations to meet the groundwater remedial goal. The result is a long and unknown length of time until the active hydraulic

containment and groundwater treatment system could be shut down. Alternative OU3-5, is considered unlikely to achieve a Permanent Solution within a defined reasonable timeframe, and was also eliminated from further consideration for this reason, leaving six alternatives for further consideration, OU3-3, OU3-4, OU3-6, OU3-7, OU3-9, OU3-10.

Of these six alternatives, alternatives OU3-4, OU3-7 and OU3-10, which include a GWTS to contain and treat the groundwater, are anticipated to reduce mass flux of TCE and PCBs to the river by nearly 100% through containment; however, groundwater treatment using a PRB is anticipated to reduce mass flux of TCE and PCBs by a minimum of 59% and 69%, respectively through treatment, which will also result in reaching the remedial cleanup goal for discharge to the river. The PRB alternatives (alternatives OU3-3, OU3-6 and OU3-9) are considered more timely, as they are estimated to reach remedial cleanup goals within approximately half the time as alternatives requiring active GWTSs. In general, the in situ reagent injection in combination with a PRB for groundwater treatment (alternatives OU3-3, OU3-6 and OU3-9) is better rated than the in situ reagent injection combined with a GWTS (alternatives OU3-4, OU3-7 and OU3-10). The PRB is better rated because remedial goals are anticipated to be reached faster (approximately one-half the time for alternatives with GWTS), and fewer O&M visits are required (monitoring only) since the PRB is passive compared to likely full time oversight, operation and maintenance with a GWTS. Additionally, there is less risk to personnel during O&M activities, the PRB has a better greener cleanup rating as a result of the passive (no energy) long term application and reduction in fuel use from a decrease in both the number of and length of time O&M visits are needed. For the alternatives with the PRB, fewer permits would be required and a licensed WWTP operator is not required. Lastly, the long term operating costs, and thus the NPW costs for alternatives with the GWTS are nearly three times higher than the costs associated with long term maintenance of the PRB. For all of these reasons, the three remaining alternatives with GWTS components were eliminated.

The remaining three alternatives, OU3-3, OU3-6 and OU3-9, differ only in the volumes of soil and associated contaminant mass that are removed from the shoreline, and the disposition of those soils once removed. Alternative OU3-3 removes the greatest amount of residual DNAPL and UCL soils from the shoreline and also removes these soils from the Site, resulting in the need for only an asphalt cap, rather than an asphalt and engineered barrier cap system. Alternatives OU3-6 and OU3-9 remove the same volume, which is slightly less than alternative OU3-3. Alternatives OU3-3 and OU3-6 score higher for Reliability, because although all three alternatives would remove an equal volume of residual DNAPL and contaminated soils from the shoreline, alternatives OU3-3 and OU3-6 include off-site transportation and disposal of these wastes rather than placement in an on-site consolidation cell. Because neither alternative OU3-3 or OU3-6 require a GWTS or consolidation cell on-site, these alternatives result in the greatest allowable reuse area on the Site and therefore, the least decrease in property value.

However, the risk of potential exposure to neighboring residents associated with alternatives OU3-3 and OU3-6 is greater than for alternative OU3-9, because there would be a period of constant truck transportation of contaminated soils for off-site disposal; similarly, there is associated potential risk of exposure to contaminants by waste transfer and/or disposal facility personnel. Alternative OU3-9 has higher scores for Implementability, Risk, Timeliness, and Cost than alternatives OU3-3 and OU3-6. Alternative OU3-9 is rated higher for Implementability because it utilizes an on-site consolidation cell for disposal of wastes generated during implementation rather than occupying landfill space. Alternative OU3-9 is also rated as having Good green remediation, whereas alternatives OU3-3 and OU3-6 have Fair green remediation ratings due to the fuel consumption associated with off-site disposal. Lastly, the cost associated with these three alternatives is significantly different, with alternative OU3-9 costing $11.5M less than alternative OU3-6 and $35.3M less than alternative OU3-3 in both capital costs and total NPW. The significant increases in cost does not result in a significant difference in risk reduction. **Therefore, for all the above detailed reasons, and in consideration of all the MCP criteria, alternative OU3-9 is the preferred alternative for OU3.**

6.4 Bedrock Groundwater (OU4) – In Situ Hot Spot Treatment and Natural Attenuation

The two remedial action alternatives for OU4 Bedrock Groundwater both rely on treatment technologies and monitored natural attenuation to achieve the remedial goals and a condition of No Significant Risk and Permanent Solution for bedrock groundwater. Neither option is anticipated to reduce COCs to or approaching background concentrations due to the complexity and intransient nature of contaminants in fractured bedrock.

The ratings are equal for both alternatives for the effectiveness, risk, benefits, and non-pecuniary interest evaluation categories. However, while all ratings for alternative OU4-1 are rated Good, three evaluation categories for alternative OU4-2 are rated Poor, including those for implementability, green remediation and cost. Based on equal likelihood for positive outcomes for each of the two alternatives, alternative OU4-1 is the selected remedial action alternative. The primary factors for choosing OU4-1 over OU4-2 are the overall numerical score and consistent good risk ratings. In addition, the difference in total capital costs and NPW further promote OU4-1 as the preferred alternative. The capital cost and NPW for alternative OU4-1 are $3.1 million and $3.8 million, respectively. These values are $8.1 million lower than the capital cost and NPW values for OU4-2. The incremental cost increase between OU4-1 and OU4-2, nearly quadruple the amount, are substantial and disproportionate to the potential benefit considering OU4-2 does not result in a corresponding risk reduction. **Therefore, alternative OU4-1 is the preferred alternative for OU4.**

6.5 Greener Cleanups Evaluation

The Response Action Performance Standards (RAPS) section of the MCP, at 310 CMR 40.0191, includes as a performance standard "(e) eliminating or reducing, to the extent practicable and consistent with response action requirements and objectives, total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem and water resources impacts, resulting from the performance of response actions through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection." This provision is generally known as the "Greener Cleanups" standard. In October 2014, MassDEP published the Greener Cleanups Guidance (WSC #14-150) to support the evaluation of remedial approaches that would promote overall net environmental benefits consistent with RAPs. Based on the selected remedial alternatives as described above, an evaluation of each alternative with respect to the Greener Cleanups provision of the MCP and MassDEP's Greener Cleanups Guidance has been completed

For each OU, a qualitative evaluation was performed for each remedial action alternative. Following remedy selection, a greener cleanup evaluation has been conducted in accordance with the MassDEP's Greener Cleanups Guidance, which recommends the use of the ASTM E2893-13 "Standard Guide for Greener Cleanups" in conducting the evaluation. Since publication of the MassDEP Guidance, in 2016 ASTM issued an updated version of its "Standard Guide for Greener Cleanups." Following the ASTM standard, the Technical Summary Form and Best Management Practices (BMPs) evaluation summary are provided in Appendix J. The BMPs that were retained in the evaluation will be considered during the remedial design of the selected alternative.

6.5.1 Green Evaluation of Remedial Alternatives for Impacted Shallow Uncapped Soils (OU1)

The five alternatives evaluated for OU1 were considered in the context of greener cleanups.

Of these, OU1-1, OU1-2 and OU1-3A/3B are similar in that each will maintain a waterfront green front and provide a permeable surface at completion of remedy. This green space will provide a reduction in

heat island effect locally and will provide infiltration to reduce the impacts of storm water to the adjacent water systems. Similarly, these alternatives all include excavation, which will require similar levels of use of diesel equipment and fuel during implementation. However, OU1-1, OU1-2 and OU1-3A all require off-site disposal, which will result in higher levels of tailpipe emissions, more fuel consumption, more impact to local roads, and a heightened risk of accident during transportation of materials off-site. OU1-4 will also require off-site disposal of soils removed for grading as well, with similar impacts as described above.

Alternative OU1-3B includes the possibility to consolidate excavated PCB-impacted soils within a consolidation cell on the Aerovox property that would decrease truck traffic and related impacts to the environment and community.

Alternative OU1-4 will have fewer emissions and fuel use than the others as there is no excavation required, but will require construction of an engineered barrier or asphalt cap. An asphalt cap, while recycled materials, utilizes relatively more diesel fuel compared to the other alternatives, utilizes asphalt (i.e., supports tar production), and creates an impermeable surface thereby increasing storm water runoff from the Site. The cap will also create a heat island effect locally.

Alterative OU1-3B is selected and is carried through for BMP evaluation.

6.5.2 Green Evaluation of Remedial Alternatives for Vapor Intrusion Mitigation (OU2)

The three alternatives evaluated for OU2 were considered in the context of greener cleanups.

A qualitative evaluation was performed for these three alternatives. Monitored natural attenuation requires no energy for operation. Each remedy will require routine trips to the Site at similar frequency for monitoring of air impacts to the Precix building. Alternatives OU2-2 and OU2-3 have additional considerations in the form of greater emissions and energy from materials brought to the Site for construction, additional embedded impacts from materials used to construct the passive or active systems, and in the case of OU2-3, energy during long-term operation of the active subslab depressurization system.

Of the three remedies, Alternative OU2-1 is carried through for BMP evaluation.

6.5.3 Green Evaluation of Remedial Alternatives for Source Area (OU3) Source Area

The 11 remedial action alternatives were formulated and retained for detailed evaluation for OU3 as describe previously were considered in the context of green remediation.

Alternatives OU3-1 through OU3-6 all include excavation and off-site disposal of soils, while OU3-7 through OU3-9 involve excavation and on-site consolidation of excavated soils. Qualitative evaluation of the excavation options indicates that the excavation and off-site disposal of soils options are less green than the excavation and on-site consolidation of soils. Off-site disposal will result in higher levels of tailpipe emissions, more fuel consumption, more impact to local roads, and a heightened risk of accident during transportation of materials off-site. Each of the excavation alternatives will result in varying quantities of impacted materials to be managed (via off-site disposal or on-site consolidation), and it is assumed for quantitative evaluation, the environmental impacts from operation of excavation equipment and truck transport can be rated according to the quantity of material handled – with a less green rating assigned to higher quantities of soil handled and disposed of off-site.

Alternatives OU3-1, OU3-2, OU3-4, OU3-5, OU3-7, OU3-8, OU3-10, and OU3-11 all include a vertical barrier wall with hydraulic containment. The hydraulic containment will result in greater long-term operation costs, including construction and maintenance of a groundwater treatment plant. This will result in long-term use of chemicals, nearly constant presence at the Site for operations and maintenance, and energy use for operation of the extraction and treatment systems. The point source

discharge of treated groundwater to the local river (if NPDES permitting is chosen) will also create a disruption to ecological systems.

Alternatives OU3-3, OU3-6, and OU3-9 all include a PRB. The PRB will not require active operation, and will have no energy use during operation. Depending on the type of PRB installed, the materials may require transportation (and greater fuel use/tailpipe emissions from transportation) from farther away than those required for construction of the vertical hydraulic containment wall – however, the materials could be from recycled sources (i.e., recycled iron for ZVI). During long-term O&M, there will be fewer trips to the Site for maintenance activities with infrequent replacement or rejuvenation of barrier wall media required compared to on-site operation requirements of a GWTS (a component of a vertical hydraulic containment wall). A GWTS will require long term use of chemicals and energy, and will produce air emissions and waste products. The groundwater would be permitted to flow naturally to the river following treatment, with no disruption to ecological systems.

Alternatives OU3-1, OU3-4, OU3-6, OU3-7, OU3-9, and OU3-10 all include in situ treatment of plume hot-spots. Qualitatively, the in situ treatment options vary in their level of green ratings depending on the type of treatment. It is generally acknowledged that biological in situ treatment mechanisms are less disruptive and the additives used are generally biodegradable and therefore more sustainable. Chemical treatment options can be less green if the chemicals required are shipped for long distances or if they are energy intensive during production. However, the use of in situ treatment can reduce the amount of time required for long-term hydraulic containment and treatment by providing a reduction in source. For alternatives OU3-1, OU3-4, OU3-7, and OU3-10, this could result in less energy used during long-term operation of the groundwater containment and treatment system. For alternatives OU3-6 and OU3-9, this could result in less maintenance in the form of replacement or rejuvenation of PRB media.

All alternatives include a cap, and alternatives OU3-4 through OU3-11 specify an asphalt cap. The asphalt cap will be easy to maintain and can be constructed from recycled materials, but will accelerate the movement of storm water overland towards the river. Additionally, asphalt relies on tar and fossil fuels for manufacture.

Of these alternatives, OU3-9 is selected and carried through for full BMP evaluation. The combination of excavation and on-site consolidation of impacted materials, use of a PRB and in situ treatment of plume hot spot was determined to be the greenest option. The energy use associated with removal and on-site disposal of the soil is moderate, and overall energy use is short term due to the PRB being efficient as a passive groundwater treatment relative to a GWTS. The PRB option does not require nearly full time O&M visits, requires less treatment chemical use, and does not generate air emissions.

6.5.4 Green Evaluation of Remedial Alternatives for Bedrock Groundwater (OU4)

The two alternatives evaluated for remediation of bedrock groundwater in OU4 were considered in the context of greener cleanup.

Alternative OU4-1 will require delivery of chemicals and energy used during implementation, while alternative OU4-2 will require the same delivery and energy for ISCO and additionally will have significantly greater energy use during thermal treatment. While energy for the in situ thermal treatment may be purchased from renewable sources, the treatment will require much more energy and will also require the construction of on-site water and air treatment systems during operation. Therefore, alternative OU4-1 is the more green remedy of the two alternatives evaluated. OU4-1 is selected and carried through for full BMP evaluation.

Section 7

Feasibility Evaluation (310 CMR 40.0860)

Under certain conditions, the MCP (310 CMR 40.0860) requires an evaluation of the feasibility of these five outcomes:

1. Implementing a Permanent Solution;
2. Reducing the concentrations of oil and hazardous material in the environment to levels that achieve or approach Background;
3. Reducing the concentrations of oil and hazardous material in soil at a Disposal Site to levels at or below applicable soil Upper Concentrations Limits;
4. Eliminating, preventing or mitigating Critical Exposure Pathway(s), and
5. Eliminating or controlling each Source of OHM Contamination, controlling migration of OHM, and removing NAPL at a Disposal Site in support of a Permanent or Temporary Solution pursuant to 310 CMR 40.1003(5) through (7).

The selected remedial action alternatives for all four OUs collectively are anticipated to achieve a Permanent Solution, so evaluating the feasibility of the first item is not required. A Critical Exposure Pathway does not exist at the Site, so the feasibility of outcome number four also does not need to be evaluated.

In addition, the MCP (310 CMR 40.0860(5)) notes that a Comprehensive Remedial Alternative that would achieve a Permanent Solution shall be considered feasible unless:

a) the alternative is not technologically feasible, as specified in 310 CMR 40.0860(6);

b) the costs of conducting, or the risks resulting from the alternative would not be justified by the benefits, considering such factors as potential damage to human health or the environment, cost of environmental restoration, long term operation and maintenance costs, and non-pecuniary values as determined by the benefit-cost analysis in 310 CMR 40.0860(7);

c) individuals with the expertise needed to effectively implement the alternative would not be available, regardless of arrangements for securing their services;

d) the alternative would necessitate land disposal other than at the Site itself and no off-site facility is available in the Commonwealth or in other states that is in full compliance with all applicable federal and state regulatory requirements; or

e) an alternative is selected for a portion of a Disposal Site for which the source of the oil and/or hazardous material is not located thereon, and the elimination or control of such source cannot currently be achieved by the party conducting the response actions at that portion of the Disposal Site. In such instances, a Temporary Solution shall be implemented for that portion of the Disposal Site to which the selected alternative applies.

These feasibility evaluations are provided in the following sections.

7.1 Feasibility of Achieving or Approaching Background (310 CMR 40.0860(1)(b))

MassDEP Policy #WSC-04-160, *Conducting Feasibility Evaluations under the MCP*, provides guidance on a process for evaluating the feasibility of approaching or achieving background which leads to "presumptive certainty" with respect to the conclusions of the feasibility evaluation. The policy includes four situations where it can be considered categorically infeasible to reach or approach background. The four situations identified for categorical infeasibility are the following:

- Excavations under Permanent Structures;
- Remedial actions that will substantially interrupt public service or threaten public safety;
- Remediation of Degradable (non-persistent) Contaminants; and,
- Remediation of Persistent Contaminants Located in S-2 and S-3 soils.

If the situation for a given site is other than those identified under categorically infeasible, a site-specific feasibility evaluation must be completed. The site-specific evaluation considers whether it is technically feasible to achieve or approach background, and whether there is sufficient benefit compared to the additional cost required to expand the remediation beyond that which is needed to reach a condition of No Significant Risk (NSR) in order to reach background. Relative to the benefit-cost analysis, the Feasibility Guidance provides that "it shall be considered feasible to conduct remedial actions to approach background conditions if the additional costs to remediate beyond NSR are equal to or less than 20 percent of the cost to remediate to NSR."

The MCP defines Background as "those levels of oil and hazardous material that would exist in the absence of the Disposal Site of concern…" The Feasibility Guidance provides the guideposts for determination of whether concentrations of OHM are Approaching Background for soil and groundwater. For soils, background for persistent contaminants in areas classified as S-1 are considered to approach background if

- The concentration of each persistent contaminant is at or below the Method 1 S-1 Standard;
- The concentration of each persistent contaminant in a soil vapor extraction system has been reduced by treatment to the point of diminishing return below No Significant Risk;
- The mass of each persistent contaminant present in S-1 soils is reduced by 50 percent below the mass present at NSR; or
- The exposure point concentration of each persistent contaminant is reduced 50 percent below the exposure point concentration present at No Significant Risk.

7.1.1 OU1

The selected remedy, OU1-3B includes removal of soils with PCB concentrations equal to or above 1 mg/kg, which is the Method 1 S-1 standard, and the TSCA standard for unrestricted. The remedial action will result in levels that approach background (levels below the Method 1, S-1 standard) for the Titleist portion of the Site.

7.1.2 OU2

The objective of OU2 is to address the potential vapor intrusion pathway characterized through the weight of evidence approach based on groundwater levels above Method 1 GW-2 standards in a GW-2 area, subslab soil gas concentrations above commercial/industrial screening values and indoor air concentrations of COCs that are detected but presently do not present a level of significant risk. The vapor intrusion stems from groundwater contamination, one source of which is the soil and groundwater contamination from the former Aerovox facility (OU3). The OU3 COCs are persistent compounds in soil in an S-2 area and it is therefore categorically not feasible to achieve background at OU3. It would

therefore follow that it would not be feasible to achieve background at OU2. The combined, complete remedy for the Site will include elimination and control of the Aerovox Site related sources as defined in 310 CMR 40.1003(5).

The OU2 remedial goals are based on eliminating or mitigating the pathway and achieving and maintaining a level of No Significant Risk. The program of monitoring included in OU2-1 will provide a sufficient level of certainty that COCs in groundwater and soil gas are stable or decreasing, and will not worsen, and that contaminant levels in indoor air affected by the Disposal Site will remain at a level at or below No Significant Risk and diminish over time. The VI Guidance contemplates "Background" to mean that there is no longer a Vapor Intrusion Pathway of concern, and the reduction of groundwater impacts through implementation of the source area response actions (OU3), combined with an AUL to prohibit residential, school or daycare use of the property and the results of the monitoring/sampling in alternative OU2-1 will support this finding.

7.1.3 OU3

Most of the COCs for the Site, and in particular those COCs that are the primary contributors to the potential for significant risk, i.e., TCE, VC and PCBs, are included in Table 9-2 of the Feasibility Guidance, and considered Persistent Contaminants. All the soil within Site boundaries are S-2 and S-3 soil and therefore satisfy the categorically infeasible criterion for Persistent Contaminants in soil.

In addition, to achieve background concentrations in soil and groundwater at OU3, removal of nearly all Site soils (except for the westernmost portion of the Property that is between the edge of the delineated Disposal Site boundary and Belleville Avenue) and an indefinite period of active or passive groundwater treatment would be necessary. Using the average length of the Disposal Site east to west across the center of the Aerovox property, the average depth to bedrock along this line, and the width of the Aerovox Property, the cost to remove soils down to the bedrock surface alone are more than $153 million. Compared to the cost to bring the Site to a condition of No Significant Risk by implementing remedial action alternative OU3-9 at a cost of $11.9 million, the incremental cost to remediate OU3 overburden soil to background concentrations is more than twelve times the cost of the preferred alternative based just on soil removal and disposal, i.e., far greater than the 20% additional cost level described in the Feasibility Guidance, and therefore, infeasible.

Alternative OU3-9 will not reduce groundwater concentrations to background, but is anticipated to achieve a condition of No Significant Risk by achieving Method 1 GW-3 Standards at the Site boundary. The estimated time period for this to occur is approximately ten years. While there are other methods (for example more aggressive in situ chemical oxidation treatment) that might reduce COC concentrations to one-half the Method 1 GW-1 and GW-3 standards within a similar time period, the costs would be substantially more than 20% higher than costs to implement remedial action alternative OU3-9. Therefore, reduction to background concentrations is considered infeasible from a cost-benefit perspective.

7.1.4 OU4

Similar to the remedy for overburden groundwater on the Aerovox Property, the selected remedial action alternative for bedrock (OU4-1) is not anticipated to result in reduction of COCs to concentrations below one-half the Method 1 GW-3 standards. Additionally, the time to reach background would be substantially longer and the cost to reach background would be more than 20% greater than the cost to reach a condition of No Significant Risk, and is therefore infeasible. Furthermore, due to the complexities associated with contaminant transport through fractured bedrock, including fracture interconnectivity, fracture closures or reduce flow through fractures due to secondary mineralization, as well as due to matrix diffusion, it likely is technologically infeasible to achieve or approach background concentrations in bedrock groundwater.

7.2 Feasibility of Reducing Concentrations Below Upper Concentration Limits (310 CMR 40.0860(1)(c))

For soil, the UCL levels for PCBs are exceeded in OU1 and OU3 areas. TCE is the only CVOC exceeding its corresponding soil UCL, which occurs both in the northeast corner of the Property and in the vicinity of UV-17 before the UV-17 area IRA excavation in groundwater. For groundwater, UCL exceedances are limited to TCE in bedrock groundwater.

The IRA excavation of the UV-17 area eliminated a significant portion of soils with TCE levels above UCLs. Under the selected OU3 alternative the remaining soils with levels above UCLs will be removed from the northeast corner and placed within the consolidation cell. Similarly, a large portion of the soils with PCB levels above UCLs are located within the first 25 feet of the shoreline and above the peat layer. These soils will also be removed, stabilized and placed in the consolidation cell. The selected alternative for OU1 will remove UCL level soils from the Titleist property and consolidate those soils with similar soils in OU3. Thus, the selected remedial alternative will result in soil concentrations below UCL levels on the Titleist property and will reduce the areal footprint of soils impacted with UCL soils on the Aerovox property. The cost for removal and off-site disposal of OU1 soils (the majority of which exceed UCL levels) is $6.6 million compared to $2.5 million for consolidation on Site, more than twice as costly. Alternatives OU3-1 and OU3-2 include excavation and off-site disposal of all UCL soils. The estimated cost for soil excavation, backfilling and off-site transportation and disposal for these two alternatives is $27.9M.

The chosen alternative (OU3-9), which results in a condition of No Significant Risk, includes excavation of soils within 25 feet of the shoreline down to peat and soils in the northeast corner of the Site down to bedrock, and on-site consolidation. Alternative OU3-9 provides one of the highest total PCB mass removals from the shoreline compared with other alternatives (see Table 4.3.5). The capital cost of OU3-9, including, excavation and backfilling, and construction, armoring, and covering the consolidation cell with an engineered barrier, is approximately $12.0M. By comparison, the total capital cost to implement OU3-4, the alternative that includes the same components as OU3-9 but removes and disposes off site all the UCL soils in the top 15 feet, is approximately $47.3M. The capital cost difference to remove all the UCL soils from OU3 is nearly four times as costly as OU3-9 and therefore considered infeasible considering the cost-benefit. (Note that this is considerably more than 20% greater than the cost to implement alternative OU3-9. While not directly applicable to the UCL feasibility evaluation, the Feasibility Guidance supports 20% additional cost as a benchmark for the benefit-cost evaluation for remediating soils, with incremental costs greater than 20% considered substantial and disproportionate). For the combined OU1 and OU3 response action, the incremental cost to reduce Site concentrations to below UCL levels in soils through off-site removal is substantially higher than the cost to consolidate those soils on-site without a proportionate reduction in Site risks. The selected alternative achieves a condition of No Significant Risk. Because it is infeasible to reduce the soils on Site to below UCL levels, an engineered barrier is required for containment of soils above UCLs within 15 feet of the ground surface.

Shallow and deep overburden groundwater at the Site does not exceed UCL levels for any COCs. Bedrock groundwater levels exceed their corresponding UCL concentrations for PCBs in a limited area (in the northeast corner in shallow bedrock) and for TCE in a broader area of the northeast corner (shallow bedrock) and across a larger area within the eastern portion of the Site in deep bedrock. The selected remedial alternative for OU4 will be designed and implemented to reduce these areas with groundwater impacts to below UCL levels.

7.3 Feasibility of Eliminating or Controlling Sources of OHM Contamination, Controlling Migration of OHM, and Removing NAPL (310 CMR 40.0860(1)(e))

The selected remedial action alternatives for OU1, OU3 and OU4 are intended to remove and control migration of OHM by removal and consolidation of sources. The alternative for OU1 will eliminate soils above 1 mg/kg, essentially reaching concentrations that allow for unrestricted future use within a portion of the Site, and subsequently will provide containment and control of those soils, and soils from the waterfront, within a consolidation cell, beyond the shoreline area where they would be subject to inundation, and above the water table eliminating them as a potential source for groundwater impacts. Alternative OU3-9 is expected to control migration of COCs by excavation and removal from the shoreline of a large portion of contaminated soils and residual DNAPL, resulting in a 36% reduction of the total estimated PCB mass in the Aerovox riverfront subsurface. This controls these soils from being an ongoing source to groundwater and removes them from the shoreline adjacent to the river. Off-site transportation and disposal (*i.e.*, removal) of these soils from the Site rather than placing them in an on-site consolidation cell is estimated to cost $10.1M. This value, when compared to the anticipated capital cost for Alternative OU3-9 associated with construction and maintenance of the consolidation cell is substantial, i.e., by orders of magnitude, and far greater than MassDEP's 20% benchmark. Because both the consolidation on-site and the disposal off-site would control the source of OHM, remove NAPL and result in a condition of No Significant Risk, the incremental cost is also disproportionate to the reduction in in risk that the expenditure would provide.

7.4 Feasibility of the Comprehensive Remedial Alternative and RAPS

The Comprehensive Remedial Alternative (CRA) for the Site will achieve a Permanent Solution and includes:

- Excavation and removal of impacted soils above the peat layer with concentrations in excess of 1 mg/kg from the Titleist property and consolidation of these soils on the Aerovox property, followed by shoreline and landscape restoration;
- Excavation and removal of impacted soils above the peat layer and within 25 feet of the shoreline at the Aerovox property, and impacted soils to the depth of bedrock in the northeast corner, stabilization and consolidation of these soils within an impacted area further west on the Aerovox property and outside of the 100-foot buffer zone, followed by shoreline and landscape restoration;
- For the Aerovox property, including the consolidation area, capping with an asphalt cap for areas with soil above 2 mg/kg of PCBs and with an engineered barrier for areas with soils in the top 15 feet bgs with PCBs above the UCL (100 mg/kg), consistent with the MassDEP Engineered Barrier Guidance and the EPA TSCA Determination;
- Containment of impacted groundwater along the north and south Aerovox property boundaries through installation of a vertical barrier;
- Treatment of overburden groundwater through in situ treatment of the source/hot spot portion of the plume and installation of a PRB at the western boundary of the 25-foot wide shoreline excavation area described above;
- Elimination of the on-site storm sewer system as a potential preferential pathway for contaminant migration by cleaning and lining, or where necessary replacing the storm sewer lines, manholes and catch basins;
- Treatment of hot spot bedrock groundwater areas impacted above UCL levels through in situ chemical oxidation of hot spots;

- Monitored natural attenuation of the groundwater/subslab soil gas/indoor air pathway at the Precix property; and
- Implementation of Activity and Use Limitations on the Aerovox and Precix properties to restrict foreseeable future use and provide for long term monitoring and maintenance of the response actions.

This CRA is feasible because:

- The CRA is technologically feasible (310 CMR 40.0860(6)). The CRA will utilize proven and available technology (excavation and consolidation, soil stabilization, containment, in situ groundwater treatment, groundwater treatment through the use of a reactive barrier, capping and engineered barriers, monitored natural attenuation and AULs) to remediate Site COCs to the extent necessary to attain a level of No Significant Risk, and for a portion of the Site, to a level that approaches background. The CRA can comply with applicable regulatory requirements, and the components of the CRA have been demonstrated effective at other sites and through site specific bench testing. In particular,
  - In situ chemical oxidation, with and without bioaugmentation, has been shown to treat the CVOCs that contribute to Site risks
  - In situ treatment of PCBs through the use of activated carbon has been shown to treat PCBs through sequestration and eliminate their bioavailability to receptors. Activated carbon treatments, when used in a barrier can mitigate the mass flux of PCBs in situ down to the levels required to address Site risks.
- The CRA satisfies the benefit-cost analysis (310 CMR 40.0860(7)). The CRA achieves a condition of No Significant Risk and will result in a Permanent Solution. Other alternatives considered in the Phase III are unlikely to result in a Permanent Solution (OU3-2, OU3-5, OU3-8 and OU3-11). The lack of an AUL renders alternatives OU1-1, OU1-2 and OU1-4 not implementable (although they would have otherwise been feasible). The costs (either capital or NPW) of conducting the remaining alternatives (OU1-3A, OU2-2, OU2-3, OU3-1, OU3-3, OU3-4, OU3-6, OU3-7, OU3-10, OU3-11 and OU4-2) are substantial (from double to orders of magnitude greater than the corresponding components of the CRA), and these additional costs would not be justified by the benefits, considering that they yield little to no incremental reduction in risk to human health or the environment, they require elevated long term operation and maintenance costs, several may need an extended period of ROS for active operation of hydraulic containment, and they represent alternatives that require significant energy use and limited opportunity for greener cleanup.
- Individuals with the expertise needed to effectively implement the CRA are available.
- The CRA minimizes the amount of waste that would necessitate land disposal other than at the Site itself.
- The CRA addresses the portion of a Disposal Site within which the source of the oil and/or hazardous material is located (except for the additional source of CVOCs on the Precix property, which will nevertheless be addressed by the CRA).

Response Action Performance Standards have been considered in the context of meeting the requirements of the MCP. The CRA will be protective of health, safety, welfare and the environment. In addition:

- The CRA is the result of an evaluation that identified a remedial action that will achieve a level of No Significant Risk, and for a portion of the Site will approach background.
- Technologies which reuse, recycle, destroy, detoxify or treat the Site COCs were considered, and where feasible were selected. In particular,

- Treatment through solidification/stabilization will be applied to treat excavated soils that may contain residual levels of NAPL
- In situ chemical oxidation (potentially with bioaugmentation) will be applied to treat and destroy CVOCs in bedrock and overburden groundwater, and subaqueous soils.
- Treatment of overburden groundwater through the use of a ZVI/activated carbon PRB will change the chemical composition (in the case of CVOCs) or physical character (in the case of PCBs) to render them less hazardous. The levels of CVOCs will be reduced (destroyed) and the levels of PCBs will be sequestered (immobilized), in each case mitigating their potential impact upon potential aquatic receptors.
- The CRA represents the alternative with the lowest total energy use, fewest emissions, and least amount of materials consumption and ecosystem impacts.

Section 8

Schedule

8.1 Projected Timeframe to Achieve a Permanent Solution

The selected remedial action alternative consists of different components in each of the four operable units. The anticipated timeframes to achieve the remedial goals for the selected alternatives in each operable unit are summarized below:

- OU1-3B Removal and On-site Consolidation of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg).
  - Remedy implementation (construction) is estimated to take approximately three to four months to complete. This portion of the Site would be eligible for a Permanent Solution upon completion of remedy Implementation.
- OU2-1 Monitored Subslab Soil Gas Attenuation
  - The OU currently meets a condition of No Significant Risk, and remedy implementation is limited to installation of additional subslab and indoor air monitoring points, estimated to take no more than a month. Subsequent monitoring in accordance with the AUL would remain in effect for approximately thirty years or until attenuation demonstrates vapor intrusion related use restrictions are no longer required. This portion of the Site would be eligible for a Permanent Solution upon completion of remedy implementation for both OU2 and OU3 and a minimum of two years of groundwater monitoring as part of an Active Remedial Monitoring Program under ROS.
- OU3-9 Removal and On-site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with PRB, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination
  - Remedy implementation is estimated to take approximately three to six months to complete, including the first in situ treatment application. In situ treatment is estimated to require two annual injections, followed by a two-year monitoring period, which collectively would be considered a period of Active Remedial Monitoring under ROS. Once complete, based on monitoring results that support completion of the in situ treatment, this portion of the Site would be eligible for a Permanent Solution. With the PRB in place, in accordance with the AUL, monitoring and maintenance of the Permanent Solution will be ongoing. If AUL required monitoring and maintenance indicates the PRB is no longer meeting the required performance, the media will be rejuvenated or replaced under a RAM. For estimating purposes, it was assumed that one media replacement may be required in approximately 10 years.
- OU4-1 In situ Chemical Oxidation of Hot Spots and Monitored Natural Attenuation
  - It is estimated that achieving remedial goals in the hot spot areas would take approximately three to four years. In situ treatment is estimated to require two annual injections, followed by a two-year MNA monitoring period, which collectively would be considered a period of Active Remedial Monitoring under ROS. Once complete, based on monitoring results that support completion of the in situ treatment (groundwater levels below UCLs), this portion of the Site would be eligible for a Permanent Solution.

A final Permanent Solution Statement would be filed after the remedial goals for all four of the operable units have been achieved and AULs are in place. Based on the above projected timeframes, it is anticipated that a Permanent Solution Statement for the Site would be filed no sooner than four years after implementation of the comprehensive remedial alternative (CRA). ROS would be maintained until that time. While the remedial action will be selected and designed to mitigate migration from west to east, demonstrating full achievement of this objective will be complicated by the tidally driven groundwater flow reversals until EPA also completes source removal in the river as part of the New Bedford Harbor Superfund Site. However, excavation of the NBH sediment by EPA could either occur any time after construction of the selected remedy, or coordinated to coincide with remedial construction for OU1 and OU3.

8.2 Projected Schedule for Implementation of Phase IV Activities

These activities will be conducted under MCP Phase IV Remedy Implementation which includes performance of pre-design studies, the preparation of a Phase IV Remedy Implementation Plan (RIP) to present the design plans and specifications, remedy implementation, documentation of the construction, and final inspection and completion.

The anticipated schedule is presented in Section 8.2.1. The pre-design investigation, including pilot studies, is discussed in Section 8.2.2.

8.2.1 Projected Schedule

The anticipated schedule for Phase IV activities is as follows:

Activity	Projected Schedule
MassDEP Approval of Phase III RAP (assumed)	December 2017
Preparation of Phase IV RIP	January 2018 - December 2018
Phase IV RIP Submittal	December 2018
Pre-Design Studies and Pilot Studies	January 2018 - September 2018
MassDEP Approval of Phase IV RIP (assumed)	March 2019
Bid Phase	March - May 2019
Remedy Implementation+	Late Spring 2019 – Early Spring 2020
ROS and Active Remedial Monitoring	Spring 2020 – TBD
Year 1 of Quarterly Monitoring, additional in situ amendments as needed	2020
Year 2 of Quarterly monitoring, Additional in situ amendments as needed	2021

Notes:

+ Remedy Implementation schedule assumes that the remedial action alternatives are implemented over two construction seasons, and not in winter.

Note that the actual construction schedule will be determined by construction sequencing requirements developed during the preparation of the RIP.

8.2.2 Pilot Studies

Pilot scale studies are anticipated: i) to support the design for alternative OU3-9 where a PRB is proposed to address groundwater contamination in the overburden and in situ treatment of soil and groundwater is proposed to treat overburden "hot spots"; and ii) to support the design for alternative OU4-1 where ISCO is proposed to treat high concentrations of COCs in groundwater (hot-spots) in deep bedrock. These pilot studies are generally described below and are subject to modification during the design process.

8.2.2.1 OU3-9: PRB Pilot Study

The objective of the pilot scale study is to determine the extent of degradation and remediation of the Site COCs by the ZVI and/or activated carbon based PRB technology and collect design parameters data in support of the proposed full scale PRB remedy to address and reduce groundwater contamination to meet Method 1 GW-3 standards for TCE (<=5,000 ug/L) and PCBs (<=10 ug/L) in the overburden. The degradation of TCE to innocuous end products (ethene and ethane) due to ZVI treatment is widely reported in literature and at full scale PRB sites across the US. Carbon, in the form of granular activated carbon, is known to adsorb CVOCs (including TCE) and PCBs. Although TCE abiotic dechlorination by ZVI is well known, its effect on PCBs dechlorination is not clear. Thus, a combined ZVI-Carbon media along with sand (to ensure adequate hydraulic conductivity) is expected to address the Site COCs (TCE and PCBs). During preparation of this revised Phase III RAP, BC conducted two separate tasks to validate the PRB approach for treating the Site COCs. The first task included a literature search of pilot and full scale remedies integrating activated carbon in situ for treatment of PCBs at sites across the US, while the second task include laboratory based column studies as PRB "proof of concept" testing.

PRB technologies have been installed at over 200 sites since the early 1990s (ITRC, 2011). Recent innovations and the need for applications at sites with COCs other than CVOCs and ZVI has driven the remediation industry to develop and implement alternative reactive media for PRB applications compared to simply ZVI. From the 2011 ITRC Permeable Reactive Barrier: Technology Update Document:

> "*New" reactive materials include mulch for treating chlorinated solvents, metals, and energetic and munitions compounds, zeolites for treating radionuclides and heavy metals, and "transformed redmud" (a waste material formed from bauxite ore during the production of alumina that has been used to treat acid-rock drainage), but other materials such as* ***carbon/zero valent iron (ZVI) combinations also are being tested and used***."

Use of granular activation carbon for PCB sequestration and treatment is an established technology for water treatment due to the high affinity and sorption potential of PCBs by granular activated carbon. More recently, granular activated carbon has been implemented at sediment remediation-sites to reduce bioaccumulation and mobility of PCBs. For example, Beckingham and Ghosh demonstrated that granular activated carbon would reduce PCB exposure to benthic organisms during pilot testing in contaminated river sediments (EST, 2011). Similarly, a reactive cap was installed in 2006 at the Upriver Dam PCB Superfund site in Spokane, Washington to sequester PCBs in the underlying sediment. By the first sampling event in 2007, concentrations of PCBs were below detection limits, with an average starting concentration as high as 1,430 ppb (USEPA, 2013).

In an April 2013, the Office of Superfund Remediation and Technology Innovation (OSWER Directive 9200.2-128FS) of the United States Environmental Protection Agency published the "Use of Amendments for In Situ Remediation at Superfund Sediment Sites" identifying granular activated carbon as an attractive amendment because of their strong sorbent properties for hydrophobic contaminants, and that

> "*PAHs, PCBs, dioxins/furans, and pesticides are strongly adsorbed by activated carbon (often in a granular form), making them less bioavailable." (USEPA, 2013)*

Additionally, from the same 2013 USEPA publication:

> *"A short contact time is often adequate because of the high hydrophobicity of the most common hydrophobic organic contaminants in sediments, such as PCBs, PAHs, and dioxins."*

This short contact time is ideal for PRB applications where residence times typically approach 24 hours or more depending upon final PRB permeability, groundwater flow velocity and other factors when properly incorporated into the PRB design. These successful applications of reactive caps to remove PCBs and alternative media implementation in PRB remedies all demonstrate that in a barrier type of remedial approach, granular activated carbon can successfully mitigate mass flux of PCBs in situ.

The second activity included the development and implementation of a proof-of-concept column study in March – May 2017 utilizing Site groundwater from MW-15D spiked with TCE and PCBs to mimic potential worst case VOC and PCB loading to a PRB. As presented in Section 4, all three active media columns reduced concentrations of TCE, cis-1,2-DCE and VC to less than their respective Method 1 GW-3 standard, while all four columns, including the control column successfully removed PCBs to less than detection limits. Based on these results of the proof of concept and the support of literature search on application of activated carbon for PCB removal, and the results of the detailed evaluation of alternatives, the PRB option has been selected as one component of the overall remediation program at the Aerovox Site.

While the column study completed to date was proof of concept, additional testing is warranted to develop final design parameters, along with the potential implementation of a pilot test on-site. If implemented, the pilot scale PRB will measure approximately 24 inches in thickness, 33 feet in depth (top of bedrock), and 50 to 100 feet in length. The pilot scale study is expected to run up to eight months and it is envisioned that the pilot scale PRB will become part of the full-scale design after the termination of pilot testing. The pilot study will be conducted near the northern portion of the proposed full scale PRB in the vicinity of MW-7 where the COC concentration are high compared to the southern portion of the proposed full scale PRB. The pilot scale PRB will be installed perpendicular to groundwater flow direction. The PRB will be constructed using One-Pass Trenching where the One-Pass operation cuts a precise trench and simultaneously backfills the trench with the reactive materials through a custom delivery box that extends to the bottom of the trench. Monitoring wells will be installed to measure the PRB performance – one monitoring well within the PRB, and one to three wells downgradient of the PRB. Select factors that influence PRB performance include groundwater COCs concentrations, reaction with PRB media and degradation half-lives, and residence time in the PRB as determined by groundwater flow, thickness and materials of construction.

The pilot scale study will monitor for the following process and performance monitoring parameters:

- Groundwater elevations and flow in and around the PRB to measure channeling, if any;
- PRB media constituent's ability to remediate TCE and PCBs;
- Reduction in TCE and PCBs concentrations as the groundwater passes through the PRB; and
- Impact and role of groundwater geochemistry on the PRB longevity (calcium and other salts, alkalinity, nitrates, etc.).

The above process and performance monitoring data collected during the pilot testing will be used in the design (for example, media composition and thickness) and construction of the full scale PRB to address groundwater impacts in the overburden.

8.2.2.2 OU3–9: In Situ Treatment of Hot Spots Pilot Study

The objective of the pilot scale study is to evaluate the extent of degradation of the Site COCs due to in situ injection of reagents (such as ZVI and organic carbon based electron donor sources or chemical oxidants) and to collect design parameters data in support of the proposed full scale in situ injections.

The full-scale injection remedy will be performed at the overburden areas with high soil COC concentrations (hot spots) to address and reduce groundwater concentrations to meet Method 1 GW-3 standards for TCE (<=5,000 ug/L) and PCBs (<=10 ug/L). ZVI and proven organic carbon based electron donor sources along with bioaugmentation culture, Dehalococcoides sp., or chemical oxidants (hydrogen peroxide, sodium persulfate or permanganate) will be considered for injections in the pilot study to promote mass destruction in situ.

The location proposed for the in situ pilot test will be determined, but is tentatively targeted to be in the vicinity of MW-7 and covers a small plume area of approximately 75 feet x 50 feet and a depth of approximately 33 feet bgs. The 75-foot width will be perpendicular to the groundwater flow and 50-foot length will be parallel to groundwater flow with injections contained within this defined area. Existing and new wells will be utilized as needed to provide an upgradient well and at least two monitoring wells installed downgradient at approximately 25 feet and 50 feet from the injection zone. Note that the test location (at MW-7) is within the hot spot where COC concentrations are high. It is envisioned that the pilot scale location will become part of the proposed full scale injections after completion of pilot testing.

The pilot scale study will monitor for the following operational and performance monitoring parameters.

- Aquifer capacity to accept the reagents injected into the groundwater including the time required to inject a desired volume and reagent dilution required;
- Pressure or resistance associated with the injections and reagents injection rates;
- COC degradation and by-products formed;
- Reagent distribution;
- Groundwater geochemistry changes and its role in COC destruction; and
- Microbial distribution post-augmentation (if selected).

The data collected from the above monitoring will help establish a design basis and prepare preliminary cost estimates for full scale in situ treatment of soil and groundwater in the overburden hot spots.

8.2.2.3 OU4-1: In Situ Bedrock Treatment Pilot Study

The objective of the pilot scale study is to evaluate the extent of degradation of Site COCs in the deep bedrock groundwater due to an aggressive ISCO remedy and to collect design parameters data in support of the proposed full scale ISCO remedy where bedrock groundwater is impacted with high COC concentrations. The goal of the ISCO remedy is to reduce groundwater contamination to meet UCL standards (TCE <=50,000 ug/L; PCBs <=100 ug/L).

The location proposed for the in situ pilot study is the vicinity of MW-26B and covers a plume area of approximately 60 feet (wide) x 100 feet (length) with treatment depth in the deep bedrock from 46 to 89 feet bgs. Existing well MW-26B will serve as the downgradient monitoring well to measure the oxidant performance while one injection well and one extraction well will be installed in the vicinity of MW-26B to serve as a recirculation system. The ISCO remedy involves pulsed oxidant solution injections through one upgradient injection well combined with groundwater extraction with one extraction well to spread the oxidant. The groundwater recirculation will occur using the extraction/injection well network after pulsed solution injections to facilitate oxidant flow through the fractured rock. The ISCO recirculation design will be a combination of active and passive i.e., alternate between recirculation and shutdown to combine forced and natural groundwater flow. The pilot scale study is expected to last approximately six to eight months. It is envisioned that the pilot scale location will become part of the proposed full scale injection/extraction recirculation system after completion of pilot testing.

The pilot scale study will monitor for the following operational and performance monitoring parameters:

- Bedrock capacity to accept the oxidant injected into the groundwater including the time required to inject a desired volume and reagent dilution required;

- Pressure or resistance associated with the oxidant injections along with injection rates;
- Assay of selected oxidant native oxidant demand to determine dosing;
- COC degradation and by-products formed;
- Oxidant longevity and by-products, if any (e.g., manganese oxide); and
- Groundwater geochemistry changes and its influence on oxidant dosing and longevity.

The data collected from the above monitoring will help establish a design basis and perform preliminary cost estimates for full scale passive injection-extraction recirculation system for treatment of high groundwater COC concentrations in deep bedrock.

As noted above, the three pilot studies are each anticipated to last for approximately eight months. It is anticipated that these studies can be conducted concurrently.

Section 9

Phase III Completion Statement and LSP Opinion

This Phase III RAP has been completed in accordance with the requirements of the MCP (310 CMR 40.0000) and meets the Remedial Action Performance Standards and Phase III Performance Standards as defined in 310 CMR 40.0853. Remedial action alternatives have been evaluated that are reasonably likely to achieve a condition of No Significant Risk. The recommended comprehensive remedial alternative (CRA) is anticipated to achieve a Permanent Solution and will reduce the concentrations of oil and hazardous materials to levels that support a condition of No Significant Risk. Reducing concentrations to levels that achieve or approach background have been determined to be infeasible based on the persistent nature or the COCs and the subsurface conditions at the Site.

A CRA has been selected based on the information and evaluation documented in this Phase III RAP and includes the following:

- Consolidation of Disposal Site soils through excavation and removal of impacted soils above the peat layer with concentrations in excess of 1 mg/kg from the Titleist property and consolidation of these soils on the Aerovox Property, followed by shoreline and landscape restoration;
- Consolidation of Disposal Site soils through excavation and removal of impacted soils above the peat layer and within 25 feet of the shoreline at the Aerovox property, and impacted soils to the depth of bedrock in the northeast corner, stabilization and consolidation of these soils within an impacted area further west on the Aerovox property and outside of the 100-foot buffer zone, followed by shoreline and landscape restoration;
- For the Aerovox property, including the consolidation area, capping with an asphalt cap for areas with soil above 2 mg/kg of PCBs and with an engineered barrier for areas with soils in the top 15 feet bgs with PCBs above the UCL (100 mg/kg), consistent with the MassDEP Engineered Barrier Guidance and the EPA TSCA Determination;
- Containment of impacted groundwater along the north and south Aerovox property boundaries through installation of a vertical barrier;
- Treatment of overburden groundwater through in situ treatment of the source/hot spot portion of the plume and installation of a PRB at the western boundary of the 25-foot wide shoreline excavation area described above;
- Elimination of the on-site storm sewer system as a potential preferential pathway for contaminant migration by cleaning and lining, or where necessary replacing the storm sewer lines, manholes and catch basins;
- Treatment of hot spot bedrock groundwater areas impacted above UCL levels through in situ treatment of hot spots, followed by monitored natural attenuation;
- Monitored natural attenuation of the groundwater/subslab soil gas/indoor air pathway at the Precix property; and
- Implementation of Activity and Use Limitations on the Aerovox and Precix properties to restrict foreseeable future use and provide for long term monitoring and maintenance of the response actions.

Implementation of these response actions, after a period of remedy operation, will lead to a condition of No Significant Risk and a Permanent Solution.

Section 10

Public Notifications

The MCP (310 CMR 40.1403(3)(e)) requires written notice be made upon the completion of a Phase III Remedial Action Plan. This written notice is to be provided to the Chief Municipal Officer and Board of Health in the community where the Site is located. Copies of the written notice letters to public officials are provided in Appendix K, and have been sent to the City of New Bedford concurrent with submittal of this Phase III RAP.

Section 11

Limitations

This document was prepared solely for AVX Corporation in accordance with professional standards at the time the services were performed and in accordance with the contract between AVX Corporation and Brown and Caldwell. This document is governed by the specific scope of work authorized by AVX; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work.

Section 12

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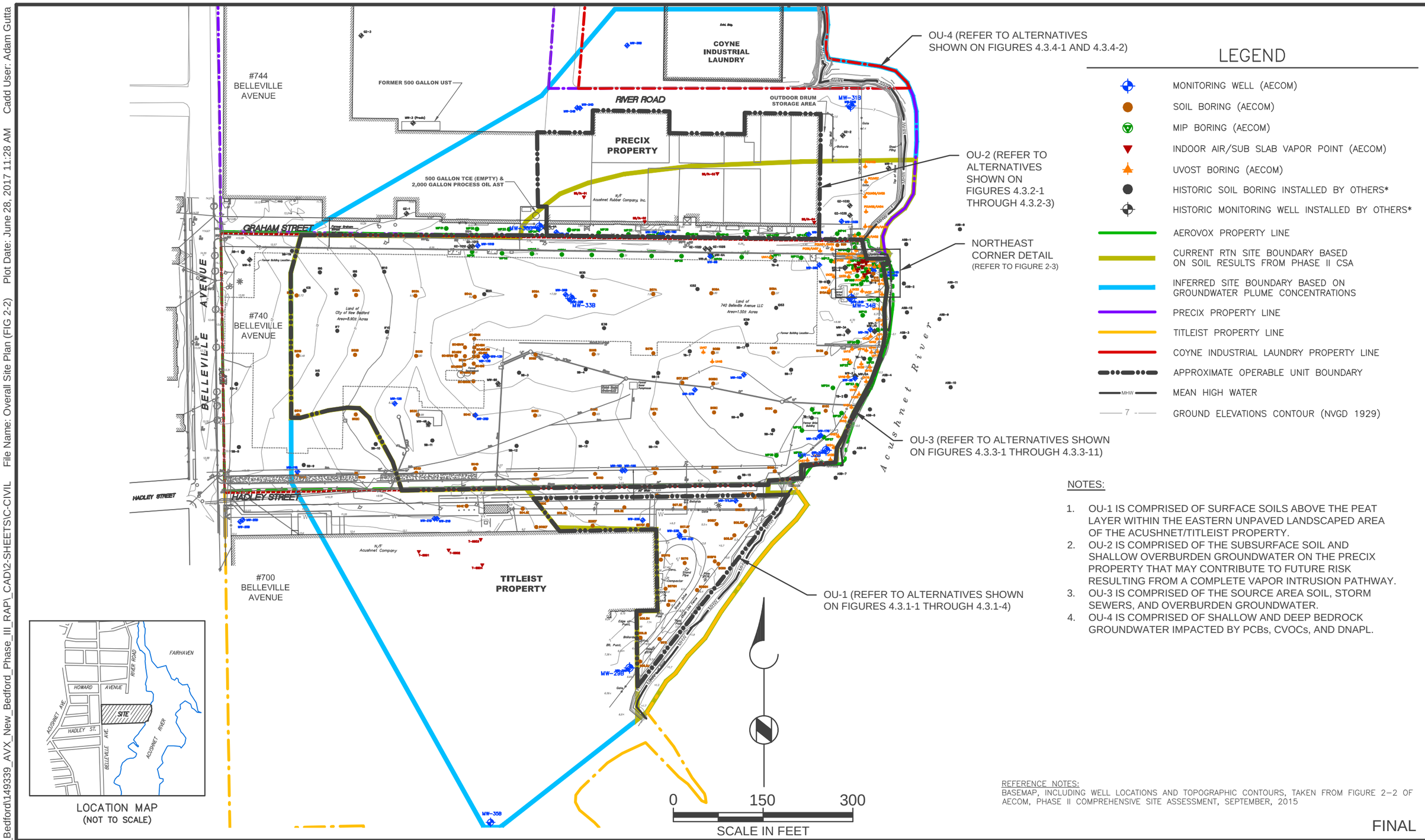


LEGEND

- MONITORING WELL (AECOM)
- SOIL BORING (AECOM)
- MIP BORING (AECOM)
- INDOOR AIR/SUB SLAB VAPOR POINT (AECOM)
- UVOST BORING (AECOM)
- HISTORIC SOIL BORING INSTALLED BY OTHERS*
- HISTORIC MONITORING WELL INSTALLED BY OTHERS*
- AEROVOX PROPERTY LINE
- CURRENT RTN SITE BOUNDARY BASED ON SOIL RESULTS FROM PHASE II CSA
- INFERRED SITE BOUNDARY BASED ON GROUNDWATER PLUME CONCENTRATIONS
- PRECIX PROPERTY LINE
- TITLEIST PROPERTY LINE
- COYNE INDUSTRIAL LAUNDRY PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MEAN HIGH WATER
- 7 GROUND ELEVATIONS CONTOUR (NVGD 1929)

NOTES:

1. OU-1 IS COMPRISED OF SURFACE SOILS ABOVE THE PEAT LAYER WITHIN THE EASTERN UNPAVED LANDSCAPED AREA OF THE ACUSHNET/TITLEIST PROPERTY.
2. OU-2 IS COMPRISED OF THE SUBSURFACE SOIL AND SHALLOW OVERBURDEN GROUNDWATER ON THE PRECIX PROPERTY THAT MAY CONTRIBUTE TO FUTURE RISK RESULTING FROM A COMPLETE VAPOR INTRUSION PATHWAY.
3. OU-3 IS COMPRISED OF THE SOURCE AREA SOIL, STORM SEWERS, AND OVERBURDEN GROUNDWATER.
4. OU-4 IS COMPRISED OF SHALLOW AND DEEP BEDROCK GROUNDWATER IMPACTED BY PCBs, CVOCs, AND DNAPL.

LOCATION MAP
(NOT TO SCALE)

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

FINAL

Brown AND Caldwell

SCALE: 1" = 150'

149339

DATE: June 29, 2017

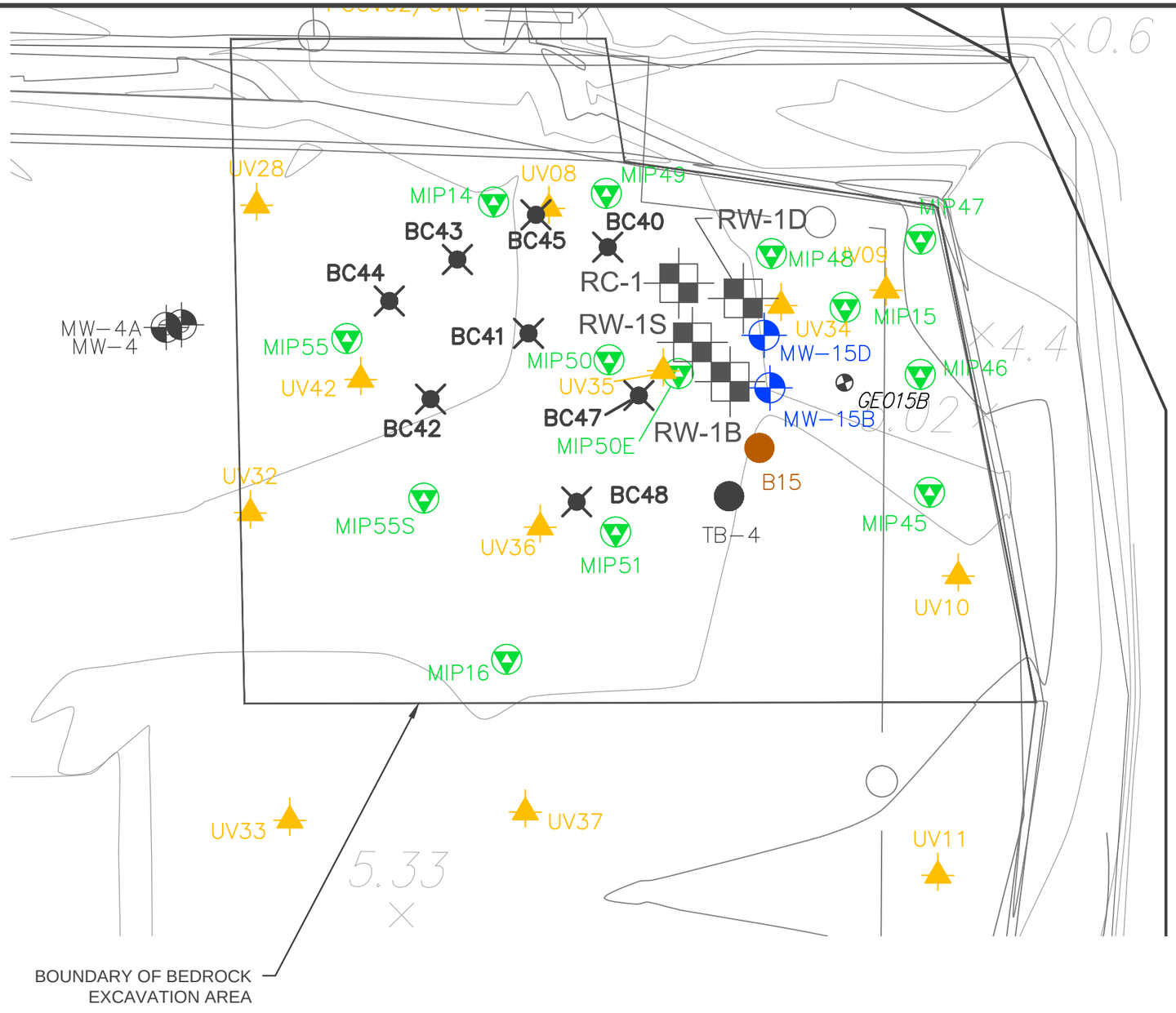
AVX CORPORATION
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY OVERALL SITE PLAN IDENTIFYING OPERABLE UNITS (OU'S)

FIGURE

2-2

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: Overall Site Plan (FIG 2-2) Plot Date: June 28, 2017 11:28 AM Cadd User: Adam Gutta

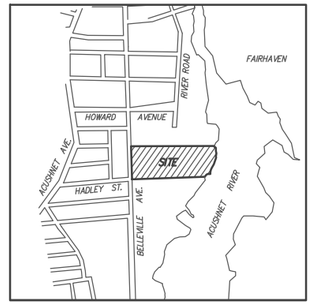


LEGEND

- FREE PRODUCT RECOVERY WELL
- MONITORING WELL
- ISCO TREATABILITY SOIL SAMPLE
- SOIL BORING
- MIP BORING
- INDOOR AIR/SUB SLAB VAPOR POINT
- UVOST BORING
- PRE-PHASE II CSA SOIL BORING*
- PRE-PHASE II CSA MONITORING WELL*
- PROPERTY LINE
- San. — SANITARY SEWER LINES
- Storm. — STORM SEWER LINES
- W — WATER LINES
- G — GAS LINES
- E — ELECTRIC LINES

KEY

- RW-1B — SHALLOW BEDROCK DNAPL RECOVERY WELL
- RW-1S — SHALLOW OVERBURDEN DNAPL RECOVERY WELL
- RW-1D — DEEP OVERBURDEN DNAPL RECOVERY WELL
- RC-1 — GROUNDWATER RECIRCULATION WELL



LOCATION MAP
(NOT TO SCALE)

FINAL

Brown AND Caldwell

SCALE: 1" = 10'

149339

DATE: June 29, 2017

AVX CORPORATION
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

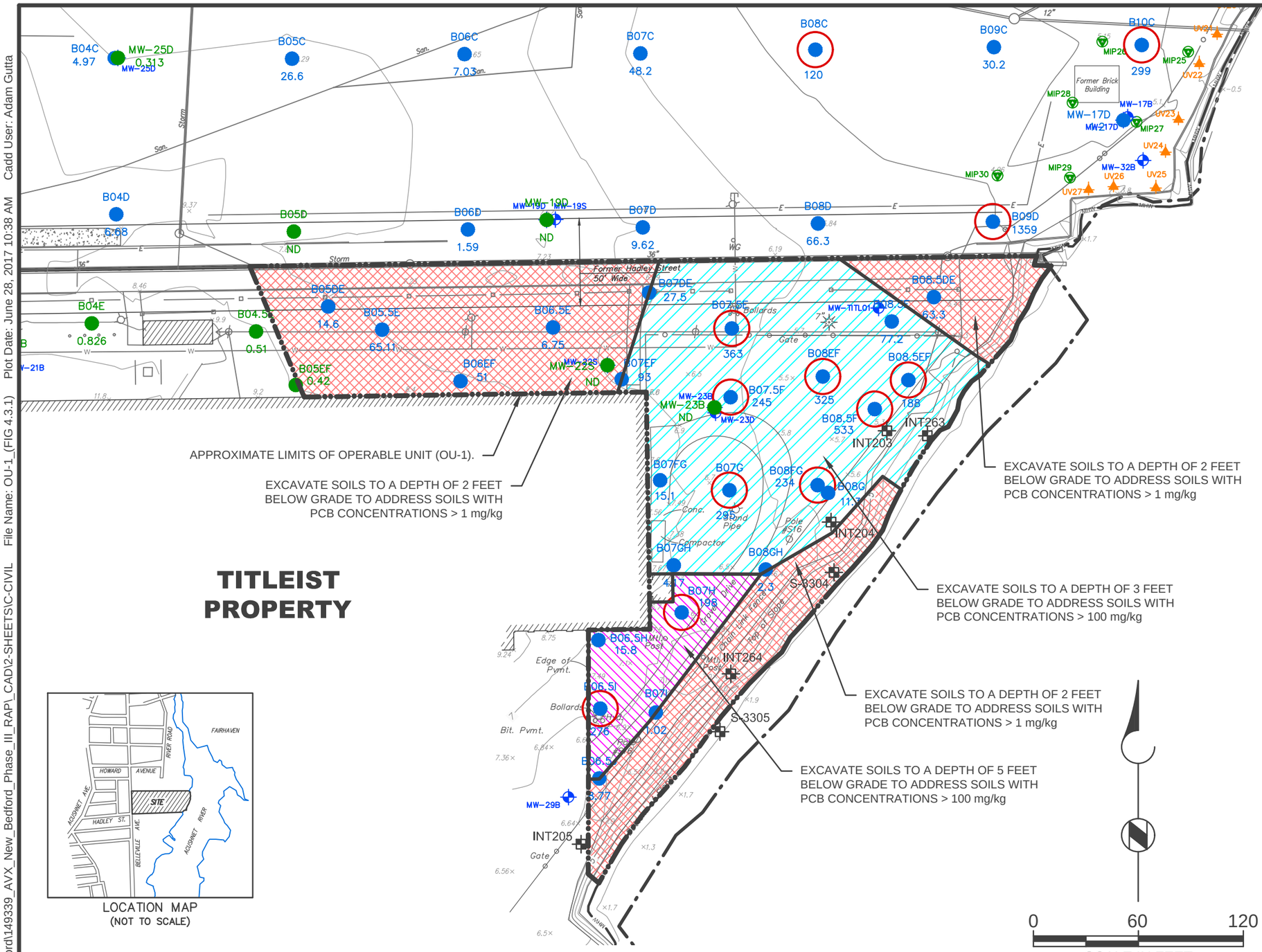
FORMER AEROVOX FACILITY

DETAIL OF NORTHEAST CORNER
OF AEROVOX FACILITY

FIGURE

2-3

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: Detail Of NE Corner2 Plot Date: June 28, 2017 9:29 AM Cadd User: Adam Gutta



LOCATION MAP
(NOT TO SCALE)

LEGEND

- SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- EPA SAMPLE LOCATION
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- EXCAVATE TO 2 FEET BELOW GRADE
- EXCAVATE TO 3 FEET BELOW GRADE
- EXCAVATE TO 5 FEET BELOW GRADE

GENERAL CONSTRUCTION SEQUENCE:

1. EXCAVATE SOILS WITHIN THE AREAS SHOWN AND TO THE DEPTHS INDICATED ON THIS FIGURE.
2. BACKFILL ALL EXCAVATIONS TO A DEPTH OF 2 FEET BGS WITH CERTIFIED CLEAN FILL MATERIALS.
3. INSTALL DEMARCATION LAYER.
4. BACKFILL ALL EXCAVATIONS TO FINAL GRADE WITH CERTIFIED CLEAN FILL MATERIALS.
5. RESTORE AREA IN KIND.
6. CONSOLIDATE EXCAVATED SOILS ONTO OU-3 OR CHARACTERIZE AND DISPOSE OF EXCAVATED SOILS AT AN OFF-SITE FACILITY(IES) LICENSED AND PERMITTED TO ACCEPT THE TYPE OF WASTE.

NOTES:

1. EXCAVATION ACTIVITIES WILL NOT BE CONDUCTED BELOW THE PEAT LAYER. IF THE PEAT LAYER IS ENCOUNTERED PRIOR TO REACHING THE NOTED EXCAVATION DEPTH, EXCAVATION ACTIVITIES WILL CEASE.
2. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 1 AS PART OF THE REMEDY.

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

FINAL

Brown AND Caldwell

SCALE: 1" = 60'

149339

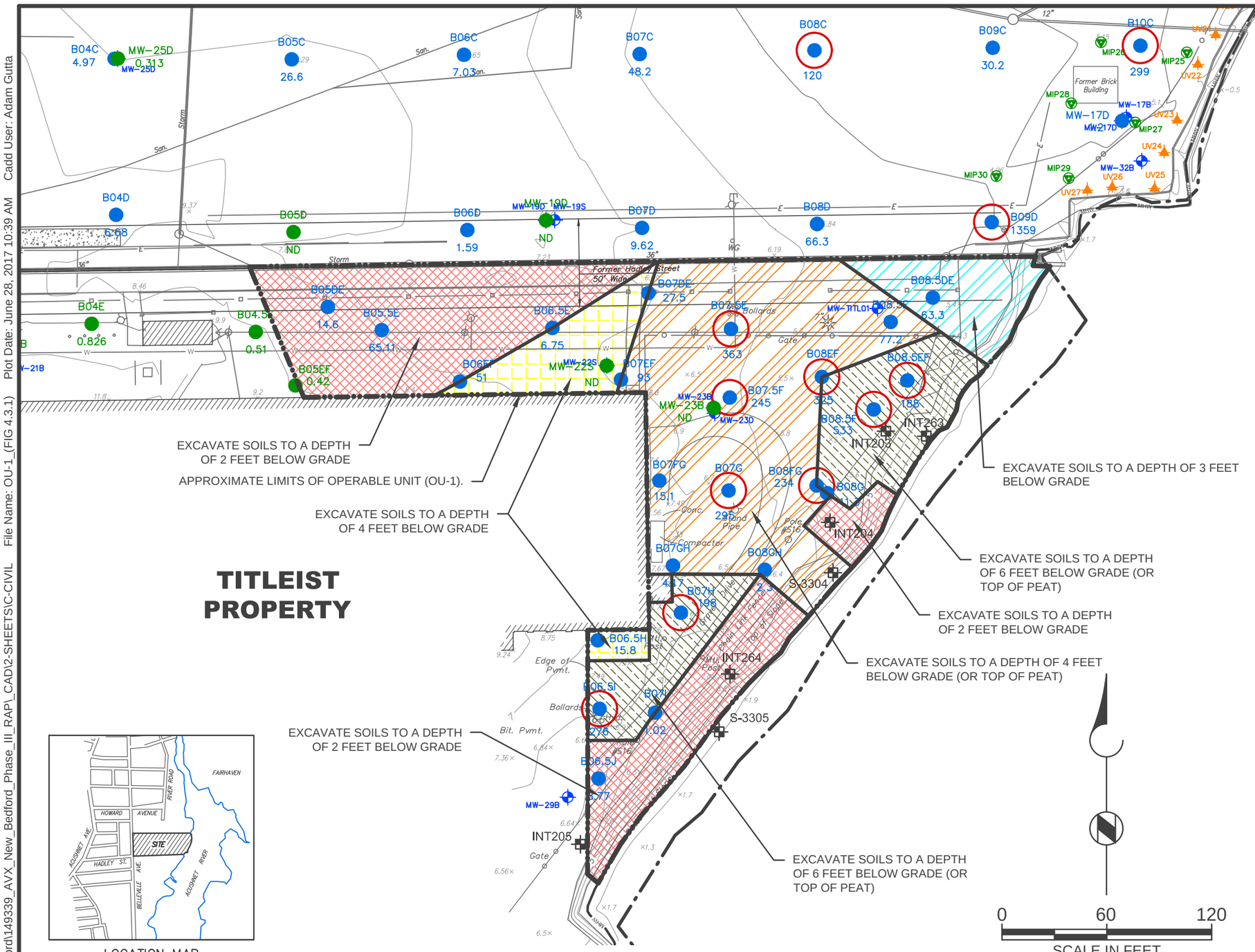
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-1
(TITLEIST PROPERTY SOILS)
ALTERNATIVE 1

FIGURE
4.3.1-1

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-1_(FIG 4.3.1) Plot Date: June 28, 2017 10:38 AM Cadd User: Adam Gutta



LOCATION MAP
(NOT TO SCALE)

LEGEND

- SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- EPA SAMPLE LOCATION
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- EXCAVATE TO 2 FEET BELOW GRADE
- EXCAVATE TO 3 FEET BELOW GRADE
- EXCAVATE TO 4 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO 4 FEET BELOW GRADE
- EXCAVATE TO 6 FEET BELOW GRADE (OR TOP OF PEAT)

GENERAL CONSTRUCTION SEQUENCE:

1. EXCAVATE SOILS WITHIN THE AREAS SHOWN AND TO THE DEPTHS INDICATED ON THIS FIGURE TO ADDRESS SOILS WITH PCB CONCENTRATIONS > 4 MG/KG.
2. BACKFILL ALL EXCAVATIONS TO A DEPTH OF 2 FEET BGS WITH CERTIFIED CLEAN FILL MATERIALS.
3. INSTALL DEMARCATION LAYER.
4. BACKFILL ALL EXCAVATIONS TO FINAL GRADE WITH CERTIFIED CLEAN FILL MATERIALS.
5. RESTORE AREA IN KIND.
6. CONSOLIDATE EXCAVATED SOILS ONTO OU-3 OR CHARACTERIZE AND DISPOSE OF EXCAVATED SOILS AT AN OFF-SITE FACILITY(IES) LICENSED AND PERMITTED TO ACCEPT THE TYPE OF WASTE.

NOTES:

1. EXCAVATION ACTIVITIES WILL NOT BE CONDUCTED BELOW THE PEAT LAYER. IF THE PEAT LAYER IS ENCOUNTERED PRIOR TO REACHING THE NOTED EXCAVATION DEPTH, EXCAVATION ACTIVITIES WILL CEASE.
2. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 1 AS PART OF THE REMEDY.

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

FINAL

Brown AND Caldwell

SCALE: 1" = 60'

149339

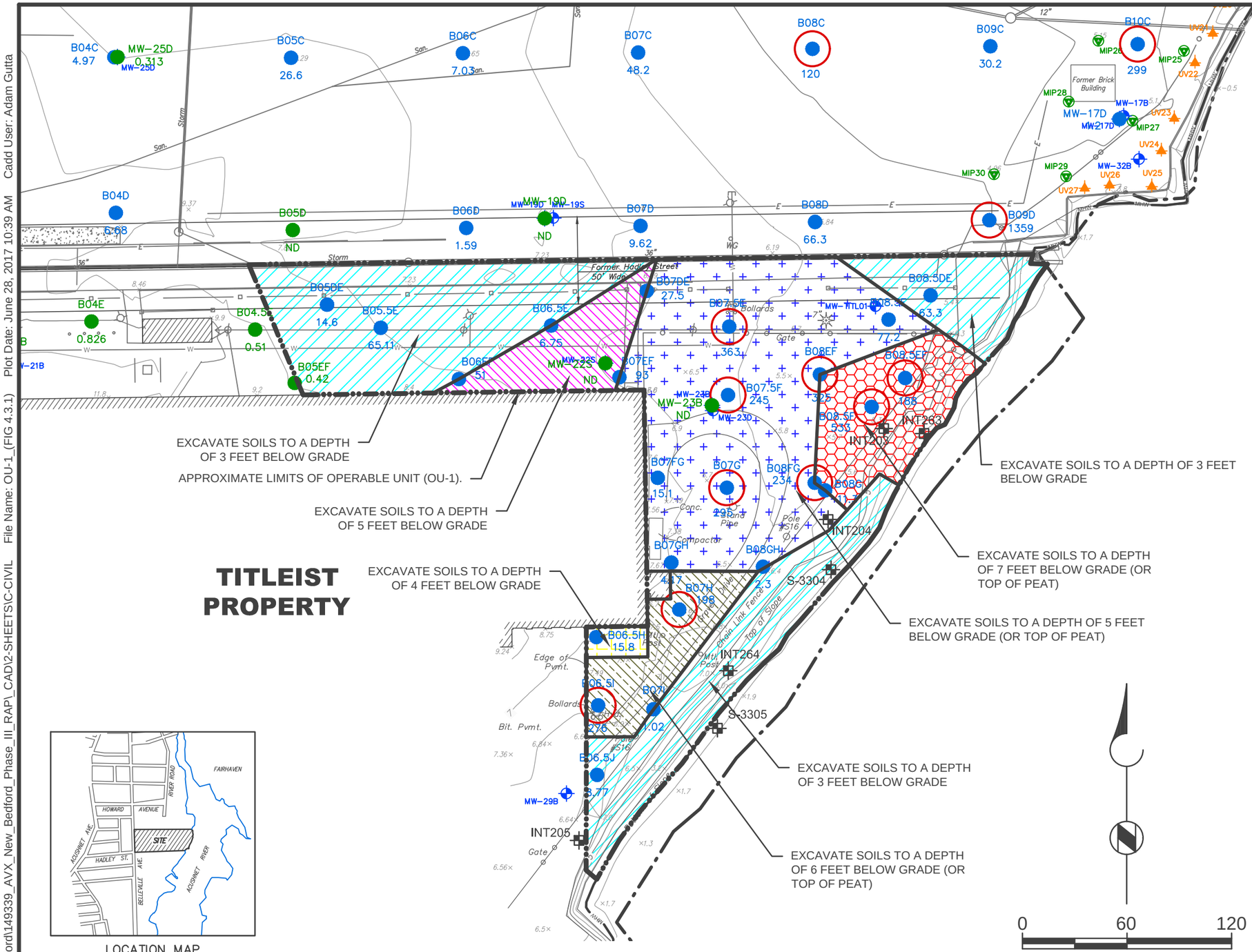
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-1
(TITLEIST PROPERTY SOILS)
ALTERNATIVE 2

FIGURE
4.3.1-2

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-1_(FIG 4.3.1) Plot Date: June 28, 2017 10:39 AM Cadd User: Adam Gutta



LEGEND

- SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- EPA SAMPLE LOCATION
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- EXCAVATE TO 3 FEET BELOW GRADE
- EXCAVATE TO 4 FEET BELOW GRADE
- EXCAVATE TO 5 FEET BELOW GRADE
- EXCAVATE TO 5 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO 6 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO 7 FEET BELOW GRADE (OR TOP OF PEAT)

LOCATION MAP
(NOT TO SCALE)

GENERAL CONSTRUCTION SEQUENCE:

1. EXCAVATE SOILS WITHIN THE AREAS SHOWN AND TO THE DEPTHS INDICATED ON THIS FIGURE TO ADDRESS SOILS WITH PCB CONCENTRATIONS > 1 MG/KG (UNRESTRICTED USE).
2. BACKFILL ALL EXCAVATIONS TO FINAL GRADE WITH CERTIFIED CLEAN FILL MATERIALS.
3. RESTORE AREA IN KIND.
4. CONSOLIDATE EXCAVATED SOILS ONTO OU-3 OR CHARACTERIZE AND DISPOSE OF EXCAVATED SOILS AT AN OFF-SITE FACILITY(IES) LICENSED AND PERMITTED TO ACCEPT THE TYPE OF WASTE.

NOTES:

1. EXCAVATION ACTIVITIES WILL NOT BE CONDUCTED BELOW THE PEAT LAYER. IF THE PEAT LAYER IS ENCOUNTERED PRIOR TO REACHING THE NOTED EXCAVATION DEPTH, EXCAVATION ACTIVITIES WILL CEASE.
2. NO ACTIVITY AND USE LIMITATION (AUL) WILL BE REQUIRED OVER THE EXTENT OF OPERABLE UNIT (OU) 1 AS PART OF THE REMEDY.

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

FINAL

Brown AND Caldwell

SCALE: 1" = 60'

149339

DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

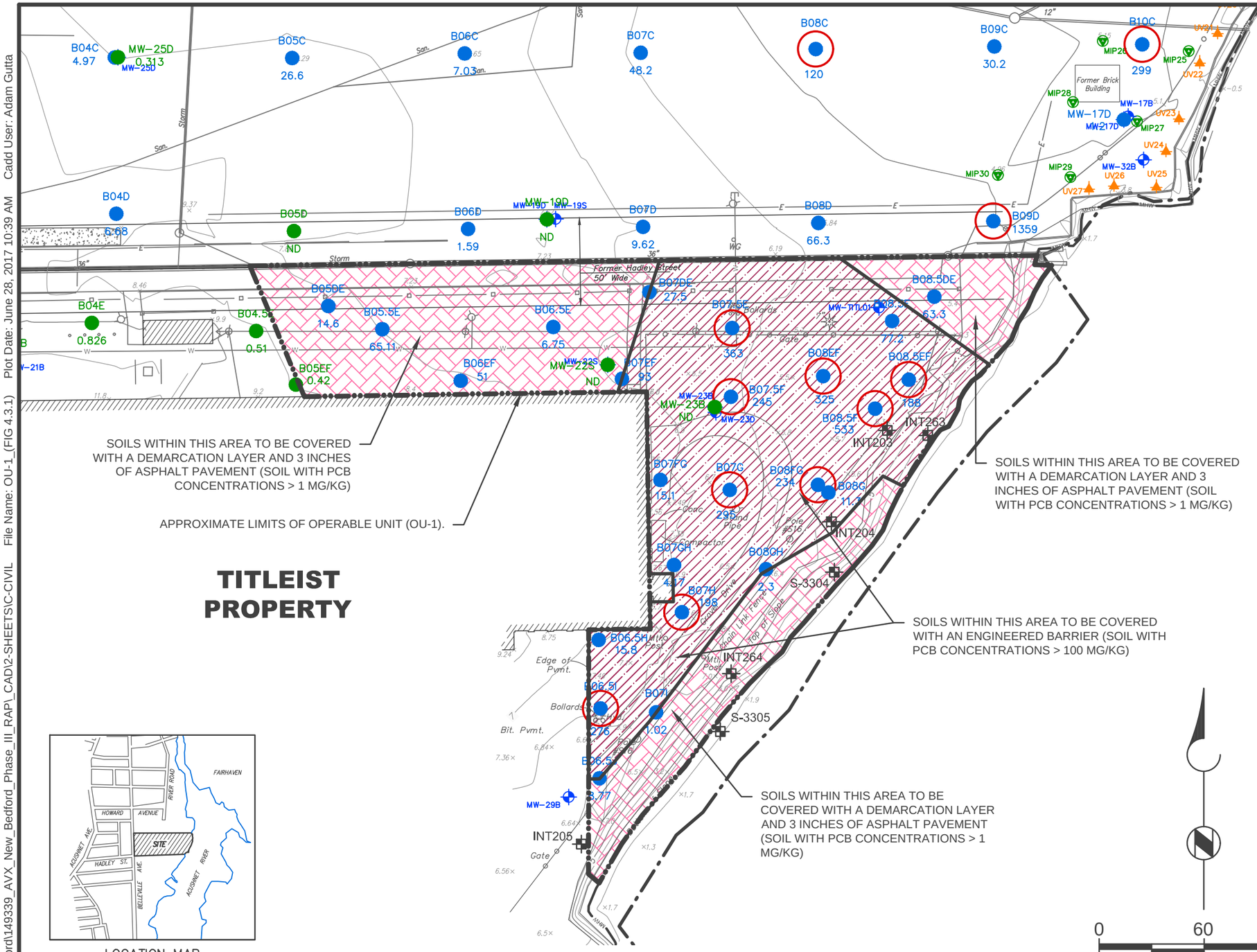
FORMER AEROVOX FACILITY
OU-1
(TITLEIST PROPERTY SOILS)
ALTERNATIVES 3A AND 3B

FIGURE

4.3.1-3

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-1_(FIG 4.3.1) Plot Date: June 28, 2017 10:39 AM Cadd User: Adam Gutta

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETSIC-CIVIL File Name: OU-1_(FIG 4.3.1) Plot Date: June 28, 2017 10:39 AM Cadd User: Adam Gutta



TITLEIST PROPERTY

LEGEND

- SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- EPA SAMPLE LOCATION
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- ASPHALT COVER
- ENGINEERING BARRIER COVER

GENERAL CONSTRUCTION SEQUENCE:

1. INSTALL DEMARCATION LAYER AND PAVEMENT CAP OVER SOILS WITH PCB CONCENTRATIONS > 1 MG/KG.
2. INSTALL DEMARCATION LAYER AND ENGINEERED BARRIER AT LOCATIONS WITH PCB CONCENTRATIONS > 100 MG/KG.
3. CONSOLIDATE EXCAVATED SOILS ONTO OU-3 OR CHARACTERIZE AND DISPOSE OF EXCAVATED SOILS AT AN OFF-SITE FACILITY(IES) LICENSED AND PERMITTED TO ACCEPT THE TYPE OF WASTE.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 1 AS PART OF THE REMEDY.

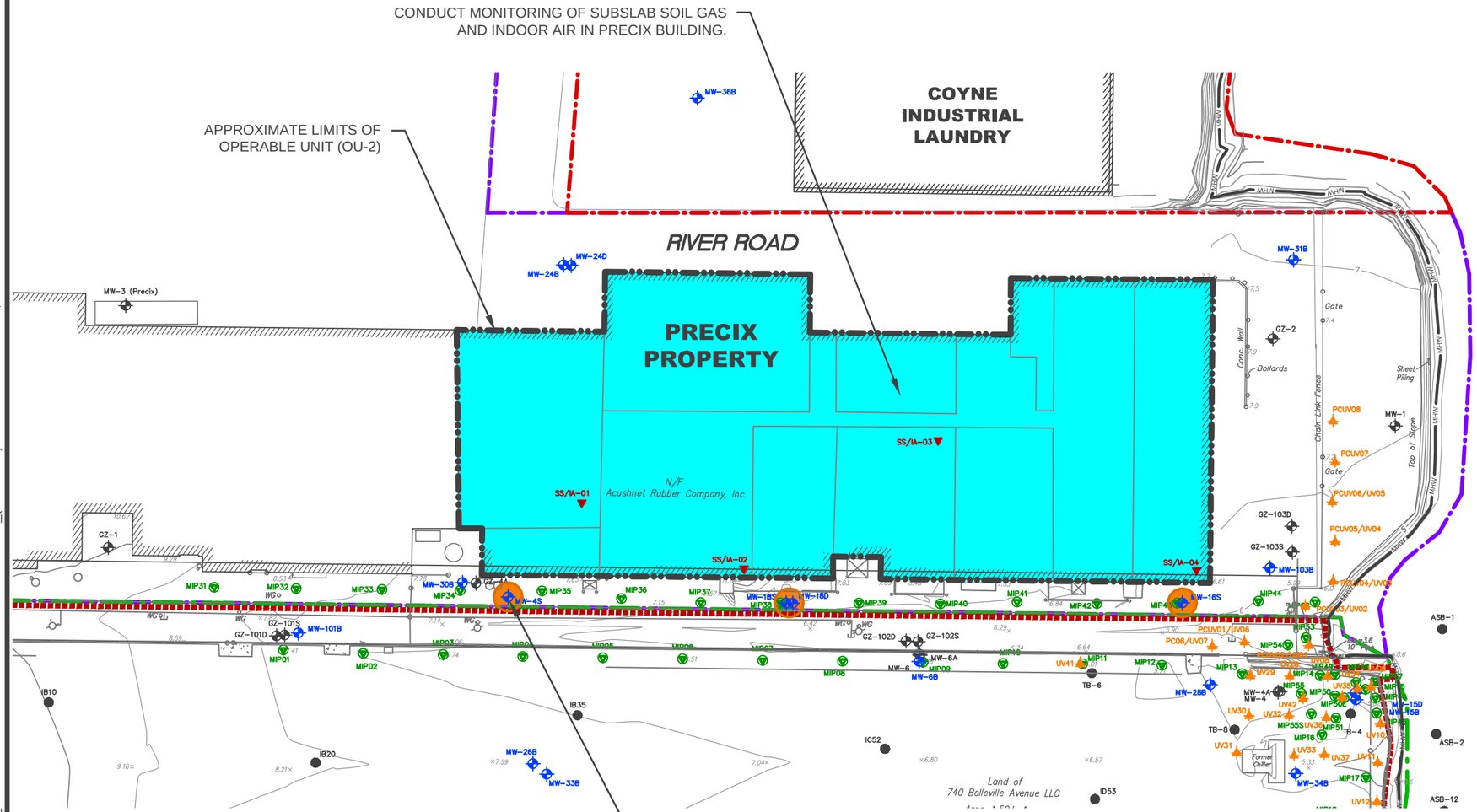
REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LOCATION MAP
(NOT TO SCALE)

0 60 120
SCALE IN FEET

FINAL

Brown AND Caldwell	SCALE: 1" = 60' 149339 DATE: June 29, 2017	FORMER AEROVOX FACILITY 740 BELLEVILLE AVENUE NEW BEDFORD, MA	FORMER AEROVOX FACILITY OU-1 (TITLEIST PROPERTY SOILS) ALTERNATIVE 4	FIGURE 4.3.1-4



CONDUCT MONITORING OF GROUNDWATER.

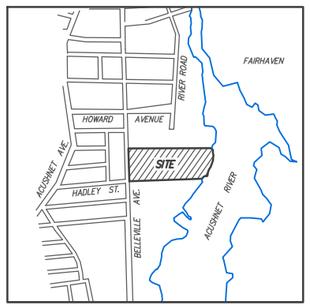
LEGEND

- MONITORING WELL (PHASE II CSA)
- SOIL BORING (PHASE II CSA)
- MIP BORING (PHASE II CSA)
- INDOOR AIR/SUB SLAB VAPOR POINT (PHASE II CSA)
- UVOST BORING (PHASE II CSA)
- HISTORIC SOIL BORING (PRE-PHASE II CSA)
- HISTORIC MONITORING WELL (PRE-PHASE II CSA)
- AEROVOX PROPERTY LINE
- RTN SITE BOUNDARY
- PRECIX PROPERTY LINE
- COYNE INDUSTRIAL LAUNDRY PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MHW — MEAN HIGH WATER
- MONITORING WELL TO WHICH MCP METHOD 1 GW-2 CRITERIA APPLY AND CONCENTRATION OF TRICHLOROETHENE IS ABOVE THE GW-2 VALUE OF 5 µg/L
- CONDUCT SEASONAL MONITORING OF SUBSLAB SOIL GAS AND INDOOR AIR

NOTES:

1. ALTERNATIVE 1 FOR OPERABLE UNIT 2 INCLUDES MONITORING SUBSLAB GAS ATTENUATION TO CONFIRM VAPOR INTRUSION DOES NOT PRESENT A SIGNIFICANT RISK FOR CURRENT OR FORESEEABLE FUTURE BUILDING OCCUPANTS.
2. AN AUL WILL BE ASSIGNED TO THE SITE TO RESTRICT BUILDING USE UNTIL ATTENUATION DEMONSTRATES VAPOR INTRUSION RELATED RESTRICTIONS ARE NO LONGER REQUIRED.
3. MONITORING OF GROUNDWATER, SUBSLAB SOIL GAS AND INDOOR AIR SHALL BE CONDUCTED WITHIN THE AREA OF THE PRECIX PROPERTY WHERE GW-2 APPLIES AND GROUNDWATER LEVELS ARE ABOVE CORRESPONDING GW-2 VALUES.

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015



LOCATION MAP
(NOT TO SCALE)

FINAL

Brown AND Caldwell

SCALE: 1" = 80'

149339

DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-2
(PRECIX PROPERTY VAPOR INTRUSION)
ALTERNATIVE 1

FIGURE
4.3.2-1

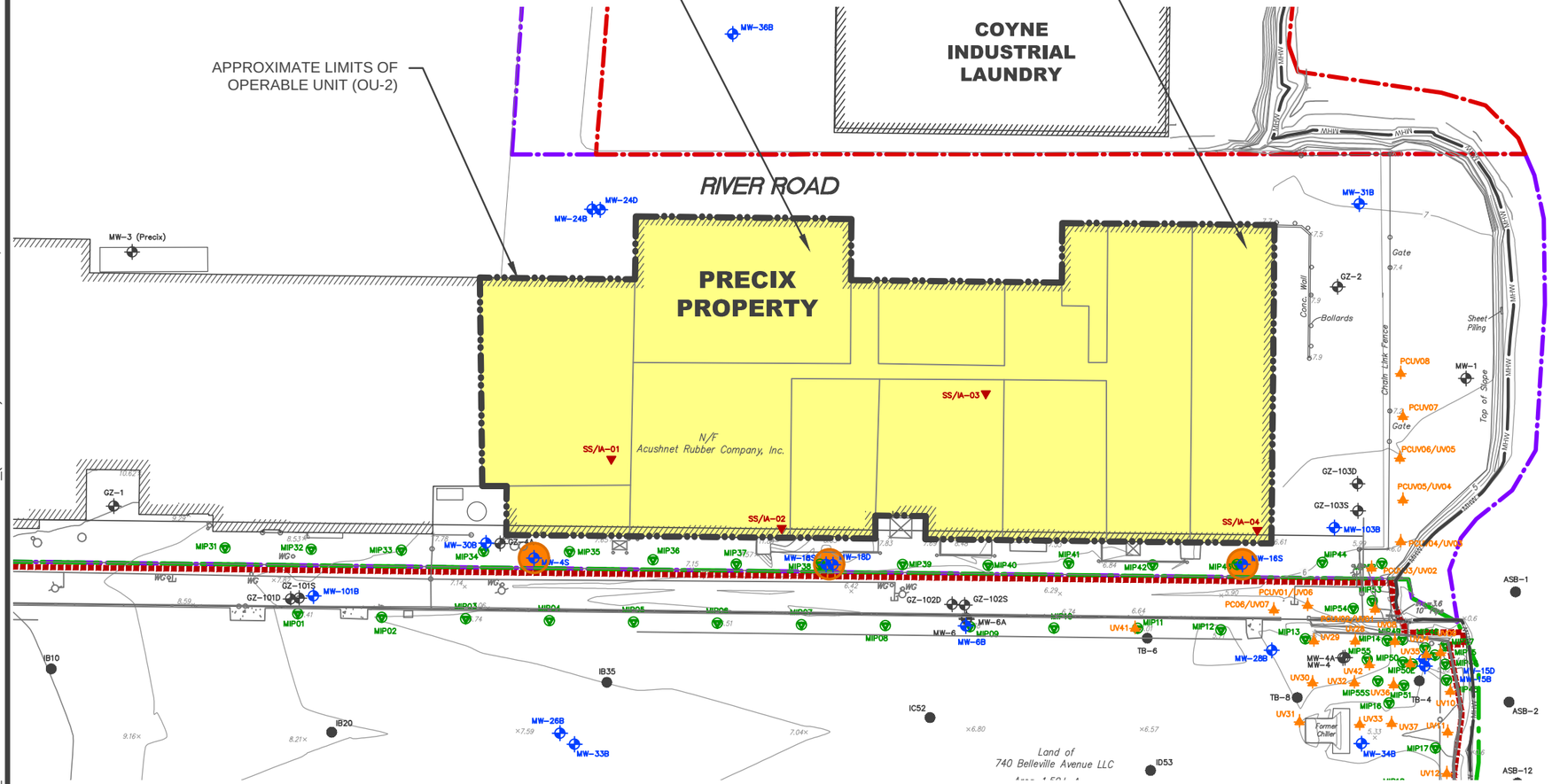
Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-2_(FIG 4.3.2) Plot Date: June 28, 2017 11:08 AM Cadd User: Adam Gutta

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-2_(FIG 4.3.2) Plot Date: June 28, 2017 11:08 AM Cadd User: Adam Gutta

INSTALL VAPOR BARRIER OVER FLOOR SLAB, SEAL FLOOR PENETRATIONS

CONDUCT MONITORING OF SUBSLAB SOIL GAS AND INDOOR AIR IN PRECIX BUILDING.

APPROXIMATE LIMITS OF OPERABLE UNIT (OU-2)



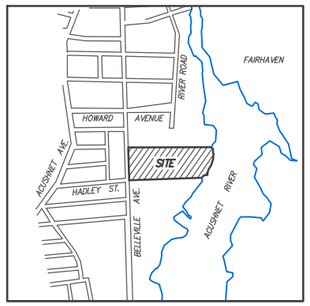
LEGEND

- MONITORING WELL (PHASE II CSA)
- SOIL BORING (PHASE II CSA)
- MIP BORING (PHASE II CSA)
- INDOOR AIR/SUB SLAB VAPOR POINT (PHASE II CSA)
- UVOST BORING (PHASE II CSA)
- HISTORIC SOIL BORING (PRE-PHASE II CSA)
- HISTORIC MONITORING WELL (PRE-PHASE II CSA)
- AEROVOX PROPERTY LINE
- RTN SITE BOUNDARY
- PRECIX PROPERTY LINE
- COYNE INDUSTRIAL LAUNDRY PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MHW — MEAN HIGH WATER
- MONITORING WELL TO WHICH MCP METHOD 1 GW-2 CRITERIA APPLY AND CONCENTRATION OF TRICHLOROETHENE IS ABOVE THE GW-2 VALUE OF 5 µg/L
- INSTALL VAPOR BARRIER OVER FLOOR SLAB

NOTES:

1. THIS ALTERNATIVE INCLUDES INSTALLATION OF A VAPOR BARRIER OVER A PORTION OF THE PRECIX BUILDING FLOOR SLAB AND ALL FLOOR PENETRATIONS TO RESTRICT FUTURE VAPOR INTRUSION.
2. ANNUAL MONITORING OF SUBSLAB SOIL GAS AND INDOOR AIR SHALL BE CONDUCTED WITHIN THE AREA OF THE PRECIX PROPERTY WHERE GROUNDWATER CONTAMINANT CONCENTRATIONS ARE ABOVE CORRESPONDING GW-2 VALUES.
3. AUL WILL BE PROVIDED ON IMPACTED PORTION OF PROPERTY TO RESTRICT FORESEEABLE FUTURE BUILDING USES AND TO PROVIDE FOR CONTINUED MONITORING, INSPECTION AND MAINTENANCE OF THE VAPOR BARRIER.

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015



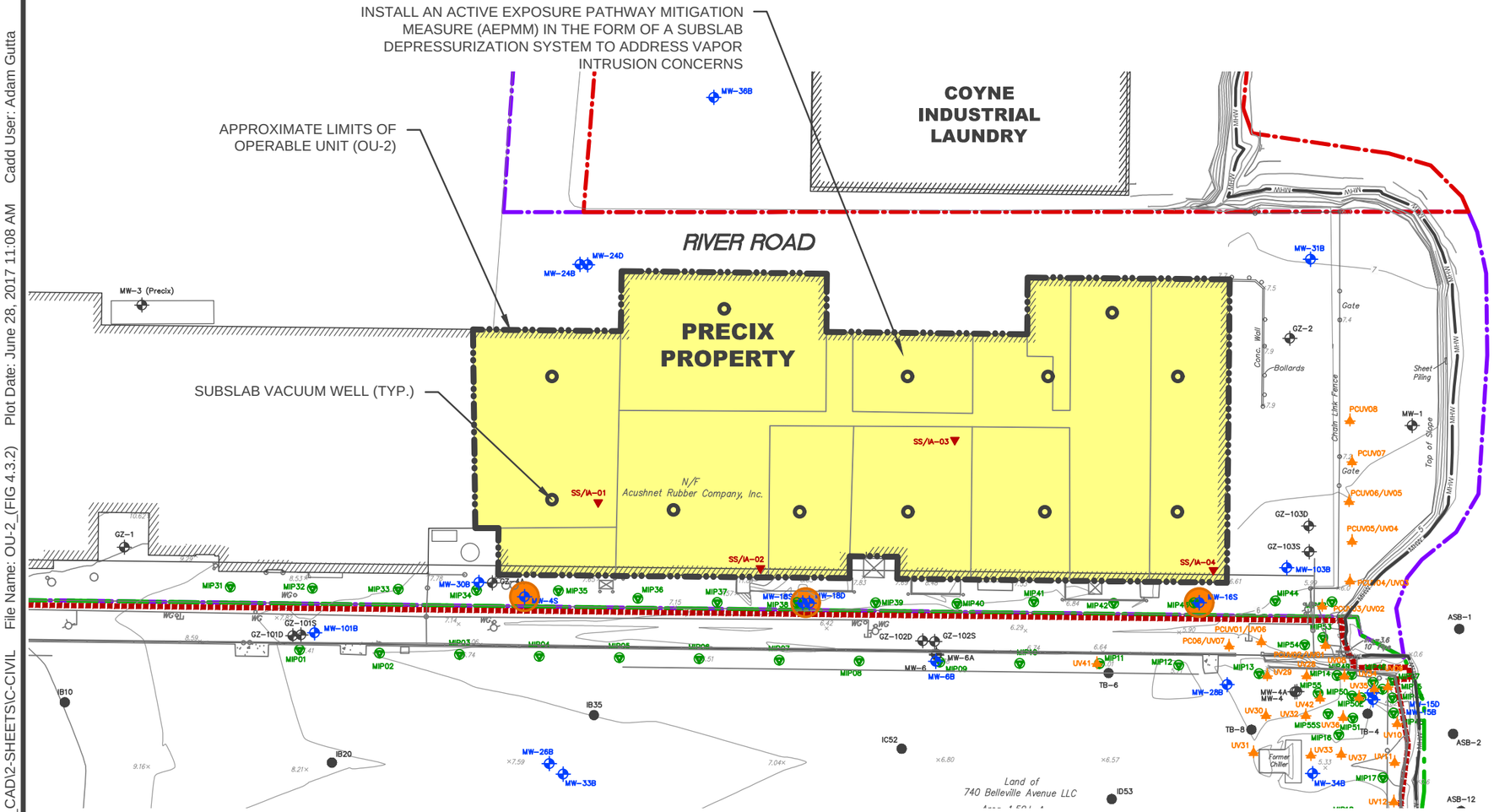
LOCATION MAP
(NOT TO SCALE)

0 80 160
SCALE IN FEET

FINAL

Brown AND Caldwell	SCALE: 1" = 80' 149339 DATE: June 29, 2017	FORMER AEROVOX FACILITY 740 BELLEVILLE AVENUE NEW BEDFORD, MA	FORMER AEROVOX FACILITY OU-2 (PRECIX PROPERTY VAPOR INTRUSION) ALTERNATIVE 2	FIGURE 4.3.2-2

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETSIC-CIVIL File Name: OU-2_(FIG 4.3.2) Plot Date: June 28, 2017 11:08 AM Cadd User: Adam Gutta



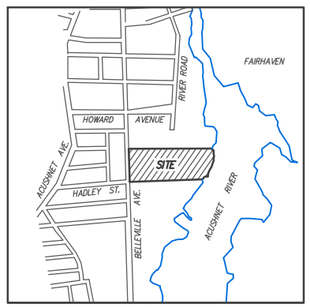
LEGEND

- MONITORING WELL (PHASE II CSA)
- SOIL BORING (PHASE II CSA)
- MIP BORING (PHASE II CSA)
- INDOOR AIR/SUB SLAB VAPOR POINT (PHASE II CSA)
- UVOST BORING (PHASE II CSA)
- HISTORIC SOIL BORING (PRE-PHASE II CSA)
- HISTORIC MONITORING WELL (PRE-PHASE II CSA)
- AEROVOX PROPERTY LINE
- RTN SITE BOUNDARY
- PRECIX PROPERTY LINE
- COYNE INDUSTRIAL LAUNDRY PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MHW — MEAN HIGH WATER
- MONITORING WELL TO WHICH MCP METHOD 1 GW-2 CRITERIA APPLY AND CONCENTRATION OF TRICHLOROETHENE IS ABOVE THE GW-2 VALUE OF 5 µg/L
- INSTALL SUBSLAB DEPRESSURIZATION SYSTEM
- SUBSLAB VACUUM WELL (TYP.)

NOTES:

1. THIS ALTERNATIVE INCLUDES INSTALLATION OF AN ACTIVE SUBSLAB DEPRESSURIZATION SYSTEM (ACTIVE EXPOSURE PATHWAY MITIGATION MEASURE OR AEPMM) WITHIN THE AREA OF THE PRECIX PROPERTY WHERE GW-2 APPLIES AND GROUNDWATER CONTAMINANT CONCENTRATIONS ARE ABOVE APPLICABLE GW-2 VALUES.
2. CONFIRMATORY MONITORING OF PRESSURE DIFFERENTIAL ACROSS BUILDING SLAB SHALL BE CONDUCTED.
3. AUL WILL BE PROVIDED ON IMPACTED PORTION OF PROPERTY TO RESTRICT FORESEEABLE FUTURE BUILDING USES AND TO PROVIDE FOR CONTINUED OPERATION AND MAINTENANCE OF THE AEPMM.
4. THE SUBSLAB VACUUM WELL LAYOUT WILL BE FINALIZED BASED ON THE OBSERVED RADIUS OF INFLUENCE.
5. AEPMM WILL INCLUDE REMOTE TELEMETRY.

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015



LOCATION MAP
(NOT TO SCALE)

FINAL

Brown AND Caldwell

SCALE: 1" = 80'

149339

DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-2
(PRECIX PROPERTY VAPOR INTRUSION)
ALTERNATIVE 3

FIGURE
4.3.2-3

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETSIC-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:13 AM Cadd User: Adam Gutta

PRECIX PROPERTY

EXCAVATE TO 8 FEET

500 GALLON TCE (EMPTY) & 2,000 GALLON PROCESS OIL AST

EXCAVATE TO 3 FEET

EXCAVATE TO 13 FEET

EXCAVATE TO 15 FEET

EXCAVATE TO 7 FEET

EXCAVATE TO 13 FEET

EXCAVATE TO 3 FEET

EXCAVATE TO 15 FEET

EXCAVATE TO 4 FEET

AREAS EXCAVATED AS PART OF THE IMMEDIATE RESPONSE ACTION

EXCAVATE SOILS WITH CONTAMINANT CONCENTRATIONS > UCLs TO THE DEPTHS INDICATED, DISPOSE OF OFF-SITE.

REAGENTS WILL BE INJECTED BETWEEN 7 TO 33 FEET BGS

APPROXIMATE LIMITS OF OPERABLE UNIT (OU-3)

REMOVE SEDIMENTS, CLEAN, REPAIR AND LINE EXISTING STORM SEWER, OR REPLACE IN KIND.

GRAHAM STREET

BELLEVILLE AVENUE

HADLEY STREET

#740 BELLEVILLE AVENUE

#700 BELLEVILLE AVENUE

TITLEIST PROPERTY

Acushnet River

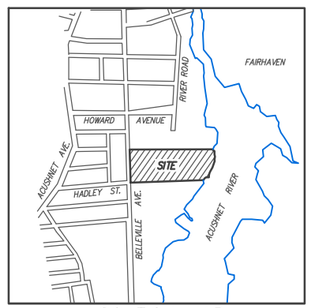
N/F Acushnet Company

740 Belleville Avenue LLC Assessor's Plate 7 Lot 4 Area = 1.504 Acres

City of New Bedford Area = 0.925 Acres

LEGEND

- SOIL SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- OVERBURDEN GROUNDWATER EXTRACTION WELL
- IN SITU TREATMENT AREA
- EXCAVATE TO 3 FEET BELOW GRADE
- EXCAVATE TO 4 FEET BELOW GRADE
- EXCAVATE TO 7 FEET BELOW GRADE
- EXCAVATE TO 8 FEET BELOW GRADE
- EXCAVATE TO 13 FEET BELOW GRADE
- EXCAVATE TO 15 FEET BELOW GRADE



LOCATION MAP (NOT TO SCALE)

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

0 120 240
SCALE IN FEET

GENERAL CONSTRUCTION SEQUENCE:

1. CONSTRUCT GROUNDWATER TREATMENT SYSTEM.
2. EXCAVATE/DEWATER SOILS WITH CONTAMINANT CONCENTRATIONS > UCLs AND DISPOSE OFF-SITE. BACKFILL WITH SEGREGATED SOILS AND CLEAN FILL.
3. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
4. INSTALL ISCO INJECTION POINTS, GROUNDWATER MONITORING WELLS, AND GROUNDWATER EXTRACTION WELLS.
5. INITIATE IN-SITU TREATMENT OF HOT SPOTS.
6. INITIATE EXTRACTION SYSTEM OPERATION.
7. INSTALL VERTICAL CONTAINMENT BARRIER.
8. RESTORE ASPHALT CAP WHERE RESIDUAL PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. SOILS SEGREGATED BASED ON CONCENTRATION WITH THOSE CONTAINING CONTAMINANTS CONCENTRATIONS BELOW THEIR RESPECTIVE UCLs RETURNED TO EXCAVATION.
3. IN-SITU TREATMENT AREA CORRESPONDS TO THE AREA WHERE AVERAGE TCE CONCENTRATIONS IN DEEP OVERBURDEN GROUNDWATER EXCEED THE GW-3 STANDARD.
4. ACTUAL AREA AND CONFIGURATION OF HYDRAULIC CONTAINMENT WOULD BE OPTIMIZED AND REDEFINED IN REMEDIAL DESIGN; BOUNDARY AND EXTRACTION WELL LOCATIONS SHOWN HERE ARE CONSERVATIVE BASED ON GW-3 EXCEEDANCES.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'

149339

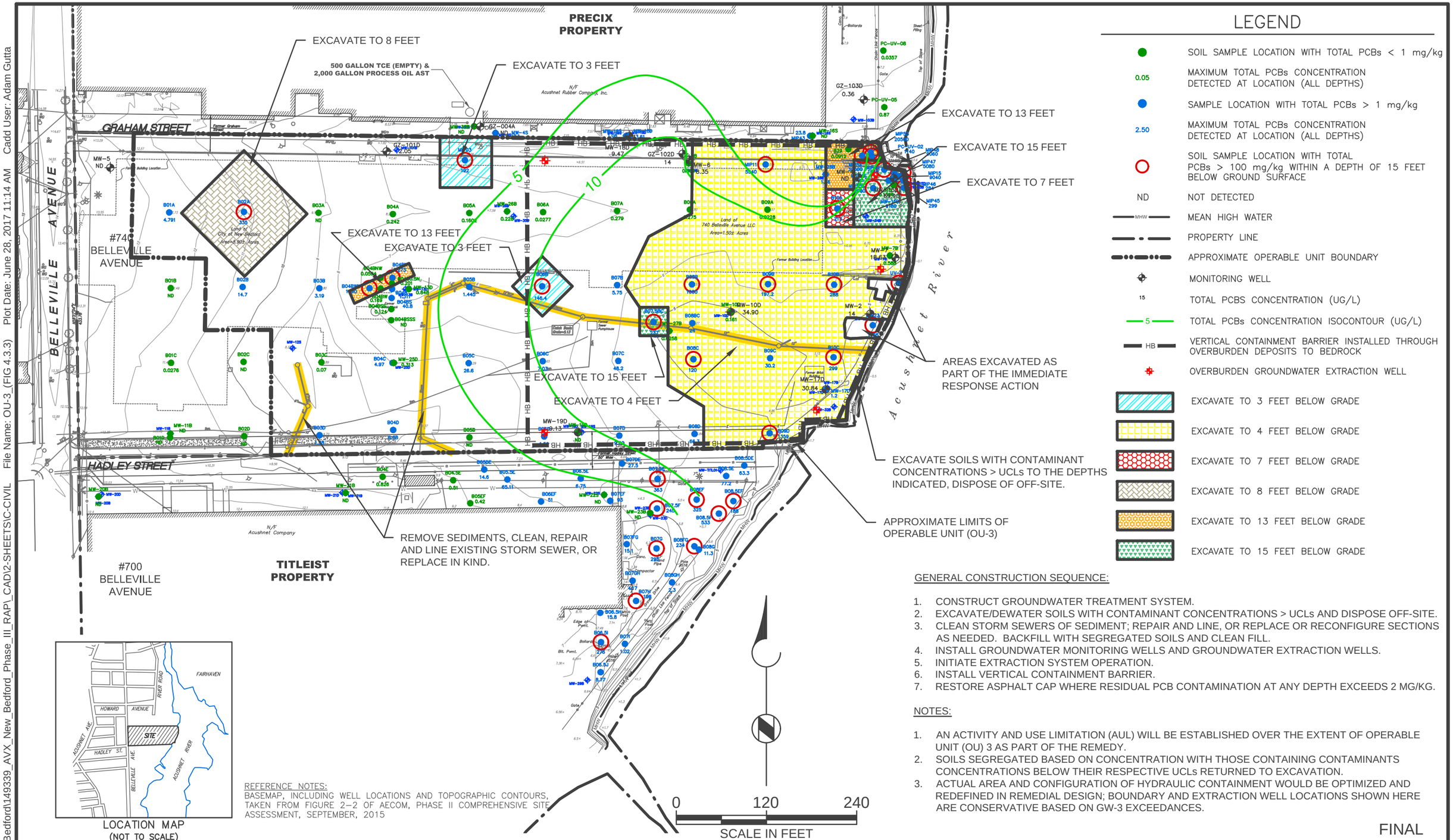
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 1

FIGURE

4.3.3-1



LOCATION MAP
(NOT TO SCALE)

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LEGEND

- SOIL SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- OVERBURDEN GROUNDWATER EXTRACTION WELL
- EXCAVATE TO 3 FEET BELOW GRADE
- EXCAVATE TO 4 FEET BELOW GRADE
- EXCAVATE TO 7 FEET BELOW GRADE
- EXCAVATE TO 8 FEET BELOW GRADE
- EXCAVATE TO 13 FEET BELOW GRADE
- EXCAVATE TO 15 FEET BELOW GRADE

GENERAL CONSTRUCTION SEQUENCE:

1. CONSTRUCT GROUNDWATER TREATMENT SYSTEM.
2. EXCAVATE/DEWATER SOILS WITH CONTAMINANT CONCENTRATIONS > UCLs AND DISPOSE OFF-SITE.
3. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED. BACKFILL WITH SEGREGATED SOILS AND CLEAN FILL.
4. INSTALL GROUNDWATER MONITORING WELLS AND GROUNDWATER EXTRACTION WELLS.
5. INITIATE EXTRACTION SYSTEM OPERATION.
6. INSTALL VERTICAL CONTAINMENT BARRIER.
7. RESTORE ASPHALT CAP WHERE RESIDUAL PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. SOILS SEGREGATED BASED ON CONCENTRATION WITH THOSE CONTAINING CONTAMINANTS CONCENTRATIONS BELOW THEIR RESPECTIVE UCLs RETURNED TO EXCAVATION.
3. ACTUAL AREA AND CONFIGURATION OF HYDRAULIC CONTAINMENT WOULD BE OPTIMIZED AND REDEFINED IN REMEDIAL DESIGN; BOUNDARY AND EXTRACTION WELL LOCATIONS SHOWN HERE ARE CONSERVATIVE BASED ON GW-3 EXCEEDANCES.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'

149339

DATE: June 29, 2017

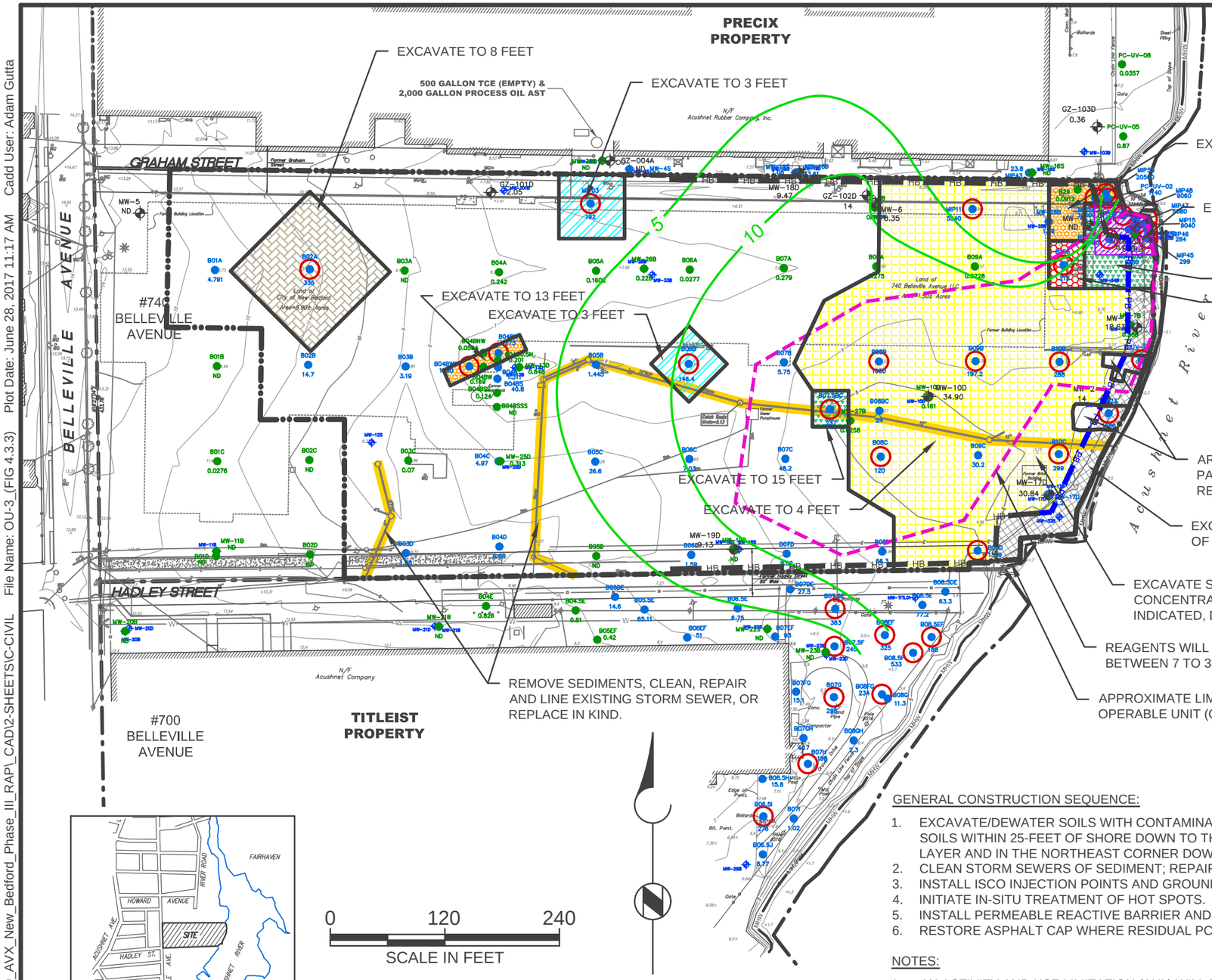
FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

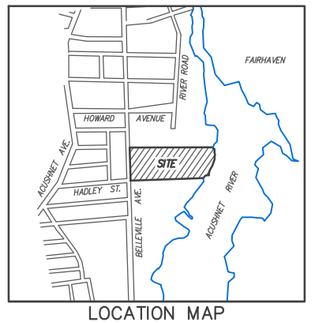
FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 2

FIGURE

4.3.3-2

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:14 AM Cadd User: Adam Gutta





LOCATION MAP
(NOT TO SCALE)

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LEGEND

- SOIL SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- PB — PERMEABLE REACTIVE BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- IN SITU TREATMENT AREA
- EXCAVATE TO 3 FEET BELOW GRADE
- EXCAVATE TO 4 FEET BELOW GRADE
- EXCAVATE TO 7 FEET BELOW GRADE
- EXCAVATE TO 8 FEET BELOW GRADE
- EXCAVATE TO 13 FEET BELOW GRADE
- EXCAVATE TO 15 FEET BELOW GRADE
- EXCAVATE TO 9 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO TOP OF BEDROCK

GENERAL CONSTRUCTION SEQUENCE:

1. EXCAVATE/DEWATER SOILS WITH CONTAMINANT CONCENTRATIONS > UCLs, SOILS WITHIN 25-FEET OF SHORE DOWN TO THE TOP OF THE TOP OF PEAT LAYER AND IN THE NORTHEAST CORNER DOWN TO BEDROCK, AND DISPOSE OFF-SITE. BACKFILL WITH SEGREGATED SOILS AND CLEAN FILL.
2. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
3. INSTALL ISCO INJECTION POINTS AND GROUNDWATER MONITORING WELLS.
4. INITIATE IN-SITU TREATMENT OF HOT SPOTS.
5. INSTALL PERMEABLE REACTIVE BARRIER AND PARTIAL VERTICAL CONTAINMENT BARRIER.
6. RESTORE ASPHALT CAP WHERE RESIDUAL PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. SOILS SEGREGATED BASED ON CONCENTRATION WITH THOSE CONTAINING CONTAMINANTS CONCENTRATIONS BELOW THEIR RESPECTIVE UCLs RETURNED TO EXCAVATION.
3. IN-SITU TREATMENT AREA CORRESPONDS TO THE AREA WHERE AVERAGE TCE CONCENTRATIONS IN DEEP OVERBURDEN GROUNDWATER EXCEED THE GW-3 STANDARD.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'

149339

DATE: June 29, 2017

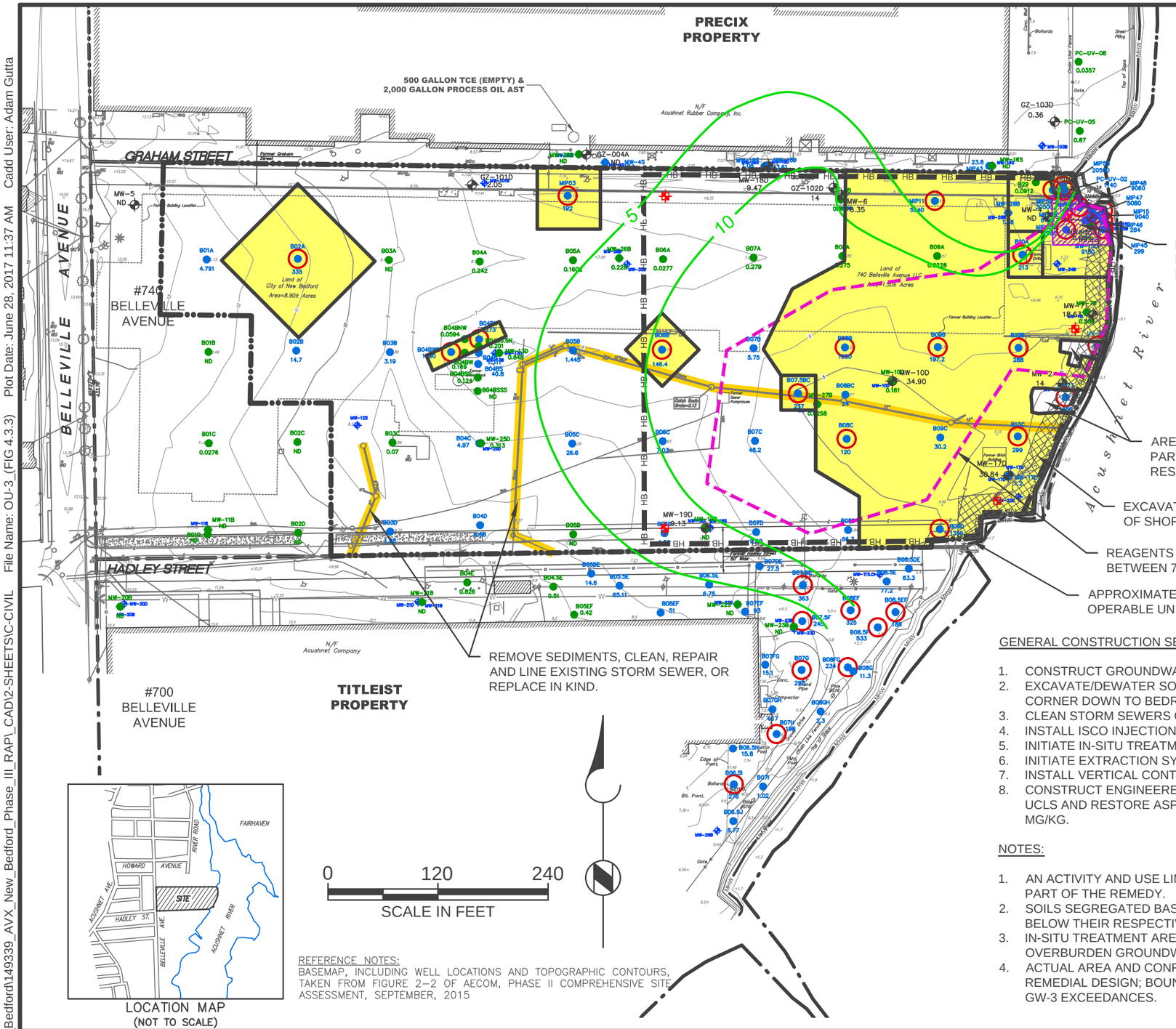
FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 3

FIGURE

4.3.3-3

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:17 AM Cadd User: Adam Gutta



REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LEGEND

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- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- OVERBURDEN GROUNDWATER EXTRACTION WELL
- IN SITU TREATMENT AREA
- ENGINEERED BARRIER
- EXCAVATE TO 9 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO TOP OF BEDROCK

GENERAL CONSTRUCTION SEQUENCE:

1. CONSTRUCT GROUNDWATER TREATMENT SYSTEM.
2. EXCAVATE/DEWATER SOILS WITHIN 25-FEET OF SHORE DOWN TO THE TOP OF PEAT LAYER AND IN THE NORTHEAST CORNER DOWN TO BEDROCK, AND DISPOSE OFF-SITE. BACKFILL WITH SEGREGATED SOILS AND CLEAN FILL.
3. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
4. INSTALL ISCO INJECTION POINTS, GROUNDWATER MONITORING WELLS, AND GROUNDWATER EXTRACTION WELLS.
5. INITIATE IN-SITU TREATMENT OF HOT SPOTS.
6. INITIATE EXTRACTION SYSTEM OPERATION.
7. INSTALL VERTICAL CONTAINMENT BARRIER.
8. CONSTRUCT ENGINEERED BARRIER WHERE PCB CONTAMINATION WITHIN 15 FEET OF GROUND SURFACE EXCEEDS UCLS AND RESTORE ASPHALT CAP AT AREAS WHERE RESIDUAL PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. SOILS SEGREGATED BASED ON CONCENTRATION WITH THOSE CONTAINING CONTAMINANTS CONCENTRATIONS BELOW THEIR RESPECTIVE UCLs RETURNED TO EXCAVATION.
3. IN-SITU TREATMENT AREA CORRESPONDS TO THE AREA WHERE AVERAGE TCE CONCENTRATIONS IN DEEP OVERBURDEN GROUNDWATER EXCEED THE GW-3 STANDARD.
4. ACTUAL AREA AND CONFIGURATION OF HYDRAULIC CONTAINMENT WOULD BE OPTIMIZED AND REDEFINED IN REMEDIAL DESIGN; BOUNDARY AND EXTRACTION WELL LOCATIONS SHOWN HERE ARE CONSERVATIVE BASED ON GW-3 EXCEEDANCES.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'

149339

DATE: June 29, 2017

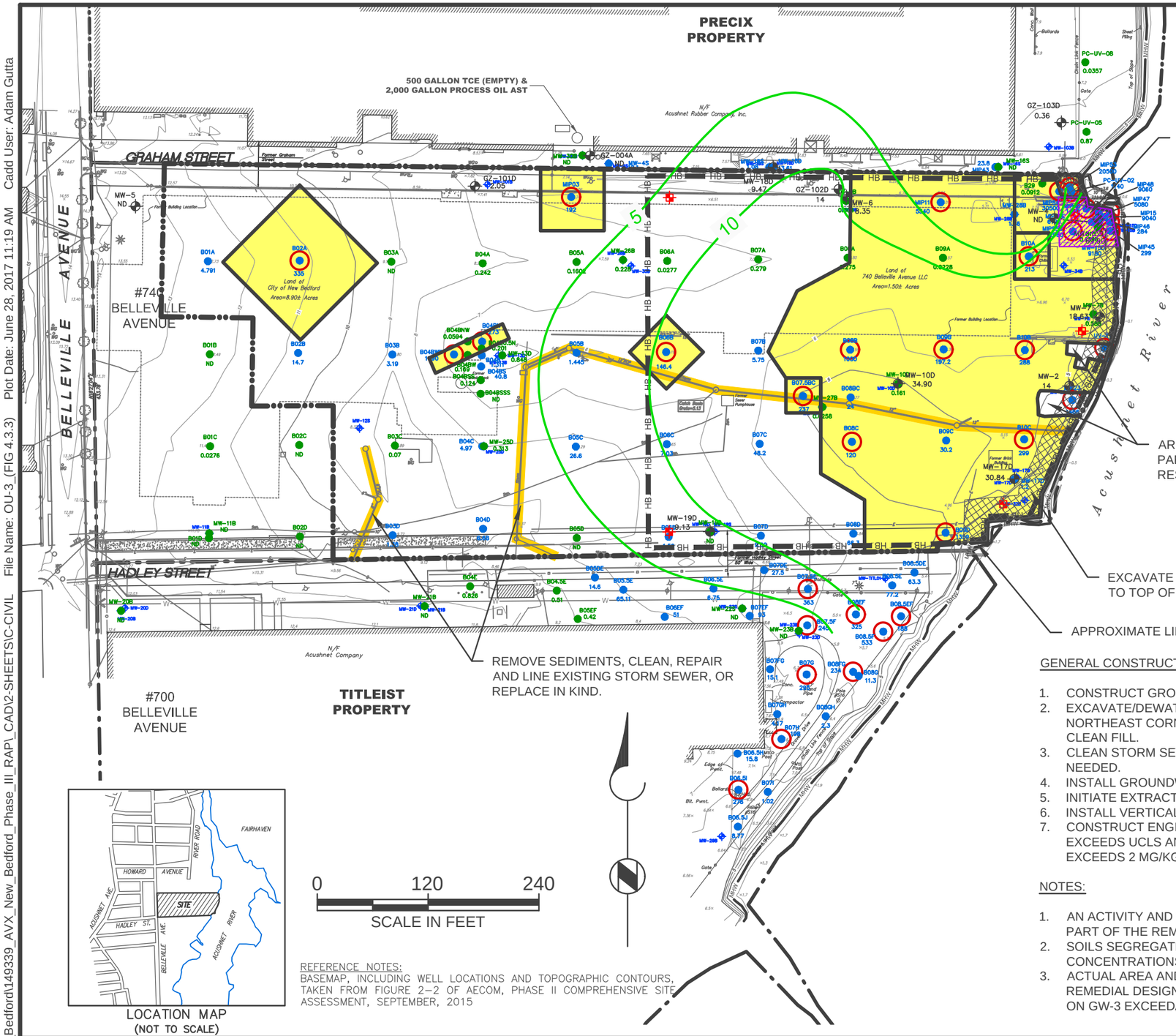
FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 4

FIGURE

4.3.3-4

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:37 AM Cadd User: Adam Gutta



LOCATION MAP
(NOT TO SCALE)

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LEGEND

- SOIL SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- OVERBURDEN GROUNDWATER EXTRACTION WELL
- ENGINEERED BARRIER
- EXCAVATE TO 9 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO TOP OF BEDROCK

EXCAVATE SOIL IN NORTHEAST CORNER TO BEDROCK

AREAS EXCAVATED AS PART OF THE IMMEDIATE RESPONSE ACTION

EXCAVATE SOIL WITHIN 25' OF SHORE TO TOP OF PEAT

APPROXIMATE LIMITS OF OPERABLE UNIT (OU-3)

GENERAL CONSTRUCTION SEQUENCE:

1. CONSTRUCT GROUNDWATER TREATMENT SYSTEM.
2. EXCAVATE/DEWATER SOILS WITHIN 25-FEET OF SHORE DOWN TO THE TOP OF PEAT LAYER AND IN THE NORTHEAST CORNER DOWN TO BEDROCK, AND DISPOSE OFF-SITE. BACKFILL WITH SEGREGATED SOILS AND CLEAN FILL.
3. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
4. INSTALL GROUNDWATER MONITORING WELLS AND GROUNDWATER EXTRACTION WELLS.
5. INITIATE EXTRACTION SYSTEM OPERATION.
6. INSTALL VERTICAL CONTAINMENT BARRIER.
7. CONSTRUCT ENGINEERED BARRIER WHERE PCB CONTAMINATION WITHIN 15 FEET OF GROUND SURFACE EXCEEDS UCLS AND RESTORE ASPHALT CAP AT AREAS WHERE RESIDUAL PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. SOILS SEGREGATED BASED ON CONCENTRATION WITH THOSE CONTAINING CONTAMINANTS CONCENTRATIONS BELOW THEIR RESPECTIVE UCLs RETURNED TO EXCAVATION.
3. ACTUAL AREA AND CONFIGURATION OF HYDRAULIC CONTAINMENT WOULD BE OPTIMIZED AND REDEFINED IN REMEDIAL DESIGN; BOUNDARY AND EXTRACTION WELL LOCATIONS SHOWN HERE ARE CONSERVATIVE BASED ON GW-3 EXCEEDANCES.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'

149339

DATE: June 29, 2017

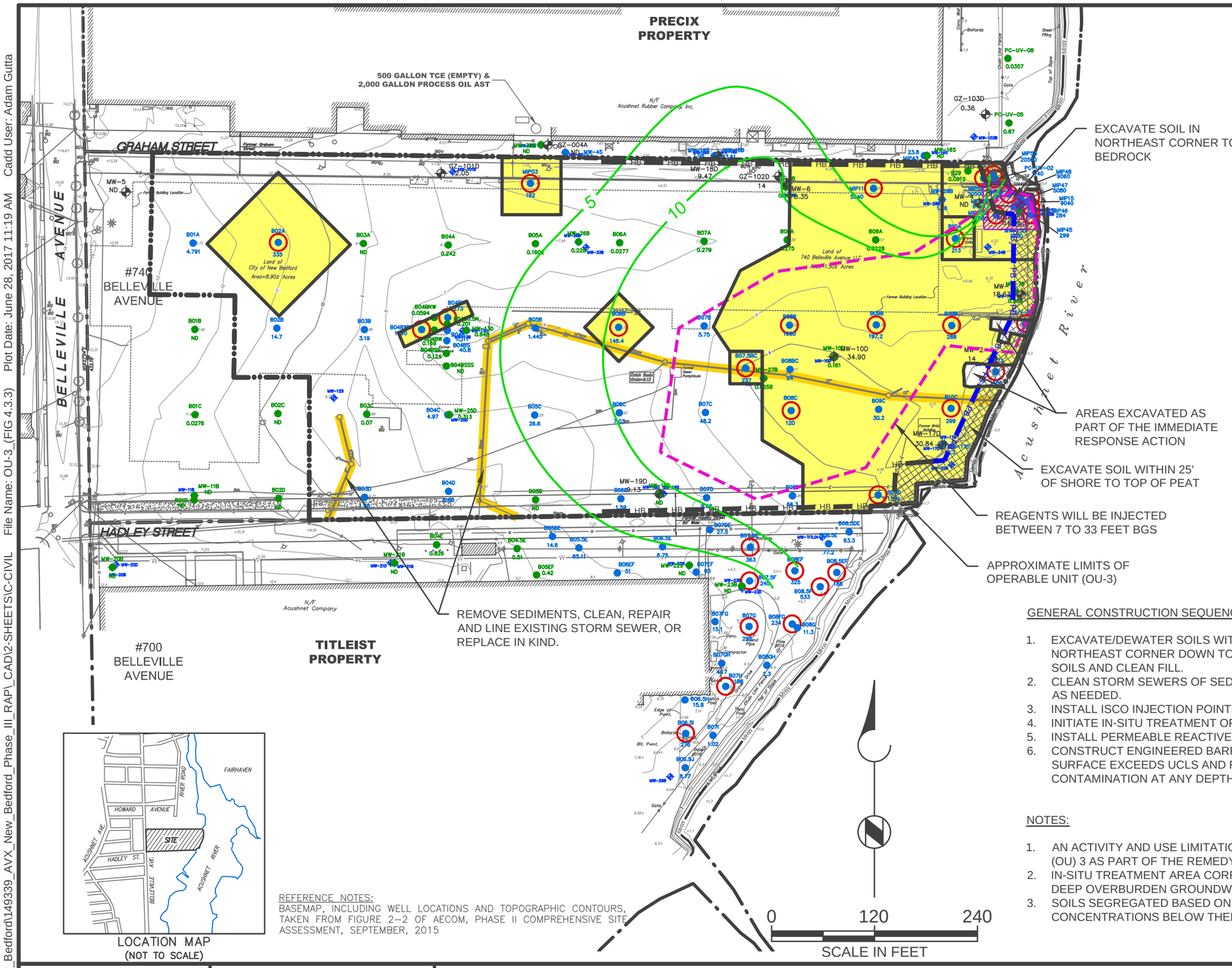
FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 5

FIGURE

4.3.3-5

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:19 AM Cadd User: Adam Gutta



LOCATION MAP
(NOT TO SCALE)

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LEGEND

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- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- PB — PERMEABLE REACTIVE BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- IN SITU TREATMENT AREA
- ENGINEERED BARRIER
- EXCAVATE TO 9 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO TOP OF BEDROCK

GENERAL CONSTRUCTION SEQUENCE:

1. EXCAVATE/DEWATER SOILS WITHIN 25-FEET OF SHORE DOWN TO THE TOP OF PEAT LAYER AND IN THE NORTHEAST CORNER DOWN TO BEDROCK, AND DISPOSE OFF-SITE. BACKFILL WITH SEGREGATED SOILS AND CLEAN FILL.
2. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
3. INSTALL ISCO INJECTION POINTS AND GROUNDWATER MONITORING WELLS.
4. INITIATE IN-SITU TREATMENT OF HOT SPOTS.
5. INSTALL PERMEABLE REACTIVE BARRIER AND PARTIAL CONTAINMENT BARRIER.
6. CONSTRUCT ENGINEERED BARRIER WHERE PCB CONTAMINATION WITHIN 15 FEET OF GROUND SURFACE EXCEEDS UCLS AND RESTORE ASPHALT CAP AT AREAS WHERE RESIDUAL PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. IN-SITU TREATMENT AREA CORRESPONDS TO THE AREA WHERE AVERAGE TCE CONCENTRATIONS IN DEEP OVERBURDEN GROUNDWATER EXCEED THE GW-3 STANDARD.
3. SOILS SEGREGATED BASED ON CONCENTRATION WITH THOSE CONTAINING CONTAMINANTS CONCENTRATIONS BELOW THEIR RESPECTIVE UCLs RETURNED TO EXCAVATION.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'
149339
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 6

FIGURE
4.3.3-6

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:19 AM Cadd User: Adam Gutta

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PRECIX PROPERTY

CONSOLIDATION CELL FOR SOILS BELOW UCL

CONSOLIDATION CELL FOR SOILS ABOVE UCL

500 GALLON TCE (EMPTY) & 2,000 GALLON PROCESS OIL AST

GRAHAM STREET

BELLEVILLE AVENUE

#740 BELLEVILLE AVENUE

HADLEY STREET

N/F Acushnet Company

Acushnet River

#700 BELLEVILLE AVENUE

TITLEIST PROPERTY

REMOVE SEDIMENTS, CLEAN, REPAIR AND LINE EXISTING STORM SEWER, OR REPLACE IN KIND.

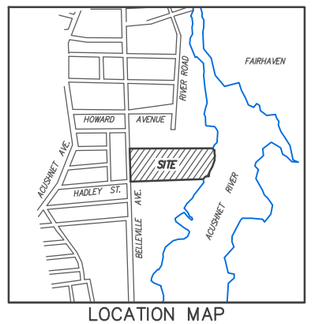
EXCAVATE SOIL IN NORTHEAST CORNER TO BEDROCK

AREAS EXCAVATED AS PART OF THE IMMEDIATE RESPONSE ACTION

EXCAVATE SOIL WITHIN 25' OF SHORE TO TOP OF PEAT

REAGENTS WILL BE INJECTED BETWEEN 7 TO 33 FEET BGS

APPROXIMATE LIMITS OF OPERABLE UNIT (OU-3)



LOCATION MAP
(NOT TO SCALE)

0 120 240

SCALE IN FEET

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LEGEND

- SOIL SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- OVERBURDEN GROUNDWATER EXTRACTION WELL
- IN SITU TREATMENT AREA
- ENGINEERED BARRIER
- EXCAVATE TO 9 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO TOP OF BEDROCK
- CONSOLIDATION CELL FOR SOILS WITH CONTAMINANT CONCENTRATIONS > UCLs
- CONSOLIDATION CELL FOR SOILS WITH CONTAMINANT CONCENTRATIONS < UCLs

GENERAL CONSTRUCTION SEQUENCE:

1. CONSTRUCT GROUNDWATER TREATMENT SYSTEM.
2. INSTALL ISCO INJECTION POINTS AND RECIRCULATION WELLS.
3. CONSTRUCT CONSOLIDATION CELLS.
4. EXCAVATE/DEWATER SOILS WITHIN 25-FEET OF SHORE DOWN TO THE TOP OF PEAT LAYER AND IN THE NORTHEAST CORNER DOWN TO BEDROCK, AND PLACE IN CONSOLIDATION CELLS. BACKFILL WITH CLEAN FILL.
5. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
6. INSTALL GROUNDWATER MONITORING WELLS AND GROUNDWATER EXTRACTION WELLS.
7. INITIATE IN-SITU TREATMENT OF HOT SPOTS.
8. INITIATE EXTRACTION SYSTEM OPERATION.
9. INSTALL VERTICAL CONTAINMENT BARRIER.
10. CONSTRUCT ENGINEERED BARRIER WHERE PCB CONTAMINATION WITHIN 15 FEET OF GROUND SURFACE EXCEEDS UCLS AND RESTORE ASPHALT CAP AT AREAS WHERE RESIDUAL PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. IN-SITU TREATMENT AREA CORRESPONDS TO THE AREA WHERE AVERAGE TCE CONCENTRATIONS IN DEEP OVERBURDEN GROUNDWATER EXCEED THE GW-3 STANDARD.
3. ACTUAL AREA AND CONFIGURATION OF HYDRAULIC CONTAINMENT WOULD BE OPTIMIZED AND REDEFINED IN REMEDIAL DESIGN; BOUNDARY AND EXTRACTION WELL LOCATIONS SHOWN HERE ARE CONSERVATIVE BASED ON GW-3 EXCEEDANCES.
4. EXCAVATED SOILS WILL BE RELOCATED TO ONE OF TWO ON-SITE CONSOLIDATION CELLS BASED ON CONTAMINANT CONCENTRATIONS. CONSOLIDATION CELLS WILL HAVE A MAXIMUM HEIGHT OF 6' ABOVE GROUND SURFACE AND WILL BE BOUNDED BY 4' HIGH BERM. PORTIONS OF THE CONSOLIDATION CELLS WITHIN BUILDING FOOTPRINT SHALL HAVE TOP 2.5' OF CLEAN FILL EXCAVATED OUT FIRST.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'

149339

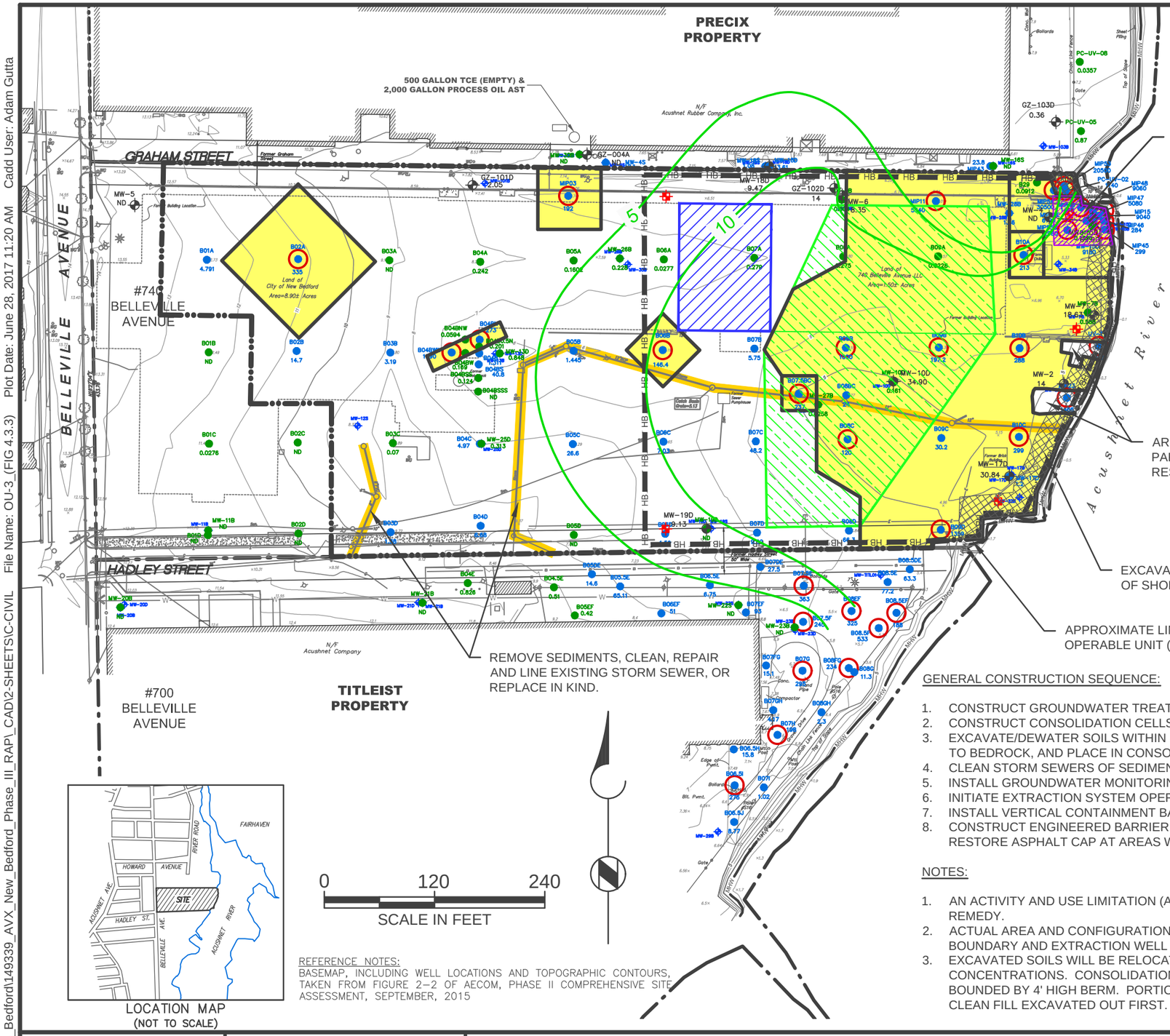
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 7

FIGURE

4.3.3-7



LOCATION MAP
(NOT TO SCALE)

REFERENCE NOTES:
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LEGEND

- SOIL SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- OVERBURDEN GROUNDWATER EXTRACTION WELL
- ENGINEERED BARRIER
- EXCAVATE TO 9 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO TOP OF BEDROCK
- CONSOLIDATION CELL FOR SOILS WITH CONTAMINANT CONCENTRATIONS > UCLs
- CONSOLIDATION CELL FOR SOILS WITH CONTAMINANT CONCENTRATIONS < UCLs

GENERAL CONSTRUCTION SEQUENCE:

1. CONSTRUCT GROUNDWATER TREATMENT SYSTEM.
2. CONSTRUCT CONSOLIDATION CELLS.
3. EXCAVATE/DEWATER SOILS WITHIN 25-FEET OF SHORE DOWN TO THE TOP OF PEAT LAYER AND IN THE NORTHEAST CORNER DOWN TO BEDROCK, AND PLACE IN CONSOLIDATION CELLS. BACKFILL WITH CLEAN FILL.
4. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
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6. INITIATE EXTRACTION SYSTEM OPERATION.
7. INSTALL VERTICAL CONTAINMENT BARRIER.
8. CONSTRUCT ENGINEERED BARRIER WHERE PCB CONTAMINATION WITHIN 15 FEET OF GROUND SURFACE EXCEEDS UCLS AND RESTORE ASPHALT CAP AT AREAS WHERE RESIDUAL PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. ACTUAL AREA AND CONFIGURATION OF HYDRAULIC CONTAINMENT WOULD BE OPTIMIZED AND REDEFINED IN REMEDIAL DESIGN; BOUNDARY AND EXTRACTION WELL LOCATIONS SHOWN HERE ARE CONSERVATIVE BASED ON GW-3 EXCEEDANCES.
3. EXCAVATED SOILS WILL BE RELOCATED TO ONE OF TWO ON-SITE CONSOLIDATION CELLS BASED ON CONTAMINANT CONCENTRATIONS. CONSOLIDATION CELLS WILL HAVE A MAXIMUM HEIGHT OF 6' ABOVE GROUND SURFACE AND WILL BE BOUNDED BY 4' HIGH BERM. PORTIONS OF THE CONSOLIDATION CELLS WITHIN BUILDING FOOTPRINT SHALL HAVE TOP 2.5' OF CLEAN FILL EXCAVATED OUT FIRST.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'

149339

DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 8

FIGURE
4.3.3-8

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETSIC-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:20 AM Cadd User: Adam Gutta

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETSIC-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:20 AM Cadd User: Adam Gutta

PRECIX PROPERTY

500 GALLON TCE (EMPTY) & 2,000 GALLON PROCESS OIL AST

GRAHAM STREET

BELLEVILLE AVENUE

HADLEY STREET

#740 BELLEVILLE AVENUE

#700 BELLEVILLE AVENUE

TITLEIST PROPERTY

N/F Acushnet Company

N/F Acushnet Rubber Company, Inc.

Acushnet River

Land of 740 Belleville Avenue LLT Area=8.90± Acres

Land of City of New Bedford Area=8.90± Acres

EXCAVATE SOIL IN NORTHEAST CORNER TO BEDROCK

AREAS EXCAVATED AS PART OF THE IMMEDIATE RESPONSE ACTION

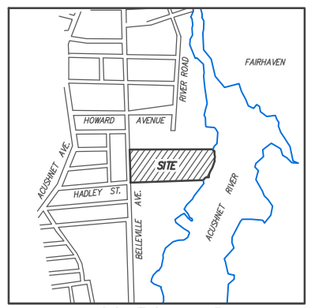
EXCAVATE SOIL WITHIN 25' OF SHORE TO TOP OF PEAT

REAGENTS WILL BE INJECTED BETWEEN 7 TO 33 FEET BGS

APPROXIMATE LIMITS OF OPERABLE UNIT (OU-3)

REMOVE SEDIMENTS, CLEAN, REPAIR AND LINE EXISTING STORM SEWER, OR REPLACE IN KIND.

LOCATION MAP
(NOT TO SCALE)



0 120 240
SCALE IN FEET

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LEGEND

- SOIL SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- PB — PERMEABLE REACTIVE BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- IN SITU TREATMENT AREA
- ENGINEERED BARRIER
- EXCAVATE TO 9 FEET BELOW GRADE (OR TOP OF PEAT)
- EXCAVATE TO TOP OF BEDROCK
- CONSOLIDATION CELL FOR SOILS WITH CONTAMINANT CONCENTRATIONS > UCLs
- CONSOLIDATION CELL FOR SOILS WITH CONTAMINANT CONCENTRATIONS < UCLs

GENERAL CONSTRUCTION SEQUENCE:

1. INSTALL ISCO INJECTION POINTS AND RECIRCULATION WELLS.
2. CONSTRUCT CONSOLIDATION CELLS.
3. EXCAVATE/DEWATER SOILS WITHIN 25-FEET OF SHORE DOWN TO THE TOP OF PEAT LAYER AND IN THE NORTHEAST CORNER DOWN TO BEDROCK, AND PLACE IN CONSOLIDATION CELLS. BACKFILL WITH CLEAN FILL.
4. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
5. INITIATE IN-SITU TREATMENT OF HOT SPOTS.
6. INSTALL PERMEABLE REACTIVE BARRIER AND PARTIAL CONTAINMENT BARRIER.
7. INSTALL GROUNDWATER MONITORING WELLS.
8. CONSTRUCT ENGINEERED BARRIER WHERE PCB CONTAMINATION WITHIN 15 FEET OF GROUND SURFACE EXCEEDS UCLS AND RESTORE ASPHALT CAP AT AREAS WHERE RESIDUAL PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. IN-SITU TREATMENT AREA CORRESPONDS TO THE AREA WHERE AVERAGE TCE CONCENTRATIONS IN DEEP OVERBURDEN GROUNDWATER EXCEED THE GW-3 STANDARD.
3. ACTUAL AREA AND CONFIGURATION OF HYDRAULIC CONTAINMENT WOULD BE OPTIMIZED AND REDEFINED IN REMEDIAL DESIGN; BOUNDARY AND EXTRACTION WELL LOCATIONS SHOWN HERE ARE CONSERVATIVE BASED ON GW-3 EXCEEDANCES.
4. EXCAVATED SOILS WILL BE RELOCATED TO ONE OF TWO ON-SITE CONSOLIDATION CELLS BASED ON CONTAMINANT CONCENTRATIONS. CONSOLIDATION CELLS WILL HAVE A MAXIMUM HEIGHT OF 6' ABOVE GROUND SURFACE AND WILL BE BOUNDED BY 4' HIGH BERM. PORTIONS OF THE CONSOLIDATION CELLS WITHIN BUILDING FOOTPRINT SHALL HAVE TOP 2.5' OF CLEAN FILL EXCAVATED OUT FIRST.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'

149339

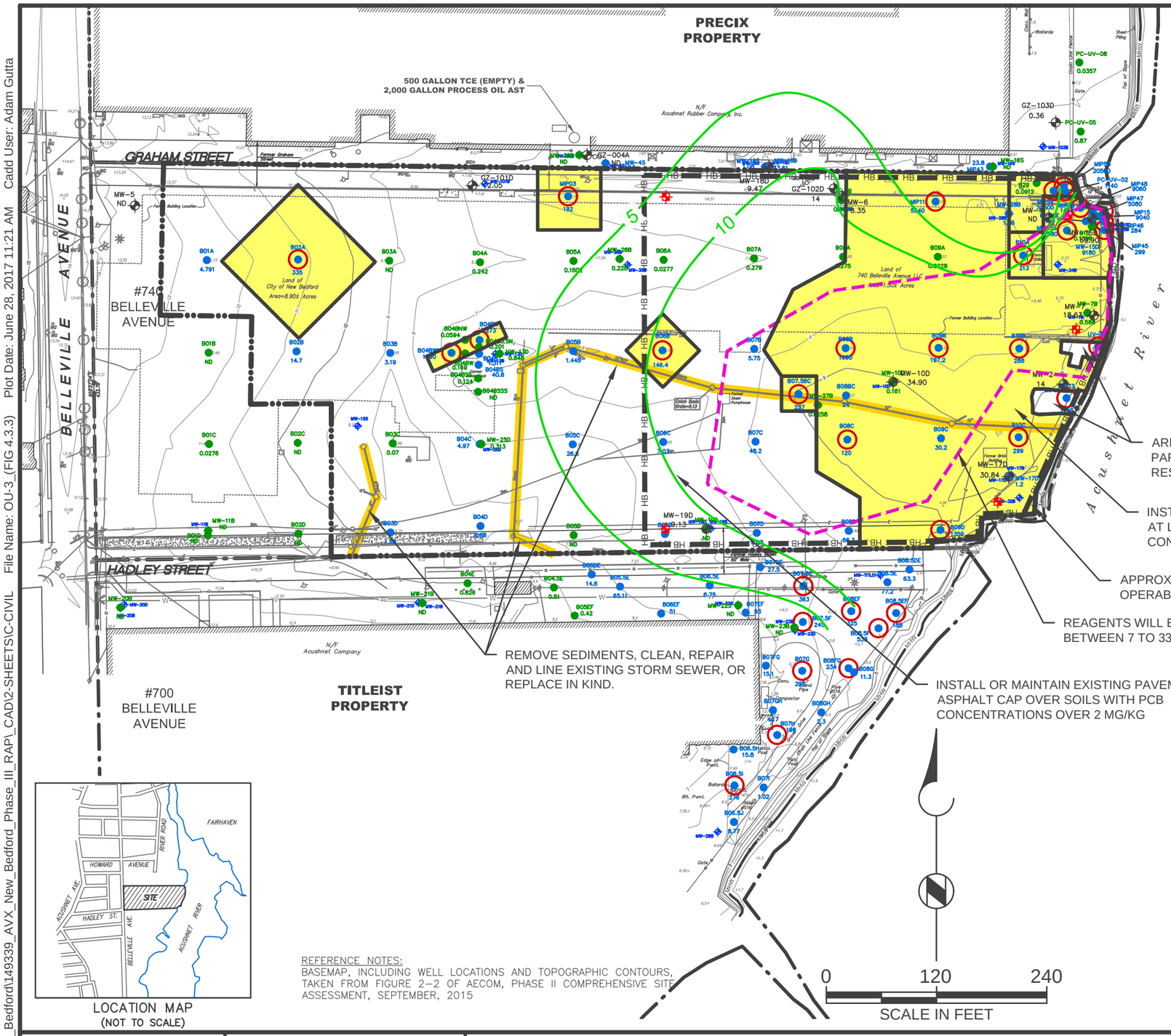
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 9

FIGURE

4.3.3-9



LOCATION MAP
(NOT TO SCALE)

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LEGEND

- SOIL SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/kg
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- ENGINEERED BARRIER
- IN SITU TREATMENT AREA
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- OVERBURDEN GROUNDWATER EXTRACTION WELL

GENERAL CONSTRUCTION SEQUENCE:

1. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
2. INSTALL ISCO INJECTION POINTS AND GROUNDWATER MONITORING WELLS.
3. CONSTRUCT GROUNDWATER TREATMENT SYSTEM.
4. INITIATE IN-SITU TREATMENT OF HOT SPOTS.
5. INSTALL GROUNDWATER EXTRACTION WELLS.
6. INITIATE EXTRACTION SYSTEM OPERATION.
7. INSTALL VERTICAL CONTAINMENT BARRIER.
8. CONSTRUCT ENGINEERED BARRIER WHERE PCB CONTAMINATION WITHIN 15 FEET OF GROUND SURFACE EXCEEDS UCLS AND RESTORE ASPHALT CAP AT AREAS WHERE PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. IN-SITU TREATMENT AREA CORRESPONDS TO THE AREA WHERE AVERAGE TCE CONCENTRATIONS IN DEEP OVERBURDEN GROUNDWATER EXCEED THE GW-3 STANDARD.
3. ACTUAL AREA AND CONFIGURATION OF HYDRAULIC CONTAINMENT WOULD BE OPTIMIZED AND REDEFINED IN REMEDIAL DESIGN; BOUNDARY AND EXTRACTION WELL LOCATIONS SHOWN HERE ARE CONSERVATIVE BASED ON GW-3 EXCEEDANCES.
4. SOILS EXCAVATED FOR INSTALLATION OF ENGINEERED BARRIER WILL BE CONSOLIDATED IN OTHER AREAS OF SUBSURFACE UNDER THE SITE AND COVERED WITH APPROPRIATE BARRIER.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'

149339

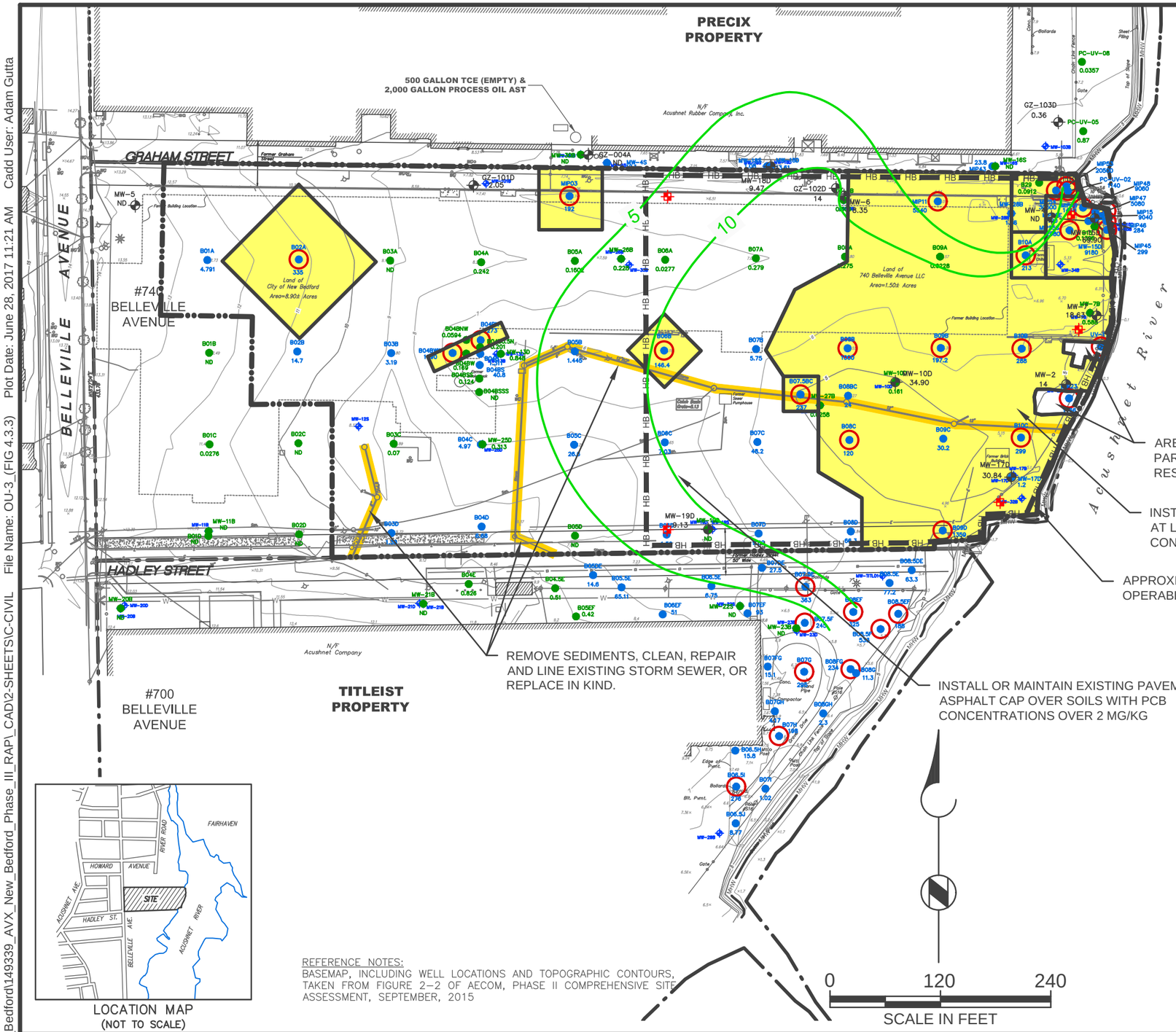
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 10

FIGURE
4.3.3-10

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:21 AM Cadd User: Adam Gutta



LOCATION MAP
(NOT TO SCALE)

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

LEGEND

- SOIL SAMPLE LOCATION WITH TOTAL PCBs < 1 mg/k
- 0.05 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SAMPLE LOCATION WITH TOTAL PCBs > 1 mg/kg
- 2.50 — MAXIMUM TOTAL PCBs CONCENTRATION DETECTED AT LOCATION (ALL DEPTHS)
- SOIL SAMPLE LOCATION WITH TOTAL PCBs > 100 mg/kg WITHIN A DEPTH OF 15 FEET BELOW GROUND SURFACE
- ND — NOT DETECTED
- MHW — MEAN HIGH WATER
- PROPERTY LINE
- APPROXIMATE OPERABLE UNIT BOUNDARY
- ENGINEERED BARRIER
- MONITORING WELL
- 15 — TOTAL PCBS CONCENTRATION (UG/L)
- 5 — TOTAL PCBs CONCENTRATION ISOCONTOUR (UG/L)
- HB — VERTICAL CONTAINMENT BARRIER INSTALLED THROUGH OVERBURDEN DEPOSITS TO BEDROCK
- OVERBURDEN GROUNDWATER EXTRACTION WELL

GENERAL CONSTRUCTION SEQUENCE:

1. CLEAN STORM SEWERS OF SEDIMENT; REPAIR AND LINE, OR REPLACE OR RECONFIGURE SECTIONS AS NEEDED.
2. INSTALL GROUNDWATER MONITORING WELLS.
3. CONSTRUCT GROUNDWATER TREATMENT SYSTEM.
4. INSTALL GROUNDWATER EXTRACTION WELLS.
5. INITIATE EXTRACTION SYSTEM OPERATION.
6. INSTALL VERTICAL CONTAINMENT BARRIER.
7. CONSTRUCT ENGINEERED BARRIER WHERE PCB CONTAMINATION WITHIN 15 FEET OF GROUND SURFACE EXCEEDS UCLS AND RESTORE ASPHALT CAP AT AREAS WHERE PCB CONTAMINATION AT ANY DEPTH EXCEEDS 2 MG/KG.

NOTES:

1. AN ACTIVITY AND USE LIMITATION (AUL) WILL BE ESTABLISHED OVER THE EXTENT OF OPERABLE UNIT (OU) 3 AS PART OF THE REMEDY.
2. ACTUAL AREA AND CONFIGURATION OF HYDRAULIC CONTAINMENT WOULD BE OPTIMIZED AND REDEFINED IN REMEDIAL DESIGN; BOUNDARY AND EXTRACTION WELL LOCATIONS SHOWN HERE ARE CONSERVATIVE BASED ON GW-3 EXCEEDANCES.
3. SOILS EXCAVATED FOR INSTALLATION OF ENGINEERED BARRIER WILL BE CONSOLIDATED IN OTHER AREAS OF SUBSURFACE UNDER THE SITE AND COVERED WITH APPROPRIATE BARRIER.

FINAL

Brown AND Caldwell

SCALE: 1" = 120'
149339
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-3
(AEROVOX PROPERTY SOILS)
ALTERNATIVE 11

FIGURE
4.3.3-11

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETSIC-CIVIL File Name: OU-3_(FIG 4.3.3) Plot Date: June 28, 2017 11:21 AM Cadd User: Adam Gutta

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-4_(FIG 4.3.4) Plot Date: June 28, 2017 11:23 AM Cadd User: Adam Gutta

#744 BELLEVILLE AVENUE

#740 BELLEVILLE AVENUE

#700 BELLEVILLE AVENUE

RIVER ROAD

GRAHAM STREET

HADLEY STREET

BELLEVILLE AVENUE

PRECIX PROPERTY

TITLEIST PROPERTY

N/F Acushnet Rubber Company, Inc.

N/F Acushnet Company

Land of City of New Bedford Area=.90± Acres

Land of 740 Belleville Avenue LLC Area=1.50± Acres

Former Graham Street

Former Building Location

Acushnet River

MW-26B (HOT SPOT TREATMENT INTERVAL FROM 46 TO 89 FEET BGS)

MW-34B AREA (HOT SPOT TREATMENT INTERVAL FROM FROM 50 TO 190 FEET BGS)

MW-15B (HOT SPOT TREATMENT INTERVAL FROM 30 TO 46 FEET BGS)

MW-31B 460

504 MW-24B

MW-30B 1400

MW-103B 1766.67

MW-101B 12050

MW-6B 2566.67

MW-28B 6460

MW-26B

MW-7B 14250

MW-13B 17250

MW-2B 3575

MW-27B 14000

MW-17B 3800

MW-4B 5600

MW-11B 9.78

MW-20B ND

44.33 MW-21B

MW-23B 4400

MW-29B 55

MW-35B ND

100

1000

5000

LEGEND

- MONITORING WELL
- 150 — TCE CONCENTRATION IN MICROGRAMS PER LITER (ug/L)
- 100 — TCE CONCENTRATION ISOCONTOUR (ug/L)
- ND — NOT DETECTED ABOVE LABORATORY DETECTION LIMIT
- BGS — BELOW GROUND SURFACE
- ESTIMATED AREA WHERE TRICHLOROETHENE CONCENTRATIONS ARE ABOVE THE MCP GROUNDWATER UCL OF 50,000 ug/L
- IN-SITU CHEMICAL OXIDATION IN SHALLOW BEDROCK HOT SPOT AT MW-15B, 1 INJECTION WELL IN EACH AREA
- IN-SITU CHEMICAL OXIDATION TREATMENT AREA FOR DEEP BEDROCK HOT SPOTS (2 INJECTION WELLS AND 1 EXTRACTION WELL FOR OXIDANT RECIRCULATION IN EACH DEEP BEDROCK TREATMENT AREA).

GENERAL CONSTRUCTION SEQUENCE:

1. INSTALL TWO INJECTION WELLS AND ONE EXTRACTION WELL AT MW-26B AS SHOWN IN THE FIGURE.
2. INSTALL ONE INJECTION WELL IN EACH OF THE THREE AREAS NEAR MW-15B FOR A TOTAL OF THREE INJECTION WELLS AS SHOWN IN THE FIGURE.
3. INSTALL TWO INJECTION WELLS AND ONE EXTRACTION WELL IN EACH OF THE TWO AREAS NEAR MW-34B FOR A TOTAL OF FOUR INJECTION WELLS AND TWO EXTRACTION WELLS AS SHOWN IN THE FIGURE.

0 120 240

SCALE IN FEET

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

FINAL

Brown AND Caldwell

SCALE: 1" = 100'

149339

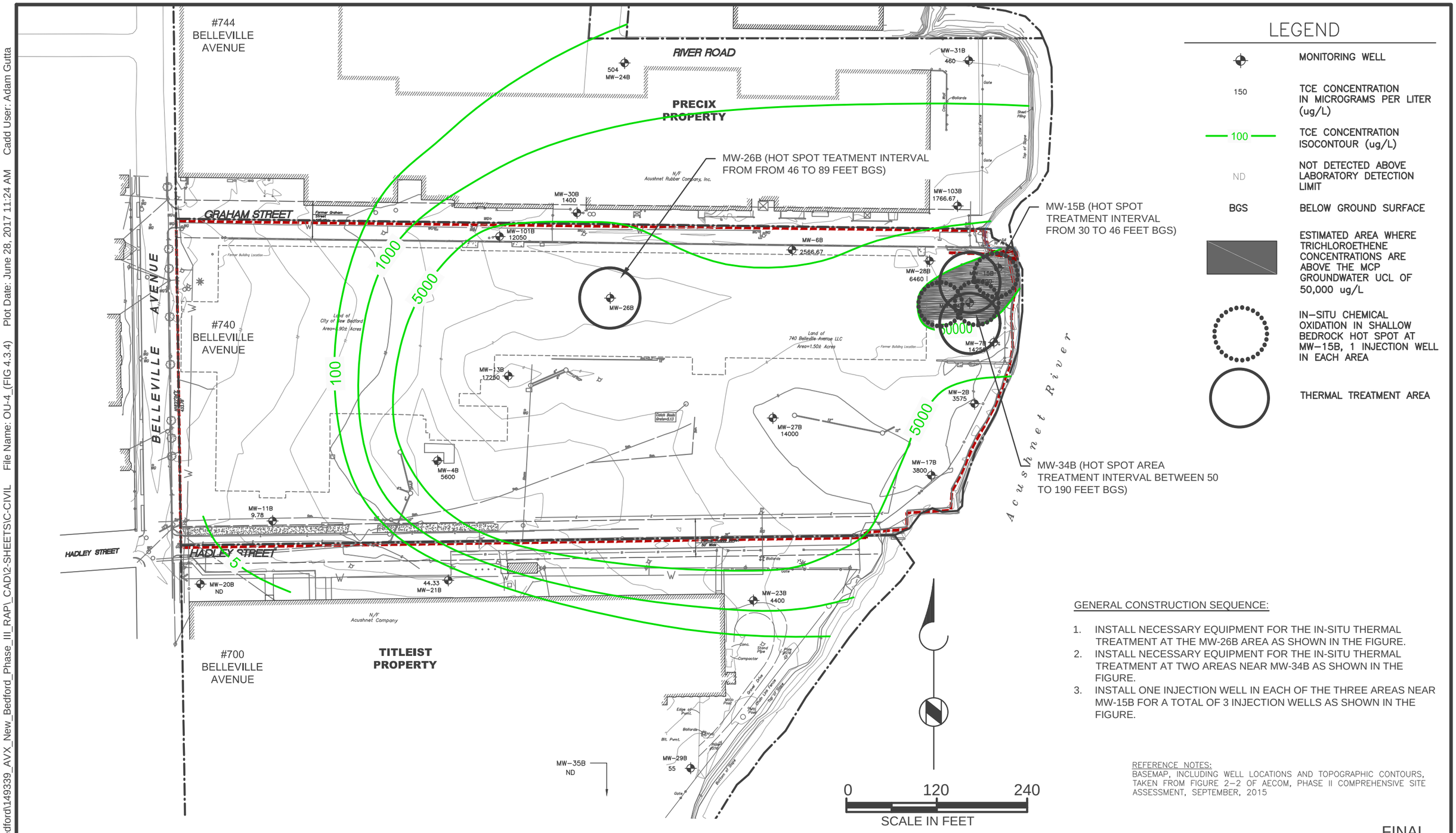
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-4
(BEDROCK GROUNDWATER)
ALTERNATIVE 1

FIGURE

4.3.4-1



GENERAL CONSTRUCTION SEQUENCE:

1. INSTALL NECESSARY EQUIPMENT FOR THE IN-SITU THERMAL TREATMENT AT THE MW-26B AREA AS SHOWN IN THE FIGURE.
2. INSTALL NECESSARY EQUIPMENT FOR THE IN-SITU THERMAL TREATMENT AT TWO AREAS NEAR MW-34B AS SHOWN IN THE FIGURE.
3. INSTALL ONE INJECTION WELL IN EACH OF THE THREE AREAS NEAR MW-15B FOR A TOTAL OF 3 INJECTION WELLS AS SHOWN IN THE FIGURE.

REFERENCE NOTES:
BASEMAP, INCLUDING WELL LOCATIONS AND TOPOGRAPHIC CONTOURS, TAKEN FROM FIGURE 2-2 OF AECOM, PHASE II COMPREHENSIVE SITE ASSESSMENT, SEPTEMBER, 2015

FINAL

Brown AND Caldwell

SCALE: 1" = 100'
149339
DATE: June 29, 2017

FORMER AEROVOX FACILITY
740 BELLEVILLE AVENUE
NEW BEDFORD, MA

FORMER AEROVOX FACILITY
OU-4
(BEDROCK GROUNDWATER)
ALTERNATIVE 2

FIGURE
4.3.4-2

Path: T:\AVX\New_Bedford\149339_AVX_New_Bedford_Phase_III_RAP_CAD\2-SHEETS\C-CIVIL File Name: OU-4_(FIG 4.3.4) Plot Date: June 28, 2017 11:24 AM Cadd User: Adam Gutta

TABLE 2.4.1
ESTIMATED PCB MASS ON FORMER AEROVOX PROPERTY
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

DESCRIPTION OF AREA	VOLUME (CY)	AVERAGE CONCENTRATION (mg/kg)	ESTIMATED PCB MASS (lbs)	ESTIMATED PCB MASS (tons)	PERCENT OF TOTAL PCB MASS
0-25 OF Shoreline					
Within 0-25 feet of shoreline, ground surface down to top of peat layer	4,100	4,259	52,495	26.2	
Within 0-25 feet of shoreline, top of peat layer down to 15 feet bgs	2,700	50	408	0.2	
Within 0-25 feet of shoreline, 15 feet bgs down to top of bedrock surface	6,800	1,893	38,687	19.3	
		Total for 0-25 Feet of Shoreline:	91,590	46	53%
25-100 feet of Shoreline					
Within 25-100 feet of shoreline, ground surface down to top of peat layer	9,400	441	12,452	6.2	
Within 25-100 feet of shoreline, top of peat layer down to 15 feet bgs	10,700	0	9	0.005	
Within 25-100 feet of shoreline, 15 feet bgs down to top of bedrock surface	20,000	442	26,603	13.3	
		Total for 25-100 Feet of Shoreline:	39,065	20	23%
100 ft of Shoreline to 100-year Floodplain Boundary					
Within 100 feet west to 100-foot floodplain boundary to top of peat (where it applies)	45,200	185	25,170	12.6	
Within 100 feet west to 100-foot floodplain boundary from top of peat to 15 feet bgs	67,700	64	13,018	6.5	
Within 100 feet west to 100-foot floodplain boundary from 15 feet bgs to bedrock	90,300	0	21	0.010	
		Total for 100 Feet of Shoreline to 100-year Flood plain boundary:	38,209	19	22%
West of 100-foot floodplain boundary to edge of OU3					
From ground suface to 15 feet bgs	68,700	20	4,092	2.0	
From 15 feet bgs to top of bedrock	22,900	0	2	0.001	
		Total for 100-year Flood plain boundary to West Boundary of OU3:	4,095	2	2%
		TOTAL ESTIMATED MASS OF PCBS IN SOIL ON AEROVOX:		86	100%

TABLE 4.1
TECHNOLOGY IDENTIFICATION AND SCREENING
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

Media and PRGs	Technology Category	Technology	Advantages	Disadvantages	Feasibility	Status for Alternative Development
SOIL Reduce to the extent feasible or control the concentrations of PCBs and CVOCs in soil such that: a. Potential exposure to surface soil that is not capped will achieve a level of No Significant Risk b. Potential exposure to surface or subsurface soil beneath the Site cap will achieve a level of No Significant Risk c. Soil is eliminated to the extent feasible or controlled as a source of impacts to groundwater and indoor air d. Soil less than 15 feet below grade surface (bgs) with concentrations above UCL levels is eliminated to the extent feasible or controlled through the use of an engineered barrier.	Treatment	**In Situ Biological Treatment -** Involves the application of nutrients and microorganisms to the subsurface to enhance the population of microorganisms that use the contaminants as a food source.	Does not depend on off-site disposal Effective for CVOCs	Can't implement in an unsaturated zone Limited effectiveness for PCBs Delivery/injection system is highly critical for complete distribution of amendments Proximity to river and varying subgrade conditions pose difficulties for uniform amendment distribution Relatively long time frame to achieve mass reduction in COCs in soil	Technology is available, however not reasonably likely to achieve the reduction of complete mix of COCs in soil due to difficulty in implementing this technology at this site (potential presence of residual NAPL in select locations, proximity to river, presence of debris/urban fill material, tidally influenced and varying groundwater elevations, brackish water, temperature, moisture and pH variations, etc.)	Not Retained for overburden soil, but retained in conjunction with groundwater
		Ex Situ Biological Treatment Involves the application of nutrients and microorganisms to soils after removal to enhance the population of microorganisms that use the contaminants as a food source.	Does not depend on off-site disposal for soils Better control over process than in situ application Effective for CVOCs	Not proven effective for PCBs Heterogeneity of subsurface materials complicates excavation and soil management Materials management and processing time Generation of dewatering waste stream during excavation, wastewater requiring treatment and disposal/discharge	Technology is available, however not reasonably likely to achieve the reduction of complete mix of COCs in soil to desired concentrations due to difficulty in implementing this technology at this site (potential presence of residual NAPL in select locations, proximity to river, presence of debris/urban fill material, generation of additional waste stream)	Not Retained
		In Situ Chemical Treatment - Involves applying reagent(s) to the subsurface to chemically break down the contaminants.	Does not depend on off-site disposal Effective for CVOCs	Requires chemicals to be utilized on-site (handle/manage hazardous materials in riverfront area) Limited effectiveness for PCBs Limited use in unsaturated zone Delivery/injection system highly critical for complete distribution of amendments	Technology is available, however not likely to achieve the reduction of mix of COCs to desired concentrations due to difficulty in implementing this technology at this site (potential presence of residual NAPL, proximity to river, varying groundwater elevations, high organic and debris content in some soils, brackish water, temperature, moisture and pH variations, etc.)	Not Retained specifically for unsaturated and saturated soil, but retained in conjunction with groundwater
		Ex Situ Chemical Treatment - Involves applying reagent(s) to soils after removal to chemically break down the contaminants.	Does not depend on off-site disposal Better control over process than in situ application Effective for CVOCs	Requires chemicals to be utilized on-site (handle/manage hazardous materials in riverfront area) Not proven effective for PCBs Heterogeneity of subsurface materials complicates excavation and soil management Materials management and processing time Generation of dewatering waste stream during excavation, wastewater requiring treatment and disposal/discharge	Technology is available, however not reasonably likely to achieve the reduction of complete mix of COCs to desired concentrations due to difficulty in implementing this technology at this site (potential presence of residual NAPL in select locations, proximity to river, presence of debris/urban fill material, generation of additional waste stream)	Not Retained
		Solidification/Stabilization (ISS) - Involves in situ mixing of soil with solidification/stabilization agents to reduce the mobility of contaminants.	Does not depend on off-site disposal except possibly for excess soils due to expansion Effective for immobilizing PCBs and reducing leachability for CVOCs	Swell (excess soil) management required Not cost effective in shallow soils Does not reduce the concentration of PCBs or CVOCs	Technology likely would not achieve a permanent solution when used as an in situ treatment. May be applicable and useful, however, in conjunction with other excavation-based alternatives to support on site consolidation.	Not retained as a general in situ technology but retained as potential soil conditioning in conjunction with excavation and on site consolidation
		Ex Situ Soil Washing- Involves desorbing chemicals from fine soil particles in a water based system after soils are removed via the use of water, surfactants, leaching agents or chelating agents or pH adjustment.	Reduces disposal cost after treatment Effective for PCBs	Complicated to implement Generation of dewatering waste stream during excavation, wastewater requiring treatment and disposal/discharge Would require residual wash water treatment in addition to soil treatment (added waste stream) Soil disposal still required after treatment	Technology is difficult to implement, and not reasonably certain to achieve reductions of COC's to desired concentrations or achieve sufficient separation of impacted fines from less impacted coarser materials.	Not retained

TABLE 4.1
TECHNOLOGY IDENTIFICATION AND SCREENING
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

Media and PRGs	Technology Category	Technology	Advantages	Disadvantages	Feasibility	Status for Alternative Development
		Air Sparging/SVE – Involves the injection of air or oxygen for stripping and volatilization of constituents from a contaminated aquifer.	Capable of removing TCE from under buildings (using horizontal drilling) Low degree of difficulty to implement Established technology	Tidal influence in subgrade (varying groundwater levels) would complicate design and operation of a system Insufficient unsaturated zone to collect soil vapors Not effective on PCBs	Technology is available, however not likely to achieve the reduction of COCs to desired concentrations due to site conditions (PCBs, proximity to river, varying groundwater elevations, etc.)	Not retained
		Thermal Treatment (Ex Situ) – Involves heating excavated soil using steam, hot air, electrical resistance or conductivity to increase the volatilization rate of contaminants and facilitate extraction and recovery as a vapor.	Effective for CVOCs Can be effective for PCBs	High energy consumption Higher temperature requirements for PCBs (similarity to incineration and dioxin concerns in community) Heterogeneity of subsurface materials complicates excavation and soil management Separated bulk material volume not treated Materials management and processing time Multiple additional waste streams, e.g. generation of dewatering waste stream during excavation, wastewater requiring treatment and disposal Requires management and disposal of recovered extract.	Technology is available, however not reasonably likely to achieve the reduction of complete mix of COCs to desired concentrations due to difficulty in implementing this technology at this site (community resistance, potential presence of residual NAPL in select locations, proximity to river, presence of debris/urban fill material, generation of additional waste stream)	Not retained
		Thermal Treatment (In Situ) – Involves heating the subsurface using steam, hot air, electrical resistance or conductivity to increase the volatilization rate of contaminants and facilitate extraction and recovery as a vapor.	Effective for CVOCs Can address DNAPL in specific type of bedrock Effective also in groundwater on VOCs with boiling points < water	Not applicable under building (no unsaturated zone to collect soil vapors) In Situ application for overburden and shallow bedrock is confounded by infinite supply of water from adjacent harbor High energy consumption Higher temperature requirements for PCBs Requires management and disposal of recovered extract.	Technology likely would not reasonably achieve a permanent solution when used as an in- situ treatment for overburden and shallow bedrock. May be applicable and useful, however, in conjunction with other technologies to enhance remedial alternative performance for deep bedrock.	Not Retained as a soil specific technology, but retained for OU-4 as a groundwater technology applicable to deep bedrock.
	Containment	**Cap or Engineered Barrier -** Consists of a physical barrier that prevents contact with the impacted soil and source material.	Handling/excavation of contaminated materials not required Low degree of difficulty to implement.	AUL required Long term performance monitoring and maintenance of cap	Technology is available and reasonably likely to achieve a permanent solution	Retained for OU-1 and OU-3
	Excavation, Disposal	**Excavation and Off-Site Disposal -** Involves excavating soils and source material and disposing of off-site.	Low degree of difficulty to implement. Reduces mass and volume of contaminants remaining on site	Utilizes and reduces licensed disposal capacity off site Implementation risks and energy usage associated with material handling and transportation Not applicable under building Generation of dewatering waste stream during excavation, wastewater requiring treatment and disposal/discharge Relocates but does not reduce mass or volume of contaminants.	Technology is available and reasonably likely to achieve a permanent solution	Retained for OU-1 and OU-3

TABLE 4.1
TECHNOLOGY IDENTIFICATION AND SCREENING
PHASE III REMEDIAL ACTION PLAN
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Media and PRGs	Technology Category	Technology	Advantages	Disadvantages	Feasibility	Status for Alternative Development
	Excavation, Consolidation	**Excavation and On-Site Consolidation -** Involves excavating soils, consolidating contaminated soils in one smaller and managed area on the Aerovox property, and covering the area with an engineered barrier.	Low degree of difficulty to implement. Does not utilize off-site disposal capacity Does not create risks associated with off-site transportation Smaller carbon footprint compared to off site disposal	Not applicable under building and for deep contamination. AUL required Generation of dewatering waste stream during excavation, wastewater requiring treatment and disposal/discharge Long term performance monitoring and maintenance of cap Does not reduce mass or volume of contaminants	Technology is available and reasonably likely to achieve a permanent solution	Retained for OU-1 and OU-3
	Activity and Use Limitation	**Legal Document** - Specifies allowable and prohibited use of the property.	Already provided for Aerovox property Mitigates potential exposure pathways	Requires agreement of abutting property owners Does not reduce mass, volume or toxicity of contaminants	Reasonably likely to achieve a Permanent Solution in conjunction with another technology	Retained for OU-1, OU-2 and OU-3
GROUNDWATER Reduce to the extent feasible or control the concentrations of PCBs and CVOCs in groundwater such that: a. Groundwater is eliminated to the extent feasible or controlled as a source of impacts to indoor air b. Groundwater is eliminated to the extent feasible or controlled as a source of impacts to surface water and sediment c. Plumes of dissolved PCBs and CVOCs in groundwater are stable or contracting d. Concentrations of CVOCs, specifically trichloroethene, in groundwater are reduced to below UCL.	Containment	**Vertical Barriers (Sheet Pile, Slurry Wall, Soil Mix Wall, Reactive Wall)** – Used to contain, divert, or direct contaminated groundwater	Proven technologies Low degree of difficulty to implement. Effective for overburden Reduces mobility of contaminants	No confining layer to key into Does not reduce mass, volume or toxicity Not effective for bedrock	Technology is available and reasonably likely to achieve a Permanent Solution in conjunction with another technology	Retained for OU-3
		Jet-Grouting for top of rock – Involves the injection of a cementitious mixture into the subsurface to fill fractures and voids that transmit contaminated groundwater.	Applicable for shallow bedrock May reduce infiltration up from bedrock	Difficult to implement and may not provide a complete barrier due to site conditions Does not reduce mass, volume or toxicity	Technology is available, however not likely to achieve the reduction of COCs to desired concentrations due to difficulty in implementing this technology at this site (proximity to river, type of bedrock)	Not retained
		Hydraulic Containment and Ex Situ Treatment – Involves the extraction of groundwater to confine the movement of contaminated groundwater.	Proven technology Low degree of difficulty to implement. Effective for overburden and bedrock	Generates multiple waste streams (groundwater that will require treatment, emissions treatment, etc.) Long term O&M without clear endpoint (indefinite lifecycle unless combined with additional treatment in situ) End of life decommissioning required Discharge limits must be met for all GW constituents present (not only site COC's) Proximity to waterbody will likely result in very high extraction rates Hydraulic containment in bedrock will require significant pumping volume due to tides and will draw contamination down from overburden into bedrock	Technology is available and reasonably likely to achieve a Permanent Solution for overburden but not likely to achieve a Permanent Solution for bedrock	Retained for OU-3 Not retained for OU-4
	Treatment	**In Situ Biological Treatment-** Involves the application of nutrients and microorganisms to the subsurface to enhance the population of microorganisms that use the contaminants as a food source.	Enhances existing processes naturally occurring on site Effective for CVOCs Reduces the toxicity and volume of COCs (provided that degradation cycle is complete)	Long term operation Not effective on NAPL Delivery/injection system is highly critical for complete distribution of amendments Proximity to river and varying subgrade conditions pose difficulties for uniform amendment distribution Relatively long time frame to achieve mass reduction in COCs	Technology is available and may achieve a Permanent Solution	Retained for OU-3

TABLE 4.1
TECHNOLOGY IDENTIFICATION AND SCREENING
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

Media and PRGs	Technology Category	Technology	Advantages	Disadvantages	Feasibility	Status for Alternative Development
		In Situ Chemical Treatment - Involves applying reagent(s) to the subsurface to chemically break down the contaminants.	Effective for CVOCs Potentially effective for PCBs Potentially addresses or partially addresses NAPL and source soils Reduces the toxicity and volume of COCs	Delivery/injection system highly critical for complete distribution of amendments Proximity to river and varying subgrade conditions pose difficulties for uniform amendment distribution Handling and storage of potentially hazardous reagent materials	Technology is available and may achieve a Permanent Solution	Retained for OU-3 and OU-4
		In Situ Thermal Treatment – Involves heating the subsurface (In Situ) or soil (Ex Situ) using steam, hot air, electrical resistance or conductivity to increase the volatilization rate of contaminants and facilitate extraction and recovery as a vapor.	Demonstrated in specific fractured rock environments Short timeframe to implement Effective also in soil with COCs containing boiling points < water	High energy cost to implement Efficiency confounded for overburden and shallow bedrock by near infinite source of fresh water Requires collection and treatment of off gas (additional waste stream)	Technology is available and may achieve a Permanent Solution for bedrock, not reasonably likely to reach a Permanent Solution for overburden and shallow bedrock	Retained for OU-4 Not retained for OU-3
		Permeable Reactive Barrier –Involves the installation of reactive materials through which a dissolved contaminant plume moves through its natural migration with treated water exiting the other side.	Effective on CVOCs Works with existing geochemical environment Low O&M effort No end of life decommissioning/removal required	Challenging to find correct mix of barrier media for site specific mix of COCs, particularly PCBs Bedrock constructability issues and low likelihood of successful installation in bedrock May require maintenance (regeneration or replacement) in the future depending upon media longevity	Technology is available and may achieve a Permanent Solution	Retained for OU-3
		Monitored Natural Attenuation	Low degree of difficulty to implement. Monitoring network in place	Relatively long time to reach goals Does not address sources (depends on other technology for this)	Technology is available and may achieve a Permanent Solution	Retained for OU-3 and OU-4
SOIL GAS Reduce to the extent feasible or control the concentrations of CVOCs in sub slab soil gas and/or indoor air on the Precix property such that: a. Potential exposure to indoor air will achieve a level of No Significant Risk	Monitored Attenuation	**Indoor Air Monitoring** and subslab Monitoring- Quarterly, semi-annually, annually, etc.	Low degree of difficulty to implement. Potentially useful during ROS, allows flexibility when Permanent Solution is reached.	Does not mitigate potential issues/exceedances	Technology is available and may achieve a Permanent Solution. Indoor air monitoring would provide information to determine if mitigation would be needed in future.	Retained for OU-2
	Vapor Barrier	**Installation of a vapor barrier –** Install over lowest level floor slab (i.e., Retrocoat)	Moderate degree of difficulty to implement. Proven technology Readily available Effective where there is no unsaturated zone (not dependent on collection of vapors)	Disruptive to operations Long term maintenance Limits use of floor slab	Technology is available and would provide for a Permanent Solution for mitigation of vapor intrusion (does not address source)	Retained for OU-2
	Subslab System	**Passive Subslab** - Installation of passive subslab depressurization system (vent system for subslab with discharge piping to roof)	Low degree of difficulty to implement. Low maintenance	Limited effectiveness (passive system) Not effective in saturated conditions (absence of vadose zone) Not a Permanent Solution	Technology is available, but has not proven to be reliably effective. Passive systems are not eligible for a Permanent Solution.	Not retained
		Active Subslab - Installation of active subslab depressurization system (vent system for subslab with blower and discharge piping to roof)	Highly effective in reducing subslab concentrations Easily implementable Low maintenance	Not effective in saturated conditions (absence of vadose zone) Requires telemetry Requires AUL May require off-gas treatment	Technology is available and would provide for a Permanent Solution for mitigation of vapor intrusion (does not address source).	Retained for OU-2

TABLE 4.1
TECHNOLOGY IDENTIFICATION AND SCREENING
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

Media and PRGs	Technology Category	Technology	Advantages	Disadvantages	Feasibility	Status for Alternative Development
NAPL Remove or contain measured Site NAPL with PCBs and/or CVOCs such that: a. Non-stable NAPL is not present under current site conditions and for the foreseeable future b. All NAPL with Micro-scale Mobility is removed to the extent feasible	Excavation	**Excavation and Off-Site Disposal or On Site Consolidation**	Highly effective for overburden Removes NAPL in overburden zone Low degree of difficulty to implement. Proven technology Relocates quantity of contaminant mass away from shoreline and out of water table Reduces footprint and simplifies management of impacted area (on site consolidation)	Not implementable for NAPL in bedrock Requires long distance transport and costly disposal (off site) Implementation risks and energy usage associated with material handling and transportation Generation of dewatering waste stream during NAPL soil excavation, wastewater requiring treatment and disposal Relocates but does not reduce mass or volume of contaminants unless sent to off site incinerator Off site disposal will require separation of boulders and debris (additional waste stream for bulky solids)	Technology is available and reasonably likely to achieve a Permanent Solution in conjunction with other remedial components	Retained for OU-3
	Recovery	**Free Product Recovery and Disposal**	Low degree of difficulty to implement. Proven technology	Only removes NAPL that is mobile (flows into the recovery wells) Time frame can be long to achieve objectives Will not address residual NAPL Potential long term O&M until micro-scale mobility is eliminated to the extent feasible. Recovery system currently installed (as IRA) plus hand recovery of measured DNAPL in monitoring wells has recovered only minimal volume of DNAPL to date.	Technology is available but based on IRA results is not reasonably likely to achieve a Permanent Solution	Not retained
Storm Sewer Reduce to the extent feasible or control the concentrations of PCBs in soil within the Site storm sewer system such that: a. Migration of PCB impacted soil through the storm sewers is eliminated to the extent feasible or controlled as a source of impacts to surface water.	Remove Storm Sewer	**Remove and Replace Storm Sewer Line**	Effective at removing storm sewer sediments and preventing/reducing migration via infiltration into storm sewer	Generates waste stream Implementation risks associated with material handling and transport Requires periodic inspection and maintenance	Technology is available and reasonably likely to achieve a Permanent Solution in conjunction with another technology	Retained for OU-3
	Clean Storm Sewer	**Clean and Line Existing Storm Sewer**	Effective at preventing/reducing migration via infiltration into storm sewer	Requires periodic inspection and maintenance Some sections of existing sewer may be too damaged to support lining.	Technology is available and reasonably likely to achieve a Permanent Solution in conjunction with another technology	Retained for OU-3

Notes:

1 When it is stated that the technology may achieve a Permanent Solution, it is implied that the technology may be capable of achieving a Permanent Solution by itself or in combination with other technologies and/or controls.

TABLE 4.3.1
DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 1 – TITLEIST PROPERTY SURFACE SOILS
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

The Aerovox Project Operable Unit 1 (OU1) is comprised of the surface soils above the peat layer within the eastern unpaved landscaped area of the Acushnet/Titleist property. The remedial goals for OU1 are to:

1. Eliminate or reduce concentrations, to the extent feasible, or control access to areas with soils with contaminant concentrations > than their respective UCLs (i.e., surface soils with PCB concentrations > 100 mg/kg)

2. Eliminate/reduce, to the extent feasible, or control access to surface soils that present unacceptable risk under current or foreseeable future site use.

Parameter	ALTERNATIVE 1 Removal of PCB Impacted Soils in Upper Two Feet (>1 mg/kg) and at Depth (>100 mg.kg)	ALTERNATIVE 2 Removal of PCB Impacted Soils at Concentrations Greater Than Commercial/Industrial Risk Based Concentration (4 mg/kg)	ALTERNATIVE 3A Removal and Off-Site Disposal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE 3B Removal and On-site Consolidation of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE 4 PCB Impacted Soils Addressed with Asphalt Cap (> 1 mg/kg and < 100 mg/kg) or Engineered Barrier (> 100 mg/kg)
Size and Configuration	This alternative includes: excavate and remove soils in top 2' with PCB concentrations > 1 mg/kg and deeper locations with PCB concentrations > 100 mg/kg (the MCP UCL), install demarcation marker layer and two feet of clean backfill, provide AUL to restrict foreseeable future use of soil below the demarcation marker layer, restore landscaping, transport and dispose of excavated material. Excavation would be completed in the footprint area shown on Figure 4.3.1-1. Concentration based subareas and corresponding depths are also shown on Figure 4.3.1-1. Soil excavation would not go below the top of peat layer. This alternative would include the excavation of approximately 5,900 cubic yards of soil. An AUL would be placed on the impacted portion of the property to restrict foreseeable future site uses and provide for maintenance of the soil cap.	This alternative includes: excavate and remove surface soils that are currently above risk based concentration for current site use, backfill with clean fill and restore landscaping, provide AUL to restrict foreseeable future use, transport and dispose of excavated material. This alternative is similar to Alternative 1 with the exception that soils with concentrations of contaminants above the risk based concentrations for the current site usage (commercial/industrial) would be removed and disposed of off-site. The soils to be addressed under this alternative and their respective depths are depicted on Figure 4.3.1-2. This alternative would include the excavation of approximately 7,900 cubic yards of soil. An AUL would be placed on the impacted portion of the property to restrict foreseeable future site uses as commercial/industrial only and provide for maintenance of the soil cap.	This alternative includes: excavate and remove surface soils that are currently above risk based concentrations for foreseeable future use as residential property, backfill with clean fill and restore landscaping, transport and dispose of excavated material. This alternative would include the excavation of approximately 9,700 cubic yards of soil. This alternative is similar to Alternative 2 with the exception that soils with concentrations of contaminants above the risk based concentrations for residential usage would be removed and disposed of off-site. The soils to be addressed under this alternative and their respective depths are depicted on Figure 4.3.1-3. As the soils would be removed to allow for a future residential site usage, no AUL is necessary.	This alternative includes: excavate and remove surface soils that are currently above risk based concentrations for foreseeable future use as residential property, backfill with clean fill and restore landscaping, consolidation of excavated material. This alternative would include the excavation of approximately 9,700 cubic yards of soil. This alternative is similar to Alternative 2 with the exception that soils with concentrations of contaminants above the risk based concentrations for residential usage would be removed from the Titleist property and consolidated on site with similar soils on the Aerovox property. The soils to be addressed under this alternative and their respective depths are depicted on Figure 4.3.1-3. As the soils would be removed to allow for a future residential site usage, no AUL is necessary.	This alternative includes: install a demarcation layer and pavement cap over soils with PCB concentrations > 1 mg/kg and an engineered barrier at locations with PCB concentrations > 100 mg/kg, provide AUL to restrict foreseeable future use and provide for cap maintenance, dispose of soil, if any, that needs to be removed to construct the Engineered Barrier. The pavement cap with a minimum asphalt thickness of 3 inches would be installed over the footprint area shown on Figure 4.3.1-4. In areas where soils are present at concentrations in excess of their respective UCL, install a cap that meets the requirements for an Engineered Barrier as defined in the MCP. These Engineered Barrier areas are also shown on Figure 4.3.1-4. This alternative would include the excavation of soil only if needed to accommodate the placement of the Engineered Barrier. An AUL would be placed on the impacted portion of the property to restrict foreseeable future site uses and provide for maintenance of the asphalt cap and Engineered Barrier.
Remediation Time	This remedial alternative is estimated to take approximately two to three months to complete.	This remedial alternative is estimated to take approximately two to three months to complete.	This remedial alternative is estimated to take approximately three to four months to complete.	This remedial alternative is estimated to take approximately two to three months to complete.	This remedial alternative is estimated to take approximately one month to complete.

TABLE 4.3.1
DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 1 – TITLEIST PROPERTY SURFACE SOILS
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

Parameter	ALTERNATIVE 1 Removal of PCB Impacted Soils in Upper Two Feet (>1 mg/kg) and at Depth (>100 mg.kg)	ALTERNATIVE 2 Removal of PCB Impacted Soils at Concentrations Greater Than Commercial/Industrial Risk Based Concentration (4 mg/kg)	ALTERNATIVE 3A Removal and Off Site Disposal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE 3B Removal and On-site Consolidation of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE 4 PCB Impacted Soils Addressed with Asphalt Cap (> 1 mg/kg and < 100 mg/kg) or Engineered Barrier (> 100 mg/kg)
Spatial Requirements	Remedial activities could be conducted within the confines of the Site. Excavated soils may be direct loaded for disposal or securely staged within the Aerovox property as needed.	Remedial activities could be conducted within the confines of the Site. Excavated soils may be direct loaded for disposal or securely staged within the Aerovox property as needed.	Remedial activities could be conducted within the confines of the Site. Excavated soils may be direct loaded for disposal or securely staged within the Aerovox property as needed.	Remedial activities could be conducted within the confines of the Site. Excavated soils would be direct loaded for transfer to the consolidation cell within the Aerovox property as needed.	Remedial activities could be conducted within the confines of the Site.
Disposal Options	Excavated soils would be disposed of at an approved facility. Water generated from dewatering would be treated on-site and discharged either to the river and/or the local POTW or transported off site for treatment and disposal.	Excavated soils would be disposed of at an approved facility. Water generated from dewatering would be treated on-site and discharged either to the river and/or the local POTW or transported off site for treatment and disposal.	Excavated soils would be disposed of at an approved facility. Water generated from dewatering would be treated on-site and discharged either to the river or the local POTW or transported off site for treatment and disposal.	Excavated soils would be placed in a consolidation cell on the Aerovox property (OU3). The soil would be placed with other similar soils for subsequent capping. Water generated from dewatering would be treated on-site and discharged either to the river or the local POTW or transported off site for treatment and disposal.	Soil excavation is not included with this alternative. Minor amounts of remediation waste, if generated, would be disposed of at an approved facility. Generation of dewatering water is not anticipated.
Substantive Permit Requirements	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Additional TSCA risk based approval under 40 CFR 761.61(c) may be required for work inconsistent with the existing TSCA determination for the project. Discharge of groundwater (from dewatering) to surface water or to the local POTW may require permitting and/or approvals. If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Additional TSCA risk based approval under 40 CFR 761.61(c) may be required for work inconsistent with the existing TSCA determination for the project. Discharge of groundwater (from dewatering) to surface water or to the local POTW may require permitting and/or approvals. If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Additional TSCA risk based approval under 40 CFR 761.61(c) may be required for work inconsistent with the existing TSCA determination for the project. Discharge of groundwater (from dewatering) to surface water or to the local POTW may require permitting and/or approvals. If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Additional TSCA risk based approval under 40 CFR 761.61(c) may be required for work inconsistent with the existing TSCA determination for the project. Discharge of groundwater (from dewatering) to surface water or to the local POTW may require permitting and/or approvals. If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. If 1 or more acres of land is disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.

Notes:
1. *Area and volumes presented in the table are estimates.*
2. *The conceptual plans for Alternatives 1 through 4 are presented as Figures 4.3.1-1 through 4.3.1-4.*

TABLE 4.3.2
DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 2 – PRECIX PROPERTY VAPOR INTRUSION
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

The Aerovox Project Operable Unit 2 (OU2) is comprised of the subsurface soil and shallow overburden groundwater (GW) on the Precix property that may contribute to future risk resulting from a complete vapor intrusion pathway. The remedial goals for OU2 are to:

1. Reduce CVOC GW and subslab soil gas concentrations, to extent feasible and control these media as potential sources for vapor intrusion in GW2 areas.

2. Mitigate or control subsurface migration of CVOCs and vapor intrusion to occupied buildings in GW2 areas so that indoor air concentrations do not exceed risk based levels for foreseeable future use.

Parameter	ALTERNATIVE 1 Monitored Subslab Soil Gas Attenuation	ALTERNATIVE 2 Vapor Barrier Over Floor Slab	ALTERNATIVE 3 Active Subslab Depressurization System
Size and Configuration	This alternative includes: monitor subslab gas attenuation to confirm vapor intrusion does not present a significant risk for current or foreseeable future building occupants, and provide AUL to restrict building use until attenuation demonstrates vapor intrusion related restrictions are no longer required. Provide monitoring of groundwater, subslab soil gas and indoor air within the area of the Precix property where GW2 applies and groundwater levels are above corresponding GW2 values. This area is shown on Figure 4.3.2-1. An AUL would be placed on the impacted portion of the property to restrict foreseeable future building uses to those activities and uses that would result in no greater exposure of occupants to indoor air than current use.	This alternative includes: install a vapor barrier over the floor slab, including floor penetrations, to restrict future vapor infiltration. Provide seasonal monitoring of subslab soil gas and indoor air within the area of the Precix property where groundwater contaminant concentrations are above corresponding GW2 values to demonstrate continued effectiveness of the barrier. This area is shown on Figure 4.3.2-2. An AUL would be placed on the impacted portion of the property to restrict foreseeable future building uses to those activities and uses that would result in no greater exposure of occupants to indoor air than current use and to provide for continued monitoring, inspection and maintenance of the vapor barrier.	This alternative includes: install an active subslab depressurization system (Active Exposure Pathway Mitigation Measure or AEPMM) within the area of the Precix property where GW2 applies and groundwater contaminant concentrations are above corresponding GW2 values. This area is shown on Figure 4.3.2-3. An AUL would be placed on the impacted portion of the property to restrict foreseeable future building uses and provide for continued operation and maintenance of the AEPMM. Remote telemetry would be required as part of the AEPMM
Remediation Time	Monitoring would remain in effect for approximately 30 years or until attenuation demonstrates vapor intrusion related restrictions are no longer required.	Monitoring of subslab and indoor air and inspection and maintenance of the vapor barrier would remain in effect for approximately 30 years or until attenuation demonstrates vapor intrusion related restrictions are no longer required.	Operation and maintenance of the subslab depressurization system would remain in effect for approximately 30 years or until attenuation demonstrates vapor intrusion related restrictions are no longer required.
Spatial Requirements	Remedial activities could be conducted within the confines of the Site.	Remedial activities could be conducted within the confines of the Site.	Remedial activities could be conducted within the confines of the Site.
Disposal Options	No remediation derived wastes would be generated during implementation of this remedial alternative.	No remediation derived wastes would be generated during implementation of this remedial alternative.	Off gas treatment, if required, may result in off-site transportation and disposal of treatment derived waste (e.g. vapor phase carbon).
Substantive Permit Requirements	No state or federal permits would need to be obtained for implementation of this remedial alternative.	No state or federal permits would need to be obtained for implementation of this remedial alternative.	No state or federal permits would need to be obtained for implementation of this remedial alternative.

Notes:
1. Area and volumes presented in the table are estimates.
2. The conceptual plans for Alternatives 1 through 3 are presented as Figures 4.3.2-1 through 4.3.2-3.

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

The Aerovox Project Operable Unit 3 (OU3) is the source control OU and is comprised of the Aerovox Property soil, storm sewers and overburden groundwater. The remedial goals for this OU3 are to:

1. Eliminate or reduce concentrations, to the extent feasible, or control access to areas with soils containing contaminants at concentrations greater than their respective UCLs.
2. Eliminate or reduce, to the extent feasible, or control access to soils that present unacceptable risk to human health and/or the environment under current or foreseeable future use.
3. Eliminate or reduce, to the extent feasible, or control soil as a potential source of impacts to overburden GW.
4. Reduce concentrations, to the extent feasible and control migration of overburden GW impacted by PCBs and/or CVOCs at concentrations that could present a risk to receptors in surface water and sediment after New Bedford Harbor remediation is complete, and achieve a stable or contracting groundwater plume.
5. Eliminate, to the extent feasible, and control DNAPL in overburden that may be a source of impacts to overburden GW or that may be non-stable, to the extent such DNAPL control is necessary after completion of the DNAPL IRA.
6. Eliminate, to the extent feasible and control the migration of PCB impacted sediments in the Site storm water system.

Parameter	ALTERNATIVE 1 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 2 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 3 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
Size and Configuration	This alternative includes: excavate and off-site dispose of soils in the top 15 feet below ground surface (bgs) with concentrations above UCLs, backfill and restore asphalt cap in areas where needed, clean and line to the extent practicable or replace sections of storm sewer that serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the cap, install a vertical containment and groundwater extraction and treatment system to prevent lateral and/or vertical migration of CVOCs and PCBs outside the containment area, and provide in situ treatment of deeper hot spot soils containing concentrations of PCBs and CVOCs that may be acting as a source to overburden groundwater contamination. Both in situ treatment and groundwater extraction and treatment would reduce concentrations of CVOCs and PCBs within the containment area. Excavation would occur in the footprint areas shown on Figure 4.3.3-1. Excavation would be undertaken to depths up to 15 feet bgs across areas where soils are impacted by contaminants at concentrations in excess of their respective UCLs. These areas and corresponding depths are also shown on Figure 4.3.3-1. Soil excavation would be required above and below the peat layer and beneath portions of the former building slab. Soils would be segregated based on concentration with those containing contaminant concentrations below their respective	This alternative includes: excavate and off-site dispose of soils with concentrations above UCLs in the top 15 feet bgs, backfill and restore asphalt cap in areas where needed, clean and line to the extent practicable or replace sections of storm sewer that serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the cap, install a vertical containment barrier and groundwater extraction and treatment system to prevent lateral and/or vertical migration of CVOCs and PCBs outside the containment area and to reduce concentrations of CVOCs and PCBs within the containment area. Excavation would occur in the footprint areas shown on Figure 4.3.3-2. Excavation would be undertaken to depths up to 15 feet bgs across areas where soils are impacted by contaminants at concentrations in excess of their respective UCLs. These areas and corresponding depths are also shown on Figure 4.3.3-2. Soil excavation would be required above and below the peat layer and beneath portions of the former building slab. Soils would be segregated based on concentration with those containing contaminant concentrations below their respective UCLs returned to the excavation. This alternative would include the excavation of approximately 26,600 cubic yards of soil with subsequent transportation and off site disposal at an approved facility. The excavated areas would be backfilled with clean soil (after excavated soils with concentrations below UCLs have	This alternative includes: excavate and off-site dispose of soils with concentrations above UCLs in the top 15 feet bgs, soils within 25 feet of the shoreline down to the top of the peat layer, and soils within the northeast corner of the site down to the top of bedrock; install a vertical containment barrier on the northern and southern sides of the impacted area, install a permeable reactive barrier to treat CVOCs and PCBs in overburden groundwater along the downgradient side of the property, backfill excavated areas not within the PRB footprint with clean fill and restore asphalt cap in areas where needed, clean and line to the extent practicable or replace sections of storm sewer that serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the cap, and in situ treatment of soils containing concentrations of PCBs and CVOCs acting as a source to overburden groundwater contamination. Excavation would occur in the footprint areas shown on Figure 4.3.3-3. Excavation would be undertaken to depths corresponding to removal of soils in the top 15 feet impacted by contaminants at concentrations in excess of their respective UCLs, removal of the northeast corner soils down to the bedrock surface; and removal of soils within 25 feet of the shoreline down to the top of peat layer. Excavation of soils >UCLs would be required above and below the peat layer and beneath portions of the former building slab at UCL areas. Soils

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY
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Parameter	ALTERNATIVE 1 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 2 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 3 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
	UCLs returned to the excavation. This alternative would include the excavation of approximately 26,600 cubic yards of soil with subsequent transportation and off-site disposal at an approved facility. The excavated areas would be backfilled with clean soil (after excavated soils with concentrations below UCLs have been redeposited). Soils with contaminants at concentrations above their respective UCLs would be disposed of off-site. The asphalt cap would be restored where residual PCB contamination at any depth exceeds 2 mg/kg. Existing storm sewers would be repaired, cleaned and lined wherever practicable, or sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-1. The type of barrier would be selected from among effective process options including: slurry wall, in situ mixed wall, and sealed sheet piling. Vertical barrier would be installed through the overburden deposits down to bedrock. Groundwater would be hydraulically contained by pumping (with above ground treatment) from a series of extraction wells within the containment area as shown on Figure 4.3.3-1. A wastewater treatment plant would be constructed on site to manage the water generated by hydraulic containment. In situ treatment would be performed by injecting nutrients, organic carbon, microbes, and zero valent iron (Figure 4.3.3-1). A monitoring program would be included to evaluate the success of groundwater treatment within the hydraulically contained area, confirm containment, and provide sentinel monitoring outside the barrier to confirm mitigation of mass flux from the property to the Acushnet River.	been redeposited). Soils with contaminants at concentrations above their respective UCLs would be disposal of off-site. The asphalt cap would be restored where residual PCB contamination at any depth exceeds 2 mg/kg. Existing storm sewers would be repaired, cleaned and lined wherever practicable, or sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-2. The type of barrier would be selected from among effective process options including: slurry wall, in situ mixed wall, and sealed sheet piling. Vertical barrier would be installed through the overburden deposits down to bedrock. Groundwater would be hydraulically contained by pumping (with above ground treatment) from a series of extraction wells within the containment area as shown on Figure 4.3.3-2. A wastewater treatment plant would be constructed on site to manage the water generated by hydraulic containment. A monitoring program would be included to confirm containment and provide sentinel monitoring outside the area to confirm mitigation of mass flux from the property to the Acushnet River.	outside of the NE corner and 25-foot of shoreline zones would be segregated based on concentration with those containing contaminant concentrations below their respective UCLs returned to the excavation. This alternative would include the excavation of approximately 30,800 cubic yards of soil with subsequent transportation and off site disposal at an approved facility. The excavated areas would be backfilled with clean soil (after excavated soils with concentrations below UCLs have been redeposited). Excavated soils with contaminants at concentrations above their respective UCLs (and all soils from the 25-foot zone and northeast corner down to bedrock) would be disposed of off-site. The asphalt cap would be restored where residual PCB contamination at any depth exceeds 2 mg/kg. Existing storm sewers would be repaired, cleaned and lined wherever practicable, or sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap. A vertical containment barrier would be installed on the northern and southern sides of the impacted area, with a permeable reactive barrier installed within the western portion of the 25 feet of shoreline zone though the overburden deposits down to bedrock to treat CVOCs and PCBs in overburden groundwater along the downgradient side of the property. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-3. In situ treatment would be performed by injecting nutrients, organic carbon, microbes, and zero valent iron in the area shown on Figure 4.3.3-3. A monitoring program would be included to provide sentinel monitoring outside the barrier and to confirm mitigation of mass flux from the property to the Acushnet River.

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY
PHASE III REMEDIAL ACTION PLAN
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Parameter	ALTERNATIVE 1 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 2 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 3 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
Remediation Time	Excavation of soils and offsite transportation and disposal, backfilling, and construction of the asphalt cap would take approximately five to seven months. Cleaning and lining/replacement of the drainage lines would take approximately one to two months. Installation of vertical containment barrier, groundwater extraction wells and above ground treatment system, and in situ treatment system would take approximately six to eight months. Operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years minimum), or until groundwater achieves GW-3 standards and the barrier walls can be removed.	Excavation of soils and offsite transportation and disposal, backfilling, and construction of the asphalt cap would take approximately five to seven months. Cleaning and lining/replacement of the drainage lines would take approximately one to two months. Installation of vertical containment barrier, groundwater extraction wells and above ground treatment system would take approximately six to eight months. Operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years minimum), or until groundwater achieves GW-3 standards and the barrier walls can be removed.	Excavation of soils and offsite transportation and disposal, backfilling, and construction of the asphalt cap would take approximately eight to 10 months. Cleaning and lining/replacement of the drainage lines would take approximately one to two months. Installation of containment and permeable reactive barrier and in situ treatment system would take approximately four to five months. PRB would function indefinitely and may require periodic replacement of media.
Spatial Requirements	Remedial construction activities could be conducted within the confines of the Site. Excavated soils may be direct loaded for disposal or securely staged within the Aerovox property as needed. A permanent wastewater treatment plant would be constructed and occupy a portion of the property.	Remedial construction activities could be conducted within the confines of the Site. Excavated soils that require off-site disposal may be direct loaded or securely staged within the Aerovox property as needed. A permanent wastewater treatment plant would be constructed and occupy a portion of the property.	Remedial construction activities could be conducted within the confines of the Site. Excavated soils that require off-site disposal may be direct loaded or securely staged within the Aerovox property as needed.
Disposal Options	Excavated soils and debris removed during barrier installation would be transported and disposed off-site at an approved facility. Water extracted and/or generated from construction dewatering and groundwater recovered as a result of hydraulic containment would be treated on-site and reinjected or discharged to the river and/or the local POTW. Waste streams produced by the wastewater treatment plant (e.g. spent activated carbon) would be transported and disposed off site. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site.	Excavated soils and debris removed during barrier installation would be transported and disposed off-site at an approved facility. Water extracted and/or generated from construction dewatering and groundwater recovered as a result of hydraulic containment would be treated on-site and reinjected or discharged to the river and/or the local POTW. Waste streams produced by the wastewater treatment plant (e.g. spent activated carbon) would be transported and disposed off site. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site.	Excavated soils and debris removed during barrier installation would be transported and disposed off-site at an approved facility. Water extracted and/or generated from construction dewatering would be treated on-site and discharged to the river and/or the local POTW. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site.

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
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Parameter	ALTERNATIVE 1 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 2 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 3 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
Substantive Permit Requirements	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. Wastewater generated through hydraulic containment would be treated on site and reinjected or discharged to the river or to the POTW (permit required). If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required. Would require prior DEP approval for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Water generated from dewatering and storm sewer jetting would be treated on-site and discharged either to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. Wastewater generated through hydraulic containment would be treated on site and reinjected or discharged to the river or to the POTW (permit required). If 1 or more acres of land is disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Water generated from dewatering and storm sewer jetting would be treated on-site and discharged either to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. If 1 or more acres of land is disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required. Would require prior DEP approval for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ALTERNATIVES – OU3
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

PARAMETER	ALTERNATIVE 4 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 5 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 6 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
Size and Configuration	This alternative includes: excavate and off-site dispose of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the site down to the top of bedrock, backfill with clean fill, install an engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet, restore asphalt cap on rest of site areas where needed, clean and line to the extent practicable or replace sections of storm sewer that serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the engineered barrier and cap, install a vertical containment and groundwater extraction and treatment system to prevent lateral and/or vertical migration of CVOCs and PCBs outside the containment area, and provide in situ treatment of hot spot soils containing concentrations of PCBs and CVOCs that may be acting as a source to overburden groundwater contamination. Both in situ treatment and groundwater extraction and treatment would reduce concentrations of CVOCs and PCBs within the containment area. Excavation would be undertaken to the top of the peat (average depth of 9 feet bgs) within 25 feet of the shoreline and to the bedrock surface (average depth of 30 feet bgs) in the northeast corner of OU3. These areas and corresponding depths are also shown on Figure 4.3.3-4. This alternative would include the excavation and off-site disposal of approximately 6,900 cubic yards of soil. An engineered barrier would be constructed where remaining soils less than 15 feet bgs contain PCBs at or greater than 100 mg/kg, and the asphalt cap would be restored where residual PCB concentrations at any depth exceed 2 mg/kg. Existing storm sewers would be repaired, cleaned and lined wherever practicable, or sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-4. The type of barrier would be selected from among effective process options including: slurry wall, in situ mixed wall, and	This alternative includes: excavate and off-site dispose of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the site down to the top of bedrock, backfill with clean fill, install an engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet, restore asphalt cap on rest of site areas where needed, clean and line to the extent practicable or replace sections of storm sewer that serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the engineered barrier and cap, install a vertical containment barrier and groundwater extraction and treatment system to prevent lateral and/or vertical migration of CVOCs and PCBs outside the containment area and to reduce concentrations of CVOCs and PCBs within the containment area. Excavation would be undertaken to the top of the peat (average depth of 9 feet bgs) within 25 feet of the shoreline and to the bedrock surface (average depth of 30 feet bgs) in the northeast corner of OU3. These areas and corresponding depths are also shown on Figure 4.3.3-5. This alternative would include the excavation and off-site disposal of approximately 6,900 cubic yards of soil. An engineered barrier would be constructed where remaining soils less than 15 feet bgs contain PCBs at or greater than 100 mg/kg, and the asphalt cap would be restored where residual PCB concentrations at any depth exceed 2 mg/kg. Existing storm sewers would be repaired, cleaned and lined wherever practicable, or sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-5. The type of barrier would be selected from among effective process options including: slurry wall, in situ mixed wall, and sealed sheet piling. Vertical barrier would be installed through the overburden deposits down to bedrock. Groundwater would be hydraulically contained by pumping (with above ground treatment) from a series of extraction wells	This alternative includes: excavate and off-site dispose of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the site down to the top of bedrock, backfill with clean fill, engineered barrier over areas with PCB concentrations in soil above UCLs, restore asphalt cap rest of site areas where needed, clean and line to the extent practicable or replace sections of storm sewer that serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the engineered barrier and cap, install a permeable reactive barrier to treat CVOCs and PCBs in overburden groundwater along the downgradient side of the property, with a vertical containment barrier on the northern and southern sides of the impacted area, and in situ treatment of soils containing concentrations of PCBs and CVOCs acting as a source to overburden groundwater contamination. Excavation would be undertaken to the top of the peat (average depth of 9 feet bgs) within 25 feet of the shoreline and to the bedrock surface (average depth of 30 feet bgs) in the northeast corner of OU3. These areas and corresponding depths are also shown on Figure 4.3.3-6. This alternative would include the excavation and off-site disposal of approximately 7,600 cubic yards of soil. An engineered barrier would be constructed where remaining soils contain PCB concentrations greater than 100 mg/kg, and the asphalt cap would be restored where residual PCB concentrations at any depth exceed 2 mg/kg. Existing storm sewers would be repaired, cleaned and lined wherever possible, or sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap. A vertical containment barrier would be installed on the northern and southern sides of the impacted area, with a permeable reactive barrier installed within the western edge of the 25 feet of the shoreline to treat CVOCs and PCBs in overburden groundwater along the downgradient side of the property. The two types of barriers would be along the alignment shown on Figure 4-7B). The permeable reactive barrier would be installed though the overburden deposits down to bedrock to treat overburden

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ALTERNATIVES – OU3
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

PARAMETER	ALTERNATIVE 4 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 5 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 6 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
	sealed sheet piling. Vertical barrier would be installed through the overburden deposits down to bedrock. Groundwater would be hydraulically contained by pumping (with above ground treatment) from a series of extraction wells within the containment area as shown on Figure 4.3.3-4. A wastewater treatment plant would be constructed on site to manage the water generated by hydraulic containment. In situ treatment would be performed by injecting nutrients, organic carbon, microbes, and zero valent iron (Figure 4.3.3-4). A monitoring program would be included to evaluate the success of groundwater treatment within the hydraulically contained area, confirm containment, and provide sentinel monitoring outside the barrier to confirm mitigation of mass flux from the property to the Acushnet River.	within the containment area as shown on Figure 4.3.3-5. A wastewater treatment plant would be constructed on site to manage the water generated by hydraulic containment. A monitoring program would be included to confirm containment and provide sentinel monitoring outside the area to confirm mitigation of mass flux from the property to the Acushnet River.	groundwater. In situ treatment would be performed by injecting nutrients, organic carbon, microbes, and zero valent iron in the area shown on Figure 4.3.3-6. A monitoring program would be included to provide sentinel monitoring outside the barrier and to confirm mitigation of mass flux from the property to the Acushnet River.
Remediation Time	Excavation of soils and off-site transportation and disposal, backfilling, and capping (engineered barrier and asphalt) would take approximately three to four months. Cleaning and lining/replacement of the drainage lines would take approximately one to two months. Installation of vertical containment barrier, groundwater extraction wells and above ground treatment system, and in situ treatment system would take approximately six to eight months. Operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years minimum), or until groundwater achieves GW-3 standards and the barrier walls can be removed.	Excavation of soils and off-site transportation and disposal, backfilling, and capping (engineered barrier and asphalt) would take approximately three to four months. Cleaning and lining/replacement of the drainage lines would take approximately one to two months. Installation of vertical containment barrier, groundwater extraction wells and above ground treatment system would take approximately five to six months. Operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years minimum), or until groundwater achieves GW-3 standards and the barrier walls can be removed.	Excavation of soils and off-site transportation and disposal, backfilling, and capping (engineered barrier and asphalt) would take approximately three to four months. Cleaning and lining/replacement of the drainage lines would take approximately one to two months. Installation of containment and permeable reactive barrier and in situ treatment system would take approximately four to five months. PRB would function indefinitely and may require periodic replacement of media.
Spatial Requirements	Remedial activities could be conducted within the confines of the Site. Excavated soils (if any) may be direct loaded for disposal or securely staged within the Aerovox property as needed. A permanent wastewater treatment plant would be constructed and occupy a portion of the property.	Remedial activities could be conducted within the confines of the Site. Excavated soils (if any) may be direct loaded for disposal or securely staged within the Aerovox property as needed. A permanent wastewater treatment plant would be constructed and occupy a portion of the property.	Remedial activities could be conducted within the confines of the Site. Excavated soils (if any) may be direct loaded for disposal or securely staged within the Aerovox property as needed.

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ALTERNATIVES – OU3
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

PARAMETER	ALTERNATIVE 4 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 5 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 6 Removal and Off-Site Disposal of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
Disposal Options	Excavated soils would be transported and disposed off-site at an approved facility. Water extracted and/or generated from construction dewatering would be treated on-site and discharged to the river and/or the local POTW and groundwater recovered as a result of hydraulic containment would be treated on-site and reinjected or discharged to the river and/or the local POTW. Waste streams produced by the wastewater treatment plant (e.g. spent activated carbon) would be transported and disposed off site. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site.	Excavated soils would be transported and disposed off-site at an approved facility. Water extracted and/or generated from construction dewatering would be treated on-site and discharged to the river and/or the local POTW. and groundwater recovered as a result of hydraulic containment would be treated on-site and reinjected or discharged to the river and/or the local POTW. Waste streams produced by the wastewater treatment plant (e.g. spent activated carbon) would be transported and disposed off site. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site.	Excavated soils would be transported and disposed off-site at an approved facility. Treatment may be performed prior to disposal to render soil a non-TSCA waste. Water extracted and/or generated from dewatering would be treated on-site and discharged to the river and/or the local POTW. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site. PRB would function indefinitely and may require periodic replacement of media.
Substantive Permit Requirements	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals. Would require prior DEP approval for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals Would require prior DEP approval for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ALTERNATIVES – OU3
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

PARAMETER	ALTERNATIVE 7 Removal and On-Site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 8 Removal and On-Site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 9 Removal and On-Site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
Size and Configuration	This alternative includes: excavate and provide on-site consolidation of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the site down to the top of bedrock, backfill with clean fill, install engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet, restore asphalt cap on rest of site areas where needed, clean and line to the extent practicable or replace sections of storm sewer that serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the engineered barrier and cap, install a vertical containment and groundwater extraction and treatment system to prevent lateral and/or vertical migration of CVOCs and PCBs outside the containment area, and provide in situ treatment of hot spot soils containing concentrations of PCBs and CVOCs that may be acting as a source to overburden groundwater contamination. Both in situ treatment and groundwater extraction and treatment would reduce concentrations of CVOCs and PCBs within the containment area. Excavation would be undertaken to the top of the peat (average depth of 9 feet bgs) within 25 feet of the shoreline and to the bedrock surface (average depth of 30 feet bgs) in the northeast corner of OU3. These areas and corresponding depths are also shown on Figure 4.3.3-7. This alternative would include the excavation and on-site consolidation away from the shoreline of approximately 6,900 cubic yards of soil. The consolidation cells would be constructed in the area shown on Figure 4.3.3-7. An engineered barrier would be constructed where remaining soils contain PCBs at or greater than 100 mg/kg (including the consolidation cell), and the asphalt cap would be restored where residual PCB concentrations at any depth exceed 2 mg/kg. Existing storm sewers would be repaired, cleaned and lined wherever practicable, or sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap and engineered barrier. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-7. The type of barrier would be selected from among	This alternative includes: excavate and on-site consolidation of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the site down to the top of bedrock, backfill with clean fill, engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet,, restore asphalt cap on rest of site areas where needed, clean and line to the extent practicable or replace sections of storm sewer that serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the engineered barrier and cap, install a vertical containment barrier and groundwater extraction and treatment system to prevent lateral and/or vertical migration of CVOCs and PCBs outside the containment area and to reduce concentrations of CVOCs and PCBs within the containment area. Excavation would be undertaken to the top of the peat (average depth of 9 feet bgs) within 25 feet of the shoreline and to the bedrock surface (average depth of 30 feet bgs) in the northeast corner of OU3. These areas and corresponding depths are also shown on Figure 4.3.3-8. This alternative would include the excavation and on site consolidation away from the shoreline of approximately 6,900 cubic yards of soil. The consolidation cells would be constructed in the area shown on Figure 4.3.3-8. An engineered barrier would be constructed where remaining soils contain PCBs at or greater than 100 mg/kg (including the consolidation cell), and the asphalt cap would be restored where residual PCB concentration at any depth exceed 2 mg/kg. Existing storm sewers would be repaired, cleaned and lined wherever practicable, or sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap and engineered barrier. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-8. The type of barrier would be selected from among effective process options including: slurry wall, in situ mixed wall, sealed sheet piling. Vertical barrier would be installed through the overburden deposits down to bedrock.	This alternative includes: excavate and off-site dispose of soils within 25 feet of the shoreline down to the top of the peat layer and within the northeast corner of the site down to the top of bedrock, backfill with clean fill, engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet,, restore asphalt cap on rest of site areas where needed, clean and line to the extent practicable or replace sections of storm sewer that serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the engineered barrier and cap, install a permeable reactive barrier to treat CVOCs and PCBs in overburden groundwater along the downgradient side of the property, with a vertical containment barrier on the northern and southern sides of the impacted area, and in situ treatment of hot spot soils containing concentrations of PCBs and CVOCs that may be acting as a source to overburden groundwater contamination. Excavation would be undertaken to the top of the peat (average depth of 9 feet bgs) within 25 feet of the shoreline and to the bedrock surface (average depth of 30 feet bgs) in the northeast corner of OU3. These areas and corresponding depths are also shown on Figure 4.3.3-9. This alternative would include the excavation and on site consolidation away from the shoreline of approximately 7,600 cubic yards of soil. The consolidation cells would be constructed in the area shown on Figure 4.3.3-9. An engineered barrier would be constructed where remaining soils contain PCB concentrations greater than 100 mg/kg (including the consolidation cell), and the asphalt cap would be restored where residual PCB concentrations at any depth exceed 2 mg/kg. Existing storm sewers would be repaired, cleaned and lined wherever practicable, or sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap and engineered barrier. A vertical containment barrier would be installed on the northern and southern sides of the impacted area, with a permeable reactive barrier installed within the western edge of the 25 feet of the shoreline to treat

TABLE 4.3.3
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PARAMETER	ALTERNATIVE 7 Removal and On-Site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 8 Removal and On-Site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 9 Removal and On-Site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
	effective process options including: slurry wall, in situ mixed wall, and sealed sheet piling. Vertical barrier would be installed through the overburden deposits down to bedrock. Groundwater would be hydraulically contained by pumping (with above ground treatment) from a series of extraction wells within the containment area as shown on Figure 4.3.3-7. A wastewater treatment plant would be constructed on site to manage the water generated by hydraulic containment In situ treatment would be performed by injecting nutrients, organic carbon, microbes, and zero valent iron (Figure 4.3.3-7). A monitoring program would be included to evaluate the success of groundwater treatment within the hydraulically contained area, confirm containment, and provide sentinel monitoring outside the barrier to confirm mitigation of mass flux from the property to the Acushnet River.	Groundwater would be hydraulically contained by pumping (with above ground treatment) from a series of extraction wells within the containment area as shown on Figure 4.3.3-8. A wastewater treatment plant would be constructed on site to manage the water generated by hydraulic containment. A monitoring program would be included to confirm containment and provide sentinel monitoring outside the area to confirm mitigation of mass flux from the property to the Acushnet River.	CVOCs and PCBs in overburden groundwater along the downgradient side of the property. The two types of barriers would be along the alignment shown on Figure 4-7B). The permeable reactive barrier would be installed though the overburden deposits down to bedrock to treat overburden groundwater. In situ treatment would be performed by injecting nutrients, organic carbon, microbes, and zero valent iron in the area shown on Figure 4.3.3-9. A monitoring program would be included to provide sentinel monitoring outside the barrier and to confirm mitigation of mass flux from the property to the Acushnet River.
Remediation Time	Excavation of soils, construction of the consolidation cell, backfilling, and capping (engineered barrier and asphalt) would take approximately four to five months. Cleaning and lining/replacement of the drainage lines would take approximately one to two months. Installation of vertical containment barrier, groundwater extraction wells and above ground treatment system, and in situ treatment system would take approximately six to eight months. Operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years minimum), or until groundwater achieves GW-3 standards and the barrier walls can be removed.	Excavation of soils, construction of the consolidation cell, backfilling, and capping (engineered barrier and asphalt) would take approximately four to five months. Cleaning and lining/replacement of the drainage lines would take approximately one to two months. Installation of vertical containment barrier, groundwater extraction wells and above ground treatment system would take approximately five to six months. Operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years minimum), or until groundwater achieves GW-3 standards and the barrier walls can be removed.	Excavation of soils, construction of the consolidation cell, backfilling, and capping (engineered barrier and asphalt) would take approximately four to five months. Cleaning and lining/replacement of the drainage lines would take approximately one to two months. Installation of containment and permeable reactive barrier and in situ treatment system would take approximately four to five months. PRB would function indefinitely and may require periodic replacement of media.
Spatial Requirements	Remedial activities could be conducted within the confines of the Site. A permanent wastewater treatment plant would be constructed and occupy a portion of the property. A consolidation cell would be constructed and occupy a portion of the property	Remedial activities could be conducted within the confines of the Site. A permanent wastewater treatment plant would be constructed and occupy a portion of the property. A consolidation cell would be constructed and occupy a portion of the property	Remedial activities could be conducted within the confines of the Site. A consolidation cell would be constructed and occupy a portion of the property

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DESCRIPTION OF REMEDIAL ALTERNATIVES – OU3
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PARAMETER	ALTERNATIVE 7 Removal and On-Site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Plume Hot Spot	ALTERNATIVE 8 Removal and On-Site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE 9 Removal and On-Site Consolidation of Soils Within 25 feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, In Situ Treatment of Plume Hot Spot
Disposal Options	Excavated soil would be consolidated on the Aerovox property with other similar soils for capping (engineered barrier or asphalt). Water extracted and/or generated from construction dewatering would be treated on-site and discharged to the river and/or the local POTW and groundwater recovered as a result of hydraulic containment would be treated on-site and reinjected or discharged to the river and/or the local POTW. Waste streams produced by the wastewater treatment plant (e.g. spent activated carbon) would be transported and disposed off site. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site.	Excavated soil would be consolidated on the Aerovox property with other similar soils for capping (engineered barrier or asphalt). Water extracted and/or generated from construction dewatering would be treated on-site and discharged to the river and/or the local POTW and groundwater recovered as a result of hydraulic containment would be treated on-site and reinjected or discharged to the river and/or the local POTW. Waste streams produced by the wastewater treatment plant (e.g. spent activated carbon) would be transported and disposed off site. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site.	Excavated soil would be consolidated on the Aerovox property with other similar soils for capping (engineered barrier or asphalt). Water extracted and/or generated from construction dewatering would be treated on-site and discharged to the river and/or the local POTW. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site.
Substantive Permit Requirements	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals. Would require prior DEP approval for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals Would require prior DEP approval for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ALTERNATIVES – OU3
PHASE III REMEDIAL ACTION PLAN
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NEW BEDFORD, MASSACHUSETTS

PARAMETER	ALTERNATIVE 10 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In Situ Treatment of Plume Hot Spot	ALTERNATIVE 11 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment
Size and Configuration	This alternative includes: install or maintain the existing pavement asphalt cap over soils with PCB concentrations > 2 mg/kg, install an engineered barrier over areas with PCB concentrations in soil above UCLs in the top 15 feet, clean and line to the extent practicable or replace sections of storm sewer that may serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the cap, install a vertical containment and groundwater extraction and treatment system to prevent lateral and/or vertical migration of CVOCs and PCBs outside the containment area, and provide in situ treatment of soils containing concentrations of PCBs and CVOCs acting as a source to overburden groundwater contamination. Both in situ treatment and groundwater extraction and treatment would reduce concentrations of CVOCs and PCBs within the containment area. The asphalt cap with a minimum asphalt thickness of 3 inches would extend over the footprint area shown on Figure 4.3.3-10. In areas where soils within 15 feet of the ground surface are present at concentrations in excess of their respective UCL, the cap shall meet the requirements for an Engineered Barrier as defined in the MCP. Soils excavated for the installation of the Engineered Barrier and vertical barrier wall would be consolidated in other areas of the subsurface under the Site and covered with an appropriate barrier. The anticipated areas to be covered with the Engineered Barrier are also shown on Figure 4.3.3-10. Existing storm sewers would be repaired, cleaned and lined wherever possible, sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap and Engineered Barrier. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-10. The type of barrier would be selected from among effective process options including: slurry wall, in situ mixed wall, and sealed sheet piling. Vertical barrier would be installed through the overburden deposits down to bedrock. Groundwater would be hydraulically contained by pumping (with above ground treatment) from a series of extraction wells within the containment area as shown on Figure 4.3.3-10. A wastewater treatment plant would be constructed on site to manage the water generated by hydraulic containment. In situ treatment would be performed by injecting nutrients, organic carbon, microbes, and zero valent iron (Figure 4.3.3-10). A monitoring program would be included to evaluate the success of groundwater treatment within the hydraulically contained area, confirm containment, and provide sentinel monitoring outside the barrier to confirm mitigation of mass flux from the property to the Acushnet River.	This alternative includes: install or maintain the existing pavement asphalt cap over soils with PCB concentrations > 2 mg/kg, install an Engineered Barrier at locations with PCB concentrations in soil above UCLs, clean and line to the extent practicable or replace sections of storm sewer that may serve as a preferential migration pathway, finalize the AUL to restrict current and foreseeable future use and provide for long term operation and maintenance of the cap, install a vertical containment barrier and groundwater extraction and treatment system to prevent lateral and/or vertical migration of CVOCs and PCBs outside the containment area and to reduce concentrations of CVOCs and PCBs within the containment area. The asphalt cap with a minimum asphalt thickness of 3 inches would extend over the footprint area shown on Figure 4.3.3-11. In areas where soils within 15 feet of the ground surface are present at concentrations in excess of their respective UCL, the cap shall meet the requirements for an Engineered Barrier as defined in the MCP. Soils excavated for the installation of the Engineered Barrier and vertical barrier wall would be consolidated in other areas of the subsurface under the Site and covered with an appropriate barrier. The anticipated areas to be covered with the Engineered Barrier are also shown on Figure 4.3.3-11. Existing storm sewers would be repaired, cleaned and lined wherever possible, sections replaced or reconfigured, as needed. The AUL for the Aerovox property would be finalized to restrict foreseeable future site uses and provide for maintenance of the cap and Engineered Barrier. Vertical barrier installation would occur along the alignment shown on Figure 4.3.3-11. The type of barrier would be selected from among effective process options including: slurry wall, in situ mixed wall, and sealed sheet piling. Vertical barrier would be installed through the overburden deposits down to bedrock. Groundwater would be hydraulically contained by pumping (with above ground treatment) from a series of extraction wells within the containment area as shown on Figure 4.3.3-11. A wastewater treatment plant would be constructed on site to manage the water generated by hydraulic containment. A monitoring program would be included to evaluate the success of groundwater treatment within the hydraulically contained area, confirm containment, and provide sentinel monitoring outside the barrier to confirm mitigation of mass flux from the property to the Acushnet River.

TABLE 4.3.3
DESCRIPTION OF REMEDIAL ALTERNATIVES – OU3
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

PARAMETER	ALTERNATIVE 10 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In Situ Treatment of Plume Hot Spot	ALTERNATIVE 11 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment
Remediation Time	Cap and Engineered Barrier installation would take approximately three to four months. Installation of vertical containment barrier, groundwater extraction wells and above ground treatment system, and in situ treatment system would take approximately six to eight months. Operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years minimum), or until groundwater achieves GW-3 standards and the barrier walls can be removed.	Cap and Engineered Barrier installation would take approximately three to four months. Installation of vertical containment barrier, groundwater extraction wells and above ground treatment system would take approximately five to six months. Operation of the hydraulic containment and treatment system would extend indefinitely (assumed 30 years minimum), or until groundwater achieves GW-3 standards and the barrier walls can be removed.
Spatial Requirements	Remedial activities could be conducted within the confines of the Site. Excavated soils (if any) and debris removed during installation of the vertical barrier may be direct loaded for disposal or securely staged within the Aerovox property as needed. A permanent wastewater treatment plant would be constructed and occupy a portion of the property.	Remedial activities could be conducted within the confines of the Site. Excavated soils (if any) and debris removed during installation of the vertical barrier may be direct loaded for disposal or securely staged within the Aerovox property as needed. A permanent wastewater treatment plant would be constructed and occupy a portion of the property.
Disposal Options	Excavated soils (if any) would either be (a) consolidated on the Aerovox property with other similar soils for subsequent capping or (b) disposed of at an approved facility. In the event that sections of the storm sewer require jetting/cleaning or replacement, removed materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site. Water extracted and/or generated from construction dewatering would be treated on-site and discharged to the river and/or the local POTW and groundwater recovered as a result of hydraulic containment would be treated on-site and reinjected or discharged to the river and/or the local POTW. Waste streams produced by the wastewater treatment plant (e.g. spent activated carbon) would be transported and disposed off site.	Excavated soils (if any) would either be (a) consolidated on the Aerovox property with other similar soils for subsequent capping or (b) disposed of at an approved facility. In the event that sections of the storm sewer require jetting/cleaning or replacement, remove materials or sections of the original storm sewer system may require offsite disposal if they cannot be consolidated on-site. Water extracted and/or generated from construction dewatering would be treated on-site and discharged to the river and/or the local POTW, and groundwater recovered as a result of hydraulic containment would be treated on-site and reinjected or discharged to the river and/or the local POTW. Waste streams produced by the wastewater treatment plant (e.g. spent activated carbon) would be transported and disposed off site.
Substantive Permit Requirements	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals. Would require prior DEP approval for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals. Would require prior DEP approval for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.

Notes:
1. *Timeframes, area and volumes presented in the table are estimates.*
2. *The conceptual plans for Alternatives 1 through 11 are presented as Figures 4.3.3-1 through 4.3.3-11.*

TABLE 4.3.4
DESCRIPTION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 4 – SITE-WIDE BEDROCK GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

The Aerovox Project Operable Unit 4 (OU4) is comprised of remedial alternatives to address the shallow and deep bedrock groundwater at the Site. The remedial goals for OU4 are to:

1. Reduce concentrations of CVOCs and PCBs in fractured bedrock where they exceed their corresponding UCLs to below UCLs.
2. Reduce concentrations of contaminants in bedrock groundwater to achieve a stable or contracting plume.
3. Eliminate, to the extent feasible, and control migration of DNAPL in fractured bedrock that may be a source of impacts to GW or that may be non-stable.

Parameter	ALTERNATIVE 1 In-Situ Chemical Oxidation of Bedrock Groundwater Hot Spots and Monitored Natural Attenuation	ALTERNATIVE 2 In-Situ Thermal Treatment of Deep Bedrock Hot Spots, In-Situ Chemical Oxidation of Shallow Bedrock Hot Spots and Monitored Natural Attenuation
Size and Configuration	This alternative includes: In situ treatment of DNAPL and groundwater UCL exceedances in fractured bedrock using chemical oxidation, monitored natural attenuation for residual COCs in groundwater. This alternative involves the injection of reagent(s) into the subsurface to chemically break down DNAPL and contaminants in groundwater at concentrations in excess of their UCLs (Refer to Figure 4.3.4-1 for in situ treatment areas). The injections would be used in combination with extraction wells to provide circulation of the reagents through the treatment zone in deep bedrock; recirculation not required for shallow bedrock. The selected treatment process would be used to remove source area hotspots. A groundwater monitoring program would be implemented to confirm reduction of COCs to levels below UCLs and to monitor natural attenuation after treatment and demonstrate a stable or shrinking groundwater plume.	This alternative includes: In situ treatment of DNAPL and groundwater UCL exceedances in deep fractured bedrock using thermal treatment and in shallow bedrock using chemical oxidation, monitored natural attenuation for residual COCs in groundwater. The thermal treatment component involves heating the fractured rock and groundwater (using heating elements installed in borings and steam injection wells) to volatilize contaminants in groundwater (with multi-phase extraction wells) at concentrations in excess of their respective UCLs. The extracted groundwater and vapors would be treated above ground. The chemical treatment component involves oxidizing the contaminants in groundwater. These two components would be used to remove source area hotspots. Refer to Figure 4.3.4-2 the location of thermal and in situ treatment areas. A groundwater monitoring program would be implemented to confirm reduction of COCs to levels below UCLs and to monitor natural attenuation after treatment and demonstrate a stable or shrinking groundwater plume.
Remediation Time	Remedy construction is estimated to take five to six months. Injections are estimated to occur at a frequency of once every six to twelve months. Operation of this remedy would extend approximately two to three years.	Remedy construction and implementation of thermal treatment is expected to take three months Injections are estimated to occur at a frequency of once every six to twelve months Operation of this remedy would extend approximately one to two years
Spatial Requirements	Remedial activities could be conducted within the confines of the Site.	Remedial activities could be conducted within the confines of the Site.
Disposal Options	Waste soil and groundwater would be generated during installation and development of monitoring, injection and extraction wells and would be transported and disposed off-site at an approved facility.	Spent liquid and vapor phase carbon would be generated under this remedial alternative and would be transported and disposed off site. Additionally, waste soil and groundwater would be generated during installation and development of thermal remediation, injection, monitoring and extraction wells and would be transported and disposed off-site at an approved facility.
Substantive Permit Requirements	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Would require prior DEP approval for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.	Work in the Riverfront Area and Buffer Zone may require permitting under the Wetlands Protection act and local ordinances. Work within 25 feet of the River would need to be designed to support the City of New Bedford's planned Riverwalk. Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals. Would require prior DEP approval for addition of oxidation reagents within 50 feet of the Acushnet River.

Notes:
1. *Timeframes, area and volumes presented in the table are estimates.*
2. *The conceptual plans for Alternatives 1 and 2 are presented as Figures 4.3.4-1 and 4.3.4-2*

TABLE 4.3.5
ESTIMATED PCB MASS REDUCTION BY ALTERNATIVE
OPERABLE UNIT 3 - AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

Alternative	Summary of Alternative	Mass Removal from Site (tons)*	Corresponding Site Soil Volume (cy)	Mass Removal from Shoreline (tons)*	Corresponding Shoreline Soil Volume (cy)
OU3-1	Removal and Off-Site Disposal of Soils Above UCLs in Top 15', Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Groundwater Contamination Hot Spot and AUL	27	26,600	14	2,900
OU3-2	Removal and Off-Site Disposal of Soils Above UCLs in Top 15', Cap Areas With PCB Concentrations > 2 mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment and AUL	27	26,600	14	2,900
OU3-3	Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs in Top 15', Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In-Situ Treatment of Groundwater Contamination Hot Spot and AUL	39	30,500	31	7,600
OU3-4	Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination	29	6,900	29	6,900
OU3-5	Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	29	6,900	29	6,900
OU3-6	Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination	31	7,600	31	7,600
OU3-7	Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination	0	0	29	6,900
OU3-8	Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	0	0	29	6,900
OU3-9	Removal and On-site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination	0	0	31	7,600
OU3-10	Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination	0	0	0	0
OU3-11	Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	0	0	0	0

Note: *Rounded to the nearest ton

TABLE 5.1
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 1 – TITLEIST PROPERTY SOILS
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES				
	ALTERNATIVE OU1-1 Removal of PCB Impacted Soils in Upper Two Feet (>1 mg/kg) and at Depth (>100 mg/kg)	ALTERNATIVE OU1-2 Removal of PCB Impacted Soils at Concentrations Greater Than Commercial/Industrial Risk Based Concentration (4 mg/kg)	ALTERNATIVE OU1-3A Removal and Off-Site Disposal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE OU1-3B Removal and Consolidation of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE OU1-4 PCB Impacted Soils Addressed with Asphalt Cap (> 1 mg/kg and < 100 mg/kg) or Engineered Barrier (> 100 mg/kg)
1. Effectiveness					
a) Achieving a Permanent or Temporary Solution	• Will achieve a Permanent Solution in a reasonable timeframe with site AUL	• Will achieve a Permanent Solution in a reasonable timeframe with site AUL	• Will achieve a Permanent Solution in a reasonable timeframe without an AUL	• Will achieve a Permanent Solution in a reasonable timeframe without an AUL	• Will achieve a Permanent Solution in a reasonable timeframe with site AUL
b) Reuse, Recycling, Destroying, Detoxifying or Treating Oil, and Hazardous Material	• Alternative does not reuse, recycle, destroy, detoxify, or treat OHM	• Alternative does not reuse, recycle, destroy, detoxify, or treat OHM	• Alternative does not reuse, recycle, destroy, detoxify, or treat OHM	• Alternative does not reuse, recycle, destroy, detoxify, or treat OHM	• Alternative does not reuse, recycle, destroy, detoxify, or treat OHM
c) Achieving or Approaching Background Concentrations	• Will not approach background in soil after remedial actions are complete	• Will not approach background in soil after remedial actions are complete	• Will approach background concentrations in OU1 soil after remedial actions are complete	• Will approach background concentrations in OU1 soil after remedial actions are complete	• Will not approach background in soil after remedial actions are complete • Leaves greater contaminant mass in subsurface than other alternatives.
Effectiveness Rating	**Good**	**Good**	**Very Good**	**Very Good**	**Fair**
Effectiveness Score	**3**	**3**	**4**	**4**	**2**
2. Reliability					
a) Certainty of Success	• Potential to be highly successful due to removal of soils above UCL provided an AUL is established and remedial cap is maintained	• Potential to be highly successful due to removal of soils above 4 mg/kg provided an AUL is established	• Highly successful due to removal of soils above 1 mg/kg	• Highly successful due to removal of soils above 1 mg/kg	• Potential probable success due to installation of asphalt cap and Engineered Barrier provided an AUL is established and remedial cap is maintained
b) Effectiveness of Measures to Manage Residues or Control Emissions/Discharges	• Effectiveness is dependent on AUL compliance	• Effectiveness is dependent on AUL compliance	• Management of residuals not required	• Management of residuals will be part of OU3, including long term O&M	• Effectiveness is dependent on AUL compliance
Reliability Rating	**Good**	**Good**	**Very Good**	**Very Good**	**Good**
Reliability Score	**3**	**3**	**4**	**4**	**3**
3. Implementability					
a) Technical Complexity	• Low to moderate technical complexity associated with removal of soil along river	• Moderate to difficult technical complexity associated with removal of soil below groundwater table and need for structural support along existing building foundation	• Moderate to difficult technical complexity associated with removal of soil below groundwater table and need for structural support along existing building foundation	• Moderate to difficult technical complexity associated with removal of soil below groundwater table and need for structural support along existing building foundation	• Low technical complexity for construction of Engineered Barrier
b) Integration with Facility Operations	• Minimal effect on OU1 area facility operations • Riverfront excavation and restoration will need to be coordinated with EPA's off shore and intertidal work (EPA scope not defined) • Restoration will need to be in kind and coordinated with City construction of the Riverwalk	• Minimal effect on OU1 area facility operations • Riverfront excavation and restoration will need to be coordinated with EPA's off shore and intertidal work (EPA scope not defined) • Restoration will need to be in kind and coordinated with City construction of the Riverwalk	• Minimal effect on current OU1 area facility operations • Riverfront excavation and restoration will need to be coordinated with EPA's off shore and intertidal work (EPA scope not defined) • Restoration will need to be in kind and coordinated with City construction of the Riverwalk	• Minimal effect on current OU1 facility operations • Riverfront excavation and restoration will need to be coordinated with EPA's off shore and intertidal work (EPA scope not defined) • Restoration will need to be in kind and coordinated with City construction of the Riverwalk	• Minimal effect on OU1 area facility operations • Use of remedial cap area could be diminished following installation • Limits surface of Riverwalk to pavement only
c) Monitoring, O&M or Site Access Requirements/ Limitations	• Moderate site use restrictions due to site AUL • Cap maintenance and AUL monitoring will be required • Property owner will not agree to an AUL	• Moderate site use restrictions due to site AUL • Property owner will not agree to an AUL	• No site use restrictions	• No site use restrictions for OU1 area; already agreed-upon restrictions will be placed on Aerovox property where consolidation area is constructed. • Consolidation cell monitoring and maintenance will be required within the site boundary for this alternative in conjunction with OU3	• Moderate site use restrictions due to site AUL • Remedial cap monitoring and documentation and AUL monitoring will be required • Property owner will not agree to an AUL
d) Availability of Services, Materials, Equipment or Specialists	• Readily available	• Readily available	• Readily available	• Readily available	• Readily available

TABLE 5.1
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 1 – TITLEIST PROPERTY SOILS
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES				
	ALTERNATIVE OU1-1 Removal of PCB Impacted Soils in Upper Two Feet (>1 mg/kg) and at Depth (>100 mg/kg)	ALTERNATIVE OU1-2 Removal of PCB Impacted Soils at Concentrations Greater Than Commercial/Industrial Risk Based Concentration (4 mg/kg)	ALTERNATIVE OU1-3A Removal and Off-Site Disposal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE OU1-3B Removal and Consolidation of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE OU1-4 PCB Impacted Soils Addressed with Asphalt Cap (> 1 mg/kg and < 100 mg/kg) or Engineered Barrier (> 100 mg/kg)
e) Availability, Capacity and Location of Off-Site Treatment, Storage, and Disposal Facilities	• Off-site disposal facilities for impacted soil are readily available • Locations of acceptable off site facilities are all a significant distance from site	• Off-site disposal facilities for impacted soil are readily available • Locations of acceptable off site facilities are all a significant distance from site	• Off-site disposal facilities for impacted soil are readily available • Locations of acceptable off site facilities are all a significant distance from site	• Off-site disposal facility not required; disposal in consolidation cell on Aerovox property	• Off-site disposal facilities for impacted soil are readily available (soil removed to achieve required grades for final pavement)
f) Permits	• CSWPPP and trenching permit required for excavation • Wetlands Order of Conditions likely for work in the Riverfront Area and Buffer Zone under the Wetlands Protection act and local ordinances • Possible requirement for Remediation General Permit or POTW discharge permit depending upon extent of dewatering • Consistent with existing TSCA Determination 761.61 (c) approval	• CSWPPP and trenching permit required for excavation • Wetlands Order of Conditions likely for work in the Riverfront Area and Buffer Zone under the Wetlands Protection act and local ordinances • Possible requirement for Remediation General Permit or POTW discharge permit depending upon extent of dewatering • May require additional TSCA review and approval	• CSWPPP and trenching permit required for excavation • Wetlands Order of Conditions likely for work in the Riverfront Area and Buffer Zone under the Wetlands Protection act and local ordinances • Requirement for Remediation General Permit or POTW discharge permit for dewatering water • May require additional TSCA review and approval	• CSWPPP and trenching permit required for excavation • Wetlands Order of Conditions likely for work in the Riverfront Area and Buffer Zone under the Wetlands Protection act and local ordinances • Requirement for Remediation General Permit or POTW discharge permit for dewatering water • May require additional TSCA review and approval	• CSWPPP likely to cover paving activities • Wetlands Order of Conditions likely for work in the Riverfront Area and Buffer Zone under the Wetlands Protection act and local ordinances • Consistent with existing TSCA Determination 761.61 (c) approval
Implementability Rating	**None**	**None**	**Good**	**Good**	**None**
Implementability Score	**0**	**0**	**3**	**3**	**0**
4. Cost					
a) Cost of Implementation (Not including Cost of Environmental Restoration)	• Moderate Capital Cost: $3.9 million NPV, 30 years: $4.0 million	• Moderate - High Capital Cost: $6.0 million NPV, 30 years: $6.2 million	• High Capital Cost: $6.6 million NPV, 30 years: $6.6 million	• Low Capital Cost: $2.5 million NPV, 30 years: $2.5 million	• Low Capital Cost: $2.6 million NPV, 30 years: $2.7 million Requires Financial Assurance Mechanism
b) Cost of Environmental Restoration and Potential Damages to Natural Resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources
c) Cost of Energy Consumption	• Moderate temporary energy consumption during excavation, removal, transportation and disposal of soil	• High temporary energy consumption during excavation, removal, transportation and disposal of soil and dewatering activities	• High temporary energy consumption during excavation, removal, transportation and disposal of soil and dewatering activities	• Moderate temporary energy consumption during soil excavation and dewatering activities, minimal transportation and disposal energy use	• Moderate temporary energy consumption during transportation and placement of cap materials
Cost Rating	**Good**	**Fair**	**Poor**	**Very Good**	**Very Good**
Cost Score	**3**	**2**	**1**	**4**	**4**
5. Risk					
a) Risk during Implementation	• Moderate short-term risk to construction workers associated with use of heavy equipment and excavation of impacted soil • Moderate potential risk to public while transporting removed soils for disposal off-site	• Moderate short-term risk to construction workers associated with use of heavy equipment and excavation of impacted soil • Moderate potential risk to public while transporting removed soils for disposal off-site	• Moderate short-term risk to construction workers associated with use of heavy equipment and excavation of impacted soil • Moderate potential risk to public while transporting removed soils for disposal off-site	• Moderate short-term risk to construction workers associated with use of heavy equipment and excavation of impacted soil • Low potential risk to public while transporting and consolidating soil	• Minimal short-term risk to construction workers associated with use of heavy equipment and excavation of minor volume of impacted soil • No transportation risks to public
b) Risk during Operations	• Low potential risk to public or future site workers following remedial implementation	• Low potential risk to public or future site workers following remedial implementation	• No potential risk to public or future site workers following remedial implementation	• Minimal incremental potential risk to public or future site workers in OU3 area.	• Low potential risk to public or future site workers following remedial implementation
c) Risk associated with Remaining Oil and Hazardous Materials	• No Significant Risk following removal of impacted surface soil and >UCL soil, capping and AUL. • No risk of AUL noncompliance	• No Significant Risk following removal of impacted surface soil and >UCL soil, capping and AUL • No risk of AUL noncompliance	• No Significant Risk following removal of impacted soil > 1 mg/kg (unrestricted use)	• No Significant Risk following removal of impacted soil > 1 mg/kg (unrestricted use)	• No Significant Risk to human health once asphalt cap and Engineered Barrier are in place • FAM required to maintain Engineered Barrier • No risk of AUL noncompliance
Risk Rating	**Good**	**Good**	**Very Good**	**Very Good**	**Good**
Risk Score	**3**	**3**	**4**	**4**	**3**

TABLE 5.1
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 1 – TITLEIST PROPERTY SOILS
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES				
	ALTERNATIVE OU1-1 Removal of PCB Impacted Soils in Upper Two Feet (>1 mg/kg) and at Depth (>100 mg/kg)	ALTERNATIVE OU1-2 Removal of PCB Impacted Soils at Concentrations Greater Than Commercial/Industrial Risk Based Concentration (4 mg/kg)	ALTERNATIVE OU1-3A Removal and Off-Site Disposal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE OU1-3B Removal and Consolidation of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE OU1-4 PCB Impacted Soils Addressed with Asphalt Cap (> 1 mg/kg and < 100 mg/kg) or Engineered Barrier (> 100 mg/kg)
6. Benefits					
a) Restores Natural Resources	• Not applicable	• Not applicable	• Not applicable	• Not applicable	• Not applicable
b) Achieves Productive Reuse of Site	• No longer requires security measures to mitigate direct contact and tracking of contaminants off-site.	• No longer requires security measures to mitigate direct contact and tracking of contaminants off-site.	• No longer requires security measures to mitigate direct contact and tracking of contaminants off-site.	• No longer requires security measures to mitigate direct contact and tracking of contaminants off-site.	• Security fence could be removed since direct contact threat and potential off-site tracking of contaminants mitigated
c) Avoids Cost of Relocating People	• Not applicable	• Not applicable	• Not applicable	• Not applicable	• Not applicable
d) Avoids Lost Value of Site	• Continued commercial/industrial use of site • No value lost • Precludes possible future residential use	• Continued commercial/industrial use of site • No value lost • Precludes possible future residential use	• Continued commercial/industrial use of OU1 area with possibility of residential use	• Continued commercial/industrial use of OU1 area with possibility of residential use	• Continued commercial/industrial use of site • Remedial cap requires continued monitoring and maintenance and FAM • Precludes possible future residential use
Benefits Rating	**Good**	**Good**	**Very Good**	**Very Good**	**Fair**
Benefits Score	**3**	**3**	**4**	**4**	**2**
7. Timeliness					
a) Time to Eliminate Uncontrolled Sources and Achieve a Level of No Significant Risk	• Will achieve a level of No Significant Risk in a relatively short period of time due to removal of impacted surface soil	• Will achieve a level of No Significant Risk in a relatively short period of time due to removal of impacted surface soil	• Will achieve a level of No Significant Risk in a relatively short period of time due to removal of impacted surface soil	• Will achieve a level of No Significant Risk in a relatively short period of time due to removal of impacted surface soil	• Will achieve a level of No Significant Risk in a relatively short period of time due to installation of asphalt cap and Engineered Barrier
Timeliness Rating	**Good**	**Good**	**Good**	**Good**	**Good**
Timeliness Score	**3**	**3**	**3**	**3**	**3**
8. Non-Pecuniary					
a) Aesthetics	• Existing area and landscaping will be restored to prior condition after excavation	• Existing area and landscaping will be restored to prior condition after excavation	• Existing area and landscaping will be restored to prior condition after excavation	• Existing area and landscaping will be restored to prior condition after excavation	• Existing area will be paved with asphalt
b) Community Acceptance	• Not likely to raise community concerns	• Not likely to raise community concerns	• Not likely to raise community concerns	• Potential to raise community concerns due to consolidation on Aerovox Property	• Asphalt remedial cap likely to raise community concerns due to loss of green space
Non-Pecuniary Rating	**Good**	**Good**	**Very Good**	**Good**	**Poor**
Non-Pecuniary Score	**3**	**3**	**4**	**3**	**1**

TABLE 5.1
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 1 – TITLEIST PROPERTY SOILS
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES				
	ALTERNATIVE OU1-1 Removal of PCB Impacted Soils in Upper Two Feet (>1 mg/kg) and at Depth (>100 mg/kg)	ALTERNATIVE OU1-2 Removal of PCB Impacted Soils at Concentrations Greater Than Commercial/Industrial Risk Based Concentration (4 mg/kg)	ALTERNATIVE OU1-3A Removal and Off-Site Disposal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE OU1-3B Removal and Consolidation of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)	ALTERNATIVE OU1-4 PCB Impacted Soils Addressed with Asphalt Cap (> 1 mg/kg and < 100 mg/kg) or Engineered Barrier (> 100 mg/kg)
9. Sustainable Remediation					
a) Eliminates or reduces to the extent practicable total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem impacts, through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection.	• Moderate sustainability – utilizes least amount of diesel fueled equipment, and off-site land disposal capacity (i.e. lowest carbon footprint) • Maintains waterfront green space and provide permeable surface	• Low sustainability – utilizes diesel fueled equipment and off-site land disposal capacity • Maintains waterfront green space and provide permeable surface	• Low sustainability – utilizes diesel fueled equipment and off-site land disposal capacity • Maintains waterfront green space and provide permeable surface	• Moderate sustainability – utilizes diesel fueled equipment on site • Moderate to good sustainability through reduction of traffic, long trips, diesel emissions and potential road safety issues with creation of onsite consolidation area. • Maintains waterfront green space and provide permeable surface	• Low sustainability – utilizes diesel fueled equipment, asphalt • Creates impermeable surface increasing stormwater runoff from the site • Recycled material may be used in constructing cap
Sustainability Rating	**Very Good**	**Good**	**Good**	**Very Good**	**Poor**
Sustainability Score	**4**	**3**	**3**	**4**	**1**
Overall Score	**25**	**23**	**30**	**33**	**19**

Notes:
1. Costs are preliminary
2. Scores are based on “1” being the lowest (poor), “2” corresponding with a Fair, “3” corresponding with Good and “4” being the highest (Very Good)
3. Overall Scores are preliminary and are not weighted

TABLE 5.2
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 2 – PRECIX PROPERTY VAPOR INTRUSION
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES		
	ALTERNATIVE OU2-1 Monitored Subslab Soil Gas Attenuation	ALTERNATIVE OU2-2 Vapor Barrier Over Floor Slab	ALTERNATIVE OU2-3 Active Subslab Depressurization System
1. Effectiveness			
a) Achieving a Permanent or Temporary Solution	• Current conditions and site uses provide a condition of No Significant Risk. Foreseeable future risks would not be addressed by monitored attenuation only unless/until other OU remedial activities address source materials or an Activity and Use Limitation eliminates future residential uses	• Current conditions and site uses provide a condition of No Significant Risk. Foreseeable future risks would not be addressed by monitored attenuation only unless/until other OU remedial activities address source materials. Passive pathway mitigation is not considered a Permanent Solution • Monitoring of vapor barrier integrity would be required	• May achieve a Permanent Solution as an Active Exposure Pathway Mitigation Measure (AEPMM) operated until remedial activities associated with OU3 effectively reduce source materials • Performance monitoring of SSDS and an AUL will be required to maintain the SSDS as an AEPMM (required to maintain Permanent Solution)
b) Reuse, Recycling, Destroying, Detoxifying or Treating Oil, and Hazardous Material	• Nearby OU remedial activities to address portion of source material coupled with natural degradation of TCE in groundwater plume • Alternative does not reuse or detoxify, solution relies on natural attenuation	• Nearby OU remedial activities to address portion of source material coupled with natural degradation of TCE in groundwater plume • Alternative does not reuse or detoxify, solution relies on engineering control	• Nearby OU remedial activities to address portion of source material coupled with slow natural degradation of TCE in groundwater plume • Alternative provides treatment of extracted vapors
c) Achieving or Approaching Background Concentrations	• In combination with the source control remedy for OU3, natural attenuation will reduce groundwater concentrations, but is not likely to achieve background in a reasonably foreseeable timeframe	• In combination with the source control remedy for OU3, natural attenuation will reduce groundwater concentrations, but is not likely to achieve background in a reasonably foreseeable timeframe	• In combination with the source control remedy for OU3, natural attenuation will reduce groundwater concentrations, but is not likely to achieve background in a reasonably foreseeable timeframe
Effectiveness Rating	**Fair**	**Fair**	**Good**
Effectiveness Score	**2**	**2**	**3**
2. Reliability			
a) Certainty of Success	• Probable success in conjunction with source remediation at other OUs	• Likely success in conjunction with source remediation at other OUs	• Highly successful via active mitigation and in conjunction with source remediation at other OUs
b) Effectiveness of Measures to Manage Residues or Control Emissions/Discharges	• No active measures required	• Effective at controlling vapor migration into building	• Effective at controlling vapor migration into building • Effective at managing emissions via carbon treatment when required
Reliability Rating	**Fair**	**Good**	**Very Good**
Reliability Score	**2**	**3**	**4**
3. Implementability			
a) Technical Complexity	• Low – Includes installation of subslab monitoring points and performance of long term monitoring	• Highly complex, would require nearly insurmountable logistics. Includes installation of vapor barrier requiring precise installation and sealing of penetrations.	• Moderate – Requires complex installation and system balancing • Once startup is completed and pressure differential, operation of the SSDS is relatively simple.
b) Integration with Facility Operations	• Low – Minor interruption of facility operations during installation of subslab monitoring points	• Extremely High – Requires significant disturbance of facility operations and interruption of production	• Moderate – Requires disturbance of facility operations
c) Monitoring, O&M or Site Access Requirements/ Limitations	• Access required for periodic monitoring	• Access required for periodic monitoring and maintenance of vapor barrier, and indoor air sampling	• Access required for periodic monitoring and maintenance of SSDS
d) Availability of Services, Materials, Equipment or Specialists	• Readily available	• Readily available	• Readily available
e) Availability, Capacity and Location of Off-Site Treatment, Storage, and Disposal Facilities	• Not applicable	• Not applicable	• Facilities for regeneration/disposal of carbon readily available
f) Permits	• No permits required	• No permits required	• Local permits required
Implementability Rating	**Very Good**	**Poor**	**Fair**
Implementability Score	**4**	**1**	**2**

TABLE 5.2
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 2 – PRECIX PROPERTY VAPOR INTRUSION
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES		
	ALTERNATIVE OU2-1 Monitored Subslab Soil Gas Attenuation	ALTERNATIVE OU2-2 Vapor Barrier Over Floor Slab	ALTERNATIVE OU2-3 Active Subslab Depressurization System
4. Cost			
a) Cost of Implementation (Not including Cost of Environmental Restoration)	• Low Capital Cost: $0.1 million NPV, 30 years: $0.8 million	• High Capital Cost: $1.0 million NPV, 30 years: $1.6 million • High collateral cost of lost production	• High Capital Cost: $0.9 million NPV, 30 years: $1.3 million
b) Cost of Environmental Restoration and Potential Damages to Natural Resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources
c) Cost of Energy Consumption	• Low	• Low	• Moderate
Cost Rating	**Very Good**	**Fair**	**Fair**
Cost Score	**4**	**2**	**2**
5. Risk			
a) Risk during Implementation	• Low short-term risk to construction workers associated with installation of subslab monitoring points	• Moderate short-term risk to construction workers associated with installation of subslab monitoring points and vapor barrier over floor slab	• Higher short-term risk to construction workers associated with installation of SSDS piping, heavy equipment, and installation of subslab monitoring points
b) Risk during Operations	• Low risk during monitoring	• Low risk during monitoring and maintenance	• Moderate risk during monitoring and maintenance of SSDS equipment and during transportation/disposal of carbon
c) Risk associated with Remaining Oil and Hazardous Materials	• No human health risks under current site uses provided indoor air concentrations do no increase during monitoring period • Unacceptable risk if future site uses or conditions change	• No human health risks under current site uses provided indoor air concentrations do no increase during monitoring period • Acceptable risk for future use provided vapor barrier effectiveness is maintained	• No human health risks under current site uses provided indoor air concentrations do no increase during monitoring period • Acceptable risk for future use provided SSDS effectiveness is maintained
Risk Rating	**Fair**	**Good**	**Good**
Risk Score	**2**	**3**	**3**
6. Benefits			
a) Restores Natural Resources	• Not applicable	• Not applicable	• Not applicable
b) Achieves Productive Reuse of Site	• Continued commercial/industrial use of site	• Continued commercial/industrial use of site	• Continued commercial/industrial use of site
c) Avoids Cost of Relocating People	• Not applicable	• Not applicable	• Not applicable
d) Avoids Lost Value of Site	• Continued commercial/industrial use of site • No value lost	• Continued commercial/industrial use of site • No value lost	• Continued commercial/industrial use of site • No value lost. Potential future use other than commercial/industrial when maintained with the operation of AEPMM.
Benefits Rating	**Fair**	**Fair**	**Good**
Benefits Score	**2**	**2**	**3**

TABLE 5.2
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 2 – PRECIX PROPERTY VAPOR INTRUSION
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES		
	ALTERNATIVE OU2-1 Monitored Subslab Soil Gas Attenuation	ALTERNATIVE OU2-2 Vapor Barrier Over Floor Slab	ALTERNATIVE OU2-3 Active Subslab Depressurization System
7. Timeliness			
a) Time to Eliminate Uncontrolled Sources and Achieve a Level of No Significant Risk	• Remedial action of other Site OU's will address contaminated soil and groundwater that are sources of vapor to indoor air	• Remedial action of other Site OU's will address contaminated soil and groundwater that are sources of vapor to indoor air	• Remedial action of other Site OU's will address contaminated soil and groundwater that are sources of vapor to indoor air
Timeliness Rating	**Fair**	**Fair**	**Fair**
Timeliness Score	**2**	**2**	**2**
8. Non-Pecuniary			
a) Aesthetics	• Minimal change to building aesthetics due to installation of subslab monitoring points	• Minimal change to building aesthetics due to the installation of the vapor barrier over the floor and the subslab monitoring points	• Moderate change to building aesthetics due to installation of subslab monitoring points and SSDS equipment/piping/components
Non-Pecuniary Rating	**Good**	**Good**	**Fair**
Non-Pecuniary Score	**3**	**3**	**2**
9. Sustainable Remediation			
a) Eliminates or reduces to the extent practicable total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem impacts, through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection.	• Highly sustainable, utilizes minimal resources	• Moderately sustainable – utilizes materials (sealants and/or liners), fuels for deliveries	• Lower sustainability – utilizes materials (piping, equipment, etc.), requires energy for continuous operations
Sustainability Rating	**Very Good**	**Good**	**Fair**
Sustainability Score	**4**	**3**	**2**
Overall Score	**25**	**21**	**23**

Notes:
1. Costs are preliminary
2. Scores are based on comparison with other alternatives "1" being the lowest (poor), "2" corresponding with a Fair, "3" corresponding with Good and "4" being the highest (Very Good)
3. Overall Scores are preliminary and are not weighted

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-1 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Groundwater Contamination Hot Spot and AUL	ALTERNATIVE OU3-2 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment and AUL	ALTERNATIVE OU3-3 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Groundwater Contamination Hot Spot and AUL
• **Effectiveness**			
a) Achieving a Permanent or Temporary Solution	• Moderate to high likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL and depending upon the timely effectiveness of the in situ treatment	• Low to moderate likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL	• Moderate to high likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL and in situ treatment
b) Reuse, Recycling, Destroying, Detoxifying or Treating Oil, and Hazardous Material	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats dissolved OHM in situ and treats extracted groundwater ex situ • A small portion of soils disposed off site will be destroyed by incineration	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats extracted groundwater • A small portion of soils disposed off site will be destroyed by incineration	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats dissolved OHM in situ and passively treats CVOCs in groundwater • A small portion of soils disposed off site will be destroyed by incineration
c) Achieving or Approaching Background Concentrations	• Not likely to achieve or approach background concentrations in soil or groundwater	• Will not achieve or approach background concentrations in soil or groundwater	• Not likely to achieve or approach background concentrations in soil or groundwater
Effectiveness Rating	**Very Good**	**Fair**	**Very Good**
Effectiveness Score	**5**	**3**	**5**
• **Reliability**			
a) Certainty of Success	• Soil portion of alternative is likely successful due to removal of soils above UCL assuming AUL compliance and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Potential for shortening the duration of operation of the hydraulic containment system with the addition of treatment • Measure of success not defined – no clear trigger for discontinuing hydraulic containment and removing barriers	• Soil portion of alternative is likely successful due to removal of soils above UCL assuming AUL compliance and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Unlikely to provide measurable success in terms of ceasing operation because no source area groundwater treatment is included.	• Soil portion of alternative is likely successful due to removal of soils above UCL, removal of NE corner shoreline DNAPL source area soils at depth, assuming AUL compliance and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Potential for extending the life of the barrier media system with the addition of treatment • No requirement to actively operate or return to disassemble barriers
b) Effectiveness of Measures to Manage Residues or Control Emissions/Discharges	• Effectiveness is dependent on AUL compliance and cap maintenance • Effectiveness dependent upon continuous operation of hydraulic containment; operational failure could allow up to 50% of contaminated groundwater to migrate into bedrock and the river • The combined vertical barrier and hydraulic containment would be designed to approach 100% reduction in mass flux of dissolved contaminants under this alternative. • The mass of PCBs removed from the site under this alternative would be approximately 27 tons, including 14 tons removed from the shoreline area.	• Effectiveness is dependent on AUL compliance and cap maintenance • Effectiveness dependent upon continuous operation of hydraulic containment; operational failure could allow up to 50% of contaminated groundwater to migrate into bedrock and the river • The combined vertical barrier and hydraulic containment would be designed to approach 100% reduction in mass flux of dissolved contaminants under this alternative. • The mass of PCBs removed from the site under this alternative would be approximately 27 tons, including 14 tons removed from the shoreline area	• Effectiveness is dependent on AUL compliance and cap maintenance • Effectiveness dependent upon monitoring and (if needed) replacement of barrier media; failure to replace media could allow gradually increasing levels of groundwater contaminants to be released to the river or result in reduced groundwater flow • The reactive barrier would be designed to achieve at a minimum sufficient reduction in mass flux of dissolved contaminants to maintain water quality below MCP standards. This yields an estimated mass flux reduction of 58.6% for TCE and 68.6% for PCBs. Based on initial treatability study results, the actual mass flux reduction is predicted to be higher • The mass of PCBs removed from the site under this alternative would be approximately 39 tons, including 31 tons removed from the shoreline area.
Reliability Rating	**Fair**	**Fair**	**Very Good**
Reliability Score	**3**	**3**	**5**
• **Implementability**			
a) Technical Complexity	• Low to moderate technical complexity associated with removal of soil along river and moderate technical complexity associated with installation of vertical containment barrier to bedrock, treatment of groundwater, and in situ treatment	• Low to moderate technical complexity associated with removal of soil along river and moderate technical complexity associated with installation of vertical containment barrier to bedrock and treatment of groundwater.	• Low to moderate technical complexity associated with removal of soil along river and moderate technical complexity associated with installation of vertical containment barriers to bedrock, reactive barrier installation, and in situ treatment.

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-1 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Groundwater Contamination Hot Spot and AUL	ALTERNATIVE OU3-2 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment and AUL	ALTERNATIVE OU3-3 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Groundwater Contamination Hot Spot and AUL
b) Integration with Facility Operations	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • EPA NBH sediment excavation could occur any time after construction of the vertical barrier, however damage to barrier and cap is possible (EPA scope not defined) • In situ treatment and hydraulic containment would be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete • Monitoring would likely occur in wells along the City's Riverwalk; temporary closure/detour of sections of the Riverwalk during monitoring activities may be advisable	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • EPA NBH sediment excavation could occur any time after construction of the vertical barrier, however damage to barrier and cap is possible (EPA scope not defined) • Hydraulic containment would be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete • Monitoring would likely occur in wells along the City's Riverwalk; temporary closure/detour of sections of the Riverwalk during monitoring activities may be advisable	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • Coordination required because it would be preferable for EPA NBH sediment excavation to coincide with soil excavation while temporary shoring along shoreline is in place (EPA scope not defined). • In situ treatment and PRB could be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete. • Monitoring would likely occur in wells along the City's Riverwalk and reactive barrier media may need replacement (estimated every 10 years); temporary closure/detour of sections of the Riverwalk during these activities will be necessary
c) Monitoring, O&M or Site Access Requirements/ Limitations	• Remedial Cap monitoring and maintenance, and groundwater monitoring will be required • Operation and maintenance of groundwater treatment system will be required for an undetermined timeframe • Short term operation of in situ treatment will be required • No access requirements or limitations	• Remedial Cap monitoring and maintenance, and groundwater monitoring will be required • Operation and maintenance of groundwater treatment system will be required indefinitely • No access requirements or limitations	• Remedial Cap monitoring and maintenance, and groundwater monitoring will be required • Short term operation of in situ treatment will be required • Intermittent revitalization/maintenance of reactive barrier may be required • No access requirements or limitations
d) Availability of Services, Materials, Equipment, or Specialists	• Readily available • WWTP operation license required for quarterly system inspections	• Readily available • WWTP operation license required for quarterly system inspections	• Readily available
e) Availability, Capacity and Location of Off-Site Treatment, Storage, and Disposal Facilities	• Capacity at off-site disposal is currently available for excavated soil, spent liquid and vapor phase GAC • Off site disposal facilities are located a significant distance from the Site	• Capacity at off-site disposal is currently available for soil, spent liquid and vapor phase GAC • Off site disposal facilities are located a significant distance from the Site	• Capacity at off-site disposal is currently available for excavated soil and spent media • Off site disposal facilities are located a significant distance from the Site
f) Permits	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • Wastewater generated through hydraulic containment would be treated on-site and reinjected or discharged to the river or to the POTW (permit required). • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required. • Prior DEP approval required for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • Wastewater generated through hydraulic containment would be treated on-site and reinjected or discharged to the river or to the POTW (permit required). • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required. • Prior DEP approval required for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.
Implementability Rating	**Fair**	**Good**	**Fair**
Implementability Score	**3**	**4**	**3**

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-1 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Groundwater Contamination Hot Spot and AUL	ALTERNATIVE OU3-2 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment and AUL	ALTERNATIVE OU3-3 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Groundwater Contamination Hot Spot and AUL
• **Cost**			
a) Cost of Implementation (Not including Cost of Environmental Restoration)	• High Capital Cost: $37.9 million NPV, 20 years: $52.9 million	• High Capital Cost: $36.5 million NPV, 30 years: $56.3 million	• Very High Capital Cost: $47.3 million NPV, 30 years: $53.6 million
b) Cost of Environmental Restoration and Potential Damages to Natural Resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources
c) Cost of Energy Consumption	• Very high to high energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • High energy consumption during operation of groundwater extraction and treatment, and in situ treatment.	• Very high to high energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • Very high energy consumption during long term operation of groundwater extraction and treatment	• Very high to high energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • Very low energy consumption during long term maintenance
Cost Rating	**Poor**	**Very Poor**	**Very Poor**
Cost Score	**2**	**1**	**1**
• **Risk**			
a) Risk during Implementation	• Moderate short-term risk to construction workers associated with use of heavy equipment during excavation and loading of impacted soil and installation of vertical containment wall • Moderate risk associated with material handling during off site transportation and disposal • Low short-term risk to construction workers during installation of injection points, handling of treatment reagents and construction of groundwater treatment system • Potential short-term risk to public during transport and disposal of removed soil through neighborhood	• Moderate short-term risk to construction workers associated with use of heavy equipment during excavation and loading of impacted soil and installation of vertical containment wall • Moderate risk associated with material handling during off site transportation and disposal • Low short-term risk to construction workers during construction of groundwater treatment system • Potential short-term risk to public during transport and disposal of removed soil through neighborhood	• Moderate short-term risk to construction workers associated with use of heavy equipment during excavation and loading of impacted soil and installation of vertical containment and reactive barrier wall • Moderate risk associated with material handling during off site transportation and disposal • Low short-term risk to construction workers during installation of injection points, handling of treatment reagents • Potential short-term risk to public during transport and disposal of removed soil through neighborhood
b) Risk during Operations	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Moderate potential risk to workers during O&M of groundwater treatment system and injections for in situ treatment • Low but more frequent potential risk to public during transport and disposal of spent materials (bag filters, carbon etc.) from groundwater treatment system through neighborhood	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Moderate potential risk to workers during O&M of groundwater treatment system • Low but more frequent potential risk to public during transport and disposal of spent materials (bag filters, carbon etc.) from groundwater treatment system through neighborhood	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Low infrequent potential risk to workers during replacement of barrier media
c) Risk associated with Remaining Oil and Hazardous Materials	• No Substantial Hazard following remedial implementation of UCL soil removal • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is controlled • Identified DNAPL, potentially with microscale mobility, is controlled but not removed in deep overburden in northeast corner • Moderately aggressive contaminant mass removal • Residual contaminated soils isolated from coastal storms through waterfront barrier and cap	• No Substantial Hazard following remedial implementation of UCL soil removal • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is controlled • Identified DNAPL, potentially with microscale mobility, is controlled but not removed in deep overburden in northeast corner • Moderate contaminant mass removal • Residual contaminated soils isolated from coastal storms through waterfront barrier and cap	• No Substantial Hazard following remedial implementation of UCL soil removal • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is treated and controlled • Identified DNAPL, potentially with microscale mobility, is removed with soil excavation in deep overburden in northeast corner • Aggressive contaminant mass removal • Minimal residual contaminated soils isolated from coastal storms through shoreline armoring and cap
Risk Rating	**Poor**	**Poor**	**Good**
Risk Score	**2**	**2**	**4**

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-1 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Groundwater Contamination Hot Spot and AUL	ALTERNATIVE OU3-2 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment and AUL	ALTERNATIVE OU3-3 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Groundwater Contamination Hot Spot and AUL
• **Benefits**			
a) Restores Natural Resources	• Not applicable	• Not applicable	• Not applicable
b) Achieves Productive Reuse of Site	• Potential for future commercial/industrial reuse of site limited by construction and operation of WWTP	• Potential for future commercial/industrial reuse of site limited by construction and operation of WWTP	• Potential for future commercial/industrial reuse of site is greater
c) Avoids Cost of Relocating People	• Not applicable	• Not applicable	• Not applicable
d) Avoids Lost Value of Site	• Reduced potential for future commercial/industrial use of site • Some potential value lost	• Reduced potential for future commercial/industrial use of site • Some potential value lost	• Potential for future commercial/industrial use of site • No value lost
Benefits Rating	**Good**	**Good**	**Very Good**
Benefits Score	**4**	**4**	**5**
• **Timeliness**			
a) Time to Eliminate Uncontrolled Sources and Achieve a Level of No Significant Risk	• Will achieve a level of No Significant Risk in a relatively moderate period of time due to removal of soil with PCB concentrations above UCLs and treatment of hot spots ○ Estimated time to construct: 4-6 months ○ Active O&M duration (ROS): 20 years	• Will achieve a level of No Significant Risk in a relatively long period of time due to removal of soil with PCB concentrations above UCL ○ Estimated time to construct: 3 to 5 months ○ Active O&M duration: Indefinite (30+ years)	• Will achieve a level of No Significant Risk in a relatively moderate period of time due to removal of soil with PCB concentrations above UCLs, removal of DNAPL soils and treatment of hot spots ○ Estimated time to construct: 4 to 6 months ○ Active Remedial Monitoring (ROS) duration: 4 years ○ Media replacement only if needed, assumed at year 10, done as RAM
Timeliness Rating	**Poor**	**Very Poor**	**Fair**
Timeliness Score	**2**	**1**	**3**
• **Non-Pecuniary**			
a) Aesthetics	• Existing area will be restored to prior condition except for treatment plant location • Shoreline prepared for Riverwalk construction	• Existing area will be restored to prior condition except for treatment plant location • Shoreline prepared for Riverwalk construction	• Existing area will be restored to prior condition • Shoreline prepared for Riverwalk construction • PRB allows for more attractive shoreline finish
b) Community Acceptance	• Truck traffic may potentially raise community concerns • Discharge to river or POTW may raise concerns • Community preference for off site	• Truck traffic may potentially raise community concerns • Discharge to river or POTW may raise concerns • Community preference for off site	• Truck traffic may potentially raise community concerns • Community preference - removes most volume off site
Non-Pecuniary Rating	**Fair**	**Fair**	**Very Good**
Non-Pecuniary Score	**3**	**3**	**5**

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-1 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In Situ Treatment of Groundwater Contamination Hot Spot and AUL	ALTERNATIVE OU3-2 Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment and AUL	ALTERNATIVE OU3-3 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Groundwater Contamination Hot Spot and AUL
• **Sustainable Remediation**			
a) Eliminates or reduces to the extent practicable total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem impacts, through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection.	• Low sustainability – high diesel equipment use and off-site truck traffic, high energy use for long term operation of groundwater extraction and treatment system. • Low energy efficiency due to extended period of plant operation • High consumption of expendable WWTP chemicals and supplies • Operation of WWTP will generate air emissions	• Low sustainability – high diesel equipment use and off-site truck traffic, high energy use for long term operation of groundwater extraction and treatment system. • Low energy efficiency due to extended period of plant operation • High consumption of expendable WWTP chemicals and supplies • Operation of WWTP will generate air emissions	• Low to moderate sustainability – high energy use limited to short duration diesel equipment use and truck traffic • Passive barrier operation provides efficiency • Barrier media replacement infrequent and rejuvenation and reuse possible • No air emissions during operation
Sustainability Rating	**Poor**	**Poor**	**Fair**
Sustainability Score	**2**	**2**	**3**
Overall Score	**26**	**23**	**34**

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-4 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-5 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE OU3-6 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination
• **Effectiveness**			
a) Achieving a Permanent or Temporary Solution	• Moderate to high likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL and depending upon the timely effectiveness of the in situ treatment	• Low to moderate likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL	• Moderate to high likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL and in situ treatment
b) Reuse, Recycling, Destroying, Detoxifying or Treating Oil, and Hazardous Material	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats dissolved OHM in situ and treats extracted groundwater ex situ • A small portion of soils disposed off site will be destroyed by incineration	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats extracted groundwater • A small portion of soils disposed off site will be destroyed by incineration	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats dissolved OHM in situ and passively treats CVOCs in groundwater • A small portion of soils disposed off site will be destroyed by incineration
c) Achieving or Approaching Background Concentrations	• Not likely to achieve or approach background concentrations in soil or groundwater	• Will not achieve or approach background concentrations in soil or groundwater	• Not likely to achieve or approach background concentrations in soil or groundwater
Effectiveness Rating	**Very Good**	**Fair**	**Very Good**
Effectiveness Score	**5**	**3**	**5**
• **Reliability**			
a) Certainty of Success	• Soil portion of alternative is likely successful due to removal of shoreline impacted soils and NE corner shoreline DNAPL source area soils at depth assuming AUL compliance and engineered barrier and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Potential for shortening the duration of operation of the hydraulic containment system with the addition of treatment • Measure of success not defined – no clear trigger for discontinuing hydraulic containment and removing barriers	• Soil portion of alternative is likely successful due to removal of shoreline impacted soils and NE corner shoreline DNAPL source area soils at depth assuming AUL compliance and engineered barrier and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Unlikely to provide measurable success in terms of ceasing operation because no source area groundwater treatment is included.	• Soil portion of alternative is likely successful due to removal of shoreline impacted soils and NE corner shoreline DNAPL source area soils at depth, assuming AUL compliance and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Potential for extending the life of the barrier media system with the addition of treatment • No requirement to actively operate or return to disassemble barriers
b) Effectiveness of Measures to Manage Residues or Control Emissions/Discharges	• Effectiveness is dependent on AUL compliance, and engineered barrier and cap maintenance • Effectiveness dependent upon continuous operation of hydraulic containment; operational failure could allow up to 50% of contaminated groundwater to migrate into bedrock and the river • The combined vertical barrier and hydraulic containment would be designed to approach 100% reduction in mass flux of dissolved contaminants under this alternative. • The mass of PCBs removed from the site under this alternative would be approximately 29 tons, all from the shoreline area.	• Effectiveness is dependent on AUL compliance, and engineered barrier and cap maintenance • Effectiveness dependent upon continuous operation of hydraulic containment; operational failure could allow up to 50% of contaminated groundwater to migrate into bedrock and the river • The combined vertical barrier and hydraulic containment would be designed to approach 100% reduction in mass flux of dissolved contaminants under this alternative. • The mass of PCBs removed from the site under this alternative would be approximately 29 tons, all from the shoreline area	• Effectiveness is dependent on AUL compliance, and engineered barrier and cap maintenance • Effectiveness dependent upon monitoring and (if needed) replacement of barrier media; failure to replace media could allow gradually increasing levels of groundwater contaminants to be released to the river • The reactive barrier would be designed to achieve at a minimum sufficient reduction in mass flux of dissolved contaminants to maintain water quality below MCP standards. This yields an estimated mass flux reduction of 58.6% for TCE and 68.6% for PCBs. Based on initial treatability study results, the actual mass flux reduction is predicted to be higher. • The mass of PCBs removed from the site under this alternative would be approximately 31 tons, all from the shoreline area.
Reliability Rating	**Very Good**	**Good**	**Very Good**
Reliability Score	**5**	**4**	**5**
• **Implementability**			
a) Technical Complexity	• Low to moderate technical complexity associated with removal of soil along river and moderate technical complexity associated with installation of vertical containment barrier to bedrock, treatment of groundwater, and in situ treatment	• Low to moderate technical complexity associated with removal of soil along river and moderate technical complexity associated with installation of vertical containment barrier to bedrock and treatment of groundwater.	• Low to moderate technical complexity associated with removal of soil along river and moderate technical complexity associated with installation of vertical containment barriers to bedrock, reactive barrier installation, and in situ treatment.
b) Integration with Facility Operations	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • EPA NBH sediment excavation could occur any time after construction of the vertical barrier, however damage to barrier and cap is possible (EPA scope not defined) • In situ treatment and hydraulic containment would be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • EPA NBH sediment excavation could occur any time after construction of the vertical barrier, however damage to barrier and cap is possible (EPA scope not defined) • Hydraulic containment would be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • Coordination required because it would be preferable for EPA NBH sediment excavation to coincide with soil excavation while temporary shoring along shoreline is in place (EPA scope not defined). • In situ treatment and PRB could be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete.

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
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	ALTERNATIVE OU3-4 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-5 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE OU3-6 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination
	• Monitoring would likely occur in wells along the City's Riverwalk; temporary closure/detour of sections of the Riverwalk during monitoring activities may be advisable	• Monitoring would likely occur in wells along the City's Riverwalk; temporary closure/detour of sections of the Riverwalk during monitoring activities may be advisable	• Monitoring would likely occur in wells along the City's Riverwalk and reactive barrier media may need replacement (estimated every 10 years); temporary closure/detour of sections of the Riverwalk during these activities will be necessary
c) Monitoring, O&M or Site Access Requirements/ Limitations	• Remedial Cap monitoring and maintenance, and groundwater monitoring will be required • Operation and maintenance of groundwater treatment system will be required for an undetermined timeframe • Short term operation of in situ treatment will be required • No access requirements or limitations	• Remedial Cap monitoring and maintenance, and groundwater monitoring will be required • Operation and maintenance of groundwater treatment system will be required indefinitely • No access requirements or limitations	• Remedial Cap monitoring and maintenance, permeable barrier and groundwater monitoring will be required • Short term operation of in situ treatment will be required • Intermittent future revitalization/maintenance of reactive barrier may be required • No access requirements or limitations
d) Availability of Services, Materials, Equipment, or Specialists	• Readily available • WWTP operation license required for quarterly system inspections	• Readily available • WWTP operation license required for quarterly system inspections	• Readily available
e) Availability, Capacity and Location of Off-Site Treatment, Storage, and Disposal Facilities	• Capacity at off-site disposal is currently available for excavated soil, spent liquid and vapor phase GAC • Off site disposal facilities are located a significant distance from the Site	• Capacity at off-site disposal is currently available for soil, spent liquid and vapor phase GAC • Off site disposal facilities are located a significant distance from the Site	• Capacity at off-site disposal is currently available for excavated soil and spent media • Off site disposal facilities are located a significant distance from the Site
f) Permits	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • Wastewater generated through hydraulic containment would be treated on-site and reinjected or discharged to the river or to the POTW (permit required). • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required. • Prior DEP approval required for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • Wastewater generated through hydraulic containment would be treated on-site and reinjected or discharged to the river or to the POTW (permit required). • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required. • Prior DEP approval required for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.
Implementability Rating	**Fair**	**Good**	**Good**
Implementability Score	**3**	**4**	**4**
• **Cost**			
a) Cost of Implementation (Not including Cost of Environmental Restoration)	• Moderate Capital Cost: $20.7 million NPV, 20 years: $35.7 million	• Low to Moderate Capital Cost: $19.2 million NPV, 30 years: $38.9 million	• Low to Moderate Capital Cost: $23.5 million NPV, 30 years: $ 29.8 million
b) Cost of Environmental Restoration and Potential Damages to Natural Resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources
c) Cost of Energy Consumption	• Very high to high energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • High energy consumption during operation of groundwater extraction and treatment, and in situ treatment.	• Very high to high energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • Very high energy consumption during long term operation of groundwater extraction and treatment	• Very high to high energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier • Very low energy consumption during long term maintenance
Cost Rating	**Poor**	**Poor**	**Fair**
Cost Score	**2**	**2**	**3**

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
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NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-4 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-5 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE OU3-6 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination
• **Risk**			
a) Risk during Implementation	• Moderate short-term risk to construction workers associated with use of heavy equipment during excavation and loading of impacted soil and installation of vertical containment wall • Moderate risk associated with material handling during off site transportation and disposal • Low short-term risk to construction workers during installation of injection points, handling of treatment reagents and construction of groundwater treatment system • Potential short-term risk to public during transport and disposal of removed soil through neighborhood	• Moderate short-term risk to construction workers associated with use of heavy equipment during excavation and loading of impacted soil and installation of vertical containment wall • Moderate risk associated with material handling during off site transportation and disposal • Low short-term risk to construction workers during construction of groundwater treatment system • Potential short-term risk to public during transport and disposal of removed soil through neighborhood	• Moderate short-term risk to construction workers associated with use of heavy equipment during excavation and loading of impacted soil and installation of vertical containment and reactive barrier walls • Moderate risk associated with material handling during off site transportation and disposal • Low short-term risk to construction workers during installation of injection points, handling of treatment reagents • Potential short-term risk to public during transport and disposal of removed soil through neighborhood
b) Risk during Operations	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Moderate potential risk to workers during O&M of groundwater treatment system and injections for in situ treatment • Low but more frequent potential risk to public during transport and disposal of spent materials (bag filters, carbon etc.) from groundwater treatment system through neighborhood	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Moderate potential risk to workers during O&M of groundwater treatment system • Low but more frequent potential risk to public during transport and disposal of spent materials (bag filters, carbon etc.) from groundwater treatment system through neighborhood	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Low infrequent potential risk to workers during replacement of barrier media
c) Risk associated with Remaining Oil and Hazardous Materials	• No Substantial Hazard following remedial implementation of UCL soil removal • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is controlled • Identified DNAPL, potentially with microscale mobility, is removed with soil excavation in deep overburden in northeast corner • Moderately aggressive contaminant mass removal • Minimal residual contaminated soils isolated from coastal storms through waterfront barrier, engineered barrier and cap	• No Substantial Hazard following remedial implementation of UCL soil removal • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is controlled • Identified DNAPL, potentially with microscale mobility, is removed with soil excavation in deep overburden in northeast corner • Moderate contaminant mass removal • Minimal residual contaminated soils isolated from coastal storms through waterfront barrier, engineered barrier and cap	• No Substantial Hazard following remedial implementation of UCL soil removal • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is treated and controlled • Identified DNAPL, potentially with microscale mobility, is removed with soil excavation in deep overburden in northeast corner • Aggressive contaminant mass removal • Minimal residual contaminated soils isolated from coastal storms through shoreline armoring, engineered barrier and cap
Risk Rating	**Fair**	**Fair**	**Good**
Risk Score	**3**	**3**	**4**
• **Benefits**			
a) Restores Natural Resources	• Not applicable	• Not applicable	• Not applicable
b) Achieves Productive Reuse of Site	• Potential for future commercial/industrial reuse of site limited by construction and operation of WWTP	• Potential for future commercial/industrial reuse of site limited by construction and operation of WWTP	• Potential for future commercial/industrial reuse of site is greater
c) Avoids Cost of Relocating People	• Not applicable	• Not applicable	• Not applicable
d) Avoids Lost Value of Site	• Reduced potential for future commercial/industrial use of site • Some potential value lost	• Reduced potential for future commercial/industrial use of site • Some potential value lost	• Potential for future commercial/industrial use of site • No value lost
Benefits Rating	**Good**	**Good**	**Very Good**
Benefits Score	**4**	**4**	**5**

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
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NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-4 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-5 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE OU3-6 Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination
• **Timeliness**			
a) Time to Eliminate Uncontrolled Sources and Achieve a Level of No Significant Risk	• Will achieve a level of No Significant Risk in a relatively moderate period of time due to removal of soil along shoreline, removal of DNAPL soils and treatment of hot spots ○ Estimated time to construct: 4-6 months ○ Active O&M duration (ROS): 20 years	• Will achieve a level of No Significant Risk in a relatively long period of time due to removal of soil along shoreline ○ Estimated time to construct: 3 to 5 months ○ Active O&M duration: Indefinite (30+ years)	• Will achieve a level of No Significant Risk in a relatively moderate period of time due to removal of soil along shoreline, removal of DNAPL soils and treatment of hot spots ○ Estimated time to construct: 4 to 6 months ○ Active Remedial Monitoring (ROS) duration: 4 years ○ Media replacement only if needed, assumed at year 10, done as RAM
Timeliness Rating	**Fair**	**Fair**	**Very Good**
Timeliness Score	**3**	**3**	**5**
• **Non-Pecuniary**			
a) Aesthetics	• Existing area will be restored to prior condition except for treatment plant location • Shoreline prepared for Riverwalk construction	• Existing area will be restored to prior condition except for treatment plant location • Shoreline prepared for Riverwalk construction	• Existing area will be restored to prior condition • Shoreline prepared for Riverwalk construction • PRB allows for more attractive shoreline finish
b) Community Acceptance	• Truck traffic may potentially raise community concerns • Discharge to river or POTW may raise concerns • Community preference for off site	• Truck traffic may potentially raise community concerns • Discharge to river or POTW may raise concerns • Community preference for off site	• Truck traffic may potentially raise community concerns • Community preference for off site
Non-Pecuniary Rating	**Fair**	**Fair**	**Good**
Non-Pecuniary Score	**3**	**3**	**4**
• **Sustainable Remediation**			
a) Eliminates or reduces to the extent practicable total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem impacts through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection.	• Low sustainability – high diesel equipment use and off-site truck traffic, high energy use for long term operation of groundwater extraction and treatment system. • Low energy efficiency due to extended period of plant operation • High consumption of expendable WWTP chemicals and supplies • Operation of WWTP will generate air emissions	• Low sustainability – high diesel equipment use and off-site truck traffic, high energy use for long term operation of groundwater extraction and treatment system. • Low energy efficiency due to extended period of plant operation • High consumption of expendable WWTP chemicals and supplies • Operation of WWTP will generate air emissions	• Low to moderate sustainability – high energy use limited to short duration diesel equipment use and truck traffic • Passive barrier operation provides efficiency • Barrier media replacement infrequent and rejuvenation and reuse possible • No air emissions during operation
Sustainability Rating	**Poor**	**Poor**	**Fair**
Sustainability Score	**2**	**2**	**3**
Overall Score	**30**	**28**	**38**

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	ALTERNATIVE OU3-7 Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-8 Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE OU3-9 Removal and On-site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination
• **Effectiveness**			
a) Achieving a Permanent or Temporary Solution	• Moderate to high likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL and depending upon the timely effectiveness of the in situ treatment	• Low to moderate likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL	• Moderate to high likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL and in situ treatment
b) Reuse, Recycling, Destroying, Detoxifying or Treating Oil, and Hazardous Material	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats dissolved OHM in situ and treats extracted groundwater ex situ	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats extracted groundwater	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats dissolved OHM in situ and passively treats CVOCs in groundwater
c) Achieving or Approaching Background Concentrations	• Not likely to achieve or approach background concentrations in soil or groundwater	• Will not achieve or approach background concentrations in soil or groundwater	• Not likely to achieve or approach background concentrations in soil or groundwater
Effectiveness Rating	**Good**	**Poor**	**Good**
Effectiveness Score	**4**	**2**	**4**
• **Reliability**			
a) Certainty of Success	• Soil portion of alternative is likely successful due to removal of shoreline impacted soils and NE corner shoreline DNAPL source area soils at depth assuming AUL compliance and engineered barrier and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Potential for shortening the duration of operation of the hydraulic containment system with the addition of treatment • Measure of success not defined – no clear trigger for discontinuing hydraulic containment and removing barriers	• Soil portion of alternative is likely successful due to removal of shoreline impacted soils and NE corner shoreline DNAPL source area soils at depth assuming AUL compliance and engineered barrier and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Unlikely to provide measurable success in terms of ceasing operation because no source area groundwater treatment is included.	• Soil portion of alternative is likely successful due to removal of shoreline impacted soils and NE corner shoreline DNAPL source area soils at depth, assuming AUL compliance and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Potential for extending the life of the barrier media system with the addition of treatment • No requirement to actively operate or return to disassemble barriers
b) Effectiveness of Measures to Manage Residues or Control Emissions/Discharges	• Effectiveness is dependent on AUL compliance, and consolidation cell, engineered barrier and cap maintenance • Effectiveness dependent upon continuous operation of hydraulic containment; operational failure could allow up to 50% of contaminated groundwater to migrate into bedrock and the river • The combined vertical barrier and hydraulic containment would be designed to approach 100% reduction in mass flux of dissolved contaminants under this alternative. • The approximate mass of PCBs removed from the shoreline under this alternative would be approximately 29 tons	• Effectiveness is dependent on AUL compliance, and consolidation cell, engineered barrier and cap maintenance • Effectiveness dependent upon continuous operation of hydraulic containment; operational failure could allow up to 50% of contaminated groundwater to migrate into bedrock and the river • The combined vertical barrier and hydraulic containment would be designed to approach 100% reduction in mass flux of dissolved contaminants under this alternative. • The approximate mass of PCBs removed from the shoreline under this alternative would be approximately 29 tons	• Effectiveness is dependent on AUL compliance, and consolidation cell, engineered barrier and cap maintenance • Effectiveness dependent upon monitoring and (if needed) replacement of barrier media; failure to replace media could allow gradually increasing levels of groundwater contaminants to be released to the river • The reactive barrier would be designed to achieve at a minimum sufficient reduction in mass flux of dissolved contaminants to maintain water quality below MCP standards. This yields an estimated mass flux reduction of 58.6% for TCE and 68.6% for PCBs. Based on initial treatability study results, the actual mass flux reduction is predicted to be higher • The approximate mass of PCBs removed from the shoreline under this alternative would be approximately 31 tons
Reliability Rating	**Good**	**Fair**	**Good**
Reliability Score	**4**	**3**	**4**
• **Implementability**			
a) Technical Complexity	• Low to moderate technical complexity associated with removal of soil along river and construction of consolidation cell, and moderate technical complexity associated with installation of vertical containment barrier to bedrock, treatment of groundwater, and in situ treatment	• Low to moderate technical complexity associated with removal of soil along river and construction of consolidation cell, and moderate technical complexity associated with installation of vertical containment barrier to bedrock and treatment of groundwater.	• Low to moderate technical complexity associated with removal of soil along river and construction of consolidation cell, and moderate technical complexity associated with installation of vertical containment barriers to bedrock, reactive barrier installation, and in situ treatment.
b) Integration with Facility Operations	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • EPA NBH sediment excavation could occur any time after construction of the vertical barrier, however damage to barrier and cap is possible (EPA scope not defined) • In situ treatment and hydraulic containment would be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • EPA NBH sediment excavation could occur any time after construction of the vertical barrier, however damage to barrier and cap is possible (EPA scope not defined) • Hydraulic containment would be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • Coordination required because it would be preferable for EPA NBH sediment excavation to coincide with soil excavation while temporary shoring along shoreline is in place (EPA scope not defined). • In situ treatment and PRB could be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete.

TABLE 5.3
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	ALTERNATIVE OU3-7 Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-8 Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE OU3-9 Removal and On-site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination
	• Monitoring would likely occur in wells along the City's Riverwalk; temporary closure/detour of sections of the Riverwalk during monitoring activities may be advisable	• Monitoring would likely occur in wells along the City's Riverwalk; temporary closure/detour of sections of the Riverwalk during monitoring activities may be advisable	• Monitoring would likely occur in wells along the City's Riverwalk and reactive barrier media may need replacement (estimated every 10 years); temporary closure/detour of sections of the Riverwalk during these activities will be necessary
c) Monitoring, O&M or Site Access Requirements/ Limitations	• Remedial cap monitoring and maintenance and groundwater monitoring will be required • Consolidation cell monitoring and maintenance will be required for this alternative in conjunction with OU1-3b • Operation and maintenance of groundwater treatment system will be required for an undetermined timeframe • Short term operation of in situ treatment will be required • No access requirements or limitations	• Remedial cap monitoring and maintenance, and groundwater monitoring will be required • Consolidation cell monitoring and maintenance will be required for this alternative in conjunction with OU1-3b • Operation and maintenance of groundwater treatment system will be required indefinitely • No access requirements or limitations	• Remedial cap monitoring and maintenance, permeable barrier and groundwater monitoring will be required • Consolidation cell monitoring and maintenance will be required for this alternative in conjunction with OU1-3b • Short term operation of in situ treatment will be required • Intermittent revitalization/maintenance of reactive barrier may be required • No access requirements or limitations
d) Availability of Services, Materials, Equipment, or Specialists	• Readily available • WWTP operation license required for quarterly system inspections	• Readily available • WWTP operation license required for quarterly system inspections	• Readily available
e) Availability, Capacity and Location of Off-Site Treatment, Storage, and Disposal Facilities	• Minimal capacity required for off-site disposal during implementation • Off site disposal facilities are located a significant distance from the Site	• Minimal capacity required for off site disposal during implementation • Off site disposal facilities are located a significant distance from the Site	• Minimal capacity required for off-site disposal during implementation and during O&M for spent media • Off site disposal facilities are located a significant distance from the Site
f) Permits	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • Wastewater generated through hydraulic containment would be treated on-site and reinjected or discharged to the river or to the POTW (permit required). • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required. • Prior DEP approval required for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • Wastewater generated through hydraulic containment would be treated on-site and reinjected or discharged to the river or to the POTW (permit required). • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required. • Prior DEP approval required for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.
Implementability Rating	**Fair**	**Good**	**Very Good**
Implementability Score	**3**	**4**	**5**
• **Cost**			
a) Cost of Implementation (Not including Cost of Environmental Restoration)	• Very Low Capital Cost: $9.5 million NPV, 20 years: $24.5 million	• Very Low Capital Cost: $8.3 million NPV, 30 years: $28.0 million	• Very Low Capital Cost: $12.0 million NPV, 30 years: $18.3 million
b) Cost of Environmental Restoration and Potential Damages to Natural Resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources
c) Cost of Energy Consumption	• High to moderate energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • High energy consumption during operation of groundwater extraction and treatment, and in situ treatment.	• High to moderate energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • Very high energy consumption during long term operation of groundwater extraction and treatment	• High to moderate energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • Very low energy consumption during long term maintenance
Cost Rating	**Good**	**Good**	**Very Good**
Cost Score	**4**	**4**	**5**

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-7 Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-8 Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE OU3-9 Removal and On-site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination
• **Risk**			
a) Risk during Implementation	• Moderate short-term risk to construction workers associated with use of heavy equipment during excavation of impacted soil, construction of consolidation cell and installation of vertical containment wall • Low short-term risk to construction workers during installation of injection points, handling of treatment reagents and construction of groundwater treatment system	• Moderate short-term risk to construction workers associated with use of heavy equipment during excavation of impacted soil, construction of consolidation cell and installation of vertical containment wall • Low short-term risk to construction workers during construction of groundwater treatment system	• Moderate short-term risk to construction workers associated with use of heavy equipment during excavation of impacted soil, construction of consolidation cell and installation of vertical containment and reactive barrier walls • Low short-term risk to construction workers during installation of injection points, handling of treatment reagents
b) Risk during Operations	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Moderate potential risk to workers during O&M of groundwater treatment system and injections for in situ treatment • Low but more frequent potential risk to public during transport and disposal of spent materials (bag filters, carbon etc.) from groundwater treatment system through neighborhood	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Moderate potential risk to workers during O&M of groundwater treatment system Low but more frequent potential risk to public during transport and disposal of spent materials (bag filters, carbon etc.) from groundwater treatment system through neighborhood	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Low infrequent potential risk to workers during replacement of barrier media
c) Risk associated with Remaining Oil and Hazardous Materials	• No Substantial Hazard following remedial implementation • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is controlled • Identified DNAPL, potentially with microscale mobility, is removed with soil excavation in deep overburden in northeast corner • Moderately aggressive contaminant mass removal • Minimal residual contaminated soils isolated from coastal storms through waterfront barrier, engineered barrier and cap • Contaminated soils in consolidation cell isolated and out of water table, secure assuming maintenance of cell and engineered barrier	• No Substantial Hazard following remedial implementation • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is controlled • Identified DNAPL, potentially with microscale mobility, is removed with soil excavation in deep overburden in northeast corner • Moderate contaminant mass removal • Minimal residual contaminated soils isolated from coastal storms through waterfront barrier, engineered barrier and cap • Contaminated soils in consolidation cell isolated and out of water table, secure assuming maintenance of cell and engineered barrier	• No Substantial Hazard following remedial implementation • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is treated and controlled • Identified DNAPL, potentially with microscale mobility, is removed with soil excavation in deep overburden in northeast corner • Aggressive contaminant mass removal • Minimal residual contaminated soils isolated from coastal storms through shoreline armoring, engineered barrier and cap • Contaminated soils in consolidation cell isolated and out of water table, secure assuming maintenance of cell and engineered barrier
Risk Rating	**Good**	**Good**	**Very Good**
Risk Score	**4**	**4**	**5**
• **Benefits**			
a) Restores Natural Resources	• Not applicable	• Not applicable	• Not applicable
b) Achieves Productive Reuse of Site	• Potential for future commercial/industrial reuse of site limited by construction and operation of WWTP and consolidation cell	• Potential for future commercial/industrial reuse of site limited by construction and operation of WWTP and consolidation cell	• Potential for future commercial/industrial reuse of site is somewhat limited by construction of consolidation cell.
c) Avoids Cost of Relocating People	• Not applicable	• Not applicable	• Not applicable
d) Avoids Lost Value of Site	• Reduced potential for future commercial/industrial use of site Some potential value lost	• Reduced potential for future commercial/industrial use of site Some potential value lost	• Potential for future commercial/industrial use of site • Some potential value lost
Benefits Rating	**Poor**	**Poor**	**Fair**
Benefits Score	**2**	**2**	**3**

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-7 Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-8 Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment	ALTERNATIVE OU3-9 Removal and On-site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination
• **Timeliness**			
a) Time to Eliminate Uncontrolled Sources and Achieve a Level of No Significant Risk	• Will achieve a level of No Significant Risk in a relatively moderate period of time due to removal of soil along shoreline, removal of DNAPL soils and treatment of hot spots ○ Estimated time to construct: 4 to 6 months ○ Active O&M duration(ROS): 20 years	• Will achieve a level of No Significant Risk in a relatively long period of time due to removal of soil along shoreline ○ Estimated time to construct: 3 to 5 months ○ Active O&M duration: Indefinite (30+ years)	• Will achieve a level of No Significant Risk in a relatively moderate period of time due to removal of soil along shoreline, removal of DNAPL soils and treatment of hot spots ○ Estimated time to construct: 4 to 6 months ○ Active Remedial Monitoring (ROS) duration: 4 years ○ Media replacement only if needed, assumed at year 10, done as RAM
Timeliness Rating	**Fair**	**Poor**	**Very Good**
Timeliness Score	**3**	**2**	**5**
• **Non-Pecuniary**			
a) Aesthetics	• Existing area will be restored to prior condition except for treatment plant location • Shoreline prepared for Riverwalk construction • Consolidation cell elevation would be noticeable	• Existing area will be restored to prior condition except for treatment plant location • Shoreline prepared for Riverwalk construction • Consolidation cell elevation would be noticeable	• Existing area will be restored to prior condition • Shoreline prepared for Riverwalk construction • Consolidation cell elevation would be noticeable
b) Community Acceptance	• Truck traffic minimized • Discharge to river or POTW may raise concerns	• Truck traffic minimized • Discharge to river or POTW may raise concerns	• PRB allows for more attractive shoreline finish
Non-Pecuniary Rating	**Poor**	**Poor**	**Fair**
Non-Pecuniary Score	**2**	**2**	**3**
• **Sustainable Remediation**			
a) Eliminates or reduces to the extent practicable total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem impacts through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection.	• Moderate sustainability – lower diesel equipment use and off-site truck traffic, high energy use for long term operation of groundwater extraction and treatment system. • Low energy efficiency due to extended period of plant operation • High consumption of expendable WWTP chemicals and supplies • Operation of WWTP will generate air emissions	• Low to moderate sustainability – lower diesel equipment use and off-site truck traffic, high energy use for long term operation of groundwater extraction and treatment system. • Low energy efficiency due to extended period of plant operation • High consumption of expendable WWTP chemicals and supplies • Operation of WWTP will generate air emissions	• Moderate to good sustainability – moderate energy use limited to short duration diesel equipment use and truck traffic • Passive barrier operation provides efficiency • Barrier media replacement infrequent and rejuvenation and reuse possible • No air emissions during operation
Sustainability Rating	**Good**	**Good**	**Very Good**
Sustainability Score	**4**	**4**	**5**
Overall Score	**30**	**27**	**39**

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-10 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-11 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment
• **Effectiveness**		
a) Achieving a Permanent or Temporary Solution	• Moderate likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL and depending upon the timely effectiveness of the in situ treatment.	• Low likelihood of achieving a Permanent Solution in a reasonable timeframe with site AUL
b) Reuse, Recycling, Destroying, Detoxifying or Treating Oil, and Hazardous Material	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats dissolved OHM in situ and treats extracted groundwater ex situ	• Soil portion of the alternative does not reuse, recycle, destroy, detoxify, or treat OHM at the Site, but the groundwater portion of the alternative treats extracted groundwater
c) Achieving or Approaching Background Concentrations	• Not likely to achieve or approach background concentrations in soil or groundwater	• Will not achieve or approach background concentrations in soil or groundwater
Effectiveness Rating	**Fair**	**Very Poor**
Effectiveness Score	**3**	**1**
• **Reliability**		
a) Certainty of Success	• Soil portion of alternative is moderately likely to be successful due to isolation of impacted soils assuming AUL compliance and engineered barrier and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Potential for shortening the duration of operation of the hydraulic containment system with the addition of treatment • Measure of success not defined – no clear trigger for discontinuing hydraulic containment and removing barriers	• Soil portion of alternative is moderately likely to be successful due to isolation of impacted soils assuming AUL compliance and engineered barrier and cap maintenance • Likely to be successful in preventing flow of dissolved constituents in overburden groundwater to Acushnet River in concentrations that could pose unacceptable risk • Unlikely to provide measurable success in terms of ceasing operation because no source area groundwater treatment is included.
b) Effectiveness of Measures to Manage Residues or Control Emissions/Discharges	• Effectiveness is dependent on AUL compliance, and engineered barrier and cap maintenance • Effectiveness dependent upon continuous operation of hydraulic containment; operational failure could allow up to 50% of contaminated groundwater to migrate into bedrock and the river • The combined vertical barrier and hydraulic containment would be designed to approach 100% reduction in mass flux of dissolved contaminants under this alternative. • Zero mass of PCBs would be removed from the shoreline under this alternative	• Effectiveness is dependent on AUL compliance, and engineered barrier and cap maintenance • Effectiveness dependent upon continuous operation of hydraulic containment; operational failure could allow up to 50% of contaminated groundwater to migrate into bedrock and the river • The combined vertical barrier and hydraulic containment would be designed to approach 100% reduction in mass flux of dissolved contaminants under this alternative. • Zero mass of PCBs would be removed from the shoreline under this alternative
Reliability Rating	**Poor**	**Very Poor**
Reliability Score	**2**	**1**
• **Implementability**		
a) Technical Complexity	• Low technical complexity associated with cap and engineered barrier construction and moderate technical complexity associated with installation of vertical containment barrier to bedrock, treatment of groundwater, and in situ treatment	• Low technical complexity associated with cap and engineered barrier construction, and moderate technical complexity associated with installation of vertical containment barrier to bedrock and treatment of groundwater.
b) Integration with Facility Operations	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • EPA NBH sediment excavation could occur any time after construction of the vertical barrier, however damage to barrier and cap is possible (EPA scope not defined) • In situ treatment and hydraulic containment would be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete • Monitoring would likely occur in wells along the City's Riverwalk; temporary closure/detour of sections of the Riverwalk during monitoring activities may be advisable	• Site not currently in use, therefore no disturbance to current facility operations is anticipated • EPA NBH sediment excavation could occur any time after construction of the vertical barrier, however damage to barrier and cap is possible (EPA scope not defined) • Hydraulic containment would be adversely effected by harbor contamination until such time as EPA NBH cleanup is complete • Monitoring would likely occur in wells along the City's Riverwalk; temporary closure/detour of sections of the Riverwalk during monitoring activities may be advisable
c) Monitoring, O&M or Site Access Requirements/ Limitations	• Remedial Cap monitoring and maintenance, and groundwater monitoring will be required • Operation and maintenance of groundwater treatment system will be required for an undetermined timeframe • Short term operation of in situ treatment will be required • No access requirements or limitations	• Remedial Cap monitoring and maintenance, and groundwater monitoring will be required • Operation and maintenance of groundwater treatment system will be required indefinitely • No access requirements or limitations
d) Availability of Services, Materials, Equipment, or Specialists	• Readily available • WWTP operation license required for quarterly system inspections	• Readily available • WWTP operation license required for quarterly system inspections
e) Availability, Capacity and Location of Off-Site Treatment, Storage, and Disposal Facilities	• Minimal capacity required for off-site disposal during implementation • Off site disposal facilities are located a significant distance from the Site	• Minimal capacity required for off site disposal during implementation • Off site disposal facilities are located a significant distance from the Site

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-10 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-11 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment
f) Permits	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • Wastewater generated through hydraulic containment would be treated on-site and reinjected or discharged to the river or to the POTW (permit required). • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required. • Prior DEP approval required for addition of Remedial Additives (if any) within 50 feet of the Acushnet River.	• Order of Conditions likely to be required for shoreline work under the Wetlands Protection act and local ordinances. • Water generated from dewatering and possible storm sewer jetting would be treated on-site and discharged to the river and/ or the local POTW (permit required) or transported off site for treatment and disposal. • Wastewater generated through hydraulic containment would be treated on-site and reinjected or discharged to the river or to the POTW (permit required). • If 1 or more acres of land are disturbed, an EPA Construction General Permit for Stormwater and CSWPPP would be required.
Implementability Rating	**Good**	**Very Good**
Implementability Score	**4**	**5**
• **Cost**		
a) Cost of Implementation (Not including Cost of Environmental Restoration)	• Very Low Capital Cost: $7.0 million NPV, 20 years: $22.0 million	• Very Low Capital Cost: $5.7 million NPV, 30 years: $25.5 million
b) Cost of Environmental Restoration and Potential Damages to Natural Resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources
c) Cost of Energy Consumption	• High to moderate energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • High energy consumption during operation of groundwater extraction and treatment, and in situ treatment.	• High to moderate energy consumption during removal, transportation and disposal of soil, capping activities and installation of vertical containment barrier, • Very high energy consumption during long term operation of groundwater extraction and treatment
Cost Rating	**Good**	**Good**
Cost Score	**4**	**4**
• **Risk**		
a) Risk during Implementation	• Moderate short-term risk to construction workers associated with use of heavy equipment during installation of vertical containment wall • Low short-term risk to construction workers during installation of injection points, handling of treatment reagents and construction of groundwater treatment system	• Moderate short-term risk to construction workers associated with use of heavy equipment during installation of vertical containment wall • Low short-term risk to construction workers during construction of groundwater treatment system
b) Risk during Operations	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Moderate potential risk to workers during O&M of groundwater treatment system • Low but more frequent potential risk to public during transport and disposal of spent materials (bag filters, carbon etc.) from groundwater treatment system through neighborhood	• Low potential risk to future construction workers and future site workers completing cap inspections and maintenance • Low potential risk to workers to monitor groundwater • Moderate potential risk to workers during O&M of groundwater treatment system • Low but more frequent potential risk to public during transport and disposal of spent materials (bag filters, carbon etc.) from groundwater treatment system through neighborhood, longer implementation period without in situ treatment
c) Risk associated with Remaining Oil and Hazardous Materials	• No Substantial Hazard following remedial implementation • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is controlled • Identified DNAPL, potentially with microscale mobility, is controlled but not removed in deep overburden in northeast corner • Some contaminant mass removal through in situ treatment • Majority of contaminated soils isolated from coastal storms through waterfront barrier, engineered barrier and cap	• No Substantial Hazard following remedial implementation • No Significant Risk to human health, safety, public welfare, or the environment once mass flux of contaminants in groundwater is controlled • Identified DNAPL, potentially with microscale mobility, is controlled but not removed in deep overburden in northeast corner • Little to no contaminant mass removal • Majority of contaminated soils isolated from coastal storms through waterfront barrier, engineered barrier and cap
Risk Rating	**Fair**	**Fair**
Risk Score	**3**	**3**
• **Benefits**		
a) Restores Natural Resources	• Not applicable	• Not applicable
b) Achieves Productive Reuse of Site	• Potential for future commercial/industrial reuse of site limited by construction and operation of WWTP	• Potential for future commercial/industrial reuse of site limited by construction and operation of WWTP

TABLE 5.3
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 3 – AEROVOX PROPERTY OVERBURDEN SOILS AND GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	ALTERNATIVE OU3-10 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In Situ Treatment of Soils Acting as a Source to Groundwater Contamination	ALTERNATIVE OU3-11 Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment
c) Avoids Cost of Relocating People	• Not applicable	• Not applicable
d) Avoids Lost Value of Site	• Reduced potential for future commercial/industrial use of site • Some potential value lost	• Reduced potential for future commercial/industrial use of site • Some potential value lost
Benefits Rating	**Good**	**Good**
Benefits Score	**4**	**4**
• **Timeliness**		
a) Time to Eliminate Uncontrolled Sources and Achieve a Level of No Significant Risk	• Will achieve a level of No Significant Risk in a relatively moderate period of time due to removal of soil along shoreline, removal of DNAPL soils and treatment of hot spots ○ Estimated time to construct: 2 to 3 months ○ Active O&M duration (ROS): 20 years	• Will achieve a level of No Significant Risk in a relatively long period of time due to removal of soil along shoreline ○ Estimated time to construct: 2 to 3 months ○ Active O&M duration: Indefinite (30+ years)
Timeliness Rating	**Good**	**Fair**
Timeliness Score	**4**	**3**
• **Non-Pecuniary**		
a) Aesthetics	• Existing area will be restored to prior condition except for treatment plant location • Shoreline prepared for Riverwalk construction	• Existing area will be restored to prior condition except for treatment plant location • Shoreline prepared for Riverwalk construction
b) Community Acceptance	• Truck traffic minimized • Discharge to river or POTW may raise concerns	• Truck traffic minimized • Community preference – most material remaining on-site and not treated • Discharge to river or POTW may raise concerns
Non-Pecuniary Rating	**Very Poor**	**Very Poor**
Non-Pecuniary Score	**1**	**1**
a) Eliminates or reduces to the extent practicable total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem impacts through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection.	• Moderate sustainability – lower diesel equipment use and off-site truck traffic, high energy use for long term operation of groundwater extraction and treatment system. • Low energy efficiency due to extended period of plant operation • High consumption of expendable WWTP chemicals and supplies • Operation of WWTP will generate air emissions	• Moderate sustainability – lower diesel equipment use and off-site truck traffic, high energy use for long term operation of groundwater extraction and treatment system. • Low energy efficiency due to extended period of plant operation • High consumption of expendable WWTP chemicals and supplies • Operation of WWTP will generate air emissions
Sustainability Rating	**Fair**	**Fair**
Sustainability Score	**3**	**3**
Overall Score	**28**	**25**

Notes:
1. Costs are preliminary
2. Scores are based on comparisons between alternatives with “1” being the lowest (very poor), “2” corresponding with a Poor, “3” corresponding with Fair, “4” corresponding with Good and “5” being the highest (Very Good)
3. Overall Scores are preliminary and are not weighted
4. Costs for alternatives that include in situ treatment and/or permeable reactive barrier may change once the results of the treatability studies are finalized.

TABLE 5.4
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 4 – SITEWIDE BEDROCK GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES	
	ALTERNATIVE OU4-1 In Situ Chemical Oxidation of Hot Spots and Monitored Natural Attenuation	ALTERNATIVE OU4-2 In Situ Thermal Treatment of Deep Bedrock Hot Spots, In Situ Chemical Oxidation of Shallow Bedrock Hot Spots and Monitored Natural Attenuation
1. Effectiveness		
a) Achieving a Permanent or Temporary Solution	• High likelihood of achieving a Permanent Solution	• High likelihood of achieving a Permanent Solution
b) Reuse, Recycling, Destroying, Detoxifying or Treating Oil, and Hazardous Material	• Alternative treats DNAPL impacted bedrock and lowers contaminant (CVOCs and PCB) concentrations to below applicable UCLs • Natural degradation of residual CVOCs and PCBs in groundwater plume will occur after application	• Alternative volatilizes and mobilizes DNAPL and UCL exceedances in deep bedrock so that they can be captured by multi-phase extraction wells and treated aboveground • Alternative treats DNAPL impacted shallow bedrock and lowers contaminant (CVOCs and PCB) concentrations to below applicable UCLs • Natural degradation of residual CVOCs and PCBs in groundwater plume will occur after application
c) Achieving or Approaching Background Concentrations	• Not likely to achieve or approach background concentrations in groundwater	• Not likely to achieve or approach background concentrations in groundwater
Effectiveness Rating	**Good**	**Good**
Effectiveness Score	**3**	**3**
2. Reliability		
a) Certainty of Success	• High certainty of success	• Very high certainty of success
b) Effectiveness of Measures to Manage Residues or Control Emissions/Discharges	• No residuals or air emissions from ISCO treatment of hot spots • Alternative will be designed to achieve groundwater concentrations below UCLs, which will reduce mass flux of TCE from bedrock to pore water beneath Acushnet River by approximately 50%. • Based on experience at other sites and the May 2017 Treatability Study Results, potential TCE reductions of >90% reductions in TCE and PCBs with ISCO is possible. • Within the mass flux boundaries, average groundwater concentrations for PCBs are already below UCL and GW-3 standards	• Vapor extraction system will be effective in capturing vapors generated from thermal treatment. Vapors will be treated at the surface. • Alternative will be designed to achieve groundwater concentrations below UCLs, which will reduce mass flux of TCE from bedrock to pore water beneath Acushnet River by approximately 50%. • Based on experience at other sites and the May 2017 Treatability Study Results, potential TCE reductions of >95% are possible with the thermal remedy and >90% reductions in TCE and PCBs with ISCO is possible. • Within the mass flux boundaries, average groundwater concentrations for PCBs are already below UCL and GW-3 standards
Reliability Rating	**Good**	**Very Good**
Reliability Score	**3**	**4**

TABLE 5.4
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 4 – SITEWIDE BEDROCK GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES	
	ALTERNATIVE OU4-1 In Situ Chemical Oxidation of Hot Spots and Monitored Natural Attenuation	ALTERNATIVE OU4-2 In Situ Thermal Treatment of Deep Bedrock Hot Spots, In Situ Chemical Oxidation of Shallow Bedrock Hot Spots and Monitored Natural Attenuation
3. Implementability		
a) Technical Complexity	• High technical complexity associated with delivery and contact of oxidants with groundwater in fractured bedrock • Requires approximately 2 injections and 1 extraction wells per hot spot treatment area in deep bedrock (total of three hot spot areas anticipated) and 3 injection wells at one hot spot area in shallow bedrock.	• High technical complexity associated with in situ thermal treatment of fractured bedrock • Requires approximately 50 bedrock wells per area (heater borings, multi-phase extraction wells, steam injection wells, temperature monitoring holes) • High technical complexity associated with delivery and contact of oxidants with groundwater in fractured bedrock • Requires approximately 2 injection wells in the shallow bedrock hot spot area
b) Integration with Facility Operations	• No facility operations conducted in area where alternative will be implemented • Unlikely to impact EPA work in NBH, if occurring at the same time • MNA monitoring would likely occur in some monitoring wells along the City's Riverwalk; Temporary closure/detour of sections of the Riverwalk during MNA monitoring activities may be advisable	• No facility operations conducted in area where alternative will be implemented • Unlikely to impact EPA work in NBH, if occurring at the same time • MNA monitoring would likely occur in some monitoring wells along the City's Riverwalk; Temporary closure/detour of sections of the Riverwalk during MNA monitoring activities may be advisable
c) Monitoring, O&M or Site Access Requirements/ Limitations	• Monitoring of groundwater will be required • Multiple rounds of injections are anticipated to be required to achieve goals • No access requirements/limitations	• Monitoring of groundwater will be required • Operation, maintenance, and monitoring of groundwater and vapor treatment systems will be required during implementation of in situ thermal treatment • No access requirements/limitations • Multiple rounds of injections are anticipated to be required to achieve goals
d) Availability of Services, Materials, Equipment or Specialists	• Readily available	• Reinstalling new, high capacity electrical service at the Site will be necessary to support the in situ thermal project
e) Availability, Capacity and Location of Off-Site Treatment, Storage, and Disposal Facilities	• No off-site disposal facilities required	• Off-site disposal facilities readily available for liquid and vapor phase carbon from groundwater/vapor treatment systems
f) Permits	• DEP approval required for application of chemical oxidants within 50 feet of River	• Discharge of groundwater to surface water or to the local POTW would require permitting and/or approvals. • DEP approval required for application of chemical oxidants within 50 feet of River
Implementability Rating	**Good**	**Poor**
Implementability Score	**3**	**1**

TABLE 5.4
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 4 – SITEWIDE BEDROCK GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES	
	ALTERNATIVE OU4-1 In Situ Chemical Oxidation of Hot Spots and Monitored Natural Attenuation	ALTERNATIVE OU4-2 In Situ Thermal Treatment of Deep Bedrock Hot Spots, In Situ Chemical Oxidation of Shallow Bedrock Hot Spots and Monitored Natural Attenuation
4. Cost		
a) Cost of Implementation (Not including Cost of Environmental Restoration)	• Low Capital Cost: $3.1 million NPV, 30 years: $3.8 million	• High Capital Cost: $11.2 million NPV, 30 years: $11.9 million
b) Cost of Environmental Restoration and Potential Damages to Natural Resources	• No cost for environmental restoration or damages to natural resources	• No cost for environmental restoration or damages to natural resources
c) Cost of Energy Consumption	• Low energy consumption during ISCO injections	• Very high energy consumption during thermal treatment and operation of groundwater/vapor treatment systems
Cost Rating	**Good**	**Poor**
Cost Score	**3**	**1**
5. Risk		
a) Risk during Implementation	• Low short-term risk to workers during installation of injection and extraction wells	• Low short-term risk to workers during installation of heating well or vapor extraction wells and groundwater treatment system • Low short-term risk to workers during installation of injection and extraction wells • Moderate potential risk for migration of vapor and vapor emissions if controls fail during in situ thermal treatment
b) Risk during Operations	• Low potential risk to workers to monitor groundwater • Moderate risk to workers during handling and injections of chemical oxidants and transport of chemicals to site • Low potential risk to public during transport of chemicals to site • Low potential risk to workers and public during MNA monitoring	• Low potential risk to workers to monitor groundwater • Low risk to workers during thermal treatment and operation of groundwater/vapor treatment systems • Low potential risk during liquid and vapor capture and treatment • Low potential risk to public during transport and disposal of spent liquid and vapor phase carbon • Moderate risk to workers during handling and injections of chemical oxidants and transport of chemicals to site • Low potential risk to public during transport of chemicals to site • Low potential risk to workers and public during MNA monitoring

TABLE 5.4
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 4 – SITEWIDE BEDROCK GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES	
	ALTERNATIVE OU4-1 In Situ Chemical Oxidation of Hot Spots and Monitored Natural Attenuation	ALTERNATIVE OU4-2 In Situ Thermal Treatment of Deep Bedrock Hot Spots, In Situ Chemical Oxidation of Shallow Bedrock Hot Spots and Monitored Natural Attenuation
c) Risk associated with Remaining Oil and Hazardous Materials	• No Significant Risk to human health, safety, public welfare, or the environment once concentrations are below UCLs.	• No Significant Risk to human health, safety, public welfare, or the environment once concentrations are below UCLs.
Risk Rating	**Good**	**Good**
Risk Score	**3**	**3**
6. Benefits		
a) Restores Natural Resources	• Not applicable	• Not applicable
b) Achieves Productive Reuse of Site	• Potential for future commercial/industrial reuse of site	• Potential for future commercial/industrial reuse of site
c) Avoids Cost of Relocating People	• Not applicable	• Not applicable
d) Avoids Lost Value of Site	• Potential for future commercial/industrial use of site • No value lost	• Potential for future commercial/industrial use of site • No value lost
Benefits Rating	**Good**	**Good**
Benefits Score	**3**	**3**
7. Timeliness		
a) Time to Eliminate Uncontrolled Sources and Achieve a Level of No Significant Risk	• Will reduce hot spots to below UCL concentrations in approximately 3 to 4 years.	• Thermal treatment for TCE will reduce hot spots in deep bedrock to below UCL concentrations in approximately 2 years. • Chemical oxidation for TCE and PCBs will reduce the shallow bedrock hot spot to below UCL concentrations in approximately 3 to 4 years
Timeliness Rating	**Good**	**Very Good**
Timeliness Score	**3**	**4**
8. Non-Pecuniary		
a) Aesthetics	• No impact on aesthetics	• No impact on aesthetics
b) Community Acceptance	• Transport of oxidants to the site may raise community concerns	• Transport of oxidants to the site may raise community concerns
Non-Pecuniary Rating	**Good**	**Good**
Non-Pecuniary Score	**3**	**3**

TABLE 5.4
DETAILED EVALUATION OF REMEDIAL ACTION ALTERNATIVES
OPERABLE UNIT 4 – SITEWIDE BEDROCK GROUNDWATER
PHASE III REMEDIAL ACTION PLAN
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

	REMEDIAL ACTION ALTERNATIVES	
	ALTERNATIVE OU4-1 In Situ Chemical Oxidation of Hot Spots and Monitored Natural Attenuation	ALTERNATIVE OU4-2 In Situ Thermal Treatment of Deep Bedrock Hot Spots, In Situ Chemical Oxidation of Shallow Bedrock Hot Spots and Monitored Natural Attenuation
9. Sustainable Remediation		
a) Eliminates or reduces to the extent of practicable, total energy use, air pollutant emissions, greenhouse gases, water use, materials consumption, and ecosystem impacts, through energy efficiency, renewable energy use, materials management, waste reduction, land management, and ecosystem protection.	• Moderate sustainability – use of chemicals for injection followed by natural attenuation to address impacts.	• Low sustainability – very high energy use • Moderate sustainability – use of chemicals for injection followed by natural attenuation to address impacts.
Sustainability Rating	**Good**	**Poor**
Sustainability Score	**3**	**1**
Overall Score	**27**	**23**

Notes:
1. Costs are preliminary
2. Scores are based on "1" being the lowest (poor), "2" corresponding with a Fair, "3" corresponding with Good and "4" being the highest (Very Good)
3. Overall Scores are straight sums and criteria are not weighted
4. Costs for the in situ treatment components of these alternatives are subject to change once the results of the treatability studies are finalized.

Appendix A: Bedrock Delineation to the North: Supporting Information

Project: Former Aerovox Facility
Project Location: New Bedford, Massachusetts
Project Number: 39744051

URS Corporation
Log of Boring MW-36B
Sheet 1 of 4

Date(s) Drilled and Installed	**11/16/15 - 11/19/15**	Water Surface Elevation	**NA**	Well Casing or Riser	**4-in permanent steel casing 0-49 ft bgs**
Logged By (URS)	**J. Harshman**	Surface Elevation	**NA**	Screen	**Open bedrock hole 49-74 ft bgs**
Drilling Contractor	**Geosearch**	Datum		Checked By	
Total Depth of Borehole	**74.0 ft**	Easting	Northing	Notes: Vac/Air-knife pre-clear 0 to 10 ft bgs	
Groundwater Level	**8.5 ft bgs**	Annular Fill: Open bedrock borehole 49-74 ft bgs, exterior of permanent casing grouted 1-49 ft bgs		Location: Located on the Coyne property adjacent to Precix	
Diameter of Borehole	**8.5 in**			Sampler Type: 2-ft Split Spoon	
Drilling Method	**Drive & Wash/ Casing/ Roller Bit/ Air Rotary w/ Air Hammer**			Hammer Data:	
				Well Type: Flush-mount open bedrock well	

Depth, feet	Sample Number	Sample Type	Recovery (in)	Blow Count per 6 in	Core RQD (%)	PID (ppm)	Headspace PID (ppm)	Graphic Log	Lithology USCS Code	MATERIAL DESCRIPTION	Well Construction	REMARKS
0										CONCRETE(0-0.5') Concrete at surface		Cemented flushmount road box 0 to 1 ft bgs
1									SW	(0.5-1') Fine to medium SAND, with little coarse sand and fine to medium gravel (loose to med. dense) (dry)		
									SW	No Impact Observed		
2									SP	(1-2') Dark brown fine to coarse SAND, some fine to coarse gravel (med. dense) (dry)		
										No Impact Observed		
3									SP	(2-3') Orange brown fine to medium poorly graded SAND, trace fine gravel (loose) (dry)		
										No Impact Observed		
4									SP	(3-4') Light brown fine to medium poorly graded SAND (loose) (dry)		
5									SP	No Impact Observed		
										(4-5') Light brown fine to medium poorly-graded SAND, trace coarse sand (loose) (dry)		
6										No Impact Observed		
7										(5-8') Light brown very fine to fine poorly-graded SAND, trace silt (loose) (dry)		
8									SP	No Impact Observed	▽	
										(8-10) Brown to yellowish brown fine to medium SAND, trace coarse sand and fine gravel (loose) (wet at 8.5 ft bgs)		
9										No Impact Observed		
10			17	1-2-5-3			0		SW	(10-12') Brown to light brown fine to coarse well-graded SAND , little fine gravel (loose) (wet)		4-in Permanent Steel Casing 1 to 49 ft bgs
11										No Impact Observed		
12			24	5-7-9-5			0		SW	(12-14') Brown to light brown fine to coarse SAND, with very coarse sand and fine gravel (loose) (wet)		
13										No Impact Observed		
14			12	8-6-9-11			0		SW	(14-16') Yellowish brown to gray fine to coarse well-graded SAND, some fine gravel (med. dense) (wet)		
15										No Impact Observed		
16			22	5-6-11-14			0		SW	(16-18') Brown to gray very fine to fine well-graded SAND, intervals of very coarse sand and fine gravel (med. dense) (wet)		
17										No Impact Observed		
18			14	8-9-7-7			0		SWG	(18-22') Gray fine to coarse well-graded SAND and GRAVEL, trace silt (med. dense) (wet)		
19										No Impact Observed		
20												

Report: AVX FINAL LOGS WITH WELL; File: AVX BORING LOGS.GPJ; 12/22/2015 MW-36B

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Project: Former Aerovox Facility
Project Location: New Bedford, Massachusetts
Project Number: 39744051

URS Corporation
Log of Boring MW-36B
Sheet 2 of 4

Depth, feet	Sample Number	Sample Type	Recovery (in)	Blow Count per 6 in	Core RQD (%)	PID (ppm)	Headspace PID (ppm)	Graphic Log	Lithology USCS Code	MATERIAL DESCRIPTION	Well Construction	REMARKS
20			9	5-7-5-9			0					
22			16	6-6-6-12			0		SWG	(22-24') Gray fine to very coarse SAND and GRAVEL, trace very fine sand and silt (med. dense) (wet) No Impact Observed		Grout backfill 1 to 49 ft bgs
24			8	8-12-12-5			0		SWG	(24-28') Gray fine to medium well-graded SAND and fine to coarse GRAVEL, trace silt (med. dense-dense) (wet) No Impact Observed		
26			8	4-4-10-5			0					
28			8	45-25-21-13			0		SW	(28-30') Gray fine to medium well-graded SAND, little coarse sand and fine to medium gravel (dense) (wet) No Impact Observed		
30			10	11-13-13-14			0		SW	(30-32') Gray fine to medium well-graded SAND, some fine to coarse gravel and little coarse sand (med. dense) (wet) No Impact Observed		
32			8	130-45-22-20			0		SW	(32-34') Gray fine to coarse well-graded fine to coarse SAND and GRAVEL (dense) (wet) No Impact Observed		
34			9	120-28-26-25			0		SWG	(34-38') Gray fine to coarse well-graded SAND and GRAVEL, trace silt (dense) (wet) No Impact Observed		
36			11	24-22-25-12			0					
38			13	60-44-36-38			0		TILL	(38-40.5') Brown to olive brown [GLACIAL TILL], with fine to medium sand and gravel (very dense) (wet) No Impact Observed		
40			5	35-150/1			0		BR	BEDROCK encountered at 40.5 ft bgs Air Hammer into Bedrock from 40.5 to 74 ft bgs No Sampling of Bedrock		
46												

Report: AVX FINAL LOGS WITH WELL; File: AVX BORING LOGS.GPJ; 12/22/2015 MW-36B

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Project: Former Aerovox Facility
Project Location: New Bedford, Massachusetts
Project Number: 39744051

URS Corporation
Log of Boring MW-36B
Sheet 3 of 4

Depth, feet	SAMPLES: Sample Number	Sample Type	Recovery (in)	Blow Count per 6 in	Core RQD (%)	PID (ppm)	Headspace PID (ppm)	Graphic Log	Lithology USCS Code	MATERIAL DESCRIPTION	Well Construction	REMARKS
47												
48												
49												
50										No Sampling of Bedrock		Open Borehole 49 to 74 ft bgs via air hammer
51												
52												
53												
54												
55												
56												
57												
58												
59												
60										No Sampling of Bedrock		
61												
62												
63												
64												
65												
66												
67												
68												
69												
70												
71												
72												
73												

URS

Project: Former Aerovox Facility
Project Location: New Bedford, Massachusetts
Project Number: 39744051

URS Corporation
Log of Boring MW-36B
Sheet 4 of 4

Depth, feet	SAMPLES: Sample Number	Sample Type	Recovery (in)	Blow Count per 6 in	Core RQD (%)	PID (ppm)	Headspace PID (ppm)	Graphic Log	Lithology USCS Code	MATERIAL DESCRIPTION	Well Construction	REMARKS
74										Bottom of Exploration at 74 ft bgs		

Report: AVX FINAL LOGS WITH WELL; File: AVX BORING LOGS.GPJ; 12/22/2015 MW-36B

URS

ANALYTICAL REPORT

Lab Number:	L1533411
Client:	AECOM 1155 Elm Street Manchester, NH 03101
ATTN:	Judith LeClair
Phone:	(603) 893-0616
Project Name:	AEROVOX-MW36B
Project Number:	60422003
Report Date:	12/24/15

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Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), VA (460195), MD (348), IL (200077), NC (666), TX (T104704476), DOD (L2217), USDA (Permit #P-330-11-00240).

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

Project Name: AEROVOX-MW36B
Project Number: 60422003

Lab Number: L1533411
Report Date: 12/24/15

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1533411-01	TRIP BLANK	WATER	NEW BEDFORD, MA	12/17/15 00:00	12/17/15
L1533411-02	AX-GW-MW36B-121715	WATER	NEW BEDFORD, MA	12/17/15 10:05	12/17/15

Project Name: AEROVOX-MW36B **Lab Number:** L1533411

Project Number: 60422003 **Report Date:** 12/24/15

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name: AEROVOX-MW36B **Lab Number:** L1533411
Project Number: 60422003 **Report Date:** 12/24/15

Case Narrative

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

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

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

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

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

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

Project Name:	AEROVOX-MW36B	**Lab Number:**	L1533411
Project Number:	60422003	**Report Date:**	12/24/15

Case Narrative (continued)

MCP Related Narratives

Volatile Organics

In reference to question I:

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

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

Authorized Signature: Kelly Stenstrom

Title: Technical Director/Representative Date: 12/24/15

ORGANICS

VOLATILES

Project Name: AEROVOX-MW36B **Lab Number:** L1533411

Project Number: 60422003 **Report Date:** 12/24/15

SAMPLE RESULTS

Lab ID: L1533411-01
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 12/24/15 04:46
Analyst: MM

Date Collected: 12/17/15 00:00
Date Received: 12/17/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Tetrachloroethene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	110		70-130

Project Name: AEROVOX-MW36B **Lab Number:** L1533411

Project Number: 60422003 **Report Date:** 12/24/15

SAMPLE RESULTS

Lab ID: L1533411-02
Client ID: AX-GW-MW36B-121715
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 12/24/15 05:18
Analyst: MM

Date Collected: 12/17/15 10:05
Date Received: 12/17/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Tetrachloroethene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	100		ug/l	1.0	--	1
cis-1,2-Dichloroethene	30		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	120		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	110		70-130

Project Name: AEROVOX-MW36B
Project Number: 60422003
Lab Number: L1533411
Report Date: 12/24/15

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 12/24/15 04:15
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-02 Batch: WG852779-3					
Tetrachloroethene	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	115		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	105		70-130
Dibromofluoromethane	108		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX-MW36B

Project Number: 60422003

Lab Number: L1533411

Report Date: 12/24/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02 Batch: WG852779-1 WG852779-2								
Methylene chloride	102		97		70-130	5		20
1,1-Dichloroethane	109		103		70-130	6		20
Chloroform	103		99		70-130	4		20
Carbon tetrachloride	75		80		70-130	6		20
1,2-Dichloropropane	99		94		70-130	5		20
Dibromochloromethane	72		73		70-130	1		20
1,1,2-Trichloroethane	95		89		70-130	7		20
Tetrachloroethene	100		96		70-130	4		20
Chlorobenzene	97		92		70-130	5		20
Trichlorofluoromethane	112		107		70-130	5		20
1,2-Dichloroethane	107		101		70-130	6		20
1,1,1-Trichloroethane	101		102		70-130	1		20
Bromodichloromethane	92		92		70-130	0		20
trans-1,3-Dichloropropene	**61**	Q	**63**	Q	70-130	3		20
cis-1,3-Dichloropropene	77		77		70-130	0		20
1,1-Dichloropropene	107		101		70-130	6		20
Bromoform	**65**	Q	**69**	Q	70-130	6		20
1,1,2,2-Tetrachloroethane	90		85		70-130	6		20
Benzene	103		98		70-130	5		20
Toluene	102		96		70-130	6		20
Ethylbenzene	103		98		70-130	5		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX-MW36B

Project Number: 60422003

Lab Number: L1533411

Report Date: 12/24/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02 Batch: WG852779-1 WG852779-2								
Chloromethane	98		91		70-130	7		20
Bromomethane	76		85		70-130	11		20
Vinyl chloride	112		106		70-130	6		20
Chloroethane	113		113		70-130	0		20
1,1-Dichloroethene	106		104		70-130	2		20
trans-1,2-Dichloroethene	103		97		70-130	6		20
Trichloroethene	103		100		70-130	3		20
1,2-Dichlorobenzene	93		88		70-130	6		20
1,3-Dichlorobenzene	94		89		70-130	5		20
1,4-Dichlorobenzene	93		89		70-130	4		20
Methyl tert butyl ether	113		108		70-130	5		20
p/m-Xylene	104		100		70-130	4		20
o-Xylene	101		97		70-130	4		20
cis-1,2-Dichloroethene	99		95		70-130	4		20
Dibromomethane	107		103		70-130	4		20
1,2,3-Trichloropropane	93		89		70-130	4		20
Styrene	99		95		70-130	4		20
Dichlorodifluoromethane	114		108		70-130	5		20
Acetone	109		106		70-130	3		20
Carbon disulfide	114		107		70-130	6		20
2-Butanone	113		107		70-130	5		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX-MW36B

Project Number: 60422003

Lab Number: L1533411

Report Date: 12/24/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02 Batch: WG852779-1 WG852779-2								
4-Methyl-2-pentanone	96		93		70-130	3		20
2-Hexanone	106		101		70-130	5		20
Bromochloromethane	97		96		70-130	1		20
Tetrahydrofuran	109		100		70-130	9		20
2,2-Dichloropropane	89		93		70-130	4		20
1,2-Dibromoethane	122		113		70-130	8		20
1,3-Dichloropropane	99		94		70-130	5		20
1,1,1,2-Tetrachloroethane	73		73		70-130	0		20
Bromobenzene	90		87		70-130	3		20
n-Butylbenzene	101		94		70-130	7		20
sec-Butylbenzene	101		95		70-130	6		20
tert-Butylbenzene	102		97		70-130	5		20
o-Chlorotoluene	100		94		70-130	6		20
p-Chlorotoluene	98		93		70-130	5		20
1,2-Dibromo-3-chloropropane	82		85		70-130	4		20
Hexachlorobutadiene	82		77		70-130	6		20
Isopropylbenzene	102		98		70-130	4		20
p-Isopropyltoluene	100		94		70-130	6		20
Naphthalene	97		93		70-130	4		20
n-Propylbenzene	104		98		70-130	6		20
1,2,3-Trichlorobenzene	92		89		70-130	3		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX-MW36B

Project Number: 60422003

Lab Number: L1533411

Report Date: 12/24/15

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02 Batch: WG852779-1 WG852779-2								
1,2,4-Trichlorobenzene	91		87		70-130	4		20
1,3,5-Trimethylbenzene	99		93		70-130	6		20
1,2,4-Trimethylbenzene	99		93		70-130	6		20
Ethyl ether	97		93		70-130	4		20
Isopropyl Ether	104		98		70-130	6		20
Ethyl-Tert-Butyl-Ether	107		104		70-130	3		20
Tertiary-Amyl Methyl Ether	101		97		70-130	4		20
1,4-Dioxane	94		105		70-130	11		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	111		110		70-130
Toluene-d8	101		101		70-130
4-Bromofluorobenzene	101		100		70-130
Dibromofluoromethane	103		104		70-130

Project Name: AEROVOX-MW36B
Project Number: 60422003

Lab Number: L1533411
Report Date: 12/24/15

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1533411-01A	Vial HCl preserved	A	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1533411-01B	Vial HCl preserved	A	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1533411-02A	Vial HCl preserved	A	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1533411-02B	Vial HCl preserved	A	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1533411-02C	Vial HCl preserved	A	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)

*Values in parentheses indicate holding time in days

Project Name:	AEROVOX-MW36B	**Lab Number:**	L1533411
Project Number:	60422003	**Report Date:**	12/24/15

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	AEROVOX-MW36B	**Lab Number:**	L1533411
Project Number:	60422003	**Report Date:**	12/24/15

Data Qualifiers

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name: AEROVOX-MW36B
Project Number: 60422003
Lab Number: L1533411
Report Date: 12/24/15

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

Westborough Facility
EPA 524.2: 1,2-Dibromo-3-chloropropane, 1,2-Dibromoethane, m/p-xylene, o-xylene
EPA 624: 2-Butanone (MEK), 1,4-Dioxane, tert-Amylmethyl Ether, tert-Butyl Alcohol, m/p-xylene, o-xylene
EPA 625: Aniline, Benzoic Acid, Benzyl Alcohol, 4-Chloroaniline, 3-Methylphenol, 4-Methylphenol.
EPA 1010A: NPW: Ignitability
EPA 6010C: NPW: Strontium; SCM: Strontium
EPA 8151A: NPW: 2,4-DB, Dicamba, Dichloroprop, MCPA, MCPP; SCM: 2,4-DB, Dichloroprop, MCPA, MCPP
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene, Isopropanol; SCM: Iodomethane (methyl iodide), Methyl methacrylate (soil); 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Pentachloronitrobenzene, 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Pentachloronitrobenzene, 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 9010: NPW: Amenable Cyanide Distillation, Total Cyanide Distillation
EPA 9038: NPW: Sulfate
EPA 9050A: NPW: Specific Conductance
EPA 9056: NPW: Chloride, Nitrate, Sulfate
EPA 9065: NPW: Phenols
EPA 9251: NPW: Chloride
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
EPA 8270D: NPW: Biphenyl; SCM: Biphenyl
EPA 2540D: TSS
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

Drinking Water
EPA 200.8: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7**: Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

Non-Potable Water
EPA 200.8: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;
EPA 200.7: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;
EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

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

CHAIN OF CUSTODY

PAGE 1 OF 1

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

Date Rec'd in Lab: 12/17/15

ALPHA Job #: L1533411

Client Information

Client: AECOM
Address: 1155 Elm St, Suite 401
Manchester, NH 03101
Phone: (603) 606-4818
Email: judy.leclair@aecom.com

Project Information

Project Name: Aerovox - MW36B
Project Location: New Bedford, MA
Project #: 60422003
Project Manager: J. LeClair / M. Wade
ALPHA Quote #:

Turn-Around Time

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

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

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

Additional Project Information:
VOC list: PCE, TCE, cis-1,2-DCE, trans 1,2-DCE, vinyl chloride ONLY

ANALYSIS: VOC: ☒ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	SVOC	METALS	METALS	EPH	VPH	PCB	TPH	Sample Comments	TOTAL # BOTTLES
33411 -01	TRIP BLANK	12/17/15		TB		2									2
-02	AX-GW-MW36B-121715	12/17/15	1005	GW	JRH	3									3

Container Type	V
Preservative	B

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
Jeffrey R. Harshman	12/17/15 1218	Jan Chuang AAL	12/17/15 1218

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

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

ANALYTICAL REPORT

Lab Number:	L1607536
Client:	AECOM 1155 Elm Street Manchester, NH 03101
ATTN:	Judith LeClair
Phone:	(603) 893-0616
Project Name:	AEROVOX-MW36B
Project Number:	60422003.20003
Report Date:	03/23/16

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), VA (460195), MD (348), IL (200077), NC (666), TX (T104704476), DOD (L2217), USDA (Permit #P-330-11-00240).

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

Project Name: AEROVOX-MW36B
Project Number: 60422003.20003

Lab Number: L1607536
Report Date: 03/23/16

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1607536-01	TRIP BLANK	WATER	NEW-BEDFORD, MA	03/16/16 00:00	03/16/16
L1607536-02	AX-GW-MW36B-031616	WATER	NEW-BEDFORD, MA	03/16/16 12:30	03/16/16

Project Name:	AEROVOX-MW36B	**Lab Number:**	L1607536
Project Number:	60422003.20003	**Report Date:**	03/23/16

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name: AEROVOX-MW36B
Project Number: 60422003.20003

Lab Number: L1607536
Report Date: 03/23/16

Case Narrative

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

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

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

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

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

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

Project Name:	AEROVOX-MW36B	**Lab Number:**	L1607536
Project Number:	60422003.20003	**Report Date:**	03/23/16

Case Narrative (continued)

MCP Related Narratives

Volatile Organics

In reference to question I:

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

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

Authorized Signature: Lura L Troy

Title: Technical Director/Representative Date: 03/23/16

ORGANICS

VOLATILES

Project Name: AEROVOX-MW36B
Lab Number: L1607536
Project Number: 60422003.20003
Report Date: 03/23/16

SAMPLE RESULTS

Lab ID: L1607536-01
Client ID: TRIP BLANK
Sample Location: NEW-BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 03/21/16 07:47
Analyst: MM

Date Collected: 03/16/16 00:00
Date Received: 03/16/16
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Tetrachloroethene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	104		70-130

Project Name: AEROVOX-MW36B **Lab Number:** L1607536

Project Number: 60422003.20003 **Report Date:** 03/23/16

SAMPLE RESULTS

Lab ID: L1607536-02
Client ID: AX-GW-MW36B-031616
Sample Location: NEW-BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 03/23/16 07:33
Analyst: MM

Date Collected: 03/16/16 12:30
Date Received: 03/16/16
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Tetrachloroethene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	140		ug/l	1.0	--	1
cis-1,2-Dichloroethene	44		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX-MW36B
Project Number: 60422003.20003

Lab Number: L1607536
Report Date: 03/23/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 03/21/16 07:15
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01 Batch: WG875767-3					
Tetrachloroethene	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--

No Tentatively Identified Compounds ND ug/l

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	105		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	105		70-130

Project Name: AEROVOX-MW36B
Project Number: 60422003.20003

Lab Number: L1607536
Report Date: 03/23/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 03/23/16 07:01
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 02 Batch: WG876668-3					
Tetrachloroethene	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	107		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	107		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX-MW36B
Project Number: 60422003.20003

Lab Number: L1607536
Report Date: 03/23/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01 Batch: WG875767-1 WG875767-2								
Methylene chloride	93		89		70-130	4		20
1,1-Dichloroethane	96		95		70-130	1		20
Chloroform	94		93		70-130	1		20
Carbon tetrachloride	99		97		70-130	2		20
1,2-Dichloropropane	93		92		70-130	1		20
Dibromochloromethane	98		97		70-130	1		20
1,1,2-Trichloroethane	96		93		70-130	3		20
Tetrachloroethene	96		93		70-130	3		20
Chlorobenzene	95		92		70-130	3		20
1,2-Dichloroethane	94		92		70-130	2		20
1,1,1-Trichloroethane	97		95		70-130	2		20
Bromodichloromethane	93		92		70-130	1		20
trans-1,3-Dichloropropene	97		95		70-130	2		20
cis-1,3-Dichloropropene	92		92		70-130	0		20
Bromoform	91		92		70-130	1		20
1,1,2,2-Tetrachloroethane	102		102		70-130	0		20
Chloromethane	74		76		70-130	3		20
Vinyl chloride	92		89		70-130	3		20
Chloroethane	97		92		70-130	5		20
1,1-Dichloroethene	95		94		70-130	1		20
trans-1,2-Dichloroethene	95		94		70-130	1		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX-MW36B

Project Number: 60422003.20003

Lab Number: L1607536

Report Date: 03/23/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01 Batch: WG875767-1 WG875767-2								
Trichloroethene	92		90		70-130	2		20
1,2-Dichlorobenzene	95		94		70-130	1		20
1,3-Dichlorobenzene	96		94		70-130	2		20
1,4-Dichlorobenzene	95		93		70-130	2		20
cis-1,2-Dichloroethene	95		94		70-130	1		20
Dichlorodifluoromethane	82		80		70-130	2		20
1,2-Dibromoethane	94		94		70-130	0		20
1,3-Dichloropropane	95		92		70-130	3		20
1,1,1,2-Tetrachloroethane	97		94		70-130	3		20
o-Chlorotoluene	94		92		70-130	2		20
p-Chlorotoluene	94		92		70-130	2		20
Hexachlorobutadiene	86		84		70-130	2		20
1,2,4-Trichlorobenzene	121		116		70-130	4		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	102		104		70-130
Toluene-d8	110		100		70-130
4-Bromofluorobenzene	99		97		70-130
Dibromofluoromethane	103		102		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX-MW36B

Project Number: 60422003.20003

Lab Number: L1607536

Report Date: 03/23/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 02 Batch: WG876668-1 WG876668-2								
Methylene chloride	93		99		70-130	6		20
1,1-Dichloroethane	98		98		70-130	0		20
Chloroform	96		97		70-130	1		20
Carbon tetrachloride	96		98		70-130	2		20
1,2-Dichloropropane	95		96		70-130	1		20
Dibromochloromethane	95		99		70-130	4		20
1,1,2-Trichloroethane	97		100		70-130	3		20
Tetrachloroethene	93		98		70-130	5		20
Chlorobenzene	95		97		70-130	2		20
1,2-Dichloroethane	97		98		70-130	1		20
1,1,1-Trichloroethane	96		96		70-130	0		20
Bromodichloromethane	94		98		70-130	4		20
trans-1,3-Dichloropropene	94		97		70-130	3		20
cis-1,3-Dichloropropene	92		96		70-130	4		20
Bromoform	87		94		70-130	8		20
1,1,2,2-Tetrachloroethane	100		107		70-130	7		20
Chloromethane	77		81		70-130	5		20
Vinyl chloride	91		89		70-130	2		20
Chloroethane	99		100		70-130	1		20
1,1-Dichloroethene	96		96		70-130	0		20
trans-1,2-Dichloroethene	95		96		70-130	1		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX-MW36B

Project Number: 60422003.20003

Lab Number: L1607536

Report Date: 03/23/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 02 Batch: WG876668-1 WG876668-2								
Trichloroethene	93		96		70-130	3		20
1,2-Dichlorobenzene	96		100		70-130	4		20
1,3-Dichlorobenzene	96		98		70-130	2		20
1,4-Dichlorobenzene	95		98		70-130	3		20
cis-1,2-Dichloroethene	96		98		70-130	2		20
Dichlorodifluoromethane	73		72		70-130	1		20
1,2-Dibromoethane	97		100		70-130	3		20
1,3-Dichloropropane	97		99		70-130	2		20
1,1,1,2-Tetrachloroethane	94		97		70-130	3		20
o-Chlorotoluene	94		95		70-130	1		20
p-Chlorotoluene	94		95		70-130	1		20
Hexachlorobutadiene	98		102		70-130	4		20
1,2,4-Trichlorobenzene	122		**131**	Q	70-130	7		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	103		105		70-130
Toluene-d8	103		109		70-130
4-Bromofluorobenzene	96		99		70-130
Dibromofluoromethane	102		106		70-130

Project Name: AEROVOX-MW36B
Project Number: 60422003.20003

Lab Number: L1607536
Report Date: 03/23/16

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1607536-01A	Vial HCl preserved	A	N/A	2.8	Y	Absent	MCP-8260-CHLR-10(14)
L1607536-01B	Vial HCl preserved	A	N/A	2.8	Y	Absent	MCP-8260-CHLR-10(14)
L1607536-02A	Vial HCl preserved	A	N/A	2.8	Y	Absent	MCP-8260-CHLR-10(14)
L1607536-02B	Vial HCl preserved	A	N/A	2.8	Y	Absent	MCP-8260-CHLR-10(14)
L1607536-02C	Vial HCl preserved	A	N/A	2.8	Y	Absent	MCP-8260-CHLR-10(14)

*Values in parentheses indicate holding time in days

Project Name:	AEROVOX-MW36B	**Lab Number:**	L1607536
Project Number:	60422003.20003	**Report Date:**	03/23/16

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

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

Terms

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

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

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

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

Report Format: Data Usability Report

Project Name:	AEROVOX-MW36B	**Lab Number:**	L1607536
Project Number:	60422003.20003	**Report Date:**	03/23/16

Data Qualifiers

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	AEROVOX-MW36B	**Lab Number:**	L1607536
Project Number:	60422003.20003	**Report Date:**	03/23/16

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

Westborough Facility
EPA 524.2: 1,2-Dibromo-3-chloropropane, 1,2-Dibromoethane, m/p-xylene, o-xylene
EPA 624: 2-Butanone (MEK), 1,4-Dioxane, tert-Amylmethyl Ether, tert-Butyl Alcohol, m/p-xylene, o-xylene
EPA 625: Aniline, Benzoic Acid, Benzyl Alcohol, 4-Chloroaniline, 3-Methylphenol, 4-Methylphenol.
EPA 1010A: NPW: Ignitability
EPA 6010C: NPW: Strontium; SCM: Strontium
EPA 8151A: NPW: 2,4-DB, Dicamba, Dichloroprop, MCPA, MCPP; SCM: 2,4-DB, Dichloroprop, MCPA, MCPP
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene, Isopropanol; SCM: Iodomethane (methyl iodide), Methyl methacrylate (soil); 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Pentachloronitrobenzene, 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Pentachloronitrobenzene, 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 9010: NPW: Amenable Cyanide Distillation, Total Cyanide Distillation
EPA 9038: NPW: Sulfate
EPA 9050A: NPW: Specific Conductance
EPA 9056: NPW: Chloride, Nitrate, Sulfate
EPA 9065: NPW: Phenols
EPA 9251: NPW: Chloride
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
EPA 8270D: NPW: Biphenyl; SCM: Biphenyl, Caprolactam
EPA 8270D-SIM Isotope Dilution: SCM: 1,4-Dioxane
SM 2540D: TSS
SM2540G: SCM: Percent Solids
EPA 1631E: SCM: Mercury
EPA 7474: SCM: Mercury
EPA 8081B: NPW and SCM: Mirex, Hexachlorobenzene.
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA 8270-SIM: NPW and SCM: Alkylated PAHs.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene, n-Butylbenzene, n-Propylbenzene, sec-Butylbenzene, tert-Butylbenzene.
Biological Tissue Matrix: ***8270D-SIM; 3050B; 3051A; 7471B; 8081B; 8082A; 6020A:*** Lead***; 8270D:*** bis(2-ethylhexyl)phthalate, Butylbenzylphthalate, Diethyl phthalate, Dimethyl phthalate, Di-n-butyl phthalate, Di-n-octyl phthalate, Fluoranthene, Pentachlorophenol.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

Drinking Water
EPA 200.8: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7**: Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

Non-Potable Water
EPA 200.8: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;
EPA 200.7: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;
EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F,**
EPA 353.2: Nitrate-N**, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

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

CHAIN OF CUSTODY

PAGE 1 OF 1

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

Date Rec'd in Lab: 3/16/16

ALPHA Job #: L1607536

Client Information

Client: AECOM
Address: 1155 Elm St, Suite 401
Manchester, NH 03101
Phone: (603) 606-4818
Email: judy.leclair@aecom.com

Project Information

Project Name: Aerovox - MW36B
Project Location: New Bedford, MA
Project #: 60422003/39744051.20003
Project Manager: J.LeClair/M.Wade
ALPHA Quote #:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

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

Turn-Around Time

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

Additional Project Information:

VOC List Only: PCE, TCE, cis-1,2-DCE, trans 1,2-DCE, vinyl chloride

ANALYSIS

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

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	Sample Comments	TOTAL # BOTTLES
07536-01	TRIP BLANK	3/16/16		TB		2		2
-02	AX-GW-MW36B-031616	3/16/16	1230	GW	JKH	3		3

Container Type: V
Preservative: B

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
MCM	3/16/16 1400	MCM AAK	3/16/16 1400
MCM	3/16/16 1630	Richard Sedita	3/16/16 16:30

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

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

AECOM

TO: Judith LeClair (email only)
AECOM – Manchester, NH

CC: Marilyn Wade (email only)
AECOM – Manchester, NH

Frederik Schuele (email only)
AECOM – Portland, ME

FROM: Teresa Amentt Jennings (email only)
AECOM – Morrisville, NC

ITR[1]: Martha Meyers-Lee (email only)
AECOM – Morrisville, NC

SUBJECT: Data Validation
Alpha Analytical – Westborough, MA
Lab No.: L1533411
Former Aerovox Facility, New Bedford, MA
Project No. 60422003.40003

DATE: April 5, 2016

On December 17, 2015, AECOM collected one (1) groundwater sample (AX-GW-MW36B-121715) at the Former Aerovox Facility in New Bedford, Massachusetts. The sample was submitted with one (1) trip blank on December 17, 2015 to Alpha Analytical of Westborough, MA for analysis of Volatile Organic Compounds (VOC) by SW-846[2] Method 8260C.

AECOM reviewed the analytical results reported by the laboratory. The data review was conducted in accordance with the *Draft Final Quality Assurance Project Plan (QAPP) for Aerovox Facility, 740 Belleville Avenue, New Bedford, MA* (URS, July 2010). In addition to the QAPP, the following guidance documents were used to validate sample results:

- *Massachusetts Contingency Plan (MCP) Representativeness Evaluations and Data Usability Assessment (MassDEP Policy WSC-07-350)*
- *Quality Assurance (QA) and Quality Control (QC) Guidelines for the Acquisition and Reporting of Analytical Data in Support of Response Actions Conducted Under the MCP (CAM Protocol WSC – CAM – VII A)*
- *QA and QC Requirements for SW-846 8260, VOCs by Gas Chromatography/Mass Spectrometry (GC/MS) for the MCP (CAM Protocol WSC-CAM IIA)*
- *Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses (12/96)*

[1] Independent technical reviewer
[2] *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) (EPA)

An evaluation of precision was based on laboratory duplicate results. An evaluation of accuracy was determined from a review of spiked sample results (e.g., laboratory control sample, surrogate results, etc.). Analytical data representativeness was evaluated based on holding time, sample preservation, and sample storage compliance. Blank contamination and reporting limits objective compliance were used to evaluate sensitivity. Validated sample results are presented in **Attachment A**. Areas of concern with respect to data quality and usability are discussed below. Criteria for acceptability of data were based upon available site information, analytical method requirements, guidance documents, and professional judgment.

The following is a list of the US EPA data qualifiers that are used during the data validation process:

Definition of Validation Flags:

J	Associated value is an estimated quantity
UJ	Not detected and the associated detection limit is uncertain
U	Not present above the associated level; blank contamination exists
R	Unusable data

Definition of Laboratory Flags:

µg/L	Micrograms per liter
ND	Not detected at the reporting limit for the sample

Data Completeness

All documentation required by the project was included in the data package. There were no discrepancies found in the laboratory data package.

Sample Condition upon Receipt and Holding Times

Alpha Analytical received all samples that were listed on the chain-of-custody (COC) record intact and in good condition on December 17, 2015. All samples were received by the laboratory at a temperature that met CAM Protocols and EPA storage requirements (i.e., ≤6°C). Custody seals were absent from the bottles and coolers; however, COC was maintained because the samples were submitted to the laboratory representative. According to *Sample Receipt and Container Information* section of the data package, all samples submitted to the laboratory for VOC analysis were received in preserved vials.

All samples were analyzed within holding times cited in CAM Protocol WSC-CAM-VIIA, Table II of 40 CFR 136, and analytical methods. All sample analyses were performed by the laboratory as requested on the COC records and instructions provided by AECOM.

Volatile Organic Compounds (SW-846 Method 8260C)

A subset of MCP compounds were analyzed per the COC record and AECOM instruction. Reporting limits were met for CAM Protocol WSC-CAM-IIA reporting limit objectives.

A method blank was reported for each analytical batch. One trip blank was also submitted to the laboratory for a VOA. Target compounds were not detected during the analysis of the method and trip blanks.

The laboratory conducted a laboratory control sample (LCS) and a LCS duplicate (LCSD) analysis for each analytical batch to verify method accuracy and precision. Recoveries fell within 70 to 130% of the true value and RPDs were less than 20% for all target analytes.

Data Completeness

Completeness is defined as a measure of the amount of valid data (i.e., not rejected) obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. As stated in Worksheet #30 of the QAPP, the overall completeness goal for individual sampling events is 90 percent. The percent completeness is calculated using the total number of analytes per fraction and matrix for all sample locations (e.g., 5 VOC for each sample times 1 sample equals 5 data points).

$$\text{Percent Completeness} = \frac{\text{Number of valid (i.e., non-R flagged) results}}{\text{Number of possible results}} \times 100$$

The percent completeness for water samples that were collected in December 2015 at the Former Aerovox Facility was calculated to be 100% for each analysis (refer to **Table 1**).

Conclusion

The analytical data from the December 17, 2015 sampling event met data quality objectives (i.e., precision, accuracy, analytical data representativeness, sensitivity, and completeness). VOC results are CAM-compliant for the compounds analyzed.

AECOM

Table 1. Percent Completeness

Parameter	Analytical Method	Total No. of Samples	No. of Results Per Method	Total No. of Sample Results [1]	No. of Unusable Data Points	Percent Completeness
VOC	SW-846 8260C	1	5	5	0	100%

[1] Number of sample results per location, not including field duplicate sample results, unless indicated otherwise

SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* (EPA)
VOC Volatile organic compounds

ATTACHMENT A

QUALIFIED SAMPLE RESULTS

Project Name: AEROVOX-MW36B
Lab Number: L1533411
Project Number: 60422003
Report Date: 12/24/15

SAMPLE RESULTS

Lab ID: L1533411-01
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 12/24/15 04:46
Analyst: MM

Date Collected: 12/17/15 00:00
Date Received: 12/17/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Tetrachloroethene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	110		70-130

Sample results have been qualified by AECOM based on the results of the data review process in accordance with the Draft Final QAPP for Aerovox Facility, 740 Belleville Avenue, New Bedford, MA (URS, July 2010)

Project Name: AEROVOX-MW36B **Lab Number:** L1533411

Project Number: 60422003 **Report Date:** 12/24/15

SAMPLE RESULTS

Lab ID: L1533411-02
Client ID: AX-GW-MW36B-121715
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 12/24/15 05:18
Analyst: MM

Date Collected: 12/17/15 10:05
Date Received: 12/17/15
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Tetrachloroethene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	100		ug/l	1.0	--	1
cis-1,2-Dichloroethene	30		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	120		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	110		70-130

Sample results have been qualified by AECOM based on the results of the data review process in accordance with the Draft Final QAPP for Aerovox Facility, 740 Belleville Avenue, New Bedford, MA (URS, July 2010)

AECOM

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FROM: Teresa Amentt Jennings (email only)
AECOM – Morrisville, NC

ITR[1]: Martha Meyers-Lee (email only)
AECOM – Morrisville, NC

SUBJECT: Data Validation
Alpha Analytical – Westborough, MA
Lab No.: L1607536
Former Aerovox Facility, New Bedford, MA
Project No. 60422003.40003

DATE: April 5, 2016

On March 16, 2016, AECOM collected one (1) groundwater sample (AX-GW-MW36B-031616) at the Former Aerovox Facility in New Bedford, Massachusetts. The sample was submitted with one (1) trip blank on March 16, 2016 to Alpha Analytical of Westborough, MA for analysis of Volatile Organic Compounds (VOC) by SW-846[2] Method 8260C.

AECOM reviewed the analytical results reported by the laboratory. The data review was conducted in accordance with the *Draft Final Quality Assurance Project Plan (QAPP) for Aerovox Facility, 740 Belleville Avenue, New Bedford, MA* (URS, July 2010). In addition to the QAPP, the following guidance documents were used to validate sample results:

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The percent completeness for water samples that were collected in March 2016 at the Former Aerovox Facility was calculated to be 100% for each analysis (refer to **Table 1**).

Conclusion

The analytical data from the March 16, 2016 sampling event met data quality objectives (i.e., precision, accuracy, analytical data representativeness, sensitivity, and completeness). VOC results are CAM-compliant for the compounds analyzed.

AECOM

Table 1. Percent Completeness

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[1] Number of sample results per location, not including field duplicate sample results, unless indicated otherwise

SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* (EPA)
VOC Volatile organic compounds

ATTACHMENT A

QUALIFIED SAMPLE RESULTS

Project Name: AEROVOX-MW36B
Lab Number: L1607536
Project Number: 60422003.20003
Report Date: 03/23/16

SAMPLE RESULTS

Lab ID: L1607536-01
Client ID: TRIP BLANK
Sample Location: NEW-BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 03/21/16 07:47
Analyst: MM

Date Collected: 03/16/16 00:00
Date Received: 03/16/16
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Tetrachloroethene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	104		70-130

Sample results have been qualified by AECOM based on the results of the data review process in accordance with the Draft Final QAPP for Aerovox Facility, 740 Belleville Avenue, New Bedford, MA (URS, July 2010)

Project Name: AEROVOX-MW36B **Lab Number:** L1607536

Project Number: 60422003.20003 **Report Date:** 03/23/16

SAMPLE RESULTS

Lab ID: L1607536-02
Client ID: AX-GW-MW36B-031616
Sample Location: NEW-BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 03/23/16 07:33
Analyst: MM

Date Collected: 03/16/16 12:30
Date Received: 03/16/16
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Tetrachloroethene	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	140		ug/l	1.0	--	1
cis-1,2-Dichloroethene	44		ug/l	1.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	108		70-130

Sample results have been qualified by AECOM based on the results of the data review process in accordance with the Draft Final QAPP for Aerovox Facility, 740 Belleville Avenue, New Bedford, MA (URS, July 2010)

Appendix B: Mass Flux Calculations

C

C'

SITE BOUNDARY

SITE BOUNDARY

MW-29B

MW-23B

SHEETPILE

B09D

MW-32B

MW-17B

MIP23

MW-02

UV-17

MW-07B

MW-34B

SHEETPILE

MIP49

MW-15

MW-103B

GZ-103

FILL

PEAT

GLACIAL OUTWASH

GLACIAL TILL

GRAVEL

BEDROCK

Elevation (Feet MSL)

GW	µg/L
TCE	9.80
Total PCBs	ND

GW	µg/L
TCE	ND
Total PCBs	0.46

GW	µg/L
TCE	ND
Total PCBs	5.48

GW	µg/L
TCE	ND
Total PCBs	14

GW	µg/L
TCE	24,285.17
Total PCBs	18.63

GW	µg/L
TCE	575
Total PCBs	0.36

GW	µg/L
TCE	5,133.33
Total PCBs	69.90

GW	µg/L
TCE	993.33
Total PCBs	0.69

GW	µg/L
TCE	4220
Total PCBs	30.84

GW	µg/L
TCE	1766.67
Total PCBs	2.95

GW	µg/L
TCE	3575
Total PCBs	31

GW	µg/L
TCE	86,200
Total PCBs	327.78

GW	µg/L
TCE	4,400
Total PCBs	0.76

GW	µg/L
TCE	3800
Total PCBs	24.65

GW	µg/L
TCE	55
Total PCBs	ND

GW	µg/L
TCE	14,250
Total PCBs	0.85

47

Open Bedrock Well

GW Interval Depth (ft)		TCE (ug/L)	Total PCBs (ug/L)
100	112	8,550	ND
135	145	37,000	0.29
153	163	16,000	ND

Open Bedrock Well
-40.44 to
-180.44 Feet MSL

GW Interval Depth (ft)		TCE (ug/L)	Total PCBs (ug/L)
60	80	49,500	ND
92	112	55,500	ND
120	130	99,500	ND
170	180	483,333.33	ND

Open Bedrock Well
-32.99 to
-192.49 Feet MSL

49,500

76

SOUTHERN SECTION -
SHALLOW AND MEDIUM BEDROCK

NORTHERN SECTION -
SHALLOW AND
MEDIUM BEDROCK

95

55,500

8,550

108

109

99,500

125

SOUTHERN SECTION -
DEEP BEDROCK

37,000

142

144

155

16,000

158

NO FLOW BELOW 159'
AT MW - 32B

164

NORTHERN SECTION -
DEEP BEDROCK

483,333

176

183

VERY LITTLE FLOW BELOW 195'

198

Approximate 10:1 Vertical Exaggeration

LEGEND

- Asphalt
- Bedrock
- Fill (made ground)
- Concrete
- Gravel
- Gravelly Sand
- Sand with Gravel
- Sand with Silt
- Sand
- Silty Sand
- Silty Sand with Gravel
- Clayey Sand
- Silt
- Sandy Silt
- Clay
- Glacial Till
- Organic Silt
- Peat
- NS Not Sampled
- ND Non-Detect
- GW Groundwater
- TCE Trichloroethylene
- PCBs Sum of Detected Aroclors
- Lithologic Contact (Dashed where Inferred)

49,500 — Sample Port in Deep Bedrock Well with TCE Concentration in UG/L. Sample Port Intervals from Table on page 2-11 of CSA

76 — Depth of Major Fracture Zone in Feet below Ground Surface

Zones of Similar Concentration used in Mass Flux Calculations

Well Screen

TCE (µg/L)	Total PCBs (µg/L)
≤5	≤5
>5	>5
>5,000 to ≤50,000	>10 to ≤100
>50,000	>100

Notes: Groundwater concentrations shown represent average concentrations detected between December 2010 and August 2014.

Figure modified from Figure R-4 of CSA.

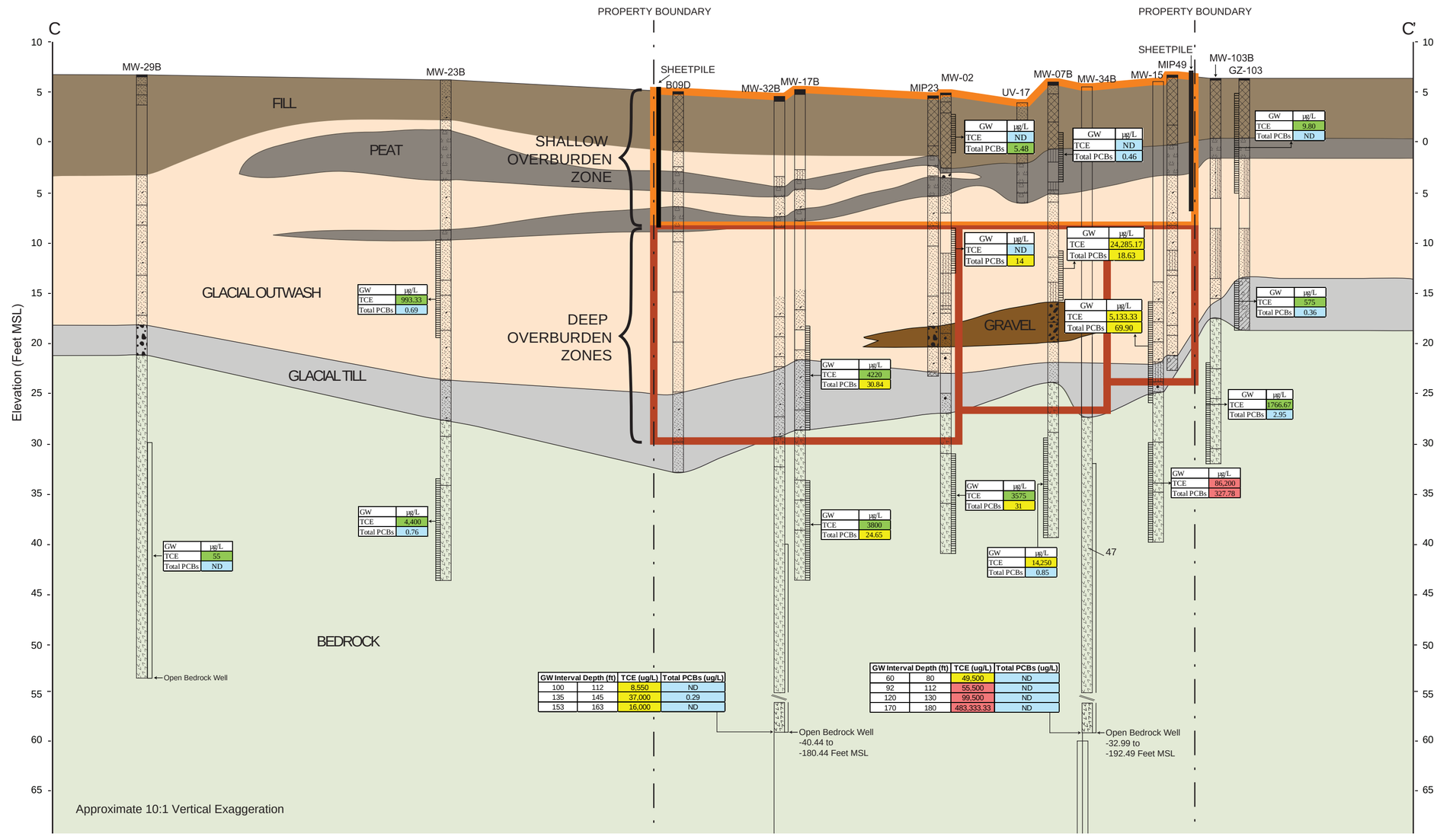
Brown AND Caldwell

EXPANDED GEOLOGIC CROSS-SECTION C-C' GROUNDWATER CONCENTRATIONS

Former Aerovox Facility | New Bedford, Massachusetts

Figure: 1

Date: 05-03-2017



LEGEND

- Asphalt
- Bedrock
- Fill (made ground)
- Concrete
- Gravel
- Gravelly Sand
- Sand with Gravel
- Sand with Silt
- Sand
- Silty Sand
- Silty Sand with Gravel
- Clayey Sand
- Silt
- Sandy Silt
- Clay
- Glacial Till
- Organic Silt
- Peat
- NS Not Sampled
- ND Non-Detect
- GW Groundwater
- TCE Trichloroethylene
- PCBs Sum of Detected Aroclors
- Lithologic Contact (Dashed where Inferred)
- 49,500 Sample Port in Deep Bedrock Well with TCE Concentration in UG/L
- 76 Depth of Major Fracture Zone in Feet below Ground Surface
- Zones of Similar Concentration in Mass Flux Calculations
- Well Screen

TCE (µg/L)	Total PCBs (µg/L)
≤5	≤5
>5	>5
>5,000 to ≤50,000	>10 to ≤100
>50,000	>100

Notes: Groundwater concentrations shown represent average concentrations detected between December 2010 and August 2014.

Figure modified from Figure R-4 of CSA.

Brown AND Caldwell

GEOLOGIC CROSS-SECTION C-C' GROUNDWATER CONCENTRATIONS

Former Aerovox Facility | New Bedford, Massachusetts

Figure: 2

Date: 05-03-2017

Mass Flux Calculations - Former Aerovox Facility

Baseline Estimate: PCB Flux in Groundwater from Bedrock **Figure 1 - Expanded Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Mass Flux from Bedrock Groundwater to Downgradient Boundary of Site

Northern section (northern property line to midpoint between MW-34B and MW-07B) - shallow and medium bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	82	ug/L =	0.08213	ug/cm^3		Average concentration from MW-15B and MW-34B above 160 feet
L =	130	ft =	3962.4	cm		Length of segment along cross section C-C'
b =	120	ft =	3657.6	cm		Double the combined bedrock screened intervals for wells MW-15B and MW-34B above 160 feet per MassDEP comment
mf =	1.8E+00	ug/s	5.5E+01	g/yr	0.12	lbs/yr

Northern Section (northern property line to midpoint between MW-34B and MW-07B) - deep bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Shallow bedrock k from Phase II CSA (no deep bedrock k data)
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	0.25	ug/L =	0.00025	ug/cm^3		Concentration in MW-34B below 160 feet
L =	130	ft =	3962.4	cm		Length of segment along cross section C-C'
b =	20	ft =	609.6	cm		Double the screen interval in well MW-34B below 160 feet per MassDEP comment
mf =	8.9E-04	ug/s	2.8E-02	g/yr	0.00	lbs/yr

Southern Section (southern boundary of plume to midpoint between MW-07B and MW-34B) - shallow and medium bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	11	ug/L =	0.0114	ug/cm^3		Average concentration in wells MW-32B, MW-17B, MW-02 and MW-07B above 125 feet
L =	340	ft =	10363.2	cm		Length of segment along cross section C-C'
b =	84	ft =	2560.32	cm		Double the combined bedrock screened intervals for wells MW-32B, MW-17B, MW-02, and MW-07B above 125 feet per MassDEP comment
mf =	4.5E-01	ug/s	1.4E+01	g/yr	0.03	lbs/yr

Southern Section (southern boundary of plume to midpoint between MW-07B and MW-34B) - deep bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	0.25	ug/L =	0.00025	ug/cm^3		Average concentration in well MW-32B below 125 feet
L =	340	ft =	10363.2	cm		Length of segment between selected contours [C]
b =	40	ft =	1219.2	cm		Double the screened interval in MW-32B below 125 feet per Mass DEP comment
mf =	4.7E-03	ug/s	1.5E-01	g/yr	0.0003	lbs/yr
mf_{br} =	2	ug/s	70	g/yr	0.15	lbs/yr

Mass Flux Calculations - Former Aerovox Facility

Baseline Estimate: PCB Flux in Groundwater from Bedrock **Figure 1 - Expanded Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Vertical Discharge through Outwash Deposits

k =	4.4E-03	hydraulic conductivity, cm/s				One-tenth of horizontal k for outwash from Phase II CSA
i =	0.0023	hydraulic gradient, dimensionless				Average upward gradients measured in couplets on western side of site (MW-13D/B, MW-21D/21B, and MW-101S/101B)
L =	470	ft	=	14325.6	cm	Length of River section from north property boundary to southern width of shallow bedrock plume
x=	305	ft	=	9296.4	cm	Average distance to midpoint of River (measured at north middle and south sides of property)
q=	1.4E+03	cm3/sec				

Concentration in Outwash Deposits and Pore Water under River Adjacent to Site

mfbr=	2.2E+00	ug/s		
1/q=	7.4E-04	cm3/s		
mfbr/t*1/q=	0.00163	ug/cm3	1.62550808	ug/l

Mass Flux Calculations - Former Aerovox Facility

Baseline Estimate: TCE Flux in Groundwater from Bedrock **Figure 1 - Expanded Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Mass Flux from Bedrock Groundwater to Downgradient Boundary of Site

Northern section (northern property line to midpoint between MW-34B and MW-07B) - shallow and medium bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	72,800	ug/L =	72.8	ug/cm^3		Average concentration from MW-15B and MW-34B above 160 feet
L =	130	ft =	3962.4	cm		Length of segment along cross section C-C'
b =	120	ft =	3657.6	cm		Double the combined bedrock screened intervals for wells MW-15B and MW-34B above 160 feet per MassDEP comment
mf =	1.6E+03	ug/s	4.9E+04	g/yr	108.13	lbs/yr

Northern Section (northern property line to midpoint between MW-34B and MW-07B) - deep bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Shallow bedrock k from Phase II CSA (no deep bedrock k data)
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	483,330	ug/L =	483.33	ug/cm^3		Concentration in MW-34B below 160 feet
L =	130	ft =	3962.4	cm		Length of segment along cross section C-C'
b =	20	ft =	609.6	cm		Double the screen interval in well MW-34B below 160 feet per MassDEP comment
mf =	1.7E+03	ug/s	5.4E+04	g/yr	119.65	lbs/yr

Southern Section (southern boundary of plume to midpoint between MW-07B and MW-34B) - shallow and medium bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	7,040	ug/L =	7.04	ug/cm^3		Average concentration in wells MW-32B, MW-17B, MW-02 and MW-07B above 125 feet
L =	340	ft =	10363.2	cm		Length of segment along cross section C-C'
b =	84	ft =	2560.32	cm		Double the combined bedrock screened intervals for wells MW-32B, MW-17B, MW-02, and MW-07B above 125 feet per MassDEP comment
mf =	2.8E+02	ug/s	8.7E+03	g/yr	19.14	lbs/yr

Southern Section (southern boundary of plume to midpoint between MW-07B and MW-34B) - deep bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	26500.00	ug/L =	26.5	ug/cm^3		Average concentration in well MW-32B below 125 feet
L =	340	ft =	10363.2	cm		Length of segment between selected contours [C]
b =	40	ft =	1219.2	cm		Double the screened interval in MW-32B below 125 feet per Mass DEP comment
mf =	4.9E+02	ug/s	1.6E+04	g/yr	34.31	lbs/yr
mf_{br} =	4054	ug/s	127837	g/yr	281	lbs/yr

Mass Flux Calculations - Former Aerovox Facility

Baseline Estimate: TCE Flux in Groundwater from Bedrock **Figure 1 - Expanded Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Vertical Discharge through Outwash Deposits

k =	4.4E-03	hydraulic conductivity, cm/s				One-tenth of horizontal k for outwash from Phase II CSA
i =	0.0023	hydraulic gradient, dimensionless				Average upward gradients measured in couplets on western side of site (MW-13D/B, MW-21D/21B, and MW-101S/101B)
L =	470	ft	=	14325.6	cm	Length of River section from north property boundary to southern width of shallow bedrock plume
x=	305	ft	=	9296.4	cm	Average distance to midpoint of River (measured at north middle and south sides of property)
q=	1.4E+03	cm3/sec				

Concentration in Outwash Deposits and Pore Water under River Adjacent to Site

mfbr=	4.1E+03	ug/s		
1/q=	7.4E-04	cm3/s		
mfbr/t*1/q=	2.98	ug/cm3	2980.65658	ug/l

Mass Flux Calculations - Former Aerovox Facility

Baseline Estimate: PCB Flux in Groundwater from Overburden **Figure 2 - Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Mass Flux from Overburden Groundwater to Downgradient Boundary of Site

Shallow Overburden (northern property line to southern property line)

k =	1.4E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow overburden from Phase II CSA is 39.7 feet/day
i =	0	hydraulic gradient, dimensionless				Horizontal gradient is away from River in shallow overburden from Figures 2-14 and 2-17 of Phase II CSA (value of zero to show no flow)
C=	2	ug/L =	0.00178	ug/cm^3		Average concentration from shallow overburden wells near River (MW-4A, MW-7A, MW-3A, and MW-2A)
L =	420	ft =	12801.6	cm		Length of segment along cross section C-C'
b =	12	ft =	365.76	cm		Thickness of average water table to bottom of shallow overburden (maximum depth of sheet piling)
mf =	0.0E+00	ug/s	0.0E+00	g/yr	0.00	lbs/yr

Deep Overburden Northern Section (northern property line to midpoint between MW-16D and MW-7)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	70	ug/L =	0.0699	ug/cm^3		Concentration in MW-15D
L =	110	ft =	3352.8	cm		Length of segment along cross section C-C'
b =	16	ft =	487.68	cm		Thickness from bottom of shallow overburden to average depth of bedrock in northern section
mf =	6.1E-01	ug/s	1.9E+01	g/yr	0.04	lbs/yr

Deep Overburden Central Section (midpoint between MW-16D and MW-7 to MW-2)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	19	ug/L =	0.01863	ug/cm^3		Concentration in MW-7
L =	110	ft =	3352.8	cm		Length of segment along cross section C-C'
b =	18	ft =	548.64	cm		Thickness from bottom of shallow overburden to average depth of bedrock in central section
mf =	1.8E-01	ug/s	5.8E+00	g/yr	0.01	lbs/yr

Deep Overburden Southern Section (MW-2 to southern property line)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	22.42	ug/L =	0.02242	ug/cm^3		Average concentrations in wells MW-2 and MW-17D
L =	200	ft =	6096	cm		Length of segment along cross section C-C'
b =	20	ft =	609.6	cm		Thickness from bottom of shallow overburden to average depth of bedrock in southern section
mf =	4.5E-01	ug/s	1.4E+01	g/yr	0.03	lbs/yr
mf_{ob} =	1.2	ug/s	39	g/yr	0.09	lbs/yr

Mass Flux Calculations - Former Aerovox Facility

Baseline Estimate: PCB Flux in Groundwater from Overburden **Figure 2 - Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Vertical Discharge through Outwash Deposits

k =	4.4E-03	hydraulic conductivity, cm/s			One-tenth of horizontal k for outwash from Phase II CSA
i =	0.0023	hydraulic gradient, dimensionless			Average upward gradients measured in couplets on western side of site (MW-13D/B, MW-21D/21B, and MW-101S/101B)
L =	420	ft	=	12801.6 cm	Length of River section from north property boundary to southern property boundary
x=	305	ft	=	9296.4 cm	Average distance to midpoint of River (measured at north middle and south sides of property)
q=	1.2E+03	cm3/sec			

Concentration in Outwash Deposits and Pore Water under River Adjacent to Site

mfob	1.2E+00	ug/s		
1/q=	8.2E-04	cm3/s		
mfob/t*1/q=	0.0010	ug/cm3	1.01930953	ug/l

Mass Flux Calculations - Former Aerovox Facility

Baseline Estimate: TCE Flux in Groundwater from Overburden **Figure 2 - Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Mass Flux from Overburden Groundwater to Downgradient Boundary of Site

Shallow Overburden (northern property line to southern property line)

k =	1.4E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow overburden from Phase II CSA is 39.7 feet/day
i =	0	hydraulic gradient, dimensionless				Horizontal gradient is away from River in shallow overburden from Figures 2-14 and 2-17 of Phase II CSA (value of zero to show no flow)
C=	1	ug/L =	0.00144	ug/cm^3		Average concentration from shallow overburden wells near River (MW-4A, MW-7A, MW-3A, and MW-2A)
L =	420	ft =	12801.6	cm		Length of segment along cross section C-C'
b =	12	ft =	365.76	cm		Thickness of average water table to bottom of shallow overburden (maximum depth of sheet piling)
mf =	0.0E+00	ug/s	0.0E+00	g/yr	0.00	lbs/yr

Deep Overburden Northern Section (northern property line to midpoint between MW-16D and MW-7)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	5,133	ug/L =	5.133	ug/cm^3		Concentration in MW-15D
L =	110	ft =	3352.8	cm		Length of segment along cross section C-C'
b =	16	ft =	487.68	cm		Thickness from bottom of shallow overburden to average depth of bedrock in northern section
mf =	4.5E+01	ug/s	1.4E+03	g/yr	3.11	lbs/yr

Deep Overburden Central Section (midpoint between MW-16D and MW-7 to MW-2)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	24,285	ug/L =	24.285	ug/cm^3		Concentration in MW-7
L =	110	ft =	3352.8	cm		Length of segment along cross section C-C'
b =	18	ft =	548.64	cm		Thickness from bottom of shallow overburden to average depth of bedrock in central section
mf =	2.4E+02	ug/s	7.5E+03	g/yr	16.56	lbs/yr

Deep Overburden Southern Section (MW-2 to southern property line)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	2110.00	ug/L =	2.11	ug/cm^3		Average concentrations in wells MW-2 and MW-17D
L =	200	ft =	6096	cm		Length of segment along cross section C-C'
b =	20	ft =	609.6	cm		Thickness from bottom of shallow overburden to average depth of bedrock in southern section
mf =	4.2E+01	ug/s	1.3E+03	g/yr	2.91	lbs/yr
mf_{ob} =	325	ug/s	10261	g/yr	23	lbs/yr

Mass Flux Calculations - Former Aerovox Facility

Baseline Estimate: TCE Flux in Groundwater from Overburden **Figure 2 - Geologic Cross Section C-C'**

---

mf = kiA * C

Where:

mf = mass flux, ug/s

k = hydraulic conductivity, cm/s

I = hydraulic gradient, dimensionless

A = cross-sectional area, cm^2 (L*B)

C = (ug/L)/1000=ug/cm^3

Vertical Discharge through Outwash Deposits

k =	4.4E-03	hydraulic conductivity, cm/s			One-tenth of horizontal k for outwash from Phase II CSA
i =	0.0023	hydraulic gradient, dimensionless			Average upward gradients measured in couplets on western side of site (MW-13D/B, MW-21D/21B, and MW-101S/101B)
L =	420	ft	=	12801.6 cm	Length of River section from north property boundary to southern property boundary
x=	305	ft	=	9296.4 cm	Average distance to midpoint of River (measured at north middle and south sides of property)
q=	1.2E+03	cm3/sec			

Concentration in Outwash Deposits and Pore Water under River Adjacent to Site

mfob=	3.3E+02	ug/s		
1/q=	8.2E-04	cm3/s		
mfob/t*1/q=	0.27	ug/cm3	267.734711	ug/l

Mass Flux Calculations - Former Aerovox Facility

Bedrock In-Situ Treatment: PCB Flux in Groundwater from Bedrock **Figure 1 - Expanded Geologic Cross Section C-C'**

---

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Mass Flux from Bedrock Groundwater to Downgradient Boundary of Site

Northern section (northern property line to midpoint between MW-34B and MW-07B) - shallow and medium bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	82	ug/L =	0.08213	ug/cm^3		Average concentration from MW-15B and MW-34B above 160 feet
L =	130	ft =	3962.4	cm		Length of segment along cross section C-C'
b =	120	ft =	3657.6	cm		Double the combined bedrock screened intervals for wells MW-15B and MW-34B above 160 feet per MassDEP comment
mf =	1.8E+00	ug/s	5.5E+01	g/yr	0.12	lbs/yr

Northern Section (northern property line to midpoint between MW-34B and MW-07B) - deep bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Shallow bedrock k from Phase II CSA (no deep bedrock k data)
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	0.25	ug/L =	0.00025	ug/cm^3		Concentration in MW-34B below 160 feet
L =	130	ft =	3962.4	cm		Length of segment along cross section C-C'
b =	20	ft =	609.6	cm		Double the screen interval in well MW-34B below 160 feet per MassDEP comment
mf =	8.9E-04	ug/s	2.8E-02	g/yr	0.00006	lbs/yr

Southern Section (southern boundary of plume to midpoint between MW-07B and MW-34B) - shallow and medium bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	11	ug/L =	0.0114	ug/cm^3		Average concentration in wells MW-32B, MW-17B, MW-02 and MW-07B above 125 feet
L =	340	ft =	10363.2	cm		Length of segment along cross section C-C'
b =	84	ft =	2560.32	cm		Double the combined bedrock screened intervals for wells MW-32B, MW-17B, MW-02, and MW-07B above 125 feet per MassDEP comment
mf =	4.5E-01	ug/s	1.4E+01	g/yr	0.03	lbs/yr

Southern Section (southern boundary of plume to midpoint between MW-07B and MW-34B) - deep bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	0.25	ug/L =	0.00025	ug/cm^3		Average concentration in well MW-32B below 125 feet
L =	340	ft =	10363.2	cm		Length of segment between selected contours [C]
b =	40	ft =	1219.2	cm		Double the screened interval in MW-32B below 125 feet per Mass DEP comment
mf =	4.7E-03	ug/s	1.5E-01	g/yr	0.00032	lbs/yr
mf_{br} =	2.2	ug/s	70	g/yr	0.15	lbs/yr

Mass Flux Calculations - Former Aerovox Facility

Bedrock In-Situ Treatment: PCB Flux in Groundwater from Bedrock **Figure 1 - Expanded Geologic Cross Section C-C'**

---

mf = kiA * C

Where:

mf = mass flux, ug/s

k = hydraulic conductivity, cm/s

I = hydraulic gradient, dimensionless

A = cross-sectional area, cm^2 (L*B)

C = (ug/L)/1000=ug/cm^3

Vertical Discharge through Outwash Deposits

k =	4.4E-03	hydraulic conductivity, cm/s				One-tenth of horizontal k for outwash from Phase II CSA
i =	0.0023	hydraulic gradient, dimensionless				Average upward gradients measured in couplets on western side of site (MW-13D/B, MW-21D/21B, and MW-101S/101B)
L =	470	ft	=	14325.6	cm	Length of River section from north property boundary to southern width of shallow bedrock plume
x=	305	ft	=	9296.4	cm	Average distance to midpoint of River (measured at north middle and south sides of property)
q=	1.4E+03	cm3/sec				

Concentration in Outwash Deposits and Pore Water under River Adjacent to Site

mfbr=	2.2E+00	ug/s		
1/q=	7.4E-04	cm3/s		
mfbr/t*1/q=	0.00	ug/cm3	1.62550808	ug/l

Mass Flux Calculations - Former Aerovox Facility

Bedrock In-Situ Treatment: TCE Flux in Groundwater from Bedrock **Figure 1 - Expanded Geologic Cross Section C-C'**

---

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Mass Flux from Bedrock Groundwater to Downgradient Boundary of Site

Northern section (northern property line to midpoint between MW-34B and MW-07B) - shallow and medium bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	50,000	ug/L =	50	ug/cm^3		Decrease concentration to 50,000 ug/l (below UCL after treatment)
L =	130	ft =	3962.4	cm		Length of segment along cross section C-C'
b =	120	ft =	3657.6	cm		Double the combined bedrock screened intervals for wells MW-15B and MW-34B above 160 feet per MassDEP comment
mf =	1.1E+03	ug/s	3.4E+04	g/yr	74.27	lbs/yr

Northern Section (northern property line to midpoint between MW-34B and MW-07B) - deep bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Shallow bedrock k from Phase II CSA (no deep bedrock k data)
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	50,000	ug/L =	50	ug/cm^3		Decrease concentration to 50,000 ug/l (below UCL after treatment)
L =	130	ft =	3962.4	cm		Length of segment along cross section C-C'
b =	20	ft =	609.6	cm		Double the screen interval in well MW-34B below 160 feet per MassDEP comment
mf =	1.8E+02	ug/s	5.6E+03	g/yr	12.38	lbs/yr

Southern Section (southern boundary of plume to midpoint between MW-07B and MW-34B) - shallow and medium bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	7,040	ug/L =	7.04	ug/cm^3		Average concentration in wells MW-32B, MW-17B, MW-02 and MW-07B above 125 feet
L =	340	ft =	10363.2	cm		Length of segment along cross section C-C'
b =	84	ft =	2560.32	cm		Double the combined bedrock screened intervals for wells MW-32B, MW-17B, MW-02, and MW-07B above 125 feet per MassDEP comment
mf =	2.8E+02	ug/s	8.7E+03	g/yr	19.14	lbs/yr

Southern Section (southern boundary of plume to midpoint between MW-07B and MW-34B) - deep bedrock

k =	1.2E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow bedrock from Phase II CSA is 34.9 feet/day
i =	0.00012	hydraulic gradient, dimensionless				Net horizontal gradient to River in shallow bedrock from Figures 2-16 and 2-19 of Phase II CSA
C=	26500.00	ug/L =	26.5	ug/cm^3		Average concentration in well MW-32B below 125 feet
L =	340	ft =	10363.2	cm		Length of segment between selected contours [C]
b =	40	ft =	1219.2	cm		Double the screened interval in MW-32B below 125 feet per Mass DEP comment
mf =	4.9E+02	ug/s	1.6E+04	g/yr	34.31	lbs/yr
mf_{br} =	2019	ug/s	63683	g/yr	140	lbs/yr

Mass Flux Calculations - Former Aerovox Facility

Bedrock In-Situ Treatment: TCE Flux in Groundwater from Bedrock **Figure 1 - Expanded Geologic Cross Section C-C'**

---

mf = kiA * C

Where:

mf = mass flux, ug/s

k = hydraulic conductivity, cm/s

I = hydraulic gradient, dimensionless

A = cross-sectional area, cm^2 (L*B)

C = (ug/L)/1000=ug/cm^3

Vertical Discharge through Outwash Deposits

k =	4.4E-03	hydraulic conductivity, cm/s			One-tenth of horizontal k for outwash from Phase II CSA
i =	0.0023	hydraulic gradient, dimensionless			Average upward gradients measured in couplets on western side of site (MW-13D/B, MW-21D/21B, and MW-101S/101B)
L =	470	ft	=	14325.6 cm	Length of River section from north property boundary to southern width of shallow bedrock plume
x=	305	ft	=	9296.4 cm	Average distance to midpoint of River (measured at north middle and south sides of property)
q=	1.4E+03	cm3/sec			

Concentration in Outwash Deposits and Pore Water under River Adjacent to Site

mfbr=	2.0E+03	ug/s	
1/q=	7.4E-04	cm3/s	
mfbr/t*1/q=	1.48	ug/cm3	1484.84105 ug/l

Mass Flux Calculations - Former Aerovox Facility

Overburden PRB: PCB Flux in Groundwater from Overburden **Figure 2 - Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Mass Flux from Overburden Groundwater to Downgradient Boundary of Site

Shallow Overburden (northern property line to southern property line)

k =	1.4E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow overburden from Phase II CSA is 39.7 feet/day
i =	0	hydraulic gradient, dimensionless				Horizontal gradient is away from River in shallow overburden from Figures 2-14 and 2-17 of Phase II CSA (value of zero to show no flow)
C=	2	ug/L =	0.00178	ug/cm^3		Average concentration from shallow overburden wells near River (MW-4A, MW-7A, MW-3A, and MW-2A)
L =	420	ft =	12801.6	cm		Length of segment along cross section C-C'
b =	12	ft =	365.76	cm		Thickness of average water table to bottom of shallow overburden (maximum depth of sheet piling)
mf =	0.0E+00	ug/s	0.0E+00	g/yr	0.00	lbs/yr

Deep Overburden Northern Section (northern property line to midpoint between MW-16D and MW-7)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	10	ug/L =	0.01	ug/cm^3		Concentration in MW-15D reduced to GW-3 standard of 10 ug/L
L =	110	ft =	3352.8	cm		Length of segment along cross section C-C'
b =	16	ft =	487.68	cm		Thickness from bottom of shallow overburden to average depth of bedrock in northern section
mf =	8.7E-02	ug/s	2.8E+00	g/yr	0.01	lbs/yr

Deep Overburden Central Section (midpoint between MW-16D and MW-7 to MW-2)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	10	ug/L =	0.01	ug/cm^3		Concentration in MW-7 reduced to GW-3 standard of 10 ug/L
L =	110	ft =	3352.8	cm		Length of segment along cross section C-C'
b =	18	ft =	548.64	cm		Thickness from bottom of shallow overburden to average depth of bedrock in central section
mf =	9.8E-02	ug/s	3.1E+00	g/yr	0.01	lbs/yr

Deep Overburden Southern Section (MW-2 to southern property line)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	10.00	ug/L =	0.01	ug/cm^3		Average concentrations in wells MW-2 and MW-17D reduced to GW-3 standard of 10 ug/L
L =	200	ft =	6096	cm		Length of segment along cross section C-C'
b =	20	ft =	609.6	cm		Thickness from bottom of shallow overburden to average depth of bedrock in southern section
mf =	2.0E-01	ug/s	6.3E+00	g/yr	0.01	lbs/yr
mf_{ob} =	0.4	ug/s	12	g/yr	0.03	lbs/yr

Mass Flux Calculations - Former Aerovox Facility

Overburden PRB: PCB Flux in Groundwater from Overburden **Figure 2 - Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Vertical Discharge through Outwash Deposits

k =	4.4E-03	hydraulic conductivity, cm/s			One-tenth of horizontal k for outwash from Phase II CSA
i =	0.0023	hydraulic gradient, dimensionless			Average upward gradients measured in couplets on western side of site (MW-13D/B, MW-21D/21B, and MW-101S/101B)
L =	420	ft	=	12801.6 cm	Length of River section from north property boundary to southern property boundary
x=	305	ft	=	9296.4 cm	Average distance to midpoint of River (measured at north middle and south sides of property)
q=	1.2E+03	cm3/sec			

Concentration in Outwash Deposits and Pore Water under River Adjacent to Site

mfob	3.8E-01	ug/s		
1/q=	8.2E-04	cm3/s		
mfob/t*1/q=	0.0003	ug/cm3	0.31609485	ug/l

Mass Flux Calculations - Former Aerovox Facility

Overburden PRB: TCE Flux in Groundwater from Overburden **Figure 2 - Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Mass Flux from Overburden Groundwater to Downgradient Boundary of Site

Shallow Overburden (northern property line to southern property line)

k =	1.4E-02	hydraulic conductivity, cm/s				Average k for slug tests in shallow overburden from Phase II CSA is 39.7 feet/day
i =	0	hydraulic gradient, dimensionless				Horizontal gradient is away from River in shallow overburden from Figures 2-14 and 2-17 of Phase II CSA (value of zero to show no flow)
C=	1	ug/L =	0.00144	ug/cm^3		Average concentration from shallow overburden wells near River (MW-4A, MW-7A, MW-3A, and MW-2A)
L =	420	ft =	12801.6	cm		Length of segment along cross section C-C'
b =	12	ft =	365.76	cm		Thickness of average water table to bottom of shallow overburden (maximum depth of sheet piling)
mf =	0.0E+00	ug/s	0.0E+00	g/yr	0.00	lbs/yr

Deep Overburden Northern Section (northern property line to midpoint between MW-16D and MW-7)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	5,000	ug/L =	5	ug/cm^3		Concentration in MW-15D reduced to GW-3 standard of 5,000 ug/l
L =	110	ft =	3352.8	cm		Length of segment along cross section C-C'
b =	16	ft =	487.68	cm		Thickness from bottom of shallow overburden to average depth of bedrock in northern section
mf =	4.4E+01	ug/s	1.4E+03	g/yr	3.03	lbs/yr

Deep Overburden Central Section (midpoint between MW-16D and MW-7 to MW-2)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	5,000	ug/L =	5	ug/cm^3		Concentration in MW-7 reduced to GW-3 standard of 5,000 ug/L
L =	110	ft =	3352.8	cm		Length of segment along cross section C-C'
b =	18	ft =	548.64	cm		Thickness from bottom of shallow overburden to average depth of bedrock in central section
mf =	4.9E+01	ug/s	1.5E+03	g/yr	3.41	lbs/yr

Deep Overburden Southern Section (MW-2 to southern property line)

k =	4.5E-02	hydraulic conductivity, cm/s				Average k for slug tests in deep overburden from Phase II is 126.2 ft/day
i =	0.00012	hydraulic gradient, dimensionless				Average horizontal gradient to River from Figures 2-15 and 2-18 of Phase II CSA
C=	2110.00	ug/L =	2.11	ug/cm^3		Average concentrations in wells MW-2 and MW-17D
L =	200	ft =	6096	cm		Length of segment along cross section C-C'
b =	20	ft =	609.6	cm		Thickness from bottom of shallow overburden to average depth of bedrock in southern section
mf =	4.2E+01	ug/s	1.3E+03	g/yr	2.91	lbs/yr
mf_{ob} =	135	ug/s	4248	g/yr	9	lbs/yr

Mass Flux Calculations - Former Aerovox Facility

Overburden PRB: TCE Flux in Groundwater from Overburden **Figure 2 - Geologic Cross Section C-C'**

mf = kiA * C

Where:
- mf = mass flux, ug/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, cm^2 (L*B)
- C = (ug/L)/1000=ug/cm^3

Vertical Discharge through Outwash Deposits

k =	4.4E-03	hydraulic conductivity, cm/s			One-tenth of horizontal k for outwash from Phase II CSA
i =	0.0023	hydraulic gradient, dimensionless			Average upward gradients measured in couplets on western side of site (MW-13D/B, MW-21D/21B, and MW-101S/101B)
L =	420	ft	=	12801.6 cm	Length of River section from north property boundary to southern property boundary
x=	305	ft	=	9296.4 cm	Average distance to midpoint of River (measured at north middle and south sides of property)
q=	1.2E+03	cm3/sec			

Concentration in Outwash Deposits and Pore Water under River Adjacent to Site

mfob=	1.3E+02	ug/s		
1/q=	8.2E-04	cm3/s		
mfob/t*1/q=	0.11	ug/cm3	110.837395	ug/l

AVX Mass Flux Comparisons – Pore Water Beneath Acushnet River

	TCE ug/L	% Reduction	PCB ug/L	% Reduction
Baseline Bedrock	2980.65		1.63	
OU4-1	1484.84	50.2%	1.63	0%
OU4-2	1484.84	50.2%	1.63	0%
Baseline Overburden	267.73		1.02	
OU3-1	0	100%	0	100%
OU3-2	0	100%	0	100%
OU3-3	110.8	58.6%	0.32	68.6%

Appendix C: IRA Supporting Information

WELL LOG

Brown AND Caldwell	**Project Name:** AVX New Bedford **Project Number:** 149279 **Project Location:** New Bedford MA	**Permit Number:**	**Well No.** **RC-1** **Page** 1 **of** 1

Inspector/Office	**Checked By:**	**Borehole Diameter:**	**Screen Diameter and Type:**	**Slot Size:**	**Total Boring Depth (ft)**
SPW/Taunton MA	JML	8"	4" Steel	0.060"	30.0 ft.

Start/Finish Date	**Drilling Contractor:**	**Sampling:** Continuous Core	**Development Method:**
8/16/16 - 8/16/16	Cascade	**Hammer Type:** NA	Air lift

Driller:	**Drilling Method:**	**Drilling Equipment:**	**Horiz Datum/Proj:**	**Easting:** --
Matt Ostenberg	Sonic	Bort Longyear Model 600T	**Vert Datum:**	**Northing:** --
			Ground Surface Elev: --	**TOC Elev:** --

Depth (feet)	Elevation (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log: Sample Int / Recovery / Lithology / Well	Readings (ppm)	Remarks
			Asphalt		1		0.0	
		SP	Brownish gray, dry, no odor, mf SAND, some c gravel		2		0.4	
		FL	Black, moist, organic, Brick and mf SAND, trace mf gravel					Bentonite Grout
5								
		SP SM	Black, moist, organic, mf SAND, some silt		3		37.9	
		ML CL	Black, moist, organic, silty CLAY					
		PT	Brownish black, moist, organic, mf SAND and PEAT					4" Steel Riser
10		SP GP	Brownish gray, moist, no odor, cmf SAND and mf GRAVEL					
15								Bentonite Seal
		SP	Grayish brown, wet, no odor, mf SAND		4		0.0	
		SP GP	Brownish gray, moist, no odor, cmf SAND and f GRAVEL					
20								#4 Silica Sand
		SP GP	Brownish gray, moist, no odor, f SAND and f GRAVEL					
		GP SP	Grayish brown, moist, no odor, cmf GRAVEL, some cm sand					
25		SP GP	Brownish gray, moist, no odor, cmf SAND, some cmf gravel					4" Steel Screen
		GP SP	Grayish brown, moist, no odor, cmf GRAVEL, some f sand, some silt					
30			End of Boring at 30ft bgs					

WELL LOG

Brown AND Caldwell	**Project Name:** AVX New Bedford **Project Number:** 149279 **Project Location:** New Bedford MA	**Permit Number:**	**Well No.** **RW-1B** **Page** 1 **of** 2

Inspector/Office	**Checked By:**	**Borehole Diameter:**	**Screen Diameter and Type:**	**Slot Size:**	**Total Boring Depth (ft)**
SPW/Taunton MA	JML	12"	6" Steel	0.060"	64.5 ft.

Start/Finish Date	**Drilling Contractor:**	**Sampling:** Continuous Core	**Development Method:**
8/11/16 - 8/12/16	Cascade	**Hammer Type:** NA	Air lift

Driller:	**Drilling Method:**	**Drilling Equipment:**	**Horiz Datum/Proj:**	**Easting:** --
Matt Ostenberg	Sonic	Bort Longyear Model 600T	**Vert Datum:**	**Northing:** --
			Ground Surface Elev: --	**TOC Elev:** --

Depth (feet)	Elevation (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log: Sample Int / Recovery / Lithology / Well	Readings (ppm)	Remarks
			Asphalt		1		0.0	
		SP GP	Brownish gray, dry, organic, mf SAND, some mf gravel		2		115	
		FILL	Black, moist, organic, Mostly rubber gaskets, some mf SAND					
5								Bentonite Grout
		SP	Black, moist, organic, mf SAND		3		101	
		CL ML	Black, moist, organic, CLAY, some silt					
10		PT	Black, moist, organic, PEAT					
		SP	Black, moist, organic, mf SAND					6" Steel Riser
		SP GP	Brownish gray, moist, no odor, cmf SAND, some f gravel					
15								
		SP GP	Brownish gray, wet, no odor, smf SAND, some f gravel		4		0.0	
		GP SP	Dark yellowish brown, wet, no odor, cmf GRAVEL, some cmf sand					Bentonite Seal
20		SP GP	Brownish gray, wet, no odor, mf SAND, little f gravel					
		SP GP	Brownish gray, wet, no odor, mf SAND, some mf gravel					#4 Silica Sand
		SP GP	Brownish gray, wet, no odor, mf SAND and mf GRAVEL					
25								
		CL ML	Grayish brown, moist, no odor, silty CLAY, trace c gravel		5		0.0	4" Steel Screen
30			Grayish blue, dry, no odor, Heavily					

WELL LOG

Brown AND Caldwell	**Project Name:** AVX New Bedford **Project Number:** 149279 **Project Location:** New Bedford MA	**Permit Number:**	**Well No.** **RW-1B** **Page** 2 **of** 2

Depth (feet)	Elevation (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log: Sample Int	Graphic Log: Recovery	Graphic Log: Lithology	Graphic Log: Well	Readings (ppm)	Remarks
35			weathered bedrock								Bentonite Grout 6" Steel Riser
40			Grayish blue, wet, no odor, Competent bedrock, no odor weathering		6					0.0	Bentonite Seal
45					7					0.0	#4 Silica Sand
50											6" Steel Screen
55					8					0.0	
60											6" Steel Sump

WELL LOG

Brown AND Caldwell	**Project Name:** AVX New Bedford **Project Number:** 149279 **Project Location:** New Bedford MA	**Permit Number:**	**Well No.** **RW-1D** **Page** 1 **of** 2

Inspector/Office	**Checked By:**	**Borehole Diameter:**	**Screen Diameter and Type:**	**Slot Size:**	**Total Boring Depth (ft)**
SPW/Taunton MA	JML	12"	6" Steel	0.040"	35.0 ft.

Start/Finish Date	**Drilling Contractor:**	**Sampling:** Continuous Core	**Development Method:**
8/12/16 - 8/15/16	Cascade	**Hammer Type:** NA	Air lift

Driller:	**Drilling Method:**	**Drilling Equipment:**	**Horiz Datum/Proj:**	**Easting:** --
Matt Ostenberg	Sonic	Bort Longyear Model 600T	**Vert Datum:**	**Northing:** --
			Ground Surface Elev: --	**TOC Elev:** --

Depth (feet)	Elevation (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log: Sample Int / Recovery / Lithology / Well	Readings (ppm)	Remarks
		SP GP	Asphalt Brownish gray, dry, no odor, mf SAND, trace f gravel		1		36.7	
		SP GP	Brownish black, moist, no odor, mf SAND, trace f gravel					Bentonite Grout
		FILL	Black, wet, organic, rubber gaskets and industrial fill					
5		SP	Black, moist, organic, f SAND					6" Steel Riser
		CL ML	Black, moist, organic, Silty CLAY					
		FILL	Black, moist, organic, Industrial fill		2		46.2	
		PT	Black, moist, organic, Silty CLAY, some peat					
10		SP GP	Brownish gray, moist, no odor, cmf SAND and f GRAVEL					
15		SP GP	Brownish gray, moist, no odor, cmf SAND and f GRAVEL		3		0.0	
20		GP SP	Dark yellowish orange, moist, no odor, mf GRAVEL, trace mf sand					Bentonite Seal
		SP GP	Brownish gray, moist, no odor, cmf SAND and mf GRAVEL					#4 Silica Sand
25		CL ML	Brownish gray, moist, no odor, Silty CLAY, some mf gravel		4		0.0	
								6" Steel Screen
30			Grayish blue, dry, no odor, Heavily weathered bedrock					6" Steel Sump

WELL LOG

Brown AND Caldwell	**Project Name:** AVX New Bedford **Project Number:** 149279 **Project Location:** New Bedford MA	**Permit Number:**	**Well No.** **RW-1D** **Page** 2 **of** 2

Depth (feet)	Elevation (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log: Sample Int	Graphic Log: Recovery	Graphic Log: Lithology	Graphic Log: Well	Readings (ppm)	Remarks
35											6" Steel Sump

WELL LOG

Brown AND Caldwell	**Project Name:** AVX New Bedford **Project Number:** 149279 **Project Location:** New Bedford MA	**Permit Number:**	**Well No.** **RW-1S** **Page** 1 **of** 1

Inspector/Office	**Checked By:**	**Borehole Diameter:**	**Screen Diameter and Type:**	**Slot Size:**	**Total Boring Depth (ft)**
SPW/Taunton MA	JML	6"	6" Steel	0.040"	12.0 ft.

Start/Finish Date	**Drilling Contractor:**	**Sampling:** Continuous Core	**Development Method:**
8/15/16 - 8/16/16	Cascade	**Hammer Type:** NA	Air lift

Driller:	**Drilling Method:**	**Drilling Equipment:**	**Horiz Datum/Proj:**	**Easting:** --
Matt Ostenberg	Sonic	Bort Longyear Model 600T	**Vert Datum:**	**Northing:** --
			Ground Surface Elev: --	**TOC Elev:** --

Depth (feet)	Elevation (feet)	USC Soil Type	Description	Blow Counts	Sample No.	Graphic Log: Sample Int / Recovery / Lithology / Well	Readings (ppm)	Remarks
			Asphalt		1		0.4	Bentonite Grout
		SP	Brownish gray, dry, no odor, mf SAND		2		6.9	
		FILL	Black, moist, organic, Rubber gaskets and possible shingles / industrial fill					Bentonite Seal
		CL ML	Black, moist, organic, Silty CLAY					6" Steel Riser
5								#4 Silica Sand
		SP	Black, wet, no odor, mf SAND, trace silt		3		6.2	
		SM	Black, moist, no odor, Silty CLAY					
		CL ML	Black, moist, organic, Silty CLAY, some peat					6" Steel Screen
10		CL ML	Black, moist, organic, Silty CLAY					6" Steel Sump
		CL ML						

Table 1A
MW-15D DNAPL Gauging and Recovery Summary
Aerovox, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

MW-15D

Date	Depth to Groundwater (ft)	Approximate DNAPL Thickness (inches)	Recovery Event Volume (ounces)	Recovery Event Volume (ml)	Cumulative Volume Removed (ml)	Recovery Event Volume (gal)	Cumulative Volume Removed (gal)	Tide Cycle At Measurement/ Comments on Recovery
5/19/2014	NM	7	8 to 16	350	350	0.09	0.09	NR
6/2/2014	5.03	4.5	8 to 16	350	700	0.09	0.18	NR
6/16/2014	NM	4.5	5.5	160	860	0.04	0.23	NR
6/30/2014	NM	6	5	150	1010	0.04	0.27	NR
7/27/2014	4.49	3.5	3.4	100	1110	0.03	0.29	low tide
8/18/2014	3.85	3	3.4	100	1210	0.03	0.32	3/4 of high
9/22/2014	5.46	5	6.8	200	1410	0.05	0.37	3/4 of high; ebbing
10/6/2014	5.48	3	1.4	40	1450	0.01	0.38	low tide
10/22/2014	4.93	4	6.8	200	1650	0.05	0.44	low tide
11/3/2014	5.74	4	0.0	1.25	1651	0.00	0.44	low tide
11/17/2014	4.43	4	3.4	100	1751	0.03	0.46	Mid-tide; ebbing
12/8/2014	2.76	4	5.1	150	1901	0.04	0.50	high tide
12/23/2014	2.94	3.5	2.7	80	1981	0.02	0.52	high tide
1/6/2015	6.35	3.5	2.5	75	2056	0.02	0.54	low tide
1/19/2015	5.07	3	3.4	100	2156	0.03	0.57	low tide
2/6/2015	NM	3	0.7	20	2176	0.01	0.57	not noted
2/23/2015								
3/9/2015	3.78	6	4.2	125	2301	0.03	0.61	high tide
3/23/2015	3.13	5.5	5.1	150	2451	0.04	0.65	high tide
4/13/2015	5.46	1	1.0	30	2481	0.01	0.66	3/4 of high tide; ebbing tide
4/27/2015	3.05	2.5	1.7	50	2531	0.01	0.67	3/4 of high tide; ebbing tide
5/11/2015	4.65	2.5	1.0	30	2561	0.01	0.68	3/4 of high tide; ebbing tide
5/26/2015	4.91	4	1.7	50	2611	0.01	0.69	mid flow tide
6/3/2015	4.99	2.5	1.7	50	2661	0.01	0.70	low tide
6/16/2015	3.89	4.5	1.7	50	2711	0.01	0.72	3/4 high tide, ebbing tide
6/29/2015	4.28	trace	0.1	2	2713	0.00	0.72	Mid-tide; ebbing
7/16/2015	4.87	2.5	0.7	20	2733	0.01	0.72	low tide
7/27/2015	4.78	2.5	0.8	25	2758	0.01	0.73	1/4 of low, flood tide
8/14/2015	5.29	2.5	0.5	15	2773	0.00	0.73	low tide
8/28/2015	2.28	2	0.3	10	2783	0.00	0.74	3/4 of high tide; ebbing tide
9/8/2015	5.66	1.75	0.2	5	2788	0.00	0.74	ebbing tide; nearly at low
9/29/2015	4.24	3	1.0	30	2818	0.01	0.74	ebbing tide; 1/2 way to low
10/5/2015	3.13	2.5	0.7	20	2838	0.01	0.75	flow tide, nearly high
10/19/2015	3.25	2	0.8	25	2863	0.01	0.76	ebbing, 3/4 of high
11/2/2015	4.01	2	0.7	20	2883	0.01	0.76	high tide
11/24/2015	5.73	2	0.7	20	2903	0.01	0.77	Flowing tide; near high tide
12/31/2015	5.54	3	4.2	125	3028	0.03	0.80	Flowing tide; near high tide
1/11/2016	2.39	3	5.1	150	3178	0.04	0.84	high tide
2/12/2016	2.89	3.5	2.5	75	3253	0.02	0.86	high tide
3/18/2016	4.1	2.25	1.0	30	3283	0.01	0.87	flowing tide, closer to low than high
4/13/2016	4.16	2.25	1.0	30	3313	0.01	0.88	flowing tide, closer to low than high
6/9/2016	4.11	0	0.0	0	3313	0.00	0.88	NR
7/7/2016	4.09	0	0.0	0	3313	0.00	0.88	NR
7/20/2016	2.60	0	0.0	0	3313	0.00	0.88	NR
9/20/2016	2.66	0	0.0	0	3313	0.00	0.88	Flowing tide, closer to high
10/12/2016	NM	0.25	0.0	0	3313	0.00	0.88	Ebbing tide; closer to low
10/19/2016	NM	0.00	0.0	0	3313	0.00	0.88	Flowing tide; closer to high
10/26/2016	NM	0.00	0.0	0	3313	0.00	0.88	Ebbing tide; closer to low
11/2/2016	NM	0.25	0.0	0	3313	0.00	0.88	Flowing tide; closer to high
11/9/2016	NM	0.25	0.0	0	3313	0.00	0.88	Near low tide

Table 1A
MW-15D DNAPL Gauging and Recovery Summary
Aerovox, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Date	Depth to Groundwater (ft)	Approximate DNAPL Thickness (inches)	Recovery Event Volume (ounces)	Recovery Event Volume (ml)	Cumulative Volume Removed (ml)	Recovery Event Volume (gal)	Cumulative Volume Removed (gal)	Tide Cycle At Measurement/ Comments on Recovery
11/23/2016	NM	5*	0.0	0	3313	0.00	0.88	Near high tide
1/4/2017	3.00	1	0.0	0	3313	0.00	0.88	flowing tide, near high
1/18/2017	3.22	NM	0.0		3313	0.00	0.88	flowing tide, near high; DNAPL within sediment in well was removed during redevelop-ment
1/27/2017	3.29	0.2	0.0		3313	0.00	0.88	flowing tide, midway to high; DNAPL blebs recovered but not measurable
2/22/2017	4.6	0.9	0.0	0	3313	0.00	0.88	Near low tide, with tide beginning to come back in; DNAPL blebs recovered but not measureable.
3/2/2017	3.01	1.1	0.0	0	3313	0.00	0.88	High tide; tide just beginning to go back out.
3/9/2017	5.15	1.25	0.0	0	3313	0.00	0.88	Near low tide; DNAPL blebs recovered, but not measureable.
3/17/2017	3.66	1.25	0.0	0	3313	0.00	0.88	Flow tide, close to high tide
4/6/2017	NM	0.9	0.0	0	3313	0.00	0.88	mid-tide, slightly closer to low
4/17/2017	3.57	0.25	0.0	0	3313	0.00	0.88	ebbing tide; closer to low
5/5/2017	4.42	0.75	0.0	0	3313	0.00	0.88	ebbing tide, near low
5/17/2016	3.31	1	0.0	0	3313	0.00	0.88	flowing tide, closer to high
Total Volume from MW-15D:				**112**		**3313**	**0.88**	

Notes:

Volume is estimated; includes DNAPL only - recovered water is not included in estimate

For the total volume recovered calculation, a value of 12 ounces was used for the first two recovery events.

The site could not be acessed on 2/23/2015 due to accumulation of ice and snow near the access gates.

* This measurement was of accumulated silt with layers of DNAPL interspersed. This well was subsequently redeveloped.

Table 1B
MW-15B DNAPL Gauging and Recovery Summary
Aerovox, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

MW-15B

Date	Depth to Groundwater (ft)	Approximate DNAPL Thickness (inches)	Recovery Event Volume (ounces)	Recovery Event Volume (ml)	Cumulative Recovery Volume (ml)	Recovery Event Volume (gal)	Cumulative Recovery Volume (Gal)	Tide Cycle At Measurement/ Comments on Recovery
10/6/2014	4.63	3	1.0	30	30	0.01	0.01	low tide
10/22/2014	4.82	3.5	3.4	100	130	0.03	0.03	low tide
11/3/2014	5.46	3	3.4	100	230	0.03	0.06	low tide
11/17/2014	4.98	2.5	2.5	75	305	0.02	0.08	mid-tide; ebbing
12/8/2014	4.98	3.5	2.5	75	380	0.02	0.10	high tide
12/23/2014	3.43	2.5	2.5	75	455	0.02	0.12	high tide
1/6/2015	4.62	3	2.5	75	530	0.02	0.14	low tide
1/19/2015	6.04	3	2.0	60	590	0.02	0.16	low tide
2/6/2015	NM	3	0.7	20	610	0.01		not noted
3/9/2015	4.11	4.5	3.4	100	710	0.03	0.18	high tide
3/23/2015	4.78	5	4.2	125	835	0.03	0.22	high tide
4/13/2015	5.07	1.5	2.5	75	910	0.02	0.24	3/4 of high tide, ebbing tide
4/27/2015	4.7	3.5	2.0	60	970	0.02	0.25	Flow tide, nearly high
5/11/2015	4.99	5.5	2.0	60	1030	0.02	0.27	3/4 of high tide, ebbing tide
5/26/2015	5.13	2.5	0.8	25	1055	0.01	0.27	mid flow tide
6/3/2015	5.33	2	1.7	50	1105	0.01	0.29	low tide
6/16/2015	4.38	2.5	1.0	30	1135	0.01	0.29	3/4 of high tide, ebbing tide
6/29/2015	4.42	2.5	0.7	20	1155	0.01	0.30	mid-tide; ebbing
7/16/2015	4.49	1	0.5	15	1170	0.00	0.30	low tide
7/27/2015	4.46	1.5	0.3	10	1180	0.00	0.31	1/4 of low, flood tide
8/14/2015	4.46	3	0.7	20	1200	0.01	0.31	low tide
8/28/2015	3.96	2.5	0.5	15	1215	0.00	0.32	3/4 of high tide; ebbing tide
9/8/2015	5.13	2.75	0.8	25	1240	0.01	0.32	ebbing tide; nearly at low
9/29/2015	4.46	2	0.5	15	1255	0.00	0.33	ebbing tide; 1/2 way to low
10/5/2015	4.1	2	0.3	10	1265	0.00	0.33	flow tide, nearly high
10/19/2015	3.72	1.5	0.5	15	1280	0.00	0.33	ebbing, 3/4 of high
11/2/2015	4.34	1.5	0.5	15	1295	0.00	0.34	high tide
11/24/2015	5.57	2	0.7	20	1315	0.01	0.34	Flow tide, nearly high
12/31/2015	5.42	3	3.4	100	1415	0.03	0.37	Flowing tide; near high tide
1/11/2016	4.34	2.5	2.5	75	1490	0.02	0.39	high tide
2/12/2016	2.85	3	1.7	50	1540	0.01	0.40	high tide
3/18/2016	4.95	1.5	7.6	225	1765	0.06	0.46	flowing tide; closer to low than high
4/13/2016	4.95	1.5	0.8	25	1790	0.01	0.47	flowing tide; closer to low than high
6/9/2016	5.07	1.45	6.8	20	1810	0.01	0.47	high tide
7/7/2016	4.21	1	5.7	17	1827	0.00	0.48	Low tide
7/20/2016	4.37	0.51	3.4	10	1837	0.00	0.48	low tide
9/20/2016	3.75	0	0.0	0	1837	0.00	0.48	Flowing tide, closer to high
10/12/2016	NM	1	0.0	0	1837	0.00	0.48	Ebbing tide; closer to low
10/19/2016	NM	<0.25	0.0	0	1837	0.00	0.48	Flowing tide; closer to high
10/26/2016	NM	0.25	0.0	0	1837	0.00	0.48	Ebbing tide; closer to low
11/2/2016	NM	0.25	0.0	0	1837	0.00	0.48	Flowing tide; closer to high
11/9/2016	NM	0.25	0.0	0	1837	0.00	0.48	Near low tide
11/23/2016	NM	0.5	0.0	0	1837	0.00	0.48	Near high tide
1/5/2017	3.74	1.31	0.0	0	1837	0.00	0.48	flowing tide, near high
1/18/2017	3.5	1.32	0.0	0	1837	0.00	0.48	flowing tide, near high; ; DNAPL blebs recovered but not measurable

Table 1B
MW-15B DNAPL Gauging and Recovery Summary
Aerovox, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Date	Depth to Groundwater (ft)	Approximate DNAPL Thickness (inches)	Recovery Event Volume (ounces)	Recovery Event Volume (ml)	Cumulative Recovery Volume (ml)	Recovery Event Volume (gal)	Cumulative Recovery Volume (Gal)	Tide Cycle At Measurement/ Comments on Recovery
1/27/2017	3.57	0.87	0.0	0	1837	0.00	0.48	flowing tide, midway to high; DNAPL blebs recovered but not measurable
2/22/2017	3.88	0.9	0.0	0	1837	0.00	0.48	Near low tide, with tide beginning to come back in; DNAPL blebs recovered but not measureable.
3/2/2017	4.33	1.5	0.0	0	1837	0.00	0.48	High tide; tide just beginning to go back out.
3/9/2017	4.33	1.75	0.0	0	1837	0.00	0.48	Near low tide; DNAPL blebs recovered, but not measureable.
3/17/2017	5.27	1.25	0.0	0	1837	0.00	0.48	Flow tide, close to high tide
4/6/2017	NM	1.25	0.0	0	1837	0.00	0.48	mid-tide, slightly closer to low
4/17/2017	3.73	4.25	7.6	225	2062	0.06	0.54	ebbing tide; closer to low;
5/5/2017	4.62	1	2.0	60	2122	0.02	0.56	ebbing tide, near low
5/17/2017	3.72	2.75	<2	<50	2172	<0.01	0.57	flowing tide, closer to high
Total Volume to Date from MW-15B:			**88**		**2172**		**0.57**	

Notes:

Volume is estimated; includes DNAPL only - recovered water is not included in estimate
DNAPL was not observed at a measureable thickness in MW-15B until September 29, 2014
The site could not be acessed on 2/23/2015 due to accumulation of ice and snow near the access gates.

Table 1C
RW-1S DNAPL Gauging and Recovery Summary
Aerovox, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

RW-1S

Date	Depth to Groundwater (ft)	Approximate DNAPL Thickness (inches)	Recovery Event Volume (ounces)	Recovery Event Volume (ml)	Cumulative Volume Removed (ml)	Recovery Event Volume (gal)	Cumulative Volume Removed (gal)	Tide Cycle At Measurement/ Comments on Recovery
9/20/2016	2.85	0	0-Jan	0	0	0.00	0.00	Flowing tide, closer to high
10/12/2016	NM	0	0	0	0	0.00	0.00	Ebbing tide; closer to low
10/19/2016	NM	0	0	0	0	0.00	0.00	Flowing tide; closer to high
10/26/2016	NM	0	0	0	0	0.00	0.00	Ebbing tide; closer to low
11/2/2016	NM	0	0	0	0	0.00	0.00	Flowing tide; closer to high
11/9/2016	NM	0	0	0	0	0.00	0.00	Near low tide
11/23/2016	NM	0	0	0	0	0.00	0.00	Near high tide
1/4/2017	2.38	0	0	0	0	0.00	0.00	flowing tide, near high
1/17/2017	2.57	0	0		0	0.00	0.00	flowing tide, near high
1/27/2017	2.19	0	0	0	0	0.00	0.00	flowing tide, midway to high
2/22/2017	2.41	0	0	0	0	0.00	0.00	Near low tide, with tide beginning to come back in;
3/2/2017	2.53	0	0	0	0	0.00	0.00	High tide; tide just beginning to go back out.
3/9/2017	2.79	0	0	0	0	0.00	0.00	Near low tide; DNAPL blebs recovered, but not measureable.
3/17/2017	2.44	0	0	0	0	0.00	0.00	Flow tide, close to high tide
4/6/2017	NM	0	0	0	0	0.00	0.00	mid-tide, slightly closer to low
4/17/2017	2.41	0	0	0	0	0.00	0.00	ebbing tide; closer to low
5/5/2017	2.24	0	0	0	0	0.00	0.00	ebbing tide, near low
5/17/2017	2.11	0	0	0	0	0.00	0.00	flowing tide, closer to high
		Total Volume from RW-1S:	0		0		0.00	

Table 1D
RW-1B DNAPL Gauging and Recovery Summary
Aerovox, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

RW-1B

Date	Depth to Groundwater (ft)	Approximate DNAPL Thickness (inches)	Recovery Event Volume (ounces)	Recovery Event Volume (ml)	Cumulative Volume Removed (ml)	Recovery Event Volume (gal)	Cumulative Volume Removed (gal)	Tide Cycle At Measurement/ Comments on Recovery
9/20/2016	3.61	0	0	0	0	0	0	Flowing tide, closer to high
10/12/2016	NM	0	0	0	0	0	0	Ebbing tide; closer to low
10/19/2016	NM	0	0	0	0	0	0	Flowing tide; closer to high
10/26/2016	NM	0	0	0	0	0	0	Ebbing tide; closer to low
11/2/2016	NM	0	0	0	0	0	0	Flowing tide; closer to high
11/9/2016	NM	0	0	0	0	0	0	Near low tide
11/23/2016	NM	0	0	0	0	0	0	Near high tide
1/4/2017	3.81	0	0	0	0	0	0	flowing tide, near high
1/18/2017	4.11	0	0	0	0	0	0	flowing tide, near high;
1/27/2017	3.99	0	0	0	0	0	0	flowing tide, midway to high
2/22/2017	4.87	0	0	0	0	0	0	Near low tide, with tide beginning to come back in;
3/2/2017	3.50	0	0	0	0	0	0	High tide; tide just beginning to go back out.
3/9/2017	5.36	0	0	0	0	0	0	Near low tide; DNAPL blebs recovered, but not measureable.
3/17/2017	4.23	0	0	0	0	0	0	Flow tide, close to high tide
4/6/2017	NM	0	0	0	0	0	0	mid-tide, slightly closer to low
4/17/2017	3.92	0	0	0	0	0	0	ebbing tide; closer to low
5/5/2017	4.06	0	0	0	0	0	0	ebbing tide, near low
5/17/2017	4.06	0	0	0	0	0	0	flowing tide, closer to high
Total Volume from RW-1B:			0		0		0	

Table 1E
RC-1 DNAPL Gauging and Recovery Summary
Aerovox, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

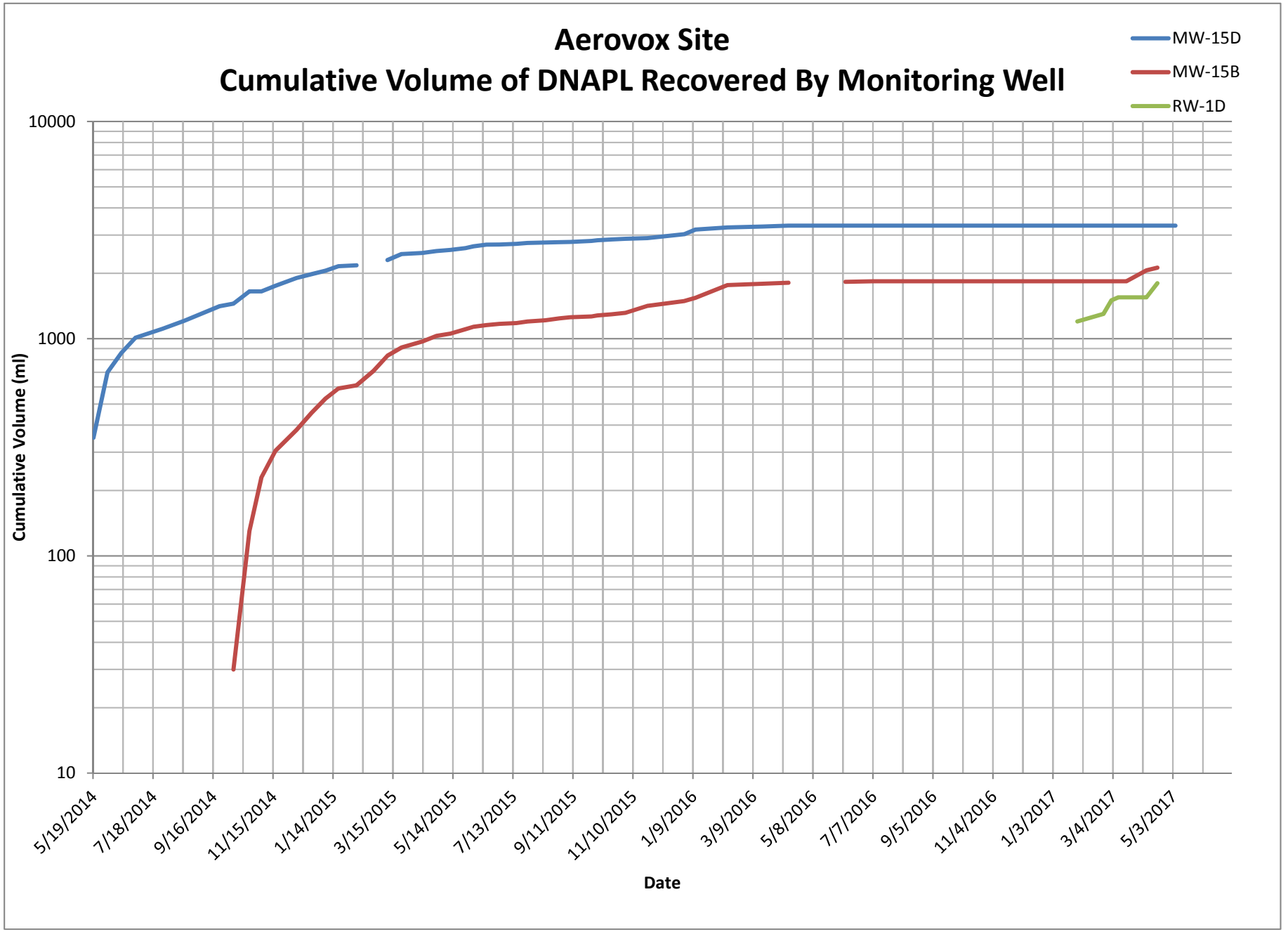
RC-1

Date	Depth to Groundwater (ft)	Approximate DNAPL Thickness (inches)	Recovery Event Volume (ounces)	Recovery Event Volume (ml)	Cumulative Volume Removed (ml)	Recovery Event Volume (gal)	Cumulative Volume Removed (gal)	Tide Cycle At Measurement/ Comments on Recovery
9/20/2016	3.44	0	0	0	0	0	0	Flowing tide, closer to high
10/12/2016	NM	<0.25	0	0	0	0	0	Ebbing tide; closer to low
10/19/2016	NM	<0.25	0	0	0	0	0	Flowing tide; closer to high
10/26/2016	NM	<0.25	0	0	0	0	0	Ebbing tide; closer to low
11/2/2016	NM	0.25	0	0	0	0	0	Flowing tide; closer to high
11/9/2016	NM	0.25	0	0	0	0	0	Near low tide
11/23/2016	NM	0.25	0	0	0	0	0	Near high tide
1/4/2017	3.91	0.1875	0	0	0	0	0	flowing tide, near high
1/18/2017	3.50	0.25	0		0	0	0	flowing tide, near high; DNAPL blebs recovered but not measurable
1/27/2017	4.75	0.2	0	0	0	0	0	flowing tide, midway to high; DNAPL blebs recovered but not measurable
2/22/2017	5.45	0.2	0		0	0	0	Near low tide, with tide beginning to come back in;
3/2/2017	3.85	0.2	0	0	0	0	0	High tide; tide just beginning to go back out.
3/9/2017	6.00	0.2	0	0	0	0	0	recovered, but not measureable.
3/17/2017	4.51	0.25	0		0	0	0	Flow tide, close to high tide
4/6/2017	NM	0.25	0	0	0	0	0	mid-tide, slightly closer to low
4/17/2017	4.37	0	0	0	0	0	0	ebbing tide; closer to low
5/5/2017	5.26	0.25	0	0	0	0	0	ebbing tide, near low
5/17/2017	4.11	0.25	0	0	0	0	0	flowing tide, closer to high
Total Volume from RC-1:			0		0		0	

Table 1F
RW-1D DNAPL Gauging and Recovery Summary
Aerovox, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

RW-1D

Date	Depth to Groundwater (ft)	Approximate DNAPL Thickness (inches)	Recovery Event Volume (ounces)	Recovery Event Volume (ml)	Cumulative Volume Removed (ml)	Recovery Event Volume (gal)	Cumulative Volume Removed (gal)	Tide Cycle At Measurement/ Comments on Recovery
9/20/2016	3-Jan	0	0	0	0	0	0	Flowing tide, closer to high
10/12/2016	NM	1.5	0	0	0	0	0	Ebbing tide; closer to low
10/19/2016	NM	1.5	0	0	0	0	0	Flowing tide; closer to high
10/26/2016	NM	2	0	0	0	0	0	Ebbing tide; closer to low
11/2/2016	NM	2	0	0	0	0	0	Flowing tide; closer to high
11/9/2016	NM	2	0	0	0	0	0	Near low tide
11/23/2016	NM	3	0	0	0	0	0	Near high tide
1/4/2017	3.37	3.375	0	0	0	0	0	flowing tide, near high
1/18/2017	3.59	3.25	0	0	0	0	0	flowing tide, near high; DNAPL blebs recovered but not measurable
1/27/2017	4.22	2.78	0	0	0	0	0	flowing tide, midway to high; DNAPL blebs recovered but not measurable
2/22/2017	4.92	3.9	41	1200	1200	0.32	0.32	Near low tide, with tide beginning to come back in;
3/2/2017	3.34	1.25	3	100	1300	0.03	0.34	High tide; tide just beginning to go back out.
3/9/2017	5.51	1.25	7	200	1500	0.05	0.40	Near low tide; DNAPL blebs recovered, but not measureable.
3/17/2017	3.99	0.875	2	50	1550	0.01	0.41	Flow tide, close to high tide
4/6/2017	NM	0.8	0	0	1550	0.00	0.41	mid-tide, slightly closer to low
4/17/2017	3.85	0.9	0	0	1550	0.00	0.41	ebbing tide; closer to low
5/5/2017	4.73	1	8	250	1800	0.07	0.48	ebbing tide, near low
5/17/2017	3.57	0.5	<1	<25	1825	0.01	0.48	flowing tide, closer to high
Total Volume from RW-1D:			85		1825		0.48	


Aerovox Site
Cumulative Volume of DNAPL Recovered By Monitoring Well
MW-15D
MW-15B
RW-1D
10000
1000
100
10
Cumulative Volume (ml)
5/19/2014
7/18/2014
9/16/2014
11/15/2014
1/14/2015
3/15/2015
5/14/2015
7/13/2015
9/11/2015
11/10/2015
1/9/2016
3/9/2016
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3/4/2017
5/3/2017
Date

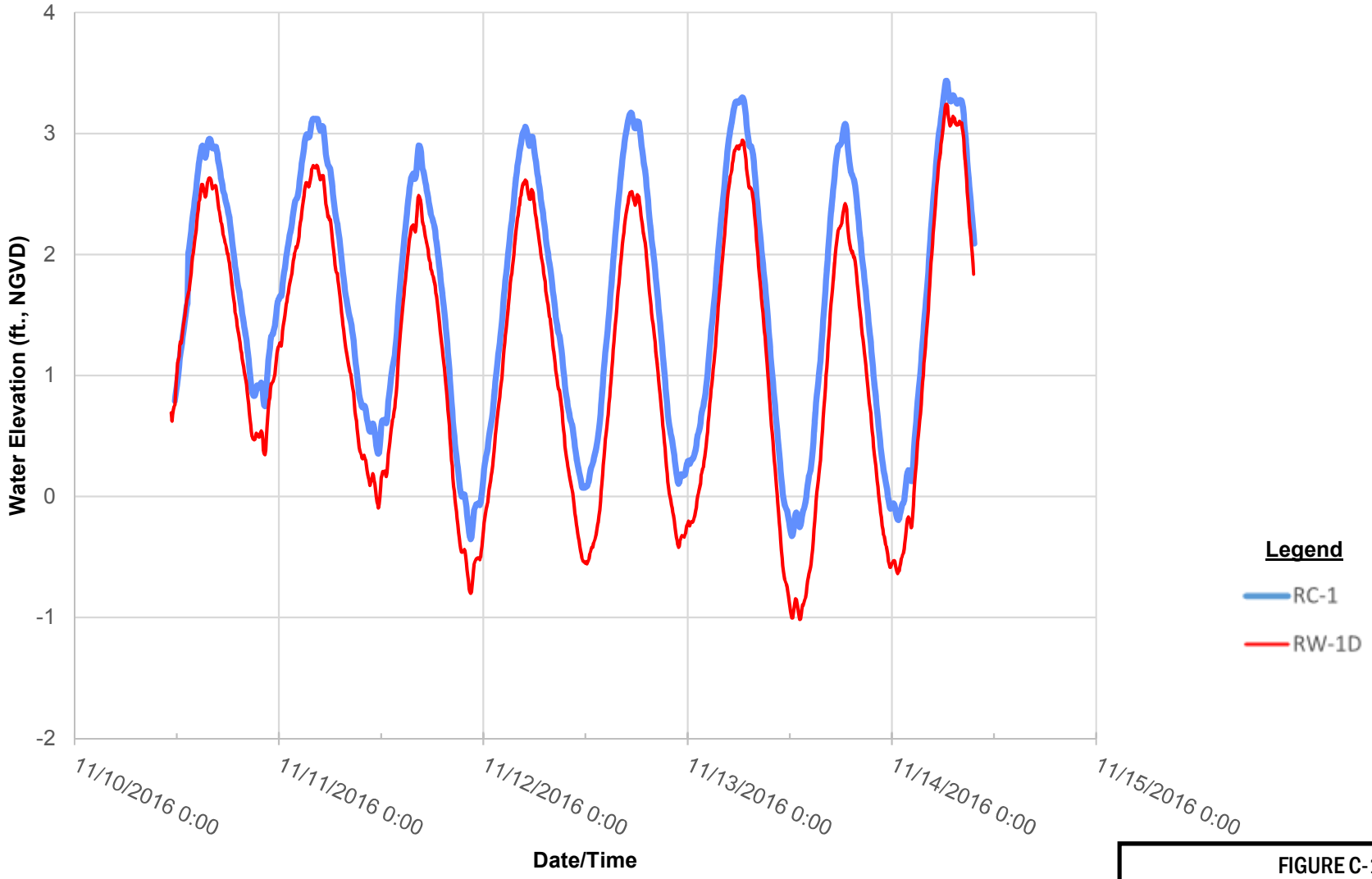
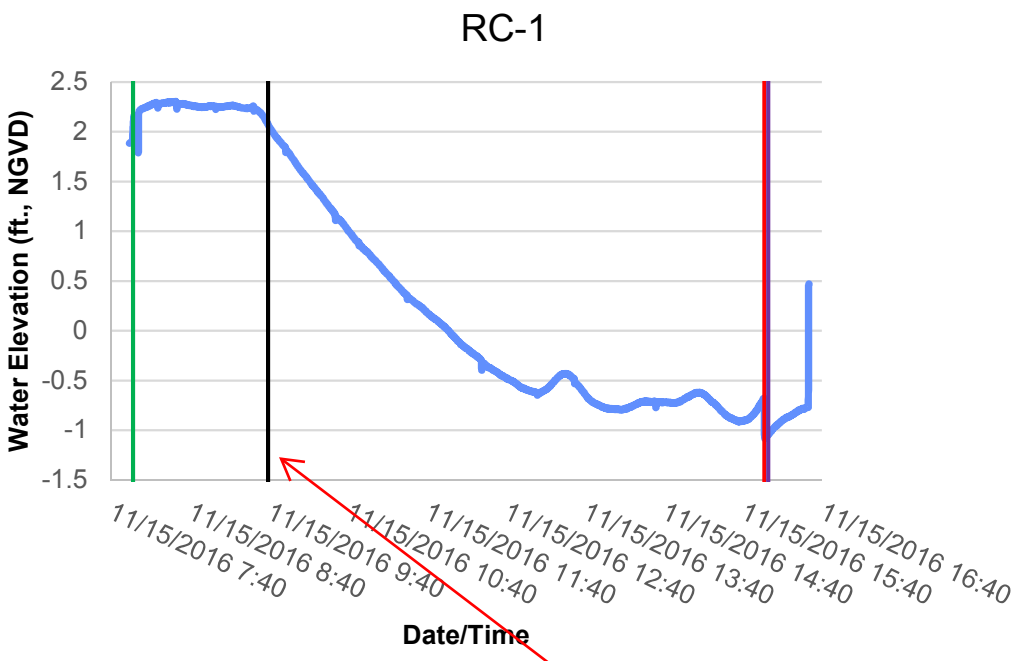


FIGURE C-1

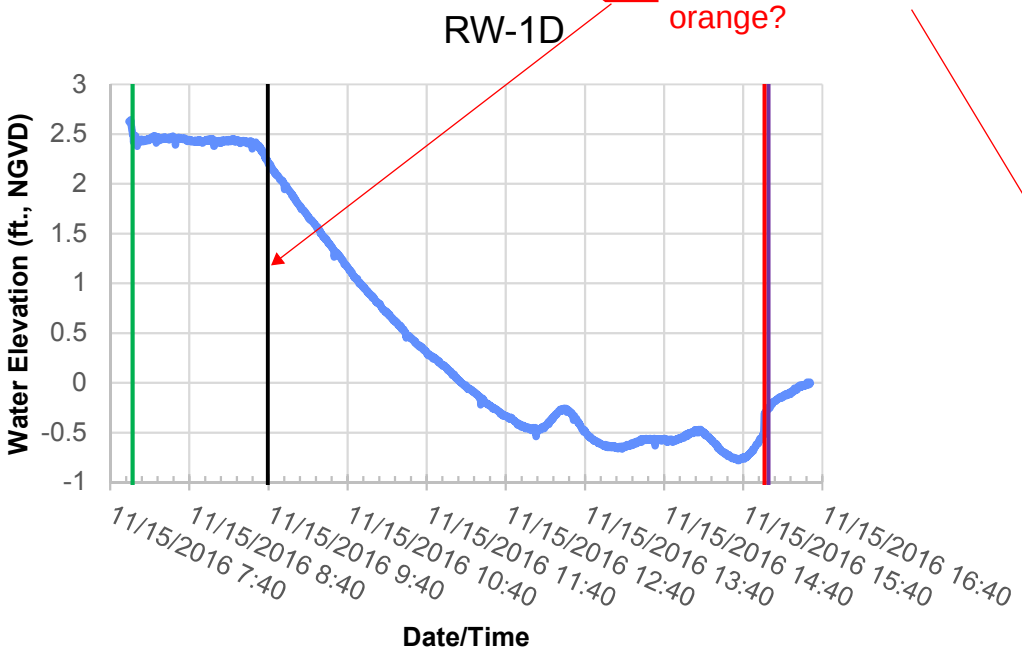
PRE-PILOT STUDY CONTINUOUS WATER TABLE ELEVATION MONITORING NOVEMBER 10-14, 2016

AVX CORPORATION
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

Brown AND Caldwell



Colors should be orange?



Legend

- Change in Water Elevation
- Start of Pumping
- End of Pumping
- Visual Indication of Ebb Tide
- Visual Indication of Flow Tide

FIGURE C-2

WATER TABLE ELEVATION
NOVEMBER 15, 2016 PILOT TEST

AVX CORPORATION
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

Brown AND Caldwell

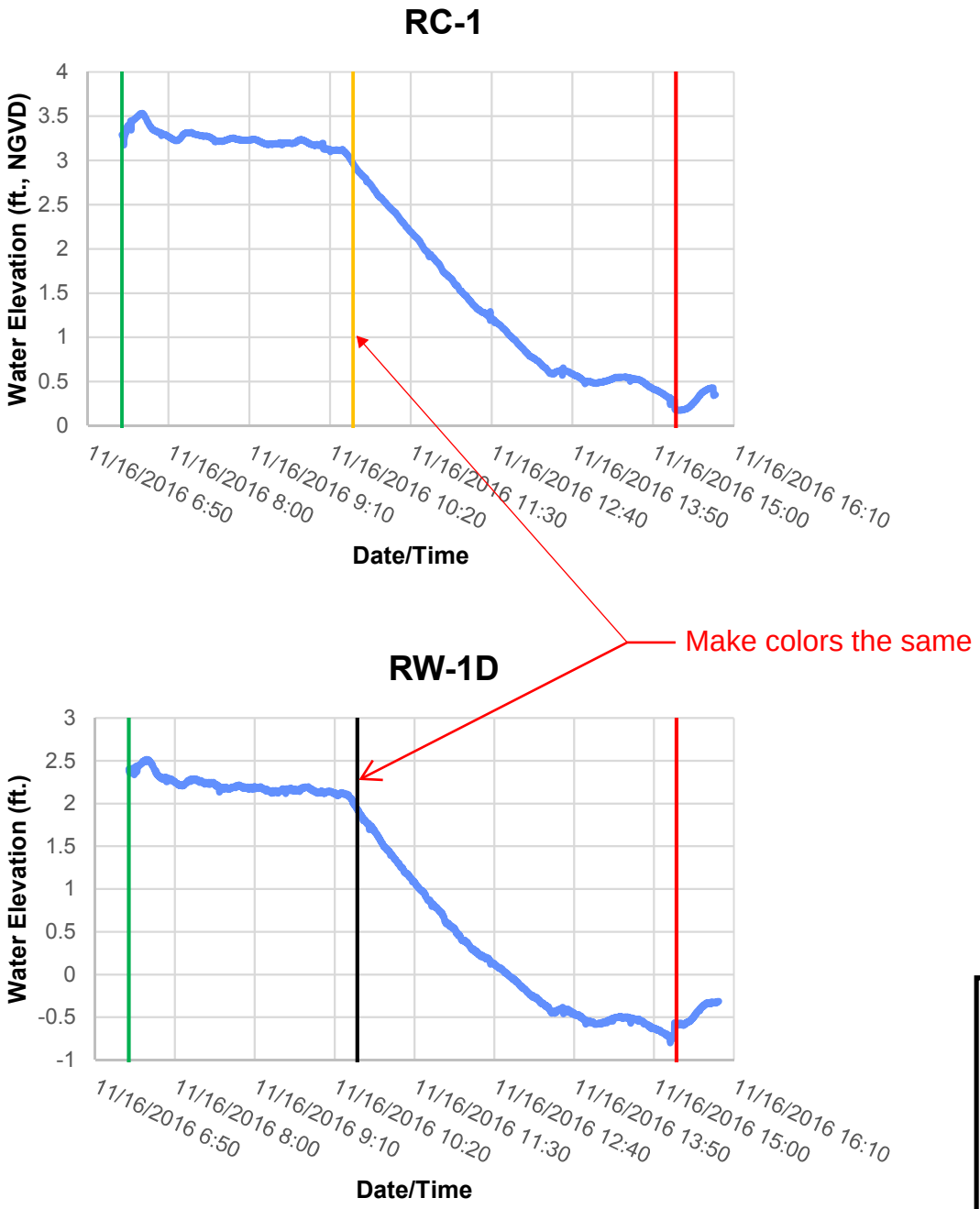


Figure C-3

WATER TABLE ELEVATION
NOVEMBER 16, 2016 PILOT TEST

AVX CORPORATION
FORMER AEROVOX FACILITY
NEW BEDFORD, MASSACHUSETTS

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Appendix D: DNAPL Source and Mobility Evaluation

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Technical Memorandum

Prepared for: AVX Corporation

Project Title: Aerovox Phase II CSA Addendum

Project No: 149339

Technical Memorandum

Subject: DNAPL Evaluation

Date: May 23, 2017

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Section 1: Introduction

This technical memorandum provides a summary of the DNAPL evaluation that has been completed for the Aerovox Site. The objectives of this evaluation are as follows:

- Document and summarize physical properties of the Site soils
- Document and summarize site-specific physical and chemical properties of collected Site DNAPL
- Provide a Potential and Probable DNAPL source zone evaluation based primarily on the lines of evidence approach provided in the 2009 Kueper and Davis paper entitled *"Assessment and Delineation of DNAPL Source Zones at Hazardous Waste Site"*
- Evaluate DNAPL mobility potential
- Evaluate DNAPL recovery potential

Section 2: Site Operations and Release History

Electrical component manufacturing began at the Facility in approximately 1938. Use of PCB containing dielectric fluid in capacitor manufacturing started in the 1940s and was terminated in 1978. Dielectric fluids were stored in above ground storage tanks (ASTs) throughout the building, but mainly in the first floor of the 2-story section of the main building. There was no secondary containment associated with the PCB ASTs. Aerovox also used solvents in the manufacturing process, including trichloroethene (TCE). The TCE was used in a capacitor degreasing operation and was stored in an AST located in the second floor of the two-story building, just outside of the impregnation room. The TCE recovery system ASTs were located in the first floor of the 3-story building, and degreasing residues were stored in 55-gallon drums on a concrete floor, reportedly with no secondary containment. The use of PCBs in the manufacturing process ceased around October 1978; however, the use of solvents continued through the end of manufacturing operations at the facility.

Operations and disposal practices involving the use of PCBs and solvents reportedly resulted in the release of hazardous materials. Releases from the former Aerovox facility reportedly included discharge of waste solvents and PCB oils to the previously unpaved ditch along the northern side of the former building and to the north and south open drainage ditches (also referred to as discharge trenches); permitted discharge of National Pollutant Discharge Elimination System (NDPES) water (including PCBs) to the north and south drainage ditches located on the northern and southern side of the building; solvent and PCB oil products spilled as these materials were delivered to tanks with fill ports along the northern side of the building; and PCB capacitors discarded just outside the Site boundary in the northeast corner of the Property along the shoreline. Records indicate that EPA observed "oil impregnated soil…in the culverts leading to and at both outfalls" during a 1981 compliance inspection of the facility. Culvert, as used here by EPA is believed to refer to the open drainage. In addition to the oily soils observed in the drainage trenches, EPA observed oily soils in the "backyard power substation" located between the former Aerovox building and the Acushnet River. Samples collected from the soils within these two areas contained PCB concentrations of up to 24,000 parts per million (ppm). EPA noted that the backyard power substation was reportedly used for drum storage within the month prior to EPA's collection of the samples and historic aerial photographs reviewed by EPA (dating back to 1951) also indicated probable storage of drums in this area.

Section 3: Site DNAPL Characterization

3.1 Soil and DNAPL Properties

Site-specific soil properties and chemical specific DNAPL properties are needed to support both the DNAPL source zone and DNAPL mobility evaluations. These properties are presented in the following section:

Site Specific Soil Properties:

Fractional organic carbon content, bulk density, and porosity were estimated based on soil samples collected form the unsaturated zone and the saturated zone. These soil samples were selected to represent AVX Site soils that have been minimally impacted by site activities, based on the chemical analytical data.

foc – fraction organic carbon of soils – from Alpha Analytical Report L1415819

- 14.245 percent (%) (0.14245 grams per gram [g/g], unsaturated zone soil) average of
  - B08B at 2.5 feet bgs (18.9 %), and
  - B09B at 4 feet bgs (9.59 %)
- 0.1665 percent (0.001665 g/g, saturated zone soil) average of
  - B08B at 12 feet bgs (0. 159 %), and
  - B09B at 10 feet bgs (0.174 %)

ρ_b – dry bulk density of soils, grams per cubic centimeter (g/cc) – from Alpha Analytical Report L1520960

- 1.8 grams per cubic centimeter (g/cc) - average of *GeoTesting Express* results for samples collected at borings:

GEO-2B (10-12)
GEO-2B (18-20)
GEO-7B (14-16)
GEO-15B (13-15)
GEO-17B (14-16)
GEO-17B (20-22)

θ = Total porosity, is dependent on dry bulk density and specific gravity of the site soil by the relationship,

$$\theta = \frac{e}{1+e}, \text{ where } e = \frac{S.G.\times\gamma_w}{\rho_b} - 1$$

Specific gravity, S.G., of the geotechnical samples above, ranged from 2.66 to 2.69, averaging 2.68. The average dry bulk density was 1.8 g/cc. Using the weight of water, γ_w, = 1 g/cc,

$$e = \frac{2.68\times 1\frac{g}{cc}}{1.8\frac{g}{cc}} - 1 = 0.49 \text{ , and}$$

$$\theta = \frac{e}{1+e} = \frac{0.49}{1+0.49} = 0.33.$$

$\theta_{effective}$ is the estimated effective porosity of Site soils. This is the porosity within which fluids may freely travel, and has been estimated at 90 % of θ (0.297), primarily based on fine and coarse sand and gravel (glacial outwash), with varying amounts of silt within the overburden above underlying glacial till and bedrock.

The water filled porosity θ_{water} and air-filled porosity θ_{air} for un-saturated soils were assumed to be 0.10 and 0.23, respectively (Cohen and Mercer 1993).

It is relevant to note that geotechnical samples were collected and analyzed for dry bulk density only where relatively undisturbed samples could be collected using Shelby tubes. Shallower, unsaturated soil, i.e., above 10 feet below the ground surface (bgs), was generally non-cohesive, and contained fill, bricks, cinders, rubber, and other debris that is not considered relevant to these calculations. It is noted that, due to the fraction of organic carbon content, some of the shallow debris, e.g., the cinders, rubber, and other organic debris, may readily sorb (or have sorbed) VOCs and PCBs

DNAPL Characterization

In March 2014, a DNAPL sample was collected from deep overburden monitoring well MW-15D. As of that time, DNAPL had not been measured in MW-15B. A composite DNAPL sample was collected from MW-15D and from bedrock monitoring well MW-15B is September 2014. Both DNAPL samples were submitted for laboratory analysis for chlorinated volatile organic compounds (CVOCs), polychlorinated biphenyls (PCBs). The MW-15 well cluster is the only identified location where DNAPL has accumulated and pooled to the extent that it is measurable.

The DNAPL CVOC and PCB analyses indicate that five CVOCs (1,2,4-trichlorobenzene, 1,4-dichlorobenzene, cis-1,2-dichloroethene, tetrachloroethene and trichloroethene [TCE]) and two Aroclors (1242 and 1254) are present in the DNAPL (see Table 1). The concentration of these constituents in the September 2014 composite sample was similar to the concentrations detected in the DNAPL sample collected from MW-15D in March 2014. Given this, the September 2014 composite DNAPL sample was used for this analysis.

The sample results provided in the Alpha Analytical Report L1422969 for the September 2014 DNAPL sample yielded the results tabulated below, along with the calculated number of moles of each compound per gram of DNAPL, and calculated mole fraction of each compound as follows:

$$\frac{moles}{gram} = \frac{[concentration\ of\ individual\ DNAPL\ component\ compound,\%]}{Molecular\ Weight\ (MW) of\ individual\ compound}, \text{ and}$$

$$\text{mole fraction} = \frac{moles\ per\ gram\ of\ DNAPL\ component\ compound}{\sum moles\ of\ all\ DNAPL\ compounds}$$

So, for trichloroethene (TCE), with a molecular weight of 130 grams per mole (g/mol), which was detected in the DNAPL sample at 2%,

$$\frac{2.0}{130\ g/mol} = 0.015 \text{ mol/g DNAPL,}$$

and with a mole fraction of

$$\frac{0.015\ \left(\frac{mol}{g}\right)}{0.464\ \left(\frac{mol}{g}\right)} = 0.033$$

Table 1 – Site Specific DNAPL Properties

Compounds		MW-15D/B DNAPL Properties		
		Conc.	g/mol	mol Fraction
		%		of DNAPL
Chlorinated Ethenes				
	Tetrachloroethene	0.81	0.005	0.0103
	Trichloroethene	2	0.015	0.0332
	cis-1,2-dichloroethene	0.13	0.001	0.0029
Chlorobenzenes				
	1,4-Dichlorobenzene	0.2	0.001	0.0029
	1,2,4-Trichlorobenzene	1.3	0.007	0.0156
Polychlorinated Biphenols	(PCBs)			
	Aroclor 1242	38.1	0.131	0.2824
	Aroclor 1254	12.4	0.038	0.0811
Mineral Oil*		45.06	0.265	0.5717
		Sum:	0.464	

**Based on the historic production of capacitors at the AVX facility, and the common use of mineral oil as a carrier liquid for dielectric compounds (such as PCBs), mineral oil is most likely to comprise the majority of the unknown fraction of DNAPL. The physical and chemical properties of mineral oil, as well as those of the seven compounds detected in the composite DNAPL sample from MW-15D and MW-15B, are referenced from the USEPA "Regional Screening Level (RSL) Chemical-specific Parameters Supporting Table - November 2015."*

Physical and Chemical Properties of mineral oil and the seven compounds detected in the DNAPL are provided below. These properties are used in partition equations that are used to calculate the fraction of each compound sorbed to soil, dissolved in soil moisture and groundwater with the pore space of the soil, and in the vapor phase within the pore space unoccupied by moisture and groundwater.

Physical properties (dynamic viscosity, fluid density, surface tension and interfacial tension) of the site specific DNAPL sample were also obtained through laboratory analysis. Doble Engineering Company of Watertown, MA provided physical parameter results for viscosity, density and surface tension in January 2015. Torkelson Geochemistry, Inc. of Tulsa, OK provided physical parameter results for density, surface tension and interfacial tension in March 2015.

Based upon the make-up of the mixed DNAPL (chlorinated organics, carrier oils and PCBs), as well as site-specific DNAPL physical property testing, baseline DNAPL physical property data was established. The anticipated range of DNAPL physical property values employed within the mobility assessment are summarized in the following table, along with the range of values for each physical property parameter employed in various sensitivity analyses completed herein.

Table 2 – DNAPL Physical Properties				
DNAPL	Density (g/cc)	Viscosity (cp)	Interfacial Tension (dynes/cm)	Contact Angle (°)
Site-specific MW-15 DNAPL Sample	1.22	27.8	15	NA
Baseline DNAPL Parameters	1.22	27.8	15	37.5
Sensitivity Analysis for Baseline Values	1.18-1.44	25-40	5-25	20-75

NA = Not analyzed

The general chemical-specific properties associated with the identified DNAPL components are presented in the in Table 3.

Table 3 – General Chemical-Specific Properties[1]					
	Molecular Weight	Pure Compound	Compound Solubility	Soil Partitioning Coefficient	Henry's Constant
	MW	Density, ρ	Si	KOC	H'
	g/mol	g/cc	mg/L	mL/g	Unitless
Chlorinated Ethenes					
Tetrachloroethene	170	1.6	150	95	0.72
Trichloroethene	130	1.5	1100	61	0.4
cis-1,2-dichloroethene	97	1.3	6300	40	0.17
Chlorobenzenes					
1,4-Dichlorobenzene	150	1.2	71	380	0.099
1,2,4-Trichlorobenzene	180	1.5	49	1400	0.058
PCBs					
Aroclor 1242	291	1.38	0.34	78000	0.0078
Aroclor 1254	330	1.54	0.057	130000	0.012
Mineral Oil	170	0.8	0.0037	4800	330

[1] – J. H. Montgomery, 2000, Groundwater Chemicals – Desk Reference, CRC Press LLC Baca Raton, Florida

3.2 Kueper-Davies Calculations

The Keuper-Davies 2009 paper (KD paper) provides a series of calculations that may be used to evaluate the potential for DNAPL to be present in the soil and groundwater. The progression of calculations that follows is different than that of the KD paper; the order has been changed so that unknowns are calculated in the order that they are needed for subsequent calculations.

Example calculations for the AVX site are provided below. These calculations are based on the analytical results of DNAPL, soil, and groundwater samples collected at the AVX site during delineation of the extent of impact. Except as noted herein, these calculations are based on the procedures outlined in Appendix A – Example Calculations, of the Kueper-Davies paper.

Effective Solubility Calculation (KD Calculation 3)

Effective solubility refers to the solubility of individual VOCs and SVOCs where multiple VOCs and SVOCs are present. When multiple VOCs and SVOCs are present, the solubility of individual VOCs or SVOCs is directly related to the mole fraction of that compound according to Raoult's Law as follows:

$$C_i = m_i S_i$$

Where C_i is the effective solubility in milligrams per liter (mg/L), $m_i$is the mole fraction of the DNAPL component, and S_i is the single-component solubility (as shown in the table above).

As an example, for PCE at a mole fraction of 0.0103,

$$C_{TCE} = 0.033 \times 1100 \frac{mg}{L} = 36.503 \frac{mg}{L}$$

The table below shows the effective solubility calculated for each of the compounds detected in the composite DNAPL sample collected at monitoring wells MW-15D and MW-15B.

Table 4 – Effective Solubility for DNAPL Components

Compounds		Effective Solubility
		C_i, mg/L
Chlorinated Ethenes		
	Tetrachloroethene	1.542
	Trichloroethene	36.505
	cis-1,2-dichloroethene	18.212
Chlorobenzenes		
	1,4-Dichlorobenzene	0.221
	1,2,4-Trichlorobenzene	0.763
PCBs		
	Aroclor 1242	0.096
	Aroclor 1254	0.005
Mineral Oil		0.002

Threshold Chemical Concentration Calculation (KD calculation 2) – based on Partitioning Relationships

The threshold chemical concentration is the maximum concentration at which a constituent compound can be present in a porous medium in the sorbed, aqueous, and vapor phases without a DNAPL phase present. These threshold concentrations will be compared to analytical soil results to determine the possible presence of DNAPL at the associated soil sample location. The threshold concentrations were calculated as follows:

$$C_i^T = \frac{C_i}{\rho_b}(K_d \rho_b + \theta_w + H'\theta_a)$$

Where

C_i^T = Soil concentration (mg/Kg) threshold

Ci = Effective solubility (mg/L)

K_d = Soil-water partition coefficient (ml/g) using $K_d = K_{oc} f_{oc}$

ρ_b = dry soil bulk density (g/cc)

θ_w = Water filled porosity (unitless)

θ_a= Air filed porosity (unitless)

H' = Unitless Henry's constant

For unsaturated zone TCE:

$$C_i^T = \frac{36.505 \frac{mg}{L}}{1.8 \frac{g}{cc} X \frac{(Kg/1000\ g)}{(L/1000\ cc)}} \left(\left(61 \frac{cc}{g}\right)(0.14245) \left(1.8 \frac{g}{cc}\right) + 0.1 + (0.72)(0.23) \right) = 321.05\ mg/kg$$

As noted in the KD paper, the calculation of the chemical threshold concentration is typically more sensitive to the fraction of organic carbon than to the porosity of the soil. This is true at the AVX site where the bulk densities varied little, but the fraction of organic carbon in the unsaturated zone samples was 85 times that of the saturated zone. Accordingly, the vadose zone soil is (theoretically) capable of sorbing more of the constituent mass than the saturated zone.

Tabulated values of threshold chemical concentrations for the respective DNAPL components is provided in the table below. For saturated soil, water filled porosity is equal to soil effective porosity, and air-filled porosity is zero.

Table 5 – Partitioning Threshold Concentrations (KD Calculation 2)

	Threshold Chemical Concentration, C^T	
Compounds	Shallow Unsaturated Soil	Deep Saturated Soil
	mg/kg	mg/kg
Chlorinated Ethenes		
Tetrachloroethene	21.09	0.53
Trichloroethene	321.07	10.40
cis-1,2-dichloroethene	105.17	4.55
Chlorobenzenes		
1,4-Dichlorobenzene	12.00	0.18
1,2,4-Trichlorobenzene	152.28	1.92
PCBs		
Aroclor 1242	1066.89	12.49
Aroclor 1254	85.55	1.00
Mineral Oil	1.54	0.02

Calculation of Threshold Chemical Concentration in Soil (KD Calculation 4) – Based on Partitioning Relationships for Single Component DNAPL

KD Calculation 4 is a means of comparing the observed (sampled and analyzed) concentration of chemicals in soil samples to the phase-partitioning-based theoretical threshold chemical concentrations, and is simply the sum of the ratio of observed concentrations to theoretical threshold chemical concentrations developed from partitioning relationships. This method is typically used when constituent concentrations of the DNAPL are not known and are estimated by using the solubility limits of the individual compounds. If the sum of the ratio of observed to theoretical threshold concentrations (for a single component DNAPL) exceed unity (1), then DNAPL may be present as follows:

$$\text{if, } \sum_{i=1}^{n} \frac{C_{obs,i}^{T}}{C_{S,i}^{T}} \geq 1, \text{ DNAPL may be present.}$$

For example, soil boring sample MW-15D from 20 to 22 feet was analyzed for VOCs and PCBs with the following results:

Table 6 – Kueper-Davis Calculation 4

Analyte	Concentration $C^{T}_{obs,i}$	Threshold Chemical Concentration for Single DNAPL Component (KD Calculation 2) $C^{T}_{S,i}$	$\frac{C^{T}_{obs,i}}{C^{T}_{S,i}}$
	(mg/kg)	(mg/Kg)	(unitless)
PCE	0.12	51.2	0.00
TCE	6.4	313.4	0.02
Cis 1,2-DCE	0.12	1574.6	0.00
1,2-DCB	0.44	62.8	0.01
1,2,4-TCB	5.0	123.2	0.04
Aroclor 1242	180	44.2	4.07
Aroclor 1254	66.5	12.3	5.41
		$\sum_{i=1}^{n} \frac{C^{T}_{obs,i}}{C^{T}_{S,i}} =$	9.55

Therefore, since the sum of the ratio of threshold concentrations to observed concentrations of the detected constituents is greater than unity (1) in the tabulated example above, DNAPL may be present in the soil at this sampling location. While this screening approach serves as a line of evidence for DNAPL presence, it needs to be coupled with a review of location specific results compared to physical boring logs (e.g. visible presence of DNAPL, sheens, etc.) to defined possible source zones.

Section 4: DNAPL Source Zone Delineation

The purpose of this evaluation is the examination of multiple lines of evidence that are cited as appropriate indicators of the potential for a DNAPL to be present in soil and groundwater samples. USEPA has expressed a preference for considering the 2009 "Assessment and Delineation of DNAPL Source Zones at Hazardous Waste Sites," by Bernard H. Kueper and Kathryn L. Davies as one appropriate reference for the evaluation of the potential for DNAPL to be present at a site. The KD paper also provides a multiple lines of evidence approach that can be used to determine a potential and probable DNAPL source zone. The lines of evidence that will be used to evaluate the source zones at this Site include both Kueper-Davis evaluations and other assessment tools as follows:

- Direct field observations based on borings advanced during the Phase II Comprehensive Site Assessment (Phase II CSA)
- The results of MiHpt, UVOST, and MALM surveys conducted during the Phase II CSA.
- Comparison of analytical soil data to calculated soil partitioning threshold values (Kueper-Davis Calculation 2).
- Sum of the ratio of observed soil concentrations to theoretical single DNAPL component threshold concentrations (Kueper-Davis Calculation 4)
- Observed groundwater concentrations in excess of 10% of the effective or single component solubility limits (Kueper et. Al, 2003).

4.1 Direct and Indirect Observations

Multiple phases of field investigation have been completed as part of the Phase II CSA and IRA to delineate the extent of DNAPL present at the Site. Based on the results of the visual observation of soil, MiHpt, UVOST, and MALM the following provides a summary of where DNAPL has been directly observed or has been inferred from field testing. The location of the borings and monitoring wells are presented on Figure 1 and Figure 2.

Shallow soils in the area adjacent to the Acushnet River from the central to the southeastern corner of the Property were evaluated using a membrane interface probe (MIP) borings every fifty linear feet along the waterfront; UVOST borings every 25 feet along the waterfront; and soil borings and well installations with soil sampling from locations across the site. Boring location MIP-23 did indicate soil concentrations above the UCL from the surface down to the peat layer, and NAPL blebs were observed in the soil interval from 4 to 6 feet bgs. Additional borings were advanced in the area of MIP-23 as well as in the vicinity of UV-17 in May and July 2017 for the purpose of delineating these areas based on visual observations DNAPL, per MassDEP's request for soil excavation of these areas as an IRA modification. The visually impacted DNAPL soils were excavated between September and November 2017.

The MIP work, UVOST, MALM, soil borings and wells MW-15D and MW-15B confirm a DNAPL is likely present in the north-east corner of the Site. The investigation suggests that the observed DNAPL impacted zone is confined to a zone approximately sixty to seventy feet in diameter. The shallow soils (fill material above the peat), and deep overburden soils in this location contain or suggest the presence of residual DNAPL. Limited DNAPL has been recovered from basal overburden well MW-15D and shallow bedrock well MW-15B, suggesting that historically DNAPL is pooled at the base of the overburden at this location. Recovery tests clearly demonstrate that the mobility of observed DNAPL in MW-15D is limited. A DNAPL sample recovered from bedrock monitoring well MW-15B demonstrates that DNAPL has migrated into the bedrock at this location. No sustainable DNAPL volumes have been recovered from this bedrock monitoring well. As part of the DNAPL recovery evaluation deep overburden recovery wells RW-1D and RC-1 were installed. This wells

are in the immediate vicinity of the MW-15 well cluster. The small and generally declining thickness of DNAPL measured in these wells (less than 1.5-inches) further support the presence of DNAPL in the vicinity of MW-15 well cluster.

4.2 Soil Partitioning Threshold Value Comparison (Kueper-Davis Calculation 2)

DNAPL within soil is difficult to physically observe or detect through field test methods. As discussed in Section 3.1 above, visual observation and field test methods only indicated DNAPL presence in three general areas of the Site. This lack of direct observation is typical for the majority of DNAPL sites because DNAPL in soils are typically present as ***residual DNAPL*** rather than pooled. Residual DNAPL results when a DNAPL is released and migrates through a porous medium. As the mobile DNAPL mass moves through the system, a portion of the mass is retained within pore throats as individual blobs and ganglia. These blobs and ganglia are typically between 1 and 10 grains in diameter and are not evenly distributed within the impacted soils. Given this, it is difficult to identify the blobs and ganglia using physical means (Kueper et al 2003).

However, the presence of residual DNAPL in soils can be evaluated by comparing analytical soil sample data to calculated soil partitioning threshold values (Kueper-Davies Calculation 2). Estimated soil partitioning threshold values represent the maximum amount (i.e., concentration) of contaminant that can be present in a soil sample in the sorbed, aqueous and vapor phases without a DNAPL phase being present. If reported soil concentrations exceed threshold values, then there is strong possibility that a DNAPL phase is present in the immediate vicinity of where the soil sample was collected.

A total of 122 soil borings were completed and 343 soil samples were analyzed as part of a Phase II Comprehensive Site Assessment. Each of the soil sample analytical results were compared to the partitioning threshold values for un-saturated and saturated soils for TCE and Aroclor 1242. These compounds represent the predominant CVOC and PCB Aroclor components comprising the DNAPL mixture collected from MW-15D/B. The partitioning threshold values were calculated using Kueper-Davies calculation 2 and were based on site-specific DNAPL parameters, chemical specific parameters, and effective solubilities, as presented in Section 2.0.

A comparison of analytical results for unsaturated soils to the calculated partitioning threshold values (Kueper-Davies Calculation 2) are presented on Figure 1. Residual DNAPL was only indicated in samples associated with two Site borings. Analytical results in MIP23 indicated an exceedance of the partitioning threshold value for Aroclor 1242 and analytical results in B04B indicated an exceedance of the partitioning threshold value for TCE. These boring locations are in areas of the site which have been associated with potential DNAPL release activities. MIP23 is located near the historic discharge of the southern drainage ditch. B04B is located in a reported loading area that was adjacent to the north side of the former boiler house. The limited detection of residual DNAPL in the unsaturated soils are consistent with soils with high organic carbon content. Samples collected in the unsaturated soils indicated that the organic carbon content was approximately 14 %. Soils of this type have a relatively high capacity to adsorb DNAPL mass; thereby, reducing the potential for residual DNAPL to be present in these soils.

A comparison of analytical results for saturated soils to the calculated partitioning threshold values are presented on Figure 2. A number of analytical soil results exceeded TCE or Aroclor 1242 partitioning threshold values. The following provides a list of the borings with exceedances and are grouped per known DNAPL release areas:

Northern Drainage Ditch Historic Discharge

- TCE Partition Threshold Exceedance – MIP15, MIP48, and MW-15D

- Aroclor 1242 Threshold Exceedance – MIP15, MIP46, MIP47, MIP48, MIP49, MIP-50E, MIP55S, and MW-15D

Northern Drainage Ditch

- TCE Partition Threshold Exceedance – MIP11

Southern Drainage Ditch Historic Discharge

- TCE Partition Threshold Exceedance – UV-17
- Aroclor 1242 Threshold Exceedance – UV-17 and MIP23

Former Loading Dock

- Aroclor 1242 Threshold Exceedance – B04BS and B04BWW

Aroclor 1242 threshold value was also exceeded in B02B. This boring is located to the west of the former loading area and beneath the former building slab.

4.3 Kueper-Davies Calculation 4

A second line of evidence for the presence of residual DNAPL is using Kueper-Davies Calculation 4. This calculation is a means of comparing the observed (sampled and analyzed) concentration of chemicals in soil samples to the phase-partitioning-based theoretical threshold chemical concentrations, and is simply the sum of the ratio of observed concentrations to theoretical threshold chemical concentrations developed from partitioning relationships. If the observed concentration of the sum of the ratio of observed to theoretical threshold concentrations (for a single component DNAPL) exceed unity (1), then DNAPL may be present.

Unsaturated soil borings where samples where the sum of the ratio of observed to the theoretical threshold concentrations exceeded unity (1) are presented on Figure 1. The following provides a list of the borings with exceedances:

Northern Drainage Ditch Historic Discharge

- MIP15, MIP45, MIP47, MIP53, and MIP54

Northern Drainage Ditch

- MIP11

Saturated soil borings where samples were the sum of the ratio of observed to the theoretical threshold concentrations exceeded unity (1) are presented on Figure 2. The following provides a list of the borings with exceedances:

Northern Drainage Ditch Historic Discharge

- MIP15, MIP46, MIP47, MIP48, MIP49, MIP-50E, MIP53, MIP54, PIP55S, PC-UV-02, and MW-15D

Southern Drainage Ditch Historic Discharge

- UV-17 and MIP23

Southern Drainage Ditch

- B07.5BC

Former Loading Dock

- B04BWW

4.4 Elevated Groundwater Concentrations

A third line of evidence for the potential presence of DNAPL at a site is the presence of elevated groundwater concentrations. The US EPA (1992) has suggested that a DNAPL source may be present upgradient of a monitoring well if sample concentrations exceed 1 percent (1%) of the effective solubility of the component of interest. The 1% 'rule of thumb' has been criticized because it does not provide guidance on how far upgradient the DNAPL source zone is located relative to the sample location. It is clear that a variety of site-specific factors influence the magnitude of sampled contaminant concentrations and that some of these factors cannot be determined (for example, the distance a monitoring well is offset from plume center line and the amount of in-borehole dilution occurring during purging). In practice, it is common to simply use the 1% 'rule of thumb' as a means of establishing that DNAPL may be present upstream of the monitoring well in question, and therefore as a means of justifying the use of additional site investigation techniques to confirm or refute the presence of DNAPL. In other words, the 1% 'rule of thumb' should not be used in isolation to establish DNAPL presence at a site, but instead should be used with other converging lines of evidence to establish DNAPL presence (Kueper, Wealthall, and Smith 2003).

Kueper et. al 2003, suggests that using groundwater concentrations in excess of 10 % of the effective solubility is more appropriate to support the line of evidence that a DNAPL source is present at the Site as opposed to the 1% 'rule of thumb'.

Shallow Overburden

Figure 2 presents the shallow soil DNAPL evaluation results along with shallow overburden monitoring wells. No shallow overburden monitoring well were observed to exceed 10% of the effective solubility.

Deep Overburden

Figure 3 presents the shallow soil DNAPL evaluation results along with deep overburden monitoring wells that exceed 10 % of the solubility limit. An initial evaluation was completed using 10 % of the effective solubility limits based on DNAPL samples collected from MW-15D. However, this comparison showed groundwater concentrations in MW-19D and MW-23D exceeding 10 % of the effective solubility. These wells are located along the southern border of the Aerovox property or on the Titleist property to the south, and are located cross-gradient to the known release areas. Additionally, numerous soil borings have been completed in the vicinity of these wells with no indication of potential DNAPL sources. Therefore, it is believed that the comparison of 10 % of the effective solubility limit is likely incorrectly identifying potential presence of DNAPL in these areas. As a result, an alternative screening approach comparing deep overburden groundwater concentrations to 10 % of the single component DNAPL solubility limits was used. The results of this alternative screening approach are presented in Figure 3.

MW-15D exceeded 10 % of the solubility for Aroclor 1242 and is located near the northern ditch discharge area, which based on historic documents and the CSM is a DNAPL release area. Deep monitoring wells MW-10D and MW17D also had concentrations exceeding 10 % of the solubility for Aroclor 1242. A number of soil borings have been completed in the vicinity of these monitoring wells. Currently, no other lines of evidence suggest that DNAPL sources are present at these locations. The elevated groundwater concentrations may be a result of impacted groundwater discharging upward from the fractured bedrock below.

Bedrock

Figure 4 presents the bedrock wells exceeding 10 % of the solubility (not adjusted for effective solubility). Based on historic Site knowledge it is believed that TCE was released both as a mixture with PCBs from facility operations and wastes, as well as a single component DNAPL from potential overfills of the AST at the fill port along the north side of the building and the south side of the adjacent Precix property building, where TCE was also used historically and other potential incidental releases within the building and across the site. Because the viscosity of TCE is lower than the viscosity of the Aroclors, there is a potential for a single component TCE DNAPL to have migrated deeper into the underlying fractured bedrock system. Given this, it would be more appropriate to evaluate the bedrock using the single component DNAPL solubility limits. Bedrock monitoring wells MW15B, MW-26B, MW-32B, and MW-34 had TCE concentrations that exceeded 10 % of the solubility limit. Bedrock monitoring wells MW-2B, MW-13B, and MW-15B had Aroclor 1242 concentrations that exceeded 10 % of the solubility limit.

4.5 DNAPL Source Zones

The probable DNAPL zone encompasses that volume of the subsurface where many converging lines of evidence suggest residual DNAPL presence. These may include known release areas, locations where DNAPL has been visually observed in soil samples or bedrock, locations where soil concentrations are above the calculated DNAPL threshold, and locations where groundwater concentrations are very high (for example, over 10 percent effective solubility). The potential DNAPL source zone provides a factor of safety, and may represent the volume of the subsurface where fewer converging lines of evidence suggest DNAPL presence.

The probable source zones were weighted towards primary lines of evidence (Site knowledge of DNAPL releases, direct observation, MiHpt, UVOST and MALM findings and exceedances of soil partitioning threshold values). Exceedances of Kueper-Davis Calculation 4 (unity) and exceedances of 10 % of the solubility limits are considered secondary lines of evidence and were used in conjunction with the primary lines of evidence.

The probable DNAPL source zone for the un-saturated and saturated soils are presented on Figure 1, Figure 2 and Figure 3. The un-saturated soil probable DNAPL source zone areas are as follows:

- The northeast corner of the Aerovox property which is associated with the northern drainage ditch discharge.
- In the vicinity of MIP23 which is associated with the southern drainage ditch discharge.
- In the vicinity of B04B which is associated with the former loading dock.

The saturated soil probable DNAPL source zones are as follows:

- The northeast corner of the Site which is associated with the northern drainage ditch discharge.
- In the vicinity of MIP11 and MW-6 which is associated with the northern drainage ditch.
- In the vicinity of MW-7, UV-17, MW-2, and MIP23 which is associated with the central drainage ditch discharge.
- In the vicinity of B04BS and B04BWW which is associated with the former loading dock.
- In the vicinity of B02B which is located beneath the former building.

Only one line of evidence (groundwater concentrations) was available to evaluate potential or probable DNAPL source zones within the fractured bedrock. Groundwater sample locations exceeding 10 % of the solubility limits strongly suggests that DNAPL sources are contributing to the dissolve phased plume within the fractured bedrock. Given this, the area that exceeded 10 % of the solubility limits were designated as

potential DNAPL source zones. Only one bedrock monitoring location, MW-34B, had groundwater concentrations that were appreciably above 10 % of the solubility limit for TCE. Groundwater samples collected from 158 to 198-feet below ground surface were observed to be as great as 29 and 42 % of the TCE solubility. Additionally, a groundwater sample collected from 170 to 180-feet below ground surface was observed to be over four times the TCE solubility limit, suggesting the DNAPL was most likely entrained in the sample during collection. Given this, the area in the vicinity of MW-34B was designated a probable bedrock DNAPL source zone. DNAPL has been measured and recovered from MW-15B, providing direct evidence that DNAPL has migrated into the bedrock at this location. The area in the immediate vicinity of MW-15B is a probable bedrock DNAPL source zone.

Section 5: DNAPL Migration Potential

The potential for the emplaced DNAPL within the subsurface at the Site to migrate was evaluated using established empirical methodologies and site-specific hydrogeologic data as well as the established DNAPL baseline properties. The DNAPL mobility assessment was completed using soil analytical results, DNAPL physical properties, and the aquifer properties (e.g. grain size distributions, gradients). The DNAPL migration potential evaluation included the following:

- Kueper -Davies Calculation 1 which estimates the maximum concentration of a chemical that may be present in the soil porosity before it may be a mobile liquid.
- Estimation of critical DNAPL height required to penetrate the water table.
- Estimation of possible critical DNAPL heights required to penetrate the shallow and deep overburden materials.
- Estimation of critical DNAPL heights required to penetrate the bedrock.

Threshold DNAPL Saturation Calculation (*Kueper-Davies calculation 1*) – Chemical Concentration in Soil

The threshold DNAPL saturation calculation is used to estimate the maximum concentration of a chemical that may be present in the soil porosity before it may be a mobile liquid. The relationship is based on a threshold saturation multiplier, S_r, of 0.05 to 0.10, which is typically applied to a single-component DNAPL in unconsolidated media with a fraction organic carbon of less than 2%.

The AVX site has a multicomponent DNAPL, and the unsaturated zone has a fraction organic carbon of 14.25 %. However, the DNAPL saturation calculation may still be used as a screening tool to compute the DNAPL saturation threshold for each component compound, and to compare the threshold with the concentration of component compounds at each soil boring. Using TCE as an example:

$$C_D = \frac{S_r \theta_{eff} \rho_N 10^6}{\rho_b} + C^T$$

and . . .

$$C_D = \frac{0.05(0.297)(1.5\ g/cc)10^6}{1.8\ g/cc} + 321\ mg/kg = 12{,}696\ \text{mg/Kg}$$

Where

C_D = Soil concentration (mg/Kg) corresponding to threshold DNAPL saturation

Sr = Threshold DNAPL Saturation (5% and 10%)

θ_{eff} = Effective porosity (unitless)

ρ_N = DNAPL density (g/cc)

ρ_b = Dry soil bulk density (g/cc)

C^T = Threshold soil concentration based on KD Calculation 2 (mg/kg)

A summary table of threshold DNAPL saturation concentrations for the chemical components detected in the DNAPL sample from monitoring well MW-15D, minus the soil threshold concentration, C^T, is provided below.

Table 7 – Concentration Threshold DNAPL 5% and 10% Saturation

	Concentration Threshold DNAPL Saturation			
	Un-Saturated Soils		Saturated Soils	
	S_r = 0.05	S_r = 0.10	S_r = 0.05	S_r = 0.10
Compounds				
	mg/kg	mg/kg	mg/kg	mg/kg
Chlorinated Ethenes				
Tetrachloroethene	13221	26400	13201	26401
Trichloroethene	12696	24750	12385	24760
cis-1,2-dichloroethene	10830	21450	10730	21455
Chlorobenzenes				
1,4-Dichlorobenzene	9912	19800	9900	19800
1,2,4-Trichlorobenzene	12527	24750	12377	24752
PCBs				
Aroclor 1242	12452	22770	11397	22782
Aroclor 1254	12705	25410	12706	25411

A total of 122 soil borings were completed and 343 soil samples were analyzed as part of a Phase II Comprehensive Site Assessment. Only 3 of the 343 soil samples had compounds detected in soil at concentrations above a 5 % DNAPL saturation threshold and only one sample had a compound detected in soil at a concentration above a 10 % DNAPL saturation a threshold:

Soil Sample Exceeding 5 % DNAPL Saturation Threshold

- UV-17, TCE was detected at 14,000 mg/kg at 8 to 9 feet below the ground surface.
- MIP-53, Aroclor 1254 was detected at 20,500 mg/kg at 3 to 5 feet below the ground surface
- MIP-54, Aroclor 1254 was detected at 30,500 mg/kg at 3 to 5 feet below the ground surface

Soil Sample Exceeding 10 % DNAPL Saturation Threshold

- MIP-54, Aroclor 1254 was detected at 30,500 mg/kg at 3 to 5 feet below the ground surface

The exceedances of a DNAPL saturation threshold may represent a soil sample where DNAPL saturations are potentially mobile. Note that all three of these locations are within areas where soil borings provided visual evidence of NAPL. The soils represented by the UV-17 analytical results were confirmed to contain NAPL and have been removed and disposed off-site as part of the IRA. Soils in the MIP-53/MIP-54 area are within the northeast corner (the northern drainage ditch discharge area) where NAPL recovery operations have been implemented under the IRA. For each of these locations, an intervening peat layer exists between the impacted soil intervals and deeper overburden, and soils immediately beneath the peat were not significantly impacted.

Vertical Migration Potential

For a surface introduced DNAPL, an evaluation of the critical DNAPL height required to penetrate the water table was completed utilizing methodologies outlined in Cohen and Mercer (1993), as follows:

$$z_n = \frac{2\sigma\ (\cos\varphi)}{r\ g\ \rho_n}$$

where:

z_n = critical DNAPL height

σ = interfacial tension

φ = contact angle

r = pore radius

ρ_n = DNAPL density

g = gravitational constant

Employing the shallow overburden physical properties, as the water table is encountered within this hydrogeologic unit at the site, a DNAPL thickness of < 3 inches (2.98") is sufficient for the site-specific DNAPL within the unsaturated zone to enter the saturated zone, employing mean grain sizes and baseline DNAPL properties. The source zone evaluation presented in previous sections provides direct evidence that DNAPL has migrated vertically through and below the water table. At present, no accumulation of DNAPL has been observed at the water table interface which is consistent with a site in late stage of DNAPL migration.

The next evaluation completed, considered the potential for the vertical mobility of subsurface DNAPL at the Site. This evaluation included determination of critical DNAPL pool heights necessary to penetrate the underlying stratigraphy. From Cohen and Mercer (1993):

$$z_s = \frac{2\sigma\ (\cos\varphi)}{r_{host}\ g\ (\rho_n - \rho_w)}$$

where:

z_s = stable DNAPL height

σ = interfacial tension

φ = contact angle

r_{host} = pore radius of host medium

ρ_n = DNAPL density

ρ_w = groundwater density

g = gravitational constant

The critical DNAPL pool heights within the shallow and deep overburden were estimated based on a range of the observed means within the grain size distribution range for each aquifer for an assumed flat lying aquitard surface. The calculated results indicate that critical DNAPL pool heights of approximately one foot would be needed for DNAPL to penetrate in the underlying deeper overburden materials. Whereas critical pool heights in the deeper overburden materials could reach thicknesses of two to three feet, owed to the finer-grained characteristics of that unit as compared to the shallow overburden. The soils and groundwater source zone evaluation provided direct evidence that DNAPL has migrated vertically through the shallow and deeper observed materials. Though DNAPL pools of the calculated critical DNAPL pool heights (i.e., thickness) may have been present in the past, no pooled DNAPL has been observed during the extensive Site investigations. This is consistent with a site in late stage of DNAPL migration, where DNAPL has historically pooled and migrated vertically within the underlying soils units. During late stage DNAPL sites, DNAPL has migrated both horizontally and vertically leaving a significant portion of DNAPL trapped in the porous medium as residual DNAPL due to the interfacial tension effects. Because of this, the migrating DNAPL mass is continually being reduced and ultimately migration is halted once accumulated DNAPL mass can no longer overcome interfacial tensions. The Threshold DNAPL saturation calculation presented in the previous section indicate that DNAPL saturation of 5% were only exceeded in 3 soil samples and DNAPL saturation of 10% was only exceed in 1 soil sample, which supports the premise that DNAPL at the Site is predominately in the form of residual DNAPL with limited migration potential which is consistent with a late stage DNAPL site.

An evaluation of the critical DNAPL height required to penetrate the bedrock was also completed, after Cohen and Mercer (1993) as follows:

$$z_n = \frac{2\sigma\ (\cos\varphi)}{b\ g\ (\rho_n - \rho_w)}$$

where:

z_n = critical DNAPL height

σ = interfacial tension

φ = contact angle

b = fracture / aperture opening size in bedrock

ρ_n = DNAPL density

ρ_w = groundwater density

g = gravitational constant

The findings indicate that for a bedrock aperture of 1 mm, the required DNAPL pool or body height to penetrate the bedrock is less than 1.5 cm. Therefore, DNAPL entry into the fractured bedrock is not limited at the Site. This is consistent with Site data which suggest that DNAPL has migrated vertically into the underlying fractured bedrock.

Horizontal Migration Potential

Additionally, an evaluation of the lateral migration potential of emplaced DNAPL within the subsurface at the Site was completed. The evaluation employed determination of the critical horizontal gradient required to initiate migration of a contiguous DNAPL body (pool or globule) of varied assumed lengths, after Cohen and Mercer (1993) as follows:

$$i_c > \frac{2\sigma\ (\cos\varphi)}{r_{host}\ \rho_w\ g\ L}$$

where:

i_c = critical horizontal hydraulic gradient

σ = interfacial tension

φ = contact angle

r_{host} = pore radius of medium with DNAPL

ρ_w = groundwater density

L = contiguous DNAPL body length perpendicular to groundwater flow direction

g = gravitational constant

The above equation was used to estimate the required horizontal gradients necessary to mobilize a contiguous DNAPL body with a length of one foot within the shallow overburden and deep overburden. The results are presented in Table 8. These estimated gradients are at least an order of magnitude greater than that observed on Site which indicates that a 1-foot contiguous DNAPL body would not be mobilized under current Site conditions.

Table 8 – Critical Hydraulic Gradient

Aquifer	Critical Hydraulic Gradient (ft / ft)
Shallow Overburden	0.2480
Deep Overburden	0.5892

Site-specific horizontal hydraulic gradients were then used to estimate the minimum lateral contiguous DNAPL body lengths required to induce horizontal migration of DNAPL within the shallow and deep overburden. Applying site-specific hydraulic gradients for each designated aquifer zone, the following table illustrates the size of the DNAPL body (length) estimated to potential induce horizontal DNAPL mobilization at the Site:

Table 9 – DNAPL Body Length	
Aquifer	**DNAPL Body Length (feet)**
Shallow Overburden (Gradient Towards Acushnet River)	10.9
Shallow Overburden (Reverse Gradient Away from Acushnet River)	71.5
Deep Overburden (Gradient Towards Acushnet River)	254
Deep Overburden (Reverse Gradient Away from Acushnet River)	249

This evaluation suggests that contiguous DNAPL bodies of lengths greater than 10.9 feet may represent continue sources for possible horizontal mobilization towards the Acushnet River within the shallow overburden. Only 3 shallow overburden soil samples collected in UV-17, MIP-53, and MIP-54 indicate the possible presence of a localized contiguous DNAPL mass at each of these locations. Soil samples, MiHpt, and UVOST borings completed indicate that contiguous DNAPL masses associated with these areas are limited and do not likely represent contiguous DNAPL source zones that could continue to migrate horizontally.

This evaluation also suggests that contiguous DNAPL bodies of lengths greater than 254 feet may represent continue sources for possible horizontal mobilization towards the Acushnet River within the shallow overburden. Soil samples, MiHpt, and UVOST borings completed in the deep overburden do not indicate that contiguous DNAPL bodies are present at the Site other than the limited DNAPL observed in MW-15D. This is consistent with late stage DNAPL Site where DNAPL migration occurred during the early stage of development and remaining Site DNAPL is in the form of residual.

Vertical Gradient and Migration Potential

Lastly, an evaluation of the propensity of the site-specific DNAPL to migrate vertically was completed. Specifically, a determination of the required upward hydraulic gradient to arrest the vertical migration (e.g. sinking) of DNAPL was calculated, after Cohen and Mercer (1993):

$$i_v = \frac{(\rho_n - \rho_w)}{\rho_w}$$

where:

i_v = critical vertical hydraulic gradient

ρ_n = DNAPL density

ρ_w = groundwater density

The calculated critical vertical gradient required to prohibit the sinking of DNAPL at the Site is determined to be 0.22 ft/ft. Considering solely the site-specific vertical gradients from the deep to shallow overburden and the bedrock to deep overburden, the existing site-specific gradients are 25 and 53 times less than required, respectively, to limit the vertical migration (sinking) of DNAPL at the Site.

Reviewed site data including DNAPL composition and physical property data, grain size distribution data, potentiometric and DNAPL gauging data and hydrogeologic testing data were employed in order to evaluate the mobility of DNAPL at the Site. Based upon the mobility assessment completed herein, supplemented with the known presence and horizons of DNAPL at the Site, the following summary is provided.

Surface distribution of DNAPL at the Site likely resulted in the immediate vertical migration of DNAPL to the water table. Once encountering the water table, DNAPL continued to sink through the overburden materials to its present locations. The potential for DNAPL accumulation above the peat zone was not evaluated herein; however, site-specific data indicating DNAPL detection at the base of the overburden materials as well as within shallow, fractured bedrock suggests that the peat zone is not pervasive or acting as an effective aquitard in all locations. Where present in sufficient thicknesses, the site data does suggest that localized DNAPL accumulation on top of or within the peat layer occurred. However, the peat layer at the Site has been described as variable in terms of degree of decomposition and thickness, pervasiveness and has been noted to contain layers of sands at random locations (GHR, 1983). More recent investigative studies undertaken by AECOM have indicated that the thickness of the peat was documented to be less than a foot, down to 0.3 feet at some locations along the eastern portions of the Site. These reported findings represent an additional line of evidence that the peat layer may not constitute a significant barrier to the vertical migration of DNAPL. However, the peat layer was observed to be continuous along the waterfront and in the vicinity of the sheet pile wall, and has served and continues to serve as an impedance to localized vertical DNAPL migration.

The lack of a pervasive aquitard or fine-grained stratigraphy at the Site suggests that vertical DNAPL migration was not prohibited and likely entered openings (fractures or apertures) in the bedrock as DNAPL will continue to invade deeper pore spaces under the influence of gravity until a stratigraphic unit that has sufficient capillary resistance is encountered (Cohen and Mercer, 1993).

Within the saturated zone, lateral DNAPL mobility was determined to have been possible under site hydraulic gradients. Specifically, the tidally influenced Acushnet River results in periodic horizontal gradient reversals which likely resulted in episodic migration of subsurface DNAPL within the saturated zone both towards and from the river during the vertical migration of the DNAPL to the bedrock. This effect likely resulted in the development of an appreciable area of residual DNAPL at the Site, that is, DNAPL present as disconnected ganglia trapped in pore spaces by tensions generated by the interactions between DNAPL, groundwater and the aquifer media. Residual DNAPL is often difficult to locate and largely unrecoverable. Residual DNAPL saturation of available pore space in porous media can be between 5 to 30 % or higher (Kueper, B.H.; and K. L. Davies, 2009), leading to persistent dissolved phase plumes.

As noted, the lack of a suitable aquitard at the Site and the presence of DNAPL within the deep overburden as well as bedrock suggest that the DNAPL migration at the Site is in the intermediate to late stage of migration, as defined by the ITRCs Integrated DNAPL Site Strategy document (ITRC, 2011). This is supported by several site-specific observations including: the inability to recover consistent volumes of DNAPL from those site wells in which it is detected; the presence of DNAPL within the lowest portions of the unconsolidated materials beneath the Site; the presence of DNAPL within the bedrock at the Site; the presence of the higher concentrations in both saturated soils and groundwater at deeper portions of the overburden than in the shallower overburden; and the limited presence of detectable DNAPL accumulations within the source zones.

These observations are supported in alternate industry studies that describe DNAPL sites in early stages of migration are characterized by higher pore saturations resulting from a more pervasive DNAPL that spreads and sinks through developed short-term fingers and pipes, which dissolve into the entire thickness of the aquifer giving the impression of a single, thick contaminant plume in the groundwater (Anderson, M.R., Johnson, R.L., and Pankow, J.F., 1992). The vertically discrete sampling network at the Site suggests clear partitioning of impacts between the shallow and deep overburden materials, that is, the highest dissolved phase concentrations are present in the deeper overburden materials, where the DNAPL has migrated, providing an additional line of evidence that the DNAPL migration within the overburden is beyond early stage and more aptly defined as intermediate to late stage.

Lines of Evidence for DNAPL Migration

The DNAPL mobility evaluation utilized site-specific data and standard methods to assess the potential for DNAPL to mobilize and migrate within the subsurface stratigraphy at the Site. The results of the evaluation are in agreement with the site-specific results reviewed. Specifically, the DNAPL mobility evaluation determined that site DNAPL could readily migrate vertically or sink due to the specific gravity of the mixed DNAPL, the gradation of the overburden and the existing gradients. The site-specific data indicates that in fact DNAPL has historically migrated vertically through the fill and overburden materials to and into bedrock beneath the Site.

Further, the evaluation determined that the site DNAPL could have historically migrate laterally, in both an easterly and westerly direction, under the influence of the observed tidally-influenced reversing gradients, provided a sufficient DNAPL body is present. Current site conditions indicate that contiguous DNAPL bodies of sufficient lateral extent to migrate under these gradient influences are not likely present at the Site and the major if the DNAPL present today is in the form of residual DNAPL. This continual back and forth migration would likely serve to aid in the dissolution of residual DNAPL and historically supported a preference for vertical migration (i.e., sinking) of DNAPL. The site-specific investigative data reviewed does not support wide-spread DNAPL accumulations, rather limited areas of known contiguous DNAPL presence, with likely larger areas constituting residual DNAPL zones, which are by definition incapable of migrating. Therefore, the DNAPL mobility evaluation is congruent with the investigative findings and supportive of a middle- to late-stage DNAPL plume condition. The mobility assessment supports the observation of measured (and recovered) DNAPL, i.e., its downward mobility has dominated over a period of 30+ years resulting in the remaining limited pooling at the deepest interface between overburden and top of rock and within shallow bedrock at the northeast corner of the property. Remaining DNAPL within the shallow and deep overburden beneath the site and river is predominantly residual DNAPL and is not subject to additional lateral migration.

Section 6: DNAPL Recoverability

Regulatory guidance documents direct free product removal to the extent practical as an appropriate first remediation step (U.S. Environmental Protection Agency [EPA], 2003; Interstate Technology & Research Council [ITRC], 2004; MCP at 310 CMR 40.1003(7), 2014). Further, the decision to undertake DNAPL recovery should also include consideration of potential effects to the dissolved phase plume, point of compliance issues, DNAPL architecture issues in order to prohibit adverse DNAPL mobilization (U.S. EPA, 2003), and efficacy.

The DNAPL mobility evaluation indicates the potential for DNAPL to migrate horizontally and vertically, with very limited potential to pool, based upon the grain size results from the overburden materials and presumed aperture openings within the surface of the bedrock. Therefore, the likelihood of locating a

contiguous DNAPL accumulation area that would support DNAPL recovery at the Site is minimal, which is supported by site-specific data that indicate limited DNAPL presence in the northeast corner of the Aerovox property (MW-15D/15B, RW-1D, RC-1).

As discussed in the IRA Plan, IRA Plan Modification, IRA Status Reports, and above discussions, DNAPL has been measured, observed, and recovered from the northeast corner of the Aerovox property, beginning in April 2014 with notification of greater than 0.5-inch of DNAPL in monitoring well MW-15D. In September 2014, DNAPL was measured in MW-15B. Gauging and recovery from MW-15D and MW-15B has been ongoing on a monthly to bi-weekly basis since that time. The initial DNAPL thickness measured in MW-15D and was 7 inches. Since that time, the DNAPL thickness has decreased in both of these wells, and has fluctuated between 0.9-inch to 1.25-inches in MW-15D between redevelopment of this well on January 18, 2017 and the gauging event on May 17, 2017. Recovery attempts since September 2016 have not resulted in the recovery of a measurable volume of DNAPL from MW-15D. Rather, intermittent blebs of DNAPL have been recovered from this well during this time period. The total estimated volume of DNAPL recovered from MW-15D since initiation of recovery efforts in early 2014 is 0.9 gallon.

Similarly, the DNAPL thickness measured in MW-15B between mid-January and early April 2017 gauging event, fluctuated between 0.9-inch and 1.75-inches. On March 29, 2017, more than three pore volumes of water were pumped from MW-15B prior to collection of 8 liters of water for bench scale treatability study. On April 17, 2017, 4.25 inches of DNAPL was measured in MW-15B. As has been observed in other wells within the northeast corner of the site, significant changes to the system dynamics results in a temporary increase in DNAPL thickness and recovery volumes. However, with increased length of time since the disturbance, DNAPL thickness and recovery decreases. On April 17, 2017, approximately 225 ml of DNAPL was recovered from MW-15B, with 60 ml and <50 ml. Continued decrease of DNAPL thickness and recovery are anticipated. The total estimated volume of DNAPL recovered from MW-15B since initiation of recovery efforts in early 2014 is 0.5 gallon.

Notwithstanding the results of DNAPL measurements and recovery volumes as of early 2015, a DNAPL recoverability assessment was completed at that time. Specifically, DNAPL recoverability was assessed through evaluation of design criteria for a site specific DNAPL recovery well. A primary design objective for mass DNAPL recovery included achieving separate phase DNAPL recovery with associated groundwater extraction, in order to mobilize pooled and potentially residual DNAPL towards the recovery well location, and in order to limit the potential generation of a DNAPL emulsion.

The preliminary design to achieve separate phase recovery of DNAPL included determining the settling velocity of the DNAPL once it enters the recovery well and designing the recovery well to maintain in-well upward velocities less than the settling velocity of the DNAPL. While actual DNAPL entry into the well may be represented as globules, blebs, and droplets, the preliminary DNAPL recovery well was designed for DNAPL droplet, which constitute the likely smallest particle of DNAPL and, hence, a limiting design factor, consistent with the methodologies provided in Coll and Paschl (2013).

The preliminary design included site-specific inputs for DNAPL density and a range of both groundwater pumping rates and recovery well slot sizes. The results of the preliminary DNAPL recovery well design included a 6-inch diameter recovery well, constructed with a 50-slot screen and operated at an associated groundwater extraction rate less than approximately 4 gallons per minute. Such a well is anticipated to be capable of separate phase DNAPL recovery within the overburden materials at the Site, provided sufficient DNAPL is present. However, as noted, no appreciable DNAPL accumulation area (i.e., a contiguous DNAPL pool with a length equal to or greater than the DNAPL body length developed above) at the Site has been located to date. Further, the co-recovered groundwater would likely require treatment and discharge, therefore, the employment of groundwater re-circulation should be considered for this hypothetical design scenario.

In March 2016, MassDEP requested an IRA modification to include measures to contain or remove DNAPL to prevent further migration to the Acushnet River…" An IRA Modification was submitted in April 2016, that include installation of a free product recovery system (FPRS) in the northeast corner of the Aerovox property as well as excavation of the areas surrounding UV-17 and MIP23, where contaminant concentrations and/or free product had been observed. The IRA Modification free product recovery system installation and associated activities are summarized in the IRA Update section of the Phase II Addendum, with some of the information also discussed briefly below as those activities relate to DNAPL recoverability.

The FPRS consists of four wells, including one shallow recovery well (RW-1S, for collection of DNAPL above the peat layer), one shallow bedrock recovery well (RW-1B, for collection of DNAPL within shallow bedrock), one deep overburden recovery well (RW-1D, for collection of DNAPL from within the overburden material above the weathered bedrock surface) and a deep overburden recirculation well (RC-1). Because the prior manual removal of DNAPL in the deep overburden (from MW-15D) had tapered off, the design for this the deep overburden portion of the system (RW-1D and RC-1) included initial operation of an active pumping and recirculation system initially to try and induce greater DNAPL mobility and recoverability in deep overburden.

Routine DNAPL gauging in the four newly installed wells and the two existing monitoring wells with prior evidence of DNAPL began on September 20, 2016. Little to no DNAPL had accumulated in the recovery wells between that time and installation in early August 2016. During the following gauging event on October 12, 2016, DNAPL was measured in RW-1D and RC-1 at 1.5-inches and less than 0.25-inch, respectively. A pilot pumping and recirculation study was undertaken to attempt additional recovery in RW-1D; however, as discussed in the IRA Update section of the Phase II Addendum, the recirculation did not appear to result in an appreciable increase in DNAPL recovery.

As of March 9, 2017, approximately 4-inches of DNAPL had accumulated in the 5-foot sump of RW-1D. On that day, approximately 1,200 milliliters of DNAPL was removed from the well. Recovery was completed on each of the following three weeks, with the recovered volumes of 100 ml, 200 ml, and 50 ml, respectively. Similarly, the thickness of DNAPL on subsequent gauging events is decreasing, with the most recent thickness measured at 0.5-inches after a 1.5-week period. This decreasing trend is similar to that observed in the monitoring well MW-15D/B cluster.

It was also noted that the DNAPL thickness in MW-15D, and to a lesser extent, MW-15B, increased after installation of the FPRS wells. This is likely because a disturbance/disequilibrium in the immediate area resulted from drilling and installation of the FPRS wells, which caused residual DNAPL that was in the immediate vicinity of the RW-1D, RC-1, MW-15D and MW-15B to temporarily move/coalesce, and migrate into the well. DNAPL thickness and recovery volume in RW-1D is decreasing as anticipated.

Section 7: Conclusions

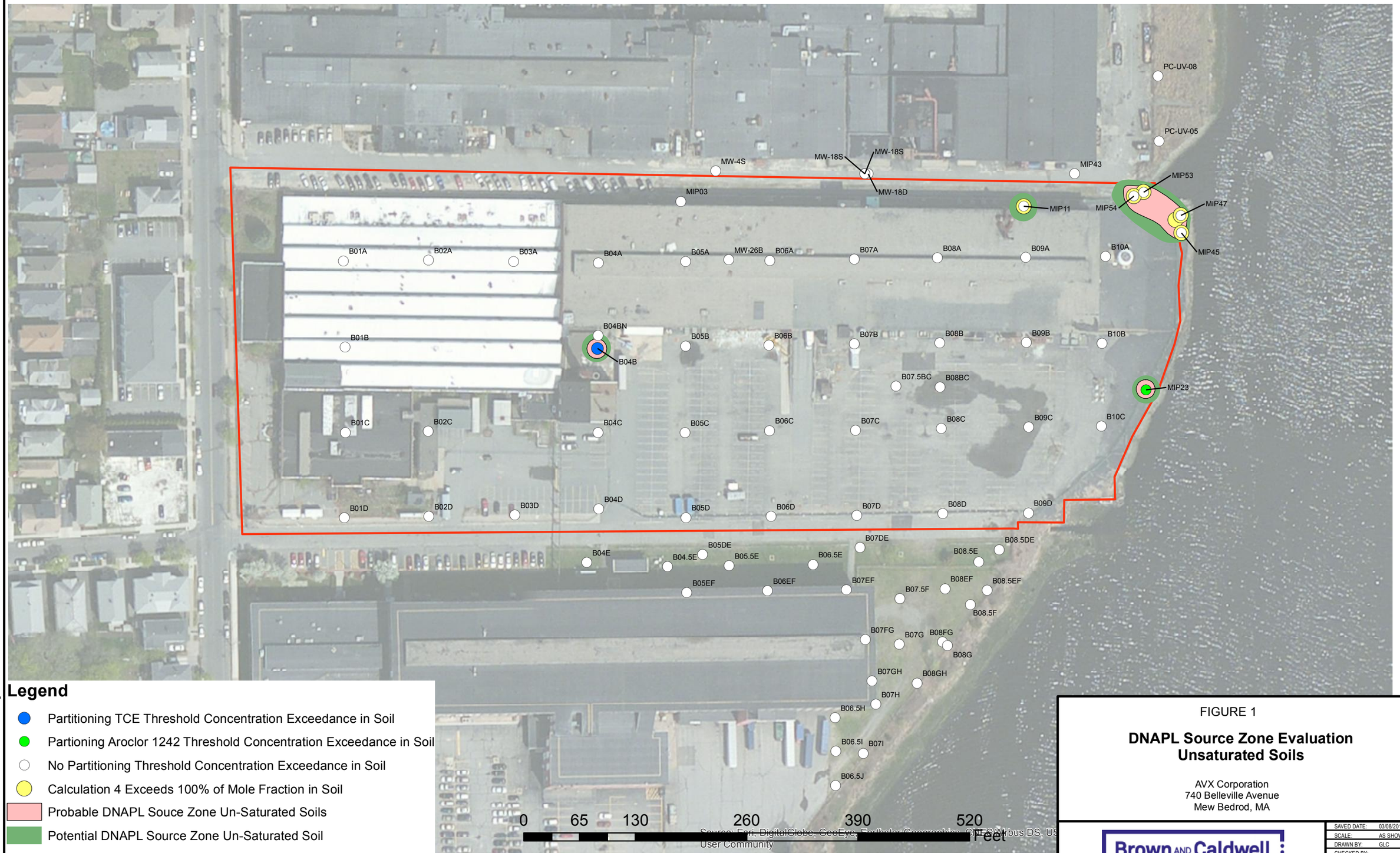
As discussed above, probable DNAPL source zones have been identified on the Aerovox property portion of the Site, both in unsaturated and saturated soils. Similarly, groundwater concentrations have been evaluated, and also suggests the presence of source zones. These areas have been identified using the Keuper and Davies lines of evidence approach, and are mostly consistent with what is known about the historic site operations and disposal practices of Aerovox.

The DNAPL mobility assessment indicates that three sample locations where DNAPL may be mobile based on saturation thresholds. These three samples were collected from shallow soils. Soils in the vicinity of one of these areas (UV-17 samples) were excavated and disposed off-site as part of the IRA modification. The other two locations are located in shallow soils above the peat layer. Nine of the eleven remedial

alternatives for the Operable Unit (OU) including these soils include removal of these soils and the other two include containment of these soils behind a barrier wall.

Similarly, the DNAPL measurement and recovery data continue to indicate that site DNAPL is late-stage and residual. The DNAPL is non-mobile, as it is not believed to be expanding laterally or vertically. Rather, the DNAPL is considered to be stable, but to have micro-scale mobility, defined by the MCP as NAPL with a footprint that is not expanding, but which is visibly present in the subsurface in sufficient quantities to migrate or potentially migrate as a separate phase over a short distance and visibly impact an excavation, boring or monitoring well. The diminishing minimal recovery volumes in MW-15B and MW-15D over time (having reached the point of diminishing returns based on recovery data collected during the IRA), with a subsequent temporary uptick in thickness and recovery immediately after the disturbance/disequilibrium in the immediate area from drilling and installation of the FPRS wells, followed again by stabilized minimal thickness and recovery illustrates a sequence consistent with MCP defined micro-scale mobility.

Remaining DNAPL within the shallow and deep overburden beneath the site and river is predominantly residual DNAPL and is not subject to additional lateral migration.



Legend

- Partitioning TCE Threshold Concentration Exceedance in Soil
- Partioning Aroclor 1242 Threshold Concentration Exceedance in Soil
- No Partitioning Threshold Concentration Exceedance in Soil
- Calculation 4 Exceeds 100% of Mole Fraction in Soil
- Probable DNAPL Souce Zone Un-Saturated Soils
- Potential DNAPL Source Zone Un-Saturated Soil
- Site Boundary

FIGURE 1

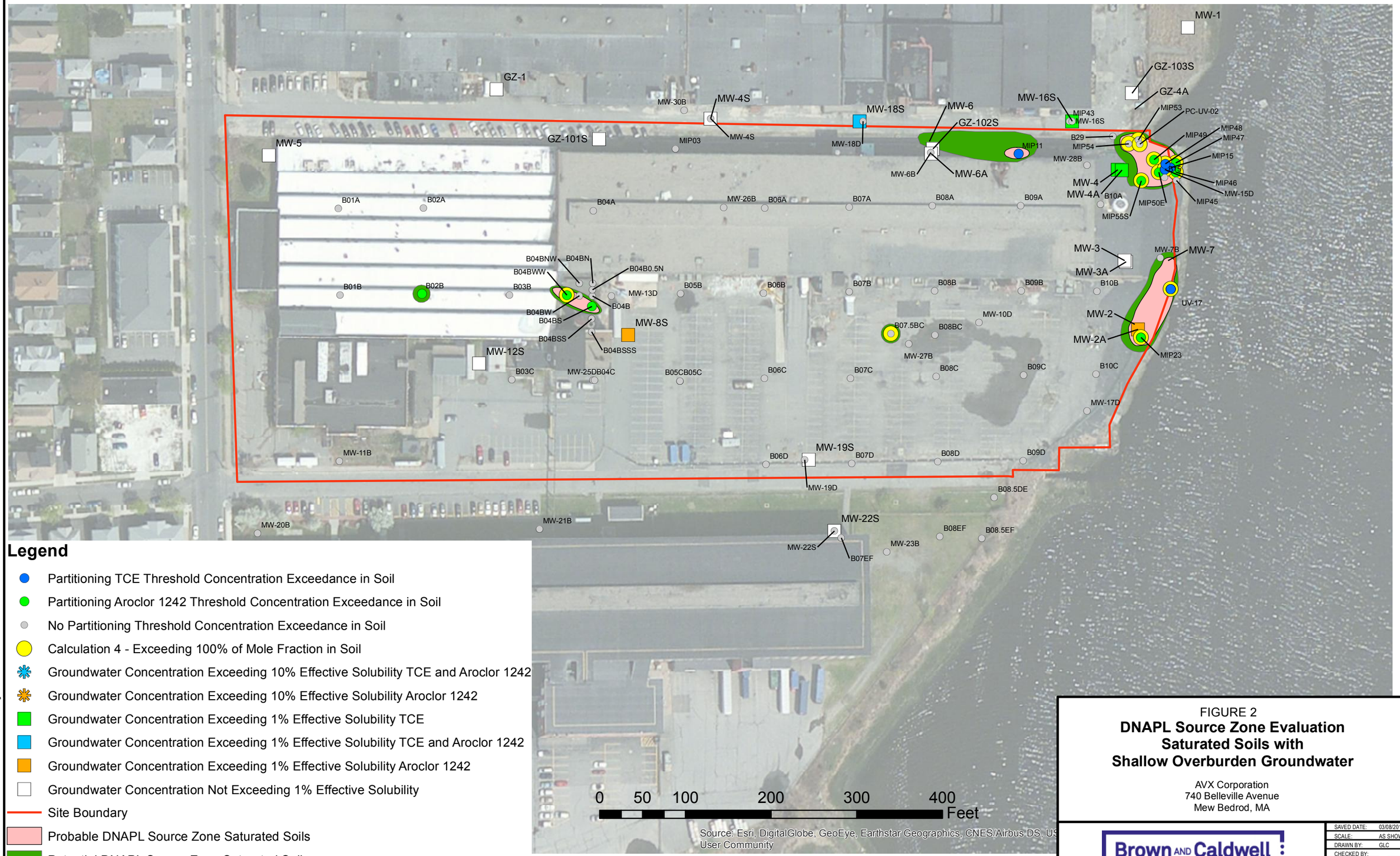
DNAPL Source Zone Evaluation
Unsaturated Soils

AVX Corporation
740 Belleville Avenue
Mew Bedrod, MA

Brown AND Caldwell

SAVED DATE:	03/08/2017
SCALE:	AS SHOWN
DRAWN BY:	GLC
CHECKED BY:	
PROJECT #:	145438
FINALIZED:	

Path: C:\Users\GChristians\Documents\Clients\Aerovox\GIS\Figure 1 DNAPL Source Zone Evaluation Unsaturated Soils.mxd



Legend

- Partitioning TCE Threshold Concentration Exceedance in Soil
- Partitioning Aroclor 1242 Threshold Concentration Exceedance in Soil
- No Partitioning Threshold Concentration Exceedance in Soil
- Calculation 4 - Exceeding 100% of Mole Fraction in Soil
- Groundwater Concentration Exceeding 10% Effective Solubility TCE and Aroclor 1242
- Groundwater Concentration Exceeding 10% Effective Solubility Aroclor 1242
- Groundwater Concentration Exceeding 1% Effective Solubility TCE
- Groundwater Concentration Exceeding 1% Effective Solubility TCE and Aroclor 1242
- Groundwater Concentration Exceeding 1% Effective Solubility Aroclor 1242
- Groundwater Concentration Not Exceeding 1% Effective Solubility
- Site Boundary
- Probable DNAPL Source Zone Saturated Soils
- Potential DNAPL Source Zone Saturated Soils

FIGURE 2

DNAPL Source Zone Evaluation Saturated Soils with Shallow Overburden Groundwater

AVX Corporation
740 Belleville Avenue
Mew Bedrod, MA

Brown AND Caldwell

SAVED DATE:	03/08/2017
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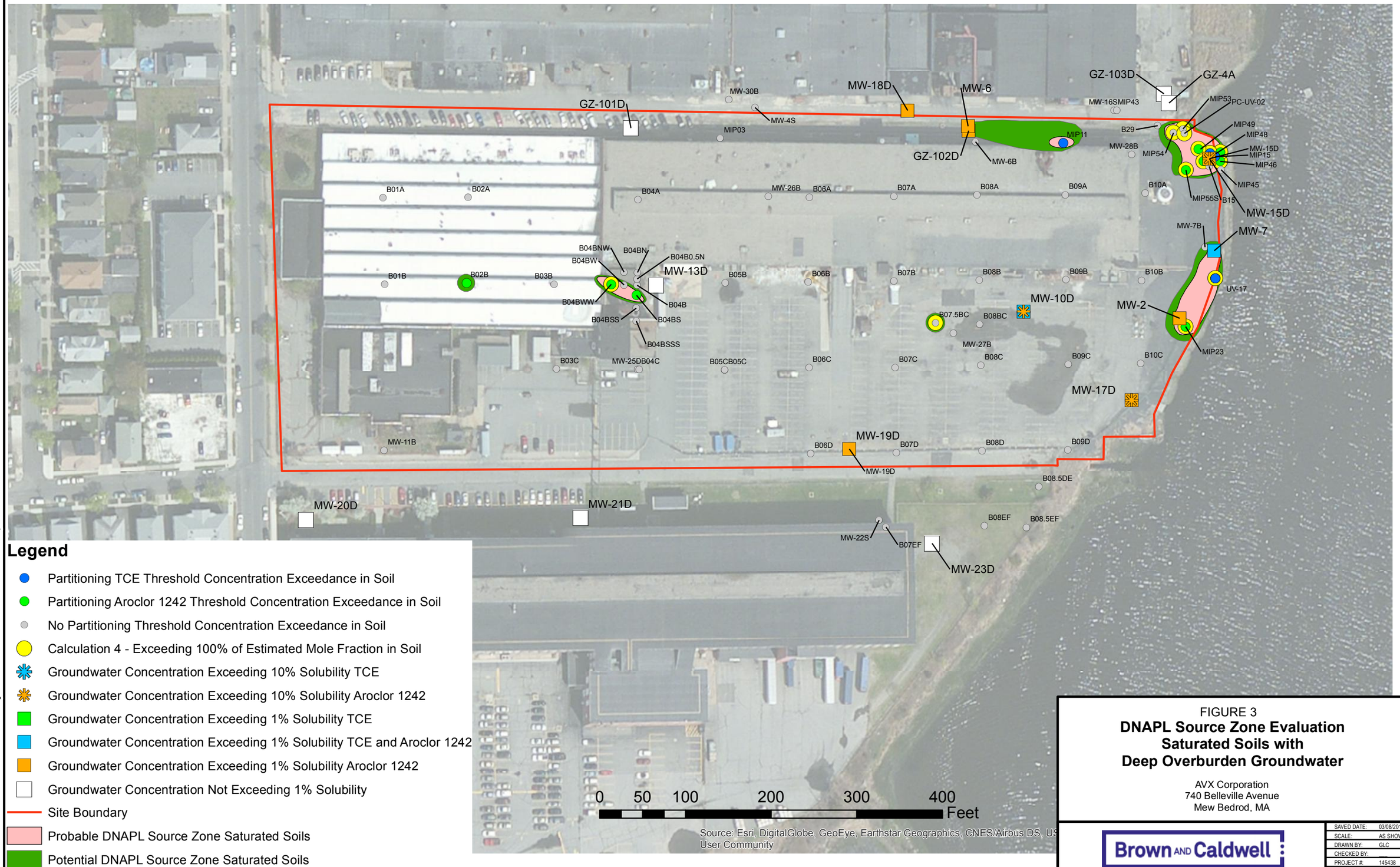

Legend

- Partitioning TCE Threshold Concentration Exceedance in Soil
- Partitioning Aroclor 1242 Threshold Concentration Exceedance in Soil
- No Partitioning Threshold Concentration Exceedance in Soil
- Calculation 4 - Exceeding 100% of Estimated Mole Fraction in Soil
- Groundwater Concentration Exceeding 10% Solubility TCE
- Groundwater Concentration Exceeding 10% Solubility Aroclor 1242
- Groundwater Concentration Exceeding 1% Solubility TCE
- Groundwater Concentration Exceeding 1% Solubility TCE and Aroclor 1242
- Groundwater Concentration Exceeding 1% Solubility Aroclor 1242
- Groundwater Concentration Not Exceeding 1% Solubility
- Site Boundary
- Probable DNAPL Source Zone Saturated Soils
- Potential DNAPL Source Zone Saturated Soils

FIGURE 3

DNAPL Source Zone Evaluation Saturated Soils with Deep Overburden Groundwater

AVX Corporation
740 Belleville Avenue
Mew Bedrod, MA

Brown AND Caldwell

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FINALIZED:	

Path: C:\Users\GChristians\Documents\Clients\Aerovox\GIS\Figure 3 DNAPL Source Zone Evaluation Saturated Soils wt Deep Groundwater.mxd

Legend

- Exceeding 10% Aroclor 1242 Solubility (0.034 mg/L)
- Exceeding 1% Aroclor 1242 Solubility (0.0034 mg/L)
- Not Exceeding 1% Aroclor 1242 Solubility
- Exceeding 10% TCE Solubility (110 mg/L)
- Exceeding 1% TCE Solubility (11 mg/L)
- Not Exceeding 1% TCE Solubility
- Site Boundary
- Probable DNAPL Source Zone Bedrock
- Potential DNAPL Source Zone Bedrock

FIGURE 4

DNAPL Source Zone Evaluation Bedrock

AVX Corporation
740 Belleville Avenue
Mew Bedrod, MA

Brown AND Caldwell

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Appendix E: April 2017 Groundwater Sampling Information

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	MW-2A	MW-2A	MW-3	MW-3	MW-3	MW-3A	MW-3A	MW-3A	MW-3A	MW-3A	MW-3A
Sample ID					AX-GW-MW2A-032114	AX-GW-MW0	MW-3	MW-3	AX-GW-MW3-032414	MW-3A	MW-3A	MW-3A	MW-3A	MW-3A	MW-3A
Sample Date					3/21/2014	4/18/2017	5/26/1998	9/14/2005	3/24/2014	5/26/1998	9/14/2005	10/12/2006	11/27/2007	11/4/2008	3/17/2010
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	--	--	2 U	--	--	--	--	--	--
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 UJ	25 U	5 U	2 U	50 U	5 U	5 U	4 UD	4 UD	2 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	--	--	2 U	--	--	--	--	--	--
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	25 U	5 U	2 U	-- U	-- U	-- U	-- UD	-- UD	-- U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	1 U	25 U	5 U	2 U	50 U	5 U	5 U	4 UD	4 UD	2 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	25 U	1 U	2 U	50 U	1 U	1 U	4 UD	4 UD	2 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	25 U	5 U	--	-- U	-- U	-- U	-- UD	-- UD	-- U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 UJ	25 U	5 U	4 U	-- U	-- U	-- U	-- UD	-- UD	-- U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	25 U	0.3 J	--	50 U	0.3 J	5 U	4 UD	4 UD	2 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 UJ	--	--	4 U	--	--	--	--	--	--
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	25 U	0.6 J	2 U	50 U	0.7 J	0.4 J	4 UD	4 UD	2 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	25 U	5 U	2 U	50 U	5 U	5 U	4 UD	4 UD	2 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	10	25 U	--	--	50 U	--	10 U	--	--	--
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	--	--	2 U	--	--	--	--	--	--
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	25 U	0.5 J	--	50 U	0.4 J	5 U	4 UD	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	5.7	2.7	25 U	16	3.9	50 U	15 J	4 J	6.2 D	4.24 D	3.35
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 UJ	-- U	-- U	4 U	50 U	5 U	5 U	4 UD	4 UD	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	0.5 U	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	8.6	4.6	35	49	7.1	50 U	50	7	11 D	6.26 D	5.66
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	--	--	4 U	--	--	--	--	--	--
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	--	--	4 U	--	--	--	--	--	--
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	5.8 U	10 UD	5 U
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	25 U	10	--	60	7	7	5.9 D	9.78 D	2.88
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	25 U	5 U	--	-- U	-- U	-- U	--	-- UD	-- U
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	--	--	2 U	--	--	--	--	--	--
Bromoform	700	50000	50000	UG/L	2 U	2 UJ	--	--	4 U	--	--	--	--	--	--
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	25 U	5 U	2 U	-- U	-- U	-- U	-- UD	-- UD	-- U
Chlorobenzene	200	1000	1000	UG/L	38	20	47	460	170	1000	450	320	380 D	316 D	130
Chloroethane	NE	NE	NE	UG/L	2 U	2 UJ	25 U	5 U	4 U	-- U	-- U	-- U	-- UD	-- UD	-- U
Chloroform	50	20000	20000	UG/L	1 U	1 U	25 U	5 U	2 U	-- U	-- U	-- U	-- UD	-- UD	-- U
Chloromethane	NE	NE	NE	UG/L	2 U	2 UJ	25 U	5 U	4 U	-- U	-- U	-- U	-- UD	-- UD	-- U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	8.9	10	98	5 U	2 U	50 U	5 U	5 U	4 UD	4 UD	9.25
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	--	--	1 U	--	--	--	--	--	--
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	25 U	5 U	2 U	50 U	5 U	5 U	4 UD	4 UD	2 U
Dibromomethane	NE	NE	NE	UG/L	--	--	-- U	-- U	--	50 U	5 U	5 U	4 UD	4 UD	2 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 UJ	-- U	-- U	4 U	50 U	5 U	5 U	4 UD	4 UD	2 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	150	5 U	--	95	5 U	0.4 J	4 UD	4 UD	2 U
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	25 U	1 U	1.2 U	-- U	-- U	-- U	-- UD	-- UD	-- U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	25 U	3 J	--	50 U	2 J	0.8 J	4 UD	4 UD	2 U
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	25 U	5 U	4 U	-- U	-- U	-- U	-- UD	-- UD	-- U
Naphthalene	700	20000	20000	UG/L	--	--	25 U	18	--	50 U	0.7 J	2 U	10 UD	10 UD	2 U
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-2A	MW-2A	MW-3	MW-3	MW-3	MW-3A	MW-3A	MW-3A	MW-3A	MW-3A	MW-3A
Sample ID					AX-GW-MW2A-032114	AX-GW-MW0	MW-3	MW-3	AX-GW-MW3-032414	MW-3A	MW-3A	MW-3A	MW-3A	MW-3A	MW-3A
Sample Date					3/21/2014	4/18/2017	5/26/1998	9/14/2005	3/24/2014	5/26/1998	9/14/2005	10/12/2006	11/27/2007	11/4/2008	3/17/2010
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	25 U	0.6 J	--	-- U	-- U	-- U	-- UD	-- UD	-- U
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1 U	1 U	25 U	1.8	2 U	50 U	1.9	5 U	4 UD	4 UD	2 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	25 U	0.05 U	--	50 U	0.05 U	5 U	4 UD	4 UD	2 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	25 U	0.05 U	2 U	50 U	0.05 U	5 U	4 UD	4 UD	2 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 UJ	--	--	1 U	--	--	--	--	--	--
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	1 U	5.8	25 U	5 U	2 U	50 U	5 U	5 U	4 UD	4 UD	2 U
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	25 U	4 U	--	50 U	12	5 U	4 UD	4 UD	2 U
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	10	6.1	270	5 U	2	76	5 U	2 U	4 UD	4 UD	3.24
Xylenes, m & p	3000	5000	5000	UG/L	--	--	25 U	0.9 J	--	50 U	0.7 J	10 U	8 UD	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	25 U	5 U	--	50 U	5 U	5 U	8 UD	12 UD	4 U
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	1.25 U	--	0.05 U	0.25 U	--	0.05 U	0.05 U	0.0061 U	0.048 U	0.02 U
Aroclor 1221	5	10	10	UG/L	0.25 U	1.25 U	--	0.05 U	0.25 U	--	0.05 U	0.05 U	0.0033 U	0.048 U	0.02 U
Aroclor 1232	5	10	10	UG/L	0.25 U	1.25 U	--	0.05 U	0.25 U	--	0.05 U	0.05 U	4.65	0.048 U	0.02 U
Aroclor 1242	5	10	10	UG/L	5.2	*30*	--	0.05 U	0.25 U	--	0.05 U	0.05 U	0.0066 U	0.048 U	0.02 U
Aroclor 1248	5	10	10	UG/L	0.25 U	1.25 U	--	0.05 U	0.25 U	--	0.05 U	0.05 U	0.0071 U	0.048 U	0.02 U
Aroclor 1254	5	10	10	UG/L	0.27	1.25 U	--	0.05 U	0.25 U	--	0.47	0.05 U	0.0053 U	0.16 J	0.02 U
Aroclor 1260	5	10	10	UG/L	0.25 U	1.25 U	--	0.05 U	0.25 U	--	0.05 U	0.05 U	0.0043 U	0.048 U	0.02 U
Aroclor 1262	5	10	10	UG/L	0.25 U	1.25 U	--	--	0.25 U	--	--	--	--	--	--
Aroclor 1268	5	10	10	UG/L	0.25 U	1.25 U	--	--	0.25 U	--	--	--	--	--	--
Total PCBs	5	10	10	UG/L	5.47	*30*	0.48 U	0.05 U	0.25 U	5 U	0.47	0.05 U	4.65	0.16	0.02 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	11	--	--	--	44	--	--	--	--	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.31	--	--	--	0.16	--	--	--	--	--	--
pH	NE	NE	NE	PH UNITS	5.99	--	--	--	5.87	--	--	--	--	--	--
Electrical conductivity	NE	NE	NE	mS/cm	0.78	--	--	--	1.43	--	--	--	--	--	--
Specific conductance	NE	NE	NE	mV	-5.6	--	--	--	-44.2	--	--	--	--	--	--
Turbidity	NE	NE	NE	NTU	6.22	--	--	--	16.9	--	--	--	--	--	--
Temperature	NE	NE	NE	DEG C	7.21	--	--	--	7.76	--	--	--	--	--	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-3A	MW-3A	MW-3A	MW-3A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A
Sample ID			Groundwater		AX-GW-MW3A-121010	AX-GW-MW3A-111011	AX-GW-MW3A-120512	AX-GW-MW3A-032114	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	AX-GW-MW4A-121010
Sample Date			UCLs		12/10/2010	11/10/2011	12/5/2012	3/21/2014	5/27/1998	9/14/2005	10/11/2006	11/28/2007	11/5/2008	3/17/2010	12/10/2010
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	4 U	1 U	2 U	1 U	--	--	--	--	--	--	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	4 U	1 U	2 U	1 U	5 U	5 U	5 U	10 UD	2 U	2 U	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	4 U	1 U	2 U	1 U	--	--	--	--	--	--	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	4 U	1 U	2 U	1 U	-- U	-- U	-- U	-- UD	-- U	-- U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	4 U	1 U	2 U	1 U	5 U	5 U	2 J	10 UD	2 U	2 U	1.2
1,1-Dichloroethene	80	30000	100000	UG/L	4 U	1 U	2 U	1 U	5 U	1 U	1 U	10 UD	2 U	2 U	1 U
1,1-Dichloropropene	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	8 U	2 U	4 U	--	-- U	-- U	-- U	-- UD	-- U	-- U	2 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	8 U	2 U	4 U	2 U	-- U	-- U	-- U	-- UD	-- U	-- U	2 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	8 U	2 U	4 U	--	5 U	5 U	5 U	10 UD	2 U	2 U	2 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	8 U	2 U	4 U	2 U	--	--	--	--	--	--	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	4 U	1 U	4	1 U	5 U	5 U	5 U	10 UD	2 U	2 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	4 U	1 U	2 U	1 U	5	5 U	5 U	10 UD	2 U	2 U	1 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	--	--	5 U	--	26	--	--	--	--
1,2-Dichloropropane	3	50000	100000	UG/L	4 U	1 U	2 U	1 U	--	--	--	--	--	--	1 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	4 U	1 U	2 U	--	5 U	5 U	5 U	10 UD	--	--	1 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	4 U	1.4	2 U	1.4	5 U	5 U	5 U	10 UD	2 U	2 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	8 U	2 U	4 U	2 U	5 U	5 U	5 U	10 UD	2 U	2 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	5	2.3	3.6	2.6	5	5 U	5 U	10 UD	2 U	2 U	1 U
1,4-Dioxane	6000	50000	50000	UG/L	1000 U	-- U	--	--	--	--	--	--	--	--	250 U
2,2-Dichloropropane	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
2-Butanone (MEK)	50000	50000	50000	UG/L	20 U	5 U	10 U	--	--	--	--	--	--	--	5 U
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	40 U	-- U	-- U	--	--	--	--	--	--	--	10 U
2-Chlorotoluene	NE	NE	NE	UG/L	8 U	2 U	4 U	2 U	--	--	--	--	--	--	2 U
2-Hexanone	NE	NE	NE	UG/L	20 U	5 U	10 U	--	--	--	--	--	--	--	5 U
4-Chlorotoluene	NE	NE	NE	UG/L	8 U	2 U	4 U	2 U	--	--	--	--	--	--	2 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	20 U	5 U	10 U	--	--	--	--	--	--	--	5 U
Acetone	50000	50000	50000	UG/L	20 U	5 U	10 U	--	--	--	--	430 D	81.6 D	5 U	87
Acrylonitrile	NE	NE	NE	UG/L	20 U	5 U	10 U	--	--	--	--	--	--	--	5 U
Benzene	1000	10000	10000	UG/L	5.5	3.7	4.3	--	5 U	5 U	0.6 J	10 UD	2 U	2 U	1 U
Bromobenzene	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
Bromochloromethane	NE	NE	NE	UG/L	8 U	2 U	4 U	--	-- U	-- U	-- U	--	-- U	-- U	2 U
Bromodichloromethane	6	50000	50000	UG/L	4 U	1 U	2 U	1 U	--	--	--	--	--	--	1 U
Bromoform	700	50000	50000	UG/L	8 U	2 U	4 U	2 U	--	--	--	--	--	--	2 U
Bromomethane	7	800	800	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
Carbon disulfide	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
Carbon tetrachloride	2	5000	5000	UG/L	4 U	1 U	2 U	1 U	-- U	-- U	-- U	-- UD	-- U	-- U	1 U
Chlorobenzene	200	1000	1000	UG/L	200	88	130	99	5 U	5 U	5 U	10 UD	2 U	2 U	1 U
Chloroethane	NE	NE	NE	UG/L	8 U	2 U	4 U	2 U	-- U	-- U	-- U	-- UD	-- U	-- U	2 U
Chloroform	50	20000	20000	UG/L	4 U	1 U	2 U	1 U	-- U	-- U	-- U	-- UD	-- U	-- U	1 U
Chloromethane	NE	NE	NE	UG/L	8 U	2 U	4 U	2 U	-- U	-- U	-- U	-- UD	-- U	-- U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	4 U	1 U	2 U	1 U	9	4 J	26	11 D	17.3	2 U	23
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	2 U	0.5 U	1 U	0.5 U	--	--	--	--	--	--	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	4 U	1 U	2 U	1 U	5 U	5 U	5 U	10 UD	2 U	2 U	1 U
Dibromomethane	NE	NE	NE	UG/L	8 U	2 U	4 U	--	5 U	5 U	5 U	10 UD	2 U	2 U	2 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	8 U	2 U	4 U	2 U	5 U	5 U	5 U	10 UD	2 U	2 U	2 U
Diethyl Ether	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
Ethyl acetate	NE	NE	NE	UG/L	40 U	10 U	20 U	--	--	--	--	--	--	--	10 U
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
Ethylbenzene	20000	5000	5000	UG/L	4 U	1 U	2 U	--	5 U	5 U	5 U	10 UD	2 U	2 U	1 U
Hexachlorobutadiene	50	3000	3000	UG/L	2.4 U	0.6 U	1.2 U	0.6 U	-- U	-- U	-- U	-- UD	-- U	-- U	0.6 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	8 U	2 U	4 U	--	5 U	5 U	5 U	10 UD	2 U	2 U	2 U
Methylene chloride	2000	50000	50000	UG/L	8 U	2 U	4 U	2 U	-- U	-- U	-- U	-- UD	-- U	-- U	2 U
Naphthalene	700	20000	20000	UG/L	8 U	2 U	4 U	--	5 U	5 U	5 U	25 UD	2 U	2 U	2 U
n-Butylbenzene	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U

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Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-3A	MW-3A	MW-3A	MW-3A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW3A-121010	AX-GW-MW3A-111011	AX-GW-MW3A-120512	AX-GW-MW3A-032114	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	MW-4A	AX-GW-MW4A-121010
Sample Date			UCLs		12/10/2010	11/10/2011	12/5/2012	3/21/2014	5/27/1998	9/14/2005	10/11/2006	11/28/2007	11/5/2008	3/17/2010	12/10/2010
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	8 U	2 U	4 U	--	-- U	-- U	-- U	-- UD	-- U	-- U	2 U
sec-Butylbenzene	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
Styrene	100	6000	6000	UG/L	4 U	1 U	2 U	--	--	--	--	--	--	--	1 U
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
tert-Butyl alcohol	NE	NE	NE	UG/L	120 U	-- U	20 U	--	--	--	--	--	--	--	30 U
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
tert-Butylbenzene	NE	NE	NE	UG/L	8 U	2 U	4 U	--	--	--	--	--	--	--	2 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	4 U	1 U	2 U	1 U	5 U	0.15	5 U	10 UD	2 U	2 U	1 U
Tetrahydrofuran	NE	NE	NE	UG/L	20 U	5 U	10 U	--	--	--	--	--	--	--	5 U
Toluene	50000	40000	40000	UG/L	4 U	1 U	2 U	--	5 U	0.05 U	5 U	10 UD	2 U	2 U	1 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	4 U	1 U	2 U	1 U	5 U	0.05 U	5 U	10 UD	2 U	2 U	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	2 U	0.5 U	1 U	0.5 U	--	--	--	--	--	--	0.5 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	10 U	2.5 U	5 U	--	--	--	--	--	--	--	2.5 U
Trichloroethene (TCE)	5	5000	5000	UG/L	4 U	1 U	2 U	1 U	10	5 U	36	26 D	16.6	15	4.6
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	8 U	2 U	4 U	--	5 U	28	5 U	10 UD	2 U	2 U	2 U
Vinyl acetate	NE	NE	NE	UG/L	10 U	2.5 U	5 U	--	--	--	--	--	--	--	2.5 U
Vinyl chloride	2	50000	50000	UG/L	4 U	1 U	2 U	1.1	5 U	5 U	2 U	10 UD	2.24	2 U	5.6
Xylenes, m & p	3000	5000	5000	UG/L	8 U	2 U	4 U	--	5 U	5 U	10 U	20 UD	--	--	2 U
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	5 U	5 U	15 U	20 UD	6 U	4 U	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	2.5 U	0.5 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0061 U	0.05 U	0.02 U	0.362 U
Aroclor 1221	5	10	10	UG/L	7.93	3.19	5.95	0.25 U	--	0.05 U	0.05 U	0.0033 U	0.05 U	0.02 U	0.362 U
Aroclor 1232	5	10	10	UG/L	2.5 U	0.5 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0071 U	0.05 U	0.02 U	0.362 U
Aroclor 1242	5	10	10	UG/L	2.5 U	0.5 U	0.25 U	0.25 U	--	1.8	0.05 U	0.0066 U	0.42 U	7.03 D	0.362 U
Aroclor 1248	5	10	10	UG/L	2.5 U	0.5 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0071 U	0.05 U	0.02 U	0.85
Aroclor 1254	5	10	10	UG/L	2.5 U	0.5 U	0.25 U	0.28	--	2.6	0.6	*12.63*	0.62	*11.7 D*	1.28
Aroclor 1260	5	10	10	UG/L	2.5 U	0.5 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0043 U	0.05	0.02 U	0.362 U
Aroclor 1262	5	10	10	UG/L	2.5 U	0.5 U	0.25 U	0.25 U	--	--	--	--	--	--	0.362 U
Aroclor 1268	5	10	10	UG/L	2.5 U	0.5 U	0.25 U	0.25 U	--	--	--	--	--	--	0.362 U
Total PCBs	5	10	10	UG/L	7.93	3.19	5.95	0.28	*36*	4.4	0.6	*12.63*	0.67	*18.73*	2.13
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	49	70	39	13	--	--	--	--	--	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.2	0.12	0.08	0.1	--	--	--	--	--	--	4.76
pH	NE	NE	NE	PH UNITS	6.57	6.15	6.07	6.01	--	--	--	--	--	--	5.95
Electrical conductivity	NE	NE	NE	mS/cm	1.36	1.31	1.34	1.08	--	--	--	--	--	--	0.23
Specific conductance	NE	NE	NE	mV	-94.3	-85	-36.6	-13.9	--	--	--	--	--	--	24.1
Turbidity	NE	NE	NE	NTU	2.12	3.5	0.92	1.3	--	--	--	--	--	--	--
Temperature	NE	NE	NE	DEG C	14.42	18.64	15.55	9.01	--	--	--	--	--	--	11.06

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
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* - Lab Qualifier
D - Result is a product of dilution
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RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-4A	MW-4A	MW-4A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A
Sample ID			Groundwater		AX-GW-MW4A-111011	AX-GW-MW4A-120612	AX-GW-MW4A-032014	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	AX-GW-MW6A-121010	AX-GW-MW6A-111011	AX-GW-MW6A-120512
Sample Date			UCLs		11/9/2011	12/5/2012	3/20/2014	9/13/2005	10/11/2006	11/29/2007	11/5/2008	3/18/2010	12/10/2010	11/9/2011	12/5/2012
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	1 U	--	--	--	--	--	1 U	1 U	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 U	1 U	5 U	5 U	4 D	2 U	2 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	1 U	--	--	--	--	--	1 U	1 U	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	1 U	-- U	-- U	-- UD	-- U	-- U	1 U	1 U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1.3	1.1	1 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U	1 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	4 JD	2 U	2 U	1 U	1 U	1 U
1,1-Dichloropropene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	2 U	2 U	--	-- U	-- U	-- UD	-- U	-- U	2 U	2 U	2 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 U	2 U	-- U	-- U	-- UD	-- U	-- U	2 U	2 U	2 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	5 U	5 U	4 UD	2 U	2 U	2 U	2 U	2 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	2 U	--	--	--	--	--	2 U	2 U	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	1 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	1 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U	1 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	--	--	21	--	--	--	--	--	--
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	1 U	--	--	--	--	--	1 U	1 U	1 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	1 U	1 U	--	5 U	5 U	4 UD	--	--	1 U	1 U	1 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	1 U	1 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	2 U	5 U	5 U	4 UD	2 U	2 U	2 U	2 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1 U	1 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U	1 U
1,4-Dioxane	6000	50000	50000	UG/L	-- U	--	--	--	--	--	--	--	250 U	-- U	--
2,2-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
2-Butanone (MEK)	50000	50000	50000	UG/L	5 U	5 U	--	--	--	--	--	--	5 U	5 U	5 U
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	-- U	-- U	--	--	--	--	--	--	10 U	-- U	-- U
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	--	--	--	--	--	2 U	2 U	2 U
2-Hexanone	NE	NE	NE	UG/L	5 U	5 U	--	--	--	--	--	--	5 U	5 U	5 U
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	--	--	--	--	--	2 U	2 U	2 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	5 U	5 U	--	--	--	--	--	--	5 U	5 U	5 U
Acetone	50000	50000	50000	UG/L	5 U	5 U	--	--	--	10 UD	5 U	5 U	5 U	5 U	5 U
Acrylonitrile	NE	NE	NE	UG/L	5 U	5 U	--	--	--	--	--	--	5 U	5 U	5 U
Benzene	1000	10000	10000	UG/L	0.5 U	0.5 U	--	5 U	5 U	4 UD	2 U	2 U	1 U	0.5 U	0.5 U
Bromobenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
Bromochloromethane	NE	NE	NE	UG/L	2 U	2 U	--	-- U	-- U	--	-- U	-- U	2 U	2 U	2 U
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	1 U	--	--	--	--	--	1 U	1 U	1 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	2 U	--	--	--	--	--	2 U	2 U	2 U
Bromomethane	7	800	800	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
Carbon disulfide	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	1 U	-- U	-- U	-- UD	-- U	-- U	1 U	1 U	1 U
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	1 U	5 U	5 U	3 UD	2 U	2 U	1 U	1 U	1 U
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	2 U	-- U	-- U	-- UD	-- U	-- U	2 U	2 U	2 U
Chloroform	50	20000	20000	UG/L	1 U	1 U	1 U	-- U	-- U	-- UD	-- U	-- U	1 U	1 U	1 U
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	2 U	-- U	-- U	-- UD	-- U	-- U	2 U	2 U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	26	18	5.5	15	20	16 D	14.3	6.79	11	15	14
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	1 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U	1 U
Dibromomethane	NE	NE	NE	UG/L	2 U	2 U	--	5 U	5 U	4 UD	2 U	2 U	2 U	2 U	2 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	2 U	5 U	5 U	4 UD	2 U	2 U	2 U	2 U	2 U
Diethyl Ether	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
Ethyl acetate	NE	NE	NE	UG/L	10 U	10 U	--	--	--	--	--	--	10 U	10 U	10 U
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
Ethylbenzene	20000	5000	5000	UG/L	1 U	1 U	--	5 U	5 U	4 UD	2 U	2 U	1 U	1 U	1 U
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	0.6 U	-- U	-- U	-- UD	-- U	-- U	0.6 U	0.6 U	0.6 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	2 U	2 U	--	5 U	5 U	4 UD	2 U	2 U	2 U	2 U	2 U
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	2 U	-- U	-- U	-- UD	-- U	-- U	2 U	2 U	2 U
Naphthalene	700	20000	20000	UG/L	2 U	2 U	--	5 U	5 U	10 UD	2 U	2 U	2 U	2 U	2 U
n-Butylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-4A	MW-4A	MW-4A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW4A-111011	AX-GW-MW4A-120612	AX-GW-MW4A-032014	MW-6A	MW-6A	MW-6A	MW-6A	MW-6A	AX-GW-MW6A-121010	AX-GW-MW6A-111011	AX-GW-MW6A-120512
Sample Date			UCLs		11/9/2011	12/5/2012	3/20/2014	9/13/2005	10/11/2006	11/29/2007	11/5/2008	3/18/2010	12/10/2010	11/9/2011	12/5/2012
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	-- U	-- U	-- UD	-- U	-- U	2 U	2 U	2 U
sec-Butylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
Styrene	100	6000	6000	UG/L	1 U	1 U	--	--	--	--	--	--	1 U	1 U	1 U
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
tert-Butyl alcohol	NE	NE	NE	UG/L	-- U	10 U	--	--	--	--	--	--	30 U	-- U	-- U
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
tert-Butylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	2 U	2 U	2 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1 U	1 U	1 U	0.05 U	10	11 D	5.27	3.01	4	5.9	5.1
Tetrahydrofuran	NE	NE	NE	UG/L	5 U	5 U	--	--	--	--	--	--	5 U	5 U	5 U
Toluene	50000	40000	40000	UG/L	1 U	1 U	--	0.05 U	5 U	4 UD	2 U	2 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	1 U	5 U	1 J	4 JD	2 U	2 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	2.5 U	2.5 U	--	--	--	--	--	--	2.5 U	2.5 U	2.5 U
Trichloroethene (TCE)	5	5000	5000	UG/L	5.4	3.6	15	26	150	130 D	113	55.7	70	95	54
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	2 U	2 U	--	5 U	5 U	4 UD	2 U	2 U	2 U	2 U	2 U
Vinyl acetate	NE	NE	NE	UG/L	2.5 U	2.5 U	--	--	--	--	--	--	2.5 U	2.5 U	2.5 U
Vinyl chloride	2	50000	50000	UG/L	6.8	6.5	1.5	5 U	2 U	4 D	2 U	2 U	1 U	1 U	1
Xylenes, m & p	3000	5000	5000	UG/L	2 U	2 U	--	5 U	10 U	8 UD	--	--	2 U	2 U	2 U
Xylenes, total	3000	5000	5000	UG/L	--	--	--	5 U	15 U	8 UD	6 U	4 U	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.291 U	0.25 U	--	0.05 U	0.0061 U	0.048 U	0.022 U	1.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.291 U	0.25 U	--	0.05 U	0.0033 U	0.048 U	0.022 U	1.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.291 U	0.25 U	--	0.05 U	0.0071	0.048 U	0.022 U	1.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.291 U	0.25 U	--	0.05 U	0.0066 U	0.048 U	0.022 U	1.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.96	0.52	--	0.05 U	3.863 U	0.048 U	6.85 D	4.72	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	1.23	0.49	--	0.05 U	0.0053 U	2.3 D	0.022 U	1.25 U	0.25 U	0.93
Aroclor 1260	5	10	10	UG/L	0.25 U	0.291 U	0.25 U	--	0.05 U	0.0043 U	0.048 U	0.022 U	1.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.291 U	0.25 U	--	--	--	--	--	1.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.291 U	0.25 U	--	--	--	--	--	1.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	2.19	1.01	2.35	0.05 U	0.0071	2.3	6.85	4.72	0.25 U	0.93
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	150	--	11	--	--	--	--	--	5 U	5 U	5 U
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.19	0.64	0.63	--	--	--	--	--	6.18	2.77	2.02
pH	NE	NE	NE	PH UNITS	5.81	5.1	4.73	--	--	--	--	--	5.83	5.68	5.44
Electrical conductivity	NE	NE	NE	mS/cm	0.36	0.28	0.3	--	--	--	--	--	0.07	0.22	0.13
Specific conductance	NE	NE	NE	mV	7	53	232.6	--	--	--	--	--	60.9	191	153.6
Turbidity	NE	NE	NE	NTU	2.57	7.31	12.2	--	--	--	--	--	3	2.8	1.51
Temperature	NE	NE	NE	DEG C	17.9	11.2	9.02	--	--	--	--	--	9	16.82	16.4

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-6A	MW-6A	MW-6A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW6A-032014	AX-GW-MW6A-121114	AX-GW-MW0	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	AX-GW-MW7A-121010	AX-GW-MW7A-110911
Sample Date			UCLs		3/20/2014	12/11/2014	4/18/2017	5/26/1998	9/13/2005	10/11/2006	11/27/2007	11/3/2008	3/17/2010	12/10/2010	11/9/2011
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	1 U	--	--	--	--	--	--	1 U	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 U	1 UJ	5 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	1 U	--	--	--	--	--	--	1 U	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	1 U	-- U	-- U	-- U	-- UD	-- U	-- UJ	1 U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	1 U	1 U	5 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	1 U	5 U	1 U	1 U	4 UD	2 U	2 U	1 U	1 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	-- U	-- U	-- U	-- UD	-- U	-- UJ	2 U	2 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 U	2 UJ	-- U	-- U	-- U	-- UD	-- U	-- UJ	2 U	2 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	5 U	5 U	5 U	4 UD	2 U	2 U	2 U	2 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	2 UJ	--	--	--	--	--	--	2 U	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	1 U	5 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	1 U	5 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	13	6.5	5 U	--	10 U	--	--	--	--	--
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	1 U	--	--	--	--	--	--	1 U	1 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	5 U	5 U	5 U	4 UD	--	--	1 U	1 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	1 U	1 U	5 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	2 UJ	5 U	5 U	5 U	4 UD	2 U	2 U	2 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1 U	1 U	5 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	250 U	-- U
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	5 U	5 U
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	10 U	-- U
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	--	--	--	--	--	--	2 U	2 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	5 U	5 U
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	--	--	--	--	--	--	2 U	2 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	5 U	5 U
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	10 UD	5 U	5 U	5 U	5 U
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	5 U	5 U
Benzene	1000	10000	10000	UG/L	--	--	--	35	38	39	42 D	32.9	20.4	30	17
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	-- U	-- U	-- U	--	-- U	-- UJ	2 U	2 U
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	1 U	--	--	--	--	--	--	1 U	1 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	2 UJ	--	--	--	--	--	--	2 U	2 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	1 U	-- U	-- U	-- U	-- UD	-- U	-- UJ	1 U	1 U
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	1 U	5 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	2 UJ	-- U	-- U	-- U	-- UD	-- U	-- UJ	2 U	2 U
Chloroform	50	20000	20000	UG/L	1 U	1 U	1 U	-- U	-- U	-- U	-- UD	-- U	-- UJ	1 U	1 U
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	2 UJ	-- U	-- U	-- U	-- UD	-- U	-- UJ	2 U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	6.3	13	6.5	5 U	0.3 J	5 U	4 UD	2 U	2 U	1 U	1 U
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	0.5 U	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	1 U	5 U	-- U	5 U	4 UD	2 U	2 U	1 U	1 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	5 U	-- U	5 U	4 UD	2 U	2 U	2 U	2 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	2 UJ	5 U	-- U	5 U	4 UD	2 U	2 U	2 U	2 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	10 U	10 U
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	5 U	0.3 J	0.4 J	4 UD	2 U	2 U	1 U	1 U
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	0.6 U	-- U	-- U	-- U	-- UD	-- U	-- UJ	0.6 U	0.6 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	5 U	5 U	5 U	4 UD	2 U	2 U	2 U	2 U
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	2 U	-- U	-- U	-- U	-- UD	-- U	-- UJ	2 U	2 U
Naphthalene	700	20000	20000	UG/L	--	--	--	5 U	5 U	5 U	10 UD	5 U	2 U	2 U	2 U
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-6A	MW-6A	MW-6A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A
Sample ID					AX-GW-MW6A-032014	AX-GW-MW6A-121114	AX-GW-MW0	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	MW-7A	AX-GW-MW7A-121010	AX-GW-MW7A-110911
Sample Date					3/20/2014	12/11/2014	4/18/2017	5/26/1998	9/13/2005	10/11/2006	11/27/2007	11/3/2008	3/17/2010	12/10/2010	11/9/2011
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	-- U	-- U	-- U	-- UD	-- U	-- UJ	2 U	2 U
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	1 U	1 U
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	30 U	-- U
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2 U	2 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1.7	2.4	3.1	5 U	0.05 U	5 U	4 UD	2 U	2 U	1 U	1 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	5 U	5 U
Toluene	50000	40000	40000	UG/L	--	--	--	5 U	0.47	5 U	4 UD	2 U	2 U	1 U	1 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	1 U	5 U	5 U	5 U	4 UD	2 U	2 U	1 U	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2.5 U	2.5 U
Trichloroethene (TCE)	5	5000	5000	UG/L	21	42	36	5 U	4 U	5 U	4 UD	2 U	2 U	1 U	1 U
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	5 U	5 U	5 U	4 UD	2 U	2 U	2 U	2 U
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	2.5 U	2.5 U
Vinyl chloride	2	50000	50000	UG/L	1 U	1 U	1 U	5 U	5 U	2 U	4 UD	2 U	2 U	1 U	1 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	5 U	2 J	2 U	8 UD	--	--	2 U	2 U
Xylenes, total	3000	5000	5000	UG/L	--	--	--	5 U	1 J	2 U	8 UD	6 U	4 U	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0061 U	0.048 U	0.02 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0033 U	0.048 U	0.02 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.65	0.048 U	0.02 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0066 U	0.048 U	0.02 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.00719 U	0.048 U	0.02 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	1.25	0.25 U	1.17	--	0.05 U	0.05 U	0.0053 U	0.048 U	0.02 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0043 U	0.048 U	0.02 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	1.25	0.25 U	1.17	0.48 U	0.05 U	0.05 U	0.65	0.048 U	0.02 U	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	0.5 U	--	--	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	0.5 U	--	--	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	0.5 U	--	--	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	37.5	--	--	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	0.075 U	--	--	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	0.5 U	--	--	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	0.31	--	--	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	1.41	--	--	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	0.01 U	--	--	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	10 U	--	--	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	2	--	--	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	5 U	5 U	--	--	--	--	--	--	--	55	65
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.28	4.01	--	--	--	--	--	--	--	0.76	0.12
pH	NE	NE	NE	PH UNITS	4.89	5.88	--	--	--	--	--	--	--	6.49	6.49
Electrical conductivity	NE	NE	NE	mS/cm	0.53	0.16	--	--	--	--	--	--	--	2.77	1.51
Specific conductance	NE	NE	NE	mV	238.4	131	--	--	--	--	--	--	--	-69.3	-227
Turbidity	NE	NE	NE	NTU	0.77	4.61	--	--	--	--	--	--	--	7.65	5.27
Temperature	NE	NE	NE	DEG C	7.69	13.48	--	--	--	--	--	--	--	12.94	17.79

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-7A	MW-7A	MW-7A	MW-7A	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S
Sample ID			Groundwater		AX-GW-MW7A-120512	AX-GW-MW7A-032414	AX-GW-MW7A-062714	AX-GW-MW7A-092414	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	AX-GW-MW8S-121010
Sample Date			UCLs		12/5/2012	3/24/2014	6/27/2014	9/24/2014	5/27/1998	9/15/2005	10/11/2006	11/28/2007	11/3/2008	3/17/2010	12/10/2010
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	10 U	1 U	1 U	1 U	--	--	--	--	--	--	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	10 U	1 U	1 U	1 U	5 U	5 U	50 U	2 U	100 UD	20 UD	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	10 U	1 U	1 U	1 U	--	--	--	--	--	--	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	10 U	1 U	1 U	1 U	-- U	-- U	-- U	-- U	-- UD	-- UD	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	10 U	1 U	1 U	1 U	5 U	63	38	1.4 J	100 UD	20 UD	1 U
1,1-Dichloroethene	80	30000	100000	UG/L	10 U	1 U	1 U	1 U	5 U	63	24	2 U	100 UD	20 UD	1 U
1,1-Dichloropropene	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	20 U	--	--	--	-- U	-- U	-- U	-- U	-- UD	-- UD	2 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	20 U	2 U	2 U	2 U	-- U	-- U	-- U	-- U	-- UD	-- UD	2 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	20 U	--	--	--	5 U	5 U	50 U	2 U	100 UD	20 UD	2 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	20 U	2 U	2 U	2 U	--	--	--	--	--	--	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	10 U	1 U	1 U	1 U	5 U	0.3 J	50 U	2 U	100 UD	20 UD	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	10 U	1 U	1 U	1 U	5 U	0.3 J	50 U	2 U	100 UD	20 UD	1 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	1 U	1 U	5 U	--	9400	--	--	--	--
1,2-Dichloropropane	3	50000	100000	UG/L	10 U	1 U	1 U	1 U	--	--	--	--	--	--	1 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	10 U	--	--	--	5 U	2 J	50 U	2 U	--	--	1 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	10 U	1 U	1 U	1 U	5 U	1 J	50 U	1 J	100 UD	20 UD	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	20 U	2 U	2 U	2 U	5 U	5	50 U	2 U	100 UD	20 UD	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	10 U	1 U	1 U	1 U	5 U	5 J	6 J	2.8	100 UD	20 UD	1 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	250 U
2,2-Dichloropropane	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
2-Butanone (MEK)	50000	50000	50000	UG/L	50 U	--	--	--	--	--	--	--	--	--	5 U
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	-- U	--	--	--	--	--	--	--	--	--	10 U
2-Chlorotoluene	NE	NE	NE	UG/L	20 U	2 U	2 U	2 U	--	--	--	--	--	--	2 U
2-Hexanone	NE	NE	NE	UG/L	50 U	--	--	--	--	--	--	--	--	--	5 U
4-Chlorotoluene	NE	NE	NE	UG/L	20 U	2 U	2 U	2 U	--	--	--	--	--	--	2 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	50 U	--	--	--	--	--	--	--	--	--	5 U
Acetone	50000	50000	50000	UG/L	50 U	--	--	--	--	--	--	4.8 U	250 UD	50 UD	5 U
Acrylonitrile	NE	NE	NE	UG/L	50 U	--	--	--	--	--	--	--	--	--	5 U
Benzene	1000	10000	10000	UG/L	23	--	--	--	5 U	5 U	50 U	2 U	100 UD	20 UD	1 U
Bromobenzene	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
Bromochloromethane	NE	NE	NE	UG/L	20 U	--	--	--	-- U	-- U	-- U	--	-- UD	-- UD	2 U
Bromodichloromethane	6	50000	50000	UG/L	10 U	1 U	1 U	1 U	--	--	--	--	--	--	1 U
Bromoform	700	50000	50000	UG/L	20 U	2 U	2 U	2 U	--	--	--	--	--	--	2 U
Bromomethane	7	800	800	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
Carbon disulfide	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
Carbon tetrachloride	2	5000	5000	UG/L	10 U	1 U	1 U	1 U	-- U	-- U	-- U	-- U	-- UD	-- UD	1 U
Chlorobenzene	200	1000	1000	UG/L	10 U	1 U	1 U	1 U	5 U	2 J	6	1.4 J	100 UD	20 UD	1 U
Chloroethane	NE	NE	NE	UG/L	20 U	2 U	2 U	2 U	-- U	-- U	-- U	-- U	-- UD	-- UD	2 U
Chloroform	50	20000	20000	UG/L	10 U	1 U	1 U	1 U	-- U	-- U	-- U	-- U	-- UD	-- UD	1 U
Chloromethane	NE	NE	NE	UG/L	20 U	2 U	2 U	2 U	-- U	-- U	-- U	-- U	-- UD	-- UD	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	10 U	1 U	1 U	1 U	29	16000	9400	18	13000 D	978 D	61
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	10 U	1 U	1 U	1 U	5 U	5 U	50 U	2 U	100 UD	20 UD	1 U
Dibromomethane	NE	NE	NE	UG/L	20 U	--	--	--	5 U	5 U	50 U	2 U	100 UD	20 UD	2 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	20 U	2 U	2 U	2 U	5 U	5 U	50 U	2 U	100 UD	20 UD	2 U
Diethyl Ether	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
Ethyl acetate	NE	NE	NE	UG/L	100 U	--	--	--	--	--	--	--	--	--	10 U
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
Ethylbenzene	20000	5000	5000	UG/L	10 U	--	--	--	5 U	2 J	50 U	2 U	100 UD	20 UD	1 U
Hexachlorobutadiene	50	3000	3000	UG/L	6 U	0.6 U	0.6 U	0.6 U	-- U	-- U	-- U	-- U	-- UD	-- UD	0.6 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	20 U	--	--	--	5 U	5 U	50 U	2 U	100 UD	20 UD	2 U
Methylene chloride	2000	50000	50000	UG/L	20 U	2 U	2 U	2 U	-- U	-- U	-- U	-- U	-- UD	-- UD	2 U
Naphthalene	700	20000	20000	UG/L	20 U	--	--	--	5 U	5 U	50 U	5 U	250 UD	20 UD	2 U
n-Butylbenzene	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location	MCP GW-2	MCP GW-3	MCP Groundwater	Units	MW-7A	MW-7A	MW-7A	MW-7A	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S
Sample ID					AX-GW-MW7A-120512	AX-GW-MW7A-032414	AX-GW-MW7A-062714	AX-GW-MW7A-092414	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	AX-GW-MW8S-121010
Sample Date			UCLs		12/5/2012	3/24/2014	6/27/2014	9/24/2014	5/27/1998	9/15/2005	10/11/2006	11/28/2007	11/3/2008	3/17/2010	12/10/2010
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	20 U	--	--	--	-- U	-- U	-- U	-- U	-- UD	-- UD	2 U
sec-Butylbenzene	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
Styrene	100	6000	6000	UG/L	10 U	--	--	--	--	--	--	--	--	--	1 U
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
tert-Butyl alcohol	NE	NE	NE	UG/L	-- U	--	--	--	--	--	--	--	--	--	30 U
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
tert-Butylbenzene	NE	NE	NE	UG/L	20 U	--	--	--	--	--	--	--	--	--	2 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	10 U	1 U	1 U	1 U	5 U	0.05 U	50 U	2 U	100 UD	20 UD	1 U
Tetrahydrofuran	NE	NE	NE	UG/L	50 U	--	--	--	--	--	--	--	--	--	5 U
Toluene	50000	40000	40000	UG/L	10 U	--	--	--	5 U	0.05 U	11 J	2 U	100 UD	20 UD	1 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	10 U	1 U	1 U	1 U	5 U	5 U	28 J	2 U	100 UD	20 UD	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	0.5 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	25 U	--	--	--	--	--	--	--	--	--	2.5 U
Trichloroethene (TCE)	5	5000	5000	UG/L	10 U	1 U	1 U	1 U	5 U	8.8	8 J	2.5	100 UD	23.1 D	1 U
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	20 U	--	--	--	5 U	5 U	50 U	2 U	100 UD	20 UD	2 U
Vinyl acetate	NE	NE	NE	UG/L	25 U	--	--	--	--	--	--	--	--	--	2.5 U
Vinyl chloride	2	50000	50000	UG/L	10 U	1 U	1 U	1 U	5 U	5 U	5000	94	4200 D	261 D	32
Xylenes, m & p	3000	5000	5000	UG/L	20 U	--	--	--	5 U	4 J	100 U	4 U	--	--	2 U
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	5 U	5 U	150 U	4 U	300 UD	40 UD	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0061 U	0.048 U	0.02 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0033 U	0.048 U	0.02 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0071 U	0.048 U	0.02 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.49	0.25 U	0.41	--	3.1	0.66	0.0066 U	0.37	0.81	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.19	0.048 U	0.02 U	0.36
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	1.2	0.05 U	0.0053 U	0.05	0.46	0.31
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0043 U	0.048 U	0.02 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.49	0.25 U	0.41	3	4.3	0.66	0.19	0.42	1.28	0.67
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	8.12	9.27	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	7890	9460	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	335	377	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	16.2	14.1	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	14	18	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	32	43	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	0.1 U	0.1 U	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	0.6	0.77	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	10 U	10 U	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	16	4	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	21	26	66	30	--	--	--	--	--	--	44
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.09	0.17	0.06	0	--	--	--	--	--	--	0.48
pH	NE	NE	NE	PH UNITS	6.22	6.39	6.5	6.78	--	--	--	--	--	--	7.13
Electrical conductivity	NE	NE	NE	mS/cm	4.61	2.48	1.67	4.48	--	--	--	--	--	--	3.83
Specific conductance	NE	NE	NE	mV	-50.7	-110	-114	-106.4	--	--	--	--	--	--	-35.6
Turbidity	NE	NE	NE	NTU	2.31	1.3	3.34	3.01	--	--	--	--	--	--	0.1
Temperature	NE	NE	NE	DEG C	15.09	7.84	20.63	23.55	--	--	--	--	--	--	11.54

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	MW-12S	MW-12S	MW-13D	MW-13D	MW-13D	MW-13D
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW8S-111111	AX-GW-MW8S-120612	AX-GW-MW8S-032014	AX-GW-MW8S-092514	AX-GW-MW8S-120914	AX-GW-MW12S-031914	AX-GW-MW12S-062614	AX-GW-MW13D-032014	AX-GW-MW13D-062614	AX-GW-MW13D-121014	AX-GW-MW1
Sample Date			UCLs		11/11/2011	12/5/2012	3/20/2014	9/25/2014	12/9/2014	3/19/2014	6/26/2014	3/20/2014	6/26/2014	12/10/2014	4/19/2017
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	3.3	5.2	2 U	2.4
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	100 U	100 U	100 U	100 U	100 U	3	5	1.9	3.3	5.8	4.1
1,1-Dichloroethene	80	30000	100000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
1,1-Dichloropropene	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 UJ
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	--	13000	8300	--	39	--	31	250	84
1,2-Dichloropropane	3	50000	100000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	100 U	100 U	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	50 U	50 U	--	0.5 U	--	0.5 U	1 U	0.5 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
1,4-Dioxane	6000	50000	50000	UG/L	-- U	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	500 U	500 U	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	-- U	-- U	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 U
2-Hexanone	NE	NE	NE	UG/L	500 U	500 U	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	500 U	500 U	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	500 U	500 U	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	500 U	500 U	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	50 U	50 U	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
Bromoform	700	50000	50000	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 UJ
Bromomethane	7	800	800	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
Chlorobenzene	200	1000	1000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
Chloroethane	NE	NE	NE	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 UJ
Chloroform	50	20000	20000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
Chloromethane	NE	NE	NE	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	3800	11000	6600	13000	8300	37	38	18	30	250	84
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	50 U	50 U	50 U	50 U	50 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1 U	1 U	2 U	1 U
Dibromomethane	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 U
Diethyl Ether	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	1000 U	1000 U	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	100 U	100 U	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	60 U	60 U	60 U	60 U	60 U	0.6 U	0.6 U	0.6 U	0.6 U	1.2 U	0.6 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	200 U	200 U	200 U	200 U	200 U	2 U	2 U	2 U	2 U	4 U	2 U
Naphthalene	700	20000	20000	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-8S	MW-8S	MW-8S	MW-8S	MW-8S	MW-12S	MW-12S	MW-13D	MW-13D	MW-13D	MW-13D
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	AX-GW-MW8S-111111	AX-GW-MW8S-120612	AX-GW-MW8S-032014	AX-GW-MW8S-092514	AX-GW-MW8S-120914	AX-GW-MW12S-031914	AX-GW-MW12S-062614	AX-GW-MW13D-032014	AX-GW-MW13D-062614	AX-GW-MW13D-121014	AX-GW-MW1
Sample Date					11/11/2011	12/5/2012	3/20/2014	9/25/2014	12/9/2014	3/19/2014	6/26/2014	3/20/2014	6/26/2014	12/10/2014	4/19/2017
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	100 U	100 U	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	-- U	1000 U	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1 U	1.9	1.8	2 U	1 U
Tetrahydrofuran	NE	NE	NE	UG/L	500 U	500 U	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	100 U	100 U	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	100 U	100 U	100 U	100 U	100 U	1 U	1	1 U	1.1	2	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	50 U	50 U	50 U	50 U	50 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	0.5 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	250 U	250 U	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	100 U	100 U	100 U	100 U	140	10	5.2	20	21	47	24
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	250 U	250 U	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	500	6400	1800	3700	4200	1.7	3	3.9	2.6	530	46 J
Xylenes, m & p	3000	5000	5000	UG/L	200 U	200 U	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	1.22	1.22	1.08	0.44	0.71	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.56	1.29	0.6	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.37	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	1.78	2.88	1.68	0.44	0.71	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	6.31	4.5	--	2.44	--	0.5 U	1.78	--
Ethene	NE	NE	NE	UG/L	--	--	--	232	325	--	0.5 U	--	0.5 U	66.3	--
Methane	NE	NE	NE	UG/L	--	--	--	444	333	--	386	--	136	312	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	230	229	--	152	--	271	272	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	1.28	0.91	--	0.38	--	0.44	0.48	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	17	11	--	7	--	0.5 U	0.5 U	--
Iron	NE	NE	NE	MG/L	--	--	--	5.9	6.1	--	11	--	0.8	0.39	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	0.1	0.09	--	0.88	--	0.08	0.06	--
Sulfate	NE	NE	NE	MG/L	--	--	--	350	360	--	13	--	40	31	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	26	9	--	12	--	4.1	4.2	--
Total Suspended Solids	NE	NE	NE	MG/L	13	37	16	13	8.5	27	21	5 U	5 U	5 U	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	3.62	0.19	0.28	0.1	0.24	0.12	0.16	0.13	0.11	0.08	--
pH	NE	NE	NE	PH UNITS	6.71	6.66	6.71	6.99	6.83	5.82	5.97	6.9	6.87	6.8	--
Electrical conductivity	NE	NE	NE	mS/cm	0.89	3.13	4.55	3.74	4.76	0.49	0.74	1.57	1.13	1.48	--
Specific conductance	NE	NE	NE	mV	7	-31.3	-68	-89.2	-82.5	30.7	-232.3	88.3	-43.1	96.2	--
Turbidity	NE	NE	NE	NTU	13.6	18.2	2.69	1.74	6.81	8.2	1.84	1.82	2.01	2.48	--
Temperature	NE	NE	NE	DEG C	12.9	14.25	9.75	22.57	13.67	9.52	18.48	10.38	19.18	15.66	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-19S	MW-19S	MW-19S	MW-25D	GZ-101S	GZ-101S	GZ-101S	GZ-101S	GZ-101S	GZ-101S	GZ-102S
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW19S-032114	AX-GW-MW19S-062614	AX-GW-MW19S-120914	AX-GW-MW25D-080714	AX-GW-GZ101S-120810	AX-GW-GZ101S-110911	AX-GW-GZ101S-031714	AX-GW-GZ101S-062414	AX-GW-GZ101S-092214	AX-GW-GZ101S-120814	AX-GW-GZ102S-120810
Sample Date			UCLs		3/21/2014	6/26/2014	12/9/2014	8/7/2014	12/8/2010	11/9/2011	3/17/2014	6/24/2014	9/22/2014	12/8/2014	12/8/2010
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	150	220	6.2	--	--	--	4.6	7.4	4.9	--
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	10 U	4 U	--	--	--	--	1 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	1 U	1 U	2.5 U	--	--	--	0.5 U	0.5 U	0.5 U	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	2500 U	-- U	--	--	--	--	250 U
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	50 U	20 U	--	--	--	--	5 U
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	100 U	-- U	--	--	--	--	10 U
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	50 U	20 U	--	--	--	--	5 U
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	50 U	20 U	--	--	--	--	5 U
Acetone	50000	50000	50000	UG/L	--	--	--	--	50 U	20 U	--	--	--	--	5 U
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	50 U	20 U	--	--	--	--	5 U
Benzene	1000	10000	10000	UG/L	--	--	--	--	10 U	2 U	--	--	--	--	1 U
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Bromodichloromethane	6	50000	50000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
Bromoform	700	50000	50000	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
Bromomethane	7	800	800	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Carbon tetrachloride	2	5000	5000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	200	1000	1000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	NE	NE	NE	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
Chloroform	50	20000	20000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	NE	NE	NE	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	120	150	210	6.2	220	92	4.2	4.6	7.4	4.9	5.6
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	1 U	1 U	2.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	2 U	2 U	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	100 U	40 U	--	--	--	--	10 U
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	10 U	4 U	--	--	--	--	1 U
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	1.2 U	1.2 U	3 U	6 U	2.4 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Methylene chloride	2000	50000	50000	UG/L	2 U	4 U	4 U	10 U	20 U	8 U	2 U	2 U	2 U	2 U	2 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U

Table E-1
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Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-19S	MW-19S	MW-19S	MW-25D	GZ-101S	GZ-101S	GZ-101S	GZ-101S	GZ-101S	GZ-101S	GZ-102S
Sample ID					AX-GW-MW19S-032114	AX-GW-MW19S-062614	AX-GW-MW19S-120914	AX-GW-MW25D-080714	AX-GW-GZ101S-120810	AX-GW-GZ101S-110911	AX-GW-GZ101S-031714	AX-GW-GZ101S-062414	AX-GW-GZ101S-092214	AX-GW-GZ101S-120814	AX-GW-GZ102S-120810
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	3/21/2014	6/26/2014	12/9/2014	8/7/2014	12/8/2010	11/9/2011	3/17/2014	6/24/2014	9/22/2014	12/8/2014	12/8/2010
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Styrene	100	6000	6000	UG/L	--	--	--	--	10 U	4 U	--	--	--	--	1 U
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	300 U	-- U	--	--	--	--	30 U
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1 U	2 U	2 U	5 U	12	28	4.2	1.8	1.5	1.4	2.2
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	50 U	20 U	--	--	--	--	5 U
Toluene	50000	40000	40000	UG/L	--	--	--	--	10 U	4 U	--	--	--	--	1 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1.4	2.9	5.2	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	1 U	1 U	2.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	25 U	10 U	--	--	--	--	2.5 U
Trichloroethene (TCE)	5	5000	5000	UG/L	17	28	26	5 U	600	180	17	9.9	11	14	59
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	25 U	10 U	--	--	--	--	2.5 U
Vinyl chloride	2	50000	50000	UG/L	4.6	2 U	3.7	5 U	10 U	4 U	1 U	1 U	1 U	1 U	1.1
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	20 U	8 U	--	--	--	--	2 U
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	3.06	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.25	0.25 U	0.25 U	3.06	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	0.5 U	0.5 U	2.3	--	--	--	0.5 U	0.5 U	0.5 U	--
Ethene	NE	NE	NE	UG/L	--	0.5 U	0.5 U	3.84	--	--	--	0.5 U	0.5 U	0.5 U	--
Methane	NE	NE	NE	UG/L	--	8.89	2.3	1120	--	--	--	5 U	0.5 U	0.5 U	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	30.4	33.4	454	--	--	--	46	49.9	54.5	--
Ammonia (as N)	NE	NE	NE	MG/L	--	0.09	0.075 U	1.01	--	--	--	0.075 U	0.075 U	0.075 U	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	0.5 U	0.5 U	0.71	--	--	--	0.5 U	0.5 U	0.5 U	--
Iron	NE	NE	NE	MG/L	--	0.06	0.14	4.5	--	--	--	0.06	0.4	0.05 U	--
Nitrate (as N)	NE	NE	NE	MG/L	--	7.69	6.56	0.1 U	--	--	--	3.18	2.81	2.61	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	0.01 U	0.01	0.24	--	--	--	0.01 U	0.01 U	0.01 U	--
Sulfate	NE	NE	NE	MG/L	--	24	22	77	--	--	--	10 U	11	11	--
Total Organic Carbon	NE	NE	NE	MG/L	--	2.6	4	57	--	--	--	1.2	1.6	1 U	--
Total Suspended Solids	NE	NE	NE	MG/L	5 U	5 U	11	12	45	49	5 U	5 U	5 U	5 U	24
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	1.2	1.59	7.09	0.24	1.8	0.5	4.33	3.71	2	1.98	4.23
pH	NE	NE	NE	PH UNITS	4.91	5.48	5.66	6.99	6.51	6.04	6.25	6.15	6.04	5.99	6.65
Electrical conductivity	NE	NE	NE	mS/cm	0.32	0.38	0.34	1.36	1.31	2.04	1.23	2.66	2.01	1.92	0.29
Specific conductance	NE	NE	NE	mV	254.6	216.2	250	-55.4	27.6	101	230.9	129.7	123.9	146.2	148.9
Turbidity	NE	NE	NE	NTU	6.91	0.52	2.01	2.65	43.5	35.4	1.72	1.56	3.86	4.02	1.26
Temperature	NE	NE	NE	DEG C	8.16	17.94	14.56	23.54	13.56	17.51	7.8	17.02	21.66	13.49	10.3

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
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* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
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Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	GZ-102S	GZ-102S	GZ-102S	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2
Sample ID			Groundwater		AX-GW-GZ102S-111011	AX-GW-GZ102S-031814	AX-GW-GZ102S-062414	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	AX-GW-MW2-121010	AX-GW-DUP2-121010
Sample Date			UCLs		11/10/2011	3/18/2014	6/24/2014	5/27/1998	9/14/2005	10/11/2006	11/28/2007	11/4/2008	3/17/2010	12/10/2010	12/10/2010
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	1 U	--	--	--	--	--	--	4 U	4 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 U	1 U	25 U	5 U	5 U	40 UD	10 UD	2 U	4 U	4 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	1 U	--	--	--	--	--	--	4 U	4 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	1 U	25 U	5 U	5 U	40 UD	10 UD	2 U	4 U	4 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	1 U	1 U	25 U	0.9 J	0.7 J	40 UD	10 UD	2 U	4 U	4 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	1 U	25 U	1 U	1 U	40 UD	10 UD	2 U	4 U	4 U
1,1-Dichloropropene	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	2 U	--	--	25 U	5 U	5 U	40 UD	25 UD	2 U	8 U	8 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 U	2 U	25 U	5 U	5 U	40 UD	25 UD	2 U	8 U	8 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	2 U	--	--	25 U	0.4 J	0.2 J	40 UD	10 UD	2 U	8 U	8 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	2 U	--	--	--	--	--	--	8 U	8 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	1 U	25 U	9	4 J	40 UD	10 UD	2 U	4 U	4 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	1 U	25 U	5 U	5 U	40 UD	10 UD	2 U	4 U	4 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	17	25 U	--	10 U	--	--	--	--	--
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	1 U	--	--	--	--	--	--	4 U	4 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	1 U	--	--	25 U	0.6 J	0.4 J	40 UD	--	--	4 U	4 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	1 U	1 U	150	150	61	40 UD	17.8 D	12.4	14	14
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	2 U	-- U	-- U	-- U	-- UD	-- UD	-- U	8 U	8 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	0.5 U	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1 U	1 U	220	170	59	40 UD	70.9 D	41.6	59	58
1,4-Dioxane	6000	50000	50000	UG/L	-- U	--	--	--	--	--	--	--	--	1000 U	1000 U
2,2-Dichloropropane	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
2-Butanone (MEK)	50000	50000	50000	UG/L	5 U	--	--	--	--	--	--	--	--	20 U	20 U
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	-- U	--	--	--	--	--	--	--	--	40 U	40 U
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	--	--	--	--	--	--	8 U	8 U
2-Hexanone	NE	NE	NE	UG/L	5 U	--	--	--	--	--	--	--	--	20 U	20 U
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	--	--	--	--	--	--	8 U	8 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	5 U	--	--	--	--	--	--	--	--	20 U	20 U
Acetone	50000	50000	50000	UG/L	5 U	--	--	--	--	--	--	25 UD	5 U	20 U	20 U
Acrylonitrile	NE	NE	NE	UG/L	5 U	--	--	--	--	--	--	--	--	20 U	20 U
Benzene	1000	10000	10000	UG/L	0.5 U	--	--	25 U	6	20	21 JD	10 UD	3.5	4 U	4
Bromobenzene	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
Bromochloromethane	NE	NE	NE	UG/L	2 U	--	--	25 U	5 U	1 U	--	10 UD	2 U	8 U	8 U
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	1 U	--	--	--	--	--	--	4 U	4 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	2 U	--	--	--	--	--	--	8 U	8 U
Bromomethane	7	800	800	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
Carbon disulfide	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	1 U	25 U	5 U	5 U	40 UD	10 UD	2 U	4 U	4 U
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	1 U	570	660	890	*2300 D*	411 D	460 J	200	200
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	2 U	25 U	5 U	5 U	40 UD	10 UD	2 U	8 U	8 U
Chloroform	50	20000	20000	UG/L	1 U	1 U	1 U	25 U	5 U	5 U	40 UD	10 UD	2 U	4 U	4 U
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	2 U	25 U	0.5 J	5 U	40 UD	10 UD	2 U	8 U	8 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	1.4	1 U	17	25 U	5 U	5 U	40 UD	10 UD	16.4	5	5.2
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	2 U	2 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	1 U	25 U	5 U	5 U	40 UD	10 UD	2 U	4 U	4 U
Dibromomethane	NE	NE	NE	UG/L	2 U	--	--	-- U	-- U	-- U	-- UD	-- UD	-- U	8 U	8 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	2 U	-- U	-- U	-- U	-- UD	-- UD	-- U	8 U	8 U
Diethyl Ether	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
Ethyl acetate	NE	NE	NE	UG/L	10 U	--	--	--	--	--	--	--	--	40 U	40 U
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
Ethylbenzene	20000	5000	5000	UG/L	1 U	--	--	25 U	0.9 J	0.8	40 UD	10 UD	2 U	4 U	4 U
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	0.6 U	25 U	1 U	1 U	40 UD	25 UD	2 U	2.4 U	2.4 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	2 U	--	--	25 U	1 J	1 J	40 UD	10 UD	2 U	8 U	8 U
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	2 U	25 U	5 U	5 U	100 UD	10 UD	5 U	8 U	8 U
Naphthalene	700	20000	20000	UG/L	2 U	--	--	25 U	2 J	0.9 J	100 UD	25 UD	4.61	8 U	8 U
n-Butylbenzene	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP Groundwater	Units	GZ-102S	GZ-102S	GZ-102S	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2
Sample ID					AX-GW-GZ102S-111011	AX-GW-GZ102S-031814	AX-GW-GZ102S-062414	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	AX-GW-MW2-121010	AX-GW-DUP2-121010
Sample Date			UCLs		11/10/2011	3/18/2014	6/24/2014	5/27/1998	9/14/2005	10/11/2006	11/28/2007	11/4/2008	3/17/2010	12/10/2010	12/10/2010
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	2 U	--	--	25 U	0.5 J	0.4 J	40 UD	10 UD	2 U	8 U	8 U
sec-Butylbenzene	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
Styrene	100	6000	6000	UG/L	1 U	--	--	--	--	--	--	--	--	4 U	4 U
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
tert-Butyl alcohol	NE	NE	NE	UG/L	-- U	--	--	--	--	--	--	--	--	120 U	120 U
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
tert-Butylbenzene	NE	NE	NE	UG/L	2 U	--	--	--	--	--	--	--	--	8 U	8 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1.6	1 U	1.2	25 U	0.05 U	5 U	40 UD	10 UD	2 U	4 U	4 U
Tetrahydrofuran	NE	NE	NE	UG/L	5 U	--	--	--	--	--	--	--	--	20 U	20 U
Toluene	50000	40000	40000	UG/L	1 U	--	--	25 U	0.05 U	0.9 J	40 UD	10 UD	2 U	4 U	4 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	1 U	25 U	0.05 U	5 U	40 UD	10 UD	2 U	4 U	4 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	2 U	2 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	2.5 U	--	--	--	--	--	--	--	--	10 U	10 U
Trichloroethene (TCE)	5	5000	5000	UG/L	50	27	78	25 U	5 U	5 U	40 UD	10 UD	2 U	4 U	4 U
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	2 U	--	--	25 U	4 U	5 U	40 UD	10 UD	2 U	8 U	8 U
Vinyl acetate	NE	NE	NE	UG/L	2.5 U	--	--	--	--	--	--	--	--	10 U	10 U
Vinyl chloride	2	50000	50000	UG/L	1 U	1 U	1 U	25 U	5 U	3	40 UD	10 UD	30.9 U	9.2	8.4
Xylenes, m & p	3000	5000	5000	UG/L	2 U	--	--	25 U	4 J	4 J	80 UD	--	--	8 U	8 U
Xylenes, total	3000	5000	5000	UG/L	--	--	--	25 U	5 U	4 J	80 UD	30 UD	4 U	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0061 U	0.048 U	0.021 U	*29.7*	*22.3*
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	*27.25*	0.048 U	0.021 U	5 U	5 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0071 U	0.048 U	0.021 U	5 U	5 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0066 U	0.048 U	*42.8*	5 U	5 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0071 U	0.048 U	0.021 U	5 U	5 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	1.15	--	0.05 U	0.05 U	0.0053 U	0.39 P	*49.4*	9.95	5 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	0.05 U	0.05 U	0.0043 U	0.04 J	0.021 U	5 U	5 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	5 U	5 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	5 U	5 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	1.15	5 U	0.05 U	0.05 U	*27.25*	0.43	*92.2*	*39.65*	*22.3*
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	0.5 U	--	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	0.5 U	--	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	5 U	--	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	70.2	--	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	0.075 U	--	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	0.5 U	--	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	0.05 U	--	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	2.88	--	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	0.01	--	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	19	--	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	3.2	--	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	5 U	5 U	5 U	--	--	--	--	--	--	31	30
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.68	6	1.55	--	--	--	--	--	--	0.1	--
pH	NE	NE	NE	PH UNITS	6.49	6.17	6.57	--	--	--	--	--	--	6.59	--
Electrical conductivity	NE	NE	NE	mS/cm	0.38	1.9	1.07	--	--	--	--	--	--	7.99	--
Specific conductance	NE	NE	NE	mV	128	1.31	122.2	--	--	--	--	--	--	-86.5	--
Turbidity	NE	NE	NE	NTU	4.3	0.47	0.67	--	--	--	--	--	--	3.44	--
Temperature	NE	NE	NE	DEG C	17.13	8.4	18.41	--	--	--	--	--	--	16.47	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location					MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-4	MW-4
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW2-111011	AX-GW-DUP2-111011	AX-GW-MW2-120512	AX-GW-MW2-032114	AX-GW-DUP2-032114	AX-GW-MW2-062714	AX-GW-MW2-092514	AX-GW-MW2-121114	AX-GW-MW	MW-4	MW-4
Sample Date			UCLs		11/9/2011	11/10/2011	12/5/2012	3/21/2014	3/21/2014	6/27/2014	9/25/2014	12/11/2014	4/18/2017	5/27/1998	9/13/2005
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	--	--
1,1,1-Trichloroethane	4000	20000	100000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 UJ	50 U	5 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	--	--
1,1,2-Trichloroethane	900	50000	100000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	5 U
1,1-Dichloroethane	2000	20000	100000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	0.05 J
1,1-Dichloroethene	80	30000	100000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	0.9 J
1,1-Dichloropropene	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	50 U	5 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 UJ	50 U	2 J
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	50 U	5 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 UJ	--	--
1,2-Dichlorobenzene	8000	2000	80000	UG/L	5 U	1.3	5 U	7.9	8.4	14	14	5.6	9.6	50 U	10
1,2-Dichloroethane	5	20000	100000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	5 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	--	--	--	10 U	10 U	2 U	5 U	50 U	--
1,2-Dichloropropane	3	50000	100000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	--	--
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	5 U	1 U	5 U	--	--	--	--	--	--	50 U	5 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	15	17	19	34	35	44	52	23	71	50 U	56
1,3-Dichloropropane	NE	NE	NE	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 UJ	-- U	-- U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	--	--	5 U	5 U	1 U	2.5 U	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	39	41	59	72	74	110	120	45	120	110	200
1,4-Dioxane	6000	50000	50000	UG/L	-- U	-- U	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	25 U	5 U	25 U	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	-- U	-- U	-- U	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 U	--	--
2-Hexanone	NE	NE	NE	UG/L	25 U	5 U	25 U	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 U	--	--
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	25 U	5 U	25 U	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	25 U	5 U	25 U	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	25 U	5 U	25 U	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	11	13	2.9	--	--	--	--	--	--	50 U	3 J
Bromobenzene	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	50 U	5 U
Bromodichloromethane	6	50000	50000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	--	--
Bromoform	700	50000	50000	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 UJ	--	--
Bromomethane	7	800	800	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	5 U
Chlorobenzene	200	1000	1000	UG/L	510	520	220	450	460	940	910	220	880	55	67
Chloroethane	NE	NE	NE	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 UJ	50 U	5 U
Chloroform	50	20000	20000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	5 U
Chloromethane	NE	NE	NE	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 UJ	50 U	5 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	850	230
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	2.5 U	0.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1 U	2.5 U	--	--
Dibromochloromethane	20	50000	50000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	5 U
Dibromomethane	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	-- U	-- U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 UJ	-- U	-- U
Diethyl Ether	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	50 U	10 U	50 U	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	5 U	1 U	5 U	--	--	--	--	--	--	50 U	5 U
Hexachlorobutadiene	50	3000	3000	UG/L	3 U	0.6 U	3 U	3 U	3 U	6 U	6 U	1.2 U	3 U	50 U	1 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	50 U	0.8 J
Methylene chloride	2000	50000	50000	UG/L	10 U	2 U	10 U	10 U	10 U	20 U	20 U	4 U	10 U	50 U	5 U
Naphthalene	700	20000	20000	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	50 U	5 U
n-Butylbenzene	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location					MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-2	MW-4	MW-4
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	AX-GW-MW2-111011	AX-GW-DUP2-111011	AX-GW-MW2-120512	AX-GW-MW2-032114	AX-GW-DUP2-032114	AX-GW-MW2-062714	AX-GW-MW2-092514	AX-GW-MW2-121114	AX-GW-MW	MW-4	MW-4
Sample Date					11/9/2011	11/10/2011	12/5/2012	3/21/2014	3/21/2014	6/27/2014	9/25/2014	12/11/2014	4/18/2017	5/27/1998	9/13/2005
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	50 U	5 U
sec-Butylbenzene	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	5 U	1 U	5 U	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	-- U	-- U	-- U	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	0.05 U
Tetrahydrofuran	NE	NE	NE	UG/L	25 U	5 U	25 U	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	5 U	1 U	5 U	--	--	--	--	--	--	50 U	0.05 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	2.4
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	2.5 U	0.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1 U	2.5 UJ	--	--
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	12 U	2.5 U	12 U	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	5 U	1 U	5 U	5 U	5 U	10 U	10 U	2 U	5 U	50 U	5 U
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	10 U	2 U	10 U	--	--	--	--	--	--	50 U	4 U
Vinyl acetate	NE	NE	NE	UG/L	12 U	2.5 U	12 U	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	5 U	3.4	5 U	5 U	5 U	10 U	10 U	2 U	5 U	490	5 U
Xylenes, m & p	3000	5000	5000	UG/L	10 U	2.1	10 U	--	--	--	--	--	--	50 U	5 U
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	50 U	5 U
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	*27.2*	*22.7*	*13.5*	0.5 U	0.5 U	1.25 U	1.25 U	1.25 U	1.25 U	--	0.05 U
Aroclor 1221	5	10	10	UG/L	1.3 U	1.3 U	1.25 U	0.5 U	0.5 U	1.25 U	1.25 U	1.25 U	1.25 U	--	0.05 U
Aroclor 1232	5	10	10	UG/L	1.3 U	1.3 U	1.25 U	0.5 U	0.5 U	1.25 U	1.25 U	1.25 U	1.25 U	--	0.05 U
Aroclor 1242	5	10	10	UG/L	1.3 U	1.3 U	1.25 U	9.5	9.73	7.68	*15.6*	*17.3*	*13.7*	--	0.05 U
Aroclor 1248	5	10	10	UG/L	1.3 U	1.3 U	1.25 U	0.5 U	0.5 U	1.25 U	1.25 U	1.25 U	1.25 U	--	0.05 U
Aroclor 1254	5	10	10	UG/L	*15.3*	*13.5*	*11.1*	1.38	1.33	2.48	3.13 P	1.9	2.74	--	0.05 U
Aroclor 1260	5	10	10	UG/L	1.3 U	1.3 U	1.25 U	0.5 U	0.5 U	1.25 U	1.25 U	1.25 U	1.25 U	--	0.05 U
Aroclor 1262	5	10	10	UG/L	1.3 U	1.3 U	1.25 U	0.5 U	0.5 U	1.25 U	1.25 U	1.25 U	1.25 U	--	--
Aroclor 1268	5	10	10	UG/L	1.3 U	1.3 U	1.25 U	0.5 U	0.5 U	1.25 U	1.25 U	1.25 U	1.25 U	--	--
Total PCBs	5	10	10	UG/L	*42.5*	*36.2*	*24.6*	*10.88*	*11.06*	*10.16*	*18.7*	*19.2*	*16.4*	2.5 U	0.05 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	481	451	144	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	4.7	7.75	15.1	--	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	7100	6150	1930	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	245	259	113	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	4.06	4.22	1.85	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	8	5.6	0.82	--	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	8.2	7.8	1	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	0.1 U	0.1 U	0.1 U	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	0.21	0.26	0.05	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	39	32	32	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	11	12	4.4	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	18	18	23	6.3	5.4	18	11	5 U	--	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.12	--	0.11	0.06	--	0.11	0.09	0.34	--	--	--
pH	NE	NE	NE	PH UNITS	6.26	--	6.32	6.11	--	6.37	6.58	6.39	--	--	--
Electrical conductivity	NE	NE	NE	mS/cm	2.74	--	6.16	2.26	--	4.01	3.55	1.33	--	--	--
Specific conductance	NE	NE	NE	mV	-50	--	-49.4	-85.8	--	-94.1	-30.1	-25.8	--	--	--
Turbidity	NE	NE	NE	NTU	5.93	--	12.7	1.22	--	0.52	1.15	0	--	--	--
Temperature	NE	NE	NE	DEG C	17.2	--	17.78	11.4	--	17.86	19.42	14.7	--	--	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-5	MW-5
Sample ID			Groundwater		MW-4	MW-4	MW-4	MW-4	AX-GW-MW4-120910	AX-GW-MW4-111011	AX-GW-MW4-120612	AX-GW-MW4-032014	AX-GW-MW4-092514	MW-5	MW-5
Sample Date			UCLs		10/11/2006	11/28/2007	11/4/2008	3/17/2010	12/9/2010	11/10/2011	12/5/2012	3/20/2014	9/25/2014	5/27/1998	9/15/2005
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	--	--	--	--	20 U	1 U	1 U	5 U	5 U	--	--
1,1,1-Trichloroethane	4000	20000	100000	UG/L	5 U	2 U	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	--	--	--	--	20 U	1 U	1 U	5 U	5 U	--	--
1,1,2-Trichloroethane	900	50000	100000	UG/L	5 U	2 U	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	2000	20000	100000	UG/L	0.7 J	2 U	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	80	30000	100000	UG/L	0.9 J	1 J	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	1 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	5 U	2 U	5 U	2 U	40 U	2 U	2 U	--	--	5 U	5 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	3	5 U	2.2	40 U	2 U	2 U	10 U	10 U	5 U	5 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	40 U	2 U	2 U	--	--	5 U	5 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	--	--	--	--	40 U	2 U	2 U	10 U	10 U	--	--
1,2-Dichlorobenzene	8000	2000	80000	UG/L	4 J	5.6	2 U	3.76	20 U	1.7	2	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5	20000	100000	UG/L	5 U	2 U	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	170	--	--	--	--	--	--	--	580	5 U	--
1,2-Dichloropropane	3	50000	100000	UG/L	--	--	--	--	20 U	1 U	1 U	5 U	5 U	--	--
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	5 U	2 U	--	--	20 U	1 U	1 U	--	--	5 U	5 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	20	23	7.62	19.2	20 U	9.5	11	9.6	5.8	5 U	5 U
1,3-Dichloropropane	NE	NE	NE	UG/L	-- U	-- U	-- U	-- U	40 U	2 U	2 U	10 U	10 U	-- U	-- U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	--	--	--	--	--	2.5 U	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	5 U	95	14.5	41.6	20 U	21	22	21	11	5 U	5 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	5000 U	-- U	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	100 U	5 U	5 U	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	200 U	-- U	-- U	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	10 U	10 U	--	--
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	100 U	5 U	5 U	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	10 U	10 U	--	--
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	100 U	5 U	5 U	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	11.1	5 U	100 U	5 U	5 U	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	100 U	5 U	5 U	--	--	--	--
Benzene	1000	10000	10000	UG/L	3	3.6	2.44	2.08	20 U	2.3	2.3	--	--	5 U	5 U
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	1 U	--	2 U	2 U	40 U	2 U	2 U	--	--	5 U	1 U
Bromodichloromethane	6	50000	50000	UG/L	--	--	--	--	20 U	1 U	1 U	5 U	5 U	--	--
Bromoform	700	50000	50000	UG/L	--	--	--	--	40 U	2 U	2 U	10 U	10 U	--	--
Bromomethane	7	800	800	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	5 U	2 U	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	5 U
Chlorobenzene	200	1000	1000	UG/L	38	56	23.4	26.8	25	20	36	22	24	5 U	5 U
Chloroethane	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	40 U	2 U	2 U	10 U	10 U	5 U	5 U
Chloroform	50	20000	20000	UG/L	5 U	2 U	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	1 J
Chloromethane	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	40 U	2 U	2 U	10 U	10 U	5 U	5 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	170	130	146	96.6	860	15	28	6.1	580	5 U	5 U
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	10 U	0.5 U	0.5 U	2.5 U	2.5 U	--	--
Dibromochloromethane	20	50000	50000	UG/L	5	2 U	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	5 U
Dibromomethane	NE	NE	NE	UG/L	-- U	-- U	-- U	-- U	40 U	2 U	2 U	--	--	-- U	-- U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	-- U	-- U	-- U	-- U	40 U	2 U	2 U	10 U	10 U	-- U	-- U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	200 U	10 U	10 U	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	5 U	2 U	2 U	2 U	20 U	1 U	1 U	--	--	5 U	5 U
Hexachlorobutadiene	50	3000	3000	UG/L	1 U	2 U	5 U	2 U	12 U	0.6 U	0.6 U	3 U	3 U	5 U	1 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	0.5 J	2 U	2 U	2 U	40 U	2 U	2 U	--	--	5 U	5 U
Methylene chloride	2000	50000	50000	UG/L	5 U	5 U	2 U	5 U	40 U	2 U	2 U	10 U	10 U	5 U	5 U
Naphthalene	700	20000	20000	UG/L	5 U	5 U	5 U	2 U	40 U	2 U	2 U	--	--	5 U	5 U
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--

Table E-1
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Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP Groundwater	Units	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-5	MW-5
Sample ID					MW-4	MW-4	MW-4	MW-4	AX-GW-MW4-120910	AX-GW-MW4-111011	AX-GW-MW4-120612	AX-GW-MW4-032014	AX-GW-MW4-092514	MW-5	MW-5
Sample Date			UCLs		10/11/2006	11/28/2007	11/4/2008	3/17/2010	12/9/2010	11/10/2011	12/5/2012	3/20/2014	9/25/2014	5/27/1998	9/15/2005
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	40 U	2 U	2 U	--	--	5 U	5 U
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	20 U	1 U	1 U	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	600 U	-- U	10 U	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	40 U	2 U	2 U	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	5 U	2 U	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	21
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	100 U	5 U	5 U	--	--	--	--
Toluene	50000	40000	40000	UG/L	0.8 J	2 U	2 U	2 U	20 U	1 U	1 U	--	--	5 U	0.05 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	0.6 J	2 U	2 U	2 U	20 U	1 U	1 U	5 U	5 U	5 U	0.05 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	10 U	0.5 U	0.5 U	2.5 U	2.5 U	--	--
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	50 U	2.5 U	2.5 U	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	53	6.7	35.8	2 U	3300	1 U	6.6	5 U	390	5 U	5 U
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	40 U	2 U	2 U	--	--	5 U	5 U
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	50 U	2.5 U	2.5 U	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	200	150	23.3	42.6	45	16	35	29	32	5 U	5 U
Xylenes, m & p	3000	5000	5000	UG/L	10 U	4 U	--	--	40 U	2 U	2 U	--	--	5 U	5 U
Xylenes, total	3000	5000	5000	UG/L	15 U	4 U	6 U	4 U	--	--	--	--	--	5 U	5 U
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.05 U	0.0061 U	0.048 UJ	0.02 U	5 U	0.25 U	0.25 U	0.25 U	0.263 U	--	0.05 U
Aroclor 1221	5	10	10	UG/L	0.05 U	*23.46*	0.048 UJ	0.02 U	*23.2*	0.25 U	0.25 U	0.25 U	0.263 U	--	0.05 U
Aroclor 1232	5	10	10	UG/L	0.05 U	0.0071 U	0.048 UJ	0.02 U	5 U	0.25 U	0.25 U	0.25 U	0.263 U	--	0.05 U
Aroclor 1242	5	10	10	UG/L	0.05 U	0.0066 U	0.048 UJ	0.02 U	5 U	0.25 U	0.25 U	0.25 U	0.263 U	--	0.05 U
Aroclor 1248	5	10	10	UG/L	0.05 U	0.0071 U	0.048 UJ	0.02 U	5 U	0.25 U	0.25 U	0.25 U	0.263 U	--	0.05 U
Aroclor 1254	5	10	10	UG/L	0.05 U	0.0053 U	0.07 P	0.02 U	5 U	0.25 U	0.25 U	0.25 U	0.263 U	--	0.12
Aroclor 1260	5	10	10	UG/L	0.05 U	0.0043 U	0.048 UJ	0.02 U	5 U	0.25 U	0.25 U	0.25 U	0.263 U	--	0.05 U
Aroclor 1262	5	10	10	UG/L	--	--	--	--	5 U	0.25 U	0.25 U	0.25 U	0.263 U	--	--
Aroclor 1268	5	10	10	UG/L	--	--	--	--	5 U	0.25 U	0.25 U	0.25 U	0.263 U	--	--
Total PCBs	5	10	10	UG/L	0.05 U	*23.46*	0.07	0.02 U	*23.2*	0.25 U	0.25 U	0.25 U	0.263 U	0.5 U	0.12
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	21.4	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	2.62	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	3920	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	172	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	4.79	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	13	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	16	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.1 U	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.06	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	66	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	28	--	--
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	--	14	20	21	36	15	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	--	--	--	0.25	0.14	0.02	0.12	0.16	--	--
pH	NE	NE	NE	PH UNITS	--	--	--	--	6.41	6.02	6.29	6.01	6.43	--	--
Electrical conductivity	NE	NE	NE	mS/cm	--	--	--	--	1.53	0.55	0.64	0.67	1.96	--	--
Specific conductance	NE	NE	NE	mV	--	--	--	--	-87.3	-39	-54.2	-74.5	-76	--	--
Turbidity	NE	NE	NE	NTU	--	--	--	--	0	0.98	11.71	3.18	1.34	--	--
Temperature	NE	NE	NE	DEG C	--	--	--	--	15.4	17.54	15.2	13.5	17.61	--	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-6
Sample ID			Groundwater		MW-5	MW-5	MW-5	MW-5	AX-GW-MW5-120910	AX-GW-MW5-111111	AX-GW-MW5-120512	AX-GW-MW5-031914	AX-GW-MW5-092414	AX-GW-MW5-121114	MW-6
Sample Date			UCLs		10/11/2006	11/27/2007	11/3/2008	3/18/2010	12/9/2010	11/9/2011	12/5/2012	3/19/2014	9/24/2014	12/11/2014	5/27/1998
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	--	--	--	--	1 U	1 U	1 U	1 U	1 U	1 U	--
1,1,1-Trichloroethane	4000	20000	100000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	--	--	--	--	1 U	1 U	1 U	1 U	1 U	1 U	--
1,1,2-Trichloroethane	900	50000	100000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
1,1-Dichloroethane	2000	20000	100000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	2 U	2 U	2 U	--	--	--	250 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	5 U	2 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	250 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	2 U	2 U	2 U	--	--	--	250 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	--	--	--	--	2 U	2 U	2 U	2 U	2 U	2 U	--
1,2-Dichlorobenzene	8000	2000	80000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
1,2-Dichloroethane	5	20000	100000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	10 U	--	--	--	--	--	--	--	1 U	1 U	250 U
1,2-Dichloropropane	3	50000	100000	UG/L	--	--	--	--	1 U	1 U	1 U	1 U	1 U	1 U	--
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	5 U	2 U	--	--	1 U	1 U	1 U	--	--	--	250 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
1,3-Dichloropropane	NE	NE	NE	UG/L	-- U	-- U	-- U	-- U	2 U	2 U	2 U	2 U	2 U	2 U	-- U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	--	--	--	--	--	0.5 U	0.5 U	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	250 U	-- U	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	5 U	5 U	5 U	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	10 U	-- U	-- U	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	2 U	2 U	2 U	--
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	5 U	5 U	5 U	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	2 U	2 U	2 U	--
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	5 U	5 U	5 U	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	5 U	5 U	5 U	5 U	5 U	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	5 U	5 U	5 U	--	--	--	--
Benzene	1000	10000	10000	UG/L	5 U	2 U	2 U	2 U	1 U	0.5 U	0.5 U	--	--	--	250 U
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	1 U	--	2 U	2 U	2 U	2 U	2 U	--	--	--	250 U
Bromodichloromethane	6	50000	50000	UG/L	--	--	--	--	1 U	1 U	1 U	1 U	1 U	1 U	--
Bromoform	700	50000	50000	UG/L	--	--	--	--	2 U	2 U	2 U	2 U	2 U	2 U	--
Bromomethane	7	800	800	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
Chlorobenzene	200	1000	1000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
Chloroethane	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	250 U
Chloroform	50	20000	20000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
Chloromethane	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	250 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	890
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--
Dibromochloromethane	20	50000	50000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
Dibromomethane	NE	NE	NE	UG/L	-- U	-- U	-- U	-- U	2 U	2 U	2 U	--	--	--	-- U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	-- U	-- U	-- U	-- U	2 U	2 U	2 U	2 U	2 U	2 U	-- U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	10 U	10 U	-- U	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	--	--	--	250 U
Hexachlorobutadiene	50	3000	3000	UG/L	1 U	2 U	5 U	2 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	250 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	2 U	2 U	2 U	--	--	--	250 U
Methylene chloride	2000	50000	50000	UG/L	5 U	5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	250 U
Naphthalene	700	20000	20000	UG/L	5 U	5 U	5 U	2 U	2 U	2 U	2 U	--	--	--	250 U
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP Groundwater	Units	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-5	MW-6
Sample ID					MW-5	MW-5	MW-5	MW-5	AX-GW-MW5-120910	AX-GW-MW5-111111	AX-GW-MW5-120512	AX-GW-MW5-031914	AX-GW-MW5-092414	AX-GW-MW5-121114	MW-6
Sample Date			UCLs		10/11/2006	11/27/2007	11/3/2008	3/18/2010	12/9/2010	11/9/2011	12/5/2012	3/19/2014	9/24/2014	12/11/2014	5/27/1998
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	5 U	5 U	2 U	2 U	2 U	2 U	2 U	--	--	--	250 U
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	1 U	1 U	1 U	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	30 U	-- U	-- U	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	2 U	2 U	2 U	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	17
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	5 U	5 U	5 U	--	--	--	--
Toluene	50000	40000	40000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	--	--	--	250 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	2.5 U	2.5 U	2.5 U	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	5 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	5000
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	5 U	2 U	2 U	2 U	2 U	2 U	2 U	--	--	--	250 U
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	2.5 U	2.5 U	2.5 U	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	2 U	2 U	2 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	250 U
Xylenes, m & p	3000	5000	5000	UG/L	10 U	4 U	--	--	2 U	2 U	2 U	--	--	--	250 U
Xylenes, total	3000	5000	5000	UG/L	15 U	4 U	6 U	6 U	--	--	--	--	--	--	250 U
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.05 U	0.0061 U	0.048 U	0.0208 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	--
Aroclor 1221	5	10	10	UG/L	0.05 U	0.0033 U	0.048 U	0.0208 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	--
Aroclor 1232	5	10	10	UG/L	0.05 U	0.0071 U	0.048 U	0.0208 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	--
Aroclor 1242	5	10	10	UG/L	0.05 U	0.0066 U	0.048 U	0.03	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	--
Aroclor 1248	5	10	10	UG/L	0.05 U	0.0071 U	0.048 U	0.0208 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	--
Aroclor 1254	5	10	10	UG/L	0.05 U	0.06	0.05	0.04	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	--
Aroclor 1260	5	10	10	UG/L	0.05 U	0.0043 U	0.048 U	0.0208 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	--
Aroclor 1262	5	10	10	UG/L	--	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	--
Aroclor 1268	5	10	10	UG/L	--	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	--
Total PCBs	5	10	10	UG/L	0.05 U	0.06	0.05	0.08	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	*33*
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	0.5 U	0.5 U	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	0.5 U	0.5 U	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	0.5 U	0.5 U	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	34.4	42.9	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.075 U	0.075 U	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.5 U	0.5 U	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.1 U	0.05 U	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	3.84	5.22	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.01 U	0.01 U	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	11	140	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	1.4	1.2	--
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	--	6.8	5 U	5 U	5 U	5 U	5 U	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	--	--	--	4.62	5.33	4.24	3.73	6.36	5.04	--
pH	NE	NE	NE	PH UNITS	--	--	--	--	6.32	6.17	6.11	5.21	5.86	5.7	--
Electrical conductivity	NE	NE	NE	mS/cm	--	--	--	--	1.01	0.88	0.64	0.65	0.7	0.63	--
Specific conductance	NE	NE	NE	mV	--	--	--	--	45.8	134	115.8	225.6	154.8	91.9	--
Turbidity	NE	NE	NE	NTU	--	--	--	--	18.8	17.6	5.07	1.87	1.22	3.81	--
Temperature	NE	NE	NE	DEG C	--	--	--	--	12.98	15.24	16.1	10.64	16.89	13.69	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6
Sample ID			Groundwater		MW-6	MW-6	MW-6	MW-6	MW-6	AX-GW-MW6-121010	AX-GW-DUP1-121010	AX-GW-MW6-111011	AX-GW-DUP1-111011	AX-GW-MW6-120512	AX-GW-DUP1-120512
Sample Date			UCLs		9/13/2005	10/11/2006	11/27/2007	11/4/2008	3/18/2010	12/10/2010	12/10/2010	11/10/2011	11/10/2011	12/5/2012	12/5/2012
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	--	--	--	--	--	50 U	50 U	50 U	50 U	20 U	20 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	19	15 U	39 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	--	--	--	--	--	50 U	50 U	50 U	50 U	20 U	20 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 J	25 U	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
1,1-Dichloroethane	2000	20000	100000	UG/L	3 J	2 J	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
1,1-Dichloroethene	80	30000	100000	UG/L	5	5 U	11 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	12	10 U	16 UD	50 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	41	29	44 UD	50 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	5 U	25 U	20 UD	20 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	0.3 J	25 U	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
1,2-Dichloroethane	5	20000	100000	UG/L	5 U	25 U	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	290	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	3	50000	100000	UG/L	--	--	--	--	--	50 U	50 U	50 U	50 U	20 U	20 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	5 U	25 U	20 UD	--	--	50 U	50 U	50 U	50 U	20 U	20 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 J	25 U	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
1,3-Dichloropropane	NE	NE	NE	UG/L	-- U	-- U	-- UD	-- UD	-- UD	100 U	100 U	100 U	100 U	40 U	40 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	5 U	3 J	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	12000 U	12000 U	-- U	-- U	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	250 U	250 U	250 U	250 U	100 U	100 U
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	500 U	500 U	-- U	-- U	-- U	-- U
2-Chlorotoluene	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	250 U	250 U	250 U	250 U	100 U	100 U
4-Chlorotoluene	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	250 U	250 U	250 U	250 U	100 U	100 U
Acetone	50000	50000	50000	UG/L	--	--	--	50 UD	100 UD	250 U	250 U	250 U	250 U	100 U	100 U
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	250 U	250 U	250 U	250 U	100 U	100 U
Benzene	1000	10000	10000	UG/L	5 U	25 U	20 UD	20 UD	40 UD	50 U	50 U	25 U	25 U	10 U	10 U
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Bromochloromethane	NE	NE	NE	UG/L	5 U	5 U	--	20 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
Bromodichloromethane	6	50000	50000	UG/L	--	--	--	--	--	50 U	50 U	50 U	50 U	20 U	20 U
Bromoform	700	50000	50000	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Carbon tetrachloride	2	5000	5000	UG/L	5 U	25 U	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
Chlorobenzene	200	1000	1000	UG/L	0.9 J	25 U	20 JD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
Chloroethane	NE	NE	NE	UG/L	5 U	25 U	20 UD	20 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
Chloroform	50	20000	20000	UG/L	2 J	25 U	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
Chloromethane	NE	NE	NE	UG/L	5 U	25 U	20 UD	20 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	310	290	1500 D	238 D	196 D	290	290	260	280	520	530
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	25 U	25 U	25 U	25 U	10 U	10 U
Dibromochloromethane	20	50000	50000	UG/L	5 U	25 U	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
Dibromomethane	NE	NE	NE	UG/L	-- U	-- U	-- UD	-- UD	-- UD	100 U	100 U	100 U	100 U	40 U	40 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	-- U	-- U	-- UD	-- UD	-- UD	100 U	100 U	100 U	100 U	40 U	40 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	500 U	500 U	500 U	500 U	200 U	200 U
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Ethylbenzene	20000	5000	5000	UG/L	5 U	25 U	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
Hexachlorobutadiene	50	3000	3000	UG/L	1 U	5 U	20 UD	50 UD	40 UD	30 U	30 U	30 U	30 U	12 U	12 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	5 U	5 U	20 UD	20 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
Methylene chloride	2000	50000	50000	UG/L	5 U	25 U	50 UD	20 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
Naphthalene	700	20000	20000	UG/L	5 U	25 U	50 UD	50 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U

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Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6
Sample ID					MW-6	MW-6	MW-6	MW-6	MW-6	AX-GW-MW6-121010	AX-GW-DUP1-121010	AX-GW-MW6-111011	AX-GW-DUP1-111011	AX-GW-MW6-120512	AX-GW-DUP1-120512
Sample Date					9/13/2005	10/11/2006	11/27/2007	11/4/2008	3/18/2010	12/10/2010	12/10/2010	11/10/2011	11/10/2011	12/5/2012	12/5/2012
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	5 U	25 U	20 UD	20 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Styrene	100	6000	6000	UG/L	--	--	--	--	--	50 U	50 U	50 U	50 U	20 U	20 U
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	1500 U	1500 U	-- U	-- U	200 U	200 U
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	3.1	15 U	74 D	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	250 U	250 U	250 U	250 U	100 U	100 U
Toluene	50000	40000	40000	UG/L	0.05 U	25 U	20 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	0.4 J	25 U	14 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	20 U	20 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	25 U	25 U	25 U	25 U	10 U	10 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	120 U	120 U	120 U	120 U	50 U	50 U
Trichloroethene (TCE)	5	5000	5000	UG/L	32	2800	*8900 D*	3080 D	2760 D	3100	3100	1800	1900	1300	1300
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	5	25 U	20 UD	20 UD	40 UD	100 U	100 U	100 U	100 U	40 U	40 U
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	120 U	120 U	120 U	120 U	50 U	50 U
Vinyl chloride	2	50000	50000	UG/L	5 U	20	120 UD	20 UD	40 UD	50 U	50 U	50 U	50 U	32	32
Xylenes, m & p	3000	5000	5000	UG/L	5 U	50 U	40 UD	--	--	100 U	100 U	100 U	100 U	40 U	40 U
Xylenes, total	3000	5000	5000	UG/L	5	75 U	40 UD	60 UD	120 UD	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	--	0.05 U	0.0061 U	0.48 UD	0.0206 U	*25.9*	*20.6*	9.72	0.25 U	*20.2*	*26.2*
Aroclor 1221	5	10	10	UG/L	--	0.05 U	0.0033 U	0.48 UD	0.0206 U	2.5 U	2.5 U	1.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1232	5	10	10	UG/L	--	*120*	*73.36*	0.48 UD	*64.6 D*	2.5 U	2.5 U	1.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1242	5	10	10	UG/L	--	0.05 U	0.0066 U	*42 D*	0.0206 U	2.5 U	2.5 U	1.25 U	6.46	2.5 U	2.5 U
Aroclor 1248	5	10	10	UG/L	--	0.05 U	0.0071 U	0.48 UD	0.0206 U	2.5 U	2.5 U	1.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1254	5	10	10	UG/L	--	0.05 U	0.0053 U	0.48 UD	0.0206 U	2.5 U	2.5 U	1.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1260	5	10	10	UG/L	--	0.05 U	0.0043 U	0.48 UD	0.0206 U	2.5 U	2.5 U	1.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1262	5	10	10	UG/L	--	--	--	--	--	2.5 U	2.5 U	1.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1268	5	10	10	UG/L	--	--	--	--	--	2.5 U	2.5 U	1.25 U	0.25 U	2.5 U	2.5 U
Total PCBs	5	10	10	UG/L	*35.4*	*120*	*73.36*	*42*	*64.6*	*25.9*	*20.6*	9.72	6.46	*20.2*	*26.2*
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	--	--	210	190	8.4	12	5 U	5 U
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	--	--	--	--	4.66	--	0.5	--	0.1	--
pH	NE	NE	NE	PH UNITS	--	--	--	--	--	6.15	--	5.99	--	5.9	--
Electrical conductivity	NE	NE	NE	mS/cm	--	--	--	--	--	1.93	--	3.15	--	3.41	--
Specific conductance	NE	NE	NE	mV	--	--	--	--	--	50.2	--	182	--	174.8	--
Turbidity	NE	NE	NE	NTU	--	--	--	--	--	1000	--	19.6	--	3.79	--
Temperature	NE	NE	NE	DEG C	--	--	--	--	--	12.68	--	15.64	--	15.9	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
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UD - Constituent was not detected above the associated detection limit, result is product of dilution
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Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-7	MW-7	MW-7	MW-7
Sample ID					AX-GW-MW6-032014	AX-GW-DUP1-032014	AX-GW-MW6-062514	AX-GW-MW6-121114	AX-GW-DUP4-121114	AX-GW-MW	AX-GW-DUP	MW-7	MW-7	MW-7	MW-7
Sample Date					3/20/2014	3/20/2014	6/25/2014	12/11/2014	12/11/2014	4/18/2017	4/18/2017	5/26/1998	9/13/2005	10/12/2006	11/28/2007
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	--	--	--	--
1,1,1-Trichloroethane	4000	20000	100000	UG/L	20 U	20 U	20 U	5 U	5 U	10 UJ	10 UJ	250 U	5 U	50 U	20 UD
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	--	--	--	--
1,1,2-Trichloroethane	900	50000	100000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	15	8 J	20 UD
1,1-Dichloroethane	2000	20000	100000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	6	4 J	20 UD
1,1-Dichloroethene	80	30000	100000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	18	16	17 JD
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	250 U	9	6	20 UD
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	40 U	40 U	40 U	10 U	10 U	20 UJ	20 UJ	250 U	52	26	20 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	250 U	5 U	50 U	20 UD
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	40 U	40 U	40 U	10 U	10 U	20 UJ	20 UJ	--	--	--	--
1,2-Dichlorobenzene	8000	2000	80000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	2 J	50 U	20 UD
1,2-Dichloroethane	5	20000	100000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	5 U	50 U	20 UD
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	1000	300	320	760	700	250 U	--	2800	--
1,2-Dichloropropane	3	50000	100000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	--	--	--	--
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	250 U	0.6 J	50 U	20 UD
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	19	13 J	25 D
1,3-Dichloropropane	NE	NE	NE	UG/L	40 U	40 U	40 U	10 U	10 U	20 UJ	20 UJ	-- U	-- U	-- U	-- UD
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	10 U	2.5 U	2.5 U	5 U	5 U	--	--	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	32	28 J	29 D
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	40 U	40 U	40 U	10 U	10 U	20 U	20 U	--	--	--	--
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	40 U	40 U	40 U	10 U	10 U	20 U	20 U	--	--	--	--
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	250 U	5 J	50 U	20 UD
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	250 U	5 U	10 U	--
Bromodichloromethane	6	50000	50000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	--	--	--	--
Bromoform	700	50000	50000	UG/L	40 U	40 U	40 U	10 U	10 U	20 UJ	20 UJ	--	--	--	--
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	5 U	50 U	20 UD
Chlorobenzene	200	1000	1000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	120	110	190 D
Chloroethane	NE	NE	NE	UG/L	40 U	40 U	40 U	10 U	10 U	20 UJ	20 UJ	250 U	1 J	50 U	20 UD
Chloroform	50	20000	20000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	2 J	50 U	20 UD
Chloromethane	NE	NE	NE	UG/L	40 U	40 U	40 U	10 U	10 U	20 UJ	20 UJ	250 U	5 U	50 U	20 UD
cis-1,2-Dichloroethene	20	50000	50000	UG/L	700	720	1000	300	320	760	700	2900	3400	2800	2500 D
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	10 U	10 U	10 U	2.5 U	2.5 U	5 U	5 U	--	--	--	--
Dibromochloromethane	20	50000	50000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	5 U	50 U	20 UD
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	-- U	-- U	-- U	-- UD
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	40 U	40 U	40 U	10 U	10 U	20 UJ	20 UJ	-- U	-- U	-- U	-- UD
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	250 U	5 U	50 U	20 UD
Hexachlorobutadiene	50	3000	3000	UG/L	12 U	12 U	12 U	3 U	3 U	6 U	6 U	250 U	1 U	10 U	20 UD
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	250 U	0.9 J	50 U	20 UD
Methylene chloride	2000	50000	50000	UG/L	40 U	40 U	40 U	10 U	10 U	20 U	20 U	250 U	5 U	50 U	50 UD
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	250 U	5 U	50 U	50 UD
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-6	MW-7	MW-7	MW-7	MW-7
Sample ID					AX-GW-MW6-032014	AX-GW-DUP1-032014	AX-GW-MW6-062514	AX-GW-MW6-121114	AX-GW-DUP4-121114	AX-GW-MW	AX-GW-DUP	MW-7	MW-7	MW-7	MW-7
Sample Date					3/20/2014	3/20/2014	6/25/2014	12/11/2014	12/11/2014	4/18/2017	4/18/2017	5/26/1998	9/13/2005	10/12/2006	11/28/2007
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	250 U	5 U	50 U	20 UD
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	0.05 U	50 U	20 UD
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	250 U	0.05 U	50 U	20 UD
trans-1,2-Dichloroethene	80	50000	50000	UG/L	20 U	20 U	20 U	5 U	5 U	10 U	10 U	250 U	5 U	13 J	20 UD
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	10 U	10 U	10 U	2.5 U	2.5 U	5 UJ	5 UJ	--	--	--	--
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	1500	1600	1800	610	650	1200	1100	*8900*	16	*6400*	*5400 D*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	250 U	5 U	50 U	20 UD
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	39	41	60	7.6	8.3	13	13	520	5 U	280	260 D
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	250 U	0.6 J	100 U	40 UD
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	250 U	48	150 U	20 UD
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	1.25 U	1.25 U	1.25 U	0.25 U	0.25 U	1.25 U	1.25 U	--	0.05 U	0.05 U	0.0061 U
Aroclor 1221	5	10	10	UG/L	1.25 U	1.25 U	1.25 U	0.25 U	0.25 U	1.25 U	1.25 U	--	0.05 U	0.05 U	7.45
Aroclor 1232	5	10	10	UG/L	1.25 U	1.25 U	1.25 U	0.25 U	0.25 U	1.25 U	1.25 U	--	0.05 U	0.05 U	0.0071 U
Aroclor 1242	5	10	10	UG/L	*10.5*	*13.4*	6.58	6.24	5.01	7.98	7.85	--	0.76	0.05 U	0.0066 U
Aroclor 1248	5	10	10	UG/L	1.25 U	1.25 U	1.25 U	0.25 U	0.25 U	1.25 U	1.25 U	--	0.05 U	0.05 U	0.0071 U
Aroclor 1254	5	10	10	UG/L	1.25 U	1.25 U	1.25 U	0.25 U	0.25 U	1.25 U	1.25 U	--	0.05 U	0.05 U	0.0053 U
Aroclor 1260	5	10	10	UG/L	1.25 U	1.25 U	1.25 U	0.25 U	0.25 U	1.25 U	1.25 U	--	0.05 U	0.05 U	0.0043 U
Aroclor 1262	5	10	10	UG/L	1.25 U	1.25 U	1.25 U	0.25 U	0.25 U	1.25 U	1.25 U	--	--	--	--
Aroclor 1268	5	10	10	UG/L	1.25 U	1.25 U	1.25 U	0.25 U	0.25 U	1.25 U	1.25 U	--	--	--	--
Total PCBs	5	10	10	UG/L	*10.5*	*13.4*	6.58	6.24	5.01	7.98	7.85	0.48 U	0.76	0.05 U	7.45
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	1.87	0.65	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	0.81	0.5 U	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	14.1	2.35	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	74.1	58.4	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	0.1	0.075 U	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	0.06	0.2	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	0.88	2.26	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	0.01 U	0.01	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	120	370	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	3.4	2.7	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	5 U	5 U	5 U	15	--	--	--	--	--	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.19	--	0.2	0.19	--	--	--	--	--	--	--
pH	NE	NE	NE	PH UNITS	5.86	--	6.14	5.78	--	--	--	--	--	--	--
Electrical conductivity	NE	NE	NE	mS/cm	4.17	--	2.4	7.53	--	--	--	--	--	--	--
Specific conductance	NE	NE	NE	mV	202.5	--	-97	189.5	--	--	--	--	--	--	--
Turbidity	NE	NE	NE	NTU	1.59	--	1.8	11.3	--	--	--	--	--	--	--
Temperature	NE	NE	NE	DEG C	12.71	--	19.38	13.99	--	--	--	--	--	--	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7
Sample ID			Groundwater		MW-7	MW-7	AX-GW-MW7-120910	AX-GW-MW7-110911	AX-GW-MW7-120512	AX-GW-MW7-032414	AX-GW-MW7-062714	AX-GW-DUP3-062714	AX-GW-MW7-092514	AX-GW-DUP2-092514	AX-GW-MW7-120914
Sample Date			UCLs		11/5/2008	3/18/2010	12/9/2010	11/9/2011	12/5/2012	3/24/2014	6/27/2014	6/27/2014	9/25/2014	9/25/2014	12/9/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	--	--	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	--	--	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,1-Dichloroethane	2000	20000	100000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,1-Dichloroethene	80	30000	100000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	200 UD	200 UD	400 U	400 U	400 U	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	200 UD	200 UD	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	-- UD	200 UD	400 U	400 U	400 U	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	--	--	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,2-Dichloroethane	5	20000	100000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	--	--	--	--	14000	23000	2600	2700	2600
1,2-Dichloropropane	3	50000	100000	UG/L	--	--	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	200 U	200 U	200 U	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,3-Dichloropropane	NE	NE	NE	UG/L	-- UD	-- UD	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	--	--	--	100 U	100 U	250 U	250 U	120 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	50000 U	-- U	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	1000 U	1000 U	1000 U	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	2000 U	-- U	-- U	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
2-Hexanone	NE	NE	NE	UG/L	--	--	1000 U	1000 U	1000 U	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	1000 U	1000 U	1000 U	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	500 UD	500 UD	1000 U	1000 U	1000 U	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	1000 U	1000 U	1000 U	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	200 UD	200 UD	200 U	100 U	100 U	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	200 UD	200 UD	400 U	400 U	400 U	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	--	--	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
Bromoform	700	50000	50000	UG/L	--	--	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
Bromomethane	7	800	800	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
Chlorobenzene	200	1000	1000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
Chloroethane	NE	NE	NE	UG/L	200 UD	200 UD	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
Chloroform	50	20000	20000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
Chloromethane	NE	NE	NE	UG/L	200 UD	200 UD	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	1250 D	905 D	1500	930	1700	1600	14000	23000	2600	2700	2600
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	100 U	100 U	100 U	100 U	100 U	100 U	250 U	250 U	120 U
Dibromochloromethane	20	50000	50000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
Dibromomethane	NE	NE	NE	UG/L	-- UD	-- UD	400 U	400 U	400 U	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	-- UD	-- UD	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	2000 U	2000 U	2000 U	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	200 UD	200 UD	200 U	200 U	200 U	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	200 UD	200 UD	120 U	120 U	120 U	120 U	120 U	120 U	300 U	300 U	150 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	200 UD	200 UD	400 U	400 U	400 U	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	200 UD	200 UD	400 U	400 U	400 U	400 U	400 U	400 U	1000 U	1000 U	500 U
Naphthalene	700	20000	20000	UG/L	200 UD	200 UD	400 U	400 U	400 U	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7	MW-7
Sample ID			Groundwater		MW-7	MW-7	AX-GW-MW7-120910	AX-GW-MW7-110911	AX-GW-MW7-120512	AX-GW-MW7-032414	AX-GW-MW7-062714	AX-GW-DUP3-062714	AX-GW-MW7-092514	AX-GW-DUP2-092514	AX-GW-MW7-120914
Sample Date			UCLs		11/5/2008	3/18/2010	12/9/2010	11/9/2011	12/5/2012	3/24/2014	6/27/2014	6/27/2014	9/25/2014	9/25/2014	12/9/2014
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	200 UD	200 UD	400 U	400 U	400 U	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	200 U	200 U	200 U	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	6000 U	-- U	-- U	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	1000 U	1000 U	1000 U	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	200 UD	200 UD	200 U	200 U	200 U	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	200 U	200 U	500 U	500 U	250 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	100 U	100 U	100 U	100 U	100 U	100 U	250 U	250 U	120 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	500 U	500 U	500 U	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*18300 D*	*24900 D*	*30000*	*20000*	*14000*	*27000*	*18000*	*22000*	*29000*	*29000*	*22000*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	200 UD	200 UD	400 U	400 U	400 U	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	500 U	500 U	500 U	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	200 UD	200 UD	200 U	200 U	200 U	200 U	400	620	500 U	500 U	250 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	400 U	400 U	400 U	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	600 UD	600 UD	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.24 UJ	0.021 U	*13.7*	0.25 U	*12.8*	2.5 U	1.25 U	1.25 U	2.5 U	2.5 U	5 U
Aroclor 1221	5	10	10	UG/L	0.24 UJ	0.021 U	2.5 U	0.25 U	1.25 U	2.5 U	1.25 U	1.25 U	2.5 U	2.5 U	5 U
Aroclor 1232	5	10	10	UG/L	0.24 UJ	*58.7 D*	2.5 U	0.25 U	1.25 U	2.5 U	1.25 U	1.25 U	2.5 U	2.5 U	5 U
Aroclor 1242	5	10	10	UG/L	15 UJ	0.021 U	2.5 U	4.94	1.25 U	*22.7*	8.52	7.06	*22.4*	*21.5*	*24.4*
Aroclor 1248	5	10	10	UG/L	0.24 UJ	0.021 U	2.5 U	0.25 U	1.25 U	2.5 U	1.25 U	1.25 U	2.5 U	2.5 U	5 U
Aroclor 1254	5	10	10	UG/L	0.24 UJ	0.021 U	2.5 U	0.25 U	1.25 U	2.5 U	1.25 U	1.25 U	2.5 U	2.5 U	5 U
Aroclor 1260	5	10	10	UG/L	0.24 UJ	0.021 U	2.5 U	0.25 U	1.25 U	2.5 U	1.25 U	1.25 U	2.5 U	2.5 U	5 U
Aroclor 1262	5	10	10	UG/L	--	--	2.5 U	0.25 U	1.25 U	2.5 U	1.25 U	1.25 U	2.5 U	2.5 U	5 U
Aroclor 1268	5	10	10	UG/L	--	--	2.5 U	0.25 U	1.25 U	2.5 U	1.25 U	1.25 U	2.5 U	2.5 U	5 U
Total PCBs	5	10	10	UG/L	7.5 UJ	*58.7*	*13.7*	4.94	*12.8*	*22.7*	8.52	7.06	*22.4*	*21.5*	*24.4*
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	65	--	38.4	--	47.8
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	17.2	--	12.8	--	10.9
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	6720	--	3600	--	4400
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	162	--	114	--	112
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	8.92	--	5.19	--	4.99
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	1.3	--	1.4	--	0.99
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	1.8	--	1.3	--	1.1
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	0.1 U	--	0.1 U	--	0.1 U
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	0.07	--	0.04	--	0.04
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	94	--	130	--	140
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	17	--	12	--	11
Total Suspended Solids	NE	NE	NE	MG/L	--	--	5 U	5 U	5.9	5 U	5 U	--	5 U	--	5 U
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	--	0.11	0.19	0.17	0.11	0.06	--	0.11	--	0.06
pH	NE	NE	NE	PH UNITS	--	--	6.11	5.96	5.86	5.91	6.13	--	6.07	--	5.94
Electrical conductivity	NE	NE	NE	mS/cm	--	--	1.41	1.81	0.98	1.88	1.67	--	1.77	--	1.8
Specific conductance	NE	NE	NE	mV	--	--	97.6	7	42.1	78.6	19.6	--	62	--	113.4
Turbidity	NE	NE	NE	NTU	--	--	0	3.38	1.11	0.83	2.14	--	1.82	--	2.01
Temperature	NE	NE	NE	DEG C	--	--	16.31	17.13	16.99	14.05	18.73	--	17.56	--	14.81

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location					MW-7	MW-7	MW-7	MW-10D	MW-10D	MW-10D	MW-10D	MW-10D	MW-15D	MW-15D	MW-15D
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-DUP2-120914	AX-GW-MW	AX-GW-DUP	AX-GW-MW10D-032014	AX-GW-MW10D-062614	AX-GW-MW10D-092514	AX-GW-MW10D-121114	AX-GW-MW1	AX-GW-MW15D-032414	AX-GW-DUP4-032414	AX-GW-MW15D-062714
Sample Date			UCLs		12/9/2014	4/19/2017	4/19/2017	3/20/2014	6/26/2014	9/25/2014	12/11/2014	4/20/2017	3/24/2014	3/24/2014	6/27/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,1-Dichloroethane	2000	20000	100000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,1-Dichloroethene	80	30000	100000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	500 U	800 U	500 U	400 U	400 U	200 U	100 U	100 UJ	80 U	80 U	100 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	500 U	800 U	500 U	400 U	400 U	200 U	100 U	100 U	80 U	80 U	100 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,2-Dichloroethane	5	20000	100000	UG/L	250 U	400 UJ	250 UJ	200 U	200 U	100 U	50 U	50 UJ	40 U	40 U	50 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	2700	1600	1500	--	4100	2600	2200	2000	--	--	1300
1,2-Dichloropropane	3	50000	100000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,3-Dichloropropane	NE	NE	NE	UG/L	500 U	800 U	500 U	400 U	400 U	200 U	100 U	100 U	80 U	80 U	100 U
1,3-Dichloropropene, total	10	200	100000	UG/L	120 U	200 U	120 U	--	100 U	50 U	25 U	25 U	--	--	25 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	500 U	800 U	500 U	400 U	400 U	200 U	100 U	100 U	80 U	80 U	100 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	500 U	800 U	500 U	400 U	400 U	200 U	100 U	100 U	80 U	80 U	100 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
Bromoform	700	50000	50000	UG/L	500 U	800 UJ	500 UJ	400 U	400 U	200 U	100 U	100 UJ	80 U	80 U	100 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 UJ	40 U	40 U	50 U
Chlorobenzene	200	1000	1000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
Chloroethane	NE	NE	NE	UG/L	500 U	800 UJ	500 UJ	400 U	400 U	200 U	100 U	100 UJ	80 U	80 U	100 U
Chloroform	50	20000	20000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
Chloromethane	NE	NE	NE	UG/L	500 U	800 U	500 U	400 U	400 U	200 U	100 U	100 U	80 U	80 U	100 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	2700	1600	1500	3500	4100	2600	2200	2000 J	990	980	1300
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	120 U	200 U	120 U	100 U	100 U	50 U	25 U	25 U	20 U	20 U	25 U
Dibromochloromethane	20	50000	50000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 U	40 U	40 U	50 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	500 U	800 U	500 U	400 U	400 U	200 U	100 U	100 U	80 U	80 U	100 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	150 U	240 U	150 U	120 U	120 U	60 U	30 U	30 U	24 U	24 U	30 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	500 U	800 U	500 U	400 U	400 U	200 U	100 U	100 U	80 U	80 U	100 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location					MW-7	MW-7	MW-7	MW-10D	MW-10D	MW-10D	MW-10D	MW-10D	MW-15D	MW-15D	MW-15D
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	AX-GW-DUP2-120914	AX-GW-MW	AX-GW-DUP	AX-GW-MW10D-032014	AX-GW-MW10D-062614	AX-GW-MW10D-092514	AX-GW-MW10D-121114	AX-GW-MW1	AX-GW-MW15D-032414	AX-GW-DUP4-032414	AX-GW-MW15D-062714
Sample Date					12/9/2014	4/19/2017	4/19/2017	3/20/2014	6/26/2014	9/25/2014	12/11/2014	4/20/2017	3/24/2014	3/24/2014	6/27/2014
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	56	50 U	47	61	180
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	250 U	400 U	250 U	200 U	200 U	100 U	50 U	50 UJ	40 U	40 U	50 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	120 U	200 U	120 U	100 U	100 U	50 U	25 U	25 U	20 U	20 U	25 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*23000*	*20000*	*18000*	*11000*	*13000*	*7700*	*6800*	4600	3800	3900	*6800*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	250 U	400 UJ	250 UJ	510	510	230	290	210	74	66	79
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	5 U	2.5 U	2.5 U	2.5 U	5 U	2.5 U	5 U	2.5 U	5 U	5 U	5 U
Aroclor 1221	5	10	10	UG/L	5 U	2.5 U	2.5 U	2.5 U	5 U	2.5 U	5 U	2.5 U	5 U	5 U	5 U
Aroclor 1232	5	10	10	UG/L	5 U	2.5 U	2.5 U	2.5 U	5 U	2.5 U	5 U	2.5 U	5 U	5 U	5 U
Aroclor 1242	5	10	10	UG/L	*23.8*	*26.4*	*23*	*43.9*	*49.1*	*24.3*	*22.3*	*29.3*	*45.2*	*44.8*	*55*
Aroclor 1248	5	10	10	UG/L	5 U	2.5 U	2.5 U	2.5 U	5 U	2.5 U	5 U	2.5 U	5 U	5 U	5 U
Aroclor 1254	5	10	10	UG/L	5 U	2.5 U	2.5 U	2.5 U	5 U	2.5 U	5 U	2.5 U	5 U	5 U	*12.6*
Aroclor 1260	5	10	10	UG/L	5 U	2.5 U	2.5 U	2.5 U	5 U	2.5 U	5 U	2.5 U	5 U	5 U	5 U
Aroclor 1262	5	10	10	UG/L	5 U	2.5 U	2.5 U	2.5 U	5 U	2.5 U	5 U	2.5 U	5 U	5 U	5 U
Aroclor 1268	5	10	10	UG/L	5 U	2.5 U	2.5 U	2.5 U	5 U	2.5 U	5 U	2.5 U	5 U	5 U	5 U
Total PCBs	5	10	10	UG/L	*23.8*	*26.4*	*23*	*43.9*	*49.1*	*24.3*	*22.3*	*29.3*	*45.2*	*44.8*	*67.6*
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	16	12.8	8.89	--	--	--	2.34
Ethene	NE	NE	NE	UG/L	--	--	--	--	4.57	4.3	3.42	--	--	--	4.59
Methane	NE	NE	NE	UG/L	--	--	--	--	320	303	237	--	--	--	48.9
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	112	102	106	--	--	--	23.8
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	1.5	1.47	1.39	--	--	--	0.48
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U
Iron	NE	NE	NE	MG/L	--	--	--	--	0.32	0.39	0.25	--	--	--	0.09
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	0.1 U	0.1 U	0.1 U	--	--	--	0.2
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	0.01 U	0.01	0.01 U	--	--	--	0.01 U
Sulfate	NE	NE	NE	MG/L	--	--	--	--	160	180	160	--	--	--	200
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	13	26	3.8	--	--	--	5.5
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	5 U	5 U	5 U	5 U	--	5 U	5 U	5 U
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	--	--	0.13	0.13	0.1	0.06	--	0.17	--	0.17
pH	NE	NE	NE	PH UNITS	--	--	--	6.12	6	6.14	6.01	--	5.21	--	5.35
Electrical conductivity	NE	NE	NE	mS/cm	--	--	--	1.53	1.41	1.83	1.63	--	3.36	--	3.6
Specific conductance	NE	NE	NE	mV	--	--	--	78	-52.7	48.7	98.5	--	176.2	--	-65.3
Turbidity	NE	NE	NE	NTU	--	--	--	0.22	0.37	1.36	0.63	--	0.5	--	0.61
Temperature	NE	NE	NE	DEG C	--	--	--	14.94	17.96	17.72	12.71	--	11.86	--	16.76

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location					MW-15D	MW-15D	MW-15D	MW-15D	MW-17D	MW-17D	MW-17D	MW-17D	MW-17D	MW-17D	MW-19D
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW15D-092614	AX-GW-MW15D-121114	AX-GW-MW15D-080715	MW-15D	AX-GW-MW17D-032114	AX-GW-DUP3-032114	AX-GW-MW17D-062614	AX-GW-MW17D-092414	AX-GW-MW17D-120914	AX-GW-MW1	AX-GW-MW19D-032114
Sample Date			UCLs		9/26/2014	12/11/2014	8/7/2015	3/21/2017	3/21/2014	3/21/2014	6/26/2014	9/24/2014	12/9/2014	4/18/2017	3/21/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 UJ	50 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,1-Dichloroethane	2000	20000	100000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,1-Dichloroethene	80	30000	100000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 UJ	100 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 UJ	100 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,2-Dichloroethane	5	20000	100000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	1400	1400	1200	--	--	--	4800	3300	2700	1800	--
1,2-Dichloropropane	3	50000	100000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,3-Dichloropropane	NE	NE	NE	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 UJ	100 U
1,3-Dichloropropene, total	10	200	100000	UG/L	50 U	50 U	25 U	--	--	--	50 U	25 U	20 U	25 U	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 U	100 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 U	100 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
Bromoform	700	50000	50000	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 UJ	100 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
Chlorobenzene	200	1000	1000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
Chloroethane	NE	NE	NE	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 UJ	100 U
Chloroform	50	20000	20000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
Chloromethane	NE	NE	NE	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 UJ	100 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	1400	1400	1200	--	1600	2000	4800	3200	2600	1800	2500
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	50 U	50 U	25 U	--	25 U	25 U	50 U	25 U	20 U	25 U	25 U
Dibromochloromethane	20	50000	50000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	50 U	40 U	50 U	50 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 UJ	100 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	60 U	60 U	30 U	--	30 U	30 U	60 U	30 U	24 U	30 U	30 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	200 U	200 U	100 U	--	100 U	100 U	200 U	100 U	80 U	100 U	100 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location					MW-15D	MW-15D	MW-15D	MW-15D	MW-17D	MW-17D	MW-17D	MW-17D	MW-17D	MW-17D	MW-19D
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	AX-GW-MW15D-092614	AX-GW-MW15D-121114	AX-GW-MW15D-080715	MW-15D	AX-GW-MW17D-032114	AX-GW-DUP3-032114	AX-GW-MW17D-062614	AX-GW-MW17D-092414	AX-GW-MW17D-120914	AX-GW-MW1	AX-GW-MW19D-032114
Sample Date					9/26/2014	12/11/2014	8/7/2015	3/21/2017	3/21/2014	3/21/2014	6/26/2014	9/24/2014	12/9/2014	4/18/2017	3/21/2014
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	160	100	72	--	50 U	68	100 U	64	40 U	64	50 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	100 U	100 U	50 U	--	50 U	50 U	100 U	71	59	50 U	50 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	50 U	50 U	25 U	--	25 U	25 U	50 U	25 U	20 U	25 UJ	25 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*6800*	*5600*	3900	--	4200	4700	4400	4600	3200	4400	3700
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	100 U	100 U	50 U	--	190	260	290	360	350	180	110
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	12.5 U	12.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	0.5 U
Aroclor 1221	5	10	10	UG/L	*44.2*	12.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	0.5 U
Aroclor 1232	5	10	10	UG/L	12.5 U	12.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	0.5 U
Aroclor 1242	5	10	10	UG/L	*42*	*56.6*	*98.7*	*71.6*	*37.6*	*34.5*	*24.3*	*23.7*	*34.1*	*28.5*	8.02
Aroclor 1248	5	10	10	UG/L	12.5 U	12.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	0.5 U
Aroclor 1254	5	10	10	UG/L	12.5 U	12.5 U	*20*	5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	0.5 U
Aroclor 1260	5	10	10	UG/L	12.5 U	12.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	0.5 U
Aroclor 1262	5	10	10	UG/L	12.5 U	12.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	0.5 U
Aroclor 1268	5	10	10	UG/L	12.5 U	12.5 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	0.5 U
Total PCBs	5	10	10	UG/L	*86.2*	*56.6*	*119*	*71.6*	*37.6*	*34.5*	*24.3*	*23.7*	*34.1*	*28.5*	8.02
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	2.29	2.53	--	--	--	--	8.94	19.9	22.9	--	--
Ethene	NE	NE	NE	UG/L	4	3.79	--	--	--	--	3.92	3.16	3.35	--	--
Methane	NE	NE	NE	UG/L	42.2	55.9	--	--	--	--	257	574	693	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	21.9	25.1	--	--	--	--	68.9	65.9	58.5	--	--
Ammonia (as N)	NE	NE	NE	MG/L	0.36	0.28	--	--	--	--	1.02	1.25	1.44	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	0.5 U	0.5 U	--	--	--	--	0.5 U	1.2	0.5 U	--	--
Iron	NE	NE	NE	MG/L	0.07	0.08	--	--	--	--	0.96	3.5	0.45	--	--
Nitrate (as N)	NE	NE	NE	MG/L	0.14	0.2	--	--	--	--	0.1 U	0.1 U	0.1 U	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	0.01 U	0.01 U	--	--	--	--	0.01 U	0.01	0.01 U	--	--
Sulfate	NE	NE	NE	MG/L	200	420	--	--	--	--	180	180	220	--	--
Total Organic Carbon	NE	NE	NE	MG/L	1	3.6	--	--	--	--	9.6	6.3	7.6	--	--
Total Suspended Solids	NE	NE	NE	MG/L	5 U	5 U	--	--	5 U	5 U	5 U	5 U	12	--	5 U
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.11	0.4	0.12	--	0.11	--	0.05	2.45	0.18	--	0.25
pH	NE	NE	NE	PH UNITS	5.7	5.19	5.34	--	5.69	--	5.8	5.88	5.5	--	5.55
Electrical conductivity	NE	NE	NE	mS/cm	3.96	3.78	3.48	--	2.59	--	1.75	2.55	3.69	--	12.18
Specific conductance	NE	NE	NE	mV	91.2	101	29.4	--	130	--	32	35	88.6	--	120.2
Turbidity	NE	NE	NE	NTU	2.17	1.53	0.76	--	3.63	--	2.15	4.98	7.12	--	2.21
Temperature	NE	NE	NE	DEG C	17.82	12.96	17.91	--	12.93	--	17.48	19.1	13.96	--	12.76

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-19D	MW-19D	MW-19D	MW-19D	GZ-101D	GZ-101D	GZ-101D	GZ-101D	GZ-101D	GZ-101D	GZ-102D
Sample ID			Groundwater		AX-GW-MW19D-062614	AX-GW-MW19D-092314	AX-GW-MW19D-120914	AX-GW-MW1	AX-GW-GZ101D-120810	AX-GW-GZ101D-110911	AX-GW-GZ101D-031814	AX-GW-GZ101D-062414	AX-GW-GZ101D-092214	AX-GW-GZ101D-120814	AX-GW-GZ102D-120810
Sample Date			UCLs		6/26/2014	9/23/2014	12/9/2014	4/18/2017	12/8/2010	11/9/2011	3/18/2014	6/24/2014	9/22/2014	12/8/2014	12/8/2010
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	100 U	50 U	40 U	100 UJ	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,1-Dichloroethane	2000	20000	100000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,1-Dichloroethene	80	30000	100000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	200 U	100 U	80 U	200 UJ	50 U	80 U	4 U	8 U	20 U	8 U	40 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	200 U	100 U	80 U	200 UJ	50 U	80 U	4 U	8 U	20 U	8 U	40 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,2-Dichloroethane	5	20000	100000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	4600	3700	3100	9700	--	--	--	23	140	70	--
1,2-Dichloropropane	3	50000	100000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	25 U	40 U	--	--	--	--	20 U
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,3-Dichloropropane	NE	NE	NE	UG/L	200 U	100 U	80 U	200 UJ	50 U	80 U	4 U	8 U	20 U	8 U	40 U
1,3-Dichloropropene, total	10	200	100000	UG/L	50 U	25 U	20 U	50 U	--	--	--	2 U	5 U	2 U	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	6200 U	-- U	--	--	--	--	5000 U
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	120 U	200 U	--	--	--	--	100 U
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	250 U	-- U	--	--	--	--	200 U
2-Chlorotoluene	NE	NE	NE	UG/L	200 U	100 U	80 U	200 U	50 U	80 U	4 U	8 U	20 U	8 U	40 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	120 U	200 U	--	--	--	--	100 U
4-Chlorotoluene	NE	NE	NE	UG/L	200 U	100 U	80 U	200 U	50 U	80 U	4 U	8 U	20 U	8 U	40 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	120 U	200 U	--	--	--	--	100 U
Acetone	50000	50000	50000	UG/L	--	--	--	--	120 U	200 U	--	--	--	--	100 U
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	120 U	200 U	--	--	--	--	100 U
Benzene	1000	10000	10000	UG/L	--	--	--	--	25 U	20 U	--	--	--	--	20 U
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Bromodichloromethane	6	50000	50000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
Bromoform	700	50000	50000	UG/L	200 U	100 U	80 U	200 UJ	50 U	80 U	4 U	8 U	20 U	8 U	40 U
Bromomethane	7	800	800	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Carbon tetrachloride	2	5000	5000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
Chlorobenzene	200	1000	1000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
Chloroethane	NE	NE	NE	UG/L	200 U	100 U	80 U	200 UJ	50 U	80 U	4 U	8 U	20 U	8 U	40 U
Chloroform	50	20000	20000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
Chloromethane	NE	NE	NE	UG/L	200 U	100 U	80 U	200 UJ	50 U	80 U	4 U	8 U	20 U	8 U	40 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	4600	3700	3100	9700	560	740	47	23	140	70	780
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	50 U	25 U	20 U	50 U	12 U	20 U	1 U	2 U	5 U	2 U	10 U
Dibromochloromethane	20	50000	50000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	200 U	100 U	80 U	200 UJ	50 U	80 U	4 U	8 U	20 U	8 U	40 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	250 U	400 U	--	--	--	--	200 U
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	25 U	40 U	--	--	--	--	20 U
Hexachlorobutadiene	50	3000	3000	UG/L	60 U	30 U	24 U	60 U	15 U	24 U	1.2 U	2.4 U	6 U	2.4 U	12 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Methylene chloride	2000	50000	50000	UG/L	200 U	100 U	80 U	200 U	50 U	80 U	4 U	8 U	20 U	8 U	40 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location					MW-19D	MW-19D	MW-19D	MW-19D	GZ-101D	GZ-101D	GZ-101D	GZ-101D	GZ-101D	GZ-101D	GZ-102D
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	AX-GW-MW19D-062614	AX-GW-MW19D-092314	AX-GW-MW19D-120914	AX-GW-MW1	AX-GW-GZ101D-120810	AX-GW-GZ101D-110911	AX-GW-GZ101D-031814	AX-GW-GZ101D-062414	AX-GW-GZ101D-092214	AX-GW-GZ101D-120814	AX-GW-GZ102D-120810
Sample Date					6/26/2014	9/23/2014	12/9/2014	4/18/2017	12/8/2010	11/9/2011	3/18/2014	6/24/2014	9/22/2014	12/8/2014	12/8/2010
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Styrene	100	6000	6000	UG/L	--	--	--	--	25 U	40 U	--	--	--	--	20 U
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	750 U	-- U	--	--	--	--	600 U
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	120 U	200 U	--	--	--	--	100 U
Toluene	50000	40000	40000	UG/L	--	--	--	--	25 U	40 U	--	--	--	--	20 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	100 U	50 U	40 U	100 U	25 U	40 U	2 U	4 U	10 U	4 U	20 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	50 U	25 U	20 U	50 UJ	12 U	20 U	1 U	2 U	5 U	2 U	10 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	62 U	100 U	--	--	--	--	50 U
Trichloroethene (TCE)	5	5000	5000	UG/L	*7300*	*5800*	2700	1600	2300	2800	180	180	550	420	2800
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	62 U	100 U	--	--	--	--	50 U
Vinyl chloride	2	50000	50000	UG/L	210	110	100	570	25 U	40 U	2 U	4 U	10 U	4 U	20 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	50 U	80 U	--	--	--	--	40 U
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	1.25 U	0.5 U	1.25 U	1.25 U	0.25 U	*13*	0.25 U	0.25 U	0.25 U	0.25 U	*13.2*
Aroclor 1221	5	10	10	UG/L	1.25 U	0.5 U	1.25 U	1.25 U	0.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U
Aroclor 1232	5	10	10	UG/L	1.25 U	0.5 U	1.25 U	1.25 U	0.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U
Aroclor 1242	5	10	10	UG/L	*12.1*	8.84	7.55	9.17 J	3.96	1.25 U	0.25 U	0.25 U	0.25 U	0.89	2.5 U
Aroclor 1248	5	10	10	UG/L	1.25 U	0.5 U	1.25 U	1.25 U	0.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U
Aroclor 1254	5	10	10	UG/L	1.25 U	0.5 U	1.25 U	1.25 U	0.25 U	1.25 U	0.25 U	0.25 U	0.25 U	1.15	2.5 U
Aroclor 1260	5	10	10	UG/L	1.25 U	0.5 U	1.25 U	1.25 U	0.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U
Aroclor 1262	5	10	10	UG/L	1.25 U	0.5 U	1.25 U	1.25 U	0.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U
Aroclor 1268	5	10	10	UG/L	1.25 U	0.5 U	1.25 U	1.25 U	0.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U
Total PCBs	5	10	10	UG/L	*12.1*	8.84	7.55	9.17	3.96	*13*	0.25 U	0.25 U	0.25 U	2.05	*13.2*
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	5.61	6.49	4.67	--	--	--	--	0.5 U	0.5 U	0.5 U	--
Ethene	NE	NE	NE	UG/L	8.87	9.85	4.53	--	--	--	--	0.5 U	0.5 U	0.5 U	--
Methane	NE	NE	NE	UG/L	549	597	446	--	--	--	--	5 U	0.5 U	0.5 U	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	44.8	45.4	50.2	--	--	--	--	37.1	40.5	40	--
Ammonia (as N)	NE	NE	NE	MG/L	1.03	0.66	0.93	--	--	--	--	0.075 U	0.075 U	0.075 U	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	3.8	0.55	1.4	--	--	--	--	0.5 U	0.5 U	0.5 U	--
Iron	NE	NE	NE	MG/L	3.8	0.65	1.3	--	--	--	--	0.25	0.05 U	0.05 U	--
Nitrate (as N)	NE	NE	NE	MG/L	0.1 U	0.1 U	0.1 U	--	--	--	--	3.91	3.72	2.98	--
Total Phosphorus as P	NE	NE	NE	MG/L	0.01 U	0.01 U	0.01 U	--	--	--	--	0.01 U	0.01 U	0.01 U	--
Sulfate	NE	NE	NE	MG/L	590	560	600	--	--	--	--	15	17	14	--
Total Organic Carbon	NE	NE	NE	MG/L	7.6	2.6	6.5	--	--	--	--	1.2	1.6	0.71	--
Total Suspended Solids	NE	NE	NE	MG/L	10	6.1	11	--	99	5 U	5 U	5 U	5 U	5 U	970
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.05	0.33	0.08	--	5.46	0.19	1.51	0.98	1.1	1	0.18
pH	NE	NE	NE	PH UNITS	5.42	5.95	5.46	--	6.23	5.73	5.32	5.52	5.46	5.91	6.28
Electrical conductivity	NE	NE	NE	mS/cm	10.99	12.81	13.91	--	1.33	1.52	0.86	0.93	0.95	1.08	2.23
Specific conductance	NE	NE	NE	mV	52	-20	123.1	--	43.8	80	249.2	-33	137.7	133.8	79.4
Turbidity	NE	NE	NE	NTU	2.7	1.11	3.19	--	167	4.83	0.09	2.86	1.25	1.94	--
Temperature	NE	NE	NE	DEG C	18.3	18.54	13.96	--	13.85	16.85	11.95	18.5	20.26	15.4	12.88

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location	MCP GW-2	MCP GW-3	MCP	Units	GZ-102D	GZ-102D	MW-2B	MW-2B	MW-2B	MW-2B	MW-2B	MW-4B	MW-4B	MW-4B	MW-4B
Sample ID			Groundwater		AX-GW-GZ102D-111011	AX-GW-GZ102D-031814	AX-GW-MW2B-032114	AX-GW-MW2B-063014	AX-GW-MW2B-093014	AX-GW-MW2B-121114	AX-GW-MW0	MW-4B	MW-4B	MW-4B	MW-4B
Sample Date			UCLs		11/10/2011	3/18/2014	3/21/2014	6/30/2014	9/30/2014	12/11/2014	4/18/2017	5/28/1998	9/14/2005	10/11/2006	11/28/2007
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	--	--	--	--
1,1,1-Trichloroethane	4000	20000	100000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 UJ	41	36	26	28 D
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	--	--	--	--
1,1,2-Trichloroethane	900	50000	100000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	5 U	2 J	2 J	20 UD
1,1-Dichloroethane	2000	20000	100000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	9	6	7 J	20 UD
1,1-Dichloroethene	80	30000	100000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	37	20	16	17 JD
1,1-Dichloropropene	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	5 U	5 U	20 U	20 UD
1,2,3-Trichloropropane	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 UJ	5 U	7	4 J	11 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	5 U	5 U	20 U	20 UD
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 UJ	--	--	--	--
1,2-Dichlorobenzene	8000	2000	80000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	5 U	0.9 J	20 U	20 UD
1,2-Dichloroethane	5	20000	100000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	5 U	4 J	20 U	20 UD
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	--	1800	2200	2600	2400	5 U	--	200	--
1,2-Dichloropropane	3	50000	100000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	--	--	--	--
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	20 U	--	--	--	--	--	--	5 U	5 U	20 U	20 UD
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	5 U	2 J	20 U	20 UD
1,3-Dichloropropane	NE	NE	NE	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 UJ	-- U	-- U	-- U	-- UD
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	25 U	25 U	12 U	12 U	--	--	--	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	5 U	7	6 J	20 UD
1,4-Dioxane	6000	50000	50000	UG/L	-- U	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	100 U	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	-- U	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 U	--	--	--	--
2-Hexanone	NE	NE	NE	UG/L	100 U	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 U	--	--	--	--
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	100 U	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	100 U	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	100 U	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	10 U	--	--	--	--	--	--	5 U	1 J	20 U	20 UD
Bromobenzene	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	5 U	5 U	4	20 UD
Bromodichloromethane	6	50000	50000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	--	--	--	--
Bromoform	700	50000	50000	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 UJ	--	--	--	--
Bromomethane	7	800	800	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	5 U	2	20 U	20 UD
Chlorobenzene	200	1000	1000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	5 U	3	3	20 UD
Chloroethane	NE	NE	NE	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 UJ	5 U	5 U	20 U	20 UD
Chloroform	50	20000	20000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	5 U	8	8 U	20 UD
Chloromethane	NE	NE	NE	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 UJ	9	5 U	20 U	20 UD
cis-1,2-Dichloroethene	20	50000	50000	UG/L	1300	1500	1400	1800	2200	2600	2300	5 U	180	200	230 D
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	10 U	10 U	50 U	25 U	25 U	12 U	12 U	--	--	--	--
Dibromochloromethane	20	50000	50000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	25 U	5 U	5 U	20 U	20 UD
Dibromomethane	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	-- U	-- U	-- U	-- UD
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 UJ	-- U	-- U	-- U	-- UD
Diethyl Ether	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	200 U	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	20 U	--	--	--	--	--	--	5 U	5 U	20 U	20 UD
Hexachlorobutadiene	50	3000	3000	UG/L	12 U	12 U	60 U	30 U	30 U	15 U	15 U	5 U	1 U	4	20 UD
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	5 U	5 U	20 U	20 UD
Methylene chloride	2000	50000	50000	UG/L	40 U	40 U	200 U	100 U	100 U	50 U	50 U	12	5	10 U	50 UD
Naphthalene	700	20000	20000	UG/L	40 U	--	--	--	--	--	--	5 U	5 U	20 U	50 UD
n-Butylbenzene	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location	MCP GW-2	MCP GW-3	MCP Groundwater	Units	GZ-102D	GZ-102D	MW-2B	MW-2B	MW-2B	MW-2B	MW-2B	MW-4B	MW-4B	MW-4B	MW-4B
Sample ID			UCLs		AX-GW-GZ102D-111011	AX-GW-GZ102D-031814	AX-GW-MW2B-032114	AX-GW-MW2B-063014	AX-GW-MW2B-093014	AX-GW-MW2B-121114	AX-GW-MW0	MW-4B	MW-4B	MW-4B	MW-4B
Sample Date					11/10/2011	3/18/2014	3/21/2014	6/30/2014	9/30/2014	12/11/2014	4/18/2017	5/28/1998	9/14/2005	10/11/2006	11/28/2007
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	5 U	5 U	20 U	20 UD
sec-Butylbenzene	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	20 U	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	-- U	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	20 U	20 U	100 U	50 U	50 U	27	67	33	0.05 J	24	170 D
Tetrahydrofuran	NE	NE	NE	UG/L	100 U	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	20 U	--	--	--	--	--	--	5 U	2.4	20 U	20 UD
trans-1,2-Dichloroethene	80	50000	50000	UG/L	20 U	20 U	100 U	50 U	50 U	25 U	72	5 U	0.05 U	20 U	20 UD
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	10 U	10 U	50 U	25 U	25 U	12 U	12 UJ	--	--	--	--
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	50 U	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	1700	1900	3800	3600	3700	3200	2900	3600	5 U	*5800*	*9000 D*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	40 U	--	--	--	--	--	--	5 U	19	20 U	20 UD
Vinyl acetate	NE	NE	NE	UG/L	50 U	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	23	79	160	160	93	160	200	55	5 U	21	18 JD
Xylenes, m & p	3000	5000	5000	UG/L	40 U	--	--	--	--	--	--	5 U	5 U	40 U	40 UD
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	5 U	5 U	60 U	40 UD
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	*11.5*	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	--	0.05 U	1.2	0.0061
Aroclor 1221	5	10	10	UG/L	1.25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	--	0.05 U	0.05 U	0.0033
Aroclor 1232	5	10	10	UG/L	1.25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	--	0.05 U	0.05 U	4.47
Aroclor 1242	5	10	10	UG/L	1.25 U	*14*	*33.2*	*35.8*	*30.4*	*24.6*	*26*	--	1.9	0.05 U	0.0066
Aroclor 1248	5	10	10	UG/L	1.25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	--	0.05 U	0.05 U	0.0071
Aroclor 1254	5	10	10	UG/L	1.25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	--	0.05 U	0.05 U	0.0053
Aroclor 1260	5	10	10	UG/L	1.25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	--	0.05 U	0.05 U	0.0043
Aroclor 1262	5	10	10	UG/L	1.25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	--	--	--	--
Aroclor 1268	5	10	10	UG/L	1.25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	1.25 U	--	--	--	--
Total PCBs	5	10	10	UG/L	*11.5*	*14*	*33.2*	*35.8*	*30.4*	*24.6*	*26*	0.48 U	1.9	1.2	4.5
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	4.88	4.91	4.32	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	4.39	4.14	3.52	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	--	176	203	180	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	38.6	35.3	37.1	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	0.5	0.42	0.4	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	0.61	0.95	1.1	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	--	0.53	0.98	0.98	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	0.1 U	0.1 U	0.1 U	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	0.01 U	0.01	0.01 U	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	170	180	170	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	15	7.6	6	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	5.1	5 U	5 U	5 U	5 U	5 U	--	--	--	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.31	0.22	0.13	0.82	0.31	1.56	--	--	--	--	--
pH	NE	NE	NE	PH UNITS	6.14	6.07	5.04	5.71	5.61	5.42	--	--	--	--	--
Electrical conductivity	NE	NE	NE	mS/cm	3.6	3.39	2.42	2.07	1.96	1.8	--	--	--	--	--
Specific conductance	NE	NE	NE	mV	122	30.4	190.7	148.4	-0.4	-21.4	--	--	--	--	--
Turbidity	NE	NE	NE	NTU	8.38	1.42	3.69	1.37	1.82	0.07	--	--	--	--	--
Temperature	NE	NE	NE	DEG C	16.08	13.67	12.02	17.98	17.88	14.02	--	--	--	--	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-6B	MW-6B
Sample ID			Groundwater		MW-4B	MW-4B	AX-GW-MW4B-120910	AX-GW-MW4B-111111	AX-GW-MW4B-120612	AX-GW-MW4B-031914	AX-GW-MW4B-062414	AX-GW-MW4B-120914	AX-GW-MW0	AX-GW-MW6B-032014	AX-GW-MW6B-062514
Sample Date			UCLs		11/5/2008	3/17/2010	12/9/2010	11/9/2011	12/5/2012	3/19/2014	6/24/2014	12/9/2014	4/19/2017	3/20/2014	6/25/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	--	--	20 U	20 U	25 U	25 U	100 U	40 U	1 U	40 U	20 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	20 UD	40 UD	20 U	20 U	25 U	33	100 U	40 U	14	40 U	20 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	--	--	20 U	20 U	25 U	25 U	100 U	40 U	1 U	40 U	20 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	1.2	40 U	20 U
1,1-Dichloroethane	2000	20000	100000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	3.1	40 U	20 U
1,1-Dichloroethene	80	30000	100000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	8.6	40 U	20 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	20 UD	40 UD	40 U	40 U	50 U	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	20 UD	40 UD	40 U	40 U	50 U	50 U	200 U	80 U	10	80 U	40 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	20 UD	40 UD	40 U	40 U	50 U	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	--	--	40 U	40 U	50 U	50 U	200 U	80 U	2 U	80 U	40 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	1 U	40 U	20 U
1,2-Dichloroethane	5	20000	100000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	3.9 J	40 U	20 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	--	--	--	--	290	230	250	--	1600
1,2-Dichloropropane	3	50000	100000	UG/L	--	--	20 U	20 U	25 U	25 U	100 U	40 U	1 U	40 U	20 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	20 U	20 U	25 U	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	1.4	40 U	20 U
1,3-Dichloropropane	NE	NE	NE	UG/L	-- UD	-- UD	40 U	40 U	50 U	50 U	200 U	80 U	2 U	80 U	40 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	--	--	--	50 U	20 U	0.5 U	--	10 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	4.5	40 U	20 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	5000 U	-- U	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	100 U	100 U	120 U	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	200 U	-- U	-- U	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	50 U	200 U	80 U	2 U	80 U	40 U
2-Hexanone	NE	NE	NE	UG/L	--	--	100 U	100 U	120 U	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	50 U	200 U	80 U	2 U	80 U	40 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	100 U	100 U	120 U	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	50 UD	100 UD	100 U	100 U	120 U	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	100 U	100 U	120 U	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	20 UD	40 UD	20 U	10 U	12 U	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	20 UD	40 UD	40 U	40 U	50 U	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	--	--	20 U	20 U	25 U	25 U	100 U	40 U	1 U	40 U	20 U
Bromoform	700	50000	50000	UG/L	--	--	40 U	40 U	50 U	50 U	200 U	80 U	2 UJ	80 U	40 U
Bromomethane	7	800	800	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	1.1	40 U	20 U
Chlorobenzene	200	1000	1000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	2.2	40 U	20 U
Chloroethane	NE	NE	NE	UG/L	20 UD	40 UD	40 U	40 U	50 U	50 U	200 U	80 U	2 UJ	80 U	40 U
Chloroform	50	20000	20000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	7.9	40 U	20 U
Chloromethane	NE	NE	NE	UG/L	20 UD	40 UD	40 U	40 U	50 U	50 U	200 U	80 U	2 U	80 U	40 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	743 D	222 D	860	1100	310	220	290	230	250	900	1600
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	10 U	10 U	12 U	12 U	50 U	20 U	0.5 U	20 U	10 U
Dibromochloromethane	20	50000	50000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	1 U	40 U	20 U
Dibromomethane	NE	NE	NE	UG/L	-- UD	-- UD	40 U	40 U	50 U	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	-- UD	-- UD	40 U	40 U	50 U	50 U	200 U	80 U	2 U	80 U	40 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	200 U	200 U	250 U	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	20 UD	40 UD	20 U	20 U	25 U	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	20 UD	40 UD	12 U	12 U	15 U	15 U	60 U	24 U	0.6 U	24 U	12 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	20 UD	40 UD	40 U	40 U	50 U	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	20 UD	100 UD	40 U	40 U	50 U	50 U	200 U	80 U	2 U	80 U	40 U
Naphthalene	700	20000	20000	UG/L	20 UD	40 UD	40 U	40 U	50 U	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-4B	MW-6B	MW-6B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	MW-4B	MW-4B	AX-GW-MW4B-120910	AX-GW-MW4B-111111	AX-GW-MW4B-120612	AX-GW-MW4B-031914	AX-GW-MW4B-062414	AX-GW-MW4B-120914	AX-GW-MW0	AX-GW-MW6B-032014	AX-GW-MW6B-062514
Sample Date			UCLs		11/5/2008	3/17/2010	12/9/2010	11/9/2011	12/5/2012	3/19/2014	6/24/2014	12/9/2014	4/19/2017	3/20/2014	6/25/2014
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	20 UD	40 UD	40 U	40 U	50 U	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	20 U	20 U	25 U	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	600 U	-- U	250 U	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	20 UD	40 UD	20 U	20 U	32	30	100 U	40 U	36	40 U	20 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	100 U	100 U	120 U	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	20 UD	40 UD	20 U	20 U	25 U	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	20 UD	40 UD	20 U	20 U	25 U	25 U	100 U	40 U	1.1	40 U	20 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	--	--	10 U	10 U	12 U	12 U	50 U	20 U	0.5 U	20 U	10 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	50 U	50 U	62 U	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	1720 D	3090 D	1800	1300	3100	*6200*	*5200*	*5400*	4200	2200	2100
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	20 UD	40 UD	40 U	40 U	50 U	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	50 U	50 U	62 U	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	308 D	40 UD	45	32	25 U	25 U	100 U	40 U	13 J	68	89
Xylenes, m & p	3000	5000	5000	UG/L	--	--	40 U	40 U	50 U	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	50 UD	120 UD	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.049 U	0.02 U	1.07	0.25 U	1.52	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1221	5	10	10	UG/L	0.049 U	0.02 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1232	5	10	10	UG/L	0.049 U	3.88 D	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1242	5	10	10	UG/L	0.74	0.02 U	0.25 U	0.25 U	0.25 U	2.04	0.25 U	1.92	1.68	*17.4*	*16.7*
Aroclor 1248	5	10	10	UG/L	0.049 U	0.02 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1254	5	10	10	UG/L	0.15	0.02 U	0.46	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1260	5	10	10	UG/L	0.049 U	0.02 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1262	5	10	10	UG/L	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U
Aroclor 1268	5	10	10	UG/L	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U
Total PCBs	5	10	10	UG/L	0.89	3.88	1.53	0.25 U	1.52	2.04	0.25 U	1.92	1.68	*17.4*	*16.7*
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	1.8	0.94	--	--	7.53
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	1.88	1.04	--	--	5.44
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	178	172	--	--	24.3
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	8.8	8.7	--	--	68.7
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	0.27	0.33	--	--	0.19
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	8	20	--	--	0.89
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	5.4	9.9	--	--	0.89
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	0.1 U	0.1 U	--	--	0.21
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	0.01 U	0.01 U	--	--	0.01 U
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	60	51	--	--	120
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	2.4	2	--	--	3.7
Total Suspended Solids	NE	NE	NE	MG/L	--	--	140	5 U	5 U	5 U	5 U	5 U	--	5 U	5 U
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	--	7.82	0.35	0.3	0.24	0.27	0.16	--	0.12	0.15
pH	NE	NE	NE	PH UNITS	--	--	5.92	4.72	4.81	4.58	4.8	4.78	--	6.01	6.04
Electrical conductivity	NE	NE	NE	mS/cm	--	--	1.24	1.2	0.79	1.98	1.93	1.7	--	3.59	2.57
Specific conductance	NE	NE	NE	mV	--	--	17.8	0.56	121.3	227.8	-81.6	202.3	--	101.1	-80.4
Turbidity	NE	NE	NE	NTU	--	--	13.6	0.73	0.37	1.22	0.68	1.34	--	0.54	3.16
Temperature	NE	NE	NE	DEG C	--	--	10.46	14.02	16.56	13.74	18.91	13.61	--	13.12	17.73

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-6B	MW-6B	MW-6B	MW-6B	MW-6B	MW-7B	MW-7B	MW-7B	MW-7B	MW-7B	MW-11B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-DUP2-062514	AX-GW-MW6B-092514	AX-GW-DUP3-092514	AX-GW-MW6B-121114	AX-GW-MW0	AX-GW-MW7B-032414	AX-GW-MW7B-062714	AX-GW-MW7B-093014	AX-GW-MW7B-120914	AX-GW-MW0	AX-GW-MW11B-031914
Sample Date			UCLs		6/25/2014	9/25/2014	9/25/2014	12/11/2014	4/18/2017	3/24/2014	6/27/2014	9/30/2014	12/9/2014	4/19/2017	3/19/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	20 U	50 U	50 U	20 U	200 UJ	100 U	200 U	100 U	10 U	200 U	5 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
1,1-Dichloroethane	2000	20000	100000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
1,1-Dichloroethene	80	30000	100000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	15	200 U	5 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	40 U	100 U	100 U	40 U	400 UJ	200 U	400 U	200 U	20 U	400 U	10 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	40 U	100 U	100 U	40 U	400 UJ	200 U	400 U	200 U	20 U	400 U	10 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
1,2-Dichloroethane	5	20000	100000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 UJ	5 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	1600	1800	1900	1400	3100	--	720	1200	610	1200	--
1,2-Dichloropropane	3	50000	100000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
1,3-Dichloropropane	NE	NE	NE	UG/L	40 U	100 U	100 U	40 U	400 UJ	200 U	400 U	200 U	20 U	400 U	10 U
1,3-Dichloropropene, total	10	200	100000	UG/L	10 U	25 U	25 U	10 U	100 U	--	100 U	50 U	5 U	100 U	--
1,4-Dichlorobenzene	60	8000	8000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	40 U	100 U	100 U	40 U	400 U	200 U	400 U	200 U	20 U	400 U	10 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	40 U	100 U	100 U	40 U	400 U	200 U	400 U	200 U	20 U	400 U	10 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
Bromoform	700	50000	50000	UG/L	40 U	100 U	100 U	40 U	400 UJ	200 U	400 U	200 U	20 U	400 UJ	10 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
Chlorobenzene	200	1000	1000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
Chloroethane	NE	NE	NE	UG/L	40 U	100 U	100 U	40 U	400 UJ	200 U	400 U	200 U	20 U	400 UJ	10 U
Chloroform	50	20000	20000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
Chloromethane	NE	NE	NE	UG/L	40 U	100 U	100 U	40 U	400 UJ	200 U	400 U	200 U	20 U	400 U	10 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	1600	1800	1900	1400	3100	710	720	1200	610	1200	5 U
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	10 U	25 U	25 U	10 U	100 U	50 U	100 U	50 U	5 U	100 U	2.5 U
Dibromochloromethane	20	50000	50000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	40 U	100 U	100 U	40 U	400 UJ	200 U	400 U	200 U	20 U	400 U	10 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	12 U	30 U	30 U	12 U	120 U	60 U	120 U	60 U	6 U	120 U	3 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	40 U	100 U	100 U	40 U	400 U	200 U	400 U	200 U	20 U	400 U	10 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-6B	MW-6B	MW-6B	MW-6B	MW-6B	MW-7B	MW-7B	MW-7B	MW-7B	MW-7B	MW-11B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-DUP2-062514	AX-GW-MW6B-092514	AX-GW-DUP3-092514	AX-GW-MW6B-121114	AX-GW-MW0	AX-GW-MW7B-032414	AX-GW-MW7B-062714	AX-GW-MW7B-093014	AX-GW-MW7B-120914	AX-GW-MW0	AX-GW-MW11B-031914
Sample Date			UCLs		6/25/2014	9/25/2014	9/25/2014	12/11/2014	4/18/2017	3/24/2014	6/27/2014	9/30/2014	12/9/2014	4/19/2017	3/19/2014
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	220
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	20 U	50 U	50 U	20 U	200 U	100 U	200 U	100 U	10 U	200 U	5 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	10 U	25 U	25 U	10 U	100 UJ	50 U	100 U	50 U	5 U	100 U	2.5 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	2100	3700	3800	1500	*9600*	*16000*	*13000*	*14000*	*14000*	*12000*	11
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	95	50 U	50 U	26	200 U	100 U	200 U	100 U	35	200 UJ	5 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	2.5 U	2.5 U	2.5 U	1.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	2.5 U	2.5 U	2.5 U	1.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	2.5 U	2.5 U	2.5 U	1.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	*15.9*	*22*	*23.9*	*11.6*	*12.2*	1.51	0.53	0.91	0.43	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	2.5 U	2.5 U	2.5 U	1.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	2.5 U	2.5 U	2.5 U	1.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	2.5 U	2.5 U	2.5 U	1.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	2.5 U	2.5 U	2.5 U	1.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	2.5 U	2.5 U	2.5 U	1.25 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	*15.9*	*22*	*23.9*	*11.6*	*12.2*	1.51	0.53	0.91	0.43	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	12.6	--	6.7	--	--	4.98	4.83	3.71	--	--
Ethene	NE	NE	NE	UG/L	--	8.92	--	4.14	--	--	9.5	11	14.9	--	--
Methane	NE	NE	NE	UG/L	--	15.9	--	7.72	--	--	58.2	62.2	44.3	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	65.6	--	61.3	--	--	67.2	71.5	72.9	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	0.14	--	0.14	--	--	0.075 U	0.075 U	0.075 U	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	1.5	--	0.97	--	--	0.5 U	0.5 U	0.5 U	--	--
Iron	NE	NE	NE	MG/L	--	1.3	--	0.96	--	--	0.05 U	0.05 U	0.05 U	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	0.73	--	1.41	--	--	0.1 U	0.1 U	0.1 U	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	0.01 U	--	0.01 U	--	--	0.02	0.02	0.02	--	--
Sulfate	NE	NE	NE	MG/L	--	140	--	240	--	--	310	350	320	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	8.1	--	5 U	--	--	3.2	2.8	1.7	--	--
Total Suspended Solids	NE	NE	NE	MG/L	--	5 U	--	5 U	--	5 U	6.7	7.6	6.1	--	5 U
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	0.09	--	0.06	--	0.35	0.07	0.4	0.17	--	0.22
pH	NE	NE	NE	PH UNITS	--	6.12	--	5.86	--	6.83	7.62	7.74	8.22	--	9.01
Electrical conductivity	NE	NE	NE	mS/cm	--	4.24	--	6.34	--	10.17	8.01	9.55	9.22	--	0.59
Specific conductance	NE	NE	NE	mV	--	57.5	--	111.9	--	33.4	35.5	-0.8	-108.1	--	-7.9
Turbidity	NE	NE	NE	NTU	--	0.88	--	0.93	--	0.77	3.14	2.66	0.51	--	1.89
Temperature	NE	NE	NE	DEG C	--	18.82	--	12.81	--	14.21	19.37	17.3	11.08	--	10.98

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-11B	MW-11B	MW-11B	MW-13B	MW-13B	MW-13B	MW-13B	MW-15B	MW-15B	MW-15B	MW-15B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW11B-062514	AX-GW-MW11B-093014	AX-GW-MW11B-121014	AX-GW-MW13B-032014	AX-GW-MW13B-062614	AX-GW-MW13B-092414	AX-GW-MW13B-121014	AX-GW-MW15B-032414	AX-GW-MW15B-062714	AX-GW-MW15B-092614	AX-GW-MW15B-121114
Sample Date			UCLs		6/25/2014	9/30/2014	12/10/2014	3/20/2014	6/26/2014	9/24/2014	12/10/2014	3/24/2014	6/27/2014	9/26/2014	12/11/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 U	1 U	400 U	200 U	170	220	400 U	2500 U	2000 U	1000 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	4.1	6.3	3	--	4400	3700	3700	--	32000	44000	43000
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
1,3-Dichloropropene, total	10	200	100000	UG/L	0.5 U	0.5 U	0.5 U	--	100 U	25 U	50 U	--	1200 U	1000 U	500 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1.5	1	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
Chloroform	50	20000	20000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	4.1	6.3	3	3200	4400	3700	3700	22000	32000	44000	43000
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	200 U	100 U	25 U	50 U	200 U	1200 U	1000 U	500 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	0.6 U	240 U	120 U	30 U	60 U	240 U	1500 U	1200 U	600 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	2 U	800 U	400 U	100 U	200 U	800 U	5000 U	4000 U	2000 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-11B	MW-11B	MW-11B	MW-13B	MW-13B	MW-13B	MW-13B	MW-15B	MW-15B	MW-15B	MW-15B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW11B-062514	AX-GW-MW11B-093014	AX-GW-MW11B-121014	AX-GW-MW13B-032014	AX-GW-MW13B-062614	AX-GW-MW13B-092414	AX-GW-MW13B-121014	AX-GW-MW15B-032414	AX-GW-MW15B-062714	AX-GW-MW15B-092614	AX-GW-MW15B-121114
Sample Date			UCLs		6/25/2014	9/30/2014	12/10/2014	3/20/2014	6/26/2014	9/24/2014	12/10/2014	3/24/2014	6/27/2014	9/26/2014	12/11/2014
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	180	140	110	400 U	200 U	76	100 U	400 U	2500 U	2000 U	1000 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	1 U	400 U	200 U	50 U	100 U	400 U	2500 U	2000 U	1000 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	200 U	100 U	25 U	50 U	200 U	1200 U	1000 U	500 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	9.4	10	8.7	*16000*	*15000*	*15000*	*23000*	*90000*	*110000*	*110000*	*88000*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	1 U	1 U	1 U	620	560	730	620	400 U	2500 U	2000 U	1000 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U	2.5 U	5 U	5 U	5 U	25 U	25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U	2.5 U	5 U	5 U	5 U	*132*	25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U	2.5 U	5 U	5 U	5 U	25 U	25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	1.02	0.53	*22.7*	*33.4*	*27.4*	*35.2*	*49.8*	*69.3*	*82.8*	*183*
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U	2.5 U	5 U	5 U	5 U	25 U	25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U	2.5 U	5 U	5 U	*11.8*	25 U	25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U	2.5 U	5 U	5 U	5 U	25 U	25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U	2.5 U	5 U	5 U	5 U	25 U	25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	2.5 U	2.5 U	2.5 U	5 U	5 U	5 U	25 U	25 U
Total PCBs	5	10	10	UG/L	0.25 U	1.02	0.53	*22.7*	*33.4*	*27.4*	*35.2*	*49.8*	*81.1*	*215*	*183*
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	--	1.06	4.43	2.89	--	3.82	8.77	20.8
Ethene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	--	40.3	71.2	57.2	--	25	35.6	43.8
Methane	NE	NE	NE	UG/L	5 U	15	8.45	--	80.4	134	155	--	79.5	102	97.9
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	91.7	89.1	89.6	--	72.5	148	185	--	42.6	45.4	40.5
Ammonia (as N)	NE	NE	NE	MG/L	0.25	0.27	0.075 U	--	0.44	0.62	0.39	--	0.2	0.075 U	0.075 U
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	9.7	12	19
Iron	NE	NE	NE	MG/L	0.05 U	0.05 U	0.05 U	--	0.14	0.96	0.07	--	8.2	11	14
Nitrate (as N)	NE	NE	NE	MG/L	2.95	2.82	1.88	--	0.1 U	0.1 U	0.1 U	--	0.11	0.1 U	0.1 U
Total Phosphorus as P	NE	NE	NE	MG/L	0.01 U	0.01	0.01 U	--	0.63	0.5	0.57	--	0.02	0.01 U	0.01 U
Sulfate	NE	NE	NE	MG/L	15	15	18	--	190	330	260	--	290	260	510
Total Organic Carbon	NE	NE	NE	MG/L	2	2.9	1.2	--	13	4	13	--	8.3	1.5	2.4
Total Suspended Solids	NE	NE	NE	MG/L	5 U	5 U	5 U	46	9	5.3	5 U	7.7	32	12	11
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.23	0.22	0.33	1.56	0.11	0.14	0.11	0.21	0.14	0.18	0.39
pH	NE	NE	NE	PH UNITS	6.32	6.32	6.2	11.4	10.6	8.87	8.88	6.57	6.73	6.76	6.09
Electrical conductivity	NE	NE	NE	mS/cm	0.64	0.8	0.68	3.04	2.43	4.94	4.17	5.65	8.17	7.95	8.14
Specific conductance	NE	NE	NE	mV	-139.7	-11	38.1	-56.9	-77.7	39.5	118.2	65.2	-109.1	-12.6	-72.4
Turbidity	NE	NE	NE	NTU	0.65	2.18	1.58	8.99	3.15	3.28	17.3	4.13	4.27	1.36	7.65
Temperature	NE	NE	NE	DEG C	17.21	19.34	15.78	12.94	18.48	20.13	15.58	11.32	16.58	17.89	13.95

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-15B	MW-17B	MW-17B	MW-17B	MW-17B	MW-17B	MW-17B	MW-17B	MW-26B	MW-26B	MW-26B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW15B-080715	AX-GW-MW17B-032114	AX-GW-MW17B-062614	AX-GW-MW17B-092414	AX-GW-DUP1-092414	AX-GW-MW17B-120914	AX-GW-DUP1-120914	AX-GW-MW1	MW-26B	AX-GW-MW26B-092614	AX-GW-DUP4-092614
Sample Date			UCLs		8/7/2015	3/21/2014	6/26/2014	9/24/2014	9/24/2014	12/9/2014	12/9/2014	4/18/2017	7/23/2014	9/26/2014	9/26/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 UJ	250 U	2000 U	2000 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,1-Dichloroethane	2000	20000	100000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,1-Dichloroethene	80	30000	100000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 UJ	500 U	4000 U	4000 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 UJ	500 U	4000 U	4000 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,2-Dichloroethane	5	20000	100000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	92000	--	3100	4500	4600	3600	3100	2400	1900	7600	8000
1,2-Dichloropropane	3	50000	100000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,3-Dichloropropane	NE	NE	NE	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 UJ	500 U	4000 U	4000 U
1,3-Dichloropropene, total	10	200	100000	UG/L	250 U	--	50 U	25 U	25 U	20 U	20 U	10 U	120 U	1000 U	1000 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 U	500 U	4000 U	4000 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 U	500 U	4000 U	4000 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
Bromoform	700	50000	50000	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 UJ	500 U	4000 U	4000 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
Chlorobenzene	200	1000	1000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
Chloroethane	NE	NE	NE	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 UJ	500 U	4000 U	4000 U
Chloroform	50	20000	20000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
Chloromethane	NE	NE	NE	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 UJ	500 U	4000 U	4000 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	92000	1900	3100	4400	4500	3500	3000	2400	1900	7600	8000
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	250 U	25 U	50 U	25 U	25 U	20 U	20 U	10 U	120 U	1000 U	1000 U
Dibromochloromethane	20	50000	50000	UG/L	500 U	50 U	100 U	50 U	50 U	40 U	40 U	20 U	250 U	2000 U	2000 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 UJ	500 U	4000 U	4000 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	300 U	30 U	60 U	30 U	30 U	24 U	24 U	12 U	150 U	1200 U	1200 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	1000 U	100 U	200 U	100 U	100 U	80 U	80 U	40 U	500 U	4000 U	4000 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-15B	MW-17B	MW-17B	MW-17B	MW-17B	MW-17B	MW-17B	MW-17B	MW-26B	MW-26B	MW-26B
Sample ID					AX-GW-MW15B-080715	AX-GW-MW17B-032114	AX-GW-MW17B-062614	AX-GW-MW17B-092414	AX-GW-DUP1-092414	AX-GW-MW17B-120914	AX-GW-DUP1-120914	AX-GW-MW1	MW-26B	AX-GW-MW26B-092614	AX-GW-DUP4-092614
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	8/7/2015	3/21/2014	6/26/2014	9/24/2014	9/24/2014	12/9/2014	12/9/2014	4/18/2017	7/23/2014	9/26/2014	9/26/2014
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	500 U	65	100 U	50 U	50 U	40 U	40 U	40	250 U	2000 U	2000 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	500 U	50 U	100 U	61	64	67	70	42	250 U	2000 U	2000 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	250 U	25 U	50 U	25 U	25 U	20 U	20 U	10 UJ	120 U	1000 U	1000 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*33000*	4600	*5100*	3600	3600	2900	3000	2500	*32000*	*150000*	*150000*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	500 U	250	240	350	350	340	370	180	250 U	2000 U	2000 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1.25 U	1.25 U	0.5 U	0.5 U
Aroclor 1221	5	10	10	UG/L	25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1.25 U	*13*	8.77	9.31
Aroclor 1232	5	10	10	UG/L	25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1.25 U	1.25 U	0.5 U	0.5 U
Aroclor 1242	5	10	10	UG/L	*699*	*30.4*	*28*	*21.7*	*21.3*	*22.9*	*23.6*	*19.7*	1.25 U	2.82	2.88
Aroclor 1248	5	10	10	UG/L	25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1.25 U	1.25 U	0.5 U	0.5 U
Aroclor 1254	5	10	10	UG/L	*289*	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1.25 U	1.25 U	0.5 U	0.5 U
Aroclor 1260	5	10	10	UG/L	*121*	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1.25 U	1.25 U	0.5 U	0.5 U
Aroclor 1262	5	10	10	UG/L	25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1.25 U	1.25 U	0.5 U	0.5 U
Aroclor 1268	5	10	10	UG/L	25 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	1.25 U	1.25 U	0.5 U	0.5 U
Total PCBs	5	10	10	UG/L	*1110*	*30.4*	*28*	*21.7*	*21.3*	*22.9*	*23.6*	*19.7*	*13*	*11.6*	*12.2*
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	10.6	15.7	--	32.3	--	--	--	9.32	--
Ethene	NE	NE	NE	UG/L	--	--	4.28	3.48	--	5.06	--	--	--	27.2	--
Methane	NE	NE	NE	UG/L	--	--	304	461	--	937	--	--	--	124	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	134	139	--	126	--	--	--	286	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	0.87	1.08	--	1.58	--	--	--	0.15	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	0.5 U	0.5 U	--	0.61	--	--	--	13	--
Iron	NE	NE	NE	MG/L	--	--	0.18	1.1	--	0.58	--	--	--	13	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	0.1 U	0.1 U	--	0.1 U	--	--	--	0.1 U	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	0.04	0.02	--	0.01	--	--	--	0.01 U	--
Sulfate	NE	NE	NE	MG/L	--	--	190	180	--	210	--	--	--	160	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	11	4	--	7.9	--	--	--	1.1	--
Total Suspended Solids	NE	NE	NE	MG/L	--	5 U	5 U	5 U	--	5 U	--	--	--	8.8	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.2	0.11	0.06	0	--	0.07	--	--	--	0	--
pH	NE	NE	NE	PH UNITS	5.78	7.5	6.73	6.58	--	6.24	--	--	--	6.23	--
Electrical conductivity	NE	NE	NE	mS/cm	7.58	2.21	1.97	2.76	--	4.09	--	--	--	10.6	--
Specific conductance	NE	NE	NE	mV	-115.9	119.9	31.2	-15.5	--	-11.7	--	--	--	23.6	--
Turbidity	NE	NE	NE	NTU	4.39	0.86	0.99	1.75	--	1.88	--	--	--	2.24	--
Temperature	NE	NE	NE	DEG C	19.55	13.92	17.47	18.32	--	11.71	--	--	--	17.86	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
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Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-26B	MW-26B	MW-27B	MW-27B	MW-27B	MW-27B	MW-27B	MW-28B	MW-28B	MW-28B	MW-28B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW26B-121014	AX-GW-DUP3-121014	AX-GW-MW27B-080714	AX-GW-DUP1-080714	AX-GW-MW27B-092614	AX-GW-MW27B-121014	AX-GW-MW27B-080615	AX-GW-MW28B-080714	AX-GW-MW28B-092414	AX-GW-MW28B-121014	AX-GW-MW28B-080615
Sample Date			UCLs		12/10/2014	12/10/2014	8/7/2014	8/7/2014	9/26/2014	12/10/2014	8/6/2015	8/7/2014	9/24/2014	12/10/2014	8/6/2015
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,1-Dichloroethene	80	30000	100000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,2-Dichloroethane	5	20000	100000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	7700	7500	1700	1700	1600	1400	1300	350	410	620	930
1,2-Dichloropropane	3	50000	100000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
1,3-Dichloropropene, total	10	200	100000	UG/L	500 U	500 U	50 U	50 U	100 U	50 U	50 U	25 U	50 U	50 U	25 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
Bromoform	700	50000	50000	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
Chlorobenzene	200	1000	1000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
Chloroethane	NE	NE	NE	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
Chloroform	50	20000	20000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
Chloromethane	NE	NE	NE	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	7700	7500	1700	1700	1600	1400	1300	350	410	620	930
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	500 U	500 U	50 U	50 U	100 U	50 U	50 U	25 U	50 U	50 U	25 U
Dibromochloromethane	20	50000	50000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	600 U	600 U	60 U	60 U	120 U	60 U	60 U	30 U	60 U	60 U	30 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	2000 U	2000 U	200 U	200 U	400 U	200 U	200 U	100 U	200 U	200 U	100 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-26B	MW-26B	MW-27B	MW-27B	MW-27B	MW-27B	MW-27B	MW-28B	MW-28B	MW-28B	MW-28B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-MW26B-121014	AX-GW-DUP3-121014	AX-GW-MW27B-080714	AX-GW-DUP1-080714	AX-GW-MW27B-092614	AX-GW-MW27B-121014	AX-GW-MW27B-080615	AX-GW-MW28B-080714	AX-GW-MW28B-092414	AX-GW-MW28B-121014	AX-GW-MW28B-080615
Sample Date			UCLs		12/10/2014	12/10/2014	8/7/2014	8/7/2014	9/26/2014	12/10/2014	8/6/2015	8/7/2014	9/24/2014	12/10/2014	8/6/2015
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1000 U	1000 U	100 U	100 U	200 U	100 U	100 U	50 U	100 U	100 U	50 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	500 U	500 U	50 U	50 U	100 U	50 U	50 U	25 U	50 U	50 U	25 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*140000*	*130000*	*15000*	*14000*	*15000*	*14000*	*12000*	*5400*	*6200*	*8600*	*6000*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	1000 U	1000 U	170	160	200 U	160	120	50 U	100 U	100 U	50 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	2.2	0.25 U	2.98	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	2.44	2.76	0.25 U	0.25 U	1.98	2.52	0.25 U	0.33	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	2.44	2.76	0.25 U	0.25 U	4.18	2.52	2.98	0.33	0.25 U	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	10.1	--	12.3	--	11	17.6	--	0.67	2.14	2.45	--
Ethene	NE	NE	NE	UG/L	37.9	--	5.11	--	5.99	21.1	--	2.09	6.6	9.01	--
Methane	NE	NE	NE	UG/L	178	--	720	--	620	662	--	3.45	5.14	4.27	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	326	--	234	--	232	238	--	149	2 U	94.2	--
Ammonia (as N)	NE	NE	NE	MG/L	0.12	--	0.13	--	0.16	0.11	--	0.16	0.26	0.16	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	37	--	0.97	--	0.5 U	1.8	--	0.5 U	0.5 U	0.5 U	--
Iron	NE	NE	NE	MG/L	17	--	3.1	--	1.8	2	--	1.2	2.2	1	--
Nitrate (as N)	NE	NE	NE	MG/L	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	0.1 U	0.1 U	0.1 U	--
Total Phosphorus as P	NE	NE	NE	MG/L	0.01 U	--	0.04	--	0.01	0.01 U	--	0.01	0.01 U	0.01 U	--
Sulfate	NE	NE	NE	MG/L	140	--	600	--	540	640	--	120	82	110	--
Total Organic Carbon	NE	NE	NE	MG/L	20	--	3.4	--	0.5 U	2.5 U	--	3.8	1.8	2.1	--
Total Suspended Solids	NE	NE	NE	MG/L	9.5	--	48	--	9	10	--	92	50	7.3	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.1	--	0.09	--	0.32	0.08	0.14	0.07	0.16	0.18	0.09
pH	NE	NE	NE	PH UNITS	5.89	--	7.49	--	7.07	6.87	6.8	10.12	9.92	11.31	10.68
Electrical conductivity	NE	NE	NE	mS/cm	11.34	--	17.38	--	17.47	16.91	15.83	4.95	4.87	5.64	5.2
Specific conductance	NE	NE	NE	mV	62.9	--	-355.2	--	-39.7	-27.8	-118.2	-128.1	-20	-151.7	-458.1
Turbidity	NE	NE	NE	NTU	2.09	--	48.6	--	4.75	0.29	19.6	7.7	2.8	0.42	13.9
Temperature	NE	NE	NE	DEG C	14.98	--	19.62	--	19.55	12.68	20.49	20.13	19.38	14.92	19.24

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-28B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-DUP1-080615	MW-32B (65-85)	MW-32B (105-125)	MW-32B (125-145)	MW-32B (145-165)	MW-32B (165-185)	AX-GW-MW32B (100-112)-071	AX-GW-MW32B (135-145)-071	AX-GW-MW32B (153-163)-071	AX-GW-MW32B(100-112)-080	AX-GW-MW32B(135-145)-080
Sample Date			UCLs		8/6/2015	4/28/2015	4/29/2015	4/30/2015	4/30/2015	4/30/2015	7/13/2015	7/13/2015	7/13/2015	8/7/2015	8/7/2015
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,1-Dichloroethane	2000	20000	100000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,1-Dichloroethene	80	30000	100000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,2-Dichloroethane	5	20000	100000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	950	3	32	1300	590	440	200	640	340	150	500 U
1,2-Dichloropropane	3	50000	100000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,3-Dichloropropane	NE	NE	NE	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
1,3-Dichloropropene, total	10	200	100000	UG/L	25 U	0.5 U	0.5 U	100 U	100 U	100 U	50 U	250 U	100 U	50 U	250 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
Bromoform	700	50000	50000	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
Chlorobenzene	200	1000	1000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
Chloroethane	NE	NE	NE	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
Chloroform	50	20000	20000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
Chloromethane	NE	NE	NE	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	950	3	32	1300	590	440	200	640	340	150	500 U
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	25 U	0.5 U	0.5 U	100 U	100 U	100 U	50 U	250 U	100 U	50 U	250 U
Dibromochloromethane	20	50000	50000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	30 U	0.6 U	0.6 U	120 U	120 U	120 U	60 U	300 U	120 U	60 U	300 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	100 U	2 U	2 U	400 U	400 U	400 U	200 U	1000 U	400 U	200 U	1000 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-28B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B	MW-32B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-DUP1-080615	MW-32B (65-85)	MW-32B (105-125)	MW-32B (125-145)	MW-32B (145-165)	MW-32B (165-185)	AX-GW-MW32B (100-112)-071	AX-GW-MW32B (135-145)-071	AX-GW-MW32B (153-163)-071	AX-GW-MW32B(100-112)-080	AX-GW-MW32B(135-145)-080
Sample Date			UCLs		8/6/2015	4/28/2015	4/29/2015	4/30/2015	4/30/2015	4/30/2015	7/13/2015	7/13/2015	7/13/2015	8/7/2015	8/7/2015
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	50 U	1 U	1 U	340	200 U	200 U	100 U	500 U	200 U	100 U	500 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	25 U	0.5 U	0.5 U	100 U	100 U	100 U	50 U	250 U	100 U	50 U	250 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*6100*	19	24	*110000*	*54000*	*34000*	*9900*	*51000*	*18000*	*7200*	*23000*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	50 U	1 U	1 U	200 U	200 U	200 U	100 U	500 U	200 U	100 U	500 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	--	--	0.25 U	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	--	--	0.25 U	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	--	--	0.25 U	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	--	--	2.81	--	3.13	0.25 U	0.25 U	0.25 U	0.25 U	0.29
Aroclor 1248	5	10	10	UG/L	0.25 U	--	--	0.25 U	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	--	--	0.25 U	--	1.29	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	--	--	0.25 U	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	--	--	0.25 U	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	--	--	0.25 U	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	--	--	2.81	--	4.42	0.25 U	0.25 U	0.25 U	0.25 U	0.29
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	1.02	2.03	1.22	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	4.07	9.24	5.32	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	9.3	13	8.48	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	69.4	94.5	116	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	0.51	0.64	0.5	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	0.5 U	0.59	0.5	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	0.19	0.68	0.64	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	0.1 U	0.1 U	0.17	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	0.025 U	0.025 U	0.025 U	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	1100	1200	1500	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	20 U	10 U	10 U	--	--
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	--	--	--	5 U	6.1	5.1	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	--	--	--	--	--	0.08	0.13	0.11	0.19	0.15
pH	NE	NE	NE	PH UNITS	--	--	--	--	--	--	7.24	7.13	7.06	7.1	7.14
Electrical conductivity	NE	NE	NE	mS/cm	--	--	--	--	--	--	28.11	30.64	34.16	23.65	33.16
Specific conductance	NE	NE	NE	mV	--	--	--	--	--	--	-34.6	-280	-24.4	-92.8	-111.4
Turbidity	NE	NE	NE	NTU	--	--	--	--	--	--	4.38	3.97	2.59	0.1	0.08
Temperature	NE	NE	NE	DEG C	--	--	--	--	--	--	15.84	18.57	17.8	17.96	17.21

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-32B	MW-32B	MW-32B	MW-32B	MW-33B	MW-33B	MW-33B	MW-33B	MW-33B	MW-33B	MW-33B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	X-GW-MW32B(153-163)-0807	AX-GW-MW32B (100-11	AX-GW-MW32B (135-14	AX-GW-MW32B (153-16	MW-33B (32-52)	MW-33B (52-72)	MW-33B (72-92)	MW-33B (92-112)	MW-33B (112-132)	MW-33B(132-152)	MW-33B(152-172)
Sample Date			UCLs		8/7/2015	4/20/2017	4/20/2017	4/20/2017	5/7/2015	5/7/2015	5/8/2015	5/8/2015	5/8/2015	5/11/2015	5/11/2015
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,1-Dichloroethane	2000	20000	100000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,1-Dichloroethene	80	30000	100000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	400 U	100 UJ	200 UJ	100 UJ	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	400 U	100 U	200 U	100 U	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,2-Dichloroethane	5	20000	100000	UG/L	200 U	50 UJ	100 UJ	50 UJ	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	220	88	100 U	50	1800	2700	3600	2500	2700	2800	610
1,2-Dichloropropane	3	50000	100000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,3-Dichloropropane	NE	NE	NE	UG/L	400 U	100 U	200 U	100 U	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
1,3-Dichloropropene, total	10	200	100000	UG/L	100 U	25 U	50 U	25 U	25 U	120 U	250 U	120 U	120 U	200 U	50 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	400 U	100 U	200 U	100 U	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	400 U	100 U	200 U	100 U	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
Bromoform	700	50000	50000	UG/L	400 U	100 UJ	200 UJ	100 UJ	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	200 U	50 UJ	100 UJ	50 UJ	50 U	250 U	500 U	250 U	250 U	400 U	100 U
Chlorobenzene	200	1000	1000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
Chloroethane	NE	NE	NE	UG/L	400 U	100 UJ	200 UJ	100 UJ	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
Chloroform	50	20000	20000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
Chloromethane	NE	NE	NE	UG/L	400 U	100 U	200 U	100 U	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	220	88 J	100 UJ	50 J	1800	2700	3600	2500	2700	2800	610
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	100 U	25 U	50 U	25 U	25 U	120 U	250 U	120 U	120 U	200 U	50 U
Dibromochloromethane	20	50000	50000	UG/L	200 U	50 U	100 U	50 U	50 U	250 U	500 U	250 U	250 U	400 U	100 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	400 U	100 U	200 U	100 U	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	120 U	30 U	60 U	30 U	30 U	150 U	300 U	150 U	150 U	240 U	60 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	400 U	100 U	200 U	100 U	100 U	500 U	1000 U	500 U	500 U	800 U	200 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-32B	MW-32B	MW-32B	MW-32B	MW-33B	MW-33B	MW-33B	MW-33B	MW-33B	MW-33B	MW-33B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	X-GW-MW32B(153-163)-0807	AX-GW-MW32B (100-11	AX-GW-MW32B (135-14	AX-GW-MW32B (153-16	MW-33B (32-52)	MW-33B (52-72)	MW-33B (72-92)	MW-33B (92-112)	MW-33B (112-132)	MW-33B(132-152)	MW-33B(152-172)
Sample Date			UCLs		8/7/2015	4/20/2017	4/20/2017	4/20/2017	5/7/2015	5/7/2015	5/8/2015	5/8/2015	5/8/2015	5/11/2015	5/11/2015
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	200 U	50 U	100 U	50 U	56	250 U	500 U	250 U	250 U	400 U	100 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	200 U	50 UJ	100 UJ	50 UJ	50 U	250 U	500 U	250 U	250 U	400 U	100 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	100 U	25 U	50 U	25 U	25 U	120 U	250 U	120 U	120 U	200 U	50 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*14000*	3600	*5100*	2500	*9800*	*26000*	*63000*	*34000*	*40000*	*41000*	*7500*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	200 U	50 U	100 U	50 U	160	250 U	500 U	250 U	250 U	400 U	100 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	1.25 U	--	--	--	--
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	1.25 U	--	--	--	--
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	1.25 U	--	--	--	--
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	*10.6*	--	--	--	--
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	1.25 U	--	--	--	--
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	1.25 U	--	--	--	--
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	1.25 U	--	--	--	--
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	1.25 U	--	--	--	--
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	1.25 U	--	--	--	--
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	--	--	*10.6*	--	--	--	--
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.24	--	--	--	--	--	--	--	--	--	--
pH	NE	NE	NE	PH UNITS	7.06	--	--	--	--	--	--	--	--	--	--
Electrical conductivity	NE	NE	NE	mS/cm	34.42	--	--	--	--	--	--	--	--	--	--
Specific conductance	NE	NE	NE	mV	-68	--	--	--	--	--	--	--	--	--	--
Turbidity	NE	NE	NE	NTU	0.12	--	--	--	--	--	--	--	--	--	--
Temperature	NE	NE	NE	DEG C	18.58	--	--	--	--	--	--	--	--	--	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-33B	MW-33B	MW-33B	MW-33B	MW-33B	MW-33B	MW-33B	MW-33B	MW-34B	MW-34B	MW-34B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	MW-33B(172-192)	MW-33B (192-212)	MW-33B (212-232)	MW-33B (232-252)	MW-33B (252-272)	MW-33B (272-292)	AX-GW-MW33B-082715	AX-GW-MW3	MW-34B (38.5-58)	MW-34B (58-78)	MW-34B (78-98)
Sample Date			UCLs		5/12/2015	5/13/2015	5/13/2015	5/14/2015	5/15/2015	5/15/2015	8/27/2015	4/20/2017	5/1/2015	5/4/2015	5/4/2015
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1.1	50 U	25 U	500 U	500 U
1,1-Dichloroethane	2000	20000	100000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	5.7	50 U	25 U	500 U	500 U
1,1-Dichloroethene	80	30000	100000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	4	50 U	25 U	500 U	500 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2 U	100 UJ	50 U	1000 U	1000 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2 U	100 U	50 U	1000 U	1000 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
1,2-Dichloroethane	5	20000	100000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	41	50 UJ	25 U	500 U	500 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	730	1800	2400	1600	1200	2400	440	390	200	2700	2400
1,2-Dichloropropane	3	50000	100000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
1,3-Dichloropropane	NE	NE	NE	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2 U	100 U	50 U	1000 U	1000 U
1,3-Dichloropropene, total	10	200	100000	UG/L	50 U	120 U	250 U	100 U	100 U	250 U	0.5 U	25 U	12 U	250 U	250 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2 U	100 U	50 U	1000 U	1000 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2 U	100 U	50 U	1000 U	1000 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
Bromoform	700	50000	50000	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2 U	100 UJ	50 U	1000 U	1000 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 UJ	25 U	500 U	500 U
Chlorobenzene	200	1000	1000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	7.8	50 U	25 U	500 U	500 U
Chloroethane	NE	NE	NE	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2 U	100 UJ	50 U	1000 U	1000 U
Chloroform	50	20000	20000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
Chloromethane	NE	NE	NE	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2 U	100 U	50 U	1000 U	1000 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	730	1800	2400	1600	1200	2400	440	390 J	200	2700	2400
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	50 U	120 U	250 U	100 U	100 U	250 U	0.5 U	25 U	12 U	250 U	250 U
Dibromochloromethane	20	50000	50000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1 U	50 U	25 U	500 U	500 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2 U	100 U	50 U	1000 U	1000 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	60 U	150 U	300 U	120 U	120 U	300 U	0.6 U	30 U	15 U	300 U	300 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	200 U	500 U	1000 U	400 U	400 U	1000 U	2.1	100 U	50 U	1000 U	1000 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone Location Sample ID Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	Bedrock MW-33B MW-33B(172-192) 5/12/2015	Bedrock MW-33B MW-33B (192-212) 5/13/2015	Bedrock MW-33B MW-33B (212-232) 5/13/2015	Bedrock MW-33B MW-33B (232-252) 5/14/2015	Bedrock MW-33B MW-33B (252-272) 5/15/2015	Bedrock MW-33B MW-33B (272-292) 5/15/2015	Bedrock MW-33B AX-GW-MW33B-082715 8/27/2015	Bedrock MW-33B AX-GW-MW3 4/20/2017	Bedrock MW-34B MW-34B (38.5-58) 5/1/2015	Bedrock MW-34B MW-34B (58-78) 5/4/2015	Bedrock MW-34B MW-34B (78-98) 5/4/2015
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	4.3	50 U	25 U	500 U	500 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	1.6	50 UJ	25 U	500 U	500 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	50 U	120 U	250 U	100 U	100 U	250 U	0.5 U	25 U	12 U	250 U	250 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*15000*	*28000*	*41000*	*22000*	*18000*	*47000*	3700	2100	3200	*60000*	*56000*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	100 U	250 U	500 U	200 U	200 U	500 U	12	50 U	25 U	500 U	500 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	--	--	--	--	--	0.25 U	0.25 U	0.25 U	--	--	--
Aroclor 1221	5	10	10	UG/L	--	--	--	--	--	0.25 U	0.25 U	0.25 U	--	--	--
Aroclor 1232	5	10	10	UG/L	--	--	--	--	--	0.25 U	0.25 U	0.25 U	--	--	--
Aroclor 1242	5	10	10	UG/L	--	--	--	--	--	3.64	0.25 U	0.25 U	--	--	--
Aroclor 1248	5	10	10	UG/L	--	--	--	--	--	0.25 U	0.25 U	0.25 U	--	--	--
Aroclor 1254	5	10	10	UG/L	--	--	--	--	--	0.25 U	0.25 U	0.25 U	--	--	--
Aroclor 1260	5	10	10	UG/L	--	--	--	--	--	0.25 U	0.25 U	0.25 U	--	--	--
Aroclor 1262	5	10	10	UG/L	--	--	--	--	--	0.25 U	0.25 U	0.25 U	--	--	--
Aroclor 1268	5	10	10	UG/L	--	--	--	--	--	0.25 U	0.25 U	0.25 U	--	--	--
Total PCBs	5	10	10	UG/L	--	--	--	--	--	3.64	0.25 U	0.25 U	--	--	--
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	--	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	--	--	--	--	--	0.31	--	--	--	--
pH	NE	NE	NE	PH UNITS	--	--	--	--	--	--	6.02	--	--	--	--
Electrical conductivity	NE	NE	NE	mS/cm	--	--	--	--	--	--	40.62	--	--	--	--
Specific conductance	NE	NE	NE	mV	--	--	--	--	--	--	-47.7	--	--	--	--
Turbidity	NE	NE	NE	NTU	--	--	--	--	--	--	4.88	--	--	--	--
Temperature	NE	NE	NE	DEG C	--	--	--	--	--	--	21.54	--	--	--	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B
Sample ID			Groundwater		MW-34B(98-118)	MW-34B(118-138)	MW-34B(138-158)	MW-34B(158-178)	MW-34B(178-198)	AX-GW-MW34B (60-80)-07141	AX-GW-MW34B (92-112)-0714	AX-GW-MW34B (120-130)-071	AX-GW-MW34B (170-180)-071	AX-GW-DUP1-071415	X-GW-MW34B(60-80)-08061
Sample Date			UCLs		5/5/2015	5/5/2015	5/6/2015	5/6/2015	5/6/2015	7/14/2015	7/14/2015	7/14/2015	7/14/2015	7/14/2015	8/6/2015
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1000 U	1000 U	1000 U	1200	1000 U	500 U	500 U	500 U	1200	1300	500 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,1-Dichloroethene	80	30000	100000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,2-Dichloroethane	5	20000	100000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	5000	7200	5400	7300	8200	2600	2600	4600	6400	6600	3600
1,2-Dichloropropane	3	50000	100000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
1,3-Dichloropropene, total	10	200	100000	UG/L	500 U	500 U	500 U	500 U	500 U	250 U	250 U	250 U	500 U	500 U	250 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
Bromoform	700	50000	50000	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
Chlorobenzene	200	1000	1000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
Chloroethane	NE	NE	NE	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
Chloroform	50	20000	20000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
Chloromethane	NE	NE	NE	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	5000	7200	5400	7300	8200	2600	2600	4600	6400	6600	3600
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	500 U	500 U	500 U	500 U	500 U	250 U	250 U	250 U	500 U	500 U	250 U
Dibromochloromethane	20	50000	50000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	600 U	600 U	600 U	600 U	600 U	300 U	300 U	300 U	600 U	600 U	300 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	2000 U	2000 U	2000 U	2000 U	2000 U	1000 U	1000 U	1000 U	2000 U	2000 U	1000 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	MW-34B(98-118)	MW-34B(118-138)	MW-34B(138-158)	MW-34B(158-178)	MW-34B(178-198)	AX-GW-MW34B (60-80)-07141	AX-GW-MW34B (92-112)-0714	AX-GW-MW34B (120-130)-071	AX-GW-MW34B (170-180)-071	AX-GW-DUP1-071415	X-GW-MW34B(60-80)-08061
Sample Date			UCLs		5/5/2015	5/5/2015	5/6/2015	5/6/2015	5/6/2015	7/14/2015	7/14/2015	7/14/2015	7/14/2015	7/14/2015	8/6/2015
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	500 U	500 U	500 U	500 U	500 U	250 U	250 U	250 U	500 U	500 U	250 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*110000*	*140000*	*140000*	*470000*	*320000*	*50000*	*51000*	*89000*	*480000*	*470000*	*49000*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	1000 U	1000 U	1000 U	1000 U	1000 U	500 U	500 U	500 U	1000 U	1000 U	500 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	--	--	--	0.64	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	--	--	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	--	--	--	0.64	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	0.66	0.84	0.87	0.99	--	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	5.34	6.68	7.38	16.4	--	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	14.6	19.6	30.6	96	--	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	41.6	42.2	55.5	70.2	--	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	0.21	0.21	0.42	0.44	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	2.8	3	1.5	0.91	--	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	2.5	2.5	1.6	1.5	--	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	0.1 U	0.1 U	0.1 U	0.1 U	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	0.01 U	0.01 U	0.01	0.01	--	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	440	540	560	740	--	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	5 U	10 U	10 U	10 U	--	--
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	--	--	7.9	6	6.7	6.1	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	--	--	--	--	--	0.32	0.14	0.07	0.08	--	0.25
pH	NE	NE	NE	PH UNITS	--	--	--	--	--	6.39	6.44	6.73	6.59	--	6.42
Electrical conductivity	NE	NE	NE	mS/cm	--	--	--	--	--	13.85	15.16	16.96	20.42	--	10.93
Specific conductance	NE	NE	NE	mV	--	--	--	--	--	8.9	2.4	-12.7	12.8	--	-16.2
Turbidity	NE	NE	NE	NTU	--	--	--	--	--	0.26	0.52	0.45	0.34	--	0.28
Temperature	NE	NE	NE	DEG C	--	--	--	--	--	17.53	17.01	17.7	17.28	--	19.65

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-101B	MW-101B	MW-101B	MW-101B
Sample ID			Groundwater		X-GW-MW34B(92-112)-08061	X-GW-MW34B(120-130)-080	X-GW-MW34B(170-180)-080	AX-GW-MW34B (60-8	AX-GW-MW34B (92-11	AX-GW-MW34B (120-13	AX-GW-MW34B (170-18	AX-GW-MW101B-031714	AX-GW-MW101B-062314	AX-GW-MW101B-052815	AX-GW-MW101B-080615
Sample Date			UCLs		8/6/2015	8/6/2015	8/6/2015	4/20/2017	4/20/2017	4/20/2017	4/20/2017	3/17/2014	6/23/2014	5/28/2015	8/6/2015
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,1-Dichloroethane	2000	20000	100000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,1-Dichloroethene	80	30000	100000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	1000 U	2000 U	20000 U	2000 UJ	2000 UJ	4000 UJ	4000 UJ	200 U	200 U	400 U	200 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	1000 U	2000 U	20000 U	2000 U	2000 U	4000 U	4000 U	200 U	200 U	400 U	200 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,2-Dichloroethane	5	20000	100000	UG/L	500 U	1000 U	10000 U	1000 UJ	1000 UJ	2000 UJ	2000 UJ	100 U	100 U	200 U	100 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	3600	6100	10000 U	15000	16000	36000	13000	--	1700	2300	2600
1,2-Dichloropropane	3	50000	100000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,3-Dichloropropane	NE	NE	NE	UG/L	1000 U	2000 U	20000 U	2000 U	2000 U	4000 U	4000 U	200 U	200 U	400 U	200 U
1,3-Dichloropropene, total	10	200	100000	UG/L	250 U	500 U	5000 U	500 U	500 U	1000 U	1000 U	--	50 U	100 U	50 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	1000 U	2000 U	20000 U	2000 U	2000 U	4000 U	4000 U	200 U	200 U	400 U	200 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	1000 U	2000 U	20000 U	2000 U	2000 U	4000 U	4000 U	200 U	200 U	400 U	200 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
Bromoform	700	50000	50000	UG/L	1000 U	2000 U	20000 U	2000 UJ	2000 UJ	4000 UJ	4000 UJ	200 U	200 U	400 U	200 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	500 U	1000 U	10000 U	1000 UJ	1000 UJ	2000 UJ	2000 UJ	100 U	100 U	200 U	100 U
Chlorobenzene	200	1000	1000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
Chloroethane	NE	NE	NE	UG/L	1000 U	2000 U	20000 U	2000 UJ	2000 UJ	4000 UJ	4000 UJ	200 U	200 U	400 U	200 U
Chloroform	50	20000	20000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
Chloromethane	NE	NE	NE	UG/L	1000 U	2000 U	20000 U	2000 U	2000 U	4000 U	4000 U	200 U	200 U	400 U	200 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	3600	6100	10000 U	15000 J	16000 J	36000 J	13000 J	1800	1700	2300	2600
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	250 U	500 U	5000 U	500 U	500 U	1000 U	1000 U	50 U	50 U	100 U	50 U
Dibromochloromethane	20	50000	50000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	1000 U	2000 U	20000 U	2000 U	2000 U	4000 U	4000 U	200 U	200 U	400 U	200 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	300 U	600 U	6000 U	600 U	600 U	1200 U	1200 U	60 U	60 U	120 U	60 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	1000 U	2000 U	20000 U	2000 U	2000 U	4000 U	4000 U	200 U	200 U	400 U	200 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-1
Aerovox Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-34B	MW-101B	MW-101B	MW-101B	MW-101B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	X-GW-MW34B(92-112)-0806	X-GW-MW34B(120-130)-080	X-GW-MW34B(170-180)-080	AX-GW-MW34B (60-8	AX-GW-MW34B (92-11	AX-GW-MW34B (120-13	AX-GW-MW34B (170-18	AX-GW-MW101B-031714	AX-GW-MW101B-062314	AX-GW-MW101B-052815	AX-GW-MW101B-080615
Sample Date			UCLs		8/6/2015	8/6/2015	8/6/2015	4/20/2017	4/20/2017	4/20/2017	4/20/2017	3/17/2014	6/23/2014	5/28/2015	8/6/2015
Volatile Organic Compounds															
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	500 U	1000 U	10000 U	1000 UJ	1000 UJ	2000 UJ	2000 UJ	100 U	100 U	200 U	100 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	250 U	500 U	5000 U	500 U	500 U	1000 U	1000 U	50 U	50 U	100 U	50 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	*60000*	*110000*	*500000*	*80000*	*100000*	*70000*	*3800000*	*7400*	*7800*	*16000*	*17000*
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	500 U	1000 U	10000 U	1000 U	1000 U	2000 U	2000 U	100 U	100 U	200 U	100 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Xylenes, total	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.94
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	3.23	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	3.23	0.94
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	0.5 U	1.41	--
Ethene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	3.75	6.35	--
Methane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	11.9	33.2	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	1790	5 U	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.42	0.07	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.5 U	0.5 U	--
Iron	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.24	0.21	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.1 U	0.47	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	0.01	0.01 U	--
Sulfate	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	10 U	40	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	--	--	--	--	--	230	7.5	--
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	--	--	--	--	34	11	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.17	0.22	0.2	--	--	--	--	2.99	1.99	0.2	0.16
pH	NE	NE	NE	PH UNITS	6.44	6.81	6.7	--	--	--	--	12.57	12.34	12.04	12.18
Electrical conductivity	NE	NE	NE	mS/cm	12.18	14.03	16.72	--	--	--	--	8.41	8.99	4.13	5.82
Specific conductance	NE	NE	NE	mV	-1.3	-39.2	-27.4	--	--	--	--	-73.6	-76.1	-76.5	19.9
Turbidity	NE	NE	NE	NTU	0.48	0.22	0.21	--	--	--	--	10.28	8.66	2.05	3.55
Temperature	NE	NE	NE	DEG C	18.11	18	18.15	--	--	--	--	10.03	26.99	15.69	19.45

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
* - Lab Qualifier
D - Result is a product of dilution
J - Result is considered an estimate
JD - Result is considered and estimate and product of dilution
P - Lab Qualifier
U - Constituent not detected above the associated detection limit
UD - Constituent was not detected above the associated detection limit, result is product of dilution
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-2
Coyne Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone Location Sample ID Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	Bedrock MW-36B AX-GW-MW36B-121715 12/17/2015	Bedrock MW-36B AX-GW-MW36B-031616 3/16/2016
Volatile Organic Compounds						
cis-1,2-Dichloroethene	20	50000	50000	UG/L	30	44
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1 U	1 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U
Trichloroethene (TCE)	5	5000	5000	UG/L	100	140
Vinyl chloride	2	50000	50000	UG/L	1 U	1 U
Field Parameters						
Dissolved Oxygen	NE	NE	NE	MG/L	0.99	1.98
pH	NE	NE	NE	PH UNITS	12.02	12.25
Electrical conductivity	NE	NE	NE	mS/cm	5.06	2.48
Specific conductance	NE	NE	NE	mV	-88.1	102.7
Turbidity	NE	NE	NE	NTU	4.93	2.73
Temperature	NE	NE	NE	DEG C	13.63	14.29

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
U - Constituent not detected above the associated detection limit

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-1	MW-3 (PRECIX)	MW-4S	MW-4S	MW-4S	MW-4S	MW-16S	MW-16S	MW-16S	MW-16S	MW-16S
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	AX-GW-MW1-031814	AX-GW-MW3-031914	AX-GW-MW4S-031814	AX-GW-MW4S-092314	AX-GW-MW4S-120814	AX-GW-MW0	AX-GW-MW16S-031814	AX-GW-MW16S-062514	AX-GW-MW16S-092214	AX-GW-MW16S-120814	AX-GW-MW1
Sample Date					3/18/2014	3/19/2014	3/18/2014	9/23/2014	12/8/2014	4/19/2017	3/18/2014	6/25/2014	9/22/2014	12/8/2014	4/19/2017
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	1 U	1.5	1.1	1.3	2 U	2 U	2.5 U	5 U	1 U	1 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 U	2 U	2 U	2 U	4 U	4 U	5 U	10 U	2 U	2 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	2 U	2 U	2 U	4 U	4 U	5 U	10 U	2 U	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	2 UJ	2 U	2.5 U	5 U	1 U	1 UJ
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	--	13	31	110	--	190	280	130	98
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	4 U	4 U	5 U	10 U	2 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	0.5 U	0.5 U	1 U	--	1.2 U	2.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	4 U	4 U	5 U	10 U	2 U	2 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	4 U	4 U	5 U	10 U	2 U	2 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	2 U	2 U	2 U	4 UJ	4 U	5 U	10 U	2 U	2 UJ
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	4 UJ	4 U	5 U	10 U	2 U	2 UJ
Chloroform	50	20000	20000	UG/L	1 U	7.6	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	4 U	4 U	5 U	10 U	2 U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	1 U	1 U	18	13	30	110	140	190	280	130	98
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1.2 U	2.5 U	0.5 U	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1 U	1 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	4 U	4 U	5 U	10 U	2 U	2 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	1.2 U	1.2 U	1.5 U	3 U	0.6 U	0.6 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	2 U	2 U	2 U	4 U	4 U	5 U	10 U	2 U	2 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-1	MW-3 (PRECIX)	MW-4S	MW-4S	MW-4S	MW-4S	MW-16S	MW-16S	MW-16S	MW-16S	MW-16S
Sample ID					AX-GW-MW1-031814	AX-GW-MW3-031914	AX-GW-MW4S-031814	AX-GW-MW4S-092314	AX-GW-MW4S-120814	AX-GW-MW0	AX-GW-MW16S-031814	AX-GW-MW16S-062514	AX-GW-MW16S-092214	AX-GW-MW16S-120814	AX-GW-MW1
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	3/18/2014	3/19/2014	3/18/2014	9/23/2014	12/8/2014	4/19/2017	3/18/2014	6/25/2014	9/22/2014	12/8/2014	4/19/2017
Volatile Organic Compounds															
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1 U	1 U	1 U	1 U	1 U	2 U	2 U	2.5 U	5 U	1.2	1 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	1.4	1 U	1.4	2 U	2 U	2.5 U	5 U	1.8	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1.2 U	2.5 U	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	1 U	1 U	36	20	47	180	250	380	280	170	180
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	1 U	1 U	17	8.7	2.5	2 UJ	2.2	3.3	5 U	1.6	9.9 J
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	0.5 U	0.5 U	--	--	0.94	2.81	0.96	--
Ethene	NE	NE	NE	UG/L	--	--	--	1.7	0.5 U	--	--	0.5 U	0.5 U	0.5 U	--
Methane	NE	NE	NE	UG/L	--	--	--	616	11.9	--	--	40.1	217	47.7	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	99.6	151	--	--	66.9	79.9	76.2	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	0.45	0.1	--	--	0.13	0.08	0.075 U	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	1.8	0.5 U	--	--	0.5 U	0.5 U	0.5 U	--
Iron	NE	NE	NE	MG/L	--	--	--	1.5	0.12	--	--	0.05 U	0.08	0.05 U	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	0.1 U	1.16	--	--	0.76	0.79	0.37	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	0.05	0.03	--	--	0.01	0.01 U	0.01 U	--
Sulfate	NE	NE	NE	MG/L	--	--	--	150	120	--	--	450	520	300	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	7.3	4	--	--	3.9	5	0.57	--
Total Suspended Solids	NE	NE	NE	MG/L	8.2	5 U	5 U	5 U	5 U	--	5 U	7.5	6.9	5 U	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.14	4.76	0.39	0.26	1.2	--	0.63	0.08	0.15	1.19	--
pH	NE	NE	NE	PH UNITS	6.15	6.16	6.22	6.37	7.36	--	6.13	6.01	6.18	6.09	--
Electrical conductivity	NE	NE	NE	mS/cm	0.8	0.38	2.82	5	4.33	--	4.85	12.61	13.69	8.19	--
Specific conductance	NE	NE	NE	mV	-48.3	153.9	128.9	13.9	149.2	--	134.4	127.1	64.5	135.4	--
Turbidity	NE	NE	NE	NTU	6.23	3.01	0.64	1.24	2.95	--	0.43	1.02	0.62	2.06	--
Temperature	NE	NE	NE	DEG C	8.38	15.41	11.33	23.34	14.29	--	9.33	19.73	24.57	13.93	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
J - Result is considered an estimate
U - Constituent not detected above the associated detection limit
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	GZ-001	GZ-001	GZ-001	GZ-001	GZ-001
Sample ID					AX-GW-MW18S-031814	AX-GW-MW18S-062414	AX-GW-DUP1-062414	AX-GW-MW18S-092214	AX-GW-MW18S-120814	AX-GW-MW1	AX-GW-GZ1-120810	AX-GW-GZ1-111011	AX-GW-GZ1-031714	AX-GW-GZ1-062414	AX-GW-GZ1-092214
Sample Date					3/18/2014	6/24/2014	6/24/2014	9/22/2014	12/8/2014	4/19/2017	12/8/2010	11/10/2011	3/17/2014	6/24/2014	9/22/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	80	30000	100000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	20 U	20 U	20 U	40 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	20 U	20 U	20 U	40 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	10 U	10 U	10 U	20 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	250	250	690	53	44	--	--	--	1 U	1 U
1,2-Dichloropropane	3	50000	100000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	1 U	1 U	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	20 U	20 U	20 U	40 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	5 U	5 U	10 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	250 U	-- U	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	5 U	5 U	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	10 U	-- U	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	20 U	20 U	20 U	40 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	5 U	5 U	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	20 U	20 U	20 U	40 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	5 U	5 U	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	5 U	5 U	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	5 U	5 U	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	1 U	0.5 U	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	700	50000	50000	UG/L	20 U	20 U	20 U	40 U	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	200	1000	1000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	NE	NE	NE	UG/L	20 U	20 U	20 U	40 U	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U
Chloroform	50	20000	20000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1.4
Chloromethane	NE	NE	NE	UG/L	20 U	20 U	20 U	40 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	330	250	250	690	53	44	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	5 U	5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	20 U	20 U	20 U	40 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	10 U	10 U	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	1 U	1 U	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	6 U	6 U	6 U	12 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Methylene chloride	2000	50000	50000	UG/L	20 U	20 U	20 U	40 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	1 U	1 U	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	30 U	-- U	--	--	--

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden
Location					MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	MW-18S	GZ-001	GZ-001	GZ-001	GZ-001	GZ-001
Sample ID					AX-GW-MW18S-031814	AX-GW-MW18S-062414	AX-GW-DUP1-062414	AX-GW-MW18S-092214	AX-GW-MW18S-120814	AX-GW-MW1	AX-GW-GZ1-120810	AX-GW-GZ1-111011	AX-GW-GZ1-031714	AX-GW-GZ1-062414	AX-GW-GZ1-092214
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	3/18/2014	6/24/2014	6/24/2014	9/22/2014	12/8/2014	4/19/2017	12/8/2010	11/10/2011	3/17/2014	6/24/2014	9/22/2014
Volatile Organic Compounds															
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	10 U	10 U	10 U	20 U	1.6	1.3	1 U	1 U	1 U	1 U	1 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	5 U	5 U	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	1 U	1 U	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	10 U	10 U	10 U	20 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	5 U	5 U	5 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	2.5 U	2.5 U	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	950	640	630	1500	200	77	4.9	1 U	5.3	3.9	2
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	2.5 U	2.5 U	--	--	--
Vinyl chloride	2	50000	50000	UG/L	10 U	10 U	10 U	20 U	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	2 U	2 U	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	1.76	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.28	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	1.76	0.25 U	0.28	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	0.79	--	1	0.5 U	--	--	--	--	0.5 U	0.5 U
Ethene	NE	NE	NE	UG/L	--	0.5 U	--	0.5 U	0.5 U	--	--	--	--	0.5 U	0.5 U
Methane	NE	NE	NE	UG/L	--	5 U	--	1.72	0.5 U	--	--	--	--	5 U	13.4
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	58.6	--	68.5	103	--	--	--	--	67.8	42.4
Ammonia (as N)	NE	NE	NE	MG/L	--	0.09	--	0.075 U	0.075 U	--	--	--	--	0.075 U	0.075 U
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	0.5 U	--	0.5 U	0.5 U	--	--	--	--	0.5 U	0.5 U
Iron	NE	NE	NE	MG/L	--	0.05 U	--	0.37	0.05 U	--	--	--	--	0.05 U	0.14
Nitrate (as N)	NE	NE	NE	MG/L	--	2.95	--	2.3	4.4	--	--	--	--	4.84	4.6
Total Phosphorus as P	NE	NE	NE	MG/L	--	0.01	--	0.01	0.01 U	--	--	--	--	0.02	0.01
Sulfate	NE	NE	NE	MG/L	--	30	--	95	15	--	--	--	--	16	150
Total Organic Carbon	NE	NE	NE	MG/L	--	2.2	--	3.7	1.3	--	--	--	--	3	2.5
Total Suspended Solids	NE	NE	NE	MG/L	5 U	5 U	--	5	5 U	--	78	5 U	5 U	5.6	6.9
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	3.06	0.5	--	0.15	1.49	--	2.72	4.5	4.12	0.86	2.23
pH	NE	NE	NE	PH UNITS	6.08	6.24	--	6.36	7.38	--	6.62	5.42	6.26	6.08	5.89
Electrical conductivity	NE	NE	NE	mS/cm	0.54	0.84	--	2.93	0.52	--	0.36	0.05	0.98	0.58	0.51
Specific conductance	NE	NE	NE	mV	214.4	98.4	--	83.7	192.6	--	17.8	228	176	-52.2	144.6
Turbidity	NE	NE	NE	NTU	1.47	1.91	--	3.86	4.11	--	53.6	3.95	0.95	4.33	28.7
Temperature	NE	NE	NE	DEG C	11.6	20.58	--	23.92	15.3	--	18.09	18.53	11.4	21.85	24.26

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
J - Result is considered an estimate
U - Constituent not detected above the associated detection limit
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden
Location					GZ-002	GZ-002	GZ-003	GZ-103S	GZ-103S	GZ-103S	GZ-103S	GZ-103S	GZ-103S	MW-18D	MW-18D
Sample ID					AX-GW-GZ2-031914	AX-GW-GZ2-120814	AX-GW-GZ3-031914	AX-GW-GZ103S-120710	AX-GW-GZ103S-110911	AX-GW-GZ103S-031914	AX-GW-GZ103S-062514	AX-GW-GZ103S-092314	AX-GW-GZ103S-120814	AX-GW-MW18D-031814	AX-GW-MW18D-062414
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	3/19/2014	12/8/2014	3/19/2014	12/7/2010	11/9/2011	3/19/2014	6/25/2014	9/23/2014	12/8/2014	3/18/2014	6/24/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	1 U	--	--	--	--	47	110	38	--	960
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	1 U	1 U	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	1 U	20 U	40 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	0.5 U	--	--	--	--	0.5 U	0.5 U	0.5 U	--	20 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1 U	1 U	1.1	1 U	1.3	1 U	2.3	1.4	20 U	40 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	250 U	-- U	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	5 U	5 U	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	10 U	-- U	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	5 U	5 U	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	5 U	5 U	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	5 U	5 U	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	5 U	5 U	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	1 U	0.55	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
Bromomethane	7	800	800	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	1 U	2.5	4	4	3.9	6.4	5.5	20 U	40 U
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
Chloroform	50	20000	20000	UG/L	1 U	1 U	2.6	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	1 U	1 U	1 U	64	24	44	47	110	38	1800	960
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	20 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	10 U	10 U	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	1 U	1 U	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	12 U	24 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	40 U	80 U
Naphthalene	700	20000	20000	UG/L	--	--	--	2	7.8	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	1 U	1 U	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	30 U	-- U	--	--	--	--	--	--

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Shallow Overburden	Deep Overburden	Deep Overburden
Location					GZ-002	GZ-002	GZ-003	GZ-103S	GZ-103S	GZ-103S	GZ-103S	GZ-103S	GZ-103S	MW-18D	MW-18D
Sample ID					AX-GW-GZ2-031914	AX-GW-GZ2-120814	AX-GW-GZ3-031914	AX-GW-GZ103S-120710	AX-GW-GZ103S-110911	AX-GW-GZ103S-031914	AX-GW-GZ103S-062514	AX-GW-GZ103S-092314	AX-GW-GZ103S-120814	AX-GW-MW18D-031814	AX-GW-MW18D-062414
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	3/19/2014	12/8/2014	3/19/2014	12/7/2010	11/9/2011	3/19/2014	6/25/2014	9/23/2014	12/8/2014	3/18/2014	6/24/2014
Volatile Organic Compounds															
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	40 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	5 U	5 U	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	1 U	1 U	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.2	1 U	20 U	40 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	10 U	20 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	2.5 U	2.5 U	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	1 U	1 U	1 U	21	4.4	16	5.8	6.4	11	2700	1600
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	2.5 U	2.5 U	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	1 U	1 U	1 U	4.5	2.4	3.6	3.7	18	8.5	230	59
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	2 U	2 U	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.25 U	0.5 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.25 U	0.5 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.25 U	0.5 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	9.58	9.97
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.25 U	0.5 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.25 U	0.5 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.25 U	0.5 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.25 U	0.5 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.25 U	0.5 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	9.58	9.97
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	0.5 U	--	--	--	--	2.21	3.29	2.97	--	2.65
Ethene	NE	NE	NE	UG/L	--	0.5 U	--	--	--	--	0.5 U	0.61	0.62	--	0.82
Methane	NE	NE	NE	UG/L	--	1550	--	--	--	--	4170	2770	5120	--	24
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	277	--	--	--	--	128	151	206	--	63.8
Ammonia (as N)	NE	NE	NE	MG/L	--	1.69	--	--	--	--	4.89	4.56	4.78	--	0.16
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	19	--	--	--	--	40	32	24	--	0.5 U
Iron	NE	NE	NE	MG/L	--	30	--	--	--	--	46	34	26	--	0.09
Nitrate (as N)	NE	NE	NE	MG/L	--	0.5 U	--	--	--	--	0.2	0.1 U	0.5 U	--	0.79
Total Phosphorus as P	NE	NE	NE	MG/L	--	0.34	--	--	--	--	0.08	0.06	0.09	--	0.01
Sulfate	NE	NE	NE	MG/L	--	13	--	--	--	--	23	51	27	--	110
Total Organic Carbon	NE	NE	NE	MG/L	--	5.5	--	--	--	--	9.1	6.4	9.2	--	3
Total Suspended Solids	NE	NE	NE	MG/L	8.5	70	5 U	140	46	7.1	54	22	5 U	5 U	5 U
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.17	0.21	2.6	1.12	0.17	0.19	0.04	0.2	0.5	0.14	0.07
pH	NE	NE	NE	PH UNITS	6.15	6.4	6.01	6.46	6.3	6.08	5.9	6.41	6.25	6.07	6.07
Electrical conductivity	NE	NE	NE	mS/cm	4.69	2.23	0.51	1.27	1.37	3.22	3.99	2.82	1.95	1.32	2.44
Specific conductance	NE	NE	NE	mV	35.4	-44.7	170.7	-30.5	-183	-32.4	-42	-5.4	-79.8	92.3	140.1
Turbidity	NE	NE	NE	NTU	1.55	131	1.38	65.6	11.4	3.4	12.57	3.44	0.79	1.27	1
Temperature	NE	NE	NE	DEG C	7.57	10.67	18.02	16.6	18.82	11.26	18.97	20.5	15.68	13.85	18.44

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
J - Result is considered an estimate
U - Constituent not detected above the associated detection limit
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location	MCP GW-2	MCP GW-3	MCP	Units	MW-18D	MW-18D	MW-24D	MW-24D	MW-24D	GZ-004A	GZ-004A	GZ-004A	GZ-004A	GZ-004A	GZ-004A
Sample ID			Groundwater		AX-GW-MW18D-092214	AX-GW-MW18D-121014	AX-GW-MW24D-080714	AX-GW-MW24D-092314	AX-GW-MW24D-120814	AX-GW-GZ4A-120910	AX-GW-GZ4A-111111	AX-GW-GZ4A-031814	AX-GW-GZ4A-062314	AX-GW-GZ4A-092214	AX-GW-GZ4A-120814
Sample Date			UCLs		9/22/2014	12/10/2014	8/7/2014	9/23/2014	12/8/2014	12/9/2010	11/11/2011	3/18/2014	6/23/2014	9/22/2014	12/8/2014
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,1-Dichloroethane	2000	20000	100000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,1-Dichloroethene	80	30000	100000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,2-Dichloroethane	5	20000	100000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	770	1100	1 U	1 U	1 U	--	--	--	34	36	150
1,2-Dichloropropane	3	50000	100000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	20 U	5 U	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,3-Dichloropropane	NE	NE	NE	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
1,3-Dichloropropene, total	10	200	100000	UG/L	10 U	20 U	0.5 U	0.5 U	0.5 U	--	--	--	1 U	0.5 U	2 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	5000 U	-- U	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	100 U	25 U	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	200 U	-- U	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	100 U	25 U	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	100 U	25 U	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	100 U	25 U	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	100 U	25 U	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	20 U	2.5 U	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
Bromoform	700	50000	50000	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
Chlorobenzene	200	1000	1000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
Chloroethane	NE	NE	NE	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
Chloroform	50	20000	20000	UG/L	20 U	40 U	4.7	4.5	2.7	20 U	5 U	2 U	2 U	1 U	4 U
Chloromethane	NE	NE	NE	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	770	1100	1 U	1 U	1 U	350	210	40	34	36	150
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	10 U	20 U	0.5 U	0.5 U	0.5 U	10 U	2.5 U	1 U	1 U	0.5 U	2 U
Dibromochloromethane	20	50000	50000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	200 U	50 U	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	20 U	5 U	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	12 U	24 U	0.6 U	0.6 U	0.6 U	12 U	3 U	1.2 U	1.2 U	0.6 U	2.4 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	40 U	80 U	2 U	2 U	2 U	40 U	10 U	4 U	4 U	2 U	8 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	20 U	5 U	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	600 U	-- U	--	--	--	--

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden
Location					MW-18D	MW-18D	MW-24D	MW-24D	MW-24D	GZ-004A	GZ-004A	GZ-004A	GZ-004A	GZ-004A	GZ-004A
Sample ID					AX-GW-MW18D-092214	AX-GW-MW18D-121014	AX-GW-MW24D-080714	AX-GW-MW24D-092314	AX-GW-MW24D-120814	AX-GW-GZ4A-120910	AX-GW-GZ4A-111111	AX-GW-GZ4A-031814	AX-GW-GZ4A-062314	AX-GW-GZ4A-092214	AX-GW-GZ4A-120814
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	9/22/2014	12/10/2014	8/7/2014	9/23/2014	12/8/2014	12/9/2010	11/11/2011	3/18/2014	6/23/2014	9/22/2014	12/8/2014
Volatile Organic Compounds															
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	100 U	25 U	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	20 U	5 U	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	20 U	40 U	1 U	1 U	1 U	20 U	5 U	2 U	2 U	1 U	4 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	10 U	20 U	0.5 U	0.5 U	0.5 U	10 U	2.5 U	1 U	1 U	0.5 U	2 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	50 U	12 U	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	1800	2100	2.2	2.4	2.8	1300	780	140	160	72	400
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	50 U	12 U	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	20 U	73	1 U	1 U	1 U	20 U	5.3	2 U	2 U	6.1	4 U
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	40 U	10 U	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.5 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.5 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	1.22	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.5 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	5.54	*12.8*	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.5 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.5 U	1.25 U	0.25 U	0.25 U	0.25 U	0.42	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.5 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.5 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.5 U	1.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	5.54	*12.8*	0.25 U	0.25 U	0.25 U	0.42	1.22	0.25 U	0.25 U	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	0.6	1.11	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U
Ethene	NE	NE	NE	UG/L	0.5 U	0.7	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U
Methane	NE	NE	NE	UG/L	0.5 U	9.34	0.5 U	0.5 U	0.6	--	--	--	14.7	22.3	5.43
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	62.7	62.8	49.6	38.8	40.1	--	--	--	74.6	98.3	75.7
Ammonia (as N)	NE	NE	NE	MG/L	0.1	0.08	0.075 U	0.075 U	0.075 U	--	--	--	0.09	0.075 U	0.075 U
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U
Iron	NE	NE	NE	MG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.63	0.16	0.31
Nitrate (as N)	NE	NE	NE	MG/L	4.49	0.91	4.29	4.35	4.1	--	--	--	2.89	1.65	1.7
Total Phosphorus as P	NE	NE	NE	MG/L	0.01 U	0.01 U	0.01	0.01 U	0.01 U	--	--	--	0.01	0.01 U	0.01 U
Sulfate	NE	NE	NE	MG/L	210	120	12	12	14	--	--	--	37	48	40
Total Organic Carbon	NE	NE	NE	MG/L	3.1	3.2	2.9	0.68	0.55	--	--	--	2.4	3.4	1.4
Total Suspended Solids	NE	NE	NE	MG/L	5 U	5 U	5 U	5 U	5 U	270	5 U	20	5 U	5 U	5 U
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.47	0.29	1.99	2.4	3.02	0.32	0.7	1.17	0.86	0.19	0.53
pH	NE	NE	NE	PH UNITS	6.23	5.92	6.08	6.31	6.03	6.39	6.17	6.14	6.33	6.1	7.28
Electrical conductivity	NE	NE	NE	mS/cm	5.4	2.55	0.47	0.49	0.55	1.6	1.2	1.62	1.19	1.27	1.7
Specific conductance	NE	NE	NE	mV	97.4	91.4	150.5	20.7	116.9	16.4	143	83.4	-87.4	78.7	165.2
Turbidity	NE	NE	NE	NTU	1.35	0.83	0.95	0.82	1.02	405	2.5	0.95	2	1.35	1.79
Temperature	NE	NE	NE	DEG C	22	16.85	20.97	22.15	15.02	14.08	17.32	13.06	16.22	21.97	16.13

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
J - Result is considered an estimate
U - Constituent not detected above the associated detection limit
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					GZ-103D	GZ-103D	GZ-103D	GZ-103D	GZ-103D	GZ-103D	MW-24B	MW-24B	MW-24B	MW-24B	MW-24B
Sample ID	MCP GW-2	MCP GW-3	MCP Groundwater	Units	AX-GW-GZ103D-120710	AX-GW-GZ103D-110911	AX-GW-GZ103D-031914	AX-GW-GZ103D-062514	AX-GW-GZ103D-092314	AX-GW-GZ103D-120814	AX-GW-MW24B-080714	AX-GW-MW24B-092314	AX-GW-MW24B-120814	AX-GW-MW24B-052915	AX-GW-DUP1-052915
Sample Date			UCLs		12/7/2010	11/9/2011	3/19/2014	6/25/2014	9/23/2014	12/8/2014	8/7/2014	9/23/2014	12/8/2014	5/29/2015	5/29/2015
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	2.8	1.9	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,1-Dichloroethane	2000	20000	100000	UG/L	2.1	1.8	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,1-Dichloroethene	80	30000	100000	UG/L	2.2	1.5	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,1-Dichloropropene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2.8	2 U	10 U	10 U	20 U	8 U	200 U	50 U	8 U	100 U	100 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	10 U	10 U	20 U	8 U	200 U	50 U	8 U	100 U	100 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	--	--	--	250	330	610	110	130	68	85	86
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	1 U	1 U	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1.1	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	10 U	10 U	20 U	8 U	200 U	50 U	8 U	100 U	100 U
1,3-Dichloropropene, total	10	200	100000	UG/L	--	--	--	2.5 U	5 U	2 U	50 U	12 U	2 U	25 U	25 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
1,4-Dioxane	6000	50000	50000	UG/L	250 U	-- U	--	--	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	5 U	5 U	--	--	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	10 U	-- U	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	10 U	10 U	20 U	8 U	200 U	50 U	8 U	100 U	100 U
2-Hexanone	NE	NE	NE	UG/L	5 U	5 U	--	--	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	10 U	10 U	20 U	8 U	200 U	50 U	8 U	100 U	100 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	5 U	5 U	--	--	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	5 U	5 U	--	--	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	5 U	5 U	--	--	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	1 U	0.5 U	--	--	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	44	50 U	50 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	10 U	10 U	20 U	8 U	200 U	50 U	8 U	100 U	100 U
Bromomethane	7	800	800	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	*33000*	*71000*	*40000*	*19000*	*19000*
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	10 U	10 U	20 U	8 U	200 U	50 U	8 U	100 U	100 U
Chloroform	50	20000	20000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	18000	*27000*	*31000*	*34000*	*34000*
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	10 U	10 U	20 U	8 U	200 U	50 U	9.7	100 U	100 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	180	180	240	250	330	610	110	130	61	85	86
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	2.5 U	2.5 U	5 U	2 U	50 U	12 U	2 U	25 U	25 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	4 U	50 U	50 U
Dibromomethane	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	10 U	10 U	20 U	8 U	200 U	50 U	8 U	100 U	100 U
Diethyl Ether	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	10 U	10 U	--	--	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	1 U	1 U	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	3 U	3 U	6 U	2.4 U	60 U	15 U	2.4 U	30 U	30 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	10 U	10 U	20 U	8 U	3300	4500	4200	4000	4100
Naphthalene	700	20000	20000	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
n-Propylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	1 U	1 U	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	30 U	-- U	--	--	--	--	--	--	--	--	--

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					GZ-103D	GZ-103D	GZ-103D	GZ-103D	GZ-103D	GZ-103D	MW-24B	MW-24B	MW-24B	MW-24B	MW-24B
Sample ID					AX-GW-GZ103D-120710	AX-GW-GZ103D-110911	AX-GW-GZ103D-031914	AX-GW-GZ103D-062514	AX-GW-GZ103D-092314	AX-GW-GZ103D-120814	AX-GW-MW24B-080714	AX-GW-MW24B-092314	AX-GW-MW24B-120814	AX-GW-MW24B-052915	AX-GW-DUP1-052915
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	12/7/2010	11/9/2011	3/19/2014	6/25/2014	9/23/2014	12/8/2014	8/7/2014	9/23/2014	12/8/2014	5/29/2015	5/29/2015
Volatile Organic Compounds															
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	4.9	2.1	5 U	5 U	10 U	4 U	100 U	39	28	50 U	50 U
Tetrahydrofuran	NE	NE	NE	UG/L	5 U	5 U	--	--	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	1 U	1 U	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	5 U	5 U	10 U	4 U	100 U	25 U	7.3	50 U	50 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	2.5 U	2.5 U	5 U	2 U	50 U	12 U	2 U	25 U	25 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	2.5 U	2.5 U	--	--	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	670	390	550	640	550	560	390	900	440	390	400
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	2.5 U	2.5 U	--	--	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	20	25	29	16	50	240	100 U	25 U	4 U	50 U	50 U
Xylenes, m & p	3000	5000	5000	UG/L	2 U	2 U	--	--	--	--	--	--	--	--	--
Polychlorinated BiPhenyls															
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.46	0.25 U	0.34	0.25	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.46	0.25 U	0.34	0.25	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Dissolved Gases															
Ethane	NE	NE	NE	UG/L	--	--	--	2.59	8.16	7.77	0.5 U	1.96	3.18	12.8	--
Ethene	NE	NE	NE	UG/L	--	--	--	6.68	39.1	37.4	3.03	7.61	8.41	19.1	--
Methane	NE	NE	NE	UG/L	--	--	--	127	304	268	9.29	17.4	19.4	73.1	--
MNA Parameters															
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	--	--	--	61.8	68.3	82.1	123	129	129	125	--
Ammonia (as N)	NE	NE	NE	MG/L	--	--	--	0.55	0.38	0.32	0.1	0.21	0.17	0.18	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	--	--	--	14	13	16	0.5 U	0.5 U	0.5 U	0.99	--
Iron	NE	NE	NE	MG/L	--	--	--	17	13	14	0.21	0.17	0.38	3.2	--
Nitrate (as N)	NE	NE	NE	MG/L	--	--	--	0.12	0.1 U	0.5 U	0.88	0.15	0.1 U	1 U	--
Total Phosphorus as P	NE	NE	NE	MG/L	--	--	--	0.03	0.03	0.03	0.01 U	0.01 U	0.01 U	0.01 U	--
Sulfate	NE	NE	NE	MG/L	--	--	--	140	130	140	79	57	61	64	--
Total Organic Carbon	NE	NE	NE	MG/L	--	--	--	7.3	3.6	2.2	4.2	1.5	1.4	2.8	--
Total Suspended Solids	NE	NE	NE	MG/L	47	56	56	23	6.3	5.1	6	5 U	5 U	--	--
Field Parameters															
Dissolved Oxygen	NE	NE	NE	MG/L	0.13	0.15	0.11	0.04	0.15	6.9	0.71	0.17	4.21	0.24	--
pH	NE	NE	NE	PH UNITS	6.8	6.45	6.04	5.91	6.31	6.17	7.04	7.47	6.84	6.82	--
Electrical conductivity	NE	NE	NE	mS/cm	3.24	3.65	3.15	2.55	2.82	2.77	3.55	3.54	3.6	3.5	--
Specific conductance	NE	NE	NE	mV	-14.4	-163	-3.5	-2.9	4.7	-18.9	104.2	-97.7	-50.6	-270.2	--
Turbidity	NE	NE	NE	NTU	51.5	14.6	17.7	36.3	4.29	3.61	2.1	3.15	1.99	5.68	--
Temperature	NE	NE	NE	DEG C	14.72	18.1	13.24	18.57	19.45	12.02	21.82	20.87	14.38	16.96	--

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
J - Result is considered an estimate
U - Constituent not detected above the associated detection limit
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location			MCP		MW-30B	MW-30B	MW-31B	MW-31B	MW-103B	MW-103B	MW-103B
Sample ID	MCP GW-2	MCP GW-3	Groundwater	Units	AX-GW-MW30B-052815	AX-GW-MW30B-080615	AX-GW-MW31B-052815	AX-GW-MW31B-080615	AX-GW-MW103B-080714	AX-GW-MW103B-092314	AX-GW-MW103B-120814
Sample Date			UCLs		5/28/2015	8/6/2015	5/28/2015	8/6/2015	8/7/2014	9/23/2014	12/8/2014
Volatile Organic Compounds											
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
1,1-Dichloroethane	2000	20000	100000	UG/L	10 U	10 U	4 U	5 U	20 U	1.9	20 U
1,1-Dichloroethene	80	30000	100000	UG/L	10 U	10 U	4 U	5 U	20 U	4.8	20 U
1,1-Dichloropropene	NE	NE	NE	UG/L	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--
1,2,3-Trichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	20 U	20 U	8 U	10 U	40 U	7.7	40 U
1,2,4-Trimethylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	NE	NE	NE	UG/L	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	20 U	20 U	8 U	10 U	40 U	2 U	40 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
1,2-Dichloroethane	5	20000	100000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	300	370	100	110	730	730	600
1,2-Dichloropropane	3	50000	100000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
1,2-Dimethylbenzene (o-Xylene)	3000	5000	NE	UG/L	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene (mesitylene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--
1,3-Dichlorobenzene	6000	50000	100000	UG/L	10 U	10 U	4 U	5 U	20 U	2.1	20 U
1,3-Dichloropropane	NE	NE	NE	UG/L	20 U	20 U	8 U	10 U	40 U	2 U	40 U
1,3-Dichloropropene, total	10	200	100000	UG/L	5 U	5 U	2 U	2.5 U	10 U	0.5 U	10 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	10 U	10 U	4 U	5 U	20 U	1.6	20 U
1,4-Dioxane	6000	50000	50000	UG/L	--	--	--	--	--	--	--
2,2-Dichloropropane	NE	NE	NE	UG/L	--	--	--	--	--	--	--
2-Butanone (MEK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--
2-Chloroethyl vinyl ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--
2-Chlorotoluene	NE	NE	NE	UG/L	20 U	20 U	8 U	10 U	40 U	2 U	40 U
2-Hexanone	NE	NE	NE	UG/L	--	--	--	--	--	--	--
4-Chlorotoluene	NE	NE	NE	UG/L	20 U	20 U	8 U	10 U	40 U	2 U	40 U
4-Isopropyltoluene (p-Cymene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--
4-Methyl-2-pentanone (MIBK)	50000	50000	50000	UG/L	--	--	--	--	--	--	--
Acetone	50000	50000	50000	UG/L	--	--	--	--	--	--	--
Acrylonitrile	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Benzene	1000	10000	10000	UG/L	--	--	--	--	--	--	--
Bromobenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Bromochloromethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Bromodichloromethane	6	50000	50000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
Bromoform	700	50000	50000	UG/L	20 U	20 U	8 U	10 U	40 U	2 U	40 U
Bromomethane	7	800	800	UG/L	--	--	--	--	--	--	--
Carbon disulfide	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Carbon tetrachloride	2	5000	5000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
Chlorobenzene	200	1000	1000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
Chloroethane	NE	NE	NE	UG/L	20 U	20 U	8 U	10 U	40 U	2 U	40 U
Chloroform	50	20000	20000	UG/L	10 U	10 U	4 U	5 U	20 U	1	20 U
Chloromethane	NE	NE	NE	UG/L	20 U	20 U	8 U	10 U	40 U	2 U	40 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	300	360	100	110	730	730	600
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	5 U	5 U	2 U	2.5 U	10 U	0.5 U	10 U
Dibromochloromethane	20	50000	50000	UG/L	10 U	10 U	4 U	5 U	20 U	1 U	20 U
Dibromomethane	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	20 U	20 U	8 U	10 U	40 U	2 U	40 U
Diethyl Ether	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Diisopropyl ether (DIPE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Ethyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Ethyl tert-butyl ether (ETBE)	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Ethylbenzene	20000	5000	5000	UG/L	--	--	--	--	--	--	--
Hexachlorobutadiene	50	3000	3000	UG/L	6 U	6 U	2.4 U	3 U	12 U	0.6 U	12 U
Isopropylbenzene (Cumene)	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Methylene chloride	2000	50000	50000	UG/L	20 U	20 U	8 U	10 U	40 U	2 U	40 U
Naphthalene	700	20000	20000	UG/L	--	--	--	--	--	--	--
n-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--
n-Propylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--
sec-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Styrene	100	6000	6000	UG/L	--	--	--	--	--	--	--
tert-Amyl methyl ether (TAME)	NE	NE	NE	UG/L	--	--	--	--	--	--	--
tert-Butyl alcohol	NE	NE	NE	UG/L	--	--	--	--	--	--	--

Table E-3
Precix Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-30B	MW-30B	MW-31B	MW-31B	MW-103B	MW-103B	MW-103B
Sample ID					AX-GW-MW30B-052815	AX-GW-MW30B-080615	AX-GW-MW31B-052815	AX-GW-MW31B-080615	AX-GW-MW103B-080714	AX-GW-MW103B-092314	AX-GW-MW103B-120814
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	5/28/2015	8/6/2015	5/28/2015	8/6/2015	8/7/2014	9/23/2014	12/8/2014
Volatile Organic Compounds											
tert-Butyl methyl ether (MTBE)	50000	50000	50000	UG/L	--	--	--	--	--	--	--
tert-Butylbenzene	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Tetrachloroethene (PCE)	50	30000	30000	UG/L	10 U	10 U	4 U	5 U	20 U	7.9	20 U
Tetrahydrofuran	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Toluene	50000	40000	40000	UG/L	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	80	50000	50000	UG/L	10 U	12	4 U	5 U	20 U	2.8	20 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	5 U	5 U	2 U	2.5 U	10 U	0.5 U	10 U
trans-1,4-Dichloro-2-butene	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Trichloroethene (TCE)	5	5000	5000	UG/L	1400	1400	460	460	1800	2000	1500
Trichlorofluoromethane (Freon 11)	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Vinyl acetate	NE	NE	NE	UG/L	--	--	--	--	--	--	--
Vinyl chloride	2	50000	50000	UG/L	10 U	10 U	4 U	5 U	46	34	51
Xylenes, m & p	3000	5000	5000	UG/L	--	--	--	--	--	--	--
Polychlorinated BiPhenyls											
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	1.41	2.85	4.6
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	1.41	2.85	4.6
Dissolved Gases											
Ethane	NE	NE	NE	UG/L	0.78	--	0.5 U	--	5.69	3.4	1
Ethene	NE	NE	NE	UG/L	3.15	--	0.5 U	--	4.46	4.68	1.25
Methane	NE	NE	NE	UG/L	2.92	--	22	--	21.3	26.3	15
MNA Parameters											
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	68.7	--	2 U	--	49.4	29.4	24.6
Ammonia (as N)	NE	NE	NE	MG/L	0.33	--	0.17	--	0.09	0.12	0.08
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	0.5 U	--	0.5 U	--	1.3	0.61	0.5 U
Iron	NE	NE	NE	MG/L	18	--	0.6	--	1.1	0.64	0.06
Nitrate (as N)	NE	NE	NE	MG/L	1.92	--	0.1 U	--	0.17	0.13	0.69
Total Phosphorus as P	NE	NE	NE	MG/L	0.05	--	0.01 U	--	0.01	0.01 U	0.01 U
Sulfate	NE	NE	NE	MG/L	24	--	280	--	110	110	120
Total Organic Carbon	NE	NE	NE	MG/L	1.9	--	5 U	--	5.2	2.1	1.4
Total Suspended Solids	NE	NE	NE	MG/L	--	--	--	--	5 U	5 U	5 U
Field Parameters											
Dissolved Oxygen	NE	NE	NE	MG/L	0.3	0.1	0.18	0.13	0.13	0.3	0.09
pH	NE	NE	NE	PH UNITS	7.03	7.54	10.94	10.74	5.58	5.65	5.34
Electrical conductivity	NE	NE	NE	mS/cm	1	1.23	5.57	6.77	1.84	2.07	2.1
Specific conductance	NE	NE	NE	mV	-168	-179.6	79.2	-29.8	-83.3	102.5	222.5
Turbidity	NE	NE	NE	NTU	15.4	9.59	11.5	8.46	1.76	1.65	0.44
Temperature	NE	NE	NE	DEG C	15.59	18.87	18.37	21.14	18.7	19.25	15.68

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
J - Result is considered an estimate
U - Constituent not detected above the associated detection limit
UJ - Constituent not detected, associated detection limit is considered an estimate

Table E-4
Titleist Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone Location Sample ID Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	Shallow Overburden MW-TITL01 AX-GW-TITL01-052915 5/29/2015	Shallow Overburden MW-20D AX-GW-MW20D-080614 8/6/2014	Shallow Overburden MW-20D AX-GW-MW20D-092914 9/29/2014	Shallow Overburden MW-20D AX-GW-MW20D-121014 12/10/2014	Shallow Overburden MW-22S AX-GW-MW22S-080614 8/6/2014	Shallow Overburden MW-22S AX-GW-MW22S-092914 9/29/2014	Shallow Overburden MW-22S AX-GW-MW22S-121014 12/10/2014	Deep Overburden MW-21D AX-GW-MW21D-080614 8/6/2014	Deep Overburden MW-21D AX-GW-MW21D-092914 9/29/2014
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	1 U	1 U	1 U	1 U	1.4	5.2	1 U	1.9	2.6
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Chloroform	50	20000	20000	UG/L	1 U	1 U	1 U	1 U	3.6	1 U	1 U	1 U	1 U
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	1 U	1 U	1 U	1 U	1.4	5.2	1 U	1.9	2.6
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U	0.6 U
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	5	5000	5000	UG/L	1 U	1 U	1 U	1 U	2.8	1 U	1 U	7.8	12
Vinyl chloride	2	50000	50000	UG/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Polychlorinated BiPhenyls													
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	4.69	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.71	0.25 U	0.94	0.65	0.98	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	5.4	0.25 U	0.94	0.65	0.98	0.25 U	0.25 U
Dissolved Gases													
Ethane	NE	NE	NE	UG/L	3.19	0.5 U	0.5 U	0.5 U	2.77	1.34	0.5 U	0.5 U	0.5 U
Ethene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	0.5 U	2.24	1.3	0.5 U	0.5 U	0.5 U
Methane	NE	NE	NE	UG/L	8440	0.5 U	0.5 U	0.5 U	2920	8500	3770	1.24	11.3

Table E-4
Titleist Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone Location Sample ID Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	Shallow Overburden MW-TITL01 AX-GW-TITL01-052915 5/29/2015	Shallow Overburden MW-20D AX-GW-MW20D-080614 8/6/2014	Shallow Overburden MW-20D AX-GW-MW20D-092914 9/29/2014	Shallow Overburden MW-20D AX-GW-MW20D-121014 12/10/2014	Shallow Overburden MW-22S AX-GW-MW22S-080614 8/6/2014	Shallow Overburden MW-22S AX-GW-MW22S-092914 9/29/2014	Shallow Overburden MW-22S AX-GW-MW22S-121014 12/10/2014	Deep Overburden MW-21D AX-GW-MW21D-080614 8/6/2014	Deep Overburden MW-21D AX-GW-MW21D-092914 9/29/2014
Volatile Organic Compounds													
MNA Parameters													
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	141	23.4	2.2	38.1	123	191	101	65.9	85.6
Ammonia (as N)	NE	NE	NE	MG/L	3.13	0.38	0.29	0.075 U	0.84	3.54	1.34	0.075 U	0.075 U
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	22	0.5 U	0.5 U	0.5 U	8	25	24	0.6	0.5 U
Iron	NE	NE	NE	MG/L	51	0.41	0.16	0.05 U	8.1	24	12	0.94	0.32
Nitrate (as N)	NE	NE	NE	MG/L	1 U	6.01	3.64	5.95	0.1 U	0.1 U	0.1 U	0.95	1.53
Total Phosphorus as P	NE	NE	NE	MG/L	0.02	0.01 U	0.02	0.01 U	0.07	0.06	0.06	0.01 U	0.01 U
Sulfate	NE	NE	NE	MG/L	10 U	79	26	34	34	10 U	24	10 U	11
Total Organic Carbon	NE	NE	NE	MG/L	9.7	6.1	1.8	3.4	14	30	7.4	2.2	0.59
Total Suspended Solids	NE	NE	NE	MG/L	--	5 U	51	5 U	15	30	9.9	5 U	5 U
Field Parameters													
Dissolved Oxygen	NE	NE	NE	MG/L	0.17	0.29	0.52	1.76	0.2	0.18	0.2	1.27	1.68
pH	NE	NE	NE	PH UNITS	6.22	5.22	4.42	5.02	6.11	6.5	6.06	6.36	6.14
Electrical conductivity	NE	NE	NE	mS/cm	0.58	0.41	0.26	0.32	0.42	0.47	0.25	0.53	0.81
Specific conductance	NE	NE	NE	mV	-43.8	53.1	125.6	118.4	-36.6	-57.4	-74.2	47.6	-19.6
Turbidity	NE	NE	NE	NTU	4.23	0.3	62	1.74	12.4	3.47	0.31	3.47	3.37
Temperature	NE	NE	NE	DEG C	21.39	18.59	17.94	12.23	16.58	16.92	10.95	17.18	17.23

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
U - Constituent not detected above the associated detection limit

Table E-4
Titleist Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-21D	MW-21D	MW-23D	MW-23D	MW-23D	MW-20B	MW-20B	MW-20B	MW-21B
Sample ID					AX-GW-MW21D-121014	AX-GW-MW21D-052915	AX-GW-MW23D-080614	AX-GW-MW23D-092914	AX-GW-MW23D-121014	AX-GW-MW20B-080614	AX-GW-MW20B-092914	AX-GW-MW20B-121014	AX-GW-MW21B-080614
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	12/10/2014	5/29/2015	8/6/2014	9/29/2014	12/10/2014	8/6/2014	9/29/2014	12/10/2014	8/6/2014
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	4	10 U	10 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	1 U	2.4	1100	840	950	1 U	1 U	1 U	12
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
Chloroform	50	20000	20000	UG/L	1 U	1 U	1.9	10 U	10 U	1.4	1 U	1 U	1 U
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	1 U	2.4	1100	840	950	1 U	1 U	1 U	12
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	0.6 U	6 U	6 U	0.6 U	0.6 U	0.6 U	0.6 U
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	2 U	20 U	20 U	2 U	2 U	2 U	2 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1 U	1 U	4.3	10 U	10 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	3.1	10 U	10 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	5	5000	5000	UG/L	3.6	12	1100	890	990	1 U	1 U	1 U	47
Vinyl chloride	2	50000	50000	UG/L	1 U	1 U	19	10 U	11	1 U	1 U	1 U	1 U
Polychlorinated BiPhenyls													
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.48	0.89	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.48	0.89	0.25 U	0.25 U	0.25 U	0.25 U
Dissolved Gases													
Ethane	NE	NE	NE	UG/L	0.5 U	0.5 U	7.96	2.92	1.07	0.5 U	0.5 U	0.5 U	0.5 U
Ethene	NE	NE	NE	UG/L	0.5 U	0.5 U	7.66	3.83	1.42	0.5 U	0.5 U	0.5 U	0.8
Methane	NE	NE	NE	UG/L	8.92	3.55	103	72.9	48.4	0.53	0.5 U	0.5 U	15.2

Table E-4
Titleist Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone					Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Deep Overburden	Bedrock	Bedrock	Bedrock	Bedrock
Location					MW-21D	MW-21D	MW-23D	MW-23D	MW-23D	MW-20B	MW-20B	MW-20B	MW-21B
Sample ID					AX-GW-MW21D-121014	AX-GW-MW21D-052915	AX-GW-MW23D-080614	AX-GW-MW23D-092914	AX-GW-MW23D-121014	AX-GW-MW20B-080614	AX-GW-MW20B-092914	AX-GW-MW20B-121014	AX-GW-MW21B-080614
Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	12/10/2014	5/29/2015	8/6/2014	9/29/2014	12/10/2014	8/6/2014	9/29/2014	12/10/2014	8/6/2014
Volatile Organic Compounds													
MNA Parameters													
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	57.9	85.5	61.3	64.4	38.4	48.2	43.6	44.9	158
Ammonia (as N)	NE	NE	NE	MG/L	0.075 U	0.075 U	0.39	0.09	0.13	0.075 U	0.07	0.075 U	0.07
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	0.5 U	0.5 U	7.2	2.1	1	0.5 U	0.5 U	0.5 U	0.5 U
Iron	NE	NE	NE	MG/L	0.34	0.34	6.8	8.1	0.98	0.16	0.1 U	0.05 U	0.64
Nitrate (as N)	NE	NE	NE	MG/L	2.32	1.2	0.2	0.1 U	0.27	4.22	5.47	3.19	0.45
Total Phosphorus as P	NE	NE	NE	MG/L	0.01 U	0.01 U	0.01	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.07
Sulfate	NE	NE	NE	MG/L	25	12	350	280	250	14	13	14	34
Total Organic Carbon	NE	NE	NE	MG/L	0.86	1	3.4	0.5 U	1.7	1.8	0.8	2.5 U	1.9
Total Suspended Solids	NE	NE	NE	MG/L	5 U	--	14	8.8	6.3	5 U	5 U	5 U	5 U
Field Parameters													
Dissolved Oxygen	NE	NE	NE	MG/L	2.52	3.11	0.14	0.07	0.11	1.06	0.94	1.41	0.19
pH	NE	NE	NE	PH UNITS	5.56	6.6	6.46	5.89	5.5	6.67	5.96	5.95	6.78
Electrical conductivity	NE	NE	NE	mS/cm	0.5	0.73	9.08	7.22	6.76	0.41	0.41	0.43	1.49
Specific conductance	NE	NE	NE	mV	130.8	73	-337.9	-30.4	154.8	34.8	88.3	59.2	-10.2
Turbidity	NE	NE	NE	NTU	1.53	3.42	12.32	4.31	0.51	1.18	1.34	1.29	1.96
Temperature	NE	NE	NE	DEG C	12.08	17.42	19.21	16.93	12.71	18.59	16.62	13.86	17.63

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
U - Constituent not detected above the associated detection limit

Table E-4
Titleist Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone Location Sample ID Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	Bedrock MW-21B AX-GW-MW21B-092914 9/29/2014	Bedrock MW-21B AX-GW-MW21B-121014 12/10/2014	Bedrock MW-23B AX-GW-MW23B-080614 8/6/2014	Bedrock MW-23B AX-GW-MW23B-093014 9/30/2014	Bedrock MW-23B AX-GW-MW23B-121014 12/10/2014	Bedrock MW-23B AX-GW-MW23B-081015 8/10/2015	Bedrock MW-29B AX-GW-MW29B-052815 5/28/2015	Bedrock MW-29B AX-GW-MW29B-081015 8/10/2015	Bedrock MW-35B AX-GW-MW35B-082715 8/27/2015
Volatile Organic Compounds													
1,1,1,2-Tetrachloroethane	10	50000	100000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,1,1-Trichloroethane	4000	20000	100000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	9	50000	100000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,1,2-Trichloroethane	900	50000	100000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,1-Dichloroethane	2000	20000	100000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,1-Dichloroethene	80	30000	100000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	200	50000	100000	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
1,2-Dibromoethane (EDB)	2	50000	100000	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
1,2-Dichlorobenzene	8000	2000	80000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,2-Dichloroethane	5	20000	100000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,2-Dichloroethene, total	NE	NE	NE	UG/L	10	8.9	1700	1500	5100	3000	5.2	3.8	1 U
1,2-Dichloropropane	3	50000	100000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,3-Dichlorobenzene	6000	50000	100000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
1,3-Dichloropropane	NE	NE	NE	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
1,3-Dichloropropene, total	10	200	100000	UG/L	0.5 U	0.5 U	50 U	50 U	25 U	50 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	60	8000	8000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
2-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
4-Chlorotoluene	NE	NE	NE	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
Bromodichloromethane	6	50000	50000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
Bromoform	700	50000	50000	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
Carbon tetrachloride	2	5000	5000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
Chlorobenzene	200	1000	1000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
Chloroethane	NE	NE	NE	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
Chloroform	50	20000	20000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
Chloromethane	NE	NE	NE	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
cis-1,2-Dichloroethene	20	50000	50000	UG/L	10	8.9	1700	1500	5100	3000	5.2	3.8	1 U
cis-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	50 U	50 U	25 U	50 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	20	50000	50000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
Dichlorodifluoromethane (Freon 12)	NE	NE	NE	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
Hexachlorobutadiene	50	3000	3000	UG/L	0.6 U	0.6 U	60 U	60 U	30 U	60 U	0.6 U	0.6 U	0.6 U
Methylene chloride	2000	50000	50000	UG/L	2 U	2 U	200 U	200 U	100 U	200 U	2 U	2 U	2 U
Tetrachloroethene (PCE)	50	30000	30000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	80	50000	50000	UG/L	1 U	1 U	100 U	100 U	50 U	100 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	NE	NE	NE	UG/L	0.5 U	0.5 U	50 U	50 U	25 U	50 U	0.5 U	0.5 U	0.5 U
Trichloroethene (TCE)	5	5000	5000	UG/L	46	40	*7500*	*6300*	2000	1800	68	42	2.8
Vinyl chloride	2	50000	50000	UG/L	1 U	1 U	100 U	100 U	91	310	1 U	1 U	1 U
Polychlorinated BiPhenyls													
Aroclor 1016	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1221	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.72	0.25 U	0.25 U	0.25 U
Aroclor 1232	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1242	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.34	0.45	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1248	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1254	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.74	0.25 U	0.25 U	0.25 U
Aroclor 1260	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1262	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Aroclor 1268	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Total PCBs	5	10	10	UG/L	0.25 U	0.25 U	0.25 U	0.34	0.45	1.47	0.25 U	0.25 U	0.25 U
Dissolved Gases													
Ethane	NE	NE	NE	UG/L	0.5 U	0.5 U	7.39	63.2	24.9	--	0.5 U	--	--
Ethene	NE	NE	NE	UG/L	0.82	0.78	4.32	46	29.3	--	0.5 U	--	--
Methane	NE	NE	NE	UG/L	18.6	16.5	356	364	361	--	4.09	--	--

Table E-4
Titleist Property Groundwater Analytical Summary
Former Aerovox Facility, 740 Belleville Avenue, New Bedford, MA
RTN 4-0601

Zone Location Sample ID Sample Date	MCP GW-2	MCP GW-3	MCP Groundwater UCLs	Units	Bedrock MW-21B AX-GW-MW21B-092914 9/29/2014	Bedrock MW-21B AX-GW-MW21B-121014 12/10/2014	Bedrock MW-23B AX-GW-MW23B-080614 8/6/2014	Bedrock MW-23B AX-GW-MW23B-093014 9/30/2014	Bedrock MW-23B AX-GW-MW23B-121014 12/10/2014	Bedrock MW-23B AX-GW-MW23B-081015 8/10/2015	Bedrock MW-29B AX-GW-MW29B-052815 5/28/2015	Bedrock MW-29B AX-GW-MW29B-081015 8/10/2015	Bedrock MW-35B AX-GW-MW35B-082715 8/27/2015
Volatile Organic Compounds													
MNA Parameters													
Alkalinity, bicarbonate (as CaCO3)	NE	NE	NE	MG/L	160	161	188	200	214	--	126	--	--
Ammonia (as N)	NE	NE	NE	MG/L	0.075 U	0.075 U	0.19	0.14	0.11	--	0.075 U	--	--
Iron, as Ferrous (Fe+2)	NE	NE	NE	MG/L	0.5 U	0.5 U	1.8	0.5 U	2.8	--	0.5 U	--	--
Iron	NE	NE	NE	MG/L	0.43	0.48	2	2.4	2.9	--	0.48	--	--
Nitrate (as N)	NE	NE	NE	MG/L	0.64	0.37	0.1 U	0.1 U	0.1 U	--	1.05	--	--
Total Phosphorus as P	NE	NE	NE	MG/L	0.1	0.1	0.02	0.01	0.01 U	--	0.01 U	--	--
Sulfate	NE	NE	NE	MG/L	30	31	380	370	400	--	80	--	--
Total Organic Carbon	NE	NE	NE	MG/L	0.57	2.5 U	3.7	6.2	2.9	--	1 U	--	--
Total Suspended Solids	NE	NE	NE	MG/L	5 U	5 U	25	14	15	--	--	--	--
Field Parameters													
Dissolved Oxygen	NE	NE	NE	MG/L	0.03	0.09	0.16	0.12	6.69	0.28	0.15	0.22	0.34
pH	NE	NE	NE	PH UNITS	6.65	9.49	7.26	6.62	6.98	7.05	8.85	11.3	10.68
Electrical conductivity	NE	NE	NE	mS/cm	1.52	1.46	12.11	11.18	11.26	8.44	1.96	2.93	0.82
Specific conductance	NE	NE	NE	mV	-92.7	-89.8	-481.7	-146.2	-149.6	-119.8	0.9	-81.6	-149.8
Turbidity	NE	NE	NE	NTU	1.89	0.7	19	6.41	0.25	4.9	5.7	4.41	11.94
Temperature	NE	NE	NE	DEG C	16.47	12.22	19.32	14.9	11.25	17.02	16.52	18.65	21.27

Notes:
NE - Not established
MCP Groundwater UCLs - Massachusetts Contingency Plan
MCP GW-2 - MCP Method 1: GW-2 Water Quality Standards
MCP GW-3 - MCP Method 1: GW-3 Water Quality Standards
MCP Groundwater UCLs - Upper Concentration Limit
Results presented in green highlight and solid border exceed MCP GW-2
Results presented in yellow highlight and italic font exceed MCP GW-3
Results presented in orange highlight and underlined font exceed the MCP Groundwater UCLs
U - Constituent not detected above the associated detection limit

To: Judith LeClair
Brown and Caldwell – Andover, MA

CC: Marilyn Wade
Brown and Caldwell – Andover, MA

From: Teresa Caputi[1]
Brown and Caldwell – Upper Saddle River, NJ

Subject: Data Validation
Alpha Analytical – Westborough, MA
Lab No.: L1708425
Former Aerovox Facility, New Bedford, MA
BC Project No: 149339.007.001

Date: May 24, 2017

On March 21, 2017, Brown and Caldwell (BC) collected 1 groundwater sample at the Former Aerovox Facility in New Bedford, Massachusetts. The groundwater sample was submitted on March 21, 2017 to Alpha Analytical of Westborough, MA for the following analyses:

- *Polychlorinated Biphenyls (PCB) (SW-846[2] Method 8082)*

BC reviewed the analytical results reported by the laboratory. The data review was conducted in accordance with the following guidance documents to validate sample results:

- Massachusetts Contingency Plan (MCP) Representativeness Evaluations and Data Usability Assessment (MADEP Policy WSC-07-350)
- Quality Assurance (QA) and Quality Control (QC) Guidelines for the Acquisition and Reporting of Analytical Data in Support of Response Actions Conducted Under the MCP (CAM Protocol WSC – CAM – VII A)
- QA and QC Requirements for SW-846 8082, PCBs by Gas Chromatography (GC) for the MCP (CAM Protocol WSC-CAM VA)
- Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses (12/96)

An evaluation of precision was based on laboratory duplicate results. Accuracy was determined from a review of calibration data and spike recoveries. Representativeness was evaluated based on holding time and sample preservation and storage compliance. Blank contamination and reporting limit objective compliance was used to evaluate sensitivity. Validated sample results are presented in Attachment A. Areas of concern with respect to data quality and usability are

[1] Independent technical reviewer
[2] *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) (EPA)*

discussed below. Criteria for acceptability of data were based upon available site information, analytical method requirements, guidance documents, and professional judgment.

The following is a list of the US EPA data qualifiers that are used during the data validation process:

Definition of Validation Flags:

J Associated value is an estimated quantity
UJ Not detected and the associated detection limit is uncertain
U Not present above the associated level; blank contamination exists
R Unusable data

Definition of Laboratory Flags and Abbreviations:

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

Q The quality control sample exceeds the associated acceptance criteria.

µg/l micrograms per liter

Data Completeness

All documentation required by the project was included in the data package. There were no discrepancies found in the laboratory data package.

Sample Condition upon Receipt and Holding Times

Alpha Analytical received the sample that was listed on the chain-of-custody (COC) record intact and in good condition on March 21, 2017. The sample was received by the laboratory at a temperature that met CAM Protocols and EPA storage requirements (i.e., ≤6°C). Custody seals were not necessary since laboratory-certified couriers delivered/picked up the bottles and coolers. The laboratory also verified the pH of unpreserved samples submitted to the laboratory for the PCBs analysis. According to *Sample Receipt and Container Information* section of the data package, all samples submitted to the laboratory for VOC analyses were received in preserved vials.

All samples were prepared and analyzed within holding times cited in CAM Protocol WSC-CAM-VIIA, Table II of 40 CFR 136, and analytical methods. All sample analyses were performed by the laboratory as requested on the COC records and instructions provided by BC.

Polychlorinated Biphenyls (SW-846 8082)

Groundwater sample detection limits and RLs for PCBs were greater than the reporting limit objective of 0.25 µg/L due to dilution of the sample.

A method blank was reported for the extraction batch. Target compounds were not detected during the analysis of the method blank.

The laboratory conducted a LCS and LCSD analysis for each extraction batch to verify method accuracy and precision. Recoveries fell within 40 to 140% of the true value and RPDs were less than 20% during the LCS and LCSD analysis of Aroclors 1016 and 1260.

Surrogate recoveries were below laboratory specifications (30 to 150%R) during the PCB analysis of the project sample, due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis were reported by the lab. The Method Blank and LCS/LCSD recoveries were within limits; no qualification of results is required.

An evaluation of accuracy and precision based on matrix spike (MS) and matrix spike duplicate (MSD) results is not possible, as results of the batch QC analyses were not included in the data package. An evaluation of accuracy and precision was based on results of the LCS and LCSD analyses.

The sample L1708425-01 contained peaks which match the retention times for Aroclor 1242, but do not match the area ratios typical for this aroclor. The result for Aroclor 1242 is reported as “weathered.”

Data Completeness

Completeness is defined as a measure of the amount of data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. The overall completeness goal for individual sampling event is 90 percent. The percent completeness is calculated by summing the number of analytes (e.g. 36 VOC for each sample times 10 groundwater samples equals 360 data points) for all samples by matrix and fraction.

$$Percent\ Completeness = \frac{Number\ of\ valid\ (i.e., non-R\ flagged)\ results}{Number\ of\ possible\ results} * 100$$

The percent completeness for the sample that was collected in March 2017 at the Former Aerovox Facility was calculated to be 100% for PCB analysis (refer to Table 1).

Conclusion

The analytical data discussed in this report exceeded the project completeness criteria. The data quality objectives have been met for the sample locations investigated.

Table 1. Percent Completeness

Parameter	Analytical Method	Total No. of Samples	No. of Results Per Method	Total No. of Sample Results[1]	No. of Unusable Data Points	Percent Completeness
PCB	SW-846-8082	1	9	9	0	100%

[1]Number of sample results per location, not including field duplicate sample results, unless indicated otherwise

PCB Polychlorinated biphenyls
SM *Standard Methods for the Examination of Water and Wastewater* (APHA, AWWA and WEF)
SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* (EPA)

ATTACHMENT A

Project Name: AEROVOX
Project Number: 149339.007
Lab Number: L1708425
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708425-01 D
Client ID: MW-15D
Sample Location: NEW BEDFORD, MA
Matrix: Groundwater
Analytical Method: 97,8082A
Analytical Date: 03/23/17 02:15
Analyst: JW

Date Collected: 03/21/17 11:55
Date Received: 03/21/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 03/22/17 00:49
Cleanup Method: EPA 3665A
Cleanup Date: 03/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 03/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	5.00	--	20	A
Aroclor 1221	ND		ug/l	5.00	--	20	A
Aroclor 1232	ND		ug/l	5.00	--	20	A
Aroclor 1242	71.6		ug/l	5.00	--	20	A
Aroclor 1248	ND		ug/l	5.00	--	20	A
Aroclor 1254	ND		ug/l	5.00	--	20	A
Aroclor 1260	ND		ug/l	5.00	--	20	A
Aroclor 1262	ND		ug/l	5.00	--	20	A
Aroclor 1268	ND		ug/l	5.00	--	20	A
PCBs, Total	71.6		ug/l	5.00	--	20	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

To: Judith LeClair
Brown and Caldwell – Andover, MA

CC: Marilyn Wade
Brown and Caldwell – Andover, MA

From: Shakib Ahmed[1]
Brown and Caldwell – Andover, MA

Subject: Data Validation
Alpha Analytical – Westborough, MA
Lab No.: L1712214
Former Aerovox Facility, New Bedford, MA
BC Project No: 149339.007.001

Date: April 28, 2017

On April 18, 2017, Brown and Caldwell (BC) collected 10 groundwater samples at the Former Aerovox Facility in New Bedford, Massachusetts. The groundwater samples were submitted along with a duplicate and trip blank on April 19, 2017 to Alpha Analytical of Westborough, MA for the following analyses:

- *Volatile Organic Compounds (VOC) (SW-846[2] Method 8260C)*
- *Polychlorinated Biphenyls (PCB) (SW-846[2] Method 8082)*

BC reviewed the analytical results reported by the laboratory. The data review was conducted in accordance with the following guidance documents to validate sample results:

- Massachusetts Contingency Plan (MCP) Representativeness Evaluations and Data Usability Assessment (MADEP Policy WSC-07-350)
- Quality Assurance (QA) and Quality Control (QC) Guidelines for the Acquisition and Reporting of Analytical Data in Support of Response Actions Conducted Under the MCP (CAM Protocol WSC – CAM – VII A)
- QA and QC Requirements for SW-846 8260, VOCs by Gas Chromatography/Mass Spectrometry (GC/MS) for the MCP (CAM Protocol WSC-CAM IIA)
- QA and QC Requirements for SW-846 8082, PCBs by Gas Chromatography (GC) for the MCP (CAM Protocol WSC-CAM VA)
- Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses (12/96)

An evaluation of precision was based on laboratory duplicate results. Accuracy was determined from a review of calibration data and spike recoveries. Representativeness was evaluated based

[1] Independent technical reviewer
[2] *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) (EPA)*

on holding time and sample preservation and storage compliance. Blank contamination and reporting limit objective compliance was used to evaluate sensitivity. Validated sample results are presented in Attachment A. Areas of concern with respect to data quality and usability are discussed below. Criteria for acceptability of data were based upon available site information, analytical method requirements, guidance documents, and professional judgment.

The following is a list of the US EPA data qualifiers that are used during the data validation process:

Definition of Validation Flags:

J Associated value is an estimated quantity
UJ Not detected and the associated detection limit is uncertain
U Not present above the associated level; blank contamination exists
R Unusable data

Definition of Laboratory Flags and Abbreviations:

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

Q The quality control sample exceeds the associated acceptance criteria

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

µg/L Micrograms per liter

Data Completeness

All documentation required by the project was included in the data package. There were no discrepancies found in the laboratory data package.

Sample Condition upon Receipt and Holding Times

Alpha Analytical received all sample that were listed on the chain-of-custody (COC) record intact and in good condition on April 18, 2017. All samples were received by the laboratory at a temperature that met CAM Protocols and EPA storage requirements (i.e., ≤6°C). Custody seals were not necessary since laboratory-certified couriers delivered/picked up the bottles and coolers. The laboratory verified that the sample containers provided for the VOCs were preserved. The laboratory also verified the pH of unpreserved samples submitted to the laboratory for the PCBs analysis. According to *Sample Receipt and Container Information* section of the data package, all samples submitted to the laboratory for VOC analyses were received in preserved vials.

All sample were prepared and analyzed within holding times cited in CAM Protocol WSC-CAM-VIIA, Table II of 40 CFR 136, and analytical methods. All sample analyses were performed by the laboratory as requested on the COC records and instructions provided by Brown and Caldwell.

Volatile Organic Compounds (SW-846 8260C)

A subset of Massachusetts Contingency Plan compounds were analyzed per the COC record and BC instruction. Reporting limits were greater than CAM Protocol WSC-CAM-IIA reporting limit objectives for one or more target analytes during the analysis of the following samples due to the elevated concentrations of target analytes:

Sample ID	Lab Sample ID
AX-GW-MW02A-041817	L1712214-01
AX-GW-MW02B-041817	L1712214-02
AX-GW-MW02-041817	L1712214-03
AX-GW-MW17D-041817	L1712214-04
AX-GW-MW17B-041817	L1712214-05
AX-GW-MW06A-041817	L1712214-06
AX-GW-MW06B-041817	L1712214-07
AX-GW-MW06-041817	L1712214-08
AX-GW-DUP01-041817	L1712214-09
AX-GW-MW19D-041817	L1712214-10

Results for some initial and continuing calibration standards were included in the laboratory data package because relative response factors (RRFs) and percent differences (%Ds) did not meet WSC-CAM-IIA acceptance criteria[3] or laboratory control limits for several compounds.

- Continuing Calibration Verification (CCV) of April 12, 2017 at 19:22, instrument Jack[4]:
  - Chloromethane: 21.2%D (negative bias)
  - Trans-1,3,-Dichloropropene: 32.2%D (negative bias)
  - 1,1,2-Trichloroethane: 30.5%D (negative bias)
  - 1,3-dichloropropane: 34.9%D (negative bias)
  - 1,2-dibromoethane: 26.1%D (negative bias)
  - Chloroethane 21.6%D (negative bias)
  - 1,2,4-trichlorobenzene 27.5%D (negative bias)

All sample results for the above constituents are estimated (J/UJ), because a negative bias was indicated by the CCV result.

The laboratory conducted a laboratory control sample (LCS) and a LCS duplicate (LCSD) analysis for each analytical batch to verify method accuracy and precision. The relative percent difference (RPD) between LCS and LCSD results were less than 20 and recoveries fell within 70 to 130% of the true value during all LCS and LCSD analyses for all target analytes except for bromoform (67 and 67%R) and 1,2,4-trichlorobenzene (130 and 140%R). Bromoform and 1,2,4-trichlorobenzene[4] were not detected in any sample and results have been UJ-flagged, because of high/low LCS and LCSD recoveries.

Surrogate recoveries met laboratory specifications during the VOA of all project samples.

[3] RRF is ≤0.05 and %D ≤20 for all target compounds, except ≤60%D for CAM WSC-CAM-II A Table II A-2 poor performers

[4] L1712214-01 through -11

An evaluation of accuracy and precision based on matrix spike (MS) and matrix spike duplicate (MSD) show that MS/MSDs performed within criteria except for bromoform and dichlorodifluoromethane, both of which were below lower control limits. These samples have been qualified as an estimate (J/UJ). The results for these constituents were non-detects in all samples.

The criteria for precision were met during the analysis of the field duplicate samples AX-GW-MW06-041817 and AX-GW-DUP01-041817 (L1712214-08 and L1712214-09, respectively) for detected VOC (refer to Attachment B).

Polychlorinated Biphenyls (SW-846 8082)

Groundwater sample detection limits and RLs for PCBs were less than or equal to reporting limit objective of 0.25 µg/L for all undiluted samples.

A method blank was reported for the extraction batch. Target compounds were not detected during the analysis of the method blank.

The laboratory conducted a LCS and LCSD analysis for each extraction batch to verify method accuracy and precision. Recoveries fell within 40 to 140% of the true value and RPDs were less than 20% during the LCS and LCSD analysis of Aroclors 1016 and 1260.

The RDP between primary and confirmation results exceeded method-specified criteria of 40% for Aroclor 1242 during the analysis of AX-GW-MW19D-041817 (L1712214-10). The Aroclor 1242 result in this sample is estimated (J) due to analytical imprecision.

Surrogate recoveries met laboratory specifications (30 to 150%R) during the PCB analysis of all project samples.

An evaluation of accuracy and precision based on matrix spike (MS) and matrix spike duplicate (MSD) show that MS/MSDs performed within criteria except for Aroclor 1016, which was below the upper control limit. Since high bias is considered conservative, %R above the upper control limit does not warrant qualification.

The criteria for precision were met during the analysis of the field duplicate samples AX-GW-MW06-041817 and AX-GW-DUP01-041817 (L1712214-08 and L1712214-09, respectively) for detected VOC (refer to Attachment B).

Data Completeness

Completeness is defined as a measure of the amount of data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. The overall completeness goal for individual sampling event is 90 percent. The percent completeness is calculated by summing the number of analytes (e.g. 36 VOC for each sample times 10 groundwater samples equals 360 data points) for all samples by matrix and fraction.

$$Percent\ Completeness = \frac{Number\ of\ valid\ (i.e., non-R\ flagged)\ results}{Number\ of\ possible\ results} * 100$$

The percent completeness for all samples that were collected in April 2017 at the Former Aerovox Facility was calculated to be 100% for each analysis (refer to Table 1).

Conclusion

The analytical data discussed in this report exceeded the project completeness criteria. The data quality objectives have been met for the sample locations investigated.

Table 1. Percent Completeness

Parameter	Analytical Method	Total No. of Samples	No. of Results Per Method	Total No. of Sample Results[1]	No. of Unusable Data Points	Percent Completeness
VOC	SW-846 8260C	9	36	324	0	100%
PCB	SW-846-8082	9	9	81	0	100%

[1]Number of sample results per location, not including field duplicate sample results, unless indicated otherwise

PCB Polychlorinated biphenyls
SM *Standard Methods for the Examination of Water and Wastewater* (APHA, AWWA and WEF)
SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* (EPA)
VOC Volatile organic compounds

ATTACHMENT A

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-01
Client ID: AX-GW-MW02A-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 20:37
Analyst: BD

Date Collected: 04/18/17 11:30
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	20		ug/l	1.0	--	1
1,2-Dichloroethane	ND	UJ	ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND	UJ	ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND	UJ	ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND	UJ	ug/l	2.0	--	1
Vinyl chloride	6.1		ug/l	1.0	--	1
Chloroethane	ND	UJ	ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	5.8		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	2.7		ug/l	1.0	--	1
1,4-Dichlorobenzene	4.6		ug/l	1.0	--	1
cis-1,2-Dichloroethene	10		ug/l	1.0	--	1
1,2-Dichloroethene, Total	10		ug/l	1.0	--	1
Dichlorodifluoromethane	ND	UJ	ug/l	2.0	--	1
1,2-Dibromoethane	ND	UJ	ug/l	2.0	--	1

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-01
Client ID: AX-GW-MW02A-041817
Sample Location: NEW BEDFORD, MA
Date Collected: 04/18/17 11:30
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND	UJ	ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	84		70-130
Dibromofluoromethane	102		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-02 D
Client ID: AX-GW-MW02B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 21:10
Analyst: BD

Date Collected: 04/18/17 09:20
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	50	--	25
1,1-Dichloroethane	ND		ug/l	25	--	25
Chloroform	ND		ug/l	25	--	25
Carbon tetrachloride	ND		ug/l	25	--	25
1,2-Dichloropropane	ND		ug/l	25	--	25
Dibromochloromethane	ND		ug/l	25	--	25
1,1,2-Trichloroethane	ND		ug/l	25	--	25
Tetrachloroethene	67		ug/l	25	--	25
Chlorobenzene	ND		ug/l	25	--	25
1,2-Dichloroethane	ND		ug/l	25	--	25
1,1,1-Trichloroethane	ND	UJ	ug/l	25	--	25
Bromodichloromethane	ND		ug/l	25	--	25
trans-1,3-Dichloropropene	ND	UJ	ug/l	12	--	25
cis-1,3-Dichloropropene	ND		ug/l	12	--	25
1,3-Dichloropropene, Total	ND		ug/l	12	--	25
Bromoform	ND	UJ	ug/l	50	--	25
1,1,2,2-Tetrachloroethane	ND		ug/l	25	--	25
Chloromethane	ND	UJ	ug/l	50	--	25
Vinyl chloride	200		ug/l	25	--	25
Chloroethane	ND	UJ	ug/l	50	--	25
1,1-Dichloroethene	ND		ug/l	25	--	25
trans-1,2-Dichloroethene	72		ug/l	25	--	25
Trichloroethene	2900		ug/l	25	--	25
1,2-Dichlorobenzene	ND		ug/l	25	--	25
1,3-Dichlorobenzene	ND		ug/l	25	--	25
1,4-Dichlorobenzene	ND		ug/l	25	--	25
cis-1,2-Dichloroethene	2300		ug/l	25	--	25
1,2-Dichloroethene, Total	2400		ug/l	25	--	25
Dichlorodifluoromethane	ND	UJ	ug/l	50	--	25
1,2-Dibromoethane	ND	UJ	ug/l	50	--	25

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-02 D Date Collected: 04/18/17 09:20

Client ID: AX-GW-MW02B-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	50	--	25
1,1,1,2-Tetrachloroethane	ND		ug/l	25	--	25
o-Chlorotoluene	ND		ug/l	50	--	25
p-Chlorotoluene	ND		ug/l	50	--	25
Hexachlorobutadiene	ND		ug/l	15	--	25
1,2,4-Trichlorobenzene	ND	UJ	ug/l	50	--	25

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	84		70-130
Dibromofluoromethane	100		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-03 D
Client ID: AX-GW-MW02-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 06:49
Analyst: MM

Date Collected: 04/18/17 10:25
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	10	--	5
1,1-Dichloroethane	ND		ug/l	5.0	--	5
Chloroform	ND		ug/l	5.0	--	5
Carbon tetrachloride	ND		ug/l	5.0	--	5
1,2-Dichloropropane	ND		ug/l	5.0	--	5
Dibromochloromethane	ND		ug/l	5.0	--	5
1,1,2-Trichloroethane	ND		ug/l	5.0	--	5
Tetrachloroethene	ND		ug/l	5.0	--	5
Chlorobenzene	880		ug/l	5.0	--	5
1,2-Dichloroethane	ND		ug/l	5.0	--	5
1,1,1-Trichloroethane	ND	UJ	ug/l	5.0	--	5
Bromodichloromethane	ND		ug/l	5.0	--	5
trans-1,3-Dichloropropene	ND	UJ	ug/l	2.5	--	5
cis-1,3-Dichloropropene	ND		ug/l	2.5	--	5
1,3-Dichloropropene, Total	ND		ug/l	2.5	--	5
Bromoform	ND	UJ	ug/l	10	--	5
1,1,2,2-Tetrachloroethane	ND		ug/l	5.0	--	5
Chloromethane	ND	UJ	ug/l	10	--	5
Vinyl chloride	ND		ug/l	5.0	--	5
Chloroethane	ND	UJ	ug/l	10	--	5
1,1-Dichloroethene	ND		ug/l	5.0	--	5
trans-1,2-Dichloroethene	ND		ug/l	5.0	--	5
Trichloroethene	ND		ug/l	5.0	--	5
1,2-Dichlorobenzene	9.6		ug/l	5.0	--	5
1,3-Dichlorobenzene	71		ug/l	5.0	--	5
1,4-Dichlorobenzene	120		ug/l	5.0	--	5
cis-1,2-Dichloroethene	ND		ug/l	5.0	--	5
1,2-Dichloroethene, Total	ND		ug/l	5.0	--	5
Dichlorodifluoromethane	ND	UJ	ug/l	10	--	5
1,2-Dibromoethane	ND	UJ	ug/l	10	--	5

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-03 D Date Collected: 04/18/17 10:25

Client ID: AX-GW-MW02-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	10	--	5
1,1,1,2-Tetrachloroethane	ND		ug/l	5.0	--	5
o-Chlorotoluene	ND		ug/l	10	--	5
p-Chlorotoluene	ND		ug/l	10	--	5
Hexachlorobutadiene	ND		ug/l	3.0	--	5
1,2,4-Trichlorobenzene	ND	UJ	ug/l	10	--	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	107		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-04 D
Client ID: AX-GW-MW17D-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 21:43
Analyst: BD

Date Collected: 04/18/17 14:20
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND		ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	64		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND		ug/l	50	--	50
1,1,1-Trichloroethane	ND	UJ	ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND	UJ	ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND	UJ	ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND	UJ	ug/l	100	--	50
Vinyl chloride	180		ug/l	50	--	50
Chloroethane	ND	UJ	ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND		ug/l	50	--	50
Trichloroethene	4400		ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	1800		ug/l	50	--	50
1,2-Dichloroethene, Total	1800		ug/l	50	--	50
Dichlorodifluoromethane	ND	UJ	ug/l	100	--	50
1,2-Dibromoethane	ND	UJ	ug/l	100	--	50

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-04 D Date Collected: 04/18/17 14:20

Client ID: AX-GW-MW17D-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND	UJ	ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	80		70-130
Dibromofluoromethane	93		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-05 D
Client ID: AX-GW-MW17B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 22:17
Analyst: BD

Date Collected: 04/18/17 15:20
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	40	--	20
1,1-Dichloroethane	ND		ug/l	20	--	20
Chloroform	ND		ug/l	20	--	20
Carbon tetrachloride	ND		ug/l	20	--	20
1,2-Dichloropropane	ND		ug/l	20	--	20
Dibromochloromethane	ND		ug/l	20	--	20
1,1,2-Trichloroethane	ND		ug/l	20	--	20
Tetrachloroethene	40		ug/l	20	--	20
Chlorobenzene	ND		ug/l	20	--	20
1,2-Dichloroethane	ND		ug/l	20	--	20
1,1,1-Trichloroethane	ND	UJ	ug/l	20	--	20
Bromodichloromethane	ND		ug/l	20	--	20
trans-1,3-Dichloropropene	ND	UJ	ug/l	10	--	20
cis-1,3-Dichloropropene	ND		ug/l	10	--	20
1,3-Dichloropropene, Total	ND		ug/l	10	--	20
Bromoform	ND	UJ	ug/l	40	--	20
1,1,2,2-Tetrachloroethane	ND		ug/l	20	--	20
Chloromethane	ND	UJ	ug/l	40	--	20
Vinyl chloride	180		ug/l	20	--	20
Chloroethane	ND	UJ	ug/l	40	--	20
1,1-Dichloroethene	ND		ug/l	20	--	20
trans-1,2-Dichloroethene	42		ug/l	20	--	20
Trichloroethene	2500		ug/l	20	--	20
1,2-Dichlorobenzene	ND		ug/l	20	--	20
1,3-Dichlorobenzene	ND		ug/l	20	--	20
1,4-Dichlorobenzene	ND		ug/l	20	--	20
cis-1,2-Dichloroethene	2400		ug/l	20	--	20
1,2-Dichloroethene, Total	2400		ug/l	20	--	20
Dichlorodifluoromethane	ND	UJ	ug/l	40	--	20
1,2-Dibromoethane	ND	UJ	ug/l	40	--	20

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-05 D Date Collected: 04/18/17 15:20

Client ID: AX-GW-MW17B-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	40	--	20
1,1,1,2-Tetrachloroethane	ND		ug/l	20	--	20
o-Chlorotoluene	ND		ug/l	40	--	20
p-Chlorotoluene	ND		ug/l	40	--	20
Hexachlorobutadiene	ND		ug/l	12	--	20
1,2,4-Trichlorobenzene	ND	UJ	ug/l	40	--	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	83		70-130
Dibromofluoromethane	94		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-06
Client ID: AX-GW-MW06A-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 22:50
Analyst: BD

Date Collected: 04/18/17 11:15
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	3.1		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND	UJ	ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND	UJ	ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND	UJ	ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND	UJ	ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND	UJ	ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	36		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	6.5		ug/l	1.0	--	1
1,2-Dichloroethene, Total	6.5		ug/l	1.0	--	1
Dichlorodifluoromethane	ND	UJ	ug/l	2.0	--	1
1,2-Dibromoethane	ND	UJ	ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-06 Date Collected: 04/18/17 11:15

Client ID: AX-GW-MW06A-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND	UJ	ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	85		70-130
Dibromofluoromethane	98		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-07 D
Client ID: AX-GW-MW06B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 23:23
Analyst: BD

Date Collected: 04/18/17 12:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	400	--	200
1,1-Dichloroethane	ND		ug/l	200	--	200
Chloroform	ND		ug/l	200	--	200
Carbon tetrachloride	ND		ug/l	200	--	200
1,2-Dichloropropane	ND		ug/l	200	--	200
Dibromochloromethane	ND		ug/l	200	--	200
1,1,2-Trichloroethane	ND		ug/l	200	--	200
Tetrachloroethene	ND		ug/l	200	--	200
Chlorobenzene	ND		ug/l	200	--	200
1,2-Dichloroethane	ND		ug/l	200	--	200
1,1,1-Trichloroethane	ND	UJ	ug/l	200	--	200
Bromodichloromethane	ND		ug/l	200	--	200
trans-1,3-Dichloropropene	ND	UJ	ug/l	100	--	200
cis-1,3-Dichloropropene	ND		ug/l	100	--	200
1,3-Dichloropropene, Total	ND		ug/l	100	--	200
Bromoform	ND	UJ	ug/l	400	--	200
1,1,2,2-Tetrachloroethane	ND		ug/l	200	--	200
Chloromethane	ND	UJ	ug/l	400	--	200
Vinyl chloride	ND		ug/l	200	--	200
Chloroethane	ND	UJ	ug/l	400	--	200
1,1-Dichloroethene	ND		ug/l	200	--	200
trans-1,2-Dichloroethene	ND		ug/l	200	--	200
Trichloroethene	9600		ug/l	200	--	200
1,2-Dichlorobenzene	ND		ug/l	200	--	200
1,3-Dichlorobenzene	ND		ug/l	200	--	200
1,4-Dichlorobenzene	ND		ug/l	200	--	200
cis-1,2-Dichloroethene	3100		ug/l	200	--	200
1,2-Dichloroethene, Total	3100		ug/l	200	--	200
Dichlorodifluoromethane	ND	UJ	ug/l	400	--	200
1,2-Dibromoethane	ND	UJ	ug/l	400	--	200

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-07 D Date Collected: 04/18/17 12:00

Client ID: AX-GW-MW06B-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	400	--	200
1,1,1,2-Tetrachloroethane	ND		ug/l	200	--	200
o-Chlorotoluene	ND		ug/l	400	--	200
p-Chlorotoluene	ND		ug/l	400	--	200
Hexachlorobutadiene	ND		ug/l	120	--	200
1,2,4-Trichlorobenzene	ND	UJ	ug/l	400	--	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	84		70-130
Dibromofluoromethane	99		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-08 D
Client ID: AX-GW-MW06-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 01:18
Analyst: PK

Date Collected: 04/18/17 10:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	20	--	10
1,1-Dichloroethane	ND		ug/l	10	--	10
Chloroform	ND		ug/l	10	--	10
Carbon tetrachloride	ND		ug/l	10	--	10
1,2-Dichloropropane	ND		ug/l	10	--	10
Dibromochloromethane	ND		ug/l	10	--	10
1,1,2-Trichloroethane	ND		ug/l	10	--	10
Tetrachloroethene	ND		ug/l	10	--	10
Chlorobenzene	ND		ug/l	10	--	10
1,2-Dichloroethane	ND		ug/l	10	--	10
1,1,1-Trichloroethane	ND	UJ	ug/l	10	--	10
Bromodichloromethane	ND		ug/l	10	--	10
trans-1,3-Dichloropropene	ND	UJ	ug/l	5.0	--	10
cis-1,3-Dichloropropene	ND		ug/l	5.0	--	10
1,3-Dichloropropene, Total	ND		ug/l	5.0	--	10
Bromoform	ND	UJ	ug/l	20	--	10
1,1,2,2-Tetrachloroethane	ND		ug/l	10	--	10
Chloromethane	ND	UJ	ug/l	20	--	10
Vinyl chloride	13		ug/l	10	--	10
Chloroethane	ND	UJ	ug/l	20	--	10
1,1-Dichloroethene	ND		ug/l	10	--	10
trans-1,2-Dichloroethene	ND		ug/l	10	--	10
Trichloroethene	1200		ug/l	10	--	10
1,2-Dichlorobenzene	ND		ug/l	10	--	10
1,3-Dichlorobenzene	ND		ug/l	10	--	10
1,4-Dichlorobenzene	ND		ug/l	10	--	10
cis-1,2-Dichloroethene	760		ug/l	10	--	10
1,2-Dichloroethene, Total	760		ug/l	10	--	10
Dichlorodifluoromethane	ND	UJ	ug/l	20	--	10
1,2-Dibromoethane	ND	UJ	ug/l	20	--	10

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-08 D Date Collected: 04/18/17 10:00

Client ID: AX-GW-MW06-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	20	--	10
1,1,1,2-Tetrachloroethane	ND		ug/l	10	--	10
o-Chlorotoluene	ND		ug/l	20	--	10
p-Chlorotoluene	ND		ug/l	20	--	10
Hexachlorobutadiene	ND		ug/l	6.0	--	10
1,2,4-Trichlorobenzene	ND	UJ	ug/l	20	--	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	104		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-09 D
Client ID: AX-GW-DUP01-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 01:49
Analyst: PK

Date Collected: 04/18/17 00:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	20	--	10
1,1-Dichloroethane	ND		ug/l	10	--	10
Chloroform	ND		ug/l	10	--	10
Carbon tetrachloride	ND		ug/l	10	--	10
1,2-Dichloropropane	ND		ug/l	10	--	10
Dibromochloromethane	ND		ug/l	10	--	10
1,1,2-Trichloroethane	ND		ug/l	10	--	10
Tetrachloroethene	ND		ug/l	10	--	10
Chlorobenzene	ND		ug/l	10	--	10
1,2-Dichloroethane	ND		ug/l	10	--	10
1,1,1-Trichloroethane	ND	UJ	ug/l	10	--	10
Bromodichloromethane	ND		ug/l	10	--	10
trans-1,3-Dichloropropene	ND	UJ	ug/l	5.0	--	10
cis-1,3-Dichloropropene	ND		ug/l	5.0	--	10
1,3-Dichloropropene, Total	ND		ug/l	5.0	--	10
Bromoform	ND	UJ	ug/l	20	--	10
1,1,2,2-Tetrachloroethane	ND		ug/l	10	--	10
Chloromethane	ND	UJ	ug/l	20	--	10
Vinyl chloride	13		ug/l	10	--	10
Chloroethane	ND	UJ	ug/l	20	--	10
1,1-Dichloroethene	ND		ug/l	10	--	10
trans-1,2-Dichloroethene	ND		ug/l	10	--	10
Trichloroethene	1100		ug/l	10	--	10
1,2-Dichlorobenzene	ND		ug/l	10	--	10
1,3-Dichlorobenzene	ND		ug/l	10	--	10
1,4-Dichlorobenzene	ND		ug/l	10	--	10
cis-1,2-Dichloroethene	700		ug/l	10	--	10
1,2-Dichloroethene, Total	700		ug/l	10	--	10
Dichlorodifluoromethane	ND	UJ	ug/l	20	--	10
1,2-Dibromoethane	ND	UJ	ug/l	20	--	10

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-09 D
Client ID: AX-GW-DUP01-041817
Sample Location: NEW BEDFORD, MA
Date Collected: 04/18/17 00:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	20	--	10
1,1,1,2-Tetrachloroethane	ND		ug/l	10	--	10
o-Chlorotoluene	ND		ug/l	20	--	10
p-Chlorotoluene	ND		ug/l	20	--	10
Hexachlorobutadiene	ND		ug/l	6.0	--	10
1,2,4-Trichlorobenzene	ND	UJ	ug/l	20	--	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	105		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-10 D
Client ID: AX-GW-MW19D-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 02:21
Analyst: PK

Date Collected: 04/18/17 14:40
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	200	--	100
1,1-Dichloroethane	ND		ug/l	100	--	100
Chloroform	ND		ug/l	100	--	100
Carbon tetrachloride	ND		ug/l	100	--	100
1,2-Dichloropropane	ND		ug/l	100	--	100
Dibromochloromethane	ND		ug/l	100	--	100
1,1,2-Trichloroethane	ND		ug/l	100	--	100
Tetrachloroethene	ND		ug/l	100	--	100
Chlorobenzene	ND		ug/l	100	--	100
1,2-Dichloroethane	ND		ug/l	100	--	100
1,1,1-Trichloroethane	ND	UJ	ug/l	100	--	100
Bromodichloromethane	ND		ug/l	100	--	100
trans-1,3-Dichloropropene	ND	UJ	ug/l	50	--	100
cis-1,3-Dichloropropene	ND		ug/l	50	--	100
1,3-Dichloropropene, Total	ND		ug/l	50	--	100
Bromoform	ND	UJ	ug/l	200	--	100
1,1,2,2-Tetrachloroethane	ND		ug/l	100	--	100
Chloromethane	ND	UJ	ug/l	200	--	100
Vinyl chloride	570		ug/l	100	--	100
Chloroethane	ND	UJ	ug/l	200	--	100
1,1-Dichloroethene	ND		ug/l	100	--	100
trans-1,2-Dichloroethene	ND		ug/l	100	--	100
Trichloroethene	1600		ug/l	100	--	100
1,2-Dichlorobenzene	ND		ug/l	100	--	100
1,3-Dichlorobenzene	ND		ug/l	100	--	100
1,4-Dichlorobenzene	ND		ug/l	100	--	100
cis-1,2-Dichloroethene	9700		ug/l	100	--	100
1,2-Dichloroethene, Total	9700		ug/l	100	--	100
Dichlorodifluoromethane	ND	UJ	ug/l	200	--	100
1,2-Dibromoethane	ND	UJ	ug/l	200	--	100

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-10 D Date Collected: 04/18/17 14:40

Client ID: AX-GW-MW19D-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	200	--	100
1,1,1,2-Tetrachloroethane	ND		ug/l	100	--	100
o-Chlorotoluene	ND		ug/l	200	--	100
p-Chlorotoluene	ND		ug/l	200	--	100
Hexachlorobutadiene	ND		ug/l	60	--	100
1,2,4-Trichlorobenzene	ND	UJ	ug/l	200	--	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-11
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 03:40
Analyst: MM

Date Collected: 04/18/17 00:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND	UJ	ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND	UJ	ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND	UJ	ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND	UJ	ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND	UJ	ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene, Total	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND	UJ	ug/l	2.0	--	1
1,2-Dibromoethane	ND	UJ	ug/l	2.0	--	1

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-11
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Date Collected: 04/18/17 00:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND	UJ	ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND	UJ	ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	115		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	106		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-01 D
Client ID: AX-GW-MW02A-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 01:02
Analyst: AF

Date Collected: 04/18/17 11:30
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	30.0		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	A
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	30.0		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	104		30-150	A
Decachlorobiphenyl	80		30-150	A
2,4,5,6-Tetrachloro-m-xylene	113		30-150	B
Decachlorobiphenyl	80		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-02 D
Client ID: AX-GW-MW02B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 01:18
Analyst: AF

Date Collected: 04/18/17 09:20
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	26.0		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	26.0		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	90		30-150	A
Decachlorobiphenyl	83		30-150	A
2,4,5,6-Tetrachloro-m-xylene	92		30-150	B
Decachlorobiphenyl	83		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-03 D
Client ID: AX-GW-MW02-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 00:45
Analyst: AF

Date Collected: 04/18/17 10:25
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	13.7		ug/l	1.25	--	5	A
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	2.74		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	16.4		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	96		30-150	A
Decachlorobiphenyl	80		30-150	A
2,4,5,6-Tetrachloro-m-xylene	109		30-150	B
Decachlorobiphenyl	86		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-04 D
Client ID: AX-GW-MW17D-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 01:35
Analyst: AF

Date Collected: 04/18/17 14:20
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	28.5		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	A
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	28.5		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	109		30-150	A
Decachlorobiphenyl	101		30-150	A
2,4,5,6-Tetrachloro-m-xylene	101		30-150	B
Decachlorobiphenyl	97		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-05 D
Client ID: AX-GW-MW17B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 01:52
Analyst: AF

Date Collected: 04/18/17 15:20
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	19.7		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	19.7		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**153**	Q	30-150	A
Decachlorobiphenyl	93		30-150	A
2,4,5,6-Tetrachloro-m-xylene	101		30-150	B
Decachlorobiphenyl	99		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-06
Client ID: AX-GW-MW06A-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/24/17 12:11
Analyst: AF

Date Collected: 04/18/17 11:15
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	1.17		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	1.17		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		30-150	A
Decachlorobiphenyl	89		30-150	A
2,4,5,6-Tetrachloro-m-xylene	90		30-150	B
Decachlorobiphenyl	90		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-07 D
Client ID: AX-GW-MW06B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 02:08
Analyst: AF

Date Collected: 04/18/17 12:00
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	12.2		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	12.2		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	97		30-150	A
Decachlorobiphenyl	81		30-150	A
2,4,5,6-Tetrachloro-m-xylene	97		30-150	B
Decachlorobiphenyl	82		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-08 D
Client ID: AX-GW-MW06-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 18:46
Analyst: JW

Date Collected: 04/18/17 10:00
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	7.98		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	A
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	7.98		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	93		30-150	A
Decachlorobiphenyl	84		30-150	A
2,4,5,6-Tetrachloro-m-xylene	86		30-150	B
Decachlorobiphenyl	65		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-09 D
Client ID: AX-GW-DUP01-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/27/17 00:02
Analyst: JW

Date Collected: 04/18/17 00:00
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	7.85		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	A
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	7.85		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	61		30-150	A
2,4,5,6-Tetrachloro-m-xylene	79		30-150	B
Decachlorobiphenyl	63		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-10 D
Client ID: AX-GW-MW19D-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 23:49
Analyst: JW

Date Collected: 04/18/17 14:40
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	9.17 J	P	ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	9.17		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	83		30-150	A
Decachlorobiphenyl	43		30-150	A
2,4,5,6-Tetrachloro-m-xylene	79		30-150	B
Decachlorobiphenyl	45		30-150	B

ATTACHMENT B

Evaluation of Field Duplicate Results **Attachment B**

Analyte	AX-GW-MW06-041817 (L1712214-08)	RL	AX-GW-DUP01-041817 (L1712214-09)	RL	Unit	2x Avg. RL	RPD	Absolute difference	Avg RL CL	Action
Vinyl Chloride	13	10	13	10	µg/L	20	0	N/A	N/A	None, RPD ≤ 30%
Trichloroethene	1200	10	1100	10	µg/L	20	9	N/A	N/A	None, RPD ≤ 30%
cis-1,2-Dichloroethene	760	10	700	10	µg/L	20	8	N/A	N/A	None, RPD ≤ 30%
1,2-Dichloroethene, total	760	10	700	10	µg/L	20	8	N/A	N/A	None, RPD ≤ 30%
Aroclor 1242	7.98	1.25	7.85	1.25	µg/L	2.5	2	N/A	N/A	None, RPD ≤ 30%
PCBs, total	7.98	1.25	7.85	1.25	µg/L	2.5	2	N/A	N/A	None, RPD ≤ 30%

Note: If the analyte was not detected, then the cell was left blank.
Mg/L – Micrograms per liter
CL – Control Limit
N/A – Not applicable
RL – Reporting Limit
RPD – Relative percent different

Precision is based on either the absolute difference between sample results or RPD. If the sample results are less than or equal to 2x's RL (5x's RL for TSS), then precision is based on the absolute difference between duplicate results. If sample results > 2x's RL (5x's RL for TSS), then precision is evaluated using RPD. J sample results whenever the absolute difference is greater than the criteria below. The table above presents the results for detected analytes only.

Parameter	Precision Criteria	RL CL
VOC	≤2x Avg RL or ≤30%RPD	2x Avg RL
PCB	≤2x Avg RL or ≤30%RPD	2x Avg RL

To: Judith LeClair
Brown and Caldwell – Andover, MA

CC: Marilyn Wade
Brown and Caldwell – Andover, MA

From: Shakib Ahmed[1]
Brown and Caldwell – Andover, MA

Subject: Data Validation
Alpha Analytical – Westborough, MA
Lab No.: L1712362
Former Aerovox Facility, New Bedford, MA
BC Project No: 149339.007.001

Date: April 28, 2017

On April 19, 2017, Brown and Caldwell (BC) collected 8 groundwater samples at the Former Aerovox Facility in New Bedford, Massachusetts. The groundwater samples were submitted along with a duplicate and trip blank on April 19, 2017 to Alpha Analytical of Westborough, MA for the following analyses:

- *Volatile Organic Compounds (VOC) (SW-846[2] Method 8260C)*
- *Polychlorinated Biphenyls (PCB) (SW-846[2] Method 8082)*

BC reviewed the analytical results reported by the laboratory. The data review was conducted in accordance with the following guidance documents to validate sample results:

- Massachusetts Contingency Plan (MCP) Representativeness Evaluations and Data Usability Assessment (MADEP Policy WSC-07-350)
- Quality Assurance (QA) and Quality Control (QC) Guidelines for the Acquisition and Reporting of Analytical Data in Support of Response Actions Conducted Under the MCP (CAM Protocol WSC – CAM – VII A)
- QA and QC Requirements for SW-846 8260, VOCs by Gas Chromatography/Mass Spectrometry (GC/MS) for the MCP (CAM Protocol WSC-CAM IIA)
- QA and QC Requirements for SW-846 8082, PCBs by Gas Chromatography (GC) for the MCP (CAM Protocol WSC-CAM VA)
- Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses (12/96)

An evaluation of precision was based on laboratory duplicate results. Accuracy was determined from a review of calibration data and spike recoveries. Representativeness was evaluated based

[1] Independent technical reviewer
[2] *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) (EPA)*

on holding time and sample preservation and storage compliance. Blank contamination and reporting limit objective compliance was used to evaluate sensitivity. Validated sample results are presented in Attachment A. Areas of concern with respect to data quality and usability are discussed below. Criteria for acceptability of data were based upon available site information, analytical method requirements, guidance documents, and professional judgment.

The following is a list of the US EPA data qualifiers that are used during the data validation process:

Definition of Validation Flags:

J Associated value is an estimated quantity
UJ Not detected and the associated detection limit is uncertain
U Not present above the associated level; blank contamination exists
R Unusable data

Definition of Laboratory Flags and Abbreviations:

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

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

Q The quality control sample exceeds the associated acceptance criteria

µg/L Micrograms per liter

Data Completeness

All documentation required by the project was included in the data package. There were no discrepancies found in the laboratory data package.

Sample Condition upon Receipt and Holding Times

Alpha Analytical received all sample that were listed on the chain-of-custody (COC) record intact and in good condition on April 19, 2017. All samples were received by the laboratory at a temperature that met CAM Protocols and EPA storage requirements (i.e., ≤6°C). Custody seals were not necessary since laboratory-certified couriers delivered/picked up the bottles and coolers. The laboratory verified that the sample containers provided for the VOCs were preserved. The laboratory also verified the pH of unpreserved samples submitted to the laboratory for the PCBs analysis. According to *Sample Receipt and Container Information* section of the data package, all samples submitted to the laboratory for VOC analyses were received in preserved vials.

All sample were prepared and analyzed within holding times cited in CAM Protocol WSC-CAM-VIIA, Table II of 40 CFR 136, and analytical methods. All sample analyses were performed by the laboratory as requested on the COC records and instructions provided by BC.

Volatile Organic Compounds (SW-846 8260C)

A subset of Massachusetts Contingency Plan compounds was analyzed per the COC record and BC instruction. Reporting limits were greater than CAM Protocol WSC-CAM-IIA reporting limit objectives for one or more target analytes during the analysis of the following samples due to the elevated concentrations of target analytes:

Sample ID	Lab Sample ID
AX-GW-MW07-041917	L1712362-01
AX-GW-DUP02-041917	L1712362-02
AX-GW-MW07B-041917	L1712362-03
AX-GW-MW16S-041917	L1712362-04
AX-GW-MW04B-041917	L1712362-05
AX-GW-MW13D-041917	L1712362-06
AX-GW-MW04S-041917	L1712362-07
AX-GW-MW18S-041917	L1712362-08

Results for some initial and continuing calibration standards were included in the laboratory data package because relative response factors (RRFs) and percent differences (%Ds) did not meet WSC-CAM-IIA acceptance criteria[3] or laboratory control limits for several compounds.

- Continuing Calibration Verification (CCV) of April 12, 2017 at 19:22, instrument Jack[4]:
  - Vinyl chloride: 27.1%D (negative bias)
  - Chloroethane: 20.7%D (negative bias)
  - 1,2-dichloroethane: 21.3%D (negative bias)

Due to a negative bias indicated by the CCV result, sample results for the above constituents are estimated (J/UJ), except L1712362-04, -05, and -06 which are marked with estimated concentration (J).

The laboratory conducted a laboratory control sample (LCS) and a LCS duplicate (LCSD) analysis for each analytical batch to verify method accuracy and precision. The relative percent difference (RPD) between LCS and LCSD results were less than 20 and recoveries fell within 70 to 130% of the true value during all LCS and LCSD analyses for all target analytes except for bromoform (64 and 66%R). Bromoform[4] was not detected in any sample and results have been UJ-flagged, because of low LCS and LCSD recoveries.

Surrogate recoveries met laboratory specifications during the VOA of all project samples.

An evaluation of accuracy and precision based on matrix spike (MS) and matrix spike duplicate (MSD) results is not possible, as results of the batch QC analyses were not included in the data package. An evaluation of accuracy and precision was based on results of the LCS and LCSD analyses.

[3] RRF is ≤0.05 and %D ≤20 for all target compounds, except ≤60%D for CAM WSC-CAM-II A Table II A-2 poor performers

[4] L1712362-01 through -08

The criteria for precision were met during the analysis of the field duplicate samples AX-GW-MW07-041917 and AX-GW-DUP02-041917 (L1712362-01 and L1712362-02, respectively) for detected VOC (refer to Attachment B).

Polychlorinated Biphenyls (SW-846 8082)

Groundwater sample detection limits and RLs for PCBs were less than or equal to reporting limit objective of 0.25 µg/L for all undiluted samples.

A method blank was reported for the extraction batch. Target compounds were not detected during the analysis of the method blank.

The laboratory conducted a LCS and LCSD analysis for each extraction batch to verify method accuracy and precision. Recoveries fell within 40 to 140% of the true value and RPDs were less than 20% during the LCS and LCSD analysis of Aroclors 1016 and 1260.

Surrogate recoveries met laboratory specifications (30 to 150%R) during the PCB analysis of all project samples.

An evaluation of accuracy and precision based on matrix spike (MS) and matrix spike duplicate (MSD) results is not possible, as results of the batch QC analyses were not included in the data package. An evaluation of accuracy and precision was based on results of the LCS and LCSD analyses.

The criteria for precision were met during the analysis of the field duplicate samples AX-GW-MW07-041917 and AX-GW-DUP02-041917 (L1712362-01 and L1712362-02, respectively) for detected VOC (refer to Attachment B).

Data Completeness

Completeness is defined as a measure of the amount of data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. The overall completeness goal for individual sampling event is 90 percent. The percent completeness is calculated by summing the number of analytes (e.g. 36 VOC for each sample times 10 groundwater samples equals 360 data points) for all samples by matrix and fraction.

$$Percent\ Completeness = \frac{Number\ of\ valid\ (i.e., non-R\ flagged)\ results}{Number\ of\ possible\ results} * 100$$

The percent completeness for all samples that were collected in April 2017 at the Former Aerovox Facility was calculated to be 100% for each analysis (refer to Table 1).

Conclusion

The analytical data discussed in this report exceeded the project completeness criteria. The data quality objectives have been met for the sample locations investigated.

Table 1. Percent Completeness

Parameter	Analytical Method	Total No. of Samples	No. of Results Per Method	Total No. of Sample Results[1]	No. of Unusable Data Points	Percent Completeness
VOC	SW-846 8260C	7	36	252	0	100%
PCB	SW-846-8082	7	9	63	0	100%

[1]Number of sample results per location, not including field duplicate sample results, unless indicated otherwise

PCB Polychlorinated biphenyls
SM *Standard Methods for the Examination of Water and Wastewater* (APHA, AWWA and WEF)
SW-846 *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* (EPA)
VOC Volatile organic compounds

ATTACHMENT A

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-01 D
Client ID: AX-GW-MW07-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 06:44
Analyst: MM

Date Collected: 04/19/17 09:15
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	800	--	400
1,1-Dichloroethane	ND		ug/l	400	--	400
Chloroform	ND		ug/l	400	--	400
Carbon tetrachloride	ND		ug/l	400	--	400
1,2-Dichloropropane	ND		ug/l	400	--	400
Dibromochloromethane	ND		ug/l	400	--	400
1,1,2-Trichloroethane	ND		ug/l	400	--	400
Tetrachloroethene	ND		ug/l	400	--	400
Chlorobenzene	ND		ug/l	400	--	400
1,2-Dichloroethane	ND	UJ	ug/l	400	--	400
1,1,1-Trichloroethane	ND		ug/l	400	--	400
Bromodichloromethane	ND		ug/l	400	--	400
trans-1,3-Dichloropropene	ND		ug/l	200	--	400
cis-1,3-Dichloropropene	ND		ug/l	200	--	400
1,3-Dichloropropene, Total	ND		ug/l	200	--	400
Bromoform	ND	UJ	ug/l	800	--	400
1,1,2,2-Tetrachloroethane	ND		ug/l	400	--	400
Chloromethane	ND		ug/l	800	--	400
Vinyl chloride	ND	UJ	ug/l	400	--	400
Chloroethane	ND	UJ	ug/l	800	--	400
1,1-Dichloroethene	ND		ug/l	400	--	400
trans-1,2-Dichloroethene	ND		ug/l	400	--	400
Trichloroethene	20000		ug/l	400	--	400
1,2-Dichlorobenzene	ND		ug/l	400	--	400
1,3-Dichlorobenzene	ND		ug/l	400	--	400
1,4-Dichlorobenzene	ND		ug/l	400	--	400
cis-1,2-Dichloroethene	1600		ug/l	400	--	400
1,2-Dichloroethene, Total	1600		ug/l	400	--	400
Dichlorodifluoromethane	ND		ug/l	800	--	400
1,2-Dibromoethane	ND		ug/l	800	--	400

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-01 D Date Collected: 04/19/17 09:15

Client ID: AX-GW-MW07-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	800	--	400
1,1,1,2-Tetrachloroethane	ND		ug/l	400	--	400
o-Chlorotoluene	ND		ug/l	800	--	400
p-Chlorotoluene	ND		ug/l	800	--	400
Hexachlorobutadiene	ND		ug/l	240	--	400
1,2,4-Trichlorobenzene	ND		ug/l	800	--	400

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	105		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-02 D
Client ID: AX-GW-DUP02-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 19:19
Analyst: KD

Date Collected: 04/19/17 00:00
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	500	--	250
1,1-Dichloroethane	ND		ug/l	250	--	250
Chloroform	ND		ug/l	250	--	250
Carbon tetrachloride	ND		ug/l	250	--	250
1,2-Dichloropropane	ND		ug/l	250	--	250
Dibromochloromethane	ND		ug/l	250	--	250
1,1,2-Trichloroethane	ND		ug/l	250	--	250
Tetrachloroethene	ND		ug/l	250	--	250
Chlorobenzene	ND		ug/l	250	--	250
1,2-Dichloroethane	ND	UJ	ug/l	250	--	250
1,1,1-Trichloroethane	ND		ug/l	250	--	250
Bromodichloromethane	ND		ug/l	250	--	250
trans-1,3-Dichloropropene	ND		ug/l	120	--	250
cis-1,3-Dichloropropene	ND		ug/l	120	--	250
1,3-Dichloropropene, Total	ND		ug/l	120	--	250
Bromoform	ND	UJ	ug/l	500	--	250
1,1,2,2-Tetrachloroethane	ND		ug/l	250	--	250
Chloromethane	ND		ug/l	500	--	250
Vinyl chloride	ND	UJ	ug/l	250	--	250
Chloroethane	ND	UJ	ug/l	500	--	250
1,1-Dichloroethene	ND		ug/l	250	--	250
trans-1,2-Dichloroethene	ND		ug/l	250	--	250
Trichloroethene	18000		ug/l	250	--	250
1,2-Dichlorobenzene	ND		ug/l	250	--	250
1,3-Dichlorobenzene	ND		ug/l	250	--	250
1,4-Dichlorobenzene	ND		ug/l	250	--	250
cis-1,2-Dichloroethene	1500		ug/l	250	--	250
1,2-Dichloroethene, Total	1500		ug/l	250	--	250
Dichlorodifluoromethane	ND		ug/l	500	--	250
1,2-Dibromoethane	ND		ug/l	500	--	250

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-02 D Date Collected: 04/19/17 00:00

Client ID: AX-GW-DUP02-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	500	--	250
1,1,1,2-Tetrachloroethane	ND		ug/l	250	--	250
o-Chlorotoluene	ND		ug/l	500	--	250
p-Chlorotoluene	ND		ug/l	500	--	250
Hexachlorobutadiene	ND		ug/l	150	--	250
1,2,4-Trichlorobenzene	ND		ug/l	500	--	250

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	106		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-03 D
Client ID: AX-GW-MW07B-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 19:50
Analyst: KD

Date Collected: 04/19/17 10:30
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	400	--	200
1,1-Dichloroethane	ND		ug/l	200	--	200
Chloroform	ND		ug/l	200	--	200
Carbon tetrachloride	ND		ug/l	200	--	200
1,2-Dichloropropane	ND		ug/l	200	--	200
Dibromochloromethane	ND		ug/l	200	--	200
1,1,2-Trichloroethane	ND		ug/l	200	--	200
Tetrachloroethene	ND		ug/l	200	--	200
Chlorobenzene	ND		ug/l	200	--	200
1,2-Dichloroethane	ND	UJ	ug/l	200	--	200
1,1,1-Trichloroethane	ND		ug/l	200	--	200
Bromodichloromethane	ND		ug/l	200	--	200
trans-1,3-Dichloropropene	ND		ug/l	100	--	200
cis-1,3-Dichloropropene	ND		ug/l	100	--	200
1,3-Dichloropropene, Total	ND		ug/l	100	--	200
Bromoform	ND	UJ	ug/l	400	--	200
1,1,2,2-Tetrachloroethane	ND		ug/l	200	--	200
Chloromethane	ND		ug/l	400	--	200
Vinyl chloride	ND	UJ	ug/l	200	--	200
Chloroethane	ND	UJ	ug/l	400	--	200
1,1-Dichloroethene	ND		ug/l	200	--	200
trans-1,2-Dichloroethene	ND		ug/l	200	--	200
Trichloroethene	12000		ug/l	200	--	200
1,2-Dichlorobenzene	ND		ug/l	200	--	200
1,3-Dichlorobenzene	ND		ug/l	200	--	200
1,4-Dichlorobenzene	ND		ug/l	200	--	200
cis-1,2-Dichloroethene	1200		ug/l	200	--	200
1,2-Dichloroethene, Total	1200		ug/l	200	--	200
Dichlorodifluoromethane	ND		ug/l	400	--	200
1,2-Dibromoethane	ND		ug/l	400	--	200

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-03 D Date Collected: 04/19/17 10:30

Client ID: AX-GW-MW07B-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	400	--	200
1,1,1,2-Tetrachloroethane	ND		ug/l	200	--	200
o-Chlorotoluene	ND		ug/l	400	--	200
p-Chlorotoluene	ND		ug/l	400	--	200
Hexachlorobutadiene	ND		ug/l	120	--	200
1,2,4-Trichlorobenzene	ND		ug/l	400	--	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	123		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	109		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-04
Client ID: AX-GW-MW16S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 20:21
Analyst: KD

Date Collected: 04/19/17 13:30
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND	UJ	ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND	UJ	ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	9.9	J	ug/l	1.0	--	1
Chloroethane	ND	UJ	ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	180		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	98		ug/l	1.0	--	1
1,2-Dichloroethene, Total	98		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-04 Date Collected: 04/19/17 13:30

Client ID: AX-GW-MW16S-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	122		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-05
Client ID: AX-GW-MW04B-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 20:53
Analyst: KD

Date Collected: 04/19/17 10:20
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	3.1		ug/l	1.0	--	1
Chloroform	7.9		ug/l	1.0	--	1
Carbon tetrachloride	1.1		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	1.2		ug/l	1.0	--	1
Tetrachloroethene	36		ug/l	1.0	--	1
Chlorobenzene	2.2		ug/l	1.0	--	1
1,2-Dichloroethane	3.9	J	ug/l	1.0	--	1
1,1,1-Trichloroethane	14		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND	UJ	ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	13	J	ug/l	1.0	--	1
Chloroethane	ND	UJ	ug/l	2.0	--	1
1,1-Dichloroethene	8.6		ug/l	1.0	--	1
trans-1,2-Dichloroethene	1.1		ug/l	1.0	--	1
Trichloroethene	4700	E	ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	1.4		ug/l	1.0	--	1
1,4-Dichlorobenzene	4.5		ug/l	1.0	--	1
cis-1,2-Dichloroethene	260	E	ug/l	1.0	--	1
1,2-Dichloroethene, Total	250		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-05 Date Collected: 04/19/17 10:20

Client ID: AX-GW-MW04B-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	10		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	106		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-05 D
Client ID: AX-GW-MW04B-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 07:15
Analyst: MM

Date Collected: 04/19/17 10:20
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Trichloroethene	4200		ug/l	100	--	100
cis-1,2-Dichloroethene	250		ug/l	100	--	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	125		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	109		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-06
Client ID: AX-GW-MW13D-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 05:41
Analyst: MM

Date Collected: 04/19/17 09:15
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	4.1		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND	UJ	ug/l	1.0	--	1
1,1,1-Trichloroethane	2.4		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND	UJ	ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	46	J	ug/l	1.0	--	1
Chloroethane	ND	UJ	ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	24		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	84		ug/l	1.0	--	1
1,2-Dichloroethene, Total	84		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-06 Date Collected: 04/19/17 09:15

Client ID: AX-GW-MW13D-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	109		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-07 D
Client ID: AX-GW-MW04S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 21:56
Analyst: KD

Date Collected: 04/19/17 14:20
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	4.0	--	2
1,1-Dichloroethane	ND		ug/l	2.0	--	2
Chloroform	ND		ug/l	2.0	--	2
Carbon tetrachloride	ND		ug/l	2.0	--	2
1,2-Dichloropropane	ND		ug/l	2.0	--	2
Dibromochloromethane	ND		ug/l	2.0	--	2
1,1,2-Trichloroethane	ND		ug/l	2.0	--	2
Tetrachloroethene	ND		ug/l	2.0	--	2
Chlorobenzene	ND		ug/l	2.0	--	2
1,2-Dichloroethane	ND	UJ	ug/l	2.0	--	2
1,1,1-Trichloroethane	ND		ug/l	2.0	--	2
Bromodichloromethane	ND		ug/l	2.0	--	2
trans-1,3-Dichloropropene	ND		ug/l	1.0	--	2
cis-1,3-Dichloropropene	ND		ug/l	1.0	--	2
1,3-Dichloropropene, Total	ND		ug/l	1.0	--	2
Bromoform	ND	UJ	ug/l	4.0	--	2
1,1,2,2-Tetrachloroethane	ND		ug/l	2.0	--	2
Chloromethane	ND		ug/l	4.0	--	2
Vinyl chloride	ND	UJ	ug/l	2.0	--	2
Chloroethane	ND	UJ	ug/l	4.0	--	2
1,1-Dichloroethene	ND		ug/l	2.0	--	2
trans-1,2-Dichloroethene	ND		ug/l	2.0	--	2
Trichloroethene	180		ug/l	2.0	--	2
1,2-Dichlorobenzene	ND		ug/l	2.0	--	2
1,3-Dichlorobenzene	ND		ug/l	2.0	--	2
1,4-Dichlorobenzene	ND		ug/l	2.0	--	2
cis-1,2-Dichloroethene	110		ug/l	2.0	--	2
1,2-Dichloroethene, Total	110		ug/l	2.0	--	2
Dichlorodifluoromethane	ND		ug/l	4.0	--	2
1,2-Dibromoethane	ND		ug/l	4.0	--	2

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-07 D Date Collected: 04/19/17 14:20

Client ID: AX-GW-MW04S-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	4.0	--	2
1,1,1,2-Tetrachloroethane	ND		ug/l	2.0	--	2
o-Chlorotoluene	ND		ug/l	4.0	--	2
p-Chlorotoluene	ND		ug/l	4.0	--	2
Hexachlorobutadiene	ND		ug/l	1.2	--	2
1,2,4-Trichlorobenzene	ND		ug/l	4.0	--	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-08
Client ID: AX-GW-MW18S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 22:27
Analyst: KD

Date Collected: 04/19/17 13:20
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	1.3		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND	UJ	ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND	UJ	ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND	UJ	ug/l	1.0	--	1
Chloroethane	ND	UJ	ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	77		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	44		ug/l	1.0	--	1
1,2-Dichloroethene, Total	44		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-08 Date Collected: 04/19/17 13:20

Client ID: AX-GW-MW18S-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	124		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-09
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 15:07
Analyst: KD

Date Collected: 04/19/17 00:00
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND	UJ	ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND	UJ	ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND	UJ	ug/l	1.0	--	1
Chloroethane	ND	UJ	ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene, Total	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-09 Date Collected: 04/19/17 00:00

Client ID: TRIP BLANK Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	110		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-01 D
Client ID: AX-GW-MW07-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 15:38
Analyst: JA

Date Collected: 04/19/17 09:15
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	2.50	--	10	A
Aroclor 1221	ND		ug/l	2.50	--	10	A
Aroclor 1232	ND		ug/l	2.50	--	10	A
Aroclor 1242	26.4		ug/l	2.50	--	10	A
Aroclor 1248	ND		ug/l	2.50	--	10	A
Aroclor 1254	ND		ug/l	2.50	--	10	A
Aroclor 1260	ND		ug/l	2.50	--	10	A
Aroclor 1262	ND		ug/l	2.50	--	10	A
Aroclor 1268	ND		ug/l	2.50	--	10	A
PCBs, Total	26.4		ug/l	2.50	--	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-02
Client ID: AX-GW-DUP02-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 13:48
Analyst: HT

Date Collected: 04/19/17 00:00
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	2.50	--	10	A
Aroclor 1221	ND		ug/l	2.50	--	10	A
Aroclor 1232	ND		ug/l	2.50	--	10	A
Aroclor 1242	23.0		ug/l	2.50	--	10	B
Aroclor 1248	ND		ug/l	2.50	--	10	A
Aroclor 1254	ND		ug/l	2.50	--	10	A
Aroclor 1260	ND		ug/l	2.50	--	10	A
Aroclor 1262	ND		ug/l	2.50	--	10	A
Aroclor 1268	ND		ug/l	2.50	--	10	A
PCBs, Total	23.0		ug/l	2.50	--	10	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-03
Client ID: AX-GW-MW07B-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 04:05
Analyst: JA

Date Collected: 04/19/17 10:30
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	B
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	73		30-150	A
Decachlorobiphenyl	69		30-150	A
2,4,5,6-Tetrachloro-m-xylene	78		30-150	B
Decachlorobiphenyl	68		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-04
Client ID: AX-GW-MW16S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 04:19
Analyst: JA

Date Collected: 04/19/17 13:30
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	80		30-150	A
Decachlorobiphenyl	74		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	72		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-05
Client ID: AX-GW-MW04B-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 04:33
Analyst: JA

Date Collected: 04/19/17 10:20
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	1.68		ug/l	0.250	--	1	B
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	1.68		ug/l	0.250	--	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	75		30-150	A
Decachlorobiphenyl	40		30-150	A
2,4,5,6-Tetrachloro-m-xylene	79		30-150	B
Decachlorobiphenyl	40		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-06
Client ID: AX-GW-MW13D-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 04:46
Analyst: JA

Date Collected: 04/19/17 09:15
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	B
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	71		30-150	A
Decachlorobiphenyl	44		30-150	A
2,4,5,6-Tetrachloro-m-xylene	77		30-150	B
Decachlorobiphenyl	43		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-07
Client ID: AX-GW-MW04S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 05:00
Analyst: JA

Date Collected: 04/19/17 14:20
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	78		30-150	A
Decachlorobiphenyl	75		30-150	A
2,4,5,6-Tetrachloro-m-xylene	81		30-150	B
Decachlorobiphenyl	72		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-08
Client ID: AX-GW-MW18S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 05:14
Analyst: JA

Date Collected: 04/19/17 13:20
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	B
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	0.280		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	0.280		ug/l	0.250	--	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	77		30-150	A
Decachlorobiphenyl	72		30-150	A
2,4,5,6-Tetrachloro-m-xylene	85		30-150	B
Decachlorobiphenyl	70		30-150	B

ATTACHMENT B

Evaluation of Field Duplicate Results **Attachment B**

Analyte	AX-GW-MW07-041917 (L1712362-01)	RL	AX-GW-DUP02-041917 (L1712362-02)	RL	Unit	2x Avg. RL	RPD	Absolute difference	Avg RL CL	Action
Trichloroethene	20000	400	18000	250	µg/L	325	11	N/A	N/A	None, RPD ≤ 30%
cis-1,2-Dichloroethene	1600	400	1500	250	µg/L	325	6	N/A	N/A	None, RPD ≤ 30%
1,2-Dichloroethene, total	1600	400	1500	250	µg/L	325	6	N/A	N/A	None, RPD ≤ 30%
Aroclor 1242	26.4	2.5	23	2.5	µg/L	5	14	N/A	N/A	None, RPD ≤ 30%
PCBs, total	26.4	2.5	23	2.5	µg/L	5	14	N/A	N/A	None, RPD ≤ 30%

Note: If the analyte was not detected, then the cell was left blank.
Mg/L – Micrograms per liter
CL – Control Limit
N/A – Not applicable
RL – Reporting Limit
RPD – Relative percent different

Precision is based on either the absolute difference between sample results or RPD. If the sample results are less than or equal to 2x's RL (5x's RL for TSS), then precision is based on the absolute difference between duplicate results. If sample results > 2x's RL (5x's RL for TSS), then precision is evaluated using RPD. J sample results whenever the absolute difference is greater than the criteria below. The table above presents the results for detected analytes only.

Parameter	**Precision Criteria**	**RL CL**
VOC	≤2x Avg RL or ≤30%RPD	2x Avg RL
PCB	≤2x Avg RL or ≤30%RPD	2x Avg RL

To: Judith LeClair
Brown and Caldwell – Andover, MA

CC: Marilyn Wade
Brown and Caldwell – Andover, MA

From: Shakib Ahmed[1]
Brown and Caldwell – Andover, MA

Subject: Data Validation
Alpha Analytical – Westborough, MA
Lab No.: L1712609
Former Aerovox Facility, New Bedford, MA
BC Project No: 149339.007.001

Date: April 28, 2017

On April 20, 2017, Brown and Caldwell (BC) collected 9 groundwater samples at the Former Aerovox Facility in New Bedford, Massachusetts. The groundwater samples were submitted along with a duplicate and trip blank on April 20, 2017 to Alpha Analytical of Westborough, MA for the following analyses:

- *Volatile Organic Compounds (VOC) (SW-846[2] Method 8260C)*
- *Polychlorinated Biphenyls (PCB) (SW-846[2] Method 8082)*

BC reviewed the analytical results reported by the laboratory. The data review was conducted in accordance with the following guidance documents to validate sample results:

- Massachusetts Contingency Plan (MCP) Representativeness Evaluations and Data Usability Assessment (MADEP Policy WSC-07-350)
- Quality Assurance (QA) and Quality Control (QC) Guidelines for the Acquisition and Reporting of Analytical Data in Support of Response Actions Conducted Under the MCP (CAM Protocol WSC – CAM – VII A)
- QA and QC Requirements for SW-846 8260, VOCs by Gas Chromatography/Mass Spectrometry (GC/MS) for the MCP (CAM Protocol WSC-CAM IIA)
- QA and QC Requirements for SW-846 8082, PCBs by Gas Chromatography (GC) for the MCP (CAM Protocol WSC-CAM VA)
- Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses (12/96)

An evaluation of precision was based on laboratory duplicate results. Accuracy was determined from a review of calibration data and spike recoveries. Representativeness was evaluated based

[1] Independent technical reviewer
[2] *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) (EPA)*

on holding time and sample preservation and storage compliance. Blank contamination and reporting limit objective compliance was used to evaluate sensitivity. Validated sample results are presented in Attachment A. Areas of concern with respect to data quality and usability are discussed below. Criteria for acceptability of data were based upon available site information, analytical method requirements, guidance documents, and professional judgment.

The following is a list of the US EPA data qualifiers that are used during the data validation process:

Definition of Validation Flags:

J Associated value is an estimated quantity
UJ Not detected and the associated detection limit is uncertain
U Not present above the associated level; blank contamination exists
R Unusable data

Definition of Laboratory Flags and Abbreviations:

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

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

Q The quality control sample exceeds the associated acceptance criteria

µg/L Micrograms per liter

Data Completeness

All documentation required by the project was included in the data package. There were no discrepancies found in the laboratory data package.

Sample Condition upon Receipt and Holding Times

Alpha Analytical received all sample that were listed on the chain-of-custody (COC) record intact and in good condition on April 20, 2017. All samples were received by the laboratory at a temperature that met CAM Protocols and EPA storage requirements (i.e., ≤6°C). Custody seals were not necessary since laboratory-certified couriers delivered/picked up the bottles and coolers. The laboratory verified that the sample containers provided for the VOCs were preserved. The laboratory also verified the pH of unpreserved samples submitted to the laboratory for the PCBs analysis. According to *Sample Receipt and Container Information* section of the data package, all samples submitted to the laboratory for VOC analyses were received in preserved vials.

All samples were prepared and analyzed within holding times cited in CAM Protocol WSC-CAM-VIIA, Table II of 40 CFR 136, and analytical methods. All sample analyses were performed by the laboratory as requested on the COC records and instructions provided by BC.

Volatile Organic Compounds (SW-846 8260C)

A subset of Massachusetts Contingency Plan compounds was analyzed per the COC record and BC instruction. Reporting limits were greater than CAM Protocol WSC-CAM-IIA reporting limit objectives for one or more target analytes during the analysis of the following samples due to the elevated concentrations of target analytes:

Sample ID	Lab Sample ID
AX-GW-MW33B-042017	L1712609-01
AX-GW-MW10D-042017	L1712609-02
AX-GW-MW32B (100-112)-042017	L1712609-03
AX-GW-MW32B (135-145)-042017	L1712609-04
AX-GW-MW32B (153-163)-042017	L1712609-05
AX-GW-MW34B (60-80)-042017	L1712609-06
AX-GW-MW34B (92-112)-042017	L1712609-07
AX-GW-MW34B (120-130)-042017	L1712609-08
AX-GW-MW34B (170-180)-042017	L1712609-09

Results for some initial and continuing calibration standards were included in the laboratory data package because relative response factors (RRFs) and percent differences (%Ds) did not meet WSC-CAM-IIA acceptance criteria[3] or laboratory control limits for several compounds.

- Continuing Calibration Verification (CCV) of April 26, 2017 at 23:30, instrument Jack[4]:
    - Chloroethane: 20.7%D (negative bias)
    - 1,2-dichloroethane: 21.3%D (negative bias)
    - 1,2,4-trichlorobenzene: 29.9%D (negative bias)
    - Trans-1,2-dichloroethene: 21.3%D (negative bias)
    - Cis-1,2-dichloroethene: 21.7%D (negative bias)
    - Carbon tetrachloride: 20.9%D (negative bias)

Due to a negative bias indicated by the CCV result, all sample results for the above constituents are estimated (J/UJ), except L1712362-01 through -09 for cis-1,2-dichloroethene, which are marked with estimated concentration (J).

The laboratory conducted a laboratory control sample (LCS) and a LCS duplicate (LCSD) analysis for each analytical batch to verify method accuracy and precision. The relative percent difference (RPD) between LCS and LCSD results were less than 20 and recoveries fell within 70 to 130% of the true value during all LCS and LCSD analyses for all target analytes except for bromoform (68 and 59%R). Bromoform[4] was not detected in any sample and results have been UJ-flagged, because of low LCS and LCSD recoveries.

Surrogate recoveries met laboratory specifications during the VOA of all project samples.

An evaluation of accuracy and precision based on matrix spike (MS) and matrix spike duplicate (MSD) results is not possible, as results of the batch QC analyses were not included in the data

[3] RRF is ≤0.05 and %D ≤20 for all target compounds, except ≤60%D for CAM WSC-CAM-II A Table II A-2 poor performers

[4] L1712609-01 through -09

package. An evaluation of accuracy and precision was based on results of the LCS and LCSD analyses.

Polychlorinated Biphenyls (SW-846 8082)

Groundwater sample detection limits and RLs for PCBs were less than or equal to reporting limit objective of 0.25 µg/L for all undiluted samples.

A method blank was reported for the extraction batch. Target compounds were not detected during the analysis of the method blank.

The laboratory conducted a LCS and LCSD analysis for each extraction batch to verify method accuracy and precision. Recoveries fell within 40 to 140% of the true value and RPDs were less than 20% during the LCS and LCSD analysis of Aroclors 1016 and 1260.

Surrogate recoveries met laboratory specifications (30 to 150%R) during the PCB analysis of all project samples.

An evaluation of accuracy and precision based on matrix spike (MS) and matrix spike duplicate (MSD) results is not possible, as results of the batch QC analyses were not included in the data package. An evaluation of accuracy and precision was based on results of the LCS and LCSD analyses.

Data Completeness

Completeness is defined as a measure of the amount of data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. The overall completeness goal for individual sampling event is 90 percent. The percent completeness is calculated by summing the number of analytes (e.g. 36 VOC for each sample times 10 groundwater samples equals 360 data points) for all samples by matrix and fraction.

$$Percent\ Completeness = \frac{Number\ of\ valid\ (i.e., non-R\ flagged)\ results}{Number\ of\ possible\ results} * 100$$

The percent completeness for all samples that were collected in April 2017 at the Former Aerovox Facility was calculated to be 100% for each analysis (refer to Table 1).

Conclusion

The analytical data discussed in this report exceeded the project completeness criteria. The data quality objectives have been met for the sample locations investigated.

Table 1. Percent Completeness

Parameter	Analytical Method	Total No. of Samples	No. of Results Per Method	Total No. of Sample Results[1]	No. of Unusable Data Points	Percent Completeness
VOC	SW-846 8260C	9	36	324	0	100%
PCB	SW-846-8082	9	9	81	0	100%

[1]Number of sample results per location, not including field duplicate sample results, unless indicated otherwise

PCB	Polychlorinated biphenyls
SM	*Standard Methods for the Examination of Water and Wastewater* (APHA, AWWA and WEF)
SW-846	*Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846)* (EPA)
VOC	Volatile organic compounds

ATTACHMENT A

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-01 D
Client ID: AX-GW-MW33B-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 11:56
Analyst: NL

Date Collected: 04/20/17 11:15
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND	UJ	ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	ND		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND	UJ	ug/l	50	--	50
1,1,1-Trichloroethane	ND		ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND		ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND	UJ	ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND		ug/l	100	--	50
Vinyl chloride	ND		ug/l	50	--	50
Chloroethane	ND	UJ	ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND	UJ	ug/l	50	--	50
Trichloroethene	2100		ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	390	J	ug/l	50	--	50
1,2-Dichloroethene, Total	390		ug/l	50	--	50
Dichlorodifluoromethane	ND		ug/l	100	--	50
1,2-Dibromoethane	ND		ug/l	100	--	50

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-01 D Date Collected: 04/20/17 11:15

Client ID: AX-GW-MW33B-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND	UJ	ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	105		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-02 D
Client ID: AX-GW-MW10D-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 12:42
Analyst: NL

Date Collected: 04/20/17 12:20
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND	UJ	ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	ND		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND	UJ	ug/l	50	--	50
1,1,1-Trichloroethane	ND		ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND		ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND	UJ	ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND		ug/l	100	--	50
Vinyl chloride	210		ug/l	50	--	50
Chloroethane	ND	UJ	ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND	UJ	ug/l	50	--	50
Trichloroethene	4600		ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	2000	J	ug/l	50	--	50
1,2-Dichloroethene, Total	2000		ug/l	50	--	50
Dichlorodifluoromethane	ND		ug/l	100	--	50
1,2-Dibromoethane	ND		ug/l	100	--	50

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-02 D
Client ID: AX-GW-MW10D-042017
Sample Location: NEW BEDFORD, MA
Date Collected: 04/20/17 12:20
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND	UJ	ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	110		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-03 D
Client ID: AX-GW-MW32B (100-112)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 13:14
Analyst: NL

Date Collected: 04/20/17 08:50
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND	UJ	ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	ND		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND	UJ	ug/l	50	--	50
1,1,1-Trichloroethane	ND		ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND		ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND	UJ	ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND		ug/l	100	--	50
Vinyl chloride	ND		ug/l	50	--	50
Chloroethane	ND	UJ	ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND		ug/l	50	--	50
Trichloroethene	3600	UJ	ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	88	J	ug/l	50	--	50
1,2-Dichloroethene, Total	88		ug/l	50	--	50
Dichlorodifluoromethane	ND		ug/l	100	--	50
1,2-Dibromoethane	ND		ug/l	100	--	50

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-03 D Date Collected: 04/20/17 08:50

Client ID: AX-GW-MW32B (100-112)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND	UJ	ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	122		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	105		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-04 D
Client ID: AX-GW-MW32B (135-145)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 13:45
Analyst: NL

Date Collected: 04/20/17 09:40
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	200	--	100
1,1-Dichloroethane	ND		ug/l	100	--	100
Chloroform	ND		ug/l	100	--	100
Carbon tetrachloride	ND	UJ	ug/l	100	--	100
1,2-Dichloropropane	ND		ug/l	100	--	100
Dibromochloromethane	ND		ug/l	100	--	100
1,1,2-Trichloroethane	ND		ug/l	100	--	100
Tetrachloroethene	ND		ug/l	100	--	100
Chlorobenzene	ND		ug/l	100	--	100
1,2-Dichloroethane	ND	UJ	ug/l	100	--	100
1,1,1-Trichloroethane	ND		ug/l	100	--	100
Bromodichloromethane	ND		ug/l	100	--	100
trans-1,3-Dichloropropene	ND		ug/l	50	--	100
cis-1,3-Dichloropropene	ND		ug/l	50	--	100
1,3-Dichloropropene, Total	ND		ug/l	50	--	100
Bromoform	ND	UJ	ug/l	200	--	100
1,1,2,2-Tetrachloroethane	ND		ug/l	100	--	100
Chloromethane	ND		ug/l	200	--	100
Vinyl chloride	ND		ug/l	100	--	100
Chloroethane	ND	UJ	ug/l	200	--	100
1,1-Dichloroethene	ND		ug/l	100	--	100
trans-1,2-Dichloroethene	ND	UJ	ug/l	100	--	100
Trichloroethene	5100		ug/l	100	--	100
1,2-Dichlorobenzene	ND		ug/l	100	--	100
1,3-Dichlorobenzene	ND		ug/l	100	--	100
1,4-Dichlorobenzene	ND		ug/l	100	--	100
cis-1,2-Dichloroethene	ND	UJ	ug/l	100	--	100
1,2-Dichloroethene, Total	ND		ug/l	100	--	100
Dichlorodifluoromethane	ND		ug/l	200	--	100
1,2-Dibromoethane	ND		ug/l	200	--	100

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-04 D Date Collected: 04/20/17 09:40

Client ID: AX-GW-MW32B (135-145)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	200	--	100
1,1,1,2-Tetrachloroethane	ND		ug/l	100	--	100
o-Chlorotoluene	ND		ug/l	200	--	100
p-Chlorotoluene	ND		ug/l	200	--	100
Hexachlorobutadiene	ND		ug/l	60	--	100
1,2,4-Trichlorobenzene	ND	UJ	ug/l	200	--	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	106		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-05 D
Client ID: AX-GW-MW32B (153-163)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 15:09
Analyst: NL

Date Collected: 04/20/17 10:40
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND	UJ	ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	ND		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND	UJ	ug/l	50	--	50
1,1,1-Trichloroethane	ND		ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND		ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND	UJ	ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND		ug/l	100	--	50
Vinyl chloride	ND		ug/l	50	--	50
Chloroethane	ND	UJ	ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND	UJ	ug/l	50	--	50
Trichloroethene	2500		ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	50	J	ug/l	50	--	50
1,2-Dichloroethene, Total	50		ug/l	50	--	50
Dichlorodifluoromethane	ND		ug/l	100	--	50
1,2-Dibromoethane	ND		ug/l	100	--	50

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-05 D Date Collected: 04/20/17 10:40

Client ID: AX-GW-MW32B (153-163)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND	UJ	ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	99		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-06 D
Client ID: AX-GW-MW34B (60-80)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 15:34
Analyst: NL

Date Collected: 04/20/17 12:40
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2000	--	1000
1,1-Dichloroethane	ND		ug/l	1000	--	1000
Chloroform	ND		ug/l	1000	--	1000
Carbon tetrachloride	ND	UJ	ug/l	1000	--	1000
1,2-Dichloropropane	ND		ug/l	1000	--	1000
Dibromochloromethane	ND		ug/l	1000	--	1000
1,1,2-Trichloroethane	ND		ug/l	1000	--	1000
Tetrachloroethene	ND		ug/l	1000	--	1000
Chlorobenzene	ND		ug/l	1000	--	1000
1,2-Dichloroethane	ND	UJ	ug/l	1000	--	1000
1,1,1-Trichloroethane	ND		ug/l	1000	--	1000
Bromodichloromethane	ND		ug/l	1000	--	1000
trans-1,3-Dichloropropene	ND		ug/l	500	--	1000
cis-1,3-Dichloropropene	ND		ug/l	500	--	1000
1,3-Dichloropropene, Total	ND		ug/l	500	--	1000
Bromoform	ND	UJ	ug/l	2000	--	1000
1,1,2,2-Tetrachloroethane	ND		ug/l	1000	--	1000
Chloromethane	ND		ug/l	2000	--	1000
Vinyl chloride	ND		ug/l	1000	--	1000
Chloroethane	ND	UJ	ug/l	2000	--	1000
1,1-Dichloroethene	ND		ug/l	1000	--	1000
trans-1,2-Dichloroethene	ND	UJ	ug/l	1000	--	1000
Trichloroethene	80000		ug/l	1000	--	1000
1,2-Dichlorobenzene	ND		ug/l	1000	--	1000
1,3-Dichlorobenzene	ND		ug/l	1000	--	1000
1,4-Dichlorobenzene	ND		ug/l	1000	--	1000
cis-1,2-Dichloroethene	15000	J	ug/l	1000	--	1000
1,2-Dichloroethene, Total	15000		ug/l	1000	--	1000
Dichlorodifluoromethane	ND		ug/l	2000	--	1000
1,2-Dibromoethane	ND		ug/l	2000	--	1000

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-06 D Date Collected: 04/20/17 12:40

Client ID: AX-GW-MW34B (60-80)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2000	--	1000
1,1,1,2-Tetrachloroethane	ND		ug/l	1000	--	1000
o-Chlorotoluene	ND		ug/l	2000	--	1000
p-Chlorotoluene	ND		ug/l	2000	--	1000
Hexachlorobutadiene	ND		ug/l	600	--	1000
1,2,4-Trichlorobenzene	ND	UJ	ug/l	2000	--	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	97		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-07 D
Client ID: AX-GW-MW34B (92-112)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 16:00
Analyst: NL

Date Collected: 04/20/17 13:30
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2000	--	1000
1,1-Dichloroethane	ND		ug/l	1000	--	1000
Chloroform	ND		ug/l	1000	--	1000
Carbon tetrachloride	ND	UJ	ug/l	1000	--	1000
1,2-Dichloropropane	ND		ug/l	1000	--	1000
Dibromochloromethane	ND		ug/l	1000	--	1000
1,1,2-Trichloroethane	ND		ug/l	1000	--	1000
Tetrachloroethene	ND		ug/l	1000	--	1000
Chlorobenzene	ND		ug/l	1000	--	1000
1,2-Dichloroethane	ND	UJ	ug/l	1000	--	1000
1,1,1-Trichloroethane	ND		ug/l	1000	--	1000
Bromodichloromethane	ND		ug/l	1000	--	1000
trans-1,3-Dichloropropene	ND		ug/l	500	--	1000
cis-1,3-Dichloropropene	ND		ug/l	500	--	1000
1,3-Dichloropropene, Total	ND		ug/l	500	--	1000
Bromoform	ND	UJ	ug/l	2000	--	1000
1,1,2,2-Tetrachloroethane	ND		ug/l	1000	--	1000
Chloromethane	ND		ug/l	2000	--	1000
Vinyl chloride	ND		ug/l	1000	--	1000
Chloroethane	ND	UJ	ug/l	2000	--	1000
1,1-Dichloroethene	ND		ug/l	1000	--	1000
trans-1,2-Dichloroethene	ND	UJ	ug/l	1000	--	1000
Trichloroethene	100000		ug/l	1000	--	1000
1,2-Dichlorobenzene	ND		ug/l	1000	--	1000
1,3-Dichlorobenzene	ND		ug/l	1000	--	1000
1,4-Dichlorobenzene	ND		ug/l	1000	--	1000
cis-1,2-Dichloroethene	16000	J	ug/l	1000	--	1000
1,2-Dichloroethene, Total	16000		ug/l	1000	--	1000
Dichlorodifluoromethane	ND		ug/l	2000	--	1000
1,2-Dibromoethane	ND		ug/l	2000	--	1000

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-07 D Date Collected: 04/20/17 13:30

Client ID: AX-GW-MW34B (92-112)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2000	--	1000
1,1,1,2-Tetrachloroethane	ND		ug/l	1000	--	1000
o-Chlorotoluene	ND		ug/l	2000	--	1000
p-Chlorotoluene	ND		ug/l	2000	--	1000
Hexachlorobutadiene	ND		ug/l	600	--	1000
1,2,4-Trichlorobenzene	ND	UJ	ug/l	2000	--	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	101		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-08 D
Client ID: AX-GW-MW34B (120-130)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 16:25
Analyst: NL

Date Collected: 04/20/17 14:25
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	4000	--	2000
1,1-Dichloroethane	ND		ug/l	2000	--	2000
Chloroform	ND		ug/l	2000	--	2000
Carbon tetrachloride	ND	UJ	ug/l	2000	--	2000
1,2-Dichloropropane	ND		ug/l	2000	--	2000
Dibromochloromethane	ND		ug/l	2000	--	2000
1,1,2-Trichloroethane	ND		ug/l	2000	--	2000
Tetrachloroethene	ND		ug/l	2000	--	2000
Chlorobenzene	ND		ug/l	2000	--	2000
1,2-Dichloroethane	ND	UJ	ug/l	2000	--	2000
1,1,1-Trichloroethane	ND		ug/l	2000	--	2000
Bromodichloromethane	ND		ug/l	2000	--	2000
trans-1,3-Dichloropropene	ND		ug/l	1000	--	2000
cis-1,3-Dichloropropene	ND		ug/l	1000	--	2000
1,3-Dichloropropene, Total	ND		ug/l	1000	--	2000
Bromoform	ND	UJ	ug/l	4000	--	2000
1,1,2,2-Tetrachloroethane	ND		ug/l	2000	--	2000
Chloromethane	ND		ug/l	4000	--	2000
Vinyl chloride	ND		ug/l	2000	--	2000
Chloroethane	ND	UJ	ug/l	4000	--	2000
1,1-Dichloroethene	ND		ug/l	2000	--	2000
trans-1,2-Dichloroethene	ND	UJ	ug/l	2000	--	2000
Trichloroethene	70000		ug/l	2000	--	2000
1,2-Dichlorobenzene	ND		ug/l	2000	--	2000
1,3-Dichlorobenzene	ND		ug/l	2000	--	2000
1,4-Dichlorobenzene	ND		ug/l	2000	--	2000
cis-1,2-Dichloroethene	36000	J	ug/l	2000	--	2000
1,2-Dichloroethene, Total	36000		ug/l	2000	--	2000
Dichlorodifluoromethane	ND		ug/l	4000	--	2000
1,2-Dibromoethane	ND		ug/l	4000	--	2000

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-08 D Date Collected: 04/20/17 14:25

Client ID: AX-GW-MW34B (120-130)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	4000	--	2000
1,1,1,2-Tetrachloroethane	ND		ug/l	2000	--	2000
o-Chlorotoluene	ND		ug/l	4000	--	2000
p-Chlorotoluene	ND		ug/l	4000	--	2000
Hexachlorobutadiene	ND		ug/l	1200	--	2000
1,2,4-Trichlorobenzene	ND	UJ	ug/l	4000	--	2000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	100		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-09 D2
Client ID: AX-GW-MW34B (170-180)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/28/17 08:59
Analyst: MM

Date Collected: 04/20/17 15:15
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Trichloroethene	3800000		ug/l	50000	--	50000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	109		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-09 D
Client ID: AX-GW-MW34B (170-180)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 16:50
Analyst: MM

Date Collected: 04/20/17 15:15
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	4000	--	2000
1,1-Dichloroethane	ND		ug/l	2000	--	2000
Chloroform	ND		ug/l	2000	--	2000
Carbon tetrachloride	ND	UJ	ug/l	2000	--	2000
1,2-Dichloropropane	ND		ug/l	2000	--	2000
Dibromochloromethane	ND		ug/l	2000	--	2000
1,1,2-Trichloroethane	ND		ug/l	2000	--	2000
Tetrachloroethene	ND		ug/l	2000	--	2000
Chlorobenzene	ND		ug/l	2000	--	2000
1,2-Dichloroethane	ND	UJ	ug/l	2000	--	2000
1,1,1-Trichloroethane	ND		ug/l	2000	--	2000
Bromodichloromethane	ND		ug/l	2000	--	2000
trans-1,3-Dichloropropene	ND		ug/l	1000	--	2000
cis-1,3-Dichloropropene	ND		ug/l	1000	--	2000
1,3-Dichloropropene, Total	ND		ug/l	1000	--	2000
Bromoform	ND	UJ	ug/l	4000	--	2000
1,1,2,2-Tetrachloroethane	ND		ug/l	2000	--	2000
Chloromethane	ND		ug/l	4000	--	2000
Vinyl chloride	ND		ug/l	2000	--	2000
Chloroethane	ND	UJ	ug/l	4000	--	2000
1,1-Dichloroethene	ND		ug/l	2000	--	2000
trans-1,2-Dichloroethene	ND	UJ	ug/l	2000	--	2000
Trichloroethene	420000	E	ug/l	2000	--	2000
1,2-Dichlorobenzene	ND		ug/l	2000	--	2000
1,3-Dichlorobenzene	ND		ug/l	2000	--	2000
1,4-Dichlorobenzene	ND		ug/l	2000	--	2000
cis-1,2-Dichloroethene	13000	J	ug/l	2000	--	2000
1,2-Dichloroethene, Total	13000		ug/l	2000	--	2000
Dichlorodifluoromethane	ND		ug/l	4000	--	2000
1,2-Dibromoethane	ND		ug/l	4000	--	2000

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-09 D Date Collected: 04/20/17 15:15

Client ID: AX-GW-MW34B (170-180)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	4000	--	2000
1,1,1,2-Tetrachloroethane	ND		ug/l	2000	--	2000
o-Chlorotoluene	ND		ug/l	4000	--	2000
p-Chlorotoluene	ND		ug/l	4000	--	2000
Hexachlorobutadiene	ND		ug/l	1200	--	2000
1,2,4-Trichlorobenzene	ND	UJ	ug/l	4000	--	2000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	101		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-10
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 14:44
Analyst: NL

Date Collected: 04/14/17 00:00
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND	UJ	ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND	UJ	ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND	UJ	ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND	UJ	ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND	UJ	ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND	UJ	ug/l	1.0	--	1
1,2-Dichloroethene, Total	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-10
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Date Collected: 04/14/17 00:00
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND	UJ	ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	96		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-01
Client ID: AX-GW-MW33B-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 00:38
Analyst: AF

Date Collected: 04/20/17 11:15
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	91		30-150	A
Decachlorobiphenyl	56		30-150	A
2,4,5,6-Tetrachloro-m-xylene	89		30-150	B
Decachlorobiphenyl	39		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-02 D
Client ID: AX-GW-MW10D-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 22:27
Analyst: JW

Date Collected: 04/20/17 12:20
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	2.50	--	10	A
Aroclor 1221	ND		ug/l	2.50	--	10	A
Aroclor 1232	ND		ug/l	2.50	--	10	A
Aroclor 1242	29.3		ug/l	2.50	--	10	B
Aroclor 1248	ND		ug/l	2.50	--	10	A
Aroclor 1254	ND		ug/l	2.50	--	10	A
Aroclor 1260	ND		ug/l	2.50	--	10	A
Aroclor 1262	ND		ug/l	2.50	--	10	A
Aroclor 1268	ND		ug/l	2.50	--	10	A
PCBs, Total	29.3		ug/l	2.50	--	10	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-03
Client ID: AX-GW-MW32B (100-112)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:05
Analyst: AF

Date Collected: 04/20/17 08:50
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	88		30-150	A
Decachlorobiphenyl	63		30-150	A
2,4,5,6-Tetrachloro-m-xylene	88		30-150	B
Decachlorobiphenyl	43		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-04
Client ID: AX-GW-MW32B (135-145)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:18
Analyst: AF

Date Collected: 04/20/17 09:40
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	62		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	43		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-05
Client ID: AX-GW-MW32B (153-163)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:32
Analyst: AF

Date Collected: 04/20/17 10:40
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	65		30-150	A
2,4,5,6-Tetrachloro-m-xylene	89		30-150	B
Decachlorobiphenyl	49		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-06
Client ID: AX-GW-MW34B (60-80)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:45
Analyst: AF

Date Collected: 04/20/17 12:40
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	66		30-150	A
2,4,5,6-Tetrachloro-m-xylene	92		30-150	B
Decachlorobiphenyl	52		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-07
Client ID: AX-GW-MW34B (92-112)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:59
Analyst: AF

Date Collected: 04/20/17 13:30
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	88		30-150	A
Decachlorobiphenyl	73		30-150	A
2,4,5,6-Tetrachloro-m-xylene	97		30-150	B
Decachlorobiphenyl	56		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-08
Client ID: AX-GW-MW34B (120-130)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 02:12
Analyst: AF

Date Collected: 04/20/17 14:25
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	80		30-150	A
Decachlorobiphenyl	65		30-150	A
2,4,5,6-Tetrachloro-m-xylene	90		30-150	B
Decachlorobiphenyl	51		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-09
Client ID: AX-GW-MW34B (170-180)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 02:26
Analyst: AF

Date Collected: 04/20/17 15:15
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	94		30-150	A
Decachlorobiphenyl	65		30-150	A
2,4,5,6-Tetrachloro-m-xylene	88		30-150	B
Decachlorobiphenyl	50		30-150	B

ANALYTICAL REPORT

Lab Number:	L1708425
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	AEROVOX
Project Number:	149339.007
Report Date:	03/23/17

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

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

Project Name: AEROVOX
Project Number: 149339.007

Lab Number: L1708425
Report Date: 03/23/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1708425-01	MW-15D	GROUNDWATER	NEW BEDFORD, MA	03/21/17 11:55	03/21/17

Project Name:	AEROVOX	**Lab Number:**	L1708425
Project Number:	149339.007	**Report Date:**	03/23/17

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name: AEROVOX
Project Number: 149339.007

Lab Number: L1708425
Report Date: 03/23/17

Case Narrative

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

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

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

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

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

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

Project Name:	AEROVOX	**Lab Number:**	L1708425
Project Number:	149339.007	**Report Date:**	03/23/17

Case Narrative (continued)

MCP Related Narratives

PCBs

L1708425-01 contains peaks which match the retention times for Aroclor 1242, but do not match the area ratios typical for this aroclor. The result for Aroclor 1242 is reported as "weathered".

In reference to question G:

L1708425-01: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

L1708425-01: The surrogate recoveries are below the acceptance criteria for 2,4,5,6-tetrachloro-m-xylene (0%) and decachlorobiphenyl (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

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

Authorized Signature: Melissa Cripps Melissa Cripps

Title: Technical Director/Representative Date: 03/23/17

ORGANICS

PCBS

Project Name: AEROVOX
Project Number: 149339.007
Lab Number: L1708425
Report Date: 03/23/17

SAMPLE RESULTS

Lab ID: L1708425-01 D
Client ID: MW-15D
Sample Location: NEW BEDFORD, MA
Matrix: Groundwater
Analytical Method: 97,8082A
Analytical Date: 03/23/17 02:15
Analyst: JW

Date Collected: 03/21/17 11:55
Date Received: 03/21/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 03/22/17 00:49
Cleanup Method: EPA 3665A
Cleanup Date: 03/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 03/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	5.00	--	20	A
Aroclor 1221	ND		ug/l	5.00	--	20	A
Aroclor 1232	ND		ug/l	5.00	--	20	A
Aroclor 1242	71.6		ug/l	5.00	--	20	A
Aroclor 1248	ND		ug/l	5.00	--	20	A
Aroclor 1254	ND		ug/l	5.00	--	20	A
Aroclor 1260	ND		ug/l	5.00	--	20	A
Aroclor 1262	ND		ug/l	5.00	--	20	A
Aroclor 1268	ND		ug/l	5.00	--	20	A
PCBs, Total	71.6		ug/l	5.00	--	20	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: AEROVOX
Project Number: 149339.007

Lab Number: L1708425
Report Date: 03/23/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 03/22/17 09:32
Analyst: HT

Extraction Method: EPA 3510C
Extraction Date: 03/22/17 00:49
Cleanup Method: EPA 3665A
Cleanup Date: 03/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 03/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01 Batch: WG987125-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	91		30-150	A
Decachlorobiphenyl	73		30-150	A
2,4,5,6-Tetrachloro-m-xylene	78		30-150	B
Decachlorobiphenyl	50		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007

Lab Number: L1708425

Report Date: 03/23/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01 Batch: WG987125-2 WG987125-3									
Aroclor 1016	83		88		40-140	5		20	A
Aroclor 1260	85		91		40-140	7		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	84		89		30-150	A
Decachlorobiphenyl	91		99		30-150	A
2,4,5,6-Tetrachloro-m-xylene	78		87		30-150	B
Decachlorobiphenyl	71		75		30-150	B

Project Name: AEROVOX
Project Number: 149339.007

Lab Number: L1708425
Report Date: 03/23/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1708425-01A	Amber 1000ml unpreserved	A	7	2.8	Y	Absent	MCP-8082-10(365)
L1708425-01B	Amber 1000ml unpreserved	A	7	2.8	Y	Absent	MCP-8082-10(365)

*Values in parentheses indicate holding time in days

Project Name:	AEROVOX	**Lab Number:**	L1708425
Project Number:	149339.007	**Report Date:**	03/23/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	AEROVOX	**Lab Number:**	L1708425
Project Number:	149339.007	**Report Date:**	03/23/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	AEROVOX	**Lab Number:**	L1708425
Project Number:	149339.007	**Report Date:**	03/23/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE_____ OF _____

Date Rec'd in Lab: 3/21/17

ALPHA Job #: 21708425

ALPHA ANALYTICAL
8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Project Information

Project Name: Aerovox

Project Location: New Bedford, MA

Project #: 149339.007

Project Manager: M. Wade

ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: Brown and Caldwell

Address: One Tech Drive
Suite 310 Andover, MA

Phone:

Email: mwade@brwncald.com

Regulatory Requirements & Project Information Requirements

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

Turn-Around Time

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

Date Due: 48 hour TAT

Additional Project Information:

2 empty bottles are being sent back; only one sample collected.

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☑ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

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

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	☑ PCB	Sample Comments
08425-01	MW-15D	3/21/17	1155	GW	ZM/JL	X	PCBs anticipated to be 40-70 ppm based on historic data

Container Type: A

Preservative: A

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	3/21/17 1240	[signature] AAL	3/21/17 1248
[signature]	3/21/17 14:40	[signature]	3/21/17 1440

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

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

ANALYTICAL REPORT

Lab Number:	L1712214
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	AEROVOX
Project Number:	149339.007.001
Report Date:	04/27/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

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

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

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1712214-01	AX-GW-MW02A-041817	WATER	NEW BEDFORD, MA	04/18/17 11:30	04/18/17
L1712214-02	AX-GW-MW02B-041817	WATER	NEW BEDFORD, MA	04/18/17 09:20	04/18/17
L1712214-03	AX-GW-MW02-041817	WATER	NEW BEDFORD, MA	04/18/17 10:25	04/18/17
L1712214-04	AX-GW-MW17D-041817	WATER	NEW BEDFORD, MA	04/18/17 14:20	04/18/17
L1712214-05	AX-GW-MW17B-041817	WATER	NEW BEDFORD, MA	04/18/17 15:20	04/18/17
L1712214-06	AX-GW-MW06A-041817	WATER	NEW BEDFORD, MA	04/18/17 11:15	04/18/17
L1712214-07	AX-GW-MW06B-041817	WATER	NEW BEDFORD, MA	04/18/17 12:00	04/18/17
L1712214-08	AX-GW-MW06-041817	WATER	NEW BEDFORD, MA	04/18/17 10:00	04/18/17
L1712214-09	AX-GW-DUP01-041817	WATER	NEW BEDFORD, MA	04/18/17 00:00	04/18/17
L1712214-10	AX-GW-MW19D-041817	WATER	NEW BEDFORD, MA	04/18/17 14:40	04/18/17
L1712214-11	TRIP BLANK	WATER	NEW BEDFORD, MA	04/18/17 00:00	04/18/17

Project Name:	AEROVOX	**Lab Number:**	L1712214
Project Number:	149339.007.001	**Report Date:**	04/27/17

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Case Narrative

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

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

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

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

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

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

Project Name:	AEROVOX	**Lab Number:**	L1712214
Project Number:	149339.007.001	**Report Date:**	04/27/17

Case Narrative (continued)

MCP Related Narratives

Volatile Organics

In reference to question G:

L1712214-02 through -05 and -07 through -10: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

The continuing calibration standards, associated with L1712214-01 through -11, are outside the acceptance criteria for several compounds; however, they are within overall method allowances. Copies of the continuing calibration standards are included as an addendum to this report.

In reference to question I:

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

PCBs

L1712214-01 through -05 and -07 through -10 contain peaks which match the retention times for Aroclor 1242, but do not match the area ratios typical for this aroclor. The results for Aroclor 1242 are reported as "weathered".

In reference to question G:

L1712214-01 through -05 and -07 through -10: One or more of the target analytes did not achieve the requested CAM reporting limits.

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

Authorized Signature: Cristin Walker

Title: Technical Director/Representative Date: 04/27/17

ORGANICS

VOLATILES

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-01
Client ID: AX-GW-MW02A-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 20:37
Analyst: BD

Date Collected: 04/18/17 11:30
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	20		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	6.1		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	5.8		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	2.7		ug/l	1.0	--	1
1,4-Dichlorobenzene	4.6		ug/l	1.0	--	1
cis-1,2-Dichloroethene	10		ug/l	1.0	--	1
1,2-Dichloroethene, Total	10		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-01 Date Collected: 04/18/17 11:30

Client ID: AX-GW-MW02A-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	84		70-130
Dibromofluoromethane	102		70-130

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-02 D
Client ID: AX-GW-MW02B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 21:10
Analyst: BD

Date Collected: 04/18/17 09:20
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	50	--	25
1,1-Dichloroethane	ND		ug/l	25	--	25
Chloroform	ND		ug/l	25	--	25
Carbon tetrachloride	ND		ug/l	25	--	25
1,2-Dichloropropane	ND		ug/l	25	--	25
Dibromochloromethane	ND		ug/l	25	--	25
1,1,2-Trichloroethane	ND		ug/l	25	--	25
Tetrachloroethene	67		ug/l	25	--	25
Chlorobenzene	ND		ug/l	25	--	25
1,2-Dichloroethane	ND		ug/l	25	--	25
1,1,1-Trichloroethane	ND		ug/l	25	--	25
Bromodichloromethane	ND		ug/l	25	--	25
trans-1,3-Dichloropropene	ND		ug/l	12	--	25
cis-1,3-Dichloropropene	ND		ug/l	12	--	25
1,3-Dichloropropene, Total	ND		ug/l	12	--	25
Bromoform	ND		ug/l	50	--	25
1,1,2,2-Tetrachloroethane	ND		ug/l	25	--	25
Chloromethane	ND		ug/l	50	--	25
Vinyl chloride	200		ug/l	25	--	25
Chloroethane	ND		ug/l	50	--	25
1,1-Dichloroethene	ND		ug/l	25	--	25
trans-1,2-Dichloroethene	72		ug/l	25	--	25
Trichloroethene	2900		ug/l	25	--	25
1,2-Dichlorobenzene	ND		ug/l	25	--	25
1,3-Dichlorobenzene	ND		ug/l	25	--	25
1,4-Dichlorobenzene	ND		ug/l	25	--	25
cis-1,2-Dichloroethene	2300		ug/l	25	--	25
1,2-Dichloroethene, Total	2400		ug/l	25	--	25
Dichlorodifluoromethane	ND		ug/l	50	--	25
1,2-Dibromoethane	ND		ug/l	50	--	25

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-02 D Date Collected: 04/18/17 09:20

Client ID: AX-GW-MW02B-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	50	--	25
1,1,1,2-Tetrachloroethane	ND		ug/l	25	--	25
o-Chlorotoluene	ND		ug/l	50	--	25
p-Chlorotoluene	ND		ug/l	50	--	25
Hexachlorobutadiene	ND		ug/l	15	--	25
1,2,4-Trichlorobenzene	ND		ug/l	50	--	25

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	84		70-130
Dibromofluoromethane	100		70-130

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-03 D
Client ID: AX-GW-MW02-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 06:49
Analyst: MM

Date Collected: 04/18/17 10:25
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	10	--	5
1,1-Dichloroethane	ND		ug/l	5.0	--	5
Chloroform	ND		ug/l	5.0	--	5
Carbon tetrachloride	ND		ug/l	5.0	--	5
1,2-Dichloropropane	ND		ug/l	5.0	--	5
Dibromochloromethane	ND		ug/l	5.0	--	5
1,1,2-Trichloroethane	ND		ug/l	5.0	--	5
Tetrachloroethene	ND		ug/l	5.0	--	5
Chlorobenzene	880		ug/l	5.0	--	5
1,2-Dichloroethane	ND		ug/l	5.0	--	5
1,1,1-Trichloroethane	ND		ug/l	5.0	--	5
Bromodichloromethane	ND		ug/l	5.0	--	5
trans-1,3-Dichloropropene	ND		ug/l	2.5	--	5
cis-1,3-Dichloropropene	ND		ug/l	2.5	--	5
1,3-Dichloropropene, Total	ND		ug/l	2.5	--	5
Bromoform	ND		ug/l	10	--	5
1,1,2,2-Tetrachloroethane	ND		ug/l	5.0	--	5
Chloromethane	ND		ug/l	10	--	5
Vinyl chloride	ND		ug/l	5.0	--	5
Chloroethane	ND		ug/l	10	--	5
1,1-Dichloroethene	ND		ug/l	5.0	--	5
trans-1,2-Dichloroethene	ND		ug/l	5.0	--	5
Trichloroethene	ND		ug/l	5.0	--	5
1,2-Dichlorobenzene	9.6		ug/l	5.0	--	5
1,3-Dichlorobenzene	71		ug/l	5.0	--	5
1,4-Dichlorobenzene	120		ug/l	5.0	--	5
cis-1,2-Dichloroethene	ND		ug/l	5.0	--	5
1,2-Dichloroethene, Total	ND		ug/l	5.0	--	5
Dichlorodifluoromethane	ND		ug/l	10	--	5
1,2-Dibromoethane	ND		ug/l	10	--	5

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-03 D Date Collected: 04/18/17 10:25

Client ID: AX-GW-MW02-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	10	--	5
1,1,1,2-Tetrachloroethane	ND		ug/l	5.0	--	5
o-Chlorotoluene	ND		ug/l	10	--	5
p-Chlorotoluene	ND		ug/l	10	--	5
Hexachlorobutadiene	ND		ug/l	3.0	--	5
1,2,4-Trichlorobenzene	ND		ug/l	10	--	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	103		70-130
4-Bromofluorobenzene	89		70-130
Dibromofluoromethane	107		70-130

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-04 D
Client ID: AX-GW-MW17D-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 21:43
Analyst: BD

Date Collected: 04/18/17 14:20
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND		ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	64		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND		ug/l	50	--	50
1,1,1-Trichloroethane	ND		ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND		ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND		ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND		ug/l	100	--	50
Vinyl chloride	180		ug/l	50	--	50
Chloroethane	ND		ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND		ug/l	50	--	50
Trichloroethene	4400		ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	1800		ug/l	50	--	50
1,2-Dichloroethene, Total	1800		ug/l	50	--	50
Dichlorodifluoromethane	ND		ug/l	100	--	50
1,2-Dibromoethane	ND		ug/l	100	--	50

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-04 D Date Collected: 04/18/17 14:20

Client ID: AX-GW-MW17D-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND		ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	91		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	80		70-130
Dibromofluoromethane	93		70-130

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-05 D
Client ID: AX-GW-MW17B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 22:17
Analyst: BD

Date Collected: 04/18/17 15:20
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	40	--	20
1,1-Dichloroethane	ND		ug/l	20	--	20
Chloroform	ND		ug/l	20	--	20
Carbon tetrachloride	ND		ug/l	20	--	20
1,2-Dichloropropane	ND		ug/l	20	--	20
Dibromochloromethane	ND		ug/l	20	--	20
1,1,2-Trichloroethane	ND		ug/l	20	--	20
Tetrachloroethene	40		ug/l	20	--	20
Chlorobenzene	ND		ug/l	20	--	20
1,2-Dichloroethane	ND		ug/l	20	--	20
1,1,1-Trichloroethane	ND		ug/l	20	--	20
Bromodichloromethane	ND		ug/l	20	--	20
trans-1,3-Dichloropropene	ND		ug/l	10	--	20
cis-1,3-Dichloropropene	ND		ug/l	10	--	20
1,3-Dichloropropene, Total	ND		ug/l	10	--	20
Bromoform	ND		ug/l	40	--	20
1,1,2,2-Tetrachloroethane	ND		ug/l	20	--	20
Chloromethane	ND		ug/l	40	--	20
Vinyl chloride	180		ug/l	20	--	20
Chloroethane	ND		ug/l	40	--	20
1,1-Dichloroethene	ND		ug/l	20	--	20
trans-1,2-Dichloroethene	42		ug/l	20	--	20
Trichloroethene	2500		ug/l	20	--	20
1,2-Dichlorobenzene	ND		ug/l	20	--	20
1,3-Dichlorobenzene	ND		ug/l	20	--	20
1,4-Dichlorobenzene	ND		ug/l	20	--	20
cis-1,2-Dichloroethene	2400		ug/l	20	--	20
1,2-Dichloroethene, Total	2400		ug/l	20	--	20
Dichlorodifluoromethane	ND		ug/l	40	--	20
1,2-Dibromoethane	ND		ug/l	40	--	20

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-05 D Date Collected: 04/18/17 15:20

Client ID: AX-GW-MW17B-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	40	--	20
1,1,1,2-Tetrachloroethane	ND		ug/l	20	--	20
o-Chlorotoluene	ND		ug/l	40	--	20
p-Chlorotoluene	ND		ug/l	40	--	20
Hexachlorobutadiene	ND		ug/l	12	--	20
1,2,4-Trichlorobenzene	ND		ug/l	40	--	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	83		70-130
Dibromofluoromethane	94		70-130

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-06
Client ID: AX-GW-MW06A-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 22:50
Analyst: BD

Date Collected: 04/18/17 11:15
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	3.1		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	36		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	6.5		ug/l	1.0	--	1
1,2-Dichloroethene, Total	6.5		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-06 Date Collected: 04/18/17 11:15

Client ID: AX-GW-MW06A-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	95		70-130
Toluene-d8	107		70-130
4-Bromofluorobenzene	85		70-130
Dibromofluoromethane	98		70-130

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-07 D
Client ID: AX-GW-MW06B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 23:23
Analyst: BD

Date Collected: 04/18/17 12:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	400	--	200
1,1-Dichloroethane	ND		ug/l	200	--	200
Chloroform	ND		ug/l	200	--	200
Carbon tetrachloride	ND		ug/l	200	--	200
1,2-Dichloropropane	ND		ug/l	200	--	200
Dibromochloromethane	ND		ug/l	200	--	200
1,1,2-Trichloroethane	ND		ug/l	200	--	200
Tetrachloroethene	ND		ug/l	200	--	200
Chlorobenzene	ND		ug/l	200	--	200
1,2-Dichloroethane	ND		ug/l	200	--	200
1,1,1-Trichloroethane	ND		ug/l	200	--	200
Bromodichloromethane	ND		ug/l	200	--	200
trans-1,3-Dichloropropene	ND		ug/l	100	--	200
cis-1,3-Dichloropropene	ND		ug/l	100	--	200
1,3-Dichloropropene, Total	ND		ug/l	100	--	200
Bromoform	ND		ug/l	400	--	200
1,1,2,2-Tetrachloroethane	ND		ug/l	200	--	200
Chloromethane	ND		ug/l	400	--	200
Vinyl chloride	ND		ug/l	200	--	200
Chloroethane	ND		ug/l	400	--	200
1,1-Dichloroethene	ND		ug/l	200	--	200
trans-1,2-Dichloroethene	ND		ug/l	200	--	200
Trichloroethene	9600		ug/l	200	--	200
1,2-Dichlorobenzene	ND		ug/l	200	--	200
1,3-Dichlorobenzene	ND		ug/l	200	--	200
1,4-Dichlorobenzene	ND		ug/l	200	--	200
cis-1,2-Dichloroethene	3100		ug/l	200	--	200
1,2-Dichloroethene, Total	3100		ug/l	200	--	200
Dichlorodifluoromethane	ND		ug/l	400	--	200
1,2-Dibromoethane	ND		ug/l	400	--	200

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-07 D Date Collected: 04/18/17 12:00

Client ID: AX-GW-MW06B-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	400	--	200
1,1,1,2-Tetrachloroethane	ND		ug/l	200	--	200
o-Chlorotoluene	ND		ug/l	400	--	200
p-Chlorotoluene	ND		ug/l	400	--	200
Hexachlorobutadiene	ND		ug/l	120	--	200
1,2,4-Trichlorobenzene	ND		ug/l	400	--	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	105		70-130
4-Bromofluorobenzene	84		70-130
Dibromofluoromethane	99		70-130

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-08 D
Client ID: AX-GW-MW06-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 01:18
Analyst: PK

Date Collected: 04/18/17 10:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	20	--	10
1,1-Dichloroethane	ND		ug/l	10	--	10
Chloroform	ND		ug/l	10	--	10
Carbon tetrachloride	ND		ug/l	10	--	10
1,2-Dichloropropane	ND		ug/l	10	--	10
Dibromochloromethane	ND		ug/l	10	--	10
1,1,2-Trichloroethane	ND		ug/l	10	--	10
Tetrachloroethene	ND		ug/l	10	--	10
Chlorobenzene	ND		ug/l	10	--	10
1,2-Dichloroethane	ND		ug/l	10	--	10
1,1,1-Trichloroethane	ND		ug/l	10	--	10
Bromodichloromethane	ND		ug/l	10	--	10
trans-1,3-Dichloropropene	ND		ug/l	5.0	--	10
cis-1,3-Dichloropropene	ND		ug/l	5.0	--	10
1,3-Dichloropropene, Total	ND		ug/l	5.0	--	10
Bromoform	ND		ug/l	20	--	10
1,1,2,2-Tetrachloroethane	ND		ug/l	10	--	10
Chloromethane	ND		ug/l	20	--	10
Vinyl chloride	13		ug/l	10	--	10
Chloroethane	ND		ug/l	20	--	10
1,1-Dichloroethene	ND		ug/l	10	--	10
trans-1,2-Dichloroethene	ND		ug/l	10	--	10
Trichloroethene	1200		ug/l	10	--	10
1,2-Dichlorobenzene	ND		ug/l	10	--	10
1,3-Dichlorobenzene	ND		ug/l	10	--	10
1,4-Dichlorobenzene	ND		ug/l	10	--	10
cis-1,2-Dichloroethene	760		ug/l	10	--	10
1,2-Dichloroethene, Total	760		ug/l	10	--	10
Dichlorodifluoromethane	ND		ug/l	20	--	10
1,2-Dibromoethane	ND		ug/l	20	--	10

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-08 D Date Collected: 04/18/17 10:00

Client ID: AX-GW-MW06-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	20	--	10
1,1,1,2-Tetrachloroethane	ND		ug/l	10	--	10
o-Chlorotoluene	ND		ug/l	20	--	10
p-Chlorotoluene	ND		ug/l	20	--	10
Hexachlorobutadiene	ND		ug/l	6.0	--	10
1,2,4-Trichlorobenzene	ND		ug/l	20	--	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	113		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	104		70-130

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-09 D
Client ID: AX-GW-DUP01-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 01:49
Analyst: PK

Date Collected: 04/18/17 00:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	20	--	10
1,1-Dichloroethane	ND		ug/l	10	--	10
Chloroform	ND		ug/l	10	--	10
Carbon tetrachloride	ND		ug/l	10	--	10
1,2-Dichloropropane	ND		ug/l	10	--	10
Dibromochloromethane	ND		ug/l	10	--	10
1,1,2-Trichloroethane	ND		ug/l	10	--	10
Tetrachloroethene	ND		ug/l	10	--	10
Chlorobenzene	ND		ug/l	10	--	10
1,2-Dichloroethane	ND		ug/l	10	--	10
1,1,1-Trichloroethane	ND		ug/l	10	--	10
Bromodichloromethane	ND		ug/l	10	--	10
trans-1,3-Dichloropropene	ND		ug/l	5.0	--	10
cis-1,3-Dichloropropene	ND		ug/l	5.0	--	10
1,3-Dichloropropene, Total	ND		ug/l	5.0	--	10
Bromoform	ND		ug/l	20	--	10
1,1,2,2-Tetrachloroethane	ND		ug/l	10	--	10
Chloromethane	ND		ug/l	20	--	10
Vinyl chloride	13		ug/l	10	--	10
Chloroethane	ND		ug/l	20	--	10
1,1-Dichloroethene	ND		ug/l	10	--	10
trans-1,2-Dichloroethene	ND		ug/l	10	--	10
Trichloroethene	1100		ug/l	10	--	10
1,2-Dichlorobenzene	ND		ug/l	10	--	10
1,3-Dichlorobenzene	ND		ug/l	10	--	10
1,4-Dichlorobenzene	ND		ug/l	10	--	10
cis-1,2-Dichloroethene	700		ug/l	10	--	10
1,2-Dichloroethene, Total	700		ug/l	10	--	10
Dichlorodifluoromethane	ND		ug/l	20	--	10
1,2-Dibromoethane	ND		ug/l	20	--	10

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-09 D Date Collected: 04/18/17 00:00

Client ID: AX-GW-DUP01-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	20	--	10
1,1,1,2-Tetrachloroethane	ND		ug/l	10	--	10
o-Chlorotoluene	ND		ug/l	20	--	10
p-Chlorotoluene	ND		ug/l	20	--	10
Hexachlorobutadiene	ND		ug/l	6.0	--	10
1,2,4-Trichlorobenzene	ND		ug/l	20	--	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	105		70-130

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-10 D
Client ID: AX-GW-MW19D-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 02:21
Analyst: PK

Date Collected: 04/18/17 14:40
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	200	--	100
1,1-Dichloroethane	ND		ug/l	100	--	100
Chloroform	ND		ug/l	100	--	100
Carbon tetrachloride	ND		ug/l	100	--	100
1,2-Dichloropropane	ND		ug/l	100	--	100
Dibromochloromethane	ND		ug/l	100	--	100
1,1,2-Trichloroethane	ND		ug/l	100	--	100
Tetrachloroethene	ND		ug/l	100	--	100
Chlorobenzene	ND		ug/l	100	--	100
1,2-Dichloroethane	ND		ug/l	100	--	100
1,1,1-Trichloroethane	ND		ug/l	100	--	100
Bromodichloromethane	ND		ug/l	100	--	100
trans-1,3-Dichloropropene	ND		ug/l	50	--	100
cis-1,3-Dichloropropene	ND		ug/l	50	--	100
1,3-Dichloropropene, Total	ND		ug/l	50	--	100
Bromoform	ND		ug/l	200	--	100
1,1,2,2-Tetrachloroethane	ND		ug/l	100	--	100
Chloromethane	ND		ug/l	200	--	100
Vinyl chloride	570		ug/l	100	--	100
Chloroethane	ND		ug/l	200	--	100
1,1-Dichloroethene	ND		ug/l	100	--	100
trans-1,2-Dichloroethene	ND		ug/l	100	--	100
Trichloroethene	1600		ug/l	100	--	100
1,2-Dichlorobenzene	ND		ug/l	100	--	100
1,3-Dichlorobenzene	ND		ug/l	100	--	100
1,4-Dichlorobenzene	ND		ug/l	100	--	100
cis-1,2-Dichloroethene	9700		ug/l	100	--	100
1,2-Dichloroethene, Total	9700		ug/l	100	--	100
Dichlorodifluoromethane	ND		ug/l	200	--	100
1,2-Dibromoethane	ND		ug/l	200	--	100

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-10 D Date Collected: 04/18/17 14:40

Client ID: AX-GW-MW19D-041817 Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	200	--	100
1,1,1,2-Tetrachloroethane	ND		ug/l	100	--	100
o-Chlorotoluene	ND		ug/l	200	--	100
p-Chlorotoluene	ND		ug/l	200	--	100
Hexachlorobutadiene	ND		ug/l	60	--	100
1,2,4-Trichlorobenzene	ND		ug/l	200	--	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-11
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/25/17 03:40
Analyst: MM

Date Collected: 04/18/17 00:00
Date Received: 04/18/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene, Total	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-11 Date Collected: 04/18/17 00:00

Client ID: TRIP BLANK Date Received: 04/18/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	115		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	101		70-130
Dibromofluoromethane	106		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/25/17 03:09
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 03,11 Batch: WG997194-5					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene, Total	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/25/17 03:09
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 03,11 Batch: WG997194-5					
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
o-Chlorotoluene	ND		ug/l	2.0	--
p-Chlorotoluene	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	106		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/25/17 15:03
Analyst: PK

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-02,04-07 Batch: WG997467-5					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene, Total	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/25/17 15:03
Analyst: PK

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-02,04-07 Batch: WG997467-5					
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
o-Chlorotoluene	ND		ug/l	2.0	--
p-Chlorotoluene	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	106		70-130
4-Bromofluorobenzene	84		70-130
Dibromofluoromethane	93		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/25/17 18:29
Analyst: KD

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 08-10 Batch: WG997883-5					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene, Total	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712214
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/25/17 18:29
Analyst: KD

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 08-10 Batch: WG997883-5					
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
o-Chlorotoluene	ND		ug/l	2.0	--
p-Chlorotoluene	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--
Tentatively Identified Compounds					
No Tentatively Identified Compounds	ND		ug/l		

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	114		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	104		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 03,11 Batch: WG997194-3 WG997194-4								
Methylene chloride	99		96		70-130	3		20
1,1-Dichloroethane	110		110		70-130	0		20
Chloroform	110		100		70-130	10		20
Carbon tetrachloride	98		94		70-130	4		20
1,2-Dichloropropane	110		100		70-130	10		20
Dibromochloromethane	89		89		70-130	0		20
1,1,2-Trichloroethane	100		97		70-130	3		20
Tetrachloroethene	97		89		70-130	9		20
Chlorobenzene	97		91		70-130	6		20
1,2-Dichloroethane	110		110		70-130	0		20
1,1,1-Trichloroethane	100		100		70-130	0		20
Bromodichloromethane	100		99		70-130	1		20
trans-1,3-Dichloropropene	99		96		70-130	3		20
cis-1,3-Dichloropropene	97		95		70-130	2		20
Bromoform	**67**	Q	**67**	Q	70-130	0		20
1,1,2,2-Tetrachloroethane	90		90		70-130	0		20
Chloromethane	120		110		70-130	9		20
Vinyl chloride	120		110		70-130	9		20
Chloroethane	120		110		70-130	9		20
1,1-Dichloroethene	99		96		70-130	3		20
trans-1,2-Dichloroethene	100		92		70-130	8		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712214

Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 03,11 Batch: WG997194-3 WG997194-4								
Trichloroethene	97		93		70-130	4		20
1,2-Dichlorobenzene	94		89		70-130	5		20
1,3-Dichlorobenzene	95		88		70-130	8		20
1,4-Dichlorobenzene	93		87		70-130	7		20
cis-1,2-Dichloroethene	100		98		70-130	2		20
Dichlorodifluoromethane	93		86		70-130	8		20
1,2-Dibromoethane	91		91		70-130	0		20
1,3-Dichloropropane	100		100		70-130	0		20
1,1,1,2-Tetrachloroethane	93		88		70-130	6		20
o-Chlorotoluene	97		90		70-130	7		20
p-Chlorotoluene	93		88		70-130	6		20
Hexachlorobutadiene	89		75		70-130	17		20
1,2,4-Trichlorobenzene	130		120		70-130	8		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	117		122		70-130
Toluene-d8	98		97		70-130
4-Bromofluorobenzene	91		92		70-130
Dibromofluoromethane	108		107		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02,04-07 Batch: WG997467-3 WG997467-4								
Methylene chloride	110		98		70-130	12		20
1,1-Dichloroethane	110		110		70-130	0		20
Chloroform	98		99		70-130	1		20
Carbon tetrachloride	90		95		70-130	5		20
1,2-Dichloropropane	110		110		70-130	0		20
Dibromochloromethane	120		110		70-130	9		20
1,1,2-Trichloroethane	130		120		70-130	8		20
Tetrachloroethene	110		110		70-130	0		20
Chlorobenzene	110		110		70-130	0		20
1,2-Dichloroethane	100		100		70-130	0		20
1,1,1-Trichloroethane	96		99		70-130	3		20
Bromodichloromethane	100		100		70-130	0		20
trans-1,3-Dichloropropene	130		120		70-130	8		20
cis-1,3-Dichloropropene	110		110		70-130	0		20
Bromoform	94		92		70-130	2		20
1,1,2,2-Tetrachloroethane	110		98		70-130	12		20
Chloromethane	85		82		70-130	4		20
Vinyl chloride	92		96		70-130	4		20
Chloroethane	100		110		70-130	10		20
1,1-Dichloroethene	96		100		70-130	4		20
trans-1,2-Dichloroethene	100		100		70-130	0		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712214

Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02,04-07 Batch: WG997467-3 WG997467-4								
Trichloroethene	98		100		70-130	2		20
1,2-Dichlorobenzene	110		120		70-130	9		20
1,3-Dichlorobenzene	120		120		70-130	0		20
1,4-Dichlorobenzene	110		120		70-130	9		20
cis-1,2-Dichloroethene	100		100		70-130	0		20
Dichlorodifluoromethane	81		74		70-130	9		20
1,2-Dibromoethane	130		110		70-130	17		20
1,3-Dichloropropane	130		120		70-130	8		20
1,1,1,2-Tetrachloroethane	110		110		70-130	0		20
o-Chlorotoluene	100		110		70-130	10		20
p-Chlorotoluene	100		110		70-130	10		20
Hexachlorobutadiene	96		110		70-130	14		20
1,2,4-Trichlorobenzene	130		**140**	Q	70-130	7		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	88		87		70-130
Toluene-d8	109		105		70-130
4-Bromofluorobenzene	99		96		70-130
Dibromofluoromethane	93		92		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 08-10 Batch: WG997883-3 WG997883-4								
Methylene chloride	95		91		70-130	4		20
1,1-Dichloroethane	110		110		70-130	0		20
Chloroform	100		100		70-130	0		20
Carbon tetrachloride	100		100		70-130	0		20
1,2-Dichloropropane	100		100		70-130	0		20
Dibromochloromethane	87		89		70-130	2		20
1,1,2-Trichloroethane	98		97		70-130	1		20
Tetrachloroethene	98		98		70-130	0		20
Chlorobenzene	97		94		70-130	3		20
1,2-Dichloroethane	110		110		70-130	0		20
1,1,1-Trichloroethane	110		110		70-130	0		20
Bromodichloromethane	100		97		70-130	3		20
trans-1,3-Dichloropropene	96		96		70-130	0		20
cis-1,3-Dichloropropene	96		95		70-130	1		20
Bromoform	**67**	Q	**67**	Q	70-130	0		20
1,1,2,2-Tetrachloroethane	93		95		70-130	2		20
Chloromethane	100		99		70-130	1		20
Vinyl chloride	120		120		70-130	0		20
Chloroethane	120		120		70-130	0		20
1,1-Dichloroethene	100		100		70-130	0		20
trans-1,2-Dichloroethene	98		100		70-130	2		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 08-10 Batch: WG997883-3 WG997883-4								
Trichloroethene	99		100		70-130	1		20
1,2-Dichlorobenzene	95		92		70-130	3		20
1,3-Dichlorobenzene	92		92		70-130	0		20
1,4-Dichlorobenzene	93		90		70-130	3		20
cis-1,2-Dichloroethene	98		100		70-130	2		20
Dichlorodifluoromethane	100		98		70-130	2		20
1,2-Dibromoethane	88		89		70-130	1		20
1,3-Dichloropropane	98		98		70-130	0		20
1,1,1,2-Tetrachloroethane	90		92		70-130	2		20
o-Chlorotoluene	98		96		70-130	2		20
p-Chlorotoluene	94		92		70-130	2		20
Hexachlorobutadiene	87		84		70-130	4		20
1,2,4-Trichlorobenzene	130		120		70-130	8		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	113		115		70-130
Toluene-d8	97		95		70-130
4-Bromofluorobenzene	93		94		70-130
Dibromofluoromethane	105		106		70-130

Matrix Spike Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 03,11 QC Batch ID: WG997194-11 WG997194-12 QC Sample: L1712214-03 Client ID: AX-GW-MW02-041817												
Methylene chloride	ND	50	49	98		47	94		70-130	4		20
1,1-Dichloroethane	ND	50	61	122		63	126		70-130	3		20
Chloroform	ND	50	57	114		59	118		70-130	3		20
Carbon tetrachloride	ND	50	57	114		61	122		70-130	7		20
1,2-Dichloropropane	ND	50	57	114		58	116		70-130	2		20
Dibromochloromethane	ND	50	47	94		49	98		70-130	4		20
1,1,2-Trichloroethane	ND	50	52	104		53	106		70-130	2		20
Tetrachloroethene	ND	50	53	106		58	116		70-130	9		20
Chlorobenzene	880	50	920	80		930	100		70-130	1		20
1,2-Dichloroethane	ND	50	61	122		62	124		70-130	2		20
1,1,1-Trichloroethane	ND	50	59	118		63	126		70-130	7		20
Bromodichloromethane	ND	50	53	106		56	112		70-130	6		20
trans-1,3-Dichloropropene	ND	50	49	98		53	106		70-130	8		20
cis-1,3-Dichloropropene	ND	50	50	100		53	106		70-130	6		20
Bromoform	ND	50	33	**66**	Q	35	70		70-130	6		20
1,1,2,2-Tetrachloroethane	ND	50	44	88		47	94		70-130	7		20
Chloromethane	ND	50	54	108		57	114		70-130	5		20
Vinyl chloride	ND	50	51	102		62	124		70-130	19		20
Chloroethane	ND	50	45	90		50	100		70-130	11		20
1,1-Dichloroethene	ND	50	59	118		61	122		70-130	3		20
trans-1,2-Dichloroethene	ND	50	55	110		58	116		70-130	5		20

Matrix Spike Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 03,11 QC Batch ID: WG997194-11 WG997194-12 QC Sample: L1712214-03 Client ID: AX-GW-MW02-041817												
Trichloroethene	ND	50	54	108		58	116		70-130	7		20
1,2-Dichlorobenzene	9.6	50	57	95		60	101		70-130	5		20
1,3-Dichlorobenzene	71	50	120	98		120	98		70-130	0		20
1,4-Dichlorobenzene	120	50	180	120		180	120		70-130	0		20
cis-1,2-Dichloroethene	ND	50	55	110		55	110		70-130	0		20
Dichlorodifluoromethane	ND	50	34	**68**	Q	40	80		70-130	16		20
1,2-Dibromoethane	ND	50	47	94		49	98		70-130	4		20
1,3-Dichloropropane	ND	50	52	104		55	110		70-130	6		20
1,1,1,2-Tetrachloroethane	ND	50	49	98		52	104		70-130	6		20
o-Chlorotoluene	ND	50	50	100		55	110		70-130	10		20
p-Chlorotoluene	ND	50	48	96		52	104		70-130	8		20
Hexachlorobutadiene	ND	50	45	90		52	104		70-130	14		20
1,2,4-Trichlorobenzene	ND	50	64	128		67	**134**	Q	70-130	5		20

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	117		116		70-130
4-Bromofluorobenzene	88		91		70-130
Dibromofluoromethane	107		109		70-130
Toluene-d8	95		96		70-130

PCBS

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-01 D
Client ID: AX-GW-MW02A-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 01:02
Analyst: AF

Date Collected: 04/18/17 11:30
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	30.0		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	A
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	30.0		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	104		30-150	A
Decachlorobiphenyl	80		30-150	A
2,4,5,6-Tetrachloro-m-xylene	113		30-150	B
Decachlorobiphenyl	80		30-150	B

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-02 D
Client ID: AX-GW-MW02B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 01:18
Analyst: AF

Date Collected: 04/18/17 09:20
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	26.0		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	26.0		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	90		30-150	A
Decachlorobiphenyl	83		30-150	A
2,4,5,6-Tetrachloro-m-xylene	92		30-150	B
Decachlorobiphenyl	83		30-150	B

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-03 D
Client ID: AX-GW-MW02-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 00:45
Analyst: AF

Date Collected: 04/18/17 10:25
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	13.7		ug/l	1.25	--	5	A
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	2.74		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	16.4		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	96		30-150	A
Decachlorobiphenyl	80		30-150	A
2,4,5,6-Tetrachloro-m-xylene	109		30-150	B
Decachlorobiphenyl	86		30-150	B

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-04 D
Client ID: AX-GW-MW17D-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 01:35
Analyst: AF

Date Collected: 04/18/17 14:20
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	28.5		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	A
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	28.5		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	109		30-150	A
Decachlorobiphenyl	101		30-150	A
2,4,5,6-Tetrachloro-m-xylene	101		30-150	B
Decachlorobiphenyl	97		30-150	B

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-05 D
Client ID: AX-GW-MW17B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 01:52
Analyst: AF

Date Collected: 04/18/17 15:20
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	19.7		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	19.7		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**153**	Q	30-150	A
Decachlorobiphenyl	93		30-150	A
2,4,5,6-Tetrachloro-m-xylene	101		30-150	B
Decachlorobiphenyl	99		30-150	B

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-06
Client ID: AX-GW-MW06A-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/24/17 12:11
Analyst: AF

Date Collected: 04/18/17 11:15
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	1.17		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	1.17		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		30-150	A
Decachlorobiphenyl	89		30-150	A
2,4,5,6-Tetrachloro-m-xylene	90		30-150	B
Decachlorobiphenyl	90		30-150	B

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-07 D
Client ID: AX-GW-MW06B-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 02:08
Analyst: AF

Date Collected: 04/18/17 12:00
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	12.2		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	12.2		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	97		30-150	A
Decachlorobiphenyl	81		30-150	A
2,4,5,6-Tetrachloro-m-xylene	97		30-150	B
Decachlorobiphenyl	82		30-150	B

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-08 D
Client ID: AX-GW-MW06-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 18:46
Analyst: JW

Date Collected: 04/18/17 10:00
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	7.98		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	A
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	7.98		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	93		30-150	A
Decachlorobiphenyl	84		30-150	A
2,4,5,6-Tetrachloro-m-xylene	86		30-150	B
Decachlorobiphenyl	65		30-150	B

Project Name: AEROVOX
Lab Number: L1712214
Project Number: 149339.007.001
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-09 D
Client ID: AX-GW-DUP01-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/27/17 00:02
Analyst: JW

Date Collected: 04/18/17 00:00
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	7.85		ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	A
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	7.85		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	61		30-150	A
2,4,5,6-Tetrachloro-m-xylene	79		30-150	B
Decachlorobiphenyl	63		30-150	B

Project Name: AEROVOX **Lab Number:** L1712214

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712214-10 D
Client ID: AX-GW-MW19D-041817
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 23:49
Analyst: JW

Date Collected: 04/18/17 14:40
Date Received: 04/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	9.17	P	ug/l	1.25	--	5	B
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	B
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	9.17		ug/l	1.25	--	5	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	83		30-150	A
Decachlorobiphenyl	43		30-150	A
2,4,5,6-Tetrachloro-m-xylene	79		30-150	B
Decachlorobiphenyl	45		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 04/24/17 13:25
Analyst: HT

Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01-10 Batch: WG996550-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		30-150	A
Decachlorobiphenyl	86		30-150	A
2,4,5,6-Tetrachloro-m-xylene	92		30-150	B
Decachlorobiphenyl	87		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712214

Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01-10 Batch: WG996550-2 WG996550-3									
Aroclor 1016	100		103		40-140	3		20	A
Aroclor 1260	110		112		40-140	2		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	89		91		30-150	A
Decachlorobiphenyl	82		84		30-150	A
2,4,5,6-Tetrachloro-m-xylene	85		86		30-150	B
Decachlorobiphenyl	83		85		30-150	B

Matrix Spike Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01-10 QC Batch ID: WG996550-4 WG996550-5 QC Sample: L1712214-03 Client ID: AX-GW-MW02-041817													
Aroclor 1016	ND	3.12	18.0	**576**	Q	18.0	**576**	Q	40-140	0		20	A
Aroclor 1260	ND	3.12	4.14	132		4.60	**147**	Q	40-140	11		20	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	107		98		30-150	A
Decachlorobiphenyl	76		77		30-150	A
2,4,5,6-Tetrachloro-m-xylene	114		109		30-150	B
Decachlorobiphenyl	78		80		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1712214-01A	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-01B	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-01C	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-01D	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-01E	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-02A	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-02B	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-02C	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-02D	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-02E	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-03A	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-03A1	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-03A2	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-03B	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-03B1	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-03B2	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-03C	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-03C1	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-03C2	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-03D	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-03D1	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-03D2	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-03E	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-03E1	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-03E2	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-04A	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-04B	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-04C	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)

*Values in parentheses indicate holding time in days

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712214
Report Date: 04/27/17

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1712214-04D	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-04E	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-05A	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-05B	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-05C	Vial HCl preserved	A	N/A	4.3	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-05D	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-05E	Amber 1000ml unpreserved	A	7	4.3	Y	Absent	MCP-8082-10(365)
L1712214-06A	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-06B	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-06C	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-06D	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-06E	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-07A	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-07B	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-07C	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-07D	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-07E	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-08A	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-08B	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-08C	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-08D	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-08E	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-09A	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-09B	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-09C	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-09D	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-09E	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-10A	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-10B	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-10C	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-10D	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-10E	Amber 1000ml unpreserved	B	7	3.2	Y	Absent	MCP-8082-10(365)
L1712214-11A	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712214-11B	Vial HCl preserved	B	N/A	3.2	Y	Absent	MCP-8260-CHLR-10(14)

*Values in parentheses indicate holding time in days

Project Name:	AEROVOX	**Lab Number:**	L1712214
Project Number:	149339.007.001	**Report Date:**	04/27/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	AEROVOX	**Lab Number:**	L1712214
Project Number:	149339.007.001	**Report Date:**	04/27/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	AEROVOX	**Lab Number:**	L1712214
Project Number:	149339.007.001	**Report Date:**	04/27/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE 1 OF 2

Date Rec'd in Lab: 4/18/17

ALPHA Job #: L1712214

ALPHA ANALYTICAL World Class Chemistry

8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220

320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name: Aerovox

Project Location: New Bedford, MA

Project #: 149339.007.001

Project Manager: Marilyn Wade

ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☑ Same as Client info PO #:

Client Information

Client: AVX Corp.

Address: Belleville Ave, New Bedford, MA

Phone: —

Email: MWade@brwncald.com

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods

☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)

☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)

☐ Yes ☐ No NPDES RGP

☐ Other State /Fed Program ______ Criteria ______

Turn-Around Time

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

Date Due:

Additional Project Information:

Reference Alpha Lab #L1516164

Aerovox CVOC list (8260)

ANALYSIS: VOC: ☑ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ■ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC 8260	PCB	Sample Comments	TOTAL # BOTTLES
12214.01	AX-GW-MW02A-041817	4/18/17	11:30	GW	AB	X	X		5
.02	AX-GW-MW02B-041817	4/18/17	09:20	↓	AB	X	X		5
.03	AX-GW-MW02-041817	4/18/17	10:25	↓	AB	X	X	MS/MSD	15
.04	AX-GW-MW17D-041817	4/18/17	14:20	↓	AB	X	X		5
.05	AX-GW-MW17B-041817	4/18/17	15:20	↓	AB	X	X		5
.06	AX-GW-MW06A-041817	4/18/17	11:15	↓	ZM	X	X		5
.07	AX-GW-MW06B-041817	4/18/17	12:00	↓	ZM	X	X		5
.08	AX-GW-MW06-041817	4/18/17	10:00	↓	ZM	X	X		5
.09	AX-GW-DUP01-041817	4/18/17	99:99	↓	ZM	X	X		5
.10	AX-GW-MW19D-041817	4/18/17	14:40	↓	ZM	X	X		5

Container Type

Preservative

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
Zach Millwood	4/18/17 1530	[signature]	4/18/17 1530
T. [signature]	4/18/17 1:03	[signature]	4/18/17 [illegible]

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

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

CHAIN OF CUSTODY

PAGE 1 OF 2

Date Rec'd in Lab: 4/18/17

ALPHA Job #: L1712214

ALPHA ANALYTICAL
8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Project Information

Project Name: Aerovox
Project Location: New Bedford, MA
Project #: 149339.007.001
Project Manager: Marilyn Wade
ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☑ Same as Client info PO #:

Client Information

Client: AVX Corp.
Address: Belleville Ave
New Bedford, MA
Phone: —
Email: mwade@brwncald.com

Turn-Around Time

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

Date Due:

Regulatory Requirements & Project Information Requirements

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

Additional Project Information:

Reference Alpha Lab #L1516164
Aerovox CVOC list (8260)

ANALYSIS: VOC: ☑ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☑ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	SVOC	METALS	METALS	EPH	VPH	PCB	TPH	Sample Comments	TOTAL # BOTTLES
12214.01	AX-GW-MW02A-041817	4/18/17	11:30	GW	AB	X						X			5
.02	AX-GW-MW02B-041817	4/18/17	09:20		AB	X						X			5
.03	AX-GW-MW02-041817	4/18/17	10:25		AB	X						X			15
.04	AX-GW-MW17D-041817	4/18/17	14:20		AB	X						X			5
.05	AX-GW-MW17B-041817	4/18/17	15:20		AB	X						X			5
.06	AX-GW-MW06A-041817	4/18/17	11:15		ZM	X						X			5
.07	AX-GW-MW06B-041817	4/18/17	12:00		ZM	X						X			5
.08	AX-GW-MW06-041817	4/18/17	10:00		ZM	X						X			5
.09	AX-GW-DUP01-041817	4/18/17	99:99		ZM	X						X			5
.10	AX-GW-MW19D-041817	4/18/17	14:40		ZM	X						X			5

Container Type
Preservative

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
Zach Midwood	4/18/17 1530	[signature]	4/18/17 1530
T. Hamilton	4/18/17 1763	[signature]	4/18/17 1763

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

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

CHAIN OF CUSTODY

PAGE 2 OF 2

Date Rec'd in Lab: 4/18/17

ALPHA Job #: L1712214

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

Project Information

Project Name: Aerovox
Project Location: New Bedford, MA
Project #: 149339.007.001
Project Manager: Marilyn Wade
ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☑ Same as Client info PO #:

Client Information

Client: AVX Corp.
Address: Belleville Ave
New Bedford, MA
Phone: -
Email: MWade@brwncald.com

Regulatory Requirements & Project Information Requirements

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

Turn-Around Time

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

Date Due:

Additional Project Information:

ANALYSIS

VOC: ☑ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint

SAMPLE INFO

Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	Sample Comments	TOTAL # BOTTLES
12214-11	Trip Blank	4/14	—	—	SM	X		2

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

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

Container Type	
Preservative	

Relinquished By:	Date/Time	Received By:	Date/Time
	4/18/17 1530		4/18/17 1530
	4/18/17 1763		4/18/17 1700

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

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

Method Blank Summary
Form 4

Client	: Brown & Caldwell	**Lab Number**	: L1712214
Project Name	: AEROVOX	**Project Number**	: 149339.007.001
Lab Sample ID	: WG997194-5	**Lab File ID**	: VQ170425A04
Instrument ID	: QUIMBY		
Matrix	: WATER	**Analysis Date**	: 04/25/17 03:09

Client Sample No.	Lab Sample ID	Analysis Date
WG997194-3LCS	WG997194-3	04/25/17 01:34
WG997194-4LCSD	WG997194-4	04/25/17 02:05
TRIP BLANK	L1712214-11	04/25/17 03:40
AX-GW-MW02-041817	L1712214-03D	04/25/17 06:49

Method Blank Summary
Form 4

Client	: Brown & Caldwell	**Lab Number**	: L1712214
Project Name	: AEROVOX	**Project Number**	: 149339.007.001
Lab Sample ID	: WG997467-5	**Lab File ID**	: VJ170425B08
Instrument ID	: JACK		
Matrix	: WATER	**Analysis Date**	: 04/25/17 15:03

Client Sample No.	Lab Sample ID	Analysis Date
WG997467-3LCS	WG997467-3	04/25/17 13:23
WG997467-4LCSD	WG997467-4	04/25/17 13:57
AX-GW-MW02A-041817	L1712214-01	04/25/17 20:37
AX-GW-MW02B-041817	L1712214-02D	04/25/17 21:10
AX-GW-MW17D-041817	L1712214-04D	04/25/17 21:43
AX-GW-MW17B-041817	L1712214-05D	04/25/17 22:17
AX-GW-MW06A-041817	L1712214-06	04/25/17 22:50
AX-GW-MW06B-041817	L1712214-07D	04/25/17 23:23

Method Blank Summary
Form 4

Client	: Brown & Caldwell	**Lab Number**	: L1712214
Project Name	: AEROVOX	**Project Number**	: 149339.007.001
Lab Sample ID	: WG997194-10	**Lab File ID**	: VQ170425N05
Instrument ID	: QUIMBY		
Matrix	:	**Analysis Date**	: 04/25/17 18:29

Client Sample No.	Lab Sample ID	Analysis Date
WG997194-8LCS	WG997194-8	04/25/17 16:55
WG997194-9LCSD	WG997194-9	04/25/17 17:26
AX-GW-MW02-041817MS	WG997194-11	04/26/17 02:52
AX-GW-MW02-041817MSD	WG997194-12	04/26/17 03:24

Method Blank Summary
Form 4

Client	: Brown & Caldwell	**Lab Number**	: L1712214
Project Name	: AEROVOX	**Project Number**	: 149339.007.001
Lab Sample ID	: WG997883-5	**Lab File ID**	: VQ170425N05
Instrument ID	: QUIMBY		
Matrix	: WATER	**Analysis Date**	: 04/25/17 18:29

Client Sample No.	Lab Sample ID	Analysis Date
WG997883-3LCS	WG997883-3	04/25/17 16:55
WG997883-4LCSD	WG997883-4	04/25/17 17:26
AX-GW-MW06-041817	L1712214-08D	04/26/17 01:18
AX-GW-DUP01-041817	L1712214-09D	04/26/17 01:49
AX-GW-MW19D-041817	L1712214-10D	04/26/17 02:21

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712214	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/25/17 01:34	
Lab File ID	: VQ170425A01	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997194-2	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	63	0
Dichlorodifluoromethane	10	9.342	-	6.6	20	61	0
Chloromethane	0.645	0.782	-	-21.2*	20	76	0
Vinyl chloride	10	11.954	-	-19.5	20	80	0
Bromomethane	10	10.556	-	-5.6	20	73	0
Chloroethane	0.334	0.396	-	-18.6	20	71	0
Trichlorofluoromethane	10	9.954	-	0.5	20	71	0
Ethyl ether	0.169	0.168	-	0.6	20	61	0
1,1-Dichloroethene	0.307	0.304	-	1	20	64	0
Carbon disulfide	1.082	0.95	-	12.2	20	61	0
Methylene chloride	0.46	0.455	-	1.1	20	61	0
Acetone	10	9.767	-	2.3	20	53	0
trans-1,2-Dichloroethene	0.379	0.379	-	0	20	63	0
Methyl tert-butyl ether	0.825	0.815	-	1.2	20	60	0
Diisopropyl ether	1.68	1.97	-	-17.3	20	73	0
1,1-Dichloroethane	0.806	0.913	-	-13.3	20	71	0
Ethyl tert-butyl ether	1.344	1.371	-	-2	20	63	0
cis-1,2-Dichloroethene	0.425	0.435	-	-2.4	20	63	0
2,2-Dichloropropane	0.638	0.689	-	-8	20	69	0
Bromochloromethane	0.158	0.145	-	8.2	20	57	0
Chloroform	0.728	0.773	-	-6.2	20	66	0
Carbon tetrachloride	0.522	0.513	-	1.7	20	65	0
Tetrahydrofuran	0.071	0.079	-	-11.3	20	67	0
Dibromofluoromethane	0.191	0.206	-	-7.9	20	69	0
1,1,1-Trichloroethane	0.632	0.664	-	-5.1	20	68	0
2-Butanone	10	11.639	-	-16.4	20	69	0
1,1-Dichloropropene	0.575	0.617	-	-7.3	20	70	0
Benzene	1.875	1.92	-	-2.4	20	64	0
tert-Amyl methyl ether	0.995	0.903	-	9.2	20	57	0
1,2-Dichloroethane-d4	0.235	0.276	-	-17.4	20	73	0
1,2-Dichloroethane	0.506	0.582	-	-15	20	71	0
Trichloroethene	0.458	0.447	-	2.4	20	62	0
Dibromomethane	0.183	0.189	-	-3.3	20	65	0
1,2-Dichloropropane	0.487	0.519	-	-6.6	20	68	0
Bromodichloromethane	0.547	0.547	-	0	20	62	0
1,4-Dioxane	0.00192	0.00166*	-	13.5	20	51	0
cis-1,3-Dichloropropene	0.69	0.669	-	3	20	61	0
Chlorobenzene-d5	1	1	-	0	20	63	0
Toluene-d8	1.331	1.301	-	2.3	20	61	0
Toluene	1.658	1.506	-	9.2	20	56	0
4-Methyl-2-pentanone	0.123	0.112	-	8.9	20	54	0
Tetrachloroethene	0.547	0.53	-	3.1	20	61	0
trans-1,3-Dichloropropene	0.663	0.657	-	0.9	20	60	0
1,1,2-Trichloroethane	0.291	0.298	-	-2.4	20	63	0
Chlorodibromomethane	0.387	0.344	-	11.1	20	55	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712214	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/25/17 01:34	
Lab File ID	: VQ170425A01	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997194-2	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,3-Dichloropropane	0.644	0.661	-	-2.6	20	62	0
1,2-Dibromoethane	0.332	0.301	-	9.3	20	56	0
2-Hexanone	0.244	0.242	-	0.8	20	63	0
Chlorobenzene	1.716	1.666	-	2.9	20	59	0
Ethylbenzene	3.245	3.239	-	0.2	20	62	0
1,1,1,2-Tetrachloroethane	0.532	0.496	-	6.8	20	59	0
p/m Xylene	1.087	1.104	-	-1.6	20	64	0
o Xylene	1.036	1.054	-	-1.7	20	63	0
Styrene	1.706	1.718	-	-0.7	20	62	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	72	0
Bromoform	10	6.684	-	33.2*	20	53	0
Isopropylbenzene	7.329	6.639	-	9.4	20	63	0
4-Bromofluorobenzene	1.24	1.133	-	8.6	20	65	0
Bromobenzene	1.499	1.25	-	16.6	20	58	0
n-Propylbenzene	8.195	8.154	-	0.5	20	70	0
1,1,2,2-Tetrachloroethane	0.969	0.868	-	10.4	20	64	0
2-Chlorotoluene	5.496	5.332	-	3	20	69	0
1,3,5-Trimethylbenzene	4.706	5.079	-	-7.9	20	78	0
1,2,3-Trichloropropane	0.847	0.718	-	15.2	20	61	0
4-Chlorotoluene	4.901	4.567	-	6.8	20	67	0
tert-Butylbenzene	4.741	4.449	-	6.2	20	66	0
1,2,4-Trimethylbenzene	4.507	5.047	-	-12	20	78	0
sec-Butylbenzene	7.115	7.081	-	0.5	20	69	0
p-Isopropyltoluene	5.269	5.514	-	-4.6	20	71	0
1,3-Dichlorobenzene	2.765	2.627	-	5	20	67	0
1,4-Dichlorobenzene	2.601	2.411	-	7.3	20	65	0
n-Butylbenzene	5.712	6.789	-	-18.9	20	78	0
1,2-Dichlorobenzene	2.389	2.234	-	6.5	20	65	0
1,2-Dibromo-3-chloropropan	0.147	0.109	-	25.9*	20	49	0
Hexachlorobutadiene	0.764	0.683	-	10.6	20	61	0
1,2,4-Trichlorobenzene	1.082	1.397	-	-29.1*	20	84	0
Naphthalene	1.806	2.404	-	-33.1*	20	88	0
1,2,3-Trichlorobenzene	0.927	1.191	-	-28.5*	20	81	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712214	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: JACK	**Calibration Date**	: 04/25/17 13:23	
Lab File ID	: VJ170425B02	**Init. Calib. Date(s)**	: 04/25/17	04/25/17
Sample No	: WG997467-2	**Init. Calib. Times**	: 04:21	08:14
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	122	0
Dichlorodifluoromethane	0.556	0.449	-	19.2	20	95	0
Chloromethane	0.478	0.408	-	14.6	20	107	0
Vinyl chloride	0.473	0.435	-	8	20	117	0
Bromomethane	10	9.801	-	2	20	133	0
Chloroethane	0.217	0.23	-	-6	20	119	0
Trichlorofluoromethane	0.918	0.818	-	10.9	20	105	-.02
Ethyl ether	0.176	0.187	-	-6.3	20	129	0
1,1-Dichloroethene	0.432	0.415	-	3.9	20	117	-.02
Carbon disulfide	1.084	1.038	-	4.2	20	119	-.02
Methylene chloride	0.35	0.376	-	-7.4	20	129	-.02
Acetone	10	12.024	-	-20.2*	20	125	-.02
trans-1,2-Dichloroethene	0.459	0.467	-	-1.7	20	129	-.02
Methyl tert-butyl ether	0.913	1.001	-	-9.6	20	137	0
Diisopropyl ether	1.185	1.328	-	-12.1	20	137	0
1,1-Dichloroethane	0.821	0.896	-	-9.1	20	131	-.02
Ethyl tert-butyl ether	1.02	1.181	-	-15.8	20	142	0
cis-1,2-Dichloroethene	0.535	0.551	-	-3	20	132	-.02
2,2-Dichloropropane	0.773	0.795	-	-2.8	20	127	0
Bromochloromethane	0.282	0.303	-	-7.4	20	133	0
Chloroform	0.877	0.856	-	2.4	20	125	0
Carbon tetrachloride	0.808	0.727	-	10	20	114	0
Tetrahydrofuran	0.097	0.109	-	-12.4	20	138	0
Dibromofluoromethane	0.319	0.297	-	6.9	20	111	0
1,1,1-Trichloroethane	0.866	0.831	-	4	20	116	-.02
2-Butanone	0.114	0.121	-	-6.1	20	136	0
1,1-Dichloropropene	0.609	0.607	-	0.3	20	125	0
Benzene	1.587	1.685	-	-6.2	20	132	0
tert-Amyl methyl ether	0.826	0.964	-	-16.7	20	145	0
1,2-Dichloroethane-d4	0.342	0.3	-	12.3	20	100	-.02
1,2-Dichloroethane	0.618	0.649	-	-5	20	127	0
Trichloroethene	0.483	0.475	-	1.7	20	125	0
Dibromomethane	0.242	0.255	-	-5.4	20	127	0
1,2-Dichloropropane	0.359	0.399	-	-11.1	20	133	0
Bromodichloromethane	0.568	0.588	-	-3.5	20	127	0
1,4-Dioxane	0.00178	0.00194*	-	-9	20	133	0
cis-1,3-Dichloropropene	0.611	0.682	-	-11.6	20	131	0
Chlorobenzene-d5	1	1	-	0	20	109	0
Toluene-d8	1.23	1.34	-	-8.9	20	111	0
Toluene	1.221	1.476	-	-20.9*	20	128	0
4-Methyl-2-pentanone	0.108	0.136	-	-25.9*	20	148	0
Tetrachloroethene	0.763	0.845	-	-10.7	20	116	0
trans-1,3-Dichloropropene	0.763	1.009	-	-32.2*	20	137	0
1,1,2-Trichloroethane	0.344	0.449	-	-30.5*	20	139	0
Chlorodibromomethane	0.612	0.738	-	-20.6*	20	125	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712214	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: JACK	**Calibration Date**	: 04/25/17 13:23	
Lab File ID	: VJ170425B02	**Init. Calib. Date(s)**	: 04/25/17	04/25/17
Sample No	: WG997467-2	**Init. Calib. Times**	: 04:21	08:14
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,3-Dichloropropane	0.699	0.943	-	-34.9*	20	136	0
1,2-Dibromoethane	0.445	0.561	-	-26.1*	20	138	-.01
2-Hexanone	0.205	0.235	-	-14.6	20	140	0
Chlorobenzene	1.442	1.655	-	-14.8	20	125	0
Ethylbenzene	1.966	2.188	-	-11.3	20	127	0
1,1,1,2-Tetrachloroethane	0.684	0.777	-	-13.6	20	125	0
p/m Xylene	0.718	0.758	-	-5.6	20	127	0
o Xylene	0.714	0.738	-	-3.4	20	127	0
Styrene	1.261	1.283	-	-1.7	20	123	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	107	0
Bromoform	10	9.435	-	5.6	20	124	0
Isopropylbenzene	4.939	4.971	-	-0.6	20	116	-.01
4-Bromofluorobenzene	0.896	0.884	-	1.3	20	117	0
Bromobenzene	1.501	1.469	-	2.1	20	116	0
n-Propylbenzene	4.273	4.482	-	-4.9	20	122	-.01
1,1,2,2-Tetrachloroethane	0.862	0.934	-	-8.4	20	125	0
2-Chlorotoluene	2.835	2.936	-	-3.6	20	120	0
1,3,5-Trimethylbenzene	2.079	2.223	-	-6.9	20	129	0
1,2,3-Trichloropropane	0.649	0.682	-	-5.1	20	116	-.01
4-Chlorotoluene	2.625	2.772	-	-5.6	20	123	0
tert-Butylbenzene	2.95	3.251	-	-10.2	20	119	0
1,2,4-Trimethylbenzene	2.362	2.74	-	-16	20	140	0
sec-Butylbenzene	3.708	4.113	-	-10.9	20	119	0
p-Isopropyltoluene	2.974	3.503	-	-17.8	20	119	0
1,3-Dichlorobenzene	2.196	2.533	-	-15.3	20	127	0
1,4-Dichlorobenzene	2.138	2.325	-	-8.7	20	124	0
n-Butylbenzene	1.877	2.341	-	-24.7*	20	122	0
1,2-Dichlorobenzene	2.072	2.279	-	-10	20	120	0
1,2-Dibromo-3-chloropropan	10	8.795	-	12.1	20	118	-.01
Hexachlorobutadiene	10	9.558	-	4.4	20	102	-.01
1,2,4-Trichlorobenzene	10	12.75	-	-27.5*	20	120	-.01
Naphthalene	10	12.101	-	-21*	20	122	-.02
1,2,3-Trichlorobenzene	10	13.01	-	-30.1*	20	140	-.01

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712214	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/25/17 16:55	
Lab File ID	: VQ170425N02	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997883-2	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	62	0
Dichlorodifluoromethane	10	10.008	-	-0.1	20	65	0
Chloromethane	0.645	0.648	-	-0.5	20	61	0
Vinyl chloride	10	11.973	-	-19.7	20	78	0
Bromomethane	10	7.772	-	22.3*	20	52	0
Chloroethane	0.334	0.406	-	-21.6*	20	71	0
Trichlorofluoromethane	10	10.599	-	-6	20	74	0
Ethyl ether	0.169	0.16	-	5.3	20	57	0
1,1-Dichloroethene	0.307	0.318	-	-3.6	20	65	0
Carbon disulfide	1.082	0.959	-	11.4	20	60	0
Methylene chloride	0.46	0.439	-	4.6	20	57	0
Acetone	10	9.31	-	6.9	20	50	0
trans-1,2-Dichloroethene	0.379	0.371	-	2.1	20	60	0
Methyl tert-butyl ether	0.825	0.759	-	8	20	55	0
Diisopropyl ether	1.68	1.923	-	-14.5	20	70	0
1,1-Dichloroethane	0.806	0.894	-	-10.9	20	68	0
Ethyl tert-butyl ether	1.344	1.301	-	3.2	20	58	0
cis-1,2-Dichloroethene	0.425	0.415	-	2.4	20	59	0
2,2-Dichloropropane	0.638	0.691	-	-8.3	20	68	0
Bromochloromethane	0.158	0.143	-	9.5	20	55	0
Chloroform	0.728	0.759	-	-4.3	20	63	0
Carbon tetrachloride	0.522	0.548	-	-5	20	68	0
Tetrahydrofuran	0.071	0.083	-	-16.9	20	70	0
Dibromofluoromethane	0.191	0.2	-	-4.7	20	66	0
1,1,1-Trichloroethane	0.632	0.679	-	-7.4	20	67	0
2-Butanone	10	12.152	-	-21.5*	20	70	0
1,1-Dichloropropene	0.575	0.651	-	-13.2	20	73	0
Benzene	1.875	1.913	-	-2	20	62	0
tert-Amyl methyl ether	0.995	0.896	-	9.9	20	55	0
1,2-Dichloroethane-d4	0.235	0.266	-	-13.2	20	69	0
1,2-Dichloroethane	0.506	0.582	-	-15	20	70	0
Trichloroethene	0.458	0.455	-	0.7	20	62	0
Dibromomethane	0.183	0.178	-	2.7	20	60	0
1,2-Dichloropropane	0.487	0.509	-	-4.5	20	65	0
Bromodichloromethane	0.547	0.55	-	-0.5	20	61	0
1,4-Dioxane	0.00192	0.00211*	-	-9.9	20	64	0
cis-1,3-Dichloropropene	0.69	0.663	-	3.9	20	59	0
Chlorobenzene-d5	1	1	-	0	20	63	0
Toluene-d8	1.331	1.292	-	2.9	20	60	0
Toluene	1.658	1.5	-	9.5	20	55	0
4-Methyl-2-pentanone	0.123	0.115	-	6.5	20	55	0
Tetrachloroethene	0.547	0.536	-	2	20	62	0
trans-1,3-Dichloropropene	0.663	0.637	-	3.9	20	58	0
1,1,2-Trichloroethane	0.291	0.285	-	2.1	20	60	0
Chlorodibromomethane	0.387	0.338	-	12.7	20	55	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712214	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/25/17 16:55	
Lab File ID	: VQ170425N02	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997883-2	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,3-Dichloropropane	0.644	0.631	-	2	20	60	0
1,2-Dibromoethane	0.332	0.293	-	11.7	20	55	0
2-Hexanone	0.244	0.245	-	-0.4	20	64	0
Chlorobenzene	1.716	1.661	-	3.2	20	59	0
Ethylbenzene	3.245	3.293	-	-1.5	20	63	0
1,1,1,2-Tetrachloroethane	0.532	0.478	-	10.2	20	57	0
p/m Xylene	1.087	1.113	-	-2.4	20	64	0
o Xylene	1.036	1.045	-	-0.9	20	63	0
Styrene	1.706	1.692	-	0.8	20	61	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	71	0
Bromoform	10	6.674	-	33.3*	20	52	0
Isopropylbenzene	7.329	6.939	-	5.3	20	65	0
4-Bromofluorobenzene	1.24	1.155	-	6.9	20	65	0
Bromobenzene	1.499	1.261	-	15.9	20	58	0
n-Propylbenzene	8.195	8.457	-	-3.2	20	72	0
1,1,2,2-Tetrachloroethane	0.969	0.901	-	7	20	66	0
2-Chlorotoluene	5.496	5.39	-	1.9	20	68	0
1,3,5-Trimethylbenzene	4.706	4.967	-	-5.5	20	75	0
1,2,3-Trichloropropane	0.847	0.725	-	14.4	20	61	0
4-Chlorotoluene	4.901	4.635	-	5.4	20	67	0
tert-Butylbenzene	4.741	4.664	-	1.6	20	68	0
1,2,4-Trimethylbenzene	4.507	5.046	-	-12	20	77	0
sec-Butylbenzene	7.115	7.4	-	-4	20	71	0
p-Isopropyltoluene	5.269	5.71	-	-8.4	20	73	0
1,3-Dichlorobenzene	2.765	2.55	-	7.8	20	64	0
1,4-Dichlorobenzene	2.601	2.418	-	7	20	64	0
n-Butylbenzene	5.712	6.986	-	-22.3*	20	79	0
1,2-Dichlorobenzene	2.389	2.27	-	5	20	65	0
1,2-Dibromo-3-chloropropan	0.147	0.103	-	29.9*	20	46	0
Hexachlorobutadiene	0.764	0.668	-	12.6	20	58	0
1,2,4-Trichlorobenzene	1.082	1.38	-	-27.5*	20	81	0
Naphthalene	1.806	2.337	-	-29.4*	20	84	0
1,2,3-Trichlorobenzene	0.927	1.151	-	-24.2*	20	77	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712214	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/25/17 16:55	
Lab File ID	: VQ170425N02	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997194-7	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	62	0
Dichlorodifluoromethane	10	10.008	-	-0.1	20	65	0
Chloromethane	0.645	0.648	-	-0.5	20	61	0
Vinyl chloride	10	11.973	-	-19.7	20	78	0
Bromomethane	10	7.772	-	22.3*	20	52	0
Chloroethane	0.334	0.406	-	-21.6*	20	71	0
Trichlorofluoromethane	10	10.599	-	-6	20	74	0
Ethyl ether	0.169	0.16	-	5.3	20	57	0
1,1-Dichloroethene	0.307	0.318	-	-3.6	20	65	0
Carbon disulfide	1.082	0.959	-	11.4	20	60	0
Methylene chloride	0.46	0.439	-	4.6	20	57	0
Acetone	10	9.31	-	6.9	20	50	0
trans-1,2-Dichloroethene	0.379	0.371	-	2.1	20	60	0
Methyl tert-butyl ether	0.825	0.759	-	8	20	55	0
Diisopropyl ether	1.68	1.923	-	-14.5	20	70	0
1,1-Dichloroethane	0.806	0.894	-	-10.9	20	68	0
Ethyl tert-butyl ether	1.344	1.301	-	3.2	20	58	0
cis-1,2-Dichloroethene	0.425	0.415	-	2.4	20	59	0
2,2-Dichloropropane	0.638	0.691	-	-8.3	20	68	0
Bromochloromethane	0.158	0.143	-	9.5	20	55	0
Chloroform	0.728	0.759	-	-4.3	20	63	0
Carbon tetrachloride	0.522	0.548	-	-5	20	68	0
Tetrahydrofuran	0.071	0.083	-	-16.9	20	70	0
Dibromofluoromethane	0.191	0.2	-	-4.7	20	66	0
1,1,1-Trichloroethane	0.632	0.679	-	-7.4	20	67	0
2-Butanone	10	12.152	-	-21.5*	20	70	0
1,1-Dichloropropene	0.575	0.651	-	-13.2	20	73	0
Benzene	1.875	1.913	-	-2	20	62	0
tert-Amyl methyl ether	0.995	0.896	-	9.9	20	55	0
1,2-Dichloroethane-d4	0.235	0.266	-	-13.2	20	69	0
1,2-Dichloroethane	0.506	0.582	-	-15	20	70	0
Trichloroethene	0.458	0.455	-	0.7	20	62	0
Dibromomethane	0.183	0.178	-	2.7	20	60	0
1,2-Dichloropropane	0.487	0.509	-	-4.5	20	65	0
Bromodichloromethane	0.547	0.55	-	-0.5	20	61	0
1,4-Dioxane	0.00192	0.00211*	-	-9.9	20	64	0
cis-1,3-Dichloropropene	0.69	0.663	-	3.9	20	59	0
Chlorobenzene-d5	1	1	-	0	20	63	0
Toluene-d8	1.331	1.292	-	2.9	20	60	0
Toluene	1.658	1.5	-	9.5	20	55	0
4-Methyl-2-pentanone	0.123	0.115	-	6.5	20	55	0
Tetrachloroethene	0.547	0.536	-	2	20	62	0
trans-1,3-Dichloropropene	0.663	0.637	-	3.9	20	58	0
1,1,2-Trichloroethane	0.291	0.285	-	2.1	20	60	0
Chlorodibromomethane	0.387	0.338	-	12.7	20	55	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712214	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/25/17 16:55	
Lab File ID	: VQ170425N02	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997194-7	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,3-Dichloropropane	0.644	0.631	-	2	20	60	0
1,2-Dibromoethane	0.332	0.293	-	11.7	20	55	0
2-Hexanone	0.244	0.245	-	-0.4	20	64	0
Chlorobenzene	1.716	1.661	-	3.2	20	59	0
Ethylbenzene	3.245	3.293	-	-1.5	20	63	0
1,1,1,2-Tetrachloroethane	0.532	0.478	-	10.2	20	57	0
p/m Xylene	1.087	1.113	-	-2.4	20	64	0
o Xylene	1.036	1.045	-	-0.9	20	63	0
Styrene	1.706	1.692	-	0.8	20	61	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	71	0
Bromoform	10	6.674	-	33.3*	20	52	0
Isopropylbenzene	7.329	6.939	-	5.3	20	65	0
4-Bromofluorobenzene	1.24	1.155	-	6.9	20	65	0
Bromobenzene	1.499	1.261	-	15.9	20	58	0
n-Propylbenzene	8.195	8.457	-	-3.2	20	72	0
1,1,2,2-Tetrachloroethane	0.969	0.901	-	7	20	66	0
2-Chlorotoluene	5.496	5.39	-	1.9	20	68	0
1,3,5-Trimethylbenzene	4.706	4.967	-	-5.5	20	75	0
1,2,3-Trichloropropane	0.847	0.725	-	14.4	20	61	0
4-Chlorotoluene	4.901	4.635	-	5.4	20	67	0
tert-Butylbenzene	4.741	4.664	-	1.6	20	68	0
1,2,4-Trimethylbenzene	4.507	5.046	-	-12	20	77	0
sec-Butylbenzene	7.115	7.4	-	-4	20	71	0
p-Isopropyltoluene	5.269	5.71	-	-8.4	20	73	0
1,3-Dichlorobenzene	2.765	2.55	-	7.8	20	64	0
1,4-Dichlorobenzene	2.601	2.418	-	7	20	64	0
n-Butylbenzene	5.712	6.986	-	-22.3*	20	79	0
1,2-Dichlorobenzene	2.389	2.27	-	5	20	65	0
1,2-Dibromo-3-chloropropan	0.147	0.103	-	29.9*	20	46	0
Hexachlorobutadiene	0.764	0.668	-	12.6	20	58	0
1,2,4-Trichlorobenzene	1.082	1.38	-	-27.5*	20	81	0
Naphthalene	1.806	2.337	-	-29.4*	20	84	0
1,2,3-Trichlorobenzene	0.927	1.151	-	-24.2*	20	77	0

* Value outside of QC limits.

ANALYTICAL REPORT

Lab Number:	L1712362
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	AEROVOX
Project Number:	149339.007.001
Report Date:	04/27/17

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

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

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1712362-01	AX-GW-MW07-041917	WATER	NEW BEDFORD, MA	04/19/17 09:15	04/19/17
L1712362-02	AX-GW-DUP02-041917	WATER	NEW BEDFORD, MA	04/19/17 00:00	04/19/17
L1712362-03	AX-GW-MW07B-041917	WATER	NEW BEDFORD, MA	04/19/17 10:30	04/19/17
L1712362-04	AX-GW-MW16S-041917	WATER	NEW BEDFORD, MA	04/19/17 13:30	04/19/17
L1712362-05	AX-GW-MW04B-041917	WATER	NEW BEDFORD, MA	04/19/17 10:20	04/19/17
L1712362-06	AX-GW-MW13D-041917	WATER	NEW BEDFORD, MA	04/19/17 09:15	04/19/17
L1712362-07	AX-GW-MW04S-041917	WATER	NEW BEDFORD, MA	04/19/17 14:20	04/19/17
L1712362-08	AX-GW-MW18S-041917	WATER	NEW BEDFORD, MA	04/19/17 13:20	04/19/17
L1712362-09	TRIP BLANK	WATER	NEW BEDFORD, MA	04/19/17 00:00	04/19/17

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Case Narrative

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

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

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

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

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

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

Project Name:	AEROVOX	**Lab Number:**	L1712362
Project Number:	149339.007.001	**Report Date:**	04/27/17

Case Narrative (continued)

MCP Related Narratives

Volatile Organics

In reference to question G:

L1712362-01, -02, -03, and -07: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

The continuing calibration standard, associated with L1712362-01 through -09, is outside the acceptance criteria for several compounds; however, it is within overall method allowances. A copy of the continuing calibration standard is included as an addendum to this report.

In reference to question I:

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

PCBs

L1712362-01, -05, and -07: The sample contains peaks which match the retention times for Aroclor 1242, but do not match the area ratios typical for this aroclor. The result for Aroclor 1242 is reported as "weathered".

In reference to question G:

L1712362-01 and -02: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

L1712362-01 and -02: The surrogate recoveries are below the acceptance criteria for 2,4,5,6-tetrachloro-m-xylene (0%) and decachlorobiphenyl (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

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

Authorized Signature: Melissa Cripps Melissa Cripps

Title: Technical Director/Representative Date: 04/27/17

ORGANICS

VOLATILES

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-01 D
Client ID: AX-GW-MW07-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 06:44
Analyst: MM

Date Collected: 04/19/17 09:15
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	800	--	400
1,1-Dichloroethane	ND		ug/l	400	--	400
Chloroform	ND		ug/l	400	--	400
Carbon tetrachloride	ND		ug/l	400	--	400
1,2-Dichloropropane	ND		ug/l	400	--	400
Dibromochloromethane	ND		ug/l	400	--	400
1,1,2-Trichloroethane	ND		ug/l	400	--	400
Tetrachloroethene	ND		ug/l	400	--	400
Chlorobenzene	ND		ug/l	400	--	400
1,2-Dichloroethane	ND		ug/l	400	--	400
1,1,1-Trichloroethane	ND		ug/l	400	--	400
Bromodichloromethane	ND		ug/l	400	--	400
trans-1,3-Dichloropropene	ND		ug/l	200	--	400
cis-1,3-Dichloropropene	ND		ug/l	200	--	400
1,3-Dichloropropene, Total	ND		ug/l	200	--	400
Bromoform	ND		ug/l	800	--	400
1,1,2,2-Tetrachloroethane	ND		ug/l	400	--	400
Chloromethane	ND		ug/l	800	--	400
Vinyl chloride	ND		ug/l	400	--	400
Chloroethane	ND		ug/l	800	--	400
1,1-Dichloroethene	ND		ug/l	400	--	400
trans-1,2-Dichloroethene	ND		ug/l	400	--	400
Trichloroethene	20000		ug/l	400	--	400
1,2-Dichlorobenzene	ND		ug/l	400	--	400
1,3-Dichlorobenzene	ND		ug/l	400	--	400
1,4-Dichlorobenzene	ND		ug/l	400	--	400
cis-1,2-Dichloroethene	1600		ug/l	400	--	400
1,2-Dichloroethene, Total	1600		ug/l	400	--	400
Dichlorodifluoromethane	ND		ug/l	800	--	400
1,2-Dibromoethane	ND		ug/l	800	--	400

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-01 D Date Collected: 04/19/17 09:15

Client ID: AX-GW-MW07-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	800	--	400
1,1,1,2-Tetrachloroethane	ND		ug/l	400	--	400
o-Chlorotoluene	ND		ug/l	800	--	400
p-Chlorotoluene	ND		ug/l	800	--	400
Hexachlorobutadiene	ND		ug/l	240	--	400
1,2,4-Trichlorobenzene	ND		ug/l	800	--	400

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	105		70-130

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-02 D
Client ID: AX-GW-DUP02-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 19:19
Analyst: KD

Date Collected: 04/19/17 00:00
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	500	--	250
1,1-Dichloroethane	ND		ug/l	250	--	250
Chloroform	ND		ug/l	250	--	250
Carbon tetrachloride	ND		ug/l	250	--	250
1,2-Dichloropropane	ND		ug/l	250	--	250
Dibromochloromethane	ND		ug/l	250	--	250
1,1,2-Trichloroethane	ND		ug/l	250	--	250
Tetrachloroethene	ND		ug/l	250	--	250
Chlorobenzene	ND		ug/l	250	--	250
1,2-Dichloroethane	ND		ug/l	250	--	250
1,1,1-Trichloroethane	ND		ug/l	250	--	250
Bromodichloromethane	ND		ug/l	250	--	250
trans-1,3-Dichloropropene	ND		ug/l	120	--	250
cis-1,3-Dichloropropene	ND		ug/l	120	--	250
1,3-Dichloropropene, Total	ND		ug/l	120	--	250
Bromoform	ND		ug/l	500	--	250
1,1,2,2-Tetrachloroethane	ND		ug/l	250	--	250
Chloromethane	ND		ug/l	500	--	250
Vinyl chloride	ND		ug/l	250	--	250
Chloroethane	ND		ug/l	500	--	250
1,1-Dichloroethene	ND		ug/l	250	--	250
trans-1,2-Dichloroethene	ND		ug/l	250	--	250
Trichloroethene	18000		ug/l	250	--	250
1,2-Dichlorobenzene	ND		ug/l	250	--	250
1,3-Dichlorobenzene	ND		ug/l	250	--	250
1,4-Dichlorobenzene	ND		ug/l	250	--	250
cis-1,2-Dichloroethene	1500		ug/l	250	--	250
1,2-Dichloroethene, Total	1500		ug/l	250	--	250
Dichlorodifluoromethane	ND		ug/l	500	--	250
1,2-Dibromoethane	ND		ug/l	500	--	250

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-02 D Date Collected: 04/19/17 00:00

Client ID: AX-GW-DUP02-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	500	--	250
1,1,1,2-Tetrachloroethane	ND		ug/l	250	--	250
o-Chlorotoluene	ND		ug/l	500	--	250
p-Chlorotoluene	ND		ug/l	500	--	250
Hexachlorobutadiene	ND		ug/l	150	--	250
1,2,4-Trichlorobenzene	ND		ug/l	500	--	250

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	106		70-130

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-03 D
Client ID: AX-GW-MW07B-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 19:50
Analyst: KD

Date Collected: 04/19/17 10:30
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	400	--	200
1,1-Dichloroethane	ND		ug/l	200	--	200
Chloroform	ND		ug/l	200	--	200
Carbon tetrachloride	ND		ug/l	200	--	200
1,2-Dichloropropane	ND		ug/l	200	--	200
Dibromochloromethane	ND		ug/l	200	--	200
1,1,2-Trichloroethane	ND		ug/l	200	--	200
Tetrachloroethene	ND		ug/l	200	--	200
Chlorobenzene	ND		ug/l	200	--	200
1,2-Dichloroethane	ND		ug/l	200	--	200
1,1,1-Trichloroethane	ND		ug/l	200	--	200
Bromodichloromethane	ND		ug/l	200	--	200
trans-1,3-Dichloropropene	ND		ug/l	100	--	200
cis-1,3-Dichloropropene	ND		ug/l	100	--	200
1,3-Dichloropropene, Total	ND		ug/l	100	--	200
Bromoform	ND		ug/l	400	--	200
1,1,2,2-Tetrachloroethane	ND		ug/l	200	--	200
Chloromethane	ND		ug/l	400	--	200
Vinyl chloride	ND		ug/l	200	--	200
Chloroethane	ND		ug/l	400	--	200
1,1-Dichloroethene	ND		ug/l	200	--	200
trans-1,2-Dichloroethene	ND		ug/l	200	--	200
Trichloroethene	12000		ug/l	200	--	200
1,2-Dichlorobenzene	ND		ug/l	200	--	200
1,3-Dichlorobenzene	ND		ug/l	200	--	200
1,4-Dichlorobenzene	ND		ug/l	200	--	200
cis-1,2-Dichloroethene	1200		ug/l	200	--	200
1,2-Dichloroethene, Total	1200		ug/l	200	--	200
Dichlorodifluoromethane	ND		ug/l	400	--	200
1,2-Dibromoethane	ND		ug/l	400	--	200

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-03 D Date Collected: 04/19/17 10:30

Client ID: AX-GW-MW07B-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	400	--	200
1,1,1,2-Tetrachloroethane	ND		ug/l	200	--	200
o-Chlorotoluene	ND		ug/l	400	--	200
p-Chlorotoluene	ND		ug/l	400	--	200
Hexachlorobutadiene	ND		ug/l	120	--	200
1,2,4-Trichlorobenzene	ND		ug/l	400	--	200

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	123		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	109		70-130

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-04
Client ID: AX-GW-MW16S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 20:21
Analyst: KD

Date Collected: 04/19/17 13:30
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	9.9		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	180		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	98		ug/l	1.0	--	1
1,2-Dichloroethene, Total	98		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-04 Date Collected: 04/19/17 13:30

Client ID: AX-GW-MW16S-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	122		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-05
Client ID: AX-GW-MW04B-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 20:53
Analyst: KD

Date Collected: 04/19/17 10:20
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	3.1		ug/l	1.0	--	1
Chloroform	7.9		ug/l	1.0	--	1
Carbon tetrachloride	1.1		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	1.2		ug/l	1.0	--	1
Tetrachloroethene	36		ug/l	1.0	--	1
Chlorobenzene	2.2		ug/l	1.0	--	1
1,2-Dichloroethane	3.9		ug/l	1.0	--	1
1,1,1-Trichloroethane	14		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	13		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	8.6		ug/l	1.0	--	1
trans-1,2-Dichloroethene	1.1		ug/l	1.0	--	1
Trichloroethene	4700	E	ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	1.4		ug/l	1.0	--	1
1,4-Dichlorobenzene	4.5		ug/l	1.0	--	1
cis-1,2-Dichloroethene	260	E	ug/l	1.0	--	1
1,2-Dichloroethene, Total	250		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-05 Date Collected: 04/19/17 10:20

Client ID: AX-GW-MW04B-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	10		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	92		70-130
Dibromofluoromethane	106		70-130

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-05 D
Client ID: AX-GW-MW04B-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 07:15
Analyst: MM

Date Collected: 04/19/17 10:20
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Trichloroethene	4200		ug/l	100	--	100
cis-1,2-Dichloroethene	250		ug/l	100	--	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	125		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	109		70-130

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-06
Client ID: AX-GW-MW13D-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 05:41
Analyst: MM

Date Collected: 04/19/17 09:15
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	4.1		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	2.4		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	46		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	24		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	84		ug/l	1.0	--	1
1,2-Dichloroethene, Total	84		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-06 Date Collected: 04/19/17 09:15

Client ID: AX-GW-MW13D-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	119		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	109		70-130

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-07 D
Client ID: AX-GW-MW04S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 21:56
Analyst: KD

Date Collected: 04/19/17 14:20
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	4.0	--	2
1,1-Dichloroethane	ND		ug/l	2.0	--	2
Chloroform	ND		ug/l	2.0	--	2
Carbon tetrachloride	ND		ug/l	2.0	--	2
1,2-Dichloropropane	ND		ug/l	2.0	--	2
Dibromochloromethane	ND		ug/l	2.0	--	2
1,1,2-Trichloroethane	ND		ug/l	2.0	--	2
Tetrachloroethene	ND		ug/l	2.0	--	2
Chlorobenzene	ND		ug/l	2.0	--	2
1,2-Dichloroethane	ND		ug/l	2.0	--	2
1,1,1-Trichloroethane	ND		ug/l	2.0	--	2
Bromodichloromethane	ND		ug/l	2.0	--	2
trans-1,3-Dichloropropene	ND		ug/l	1.0	--	2
cis-1,3-Dichloropropene	ND		ug/l	1.0	--	2
1,3-Dichloropropene, Total	ND		ug/l	1.0	--	2
Bromoform	ND		ug/l	4.0	--	2
1,1,2,2-Tetrachloroethane	ND		ug/l	2.0	--	2
Chloromethane	ND		ug/l	4.0	--	2
Vinyl chloride	ND		ug/l	2.0	--	2
Chloroethane	ND		ug/l	4.0	--	2
1,1-Dichloroethene	ND		ug/l	2.0	--	2
trans-1,2-Dichloroethene	ND		ug/l	2.0	--	2
Trichloroethene	180		ug/l	2.0	--	2
1,2-Dichlorobenzene	ND		ug/l	2.0	--	2
1,3-Dichlorobenzene	ND		ug/l	2.0	--	2
1,4-Dichlorobenzene	ND		ug/l	2.0	--	2
cis-1,2-Dichloroethene	110		ug/l	2.0	--	2
1,2-Dichloroethene, Total	110		ug/l	2.0	--	2
Dichlorodifluoromethane	ND		ug/l	4.0	--	2
1,2-Dibromoethane	ND		ug/l	4.0	--	2

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-07 D Date Collected: 04/19/17 14:20

Client ID: AX-GW-MW04S-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	4.0	--	2
1,1,1,2-Tetrachloroethane	ND		ug/l	2.0	--	2
o-Chlorotoluene	ND		ug/l	4.0	--	2
p-Chlorotoluene	ND		ug/l	4.0	--	2
Hexachlorobutadiene	ND		ug/l	1.2	--	2
1,2,4-Trichlorobenzene	ND		ug/l	4.0	--	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	121		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-08
Client ID: AX-GW-MW18S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 22:27
Analyst: KD

Date Collected: 04/19/17 13:20
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	1.3		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	77		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	44		ug/l	1.0	--	1
1,2-Dichloroethene, Total	44		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-08 Date Collected: 04/19/17 13:20

Client ID: AX-GW-MW18S-041917 Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	124		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	93		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-09
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/26/17 15:07
Analyst: KD

Date Collected: 04/19/17 00:00
Date Received: 04/19/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene, Total	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-09 Date Collected: 04/19/17 00:00

Client ID: TRIP BLANK Date Received: 04/19/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	110		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/27/17 05:09
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01,05-06 Batch: WG997811-10					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene, Total	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/27/17 05:09
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01,05-06 Batch: WG997811-10					
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
o-Chlorotoluene	ND		ug/l	2.0	--
p-Chlorotoluene	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/26/17 13:33
Analyst: BD

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 02-05,07-09 Batch: WG997811-5					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene, Total	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/26/17 13:33
Analyst: BD

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 02-05,07-09 Batch: WG997811-5					
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
o-Chlorotoluene	ND		ug/l	2.0	--
p-Chlorotoluene	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	115		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	107		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 02-05,07-09 Batch: WG997811-3 WG997811-4								
Methylene chloride	85		86		70-130	1		20
1,1-Dichloroethane	96		94		70-130	2		20
Chloroform	88		90		70-130	2		20
Carbon tetrachloride	85		86		70-130	1		20
1,2-Dichloropropane	89		91		70-130	2		20
Dibromochloromethane	78		79		70-130	1		20
1,1,2-Trichloroethane	88		86		70-130	2		20
Tetrachloroethene	85		84		70-130	1		20
Chlorobenzene	84		85		70-130	1		20
1,2-Dichloroethane	97		96		70-130	1		20
1,1,1-Trichloroethane	88		89		70-130	1		20
Bromodichloromethane	86		88		70-130	2		20
trans-1,3-Dichloropropene	85		87		70-130	2		20
cis-1,3-Dichloropropene	84		84		70-130	0		20
Bromoform	**64**	Q	**66**	Q	70-130	3		20
1,1,2,2-Tetrachloroethane	91		90		70-130	1		20
Chloromethane	84		82		70-130	2		20
Vinyl chloride	96		93		70-130	3		20
Chloroethane	96		98		70-130	2		20
1,1-Dichloroethene	86		88		70-130	2		20
trans-1,2-Dichloroethene	84		86		70-130	2		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712362

Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 02-05,07-09 Batch: WG997811-3 WG997811-4								
Trichloroethene	84		83		70-130	1		20
1,2-Dichlorobenzene	82		82		70-130	0		20
1,3-Dichlorobenzene	81		80		70-130	1		20
1,4-Dichlorobenzene	80		80		70-130	0		20
cis-1,2-Dichloroethene	86		87		70-130	1		20
Dichlorodifluoromethane	80		80		70-130	0		20
1,2-Dibromoethane	80		79		70-130	1		20
1,3-Dichloropropane	88		88		70-130	0		20
1,1,1,2-Tetrachloroethane	81		80		70-130	1		20
o-Chlorotoluene	85		85		70-130	0		20
p-Chlorotoluene	80		81		70-130	1		20
Hexachlorobutadiene	75		73		70-130	3		20
1,2,4-Trichlorobenzene	120		120		70-130	0		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	112		113		70-130
Toluene-d8	104		103		70-130
4-Bromofluorobenzene	95		96		70-130
Dibromofluoromethane	103		106		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01,05-06 Batch: WG997811-8 WG997811-9								
Methylene chloride	100		95		70-130	5		20
1,1-Dichloroethane	110		110		70-130	0		20
Chloroform	110		100		70-130	10		20
Carbon tetrachloride	100		100		70-130	0		20
1,2-Dichloropropane	110		100		70-130	10		20
Dibromochloromethane	92		86		70-130	7		20
1,1,2-Trichloroethane	100		98		70-130	2		20
Tetrachloroethene	98		94		70-130	4		20
Chlorobenzene	98		93		70-130	5		20
1,2-Dichloroethane	120		110		70-130	9		20
1,1,1-Trichloroethane	110		100		70-130	10		20
Bromodichloromethane	100		97		70-130	3		20
trans-1,3-Dichloropropene	99		95		70-130	4		20
cis-1,3-Dichloropropene	99		95		70-130	4		20
Bromoform	**68**	Q	**59**	Q	70-130	14		20
1,1,2,2-Tetrachloroethane	93		85		70-130	9		20
Chloromethane	110		99		70-130	11		20
Vinyl chloride	130		120		70-130	8		20
Chloroethane	120		110		70-130	9		20
1,1-Dichloroethene	110		100		70-130	10		20
trans-1,2-Dichloroethene	100		96		70-130	4		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712362

Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01,05-06 Batch: WG997811-8 WG997811-9								
Trichloroethene	100		98		70-130	2		20
1,2-Dichlorobenzene	95		90		70-130	5		20
1,3-Dichlorobenzene	94		89		70-130	5		20
1,4-Dichlorobenzene	92		89		70-130	3		20
cis-1,2-Dichloroethene	100		97		70-130	3		20
Dichlorodifluoromethane	100		96		70-130	4		20
1,2-Dibromoethane	94		89		70-130	5		20
1,3-Dichloropropane	100		98		70-130	2		20
1,1,1,2-Tetrachloroethane	92		87		70-130	6		20
o-Chlorotoluene	97		92		70-130	5		20
p-Chlorotoluene	93		89		70-130	4		20
Hexachlorobutadiene	83		84		70-130	1		20
1,2,4-Trichlorobenzene	130		120		70-130	8		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	115		116		70-130
Toluene-d8	96		98		70-130
4-Bromofluorobenzene	90		89		70-130
Dibromofluoromethane	106		105		70-130

PCBS

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-01 D
Client ID: AX-GW-MW07-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 15:38
Analyst: JA

Date Collected: 04/19/17 09:15
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	2.50	--	10	A
Aroclor 1221	ND		ug/l	2.50	--	10	A
Aroclor 1232	ND		ug/l	2.50	--	10	A
Aroclor 1242	26.4		ug/l	2.50	--	10	A
Aroclor 1248	ND		ug/l	2.50	--	10	A
Aroclor 1254	ND		ug/l	2.50	--	10	A
Aroclor 1260	ND		ug/l	2.50	--	10	A
Aroclor 1262	ND		ug/l	2.50	--	10	A
Aroclor 1268	ND		ug/l	2.50	--	10	A
PCBs, Total	26.4		ug/l	2.50	--	10	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: AEROVOX
Lab Number: L1712362
Project Number: 149339.007.001
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-02
Client ID: AX-GW-DUP02-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 13:48
Analyst: HT

Date Collected: 04/19/17 00:00
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	2.50	--	10	A
Aroclor 1221	ND		ug/l	2.50	--	10	A
Aroclor 1232	ND		ug/l	2.50	--	10	A
Aroclor 1242	23.0		ug/l	2.50	--	10	B
Aroclor 1248	ND		ug/l	2.50	--	10	A
Aroclor 1254	ND		ug/l	2.50	--	10	A
Aroclor 1260	ND		ug/l	2.50	--	10	A
Aroclor 1262	ND		ug/l	2.50	--	10	A
Aroclor 1268	ND		ug/l	2.50	--	10	A
PCBs, Total	23.0		ug/l	2.50	--	10	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: AEROVOX
Lab Number: L1712362
Project Number: 149339.007.001
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-03
Client ID: AX-GW-MW07B-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 04:05
Analyst: JA

Date Collected: 04/19/17 10:30
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	B
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	73		30-150	A
Decachlorobiphenyl	69		30-150	A
2,4,5,6-Tetrachloro-m-xylene	78		30-150	B
Decachlorobiphenyl	68		30-150	B

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-04
Client ID: AX-GW-MW16S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 04:19
Analyst: JA

Date Collected: 04/19/17 13:30
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	80		30-150	A
Decachlorobiphenyl	74		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	72		30-150	B

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID:	L1712362-05	Date Collected:	04/19/17 10:20
Client ID:	AX-GW-MW04B-041917	Date Received:	04/19/17
Sample Location:	NEW BEDFORD, MA	Field Prep:	Not Specified
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	97,8082A	Extraction Date:	04/22/17 09:03
Analytical Date:	04/25/17 04:33	Cleanup Method:	EPA 3665A
Analyst:	JA	Cleanup Date:	04/23/17
		Cleanup Method:	EPA 3660B
		Cleanup Date:	04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	1.68		ug/l	0.250	--	1	B
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	1.68		ug/l	0.250	--	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	75		30-150	A
Decachlorobiphenyl	40		30-150	A
2,4,5,6-Tetrachloro-m-xylene	79		30-150	B
Decachlorobiphenyl	40		30-150	B

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-06
Client ID: AX-GW-MW13D-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 04:46
Analyst: JA

Date Collected: 04/19/17 09:15
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	B
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	71		30-150	A
Decachlorobiphenyl	44		30-150	A
2,4,5,6-Tetrachloro-m-xylene	77		30-150	B
Decachlorobiphenyl	43		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712362
Report Date: 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-07
Client ID: AX-GW-MW04S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 05:00
Analyst: JA

Date Collected: 04/19/17 14:20
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	78		30-150	A
Decachlorobiphenyl	75		30-150	A
2,4,5,6-Tetrachloro-m-xylene	81		30-150	B
Decachlorobiphenyl	72		30-150	B

Project Name: AEROVOX **Lab Number:** L1712362

Project Number: 149339.007.001 **Report Date:** 04/27/17

SAMPLE RESULTS

Lab ID: L1712362-08
Client ID: AX-GW-MW18S-041917
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 05:14
Analyst: JA

Date Collected: 04/19/17 13:20
Date Received: 04/19/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 09:03
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	B
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	0.280		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	0.280		ug/l	0.250	--	1	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	77		30-150	A
Decachlorobiphenyl	72		30-150	A
2,4,5,6-Tetrachloro-m-xylene	85		30-150	B
Decachlorobiphenyl	70		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 04/24/17 13:25
Analyst: HT

Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01-08 Batch: WG996550-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		30-150	A
Decachlorobiphenyl	86		30-150	A
2,4,5,6-Tetrachloro-m-xylene	92		30-150	B
Decachlorobiphenyl	87		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712362

Report Date: 04/27/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01-08 Batch: WG996550-2 WG996550-3									
Aroclor 1016	100		103		40-140	3		20	A
Aroclor 1260	110		112		40-140	2		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	89		91		30-150	A
Decachlorobiphenyl	82		84		30-150	A
2,4,5,6-Tetrachloro-m-xylene	85		86		30-150	B
Decachlorobiphenyl	83		85		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1712362-01A	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-01B	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-01C	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-01D	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-01E	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-02A	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-02B	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-02C	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-02D	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-02E	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-03A	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-03B	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-03C	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-03D	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-03E	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-04A	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-04B	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-04C	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-04D	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-04E	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-05A	Vial HCl preserved	A	N/A	5.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-05B	Vial HCl preserved	A	N/A	5.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-05C	Vial HCl preserved	A	N/A	5.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-05D	Amber 1000ml unpreserved	A	7	5.2	Y	Absent	MCP-8082-10(365)
L1712362-05E	Amber 1000ml unpreserved	A	7	5.2	Y	Absent	MCP-8082-10(365)
L1712362-06A	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-06B	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-06C	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)

*Values in parentheses indicate holding time in days

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712362
Report Date: 04/27/17

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1712362-06D	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-06E	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-07A	Vial HCl preserved	A	N/A	5.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-07B	Vial HCl preserved	A	N/A	5.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-07C	Vial HCl preserved	A	N/A	5.2	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-07D	Amber 1000ml unpreserved	A	7	5.2	Y	Absent	MCP-8082-10(365)
L1712362-07E	Amber 1000ml unpreserved	A	7	5.2	Y	Absent	MCP-8082-10(365)
L1712362-08A	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-08B	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-08C	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-08D	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-08E	Amber 1000ml unpreserved	B	7	5.0	Y	Absent	MCP-8082-10(365)
L1712362-09A	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-09B	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)
L1712362-09C	Vial HCl preserved	B	N/A	5.0	Y	Absent	MCP-8260-CHLR-10(14)

*Values in parentheses indicate holding time in days

Project Name:	AEROVOX	**Lab Number:**	L1712362
Project Number:	149339.007.001	**Report Date:**	04/27/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	AEROVOX	**Lab Number:**	L1712362
Project Number:	149339.007.001	**Report Date:**	04/27/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	AEROVOX	**Lab Number:**	L1712362
Project Number:	149339.007.001	**Report Date:**	04/27/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

Revised 4-25-17 MW/DS

Serial_No:04271719:32

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 4/19/17

ALPHA Job #: L1712362

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

Project Information

Project Name: Aerovox

Project Location: New Bedford, MA

Project #: 149339.007.001

Project Manager: Marilyn Wade

ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☑ Same as Client info PO #:

Client Information

Client: AVX Corp.

Address: Belleville Ave. New Bedford, MA

Phone:

Email: mwade@brwncald.com

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods

☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)

☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)

☐ Yes ☐ No NPDES RGP

☐ Other State /Fed Program _____ Criteria _____

Turn-Around Time

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

Date Due:

Additional Project Information:

Reference Alpha Lab # L1516164
Aerovox CVOC list (8260)

ANALYSIS: VOC: ■ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ■ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	SVOC	METALS	METALS	EPH	VPH	PCB	TPH	Sample Comments	TOTAL # BOTTLES
12362 -01	AX-GW-MW07-041917	4/19/17	09 15	GW	ZM	X						X			5
-02	AX-GW-DUP02-041917	4/19/17	99:99		ZM	X						X			5
-03	AX-GW-MW07B-041917	4/19/17	10:30		ZM	X						X			5
-04	AX-GW-MW16S-041917	4/19/17	13:30		ZM	X						X			5
-05	~~AX-GW-MW4B-041917~~	4/19/17	10:20		AB	X						X		AX-GW-MW04B-041917	5
-06	AX-GW-MW13D-041917	4/19/17	09:15		AB	X						X			5
-07	~~AX-GW-MW04S-041917~~	4/19/17	14:20		AB	X						X		AX-GW-MW04S-041917	5
-08	AX-GW-MW18S-041917	4/19/17	13:20		AB	X						X			5
-09	Trip Blank	4/19/17	-		SM	X						X			2

Container Type

Preservative

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	4/19/17 14:40	[signature] AAL	4/19/17 1440
[signature]	4/19/17 1750	[signature]	4/19/17 1750

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

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

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 4/19/17

ALPHA Job #: L1712362

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

Project Information

Project Name: Aerovox
Project Location: New Bedford, MA
Project #: 149339.007.001
Project Manager: Marilyn Wade
ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☑ Same as Client info PO #:

Client Information

Client: AVX Corp.
Address: Belleville Ave. New Bedford, MA
Phone:
Email: mwade@brwncald.com

Regulatory Requirements & Project Information Requirements

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

Turn-Around Time

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

Date Due:

Additional Project Information:

Reference Alpha Lab # L1516164
Aerovox CVOC list (8260)

ANALYSIS: VOC: ■ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ■ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	SVOC	METALS	METALS	EPH	VPH	PCB	TPH	Sample Comments	TOTAL # BOTTLES
12362 -01	AX-GW-MW07-041917	4/19/17	09 15	GW	ZM	X						X			5
-02	AX-GW-DUP02-041917	4/19/17	99:99		ZM	X						X			5
-03	AX-GW-MW07B-041917	4/19/17	10:30		ZM	X						X			5
-04	AX-GW-MW16S-041917	4/19/17	13:30		ZM	X						X			5
-05	AX-GW-MW4B-041917	4/19/17	10:20		AB	X						X			5
-06	AX-GW-MW13D-041917	4/19/17	09:15		AB	X						X			5
-07	AX-GW-MW04S-041917	4/19/17	14:20		AB	X						X			5
-08	AX-GW-MW18S-041917	4/19/17	13:20		AB	X						X			5
-09	Trip Blank	4/14/17	-		SM	X						X			2

Container Type
Preservative

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
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[signature]	4/19/17 1750	[signature]	4/19/17 1750

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

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

Method Blank Summary
Form 4

Client	: Brown & Caldwell	**Lab Number**	: L1712362
Project Name	: AEROVOX	**Project Number**	: 149339.007.001
Lab Sample ID	: WG997811-5	**Lab File ID**	: VQ170426A05
Instrument ID	: QUIMBY		
Matrix	: WATER	**Analysis Date**	: 04/26/17 13:33

Client Sample No.	Lab Sample ID	Analysis Date
WG997811-3LCS	WG997811-3	04/26/17 11:59
WG997811-4LCSD	WG997811-4	04/26/17 12:30
TRIP BLANK	L1712362-09	04/26/17 15:07
AX-GW-DUP02-041917	L1712362-02D	04/26/17 19:19
AX-GW-MW07B-041917	L1712362-03D	04/26/17 19:50
AX-GW-MW16S-041917	L1712362-04	04/26/17 20:21
AX-GW-MW04B-041917	L1712362-05	04/26/17 20:53
AX-GW-MW04S-041917	L1712362-07D	04/26/17 21:56
AX-GW-MW18S-041917	L1712362-08	04/26/17 22:27

Method Blank Summary
Form 4

Client	: Brown & Caldwell	**Lab Number**	: L1712362
Project Name	: AEROVOX	**Project Number**	: 149339.007.001
Lab Sample ID	: WG997811-10	**Lab File ID**	: VQ170427A04
Instrument ID	: QUIMBY		
Matrix	: WATER	**Analysis Date**	: 04/27/17 05:09

Client Sample No.	Lab Sample ID	Analysis Date
WG997811-8LCS	WG997811-8	04/27/17 03:35
WG997811-9LCSD	WG997811-9	04/27/17 04:06
AX-GW-MW13D-041917	L1712362-06	04/27/17 05:41
AX-GW-MW07-041917	L1712362-01D	04/27/17 06:44
AX-GW-MW04B-041917	L1712362-05D	04/27/17 07:15

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712362	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/26/17 11:59	
Lab File ID	: VQ170426A02	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997811-2	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	65	0
Dichlorodifluoromethane	10	8.047	-	19.5	20	53	0
Chloromethane	0.645	0.542	-	16	20	54	0
Vinyl chloride	10	9.601	-	4	20	66	0
Bromomethane	10	5.706	-	42.9*	20	40	0
Chloroethane	0.334	0.32	-	4.2	20	59	0
Trichlorofluoromethane	10	8.888	-	11.1	20	65	0
Ethyl ether	0.169	0.146	-	13.6	20	54	0
1,1-Dichloroethene	0.307	0.263	-	14.3	20	57	0
Carbon disulfide	1.082	0.812	-	25*	20	54	0
Freon-113	10	8.197	-	18	20	61	0
Iodomethane	10	3.448	-	65.5*	20	24	0
Acrolein	0.03106	0.00027*	-	99.1*	20	1	0
Methylene chloride	0.46	0.391	-	15	20	54	0
Acetone	10	8.968	-	10.3	20	51	0
trans-1,2-Dichloroethene	0.379	0.317	-	16.4	20	54	0
Methyl acetate	0.169	0.169	-	0	20	65	0
Methyl tert-butyl ether	0.825	0.698	-	15.4	20	53	0
tert-Butyl alcohol	0.019	0.016*	-	15.8	20	53	0
Diisopropyl ether	1.68	1.693	-	-0.8	20	65	0
1,1-Dichloroethane	0.806	0.772	-	4.2	20	62	0
Halothane	0.261	0.223	-	14.6	20	58	0
Acrylonitrile	0.102	0.089	-	12.7	20	59	0
Ethyl tert-butyl ether	1.344	1.173	-	12.7	20	55	0
Vinyl acetate	0.61	0.627	-	-2.8	20	66	0
cis-1,2-Dichloroethene	0.425	0.365	-	14.1	20	55	0
2,2-Dichloropropane	0.638	0.574	-	10	20	59	0
Bromochloromethane	0.158	0.123	-	22.2*	20	50	0
Cyclohexane	0.866	0.822	-	5.1	20	67	0
Chloroform	0.728	0.643	-	11.7	20	57	0
Ethyl acetate	0.244	0.225	-	7.8	20	59	0
Carbon tetrachloride	0.522	0.444	-	14.9	20	58	0
Tetrahydrofuran	0.071	0.07	-	1.4	20	62	0
Dibromofluoromethane	0.191	0.197	-	-3.1	20	68	0
1,1,1-Trichloroethane	0.632	0.556	-	12	20	58	0
2-Butanone	10	10.191	-	-1.9	20	62	0
1,1-Dichloropropene	0.575	0.543	-	5.6	20	64	0
Benzene	1.875	1.666	-	11.1	20	57	0
tert-Amyl methyl ether	0.995	0.785	-	21.1*	20	51	0
1,2-Dichloroethane-d4	0.235	0.264	-	-12.3	20	73	0
1,2-Dichloroethane	0.506	0.49	-	3.2	20	62	0
Methyl cyclohexane	10	8.007	-	19.9	20	62	0
Trichloroethene	0.458	0.387	-	15.5	20	55	0
Dibromomethane	0.183	0.153	-	16.4	20	54	0
1,2-Dichloropropane	0.487	0.433	-	11.1	20	58	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712362	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/26/17 11:59	
Lab File ID	: VQ170426A02	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997811-2	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
2-Chloroethyl vinyl ether	0.224	0.188	-	16.1	20	53	0
Bromodichloromethane	0.547	0.472	-	13.7	20	56	0
1,4-Dioxane	0.00192	0.00218*	-	-13.5	20	69	0
cis-1,3-Dichloropropene	0.69	0.58	-	15.9	20	54	0
Chlorobenzene-d5	1	1	-	0	20	65	0
Toluene-d8	1.331	1.391	-	-4.5	20	67	0
Toluene	1.658	1.416	-	14.6	20	54	0
4-Methyl-2-pentanone	0.123	0.105	-	14.6	20	52	0
Tetrachloroethene	0.547	0.465	-	15	20	55	0
trans-1,3-Dichloropropene	0.663	0.565	-	14.8	20	53	0
Ethyl methacrylate	0.543	0.405	-	25.4*	20	48	0
1,1,2-Trichloroethane	0.291	0.255	-	12.4	20	55	0
Chlorodibromomethane	0.387	0.304	-	21.4*	20	50	0
1,3-Dichloropropane	0.644	0.565	-	12.3	20	55	0
1,2-Dibromoethane	0.332	0.266	-	19.9	20	51	0
2-Hexanone	0.244	0.218	-	10.7	20	59	0
Chlorobenzene	1.716	1.446	-	15.7	20	53	0
Ethylbenzene	3.245	2.732	-	15.8	20	54	0
1,1,1,2-Tetrachloroethane	0.532	0.43	-	19.2	20	53	0
p/m Xylene	1.087	0.874	-	19.6	20	52	0
o Xylene	1.036	0.827	-	20.2*	20	51	0
Styrene	1.706	1.341	-	21.4*	20	50	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	67	0
Bromoform	10	6.375	-	36.3*	20	47	0
Isopropylbenzene	7.329	5.895	-	19.6	20	52	0
4-Bromofluorobenzene	1.24	1.175	-	5.2	20	62	0
Bromobenzene	1.499	1.136	-	24.2*	20	49	0
n-Propylbenzene	8.195	7.068	-	13.8	20	56	0
1,4-Dichlorobutane	2.161	1.959	-	9.3	20	60	0
1,1,2,2-Tetrachloroethane	0.969	0.878	-	9.4	20	60	0
4-Ethyltoluene	6.3	5.385	-	14.5	20	56	0
2-Chlorotoluene	5.496	4.651	-	15.4	20	55	0
1,3,5-Trimethylbenzene	4.706	4.444	-	5.6	20	64	0
1,2,3-Trichloropropane	0.847	0.703	-	17	20	56	0
trans-1,4-Dichloro-2-buten	0.43	0.367	-	14.7	20	55	0
4-Chlorotoluene	4.901	3.925	-	19.9	20	53	0
tert-Butylbenzene	4.741	3.857	-	18.6	20	53	0
1,2,4-Trimethylbenzene	4.507	4.467	-	0.9	20	64	0
sec-Butylbenzene	7.115	6.147	-	13.6	20	55	0
p-Isopropyltoluene	5.269	4.79	-	9.1	20	58	0
1,3-Dichlorobenzene	2.765	2.237	-	19.1	20	53	0
1,4-Dichlorobenzene	2.601	2.078	-	20.1*	20	52	0
p-Diethylbenzene	3.013	3.088	-	-2.5	20	62	0
n-Butylbenzene	5.712	6.002	-	-5.1	20	64	0
1,2-Dichlorobenzene	2.389	1.965	-	17.7	20	53	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712362	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/26/17 11:59	
Lab File ID	: VQ170426A02	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997811-2	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,2,4,5-Tetramethylbenzene	10	15.777	-	-57.8*	20	92	0
1,2-Dibromo-3-chloropropan	0.147	0.097	-	34*	20	41	0
1,3,5-Trichlorobenzene	1.443	1.63	-	-13	20	69	0
Hexachlorobutadiene	0.764	0.573	-	25*	20	47	0
1,2,4-Trichlorobenzene	1.082	1.261	-	-16.5	20	70	0
Naphthalene	1.806	2.305	-	-27.6*	20	78	0
1,2,3-Trichlorobenzene	0.927	1.098	-	-18.4	20	70	0

*** Value outside of QC limits.**

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712362	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/27/17 03:35	
Lab File ID	: VQ170427A01	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997811-7	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	58	0
Dichlorodifluoromethane	10	10.062	-	-0.6	20	62	0
Chloromethane	0.645	0.689	-	-6.8	20	62	0
Vinyl chloride	10	12.705	-	-27.1*	20	78	0
Bromomethane	10	6.839	-	31.6*	20	43	0
Chloroethane	0.334	0.403	-	-20.7*	20	67	0
Trichlorofluoromethane	10	10.78	-	-7.8	20	71	0
Ethyl ether	0.169	0.172	-	-1.8	20	57	0
1,1-Dichloroethene	0.307	0.329	-	-7.2	20	64	0
Carbon disulfide	1.082	0.971	-	10.3	20	58	0
Methylene chloride	0.46	0.482	-	-4.8	20	60	0
Acetone	10	10.299	-	-3	20	52	0
trans-1,2-Dichloroethene	0.379	0.399	-	-5.3	20	61	0
Methyl tert-butyl ether	0.825	0.831	-	-0.7	20	57	0
Diisopropyl ether	1.68	2.078	-	-23.7*	20	71	0
1,1-Dichloroethane	0.806	0.923	-	-14.5	20	67	0
Ethyl tert-butyl ether	1.344	1.421	-	-5.7	20	60	0
cis-1,2-Dichloroethene	0.425	0.448	-	-5.4	20	60	0
2,2-Dichloropropane	0.638	0.699	-	-9.6	20	65	0
Bromochloromethane	0.158	0.151	-	4.4	20	55	0
Chloroform	0.728	0.792	-	-8.8	20	63	0
Carbon tetrachloride	0.522	0.541	-	-3.6	20	63	0
Tetrahydrofuran	0.071	0.085	-	-19.7	20	67	0
Dibromofluoromethane	0.191	0.202	-	-5.8	20	63	0
1,1,1-Trichloroethane	0.632	0.682	-	-7.9	20	64	0
2-Butanone	10	11.894	-	-18.9	20	65	0
1,1-Dichloropropene	0.575	0.659	-	-14.6	20	70	0
Benzene	1.875	1.978	-	-5.5	20	61	0
tert-Amyl methyl ether	0.995	0.957	-	3.8	20	56	0
1,2-Dichloroethane-d4	0.235	0.271	-	-15.3	20	67	0
1,2-Dichloroethane	0.506	0.614	-	-21.3*	20	70	0
Trichloroethene	0.458	0.469	-	-2.4	20	60	0
Dibromomethane	0.183	0.199	-	-8.7	20	63	0
1,2-Dichloropropane	0.487	0.535	-	-9.9	20	65	0
Bromodichloromethane	0.547	0.553	-	-1.1	20	58	0
1,4-Dioxane	0.00192	0.00226*	-	-17.7	20	65	0
cis-1,3-Dichloropropene	0.69	0.685	-	0.7	20	58	0
Chlorobenzene-d5	1	1	-	0	20	60	0
Toluene-d8	1.331	1.273	-	4.4	20	57	0
Toluene	1.658	1.532	-	7.6	20	54	0
4-Methyl-2-pentanone	0.123	0.126	-	-2.4	20	58	0
Tetrachloroethene	0.547	0.538	-	1.6	20	60	0
trans-1,3-Dichloropropene	0.663	0.656	-	1.1	20	58	0
1,1,2-Trichloroethane	0.291	0.301	-	-3.4	20	61	0
Chlorodibromomethane	0.387	0.358	-	7.5	20	55	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712362	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/27/17 03:35	
Lab File ID	: VQ170427A01	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG997811-7	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,3-Dichloropropane	0.644	0.668	-	-3.7	20	61	0
1,2-Dibromoethane	0.332	0.313	-	5.7	20	56	0
2-Hexanone	0.244	0.257	-	-5.3	20	64	0
Chlorobenzene	1.716	1.688	-	1.6	20	58	0
Ethylbenzene	3.245	3.377	-	-4.1	20	62	0
1,1,1,2-Tetrachloroethane	0.532	0.492	-	7.5	20	56	0
p/m Xylene	1.087	1.149	-	-5.7	20	64	0
o Xylene	1.036	1.09	-	-5.2	20	63	0
Styrene	1.706	1.788	-	-4.8	20	62	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	73	0
Bromoform	10	6.801	-	32*	20	54	0
Isopropylbenzene	7.329	6.645	-	9.3	20	64	0
4-Bromofluorobenzene	1.24	1.12	-	9.7	20	64	0
Bromobenzene	1.499	1.238	-	17.4	20	58	0
n-Propylbenzene	8.195	8.225	-	-0.4	20	71	0
1,1,2,2-Tetrachloroethane	0.969	0.904	-	6.7	20	68	0
2-Chlorotoluene	5.496	5.328	-	3.1	20	69	0
1,3,5-Trimethylbenzene	4.706	5.052	-	-7.4	20	79	0
1,2,3-Trichloropropane	0.847	0.749	-	11.6	20	65	0
4-Chlorotoluene	4.901	4.561	-	6.9	20	67	0
tert-Butylbenzene	4.741	4.519	-	4.7	20	68	0
1,2,4-Trimethylbenzene	4.507	5.018	-	-11.3	20	78	0
sec-Butylbenzene	7.115	7.13	-	-0.2	20	70	0
p-Isopropyltoluene	5.269	5.529	-	-4.9	20	72	0
1,3-Dichlorobenzene	2.765	2.588	-	6.4	20	67	0
1,4-Dichlorobenzene	2.601	2.406	-	7.5	20	66	0
n-Butylbenzene	5.712	6.814	-	-19.3	20	80	0
1,2-Dichlorobenzene	2.389	2.274	-	4.8	20	67	0
1,2-Dibromo-3-chloropropan	0.147	0.109	-	25.9*	20	50	0
Hexachlorobutadiene	0.764	0.637	-	16.6	20	57	0
1,2,4-Trichlorobenzene	1.082	1.406	-	-29.9*	20	85	0
Naphthalene	1.806	2.492	-	-38*	20	92	0
1,2,3-Trichlorobenzene	0.927	1.199	-	-29.3*	20	83	0

* Value outside of QC limits.

ANALYTICAL REPORT

Lab Number:	L1712609
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	AEROVOX
Project Number:	149339.007.001
Report Date:	04/28/17

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

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

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1712609-01	AX-GW-MW33B-042017	WATER	NEW BEDFORD, MA	04/20/17 11:15	04/20/17
L1712609-02	AX-GW-MW10D-042017	WATER	NEW BEDFORD, MA	04/20/17 12:20	04/20/17
L1712609-03	AX-GW-MW32B (100-112)-042017	WATER	NEW BEDFORD, MA	04/20/17 08:50	04/20/17
L1712609-04	AX-GW-MW32B (135-145)-042017	WATER	NEW BEDFORD, MA	04/20/17 09:40	04/20/17
L1712609-05	AX-GW-MW32B (153-163)-042017	WATER	NEW BEDFORD, MA	04/20/17 10:40	04/20/17
L1712609-06	AX-GW-MW34B (60-80)-042017	WATER	NEW BEDFORD, MA	04/20/17 12:40	04/20/17
L1712609-07	AX-GW-MW34B (92-112)-042017	WATER	NEW BEDFORD, MA	04/20/17 13:30	04/20/17
L1712609-08	AX-GW-MW34B (120-130)-042017	WATER	NEW BEDFORD, MA	04/20/17 14:25	04/20/17
L1712609-09	AX-GW-MW34B (170-180)-042017	WATER	NEW BEDFORD, MA	04/20/17 15:15	04/20/17
L1712609-10	TRIP BLANK	WATER	NEW BEDFORD, MA	04/14/17 00:00	04/20/17

Project Name:	AEROVOX	**Lab Number:**	L1712609
Project Number:	149339.007.001	**Report Date:**	04/28/17

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name:	AEROVOX	**Lab Number:**	L1712609
Project Number:	149339.007.001	**Report Date:**	04/28/17

Case Narrative

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

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

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

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

HOLD POLICY

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

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

Project Name:	AEROVOX	**Lab Number:**	L1712609
Project Number:	149339.007.001	**Report Date:**	04/28/17

Case Narrative (continued)

MCP Related Narratives

Volatile Organics

In reference to question G:

L1712609-01 through -09: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

The continuing calibration standards, associated with L1712609-01 through -10, are outside the acceptance criteria for several compounds; however, they are within overall method allowances. Copies of the continuing calibration standards are included as an addendum to this report.

In reference to question I:

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

PCBs

L1712609-02 contains peaks which match the retention times for Aroclor 1242, but do not match the area ratios typical for this aroclor. The result for Aroclor 1242 is reported as "weathered".

In reference to question G:

L1712609-02: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

L1712609-02: The surrogate recoveries are below the acceptance criteria for 2,4,5,6-tetrachloro-m-xylene (0%) and decachlorobiphenyl (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

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

Authorized Signature: Cristin Walker

Title: Technical Director/Representative Date: 04/28/17

ORGANICS

VOLATILES

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-01 D
Client ID: AX-GW-MW33B-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 11:56
Analyst: NL

Date Collected: 04/20/17 11:15
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND		ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	ND		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND		ug/l	50	--	50
1,1,1-Trichloroethane	ND		ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND		ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND		ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND		ug/l	100	--	50
Vinyl chloride	ND		ug/l	50	--	50
Chloroethane	ND		ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND		ug/l	50	--	50
Trichloroethene	2100		ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	390		ug/l	50	--	50
1,2-Dichloroethene, Total	390		ug/l	50	--	50
Dichlorodifluoromethane	ND		ug/l	100	--	50
1,2-Dibromoethane	ND		ug/l	100	--	50

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-01 D Date Collected: 04/20/17 11:15

Client ID: AX-GW-MW33B-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND		ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	99		70-130
Dibromofluoromethane	105		70-130

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-02 D
Client ID: AX-GW-MW10D-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 12:42
Analyst: NL

Date Collected: 04/20/17 12:20
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND		ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	ND		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND		ug/l	50	--	50
1,1,1-Trichloroethane	ND		ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND		ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND		ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND		ug/l	100	--	50
Vinyl chloride	210		ug/l	50	--	50
Chloroethane	ND		ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND		ug/l	50	--	50
Trichloroethene	4600		ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	2000		ug/l	50	--	50
1,2-Dichloroethene, Total	2000		ug/l	50	--	50
Dichlorodifluoromethane	ND		ug/l	100	--	50
1,2-Dibromoethane	ND		ug/l	100	--	50

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-02 D Date Collected: 04/20/17 12:20

Client ID: AX-GW-MW10D-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND		ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	95		70-130
Dibromofluoromethane	110		70-130

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-03 D
Client ID: AX-GW-MW32B (100-112)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 13:14
Analyst: NL

Date Collected: 04/20/17 08:50
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND		ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	ND		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND		ug/l	50	--	50
1,1,1-Trichloroethane	ND		ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND		ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND		ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND		ug/l	100	--	50
Vinyl chloride	ND		ug/l	50	--	50
Chloroethane	ND		ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND		ug/l	50	--	50
Trichloroethene	3600		ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	88		ug/l	50	--	50
1,2-Dichloroethene, Total	88		ug/l	50	--	50
Dichlorodifluoromethane	ND		ug/l	100	--	50
1,2-Dibromoethane	ND		ug/l	100	--	50

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-03 D Date Collected: 04/20/17 08:50

Client ID: AX-GW-MW32B (100-112)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND		ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	122		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	97		70-130
Dibromofluoromethane	105		70-130

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-04 D
Client ID: AX-GW-MW32B (135-145)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 13:45
Analyst: NL

Date Collected: 04/20/17 09:40
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	200	--	100
1,1-Dichloroethane	ND		ug/l	100	--	100
Chloroform	ND		ug/l	100	--	100
Carbon tetrachloride	ND		ug/l	100	--	100
1,2-Dichloropropane	ND		ug/l	100	--	100
Dibromochloromethane	ND		ug/l	100	--	100
1,1,2-Trichloroethane	ND		ug/l	100	--	100
Tetrachloroethene	ND		ug/l	100	--	100
Chlorobenzene	ND		ug/l	100	--	100
1,2-Dichloroethane	ND		ug/l	100	--	100
1,1,1-Trichloroethane	ND		ug/l	100	--	100
Bromodichloromethane	ND		ug/l	100	--	100
trans-1,3-Dichloropropene	ND		ug/l	50	--	100
cis-1,3-Dichloropropene	ND		ug/l	50	--	100
1,3-Dichloropropene, Total	ND		ug/l	50	--	100
Bromoform	ND		ug/l	200	--	100
1,1,2,2-Tetrachloroethane	ND		ug/l	100	--	100
Chloromethane	ND		ug/l	200	--	100
Vinyl chloride	ND		ug/l	100	--	100
Chloroethane	ND		ug/l	200	--	100
1,1-Dichloroethene	ND		ug/l	100	--	100
trans-1,2-Dichloroethene	ND		ug/l	100	--	100
Trichloroethene	5100		ug/l	100	--	100
1,2-Dichlorobenzene	ND		ug/l	100	--	100
1,3-Dichlorobenzene	ND		ug/l	100	--	100
1,4-Dichlorobenzene	ND		ug/l	100	--	100
cis-1,2-Dichloroethene	ND		ug/l	100	--	100
1,2-Dichloroethene, Total	ND		ug/l	100	--	100
Dichlorodifluoromethane	ND		ug/l	200	--	100
1,2-Dibromoethane	ND		ug/l	200	--	100

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-04 D Date Collected: 04/20/17 09:40

Client ID: AX-GW-MW32B (135-145)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	200	--	100
1,1,1,2-Tetrachloroethane	ND		ug/l	100	--	100
o-Chlorotoluene	ND		ug/l	200	--	100
p-Chlorotoluene	ND		ug/l	200	--	100
Hexachlorobutadiene	ND		ug/l	60	--	100
1,2,4-Trichlorobenzene	ND		ug/l	200	--	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	116		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	106		70-130

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-05 D
Client ID: AX-GW-MW32B (153-163)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 15:09
Analyst: NL

Date Collected: 04/20/17 10:40
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	100	--	50
1,1-Dichloroethane	ND		ug/l	50	--	50
Chloroform	ND		ug/l	50	--	50
Carbon tetrachloride	ND		ug/l	50	--	50
1,2-Dichloropropane	ND		ug/l	50	--	50
Dibromochloromethane	ND		ug/l	50	--	50
1,1,2-Trichloroethane	ND		ug/l	50	--	50
Tetrachloroethene	ND		ug/l	50	--	50
Chlorobenzene	ND		ug/l	50	--	50
1,2-Dichloroethane	ND		ug/l	50	--	50
1,1,1-Trichloroethane	ND		ug/l	50	--	50
Bromodichloromethane	ND		ug/l	50	--	50
trans-1,3-Dichloropropene	ND		ug/l	25	--	50
cis-1,3-Dichloropropene	ND		ug/l	25	--	50
1,3-Dichloropropene, Total	ND		ug/l	25	--	50
Bromoform	ND		ug/l	100	--	50
1,1,2,2-Tetrachloroethane	ND		ug/l	50	--	50
Chloromethane	ND		ug/l	100	--	50
Vinyl chloride	ND		ug/l	50	--	50
Chloroethane	ND		ug/l	100	--	50
1,1-Dichloroethene	ND		ug/l	50	--	50
trans-1,2-Dichloroethene	ND		ug/l	50	--	50
Trichloroethene	2500		ug/l	50	--	50
1,2-Dichlorobenzene	ND		ug/l	50	--	50
1,3-Dichlorobenzene	ND		ug/l	50	--	50
1,4-Dichlorobenzene	ND		ug/l	50	--	50
cis-1,2-Dichloroethene	50		ug/l	50	--	50
1,2-Dichloroethene, Total	50		ug/l	50	--	50
Dichlorodifluoromethane	ND		ug/l	100	--	50
1,2-Dibromoethane	ND		ug/l	100	--	50

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-05 D Date Collected: 04/20/17 10:40

Client ID: AX-GW-MW32B (153-163)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	100	--	50
1,1,1,2-Tetrachloroethane	ND		ug/l	50	--	50
o-Chlorotoluene	ND		ug/l	100	--	50
p-Chlorotoluene	ND		ug/l	100	--	50
Hexachlorobutadiene	ND		ug/l	30	--	50
1,2,4-Trichlorobenzene	ND		ug/l	100	--	50

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	92		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	99		70-130

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-06 D
Client ID: AX-GW-MW34B (60-80)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 15:34
Analyst: NL

Date Collected: 04/20/17 12:40
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2000	--	1000
1,1-Dichloroethane	ND		ug/l	1000	--	1000
Chloroform	ND		ug/l	1000	--	1000
Carbon tetrachloride	ND		ug/l	1000	--	1000
1,2-Dichloropropane	ND		ug/l	1000	--	1000
Dibromochloromethane	ND		ug/l	1000	--	1000
1,1,2-Trichloroethane	ND		ug/l	1000	--	1000
Tetrachloroethene	ND		ug/l	1000	--	1000
Chlorobenzene	ND		ug/l	1000	--	1000
1,2-Dichloroethane	ND		ug/l	1000	--	1000
1,1,1-Trichloroethane	ND		ug/l	1000	--	1000
Bromodichloromethane	ND		ug/l	1000	--	1000
trans-1,3-Dichloropropene	ND		ug/l	500	--	1000
cis-1,3-Dichloropropene	ND		ug/l	500	--	1000
1,3-Dichloropropene, Total	ND		ug/l	500	--	1000
Bromoform	ND		ug/l	2000	--	1000
1,1,2,2-Tetrachloroethane	ND		ug/l	1000	--	1000
Chloromethane	ND		ug/l	2000	--	1000
Vinyl chloride	ND		ug/l	1000	--	1000
Chloroethane	ND		ug/l	2000	--	1000
1,1-Dichloroethene	ND		ug/l	1000	--	1000
trans-1,2-Dichloroethene	ND		ug/l	1000	--	1000
Trichloroethene	80000		ug/l	1000	--	1000
1,2-Dichlorobenzene	ND		ug/l	1000	--	1000
1,3-Dichlorobenzene	ND		ug/l	1000	--	1000
1,4-Dichlorobenzene	ND		ug/l	1000	--	1000
cis-1,2-Dichloroethene	15000		ug/l	1000	--	1000
1,2-Dichloroethene, Total	15000		ug/l	1000	--	1000
Dichlorodifluoromethane	ND		ug/l	2000	--	1000
1,2-Dibromoethane	ND		ug/l	2000	--	1000

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-06 D Date Collected: 04/20/17 12:40

Client ID: AX-GW-MW34B (60-80)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2000	--	1000
1,1,1,2-Tetrachloroethane	ND		ug/l	1000	--	1000
o-Chlorotoluene	ND		ug/l	2000	--	1000
p-Chlorotoluene	ND		ug/l	2000	--	1000
Hexachlorobutadiene	ND		ug/l	600	--	1000
1,2,4-Trichlorobenzene	ND		ug/l	2000	--	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	93		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	97		70-130

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-07 D
Client ID: AX-GW-MW34B (92-112)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 16:00
Analyst: NL

Date Collected: 04/20/17 13:30
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2000	--	1000
1,1-Dichloroethane	ND		ug/l	1000	--	1000
Chloroform	ND		ug/l	1000	--	1000
Carbon tetrachloride	ND		ug/l	1000	--	1000
1,2-Dichloropropane	ND		ug/l	1000	--	1000
Dibromochloromethane	ND		ug/l	1000	--	1000
1,1,2-Trichloroethane	ND		ug/l	1000	--	1000
Tetrachloroethene	ND		ug/l	1000	--	1000
Chlorobenzene	ND		ug/l	1000	--	1000
1,2-Dichloroethane	ND		ug/l	1000	--	1000
1,1,1-Trichloroethane	ND		ug/l	1000	--	1000
Bromodichloromethane	ND		ug/l	1000	--	1000
trans-1,3-Dichloropropene	ND		ug/l	500	--	1000
cis-1,3-Dichloropropene	ND		ug/l	500	--	1000
1,3-Dichloropropene, Total	ND		ug/l	500	--	1000
Bromoform	ND		ug/l	2000	--	1000
1,1,2,2-Tetrachloroethane	ND		ug/l	1000	--	1000
Chloromethane	ND		ug/l	2000	--	1000
Vinyl chloride	ND		ug/l	1000	--	1000
Chloroethane	ND		ug/l	2000	--	1000
1,1-Dichloroethene	ND		ug/l	1000	--	1000
trans-1,2-Dichloroethene	ND		ug/l	1000	--	1000
Trichloroethene	100000		ug/l	1000	--	1000
1,2-Dichlorobenzene	ND		ug/l	1000	--	1000
1,3-Dichlorobenzene	ND		ug/l	1000	--	1000
1,4-Dichlorobenzene	ND		ug/l	1000	--	1000
cis-1,2-Dichloroethene	16000		ug/l	1000	--	1000
1,2-Dichloroethene, Total	16000		ug/l	1000	--	1000
Dichlorodifluoromethane	ND		ug/l	2000	--	1000
1,2-Dibromoethane	ND		ug/l	2000	--	1000

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-07 D Date Collected: 04/20/17 13:30

Client ID: AX-GW-MW34B (92-112)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2000	--	1000
1,1,1,2-Tetrachloroethane	ND		ug/l	1000	--	1000
o-Chlorotoluene	ND		ug/l	2000	--	1000
p-Chlorotoluene	ND		ug/l	2000	--	1000
Hexachlorobutadiene	ND		ug/l	600	--	1000
1,2,4-Trichlorobenzene	ND		ug/l	2000	--	1000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	97		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	101		70-130

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-08 D
Client ID: AX-GW-MW34B (120-130)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 16:25
Analyst: NL

Date Collected: 04/20/17 14:25
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	4000	--	2000
1,1-Dichloroethane	ND		ug/l	2000	--	2000
Chloroform	ND		ug/l	2000	--	2000
Carbon tetrachloride	ND		ug/l	2000	--	2000
1,2-Dichloropropane	ND		ug/l	2000	--	2000
Dibromochloromethane	ND		ug/l	2000	--	2000
1,1,2-Trichloroethane	ND		ug/l	2000	--	2000
Tetrachloroethene	ND		ug/l	2000	--	2000
Chlorobenzene	ND		ug/l	2000	--	2000
1,2-Dichloroethane	ND		ug/l	2000	--	2000
1,1,1-Trichloroethane	ND		ug/l	2000	--	2000
Bromodichloromethane	ND		ug/l	2000	--	2000
trans-1,3-Dichloropropene	ND		ug/l	1000	--	2000
cis-1,3-Dichloropropene	ND		ug/l	1000	--	2000
1,3-Dichloropropene, Total	ND		ug/l	1000	--	2000
Bromoform	ND		ug/l	4000	--	2000
1,1,2,2-Tetrachloroethane	ND		ug/l	2000	--	2000
Chloromethane	ND		ug/l	4000	--	2000
Vinyl chloride	ND		ug/l	2000	--	2000
Chloroethane	ND		ug/l	4000	--	2000
1,1-Dichloroethene	ND		ug/l	2000	--	2000
trans-1,2-Dichloroethene	ND		ug/l	2000	--	2000
Trichloroethene	70000		ug/l	2000	--	2000
1,2-Dichlorobenzene	ND		ug/l	2000	--	2000
1,3-Dichlorobenzene	ND		ug/l	2000	--	2000
1,4-Dichlorobenzene	ND		ug/l	2000	--	2000
cis-1,2-Dichloroethene	36000		ug/l	2000	--	2000
1,2-Dichloroethene, Total	36000		ug/l	2000	--	2000
Dichlorodifluoromethane	ND		ug/l	4000	--	2000
1,2-Dibromoethane	ND		ug/l	4000	--	2000

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-08 D Date Collected: 04/20/17 14:25

Client ID: AX-GW-MW34B (120-130)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	4000	--	2000
1,1,1,2-Tetrachloroethane	ND		ug/l	2000	--	2000
o-Chlorotoluene	ND		ug/l	4000	--	2000
p-Chlorotoluene	ND		ug/l	4000	--	2000
Hexachlorobutadiene	ND		ug/l	1200	--	2000
1,2,4-Trichlorobenzene	ND		ug/l	4000	--	2000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	108		70-130
Dibromofluoromethane	100		70-130

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-09 D2
Client ID: AX-GW-MW34B (170-180)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/28/17 08:59
Analyst: MM

Date Collected: 04/20/17 15:15
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Trichloroethene	3800000		ug/l	50000	--	50000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	109		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	109		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-09 D
Client ID: AX-GW-MW34B (170-180)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 16:50
Analyst: MM

Date Collected: 04/20/17 15:15
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	4000	--	2000
1,1-Dichloroethane	ND		ug/l	2000	--	2000
Chloroform	ND		ug/l	2000	--	2000
Carbon tetrachloride	ND		ug/l	2000	--	2000
1,2-Dichloropropane	ND		ug/l	2000	--	2000
Dibromochloromethane	ND		ug/l	2000	--	2000
1,1,2-Trichloroethane	ND		ug/l	2000	--	2000
Tetrachloroethene	ND		ug/l	2000	--	2000
Chlorobenzene	ND		ug/l	2000	--	2000
1,2-Dichloroethane	ND		ug/l	2000	--	2000
1,1,1-Trichloroethane	ND		ug/l	2000	--	2000
Bromodichloromethane	ND		ug/l	2000	--	2000
trans-1,3-Dichloropropene	ND		ug/l	1000	--	2000
cis-1,3-Dichloropropene	ND		ug/l	1000	--	2000
1,3-Dichloropropene, Total	ND		ug/l	1000	--	2000
Bromoform	ND		ug/l	4000	--	2000
1,1,2,2-Tetrachloroethane	ND		ug/l	2000	--	2000
Chloromethane	ND		ug/l	4000	--	2000
Vinyl chloride	ND		ug/l	2000	--	2000
Chloroethane	ND		ug/l	4000	--	2000
1,1-Dichloroethene	ND		ug/l	2000	--	2000
trans-1,2-Dichloroethene	ND		ug/l	2000	--	2000
Trichloroethene	420000	E	ug/l	2000	--	2000
1,2-Dichlorobenzene	ND		ug/l	2000	--	2000
1,3-Dichlorobenzene	ND		ug/l	2000	--	2000
1,4-Dichlorobenzene	ND		ug/l	2000	--	2000
cis-1,2-Dichloroethene	13000		ug/l	2000	--	2000
1,2-Dichloroethene, Total	13000		ug/l	2000	--	2000
Dichlorodifluoromethane	ND		ug/l	4000	--	2000
1,2-Dibromoethane	ND		ug/l	4000	--	2000

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-09 D Date Collected: 04/20/17 15:15

Client ID: AX-GW-MW34B (170-180)-042017 Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	4000	--	2000
1,1,1,2-Tetrachloroethane	ND		ug/l	2000	--	2000
o-Chlorotoluene	ND		ug/l	4000	--	2000
p-Chlorotoluene	ND		ug/l	4000	--	2000
Hexachlorobutadiene	ND		ug/l	1200	--	2000
1,2,4-Trichlorobenzene	ND		ug/l	4000	--	2000

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	102		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	107		70-130
Dibromofluoromethane	101		70-130

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-10
Client ID: TRIP BLANK
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8260C
Analytical Date: 04/27/17 14:44
Analyst: NL

Date Collected: 04/14/17 00:00
Date Received: 04/20/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene, Total	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-10 Date Collected: 04/14/17 00:00

Client ID: TRIP BLANK Date Received: 04/20/17

Sample Location: NEW BEDFORD, MA Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	88		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	96		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/27/17 05:09
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-04 Batch: WG998135-5					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene, Total	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/27/17 05:09
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-04 Batch: WG998135-5					
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
o-Chlorotoluene	ND		ug/l	2.0	--
p-Chlorotoluene	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	118		70-130
Toluene-d8	98		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	108		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/28/17 06:28
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 09 Batch: WG998214-10					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene, Total	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/28/17 06:28
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 09 Batch: WG998214-10					
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
o-Chlorotoluene	ND		ug/l	2.0	--
p-Chlorotoluene	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	103		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	103		70-130

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/27/17 10:07
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 05-10 Batch: WG998214-5					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene, Total	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--

Project Name: AEROVOX
Project Number: 149339.007.001
Lab Number: L1712609
Report Date: 04/28/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8260C
Analytical Date: 04/27/17 10:07
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 05-10 Batch: WG998214-5					
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
o-Chlorotoluene	ND		ug/l	2.0	--
p-Chlorotoluene	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	106		70-130
Toluene-d8	99		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	107		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-04 Batch: WG998135-3 WG998135-4								
Methylene chloride	100		95		70-130	5		20
1,1-Dichloroethane	110		110		70-130	0		20
Chloroform	110		100		70-130	10		20
Carbon tetrachloride	100		100		70-130	0		20
1,2-Dichloropropane	110		100		70-130	10		20
Dibromochloromethane	92		86		70-130	7		20
1,1,2-Trichloroethane	100		98		70-130	2		20
Tetrachloroethene	98		94		70-130	4		20
Chlorobenzene	98		93		70-130	5		20
1,2-Dichloroethane	120		110		70-130	9		20
1,1,1-Trichloroethane	110		100		70-130	10		20
Bromodichloromethane	100		97		70-130	3		20
trans-1,3-Dichloropropene	99		95		70-130	4		20
cis-1,3-Dichloropropene	99		95		70-130	4		20
Bromoform	**68**	Q	**59**	Q	70-130	14		20
1,1,2,2-Tetrachloroethane	93		85		70-130	9		20
Chloromethane	110		99		70-130	11		20
Vinyl chloride	130		120		70-130	8		20
Chloroethane	120		110		70-130	9		20
1,1-Dichloroethene	110		100		70-130	10		20
trans-1,2-Dichloroethene	100		96		70-130	4		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712609

Report Date: 04/28/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-04 Batch: WG998135-3 WG998135-4								
Trichloroethene	100		98		70-130	2		20
1,2-Dichlorobenzene	95		90		70-130	5		20
1,3-Dichlorobenzene	94		89		70-130	5		20
1,4-Dichlorobenzene	92		89		70-130	3		20
cis-1,2-Dichloroethene	100		97		70-130	3		20
Dichlorodifluoromethane	100		96		70-130	4		20
1,2-Dibromoethane	94		89		70-130	5		20
1,3-Dichloropropane	100		98		70-130	2		20
1,1,1,2-Tetrachloroethane	92		87		70-130	6		20
o-Chlorotoluene	97		92		70-130	5		20
p-Chlorotoluene	93		89		70-130	4		20
Hexachlorobutadiene	83		84		70-130	1		20
1,2,4-Trichlorobenzene	130		120		70-130	8		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	115		116		70-130
Toluene-d8	96		98		70-130
4-Bromofluorobenzene	90		89		70-130
Dibromofluoromethane	106		105		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712609

Report Date: 04/28/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 05-10 Batch: WG998214-3 WG998214-4								
Methylene chloride	100		100		70-130	0		20
1,1-Dichloroethane	100		100		70-130	0		20
Chloroform	100		100		70-130	0		20
Carbon tetrachloride	100		100		70-130	0		20
1,2-Dichloropropane	96		97		70-130	1		20
Dibromochloromethane	95		96		70-130	1		20
1,1,2-Trichloroethane	97		96		70-130	1		20
Tetrachloroethene	100		100		70-130	0		20
Chlorobenzene	96		96		70-130	0		20
1,2-Dichloroethane	98		100		70-130	2		20
1,1,1-Trichloroethane	100		100		70-130	0		20
Bromodichloromethane	94		96		70-130	2		20
trans-1,3-Dichloropropene	95		93		70-130	2		20
cis-1,3-Dichloropropene	100		100		70-130	0		20
Bromoform	90		92		70-130	2		20
1,1,2,2-Tetrachloroethane	92		92		70-130	0		20
Chloromethane	92		93		70-130	1		20
Vinyl chloride	86		85		70-130	1		20
Chloroethane	95		98		70-130	3		20
1,1-Dichloroethene	100		110		70-130	10		20
trans-1,2-Dichloroethene	98		100		70-130	2		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 05-10 Batch: WG998214-3 WG998214-4								
Trichloroethene	98		99		70-130	1		20
1,2-Dichlorobenzene	95		97		70-130	2		20
1,3-Dichlorobenzene	98		99		70-130	1		20
1,4-Dichlorobenzene	96		95		70-130	1		20
cis-1,2-Dichloroethene	100		100		70-130	0		20
Dichlorodifluoromethane	95		94		70-130	1		20
1,2-Dibromoethane	96		99		70-130	3		20
1,3-Dichloropropane	94		95		70-130	1		20
1,1,1,2-Tetrachloroethane	97		100		70-130	3		20
o-Chlorotoluene	100		100		70-130	0		20
p-Chlorotoluene	100		100		70-130	0		20
Hexachlorobutadiene	100		100		70-130	0		20
1,2,4-Trichlorobenzene	94		95		70-130	1		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	98		102		70-130
Toluene-d8	101		99		70-130
4-Bromofluorobenzene	106		103		70-130
Dibromofluoromethane	102		102		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 09 Batch: WG998214-8 WG998214-9								
Methylene chloride	100		98		70-130	2		20
1,1-Dichloroethane	100		98		70-130	2		20
Chloroform	110		99		70-130	11		20
Carbon tetrachloride	100		100		70-130	0		20
1,2-Dichloropropane	100		90		70-130	11		20
Dibromochloromethane	98		97		70-130	1		20
1,1,2-Trichloroethane	100		100		70-130	0		20
Tetrachloroethene	100		100		70-130	0		20
Chlorobenzene	98		100		70-130	2		20
1,2-Dichloroethane	110		99		70-130	11		20
1,1,1-Trichloroethane	110		100		70-130	10		20
Bromodichloromethane	99		91		70-130	8		20
trans-1,3-Dichloropropene	95		92		70-130	3		20
cis-1,3-Dichloropropene	100		99		70-130	1		20
Bromoform	95		89		70-130	7		20
1,1,2,2-Tetrachloroethane	94		94		70-130	0		20
Chloromethane	88		87		70-130	1		20
Vinyl chloride	87		84		70-130	4		20
Chloroethane	97		92		70-130	5		20
1,1-Dichloroethene	100		98		70-130	2		20
trans-1,2-Dichloroethene	110		95		70-130	15		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712609

Report Date: 04/28/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 09 Batch: WG998214-8 WG998214-9								
Trichloroethene	100		100		70-130	0		20
1,2-Dichlorobenzene	97		96		70-130	1		20
1,3-Dichlorobenzene	100		100		70-130	0		20
1,4-Dichlorobenzene	98		96		70-130	2		20
cis-1,2-Dichloroethene	110		100		70-130	10		20
Dichlorodifluoromethane	92		92		70-130	0		20
1,2-Dibromoethane	100		98		70-130	2		20
1,3-Dichloropropane	100		98		70-130	2		20
1,1,1,2-Tetrachloroethane	100		100		70-130	0		20
o-Chlorotoluene	100		100		70-130	0		20
p-Chlorotoluene	100		100		70-130	0		20
Hexachlorobutadiene	100		100		70-130	0		20
1,2,4-Trichlorobenzene	95		94		70-130	1		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	106		97		70-130
Toluene-d8	101		102		70-130
4-Bromofluorobenzene	102		103		70-130
Dibromofluoromethane	103		98		70-130

PCBS

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-01
Client ID: AX-GW-MW33B-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 00:38
Analyst: AF

Date Collected: 04/20/17 11:15
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	91		30-150	A
Decachlorobiphenyl	56		30-150	A
2,4,5,6-Tetrachloro-m-xylene	89		30-150	B
Decachlorobiphenyl	39		30-150	B

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-02 D
Client ID: AX-GW-MW10D-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/26/17 22:27
Analyst: JW

Date Collected: 04/20/17 12:20
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	2.50	--	10	A
Aroclor 1221	ND		ug/l	2.50	--	10	A
Aroclor 1232	ND		ug/l	2.50	--	10	A
Aroclor 1242	29.3		ug/l	2.50	--	10	B
Aroclor 1248	ND		ug/l	2.50	--	10	A
Aroclor 1254	ND		ug/l	2.50	--	10	A
Aroclor 1260	ND		ug/l	2.50	--	10	A
Aroclor 1262	ND		ug/l	2.50	--	10	A
Aroclor 1268	ND		ug/l	2.50	--	10	A
PCBs, Total	29.3		ug/l	2.50	--	10	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-03
Client ID: AX-GW-MW32B (100-112)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:05
Analyst: AF

Date Collected: 04/20/17 08:50
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	88		30-150	A
Decachlorobiphenyl	63		30-150	A
2,4,5,6-Tetrachloro-m-xylene	88		30-150	B
Decachlorobiphenyl	43		30-150	B

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-04
Client ID: AX-GW-MW32B (135-145)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:18
Analyst: AF

Date Collected: 04/20/17 09:40
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	62		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	43		30-150	B

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-05
Client ID: AX-GW-MW32B (153-163)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:32
Analyst: AF

Date Collected: 04/20/17 10:40
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	65		30-150	A
2,4,5,6-Tetrachloro-m-xylene	89		30-150	B
Decachlorobiphenyl	49		30-150	B

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-06
Client ID: AX-GW-MW34B (60-80)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:45
Analyst: AF

Date Collected: 04/20/17 12:40
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	82		30-150	A
Decachlorobiphenyl	66		30-150	A
2,4,5,6-Tetrachloro-m-xylene	92		30-150	B
Decachlorobiphenyl	52		30-150	B

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-07
Client ID: AX-GW-MW34B (92-112)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 01:59
Analyst: AF

Date Collected: 04/20/17 13:30
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	88		30-150	A
Decachlorobiphenyl	73		30-150	A
2,4,5,6-Tetrachloro-m-xylene	97		30-150	B
Decachlorobiphenyl	56		30-150	B

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-08
Client ID: AX-GW-MW34B (120-130)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 02:12
Analyst: AF

Date Collected: 04/20/17 14:25
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	80		30-150	A
Decachlorobiphenyl	65		30-150	A
2,4,5,6-Tetrachloro-m-xylene	90		30-150	B
Decachlorobiphenyl	51		30-150	B

Project Name: AEROVOX **Lab Number:** L1712609

Project Number: 149339.007.001 **Report Date:** 04/28/17

SAMPLE RESULTS

Lab ID: L1712609-09
Client ID: AX-GW-MW34B (170-180)-042017
Sample Location: NEW BEDFORD, MA
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/25/17 02:26
Analyst: AF

Date Collected: 04/20/17 15:15
Date Received: 04/20/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	94		30-150	A
Decachlorobiphenyl	65		30-150	A
2,4,5,6-Tetrachloro-m-xylene	88		30-150	B
Decachlorobiphenyl	50		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 04/24/17 23:58
Analyst: AF

Extraction Method: EPA 3510C
Extraction Date: 04/22/17 23:09
Cleanup Method: EPA 3665A
Cleanup Date: 04/23/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/23/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01-09 Batch: WG996726-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	70		30-150	A
Decachlorobiphenyl	33		30-150	A
2,4,5,6-Tetrachloro-m-xylene	87		30-150	B
Decachlorobiphenyl	38		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: AEROVOX

Project Number: 149339.007.001

Lab Number: L1712609

Report Date: 04/28/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01-09 Batch: WG996726-2 WG996726-3									
Aroclor 1016	89		94		40-140	5		20	A
Aroclor 1260	63		70		40-140	10		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	83		82		30-150	A
Decachlorobiphenyl	43		48		30-150	A
2,4,5,6-Tetrachloro-m-xylene	75		80		30-150	B
Decachlorobiphenyl	35		36		30-150	B

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1712609-01A	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-01B	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-01C	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-01D	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-01E	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-02A	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-02B	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-02C	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-02D	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-02E	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-03A	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-03B	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-03C	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-03D	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-03E	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-04A	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-04B	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-04C	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-04D	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-04E	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-05A	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-05B	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-05C	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-05D	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-05E	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-06A	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-06B	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-06C	Vial HCl preserved	A	N/A	4.7	Y	Absent	MCP-8260-CHLR-10(14)

*Values in parentheses indicate holding time in days

Project Name: AEROVOX
Project Number: 149339.007.001

Lab Number: L1712609
Report Date: 04/28/17

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1712609-06D	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-06E	Amber 1000ml unpreserved	A	7	4.7	Y	Absent	MCP-8082-10(365)
L1712609-07A	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-07B	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-07C	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-07D	Amber 1000ml unpreserved	B	7	5.1	Y	Absent	MCP-8082-10(365)
L1712609-07E	Amber 1000ml unpreserved	B	7	5.1	Y	Absent	MCP-8082-10(365)
L1712609-08A	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-08B	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-08C	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-08D	Amber 1000ml unpreserved	B	7	5.1	Y	Absent	MCP-8082-10(365)
L1712609-08E	Amber 1000ml unpreserved	B	7	5.1	Y	Absent	MCP-8082-10(365)
L1712609-09A	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-09B	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-09C	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-09D	Amber 1000ml unpreserved	B	7	5.1	Y	Absent	MCP-8082-10(365)
L1712609-09E	Amber 1000ml unpreserved	B	7	5.1	Y	Absent	MCP-8082-10(365)
L1712609-10A	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)
L1712609-10B	Vial HCl preserved	B	N/A	5.1	Y	Absent	MCP-8260-CHLR-10(14)

*Values in parentheses indicate holding time in days

Project Name:	AEROVOX	**Lab Number:**	L1712609
Project Number:	149339.007.001	**Report Date:**	04/28/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	AEROVOX	**Lab Number:**	L1712609
Project Number:	149339.007.001	**Report Date:**	04/28/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	AEROVOX	**Lab Number:**	L1712609
Project Number:	149339.007.001	**Report Date:**	04/28/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 04/21/17

ALPHA Job #: L1712609

ALPHA ANALYTICAL
8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Client Information

Client: AVX Corp.
Address: Belleville Ave.
New Bedford, MA
Phone:
Email: mwade@bruncald.com

Project Information

Project Name: Aerovox
Project Location: New Bedford, MA
Project #: 149339.007.001
Project Manager: Marilyn Wade
ALPHA Quote #:

Turn-Around Time

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

Date Due:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☑ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

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

Additional Project Information:

Reference Alpha Lab #L1516164
Aerovox CVOC list (8260)

ANALYSIS: VOC: ☑ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☑ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

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

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	SVOC	METALS	METALS	EPH	VPH	☑ PCB	TPH	Sample Comments	TOTAL # BOTTLES
12609-01	AX-GW-MW33B-042017	4/20/17	11:15	GW	ZM	X						X			5
02	AX-GW-MW10D-042017	4/20/17	12:20		ZM	X						X			5
03	AX-GW-MW32B(100-112)-042017	4/20/17	08:50		AB	X						X			5
04	AX-GW-MW32B(135-145)-042017		09:40		AB	X						X			5
05	AX-GW-MW32B(153-163)-042017		10:40		AB	X						X			5
06	AX-GW-MW34B(60-80)-042017		12:40		AB	X						X			5
07	AX-GW-MW34B(92-112)-042017		13:30		AB	X						X			5
08	AX-GW-MW34B(120-130)-042017		14:25		AB	X						X			5
09	AX-GW-MW34B(170-180)-042017		15:15		AB	X						X			5
10	Trip Blank	4/14	—		SM	X									2

Container Type
Preservative

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
Zach Milwood	4/20/17 15:10	MCM AAL	4/20/17 1710
MSM	4/20/17 1710	Richard Lutz	4/20/17 17:10

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

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

Method Blank Summary
Form 4

Client	: Brown & Caldwell	**Lab Number**	: L1712609
Project Name	: AEROVOX	**Project Number**	: 149339.007.001
Lab Sample ID	: WG998135-5	**Lab File ID**	: VQ170427A04
Instrument ID	: QUIMBY		
Matrix	: WATER	**Analysis Date**	: 04/27/17 05:09

Client Sample No.	Lab Sample ID	Analysis Date
WG998135-3LCS	WG998135-3	04/27/17 03:35
WG998135-4LCSD	WG998135-4	04/27/17 04:06
AX-GW-MW33B-042017	L1712609-01D	04/27/17 11:56
AX-GW-MW10D-042017	L1712609-02D	04/27/17 12:42
AX-GW-MW32B (100-112)-042017	L1712609-03D	04/27/17 13:14
AX-GW-MW32B (135-145)-042017	L1712609-04D	04/27/17 13:45

Method Blank Summary
Form 4

Client	: Brown & Caldwell	**Lab Number**	: L1712609
Project Name	: AEROVOX	**Project Number**	: 149339.007.001
Lab Sample ID	: WG998214-5	**Lab File ID**	: V16170427A05
Instrument ID	: VOA116		
Matrix	: WATER	**Analysis Date**	: 04/27/17 10:07

Client Sample No.	Lab Sample ID	Analysis Date
WG998214-3LCS	WG998214-3	04/27/17 08:52
WG998214-4LCSD	WG998214-4	04/27/17 09:17
TRIP BLANK	L1712609-10	04/27/17 14:44
AX-GW-MW32B (153-163)-042017	L1712609-05D	04/27/17 15:09
AX-GW-MW34B (60-80)-042017	L1712609-06D	04/27/17 15:34
AX-GW-MW34B (92-112)-042017	L1712609-07D	04/27/17 16:00
AX-GW-MW34B (120-130)-042017	L1712609-08D	04/27/17 16:25
AX-GW-MW34B (170-180)-042017	L1712609-09D	04/27/17 16:50

Method Blank Summary
Form 4

Client	: Brown & Caldwell	**Lab Number**	: L1712609
Project Name	: AEROVOX	**Project Number**	: 149339.007.001
Lab Sample ID	: WG998214-10	**Lab File ID**	: V16170428A07
Instrument ID	: VOA116		
Matrix	: WATER	**Analysis Date**	: 04/28/17 06:28

Client Sample No.	Lab Sample ID	Analysis Date
WG998214-8LCS	WG998214-8	04/28/17 05:13
WG998214-9LCSD	WG998214-9	04/28/17 05:38
AX-GW-MW34B (170-180)-042017	L1712609-09D2	04/28/17 08:59

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712609	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/27/17 03:35	
Lab File ID	: VQ170427A01	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG998135-2	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	58	0
Dichlorodifluoromethane	10	10.062	-	-0.6	20	62	0
Chloromethane	0.645	0.689	-	-6.8	20	62	0
Vinyl chloride	10	12.705	-	-27.1*	20	78	0
Bromomethane	10	6.839	-	31.6*	20	43	0
Chloroethane	0.334	0.403	-	-20.7*	20	67	0
Trichlorofluoromethane	10	10.78	-	-7.8	20	71	0
Ethyl ether	0.169	0.172	-	-1.8	20	57	0
1,1-Dichloroethene	0.307	0.329	-	-7.2	20	64	0
Carbon disulfide	1.082	0.971	-	10.3	20	58	0
Methylene chloride	0.46	0.482	-	-4.8	20	60	0
Acetone	10	10.299	-	-3	20	52	0
trans-1,2-Dichloroethene	0.379	0.399	-	-5.3	20	61	0
Methyl tert-butyl ether	0.825	0.831	-	-0.7	20	57	0
Diisopropyl ether	1.68	2.078	-	-23.7*	20	71	0
1,1-Dichloroethane	0.806	0.923	-	-14.5	20	67	0
Ethyl tert-butyl ether	1.344	1.421	-	-5.7	20	60	0
cis-1,2-Dichloroethene	0.425	0.448	-	-5.4	20	60	0
2,2-Dichloropropane	0.638	0.699	-	-9.6	20	65	0
Bromochloromethane	0.158	0.151	-	4.4	20	55	0
Chloroform	0.728	0.792	-	-8.8	20	63	0
Carbon tetrachloride	0.522	0.541	-	-3.6	20	63	0
Tetrahydrofuran	0.071	0.085	-	-19.7	20	67	0
Dibromofluoromethane	0.191	0.202	-	-5.8	20	63	0
1,1,1-Trichloroethane	0.632	0.682	-	-7.9	20	64	0
2-Butanone	10	11.894	-	-18.9	20	65	0
1,1-Dichloropropene	0.575	0.659	-	-14.6	20	70	0
Benzene	1.875	1.978	-	-5.5	20	61	0
tert-Amyl methyl ether	0.995	0.957	-	3.8	20	56	0
1,2-Dichloroethane-d4	0.235	0.271	-	-15.3	20	67	0
1,2-Dichloroethane	0.506	0.614	-	-21.3*	20	70	0
Trichloroethene	0.458	0.469	-	-2.4	20	60	0
Dibromomethane	0.183	0.199	-	-8.7	20	63	0
1,2-Dichloropropane	0.487	0.535	-	-9.9	20	65	0
Bromodichloromethane	0.547	0.553	-	-1.1	20	58	0
1,4-Dioxane	0.00192	0.00226*	-	-17.7	20	65	0
cis-1,3-Dichloropropene	0.69	0.685	-	0.7	20	58	0
Chlorobenzene-d5	1	1	-	0	20	60	0
Toluene-d8	1.331	1.273	-	4.4	20	57	0
Toluene	1.658	1.532	-	7.6	20	54	0
4-Methyl-2-pentanone	0.123	0.126	-	-2.4	20	58	0
Tetrachloroethene	0.547	0.538	-	1.6	20	60	0
trans-1,3-Dichloropropene	0.663	0.656	-	1.1	20	58	0
1,1,2-Trichloroethane	0.291	0.301	-	-3.4	20	61	0
Chlorodibromomethane	0.387	0.358	-	7.5	20	55	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712609	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: QUIMBY	**Calibration Date**	: 04/27/17 03:35	
Lab File ID	: VQ170427A01	**Init. Calib. Date(s)**	: 04/12/17	04/13/17
Sample No	: WG998135-2	**Init. Calib. Times**	: 19:22	04:16
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,3-Dichloropropane	0.644	0.668	-	-3.7	20	61	0
1,2-Dibromoethane	0.332	0.313	-	5.7	20	56	0
2-Hexanone	0.244	0.257	-	-5.3	20	64	0
Chlorobenzene	1.716	1.688	-	1.6	20	58	0
Ethylbenzene	3.245	3.377	-	-4.1	20	62	0
1,1,1,2-Tetrachloroethane	0.532	0.492	-	7.5	20	56	0
p/m Xylene	1.087	1.149	-	-5.7	20	64	0
o Xylene	1.036	1.09	-	-5.2	20	63	0
Styrene	1.706	1.788	-	-4.8	20	62	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	73	0
Bromoform	10	6.801	-	32*	20	54	0
Isopropylbenzene	7.329	6.645	-	9.3	20	64	0
4-Bromofluorobenzene	1.24	1.12	-	9.7	20	64	0
Bromobenzene	1.499	1.238	-	17.4	20	58	0
n-Propylbenzene	8.195	8.225	-	-0.4	20	71	0
1,1,2,2-Tetrachloroethane	0.969	0.904	-	6.7	20	68	0
2-Chlorotoluene	5.496	5.328	-	3.1	20	69	0
1,3,5-Trimethylbenzene	4.706	5.052	-	-7.4	20	79	0
1,2,3-Trichloropropane	0.847	0.749	-	11.6	20	65	0
4-Chlorotoluene	4.901	4.561	-	6.9	20	67	0
tert-Butylbenzene	4.741	4.519	-	4.7	20	68	0
1,2,4-Trimethylbenzene	4.507	5.018	-	-11.3	20	78	0
sec-Butylbenzene	7.115	7.13	-	-0.2	20	70	0
p-Isopropyltoluene	5.269	5.529	-	-4.9	20	72	0
1,3-Dichlorobenzene	2.765	2.588	-	6.4	20	67	0
1,4-Dichlorobenzene	2.601	2.406	-	7.5	20	66	0
n-Butylbenzene	5.712	6.814	-	-19.3	20	80	0
1,2-Dichlorobenzene	2.389	2.274	-	4.8	20	67	0
1,2-Dibromo-3-chloropropan	0.147	0.109	-	25.9*	20	50	0
Hexachlorobutadiene	0.764	0.637	-	16.6	20	57	0
1,2,4-Trichlorobenzene	1.082	1.406	-	-29.9*	20	85	0
Naphthalene	1.806	2.492	-	-38*	20	92	0
1,2,3-Trichlorobenzene	0.927	1.199	-	-29.3*	20	83	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712609	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: VOA116	**Calibration Date**	: 04/27/17 08:52	
Lab File ID	: V16170427A02	**Init. Calib. Date(s)**	: 04/26/17	04/27/17
Sample No	: WG998214-2	**Init. Calib. Times**	: 23:30	03:18
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	100	0
Dichlorodifluoromethane	0.416	0.395	-	5	20	99	0
Chloromethane	0.34	0.314	-	7.6	20	96	0
Vinyl chloride	10	8.579	-	14.2	20	99	0
Bromomethane	10	7.896	-	21*	20	125	0
Chloroethane	0.212	0.201	-	5.2	20	100	0
Trichlorofluoromethane	0.718	0.72	-	-0.3	20	101	0
Ethyl ether	0.127	0.125	-	1.6	20	106	0
1,1-Dichloroethene	0.26	0.266	-	-2.3	20	110	0
Carbon disulfide	10	9.583	-	4.2	20	96	0
Freon-113	0.279	0.287	-	-2.9	20	105	0
Iodomethane	10	7.833	-	21.7*	20	110	0
Acrolein	0.03	0.03*	-	0	20	98	0
Methylene chloride	0.275	0.277	-	-0.7	20	99	-.01
Acetone	10	10.874	-	-8.7	20	107	-.01
trans-1,2-Dichloroethene	0.244	0.274	-	-12.3	20	105	0
Methyl acetate	0.097	0.1*	-	-3.1	20	97	0
Methyl tert-butyl ether	0.632	0.623	-	1.4	20	108	0
tert-Butyl alcohol	0.014	0.013*	-	7.1	20	97	0
Diisopropyl ether	0.716	0.693	-	3.2	20	102	0
1,1-Dichloroethane	0.561	0.562	-	-0.2	20	102	0
Halothane	0.212	0.2	-	5.7	20	100	0
Acrylonitrile	10	9.578	-	4.2	20	102	0
Ethyl tert-butyl ether	0.748	0.731	-	2.3	20	106	0
Vinyl acetate	0.437	0.402	-	8	20	104	0
cis-1,2-Dichloroethene	0.254	0.298	-	-17.3	20	107	0
2,2-Dichloropropane	0.483	0.542	-	-12.2	20	112	0
Bromochloromethane	10	10.521	-	-5.2	20	100	0
Cyclohexane	0.493	0.459	-	6.9	20	101	0
Chloroform	0.584	0.584	-	0	20	100	0
Ethyl acetate	0.15	0.136	-	9.3	20	96	0
Carbon tetrachloride	0.45	0.54	-	-20	20	107	-.01
Tetrahydrofuran	10	9.908	-	0.9	20	105	0
Dibromofluoromethane	0.282	0.328	-	-16.3	20	103	-.01
1,1,1-Trichloroethane	0.595	0.606	-	-1.8	20	108	0
2-Butanone	10	10.158	-	-1.6	20	111	0
1,1-Dichloropropene	0.409	0.414	-	-1.2	20	110	0
Benzene	0.958	1.089	-	-13.7	20	103	0
tert-Amyl methyl ether	0.622	0.605	-	2.7	20	108	0
1,2-Dichloroethane-d4	0.374	0.419	-	-12	20	97	0
1,2-Dichloroethane	0.436	0.428	-	1.8	20	103	0
Methyl cyclohexane	0.472	0.446	-	5.5	20	107	0
Trichloroethene	0.281	0.314	-	-11.7	20	99	0
Dibromomethane	0.164	0.161	-	1.8	20	100	0
1,2-Dichloropropane	0.269	0.258	-	4.1	20	101	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712609	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: VOA116	**Calibration Date**	: 04/27/17 08:52	
Lab File ID	: V16170427A02	**Init. Calib. Date(s)**	: 04/26/17	04/27/17
Sample No	: WG998214-2	**Init. Calib. Times**	: 23:30	03:18
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
2-Chloroethyl vinyl ether	0.077	0.057	-	26*	20	110	0
Bromodichloromethane	0.468	0.441	-	5.8	20	105	0
1,4-Dioxane	0.00103	0.00107*	-	-3.9	20	105	0
cis-1,3-Dichloropropene	0.395	0.464	-	-17.5	20	109	0
Chlorobenzene-d5	1	1	-	0	20	102	0
Toluene-d8	1.18	1.362	-	-15.4	20	102	0
Toluene	0.885	0.865	-	2.3	20	104	0
4-Methyl-2-pentanone	10	8.567	-	14.3	20	95	0
Tetrachloroethene	0.374	0.427	-	-14.2	20	108	0
trans-1,3-Dichloropropene	10	9.492	-	5.1	20	107	0
Ethyl methacrylate	10	8.36	-	16.4	20	105	0
1,1,2-Trichloroethane	0.224	0.218	-	2.7	20	96	0
Chlorodibromomethane	0.357	0.339	-	5	20	103	0
1,3-Dichloropropane	0.466	0.439	-	5.8	20	98	0
1,2-Dibromoethane	0.252	0.243	-	3.6	20	100	0
2-Hexanone	10	8.35	-	16.5	20	94	0
Chlorobenzene	0.965	0.93	-	3.6	20	103	0
Ethylbenzene	1.75	1.718	-	1.8	20	106	0
1,1,1,2-Tetrachloroethane	0.371	0.361	-	2.7	20	99	0
p/m Xylene	20	18.778	-	6.1	20	106	0
o Xylene	20	18.372	-	8.1	20	104	0
Styrene	20	20.744	-	-3.7	20	101	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	102	0
Bromoform	0.288	0.261	-	9.4	20	98	0
Isopropylbenzene	10	9.268	-	7.3	20	107	0
4-Bromofluorobenzene	0.784	0.95	-	-21.2*	20	111	0
Bromobenzene	0.689	0.689	-	0	20	104	0
n-Propylbenzene	3.857	3.778	-	2	20	104	0
1,4-Dichlorobutane	0.827	0.786	-	5	20	97	0
1,1,2,2-Tetrachloroethane	0.54	0.494	-	8.5	20	95	0
4-Ethyltoluene	3.019	3.046	-	-0.9	20	107	0
2-Chlorotoluene	2.65	2.663	-	-0.5	20	102	0
1,3,5-Trimethylbenzene	2.597	2.625	-	-1.1	20	106	0
1,2,3-Trichloropropane	0.485	0.466	-	3.9	20	102	0
trans-1,4-Dichloro-2-buten	0.163	0.15	-	8	20	101	-.01
4-Chlorotoluene	2.351	2.351	-	0	20	104	0
tert-Butylbenzene	2.12	2.108	-	0.6	20	109	0
1,2,4-Trimethylbenzene	10	9.481	-	5.2	20	105	0
sec-Butylbenzene	3.247	3.699	-	-13.9	20	106	0
p-Isopropyltoluene	10	9.17	-	8.3	20	108	0
1,3-Dichlorobenzene	1.438	1.417	-	1.5	20	104	0
1,4-Dichlorobenzene	1.44	1.384	-	3.9	20	101	0
p-Diethylbenzene	1.575	1.483	-	5.8	20	111	0
n-Butylbenzene	10	9.554	-	4.5	20	108	0
1,2-Dichlorobenzene	1.301	1.24	-	4.7	20	99	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712609	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: VOA116	**Calibration Date**	: 04/27/17 08:52	
Lab File ID	: V16170427A02	**Init. Calib. Date(s)**	: 04/26/17	04/27/17
Sample No	: WG998214-2	**Init. Calib. Times**	: 23:30	03:18
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,2,4,5-Tetramethylbenzene	10	8.242	-	17.6	20	112	0
1,2-Dibromo-3-chloropropan	0.079	0.073	-	7.6	20	99	0
1,3,5-Trichlorobenzene	1.03	0.989	-	4	20	106	0
Hexachlorobutadiene	0.375	0.383	-	-2.1	20	114	0
1,2,4-Trichlorobenzene	0.83	0.778	-	6.3	20	108	0
Naphthalene	1.382	1.251	-	9.5	20	109	0
1,2,3-Trichlorobenzene	0.727	0.654	-	10	20	104	0

*** Value outside of QC limits.**

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712609	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: VOA116	**Calibration Date**	: 04/28/17 05:13	
Lab File ID	: V16170428A04	**Init. Calib. Date(s)**	: 04/26/17	04/27/17
Sample No	: WG998214-7	**Init. Calib. Times**	: 23:30	03:18
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	91	0
Dichlorodifluoromethane	0.416	0.382	-	8.2	20	87	.01
Chloromethane	0.34	0.299	-	12.1	20	83	.01
Vinyl chloride	10	8.66	-	13.4	20	91	0
Bromomethane	10	8.018	-	19.8	20	115	0
Chloroethane	0.212	0.207	-	2.4	20	94	0
Trichlorofluoromethane	0.718	0.779	-	-8.5	20	99	0
Ethyl ether	0.127	0.14	-	-10.2	20	107	0
1,1-Dichloroethene	0.26	0.265	-	-1.9	20	99	0
Carbon disulfide	10	10.177	-	-1.8	20	93	0
Methylene chloride	0.275	0.284	-	-3.3	20	92	-.01
Acetone	10	11.905	-	-19	20	106	0
trans-1,2-Dichloroethene	0.244	0.296	-	-21.3*	20	103	0
Methyl tert-butyl ether	0.632	0.647	-	-2.4	20	102	0
Diisopropyl ether	0.716	0.734	-	-2.5	20	98	0
1,1-Dichloroethane	0.561	0.579	-	-3.2	20	96	0
Ethyl tert-butyl ether	0.748	0.763	-	-2	20	100	0
cis-1,2-Dichloroethene	0.254	0.309	-	-21.7*	20	101	0
2,2-Dichloropropane	0.483	0.55	-	-13.9	20	103	0
Bromochloromethane	10	11	-	-10	20	95	0
Chloroform	0.584	0.656	-	-12.3	20	102	0
Carbon tetrachloride	0.45	0.544	-	-20.9*	20	98	-.01
Tetrahydrofuran	10	10.343	-	-3.4	20	99	0
Dibromofluoromethane	0.282	0.334	-	-18.4	20	96	-.01
1,1,1-Trichloroethane	0.595	0.631	-	-6.1	20	101	0
2-Butanone	10	10.928	-	-9.3	20	108	0
1,1-Dichloropropene	0.409	0.433	-	-5.9	20	104	0
Benzene	0.958	1.114	-	-16.3	20	96	0
tert-Amyl methyl ether	0.622	0.635	-	-2.1	20	103	0
1,2-Dichloroethane-d4	0.374	0.453	-	-21.1*	20	95	0
1,2-Dichloroethane	0.436	0.464	-	-6.4	20	102	0
Trichloroethene	0.281	0.33	-	-17.4	20	95	0
Dibromomethane	0.164	0.173	-	-5.5	20	98	0
1,2-Dichloropropane	0.269	0.272	-	-1.1	20	97	0
Bromodichloromethane	0.468	0.465	-	0.6	20	100	0
1,4-Dioxane	0.00103	0.0011*	-	-6.8	20	98	0
cis-1,3-Dichloropropene	0.395	0.464	-	-17.5	20	99	0
Chlorobenzene-d5	1	1	-	0	20	94	0
Toluene-d8	1.18	1.361	-	-15.3	20	94	0
Toluene	0.885	0.896	-	-1.2	20	99	0
4-Methyl-2-pentanone	10	9.216	-	7.8	20	95	0
Tetrachloroethene	0.374	0.44	-	-17.6	20	102	0
trans-1,3-Dichloropropene	10	9.528	-	4.7	20	99	0
1,1,2-Trichloroethane	0.224	0.231	-	-3.1	20	94	0
Chlorodibromomethane	0.357	0.351	-	1.7	20	98	0

* Value outside of QC limits.

Continuing Calibration
Form 7

Client	: Brown & Caldwell	**Lab Number**	: L1712609	
Project Name	: AEROVOX	**Project Number**	: 149339.007.001	
Instrument ID	: VOA116	**Calibration Date**	: 04/28/17 05:13	
Lab File ID	: V16170428A04	**Init. Calib. Date(s)**	: 04/26/17	04/27/17
Sample No	: WG998214-7	**Init. Calib. Times**	: 23:30	03:18
Channel	:			

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
1,3-Dichloropropane	0.466	0.471	-	-1.1	20	97	0
1,2-Dibromoethane	0.252	0.26	-	-3.2	20	98	0
2-Hexanone	10	8.803	-	12	20	91	0
Chlorobenzene	0.965	0.947	-	1.9	20	97	0
Ethylbenzene	1.75	1.8	-	-2.9	20	102	0
1,1,1,2-Tetrachloroethane	0.371	0.376	-	-1.3	20	95	0
p/m Xylene	20	19.256	-	3.7	20	100	0
o Xylene	20	18.753	-	6.2	20	98	0
Styrene	20	22.604	-	-13	20	101	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	94	0
Bromoform	0.288	0.275	-	4.5	20	96	0
Isopropylbenzene	10	9.461	-	5.4	20	101	0
4-Bromofluorobenzene	0.784	0.914	-	-16.6	20	99	-.01
Bromobenzene	0.689	0.688	-	0.1	20	96	0
n-Propylbenzene	3.857	3.97	-	-2.9	20	101	0
1,1,2,2-Tetrachloroethane	0.54	0.51	-	5.6	20	91	0
2-Chlorotoluene	2.65	2.792	-	-5.4	20	98	0
1,3,5-Trimethylbenzene	2.597	2.713	-	-4.5	20	101	0
1,2,3-Trichloropropane	0.485	0.473	-	2.5	20	96	0
4-Chlorotoluene	2.351	2.408	-	-2.4	20	98	0
tert-Butylbenzene	2.12	2.146	-	-1.2	20	102	0
1,2,4-Trimethylbenzene	10	9.698	-	3	20	99	0
sec-Butylbenzene	3.247	3.756	-	-15.7	20	99	0
p-Isopropyltoluene	10	9.448	-	5.5	20	103	0
1,3-Dichlorobenzene	1.438	1.437	-	0.1	20	97	0
1,4-Dichlorobenzene	1.44	1.417	-	1.6	20	95	0
n-Butylbenzene	10	9.909	-	0.9	20	103	0
1,2-Dichlorobenzene	1.301	1.264	-	2.8	20	94	0
1,2-Dibromo-3-chloropropan	0.079	0.075	-	5.1	20	95	0
Hexachlorobutadiene	0.375	0.387	-	-3.2	20	106	0
1,2,4-Trichlorobenzene	0.83	0.788	-	5.1	20	101	0
Naphthalene	1.382	1.313	-	5	20	105	0
1,2,3-Trichlorobenzene	0.727	0.692	-	4.8	20	102	0

* Value outside of QC limits.

Appendix F: Updated CSM

Conceptual Site Model
RTN 4-601
Former Aerovox Facility
New Bedford, MA

Prepared for

AVX Corporation, Fountain Inn, SC

June 2017

Conceptual Site Model
RTN 4-601
Former Aerovox Facility
New Bedford, MA

Prepared for

AVX Corporation, Fountain Inn, SC

June 2017

Brown AND Caldwell

1 Tech Drive, Suite 310

Andover, MA 01810

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List of Abbreviations

ACO	Administrative Consent Order and Notice of Responsibility
AECOM	AECOM Technical Services, Inc. (formerly URS Corporation)
AST	aboveground storage tank
AUL	Activity and Use Limitation
AVX	AVX Corporation
bgs	below ground surface
COC	Contaminant of Concern
CSM	Conceptual Site Model
CVOC	chlorinated volatile organic compound
DNAPL	dense non-aqueous phase liquid
EPA	United States Environmental Protection Agency
FLUTe™	Flexible Liner Underground Technologies
ft	feet
HAC	Hydraulic Asphalt Concrete
IRA	Immediate Reponse Action
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
Mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MHW	Mean High Water
MiHpt	combination Membrane Interface Tool/Hydraulic Profiling Tool
MIP	Membrane Interface Probe
mm	millimeter
msl	mean sea level
NAPL	non-aqueous phase liquid
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
NTCRA	Non-Time-Critical Removal Action
OHM	Oil and Hazardous Material
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
Phase I ISI	Phase I Initial Site Investigation
Phase II CSA	Phase II Comprehensive Site Assessment
ppm	parts per million
RTN	Release Tracking Number
TCE	trichloroethene
TSCA	Toxic Substances Control Act
UCL	Upper Concentration Limit
ug/L	micrograms per liter
UST	underground storage tank
UVOST	Ultraviolet Optical Screening Tool
VI	Vapor Intrusion
VOC	volatile organic compound

Section 1

Introduction, Site Description and History

The Massachusetts Contingency Plan (MCP) provides for the development and refinement of a Conceptual Site Model (CSM) to provide a description of how contaminants entered the environment, how they have been or may be transported within the environment and between media, and the potential routes of exposure to these contaminants for human and environmental receptors. The CSM is modified as needed at each phase of the MCP process and is intended to be a dynamic document. The following CSM presents the current understanding of site conditions, contaminant migration and potential exposure pathways through June 2017.

1.1 Site Description

The Aerovox Site was originally defined by the Administrative Consent Order (ACO) between the Commonwealth of Massachusetts and AVX Corporation, as the property located at 740 Belleville Avenue, Bristol County, New Bedford, Massachusetts, encompassing approximately 10.3 acres (Property). It was assigned Release Tracking Number (RTN) 4-601. The Site, includes the Property and any place or area where a release of oil and/or hazardous material from the Property which occurred before the ACO effective date (June 3, 2010) has come to be located, excepting releases associated with the former fuel oil/bunker oil tanks (addressed as a short term measure) as well as those places or areas that are part of, or associated with, the New Bedford Harbor Superfund Site including land area, bank or water body located seaward of the sheet pile wall previously installed at the Property or seaward of the mean high water (MHW) level at the Property and running along the MHW level in a northward and southward direction from the Property. Per this definition and the subsequent results of the MCP Phase II Comprehensive Site Assessment (Phase II CSA), the Site as currently delineated based on soil and groundwater impacts, extends to the following locations:

- The existing Aerovox western property line along Belleville Avenue,
- The existing sheet pile wall (inclusive of the wall itself) running generally in a north-south orientation along the Acushnet River (the River);
- North of the northern boundary of the Property, on to the Precix property located at 744 Belleville Avenue;
- Beyond the Precix property to the northeast on to the former Coyne Textile Services property at 50 Howard Avenue, and
- South of the southern boundary of the Property, on to the Titleist Property located at 700 Belleville Avenue.

Note that in all instances, the eastern boundary of the Site is by definition the existing sheet pile wall on the Property and the landward side of the MHW line to the north and south where the sheet pile wall is not present.

1.2 Site History

The Property is situated on industrially-zoned land and formerly contained a manufacturing building, associated ancillary buildings, and a parking lot. The approximately 450,000 square-foot manufacturing building consisted of a western section containing two floors, and an eastern section containing three floors. The exterior walls of the building were brick and the roof was constructed of wood. The first floor, which was the building foundation floor, was constructed of concrete. The second floor consisted of both concrete and wood, and the third floor was constructed of wood. Ancillary structures included a brick sewer pump station and a brick boiler house situated along the southern side of the manufacturing building, and a brick structure that housed electrical switching equipment located at the southwest corner of the manufacturing building.

The Property was originally developed as a textile mill circa 1916 to 1921 (Manomet Mills, later sold to Nashawena Mills in 1925). Aerovox acquired the Property circa 1937 and electrical component manufacturing began on the Property in approximately 1938. Beginning in the 1940s, use of dielectric fluid containing polychlorinated biphenyls (PCBs) in capacitor manufacturing started. In addition to the use of PCBs in capacitor manufacturing, the Aerovox Facility (Facility) also utilized a trichloroethene (TCE) capacitor degreasing operation. Degreasing residues from the degreasing operations were stored in 55-gallon drums on a concrete floor with no secondary containment. Sampling of the degreasing residues by EPA confirmed the presence of PCBs. Reportedly, PCB concentrations of up to 50 ppm were present in the degreasing residues based on samples collected by Aerovox. A TCE above ground storage tank (AST) was formerly located in the second floor of the manufacturing building, just outside of the impregnation room (where capacitors were filled). In addition, the TCE recovery system ASTs were located in the first floor of the manufacturing building. Use of PCBs in the manufacturing process ended on or about October 1978, and it has been estimated that up to 100,000,000 pounds of PCBs were used at the Facility during this period.[1] The Facility continued to be used for manufacturing until Aerovox filed for bankruptcy and the building was closed in 2001.

During a 1981 United States Environmental Protection Agency (EPA) compliance inspection of the Facility, “oil impregnated soil was observed in the culverts leading to and at both outfalls.” Culvert, as used here, is believed to refer to the open drainage trenches that were formerly adjacent to the north and south sides of the manufacturing building. The Facility had a National Pollution Discharge Elimination System (NPDES) permit for both of these outfalls. The compliance inspection report further indicated that “small amounts of PCBs have been discharged through the two NPDES outfalls (001 and 002) into the river.” In addition to the oily soils observed in the drainage trenches, stained soil was observed in the “backyard power substation” located between the former Aerovox building and the River. Samples collected from the soils within the drainage ditches and in the former backyard power substation contained PCB concentrations of up to 24,000 parts per million (ppm). The backyard power substation was reportedly used for drum storage within the month prior to EPA’s collection of the samples.

Between 1981 and 1984, under consent agreements between Aerovox and EPA, Aerovox completed further investigation of the unpaved area between the building and the River, and the unpaved ditch running along the north side of the building, and a remedial action was developed to address this contamination. These two areas were covered with a hydraulic asphalt concrete (HAC) cap. In addition, at the same time, a sheet pile wall was installed to serve as a vertical barrier to limit the tidal and groundwater flow through impacted shallow soils. The sheet pile wall was installed down 9 to 13 feet below ground surface and keyed into a peat layer present between shallow and deep soils along the waterfront.

[1] U.S. EPA, 1997. Aerovox Incorporated, New Bedford, Massachusetts. June 27, 1997, pg. 2.

In 1988, two 10,000-gallon fuel oil underground storage tanks (USTs) were removed from a former concrete oil containment bunker. Follow-up investigations indicated the presence of oil saturated soils and non-aqueous phase liquid (NAPL) on the surface of groundwater within monitoring wells adjacent to the bunker. As part of the cleanup of this release, contaminated soils around the concrete bunker were excavated and sent to an asphalt batching facility. The asphalt was then used to pave the Facility's parking lot. Subsequent sampling indicated that PCBs were present in the asphalt of the parking lot, presumably due to the presence of PCBs within soils around the fuel oil USTs.

In May 1997, EPA conducted a multi-media compliance inspection of the Facility. The Toxic Substance Control Act (TSCA) compliance inspection report indicates that the first floor of the building was where "all oils and wastes were stored." In June 1997, EPA returned to the Facility to collect samples from building materials and interior building surfaces for PCBs. The results of this sampling indicated that PCBs were detected in floors and walls and on various surfaces within the building, especially in the impregnation room.

In 2001, Aerovox abandoned the building and ceased operations at the Site. The building was left unmaintained and subject to vandalism and water intrusion. EPA sampling of building materials indicated that building surfaces throughout were contaminated with PCBs. Sampling also indicated the presence of PCBs and volatile organic compounds (VOCs) below the foundation floor and the paved area surrounding the manufacturing building, as well as in groundwater below the Site. The building remained vacant from 2001 through its demolition in 2011. In 2011, a Non-Time Critical Removal Action (NTCRA) was completed which included removal of the existing building, backfilling of the building foundation with clean backfill, and placement of a 3-inch asphalt cap across the Property, covering both the demolished building footprint and the existing impacted pavement. The new asphalt cap did not extend over the area of the HAC cap. The Property is currently a vacant, asphalt paved parking lot.

In addition to the Property, the Site boundary extends onto the Precix property and the former Coyne property to the north. The Precix property is occupied by a former mill building where the company is now engaged in the manufacturing of O-rings, Fuel System and Brake System Seals. Precix previously used and stored VOCs as part of its manufacturing process. The Coyne property previously operated as a commercial laundry facility, but was sold during bankruptcy proceedings in 2016 and is currently unoccupied. The Site boundary extends onto the Acushnet Company (Titleist) property to the south, which also contains a former mill building. Titleist is engaged in the manufacturing of golf balls and equipment.

Section 2

Site Setting

2.1 Topography and Site Drainage

Topography grades slightly downward from west to east across the Site. Elevation in the northwest corner of the Site is approximately 14 feet above mean sea level (msl) and elevation adjacent to the River (eastern margin of Site) is approximately 4 feet above msl. Surface water runoff from the Site drains to two drainage ditches and to the on-site storm sewer system, which consists of eight catch basins. The two drainage ditches and the catch basins ultimately discharge to the River. Site drainage patterns were altered slightly from historic drainage patterns when the NTCRA was completed. Historic drainage patterns also may have allowed surface water runoff from the Facility parking area and Hadley Street to flow onto the eastern end of the Titleist property, adjacent to the southern end of the Titleist building. In addition, flooding of the eastern end of Hadley Street occurs during periods of heavy rain and high tide due to influx to the Hadley Street catch basin system from the Site and along Belleville Avenue.

2.2 Geology

2.2.1 Surficial

Unconsolidated subsurface materials at the Site consist of four main categories (from top to bottom); fill, peat, glacial outwash, and till. The fill materials range from approximately 2 feet to 10 feet in depth across the Site. Fill materials observed in the western end of the Site and throughout the former building foundation on the Property are largely clean sand backfill that was used to fill the former Aerovox basement after demolition of the building. Fill materials along the eastern end of the Site are mostly related to filling of wetlands and are largely industrial fill and urban fill materials, including wood, plastic, rubber gaskets, metal, wire, and cloth mixed with sand and gravel.

In the eastern half of the Site, peat, peaty clay, and fine silts have been identified at depths of between 2 to 11 feet bgs, with a peat thickness from several inches to a maximum of 8 feet. The peat layer has not been identified beneath the western portion of the Site. Underlying the peat is a layer of glacial outwash stratified variable sands and gravels, with some layers and lenses of silt or silty sand. With the exception of the northwest corner of the Property, the sand and gravel deposit is underlain by bedrock. The bedrock has been identified as granitic gneiss, and has been observed from 4 feet bgs in the western part of the Site (SB-2), 2 to 6 feet bgs in the center of the Property (SB-1 and SB-12), to 45 feet along the northern Property boundary (MW-6B), and 29 feet (MW-103B) to 35 feet bgs (MW-23B) feet along the River. Till has been identified in several borings between the glacial outwash deposits and the bedrock surface, including MW-20B on the western side of the Site, and MW-105D, MW-24B, MW-102D, MW-103, MIP-23, MIP-43, MIP-49, MIP-50E, MIP-53, MIP-54 and MIP-55S.

2.2.2 Bedrock

The City of New Bedford lies within the Southeastern Massachusetts Batholith which is Proterozoic in age. The Freetown fault is a major structural feature in the area trending north-south from Dartmouth, Massachusetts to Lakeville more than 20 miles to the north. The fault zone is believed to have been eroded to form the current path of the existing Acushnet River, abutting the Site to the east.

The igneous intrusive rocks at the Site were metamorphosed (heated and squeezed) multiple times to form the gneissic bedrock observed at the Site. Mineral assemblages in rock cores from the Site are varying and contain quartz, feldspar, amphibole, and other minor minerals. Gneissic foliation is present at thicknesses ranging from less than 1 to 10 millimeters (mm), exhibiting a 30 to 50 degree dip. The foliation is observed generally in the central and western portion of the Site. Rocks close to the river (in borings MW-2B, MW-7B and MW-15B) lack distinct foliation but have fractures filled and sealed with a secondary mineral, possibly epidote.

Two main fractures sets have been identified in the bedrock cores using geophysical borehole logging techniques, including a near-horizontal to shallow dipping set and a high angle to vertical fracture set. Additionally, a local bedrock outcrop west of the Site also exhibits two joint sets, one trending north-south and dipping 61 degrees to east and the other east-west and dipping 49 degrees to the south. Groundwater flow through bedrock occurs in these fracture sets.

The bedrock topography gradually slopes down to the west across the western two-thirds of the Site, at which point the bedrock surface begins to gradually rise toward the east, forming a north-south trending bedrock trough. In the west end of the Site, the bedrock is very shallow (approximately 2 feet elevation relative to the National Geodetic Vertical Datum (NGVD), while bedrock is deepest within the trough (approximately -36 feet NGVD). This bedrock low trends parallel to the Freetown fault and Acushnet River. Several bedrock knobs are located across the Site.

2.3 Hydrogeology

There are three (3) water bearing zones at the Site: shallow overburden, deep overburden, and bedrock. The net flow for all three aquifers is from west to east and towards the Acushnet River. However, the water levels in all zones are affected by the tidally-influenced river level, causing flow direction reversals on the east side of the Site during high tide in the deep overburden and bedrock aquifers. The flow reversals result in a groundwater divide with flow in opposite directions, with the groundwater divide approximately 300 feet inland in the deep overburden aquifer and 500-600 feet inland in the bedrock aquifer. The shallow overburden aquifer exhibits a flow reversal, regardless of the tidal cycle. However, the potentiometric surface resulting from high tide forms a steeper gradient than observed at low tide.

Vertical groundwater gradients exist at the Site between the three aquifer types, and vary between positive (upward) and negative (downward) across the Site. In portions of the Site where tidal influence on groundwater levels is greatest, reversals in vertical gradient from positive to negative are observed with changing tides. Further inland, vertical gradients are largely upward, with the magnitude of the gradient also changing with the tides. Based on data collected for the multi-level bedrock sampling devices (Water FLUTes), a positive vertical gradient is observed in shallow bedrock, while negative vertical gradients are observed in deeper bedrock sampling intervals.

Section 3

Historic Sources and Release Mechanisms

Based on prior investigations and available reports dating back to 1981, known or presumed releases from past operations at the Facility include the following:

- Discharge of (NPDES permitted) water (including PCBs) directly to the Acushnet River through the discharge trenches located on the northern and southern side of the building;
- Direct dumping of waste into the River from shore (as evidenced by the excavation of capacitors during dredging);
- Contaminated soils located beneath the existing HAC cap (from storage of drums containing wastes in between the former building and the River, from excavation of contaminated river sediment and placement as fill behind the existing sheetpile wall, and from releases to a previously unpaved ditch along the north side of the former building);
- Leakage within the former building of stored virgin and waste PCB-containing oils and TCE through sumps or cracks in the building foundations;
- Surface spills of virgin and waste PCB- and TCE- containing liquids at the loading dock areas of the former building during shipping and deliveries;
- Infiltration of storm water formerly in contact with contaminated building materials;
- Overfills of virgin PCB-containing oil (on the Property) and TCE (on the Property and the Precix property) to the ground surface on the northern and southern side of Graham Street near the manufacturing buildings during tank filling activities;
- Release of oil from the 2 fuel oil USTs formerly located on the south side of the manufacturing building and associated contaminated soils that were not excavated due to structural concerns associated with adjacent nitrogen cooling system pad and corrugated storm sewer;[2]
- PCBs contained within the former parking lot asphalt placed as part of the fuel oil remediation;
- Erosion and runoff of contaminated soils that existed in the former unpaved areas between the former manufacturing building and the shoreline;
- PCB-containing sediment within the catch basin/surface water runoff system.

None of these historic or potential sources is currently uncontrolled. No specific release mechanisms or release volumes are documented; rather, the releases are presumed to be the result of activities related to the historic manufacturing of electrical components at the Facility over a forty-year period. Releases most likely occurred from spills and improper storage or handling of Oil and Hazardous Material (OHM). Releases to the environment including soil, groundwater, and the adjacent Acushnet River likely occurred through surface spills, floor sumps, foundation cracks, surficial erosion, and via the stormwater outfall systems.

[2] Fuel oil releases from storage tanks have been addressed separately and are not part of this RTN.

Section 4

Contaminants of Concern, Nature and Extent of Impacts, and Source Areas

The following sections describe the type and lateral/vertical extent of contaminants on the Site, based on the investigations summarized in the Phase II Comprehensive Site Assessment (CSA) report. Refer to Figure 2-2 in the Phase II CSA Report for the locations of borings, wells and features discussed below.

4.1 Contaminants of Concern

Based on investigations conducted at the Site to date, the contaminants of concern (COCs) for the Site include PCBs (Aroclor-1016, Aroclor-1242, and Aroclor-1254 were used by Aerovox [Versar 1981]); associated chlorobenzenes typically found in PCB oil (1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene and chlorobenzene); and chlorinated VOCs including primarily TCE and its daughter products (cis-1,2-dichloroethene and vinyl chloride), but also to a lesser extent tetrachloroethene (PCE). Detected concentrations of COCs have been compared to the UCLs applicable to the Site. Comparisons to Method 1 GW-2 (where applicable) and GW-3 standards are also used for illustrative purposes only. (A Method 3 Risk Assessment was used for the Phase II CSA.)

4.2 Soil

Site COCs were found in shallow (0 to 3 feet bgs), mid-range (3 to 15 feet bgs) and deep (>15 feet bgs) soils as described below. Additional details regarding the extent of COCs in soil at the Site can be found in Table 2-1, Figures 2-4 and 2-5, and the cross sections in Appendix R of the Phase II CSA Report.

4.2.1 PCBs

Soils impacted with PCBs in the shallow and mid-range depths are primarily present in seven areas of the Site: (1) the area including surrounding and inclusive of B01A, B02A, south to B02B and west to the area surrounding B04B and south to B04C; (2) the area surrounding and inclusive of B07B and B07.5BC; (3) the landscaped area in the eastern third of the Titleist property; (4) soils in the southeast portion of the Property immediately surrounding and inclusive of B09C, B10C and MIP-23; (5) soils on the Property in the immediate vicinity of UV-17, delineated by UVOST borings; (6) the northeast corner of the Property; and (7) along Graham Street within the bounds of the Precix property, including MW-4S and MW-18D, and MIP43.

1. Soils in the first area described above reach PCB concentrations of less than one mg/kg at depths ranging from eight feet bgs to 13 feet bgs.
2. PCB concentrations at borings B07B above the UCL extend to below 15 feet bgs, and PCB concentrations at B07.5BC decrease to below reporting limits by three feet bgs.
3. Soils on the eastern third of the Titleist property exceeding the Method 1 S-3/GW-2 standard (as applicable), Method 1 S-3/GW-3 standard and/or UCL decrease to less than one mg/kg at depths of between four feet to eight feet bgs, with the exception of soils surrounding and including B06.5I.

PCB concentrations are highest and exceed the PCB UCL of 100 mg/kg adjacent to the fence line along the Acushnet River.

4. In the soils in the southeast corner of the Property, PCB concentrations decrease to below one mg/kg by eight feet bgs, just above or within the peat layer.
5. Soils in the immediate vicinity of UV-17 from a depth of five feet bgs down to 10 feet bgs exceed the Method 1 S-3/GW-3 and/or UCL down to at least 10 feet bgs, which is within the peat layer.
6. Soils in the northeast corner of the Property generally decrease to below four ug/kg between eight feet to 13 feet bgs.
7. Lastly, PCB concentrations in soils along Graham Street collected from below the asphalt pavement to a depth of 2 feet bgs exceed the Method 1 S-3/GW-2 and Method 1 S-3/GW-3 standards. One of the samples (MIP43) contains a PCB concentration exceeding the UCL.

At depths of greater than 15 feet bgs, sporadic detections of less than one mg/kg are present on the Titleist and Precix properties. In general, soils at this depth from borings throughout the Property are non-detect or detected at less than one mg/kg. Soil samples collected from two locations contain concentrations greater than 1.0 mg/kg but less than 4.0 mg/kg. The only area of the Site with PCB concentrations greater than the UCL in soils at depths greater than 15 feet bgs are located in the northeast corner of the Property, in the vicinity of MW-15B/MW-15D. In this area, soil samples MIP46 (20-22' bgs), MIP-47 (23-25' bgs), MIP-48 (22.5' bgs), MIP-48(30-31' bgs) and MIP-50E (30-31' bgs) exceed the UCL of 100 mg/kg. The depth to bedrock in this area ranges between 27 feet bgs to 31 feet bgs.

4.2.2 CVOCs

4.2.2.1 TCE and Daughter Products

CVOCs were detected in only one sample in the shallow depth interval from the ground surface to three feet bgs. This sample was collected at B04BN in the central portion of the Property. The concentrations of TCE, cis-1,2-dichloroethene and PCE detected in this sample are below the respective UCLs and Method 1 S-3/GW-3 standards. There were no other CVOCs detected in soil samples collected from the ground surface to three feet bgs interval.

TCE concentrations in the three feet to 15 feet bgs depth interval are present beneath the former Aerovox building foundation, in the south central area of the Property near B04B and B04C, at B08B (near MW-10D and MW-27B), at MIP-43 (Titleist property), in the UV-17 area, and within the northeast corner of the Site. TCE concentrations at soil boring MIP-43, B04B, and soil boring UV-17 exceed the Method 1 S-3/GW-2 standard (applicable for MIP-43), Method 1 S-3/GW-3 standard and UCL, respectively.

The soil interval between 15 feet bgs down to the bedrock surface has a higher concentrations of TCE detections in the eastern half of the Property. With the exception of soil boring B02B, there are no TCE concentrations detected in soils beneath the former 2-story (west) section of the building. TCE concentrations in this depth interval were detected north as far as MW-30B (in Graham Street), and south as far as MW-23B (east end of Titleist Property). In general, higher TCE concentrations are detected in deeper soils. Soil samples collected in the 15 feet bgs to bedrock depth intervals exceeding the Method 1 S-3/GW-3 standard and/or UCL include soils collected from borings MIP-11, MIP15, MIP48 and MW-15D.

Soil concentrations of cis-1,2-dichloroethene and vinyl chloride are present pervasively across the Site in the soil profile beneath three feet bgs at variable concentrations. Concentrations of cis-1,2-dichloroethene exceeding the Method 1 S-3/GW-2 standard (as applicable), Method 1 S-3/GW-3 standard and/or the UCL were detected in samples collected from soil borings MIP43 and UV-17.

Concentrations of trans-1,2-dichloroethene ranging from 2.1 ug/kg to 4.2 ug/kg were detected in soil samples collected from three soil borings on the Property. These concentrations do not exceed the Method 1 S-3/GW-3 standard or UCL. Vinyl chloride concentrations in soils collected from the UV-17 soil boring exceed the Method 1 S-3/GW-3 standard. There are no soil samples collected from the Site that exceed the vinyl chloride UCL.

4.2.2.2 PCE

Tetrachloroethene concentrations were detected in soils collected from three soil borings in the three feet to 15 feet bgs depth interval. The detections were reported in soil samples collected from soil boring MW-11B (0.90 ug/kg) in the southwest corner of the Property, and soil borings MIP53 (5.6 ug/kg) and MIP54 (140 ug/kg) in the northeast corner of the Property. Nine soil borings collected at a depth of greater than 15 feet bgs contained PCE concentrations. Of these nine locations, only the PCE concentration in the soil sample collected from a depth interval of 26 feet to 28 feet bgs in soil boring MW-15D exceeds the Method 1 S-3/GW-3 standard. There are no PCE concentrations in soil that exceed the UCL.

4.2.2.3 Chlorobenzenes

Concentrations of 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, and/or 1,4-dichlorobenzene were detected in soil samples collected from eleven soil borings on the Aerovox property in the 3 foot to 15 foot bgs depth interval. Similarly, soil samples collected at depths of greater than 15 feet bgs contained concentrations of one or more of these compounds. These compounds were not detected in soil samples collected from the Precix or Titleist properties, and none of the detections exceed the Method 1 S-3/GW-3 and/or UCL standard.

4.2.2.4 Other CVOCs

Other CVOCs detected in soils include 1,1,1-trichloroethane (three feet to 15 feet bgs), 1,1,2-trichloroethane (greater than 15 feet bgs), 1,1-dichloroethane (three feet to 15 feet bgs), 1,1-dichloroethene (greater than three feet bgs), carbon tetrachloride (greater than three feet bgs) and (chloroform (greater than three feet bgs). None of these compound concentrations exceed their Method 1 S-3/GW-3 or UCL.

4.3 Groundwater

Groundwater at the Site is broken into three aquifers: shallow overburden (groundwater within 15 feet of the ground surface), deep overburden (groundwater at depths of greater than 15 feet bgs to the bedrock interface, and bedrock. Groundwater contamination at the Site includes PCBs and CVOCs.

4.3.1 PCBs

PCBs are present in the shallow overburden, deep overburden and bedrock aquifers. Both PCB concentrations and the areal extent of PCB concentrations in groundwater increase with depth.

PCBs were detected in samples collected from 11 of the shallow overburden monitoring wells. The shallow overburden aquifer contains the lowest average total PCB concentrations, ranging from below laboratory reporting limits to 5.46 ug/L, detected in MW-2A. The PCB detections in shallow overburden wells are largely in wells on the Property and Graham Street, with the exception of detections in samples collected from MW-22S. There are no total PCB concentrations in shallow overburden monitoring wells above the UCL or Method 1 GW-3 standard.

Concentrations of total PCBs were detected in 11 deep overburden monitoring wells: GZ-101D, GZ-103D, MW-2, MW-6, MW-7, MW-10D, MW-15D, MW-17D, MW-18D, MW-19D and MW-23D. Detected PCB concentrations in these wells range from 0.464 ug/L to a maximum of 86.2 ug/L in the sample

collected from MW-15D. PCB concentrations in deep overburden groundwater are highest in the northeast corner of the Property, near MW-15D, and in the southeast corner of Property around MW-10D and MW-17D. There are no individual or average PCB concentrations in deep overburden groundwater above the UCL. However, the eastern third of the Property and one monitoring well on the Titleist property exceed the Method 1 GW-3 standard.

PCBs were detected in 12 bedrock monitoring wells including MW-2B, MW-4B, MW-6B, MW-7B, MW-11B, MW-13B, MW-15B, MW-17B, MW-23B, MW-26B, MW-27B and MW-28B. Detected PCB concentrations in individual sample collected from these wells ranged from 0.336 ug/L in MW-28B to a maximum of 215 ug/L in the sample collected from MW-15B. The highest total PCB concentrations are centered around MW-13B in the center of the Property, and along the east end of the Property adjacent to the Acushnet River. The average total PCB concentration in groundwater samples collected from MW-15B exceeds the UCL, and concentrations in five of the bedrock monitoring wells exceed the Method 1 GW-3 standard.

Refer to the Phase II CSA Report, Table 2-8, Figures 2-6 through 2-8, and the cross sections in Appendix R for graphical depictions of PCB concentrations in groundwater across the Site.

4.3.2 CVOCs

Eleven CVOCs were detected in shallow groundwater during completion of this Phase II CSA: tetrachloroethene, trichloroethene, cis-1,2-dicloroethene, trans-1,2-dichloroethene, vinyl chloride, chloroform, 1,1,1-trichloroethane, 1,1-dichloroehtane, chlorobenzene, 1,3-dichlorobenzene and 1,4-dichlorobenzene. Ten CVOCs were detected in shallow groundwater during completion of this Phase II CSA: tetrachloroethene, trichloroethene, cis-1,2-dicloroethene, trans-1,2-dichloroethene, vinyl chloride, chloroform, chlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene and 1,4-dichlorobenzene. A total of 16 CVOCs were detected in bedrock groundwater samples collected for the Phase II CSA: PCE, TCE, cis-1,2-dichloroethene, trans-1,2-dichloroethene, vinyl chloride, 1,1-dichloroethene, 1,1,2-trichloroethane, 1,1,1-thricloroethane, 1,1-dichloroethane, carbon tetrachloride, chloroform, methylene chloride, bromodicloromethane, 1,3-dichlorobenzene, 1,4-dichlorobenzne and chloromethane.

4.3.2.1 TCE and Daughter Products

Similar to PCBs, TCE and associated daughter products, cis-1,2-dichloroethene, trans 1,2-DCE and vinyl chloride, are present in the shallow overburden, deep overburden, and bedrock aquifers. Also similar is the increasing TCE concentrations detected with depth, with the highest average concentrations in the shallow overburden aquifer, deep overburden aquifer, and bedrock aquifer of 784 ug/L, 24,286 ug/L and 483,333 ug/L, respectively. In general, the aerial extent of the groundwater plume increases with depth.

TCE concentrations were detected in 15 shallow overburden monitoring wells, with groundwater concentrations ranging from below laboratory reporting limits (< 1.0 ug/L) to a maximum of 1,500 ug/l in the sample collected from MW-18S on the Precix property. The average TCE concentration in MW-18S is 784 ug/L. The highest TCE concentrations are present in two monitoring wells along Graham Street adjacent to the Precix building (MW-18S and MW-16S), as well as MW-8S, located in the center of the Property. The average concentrations of TCE in MW-18S (823 ug/L), MW-16S (270 ug/L) on Precix property and MW-21D (8.85 ug/L) on Titleist property exceed the Method 1 GW-2 standard of five ug/L. Lower concentrations of PCE are detected in monitoring wells across the center portion of the Site, and are roughly bounded by MW-21D and MW-19S to the south, MW-4A and GZ-103D to the east, and GZ-1 and MW-12 to the west. TCE concentrations were detected in deep overburden groundwater samples collected from 14 monitoring well across the Site, including the Titleist property to the south (MW-23D) and Precix to the north (MW-24D). The highest detected TCE concentrations in individual samples collected deep overburden monitoring wells range from a minimum of 2.8 ug/L in MW-24D to a

maximum of 29,000 in MW-7. The average TCE concentrations for the samples collected during the Phase II CSA from MW-7 (24,265 ug/L), MW-10D (9,625 ug/L), MW-15D (5,133 ug/L) and MW-19D (4,875 ug/L), exceed the Method 1 GW-3 Standard. There are no average TCE concentrations in deep overburden exceeding the UCL. In general, the wells with TCE concentrations present are largely found along Graham Street and the east edge of the Property, with the exception of detects at two wells located further inland (MW-10D and MW-19D). TCE concentrations are highest in the west-central part of the Property, extending east to MW-7 and MW-15D, adjacent to the Acushnet River.

Concentrations of TCE were detected in bedrock in 23 site monitoring wells at concentrations above laboratory reporting limits. The three monitoring wells with the highest individual sample concentrations are MW-26B (150,000 ug/L), MW-15B (110,000 ug/L), and MW-34B (500,000 ug/L in the 170 foot to 180 foot bgs sampling interval). The wells on the perimeter of the site boundary contain TCE concentrations ranging from 2.8 ug/L in MW-35B south of the Titleist building to 9.78 in MW-11B to the southwest, and 504 ug/L and 480 ug/L to the north of the Precix building. The northern boundary of TCE in groundwater in bedrock has been estimated to be within the former Coyne property. The TCE concentration in the northern most well (MW-36B) on the former Coyne property averaged 120 ug/L. Average TCE concentrations detected in MW-26B, MW-15B, and MW-28B exceed the UCL, and average TCE concentrations in MW-4B, MW-6B, MW-7B, MW-13B, MW-27B, MW-28B, MW-32B and MW-101B exceed Method 1 GW-3 Standards.

In the Phase II CSA Report, refer to Table 2-8, Figures 2-9 through 2-11, and the cross sections in Appendix R for graphical depictions of TCE concentrations across the Site.

Twelve monitoring wells contained concentrations of cis-1,2-dichloroethene in shallow overburden groundwater. Individual sample concentrations of cis-1,2-dichloroethene in shallow overburden groundwater range from below reporting limits (1.0 ug/L) to a maximum of 13,000 ug/L in MW-8S. Detections of cis-1,2-dichloroethene are generally found within the same monitoring wells as TCE, with limited exception. Monitoring well GZ-1 does not contain a detectable concentration of cis-1,2-dichloroethene, and MW-2A and GZ-103S contain cis-1,2-dichloroethene, but do not contain TCE. The monitoring wells bounding the current extent of detectable concentrations of cis-1,2-dichloroethene include MW-21D and MW-22S to the south, MW-12S to the east, multiple wells along Graham Street, and MW-2A to the east and adjacent to the Acushnet River. Average concentrations of cis-1,2-dichloroethene in monitoring wells MW-4S, MW-16S, MW-18S exceed the Method 1 GW-2 standard. There are no UCL or Method 1 GW-3 standard exceedances of cis-1,2-dichloroethene in the shallow overburden aquifer.

With the exception of groundwater samples collected from MW-24D, cis-1,2-dichloroethene is present in the same deep overburden monitoring wells as TCE. The highest detected cis-1,2-dichloroethene concentrations in individual samples collected for the Phase II CSA range from 140 ug/L in MW-101D to a maximum of 4,800 in MW-17D. The center of the existing cis-1,2-dichloroethene plume is shifted slightly southeast of the center of the TCE plume, defined by the average cis-1,2-dichloroethene concentrations in MW-17D (3,150 ug/L), MW-19D (3,475 ug/L) and MW-10D (4,250 ug/L). There are no individual or average concentrations exceeding the UCL or Method 1 GW-3 standard for cis-1,2-dichloroethene in deep overburden.

Concentrations of cis-1,2-dichloroethene were detected in the same 23 bedrock monitoring wells as TCE. The highest individual cis-1,2-dichloroethene sample result was 92,000 ug/L, collected from MW-15B, with the second highest average concentration detected at MW-26B, similar to the TCE concentrations. There were no cis-1,2-dichloroethene concentrations in bedrock groundwater samples exceeding the UCL. However, the concentration detected in MW-15B exceeds the Method 1 GW-3 standard.

Trans-1,2-dichloroethene was detected in groundwater samples collected from MW-4S, MW-12S, MW-13D, MW-16S, MW-19S and GZ-103S. The highest detected trans-1,2-dichloroethene concentration

detected was 5.2 ug/L, detected in MW-19S. These detections correspond to two areas of the Site, the central portion of the Property and along Graham Street. Trans-1,2-dichloroethene was detected in samples collected from two deep overburden monitoring wells, MW-17D and MW-23D. These wells are both located in the southeast portion of the Site, near the Acushnet River. There are no individual or average trans-1,2-dichloroethene concentrations above the UCL or Method 1 GW-3 standard. Only four bedrock monitoring wells contained detectable concentrations of trans-1,2-dichloroethene: MW17B, MW-26B, MW-30B, and MW-103B. These four wells are located at various locations across the Site.

Vinyl chloride was detected in twelve monitoring wells. Concentrations of vinyl chloride ranged from below reporting limits to a maximum concentration of 3,700 ug/L in a sample collected from monitoring well MW-8S. The average concentration of vinyl chloride in MW-8S, based on three groundwater sampling events, is 3,233 ug/L. The vinyl chloride concentrations in deep overburden groundwater are present in the same set of monitoring wells that exhibit detectable cis-1,2-dichloroethene concentrations. The highest individual sample detections range from a minimum of 6.1 ug/L in samples collected from GZ-4A to a maximum concentrations of 620 ug/L in a sample collected from MW-7. Vinyl chloride has not been detected in individual sample concentrations above UCLs or Method 1 GW-3 standards. Vinyl chloride concentrations were detected in seven bedrock monitoring wells, also at various locations across the Site. Laboratory reporting limits for these TCE daughter products are elevated in many of the sample analyses, due to the elevated concentration of TCE. None of the detected concentrations of TCE daughter products are reported at concentrations greater than the UCL or Method 1 GW-3 standard.

4.3.2.2 PCE

Reported concentrations of PCE in shallow groundwater range from below laboratory reporting limits (<1.0 ug/l) in MW-16S to a maximum of 4.2 ug/l in GZ-101S. Detections of PCE are generally in monitoring wells along Graham Street, with detections also in the center of the Site near MW-13D.

PCE is present above laboratory detection limits in four monitoring wells, including MW-10D, MW-15D, MW-17D, and MW-23D. Reported concentrations of PCE in deep overburden groundwater collected from these monitoring wells range from 56 ug/L in MW-10D to a maximum of 180 ug/l in MW-15D. PCE detections are generally present in monitoring wells on the eastern third of the Site.

PCE concentrations were detected in five monitoring wells, MW-11B, MW-13B, MW-17B and MW-103B. Three of these monitoring wells, MW-11B, MW-13B, and MW-24B are located along a roughly northeast-southwest linear fashion relative to each other. The other two wells are located along the eastern edge of the Site, adjacent to the Acushnet River. Detected PCE concentrations range from 7.0 ug/L in MW-103B to a maximum of 220 ug/L in MW-11B, which is located in the southeast corner of the Site. There were no PCE concentrations detected above the UCL or Method 3 GW-3 standard.

4.3.2.3 Chlorobenzenes

Chlorobenzene was detected in shallow overburden monitoring wells MW-2A, MW-3, MW-3A, and GZ-103S, located along the east end of the Site. The highest concentrations of chlorobenzene in these monitoring wells were 38 ug/L, 170 ug/L, 99 ug/L and 6.4 ug/L, below the UCL of 10,000 ug/L and Method 1 GW-3 standard of 1,000 ug/L. Both 1,3-dichlorobenzene and 1,4-dichlorobenzene were detected in the same monitoring wells as chlorobenzene. The highest concentration of 1,3-DCB in these monitoring wells was 5.7 ug/l, 3.9 ug/l, 1.4 ug/L and 2.1 ug/L, respectively, and the highest concentrations of 1,4-DCB in these monitoring wells was 8.6 ug/L, 7.1 ug/L, 2.6 ug/L and 1.4 ug/L, respectively.

Chlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene concentrations were detected in deep overburden monitoring wells MW-2 and MW-4. These two monitoring wells are located between the east end of the former Aerovox building and south of the southern drainage ditch. The highest concentrations

of these three constituents detected in MW-2 were 940 ug/L, 52 ug/L and 120 ug/L, respectively. Concentrations of these compounds in samples collected from MW-4 are lower, with the highest detections of 24 ug/L, 9.6 ug/L, and 21 ug/L. The highest detected concentration of 1,2-dichlorobenzene in MW-2 was 14 ug/L. This compound was not detected in MW-4.

There were no detected chlorobenzenes present in any of the bedrock monitoring wells. A 1,3-dichlorobenzene concentration of 2.1 ug/L was detected a groundwater samples collected from MW-103B in September 2014. Analytical results for the samples collected from this monitoring well during the other two groundwater sampling rounds indicate the compound was not detected. Concentrations of 1,4-dichlorobenzene were detected in monitoring wells MW-11B and MW-103 B. The maximum detected concentrations in these two wells were 1.5 ug/L and 1.6 ug/L, respectively. There were no UCL or Method 1 GW-3 exceedances of chlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene or 1,4-dichlorobenzene in the shallow overburden, deep overburden or bedrock aquifers.

4.4 DNAPL

During the Phase II CSA, measured DNAPL was found in two monitoring wells in the northeast corner of the Property, wells MW-15D and MW-15B. Subsequent investigations, done as part of an IRA, defined the extent of DNAPL and this location and areas where DNAPL may also be present along the eastern boundary of the Site. Based on results of the IRA and the Phase II CSA, areas of the Site with DNAPL (potential source areas) were identified as follows:

- Northeast corner of the Property, at the MW-15 wells. Data from the MIP work, UVOST, MALM, soil borings, and from wells MW-15D and MW-15B confirm that this DNAPL source area is confined to a zone approximately sixty feet in diameter. The shallow soils (fill material above the peat), deep overburden, and bedrock in this area contain, or likely contain, pooled or residual DNAPL. Analysis of DNAPL samples from wells MW-15D and MW-15B indicate that it contains both CVOCs and PCBs.
- Small area isolated above the peat and behind the existing sheet pile wall in the vicinity of MIP-23. Boring location MIP-23 exhibited soil concentrations above the UCL from the surface down to the peat layer, and NAPL blebs were observed in the soil interval from 4 to 6 feet bgs. However, explorations surrounding this boring, including the MIP and UVOST borings, did not indicate a widespread or contiguous NAPL area.
- Former northern manufacturing building ditch area. North of the former manufacturing building, lines of evidence suggest a potential DNAPL source zone in the vicinity of boring MIP-11 in shallow soils (0-2 feet bgs, PCBs only) immediately under the pavement, and in deep soils (24-27 feet bgs, CVOCs only).
- Former loading dock (central area of the Site). Soil sampling from the area surrounding boring B04B indicates a potential, or possibly historic, DNAPL source zone that is approximately fifty feet in diameter and less than 15 feet bgs with both CVOCs and PCBs. This area has little overburden (bedrock is shallow) and concentrations drop off laterally in all directions.
- Area near UV-17. The UVOST response observed at UV-17, and subsequent sampling at this location, suggest that a small area situated near where the southern manufacturing building ditch discharged to the River is a probable DNAPL source zone. This area is approximately 35 feet in diameter and extends only down to the top of the peat layer.

Since submittal of the Phase II CSA, an IRA modification has been implemented that included excavation and off site disposal of the DNAPL impacted soils in the vicinity of MIP-23 and UV-17 that are described above, A DNAPL Free Product Recover System (FPRS) was installed in the northeast corner where DNAPL had been measured in wells MW-15D and MW-15B. Three recovery wells (shallow overburden, deep overburden and bedrock) and an overburden recirculation well were installed. No measurable DNAPL has been found in the shallow and bedrock recovery well. Both the deep overburden and recirculation

wells have had measurable DNAPL, but of insufficient quantity to recovery through continuous pumping operations. These two wells, along with MW-15D and MW-15B are routinely gauged, and DNAPL is manually recovered when accumulated volumes allow.

4.5 Storm Sewers

Analysis of sediment from the on-site catch basins (CB-01, CB-02, CB-03, CB-04, CB-05, CB-66, CB-09 and CB-13) and manhole (MH03) indicates that PCBs are present at concentrations ranging from 4.21 mg/kg to 696 mg/kg. The assessment of the storm sewers indicates that PCBs are present within the Property sewers, including the main sewer line along Hadley Street which collects storm water runoff from Belleville Avenue, beyond the Site. Specific catch basin and manhole sediment results are provided in Table 4-1.

Based on these results, and the structural assessment completed with the televiewer, the storm sewer pathway warrants inclusion in development of response actions to mitigate their potential as a preferential pathway to the River.

4.6 Indoor Air

Shallow groundwater monitoring wells installed adjacent to the Precix and Titleist buildings exhibited concentrations of CVOCs above Method 1 GW-2 standards, suggesting a potential for impacts to indoor air. In response to these findings, sub-slab soil gas and indoor air sampling were conducted at the Precix building in May 2014 and December 2014, and sub-slab soil gas sampling was conducted at the Titleist building in December 2014 and April 2015. Sub-slab soil gas data indicated the presence of TCE and tetrachloroethene beneath the Precix building at levels above commercial/industrial screening values. CVOC concentrations in co-located indoor air samples within the Precix building suggest that significant attenuation of soil vapor is achieved by the existing concrete slab foundation. However, levels of TCE above commercial/industrial threshold values were observed in indoor air samples collected from the Precix building. No CVOCs were detected above applicable screening values in sub-slab soil gas samples collected at the Titleist building.

4.7 Summary of Current Source Areas and Migration

Based on the findings described above and current Site conditions, including mechanical removal of DNAPL, earlier implementation of the NTCRA and historical installation of the HAC cap, the remaining sources of contaminants at the Site include:

- impacted soils;
- impacted groundwater; and
- areas of the Site with DNAPL.

4.7.1 Soil

Based on soil analytical data collected as part of the Phase II CSA from December 2013 through April 2015, soils at the Site are impacted with PCBs and VOCs at concentrations that may be a source to groundwater. PCBs are ubiquitous throughout the Site and in general, PCBs are present in surficial soils and in deeper soils above the peat layer. The existing HAC cap prevents infiltration of precipitation to soils underneath the cap, thereby limiting the ability of impacts to leach from shallow soils. However, in the northeastern portion of the Site the groundwater table is shallow and comes in contact fill materials that exhibit elevated levels of COCs.

4.7.2 Groundwater

Based on groundwater analytical data collected as part of the Phase II CSA from March 2014 through August 2015, and subsequently during the IRA, groundwater at the Site is impacted with PCBs and CVOCs at concentrations that may be a source to surface water and indoor air. Constituents that may impact surface water (i.e., constituents detected in groundwater at levels exceeding Method 1 GW-3 standards) include PCBs, TCE, cis-1,2-DCE, carbon tetrachloride, and chloroform. Of these constituents, only PCBs, TCE, cis-1,2-DCE are from on-site sources. Carbon tetrachloride and chloroform were detected at levels above Method 1 GW-3 standards in well MW-24B only. MW-24B is a bedrock well located towards the northern boundary of the Precix property and southeast of an adjacent laundry and dry cleaning facility. The carbon tetrachloride is believed to be from a release associated with the dry cleaning facility, and chloroform is a carbon tetrachloride degradation product. Constituents in groundwater that may impact indoor air (i.e., constituents detected in groundwater at levels exceeding Method 1 GW-2 standards, where applicable) include PCBs, TCE, cis-1,2-DCE, and vinyl chloride.

4.7.3 DNAPL

The MCP indicates that for sites where NAPL is present, it is necessary to describe the scientific principles behind and behavior of fluid flow in porous media at the Site. This description has been provided previously in detail in the IRA Status Reports, and is summarized below.

Based on the 2009 technical publication by Kueper and Davies, the characterization of an area or volume of soil within the Site as a DNAPL source means that the area has a volume that contains residual or pooled DNAPL. This definition does not imply that DNAPL is, or may, migrate within, or from, that zone, or that such zone's contribution to a dissolved-phase will necessarily contribute to an unacceptable site risk. The stage of the DNAPL zone present at the Site (early, middle or late), and whether that DNAPL is stable, has micro-scale mobility, or whether it is contributing to an expanding, stable, or contracting dissolved-phase groundwater plume were evaluated using site-specific data and standard methods to assess the potential for DNAPL to mobilize and migrate within the subsurface stratigraphy at the Site.

The results of the Phase II CSA and the IRA DNAPL mobility evaluation indicate that site DNAPL has migrated vertically through the fill and overburden materials to, and into, bedrock beneath the Site. Furthermore, the evaluation determined that Site DNAPL migrates laterally, in both an easterly and westerly direction, under the influence of the observed tidally-influenced reversing gradients, provided a sufficient DNAPL body is present. This continual back and forth migration likely aids the dissolution of subsurface DNAPL and supports a preference for vertical migration (i.e., sinking) of DNAPL.

The site-specific investigative data does not support wide-spread DNAPL accumulations, rather limited areas of known DNAPL presence, with likely larger areas constituting residual DNAPL zones, which are by definition incapable of migrating. Therefore, the DNAPL investigative findings are supportive of a middle-to late-stage DNAPL plume condition, i.e., its downward mobility has dominated over a period of 30+ years resulting in the remaining limited pooling at the deepest interface between overburden and top of rock and within shallow bedrock at the northeast corner of the Property. The two remaining areas where the Phase II CSA and IRA indicate the potential for DNAPL to be present (described in Section 4.4 above) do not have corresponding measurable DNAPL thickness in a well, and are confined to small zones within the overall Site. These small areas are either stranded in shallow vadose zone soils without a driver for migration, are stranded on top of the peat layer where the increased carbon content mitigates migration, or are present at depth at the top of rock interface.

Section 5

Potential Exposure Pathways

5.1 Soil Pathway

As a result of the existing pavement and HAC cap on the Property, direct contact exposure is not a complete pathway. Should the asphalt be removed, a direct exposure pathway will potentially exist. As a result of temporary security measures that have been implemented on the east end of the Titleist property, the PCB concentrations in surface soils have been mitigated and these measures will be maintained until a permanent solution is achieved.

5.2 Groundwater Pathway

Groundwater in the site vicinity is not utilized for drinking purposes and there are currently no known irrigation wells present in the site vicinity. Therefore, category GW-1 does not apply. In addition, use of groundwater at the Site is prohibited by a Declaration recorded on the property title. The GW-2 groundwater category is applicable to sites where groundwater is within 15 vertical feet of the ground surface and 30 horizontal feet of a building, reflecting a potential pathway to indoor air. Groundwater within 30 horizontal feet of the Precix and Titleist buildings to the north and south are subject to GW-2 standards. Therefore, the groundwater pathway for the Site as currently defined under current uses consists of potential migration to indoor air and migration and discharge to surface water (as reflected in the category GW-3 definition).

5.3 Air Pathway

CVOCs were detected in groundwater adjacent to the Precix and Titleist properties at levels above the applicable Method 1 GW-2 standards. Sub-slab and indoor air sampling has demonstrated that there is a complete pathway at the Precix building, as both sub-slab and indoor air samples exceeded applicable threshold values. Sub-slab soil vapor sampling at the Titleist property indicated that a complete pathway does not exist in this building.

5.4 Storm and Surface Water

Storm water at the Site is currently directed to existing drainage structures. The existing HAC cap prevents potential contamination of storm water runoff from occurring. Subsurface drainage structures used prior to capping are still in place and are utilized. Samples of the accumulated soil/sediment within catch basins and a manhole at the Site have indicated that PCBs, CVOCs and PAHs (not a site contaminant of concern) are present. These contaminated sediments could mobilize during storm events and are considered a potential pathway to surface water.

Contaminant transport through groundwater to the adjacent surface water (Acushnet River) is a potential exposure pathway to Site COCs. Existing levels of contamination in sediment and surface water are primarily the result of direct discharge to the river and secondarily the result of contaminant migration with groundwater. The Acushnet River is being addressed by U.S. EPA under the Superfund program and by definition is not considered part of the Site. However, based on the Phase II CSA results in groundwater samples collected from adjacent to the River, and the tidal flushing of groundwater both into and outward from the Site, it is likely that contaminants from the Site are migrating to surface water and from the river back into the Site. As such, this pathway is valid if and only to the extent that the Site

could act as a continuing source to the River after both MCP Phase IV (at the Site) and EPA CERCLA (at NBH Superfund Site) response actions are complete, as measured by post-Phase IV confirmatory sampling. Such confirmatory sampling and analysis would need to clearly identify contaminants, if any, as coming from the Site and not from other sources historically or presently impacting the River or from historical conditions in the River that remain after EPA CERCLA response actions are complete.

Section 6

Potential Receptors

6.1 Current Use

Under existing site use, there are no on-site receptors at the Property. On-site receptors at the Precix, former Coyne and Titleist facilities that are part of the disposal site include employees, visitors, utility/construction workers, and trespassers.

The site vicinity is served by municipal water and sewer. There is one single institution, St. Joseph-St. Therese School, within 500 feet of the Site. There are no known daycare centers within 500 feet of the Site. The northwest corner of the Property has been converted to a public park. Based on historic data for samples collected in the area of the park (MW-5), PCB concentrations in samples collected from this area were reported as below laboratory detection limits. According to the Massachusetts Department of Environmental Protection (MassDEP), Bureau of Waste Site Cleanup, site scoring map of the area, Brooklawn Park, located approximately 650 feet west, is mapped as Protected Open Space. Wetland areas and mapped aquifers are located on the east bank of the River. There were no complete pathways to these areas identified as a result of the Phase II CSA. Potential off-site receptors (human and ecological) related to the River are being addressed by EPA under CERCLA.

6.2 Foreseeable Future Use

An Activity and Use Limitation (AUL) was negotiated as part of a settlement agreement between the owner of the Site, the City of New Bedford, and AVX. Potential future uses of the Property are limited to commercial or industrial uses, or use as open space available for passive recreational use. These are activities that will not pose risk to human health, public safety, or the environment. Upon completion of the MCP response actions, the AUL will be recorded with the Registry of Deeds and Registered Land Office.

For other properties within the site boundary, the potential for future residential use cannot be assumed, and as such the Method 3 risk assessment evaluated the risks to such receptors on the Titleist and Precix properties. A condition of No Significant Risk was not found for such future uses based on the levels of COCs identified and the potentially foreseeably complete exposure pathways.

Aquatic human and environmental receptors associated with the River are possible only if COCs are transported through groundwater to the adjacent surface water (Acushnet River) in the foreseeable future. Existing levels of contamination in sediment and surface water are being addressed by U.S. EPA under the Superfund program and are not considered part of the Site. However the foreseeable migration of groundwater contaminants to surface water is a valid site-related pathway to such receptors if and only to the extent that the Site could act as a continuing source to the River after both MCP Phase IV (at the Site) and EPA CERCLA (at NBH Superfund Site) response actions are complete, and such contaminants are clearly identifiable as coming from the Site and not from other sources historically or presently impacting the River or from historical conditions in the River that remain after EPA CERCLA response actions are complete.

Section 7

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Appendix G: Groundwater Modeling Report

Groundwater Modeling Report
Former Aerovox Facility
New Bedford, Massachusetts

Prepared for

AVX Corporation, Myrtle Beach, South Carolina

June 2017

Groundwater Modeling Report
Former Aerovox Facility
New Bedford, Massachusetts

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June 2017

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List of Abbreviations

cm/sec	Centimeters per second
DEM	Digital Elevation Model
ft.	Feet
ft/day	Feet per day
GPM	Gallons per minute
SL	Mean Sea Level
NAVD	North American Vertical Datum of 1988
n_e	Effective porosity
PRB	Passive Reactive Barrier
Site	Former Aerovox Property
S_s	Specific storage
S_y	Specific yield

Section 1

Groundwater Flow Model

This report presents a numerical groundwater flow model that was developed to evaluate, confirm and, where appropriate, refine the understanding of groundwater behavior in and around the Former Aerovox property (Site) to support the development of a Phase III Remedial Action Plan. A calibrated groundwater model was developed as an estimation of current groundwater behavior and was subsequently used to:

- Evaluate how groundwater would be influenced by the implementation of various remedial alternatives that may be considered;
- Assess whether, and the degree to which remedial alternatives would require groundwater management (e.g., groundwater extraction, containment, etc.); and
- Provide an initial evaluation of approaches for groundwater management, if required.

This model was constructed as a screening level exercise and additional data collection may be required to further refine the model to decrease uncertainty in the results.

1.1 Model Construction

The Modular Three-dimensional Finite Difference Groundwater Flow Model (MODFLOW) was selected for the groundwater flow simulation. This modeling code was developed by the United States Geological Survey (McDonald and Harbaugh, 1988) in the early 1980's based on theoretical flow behavior defined by Darcy's Law. The MODFLOW code is well proven and is accepted by industry and by regulatory agencies for application to porous media flow systems, and remains today as the de facto standard code for groundwater modeling. The specific version of MODFLOW used was MODFLOW 2000, and the graphical user interface used to input the model components into the model was Groundwater Vistas 6 from Environmental Simulations, Inc.

Site data, including in-situ hydraulic conductivity test (slug test) results, soil characteristics described in borings, and water elevation data collected from the monitoring wells, were used to construct and calibrate the model. These data and information are available in the "Phase II Comprehensive Site Assessment" (AECOM, September 2015). The model also incorporated publicly available regional data, where available, such as the USGS Digital Elevation Model (DEM) data to provide regional surface topography.

1.1.1 Model Domain

The model domain (Figure 1-1) consists of a grid of 150 columns and 200 rows covering an area that is approximately 0.43 square miles in extent. The Site is located near the center of the grid. The columns and rows are of a uniform 20 feet (ft) by 20 ft size (Figure 1-2). The eastern edge of the model is bounded by the Acushnet River, while the western edge is based off of a ground surface elevation contour of 10 meters above Mean Sea Level (MSL) by the North American Vertical Datum of 1988 (NAVD). The model is extended approximately 1500 ft north and south of the property boundaries.

The model was constructed with three layers (Figure 1-3). These layers were incorporated into the model to represent significant hydrostratigraphic units within the domain, as described below. Both the thickness and the elevation of these layers vary horizontally to account for spatial changes in topography and stratigraphy. The top and bottom elevations of the hydrostratigraphic units in the vicinity of the Site were estimated based on Site boring logs. These values were contoured using the kriging method to

create layer surfaces that were imported into the model by the modeling software. In model areas located outside the boundaries of the Site, where subsurface boring data are limited or unavailable, thicknesses and elevations were assumed for the stratigraphic units based on the geologic understanding of the extent of these units. The bottom of the lowermost unit modeled (Layer 3) was assigned a constant elevation of -300 ft NAVD.

The nature of the various stratigraphic units beneath the Site, and the conceptual model of groundwater flow are described in Section 2.2 of the Phase II Comprehensive Site Assessment (CSA). The hydrostratigraphic units incorporated into the model include:

- Model Layer 1: Artificial Fill and Peat Units.
- Model Layer 2: Glacial Outwash and Till
- Model Layer 3: Bedrock

1.1.2 Boundary Conditions

Boundary conditions are simulations of natural and artificial features, such as streams, drains, extractions wells, surficial recharge, etc., that control water entering and leaving a model's domain. The boundary conditions for this particular model are described in the sections below.

1.1.2.1 Inflow of Water

The flow of water into the model was simulated by applying a constant head boundary to a single row of cells along the western edge of the model. The elevation of this constant head boundary was modified during the calibration of the model to a final value of 4.1 ft NAVD. This boundary condition is represented on Figure 1-4.

In addition to the constant head boundary a surface recharge boundary was applied to the topmost layer of the model. A single recharge value of 10 inches/year was utilized over the model domain.

1.1.2.2 Outflow of Water

The flow of water out of the model was simulated by applying a constant head boundary to the area of the model domain that represents the Acushnet River. This constant head boundary was set to a constant elevation of 0 ft NAVD to generate the heads adjacent to the river that are representative of a low-tide condition. Tidal variations in the Acushnet River, as presented in the Phase II CSA reach an elevation of approximately -1 ft NAVD. However, these are transient conditions and an elevation of -1 ft in the steady-state version of the model calculated heads at the Site that were too low relative to heads measured at the site. This boundary condition is represented on Figure 1-4.

1.1.2.3 Sheet Pile Wall

The code's hydraulic barrier module was utilized to simulate the existing sheet-pile walls along the shoreline of the property. This hydraulic barrier was simulated across the thickness of model layer 1, which represents the fill and peat units. The hydraulic barrier was given a thickness of 1 ft and a hydraulic conductivity of 1E-07 centimeters/second (cm/sec). These values may not match the actual properties of the sheet-pile but they provide the necessary degree of impermeability to reduce tidal fluctuations in the fill unit behind them, as was documented in the Phase II CSA. This boundary condition is represented on Figure 1-4.

1.1.3 Hydrogeologic Properties of Layers

The table below identifies the hydraulic conductivities assigned to each of the model layers. In addition, Figure 1-5 presents a cross-section from the model that illustrates the distribution of hydraulic conductivities across the Site. The horizontal hydraulic conductivities assigned to each of the units (denoted as Kx and Ky, or, Kx,y, since horizontal K is assumed the same regardless of flow direction in

this model) were initially approximated from soil descriptions from soil borings and slug test results from wells as reported in the Phase II CSA. The values were subsequently refined during the calibration process. Thus, the hydraulic conductivity values assigned to the model, following calibration, are as follows:

Table 1-1. Hydraulic Conductivity

Unit	Model Layer	Kx,y (ft/day)	Kz (ft/day)
Fill Unit	1	18.1	1.81
Fill Unit where Peat is Present	1	18.1	0.0002834
Glacial Outwash/Till	2	34.1	3.41
Bedrock	3	8.96	8.96

It was assumed for units of generally consistent grain size (i.e., Glacial Outwash) that the vertical hydraulic conductivity (Kz) was at least one-half order of magnitude less than the Kx,y. This assumption is consistent with the literature, which indicates Kz to Kx,y ratios ranging from 0.1 to 0.95 for unconsolidated deposits, with the more granular deposits, such as sand exhibiting the higher ratios and clay-dominated deposits exhibiting the lower ratios (Spitz and Moreno, 1996). The degree of anisotropy of hydraulic conductivity in the bedrock unit has not been defined. As such the same value was utilized for the horizontal and vertical hydraulic conductivities for the bedrock unit.

The fill unit simulated as Layer 1 of the groundwater flow model was separated into two sub-units. The first represents the fill in areas where it is not underlain by peat materials. The second sub-unit represents the areas where the fill is underlain by peat materials, as delineated in the Phase II CSA. For the second sub-unit the vertical conductivity of the layer was reduced significantly from 1.81 feet/day (ft/day) to 0.0002834 ft/day to represent the relative impermeability of the peat materials to vertical flow. This alteration was necessary to produce the heads in the fill near the river that are minimally effected by tidal fluctuations that are described in Section 2.1, below.

1.2 Model Calibration

The groundwater flow model was calibrated under steady-state conditions by comparing model calculated groundwater levels to monitoring well levels measured on May 28, 2015. These measurements were taken during a low-tide condition, which is the state that the Steady-state version of the groundwater model was developed to simulate. A total of 47 measurements were utilized for the calibration. Several other well readings were not used, including five overburden wells, GZ-2, MW-1, MW-2A, MW-3 (AVX), and MW-4A. Readings from these five wells were suspected of representing perched conditions above the peat, which the groundwater model, as designed, is unable to simulate.

To obtain the best-fit correlation between model-calculated water levels and measured water levels, the hydraulic conductivity of the units, recharge values and the elevations of the constant head boundaries were subjected to adjustments; these adjustments were made within the range of values expected for the type of deposit or boundary condition.

A plot comparing the measured (observed) groundwater head elevations to model-computed groundwater heads, as well as statistics to evaluate the degree to which the model values match the observed values, is provided in Figure 1-7. These statistics indicate that model calculated groundwater elevations in the final calibrated model match well to actual groundwater elevation measurements obtained on May 28, 2015. This comparison yields a high correlation coefficient of 0.96, a mean absolute error of 0.16 ft, and a normalized root mean square error (RMS) of 7.2 percent, all considered indicators of a reasonable match between modeled and observed values.

The calibrated steady-state groundwater head equipotential contours for the Fill unit (Layer 1), Glacial Outwash Unit (Layer 2), and Bedrock Unit (Layer 3), are displayed in Figures 1-8, 1-9, and 1-10, respectively. Figure 1-11 provides a cross-section across the model domain, showing a vertical profile of groundwater head value contours. Additional calibration data is presented in Tables 1-2 and 1-3, below.

Table 1-2. Calibrated Model Head Results

Well	Model Layer	Observed Head (ft)	Computed Head (ft)	Residual (ft)
GZ-1	2	1.82	2.06	-0.24
GZ-101S	1	1.70	1.80	-0.10
GZ-102S	1	1.07	1.05	0.02
GZ-103D	2	0.42	0.57	-0.15
GZ-103S	1	0.44	0.43	0.01
GZ-3	2	1.94	2.26	-0.32
MW-101B	3	1.67	1.77	-0.10
MW-103B	3	0.74	0.62	0.12
MW-10D	2	0.76	0.78	-0.02
MW-11B	3	2.05	2.27	-0.22
MW-12S	2	2.00	1.99	0.01
MW-13B	3	1.62	1.67	-0.05
MW-13D	1	1.66	1.83	-0.17
MW-15B	3	0.08	0.52	-0.44
MW-15D	2	0.06	0.44	-0.38
MW-16S	1	1.06	0.75	0.31
MW-17B	3	0.50	0.54	-0.04
MW-17D	2	0.47	0.45	0.02
MW-18D	2	1.15	1.16	-0.01
MW-18S	1	1.16	1.18	-0.02
MW-19D	2	0.82	1.06	-0.24
MW-19S	1	1.02	1.09	-0.07
MW-20B	3	2.71	2.46	0.25
MW-20D	2	2.86	2.46	0.40
MW-21B	3	1.87	1.70	0.17
MW-21D	2	1.78	1.75	0.03
MW-22S	1	0.85	1.00	-0.15
MW-23B	3	0.57	0.80	-0.23
MW-23D	2	0.63	0.72	-0.09
MW-24B	3	1.32	1.49	-0.17
MW-24D	2	1.23	1.48	-0.25
MW-26B	3	1.12	1.44	-0.32

Table 1-2. Calibrated Model Head Results				
Well	Model Layer	Observed Head (ft)	Computed Head (ft)	Residual (ft)
MW-27B	3	0.92	0.93	-0.01
MW-28B	3	0.46	0.67	-0.21
MW-29B	3	0.94	0.74	0.20
MW-2B	3	0.35	0.51	-0.16
MW-30B	3	1.27	1.57	-0.30
MW-31B	3	0.47	0.59	-0.12
MW-3Precix	2	1.81	2.06	-0.25
MW-4B	3	1.59	1.82	-0.23
MW-4S	1	1.47	1.53	-0.06
MW-6	2	1.01	1.02	-0.01
MW-6A	1	1.09	1.06	0.03
MW-6B	3	1.03	0.99	0.04
MW-7B	3	0.08	0.50	-0.42
MW-8S	1	1.50	1.71	-0.21
MW-TITL-01	1	0.66	0.70	-0.04

Table 1-3. Model Calibration Statistics	
Residual Mean	-0.089
Absolute Residual Mean	0.158
Sum of Square Residuals	1.892
Root Mean Squared Error	0.201
Minimum Residual	-0.443
Maximum Residual	0.402
Number of Observations	47
Range in Observations	2.8
Scaled RMS Error	7.17%

1.3 Model Sensitivity

To determine the degree of uncertainty associated with the calibrated model, a sensitivity analysis was performed by varying the hydraulic conductivity (both horizontal and vertical) of all units by factors of 2, one-half order of magnitude, and one order of magnitude. For each variation of the model, the resulting Sum of Square Residuals was calculated. The statistical results of the sensitivity analyses are summarized in the following tables.

Table 1-4. Horizontal Conductivity Sensitivity – Sum of Square Residuals				
Factor Relative to Calibrated Values	Fill	Fill where Peat is Present	Glacial Outwash	Bedrock
0.1	2.66	10.66	6.00	2.49
0.2	2.36	4.54	4.98	1.80
0.5	2.10	2.30	3.19	1.51
1	1.90	1.90	1.90	1.90
2	1.70	1.79	1.68	5.86
5	1.53	1.87	5.40	31.14
10	1.84	2.24	12.25	79.68

Table 1-5. Vertical Conductivity Sensitivity – Sum of Square Residuals				
Factor Relative to Calibrated Values	Fill	Fill where Peat is Present	Glacial Outwash	Bedrock
0.1	8.47	1.91	21.91	21.87
0.2	4.11	1.91	8.79	9.54
0.5	2.32	1.91	3.04	3.25
1	1.90	1.90	1.90	1.90
2	1.75	1.90	1.58	1.56
5	1.67	1.89	1.50	1.54
10	1.65	1.88	1.49	1.57

These statistics indicate that the groundwater model is sensitive to horizontal hydraulic conductivity variations in the Glacial Outwash and Bedrock units, particularly to increases in the horizontal conductivity of the bedrock. The model is also sensitive to reductions in the vertical conductivity of recharge to these units. While some variations produced statistically slightly better results than the calibrated model, particularly increases in the vertical conductivity of the Glacial Outwash and Bedrock Units, the empirically derived values taken from the Phase II CSA were maintained in the Model. Additional hydraulic testing in the future could provide additional data to refine these values.

At the request of Massachusetts DEP, two additional sensitivity analyses were performed to evaluate the effect of variations in the recharge value utilized in the steady-state model on the head values calculated for the Site. The first sensitivity analysis was performed by varying the single recharge value that was applied model-wide to the uppermost unit of the model by factors of 0.5, 0.75, 1.5 and 2. These variations resulted in recharge values varying between 5-20 inches per year, a reasonable range of expected recharge values for surfaces that are not specifically engineered to limit infiltration. The second sensitivity analysis only varied recharge values within the confines of the Site by factors of 0.1, 0.2, and 0.5. This sensitivity test evaluates the sensitivity of the modeled heads to various low-recharge values that could be applied to the Site asphalt cover. For each variation of the model, the resulting Sum of Square Residuals was calculated. The statistical results of the sensitivity analyses are summarized in the following tables:

Table 1-6. Model-Wide Recharge Sensitivity – Sum of Square Residuals		
Factor Relative to Calibrated Values	Recharge Value (in/yr)	Sum of Square Residuals
0.5	5	1.73
0.75	7.5	1.58
1	10	1.90
1.5	15	3.92
2	20	7.71

Table 1-7. Site-Wide Recharge Sensitivity – Sum of Square Residuals		
Factor Relative to Calibrated Values	Recharge Value (in/yr)	Sum of Square Residuals
0.1	1	1.72
0.2	2	1.70
0.5	5	1.71
1	10	1.90

These statistics indicate that the steady-state groundwater model is sensitive only to increases in model-wide recharge but is not sensitive to decreases in recharge either model wide or site wide. This sensitivity is attributed to the model's use of constant-head boundaries to control the hydraulic gradient; i.e. the model was designed to behave independently of recharge due to the nature of the remedial alternatives to be simulated[1]. As a result, decreases in recharge, such as simulating a lower permeability cover over the site, have little effect on the hydraulic gradient produced by the constant-head boundaries. However, increases in recharge do have an effect since it contributes additional water to the model domain. Thus, the hydraulic gradient is generally maintained until recharge is increased sufficiently enough to elevate heads when, coincidentally, the model is still attempting control the hydraulic gradient using its original constant-head boundaries.

The evaluation of remedial alternatives discussed in Section 2 is conducted in a transient mode to simulate typical tidal fluctuations. Because these simulations are short-term in duration, often within a few simulated days and in locations where tidal fluctuations will have a significant impact on the remedial alternatives, recharge as a model element is not considered to be important.

1.4 Conversion to Transient Operation

The tidal cycle within the Acushnet River has significant impact on the groundwater elevation and flow directions at the Site. The alternating flow directions caused by the tidal fluctuations present a complication for the evaluation of remedial alternatives. The remedial alternative selected will need to meet its design objectives at both low tide and high tide conditions. As such the calibrated steady-state groundwater model was converted to operate on a transient basis with a simulated tidal cycle to evaluate the effects these variations have on the effectiveness of each alternative in preventing migration of site constituents and the amount of groundwater management required.

The transient model was developed to first run a steady-state simulation in order to generate starting heads for the transient component of the simulation. The tidal cycles documented in the Phase II CSA varied between approximately 4.2 and -1.0 ft NAVD. A starting steady-state head level of 1.5 ft NAVD was

[1] Recharge was considered a less significant factor in this model than tidal fluctuations, which were simulated in the transient mode by varying the downgradient constant-head boundary.

selected to produce an approximately average condition in the model prior to the transient portion of the simulation.

After the steady-state starting heads were calculated the model was run in transient mode for a simulated period of approximately 3.5 days, representing 7 tidal cycles. During this period the head levels in the constant-head boundary condition representing the Acushnet River were varied. The heads are varied in hourly increments to create a sinusoidal variation that approximates the tidal cycles documented in the Phase II CSA. These cycles have high tide elevations of 4.2 ft NAVD and low tide elevations of -1 ft NAVD. Simulating multiple repetitions of the tidal cycle was necessary to confirm that groundwater elevations would return after each cycle to levels estimated by the steady-state model and not drift new levels.

The boundary condition representing the Acushnet River was copied from layer 1 to also be simulated in layer 2 and 3. This was found to be necessary to propagate the observed tidal fluctuations through the Glacial Outwash and Bedrock units. This is consistent with the Site Conceptual Model, which assumes that the Acushnet River is in direct hydraulic communication with these units.

Once the transient simulation was developed, the transient parameters specific storage (S_s), specific yield (S_y) and effective porosity (n_e) were adjusted to control the tidal variations within the aquifers to produce simulated head variations in the target wells to match the variations documented in Appendix H of the Phase II CSA. The values selected are documented in Table 1-8 below. Since it is assumed that all three units are behaving as unconfined aquifers, the specific storage is negligible relative to the specific yield, which is the ratio of the fraction of the bulk aquifer volume that a given aquifer will yield when all the water is allowed to drain out of it. This value is always less than the effective porosity.

Table 1-8. Transient Properties

Unit	Model Layer	Specific Storage (ft^{-1})	Specific Yield	Effective Porosity
Fill Unit	1	5e-005	0.20	0.30
Glacial Outwash/Till	2	5e-005	0.22	0.25
Bedrock	3	5e-005	0.05	0.10

Section 2

Simulations of Remedial Alternative

The transient model was used as the basis for a series of simulations that were used to evaluate the effect of the various remedial alternatives on groundwater flow, and to estimate potential groundwater management needs for the alternatives. The various remedial alternatives that were simulated are discussed below. The specific objectives of the simulations included the following:

- Evaluate the effectiveness of the proposed remedial alternatives on preventing the migration of impacted groundwater off-Site.
- Estimate the amount of groundwater that might be required to be managed to meet remedial objectives (i.e., to mitigate off-property migration of dissolved-phase constituents and reduce the potential for unacceptable groundwater level increase [e.g., groundwater mounding, flooding]).

In the modeled remedial alternative scenarios discussed below that include groundwater extraction, it was assumed that wells would be used to extract groundwater. However, other technologies may be considered in the detailed design, such as french drains. Note that the number of extraction wells assumed in each scenario, and their position and rate of pumping, are meant to be generally representative and would be subject to modification and optimization in the detailed design if a given alternative is selected.

2.1 Remedial Scenario 1 – Fully Enclosing Barrier Wall with Low Permeability Cap

Remedial Scenario 1 modifies the transient simulation discussed in Section 1.4 above, by simulating a low-permeability barrier wall across the unconsolidated Fill/Peat and Glacial Outwash/Till units simulated in layers 1 and 2. This barrier wall was simulated to surround the eastern half of the property, as shown on Figures 2-1. This extent was selected to contain the groundwater zone that, based on the results of the Phase II CSA is potentially impacted above MCP Method 1, GW-3 groundwater criteria. The wall was simulated using the horizontal flow barrier module with a thickness of 1 foot and a hydraulic conductivity of 1E-07 cm/sec. A low-permeability surface cap was also simulated over the extent of the contained area by reducing the surface recharge to 0 inches/year in this area.

The groundwater flow model indicates (Figures 2-2 and 2-3) that the barrier wall would likely reduce the amplitude of tidal fluctuation in the Glacial Outwash unit (Layer 2). Only layer 2 is presented as the glacial outwash unit is the principal transmissive unconsolidated unit. The barrier wall does not fully dampen the tidal cycle in the contained overburden, however, since the tidally affected bedrock remains in direct communication with the overlying overburden.

In addition, the barrier wall does not prevent the discharge of impacted groundwater from the overburden units to the Acushnet River. Particle flow tracking indicates that vertical communication between the overburden layers and the underlying bedrock will allow water to flow vertically downward into the bedrock, bypassing underneath the Barrier Wall, before discharging to the river. The barrier wall does, however, reduce the estimated groundwater flux through the contained overburden by approximately 50 percent. This is due to the more circuitous route groundwater from the overburden units must take to discharge to the river, as well as the reduced gradients and tidal fluctuations caused by the barrier wall.

The groundwater equipotential contours for Scenario 1 in Layer 2 at low and high tide conditions are presented in Figures 2-4 and 2-5, respectively. The groundwater equipotential contours for Scenario 1 in cross-section at low and high tide are presented in Figures 2-5 and 2-6, respectively.

2.2 Remedial Scenario 2 – Fully Enclosing Barrier Wall with Low Permeability Cap and Groundwater Extraction

Remedial Scenario 2 modifies Scenario 1 by adding constant flux boundaries to simulate extraction wells within the contained area. Five wells were simulated, three along the downgradient edge of the contained area and two along the upgradient edge (Figures 2-6). The extraction rates of the wells were adjusted iteratively until no groundwater discharged out of the contained overburden at either high or low tide conditions. This condition was achieved with the three downgradient wells extracting 15 gallons/minute (GPM) each and the two upgradient wells extracting ten GPM each for a total of 65 GPM.

The groundwater equipotential contours for Scenario 2 in Layer 2 at low and high tide conditions are presented in Figures 2-7 and 2-8, respectively. The groundwater equipotential contours for Scenario 2 in cross-section at low and high tide are presented in Figures 2-9 and 2-10, respectively.

2.3 Remedial Scenario 3 – Passive Reactive Barrier with Lateral Barrier walls and Low Permeability Cap

Remedial Scenario 3 modifies the transient simulation described in Section 2.1 by simulating a Passive Reactive Barrier (PRB) along the shoreline of the property across the unconsolidated Fill/Peat and Glacial Outwash/Till units (Figures 2-1). This PRB was simulated using the horizontal flow barrier module with a thickness of 3 ft and a hydraulic conductivity of 28 ft/day. This conductivity is similar to the modeled hydraulic conductivity of the glacial outwash unit, which is 34 ft/day. To direct groundwater flow through the PRB rather than around the northern or southern edges of the PRB, the northern and southern barrier walls simulated in Scenarios 1 and 2 are also included in Scenario 3. Scenario 3 does not, however, utilize an upgradient barrier wall along the western edge of the contained area (Figure 2-11).

Flow direction through the PRB alternates with the tidal fluctuations. Thus, the PRB is only treating impacted Site groundwater during lower tide conditions. Based on preliminary mass balance calculations from the model approximately 99 percent of water exiting the contained area of the glacial outwash materials at low tide will pass through the PRB. During high tide the flow direction is reversed and water enters the contained area from the Acushnet River, through the PRB. During high tide some groundwater flows from the contained area of the glacial outwash deposits downward into the bedrock unit. The rate of this downward flow, however, is similar to the rate of upward flow from the bedrock during low tide conditions. This indicates that little net flux is expected between these two units in the contained area following construction of the PRB and lateral hydraulic barriers.

The groundwater equipotential contours for Scenario 3 in Layer 2 at low and high tide conditions are presented in Figures 2-12 and 2-13, respectively. The groundwater equipotential contours for Scenario 3 in cross-section at low and high tide are presented in Figures 2-14 and 2-15, respectively.

2.4 Remedial Scenario 4 – Bedrock Groundwater Extraction and Low Permeability Cap

Remedial Scenario 4 modifies the transient simulation described in Section 2.1 by adding constant flux boundaries to simulate extraction wells in the Bedrock layer. Six wells were simulated along the eastern

edge of the Site (Figure 2-16). Each of these wells was simulated at a constant pumping rate of 40 GPM.

The groundwater flow model indicates that the bedrock extraction would reduce discharge to the Acushnet River through the bedrock unit by 98.5 percent. The strong gradient produced by the bedrock extraction wells increases the amount of water that enters the bedrock unit from the River to 4.8 times the transient version of the calibrated model. As a result, the small amount of water that flows from the Site to the River at low tide is expected to be unimpacted river water that was pulled into the bedrock unit under higher tide conditions. The bedrock extraction increases downward gradients from the unconsolidated units into the bedrock unit, tripling the amount of downward flux into the bedrock from the overlying overburden at the site, likely resulting in increased contaminant migration to the bedrock. This downward flow of water reduces the outflow from the glacial outwash material to the River by 59 percent but does not fully contain impacted groundwater in the outwash from discharging to the River.

The groundwater equipotential contours for Scenario 3 in Layer 2 at low and high tide conditions are presented in Figures 2-17 and 2-18, respectively. The groundwater equipotential contours for Scenario 3 in cross-section at low and high tide are presented in Figures 2-19 and 2-20, respectively.

2.5 Remedial Scenario 5 – Passive Reactive Barrier with Funnel Lateral Barrier walls and Low Permeability Cap

Remedial Scenario 5 modifies the transient simulation described in Section 2.1 by simulating a Passive Reactive Barrier (PRB) near the shoreline of the property across the unconsolidated Fill/Peat and Glacial Outwash/Till units. This PRB was simulated using the horizontal flow barrier module with a thickness of 3 feet and a hydraulic conductivity of 28 feet/day. This conductivity is similar to the modeled hydraulic conductivity of the glacial outwash unit, which is 34 feet/day. To direct groundwater flow through the PRB rather than around the northern or southern edges of the PRB, northern and southern barrier walls, similar to Scenario 3 are simulated in Scenario 5. The lateral walls in Scenario 5 also continue for approximately 20 percent of the shoreline, reducing the length of the PRB in Scenario 5, relative to Scenario 3. Similar to Scenario 3, Scenario 5 does not utilize an upgradient barrier wall along the western edge of the contained area. The layout of Scenario 5 is presented in Figure 2-21.

Flow direction through the PRB alternates with the tidal fluctuations. Thus, the PRB is only treating impacted Site groundwater during lower tide conditions. Based on preliminary mass balance calculations from the model approximately 89 percent of water exiting the contained area of the glacial outwash materials at low tide will pass through the PRB. Much of the remaining 11 percent of the flux is downward towards the bedrock. During high tide the flow direction is reversed and water enters the contained area from the Acushnet River, through the PRB. During high tide, some groundwater flows from the contained area of the glacial outwash deposits downward into the bedrock unit. The rate of this downward flow, however, is similar to the rate of upward flow from the bedrock during low tide conditions. This indicates that little net flux is expected between these two units in the contained area following construction of the PRB and lateral hydraulic barriers. The net flux between these units was estimated by the model to be a net downward flow of 172 ft^3/day. This is more than the net downward flux of 67 ft^3/day estimated for Scenario 3 but is still less than the net downward flux of 193 ft^3/day calculated by the transient version of the calibrated model. The hourly net vertical gradients between the overburden and bedrock units for a 24-hour period in each of these three simulations is presented in Figure 2-22. The reduction in width of the PRB in Scenario 5, relative to Scenario 3, reduces the magnitude of both the upward and downward flow between the bedrock and overburden as shown in Figure 2-22, but increases the net downward flow slightly relative to Scenario 3. This net downward flow is still estimated to be less than is expected under current, i.e. calibrated, conditions.

The groundwater equipotential contours for Scenario 5 in Layer 2 at low and high tide conditions are presented in Figures 2-23 and 2-24, respectively. The groundwater equipotential contours for Scenario 5 in cross-section at low and high tide are presented in Figures 2-25 and 2-26, respectively.

Section 3

Conclusions

The following conclusions have been made from the groundwater flow model simulations conducted to evaluate remedial alternative scenarios for the former Aerovox property:

- The construction of a hydraulic barrier installed to the bedrock will require groundwater control measures in the form of groundwater extraction to maintain inward and upward hydraulic gradients into the area to prevent migration of Site COCs in the overburden offsite.
- Groundwater extraction rates to maintain hydraulic control of heads within the simulated hydraulic barrier throughout a tidal cycle can be expected to be on the order of 65 gallons per minute.
- Groundwater extraction within the overburden units has the potential to capture some of the impacted groundwater within the shallow bedrock unit.
- A PRB installed across the unconsolidated units at the downgradient side of the property can be expected to treat nearly all water in the overburden units impacted by site constituents when paired with parallel hydraulic barriers to prevent lateral migration around the PRB.
- Reducing the width of the PRB reduces the amplitude of both upward and downward flows between the Overburden and Bedrock but slightly increases the net downward flow.
- Operation of Bedrock Extraction Wells has the potential to capture nearly all impacted bedrock groundwater but will produce downward gradients, potentially increasing downward migration of contaminant mass from the overburden.

Section 4

Limitations

This groundwater model, like all others, cannot simulate groundwater behavior with absolute certainty, but rather provides an estimate of flow behavior based on the current understanding of subsurface conditions at the Site. Missing information, or data gaps, are addressed to the extent possible using assumptions that are based on general geologic principles, regional geologic data, where available and ascertainable, or information generated from studies performed in like settings that are documented in the scientific literature. The use of these indirect sources of data creates a level of uncertainty, as conditions may be different from those assumed. Sensitivity analyses have been performed in an attempt to quantify uncertainties. However, despite all efforts to reduce or quantify uncertainty, subsurface conditions may nonetheless exist that are not predictable and which could result in groundwater behavior that is significantly different than that simulated by the groundwater model.

Section 5

References

AECOM, 2015 “Phase II Comprehensive Site Assessment, Former Aerovox Facility, New Bedford Massachusetts”

McDonald and Harbaugh, 1988 “A Modular, Three-Dimensional Finite-Difference Groundwater Flow Model,” Techniques of Water-Resources Investigations, Book 6, U.S. Geological Survey

Spitz and Moreno, 1996. “A Practical Guide to Groundwater and Solute Transport Modeling”. John Wiley and Sons Inc.

Figures

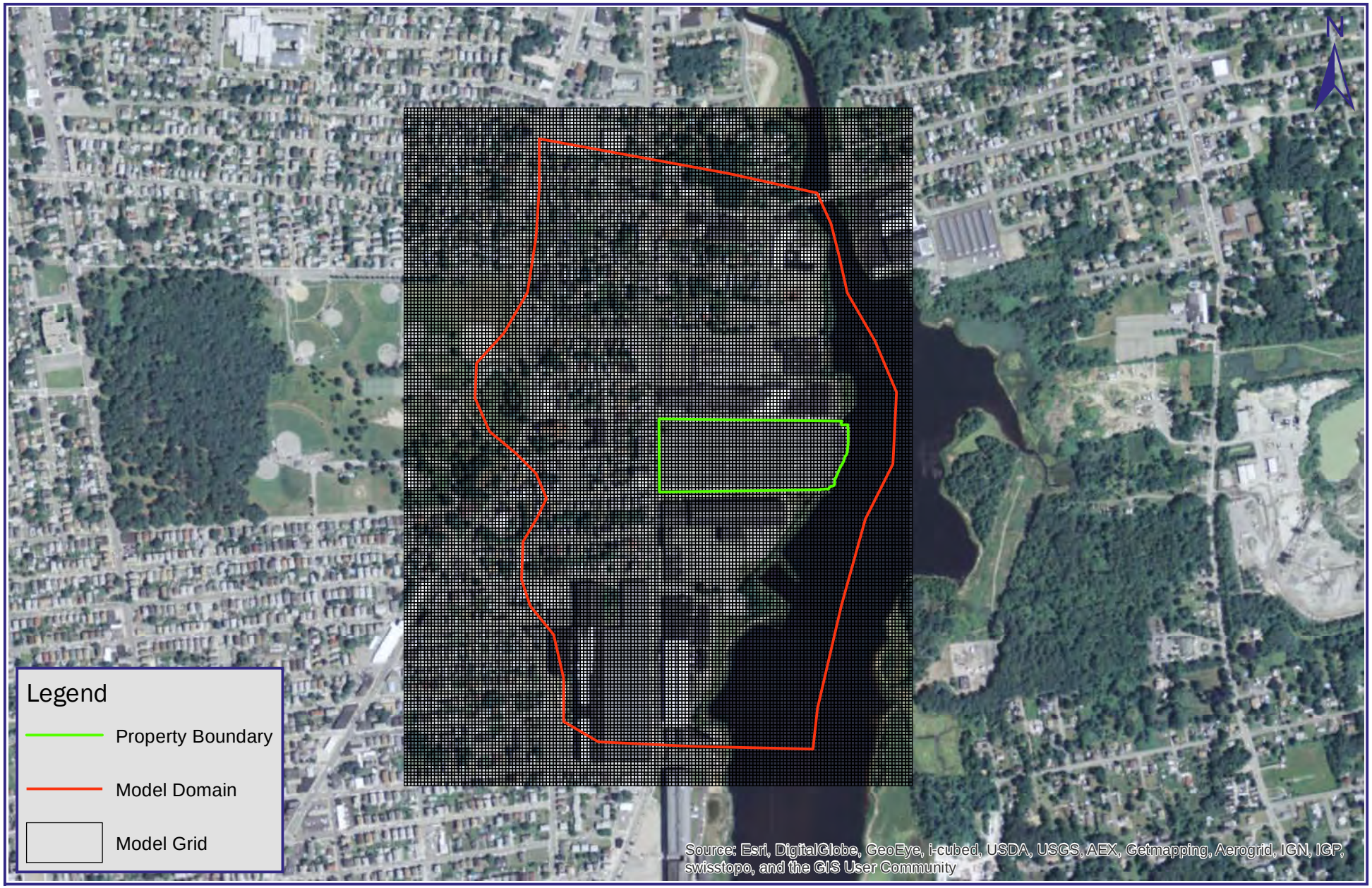
7/28/2016

Author: CMeyn Path: \\bcusrfp01\projects\GIS\AVX\Model_Domain.mxd

Brown AND Caldwell

FIGURE 1-1
GROUNDWATER MODEL DOMAIN
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 500 1,000
Feet



7/28/2016

Author: CMeyn Path: P:\GIS\AVX\Model_Grid.mxd

Brown AND Caldwell

FIGURE 1-2
GROUNDWATER MODEL GRID
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

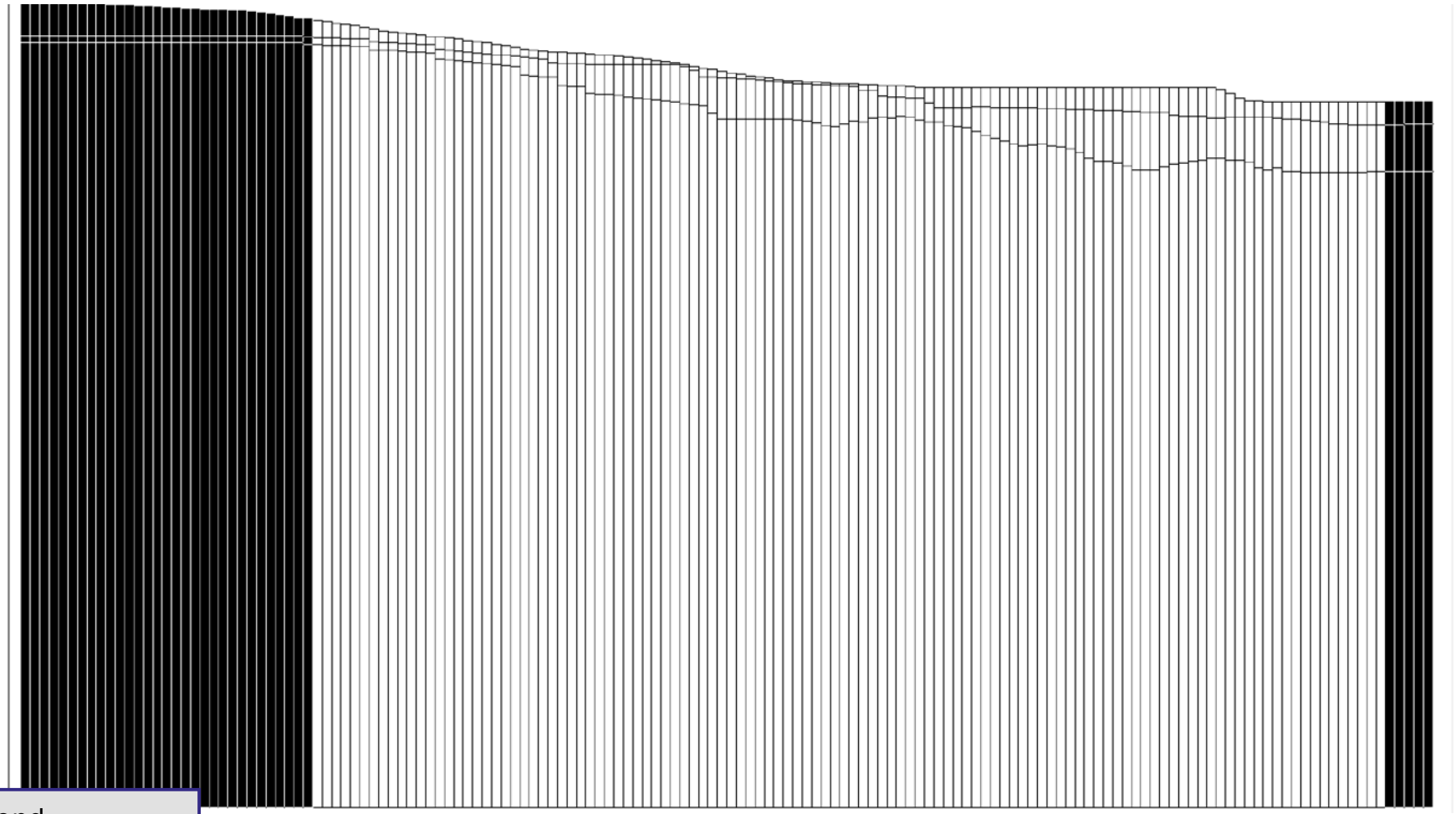
0 400 800
Feet

7/28/2016

West

Cross-Section Along Row #101

East



Legend

Active Cells

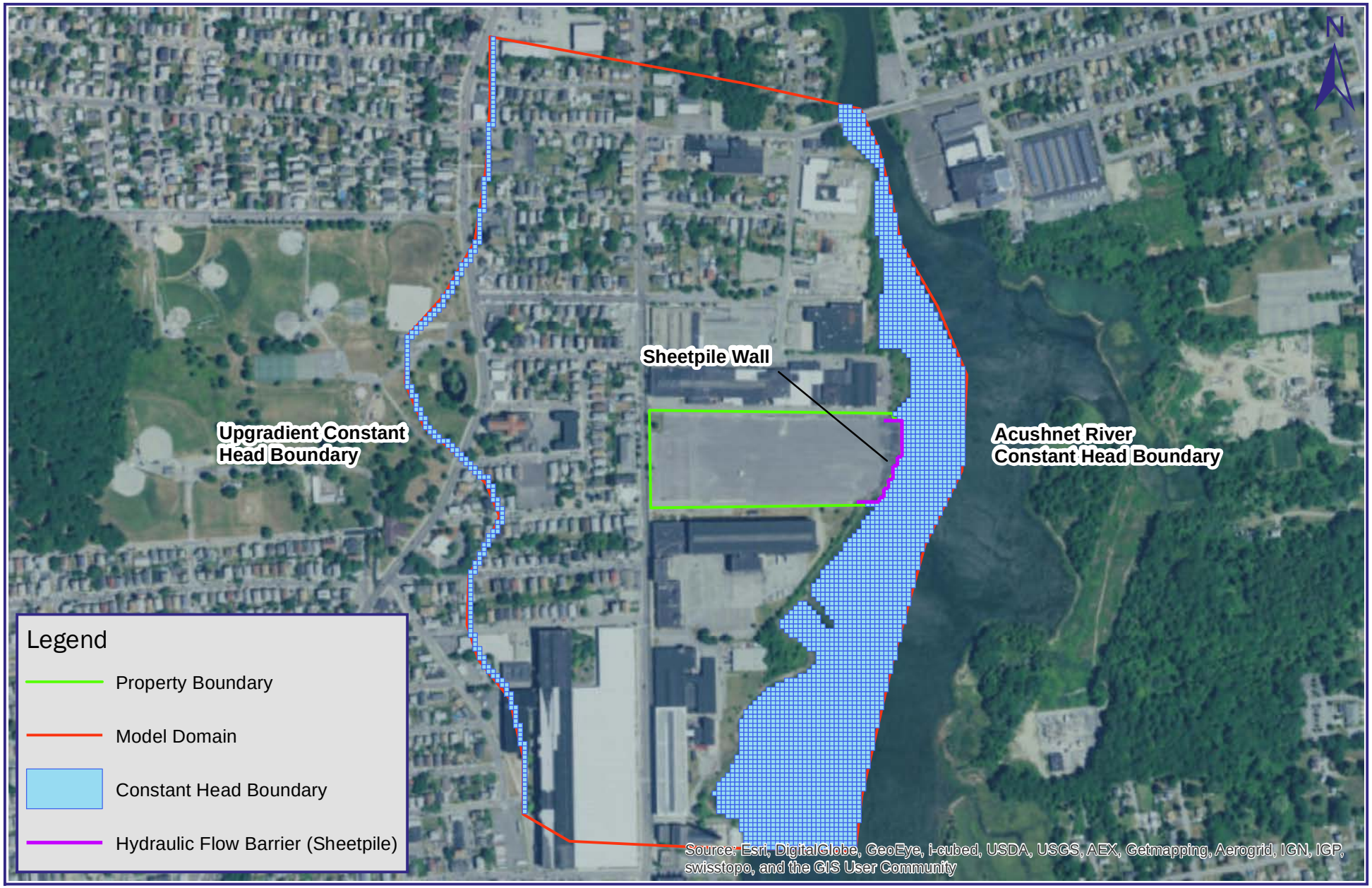
Inactive Cells

Cross-Section at 5 x Vertical Exaggeration

Author: CMeyn Path: P:\GIS\AVX\Grid_XSection.mxd

Brown AND Caldwell

FIGURE 1-3
GROUNDWATER MODEL GRID - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Boundary_Conditions.mxd

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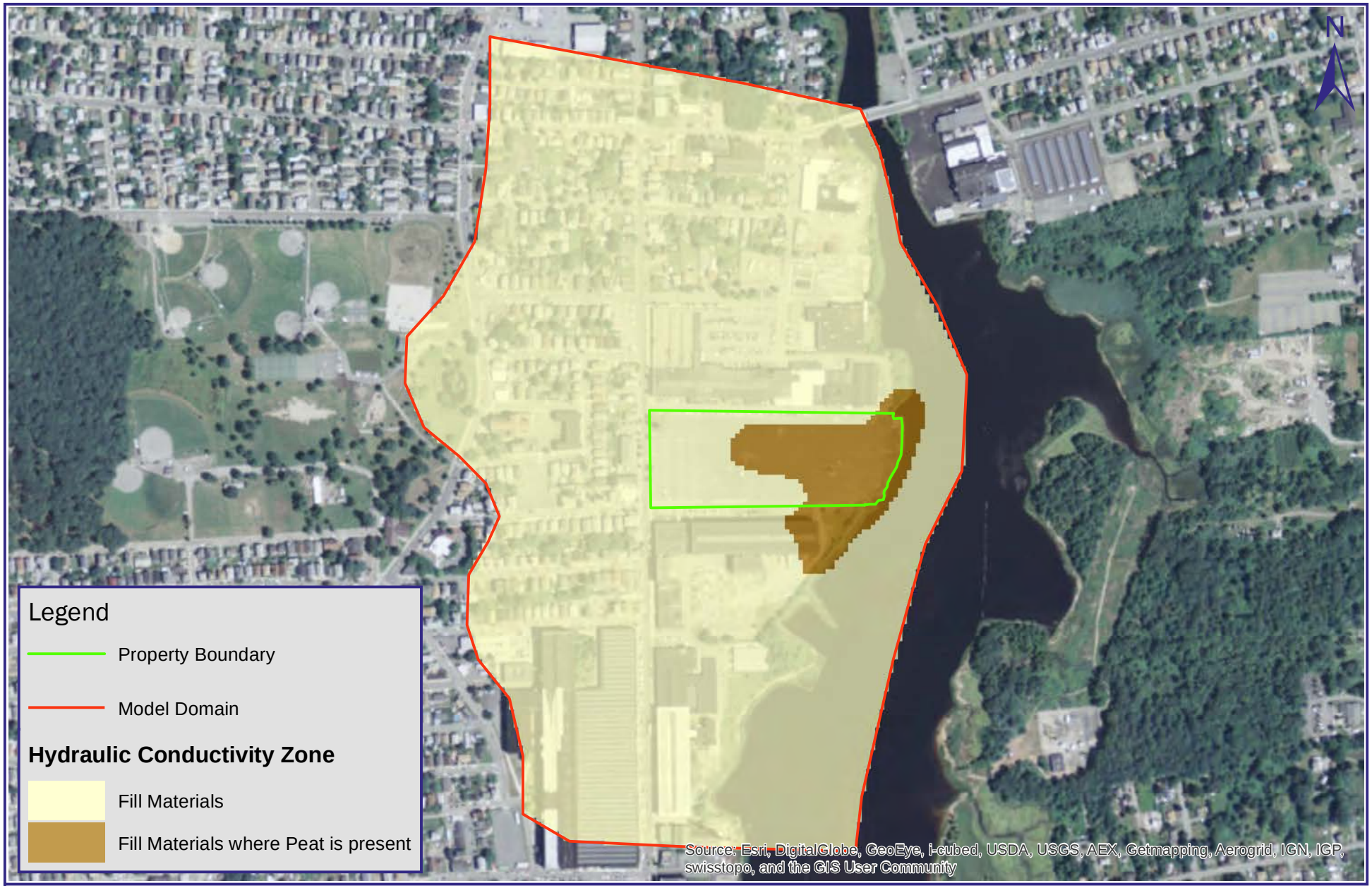
FIGURE 1-4
GROUNDWATER MODEL BOUNDARY CONDITIONS
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 300 600
Feet



7/28/2016

Author: CMeyn Path: P:\GIS\AVX\Hydraulic_Props_Layer1.mxd

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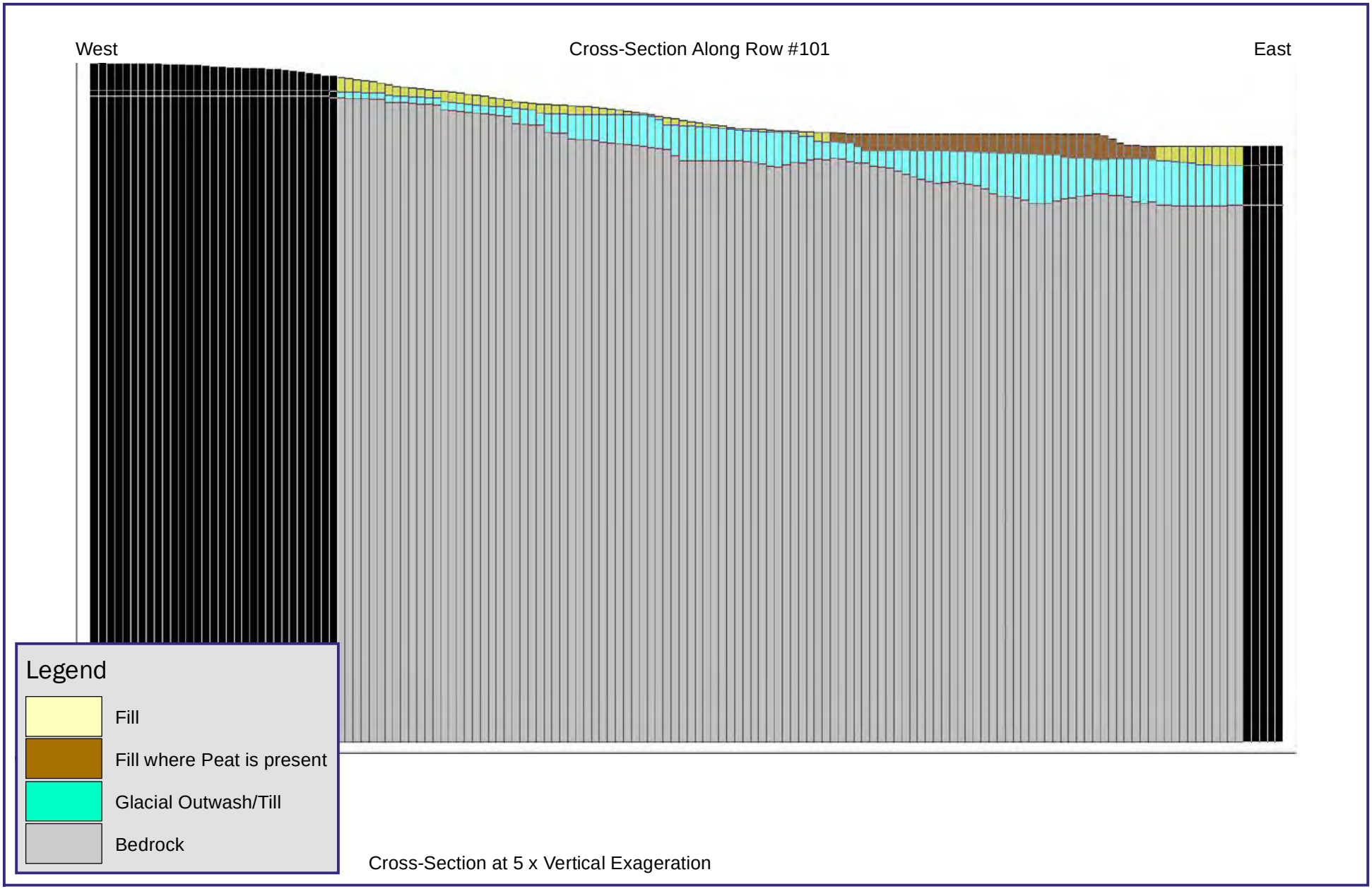
FIGURE 1-5
HYDRAULIC PROPERTIES, LAYER 1
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 300 600
Feet

7/28/2016



Author: CMeyn Path: P:\GIS\AVX\Hydraulic_Prop_XSection.mxd

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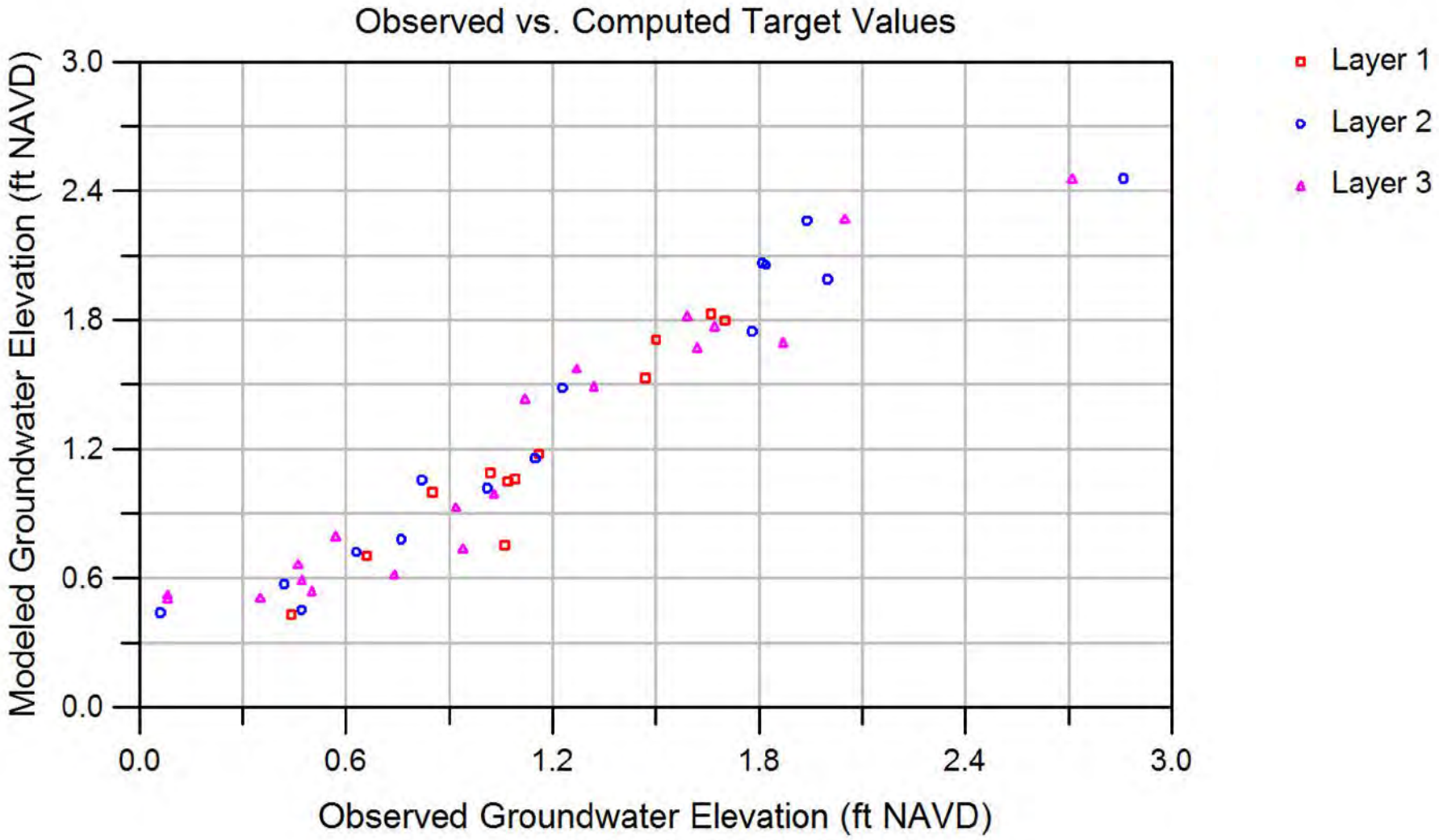
FIGURE 1-6
HYDRAULIC PROPERIES - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

5/23/2017



Author: CMeyn Path: P:\GIS\AVX\Calibration.mxd

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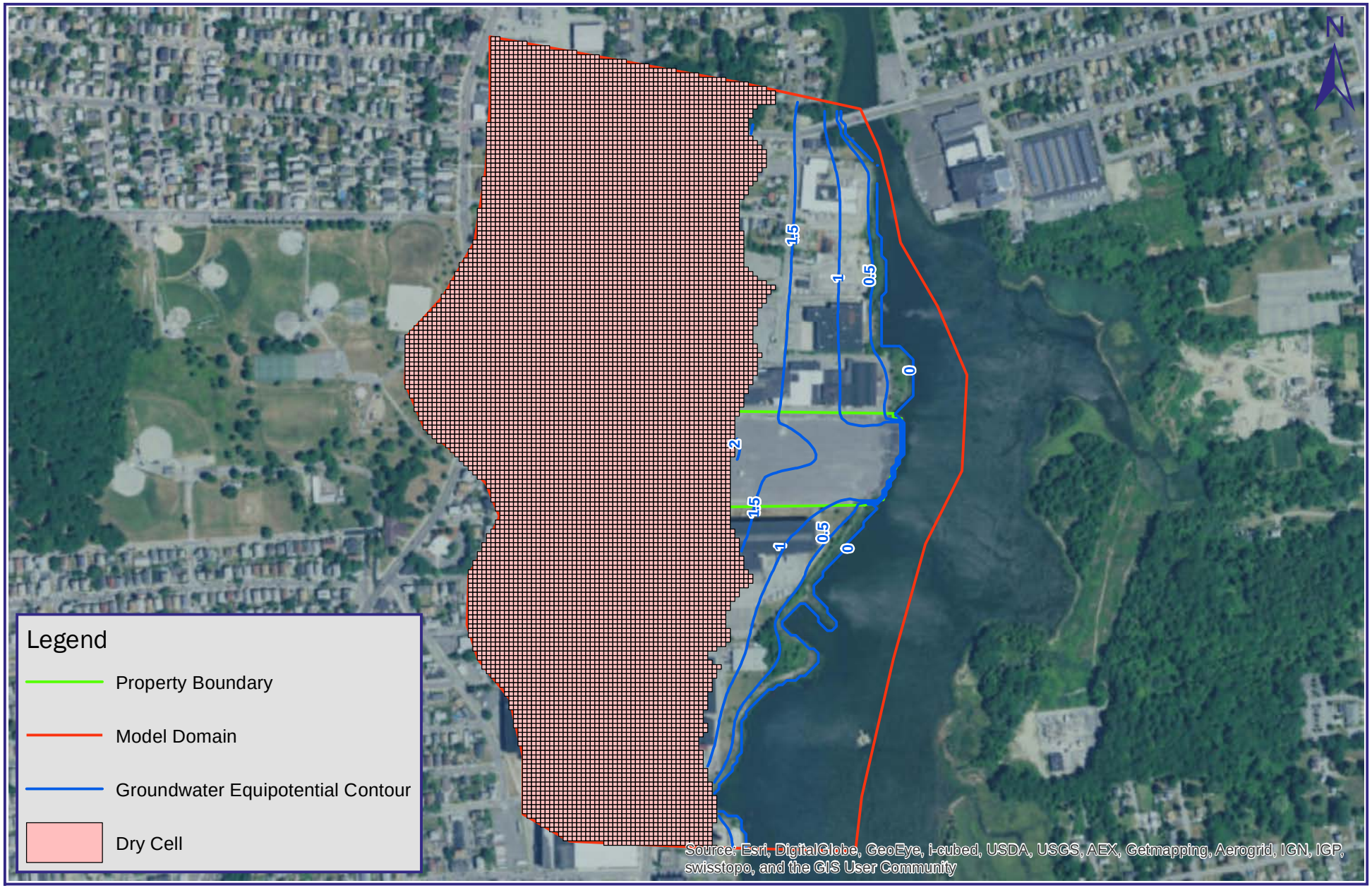
FIGURE 1-7
STEADY-STATE MODEL CALIBRATION RESULTS
FORMER AEROVOX FACILITY, NEW BEDFORD, MA



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Calibrated_Layer1.mxd

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FIGURE 1-8
CALIBRATED GROUNDWATER EQUIPOTENTIAL CONTOURS - LAYER 1
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 300 600
Feet

5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Calibrated_Layer2.mxd

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FIGURE 1-9
CALIBRATED GROUNDWATER EQUIPOTENTIAL CONTOURS - LAYER 2
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 300 600
Feet

5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Calibrated_Layer3.mxd

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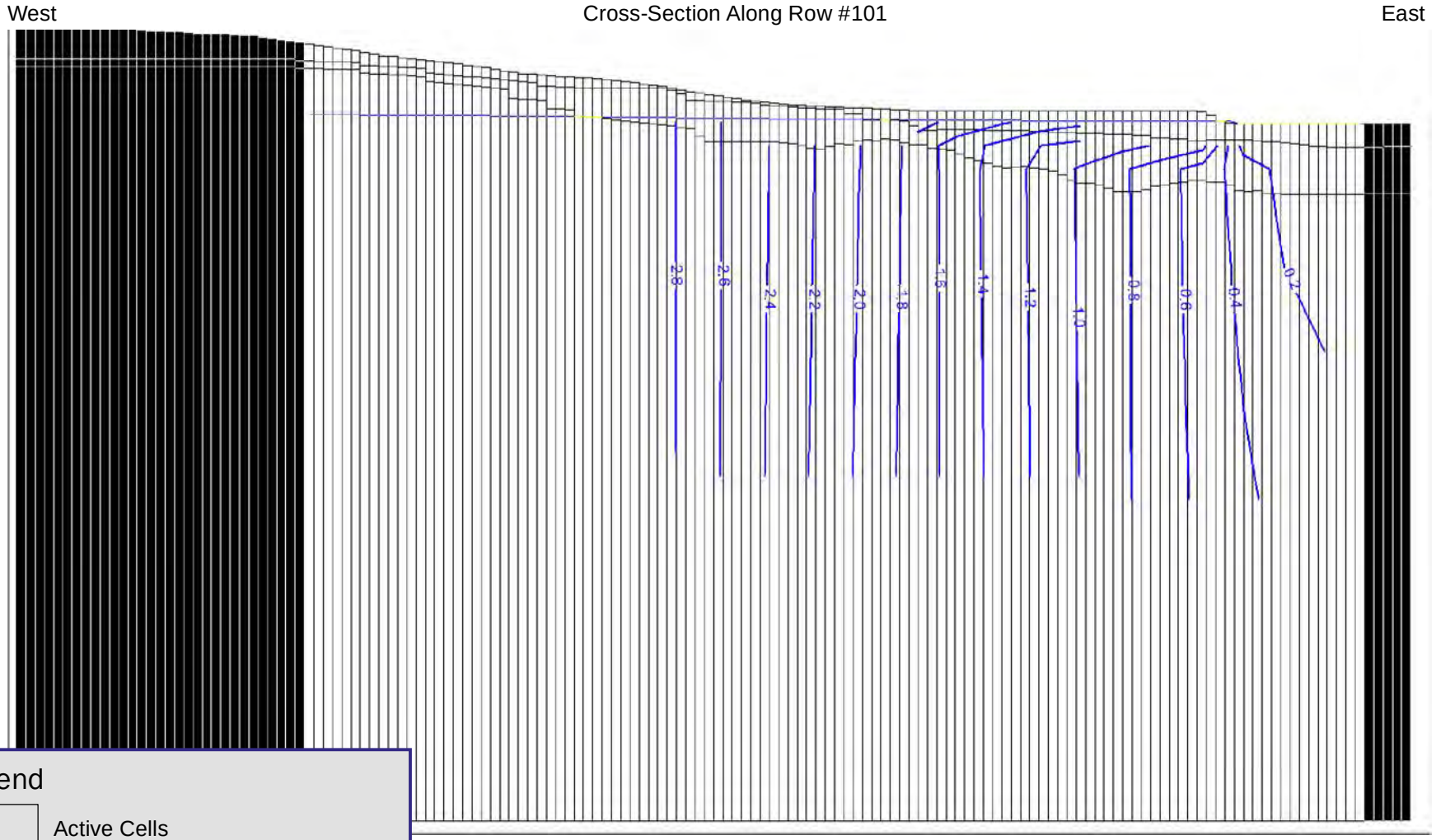
FIGURE 1-10
CALIBRATED GROUNDWATER EQUIPOTENTIAL CONTOURS - LAYER 3
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 300 600
Feet

7/28/2016



Author: CMeyn Path: P:\GIS\AVX\Calibrated_XSection.mxd

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FIGURE 1-11
CALIBRATED GROUNDWATER EQUIPOTENTIAL CONTOURS - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

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Author: CMeyn Path: P:\GIS\AVX\Scenario1_Layout.mxd

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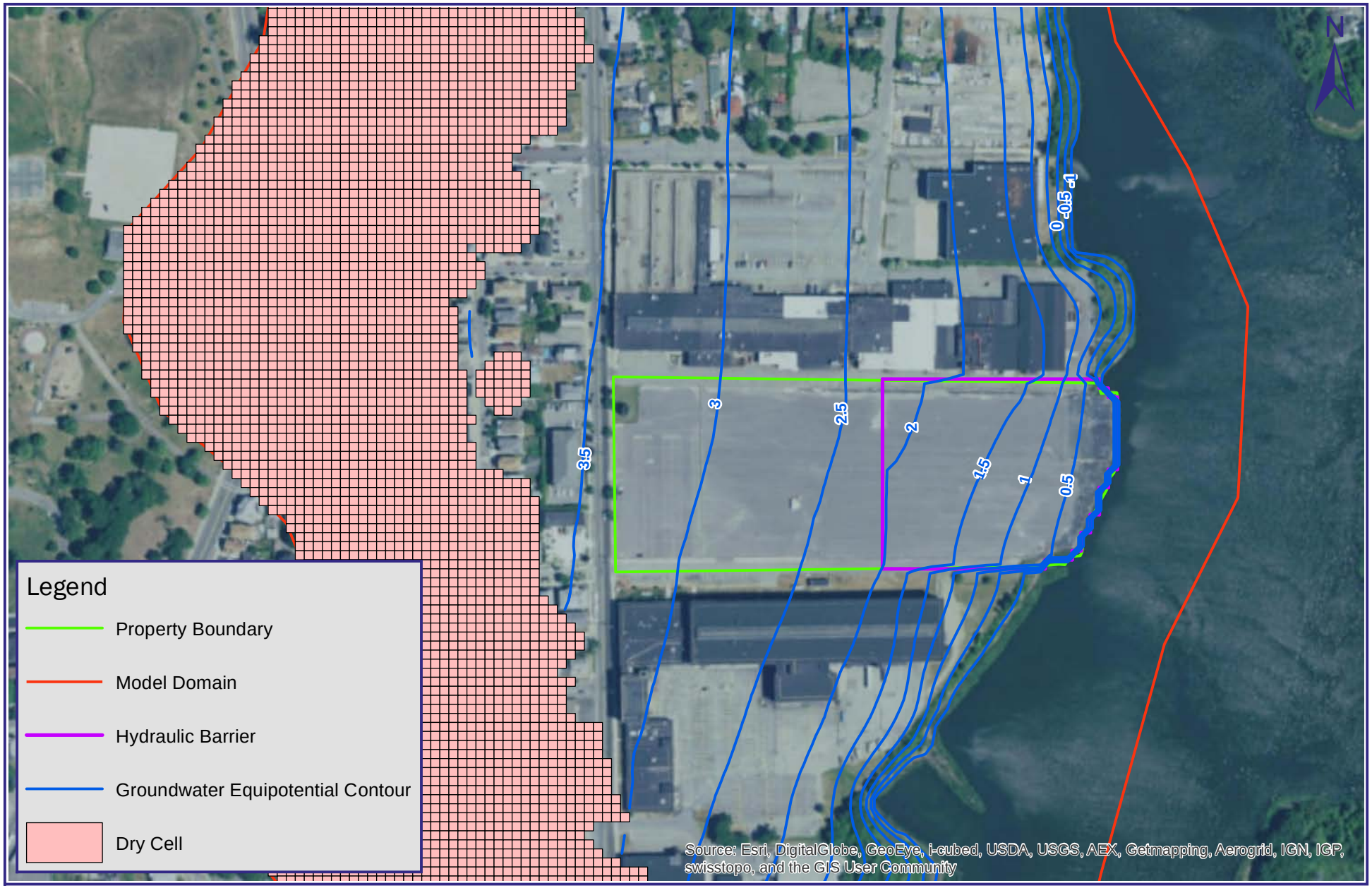
FIGURE 2-1
REMEDIAL SCENARIO 1 LAYOUT
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario1_Low_Tide.mxd

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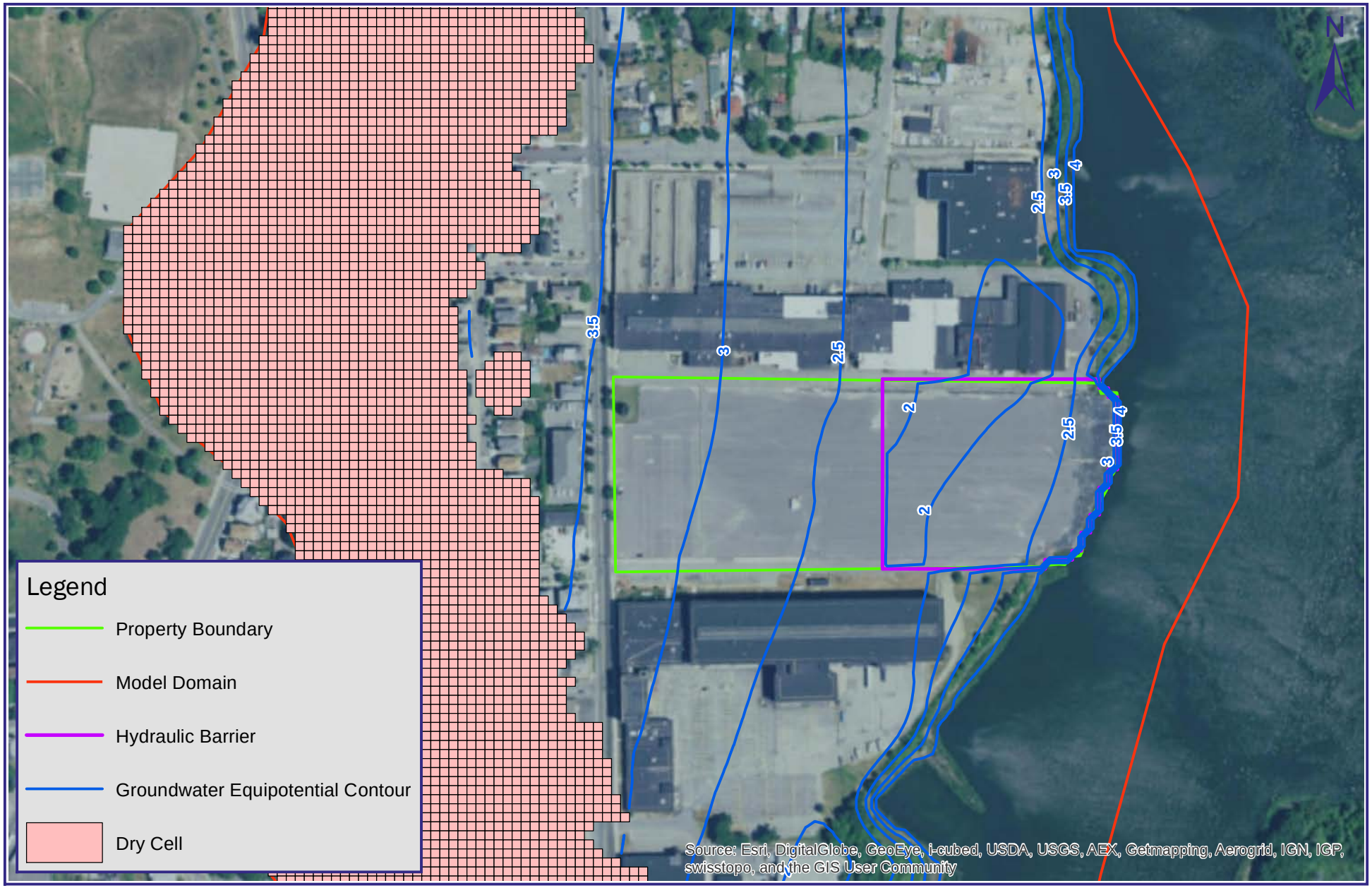
FIGURE 2-2
REMEDIAL SCENARIO 1 RESULTS AT LOW TIDE - LAYER 2
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario1_High_Tide.mxd

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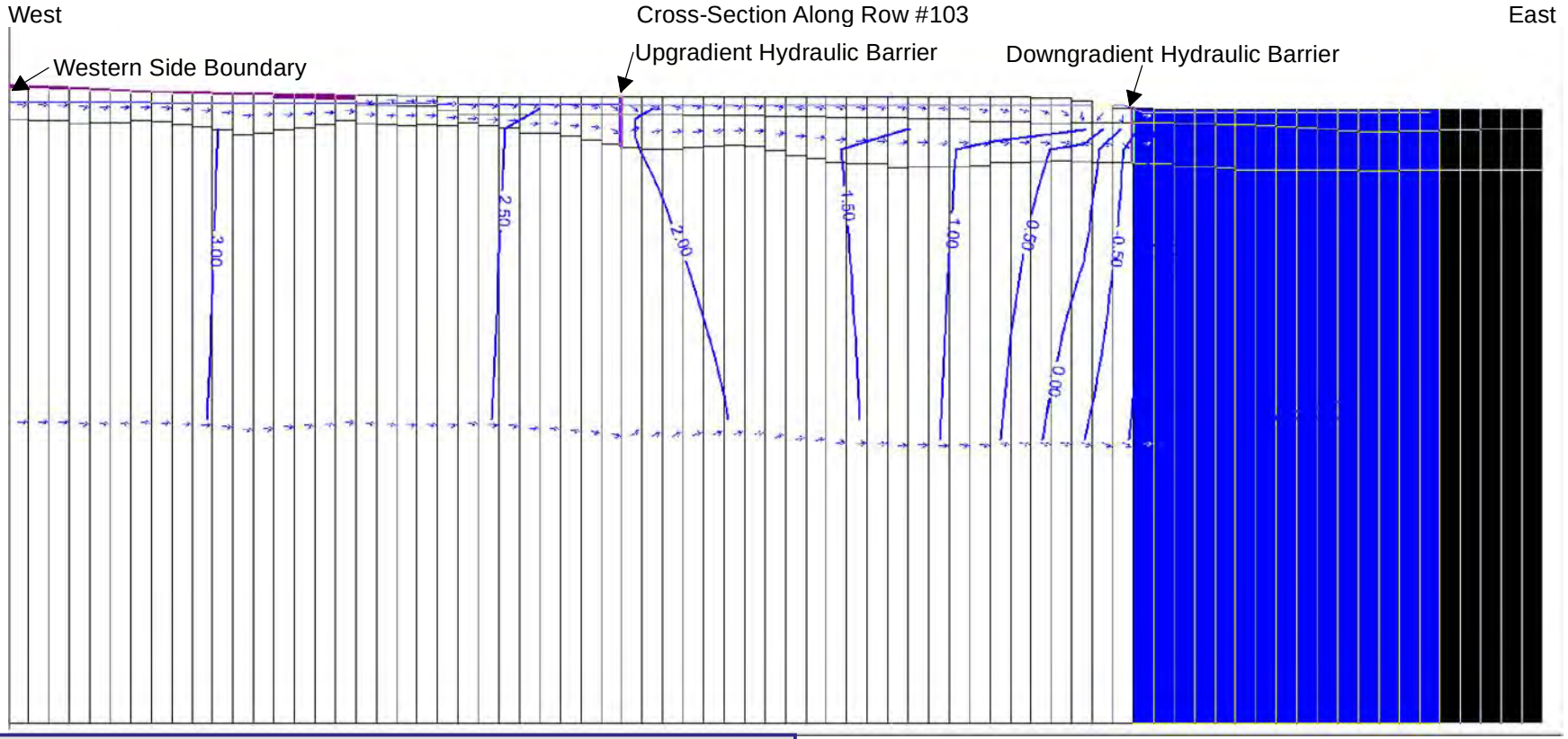
FIGURE 2-3
REMEDIAL SCENARIO 1 RESULTS AT HIGH TIDE - LAYER 2
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet

7/28/2016



Legend

- Groundwater Equipotential Contour (Arrows Indicate Flow Direction)
- Constant Head Boundary
- Hydraulic Barrier
- Dry Cell

Cross-Section at 2 x Vertical Exageration

Author: CMeyn Path: P:\GIS\AVX\Scenario1_Low_Tide_XSection.mxd

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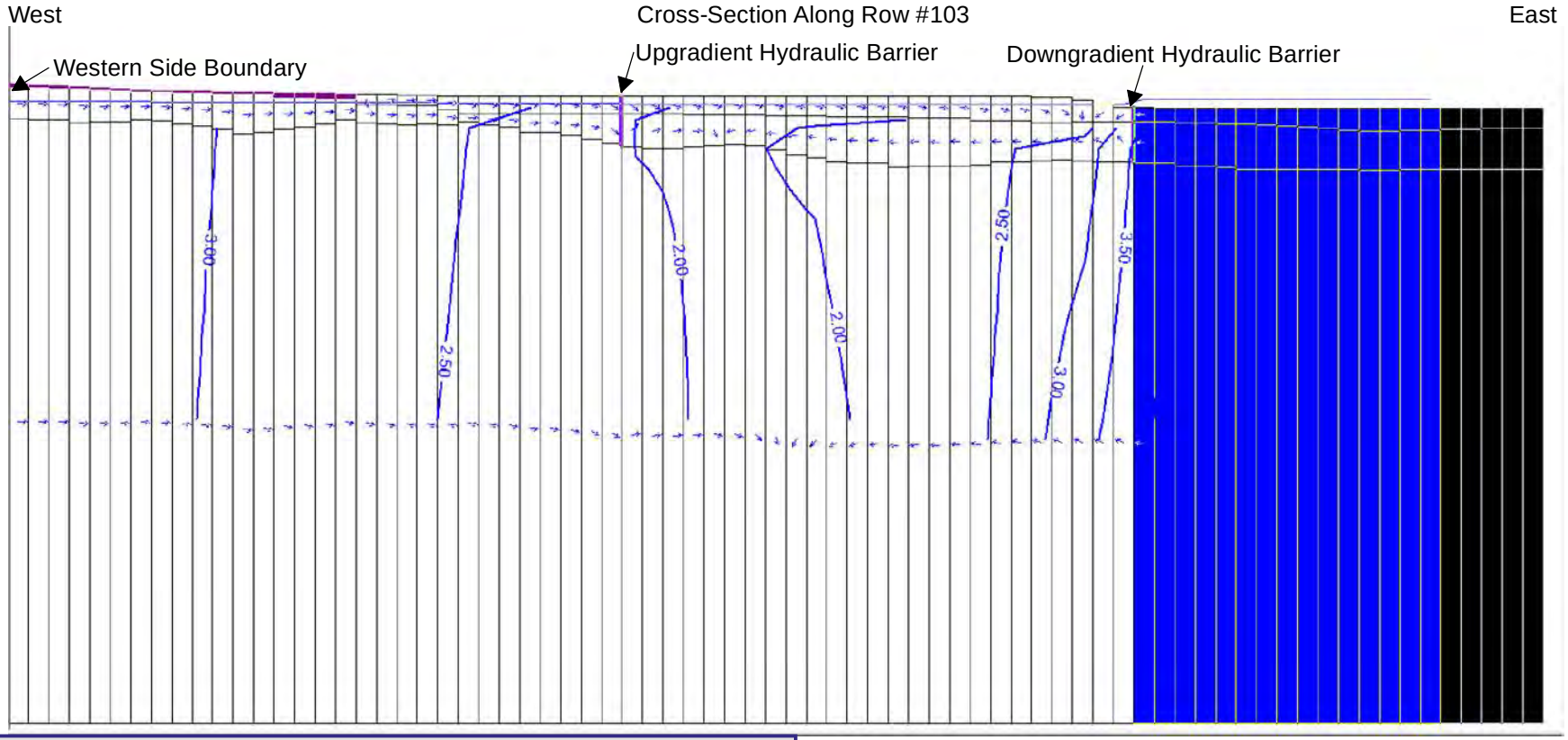
FIGURE 2-4
REMEDIAL SCENARIO 1 RESULTS AT LOW TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA



Legend

- Groundwater Equipotential Contour (Arrows Indicate Flow Direction)
- Constant Head Boundary
- Hydraulic Barrier
- Dry Cell

Cross-Section at 2 x Vertical Exageration

7/28/2016

Author: CMeyn Path: P:\GIS\AVX\Scenario1_High_Tide_XSection.mxd

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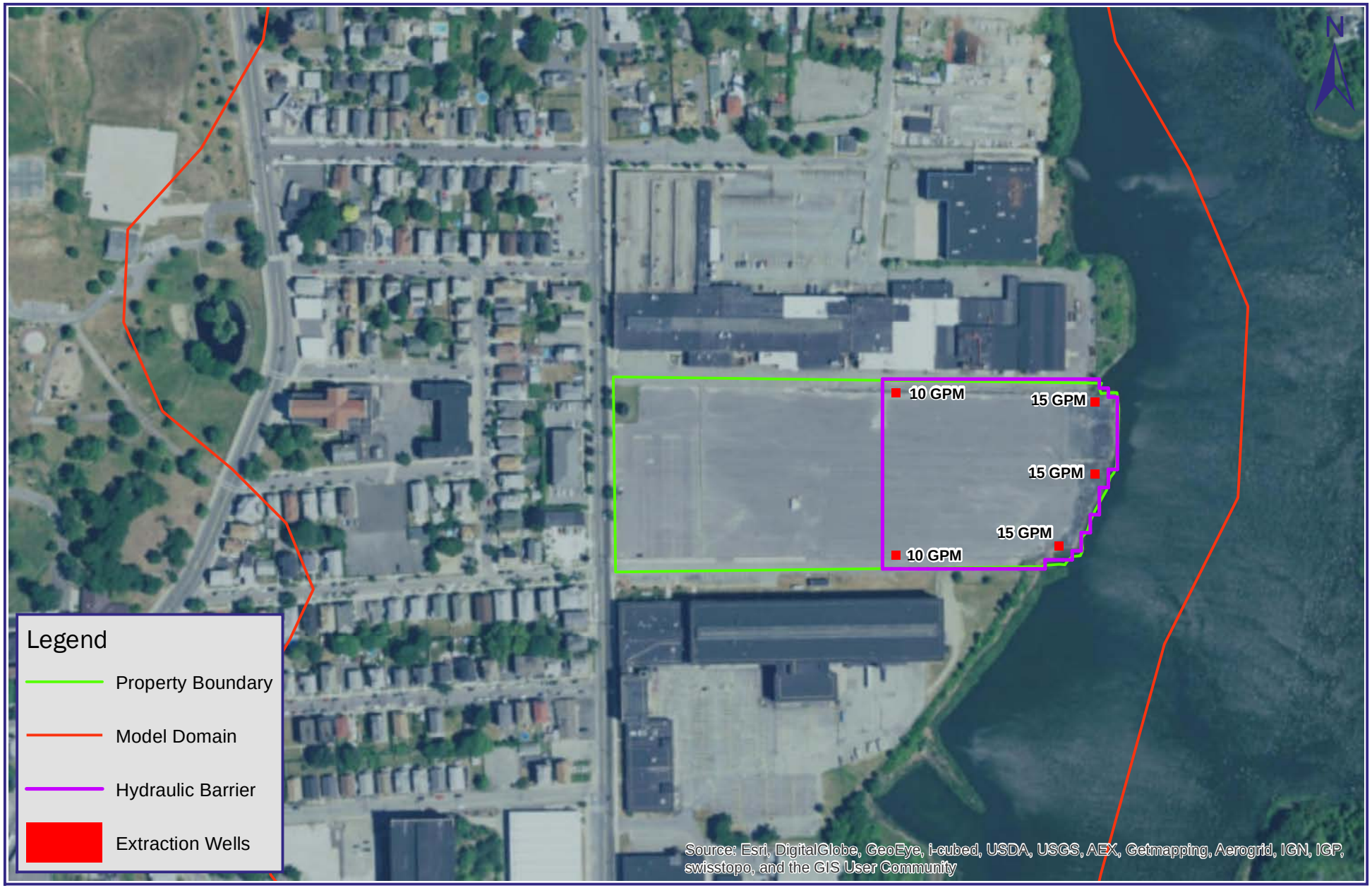
FIGURE 2-5
REMEDIAL SCENARIO 1 RESULTS AT HIGH TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario2_Layout.mxd

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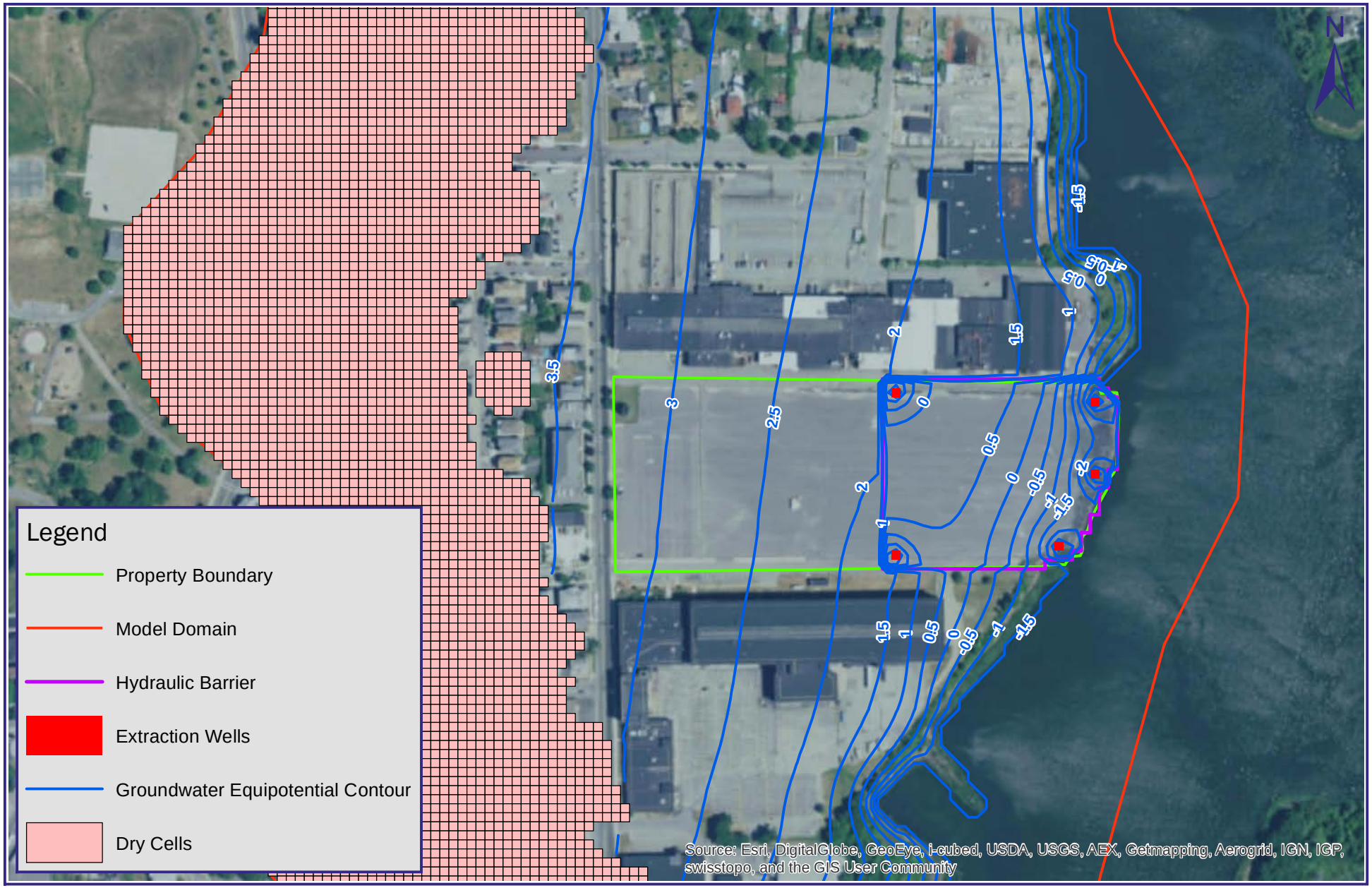
FIGURE 2-6
REMEDIAL SCENARIO 2 LAYOUT
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario2_Low_Tide.mxd

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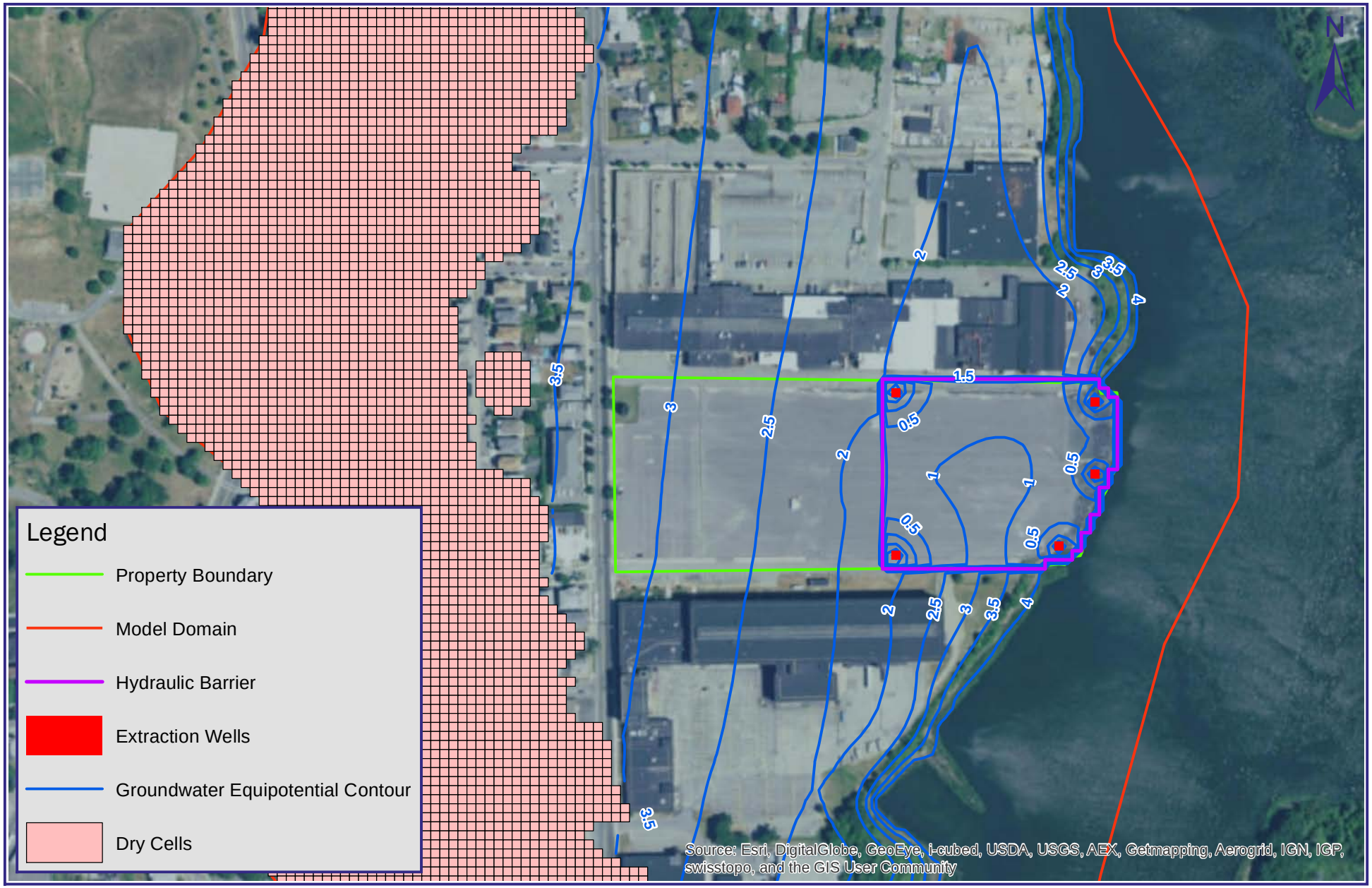
FIGURE 2-7
REMEDIAL SCENARIO 2 RESULTS AT LOW TIDE - LAYER 2
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



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Author: CMeyn Path: P:\GIS\AVX\Scenario2_High_Tide.mxd

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FIGURE 2-8
REMEDIAL SCENARIO 2 RESULTS AT HIGH TIME - LAYER 2
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet

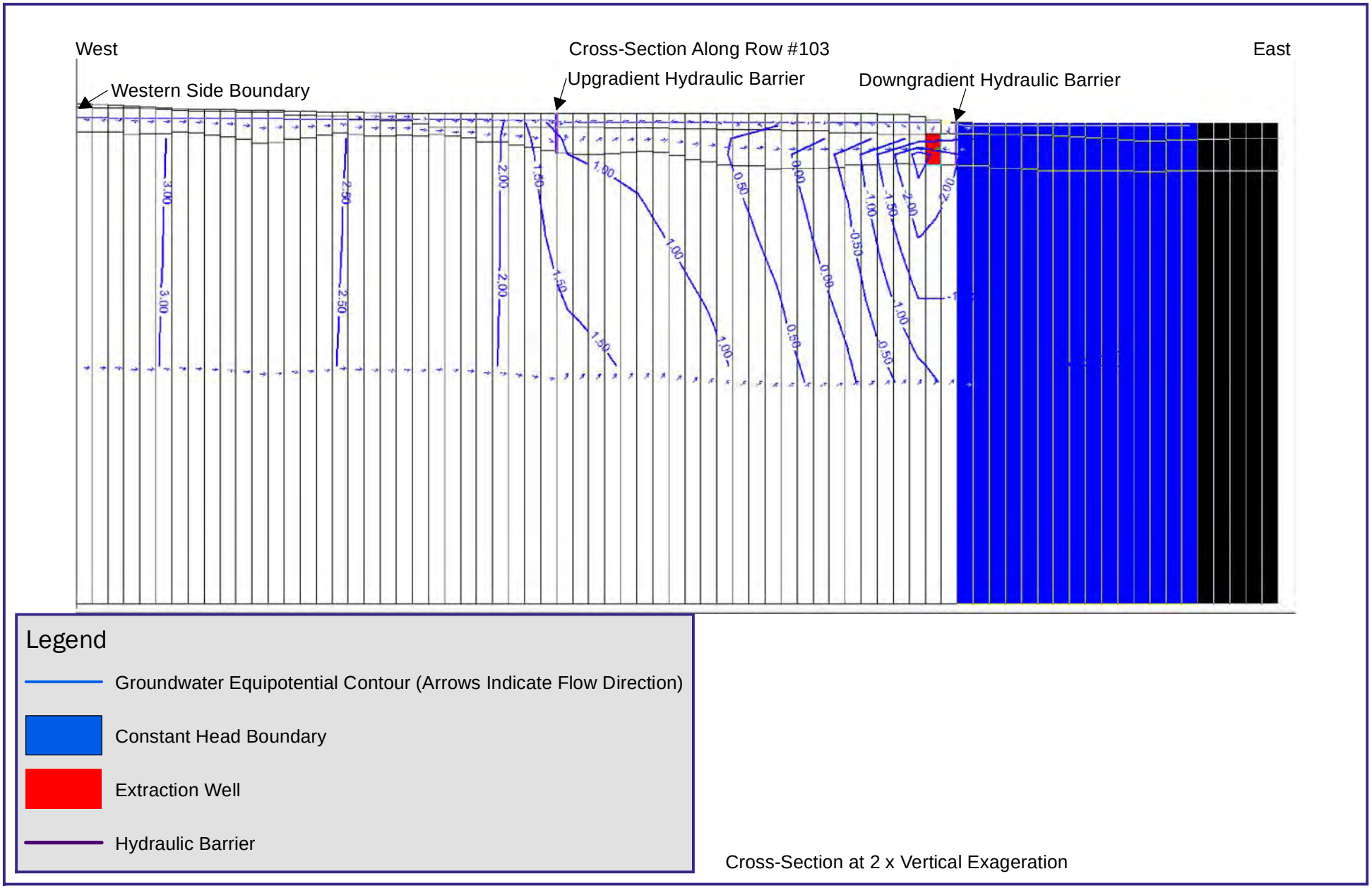

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FIGURE 2-9
REMEDIAL SCENARIO 2 RESULTS AT LOW TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

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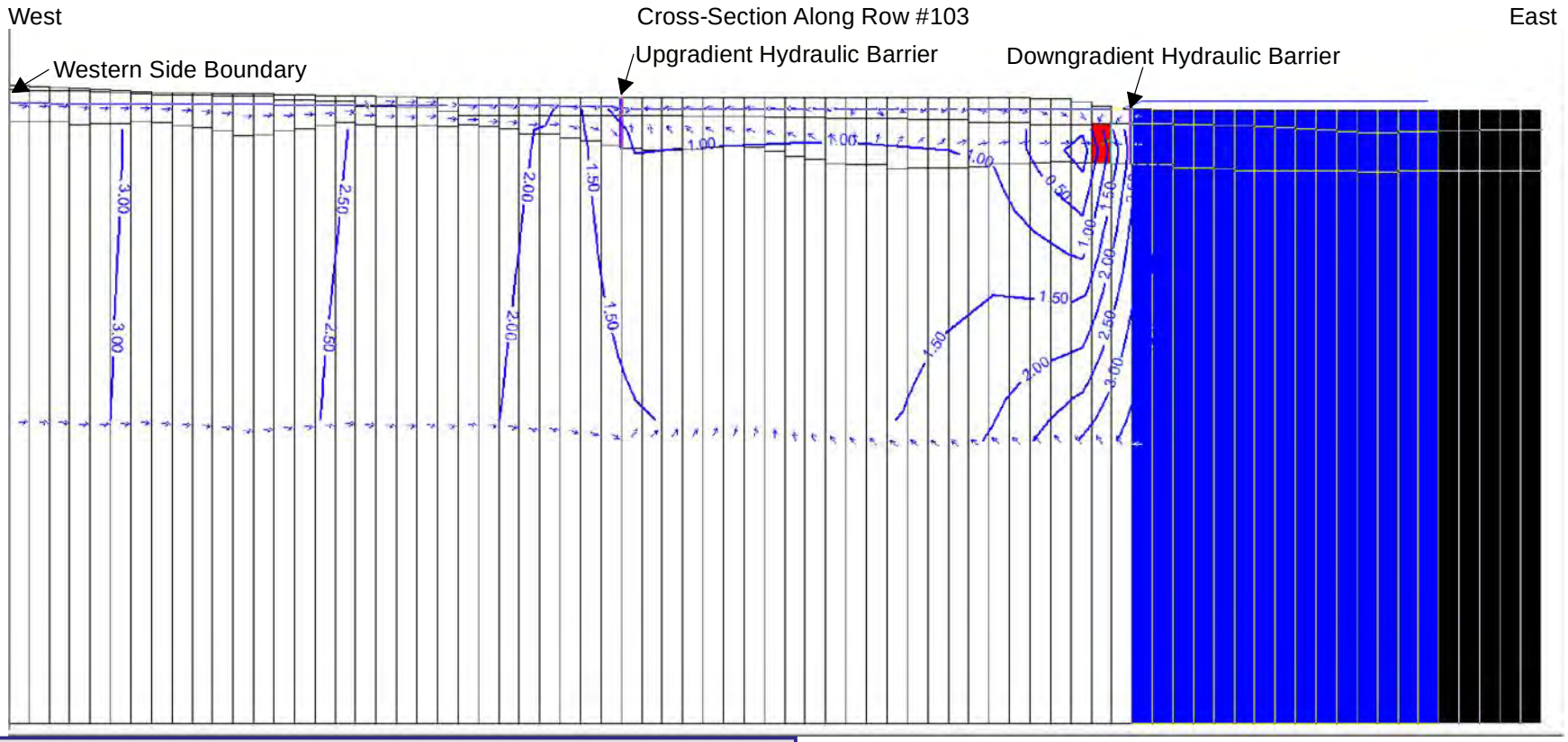
Author: CMeyn Path: P:\GIS\AVX\Scenario2_Low_Tide_XSection.mxd



Legend

- Groundwater Equipotential Contour (Arrows Indicate Flow Direction)
- Constant Head Boundary
- Extraction Well
- Hydraulic Barrier

Cross-Section at 2 x Vertical Exageration

7/28/2016

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FIGURE 2-10
REMEDIAL SCENARIO 2 RESULTS AT HIGH TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

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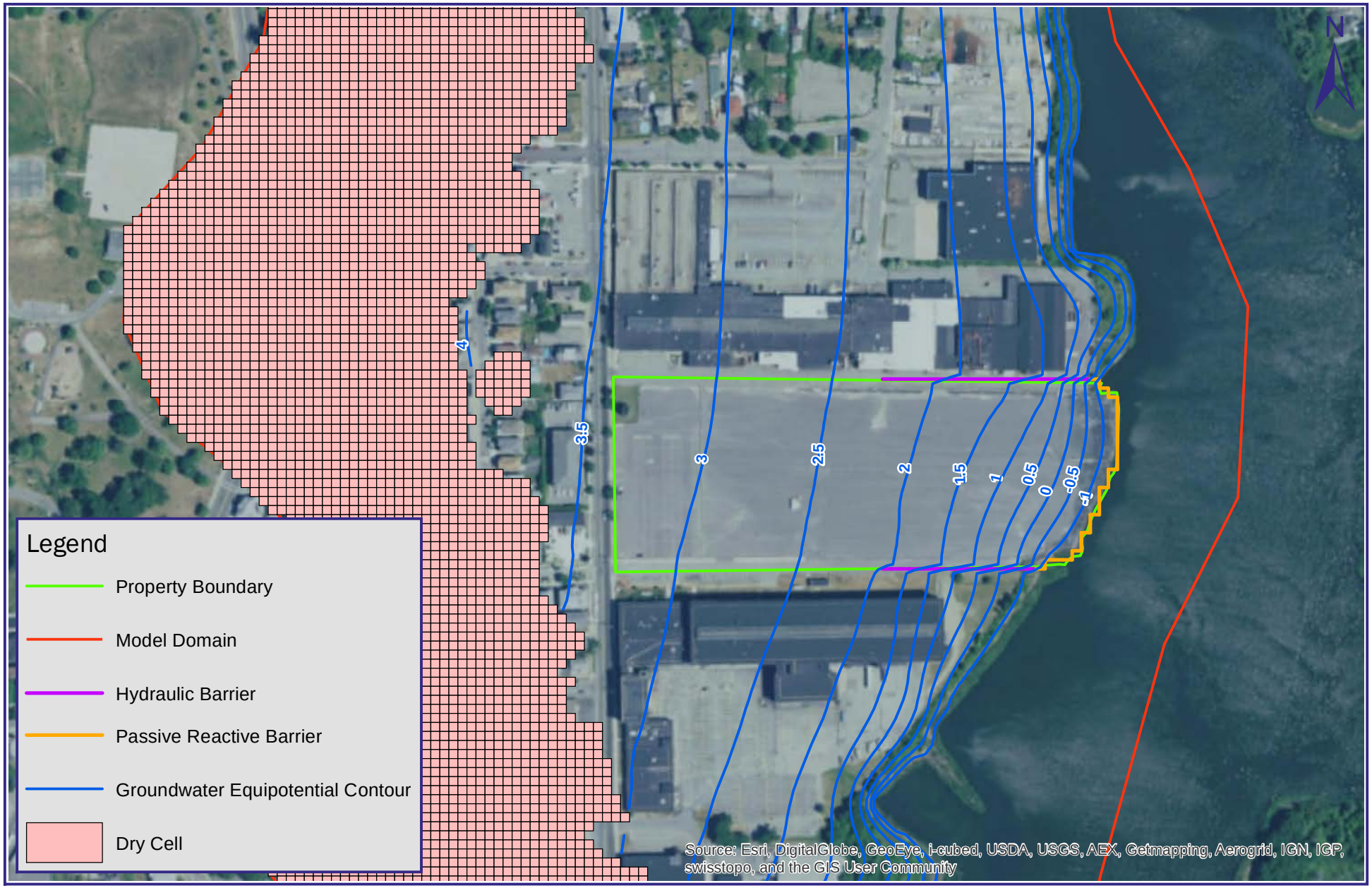
FIGURE 2-11
REMEDIAL SCENARIO 3 LAYOUT
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario3_Lowtide.mxd

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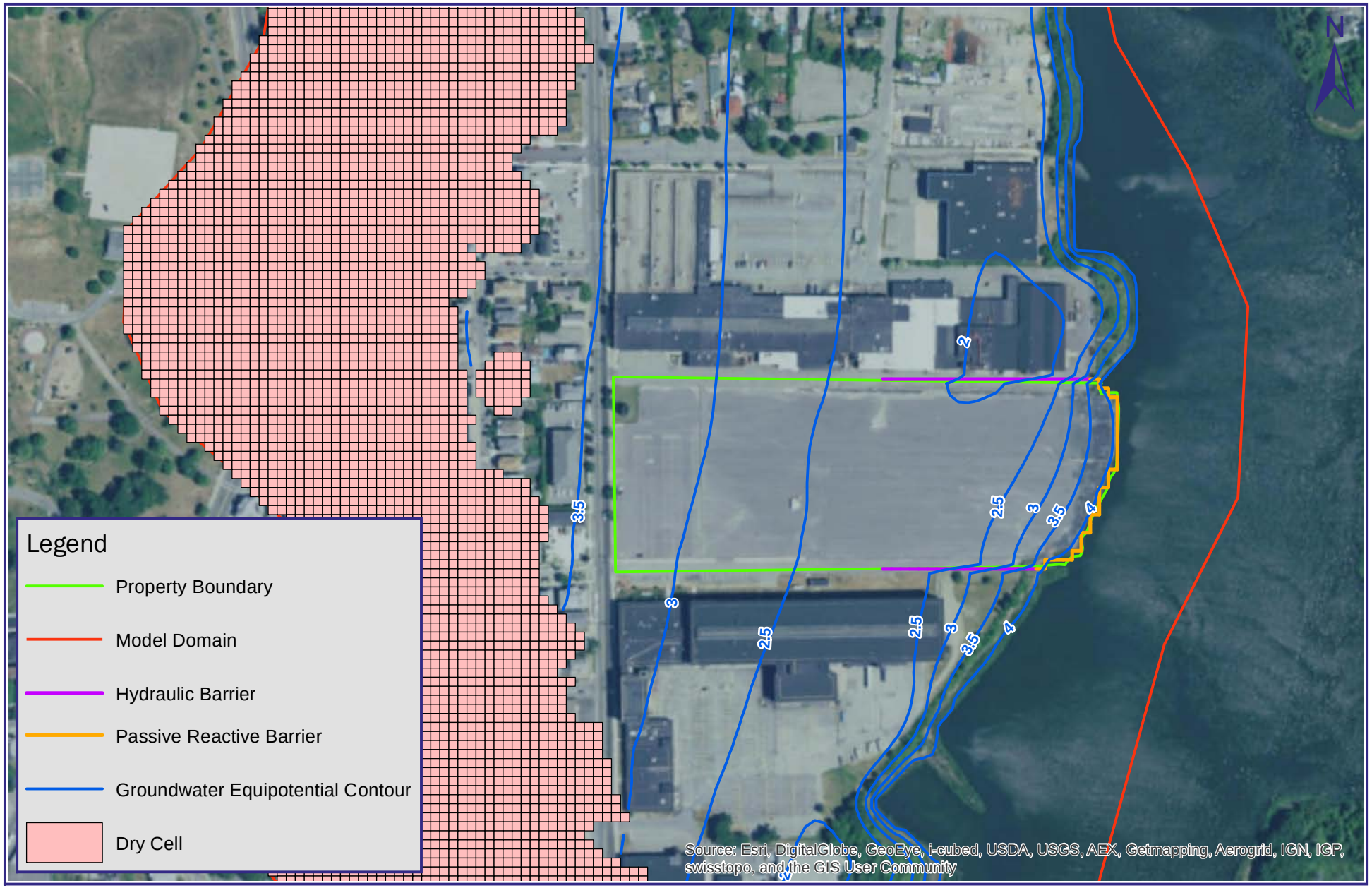
FIGURE 2-12
REMEDIAL SCENARIO 3 RESULTS AT LOW TIDE - LAYER 2
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario3_Hightide.mxd

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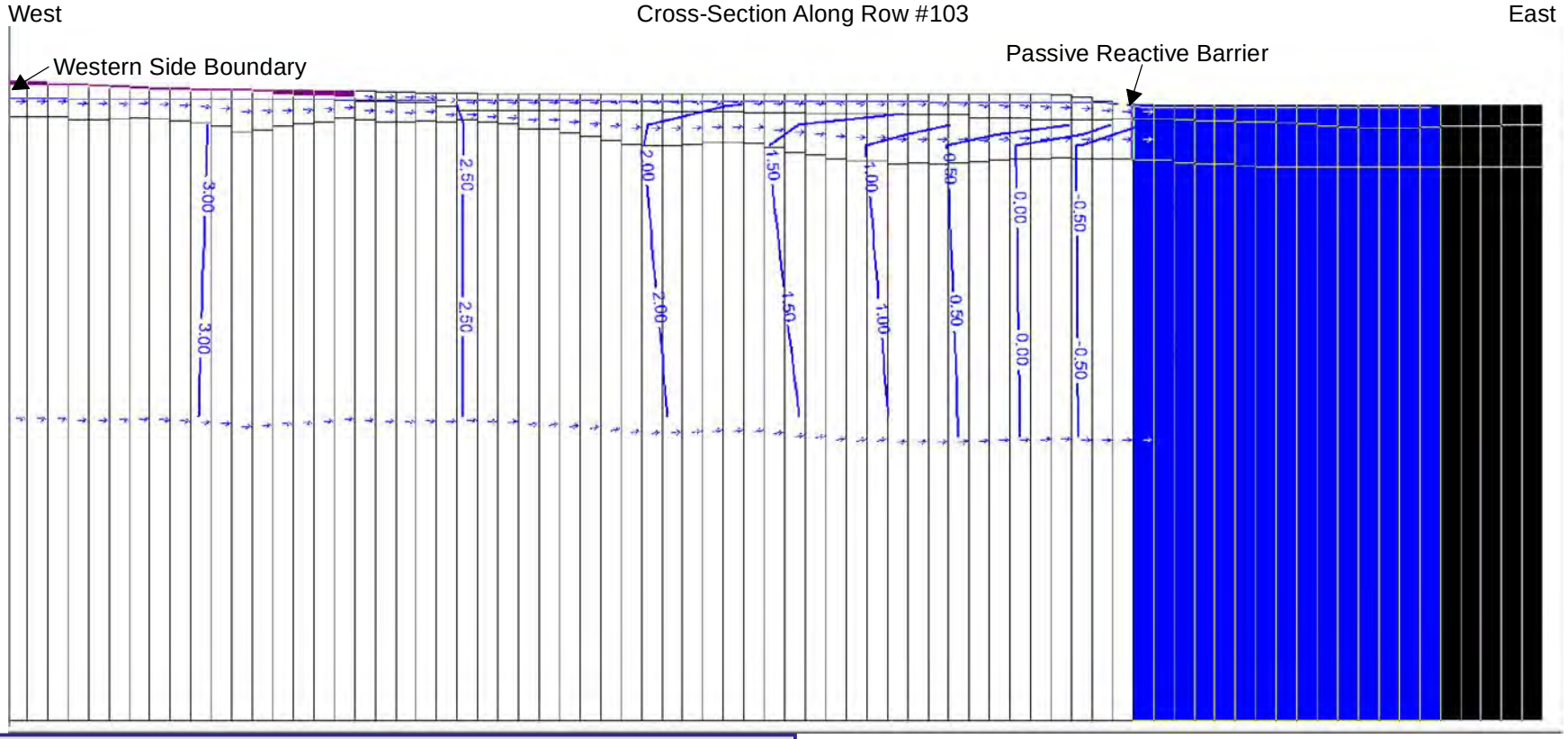
FIGURE 2-13
REMEDIAL SCENARIO 3 RESULTS AT HIGH TIDE - LAYER 2
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



Legend

- Groundwater Equipotential Contour (Arrows Indicate Flow Direction)
- Constant Head Boundary
- Passive Reactive Barrier
- Dry Cell

Cross-Section at 2 x Vertical Exageration

7/28/2016

Author: CMeyn Path: P:\GIS\AVX\Scenario3_Low_Tide_XSection.mxd

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FIGURE 2-14
REMEDIAL SCENARIO 3 RESULTS AT LOW TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

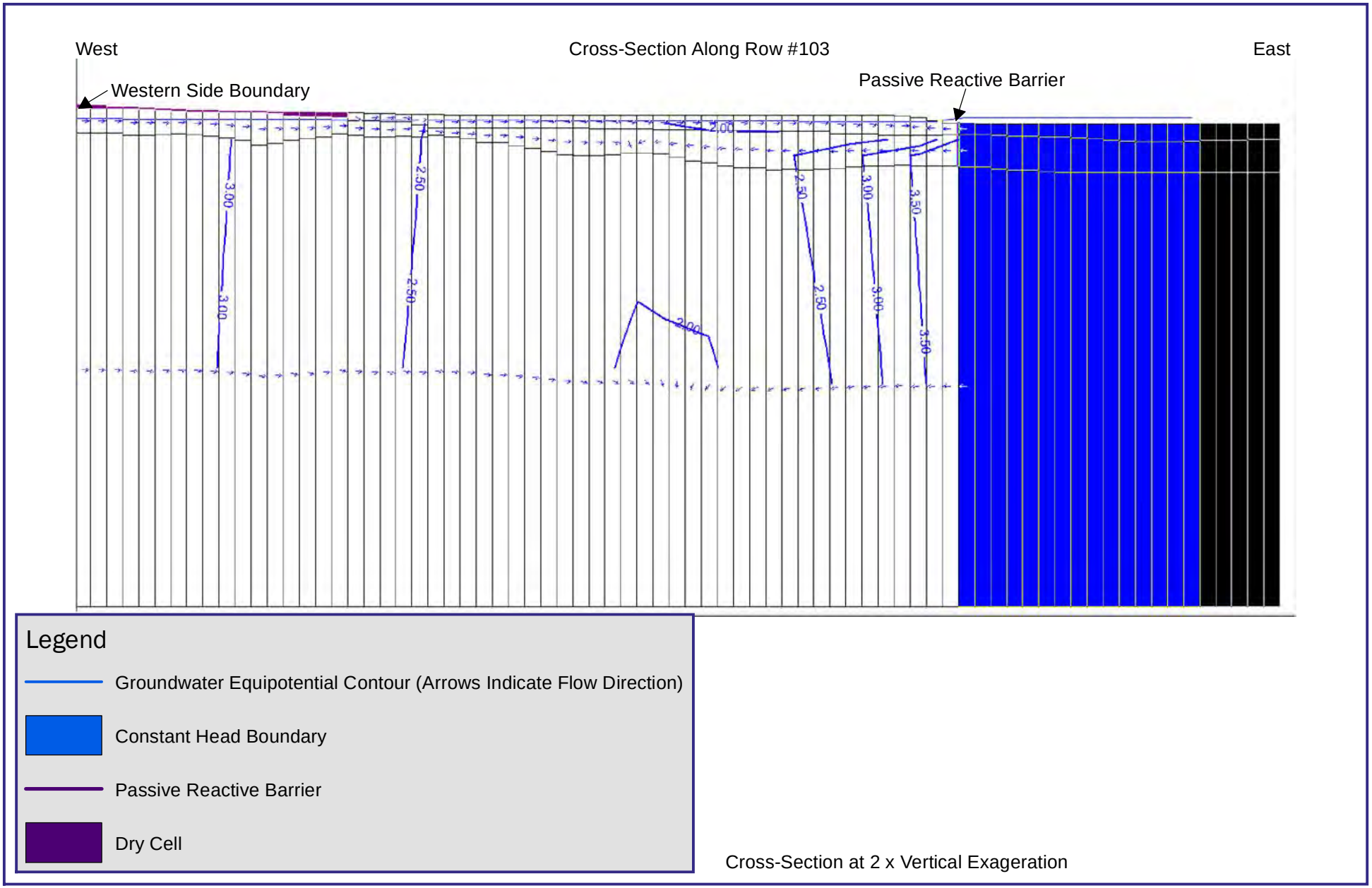

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FIGURE 2-15
REMEDIAL SCENARIO 3 RESULTS AT HIGH TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

7/28/2016

Author: CMeyn Path: P:\GIS\AVX\Scenario3_High_Tide_XSection.mxd

4/20/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario4_Layout.mxd

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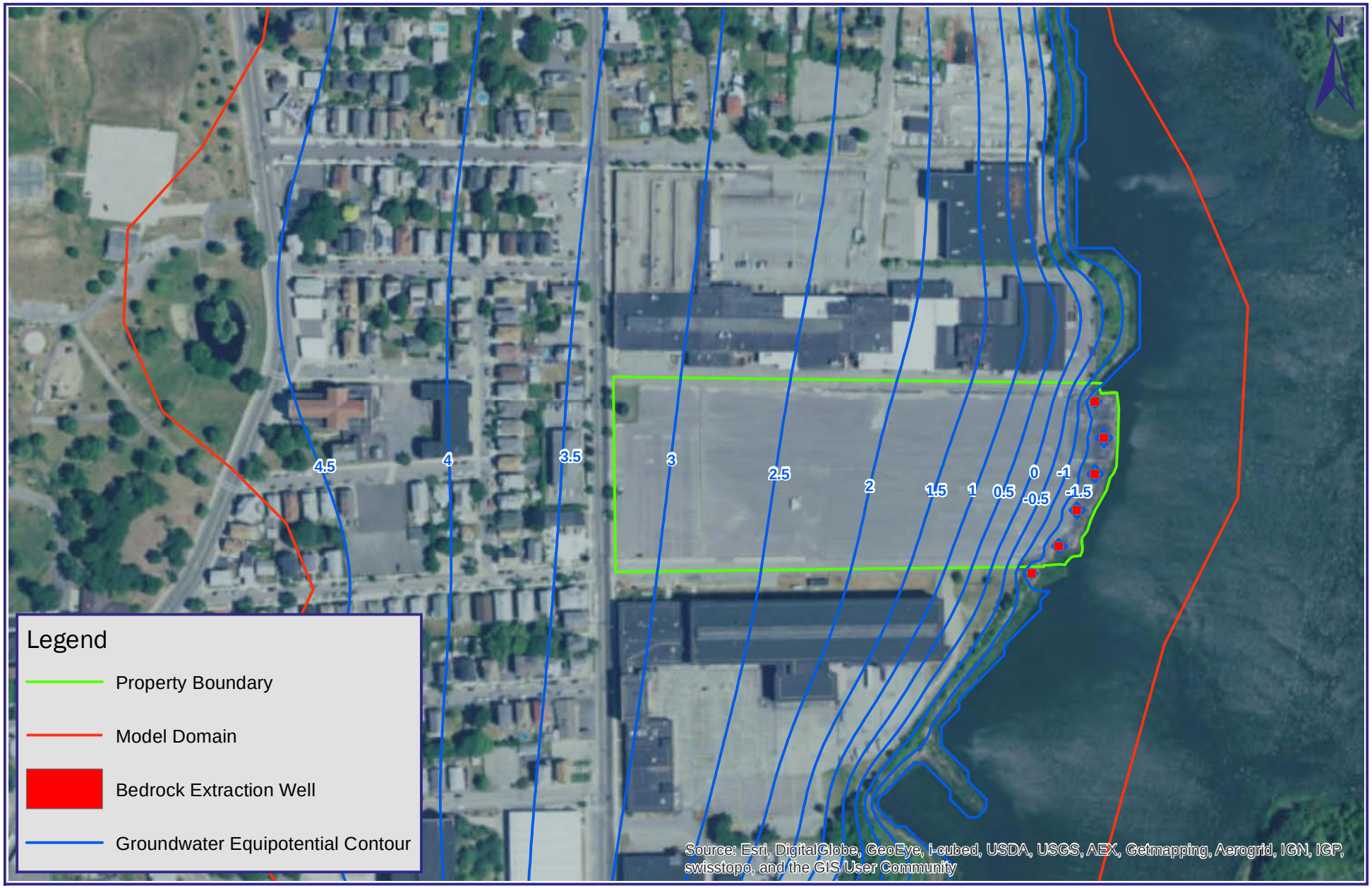
FIGURE 2-16
REMEDIAL SCENARIO 4 LAYOUT
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario4_Low_Tide.mxd

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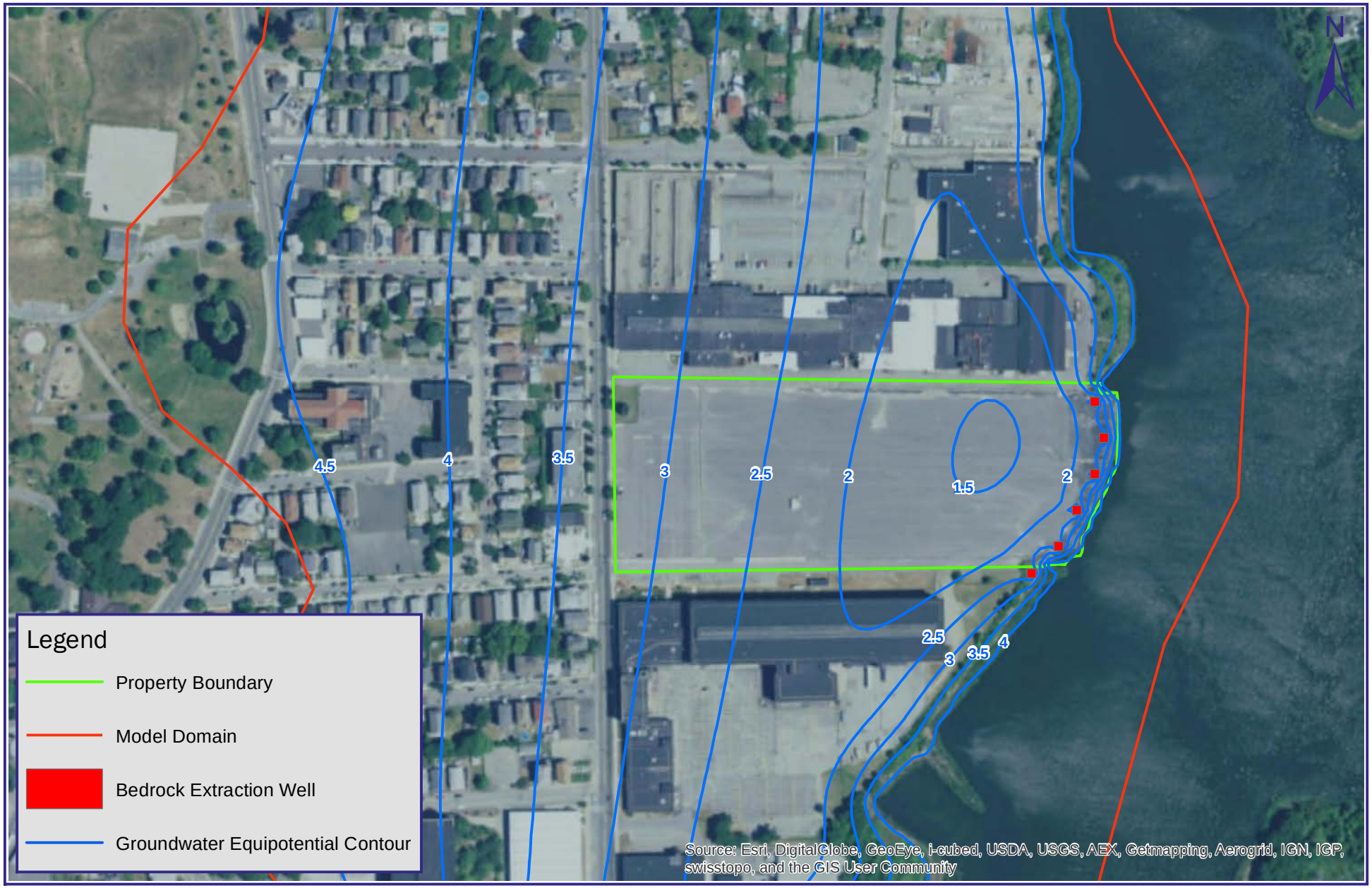
FIGURE 2-17
REMEDIAL SCENARIO 4 RESULTS AT LOW TIDE - LAYER 3
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario4_High_Tide.mxd

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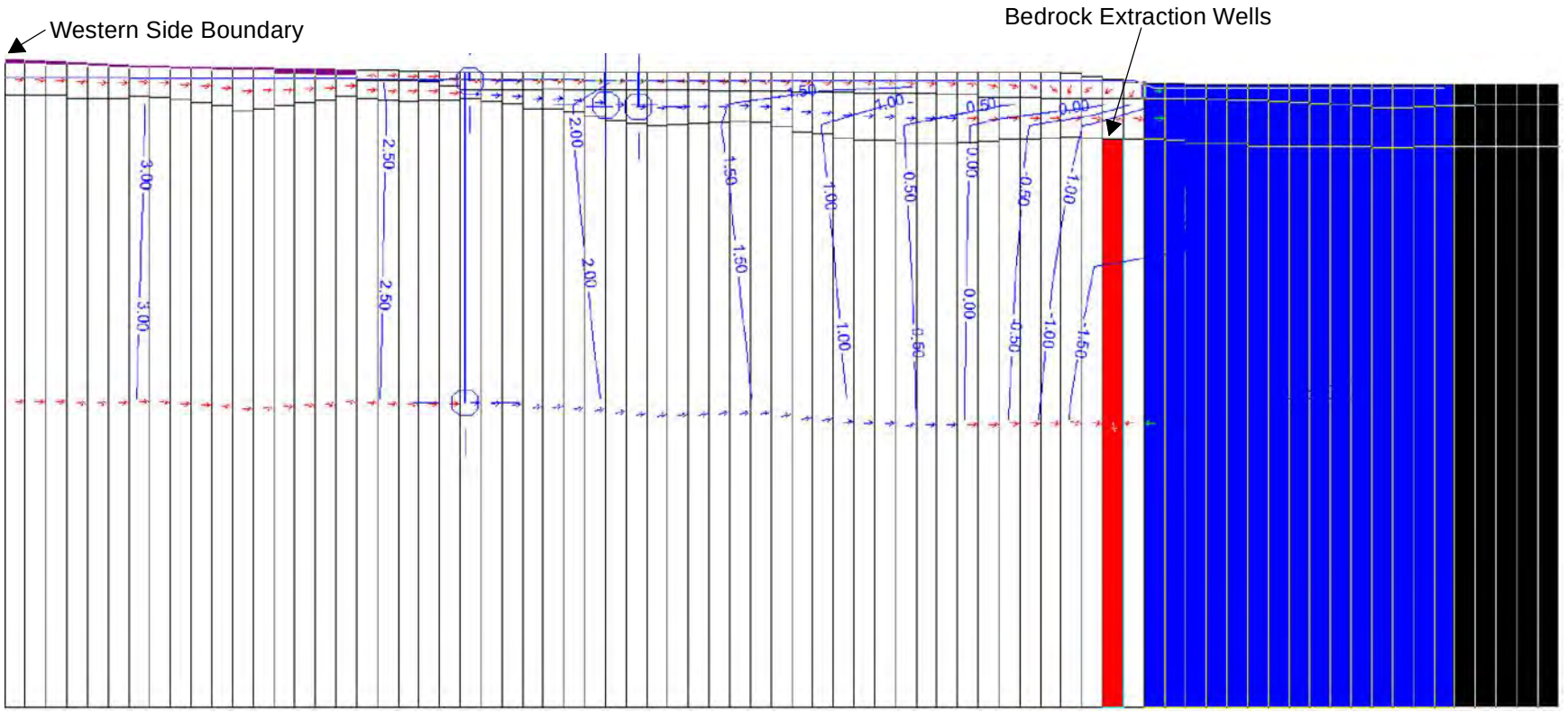
FIGURE 2-18
REMEDIAL SCENARIO 4 RESULTS AT HIGH TIDE - LAYER 3
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet

4/21/2017

West Cross-Section Along Row #103 East



Legend

- Groundwater Equipotential Contour (Arrows Indicate Flow Direction)
- Constant Head Boundary
- Extraction Well

Cross-Section at 2 x Vertical Exageration

Author: CMeyn Path: P:\GIS\AVX\Scenario4_Low_Tide_XSection.mxd

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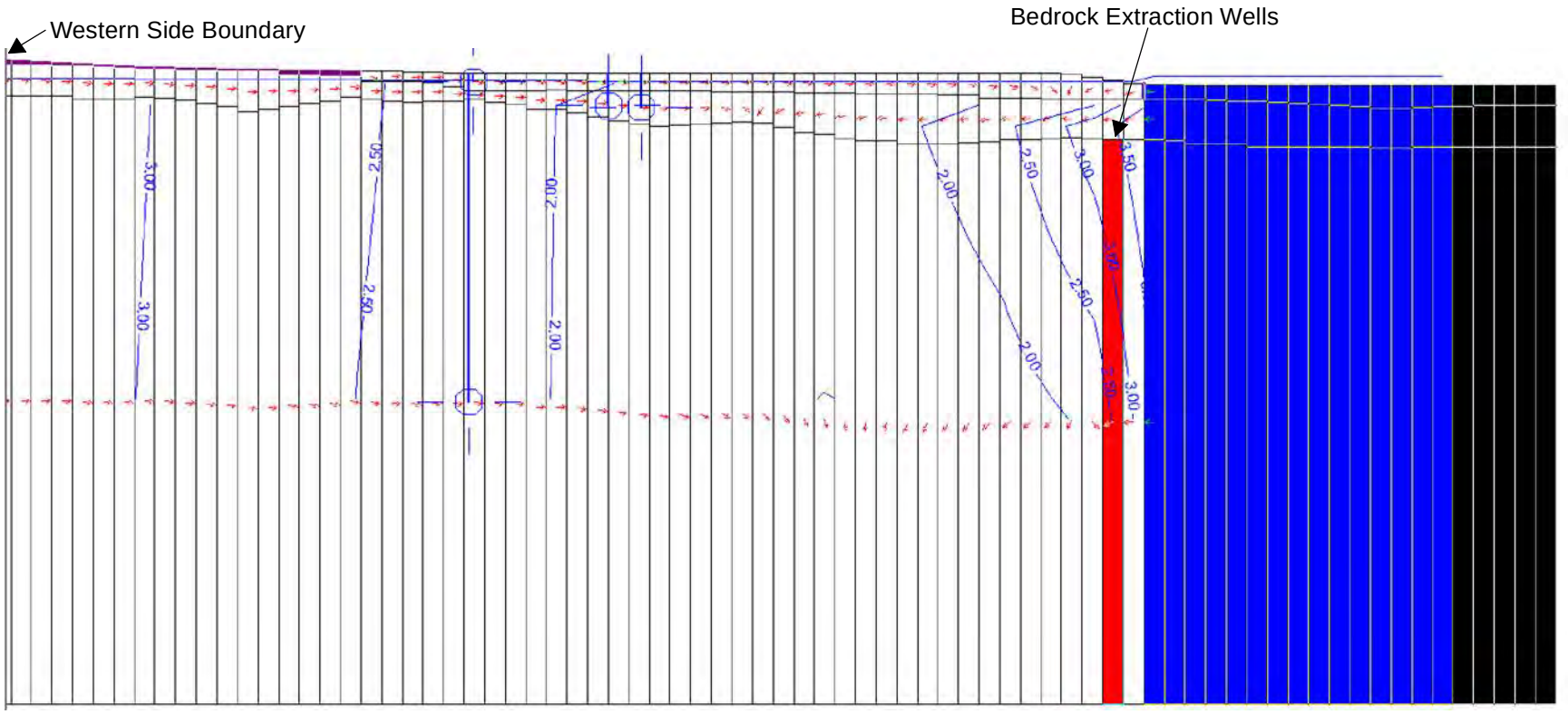
FIGURE 2-19
REMEDIAL SCENARIO 4 RESULTS AT LOW TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

4/21/2017

West Cross-Section Along Row #103 East



Legend

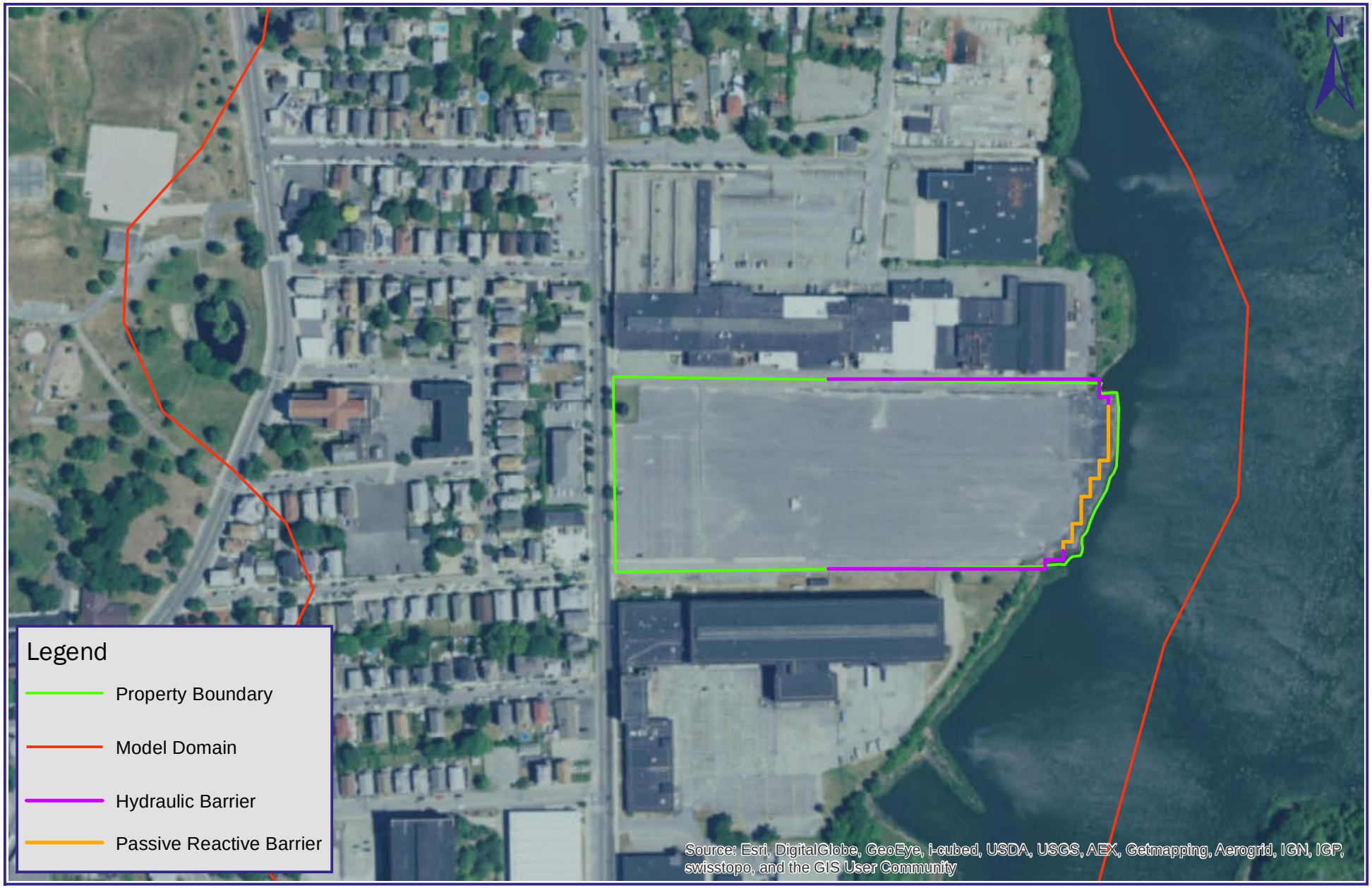
- Groundwater Equipotential Contour (Arrows Indicate Flow Direction)
- Constant Head Boundary
- Extraction Well

Cross-Section at 2 x Vertical Exageration

Author: CMeyn Path: P:\GIS\AVX\Scenario4_High_Tide_XSection.mxd

Brown AND Caldwell

FIGURE 2-20
REMEDIAL SCENARIO 4 RESULTS AT HIGH TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA



5/23/2017

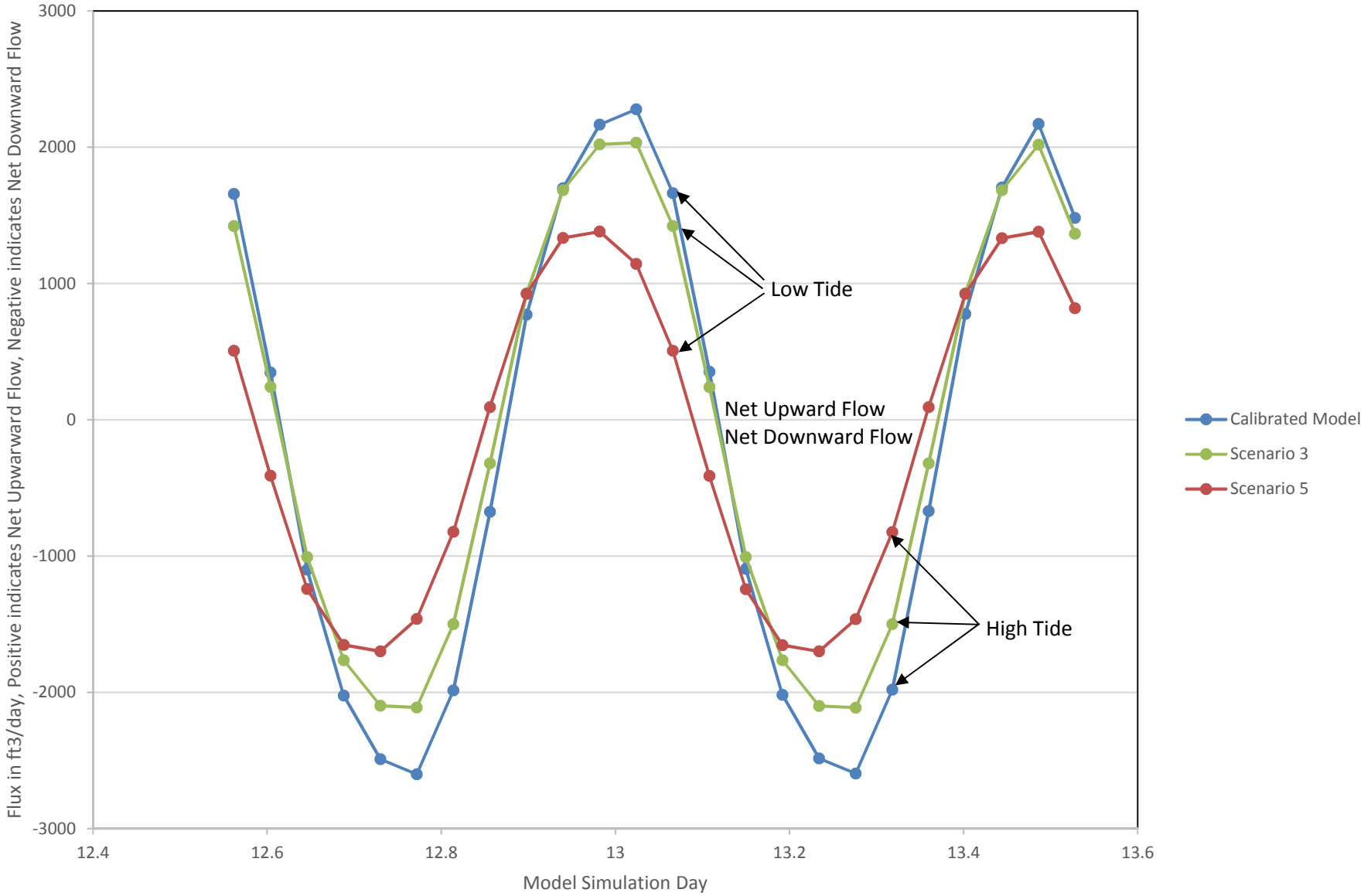
Author: CMeyn Path: P:\GIS\AVX\Scenario5_Layout.mxd

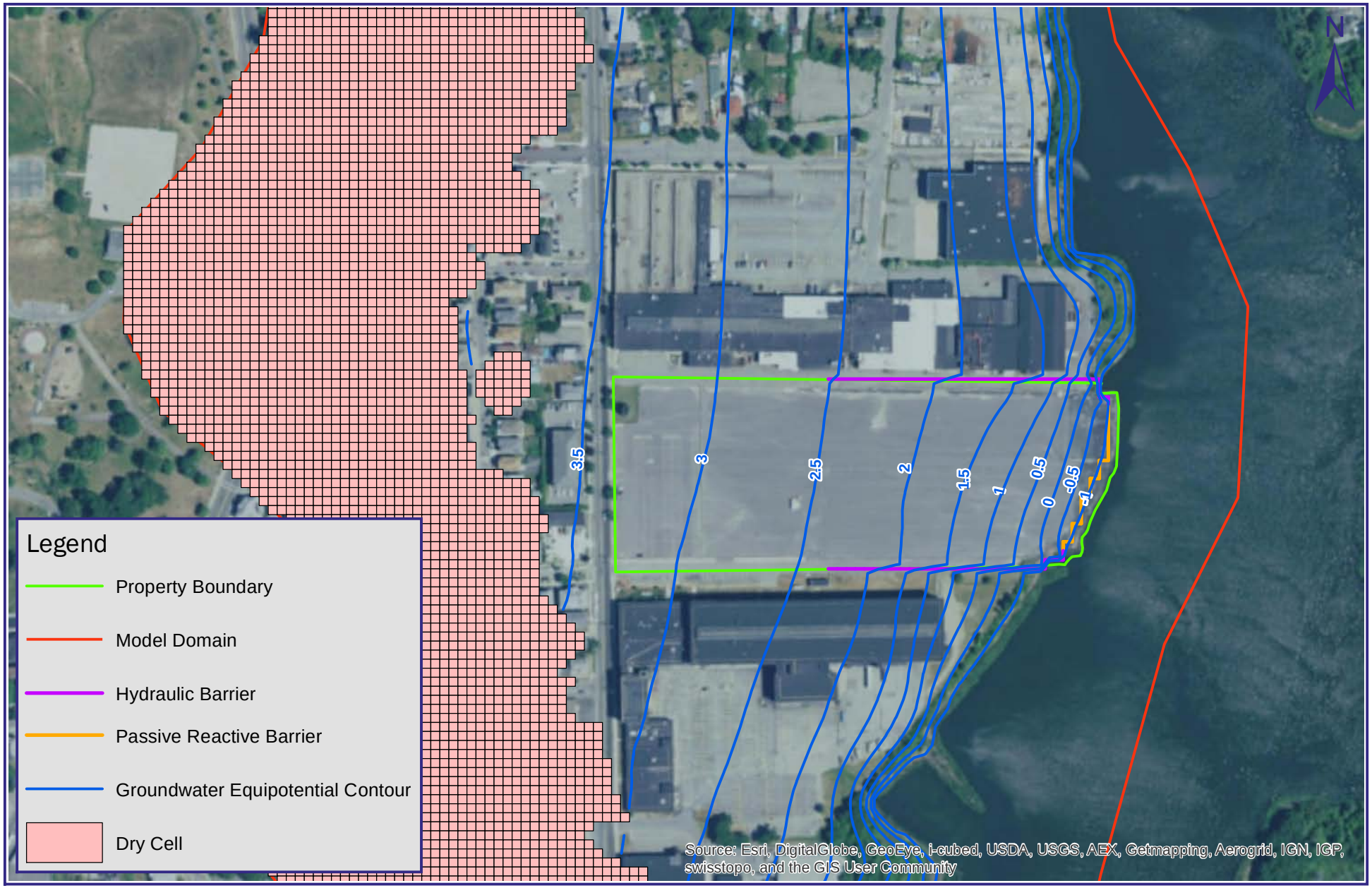
Brown AND Caldwell

FIGURE 2-21
REMEDIAL SCENARIO 5 LAYOUT
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet

Figure 2-22
Net Vertical Flux between the Contained Area of Overburden and Bedrock





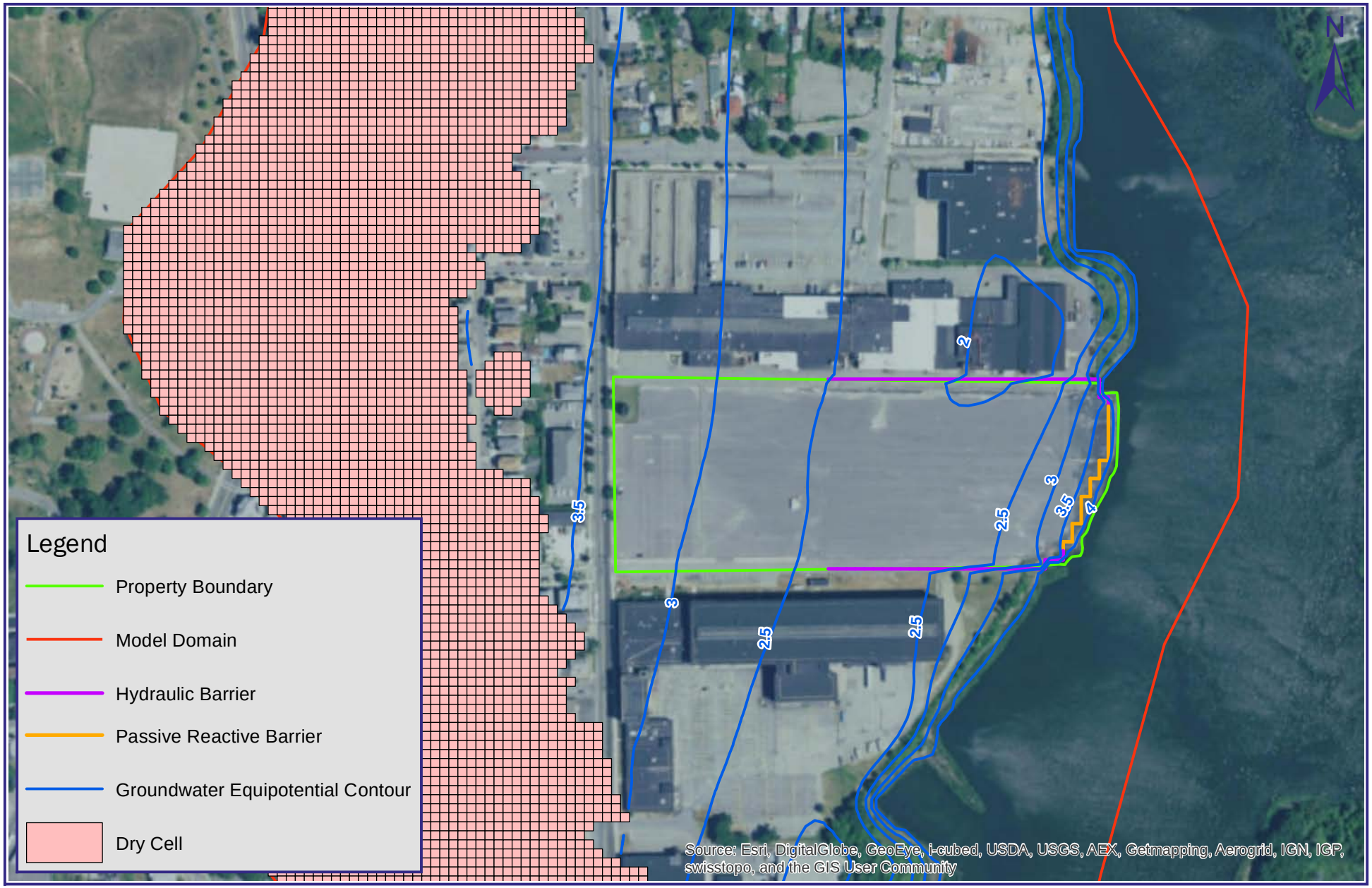
5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario5_Lowtide.mxd

Brown AND Caldwell

FIGURE 2-23
REMEDIAL SCENARIO 5 RESULTS AT LOW TIDE - LAYER 2
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet



5/23/2017

Author: CMeyn Path: P:\GIS\AVX\Scenario5_Hightide.mxd

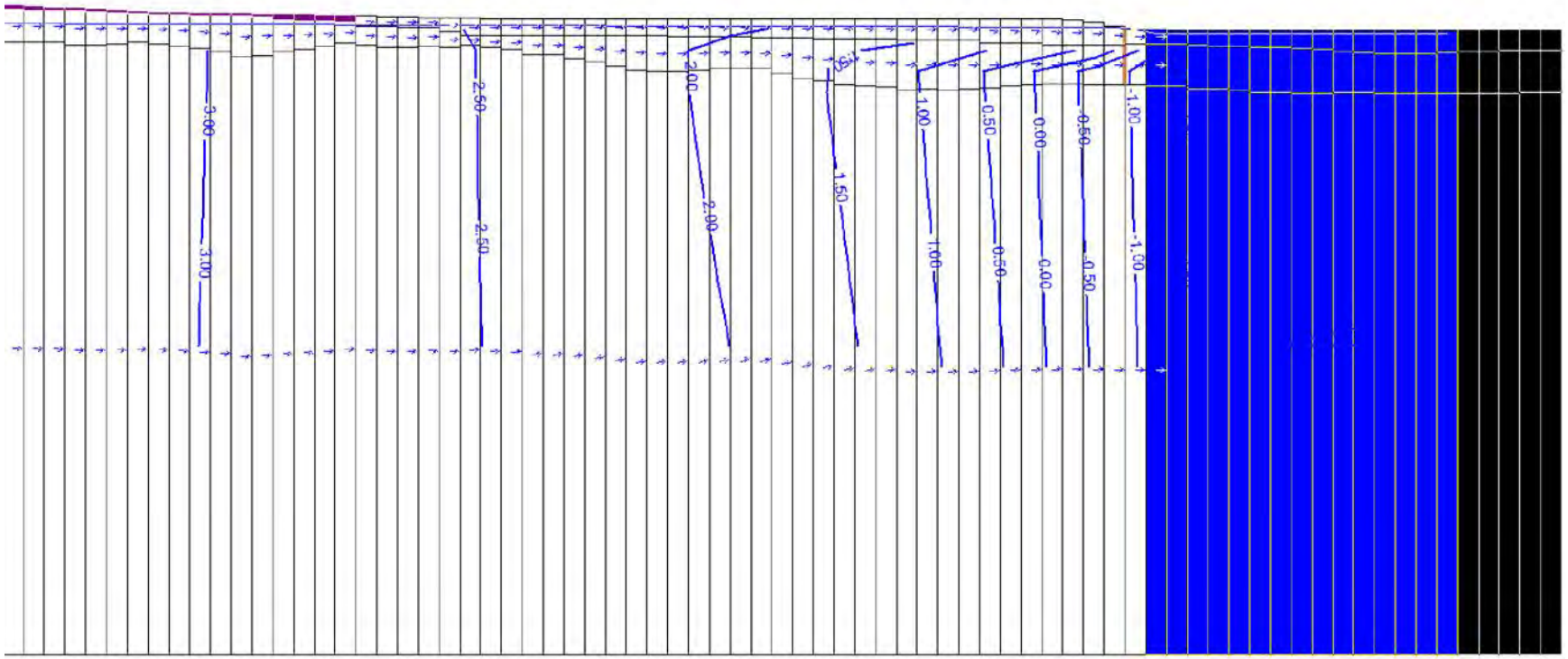
Brown AND Caldwell

FIGURE 2-24
REMEDIAL SCENARIO 5 RESULTS AT HIGH TIDE - LAYER 2
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

0 150 300
Feet

5/1/2017

West Cross-Section Along Row #103 East



Legend

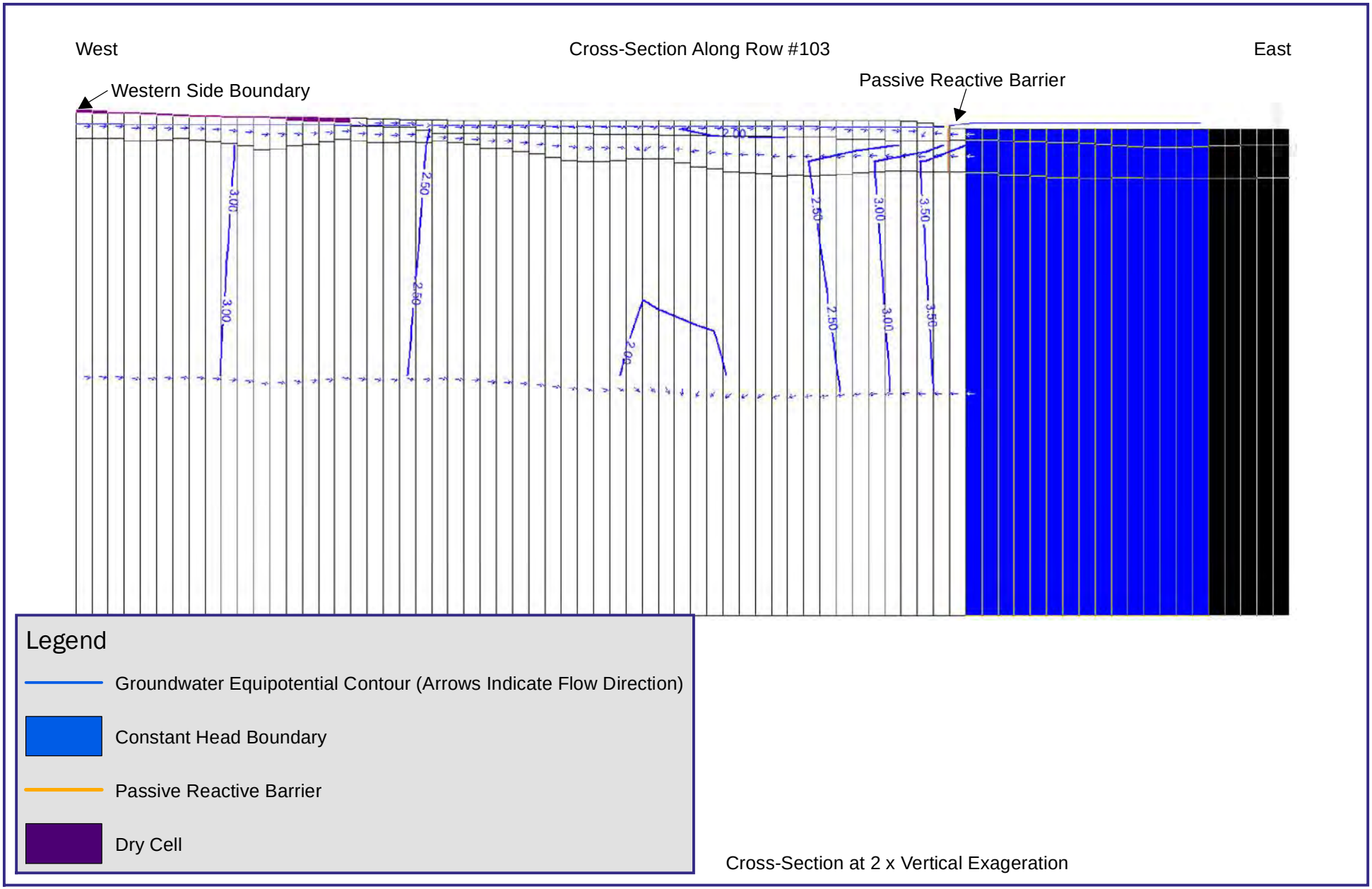
- Groundwater Equipotential Contour (Arrows Indicate Flow Direction)
- Constant Head Boundary
- Passive Reactive Barrier
- Dry Cell

Cross-Section at 2 x Vertical Exageration

Author: CMeyn Path: P:\GIS\AVX\Scenario5_Low_Tide_XSection.mxd

Brown AND Caldwell

FIGURE 2-25
REMEDIAL SCENARIO 5 RESULTS AT LOW TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA



5/1/2017

Author: CMeyn Path: \\bcusrfp01\projects\GIS\AVX\Scenario5_High_Tide_XSection.mxd

Brown AND Caldwell

FIGURE 2-26
REMEDIAL SCENARIO 5 RESULTS AT HIGH TIDE - CROSS-SECTION
FORMER AEROVOX FACILITY, NEW BEDFORD, MA

Appendix H: Treatability Study Plans and Reports

PRIMA ENVIRONMENTAL INC.

May 24, 2017

Marilyn Wade
Brown & Caldwell
One Tech Drive, Suite 310
Andover, MA 01810

RE: REVISED Final Report of Findings for Bench-scale Evaluation of Treatment Options for PCBs and VOCs

Dear Ms. Wade:

Enclosed is the final report of findings for "Bench-scale Evaluation of Treatment Options for Destruction of PCBs and VOCs" that describes bench testing conducted on soil and groundwater from your site. If you have any questions, please give me a call. Thank you for the opportunity to be of service.

Sincerely,
PRIMA Environmental, Inc.

Cindy G. Schreier, Ph.D.
President and Chief Scientist

5070 Robert J. Mathews Parkway, Suite 300, El Dorado Hills, CA 95762
Ph (916) 939-7300 • Fax (916) 939-7398
www.primaenvironmental.com

Report of Findings

Bench-Scale Evaluation of Treatment Options for Destruction of PCBs and VOCs

Confidential Site

May 24, 2017

Submitted to

Marilyn Wade
Brown & Caldwell
One Tech Drive, Suite 310
Andover, MA 01810

Submitted by

5070 Robert J Mathews Parkway, Suite 300
El Dorado Hills, CA 95762

Cindy G. Schreier, Ph.D., President **Date**

EXECUTIVE SUMMARY

Bench-scale treatability testing was conducted on soil (BC40 20-25, BC41 15-20, BC42 20-25; BC45 20-25, BC46 20-30, BC48 15-20) and groundwater (MW-15D, MW-15B, MW-26B) from the Aerovox site located in New Bedford, Massachusetts, to evaluate the ability of treatment options to destroy chemicals of concern (COCs). The primary COCs in overburden material (soil and groundwater MW-15D) were polychlorinated biphenyls (PCBs), trichloroethene (TCE) and other volatile organic compounds (VOCs). The primary COCs in the bedrock material (groundwater's MW-15B and MW-26B) were PCBs and or TCE. Microcosm testing with overburden samples consisted of soil and groundwater, while testing with bedrock sample consisted of groundwater alone. Treatment options evaluated to address overburden COCs were zero valent iron (ZVI) plus lactate plus bioaugmentation (Dehalococcoides sp.), hydrogen peroxide activated persulfate (AP-HP), and catalyzed hydrogen peroxide (CHP). Treatment options evaluated for the bedrock groundwater were sodium permanganate ($NaMnO_4$) for groundwater MW-26B and AP-HP for groundwater MW-15B.

Laboratory testing successfully demonstrated that ZVI + biostimulation/bioaugmentation, AP-HP, CHP and $NaMnO_4$ could destroy TCE and other chlorinated ethenes, one of the primary COCs at the site. The effect of treatments on PCBs is less clear. AP-HP and CHP appeared to reduce PCB concentrations in overburden soil, but did not have a clear effect on groundwater concentrations. This may be due to the presence of small amounts of soil particulates in aqueous samples despite efforts to remove them from groundwater prior to analysis, or to desorption of PCBs from soil into water. ZVI did not reduce PCB concentrations in soil or groundwater in the time frame of the study. (ZVI+ biostimulation/bioaugmentation performance was evaluated after three weeks of treatment but typically requires a time on the order of months to fully evaluate its performance.) AP-HP did not appear to destroy PCBs in bedrock samples that contained no soil, presumably because the initial concentration of AP-HP was not high enough. $NaMnO_4$ appeared to reduced PCBs concentrations, though additional testing is recommended to confirm this, since this is unexpected based on the literature.

Results of congener analyses on the second Time 0 overburden sample and the Day 20 AP-HP and CHP overburden samples are pending and will be discussed in Brown and Caldwell's report. These data are expected to clarify whether the treatments can destroy specific PCB congeners, which might not be reflected in Aroclor data.

All treatments affected the secondary groundwater quality parameters in the manner expected. Specifically ZVI generated reducing conditions, which increased the concentration of dissolved iron. AP-HP and CHP both increased dissolved oxygen, oxidation-reduction potential (ORP) and sulfate while decreasing pH (to below pH 3). $NaMnO_4$ had no effect on most parameters except for an increase in ORP.

CHP persisted for up to about 28 hours depending upon the initial concentration of HP used, but at least 47% of the reagent was consumed within about 4.5 hours.

Based on the results of this study, PRIMA recommends that all of the treatments be considered for areas containing VOCs, but that additional testing be conducted to assess the ability of each treatment to destroy PCBs.

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ACRONYMS AND ABBREVIATIONS

AP-HP	hydrogen peroxide activated persulfate
CHP	catalyzed hydrogen peroxide
COCs	chemicals of concern
DCE	dichloroethene
DHC	dehalococcoides
Fe	iron
HP	hydrogen peroxide
g	grams
kg	kilograms
L	liters
mg	milligrams
mL	milliliters
mV	millivolts
µg	micrograms
ORP	oxidation reduction potential
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
SP	sodium persulfate
TCE	trichloroethene
TOC	total organic carbon
VC	vinyl chloride
VOCs	volatile organic compounds
ZVI	zero-valent iron

CHEMICAL FORMULAE

C_2H_4	ethene
C_2HCl_3	trichloroethene
$C_{12}H_{10}$	biphenyl
$C_{12}H_7Cl_3$	trichlorobiphenyl (multiple congeners)
CO_2	carbon dioxide
Fe^0	zero-valent iron
Fe^{2+}	ferrous iron
H_2O	water
H_2O_2	hydrogen peroxide
MnO_2	manganese dioxide
$NaMnO_4$	sodium permanganate
$Na_2S_2O_8$	sodium persulfate
SO_4^{2-}	sulfate

1.0 INTRODUCTION

Bench-scale treatability testing was conducted on soil (BC40 20-25, BC41 15-20, BC42 20-25; BC45 20-25, BC46 20-30, BC48 15-20) and groundwater (MW-15D, MW-15B, MW-26B) from the Aerovox site located in New Bedford, Massachusetts, to evaluate the ability of treatment options to destroy chemicals of concern (COCs). Soil and MW-15D groundwater were collected from the overburden. Groundwaters MW-15B and MW-26B were collected from the bedrock. The primary COCs in overburden materials were polychlorinated biphenyls (PCBs), trichloroethene (TCE) and other volatile organic compounds (VOCs). The primary COCs in bedrock material were TCE (MW-26B) and PCBs and TCE (MW-15B). Historically, PCBs released at the site and found in groundwater (MW-15D, MW-15B and MW-26B) consisted primarily of Aroclor 1242, with occasional detections of lesser amounts of Aroclor 1254 (MW-15B). Due to the age of the release and resultant sample weathering, prior analyses have also detected Aroclor 1221 in these wells.

In this study, the treatment options evaluated for overburden materials were zero valent iron (ZVI) plus biostimulation/bioaugmentation, hydrogen peroxide activated persulfate (AP-HP), and catalyzed hydrogen peroxide (CHP). Treatment options evaluated for the bedrock groundwater were sodium permanganate ($NaMnO_4$) for groundwater MW-26B and AP-HP for groundwater MW-15B.

1.1 Background

1.1.1 Zero-valent Iron + Biostimulation/Bioaugmentation

ZVI is an established method for the abiotic reduction of chlorinated ethenes to ethene, ethane, and other completely dehalogenated compounds and may also dechlorinate some PCBs. Addition of a carbon source such a lactate, as well as Dehalococcoides (DHC) and other bacteria could stimulate biodegradation of TCE and possibly PCBs and may also enhance abiotic degradation through formation of reactive iron sulfide and/or iron oxide minerals.

Abiotic transformation by ZVI occurs primarily via stepwise reductive dechlorination. **Equation 1** summarizes the reaction for conversion of TCE to ethene (the primary end

product) by ZVI (Fe^0), while **Equation 2** summarizes the potential overall reaction for dechlorination of trichlorobiphenyl, the predominate group of PCBs in Aroclor 1242. Note, however, that there are 24 congeners of trichlorobiphenyl and not all will necessarily react with ZVI or react at the same rate. **Table 1** summarizes the theoretical amount of ZVI required to achieve complete dechlorination of selected COCs.

$$\underset{TCE}{C_2HCl_3} + 3Fe^0 + 3H^+ \rightarrow \underset{ethene}{C_2H_4} + 3Fe^{2+} + 3Cl^- \qquad \text{Eqn. 1}$$

$$\underset{trichlorobiphenyl}{C_{12}H_7Cl_3} + 3Fe^0 + 3H^+ \overset{?}{\rightarrow} \underset{biphenyl}{C_{12}H_{10}} + 3Fe^{2+} + 3Cl^- \qquad \text{Eqn. 2}$$

1.1.2 Hydrogen Peroxide Activated Persulfate (AP-HP)

AP-HP is a mixture of persulfate activated with hydrogen peroxide used for the destruction of a wide range of organic compounds, including TCE. It may also be effective toward PCBs. **Equations 3** and **4** show theoretical reactions for oxidation of TCE and trichlorobiphenyl congeners by sodium persulfate (SP) to carbon dioxide (CO_2), water and chloride. Similar reactions are expected to apply for AP-HP. The theoretical SP demand based on these reactions is given in **Table 1**. In practice, a larger amount of AP-HP will likely be required because AP-HP is non-selective and because it auto-decomposes.

$$\underset{TCE}{C_2HCl_3} + 3Na_2S_2O_8 + 4H_2O \rightarrow 2CO_2 + 6Na^+ + 6SO_4^{2-} + 9H^+ + 3Cl^- \qquad \text{Eqn. 3}$$

$$\underset{trichlorobiphenyl}{C_{12}H_7Cl_3} + 26Na_2S_2O_8 + 24H_2O \overset{?}{\rightarrow} CO_2 + 52Na^+ + 52SO_4^{2-} + 55H^+ + 3Cl^- \qquad \text{Eqn. 4}$$

1.1.3 Catalyzed Hydrogen Peroxide (CHP)

CHP is a mixture of hydrogen peroxide and catalyst. It is known as Fenton's reagent if the reaction is carried out under acidic conditions and the catalyst is ferrous iron. CHP is an established technology for the oxidation of a wide range of organic compounds, including TCE and possibly PCBs. **Equations 5** and **6** show theoretical reactions for

oxidation of TCE and trichlorobiphenyl congeners by hydrogen peroxide (HP). HP is a weak oxidant, but it serves as a first approximation of the amount of HP needed for oxidation by CHP. The theoretical HP demand based on these reactions is given in **Table 1**. In practice, a larger amount of CHP will likely be required because CHP is non-selective and because it auto-decomposes.

$$\underset{TCE}{C_2HCl_3} + 3H_2O_2 \rightarrow 2CO_2 + 2H_2O + 3H^+ + 3Cl^- \qquad \text{Eqn. 5}$$

$$\underset{trichlorobiphenyl}{C_{12}H_7Cl_3} + 26H_2O_2 \xrightarrow{?} 12CO_2 + 28H_2O + 3H^+ + 3Cl^- \qquad \text{Eqn. 6}$$

1.1.4 Sodium Permanganate

In situ chemical oxidation using sodium permanganate is an established technology for the oxidation of chlorinated ethenes, but its effectiveness toward PCBs is unknown. **Equation 7** and **8** shows the theoretical reaction for oxidation of TCE and trichlorobiphenyl to carbon dioxide, water and chloride. The $NaMnO_4$ demand based on this reaction is given in **Table 1**. In practice, a larger amount of $NaMnO_4$ will likely be required because $NaMnO_4$ is non-selective.

$$\underset{TCE}{C_2HCl_3} + 2NaMnO_4 \rightarrow 2CO_2 + 2Na^+ + 2MnO_2 + H^+ + 3Cl^- \qquad \text{Eqn. 7}$$

$$\underset{trichlorobiphenyl}{3C_{12}H_7Cl_3} + 52NaMnO_4 + 43\,H^+ \xrightarrow{?} 36CO_2 + 52Na^+ + 52MnO_2 + 9Cl^- + 32H_2O \qquad \text{Eqn. 8}$$

Table 1. Theoretical Stoichiometric Requirements for COCs and other Compounds.

COC	Reagent (g / g COC)			
	ZVI*	SP	HP	$NaMnO_4$
Dichloroethene	1.2	9.8	1.4	3.9
Trichloroethene	1.3	5.4	0.8	2.2
Tetrachloroethene	1.3	2.9	0.4	1.1
Trichlorobiphenyl**	0.7	24	3.4	9.6

* ZVI only. Does not include effects of biostimulation or bioaugmentation.

**Predominant congeners in Aroclor 1242.

1.2 Study Objectives

Batch tests were conducted to evaluate the effect of each treatment on COCs degradation. Specific goals of the proof of concept bench testing were:

- Measure the persistence of CHP in the presence of overburden soil and groundwater
- Assess removal of PCBs and VOCs in overburden material using ZVI + biostimulation (lactate)/bioaugmentation, AP-HP and CHP
- Assess removal of VOCs from bedrock groundwater (MW-26B) using $NaMnO_4$
- Assess removal of PCBs and VOCs from bedrock groundwater (MW-15B) using AP-HP.
- Evaluate the effect of treatment on secondary water quality parameters.

CHP in the above study was acidified ferrous iron plus hydrogen peroxide. The specific tests conducted to achieve these goals are described in **Section 2.0** of this report. Results and Summary/Conclusions are presented in **Sections 3.0 and 4.0**, respectively.

2.0 MATERIALS AND METHODS

2.1 Materials

Dehalococcoides culture. KB-1 Plus microbial consortium was obtained from SiREM (www.siremlab.com). It was stored in a refrigerator and used within one week of receipt.

Ferrous sulfate heptahydrate, $FeSO_4 \cdot 7H_2O$. Reagent grade $FeSO_4 \cdot 7H_2O$ was used in this study. Stock solutions were made by dissolving the appropriate amount of solid material in deionized water.

Hydrogen peroxide, HP. Reagent grade 35% hydrogen peroxide was used in this study. It was diluted as needed.

Iron EDTA. Dissolvine brand iron ethylenediaminetetraacetic acid was obtained from Peroxychem (www.peroxychem.com). Stock solutions were made by dissolving the appropriate amount of solid material in deionized water.

Sodium permanganate. RemOx brand sodium permanganate was obtained from Carus Corporation (www.caruscorporation.com).

Sodium Persulfate, SP. Klozur brand SP was obtained from Peroxychem (www.peroxychem.com). Stock solutions were made by dissolving the appropriate amount of solid material in deionized water.

Zero-valent iron, ZVI. Cast Iron Aggregate, Site 14D from Peerless Metal Powders (www.peerlessmetal.com) was used in this study.

2.2 Preparation and Characterization of Soil and Groundwater

Soil. Several soil samples were received on March 30, 2017. Per direction of Brown and Caldwell, samples BC40 20-25, BC41 15-20, BC42 20-25; BC45 20-25, BC46 20-30, BC48 15-20 were composited into a single sample for use in this study. The soil was composited by passing it through a No. 4 sieve to remove particles greater than 3/16 inches then mixing by hand until the soil was visually homogeneous. Approximately

87% of the initial mass passed the No. 4 sieve. Homogenized soil was mostly dark gray sand with some fines. Homogenized soil was analyzed for:

- COCs
    - PCBs
    - VOCs
- pH
- Total organic carbon (TOC)

Groundwater. Three groundwater samples (MW-15D, MW-15B, and MW-26B), each consisting of multiple 1-L amber bottles were received on March 30, 2017. Each sample was homogenized while cold in such a way as to minimize loss of volatile compounds. Each composited groundwater was analyzed for:

- COCs
    - PCBs
    - VOCs
- Alkalinity
- Chloride
- Dissolved organic carbon
- Dissolved oxygen
- Iron (ferrous and total)
- Oxidation reduction potential (ORP)
- pH
- Sulfate

2.3 Soil and Groundwater Titration

Because acidic conditions are needed for CHP, overburden soil and groundwater (MW-15D) were titrated with sulfuric acid to determine the amount acid needed to decrease the pH of each matrix to about 3.

2.4 CHP Longevity

CHP decomposes to generate oxygen gas. The rate at which gas is formed, which is a first approximation of the longevity of CHP, was measured in the presence of overburden soil and groundwater. Two pairs of reactors, each containing 120 g soil, 45 mL MW-15D groundwater, and 15 mL total of 35% HP stock solution, ferrous iron solution and sulfuric acid solution as needed, were prepared such that the initial conditions were as shown in **Table 2**. One reactor from each set was connected to an inverted cylinder filled with water. As CHP decomposed, the off-gases formed displaced the water in the cylinders. The amount of water displaced was recorded as a function of time. For the remaining reactors, HP was measured periodically with test strips. This information can be used to estimate longevity of CHP in the field

Table 2. Initial Conditions for CHP Longevity Tests

Test	Soil	GW (MW-15D)	# Reps	Initial Conditions			Total Volume	Sample Time
				HP		Fe		
	g	mL		gHP/100g so	mg/L	mg/L	mL	
CHP-Low	120	45	2	1	20000	250	60	as needed
CHP-High	120	45	2	4	80000	250	60	

GW = groundwater

2.5 Chemicals of Concern (COC) Removal – Overburden

Soil (300 g), MW-15D groundwater (820 mL), reagents, and deionized water were combined in a 2L (nominal) reactor such that the initial conditions were as shown in **Table 3** and the soil to water ratio was 1:3. Reagent dosages were specified by Brown and Caldwell. The reactors contained about 1L of headspace in order to accommodate the off-gases expected from the AP-HP and CHP reactors. For the ZVI test, the headspace was purged with nitrogen gas to minimize the amount of oxygen present. DHC culture was added to the ZVI reactors once reducing conditions had been established (after about 48 hours; ORP below -290 mV). After 10 days, the remaining AP-HP reactor was re-dosed with 25% of the initial doses of SP and HP; while the remaining CHP reactor was re-dosed with 25% of the initial HP (no additional iron or

acid was applied). All reactors were stored at room temperature in the dark. At the times specified in **Table 3**, each reactor was destructively sampled and the aqueous phases analyzed for COCs, PCB congeners, dissolved gases (methane, ethane, and ethene), chloride, dissolved oxygen, iron, ORP, pH, residual oxidant and/or sulfate as summarized in **Table 4**. For the Day 20 AP-HP and CHP tests, PCB congeners were analyzed in addition to Aroclors because analysis of Aroclors, which are a mixture of PCBs, suggested that some components of the Aroclors were selectively degraded (see **Section 2.7**). Soil was analyzed for COCs at the Day 20 sample event only. Water samples were collected by allowing the contents of each reactor to settle, then syphoning water into appropriate sample containers using Tygon E3603 tubing; new tubing was used for each reactor. Soil was separated from the remaining water by centrifuging the soil and water in HDPE centrifuge bottles at 8,000 rpm for 5 minutes, decanting the water, homogenizing the soil using a stainless steel spatula, then transferring the soil to appropriate sample. For the Time 0 reactors and Day 6 reactors, the reactors settled overnight prior to sampling. For the Day 20 reactors, the reactors settled for approximately 10 days. **Figures 1-3** show the reactors upon set-up, at Day 6, and at Day 20.

A second set of Time 0 reactors were set in the same manner as the first set. This set was analyzed only for PCBs, including congener analysis, after allowing the soil and water to settle overnight. Time 0 reactors were re-set because PCB results from the initial set were inconsistent with untreated samples (**Section 2.2**) and with each other, possibly due to labeling error among overburden and bedrock samples that could not be confirmed. All Time 0 PCB data were taken from the re-set reactors. All other Time 0 data were taken from the initial Time 0 reactors.

Table 3. Initial Conditions for COC Removal Tests – Overburden.

Test	Initial Conditions							Sample Time
	ZVI	Lactate	DHC**	SP	HP	Fe(II)	pH	
	g/100g so	g/L	cfu/L	g/reactor	g/reactor	mg/L		days
Time 0 - A	0	0	0	0	0	0	no adjust	0
Time 0 - B	0	0	0	0	0	0	no adjust	0
Control	0	0	0	0	0	0	no adjust	20
ZVI - A	2.5	3	10^6	0	0	0	no adjust	6
ZVI - B	2.5	3	10^6	0	0	0	no adjust	20
AP-HP - A	0	0	0	7.65	22.96	0	no adjust	6
AP-HP - B	0	0	0	7.65+1.91*	23+5.8*	0	no adjust	20
CHP - A	0	0	0	0	9.95	250	pH ~3	6
CHP - B	0	0	0	0	9.95+2.49*	250	pH ~3	20

* Initially dosed same as "A" reactor. Additional reagent added on Day 10.

** Dehalococcoides added at approximately 48 hours.

Table 4. Post-treatment Analyses – Overburden.

Analyte	Overburden								
	Time 0		Control	ZVI/Lac/DHC		AP-HP		CHP	
	Rep A	Rep B	20d	7d	20d	7d	20d	6d	20d
Water analyses									
PCBs - 8082	1	1	1	1	1	1	1	1	1
PCBs - congeners	1^	-	-	-	-	-	1	-	1
VOCs	1	1	1	1	1	1	1	1	1
Chloride	-	-	1	-	1	-	1	-	1
Dissolved gases*	-	-	1	-	1	-	-	-	-
DOC**	-	-	1	-	1	-	-	-	-
Dissolved Oxygen	-	-	1	1	1	1	1	1	1
Ferrous iron	-	-	1	1	1	-	-	-	-
Total Iron	-	-	1	1	1	-	-	1	1
ORP	-	-	1	1	1	1	1	1	1
pH	-	-	1	1	1	1	1	1	1
residual HP	-	-	-	-	-	1	1	1	1
residual SP	-	-	-	-	-	1	1	-	-
Sulfate	-	-	1	-	1	1	1	-	1
Soil analyses									
PCBs	-	-	1	-	1	-	1	-	1
VOCs	-	-	1	-	1	-	1	-	1

* Dissolved Gases = methane, ethane, ethene

** Dissolved organic carbon. Samples were filtered by PRIMA, then submitted for analysis of *total* organic carbon.

^ Re-set Time 0 - see **Section 2.5** for explanation.

Figure 1. Overburden COC Removal – "A" Reactors, Day 0. *From left*: Time 0, Control, AP-HP, CHP, ZVI/Lac/DHC (DHC added at 48 hrs).

Figure 2. Overburden COC Removal – Day 6. *From left*: ZVI/Lac/DHC, CHP, AP-HP.

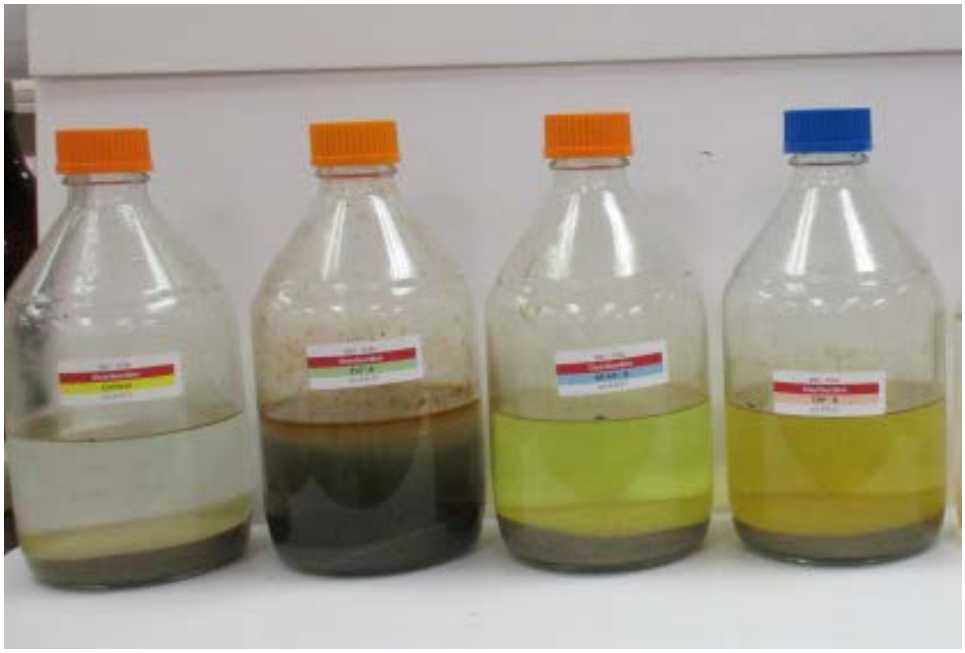

Figure 3. Overburden COC Removal – Day 20. *From left*: Control, ZVI/Lac/DHC, AP-HP, CHP.

2.6 COC Removal – Bedrock Reactor Design

Groundwater, reagents, and deionized water were combined in a 1L (nominal) reactor such that the initial conditions were as shown in **Table 5**. Reagent dosages were specified by Brown and Caldwell. The $NaMnO_4$ reactors contained no headspace while all remaining reactors contained about 200 mL headspace in order to accommodate the off-gases expected from the AP-HP reactors. After 10 days, the remaining AP-HP reactor was re-dosed with 25% of the initial dose of SP and HP. All reactors were capped and stored at room temperature in the dark. At the times specified in **Table 5**, each reactor was destructively sampled and the water analyzed for COCs, chloride, dissolved oxygen, ORP, pH, residual oxidant and/or sulfate as summarized in **Table 6**. Residual $NaMnO_4$ in PCB and VOCs sample containers was quenched using manganese sulfate prior to submittal for analysis. Samples were collected by syphoning water into appropriate sample containers as described in **Section 2.5**. For the Time 0 reactors and Day 6 reactors, the reactors settled overnight prior to sampling. For the Day 20 reactors, the reactors settled for approximately 10 days. **Figures 4-6** show the reactors at set-up, at Day 6, and at Day 20.

(Note: Time 0 reactors were initially set at the same time as other reactors. However, due to analytical anomalies possibly arising from a labeling error among overburden and bedrock samples that could not be confirmed, the Time 0 reactors were re-set. Only data relating to the re-set reactors are discussed in this report.)

Table 5. Initial Conditions for COC Removal Tests – Bedrock.

Test	GW		Initial Conditions **			Total volume	Sample Time
			$NaMnO_4$	SP	HP		
	source	mL	g/reactor	g/reactor	g/reactor	mL	days
Time 0-15B - A	MW15B	890	0	0	0	900	0
Time 0-15B - B	MW15B	890	0	0	0	900	0
Control-15B	MW15B	890	0	0	0	900	20
NaMnO4 - A	MW-26B	1100	0.27	0	0	1100	6
NaMnO4 - B	MW-26B	1100	0.27	0	0	1100	20
AP-HP - A	MW15B	890	0	0.38	1.12	900	6
AP-HP - B	MW15B	890	0	0.375+0.094*	1.12+0.28*	900	20

* Initially dosed same as "A" reactor. Additional reagent added on Day 10.

** Values are the amount of each oxidant, NOT the amount of stock solution.

GW = groundwater

Table 6. Post-treatment Analyses – Bedrock

Analyte	Lab	Bedrock						
		Time 0		Control	NaMnO4		AP-HP	
		Rep A	Rep B	20d	6d	20d	6d	20d
VOCs	Alpha	1	1	1	1	1	1	1
PCBs	McCamp	1	1	1	1	1	1	1
Chloride	Alpha	-	-	1	-	1	-	1
Dissolved Oxygen	PRIMA	-	-	1	1	1	1	1
ORP	PRIMA	-	-	1	1	1	1	1
pH	PRIMA	-	-	1	1	1	1	1
residual HP	PRIMA	-	-	-	-	-	1	1
residual NaMnO4	PRIMA	-	-	-	1	1	-	-
residual SP	PRIMA	-	-	-	-	-	1	1
Sulfate	PRIMA	-	-	1	-	-	1	1

Figure 4. Bedrock COC Removal – "A" Reactors, Day 0. *From left*: Time 0, Control, AP-HP, $NaMnO_4$.

Figure 5. Bedrock COC Removal – Day 6. *From left*: AP-HP, $NaMnO_4$.

Figure 6. Bedrock COC Removal – Day 20. *From left*: Control, AP-HP, $NaMnO_4$.

2.7 Analytical Methods

The methods for each analysis and the laboratory that performed the analyses are summarized in **Table 7**. Note that Alpha Analytical (Sparks, NV) and Alpha Analytical (Mansfield, MA) are not affiliated with each other. Many Overburden PCB groundwater sample containers contained small amounts of soil particulates despite efforts to exclude it during sampling; the analytical laboratory was instructed to exclude particulates to the extent possible before extracting. In several cases (both overburden and bedrock), Aroclor identifications were made solely on retention time rather than retention time and Aroclor pattern and resulting concentrations are therefore estimates. Identification based solely on retention time was necessary because patterns in treated samples did not always match the parent Aroclor, which is possible since treatments could potentially selectively destroy certain PCB congeners. If the peak pattern does not match the parent compound, then the concentration is an estimate.

Table 7. Analytical Methods.

Analyte	Method	Lab performing test*
VOCs	EPA 8260	Alpha Analytical
PCBs	EPA 8082	McCampbell
PCB – congeners		Alpha - Mansfield
Alkalinity	EPA SM2320B	Alpha Analytical
Chloride	EPA 300	Alpha Analytical
Dissolved oxygen	Probe	PRIMA
Dissolved organic carbon	EPA 5310	Alpha Analytical
Iron	Hach**	PRIMA
ORP	Probe	PRIMA
pH	Probe	PRIMA
Residual permanganate	Visible spectroscopy	PRIMA
Residual peroxide	FAS/CeSO4 titration or test strips	PRIMA
Residual persulfate	FAS/CeSO4 titration	PRIMA
Sulfate	Hach	PRIMA
Total Organic Carbon - soil	EPA 9060	McCampbell

* Alpha Analytical (Sparks, NV); Alpha Analytical (Mansfield, MA); McCampbell Analytical (Pittsburg, CA)

3.0 RESULTS AND DISCUSSION

3.1 Untreated Soil and Groundwater

The concentrations of VOCs and secondary parameters in untreated soil and groundwater are shown in **Table 8**. Complete analytical reports are provided in **Appendix B**. Soil was heavily impacted with Aroclor 1242 (830 mg/kg) and Aroclor 1248 (1,300 mg/kg). Soil also contained 1,896 μg/kg total VOCs, which consisted primarily of chlorinated ethenes and chlorinated benzenes. Groundwater MW-15D contained 130 μg/L Aroclor 1242, 44 μg/L PCE, 5,200 μg/L TCE, 1,200 μg/L cis-DCE and, 1,200 mg/L chloride and had a pH of 5.67. Groundwater MW-15B contained 100,000 μg/L TCE, 52,000 μg/L cis-DCE, and 3,520 mg/L chloride and had pH 6.01, while groundwater MW-26B contained 66,000 μg/L TCE, 47,000 μg/L cis-DCE, and 4,030 mg/L chloride and had pH of 5.97. The theoretical reagent requirements based on COC concentrations and stoichiometries in **Table 1** are shown in **Table 9**.

3.2 Acid Titration

Sulfuric acid was added to overburden soil and groundwater to determine the amount of acid needed to decrease pH to approximately 3.0. Groundwater MW-15D required 1.8 mmoles H^+/L water. Soil required approximately 10 mmoles H^+/kg soil. Note that the soil buffered well near 3.2 – decreasing pH below this value for an extended period of time would likely require significantly more acid.

3.3 CHP Longevity

The volume of off-gas formed by decomposition of CHP is shown in **Figure 7**. CHP persisted for about 21 hours in the low dose (1 g HP/100 g soil) test and over 27 hours in the high dose (4 g HP/100 g soil) test. In the low dose test, approximately 60% of the off-gases were produced within the first 4.5 hours, while 98% were produced within 21 hours. The concentration of HP (via direct measurement) was 500 mg/L at 21 hours and less than 1 mg/L by 27 hours. In the high dose test, 47% of the off-gases were formed within 4.5 hours, while 92% were formed within 27 hours. The concentration of HP was 2,000 mg/L at 27 hours and less than 0.5 mg/L by 70 hours. Temperature was not measured in these tests, but the reactors did not become notably warm.

Table 8. COCs and Secondary Parameters in Untreated Soil and Groundwater.

Analyte	Units	Composite Soil	Untreated GW		
			MW-15D	MW-15B	MW-26B
PCBs					
Aroclor 1016	mg/kg or µg/L	< 100	< 25	< 25	6.1
Aroclor 1242	mg/kg or µg/L	830	130	290	< 1.0
Aroclor 1248	mg/kg or µg/L	1300	< 25	< 25	< 1.0
Aroclor 1254	mg/kg or µg/L	< 100	34	98	< 1.0
total PCBs	mg/kg or µg/L	2100	160	390	6.1
VOCs					
cis-dichloroethene	µg/kg or µg/L	230	1,200	52,000	4,700
trichloroethene	µg/kg or µg/L	590	5,200	100,000	66,000
tetrachloroethene	µg/kg or µg/L	34	44	< 500	< 500
ethylbenzene	µg/kg or µg/L	65	< 20	< 250	< 250
1,3-dichlorobenzene	µg/kg or µg/L	170	< 40	< 500	< 500
1,4-dichlorobenzene	µg/kg or µg/L	760	< 40	< 500	< 500
1,2-dichlorobenzene	µg/kg or µg/L	47	< 40	< 500	< 500
total VOCs	*µg/kg or µg/L*	*1,896*	*6,444*	*152,000*	*70,700*
Other Parameters					
Alkalinity	mg/L CaCO3	n.a.	28.7	28.6	225
Chloride	mg/L	n.a.	1,260	3,520	4,030
DOC	mg/L	n.a.	4.38	5.78	9.06
Dissolved oxygen	mg/L	n.a.	4.4	4.2	4.5
Ferrous iron	mg/L	n.m.	0.02	17	3.6
Total iron	mg/L	n.m.	0.08	24.8	5.3
ORP	mV	n.m.	325	109	173
pH	--	6.4	5.67	6.01	5.97
Sulfate	mg/L	n.m.	140	310	70
TOC	mg/kg	1600	n.m.	n.m.	n.m.

n.a. = not applicable

n.m. = not measured

GW = groundwater

Table 9. Theoretical Reagent Requirements.

Matrix	Units	ZVI	SP	HP	NaMnO4
Soil	mg/kg soil	1500	46,000	6600	2
MW-15D	mg/L GW	8.3	43	6.3	16
MW-15B	mg/L GW	190	1100	150	420
MW-26B	mg/L GW	91	400	59	160

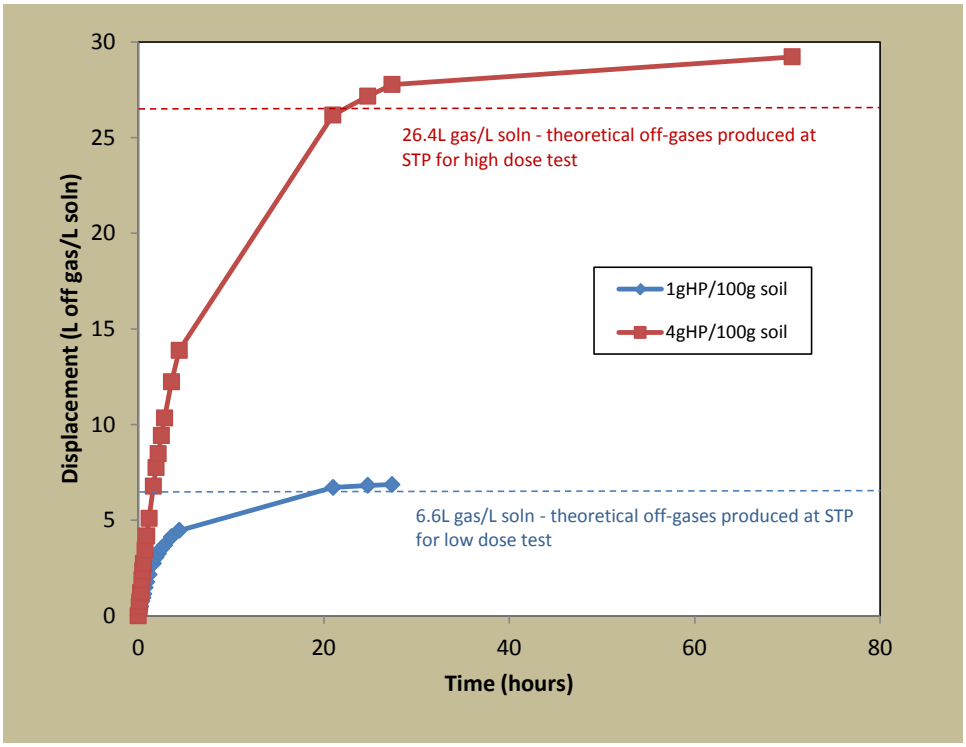

Figure 7. CHP Longevity – Overburden Soil and MW-15D Groundwater.

3.4 COC Removal / Secondary Effects

3.4.1 Overburden

The concentrations of VOCs and PCBs in overburden tests are given in **Tables 10** and **11**, respectively. Secondary parameters are given in **Table 12**. Note that aqueous Aroclor concentrations are estimated values in many cases because Aroclors were identified solely on retention time (see **Section 2.7** and analytical reports, **Appendix B** for further discussion).

All treatments decreased concentrations of VOCs. ZVI decreased groundwater concentrations of TCE from an average of 2,300 µg/L at Time 0 to 860 µg/L by Day 20, while both AP-HP and CHP reduced the concentration to below the reporting limit of 1.0 µg/L within 6 days of treatment. Although the oxidants appear more effective than ZVI,

the true measure of ZVI/biostimulation/bioaugmentation performance requires treatment times on the order of months compared to days or weeks for the oxidants. Bioaugmentation with dehalococcoides culture did not rapidly degrade TCE or potentially PCBs as anticipated, possibly due to inhibition caused by the high concentration of PCBs in soil (see below) ZVI reduced the TCE soil concentration from 510 μg/kg in the Day 20 control to 90 μg/kg; no TCE was detected in soil from either the AP-HP or CHP tests. Similar results were observed for cis-DCE and 1,4-dichlorobenzene.

None of the treatments generated measureable concentrations of vinyl chloride or chlorobenzene. Some ethene (0.02 mg/L) was detected in the ZVI test at Day 20, implying that some TCE was completely dechlorinated. Low concentrations of bromoform (less than 30 μg/L) and dibromochloromethane were detected in the CHP test.

Treatment with AP-HP and CHP, but not ZVI, appeared to reduce PCB concentrations in soil. The Day 20 control contained 1,100 mg/kg total PCBs (as Aroclor), while the AP-HP test contained 680 mg/kg, the CHP test contained 790 mg/kg, and the ZVI test contained 1,200 mg/kg total PCBs. Although AP-HP and CHP appeared to destroy some PCBs in soil, data should be viewed cautiously because the total PCB concentration in the Day 20 control was notably lower than the total PCB concentration in untreated soil (2,100 mg/kg – see **Table 8**) implying uneven distribution of PCBs in soil despite efforts to homogenize the soil prior to testing. The effect of ZVI on PCB concentration reduction was not evident on Day 20 and a true performance measurement is expected after only treatment on the order of months.

The effect of each treatment on aqueous PCBs is inconclusive because aqueous PCB concentrations did not follow a clear trend. Although all concentrations were lower than at Time 0, most were similar to the Day 20 control. There are two likely explanations for this:

i) Some soil particulates were present in all samples. Although great care was taken by both PRIMA and the analytical laboratory to exclude particulates from the analysis, some particulates could have been included since PCB samples can not be filtered. Since soil is so heavily impacted (see **Section**

3.1), even very small amount of of soil in an aqueous sample could result in detections.

ii) PCBs desorbed from the soil. This is especially likely for AP-HP and CHP tests. No oxidant remained at Day 6 or Day 20. It is possible that significant removal of aqueous PCBs occurred, but that additional PCBs desorbed from the soil once the oxidant was consumed.

Results of the PCB congener analyses are pending and will be discussed in Brown and Caldwell's report. Congener analysis was run for the re-set Time 0 reactor and the Day 20 AP-HP and CHP tests in an effort to determine whether specific PCB congeners were preferentially destroyed. Destruction of specific congeners would be obscured by measurement of Aroclors because Aroclors are mixtures of PCBs.

The effect of each treatment on selected secondary parameters was generally as expected. In the ZVI test, DOC and ferrous iron increased while dissolved oxygen, ORP and sulfate decreased, indicating reducing conditions had been established. The decrease in sulfate implies that microbial activity was present. The presence of DOC suggests that some of the lactate added was still present. In the AP-HP and CHP tests, dissolved oxygen increased (due to deocmposition of HP), ORP increased, sulfate increased (due to decomposition of SP in the case of AP-HP and to the addition of ferrous iron and sulfuric acid in the case of CHP). In both cases the pH decreased to below pH 3, which increased the concentration of total dissolved iron. No SP was present at either sampling event in the AP-HP tests and only 8.5 mg/L HP was present, indicating that no further oxidation of COCs would occur. Similarly, no HP was present in the CHP test, also indicating no further oxidation could occur. Baseline chloride concentrations were too high to detect changes due to dechlorination of COCs.

Table 10. Post Treatment VOC and Dissolved Gases Concentrations – Overburden

Analyte	Units	Overburden								
		Time 0		Control	ZVI		AP-HP		CHP	
		Rep A	Rep B	Day 20	Day 6	Day 20	Day 6	Day 20	Day 6	Day 20
VOCs - aqueous										
acetone	µg/L	< 600	< 400	< 400	< 400	< 400	180	260	139	210
vinyl chloride	µg/L	< 30	< 20	< 20	< 20	< 20	< 1.0	< 1.0	< 1.0	< 1.0
cis-dichloroethene	µg/L	640	590	820	680	790	< 1.0	< 1.0	< 1.0	< 1.0
trichloroethene	µg/L	2500	2200	2300	1800	860	< 1.0	< 1.0	< 1.0	< 1.0
tetrachloroethene	µg/L	< 30	< 20	< 20	< 20	< 10	< 1.0	< 1.0	< 1.0	< 1.0
ethylbenzene	µg/L	< 15	< 10	< 10	< 10	6.2	< 0.50	< 0.50	< 0.50	< 0.50
bromoform	µg/L	< 30	< 20	< 20	< 20	< 20	< 1.0	< 1.0	3.6	29
dibromochloromethane	µg/L	< 30	< 20	< 20	< 20	< 20	< 1.0	< 1.0	< 1.0	4.0
chlorobenzene	µg/L	< 30	< 20	< 20	< 20	< 20	< 1.0	< 1.0	< 1.0	< 1.0
1,3-dichlorobenzene	µg/L	< 30	< 20	< 20	< 20	< 20	< 1.0	< 1.0	< 1.0	< 1.0
1,4-dichlorobenzene	µg/L	45	48	65	65	52	< 1.0	< 1.0	1.99	< 1.0
1,2-dichlorobenzene	µg/L	< 30	< 20.0	< 20	< 20.0	< 10	< 1.0	< 1.0	< 1.00	< 1.0
VOCs - soil										
acetone	µg/kg	not measured		< 200	not measured	< 200	not measured	< 200	not measured	< 200
vinyl chloride	µg/kg			< 20		< 20		< 20		< 20
cis-dichloroethene	µg/kg			48		40		< 20		< 20
trichloroethene	µg/kg			510		90		< 20		< 20
tetrachloroethene	µg/kg			24		< 20		< 20		< 20
ethylbenzene	µg/kg			< 5.00		13		< 5.00		< 5.00
bromoform	µg/kg			< 20		< 20		< 20		< 20
dibromochloromethane	µg/kg			< 20		< 20		< 20		< 20
chlorobenzene	µg/kg			< 20		< 20		< 20		< 20
1,3-dichlorobenzene	µg/kg			76		55		< 20		< 20
1,4-dichlorobenzene	µg/kg			320		230		< 20		< 20
1,2-dichlorobenzene	µg/kg			< 20		< 20		< 20		< 20
Dissolved gases										
Methane	mg/L	not measured		< 0.01	not measured	< 0.01	not measured	< 1.00	not measured	< 1.00
Ethane	mg/L			< 0.01		< 0.01		< 1.00		< 1.00
Ethene	mg/L			< 0.01		0.02		< 1.00		< 1.00

n.m. = not measured

Table 11. Post-Treatment PCB Concentrations – Overburden

Analyte	Units	Overburden								
		Time 0		Control	ZVI		AP-HP		CHP	
		Rep A	Rep B	Day 20	Day 6	Day 20	Day 6	Day 20	Day 6	Day 20
*PCBs - Water **										
Aroclor 1016	µg/L	< 25	< 25	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aroclor 1232	µg/L	< 25	410	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aroclor 1242	µg/L	350	< 25	64	83	63	130	74	72	91
Aroclor 1248	µg/L	< 25	< 25	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aroclor 1254	µg/L	190	51	6.0	26	< 5.0	46	5.1	< 5.0	5.2
total PCBs	µg/L	540	460	70	109	63	176	79	72	96
PCBs - Soil										
Aroclor 1016	mg/kg	not measured		< 100	not measured	< 100	not measured	< 100	not measured	< 100
Aroclor 1232	mg/kg			< 100		< 100		< 100		< 100
Aroclor 1242	mg/kg			670		730		410		480
Aroclor 1248	mg/kg			< 100		< 100		< 100		< 100
Aroclor 1254	mg/kg			430		440		270		310
total PCBs	mg/kg			1100		1200		680		790

* Aqueous concentrations are estimated values - data are based on retention times rather than intensites of the aroclor.

Table 12. Secondary Effects - Overburden

Analyte	Units	Overburden								
		Time 0		Control	ZVI		AP-HP		CHP	
		Rep A	Rep B	Day 20	Day 6	Day 20	Day 6	Day 20	Day 6	Day 20
Chloride	mg/L	not measured		1100	n.m.	1200	n.m.	1100	n.m.	1100
DOC	mg/L			3.7	n.m.	930	n.m.	n.m.	n.m.	n.m.
Dissolved oxygen	mg/L			5.6	0.4	0.5	72.5	51	30.5	46
Ferrous iron	mg/L			0.01	21	41	n.m.	n.m.	n.m.	n.m.
Total iron	mg/L			0.04	49	106	n.m.	390	n.m.	390
ORP	mV			295	-95	-115	571	547	501	493
pH	--			5.87	6.47	6.82	1.72	1.92	2.24	2.51
Residual HP	mg/L			n.a.	n.a.	n.a.	8.5	8.5	< 0.5	< 1
Residual SP	g/L			n.a.	n.a.	n.a.	< 0.15	< 0.15	n.a.	n.a.
Sulfate	mg/L			170	n.m.	70	6200	8000	n.m.	1600

n.m. = not measured

n.a. = not applicable

3.4.2 Bedrock

The groundwater concentrations of PCBs and VOCs for the bedrock tests are provided in **Table 13**. The secondary parameters data are shown in **Table 14**. Note that Time 0 and Day 20 Aroclor concentrations are estimated values in many cases because Aroclors were identified solely on retention time (see **Section 2.7** and analytical reports, **Appendix B** for further discussion).

Both treatments decreased the concentrations of VOCs in bedrock groundwater samples. $NaMnO_4$ completely removed all TCE and cis-DCE within 6 days when compared to untreated MW-26B with concentrations of 66,000 µg/l and 47,000 µg/L, respectively (see **Section 3.1**). AP-HP dramatically decreased TCE (from 81,000 µg/L at Time 0 to 6,000 µg/L by Day 6 and 3.3 µg/L by Day 20) and completely removed cis-DCE. Low levels (less than 25 µg/L each) of several other VOCs were detected. Most were likely present in untreated grounwater but masked due to high ocncentrations of TCE, though bromoform or dibromochloromethane may have been generated by treatment since AP-HP involves radical reactions.

The effect of AP-HP on PCBs is unclear. The average concentration of Aroclor 1242 was 65 µg/L at Time 0 and 64 µg/L in the AP-HP Day 20 reactor, which is similar to the concentration in the Day 20 Control. However, Aroclor 1232 was present in the Day 6 sample, suggesting that some Aroclor 1242 (present in the untreated MW-15B groundwater, Time 0 and Control tests) was transformed to Arocloro1232. The concentration of Aroclor 1232 was about 4 times higher than in the Time 0 or Control samples, but was comparable to the concentration of Aroclor 1242 in untreated MW-15B groundwater; this suggests that a small amount of free-phase liquid may have been present in the untreated sample and the AP-HP Day 6 samples, despite PRIMA's efforts to exclude it.

The reason for the poor removal of PCBs from bedrock groundater is probably due to underdosing of AP-HP, since removal appeared to occur in the overburden tests (soil phase – see **Section 3.3.1**). The concentration of SP in the bedrock test was 0.4 g/L SP, which is approximately 1x stoichiometric dose based on theoretical demand and the concentrations in untreated MW-15B groundwater (see **Table 9**), while the concentation in the overburden tests was 8.5 g/L SP. It is possible that groundwater exerted a much high demand than anticipated and/or that the high salinity reduced the effectiveness of AP-HP. It is

recommended that additional testing be conducted to determine whether a higher concentration of AP-HP can destroy PCBs in bedrock groundwater.

Treatment with $NaMnO_4$ appeared to decrease PCBs. The concentration of Aroclor 1242 decreased from 13 µg/L at Day 6 to an estimated 7.1 µg/L at Day 20. However, Aroclor 1242 was not detected in untreated MW-26B groundwater (see **Table 8**); rather Aroclor 1016 was present at 6.1 µg/L. Aroclor 1016 and Aroclor 1242 have very similar compositions (see Chemical and Physical Information at www.atsdr.cdc.govtoxprofiles/tp17-c4.pdf), so it is possible that $NaMnO_4$ selectively destroyed some PCBs congeners, shifting the peak pattern to one more representative of Aroclor 1242. Additional testing is recommended to confirm this result since $NaMnO_4$ was not expected to treat PCBs.

The effect of AP-HP and $NaMnO_4$ on selected secondary parameters was generally as expected. In the AP-HP tests, dissolved oxygen, ORP and sulfate increased while pH decreased (to below 3) due to decomposition of AP-HP. Some SP (0.2 g/L), but no HP was present at Day 6 and Day 20 indicating that additional COC removal could occur given a longer reaction time if activaiton of SP is not required. The concentration of chloride increased, implying that TCE and cis-DCE were completely dechlorinated. In the $NaMnO_4$ test, the DO and pH were not significantly affected, ORP increased. $NaMnO_4$ was still present at Day 20.

Table 13. Post-Treatment PCBs and VOCs – Bedrock.

Analyte	Units	Bedrock						
		Time 0 (MW-15B)		Control (MW-15B)	NaMnO4 (MW-26B)		AP-HP (MW-15B)	
		Rep A	Rep B	Day 20	Day 6	Day 20	Day 6	Day 20
PCBs *								
Aroclor 1016	µg/L	< 5.0	< 5.0	< 5.0	< 2.5	< 1.0	< 50	< 5.0
Aroclor 1232	µg/L	< 5.0	< 5.0	< 5.0	< 2.5	< 1.0	250	< 5.0
Aroclor 1242	µg/L	72	58	66	13	7.1	< 50	64
Aroclor 1248	µg/L	< 5.0	< 5.0	< 5.0	< 2.5	< 1.0	< 50	< 5.0
Aroclor 1254	µg/L	6.7	< 5.0	< 5.0	< 2.5	< 1.0	< 50	6.4
total PCBs	µg/L	79	58	66	13	7.1	250	70
VOCs								
acetone	µg/L	< 10,000	< 10,000	< 16,000	< 20	21	24	25
1,1-dichloroethane	µg/L	< 500	< 500	< 800	8.3	15	1.2	1.5
cis-dichloroethene	µg/L	41,000	45,000	50,000	< 1.0	< 1.0	< 1.0	< 1.0
chloroform	µg/L	< 500	< 500	< 800	< 1.0	1.3	1.1	1.4
1,2-dichloroethane	µg/L	< 500	< 500	< 800	3.0	7.2	< 1.0	< 1.0
1,1,1-trichloroethane	µg/L	< 500	< 500	< 800	12	29	< 1.0	< 1.0
benzene	µg/L	< 250	< 250	< 400	1.9	3.6	< 0.50	< 0.50
trichloroethene	µg/L	78,000	83,000	89,000	< 1.0	< 1.0	6.0	3.3
vinyl chloride	µg/L	< 250	< 250	< 400	< 0.50	< 0.50	< 0.50	< 0.50
toluene	µg/L	< 250	< 250	< 400	3.6	4.4	< 0.50	< 0.50
dibromochloromethane	µg/L	< 500	< 500	< 800	< 1.0	< 1.0	2.6	2.6
tetrachloroethene	µg/L	< 500	< 500	< 800	< 1.0	< 1.0	1.4	< 1.0
chlorobenzene	µg/L	< 500	< 500	< 800	1.8	3.3	< 1.0	< 1.0
ethylbenzene	µg/L	< 250	< 250	< 400	< 0.50	< 0.50	< 0.50	< 0.50
bromoform	µg/L	< 500	< 500	< 800	< 1.0	< 1.0	22	23
1,3-dichlorobenzene	µg/L	< 500	< 500	< 800	< 1.0	< 1.0	< 1.0	< 1.0
1,4-dichlorobenzene	µg/L	< 500	< 500	< 800	3.9	7.0	< 1.0	< 1.0
1,2-dichlorobenzene	µg/L	< 500	< 500	< 800	1.8	2.9	< 1.0	< 1.0

* Time 0 and Day 20 data are estimates - data based on retention times rather than intensites of the aroclor.

Table 14. Secondary Parameters – Bedrock.

Analyte	Units	Bedrock						
		Time 0 (MW-15B)		Control (MW-15B)	NaMnO4 (MW-26B)		AP-HP (MW-15B)	
		Rep A	Rep B	d20	d6	d20	d6	d20
Chloride	mg/L	not measured		3,300	n.m.	3,900	n.m.	3,500
Dissolved oxygen	mg/L			7.5	5.4	5.6	39	39
ORP	mV			250	743	677	686	590
pH	--			5.07	5.63	5.64	2.38	2.48
Residual HP	mg/L			n.a.	n.a.	n.a.	< 8	< 8
Residual NaMnO4	mg/L			n.a.	83	78	n.a.	n.a.
Residual SP	g/L			n.a.	n.a.	n.a.	0.2	0.2
Sulfate	mg/L			280	n.m.	n.m.	480	520

n.m. = not measured

n.a. = not applicable

4.0 SUMMARY AND CONCLUSIONS

Laboratory testing successfully demonstrated that ZVI + biostimulation/bioaugmentation, AP-HP, CHP and $NaMnO_4$ could destroy TCE and other chlorinated ethenes, one of the primary COCs at the site. The effect of treatments on PCBs is less clear. AP-HP and CHP appeared to reduce PCB concentrations in overburden soil, but did not have a clear effect on groundwater concentrations. This may be due to presence of small amounts of soil particulates in aqueous samples despite efforts to remove them from groundwater prior to analysis, or to desorption of PCBs from soil into water. ZVI did not reduce PCB concentrations in soil or groundwater in the time frame of the study. (ZVI+ biostimulation/bioaugmentation performance was evaluated after three weeks of treatment but typically requires a time on the order of months to fully evaluate its performance.) AP-HP did not appear to destroy PCBs in bedrock samples that contained no soil, presumably because the initial concentration of AP-HP was not high enough. $NaMnO_4$ appeared to reduced PCBs concentrations, though additional testing is recommended to confirm this, since this is unexpected based on the literature.

Results of congener analyses on the second Time 0 overburden sample and the Day 20 AP-HP and CHP overburden samples are pending and will be discussed in Brown and Caldwell's report. These data are expected to clarify whether the treatments can destroy specific PCB congeners, which might not be reflected in Aroclor data.

All treatments effected the secondary groundwater quality parameters in manner expected. Specifically ZVI generated reducing conditions, which increased the concentration of dissolved iron. AP-HP and CHP both increased DO, ORP and sulfate levels and decreased the pH (to below pH 3), while $NaMnO_4$ caused an increase in ORP.

CHP persisted for up to about 28 hours depending upon the initial concentration of HP used, but at least 47% of the reagent was consumed within about 4.5 hours.

Based on the results of this study, PRIMA recommends that all four treatments evaluated (ZVI + biostimulation/bioaugmentation, AP-HP and CHP and $NaMnO_4$) be considered for areas containing CVOCs, but that additional testing be conducted to better assess the ability of each of these treatments to destroy PCBs.

APPENDIX A
(Chain of Custody)

CHAIN OF CUSTODY

PAGE ____ OF ____

ALPHA ANALYTICAL

8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Date Rec'd in Lab:

ALPHA Job #:

Client Information

Client: Brown & Caldwell
Address: One Tech Drive
Andover, MA
Phone: 978-683-2843
Email: MWADE@BrwnCald.com

Additional Project Information:

Project Information

Project Name: Aerovox
Project Location: New Bedford, MA
Project #: 149339.007.003
Project Manager: M. Wade
ALPHA Quote #:

Turn-Around Time

❑ Standard ❑ RUSH (only confirmed if pre-approved!)

Date Due:

Report Information - Data Deliverables

❑ ADEx ❑ EMAIL

Billing Information

❑ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

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

ANALYSIS: VOC: ❑ 8260 ❑ 624 ❑ 524.2; SVOC: ❑ ABN ❑ PAH; METALS: ❑ MCP 13 ❑ MCP 14 ❑ RCP 15; METALS: ❑ RCRA5 ❑ RCRA8 ❑ PP13; EPH: ❑ Ranges & Targets ❑ Ranges Only; VPH: ❑ Ranges & Targets ❑ Ranges Only; ❑ PCB ❑ PEST; TPH: ❑ Quant Only ❑ Fingerprint; Bench Scale Study

SAMPLE INFO
Filtration
❑ Field
❑ Lab to do
Preservation
❑ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Bench Scale Study	Sample Comments	TOTAL # BOTTLES
	MW-15D	3/29/17	—	GW	AB/JL	X	15 Bottles	15
	MW-15B	↓		↓	↓	X	8 Bottles	8
	MW-26B	↓		↓	↓	X	8 Bottles	8

[signature] 3/29/2017

One MW-15D Bottle broken
3 coolers, temp range 5-7°C
ice Present
Seals intact

		Bench Scale Study
Container Type		A
Preservative		A

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

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

Relinquished By:	Date/Time	Received By:	Date/Time
[signature] (FedEx)	3/29/17	[signature] / ALPHA	3/30/17-1000

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

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

CHAIN OF CUSTODY

PAGE 1 OF 2

Date Rec'd in Lab:

~~ALPHA Job #:~~

ALPHA ANALYTICAL
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Client Information

Client: Brown and Caldwell
Address: One Tech Drive, Suite 310
Andover, MA 01810
Phone: (978) 938-2055
Fax: (978) 794-0534
Email: MWAde@brwncald.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Aerovox
Project Location: New Bedford, MA
Project #: 149339.007.003
Project Manager: Marilyn Wade
ALPHA ~~Quote #:~~

Turn-Around Time

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

Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program NA Criteria NA

MA MCP PRESUMPTIVE CERTAINTY --- CT REASONABLE CONFIDENCE PROTO

☐ Yes ☐ No Are MCP Analytical Methods Required?
☐ Yes ☐ No Is Matrix Spike (MS) Required on this SDG? (If yes see note in Comments)
☐ Yes ☐ No Are CT RCP (Reasonable Confidence Protocols) Required?

Other Project Specific Requirements/Comments/Detection Limits:

If MS is required, indicate in Sample Specific Comments which samples and what tests MS to be performed.
(Note: All *CAM* methods for inorganic analyses require MS every 20 soil samples)

ANALYSIS: ISCO Bench Study

Judith Fuhrman 3/29/17

SAMPLE HANDLING

Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ISCO Bench Study	Sample Specific Comments	TOTAL # BOTTLES
	BC40, 20-25	3/29/17	Various	S	JML	X		1
	BC40, 20-25, 25-30						20-25 bottom 25-30 top	1
	BC41, 15-20						*	1
	BC41, 20-25						top	1
	BC42, 15-20						No visible contamination	1
	BC42, 20-25						15-20 bottom half	1
	BC45, 15-20, 20-25						15-20 bottom half 20-25 top half	1
	BC46, 20-25						*	2
	BC46, 25-29						DNAPL*	1
	BC47, 15-20							1

Judith Fuhrman 3/29/17

Container Type	GLASS
Preservative	NONE

PLEASE ANSWER QUESTIONS ABOVE!

IS YOUR PROJECT MA MCP *or* CT RCP?

Relinquished By:	Date/Time	Received By:	Date/Time
Judith Fuhrman	3/29/17		

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 18-Jan-2010)

CHAIN OF CUSTODY

PAGE 2 OF 2

ALPHA ANALYTICAL
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab:

ALPHA Job #:

Client Information

Client: Brown and Caldwell
Address: One Tech Drive
Andover, MA 01810
Phone: 978-938-2055
Fax: 978-794-0534
Email: MWade@brwncald.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Arrow
Project Location: New Bedford, MA
Project #: 149339.007.002
Project Manager: Marilyn Wade
ALPHA Quote #: NA

Turn-Around Time

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

Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program: NA | Criteria: NA

MA MCP PRESUMPTIVE CERTAINTY --- CT REASONABLE CONFIDENCE PROTO

☐ Yes ☐ No Are MCP Analytical Methods Required?
☐ Yes ☐ No Is Matrix Spike (MS) Required on this SDG? (If yes see note in Comments)
☐ Yes ☐ No Are CT RCP (Reasonable Confidence Protocols) Required?

Other Project Specific Requirements/Comments/Detection Limits:

If MS is required, indicate in Sample Specific Comments which samples and what tests MS to be performed.
(Note: All *CAM* methods for inorganic analyses require MS every 20 soil samples)

ANALYSIS: ISCO Bench Study

SAMPLE HANDLING
Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials		Sample Specific Comments	TOTAL # BOTTLES
	BC47, 20-25	3/29/17	Various	S	JML	X		1
	BC48, 15-20						top section	1
	BC48, 15-20							1
	BC48, 15-20						top section, visual impact	1
	BC48, 20-25/BC47 25-30						BC48 20-25 top half BC47 25-30 bottom	1

Container Type: GLASS
Preservative: None

PLEASE ANSWER QUESTIONS ABOVE!

IS YOUR PROJECT MA MCP *or* CT RCP?

Relinquished By:	Date/Time	Received By:	Date/Time
	3/29/17		

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 18-Jan-2010)

APPENDIX B
(Analytical Reports)

Per Alpha Analytical, data in Alpha Analytical reports PES1704080, 1704145, and PES1705001 should be reported to 2 significant figures.

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778
(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ANALYTICAL REPORT

Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762
Job: BC-PCB

Attn: Cindy Schreier
Phone: (916) 939-7300
Fax: (916) 393-7398

Alpha Analytical Number: PES17033121-01A
Client I.D. Number: BC-PCB-Comp SO

Sampled: 03/30/17 17:30
Received: 03/31/17
Extracted: 03/31/17 15:43
Analyzed: 03/31/17 16:36

Volatile Organics by GC/MS
EPA Method SW8260B

	Compound	Concentration	Reporting Limit
1	Chloromethane	ND	40 µg/Kg
2	Vinyl chloride	ND	20 µg/Kg
3	Chloroethane	ND	20 µg/Kg
4	Bromomethane	ND	40 µg/Kg
5	Trichlorofluoromethane	ND	20 µg/Kg
6	Acetone	ND	200 µg/Kg
7	1,1-Dichloroethene	ND	20 µg/Kg
8	Dichloromethane	ND	40 µg/Kg
9	trans-1,2-Dichloroethene	ND	20 µg/Kg
10	1,1-Dichloroethane	ND	20 µg/Kg
11	cis-1,2-Dichloroethene	230	20 µg/Kg
12	Chloroform	ND	20 µg/Kg
13	1,2-Dichloroethane	ND	20 µg/Kg
14	1,1,1-Trichloroethane	ND	20 µg/Kg
15	Carbon tetrachloride	ND	20 µg/Kg
16	Benzene	ND	5.0 µg/Kg
17	1,2-Dichloropropane	ND	20 µg/Kg
18	Trichloroethene	590	20 µg/Kg
19	Bromodichloromethane	ND	20 µg/Kg
20	cis-1,3-Dichloropropene	ND	20 µg/Kg
21	trans-1,3-Dichloropropene	ND	20 µg/Kg
22	1,1,2-Trichloroethane	ND	20 µg/Kg
23	Toluene	ND	5.0 µg/Kg
24	Dibromochloromethane	ND	20 µg/Kg
25	Tetrachloroethene	34	20 µg/Kg
26	Chlorobenzene	ND	20 µg/Kg
27	Ethylbenzene	65	5.0 µg/Kg
28	m,p-Xylene	ND	5.0 µg/Kg
29	Bromoform	ND	20 µg/Kg
30	o-Xylene	ND	5.0 µg/Kg
31	1,1,2,2-Tetrachloroethane	ND	20 µg/Kg
32	1,3-Dichlorobenzene	170	20 µg/Kg
33	1,4-Dichlorobenzene	760	20 µg/Kg
34	1,2-Dichlorobenzene	47	20 µg/Kg

Sample results were calculated on a wet weight basis.
ND = Not Detected

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager
Sacramento, CA • (916) 366-9089 / Las Vegas, NV • (702) 281-4848 / Carson, CA • (714) 386-2901 / info@alpha-analytical.com
Alpha Analytical, Inc. certifies that the test results meet all requirements of NELAC unless footnoted otherwise.
Statement of Data Authenticity : Alpha Analytical, Inc. attests that the data reported has not been altered an any way.

ACCREDITED ACLASS DoD ELAP

4/4/17
Report Date

Alpha Analytical, Inc. currently holds appropriate and available California (#2019) and NELAC (01154CA) certifications for the data reported. Test results relate only to reported samples.

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778
(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ANALYTICAL REPORT

Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762
Job: BC-PCB

Attn: Cindy Schreier
Phone: (916) 939-7300
Fax: (916) 393-7398

Alpha Analytical Number: PES17033121-02A
Client I.D. Number: MW-15D-Unt

Sampled: 03/30/17 16:00
Received: 03/31/17
Extracted: 03/31/17 13:33
Analyzed: 03/31/17 13:33

Volatile Organics by GC/MS
EPA Method 624/8260

	Compound	Concentration	Reporting Limit
1	Chloromethane	ND	160 µg/L
2	Vinyl chloride	ND	40 µg/L
3	Chloroethane	ND	40 µg/L
4	Bromomethane	ND	160 µg/L
5	Trichlorofluoromethane	ND	40 µg/L
6	Acetone	ND	800 µg/L
7	1,1-Dichloroethene	ND	40 µg/L
8	Dichloromethane	ND	160 µg/L
9	trans-1,2-Dichloroethene	ND	40 µg/L
10	1,1-Dichloroethane	ND	40 µg/L
11	cis-1,2-Dichloroethene	1,200	40 µg/L
12	Chloroform	ND	40 µg/L
13	1,2-Dichloroethane	ND	40 µg/L
14	1,1,1-Trichloroethane	ND	40 µg/L
15	Carbon tetrachloride	ND	40 µg/L
16	Benzene	ND	20 µg/L
17	1,2-Dichloropropane	ND	40 µg/L
18	Trichloroethene	5,200	40 µg/L
19	Bromodichloromethane	ND	40 µg/L
20	cis-1,3-Dichloropropene	ND	40 µg/L
21	trans-1,3-Dichloropropene	ND	40 µg/L
22	1,1,2-Trichloroethane	ND	40 µg/L
23	Toluene	ND	20 µg/L
24	Dibromochloromethane	ND	40 µg/L
25	Tetrachloroethene	44	40 µg/L
26	Chlorobenzene	ND	40 µg/L
27	Ethylbenzene	ND	20 µg/L
28	m,p-Xylene	ND	20 µg/L
29	Bromoform	ND	40 µg/L
30	o-Xylene	ND	20 µg/L
31	1,1,2,2-Tetrachloroethane	ND	40 µg/L
32	1,3-Dichlorobenzene	ND	40 µg/L
33	1,4-Dichlorobenzene	ND	40 µg/L
34	1,2-Dichlorobenzene	ND	40 µg/L

Reporting Limits were increased due to high concentrations of target analytes.

Sample results were calculated on a wet weight basis.
ND = Not Detected

ACCREDITED ACLASS DoD ELAP

Roger Scholl Randy Gardner

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager
Sacramento, CA • (916) 366-9089 / Las Vegas, NV • (702) 281-4848 / Carson, CA • (714) 386-2901 / info@alpha-analytical.com
Alpha Analytical, Inc. certifies that the test results meet all requirements of NELAC unless footnoted otherwise.
Statement of Data Authenticity : Alpha Analytical, Inc. attests that the data reported has not been altered an any way.

Alpha Analytical, Inc. currently holds appropriate and available California (#2019) and NELAC (01154CA) certifications for the data reported. Test results relate only to reported samples.

4/4/17
Report Date

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778
(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ANALYTICAL REPORT

Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762
Job: BC-PCB

Attn: Cindy Schreier
Phone: (916) 939-7300
Fax: (916) 393-7398

Alpha Analytical Number: PES17033121-03A
Client I.D. Number: MW-15B-Unt

Sampled: 03/30/17 15:30
Received: 03/31/17
Extracted: 03/31/17 13:59
Analyzed: 03/31/17 13:59

Volatile Organics by GC/MS
EPA Method 624/8260

	Compound	Concentration	Reporting Limit
1	Chloromethane	ND	2,000 µg/L
2	Vinyl chloride	ND	500 µg/L
3	Chloroethane	ND	500 µg/L
4	Bromomethane	ND	2,000 µg/L
5	Trichlorofluoromethane	ND	500 µg/L
6	Acetone	ND	10,000 µg/L
7	1,1-Dichloroethene	ND	500 µg/L
8	Dichloromethane	ND	2,000 µg/L
9	trans-1,2-Dichloroethene	ND	500 µg/L
10	1,1-Dichloroethane	ND	500 µg/L
11	cis-1,2-Dichloroethene	52,000	500 µg/L
12	Chloroform	ND	500 µg/L
13	1,2-Dichloroethane	ND	500 µg/L
14	1,1,1-Trichloroethane	ND	500 µg/L
15	Carbon tetrachloride	ND	500 µg/L
16	Benzene	ND	250 µg/L
17	1,2-Dichloropropane	ND	500 µg/L
18	Trichloroethene	100,000	500 µg/L
19	Bromodichloromethane	ND	500 µg/L
20	cis-1,3-Dichloropropene	ND	500 µg/L
21	trans-1,3-Dichloropropene	ND	500 µg/L
22	1,1,2-Trichloroethane	ND	500 µg/L
23	Toluene	ND	250 µg/L
24	Dibromochloromethane	ND	500 µg/L
25	Tetrachloroethene	ND	500 µg/L
26	Chlorobenzene	ND	500 µg/L
27	Ethylbenzene	ND	250 µg/L
28	m,p-Xylene	ND	250 µg/L
29	Bromoform	ND	500 µg/L
30	o-Xylene	ND	250 µg/L
31	1,1,2,2-Tetrachloroethane	ND	500 µg/L
32	1,3-Dichlorobenzene	ND	500 µg/L
33	1,4-Dichlorobenzene	ND	500 µg/L
34	1,2-Dichlorobenzene	ND	500 µg/L

Reporting Limits were increased due to high concentrations of target analytes.

Sample results were calculated on a wet weight basis.
ND = Not Detected

ACLASS ACCREDITED DoD ELAP

Roger Scholl Randy Gardner

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager

Sacramento, CA • (916) 366-9089 / Las Vegas, NV • (702) 281-4848 / Carson, CA • (714) 386-2901 / info@alpha-analytical.com

Alpha Analytical, Inc. certifies that the test results meet all requirements of NELAC unless footnoted otherwise.

Statement of Data Authenticity : Alpha Analytical, Inc. attests that the data reported has not been altered an any way.

Alpha Analytical, Inc. currently holds appropriate and available California (#2019) and NELAC (01154CA) certifications for the data reported. Test results relate only to reported samples.

4/4/17
Report Date

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778
(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

ANALYTICAL REPORT

Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762
Job: BC-PCB

Attn: Cindy Schreier
Phone: (916) 939-7300
Fax: (916) 393-7398

Alpha Analytical Number: PES17033121-04A
Client I.D. Number: MW-26B-Unt

Sampled: 03/30/17 15:00
Received: 03/31/17
Extracted: 03/31/17 14:25
Analyzed: 03/31/17 14:25

Volatile Organics by GC/MS
EPA Method 624/8260

	Compound	Concentration	Reporting Limit
1	Chloromethane	ND	2,000 µg/L
2	Vinyl chloride	ND	500 µg/L
3	Chloroethane	ND	500 µg/L
4	Bromomethane	ND	2,000 µg/L
5	Trichlorofluoromethane	ND	500 µg/L
6	Acetone	ND	10,000 µg/L
7	1,1-Dichloroethene	ND	500 µg/L
8	Dichloromethane	ND	2,000 µg/L
9	trans-1,2-Dichloroethene	ND	500 µg/L
10	1,1-Dichloroethane	ND	500 µg/L
11	cis-1,2-Dichloroethene	4,700	500 µg/L
12	Chloroform	ND	500 µg/L
13	1,2-Dichloroethane	ND	500 µg/L
14	1,1,1-Trichloroethane	ND	500 µg/L
15	Carbon tetrachloride	ND	500 µg/L
16	Benzene	ND	250 µg/L
17	1,2-Dichloropropane	ND	500 µg/L
18	Trichloroethene	66,000	500 µg/L
19	Bromodichloromethane	ND	500 µg/L
20	cis-1,3-Dichloropropene	ND	500 µg/L
21	trans-1,3-Dichloropropene	ND	500 µg/L
22	1,1,2-Trichloroethane	ND	500 µg/L
23	Toluene	ND	250 µg/L
24	Dibromochloromethane	ND	500 µg/L
25	Tetrachloroethene	ND	500 µg/L
26	Chlorobenzene	ND	500 µg/L
27	Ethylbenzene	ND	250 µg/L
28	m,p-Xylene	ND	250 µg/L
29	Bromoform	ND	500 µg/L
30	o-Xylene	ND	250 µg/L
31	1,1,2,2-Tetrachloroethane	ND	500 µg/L
32	1,3-Dichlorobenzene	ND	500 µg/L
33	1,4-Dichlorobenzene	ND	500 µg/L
34	1,2-Dichlorobenzene	ND	500 µg/L

Reporting Limits were increased due to high concentrations of target analytes.

Sample results were calculated on a wet weight basis.
ND = Not Detected

Roger L. Scholl, Ph.D., Laboratory Director • • Randy Gardner, Laboratory Manager

Alpha Analytical, Inc. certifies that the test results meet all requirements of NELAC unless footnoted otherwise.
Statement of Data Authenticity : Alpha Analytical, Inc. attests that the data reported has not been altered an any way.
Alpha Analytical, Inc. currently holds appropriate and available California (#2019) and NELAC (01154CA) certifications for the data reported. Test results relate only to reported samples.

4/4/17
Report Date

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778

(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

Date: *05-Apr-17*

QC Summary Report

Work Order: 17033121

Method Blank

Type **MBLK** Test Code: **EPA Method SW8260B**

File ID: **5** Batch ID: **38005** Analysis Date: **04/03/2017 14:26**

Sample ID: **MBLK MS09S8005A** Units : **µg/Kg** Run ID: **MANUAL_170403A** Prep Date: **03/30/2017 15:43**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Chloromethane	ND	40								
Vinyl chloride	ND	20								
Chloroethane	ND	20								
Bromomethane	ND	40								
Trichlorofluoromethane	ND	20								
Acetone	ND	200								
1,1-Dichloroethene	ND	20								
Dichloromethane	ND	40								
trans-1,2-Dichloroethene	ND	20								
1,1-Dichloroethane	ND	20								
cis-1,2-Dichloroethene	ND	20								
Chloroform	ND	20								
1,2-Dichloroethane	ND	20								
1,1,1-Trichloroethane	ND	20								
Carbon tetrachloride	ND	20								
Benzene	ND	5								
1,2-Dichloropropane	ND	20								
Trichloroethene	ND	20								
Bromodichloromethane	ND	20								
cis-1,3-Dichloropropene	ND	20								
trans-1,3-Dichloropropene	ND	20								
1,1,2-Trichloroethane	ND	20								
Toluene	ND	5								
Dibromochloromethane	ND	20								
Tetrachloroethene	ND	20								
Chlorobenzene	ND	20								
Ethylbenzene	ND	5								
m,p-Xylene	ND	5								
Bromoform	ND	20								
o-Xylene	ND	5								
1,1,2,2-Tetrachloroethane	ND	20								
1,3-Dichlorobenzene	ND	20								
1,4-Dichlorobenzene	ND	20								
1,2-Dichlorobenzene	ND	20								
Surr: 1,2-Dichloroethane-d4	195		200		98	70	130			
Surr: Toluene-d8	199		200		99.7	70	130			
Surr: 4-Bromofluorobenzene	196		200		98	70	130			

Laboratory Control Spike

Type **LCS** Test Code: **EPA Method SW8260B**

File ID: **4** Batch ID: **38005** Analysis Date: **03/31/2017 18:46**

Sample ID: **LCS MS17S8005A** Units : **µg/Kg** Run ID: **MANUAL_170331G** Prep Date: **03/30/2017 15:43**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
1,1-Dichloroethene	288	20	400		72	10	131			
Benzene	318	10	400		79	70	137			
Trichloroethene	331	20	400		83	70	149			
Toluene	318	10	400		79	70	139			
Chlorobenzene	336	20	400		84	70	137			
Ethylbenzene	326	10	400		81	70	137			
m,p-Xylene	336	10	400		84	70	145			
o-Xylene	340	10	400		85	70	145			
Surr: 1,2-Dichloroethane-d4	388		400		97	70	130			
Surr: Toluene-d8	391		400		98	70	130			
Surr: 4-Bromofluorobenzene	384		400		96	70	130			

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778

(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

Date: *05-Apr-17*

QC Summary Report

Work Order: 17033121

Sample Matrix Spike

Type **MS** Test Code: **EPA Method SW8260B**

File ID: **5** Batch ID: **38005** Analysis Date: **03/31/2017 19:12**

Sample ID: **17033022-01AMS** Units : **µg/Kg** Run ID: **MANUAL_170331G** Prep Date: **03/30/2017 15:43**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
1,1-Dichloroethene	231	20	400	0	58	10	131			
Benzene	268	10	400	0	67	52	151			
Trichloroethene	285	20	400	0	71	48	165			
Toluene	278	10	400	0	70	47	154			
Chlorobenzene	294	20	400	0	73	50	151			
Ethylbenzene	284	10	400	0	71	52	154			
m,p-Xylene	285	10	400	0	71	51	162			
o-Xylene	294	10	400	0	73	52	162			
Surr: 1,2-Dichloroethane-d4	384		400		96	70	130			
Surr: Toluene-d8	406		400		101	70	130			
Surr: 4-Bromofluorobenzene	393		400		98	70	130			

Sample Matrix Spike Duplicate

Type **MSD** Test Code: **EPA Method SW8260B**

File ID: **6** Batch ID: **38005** Analysis Date: **03/31/2017 19:38**

Sample ID: **17033022-01AMSD** Units : **µg/Kg** Run ID: **MANUAL_170331G** Prep Date: **03/30/2017 15:43**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
1,1-Dichloroethene	221	20	400	0	55	10	131	231.5	4.5(40)	
Benzene	269	10	400	0	67	52	151	268.3	0.2(30)	
Trichloroethene	279	20	400	0	70	48	165	285.3	2.1(29)	
Toluene	280	10	400	0	70	47	154	278.3	0.6(28)	
Chlorobenzene	289	20	400	0	72	50	151	293.7	1.6(40)	
Ethylbenzene	284	10	400	0	71	52	154	283.6	0.2(37)	
m,p-Xylene	287	10	400	0	72	51	162	285	0.5(34)	
o-Xylene	289	10	400	0	72	52	162	293.7	1.6(40)	
Surr: 1,2-Dichloroethane-d4	389		400		97	70	130			
Surr: Toluene-d8	401		400		100	70	130			
Surr: 4-Bromofluorobenzene	380		400		95	70	130			

Comments:

Calculations are based off of raw (non-rounded) data. However, for reporting purposes, all QC data is rounded to three significant figures. Therefore, hand calculated values may differ slightly.

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778

(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

Date: 05-Apr-17

QC Summary Report

Work Order: 17033121

Method Blank

Type **MBLK** Test Code: **EPA Method SW8260B**

File ID: **2** Batch ID: **MS17W0331A** Analysis Date: **03/31/2017 10:47**

Sample ID: **MBLK MS17W0331A** Units : **µg/L** Run ID: **MANUAL_170331H** Prep Date: **03/31/2017 10:47**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
Chloromethane	ND	2								
Vinyl chloride	ND	1								
Chloroethane	ND	1								
Bromomethane	ND	2								
Trichlorofluoromethane	ND	1								
Acetone	ND	10								
1,1-Dichloroethene	ND	1								
Dichloromethane	ND	2								
trans-1,2-Dichloroethene	ND	1								
1,1-Dichloroethane	ND	1								
cis-1,2-Dichloroethene	ND	1								
Chloroform	ND	1								
1,2-Dichloroethane	ND	1								
1,1,1-Trichloroethane	ND	1								
Carbon tetrachloride	ND	1								
Benzene	ND	0.5								
1,2-Dichloropropane	ND	1								
Trichloroethene	ND	1								
Bromodichloromethane	ND	1								
cis-1,3-Dichloropropene	ND	1								
trans-1,3-Dichloropropene	ND	1								
1,1,2-Trichloroethane	ND	1								
Toluene	ND	0.5								
Dibromochloromethane	ND	1								
Tetrachloroethene	ND	1								
Chlorobenzene	ND	1								
Ethylbenzene	ND	0.5								
m,p-Xylene	ND	0.5								
Bromoform	ND	1								
o-Xylene	ND	0.5								
1,1,2,2-Tetrachloroethane	ND	1								
1,3-Dichlorobenzene	ND	1								
1,4-Dichlorobenzene	ND	1								
1,2-Dichlorobenzene	ND	1								
Surr: 1,2-Dichloroethane-d4	10		10		100	70	130			
Surr: Toluene-d8	9.95		10		100	70	130			
Surr: 4-Bromofluorobenzene	9.89		10		99	70	130			

Laboratory Control Spike

Type **LCS** Test Code: **EPA Method SW8260B**

File ID: **1** Batch ID: **MS17W0331A** Analysis Date: **03/31/2017 09:55**

Sample ID: **LCS MS17W0331A** Units : **µg/L** Run ID: **MANUAL_170331H** Prep Date: **03/31/2017 09:55**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
1,1-Dichloroethene	9.33	1	10		93	70	130			
Benzene	9.89	0.5	10		99	70	130			
Trichloroethene	10.2	1	10		102	68	138			
Toluene	10.2	0.5	10		102	70	130			
Chlorobenzene	10.7	1	10		107	70	130			
Ethylbenzene	10.6	0.5	10		106	70	130			
m,p-Xylene	10.7	0.5	10		107	65	139			
o-Xylene	10.7	0.5	10		107	70	130			
Surr: 1,2-Dichloroethane-d4	9.8		10		98	70	130			
Surr: Toluene-d8	10.1		10		101	70	130			
Surr: 4-Bromofluorobenzene	9.6		10		96	70	130			

Alpha Analytical, Inc.

255 Glendale Ave. • Suite 21 • Sparks, Nevada 89431-5778

(775) 355-1044 • (775) 355-0406 FAX • 1-800-283-1183

Date: *05-Apr-17*

QC Summary Report

Work Order: 17033121

Sample Matrix Spike

Type **MS** Test Code: **EPA Method SW8260B**

File ID: **1** Batch ID: **MS17W0331A** Analysis Date: **03/31/2017 12:15**

Sample ID: **17032322-03AMS** Units : **µg/L** Run ID: **MANUAL_170331H** Prep Date: **03/31/2017 12:15**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
1,1-Dichloroethene	52.3	2.5	50	0	105	62	133			
Benzene	54.7	1.3	50	0	109	67	134			
Trichloroethene	57.4	2.5	50	0	115	68	138			
Toluene	56.1	1.3	50	0	112	38	130			
Chlorobenzene	59.1	2.5	50	0	118	70	130			
Ethylbenzene	59	1.3	50	0	118	70	130			
m,p-Xylene	60.1	1.3	50	0	120	65	139			
o-Xylene	61.2	1.3	50	0	122	69	130			
Surr: 1,2-Dichloroethane-d4	49.7		50		99	70	130			
Surr: Toluene-d8	49.7		50		99	70	130			
Surr: 4-Bromofluorobenzene	48.2		50		96	70	130			

Sample Matrix Spike Duplicate

Type **MSD** Test Code: **EPA Method SW8260B**

File ID: **2** Batch ID: **MS17W0331A** Analysis Date: **03/31/2017 12:41**

Sample ID: **17032322-03AMSD** Units : **µg/L** Run ID: **MANUAL_170331H** Prep Date: **03/31/2017 12:41**

Analyte	Result	PQL	SpkVal	SpkRefVal	%REC	LCL(ME)	UCL(ME)	RPDRefVal	%RPD(Limit)	Qual
1,1-Dichloroethene	57.7	2.5	50	0	115	62	133	52.34	9.7(35)	
Benzene	57.2	1.3	50	0	114	67	134	54.7	4.5(21)	
Trichloroethene	58.5	2.5	50	0	117	68	138	57.36	1.9(20)	
Toluene	58.8	1.3	50	0	118	38	130	56.12	4.6(20)	
Chlorobenzene	62.8	2.5	50	0	126	70	130	59.13	6.1(20)	
Ethylbenzene	61.2	1.3	50	0	122	70	130	59.02	3.6(20)	
m,p-Xylene	62.7	1.3	50	0	125	65	139	60.07	4.3(20)	
o-Xylene	63.4	1.3	50	0	127	69	130	61.2	3.5(20)	
Surr: 1,2-Dichloroethane-d4	49.8		50		99.7	70	130			
Surr: Toluene-d8	49		50		98	70	130			
Surr: 4-Bromofluorobenzene	47.5		50		95	70	130			

Comments:

Calculations are based off of raw (non-rounded) data. However, for reporting purposes, all QC data is rounded to three significant figures. Therefore, hand calculated values may differ slightly.

Billing Information :

CHAIN-OF-CUSTODY RECORD

Alpha Analytical, Inc.
255 Glendale Avenue, Suite 21 Sparks, Nevada 89431-5778
TEL: (775) 355-1044 FAX: (775) 355-0406

CA RUSH

WorkOrder : PES17033121

Report Due By : 5:00 PM On : 04-Apr-17

Client:
Prima Environmental
5070 Robert J. Mathews Parkway
Suite 300
El Dorado Hills, CA 95762

Report Attention	Phone Number	EMail Address
Cindy Schreier	(916) 939-7300 x	data@primaenvironmental.com

EDD Required : **No**

Sampled by : Cindy Schreier

PO :

Client's COC # : 1323 Job : BC-PCB

Cooler Temp	Samples Received	Date Printed
2 °C	31-Mar-17	31-Mar-17

QC Level : S3 = Final Rpt, MBLK, LCS, MS/MSD With Surrogates

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	Requested Tests VOC_S	VOC_W							Sample Remarks
PES17033121-01A	BC-PCB-Comp SO	SO	03/30/17 17:30	2	0	2	8260/ Acetone_Cs								
PES17033121-02A	MW-15D-Unt	AQ	03/30/17 16:00	3	0	2		8260/ Acetone_Cs							
PES17033121-03A	MW-15B-Unt	AQ	03/30/17 15:30	3	0	2		8260/ Acetone_Cs							
PES17033121-04A	MW-26B-Unt	AQ	03/30/17 15:00	3	0	2		8260/ Acetone_Cs							

Comments: 48 HR TAT. No security seals. Frozen ice. TCE is probably very high. >10mg/L in GW. Unknown in soil. :

	Signature	Print Name	Company	Date/Time
Logged in by:	KMurray	KMurray	Alpha Analytical, Inc.	3/31/17 1100

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.
The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.
Matrix Type : AQ(Aqueous) AR(Air) SO(Soil) WS(Waste) DW(Drinking Water) OT(Other) Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

CHAIN OF CUSTODY

1323

Billing Information:

Company: PRIMA
Attn:
Address:
City, State, Zip:
Phone Number: Fax:

Alpha Analytical, Inc.
Main Laboratory: 255 Glendale Ave, Suite 21 Sparks, NV 89431 — Phone: 775-355-1044, Fax: 775-355-0406

Satellite Service Centers:
Northern CA: 9891 Horn Road, Suite C, Rancho Cordova, CA 95827 — Phone: 916-366-9089
Southern CA: 1007 E. Dominguez St., Suite O, Carson, CA 90746 — Phone: 714-386-2901
Northern NV: Elko, NV 89801 — Phone: 775-388-7043
Southern NV: Las Vegas, NV 89120 — Phone: 702-281-4848

Page # 1 of 1

Consultant/ Client Info:
Company: PRIMA
Address:
City, State, Zip:

Job and Purchase Order Info:
Job # BC-PCB
Job Name:
P.O. #:

Report Attention/Project Manager:
Name: Cindy Schreier
Email Address:
Phone #:
Cell #:

QC Deliverable Info:
EDD Required? Yes / No
EDF Required? Yes / No
Global ID:
Data Validation Packages: III or IV

Samples Collected from which State? (circle one) AR CA KS NV OR WA DOD Site Other

Time Sampled (HHMM)	Date Sampled (MM/DD)	Matrix* (See Key Below)	Lab ID Number (For Lab Use Only)	Sample Description	TAT	# Containers** (See Key Below)	Field Filtered? Yes	Field Filtered? No	VOCs	Remarks
1730	3/30	SO	PES17033121-01	BC PCB-Comp SO	48h	1		X	X	
1600	↓	AQ	02	MW-15D-Unt	↓	2		X	X	
1530	↓	↓	03	MW-15B-Unt	↓	2		X	X	
1500	↓	↓	04	MW-26B-Unt	↓	2		X	X	

ADDITIONAL INSTRUCTIONS: TCE is probably very high. >10 mg/L in GW. Unknown in Soil

I (field sampler) attest to the validity and authenticity of this sample(s). I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. NAC 445.0636 (c) (2).

Sampled By: [signature]

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
[signature]	3/30/17		K Murray	3/31/17	1050

* Key: AQ - Aqueous AR-Air OT - Other So-Soil WA - Waste ** B - Brass L - Liter O - Orbo OT - Other P - Plastic S-Soil Jar T - Tedlar V - VOA

NOTE: Samples are discarded 60 days after sample receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense. The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.

07/16

Alpha Analytical, Inc
255 Glendale Ave, #21
Sparks, Nevada 89431
TEL: (775) 355-1044 FAX: (775) 355-0406
Website: www.alpha-analytical.com

Cindy Schreier
Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762
TEL: (916) 939-7300
FAX (916) 939-7398

RE: BC-PCB

Order No.: PES1704080

Dear Cindy Schreier:

There were no problems with the analytical events associated with this report unless noted.

Quality control data is within laboratory defined or method specified acceptance limits except if noted. Version 8260B was used.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Roger Scholl

Roger Scholl
Laboratory Director
255 Glendale Ave, #21
Sparks, Nevada 89431

Alpha Analytical, Inc.

(775) 335-1044 / (775) 355-0406 FAX / 1-800-283-1183
225 Glendale Ave. - Suite 21 - Sparks, Nevada 89431-5578

Analytical Report

WO#: **PES1704080**
Report Date: **4/24/2017**

CLIENT: Prima Environmental
Collection Date: 4/8/2017 3:15:00 PM
Project: BC-PCB
Lab ID: 1704080-01
Matrix: AQUEOUS
Client Sample ID OV-T0-A

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	120		µg/L	4/14/2017	VOCs by EPA 8260
Vinyl chloride	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Chloroethane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Bromomethane	ND	120		µg/L	4/14/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Acetone	ND	600		µg/L	4/14/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Dichloromethane	ND	120		µg/L	4/14/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	637	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Chloroform	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Benzene	ND	15.0		µg/L	4/14/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Trichloroethene	2,500	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Bromodichloromethane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Toluene	ND	15.0		µg/L	4/14/2017	VOCs by EPA 8260
Dibromochloromethane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Tetrachloroethene	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Chlorobenzene	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Ethylbenzene	ND	15.0		µg/L	4/14/2017	VOCs by EPA 8260
m,p-Xylene	ND	15.0		µg/L	4/14/2017	VOCs by EPA 8260
Bromoform	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
o-Xylene	ND	15.0		µg/L	4/14/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	45.4	30.0		µg/L	4/14/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	30.0		µg/L	4/14/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	4/14/2017	VOCs by EPA 8260
Surr: Toluene-d8	107	70-130		%Rec	4/14/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	94	70-130		%Rec	4/14/2017	VOCs by EPA 8260

NOTES:
Reporting Limits were increased due to high concentrations of target analytes.

Alpha Analytical, Inc.

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225 Glendale Ave. - Suite 21 - Sparks, Nevada 89431-5578

Analytical Report

WO#: **PES1704080**
Report Date: **4/24/2017**

CLIENT: Prima Environmental
Collection Date: 4/8/2017 3:15:00 PM
Project: BC-PCB
Lab ID: 1704080-02
Matrix: AQUEOUS
Client Sample ID OV-T0-B

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	80.0		µg/L	4/14/2017	VOCs by EPA 8260
Vinyl chloride	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Chloroethane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Bromomethane	ND	80.0		µg/L	4/14/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Acetone	ND	400		µg/L	4/14/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Dichloromethane	ND	80.0		µg/L	4/14/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	590	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Chloroform	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Benzene	ND	10.0		µg/L	4/14/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Trichloroethene	2,160	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Bromodichloromethane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Toluene	ND	10.0		µg/L	4/14/2017	VOCs by EPA 8260
Dibromochloromethane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Tetrachloroethene	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Chlorobenzene	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Ethylbenzene	ND	10.0		µg/L	4/14/2017	VOCs by EPA 8260
m,p-Xylene	ND	10.0		µg/L	4/14/2017	VOCs by EPA 8260
Bromoform	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
o-Xylene	ND	10.0		µg/L	4/14/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	47.7	20.0		µg/L	4/14/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	20.0		µg/L	4/14/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	4/14/2017	VOCs by EPA 8260
Surr: Toluene-d8	105	70-130		%Rec	4/14/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	95	70-130		%Rec	4/14/2017	VOCs by EPA 8260

NOTES:
Reporting Limits were increased due to high concentrations of target analytes.

Alpha Analytical, Inc.

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225 Glendale Ave. - Suite 21 - Sparks, Nevada 89431-5578

Analytical Report

WO#: **PES1704080**
Report Date: **4/24/2017**

CLIENT: Prima Environmental
Collection Date: 4/8/2017 3:45:00 PM
Project: BC-PCB
Lab ID: 1704080-03
Matrix: AQUEOUS
Client Sample ID Bed-T0-A

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	2,000		µg/L	4/19/2017	VOCs by EPA 8260
Vinyl chloride	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Chloroethane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Bromomethane	ND	2,000		µg/L	4/19/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Acetone	ND	10,000		µg/L	4/19/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Dichloromethane	ND	2,000		µg/L	4/19/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	41,300	500		µg/L	4/19/2017	VOCs by EPA 8260
Chloroform	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Benzene	ND	250		µg/L	4/19/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Trichloroethene	77,700	500		µg/L	4/19/2017	VOCs by EPA 8260
Bromodichloromethane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Toluene	ND	250		µg/L	4/19/2017	VOCs by EPA 8260
Dibromochloromethane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Tetrachloroethene	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Chlorobenzene	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Ethylbenzene	ND	250		µg/L	4/19/2017	VOCs by EPA 8260
m,p-Xylene	ND	250		µg/L	4/19/2017	VOCs by EPA 8260
Bromoform	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
o-Xylene	ND	250		µg/L	4/19/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	500		µg/L	4/19/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	89	70-130		%Rec	4/19/2017	VOCs by EPA 8260
Surr: Toluene-d8	103	70-130		%Rec	4/19/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	97	70-130		%Rec	4/19/2017	VOCs by EPA 8260

NOTES:
Reporting Limits were increased due to high concentrations of target analytes.

Alpha Analytical, Inc.
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Analytical Report

WO#: **PES1704080**
Report Date: **4/24/2017**

CLIENT: Prima Environmental
Collection Date: 4/8/2017 3:45:00 PM
Project: BC-PCB
Lab ID: 1704080-04
Matrix: AQUEOUS
Client Sample ID Bed-T0-B

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	2,000		µg/L	4/17/2017	VOCs by EPA 8260
Vinyl chloride	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Chloroethane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Bromomethane	ND	2,000		µg/L	4/17/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Acetone	ND	10,000		µg/L	4/17/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Dichloromethane	ND	2,000		µg/L	4/17/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	45,100	500		µg/L	4/17/2017	VOCs by EPA 8260
Chloroform	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Benzene	ND	250		µg/L	4/17/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Trichloroethene	83,300	500		µg/L	4/17/2017	VOCs by EPA 8260
Bromodichloromethane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Toluene	ND	250		µg/L	4/17/2017	VOCs by EPA 8260
Dibromochloromethane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Tetrachloroethene	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Chlorobenzene	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Ethylbenzene	ND	250		µg/L	4/17/2017	VOCs by EPA 8260
m,p-Xylene	ND	250		µg/L	4/17/2017	VOCs by EPA 8260
Bromoform	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
o-Xylene	ND	250		µg/L	4/17/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	500		µg/L	4/17/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	84	70-130		%Rec	4/17/2017	VOCs by EPA 8260
Surr: Toluene-d8	107	70-130		%Rec	4/17/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	99	70-130		%Rec	4/17/2017	VOCs by EPA 8260

NOTES:
Reporting Limits were increased due to high concentrations of target analytes.

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Analytical Report

WO#: **PES1704080**
Report Date: **4/24/2017**

CLIENT: Prima Environmental
Collection Date: 4/10/2017 1:00:00 PM
Project: BC-PCB
Lab ID: 1704080-05
Matrix: AQUEOUS
Client Sample ID MW-15B-Unt

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	3,520	25.0		mg/L	4/15/2017	Anions by EPA 300.0
Total Organic Carbon	5.78	1.00		mg/L	4/17/2017	TOC by EPA 5310
Alkalinity, Total (As CaCO3 at pH 4.5)	28.6	20.0		mg/L	4/20/2017	Alkalinity by SM2320B

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Analytical Report

WO#: **PES1704080**
Report Date: **4/24/2017**

CLIENT: Prima Environmental
Collection Date: 4/10/2017 1:00:00 PM
Project: BC-PCB
Lab ID: 1704080-06
Matrix: AQUEOUS
Client Sample ID MW-15D-Unt

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	1,260	25.0		mg/L	4/15/2017	Anions by EPA 300.0
Total Organic Carbon	4.38	1.00		mg/L	4/17/2017	TOC by EPA 5310
Alkalinity, Total (As CaCO3 at pH 4.5)	28.7	20.0		mg/L	4/20/2017	Alkalinity by SM2320B

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Analytical Report

WO#: **PES1704080**
Report Date: **4/24/2017**

CLIENT: Prima Environmental
Collection Date: 4/10/2017 1:00:00 PM
Project: BC-PCB
Lab ID: 1704080-07
Matrix: AQUEOUS
Client Sample ID MW-26B-Unt

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	4,030	25.0		mg/L	4/15/2017	Anions by EPA 300.0
Total Organic Carbon	9.06	1.00		mg/L	4/17/2017	TOC by EPA 5310
Alkalinity, Total (As CaCO3 at pH 4.5)	225	20.0		mg/L	4/20/2017	Alkalinity by SM2320B

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **300_0_W**

Sample ID **MBLK-965**	SampType: **MBLK**	TestCode: **300_0_W**	Units: **mg/L**	Prep Date: **4/11/2017**	RunNo: **436**
Client ID: **PBW**	Batch ID: **965**	TestNo: **E300.0**		Analysis Date: **4/11/2017**	SeqNo: **10083**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	0.50									

Sample ID **LCS-965**	SampType: **LCS**	TestCode: **300_0_W**	Units: **mg/L**	Prep Date: **4/11/2017**	RunNo: **436**
Client ID: **LCSW**	Batch ID: **965**	TestNo: **E300.0**		Analysis Date: **4/11/2017**	SeqNo: **10084**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	48.7	0.50	50.00	0	97.3	89.51	110.49				

Sample ID **1704045-01CMS**	SampType: **MS**	TestCode: **300_0_W**	Units: **mg/L**	Prep Date: **4/11/2017**	RunNo: **436**
Client ID: **BatchQC**	Batch ID: **965**	TestNo: **E300.0**		Analysis Date: **4/11/2017**	SeqNo: **10087**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	273	2.50	250.0	37.54	94.1	79.51	120.49				

Sample ID **1704045-01CMSD**	SampType: **MSD**	TestCode: **300_0_W**	Units: **mg/L**	Prep Date: **4/11/2017**	RunNo: **436**
Client ID: **BatchQC**	Batch ID: **965**	TestNo: **E300.0**		Analysis Date: **4/11/2017**	SeqNo: **10088**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	278	2.50	250.0	37.54	96.1	79.51	120.49	272.9	1.74	15	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **300_0_W**

Sample ID	**1704045-01CMSD**	SampType: **MSD**	TestCode: **300_0_W**	Units: **mg/L**	Prep Date: **4/11/2017**	RunNo: **436**
Client ID:	**BatchQC**	Batch ID: **965**	TestNo: **E300.0**		Analysis Date: **4/11/2017**	SeqNo: **10088**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **ALKALINITY_W**

Sample ID	**WC160520-01**	SampType:	**LCS**	TestCode:	**ALKALINITY_**	Units:	**mg/L**	Prep Date:	**4/20/2017**	RunNo:	**505**
Client ID:	**LCSW**	Batch ID:	**W0420AL**	TestNo:	**Alkalinity**			Analysis Date:	**4/20/2017**	SeqNo:	**12009**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3 at pH 4.5)	244	10.00	250.0	0	97.7	79.51	120.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

Alpha Analytical, Inc
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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **TOC_W**

Sample ID **MB-1009**	SampType: **MBLK**	TestCode: **TOC_W**	Units: **mg/L**	Prep Date: **4/17/2017**	RunNo: **490**
Client ID: **PBW**	Batch ID: **1009**	TestNo: **SW9060**		Analysis Date: **4/17/2017**	SeqNo: **11562**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	1.00									

Sample ID **LCS-1009**	SampType: **LCS**	TestCode: **TOC_W**	Units: **mg/L**	Prep Date: **4/17/2017**	RunNo: **490**
Client ID: **LCSW**	Batch ID: **1009**	TestNo: **SW9060**		Analysis Date: **4/17/2017**	SeqNo: **11563**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	6.13	0.03	5.000	0	123	69.51	130.49				

Sample ID **1704109-01EMS**	SampType: **MS**	TestCode: **TOC_W**	Units: **mg/L**	Prep Date: **4/17/2017**	RunNo: **490**
Client ID: **BatchQC**	Batch ID: **1009**	TestNo: **SW9060**		Analysis Date: **4/17/2017**	SeqNo: **11565**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	7.02	0.03	5.000	1.657	107	47.51	132.49				

Sample ID **1704109-01EMSD**	SampType: **MSD**	TestCode: **TOC_W**	Units: **mg/L**	Prep Date: **4/17/2017**	RunNo: **490**
Client ID: **BatchQC**	Batch ID: **1009**	TestNo: **SW9060**		Analysis Date: **4/17/2017**	SeqNo: **11566**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	7.56	0.03	5.000	1.657	118	47.51	132.49	7.024	7.36	20	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **TOC_W**

Sample ID	**1704109-01EMSD**	SampType: **MSD**	TestCode: **TOC_W**	Units: **mg/L**	Prep Date: **4/17/2017**	RunNo: **490**
Client ID:	**BatchQC**	Batch ID: **1009**	TestNo: **SW9060**		Analysis Date: **4/17/2017**	SeqNo: **11566**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **LCS-988**	SampType: **LCS**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/14/2017**	RunNo: **486**
Client ID: **LCSW**	Batch ID: **0A988**	TestNo: **SW8260B**		Analysis Date: **4/14/2017**	SeqNo: **11504**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	8.92	2.00	10.00	0	89.2	39.51	145.49				
Vinyl chloride	8.59	0.50	10.00	0	85.9	69.51	130.49				
Chloroethane	9.11	0.50	10.00	0	91.1	37.51	156.49				
Bromomethane	5.29	2.00	10.00	0	52.9	13.51	162.49				
Trichlorofluoromethane	9.04	0.50	10.00	0	90.4	45.51	154.49				
Acetone	197	10.00	200.0	0	98.7	21.51	188.49				
1,1-Dichloroethene	8.76	0.50	10.00	0	87.6	69.51	130.49				
Dichloromethane	9.70	2.00	10.00	0	97.0	68.51	130.49				
trans-1,2-Dichloroethene	11.3	0.50	10.00	0	113	69.51	130.49				
1,1-Dichloroethane	10.5	0.50	10.00	0	105	69.51	130.49				
cis-1,2-Dichloroethene	10.8	0.50	10.00	0	108	69.51	130.49				
Chloroform	10.2	0.50	10.00	0	102	69.51	130.49				
1,2-Dichloroethane	10.1	0.50	10.00	0	101	69.51	133.49				
1,1,1-Trichloroethane	11.1	0.50	10.00	0	111	69.51	135.49				
Carbon tetrachloride	11.4	0.50	10.00	0	114	62.51	143.49				
Benzene	10.2	0.50	10.00	0	102	69.51	130.49				
1,2-Dichloropropane	11.0	0.50	10.00	0	110	69.51	130.49				
Trichloroethene	11.6	0.50	10.00	0	116	67.51	138.49				
Bromodichloromethane	11.0	0.50	10.00	0	110	57.51	147.49				
cis-1,3-Dichloropropene	10.4	0.50	10.00	0	104	69.51	130.49				
trans-1,3-Dichloropropene	10.1	0.50	10.00	0	101	69.51	131.49				
1,1,2-Trichloroethane	10.3	0.50	10.00	0	103	69.51	130.49				
Toluene	9.97	0.50	10.00	0	99.7	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **LCS-988**	SampType: **LCS**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/14/2017**	RunNo: **486**
Client ID: **LCSW**	Batch ID: **0A988**	TestNo: **SW8260B**		Analysis Date: **4/14/2017**	SeqNo: **11504**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibromochloromethane	10.8	0.50	10.00	0	108	48.51	147.49				
Tetrachloroethene	11.6	0.50	10.00	0	116	69.51	130.49				
Chlorobenzene	10.5	0.50	10.00	0	105	69.51	130.49				
Ethylbenzene	11.0	0.50	10.00	0	110	69.51	130.49				
m,p-Xylene	11.0	0.50	10.00	0	110	64.51	139.49				
Bromoform	9.21	0.50	10.00	0	92.1	59.51	144.49				
o-Xylene	10.9	0.50	10.00	0	109	69.51	130.49				
1,1,2,2-Tetrachloroethane	9.18	0.50	10.00	0	91.8	69.51	130.49				
1,3-Dichlorobenzene	10.9	0.50	10.00	0	109	69.51	130.49				
1,4-Dichlorobenzene	11.3	0.50	10.00	0	113	69.51	130.49				
1,2-Dichlorobenzene	10.4	0.50	10.00	0	104	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	9.37		10.00		93.7	69.51	130.49				
Surr: Toluene-d8	9.56		10.00		95.6	69.51	130.49				
Surr: 4-Bromofluorobenzene	11.0		10.00		110	69.51	130.49				

Sample ID **MB-988**	SampType: **MBLK**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/14/2017**	RunNo: **486**
Client ID: **PBW**	Batch ID: **0A988**	TestNo: **SW8260B**		Analysis Date: **4/14/2017**	SeqNo: **11505**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	2.00									
Vinyl chloride	ND	0.50									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **MB-988** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/14/2017** RunNo: **486**
Client ID: **PBW** Batch ID: **0A988** TestNo: **SW8260B** Analysis Date: **4/14/2017** SeqNo: **11505**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroethane	ND	0.50									
Bromomethane	ND	2.00									
Trichlorofluoromethane	ND	0.50									
Acetone	ND	10.00									
1,1-Dichloroethene	ND	0.50									
Dichloromethane	ND	2.00									
trans-1,2-Dichloroethene	ND	0.50									
1,1-Dichloroethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Chloroform	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Benzene	ND	0.50									
1,2-Dichloropropane	ND	0.50									
Trichloroethene	ND	0.50									
Bromodichloromethane	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
trans-1,3-Dichloropropene	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
Toluene	ND	0.50									
Dibromochloromethane	ND	0.50									
Tetrachloroethene	ND	0.50									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **MB-988** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/14/2017** RunNo: **486**
Client ID: **PBW** Batch ID: **0A988** TestNo: **SW8260B** Analysis Date: **4/14/2017** SeqNo: **11505**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	ND	0.50									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	0.50									
Bromoform	ND	0.50									
o-Xylene	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	9.25		10.00		92.5	69.51	130.49				
Surr: Toluene-d8	10.4		10.00		104	69.51	130.49				
Surr: 4-Bromofluorobenzene	10.7		10.00		107	69.51	130.49				

Sample ID **1704089-01AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/14/2017** RunNo: **486**
Client ID: **BatchQC** Batch ID: **0A988** TestNo: **SW8260B** Analysis Date: **4/14/2017** SeqNo: **11506**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	39.7	10.00	50.00	0	79.3	25.51	146.49				
Vinyl chloride	37.2	2.50	50.00	0	74.5	45.51	142.49				
Chloroethane	34.6	2.50	50.00	0	69.1	24.51	164.49				
Bromomethane	20.2	10.00	50.00	0	40.3	9.51	172.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **1704089-01AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/14/2017** RunNo: **486**
Client ID: **BatchQC** Batch ID: **0A988** TestNo: **SW8260B** Analysis Date: **4/14/2017** SeqNo: **11506**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichlorofluoromethane	34.0	2.50	50.00	0	67.9	31.51	164.49				
Acetone	858	50.00	1,000	0	85.8	9.51	188.49				
1,1-Dichloroethene	33.8	2.50	50.00	0	67.6	61.51	133.49				
Dichloromethane	38.8	10.00	50.00	0	77.5	68.51	130.49				
trans-1,2-Dichloroethene	43.8	2.50	50.00	0	87.5	66.51	131.49				
1,1-Dichloroethane	42.0	2.50	50.00	0	84.1	66.51	130.49				
cis-1,2-Dichloroethene	42.8	2.50	50.00	0	85.6	69.51	130.49				
Chloroform	40.7	2.50	50.00	0	81.3	68.51	130.49				
1,2-Dichloroethane	39.4	2.50	50.00	0	78.8	63.51	139.49				
1,1,1-Trichloroethane	43.3	2.50	50.00	0	86.7	64.51	139.49				
Carbon tetrachloride	42.9	2.50	50.00	0	85.8	55.51	146.49				
Benzene	40.2	2.50	50.00	0	80.4	66.51	134.49				
1,2-Dichloropropane	42.5	2.50	50.00	0	85.0	68.51	134.49				
Trichloroethene	43.0	2.50	50.00	0	86.1	67.51	138.49				
Bromodichloromethane	43.8	2.50	50.00	0	87.5	57.51	147.49				
cis-1,3-Dichloropropene	37.7	2.50	50.00	0	75.4	60.51	130.49				
trans-1,3-Dichloropropene	42.0	2.50	50.00	0	84.1	61.51	131.49				
1,1,2-Trichloroethane	42.2	2.50	50.00	0	84.4	69.51	131.49				
Toluene	40.4	2.50	50.00	0	80.9	37.51	130.49				
Dibromochloromethane	46.7	2.50	50.00	0	93.4	48.51	147.49				
Tetrachloroethene	45.9	2.50	50.00	0	91.7	62.51	134.49				
Chlorobenzene	42.4	2.50	50.00	0	84.8	69.51	130.49				
Ethylbenzene	43.2	2.50	50.00	0	86.4	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **1704089-01AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/14/2017** RunNo: **486**
Client ID: **BatchQC** Batch ID: **0A988** TestNo: **SW8260B** Analysis Date: **4/14/2017** SeqNo: **11506**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
m,p-Xylene	43.9	2.50	50.00	0	87.7	64.51	139.49				
Bromoform	41.1	2.50	50.00	0	82.1	59.51	144.49				
o-Xylene	44.4	2.50	50.00	0	88.9	68.51	130.49				
1,1,2,2-Tetrachloroethane	40.1	2.50	50.00	0	80.3	66.51	134.49				
1,3-Dichlorobenzene	44.6	2.50	50.00	0	89.1	69.51	130.49				
1,4-Dichlorobenzene	45.8	2.50	50.00	0	91.6	69.51	130.49				
1,2-Dichlorobenzene	41.9	2.50	50.00	0	83.7	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	46.1	0.00	50.00		92.1	69.51	130.49				
Surr: Toluene-d8	49.5	0.00	50.00		99.1	69.51	130.49				
Surr: 4-Bromofluorobenzene	56.8	0.00	50.00		114	69.51	130.49				

Sample ID **1704089-01AMSD** SampType: **MSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/14/2017** RunNo: **486**
Client ID: **BatchQC** Batch ID: **0A988** TestNo: **SW8260B** Analysis Date: **4/14/2017** SeqNo: **11507**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	45.0	10.00	50.00	0	90.0	25.51	146.49	39.66	12.6	30	
Vinyl chloride	44.1	2.50	50.00	0	88.3	45.51	142.49	37.23	17.0	30	
Chloroethane	38.8	2.50	50.00	0	77.7	24.51	164.49	34.55	11.7	30	
Bromomethane	29.1	10.00	50.00	0	58.2	9.51	172.49	20.16	36.3	30	R
Trichlorofluoromethane	40.5	2.50	50.00	0	81.1	31.51	164.49	33.95	17.7	30	
Acetone	1,020	50.00	1,000	0	102	9.51	188.49	858.1	17.6	30	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **1704089-01AMSD**	SampType: **MSD**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/14/2017**	RunNo: **486**
Client ID: **BatchQC**	Batch ID: **0A988**	TestNo: **SW8260B**		Analysis Date: **4/14/2017**	SeqNo: **11507**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	39.8	2.50	50.00	0	79.7	61.51	133.49	33.79	16.4	30	
Dichloromethane	45.5	10.00	50.00	0	91.0	68.51	130.49	38.75	16.0	30	
trans-1,2-Dichloroethene	52.2	2.50	50.00	0	104	66.51	131.49	43.75	17.6	30	
1,1-Dichloroethane	49.5	2.50	50.00	0	98.9	66.51	130.49	42.03	16.2	30	
cis-1,2-Dichloroethene	50.9	2.50	50.00	0	102	69.51	130.49	42.78	17.4	30	
Chloroform	47.4	2.50	50.00	0	94.9	68.51	130.49	40.66	15.4	30	
1,2-Dichloroethane	47.1	2.50	50.00	0	94.3	63.51	139.49	39.41	17.9	30	
1,1,1-Trichloroethane	51.5	2.50	50.00	0	103	64.51	139.49	43.34	17.2	30	
Carbon tetrachloride	51.2	2.50	50.00	0	102	55.51	146.49	42.91	17.7	30	
Benzene	47.2	2.50	50.00	0	94.4	66.51	134.49	40.22	15.9	30	
1,2-Dichloropropane	51.0	2.50	50.00	0	102	68.51	134.49	42.48	18.2	30	
Trichloroethene	51.7	2.50	50.00	0	103	67.51	138.49	43.03	18.3	30	
Bromodichloromethane	51.8	2.50	50.00	0	104	57.51	147.49	43.77	16.9	30	
cis-1,3-Dichloropropene	45.8	2.50	50.00	0	91.7	60.51	130.49	37.72	19.5	30	
trans-1,3-Dichloropropene	52.0	2.50	50.00	0	104	61.51	131.49	42.05	21.1	30	
1,1,2-Trichloroethane	50.1	2.50	50.00	0	100	69.51	131.49	42.20	17.0	30	
Toluene	46.3	2.50	50.00	0	92.7	37.51	130.49	40.43	13.6	30	
Dibromochloromethane	55.1	2.50	50.00	0	110	48.51	147.49	46.68	16.5	30	
Tetrachloroethene	52.3	2.50	50.00	0	105	62.51	134.49	45.86	13.1	30	
Chlorobenzene	49.2	2.50	50.00	0	98.3	69.51	130.49	42.40	14.8	30	
Ethylbenzene	50.5	2.50	50.00	0	101	69.51	130.49	43.22	15.5	30	
m,p-Xylene	50.3	2.50	50.00	0	101	64.51	139.49	43.87	13.7	30	
Bromoform	49.9	2.50	50.00	0	99.8	59.51	144.49	41.05	19.5	30	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **1704089-01AMSD** SampType: **MSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/14/2017** RunNo: **486**
Client ID: **BatchQC** Batch ID: **0A988** TestNo: **SW8260B** Analysis Date: **4/14/2017** SeqNo: **11507**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	50.5	2.50	50.00	0	101	68.51	130.49	44.44	12.8	30	
1,1,2,2-Tetrachloroethane	47.5	2.50	50.00	0	95.0	66.51	134.49	40.14	16.8	30	
1,3-Dichlorobenzene	50.8	2.50	50.00	0	102	69.51	130.49	44.56	13.0	30	
1,4-Dichlorobenzene	53.1	2.50	50.00	0	106	69.51	130.49	45.80	14.7	30	
1,2-Dichlorobenzene	48.7	2.50	50.00	0	97.5	69.51	130.49	41.87	15.1	30	
Surr: 1,2-Dichloroethane-d4	47.1	0.00	50.00		94.2	69.51	130.49		0	0	
Surr: Toluene-d8	48.8	0.00	50.00		97.5	69.51	130.49		0	0	
Surr: 4-Bromofluorobenzene	55.5	0.00	50.00		111	69.51	130.49		0	0	

Sample ID **LCS-1002** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/17/2017** RunNo: **492**
Client ID: **LCSW** Batch ID: **A1002** TestNo: **SW8260B** Analysis Date: **4/17/2017** SeqNo: **11677**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	12.2	2.00	10.00	0	122	39.51	145.49				
Vinyl chloride	10.9	0.50	10.00	0	109	69.51	130.49				
Chloroethane	10.8	0.50	10.00	0	108	37.51	156.49				
Bromomethane	6.10	2.00	10.00	0	61.0	13.51	162.49				
Trichlorofluoromethane	9.40	0.50	10.00	0	94.0	45.51	154.49				
Acetone	257	10.00	200.0	0	129	21.51	188.49				
1,1-Dichloroethene	11.2	0.50	10.00	0	112	69.51	130.49				
Dichloromethane	10.8	2.00	10.00	0	108	68.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **LCS-1002**	SampType: **LCS**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/17/2017**	RunNo: **492**
Client ID: **LCSW**	Batch ID: **A1002**	TestNo: **SW8260B**		Analysis Date: **4/17/2017**	SeqNo: **11677**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,2-Dichloroethene	11.0	0.50	10.00	0	110	69.51	130.49				
1,1-Dichloroethane	10.4	0.50	10.00	0	104	69.51	130.49				
cis-1,2-Dichloroethene	11.1	0.50	10.00	0	111	69.51	130.49				
Chloroform	10.7	0.50	10.00	0	107	69.51	130.49				
1,2-Dichloroethane	8.21	0.50	10.00	0	82.1	69.51	133.49				
1,1,1-Trichloroethane	9.07	0.50	10.00	0	90.7	69.51	135.49				
Carbon tetrachloride	9.17	0.50	10.00	0	91.7	62.51	143.49				
Benzene	11.9	0.50	10.00	0	119	69.51	130.49				
1,2-Dichloropropane	10.8	0.50	10.00	0	108	69.51	130.49				
Trichloroethene	10.0	0.50	10.00	0	100	67.51	138.49				
Bromodichloromethane	8.86	0.50	10.00	0	88.6	57.51	147.49				
cis-1,3-Dichloropropene	10.2	0.50	10.00	0	102	69.51	130.49				
trans-1,3-Dichloropropene	9.33	0.50	10.00	0	93.3	69.51	131.49				
1,1,2-Trichloroethane	9.25	0.50	10.00	0	92.5	69.51	130.49				
Toluene	11.2	0.50	10.00	0	112	69.51	130.49				
Dibromochloromethane	8.94	0.50	10.00	0	89.4	48.51	147.49				
Tetrachloroethene	11.0	0.50	10.00	0	110	69.51	130.49				
Chlorobenzene	10.1	0.50	10.00	0	101	69.51	130.49				
Ethylbenzene	10.7	0.50	10.00	0	107	69.51	130.49				
m,p-Xylene	11.7	0.50	10.00	0	117	64.51	139.49				
Bromoform	8.91	0.50	10.00	0	89.1	59.51	144.49				
o-Xylene	11.4	0.50	10.00	0	114	69.51	130.49				
1,1,2,2-Tetrachloroethane	9.37	0.50	10.00	0	93.7	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **LCS-1002**	SampType: **LCS**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/17/2017**	RunNo: **492**
Client ID: **LCSW**	Batch ID: **A1002**	TestNo: **SW8260B**		Analysis Date: **4/17/2017**	SeqNo: **11677**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	10.9	0.50	10.00	0	109	69.51	130.49				
1,4-Dichlorobenzene	10.7	0.50	10.00	0	107	69.51	130.49				
1,2-Dichlorobenzene	10.2	0.50	10.00	0	102	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	8.89		10.00		88.9	69.51	130.49				
Surr: Toluene-d8	10.3		10.00		103	69.51	130.49				
Surr: 4-Bromofluorobenzene	10.0		10.00		100	69.51	130.49				

Sample ID **MB-1002**	SampType: **MBLK**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/17/2017**	RunNo: **492**
Client ID: **PBW**	Batch ID: **A1002**	TestNo: **SW8260B**		Analysis Date: **4/17/2017**	SeqNo: **11678**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	2.00									
Vinyl chloride	ND	0.50									
Chloroethane	ND	0.50									
Bromomethane	ND	2.00									
Trichlorofluoromethane	ND	0.50									
Acetone	ND	10.00									
1,1-Dichloroethene	ND	0.50									
Dichloromethane	ND	2.00									
trans-1,2-Dichloroethene	ND	0.50									
1,1-Dichloroethane	ND	0.50									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **MB-1002**	SampType: **MBLK**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/17/2017**	RunNo: **492**
Client ID: **PBW**	Batch ID: **A1002**	TestNo: **SW8260B**		Analysis Date: **4/17/2017**	SeqNo: **11678**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	0.50									
Chloroform	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Benzene	ND	0.50									
1,2-Dichloropropane	ND	0.50									
Trichloroethene	ND	0.50									
Bromodichloromethane	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
trans-1,3-Dichloropropene	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
Toluene	ND	0.50									
Dibromochloromethane	ND	0.50									
Tetrachloroethene	ND	0.50									
Chlorobenzene	ND	0.50									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	0.50									
Bromoform	ND	0.50									
o-Xylene	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **MB-1002** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/17/2017** RunNo: **492**
Client ID: **PBW** Batch ID: **A1002** TestNo: **SW8260B** Analysis Date: **4/17/2017** SeqNo: **11678**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	7.75		10.00		77.5	69.51	130.49				
Surr: Toluene-d8	10.8		10.00		108	69.51	130.49				
Surr: 4-Bromofluorobenzene	10.4		10.00		104	69.51	130.49				

Sample ID **1704079-02AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/17/2017** RunNo: **492**
Client ID: **BatchQC** Batch ID: **A1002** TestNo: **SW8260B** Analysis Date: **4/17/2017** SeqNo: **11679**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	62.2	10.00	50.00	0	124	25.51	146.49				
Vinyl chloride	53.6	2.50	50.00	0	107	45.51	142.49				
Chloroethane	55.1	2.50	50.00	0	110	24.51	164.49				
Bromomethane	32.5	10.00	50.00	0	65.0	9.51	172.49				
Trichlorofluoromethane	45.6	2.50	50.00	0	91.1	31.51	164.49				
Acetone	1,260	50.00	1,000	0	126	9.51	188.49				
1,1-Dichloroethene	50.1	2.50	50.00	0	100	61.51	133.49				
Dichloromethane	55.4	10.00	50.00	0	111	68.51	130.49				
trans-1,2-Dichloroethene	51.8	2.50	50.00	0	104	66.51	131.49				
1,1-Dichloroethane	54.4	2.50	50.00	0	109	66.51	130.49				
cis-1,2-Dichloroethene	56.9	2.50	50.00	0	114	69.51	130.49				
Chloroform	59.1	2.50	50.00	0	118	68.51	130.49				

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **1704079-02AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/17/2017** RunNo: **492**
Client ID: **BatchQC** Batch ID: **A1002** TestNo: **SW8260B** Analysis Date: **4/17/2017** SeqNo: **11679**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloroethane	48.4	2.50	50.00	0	96.9	63.51	139.49				
1,1,1-Trichloroethane	47.2	2.50	50.00	0	94.4	64.51	139.49				
Carbon tetrachloride	45.7	2.50	50.00	0	91.3	55.51	146.49				
Benzene	61.8	2.50	50.00	0	124	66.51	134.49				
1,2-Dichloropropane	57.2	2.50	50.00	0	114	68.51	134.49				
Trichloroethene	48.8	2.50	50.00	0	97.5	67.51	138.49				
Bromodichloromethane	49.6	2.50	50.00	0	99.3	57.51	147.49				
cis-1,3-Dichloropropene	44.7	2.50	50.00	0	89.5	60.51	130.49				
trans-1,3-Dichloropropene	50.6	2.50	50.00	0	101	61.51	131.49				
1,1,2-Trichloroethane	51.6	2.50	50.00	0	103	69.51	131.49				
Toluene	52.2	2.50	50.00	0	104	37.51	130.49				
Dibromochloromethane	44.8	2.50	50.00	0	89.5	48.51	147.49				
Tetrachloroethene	46.7	2.50	50.00	0	93.4	62.51	134.49				
Chlorobenzene	47.8	2.50	50.00	0	95.6	69.51	130.49				
Ethylbenzene	48.0	2.50	50.00	0	95.9	69.51	130.49				
m,p-Xylene	52.0	2.50	50.00	0	104	64.51	139.49				
Bromoform	45.3	2.50	50.00	0	90.6	59.51	144.49				
o-Xylene	52.5	2.50	50.00	0	105	68.51	130.49				
1,1,2,2-Tetrachloroethane	52.7	2.50	50.00	0	105	66.51	134.49				
1,3-Dichlorobenzene	45.4	2.50	50.00	0	90.8	69.51	130.49				
1,4-Dichlorobenzene	44.9	2.50	50.00	0	89.9	69.51	130.49				
1,2-Dichlorobenzene	44.6	2.50	50.00	0	89.3	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	46.3	0.00	50.00		92.6	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **1704079-02AMS**	SampType: **MS**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/17/2017**	RunNo: **492**
Client ID: **BatchQC**	Batch ID: **A1002**	TestNo: **SW8260B**		Analysis Date: **4/17/2017**	SeqNo: **11679**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	48.3	0.00	50.00		96.6	69.51	130.49				
Surr: 4-Bromofluorobenzene	47.6	0.00	50.00		95.2	69.51	130.49				

Sample ID **1704079-02AMSD**	SampType: **MSD**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/17/2017**	RunNo: **492**
Client ID: **BatchQC**	Batch ID: **A1002**	TestNo: **SW8260B**		Analysis Date: **4/17/2017**	SeqNo: **11680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	68.9	10.00	50.00	0	138	25.51	146.49	62.19	10.2	30	
Vinyl chloride	59.0	2.50	50.00	0	118	45.51	142.49	53.58	9.70	30	
Chloroethane	58.2	2.50	50.00	0	116	24.51	164.49	55.06	5.53	30	
Bromomethane	40.1	10.00	50.00	0	80.2	9.51	172.49	32.52	20.8	30	
Trichlorofluoromethane	46.4	2.50	50.00	0	92.8	31.51	164.49	45.56	1.81	30	
Acetone	1,320	50.00	1,000	0	132	9.51	188.49	1,257	4.61	30	
1,1-Dichloroethene	54.4	2.50	50.00	0	109	61.51	133.49	50.11	8.12	30	
Dichloromethane	55.6	10.00	50.00	0	111	68.51	130.49	55.42	0.252	30	
trans-1,2-Dichloroethene	53.2	2.50	50.00	0	106	66.51	131.49	51.77	2.74	30	
1,1-Dichloroethane	54.6	2.50	50.00	0	109	66.51	130.49	54.38	0.459	30	
cis-1,2-Dichloroethene	53.9	2.50	50.00	0	108	69.51	130.49	56.86	5.27	30	
Chloroform	56.4	2.50	50.00	0	113	68.51	130.49	59.11	4.62	30	
1,2-Dichloroethane	45.7	2.50	50.00	0	91.5	63.51	139.49	48.43	5.73	30	
1,1,1-Trichloroethane	45.6	2.50	50.00	0	91.2	64.51	139.49	47.20	3.43	30	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **1704079-02AMSD**	SampType: **MSD**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/17/2017**	RunNo: **492**
Client ID: **BatchQC**	Batch ID: **A1002**	TestNo: **SW8260B**		Analysis Date: **4/17/2017**	SeqNo: **11680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon tetrachloride	45.0	2.50	50.00	0	90.0	55.51	146.49	45.66	1.43	30	
Benzene	60.8	2.50	50.00	0	122	66.51	134.49	61.81	1.68	30	
1,2-Dichloropropane	56.2	2.50	50.00	0	112	68.51	134.49	57.17	1.75	30	
Trichloroethene	48.5	2.50	50.00	0	97.0	67.51	138.49	48.75	0.555	30	
Bromodichloromethane	47.1	2.50	50.00	0	94.2	57.51	147.49	49.64	5.29	30	
cis-1,3-Dichloropropene	43.5	2.50	50.00	0	87.0	60.51	130.49	44.73	2.81	30	
trans-1,3-Dichloropropene	47.7	2.50	50.00	0	95.4	61.51	131.49	50.63	5.98	30	
1,1,2-Trichloroethane	49.4	2.50	50.00	0	98.9	69.51	131.49	51.55	4.18	30	
Toluene	51.4	2.50	50.00	0	103	37.51	130.49	52.23	1.64	30	
Dibromochloromethane	43.4	2.50	50.00	0	86.8	48.51	147.49	44.77	3.08	30	
Tetrachloroethene	47.2	2.50	50.00	0	94.5	62.51	134.49	46.71	1.13	30	
Chlorobenzene	47.3	2.50	50.00	0	94.7	69.51	130.49	47.78	0.925	30	
Ethylbenzene	48.2	2.50	50.00	0	96.3	69.51	130.49	47.95	0.416	30	
m,p-Xylene	51.4	2.50	50.00	0	103	64.51	139.49	52.04	1.32	30	
Bromoform	42.2	2.50	50.00	0	84.4	59.51	144.49	45.28	7.07	30	
o-Xylene	52.2	2.50	50.00	0	104	68.51	130.49	52.51	0.688	30	
1,1,2,2-Tetrachloroethane	50.0	2.50	50.00	0	100	66.51	134.49	52.72	5.20	30	
1,3-Dichlorobenzene	48.5	2.50	50.00	0	97.0	69.51	130.49	45.42	6.56	30	
1,4-Dichlorobenzene	48.2	2.50	50.00	0	96.3	69.51	130.49	44.94	6.92	30	
1,2-Dichlorobenzene	47.4	2.50	50.00	0	94.8	69.51	130.49	44.64	5.96	30	
Surr: 1,2-Dichloroethane-d4	47.7	0.00	50.00		95.3	69.51	130.49		0	0	
Surr: Toluene-d8	48.4	0.00	50.00		96.9	69.51	130.49		0	0	
Surr: 4-Bromofluorobenzene	48.2	0.00	50.00		96.4	69.51	130.49		0	0	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID	**1704079-02AMSD**	SampType: **MSD**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/17/2017**	RunNo: **492**
Client ID:	**BatchQC**	Batch ID: **A1002**	TestNo: **SW8260B**		Analysis Date: **4/17/2017**	SeqNo: **11680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID	**LCS-1026**	SampType: **LCS**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/19/2017**	RunNo: **498**
Client ID:	**LCSW**	Batch ID: **A1026**	TestNo: **SW8260B**		Analysis Date: **4/19/2017**	SeqNo: **11938**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	11.0	2.00	10.00	0	110	39.51	145.49				
Vinyl chloride	10.1	0.50	10.00	0	101	69.51	130.49				
Chloroethane	10.3	0.50	10.00	0	103	37.51	156.49				
Bromomethane	6.54	2.00	10.00	0	65.4	13.51	162.49				
Trichlorofluoromethane	8.80	0.50	10.00	0	88.0	45.51	154.49				
Acetone	243	10.00	200.0	0	122	21.51	188.49				
1,1-Dichloroethene	9.96	0.50	10.00	0	99.6	69.51	130.49				
Dichloromethane	10.4	2.00	10.00	0	104	68.51	130.49				
trans-1,2-Dichloroethene	10.1	0.50	10.00	0	101	69.51	130.49				
1,1-Dichloroethane	9.98	0.50	10.00	0	99.8	69.51	130.49				
cis-1,2-Dichloroethene	9.77	0.50	10.00	0	97.7	69.51	130.49				
Chloroform	10.4	0.50	10.00	0	104	69.51	130.49				
1,2-Dichloroethane	8.27	0.50	10.00	0	82.7	69.51	133.49				
1,1,1-Trichloroethane	8.61	0.50	10.00	0	86.1	69.51	135.49				
Carbon tetrachloride	8.67	0.50	10.00	0	86.7	62.51	143.49				
Benzene	11.6	0.50	10.00	0	116	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **LCS-1026** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/19/2017** RunNo: **498**
Client ID: **LCSW** Batch ID: **A1026** TestNo: **SW8260B** Analysis Date: **4/19/2017** SeqNo: **11938**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloropropane	10.4	0.50	10.00	0	104	69.51	130.49				
Trichloroethene	9.40	0.50	10.00	0	94.0	67.51	138.49				
Bromodichloromethane	8.61	0.50	10.00	0	86.1	57.51	147.49				
cis-1,3-Dichloropropene	9.76	0.50	10.00	0	97.6	69.51	130.49				
trans-1,3-Dichloropropene	9.07	0.50	10.00	0	90.7	69.51	131.49				
1,1,2-Trichloroethane	9.28	0.50	10.00	0	92.8	69.51	130.49				
Toluene	10.4	0.50	10.00	0	104	69.51	130.49				
Dibromochloromethane	8.03	0.50	10.00	0	80.3	48.51	147.49				
Tetrachloroethene	9.97	0.50	10.00	0	99.7	69.51	130.49				
Chlorobenzene	9.21	0.50	10.00	0	92.1	69.51	130.49				
Ethylbenzene	9.73	0.50	10.00	0	97.3	69.51	130.49				
m,p-Xylene	10.8	0.50	10.00	0	108	64.51	139.49				
Bromoform	8.29	0.50	10.00	0	82.9	59.51	144.49				
o-Xylene	10.4	0.50	10.00	0	104	69.51	130.49				
1,1,2,2-Tetrachloroethane	9.33	0.50	10.00	0	93.3	69.51	130.49				
1,3-Dichlorobenzene	9.39	0.50	10.00	0	93.9	69.51	130.49				
1,4-Dichlorobenzene	9.27	0.50	10.00	0	92.7	69.51	130.49				
1,2-Dichlorobenzene	8.88	0.50	10.00	0	88.8	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	9.38		10.00		93.8	69.51	130.49				
Surr: Toluene-d8	9.86		10.00		98.6	69.51	130.49				
Surr: 4-Bromofluorobenzene	9.70		10.00		97.0	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

Alpha Analytical, Inc
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Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **LCSD-1026** SampType: **LCSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/19/2017** RunNo: **498**
Client ID: **LCSS02** Batch ID: **A1026** TestNo: **SW8260B** Analysis Date: **4/19/2017** SeqNo: **11939**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	12.2	2.00	10.00	0	122	0	0	10.98	10.8	31	S
Vinyl chloride	11.0	0.50	10.00	0	110	41.51	157.49	10.06	9.02	25	
Chloroethane	11.0	0.50	10.00	0	110	69.51	130.49	10.34	6.09	40	
Bromomethane	6.66	2.00	10.00	0	66.6	0	0	6.540	1.82	40	S
Trichlorofluoromethane	8.77	0.50	10.00	0	87.7	0	0	8.800	0.341	34	S
Acetone	208	10.00	200.0	0	104	0	0	243.3	15.5	39	S
1,1-Dichloroethene	10.8	0.50	10.00	0	108	69.51	130.49	9.960	7.91	35	
Dichloromethane	10.0	2.00	10.00	0	100	65.51	135.49	10.37	3.53	26	
trans-1,2-Dichloroethene	10.5	0.50	10.00	0	105	69.51	131.49	10.08	4.37	27	
1,1-Dichloroethane	10.2	0.50	10.00	0	102	69.51	130.49	9.980	1.79	20	
cis-1,2-Dichloroethene	9.71	0.50	10.00	0	97.1	69.51	130.49	9.770	0.616	20	
Chloroform	9.93	0.50	10.00	0	99.3	39.51	145.49	10.40	4.62	22	
1,2-Dichloroethane	7.07	0.50	10.00	0	70.7	69.51	130.49	8.270	15.6	20	
1,1,1-Trichloroethane	8.57	0.50	10.00	0	85.7	69.51	130.49	8.610	0.466	20	
Carbon tetrachloride	8.59	0.50	10.00	0	85.9	69.51	130.49	8.670	0.927	21	
Benzene	11.5	0.50	10.00	0	115	69.51	130.49	11.57	0.260	21	
1,2-Dichloropropane	10.1	0.50	10.00	0	101	69.51	134.49	10.38	2.64	20	
Trichloroethene	9.52	0.50	10.00	0	95.2	45.51	154.49	9.400	1.27	20	
Bromodichloromethane	7.67	0.50	10.00	0	76.7	59.51	144.49	8.610	11.5	20	
cis-1,3-Dichloropropene	8.84	0.50	10.00	0	88.4	68.51	133.49	9.760	9.89	20	
trans-1,3-Dichloropropene	7.63	0.50	10.00	0	76.3	0	0	9.070	17.2	21	S
1,1,2-Trichloroethane	7.73	0.50	10.00	0	77.3	69.51	130.49	9.280	18.2	20	
Toluene	10.7	0.50	10.00	0	107	0	0	10.39	2.75	20	S

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **LCSD-1026**	SampType: **LCSD**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/19/2017**	RunNo: **498**
Client ID: **LCSS02**	Batch ID: **A1026**	TestNo: **SW8260B**		Analysis Date: **4/19/2017**	SeqNo: **11939**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibromochloromethane	7.30	0.50	10.00	0	73.0	69.51	130.49	8.030	9.52	20	
Tetrachloroethene	10.6	0.50	10.00	0	106	69.51	130.49	9.970	6.13	20	
Chlorobenzene	9.17	0.50	10.00	0	91.7	37.51	156.49	9.210	0.435	20	
Ethylbenzene	10.2	0.50	10.00	0	102	69.51	136.49	9.730	4.52	20	
m,p-Xylene	11.0	0.50	10.00	0	110	62.51	137.49	10.85	1.10	20	
Bromoform	7.15	0.50	10.00	0	71.5	13.51	162.49	8.290	14.8	21	
o-Xylene	10.4	0.50	10.00	0	104	69.51	132.49	10.36	0.385	20	
1,1,2,2-Tetrachloroethane	7.84	0.50	10.00	0	78.4	69.51	130.49	9.330	17.4	20	
1,3-Dichlorobenzene	9.84	0.50	10.00	0	98.4	69.51	130.49	9.390	4.68	20	
1,4-Dichlorobenzene	9.49	0.50	10.00	0	94.9	69.51	130.49	9.270	2.35	20	S
1,2-Dichlorobenzene	8.82	0.50	10.00	0	88.2	69.51	133.49	8.880	0.678	20	
Surr: 1,2-Dichloroethane-d4	7.96		10.00		79.6	69.51	130.49		0	0	
Surr: Toluene-d8	10.5		10.00		105	69.51	130.49		0	0	
Surr: 4-Bromofluorobenzene	10.5		10.00		105	69.51	130.49		0	0	

Sample ID **MB-1026**	SampType: **MBLK**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/19/2017**	RunNo: **498**
Client ID: **PBW**	Batch ID: **A1026**	TestNo: **SW8260B**		Analysis Date: **4/19/2017**	SeqNo: **11940**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	2.00									
Vinyl chloride	ND	0.50									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **MB-1026**	SampType: **MBLK**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/19/2017**	RunNo: **498**
Client ID: **PBW**	Batch ID: **A1026**	TestNo: **SW8260B**		Analysis Date: **4/19/2017**	SeqNo: **11940**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroethane	ND	0.50									
Bromomethane	ND	2.00									
Trichlorofluoromethane	ND	0.50									
Acetone	ND	10.00									
1,1-Dichloroethene	ND	0.50									
Dichloromethane	ND	2.00									
trans-1,2-Dichloroethene	ND	0.50									
1,1-Dichloroethane	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
Chloroform	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Benzene	ND	0.50									
1,2-Dichloropropane	ND	0.50									
Trichloroethene	ND	0.50									
Bromodichloromethane	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
trans-1,3-Dichloropropene	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
Toluene	ND	0.50									
Dibromochloromethane	ND	0.50									
Tetrachloroethene	ND	0.50									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

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QC SUMMARY REPORT

WO#: **1704080**
24-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID **MB-1026** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/19/2017** RunNo: **498**
Client ID: **PBW** Batch ID: **A1026** TestNo: **SW8260B** Analysis Date: **4/19/2017** SeqNo: **11940**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	ND	0.50									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	0.50									
Bromoform	ND	0.50									
o-Xylene	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									
1,4-Dichlorobenzene	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
Surr: 1,2-Dichloroethane-d4	8.73		10.00		87.3	69.51	130.49				
Surr: Toluene-d8	10.3		10.00		103	69.51	130.49				
Surr: 4-Bromofluorobenzene	9.55		10.00		95.5	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limit

Definitions:

ND = Not Detected

D = Reporting Limits were increased due to high concentrations of non-target analytes.

H = Reporting Limits were increased due to the hydrocarbons present in the sample.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

K = DRO concentration may include contributions from lighter-end hydrocarbons (e.g. gasoline) that elute in the DRO range.

L = DRO concentration may include contributions from heavier-end hydrocarbons (e.g. motor oil) that elute in the DRO range.

M = Manual Integration used to determine area response.

O = Reporting Limits were increased due to sample foaming.

V = Reporting Limits were increased due to high concentrations of target analytes.

X = Reporting Limits were increased due to sample matrix interferences.

Z = DRO concentration may include contributions from lighter-end (e.g. gasoline) and heavier-end (e.g. motor oil) hydrocarbons that elute in the DRO range.

S50 = The analysis of the sample required a dilution such that the surrogate concentration was diluted below the laboratory acceptance criteria. The laboratory control sample was acceptable.

S51 = Surrogate recovery could not be determined due to the presence of co-eluting hydrocarbons.

S54 = Surrogate recovery was below laboratory acceptance limits.

S55 = Surrogate recovery was above laboratory acceptance limits.

Report CC's Cindy Schreier

CHAIN-OF-CUSTODY RECORD

CA

Alpha Analytical, Inc.
255 Glendale Ave, #21 Sparks, Nevada 89431
TEL: (775) 355-1044 FAX: (775) 355-0406

WorkOrder: PES1704080
Report Due By: 25-Apr-17
EDD Required: NO

Report Attention: Cindy Schreier

Client:
Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762

TEL: 9169397300
FAX: 9169397398
ProjectNo: BC-PCB

Date Received: 11-Apr-17

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	Requested Tests 300_0_W	ALKALINITY_W	TOC_W	VOC_W				Sample Remarks
PES1704080-01	OV-T0-A	AQ	4/8/2017 3:15:00 PM	3	0	10				A - 8260/Acetone_Cs				
PES1704080-02	OV-T0-B	AQ	4/8/2017 3:15:00 PM	3	0	10				A - 8260/Acetone_Cs				
PES1704080-03	Bed-T0-A	AQ	4/8/2017 3:45:00 PM	3	0	10				A - 8260/Acetone_Cs				Time on voas is 15:20.
PES1704080-04	Bed-T0-B	AQ	4/8/2017 3:45:00 PM	3	0	10				A - 8260/Acetone_Cs				
PES1704080-05	MW-15B-Unt	AQ	4/10/2017 1:00:00 PM	2	0	10	A - Cl	A - Alk	B - TOC					
PES1704080-06	MW-15D-Unt	AQ	4/10/2017 1:00:00 PM	2	0	10	A - Cl	A - Alk	B - TOC					
PES1704080-07	MW-26B-Unt	AQ	4/10/2017 1:00:00 PM	2	0	10	A - Cl	A - Alk	B - TOC					

Comments: TOC Ph=2. TCE may be high.

	Signature	Print Name	Company	Date/Time
Logged in by:	K Murray	K Murray	Alpha Analytical, Inc.	4/11/17 1130

NOTE: Samples are discarded 60 days after sample receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

CHAIN OF CUSTODY

1321

Billing Information:
Company: PRIMA
Attn:
Address:
City, State, Zip:
Phone Number: Fax:

Alpha Analytical, Inc.
Main Laboratory: 255 Glendale Ave, Suite 21 Sparks, NV 89431 Phone: 775-355-1044
Fax: 775-355-0406

Satellite Service Centers:
Northern CA: 9891 Horn Road, Suite C, Rancho Cordova, CA 95827 Phone: 916-366-9089
Southern CA: 1007 E. Dominguez St., Suite O, Carson, CA 90746 Phone: 714-386-2901
Northern NV: Elko, NV 89801 Phone: 775-388-7043
Southern NV: Las Vegas, NV 89120 Phone: 702-281-4848

Consultant/ Client Info:
Company: PRIMA
Address:
City, State, Zip:

Job and Purchase Order Info:
Job # BC - PCB
Job Name:
P.O. #:

Report Attention/Project Manager:
Name: Cindy Schreier
Email Address:
Phone #:
Cell #:

QC Deliverable Info:
EDD Required? Yes / No EDF Required? Yes / No
Global ID:
Data Validation Packages: III or IV

Samples Collected from which State? (circle one) AR CA KS NV OR WA DOD Site Other

Time Sampled (HHMM)	Date Sampled (MM/DD)	Matrix* (See Key Below)	Lab ID Number (For Lab Use Only)	Sample Description	TAT	# Containers** (See Key Below)	Field Filtered? Yes	Field Filtered? No	8260	TOC	Alkalinity	Chloride	Remarks
1515	4/8	AQ	PES1704080-01	OV-TCP-A	std	3V		X	X				
1515	↓	↓	02	OV-TCP-B	↓	↓		X	X				
1545			03	Bed-TCP-A				X	X				
1545			04	Bed-TCP-B				X	X				
1300	4/10/17	AQ	05	MW-15B-Unf		1OT,1P		X		X	X	X	
↓	↓	↓	06	MW-15D-Unf		↓		X		X	X	X	
			07	MW-26B-Unf				X		X	X	X	

ADDITIONAL INSTRUCTIONS: TCE may be high

I (field sampler) attest to the validity and authenticity of this sample(s). I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. NAC 445.0636 (c) (2).

Sampled By:

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
[signature]	4/10/17	1430	FED EX		
			[signature]	4/11/17	1125

* Key: AQ - Aqueous AR-Air OT - Other So-Soil WA - Waste ** B - Brass L - Liter O - Orbo OT - Other P - Plastic S-Soil Jar T - Tedlar V - VOA

NOTE: Samples are discarded 60 days after sample receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense. The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.

Alpha Analytical, Inc
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Cindy Schreier
Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762
TEL: (916) 939-7300
FAX (916) 939-7398

RE: BC-PCB

Order No.: PES1704145

Dear Cindy Schreier:

There were no problems with the analytical events associated with this report unless noted.

Quality control data is within laboratory defined or method specified acceptance limits except if noted. Version 8260B was used.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Roger Scholl

Roger Scholl
Laboratory Director
255 Glendale Ave, #21
Sparks, Nevada 89431

Alpha Analytical, Inc.
(775) 335-1044 / (775) 355-0406 FAX / 1-800-283-1183
225 Glendale Ave. - Suite 21 - Sparks, Nevada 89431-5578

Analytical Report

WO#: **PES1704145**
Report Date: **4/25/2017**

CLIENT: Prima Environmental
Collection Date: 4/14/2017 3:15:00 PM
Project: BC-PCB
Lab ID: 1704145-01
Matrix: AQUEOUS
Client Sample ID OV-ZVI-A

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	80.0		µg/L	4/24/2017	VOCs by EPA 8260
Vinyl chloride	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Chloroethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Bromomethane	ND	80.0		µg/L	4/24/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Acetone	ND	400		µg/L	4/24/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Dichloromethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	680	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Chloroform	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Benzene	ND	10.0		µg/L	4/24/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Trichloroethene	1,790	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Bromodichloromethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Toluene	ND	10.0		µg/L	4/24/2017	VOCs by EPA 8260
Dibromochloromethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Tetrachloroethene	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Chlorobenzene	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Ethylbenzene	ND	10.0		µg/L	4/24/2017	VOCs by EPA 8260
m,p-Xylene	ND	10.0		µg/L	4/24/2017	VOCs by EPA 8260
Bromoform	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
o-Xylene	ND	10.0		µg/L	4/24/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	65.0	20.0		µg/L	4/24/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	20.0		µg/L	4/24/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	99	70-130		%Rec	4/24/2017	VOCs by EPA 8260
Surr: Toluene-d8	107	70-130		%Rec	4/24/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	87	70-130		%Rec	4/24/2017	VOCs by EPA 8260

NOTES:
Reporting Limits were increased due to high concentrations of target analytes.

Alpha Analytical, Inc.
(775) 335-1044 / (775) 355-0406 FAX / 1-800-283-1183
225 Glendale Ave. - Suite 21 - Sparks, Nevada 89431-5578

Analytical Report

WO#: **PES1704145**
Report Date: **4/25/2017**

CLIENT: Prima Environmental
Collection Date: 4/14/2017 3:15:00 PM
Project: BC-PCB
Lab ID: 1704145-02
Matrix: AQUEOUS
Client Sample ID OV-AP-HP-A

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
Vinyl chloride	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Bromomethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Acetone	180	20.0		µg/L	4/21/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Dichloromethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chloroform	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Benzene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Trichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Bromodichloromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Toluene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
Dibromochloromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Tetrachloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Ethylbenzene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
m,p-Xylene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
Bromoform	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
o-Xylene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	85	70-130		%Rec	4/21/2017	VOCs by EPA 8260
Surr: Toluene-d8	112	70-130		%Rec	4/21/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	103	70-130		%Rec	4/21/2017	VOCs by EPA 8260

NOTES:
Some Reporting Limits were increased due to sample foaming.

Alpha Analytical, Inc.
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Analytical Report

WO#: **PES1704145**
Report Date: **4/25/2017**

CLIENT: Prima Environmental
Collection Date: 4/14/2017 3:15:00 PM
Project: BC-PCB
Lab ID: 1704145-03
Matrix: AQUEOUS
Client Sample ID OV-CHP-A

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
Vinyl chloride	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Bromomethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Acetone	139	20.0		µg/L	4/21/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Dichloromethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chloroform	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Benzene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Trichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Bromodichloromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Toluene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
Dibromochloromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Tetrachloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Ethylbenzene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
m,p-Xylene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
Bromoform	3.60	1.00		µg/L	4/21/2017	VOCs by EPA 8260
o-Xylene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	1.99	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	80	70-130		%Rec	4/21/2017	VOCs by EPA 8260
Surr: Toluene-d8	114	70-130		%Rec	4/21/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	103	70-130		%Rec	4/21/2017	VOCs by EPA 8260

NOTES:
Some Reporting Limits were increased due to high concentrations of non-target analytes.

Alpha Analytical, Inc.
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225 Glendale Ave. - Suite 21 - Sparks, Nevada 89431-5578

Analytical Report

WO#: **PES1704145**
Report Date: **4/25/2017**

CLIENT: Prima Environmental
Collection Date: 4/14/2017 3:15:00 PM
Project: BC-PCB
Lab ID: 1704145-04
Matrix: AQUEOUS
Client Sample ID Bed-NaMnO4-A

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
Vinyl chloride	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Bromomethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Acetone	ND	20.0		µg/L	4/21/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Dichloromethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1-Dichloroethane	8.27	1.00		µg/L	4/21/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chloroform	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichloroethane	2.95	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	12.3	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Benzene	1.91	0.500		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Trichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Bromodichloromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Toluene	3.62	0.500		µg/L	4/21/2017	VOCs by EPA 8260
Dibromochloromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Tetrachloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chlorobenzene	1.79	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Ethylbenzene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
m,p-Xylene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
Bromoform	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
o-Xylene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	3.90	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	1.84	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	93	70-130		%Rec	4/21/2017	VOCs by EPA 8260
Surr: Toluene-d8	108	70-130		%Rec	4/21/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	97	70-130		%Rec	4/21/2017	VOCs by EPA 8260

NOTES:
Some Reporting Limits were increased due to sample foaming.

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Analytical Report

WO#: **PES1704145**
Report Date: **4/25/2017**

CLIENT: Prima Environmental
Collection Date: 4/14/2017 3:15:00 PM
Project: BC-PCB
Lab ID: 1704145-05
Matrix: AQUEOUS
Client Sample ID Bed-AP-HP-A

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
Vinyl chloride	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Bromomethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Acetone	23.6	20.0		µg/L	4/21/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Dichloromethane	ND	4.00		µg/L	4/21/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1-Dichloroethane	1.24	1.00		µg/L	4/21/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chloroform	1.12	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Benzene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Trichloroethene	5.98	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Bromodichloromethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Toluene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
Dibromochloromethane	2.64	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Tetrachloroethene	1.35	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Chlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Ethylbenzene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
m,p-Xylene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
Bromoform	22.3	1.00		µg/L	4/21/2017	VOCs by EPA 8260
o-Xylene	ND	0.500		µg/L	4/21/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	1.00		µg/L	4/21/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	97	70-130		%Rec	4/21/2017	VOCs by EPA 8260
Surr: Toluene-d8	67	70-130		%Rec	4/21/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	91	70-130		%Rec	4/21/2017	VOCs by EPA 8260

NOTES:
Some Reporting Limits were increased due to sample foaming.

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **LCS-1049** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **LCSW** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12497**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	11.3	2.00	10.00	0	113	39.51	145.49				
Vinyl chloride	11.5	1.00	10.00	0	115	69.51	130.49				
Chloroethane	13.0	1.00	10.00	0	130	37.51	156.49				
Bromomethane	12.2	2.00	10.00	0	122	13.51	162.49				
Trichlorofluoromethane	12.2	1.00	10.00	0	122	45.51	154.49				
Acetone	205	10.00	200.0	0	102	21.51	188.49				
1,1-Dichloroethene	11.7	1.00	10.00	0	117	69.51	130.49				
Dichloromethane	10.6	2.00	10.00	0	106	68.51	130.49				
trans-1,2-Dichloroethene	12.0	1.00	10.00	0	120	69.51	130.49				
1,1-Dichloroethane	11.6	1.00	10.00	0	116	69.51	130.49				
cis-1,2-Dichloroethene	10.9	1.00	10.00	0	109	69.51	130.49				
Chloroform	11.0	1.00	10.00	0	110	69.51	130.49				
1,2-Dichloroethane	10.7	1.00	10.00	0	107	69.51	133.49				
1,1,1-Trichloroethane	11.2	1.00	10.00	0	112	69.51	135.49				
Carbon tetrachloride	11.3	1.00	10.00	0	113	62.51	143.49				
Benzene	11.0	0.50	10.00	0	110	69.51	130.49				
1,2-Dichloropropane	11.6	1.00	10.00	0	116	69.51	130.49				
Trichloroethene	11.8	1.00	10.00	0	118	67.51	138.49				
Bromodichloromethane	10.3	1.00	10.00	0	103	57.51	147.49				
cis-1,3-Dichloropropene	10.2	1.00	10.00	0	102	69.51	130.49				
trans-1,3-Dichloropropene	9.79	1.00	10.00	0	97.9	69.51	131.49				
1,1,2-Trichloroethane	10.6	1.00	10.00	0	106	69.51	130.49				
Toluene	11.2	0.50	10.00	0	112	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**
25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **LCS-1049** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **LCSW** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12497**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibromochloromethane	10.0	1.00	10.00	0	100	48.51	147.49				
Tetrachloroethene	11.9	1.00	10.00	0	119	69.51	130.49				
Chlorobenzene	11.1	1.00	10.00	0	111	69.51	130.49				
Ethylbenzene	11.4	0.50	10.00	0	114	69.51	130.49				
m,p-Xylene	11.3	0.50	10.00	0	113	64.51	139.49				
Bromoform	9.28	1.00	10.00	0	92.8	59.51	144.49				
o-Xylene	11.5	0.50	10.00	0	115	69.51	130.49				
1,1,2,2-Tetrachloroethane	10.2	1.00	10.00	0	102	69.51	130.49				
1,3-Dichlorobenzene	11.6	1.00	10.00	0	116	69.51	130.49				
1,4-Dichlorobenzene	11.7	1.00	10.00	0	117	69.51	130.49				
1,2-Dichlorobenzene	10.9	1.00	10.00	0	109	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	9.44	1.00	10.00		94.4	69.51	130.49				
Surr: Toluene-d8	9.94	1.00	10.00		99.4	69.51	130.49				
Surr: 4-Bromofluorobenzene	10.0	1.00	10.00		100	69.51	130.49				

Sample ID: **MB-1049** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **PBW** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	2.00									
Vinyl chloride	ND	1.00									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **MB-1049** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **PBW** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroethane	ND	1.00									
Bromomethane	ND	2.00									
Trichlorofluoromethane	ND	1.00									
Acetone	ND	10.00									
1,1-Dichloroethene	ND	1.00									
Dichloromethane	ND	2.00									
trans-1,2-Dichloroethene	ND	1.00									
1,1-Dichloroethane	ND	1.00									
cis-1,2-Dichloroethene	ND	1.00									
Chloroform	ND	1.00									
1,2-Dichloroethane	ND	1.00									
1,1,1-Trichloroethane	ND	1.00									
Carbon tetrachloride	ND	1.00									
Benzene	ND	0.50									
1,2-Dichloropropane	ND	1.00									
Trichloroethene	ND	1.00									
Bromodichloromethane	ND	1.00									
cis-1,3-Dichloropropene	ND	1.00									
trans-1,3-Dichloropropene	ND	1.00									
1,1,2-Trichloroethane	ND	1.00									
Toluene	ND	0.50									
Dibromochloromethane	ND	1.00									
Tetrachloroethene	ND	1.00									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1704145**
25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **MB-1049** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **PBW** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12498**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	ND	1.00									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	0.50									
Bromoform	ND	1.00									
o-Xylene	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	1.00									
1,3-Dichlorobenzene	ND	1.00									
1,4-Dichlorobenzene	ND	1.00									
1,2-Dichlorobenzene	ND	1.00									
Surr: 1,2-Dichloroethane-d4	8.96	1.00	10.00		89.6	69.51	130.49				
Surr: Toluene-d8	10.5	1.00	10.00		105	69.51	130.49				
Surr: 4-Bromofluorobenzene	9.88	1.00	10.00		98.8	69.51	130.49				

Sample ID: **1704172-02AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **BatchQC** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	38.4	10.00	50.00	0	76.9	25.51	146.49				
Vinyl chloride	39.1	2.50	50.00	0	78.1	45.51	142.49				
Chloroethane	43.6	2.50	50.00	0	87.1	24.51	164.49				
Bromomethane	43.9	10.00	50.00	0	87.9	9.51	172.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **1704172-02AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **BatchQC** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichlorofluoromethane	43.7	2.50	50.00	0	87.3	31.51	164.49				
Acetone	809	50.00	1,000	0	80.9	9.51	188.49				
1,1-Dichloroethene	43.2	2.50	50.00	0	86.3	61.51	133.49				
Dichloromethane	40.7	10.00	50.00	0	81.4	68.51	130.49				
trans-1,2-Dichloroethene	44.8	2.50	50.00	0	89.6	66.51	131.49				
1,1-Dichloroethane	44.2	2.50	50.00	0	88.3	66.51	130.49				
cis-1,2-Dichloroethene	41.8	2.50	50.00	0	83.6	69.51	130.49				
Chloroform	42.6	2.50	50.00	0	85.2	68.51	130.49				
1,2-Dichloroethane	43.1	2.50	50.00	0	86.2	63.51	139.49				
1,1,1-Trichloroethane	42.2	2.50	50.00	0	84.5	64.51	139.49				
Carbon tetrachloride	41.9	2.50	50.00	0	83.8	55.51	146.49				
Benzene	42.4	2.50	50.00	0	84.9	66.51	134.49				
1,2-Dichloropropane	46.2	2.50	50.00	0	92.5	68.51	134.49				
Trichloroethene	44.5	2.50	50.00	0	89.1	67.51	138.49				
Bromodichloromethane	41.3	2.50	50.00	0	82.5	57.51	147.49				
cis-1,3-Dichloropropene	37.6	2.50	50.00	0	75.2	60.51	130.49				
trans-1,3-Dichloropropene	39.5	2.50	50.00	0	79.0	61.51	131.49				
1,1,2-Trichloroethane	44.7	2.50	50.00	0	89.4	69.51	131.49				
Toluene	42.0	2.50	50.00	0	84.0	37.51	130.49				
Dibromochloromethane	40.1	2.50	50.00	0	80.1	48.51	147.49				
Tetrachloroethene	43.4	2.50	50.00	0	86.8	62.51	134.49				
Chlorobenzene	42.1	2.50	50.00	0	84.2	69.51	130.49				
Ethylbenzene	42.3	2.50	50.00	0	84.7	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **1704172-02AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **BatchQC** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12499**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
m,p-Xylene	42.3	2.50	50.00	0	84.6	64.51	139.49				
Bromoform	37.5	2.50	50.00	0	74.9	59.51	144.49				
o-Xylene	41.6	2.50	50.00	0	83.3	68.51	130.49				
1,1,2,2-Tetrachloroethane	42.5	2.50	50.00	0	84.9	66.51	134.49				
1,3-Dichlorobenzene	44.3	2.50	50.00	0	88.6	69.51	130.49				
1,4-Dichlorobenzene	43.8	2.50	50.00	0	87.5	69.51	130.49				
1,2-Dichlorobenzene	42.4	2.50	50.00	0	84.7	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	50.7	0.00	50.00		101	69.51	130.49				
Surr: Toluene-d8	49.8	0.00	50.00		99.6	69.51	130.49				
Surr: 4-Bromofluorobenzene	51.0	0.00	50.00		102	69.51	130.49				

Sample ID: **1704172-02AMSD** SampType: **MSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **BatchQC** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12500**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	44.5	10.00	50.00	0	89.0	25.51	146.49	38.45	14.6	30	
Vinyl chloride	46.5	2.50	50.00	0	93.0	45.51	142.49	39.07	17.3	30	
Chloroethane	51.9	2.50	50.00	0	104	24.51	164.49	43.57	17.4	30	
Bromomethane	56.4	10.00	50.00	0	113	9.51	172.49	43.93	24.9	30	
Trichlorofluoromethane	50.4	2.50	50.00	0	101	31.51	164.49	43.66	14.3	30	
Acetone	1,030	50.00	1,000	0	103	9.51	188.49	809.0	23.9	30	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **1704172-02AMSD** SampType: **MSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **BatchQC** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12500**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	51.0	2.50	50.00	0	102	61.51	133.49	43.16	16.6	30	
Dichloromethane	48.7	10.00	50.00	0	97.3	68.51	130.49	40.70	17.8	30	
trans-1,2-Dichloroethene	53.4	2.50	50.00	0	107	66.51	131.49	44.82	17.5	30	
1,1-Dichloroethane	52.8	2.50	50.00	0	106	66.51	130.49	44.16	17.8	30	
cis-1,2-Dichloroethene	50.4	2.50	50.00	0	101	69.51	130.49	41.80	18.7	30	
Chloroform	51.3	2.50	50.00	0	103	68.51	130.49	42.62	18.4	30	
1,2-Dichloroethane	51.9	2.50	50.00	0	104	63.51	139.49	43.09	18.5	30	
1,1,1-Trichloroethane	50.3	2.50	50.00	0	101	64.51	139.49	42.24	17.5	30	
Carbon tetrachloride	49.5	2.50	50.00	0	99.1	55.51	146.49	41.88	16.8	30	
Benzene	50.5	2.50	50.00	0	101	66.51	134.49	42.43	17.3	30	
1,2-Dichloropropane	53.6	2.50	50.00	0	107	68.51	134.49	46.23	14.7	30	
Trichloroethene	52.9	2.50	50.00	0	106	67.51	138.49	44.53	17.2	30	
Bromodichloromethane	49.0	2.50	50.00	0	98.1	57.51	147.49	41.27	17.2	30	
cis-1,3-Dichloropropene	44.3	2.50	50.00	0	88.6	60.51	130.49	37.61	16.3	30	
trans-1,3-Dichloropropene	47.4	2.50	50.00	0	94.8	61.51	131.49	39.52	18.1	30	
1,1,2-Trichloroethane	53.2	2.50	50.00	0	106	69.51	131.49	44.68	17.4	30	
Toluene	51.2	2.50	50.00	0	102	37.51	130.49	42.00	19.8	30	
Dibromochloromethane	47.5	2.50	50.00	0	95.0	48.51	147.49	40.06	17.0	30	
Tetrachloroethene	50.9	2.50	50.00	0	102	62.51	134.49	43.38	15.9	30	
Chlorobenzene	50.8	2.50	50.00	0	102	69.51	130.49	42.11	18.7	30	
Ethylbenzene	50.1	2.50	50.00	0	100	69.51	130.49	42.33	16.8	30	
m,p-Xylene	50.3	2.50	50.00	0	101	64.51	139.49	42.29	17.3	30	
Bromoform	46.1	2.50	50.00	0	92.1	59.51	144.49	37.47	20.5	30	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **1704172-02AMSD** SampType: **MSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/24/2017** RunNo: **527**
Client ID: **BatchQC** Batch ID: **A1049** TestNo: **SW8260B** Analysis Date: **4/24/2017** SeqNo: **12500**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	51.3	2.50	50.00	0	103	68.51	130.49	41.63	20.9	30	
1,1,2,2-Tetrachloroethane	51.9	2.50	50.00	0	104	66.51	134.49	42.46	20.0	30	
1,3-Dichlorobenzene	53.0	2.50	50.00	0	106	69.51	130.49	44.32	17.9	30	
1,4-Dichlorobenzene	54.2	2.50	50.00	0	108	69.51	130.49	43.76	21.3	30	
1,2-Dichlorobenzene	51.2	2.50	50.00	0	102	69.51	130.49	42.36	18.8	30	
Surr: 1,2-Dichloroethane-d4	50.4	0.00	50.00		101	69.51	130.49		0	0	
Surr: Toluene-d8	49.4	0.00	50.00		98.8	69.51	130.49		0	0	
Surr: 4-Bromofluorobenzene	50.2	0.00	50.00		100	69.51	130.49		0	0	

Sample ID: **LCS-1042** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **LCSW** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12595**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	12.6	2.00	10.00	0	126	39.51	145.49				
Vinyl chloride	11.0	1.00	10.00	0	110	69.51	130.49				
Chloroethane	10.5	1.00	10.00	0	105	37.51	156.49				
Bromomethane	8.05	2.00	10.00	0	80.5	13.51	162.49				
Trichlorofluoromethane	9.06	1.00	10.00	0	90.6	45.51	154.49				
Acetone	233	10.00	200.0	0	117	21.51	188.49				
1,1-Dichloroethene	10.9	1.00	10.00	0	109	69.51	130.49				
Dichloromethane	10.7	2.00	10.00	0	107	68.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **LCS-1042** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **LCSW** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12595**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,2-Dichloroethene	10.7	1.00	10.00	0	107	69.51	130.49				
1,1-Dichloroethane	10.1	1.00	10.00	0	101	69.51	130.49				
cis-1,2-Dichloroethene	10.8	1.00	10.00	0	108	69.51	130.49				
Chloroform	10.4	1.00	10.00	0	104	69.51	130.49				
1,2-Dichloroethane	7.94	1.00	10.00	0	79.4	69.51	133.49				
1,1,1-Trichloroethane	8.72	1.00	10.00	0	87.2	69.51	135.49				
Carbon tetrachloride	8.76	1.00	10.00	0	87.6	62.51	143.49				
Benzene	11.7	0.50	10.00	0	117	69.51	130.49				
1,2-Dichloropropane	10.6	1.00	10.00	0	106	69.51	130.49				
Trichloroethene	9.81	1.00	10.00	0	98.1	67.51	138.49				
Bromodichloromethane	8.57	1.00	10.00	0	85.7	57.51	147.49				
cis-1,3-Dichloropropene	9.84	1.00	10.00	0	98.4	69.51	130.49				
trans-1,3-Dichloropropene	8.96	1.00	10.00	0	89.6	69.51	131.49				
1,1,2-Trichloroethane	9.05	1.00	10.00	0	90.5	69.51	130.49				
Toluene	10.2	0.50	10.00	0	102	69.51	130.49				
Dibromochloromethane	7.92	1.00	10.00	0	79.2	48.51	147.49				
Tetrachloroethene	9.82	1.00	10.00	0	98.2	69.51	130.49				
Chlorobenzene	9.02	1.00	10.00	0	90.2	69.51	130.49				
Ethylbenzene	9.57	0.50	10.00	0	95.7	69.51	130.49				
m,p-Xylene	10.7	0.50	10.00	0	107	64.51	139.49				
Bromoform	7.69	1.00	10.00	0	76.9	59.51	144.49				
o-Xylene	10.2	0.50	10.00	0	102	69.51	130.49				
1,1,2,2-Tetrachloroethane	8.39	1.00	10.00	0	83.9	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **LCS-1042** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **LCSW** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12595**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	9.21	1.00	10.00	0	92.1	69.51	130.49				
1,4-Dichlorobenzene	9.10	1.00	10.00	0	91.0	69.51	130.49				
1,2-Dichlorobenzene	8.49	1.00	10.00	0	84.9	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	8.71	1.00	10.00		87.1	69.51	130.49				
Surr: Toluene-d8	9.92	1.00	10.00		99.2	69.51	130.49				
Surr: 4-Bromofluorobenzene	10.1	1.00	10.00		101	69.51	130.49				

Sample ID: **MB-1042** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **PBW** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12596**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	2.00									
Vinyl chloride	ND	1.00									
Chloroethane	ND	1.00									
Bromomethane	ND	2.00									
Trichlorofluoromethane	ND	1.00									
Acetone	ND	10.00									
1,1-Dichloroethene	ND	1.00									
Dichloromethane	ND	2.00									
trans-1,2-Dichloroethene	ND	1.00									
1,1-Dichloroethane	ND	1.00									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **MB-1042** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **PBW** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12596**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	ND	1.00									
Chloroform	ND	1.00									
1,2-Dichloroethane	ND	1.00									
1,1,1-Trichloroethane	ND	1.00									
Carbon tetrachloride	ND	1.00									
Benzene	ND	0.50									
1,2-Dichloropropane	ND	1.00									
Trichloroethene	ND	1.00									
Bromodichloromethane	ND	1.00									
cis-1,3-Dichloropropene	ND	1.00									
trans-1,3-Dichloropropene	ND	1.00									
1,1,2-Trichloroethane	ND	1.00									
Toluene	ND	0.50									
Dibromochloromethane	ND	1.00									
Tetrachloroethene	ND	1.00									
Chlorobenzene	ND	1.00									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	0.50									
Bromoform	ND	1.00									
o-Xylene	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	1.00									
1,3-Dichlorobenzene	ND	1.00									
1,4-Dichlorobenzene	ND	1.00									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **MB-1042** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **PBW** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12596**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	ND	1.00									
Surr: 1,2-Dichloroethane-d4	14.2	1.00	10.00		142	69.51	130.49				S
Surr: Toluene-d8	9.47	1.00	10.00		94.7	69.51	130.49				
Surr: 4-Bromofluorobenzene	8.66	1.00	10.00		86.6	69.51	130.49				

Sample ID: **1704170-01AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **BatchQC** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12597**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	61.8	10.00	50.00	0	124	25.51	146.49				
Vinyl chloride	52.1	2.50	50.00	0	104	45.51	142.49				
Chloroethane	45.3	2.50	50.00	0	90.7	24.51	164.49				
Bromomethane	23.2	10.00	50.00	0	46.3	9.51	172.49				
Trichlorofluoromethane	37.1	2.50	50.00	0	74.2	31.51	164.49				
Acetone	2,190	50.00	1,000	0	219	9.51	188.49				S
1,1-Dichloroethene	41.5	2.50	50.00	0	83.0	61.51	133.49				
Dichloromethane	54.6	10.00	50.00	0	109	68.51	130.49				
trans-1,2-Dichloroethene	54.4	2.50	50.00	0	109	66.51	131.49				
1,1-Dichloroethane	51.1	2.50	50.00	0	102	66.51	130.49				
cis-1,2-Dichloroethene	57.3	2.50	50.00	0	115	69.51	130.49				
Chloroform	50.8	2.50	50.00	0	102	68.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

Alpha Analytical, Inc
255 Glendale Ave, #21
Sparks, Nevada 89431
TEL: (775) 355-1044 FAX: (775) 355-0406
Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **1704170-01AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **BatchQC** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12597**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichloroethane	39.2	2.50	50.00	0	78.4	63.51	139.49				
1,1,1-Trichloroethane	40.9	2.50	50.00	0	81.9	64.51	139.49				
Carbon tetrachloride	39.2	2.50	50.00	0	78.5	55.51	146.49				
Benzene	59.5	2.50	50.00	0	119	66.51	134.49				
1,2-Dichloropropane	58.2	2.50	50.00	0	116	68.51	134.49				
Trichloroethene	47.6	2.50	50.00	0	95.2	67.51	138.49				
Bromodichloromethane	42.3	2.50	50.00	0	84.5	57.51	147.49				
cis-1,3-Dichloropropene	49.4	2.50	50.00	0	98.7	60.51	130.49				
trans-1,3-Dichloropropene	46.2	2.50	50.00	0	92.4	61.51	131.49				
1,1,2-Trichloroethane	47.0	2.50	50.00	0	94.1	69.51	131.49				
Toluene	49.1	2.50	50.00	0	98.2	37.51	130.49				
Dibromochloromethane	40.6	2.50	50.00	0	81.2	48.51	147.49				
Tetrachloroethene	44.6	2.50	50.00	0	89.3	62.51	134.49				
Chlorobenzene	43.8	2.50	50.00	0	87.5	69.51	130.49				
Ethylbenzene	45.8	2.50	50.00	0	91.6	69.51	130.49				
m,p-Xylene	50.1	2.50	50.00	0	100	64.51	139.49				
Bromoform	39.1	2.50	50.00	0	78.2	59.51	144.49				
o-Xylene	51.1	2.50	50.00	0	102	68.51	130.49				
1,1,2,2-Tetrachloroethane	51.7	2.50	50.00	0	103	66.51	134.49				
1,3-Dichlorobenzene	43.2	2.50	50.00	0	86.4	69.51	130.49				
1,4-Dichlorobenzene	42.9	2.50	50.00	0	85.7	69.51	130.49				
1,2-Dichlorobenzene	40.3	2.50	50.00	0	80.6	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	37.5	0.00	50.00		75.0	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **1704170-01AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **BatchQC** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12597**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	49.4	0.00	50.00		98.8	69.51	130.49				
Surr: 4-Bromofluorobenzene	54.4	0.00	50.00		109	69.51	130.49				

Sample ID: **1704170-01AMSD** SampType: **MSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **BatchQC** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12598**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	63.6	10.00	50.00	0	127	25.51	146.49	61.79	2.84	30	
Vinyl chloride	52.6	2.50	50.00	0	105	45.51	142.49	52.13	0.936	30	
Chloroethane	48.6	2.50	50.00	0	97.2	24.51	164.49	45.34	6.94	30	
Bromomethane	29.9	10.00	50.00	0	59.9	9.51	172.49	23.16	25.5	30	
Trichlorofluoromethane	35.7	2.50	50.00	0	71.3	31.51	164.49	37.12	4.01	30	
Acetone	2,070	50.00	1,000	0	207	9.51	188.49	2,186	5.58	30	S
1,1-Dichloroethene	40.4	2.50	50.00	0	80.9	61.51	133.49	41.48	2.54	30	
Dichloromethane	54.8	10.00	50.00	0	110	68.51	130.49	54.65	0.201	30	
trans-1,2-Dichloroethene	55.5	2.50	50.00	0	111	66.51	131.49	54.44	1.91	30	
1,1-Dichloroethane	52.2	2.50	50.00	0	104	66.51	130.49	51.13	2.17	30	
cis-1,2-Dichloroethene	55.3	2.50	50.00	0	111	69.51	130.49	57.28	3.50	30	
Chloroform	51.2	2.50	50.00	0	102	68.51	130.49	50.75	0.785	30	
1,2-Dichloroethane	38.7	2.50	50.00	0	77.5	63.51	139.49	39.18	1.13	30	
1,1,1-Trichloroethane	41.7	2.50	50.00	0	83.4	64.51	139.49	40.93	1.91	30	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **1704170-01AMSD** SampType: **MSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **4/21/2017** RunNo: **517**
Client ID: **BatchQC** Batch ID: **A1042** TestNo: **SW8260B** Analysis Date: **4/21/2017** SeqNo: **12598**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon tetrachloride	38.8	2.50	50.00	0	77.7	55.51	146.49	39.23	1.02	30	
Benzene	60.5	2.50	50.00	0	121	66.51	134.49	59.52	1.65	30	
1,2-Dichloropropane	58.9	2.50	50.00	0	118	68.51	134.49	58.18	1.16	30	
Trichloroethene	49.3	2.50	50.00	0	98.6	67.51	138.49	47.61	3.45	30	
Bromodichloromethane	42.6	2.50	50.00	0	85.2	57.51	147.49	42.26	0.801	30	
cis-1,3-Dichloropropene	49.5	2.50	50.00	0	98.9	60.51	130.49	49.37	0.182	30	
trans-1,3-Dichloropropene	45.3	2.50	50.00	0	90.6	61.51	131.49	46.18	1.88	30	
1,1,2-Trichloroethane	46.4	2.50	50.00	0	92.8	69.51	131.49	47.03	1.35	30	
Toluene	51.5	2.50	50.00	0	103	37.51	130.49	49.08	4.85	30	
Dibromochloromethane	41.2	2.50	50.00	0	82.4	48.51	147.49	40.61	1.44	30	
Tetrachloroethene	46.6	2.50	50.00	0	93.2	62.51	134.49	44.63	4.28	30	
Chlorobenzene	45.2	2.50	50.00	0	90.4	69.51	130.49	43.76	3.24	30	
Ethylbenzene	47.8	2.50	50.00	0	95.6	69.51	130.49	45.82	4.27	30	
m,p-Xylene	52.1	2.50	50.00	0	104	64.51	139.49	50.08	4.03	30	
Bromoform	38.2	2.50	50.00	0	76.4	59.51	144.49	39.09	2.25	30	
o-Xylene	53.2	2.50	50.00	0	106	68.51	130.49	51.10	4.01	30	
1,1,2,2-Tetrachloroethane	52.7	2.50	50.00	0	105	66.51	134.49	51.69	1.86	30	
1,3-Dichlorobenzene	45.7	2.50	50.00	0	91.4	69.51	130.49	43.19	5.69	30	
1,4-Dichlorobenzene	45.5	2.50	50.00	0	91.0	69.51	130.49	42.87	6.00	30	
1,2-Dichlorobenzene	42.6	2.50	50.00	0	85.3	69.51	130.49	40.31	5.62	30	
Surr: 1,2-Dichloroethane-d4	39.1	0.00	50.00		78.2	69.51	130.49		0	0	
Surr: Toluene-d8	50.2	0.00	50.00		100	69.51	130.49		0	0	
Surr: 4-Bromofluorobenzene	55.6	0.00	50.00		111	69.51	130.49		0	0	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1704145**

25-Apr-17

Client: Prima Environmental
Project: BC-PCB **TestCode:** **VOC_W**

Sample ID: **1704170-01AMSD**	SampType: **MSD**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **4/21/2017**	RunNo: **517**				
Client ID: **BatchQC**	Batch ID: **A1042**	TestNo: **SW8260B**		Analysis Date: **4/21/2017**	SeqNo: **12598**				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

Definitions:

ND = Not Detected

D = Reporting Limits were increased due to high concentrations of non-target analytes.

H = Reporting Limits were increased due to the hydrocarbons present in the sample.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

K = DRO concentration may include contributions from lighter-end hydrocarbons (e.g. gasoline) that elute in the DRO range.

L = DRO concentration may include contributions from heavier-end hydrocarbons (e.g. motor oil) that elute in the DRO range.

M = Manual Integration used to determine area response.

O = Reporting Limits were increased due to sample foaming.

V = Reporting Limits were increased due to high concentrations of target analytes.

X = Reporting Limits were increased due to sample matrix interferences.

Z = DRO concentration may include contributions from lighter-end (e.g. gasoline) and heavier-end (e.g. motor oil) hydrocarbons that elute in the DRO range.

S50 = The analysis of the sample required a dilution such that the surrogate concentration was diluted below the laboratory acceptance criteria. The laboratory control sample was acceptable.

S51 = Surrogate recovery could not be determined due to the presence of co-eluting hydrocarbons.

S54 = Surrogate recovery was below laboratory acceptance limits.

S55 = Surrogate recovery was above laboratory acceptance limits.

Report CC's Cindy Schreier

CHAIN-OF-CUSTODY RECORD

CA

Alpha Analytical, Inc.

255 Glendale Ave, #21 Sparks, Nevada 89431

TEL: (775) 355-1044 FAX: (775) 355-0406

WorkOrder: PES1704145
Report Due By: 25-Apr-17
EDD Required: NO

Report Attention: Cindy Schreier

Client:
Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762

TEL: 9169397300
FAX: 9169397398
ProjectNo: BC-PCB

Date Received: 18-Apr-17

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	Requested Tests VOC_W							Sample Remarks
PES1704145-01	OV-ZVI-A	AQ	4/14/2017 3:15:00 PM	3	0	5	A - 8260/Acetone_ Cs							
PES1704145-02	OV-AP-HP-A	AQ	4/14/2017 3:15:00 PM	3	0	5	A - 8260/Acetone_ Cs							
PES1704145-03	OV-CHP-A	AQ	4/14/2017 3:15:00 PM	3	0	5	A - 8260/Acetone_ Cs							
PES1704145-04	Bed-NaMnO4-A	AQ	4/14/2017 3:15:00 PM	3	0	5	A - 8260/Acetone_ Cs							
PES1704145-05	Bed-AP-HP-A	AQ	4/14/2017 3:15:00 PM	3	0	5	A - 8260/Acetone_ Cs							

Comments: TCE may be high.

	Signature	Print Name	Company	Date/Time
Logged in by:	Kmurray	K Murray	Alpha Analytical, Inc.	4/18/17 1235

NOTE: Samples are discarded 60 days after sample receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

CHAIN OF CUSTODY

1320

PRIMA ENVIRONMENTAL, Inc.
5070 Robert J. Mathews Pkwy, Ste 300
El Dorado Hills, CA 95762
PH: 916-939-7300 FAX: 916-939-7398
data@primaenvironmental.com

Alpha Analytical, Inc.
Main Laboratory: 255 Glendale Ave, Suite 21 Sparks, NV 89431 Phone: 775-355-1044 Fax: 775-355-0406

Satellite Service Centers:
Northern CA: 9891 Horn Road, Suite C, Rancho Cordova, CA 95827 Phone: 916-366-9089
Southern CA: 1007 E. Dominguez St., Suite O, Carson, CA 90746 Phone: 714-386-2901
Northern NV: Elko, NV 89801 Phone: 775-388-7043
Southern NV: Las Vegas, NV 89120 Phone: 702-281-4848

Consultant/ Client Info:
Company:
Address:
City, State, Zip:

Job and Purchase Order Info:
Job # BC-PCB
Job Name:
P.O. #:

Report Attention/Project Manager:
Name:
Email Address:
Phone #:
Cell #:

QC Deliverable Info:
EDD Required? Yes / No EDF Required? Yes / No
Global ID:
Data Validation Packages: III or IV

Samples Collected from which State? (circle one) AR CA KS NV OR WA DOD Site Other

Time Sampled (HHMM)	Date Sampled (MM/DD)	Matrix* (See Key Below)	Lab ID Number (For Lab Use Only)	Sample Description	TAT	# Containers** (See Key Below)	Field Filtered? Yes	Field Filtered? No	Analysis Requested: 8260	Remarks
1515	4/14/17	AQ	PES1704145-01	OV-2VI-A	5day	3V		X	X	
			02	OV-AP-HP-A				X	X	
			03	OV-CHP-A				X	X	
			04	Bed-NaMnO4-A				X	X	
			05	Bed-AP-HP-A				X	X	

ADDITIONAL INSTRUCTIONS: TCE may be high

I (field sampler) attest to the validity and authenticity of this sample(s). I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. NAC 445.0636 (c) (2).

Sampled By: Anthony Lyon

Relinquished by: (Signature/Affiliation)	Date:	Time:	Received by: (Signature/Affiliation)	Date:	Time:
Anthony Lyon	4/17/17	1500	FED EX		
			Killmary	4/18/17	1230

* Key: AQ - Aqueous AR-Air OT - Other So-Soil WA - Waste ** B - Brass L - Liter O - Orbo OT - Other P - Plastic S-Soil Jar T - Tedlar V - VOA

NOTE: Samples are discarded 60 days after sample receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense. The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.

07/16

Alpha Analytical, Inc
255 Glendale Ave, #21
Sparks, Nevada 89431
TEL: (775) 355-1044 FAX: (775) 355-0406
Website: www.alpha-analytical.com

Cindy Schreier
Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762
TEL: (916) 939-7300
FAX (916) 939-7398

RE: BC-PCBs

Order No.: PES1705001

Dear Cindy Schreier:

There were no problems with the analytical events associated with this report unless noted.

Quality control data is within laboratory defined or method specified acceptance limits except if noted. Version 8260B was used.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Roger Scholl

Roger Scholl
Laboratory Director
255 Glendale Ave, #21
Sparks, Nevada 89431

Alpha Analytical, Inc.

(775) 335-1044 / (775) 355-0406 FAX / 1-800-283-1183
225 Glendale Ave. - Suite 21 - Sparks, Nevada 89431-5578

Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-01
Matrix: AQUEOUS
Client Sample ID OV-Con

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	1,115.93	500.00		mg/L	5/8/2017	Anions by EPA 300.0
Methane	ND	0.01		mg/L	5/2/2017	Gases by RSK-175
Ethene	ND	0.01		mg/L	5/2/2017	Gases by RSK-175
Ethane	ND	0.01		mg/L	5/2/2017	Gases by RSK-175
Chloromethane	ND	80.00		µg/L	5/2/2017	VOCs by EPA 8260
Vinyl chloride	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Chloroethane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromomethane	ND	80.00		µg/L	5/2/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Acetone	ND	400.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Dichloromethane	ND	80.00		µg/L	5/2/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	823.46	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Chloroform	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Benzene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Trichloroethene	2,264.54	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromodichloromethane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Toluene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Dibromochloromethane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Tetrachloroethene	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Chlorobenzene	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Ethylbenzene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
m,p-Xylene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromoform	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
o-Xylene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	65.18	20.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	20.00		µg/L	5/2/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	109	70-130		%Rec	5/2/2017	VOCs by EPA 8260
Surr: Toluene-d8	101	70-130		%Rec	5/2/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	5/2/2017	VOCs by EPA 8260

NOTES:
Reporting Limits were increased due to high concentrations of target analytes.

Alpha Analytical, Inc.

(775) 335-1044 / (775) 355-0406 FAX / 1-800-283-1183
225 Glendale Ave. - Suite 21 - Sparks, Nevada 89431-5578

Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-02
Matrix: AQUEOUS
Client Sample ID OV-ZVI-B

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	1,182.83	500.00		mg/L	5/8/2017	Anions by EPA 300.0
Methane	ND	0.01		mg/L	5/2/2017	Gases by RSK-175
Ethene	0.02	0.01		mg/L	5/2/2017	Gases by RSK-175
Ethane	ND	0.01		mg/L	5/2/2017	Gases by RSK-175
Chloromethane	ND	40.00		µg/L	5/2/2017	VOCs by EPA 8260
Vinyl chloride	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Chloroethane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromomethane	ND	40.00		µg/L	5/2/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Acetone	ND	200.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Dichloromethane	ND	40.00		µg/L	5/2/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	788.52	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Chloroform	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Benzene	ND	5.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Trichloroethene	859.10	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromodichloromethane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Toluene	ND	5.00		µg/L	5/2/2017	VOCs by EPA 8260
Dibromochloromethane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Tetrachloroethene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Chlorobenzene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Ethylbenzene	6.15	5.00		µg/L	5/2/2017	VOCs by EPA 8260
m,p-Xylene	ND	5.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromoform	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
o-Xylene	ND	5.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	51.82	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	10.00		µg/L	5/2/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	108	70-130		%Rec	5/2/2017	VOCs by EPA 8260
Surr: Toluene-d8	100	70-130		%Rec	5/2/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	100	70-130		%Rec	5/2/2017	VOCs by EPA 8260

NOTES:
Reporting Limits were increased due to high concentrations of target analytes.

Alpha Analytical, Inc.

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Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-03
Matrix: AQUEOUS
Client Sample ID OV-AP-HP-B

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	1,116.38	500.00		mg/L	5/8/2017	Anions by EPA 300.0
Chloromethane	ND	4.00		µg/L	5/2/2017	VOCs by EPA 8260
Vinyl chloride	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Chloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromomethane	ND	4.00		µg/L	5/2/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Acetone	260.16	20.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Dichloromethane	ND	4.00		µg/L	5/2/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Chloroform	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Benzene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Trichloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromodichloromethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Toluene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
Dibromochloromethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Tetrachloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Chlorobenzene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Ethylbenzene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
m,p-Xylene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
Bromoform	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
o-Xylene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	109	70-130		%Rec	5/2/2017	VOCs by EPA 8260
Surr: Toluene-d8	99	70-130		%Rec	5/2/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	5/2/2017	VOCs by EPA 8260

NOTES:
Some Reporting Limits were increased due to sample foaming.

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Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-04
Matrix: AQUEOUS
Client Sample ID OV-CHP-B

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	1,120.27	500.00		mg/L	5/8/2017	Anions by EPA 300.0
Chloromethane	ND	2.00		µg/L	5/2/2017	VOCs by EPA 8260
Vinyl chloride	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Chloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromomethane	ND	2.00		µg/L	5/2/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Acetone	207.36	10.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Dichloromethane	ND	2.00		µg/L	5/2/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Chloroform	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Benzene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Trichloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Bromodichloromethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Toluene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
Dibromochloromethane	3.97	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Tetrachloroethene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Chlorobenzene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Ethylbenzene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
m,p-Xylene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
Bromoform	29.28	1.00		µg/L	5/2/2017	VOCs by EPA 8260
o-Xylene	ND	0.50		µg/L	5/2/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	1.52	1.00		µg/L	5/2/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	1.00		µg/L	5/2/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	105	70-130		%Rec	5/2/2017	VOCs by EPA 8260
Surr: Toluene-d8	99	70-130		%Rec	5/2/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	106	70-130		%Rec	5/2/2017	VOCs by EPA 8260

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Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-05
Matrix: AQUEOUS
Client Sample ID Bed-Con

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	3,337.07	500.00		mg/L	5/8/2017	Anions by EPA 300.0
Chloromethane	ND	3,200.00		µg/L	5/3/2017	VOCs by EPA 8260
Vinyl chloride	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Chloroethane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Bromomethane	ND	3,200.00		µg/L	5/3/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Acetone	ND	16,000.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Dichloromethane	ND	3,200.00		µg/L	5/3/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	49,644.88	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Chloroform	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Benzene	ND	400.00		µg/L	5/3/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Trichloroethene	88,763.48	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Bromodichloromethane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Toluene	ND	400.00		µg/L	5/3/2017	VOCs by EPA 8260
Dibromochloromethane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Tetrachloroethene	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Chlorobenzene	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Ethylbenzene	ND	400.00		µg/L	5/3/2017	VOCs by EPA 8260
m,p-Xylene	ND	400.00		µg/L	5/3/2017	VOCs by EPA 8260
Bromoform	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
o-Xylene	ND	400.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	800.00		µg/L	5/3/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	5/3/2017	VOCs by EPA 8260
Surr: Toluene-d8	101	70-130		%Rec	5/3/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	110	70-130		%Rec	5/3/2017	VOCs by EPA 8260

NOTES:
Reporting Limits were increased due to high concentrations of target analytes.

Alpha Analytical, Inc.

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Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-06
Matrix: AQUEOUS
Client Sample ID Bed-NaMnO4-B

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	3,903.73	500.00		mg/L	5/8/2017	Anions by EPA 300.0
Chloromethane	ND	4.00		µg/L	5/3/2017	VOCs by EPA 8260
Vinyl chloride	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Chloroethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Bromomethane	ND	4.00		µg/L	5/3/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Acetone	21.05	20.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Dichloromethane	ND	4.00		µg/L	5/3/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1-Dichloroethane	15.39	1.00		µg/L	5/3/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Chloroform	1.34	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,2-Dichloroethane	7.23	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	29.07	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Benzene	3.63	0.50		µg/L	5/3/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Trichloroethene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Bromodichloromethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	4.09	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Toluene	4.42	0.50		µg/L	5/3/2017	VOCs by EPA 8260
Dibromochloromethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Tetrachloroethene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Chlorobenzene	3.29	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Ethylbenzene	ND	0.50		µg/L	5/3/2017	VOCs by EPA 8260
m,p-Xylene	ND	0.50		µg/L	5/3/2017	VOCs by EPA 8260
Bromoform	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
o-Xylene	ND	0.50		µg/L	5/3/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	6.98	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	2.86	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	100	70-130		%Rec	5/3/2017	VOCs by EPA 8260
Surr: Toluene-d8	99	70-130		%Rec	5/3/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	99	70-130		%Rec	5/3/2017	VOCs by EPA 8260

NOTES:
Some Reporting Limits were increased due to sample foaming.

Alpha Analytical, Inc.
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Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-07
Matrix: AQUEOUS
Client Sample ID Bed-AP-HP-B

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloride	3,477.69	500.00		mg/L	5/8/2017	Anions by EPA 300.0
Chloromethane	ND	2.00		µg/L	5/3/2017	VOCs by EPA 8260
Vinyl chloride	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Chloroethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Bromomethane	ND	2.00		µg/L	5/3/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Acetone	25.33	10.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Dichloromethane	ND	2.00		µg/L	5/3/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1-Dichloroethane	1.45	1.00		µg/L	5/3/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Chloroform	1.44	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Benzene	ND	0.50		µg/L	5/3/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Trichloroethene	3.26	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Bromodichloromethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	5.10	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Toluene	ND	0.50		µg/L	5/3/2017	VOCs by EPA 8260
Dibromochloromethane	2.62	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Tetrachloroethene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Chlorobenzene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Ethylbenzene	ND	0.50		µg/L	5/3/2017	VOCs by EPA 8260
m,p-Xylene	ND	0.50		µg/L	5/3/2017	VOCs by EPA 8260
Bromoform	22.75	1.00		µg/L	5/3/2017	VOCs by EPA 8260
o-Xylene	ND	0.50		µg/L	5/3/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	1.00		µg/L	5/3/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	92	70-130		%Rec	5/3/2017	VOCs by EPA 8260
Surr: Toluene-d8	104	70-130		%Rec	5/3/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	120	70-130		%Rec	5/3/2017	VOCs by EPA 8260

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Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-08
Matrix: SOIL
Client Sample ID OV-Con-SO

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Vinyl chloride	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromomethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Acetone	ND	200.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Dichloromethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	48.50	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chloroform	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Benzene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Trichloroethene	514.15	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromodichloromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Toluene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Dibromochloromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Tetrachloroethene	24.45	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Ethylbenzene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
m,p-Xylene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromoform	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
o-Xylene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	76.24	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	316.49	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	89	70-130		%Rec	5/5/2017	VOCs by EPA 8260
Surr: Toluene-d8	100	70-130		%Rec	5/5/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	96	70-130		%Rec	5/5/2017	VOCs by EPA 8260

Alpha Analytical, Inc.
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Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-09
Matrix: SOIL
Client Sample ID OV-ZVI-B-SO

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Vinyl chloride	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromomethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Acetone	ND	200.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Dichloromethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	39.55	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chloroform	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Benzene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Trichloroethene	90.02	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromodichloromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Toluene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Dibromochloromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Tetrachloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Ethylbenzene	12.71	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
m,p-Xylene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromoform	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
o-Xylene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	54.95	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	232.05	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	88	70-130		%Rec	5/5/2017	VOCs by EPA 8260
Surr: Toluene-d8	101	70-130		%Rec	5/5/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	95	70-130		%Rec	5/5/2017	VOCs by EPA 8260

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Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-10
Matrix: SOIL
Client Sample ID OV-AP-HP-B-SO

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Vinyl chloride	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromomethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Acetone	ND	200.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Dichloromethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chloroform	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Benzene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Trichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromodichloromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Toluene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Dibromochloromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Tetrachloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Ethylbenzene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
m,p-Xylene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromoform	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
o-Xylene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	88	70-130		%Rec	5/5/2017	VOCs by EPA 8260
Surr: Toluene-d8	101	70-130		%Rec	5/5/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	94	70-130		%Rec	5/5/2017	VOCs by EPA 8260

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Analytical Report

WO#: **PES1705001**
Report Date: **5/9/2017**

CLIENT: Prima Environmental
Collection Date: 4/28/2017 3:30:00 PM
Project: BC-PCBs
Lab ID: 1705001-11
Matrix: SOIL
Client Sample ID OV-CHP-B-SO

Analyses	Result	PQL	Qual	Units	Date Analyzed	Method
Chloromethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Vinyl chloride	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromomethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Trichlorofluoromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Acetone	ND	200.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Dichloromethane	ND	40.00		µg/Kg	5/5/2017	VOCs by EPA 8260
trans-1,2-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1-Dichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
cis-1,2-Dichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chloroform	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,1-Trichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Carbon tetrachloride	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Benzene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichloropropane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Trichloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromodichloromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
cis-1,3-Dichloropropene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
trans-1,3-Dichloropropene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,2-Trichloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Toluene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Dibromochloromethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Tetrachloroethene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Chlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Ethylbenzene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
m,p-Xylene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Bromoform	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
o-Xylene	ND	5.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,1,2,2-Tetrachloroethane	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,3-Dichlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,4-Dichlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
1,2-Dichlorobenzene	ND	20.00		µg/Kg	5/5/2017	VOCs by EPA 8260
Surr: 1,2-Dichloroethane-d4	88	70-130		%Rec	5/5/2017	VOCs by EPA 8260
Surr: Toluene-d8	101	70-130		%Rec	5/5/2017	VOCs by EPA 8260
Surr: 4-Bromofluorobenzene	95	70-130		%Rec	5/5/2017	VOCs by EPA 8260

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Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1705001**
09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **300_0_W**

Sample ID: **MB-1177** SampType: **MBLK** TestCode: **300_0_W** Units: **mg/L** Prep Date: **5/7/2017** RunNo: **658**
Client ID: **PBW** Batch ID: **1177** TestNo: **E300.0** Analysis Date: **5/7/2017** SeqNo: **15959**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	ND	0.50									

Sample ID: **LCS-1177** SampType: **LCS** TestCode: **300_0_W** Units: **mg/L** Prep Date: **5/7/2017** RunNo: **658**
Client ID: **LCSW** Batch ID: **1177** TestNo: **E300.0** Analysis Date: **5/7/2017** SeqNo: **15960**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	49.47	0.50	50.00	0	98.9	89.51	110.49				

Sample ID: **1705091-01AMSD** SampType: **MSD** TestCode: **300_0_W** Units: **mg/L** Prep Date: **5/7/2017** RunNo: **658**
Client ID: **BatchQC** Batch ID: **1177** TestNo: **E300.0** Analysis Date: **5/7/2017** SeqNo: **15964**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	252.62	2.50	250.0	4.575	99.2	79.51	120.49	250.4	0.870	15	

Sample ID: **1705091-01AMS** SampType: **MS** TestCode: **300_0_W** Units: **mg/L** Prep Date: **5/7/2017** RunNo: **658**
Client ID: **BatchQC** Batch ID: **1177** TestNo: **E300.0** Analysis Date: **5/7/2017** SeqNo: **15963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	250.43	2.50	250.0	4.575	98.3	79.51	120.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **300_0_W**

Sample ID: **1705091-01AMS**	SampType: **MS**	TestCode: **300_0_W**	Units: **mg/L**	Prep Date: **5/7/2017**	RunNo: **658**
Client ID: **BatchQC**	Batch ID: **1177**	TestNo: **E300.0**		Analysis Date: **5/7/2017**	SeqNo: **15963**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **METHANE_W**

Sample ID: **MBLK-1129** SampType: **MBLK** TestCode: **METHANE_W** Units: **mg/L** Prep Date: **5/2/2017** RunNo: **614**
Client ID: **PBW** Batch ID: **1129** TestNo: **SW3810** Analysis Date: **5/2/2017** SeqNo: **14708**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	ND	0.01									
Ethene	ND	0.01									
Ethane	ND	0.01									

Sample ID: **LCS-1129** SampType: **LCS** TestCode: **METHANE_W** Units: **mg/L** Prep Date: **5/2/2017** RunNo: **614**
Client ID: **LCSW** Batch ID: **1129** TestNo: **SW3810** Analysis Date: **5/2/2017** SeqNo: **14709**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	0.32	0.01	0.4520	0	69.7	53.51	138.49				
Ethene	0.27	0.01	0.3960	0	69.2	52.51	130.49				
Ethane	0.32	0.01	0.4240	0	75.0	69.51	130.49				

Sample ID: **1704172-02AMSD** SampType: **MSD** TestCode: **METHANE_W** Units: **mg/L** Prep Date: **5/2/2017** RunNo: **614**
Client ID: **BatchQC** Batch ID: **1129** TestNo: **SW3810** Analysis Date: **5/2/2017** SeqNo: **14718**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	1.46	0.01	1.810	0.006000	80.2	42.51	138.49	1.390	4.71	27	
Ethene	1.26	0.01	1.580	0	79.6	43.51	130.49	1.194	5.22	26	
Ethane	1.45	0.01	1.700	0	85.2	21.51	149.49	1.391	4.08	37	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs

TestCode: **METHANE_W**

Sample ID: **1704172-02AMS** SampType: **MS** TestCode: **METHANE_W** Units: **mg/L** Prep Date: **5/2/2017** RunNo: **614**
Client ID: **BatchQC** Batch ID: **1129** TestNo: **SW3810** Analysis Date: **5/2/2017** SeqNo: **14717**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	1.39	0.01	1.810	0.006000	76.5	42.51	138.49				
Ethene	1.19	0.01	1.580	0	75.6	43.51	130.49				
Ethane	1.39	0.01	1.700	0	81.8	21.51	149.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**
09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_S**

Sample ID: **MB-1133** SampType: **MBLK** TestCode: **VOC_S** Units: **µg/Kg** Prep Date: **5/3/2017** RunNo: **621**
Client ID: **PBS** Batch ID: **A1133** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **15222**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	40.00									
Vinyl chloride	ND	20.00									
Chloroethane	ND	20.00									
Bromomethane	ND	40.00									
Trichlorofluoromethane	ND	20.00									
Acetone	ND	200.00									
1,1-Dichloroethene	ND	20.00									
Dichloromethane	ND	40.00									
trans-1,2-Dichloroethene	ND	20.00									
1,1-Dichloroethane	ND	20.00									
cis-1,2-Dichloroethene	ND	20.00									
Chloroform	ND	20.00									
1,2-Dichloroethane	ND	20.00									
1,1,1-Trichloroethane	ND	20.00									
Carbon tetrachloride	ND	20.00									
Benzene	ND	5.00									
1,2-Dichloropropane	ND	20.00									
Trichloroethene	ND	20.00									
Bromodichloromethane	ND	20.00									
cis-1,3-Dichloropropene	ND	20.00									
trans-1,3-Dichloropropene	ND	20.00									
1,1,2-Trichloroethane	ND	20.00									
Toluene	ND	5.00									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**
09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_S**

Sample ID: **MB-1133** SampType: **MBLK** TestCode: **VOC_S** Units: **µg/Kg** Prep Date: **5/3/2017** RunNo: **621**
Client ID: **PBS** Batch ID: **A1133** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **15222**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibromochloromethane	ND	20.00									
Tetrachloroethene	ND	20.00									
Chlorobenzene	ND	20.00									
Ethylbenzene	ND	5.00									
m,p-Xylene	ND	5.00									
Bromoform	ND	20.00									
o-Xylene	ND	5.00									
1,1,2,2-Tetrachloroethane	ND	20.00									
1,3-Dichlorobenzene	ND	20.00									
1,4-Dichlorobenzene	ND	20.00									
1,2-Dichlorobenzene	ND	20.00									
Surr: 1,2-Dichloroethane-d4	174		200.0		86.8	69.51	130.49				
Surr: Toluene-d8	205		200.0		103	69.51	130.49				
Surr: 4-Bromofluorobenzene	173		200.0		86.7	69.51	130.49				

Sample ID: **LCSD-1133** SampType: **LCS** TestCode: **VOC_S** Units: **µg/Kg** Prep Date: **5/3/2017** RunNo: **621**
Client ID: **LCSS** Batch ID: **A1133** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **15224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	317.28	80.00	400.0	0	79.3	13.51	175.49				
Vinyl chloride	479.86	40.00	400.0	0	120	36.51	161.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_S**

Sample ID: **LCSD-1133** SampType: **LCS** TestCode: **VOC_S** Units: **µg/Kg** Prep Date: **5/3/2017** RunNo: **621**
Client ID: **LCSS** Batch ID: **A1133** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **15224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroethane	114.88	40.00	400.0	0	28.7	9.51	130.49				
Bromomethane	95.01	80.00	400.0	0	23.8	9.51	130.49				
Trichlorofluoromethane	108.11	40.00	400.0	0	27.0	9.51	130.49				
Acetone	7,184.31	400.00	8,000	0	89.8	9.51	186.49				
1,1-Dichloroethene	328.74	40.00	400.0	0	82.2	9.51	131.49				
Dichloromethane	360.87	80.00	400.0	0	90.2	61.51	138.49				
trans-1,2-Dichloroethene	390.50	40.00	400.0	0	97.6	69.51	148.49				
1,1-Dichloroethane	381.52	40.00	400.0	0	95.4	66.51	141.49				
cis-1,2-Dichloroethene	361.01	40.00	400.0	0	90.3	69.51	142.49				
Chloroform	364.01	40.00	400.0	0	91.0	64.51	136.49				
1,2-Dichloroethane	339.85	40.00	400.0	0	85.0	60.51	142.49				
1,1,1-Trichloroethane	371.31	40.00	400.0	0	92.8	60.51	152.49				
Carbon tetrachloride	349.47	40.00	400.0	0	87.4	49.51	146.49				
Benzene	377.74	10.00	400.0	0	94.4	69.51	137.49				
1,2-Dichloropropane	355.49	40.00	400.0	0	88.9	67.51	142.49				
Trichloroethene	395.41	40.00	400.0	0	98.9	69.51	149.49				
Bromodichloromethane	306.36	40.00	400.0	0	76.6	61.51	138.49				
cis-1,3-Dichloropropene	291.23	40.00	400.0	0	72.8	60.51	141.49				
trans-1,3-Dichloropropene	273.13	40.00	400.0	0	68.3	54.51	143.49				
1,1,2-Trichloroethane	357.11	40.00	400.0	0	89.3	66.51	137.49				
Toluene	385.22	10.00	400.0	0	96.3	69.51	139.49				
Dibromochloromethane	296.82	40.00	400.0	0	74.2	57.51	134.49				
Tetrachloroethene	420.29	40.00	400.0	0	105	69.51	159.49				

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_S**

Sample ID: **LCSD-1133** SampType: **LCS** TestCode: **VOC_S** Units: **µg/Kg** Prep Date: **5/3/2017** RunNo: **621**
Client ID: **LCSS** Batch ID: **A1133** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **15224**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	383.57	40.00	400.0	0	95.9	69.51	137.49				
Ethylbenzene	403.64	10.00	400.0	0	101	69.51	137.49				
m,p-Xylene	410.24	10.00	400.0	0	103	69.51	145.49				
Bromoform	274.93	40.00	400.0	0	68.7	47.51	135.49				
o-Xylene	409.64	10.00	400.0	0	102	69.51	145.49				
1,1,2,2-Tetrachloroethane	400.60	40.00	400.0	0	100	55.51	136.49				
1,3-Dichlorobenzene	395.00	40.00	400.0	0	98.8	69.51	141.49				
1,4-Dichlorobenzene	401.53	40.00	400.0	0	100	69.51	138.49				
1,2-Dichlorobenzene	377.17	40.00	400.0	0	94.3	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	363.19		400.0		90.8	69.51	130.49				
Surr: Toluene-d8	402.25		400.0		101	69.51	130.49				
Surr: 4-Bromofluorobenzene	376.28		400.0		94.1	69.51	130.49				

Sample ID: **LCS-1133** SampType: **LCS** TestCode: **VOC_S** Units: **µg/Kg** Prep Date: **5/3/2017** RunNo: **621**
Client ID: **LCSS** Batch ID: **A1133** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **15223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	273.45	80.00	400.0	0	68.4	13.51	175.49				
Vinyl chloride	407.05	40.00	400.0	0	102	36.51	161.49				
Chloroethane	100.11	40.00	400.0	0	25.0	9.51	130.49				
Bromomethane	61.87	80.00	400.0	0	15.5	9.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental

Project: BC-PCBs **TestCode:** **VOC_S**

Sample ID: **LCS-1133** SampType: **LCS** TestCode: **VOC_S** Units: **µg/Kg** Prep Date: **5/3/2017** RunNo: **621**

Client ID: **LCSS** Batch ID: **A1133** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **15223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichlorofluoromethane	97.10	40.00	400.0	0	24.3	9.51	130.49				
Acetone	6,512.55	400.00	8,000	0	81.4	9.51	186.49				
1,1-Dichloroethene	296.31	40.00	400.0	0	74.1	9.51	131.49				
Dichloromethane	331.35	80.00	400.0	0	82.8	61.51	138.49				
trans-1,2-Dichloroethene	354.16	40.00	400.0	0	88.5	69.51	148.49				
1,1-Dichloroethane	343.67	40.00	400.0	0	85.9	66.51	141.49				
cis-1,2-Dichloroethene	323.04	40.00	400.0	0	80.8	69.51	142.49				
Chloroform	330.39	40.00	400.0	0	82.6	64.51	136.49				
1,2-Dichloroethane	316.01	40.00	400.0	0	79.0	60.51	142.49				
1,1,1-Trichloroethane	336.17	40.00	400.0	0	84.0	60.51	152.49				
Carbon tetrachloride	306.58	40.00	400.0	0	76.6	49.51	146.49				
Benzene	342.86	10.00	400.0	0	85.7	69.51	137.49				
1,2-Dichloropropane	323.59	40.00	400.0	0	80.9	67.51	142.49				
Trichloroethene	359.69	40.00	400.0	0	89.9	69.51	149.49				
Bromodichloromethane	272.50	40.00	400.0	0	68.1	61.51	138.49				
cis-1,3-Dichloropropene	259.29	40.00	400.0	0	64.8	60.51	141.49				
trans-1,3-Dichloropropene	241.07	40.00	400.0	0	60.3	54.51	143.49				
1,1,2-Trichloroethane	326.87	40.00	400.0	0	81.7	66.51	137.49				
Toluene	343.95	10.00	400.0	0	86.0	69.51	139.49				
Dibromochloromethane	257.51	40.00	400.0	0	64.4	57.51	134.49				
Tetrachloroethene	372.59	40.00	400.0	0	93.1	69.51	159.49				
Chlorobenzene	349.43	40.00	400.0	0	87.4	69.51	137.49				
Ethylbenzene	361.13	10.00	400.0	0	90.3	69.51	137.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_S**

Sample ID: **LCS-1133** SampType: **LCS** TestCode: **VOC_S** Units: **µg/Kg** Prep Date: **5/3/2017** RunNo: **621**
Client ID: **LCSS** Batch ID: **A1133** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **15223**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
m,p-Xylene	374.22	10.00	400.0	0	93.6	69.51	145.49				
Bromoform	242.02	40.00	400.0	0	60.5	47.51	135.49				
o-Xylene	365.00	10.00	400.0	0	91.2	69.51	145.49				
1,1,2,2-Tetrachloroethane	364.93	40.00	400.0	0	91.2	55.51	136.49				
1,3-Dichlorobenzene	359.19	40.00	400.0	0	89.8	69.51	141.49				
1,4-Dichlorobenzene	364.31	40.00	400.0	0	91.1	69.51	138.49				
1,2-Dichlorobenzene	345.01	40.00	400.0	0	86.3	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	370.03		400.0		92.5	69.51	130.49				
Surr: Toluene-d8	392.46		400.0		98.1	69.51	130.49				
Surr: 4-Bromofluorobenzene	376.53		400.0		94.1	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**
09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **MB-1135** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/2/2017** RunNo: **613**
Client ID: **PBW** Batch ID: **A1135** TestNo: **SW8260B** Analysis Date: **5/2/2017** SeqNo: **14683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	0.60									
Vinyl chloride	ND	0.30									
Chloroethane	ND	0.30									
Bromomethane	ND	0.60									
Trichlorofluoromethane	ND	0.30									
Acetone	ND	3.00									
1,1-Dichloroethene	ND	0.30									
Dichloromethane	ND	0.60									
trans-1,2-Dichloroethene	ND	0.30									
1,1-Dichloroethane	ND	0.30									
cis-1,2-Dichloroethene	ND	0.30									
Chloroform	ND	0.30									
1,2-Dichloroethane	ND	0.30									
1,1,1-Trichloroethane	ND	0.30									
Carbon tetrachloride	ND	0.30									
Benzene	ND	0.15									
1,2-Dichloropropane	ND	0.30									
Trichloroethene	ND	0.30									
Bromodichloromethane	ND	0.30									
cis-1,3-Dichloropropene	ND	0.30									
trans-1,3-Dichloropropene	ND	0.30									
1,1,2-Trichloroethane	ND	0.30									
Toluene	ND	0.15									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**
09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **MB-1135**	SampType: **MBLK**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **5/2/2017**	RunNo: **613**
Client ID: **PBW**	Batch ID: **A1135**	TestNo: **SW8260B**		Analysis Date: **5/2/2017**	SeqNo: **14683**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Dibromochloromethane	ND	0.30									
Tetrachloroethene	ND	0.30									
Chlorobenzene	ND	0.30									
Ethylbenzene	ND	0.15									
m,p-Xylene	ND	0.15									
Bromoform	ND	0.30									
o-Xylene	ND	0.15									
1,1,2,2-Tetrachloroethane	ND	0.30									
1,3-Dichlorobenzene	ND	0.30									
1,4-Dichlorobenzene	ND	0.30									
1,2-Dichlorobenzene	ND	0.30									
Surr: 1,2-Dichloroethane-d4	10.2		10.00		102	69.51	130.49				
Surr: Toluene-d8	10.1		10.00		101	69.51	130.49				
Surr: 4-Bromofluorobenzene	10.3		10.00		103	69.51	130.49				

Sample ID: **LCS-1135**	SampType: **LCS**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **5/2/2017**	RunNo: **613**
Client ID: **LCSW**	Batch ID: **A1135**	TestNo: **SW8260B**		Analysis Date: **5/2/2017**	SeqNo: **14682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	9.70	0.60	10.00	0	97.0	39.51	145.49				
Vinyl chloride	10.01	0.30	10.00	0	100	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **LCS-1135** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/2/2017** RunNo: **613**
Client ID: **LCSW** Batch ID: **A1135** TestNo: **SW8260B** Analysis Date: **5/2/2017** SeqNo: **14682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroethane	8.65	0.30	10.00	0	86.5	37.51	156.49				
Bromomethane	3.95	0.60	10.00	0	39.5	13.51	162.49				
Trichlorofluoromethane	11.61	0.30	10.00	0	116	45.51	154.49				
Acetone	270.52	3.00	200.0	0	135	21.51	188.49				
1,1-Dichloroethene	11.66	0.30	10.00	0	117	69.51	130.49				
Dichloromethane	10.72	0.60	10.00	0	107	68.51	130.49				
trans-1,2-Dichloroethene	10.96	0.30	10.00	0	110	69.51	130.49				
1,1-Dichloroethane	10.74	0.30	10.00	0	107	69.51	130.49				
cis-1,2-Dichloroethene	11.24	0.30	10.00	0	112	69.51	130.49				
Chloroform	10.73	0.30	10.00	0	107	69.51	130.49				
1,2-Dichloroethane	11.39	0.30	10.00	0	114	69.51	133.49				
1,1,1-Trichloroethane	10.76	0.30	10.00	0	108	69.51	135.49				
Carbon tetrachloride	11.96	0.30	10.00	0	120	62.51	143.49				
Benzene	11.22	0.15	10.00	0	112	69.51	130.49				
1,2-Dichloropropane	11.15	0.30	10.00	0	112	69.51	130.49				
Trichloroethene	11.96	0.30	10.00	0	120	67.51	138.49				
Bromodichloromethane	12.13	0.30	10.00	0	121	57.51	147.49				
cis-1,3-Dichloropropene	12.08	0.30	10.00	0	121	69.51	130.49				
trans-1,3-Dichloropropene	11.62	0.30	10.00	0	116	69.51	131.49				
1,1,2-Trichloroethane	11.48	0.30	10.00	0	115	69.51	130.49				
Toluene	11.10	0.15	10.00	0	111	69.51	130.49				
Dibromochloromethane	12.35	0.30	10.00	0	124	48.51	147.49				
Tetrachloroethene	12.19	0.30	10.00	0	122	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1705001**
09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **LCS-1135** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/2/2017** RunNo: **613**
Client ID: **LCSW** Batch ID: **A1135** TestNo: **SW8260B** Analysis Date: **5/2/2017** SeqNo: **14682**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorobenzene	10.43	0.30	10.00	0	104	69.51	130.49				
Ethylbenzene	11.16	0.15	10.00	0	112	69.51	130.49				
m,p-Xylene	10.99	0.15	10.00	0	110	64.51	139.49				
Bromoform	12.15	0.30	10.00	0	122	59.51	144.49				
o-Xylene	10.77	0.15	10.00	0	108	69.51	130.49				
1,1,2,2-Tetrachloroethane	11.42	0.30	10.00	0	114	69.51	130.49				
1,3-Dichlorobenzene	10.39	0.30	10.00	0	104	69.51	130.49				
1,4-Dichlorobenzene	10.51	0.30	10.00	0	105	69.51	130.49				
1,2-Dichlorobenzene	10.31	0.30	10.00	0	103	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	10.28		10.00		103	69.51	130.49				
Surr: Toluene-d8	9.69		10.00		96.9	69.51	130.49				
Surr: 4-Bromofluorobenzene	9.61		10.00		96.1	69.51	130.49				

Sample ID: **1705011-04AMSD** SampType: **MSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/2/2017** RunNo: **613**
Client ID: **BatchQC** Batch ID: **A1135** TestNo: **SW8260B** Analysis Date: **5/2/2017** SeqNo: **14681**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	57.73	10.00	50.00	0	115	25.51	146.49	53.21	8.15	30	
Vinyl chloride	56.27	5.00	50.00	0	113	45.51	142.49	55.15	2.01	30	
Chloroethane	47.19	5.00	50.00	0	94.4	24.51	164.49	49.29	4.35	30	
Bromomethane	31.72	10.00	50.00	0	63.4	9.51	172.49	21.20	39.8	30	R

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental

Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **1705011-04AMSD**	SampType: **MSD**	TestCode: **VOC_W**	Units: **µg/L**	Prep Date: **5/2/2017**	RunNo: **613**
Client ID: **BatchQC**	Batch ID: **A1135**	TestNo: **SW8260B**		Analysis Date: **5/2/2017**	SeqNo: **14681**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichlorofluoromethane	60.16	5.00	50.00	0	120	31.51	164.49	58.50	2.80	30	
Acetone	1,442.87	50.00	1,000	5.580	144	9.51	188.49	1,404	2.70	30	
1,1-Dichloroethene	59.98	5.00	50.00	0	120	61.51	133.49	57.88	3.56	30	
Dichloromethane	55.51	10.00	50.00	0	111	68.51	130.49	53.44	3.80	30	
trans-1,2-Dichloroethene	56.42	5.00	50.00	0	113	66.51	131.49	53.72	4.90	30	
1,1-Dichloroethane	57.13	5.00	50.00	0	114	66.51	130.49	54.57	4.58	30	
cis-1,2-Dichloroethene	57.90	5.00	50.00	0	116	69.51	130.49	56.16	3.05	30	
Chloroform	64.03	5.00	50.00	6.330	115	68.51	130.49	60.70	5.34	30	
1,2-Dichloroethane	62.36	5.00	50.00	0	125	63.51	139.49	61.44	1.49	30	
1,1,1-Trichloroethane	57.52	5.00	50.00	0	115	64.51	139.49	55.20	4.12	30	
Carbon tetrachloride	62.99	5.00	50.00	0	126	55.51	146.49	60.69	3.72	30	
Benzene	59.36	2.50	50.00	0	119	66.51	134.49	57.12	3.85	30	
1,2-Dichloropropane	58.94	5.00	50.00	0	118	68.51	134.49	56.99	3.36	30	
Trichloroethene	62.06	5.00	50.00	0	124	67.51	138.49	60.39	2.73	30	
Bromodichloromethane	64.75	5.00	50.00	0	130	57.51	147.49	62.69	3.23	30	
cis-1,3-Dichloropropene	58.62	5.00	50.00	0	117	60.51	130.49	56.08	4.43	30	
trans-1,3-Dichloropropene	58.80	5.00	50.00	0	118	61.51	131.49	55.88	5.09	30	
1,1,2-Trichloroethane	59.05	5.00	50.00	0	118	69.51	131.49	56.10	5.12	30	
Toluene	58.86	2.50	50.00	0	118	37.51	130.49	56.77	3.61	30	
Dibromochloromethane	64.02	5.00	50.00	0	128	48.51	147.49	60.55	5.57	30	
Tetrachloroethene	64.14	5.00	50.00	2.080	124	62.51	134.49	61.17	4.74	30	
Chlorobenzene	55.16	5.00	50.00	0	110	69.51	130.49	51.95	5.99	30	
Ethylbenzene	59.03	2.50	50.00	0	118	69.51	130.49	55.92	5.41	30	

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **1705011-04AMSD** SampType: **MSD** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/2/2017** RunNo: **613**
Client ID: **BatchQC** Batch ID: **A1135** TestNo: **SW8260B** Analysis Date: **5/2/2017** SeqNo: **14681**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
m,p-Xylene	58.12	2.50	50.00	0	116	64.51	139.49	53.82	7.68	30	
Bromoform	62.46	5.00	50.00	0	125	59.51	144.49	60.41	3.34	30	
o-Xylene	56.60	2.50	50.00	0	113	68.51	130.49	53.47	5.69	30	
1,1,2,2-Tetrachloroethane	61.65	5.00	50.00	0	123	66.51	134.49	58.28	5.62	30	
1,3-Dichlorobenzene	56.80	5.00	50.00	0	114	69.51	130.49	51.74	9.32	30	
1,4-Dichlorobenzene	57.21	5.00	50.00	0	114	69.51	130.49	52.57	8.45	30	
1,2-Dichlorobenzene	56.11	5.00	50.00	0	112	69.51	130.49	51.86	7.87	30	
Surr: 1,2-Dichloroethane-d4	53.18		50.00		106	69.51	130.49		0	0	
Surr: Toluene-d8	47.15		50.00		94.3	69.51	130.49		0	0	
Surr: 4-Bromofluorobenzene	49.36		50.00		98.7	69.51	130.49		0	0	

Sample ID: **1705011-04AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/2/2017** RunNo: **613**
Client ID: **BatchQC** Batch ID: **A1135** TestNo: **SW8260B** Analysis Date: **5/2/2017** SeqNo: **14680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	53.21	10.00	50.00	0	106	25.51	146.49				
Vinyl chloride	55.15	5.00	50.00	0	110	45.51	142.49				
Chloroethane	49.29	5.00	50.00	0	98.6	24.51	164.49				
Bromomethane	21.20	10.00	50.00	0	42.4	9.51	172.49				
Trichlorofluoromethane	58.50	5.00	50.00	0	117	31.51	164.49				
Acetone	1,404.50	50.00	1,000	5.580	140	9.51	188.49				

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental

Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **1705011-04AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/2/2017** RunNo: **613**

Client ID: **BatchQC** Batch ID: **A1135** TestNo: **SW8260B** Analysis Date: **5/2/2017** SeqNo: **14680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	57.88	5.00	50.00	0	116	61.51	133.49				
Dichloromethane	53.44	10.00	50.00	0	107	68.51	130.49				
trans-1,2-Dichloroethene	53.72	5.00	50.00	0	107	66.51	131.49				
1,1-Dichloroethane	54.57	5.00	50.00	0	109	66.51	130.49				
cis-1,2-Dichloroethene	56.16	5.00	50.00	0	112	69.51	130.49				
Chloroform	60.70	5.00	50.00	6.330	109	68.51	130.49				
1,2-Dichloroethane	61.44	5.00	50.00	0	123	63.51	139.49				
1,1,1-Trichloroethane	55.20	5.00	50.00	0	110	64.51	139.49				
Carbon tetrachloride	60.69	5.00	50.00	0	121	55.51	146.49				
Benzene	57.12	2.50	50.00	0	114	66.51	134.49				
1,2-Dichloropropane	56.99	5.00	50.00	0	114	68.51	134.49				
Trichloroethene	60.39	5.00	50.00	0	121	67.51	138.49				
Bromodichloromethane	62.69	5.00	50.00	0	125	57.51	147.49				
cis-1,3-Dichloropropene	56.08	5.00	50.00	0	112	60.51	130.49				
trans-1,3-Dichloropropene	55.88	5.00	50.00	0	112	61.51	131.49				
1,1,2-Trichloroethane	56.10	5.00	50.00	0	112	69.51	131.49				
Toluene	56.77	2.50	50.00	0	114	37.51	130.49				
Dibromochloromethane	60.55	5.00	50.00	0	121	48.51	147.49				
Tetrachloroethene	61.17	5.00	50.00	2.080	118	62.51	134.49				
Chlorobenzene	51.95	5.00	50.00	0	104	69.51	130.49				
Ethylbenzene	55.92	2.50	50.00	0	112	69.51	130.49				
m,p-Xylene	53.82	2.50	50.00	0	108	64.51	139.49				
Bromoform	60.41	5.00	50.00	0	121	59.51	144.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **1705011-04AMS** SampType: **MS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/2/2017** RunNo: **613**
Client ID: **BatchQC** Batch ID: **A1135** TestNo: **SW8260B** Analysis Date: **5/2/2017** SeqNo: **14680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
o-Xylene	53.47	2.50	50.00	0	107	68.51	130.49				
1,1,2,2-Tetrachloroethane	58.28	5.00	50.00	0	117	66.51	134.49				
1,3-Dichlorobenzene	51.74	5.00	50.00	0	103	69.51	130.49				
1,4-Dichlorobenzene	52.57	5.00	50.00	0	105	69.51	130.49				
1,2-Dichlorobenzene	51.86	5.00	50.00	0	104	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	55.58		50.00		111	69.51	130.49				
Surr: Toluene-d8	46.76		50.00		93.5	69.51	130.49				
Surr: 4-Bromofluorobenzene	48.02		50.00		96.0	69.51	130.49				

Sample ID: **MB-1151** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/3/2017** RunNo: **627**
Client ID: **PBW** Batch ID: **A1151** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **14983**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	ND	2.00									
Vinyl chloride	ND	1.00									
Chloroethane	ND	1.00									
Bromomethane	ND	2.00									
Trichlorofluoromethane	ND	1.00									
Acetone	ND	10.00									
1,1-Dichloroethene	ND	1.00									
Dichloromethane	ND	2.00									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**
09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **MB-1151** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/3/2017** RunNo: **627**
Client ID: **PBW** Batch ID: **A1151** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **14983**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
trans-1,2-Dichloroethene	ND	1.00									
1,1-Dichloroethane	ND	1.00									
cis-1,2-Dichloroethene	ND	1.00									
Chloroform	ND	1.00									
1,2-Dichloroethane	ND	1.00									
1,1,1-Trichloroethane	ND	1.00									
Carbon tetrachloride	ND	1.00									
Benzene	ND	0.50									
1,2-Dichloropropane	ND	1.00									
Trichloroethene	ND	1.00									
Bromodichloromethane	ND	1.00									
cis-1,3-Dichloropropene	ND	1.00									
trans-1,3-Dichloropropene	ND	1.00									
1,1,2-Trichloroethane	ND	1.00									
Toluene	ND	0.50									
Dibromochloromethane	ND	1.00									
Tetrachloroethene	ND	1.00									
Chlorobenzene	ND	1.00									
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	0.50									
Bromoform	ND	1.00									
o-Xylene	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	1.00									

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **MB-1151** SampType: **MBLK** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/3/2017** RunNo: **627**
Client ID: **PBW** Batch ID: **A1151** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **14983**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,3-Dichlorobenzene	ND	1.00									
1,4-Dichlorobenzene	ND	1.00									
1,2-Dichlorobenzene	ND	1.00									
Surr: 1,2-Dichloroethane-d4	10.3		10.00		103	69.51	130.49				
Surr: Toluene-d8	9.90		10.00		99.0	69.51	130.49				
Surr: 4-Bromofluorobenzene	10.6		10.00		106	69.51	130.49				

Sample ID: **LCS-1151** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/3/2017** RunNo: **627**
Client ID: **LCSW** Batch ID: **A1151** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **14982**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloromethane	9.49	2.00	10.00	0	94.9	39.51	145.49				
Vinyl chloride	9.76	1.00	10.00	0	97.6	69.51	130.49				
Chloroethane	8.12	1.00	10.00	0	81.2	37.51	156.49				
Bromomethane	5.64	2.00	10.00	0	56.4	13.51	162.49				
Trichlorofluoromethane	10.35	1.00	10.00	0	104	45.51	154.49				
Acetone	240.93	10.00	200.0	0	120	21.51	188.49				
1,1-Dichloroethene	10.63	1.00	10.00	0	106	69.51	130.49				
Dichloromethane	9.59	2.00	10.00	0	95.9	68.51	130.49				
trans-1,2-Dichloroethene	10.04	1.00	10.00	0	100	69.51	130.49				
1,1-Dichloroethane	9.91	1.00	10.00	0	99.1	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

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QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **LCS-1151** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/3/2017** RunNo: **627**
Client ID: **LCSW** Batch ID: **A1151** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **14982**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
cis-1,2-Dichloroethene	10.01	1.00	10.00	0	100	69.51	130.49				
Chloroform	9.76	1.00	10.00	0	97.6	69.51	130.49				
1,2-Dichloroethane	10.53	1.00	10.00	0	105	69.51	133.49				
1,1,1-Trichloroethane	9.99	1.00	10.00	0	99.9	69.51	135.49				
Carbon tetrachloride	11.06	1.00	10.00	0	111	62.51	143.49				
Benzene	10.33	0.50	10.00	0	103	69.51	130.49				
1,2-Dichloropropane	10.07	1.00	10.00	0	101	69.51	130.49				
Trichloroethene	10.92	1.00	10.00	0	109	67.51	138.49				
Bromodichloromethane	11.12	1.00	10.00	0	111	57.51	147.49				
cis-1,3-Dichloropropene	11.06	1.00	10.00	0	111	69.51	130.49				
trans-1,3-Dichloropropene	10.49	1.00	10.00	0	105	69.51	131.49				
1,1,2-Trichloroethane	10.08	1.00	10.00	0	101	69.51	130.49				
Toluene	10.25	0.50	10.00	0	103	69.51	130.49				
Dibromochloromethane	11.07	1.00	10.00	0	111	48.51	147.49				
Tetrachloroethene	11.00	1.00	10.00	0	110	69.51	130.49				
Chlorobenzene	9.56	1.00	10.00	0	95.6	69.51	130.49				
Ethylbenzene	10.32	0.50	10.00	0	103	69.51	130.49				
m,p-Xylene	10.09	0.50	10.00	0	101	64.51	139.49				
Bromoform	10.89	1.00	10.00	0	109	59.51	144.49				
o-Xylene	9.86	0.50	10.00	0	98.6	69.51	130.49				
1,1,2,2-Tetrachloroethane	10.56	1.00	10.00	0	106	69.51	130.49				
1,3-Dichlorobenzene	9.55	1.00	10.00	0	95.5	69.51	130.49				
1,4-Dichlorobenzene	9.64	1.00	10.00	0	96.4	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

Alpha Analytical, Inc
255 Glendale Ave, #21
Sparks, Nevada 89431
TEL: (775) 355-1044 FAX: (775) 355-0406
Website: www.alpha-analytical.com

QC SUMMARY REPORT

WO#: **1705001**

09-May-17

Client: Prima Environmental
Project: BC-PCBs **TestCode:** **VOC_W**

Sample ID: **LCS-1151** SampType: **LCS** TestCode: **VOC_W** Units: **µg/L** Prep Date: **5/3/2017** RunNo: **627**
Client ID: **LCSW** Batch ID: **A1151** TestNo: **SW8260B** Analysis Date: **5/3/2017** SeqNo: **14982**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	9.43	1.00	10.00	0	94.3	69.51	130.49				
Surr: 1,2-Dichloroethane-d4	10.36		10.00		104	69.51	130.49				
Surr: Toluene-d8	9.61		10.00		96.1	69.51	130.49				
Surr: 4-Bromofluorobenzene	9.92		10.00		99.2	69.51	130.49				

Qualifiers: ND Not Detected at the Reporting Limit R RPD outside accepted recovery limits S Spike Recovery outside accepted recovery limits

Definitions:

ND = Not Detected

D = Reporting Limits were increased due to high concentrations of non-target analytes.

H = Reporting Limits were increased due to the hydrocarbons present in the sample.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

K = DRO concentration may include contributions from lighter-end hydrocarbons (e.g. gasoline) that elute in the DRO range.

L = DRO concentration may include contributions from heavier-end hydrocarbons (e.g. motor oil) that elute in the DRO range.

M = Manual Integration used to determine area response.

O = Reporting Limits were increased due to sample foaming.

V = Reporting Limits were increased due to high concentrations of target analytes.

X = Reporting Limits were increased due to sample matrix interferences.

Z = DRO concentration may include contributions from lighter-end (e.g. gasoline) and heavier-end (e.g. motor oil) hydrocarbons that elute in the DRO range.

S50 = The analysis of the sample required a dilution such that the surrogate concentration was diluted below the laboratory acceptance criteria. The laboratory control sample was acceptable.

S51 = Surrogate recovery could not be determined due to the presence of co-eluting hydrocarbons.

S54 = Surrogate recovery was below laboratory acceptance limits.

S55 = Surrogate recovery was above laboratory acceptance limits.

Report CC's Cindy Schreier

CHAIN-OF-CUSTODY RECORD

Alpha Analytical, Inc.

255 Glendale Ave, #21 Sparks, Nevada 89431
TEL: (775) 355-1044 FAX: (775) 355-0406

CA

WorkOrder: PES1705001
Report Due By: 08-May-17
EDD Required: NO

Report Attention: Cindy Schreier

Client:
Prima Environmental
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762

TEL: 9169397300
FAX: 9169397398
ProjectNo: BC-PCBs

Date Received: 29-Apr-17

Alpha Sample ID	Client Sample ID	Matrix	Collection Date	No. of Bottles Alpha	Sub	TAT	Requested Tests 300_0_W	METHANE_W	VOC_S	VOC_W				Sample Remarks
PES1705001-01	OV-Con	AQ	4/28/2017 3:30:00 PM	7	0	5	B - Chloride	A - CH4/C2H6/ C2H4		A - 8260/ Acetone_Cs				
PES1705001-02	OV-ZVI-B	AQ	4/28/2017 3:30:00 PM	7	0	5	B - Chloride	A - CH4/C2H6/ C2H4		A - 8260/ Acetone_Cs				
PES1705001-03	OV-AP-HP-B	AQ	4/28/2017 3:30:00 PM	4	0	5	B - Chloride			A - 8260/ Acetone_Cs				
PES1705001-04	OV-CHP-B	AQ	4/28/2017 3:30:00 PM	4	0	5	B - Chloride			A - 8260/ Acetone_Cs				
PES1705001-05	Bed-Con	AQ	4/28/2017 3:30:00 PM	4	0	5	B - Chloride			A - 8260/ Acetone_Cs				
PES1705001-06	Bed-NaMnO4-B	AQ	4/28/2017 3:30:00 PM	4	0	5	B - Chloride			A - 8260/ Acetone_Cs				
PES1705001-07	Bed-AP-HP-B	AQ	4/28/2017 3:30:00 PM	4	0	5	B - Chloride			A - 8260/ Acetone_Cs				
PES1705001-08	OV-Con-SO	SO	4/28/2017 3:30:00 PM	1	0	5			A - 8260/ Acetone_Cs					
PES1705001-09	OV-ZVI-B-SO	SO	4/28/2017 3:30:00 PM	1	0	5			A - 8260/ Acetone_Cs					

Comments: Saturday delivery. Samples kept cold and secure until login on Monday. TCE may be high in OV-Con, Bed Con, OV-ZVI-B.

	Signature	Print Name	Company	Date/Time
Logged in by:	KMurray	KMurray	Alpha Analytical, Inc.	5/1/17 1015

NOTE: Samples are discarded 60 days after sample receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

PES1705001-10	OV-AP-HP-B-SO	SO	4/28/2017 3:30:00 PM	1	0	5			A - 8260/ Acetone_Cs					
PES1705001-11	OV-CHP-B-SO	SO	4/28/2017 3:30:00 PM	1	0	5			A - 8260/ Acetone_Cs					

Comments: Saturday delivery. Samples kept cold and secure until login on Monday. TCE may be high in OV-Con, Bed Con, OV-ZVI-B.

	Signature	Print Name	Company	Date/Time
Logged in by:	K Murray	K Murray	**Alpha Analytical, Inc.**	5/1/17 1015

NOTE: Samples are discarded 60 days after sample receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

CHAIN OF CUSTODY

2846

Billing Information:
Company: PRIMA Env
Attn:
Address:
City, State, Zip:
Phone Number: Fax:

Alpha Analytical, Inc.
Main Laboratory: 255 Glendale Ave, Suite 21 Sparks, NV 89431 Phone: 775-355-1044 Fax: 775-355-0406
Satellite Service Centers:
Northern CA: 9891 Horn Road, Suite C, Rancho Cordova, CA 95827 Phone: 916-366-9089
Southern CA: 1007 E. Dominguez St., Suite O, Carson, CA 90746 Phone: 714-386-2901
Northern NV: Elko, NV 89801 Phone: 775-388-7043
Southern NV: Las Vegas, NV 89120 Phone: 702-281-4848

Consultant/ Client Info:
Company: PRIMA
Address:
City, State, Zip:

Job and Purchase Order Info:
Job # BC-PCBs
Job Name:
P.O. #:

Report Attention/Project Manager:
Name: Cindy Schreier
Email Address: data@primenvironmental.com
Phone #: 916-939-7300
Cell #:

QC Deliverable Info:
EDD Required? Yes / No EDF Required? Yes / No
Global ID:
Data Validation Packages: III or IV

Samples Collected from which State? (circle one) AR CA KS NV OR WA DOD Site Other

Time Sampled (HHMM)	Date Sampled (MM/DD)	Matrix* (See Key Below)	Lab ID Number (For Lab Use Only)	Sample Description	TAT	# of Containers** (See Key Below)	Field Filtered? Yes	Field Filtered? No	Analysis Requested: 8260	Analysis Requested: RSK-175 Dissolved gasses	Analysis Requested: Chloride	Remarks
1530	4/28/17	AQ	PES1705001-01	OV-Con	5day	6V 1P	X	X	X	X	X	
			02	OV-ZVI-B		3V 1P	X	X	X	X	X	
			03	OV-AP-HP-B			X	X	X		X	
			04	OV-CHP-B			X	X	X		X	
			05	Bed-Con			X	X	X		X	
			06	Bed-$NaMnO_4$-B			X	X	X		X	
			07	Bed-AP-HP-B			X	X	X		X	
	4/28/17	SO	08	OV-Con-SO		1SO			X			
			09	OV-ZVI-B-SO					X			
			10	OV-AP-HP-B-SO					X			

ADDITIONAL INSTRUCTIONS:
TCE may be high, Dissolved gasses: Methane, ethane, ethene
↳ in "OV-Con", "Bed Con", "OV-ZVI-B"

I (field sampler) attest to the validity and authenticity of this sample(s). I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. NAC 445.0636 (c) (2).

Sampled By:

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	4/28/17	1830	FedEx		
			KMurray	5/1/17	0945

* Key: AQ - Aqueous AR-Air OT - Other So-Soil WA - Waste ** B - Brass L - Liter O - Orbo OT - Other P - Plastic S-Soil Jar T - Tedlar V - VOA

NOTE: Samples are discarded 60 days after sample receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense. The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.

07/16

CHAIN OF CUSTODY

2848

Billing Information:

Company: PRIMA
Attn:
Address:
City, State, Zip:
Phone Number: Fax:

Alpha Analytical, Inc.

Main Laboratory: 255 Glendale Ave, Suite 21 Sparks, NV 89431 Phone: 775-355-1044 Fax: 775-355-0406

Satellite Service Centers:

Northern CA: 9891 Horn Road, Suite C, Rancho Cordova, CA 95827 Phone: 916-366-9089
Southern CA: 1007 E. Dominguez St., Suite O, Carson, CA 90746 Phone: 714-386-2901
Northern NV: Elko, NV 89801 Phone: 775-388-7043
Southern NV: Las Vegas, NV 89120 Phone: 702-281-4848

Consultant/ Client Info:

Company: PRIMA
Address:
City, State, Zip:

Job and Purchase Order Info:

Job # BC-PCBs
Job Name:
P.O. #:

Report Attention/Project Manager:

Name: Cindy Schreier
Email Address: data@primenvironmental.com
Phone #: 916-939-7300
Cell #:

QC Deliverable Info:

EDD Required? Yes / No EDF Required? Yes / No
Global ID:
Data Validation Packages: III or IV

Samples Collected from which State? (circle one) AR CA KS NV OR WA DOD Site Other

Time Sampled (HHMM)	Date Sampled (MM/DD)	Matrix* (See Key Below)	Lab ID Number (For Lab Use Only)	Sample Description	TAT	# Containers** (See Key Below)	Field Filtered? Yes	Field Filtered? No	Analysis Requested: 8260	Remarks
	4/28/17	SO	PES1705001-11	SV-CHP-B-SO	5day	1sv			X	

ADDITIONAL INSTRUCTIONS:

I (field sampler) attest to the validity and authenticity of this sample(s). I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action. NAC 445.0636 (c) (2).

Sampled By:

Relinquished by: (Signature/Affiliation)	Date	Time	Received by: (Signature/Affiliation)	Date	Time
	4/28/17	1830	FedEx		
				5/1/17	0945

* Key: AQ - Aqueous AR-Air OT - Other So-Soil WA - Waste ** B - Brass L - Liter O - Orbo OT - Other P - Plastic S-Soil Jar T - Tedlar V - VOA

NOTE: Samples are discarded 60 days after sample receipt unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense. The report for the analysis of the above samples is applicable only to those samples received by the laboratory with this COC. The liability of the laboratory is limited to the amount paid for the report.

07/16

McCampbell Analytical, Inc.
"When Quality Counts"

Analytical Report

WorkOrder: 1703G45 **Amended:** 05/15/2017

Report Created for: Prima Environmental

5070 Robert J. Mathews Pkwy, Suite 300
El Dorado Hills, CA 95762

Project Contact: Cindy Schreier
Project P.O.:
Project Name: BC-PCBs

Project Received: 03/31/2017

Analytical Report reviewed & approved for release on 04/04/2017 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

1534 Willow Pass Rd. Pittsburg, CA 94565 ♦ TEL: (877) 252-9262 ♦ FAX: (925) 252-9269 ♦ www.mccampbell.com
CA ELAP 1644 ♦ NELAP 4033ORELAP

McCampbell Analytical, Inc.
"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Prima Environmental
Project: BC-PCBs
WorkOrder: 1703G45

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

McCampbell Analytical, Inc.
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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1703G45
Date Received:	3/31/17 9:39	**Extraction Method:**	SW3510C
Date Prepared:	3/31/17	**Analytical Method:**	SW8082
Project:	BC-PCBs	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW15D-Unt	1703G45-001A	Water	03/30/2017 16:00	GC20	136545

Analytes	Result	MDL	RL	DF	Date Analyzed
Aroclor1016	ND	6.0	25	50	04/04/2017 09:54
Aroclor1221	ND	9.0	25	50	04/04/2017 09:54
Aroclor1232	ND	6.5	25	50	04/04/2017 09:54
Aroclor1242	**130**	4.0	25	50	04/04/2017 09:54
Aroclor1248	ND	14	25	50	04/04/2017 09:54
Aroclor1254	**34**	8.0	25	50	04/04/2017 09:54
Aroclor1260	ND	5.5	25	50	04/04/2017 09:54
PCBs, total	**160**	25	25	50	04/04/2017 09:54

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	130	70-130	04/04/2017 09:54

Analyst(s): CK

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW15B-Unt	1703G45-002A	Water	03/30/2017 15:30	GC20	136545

Analytes	Result	MDL	RL	DF	Date Analyzed
Aroclor1016	ND	6.0	25	50	04/04/2017 10:50
Aroclor1221	ND	9.0	25	50	04/04/2017 10:50
Aroclor1232	ND	6.5	25	50	04/04/2017 10:50
Aroclor1242	**290**	4.0	25	50	04/04/2017 10:50
Aroclor1248	ND	14	25	50	04/04/2017 10:50
Aroclor1254	**98**	8.0	25	50	04/04/2017 10:50
Aroclor1260	ND	5.5	25	50	04/04/2017 10:50
PCBs, total	**390**	25	25	50	04/04/2017 10:50

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	95	70-130	04/04/2017 10:50

Analyst(s): CK

(Cont.)

NELAP 4033ORELAP

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1703G45
Date Received:	3/31/17 9:39	**Extraction Method:**	SW3510C
Date Prepared:	3/31/17	**Analytical Method:**	SW8082
Project:	BC-PCBs	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MW26B-Unt	1703G45-003A	Water	03/30/2017 15:00	GC20	136545

Analytes	Result	MDL	RL	DF	Date Analyzed
Aroclor1016	**6.1**	0.24	1.0	2	04/04/2017 11:47
Aroclor1221	ND	0.36	1.0	2	04/04/2017 11:47
Aroclor1232	ND	0.26	1.0	2	04/04/2017 11:47
Aroclor1242	ND	0.16	1.0	2	04/04/2017 11:47
Aroclor1248	ND	0.56	1.0	2	04/04/2017 11:47
Aroclor1254	ND	0.32	1.0	2	04/04/2017 11:47
Aroclor1260	ND	0.22	1.0	2	04/04/2017 11:47
PCBs, total	**6.1**	1.0	1.0	2	04/04/2017 11:47

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	70	70-130	04/04/2017 11:47

Analyst(s): CK

McCampbell Analytical, Inc.
"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Quality Control Report

Client:	Prima Environmental	**WorkOrder:**	1703G45
Date Prepared:	3/31/17	**BatchID:**	136545
Date Analyzed:	3/31/17	**Extraction Method:**	SW3510C
Instrument:	GC20	**Analytical Method:**	SW8082
Matrix:	Water	**Unit:**	µg/L
Project:	BC-PCBs	**Sample ID:**	MB/LCS/LCSD-136545

QC Summary Report for SW8082

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Aroclor1016	ND	0.12	0.50	-	-	-
Aroclor1221	ND	0.18	0.50	-	-	-
Aroclor1232	ND	0.13	0.50	-	-	-
Aroclor1242	ND	0.080	0.50	-	-	-
Aroclor1248	ND	0.28	0.50	-	-	-
Aroclor1254	ND	0.16	0.50	-	-	-
Aroclor1260	ND	0.11	0.50	-	-	-
PCBs, total	ND	0.50	0.50	-	-	-
Surrogate Recovery						
Decachlorobiphenyl	1.186			1.25	95	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Aroclor1016	4.10	3.81	3.75	109	102	70-130	7.21	20
Aroclor1260	4.01	3.61	3.75	107	96	70-130	10.4	20
Surrogate Recovery								
Decachlorobiphenyl	1.21	1.23	1.25	97	98	70-130	1.49	20

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1703G45 **ClientCode: PEM** **QuoteID: 7102**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☑ J-flag

Report to:
Cindy Schreier
Prima Environmental
5070 Robert J. Mathews Pkwy, Suite 300
El Dorado Hills, CA 95762
(916) 363-8798 FAX: (916) 363-8829

Email: data@primaenvironmental.com
cc/3rd Party:
PO:
ProjectNo: BC-PCBs

Bill to:
Accounts Payable
Prima Environmental
5070 Robert J. Mathews Pkwy, Suite 30
El Dorado Hills, CA 95762

Requested TAT: 2 days;
Date Received: 03/31/2017
Date Logged: 03/31/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1703G45-001	MW15D-Unt	Water	3/30/2017 16:00	☐	A											
1703G45-002	MW15B-Unt	Water	3/30/2017 15:30	☐	A											
1703G45-003	MW26B-Unt	Water	3/30/2017 15:00	☐	A											

Test Legend:

1	8082_PCB_W	2		3		4	
5		6		7		8	
9		10		11		12	

Project Manager: Blake Brown

Prepared by: Jena Alfaro

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: PRIMA ENVIRONMENTAL **Project:** BC-PCBs **Work Order:** 1703G45
Client Contact: Cindy Schreier **QC Level:**
Contact's Email: data@primaenvironmental.com **Comments:** **Date Logged:** 3/31/2017

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☑ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1703G45-001A	MW15D-Unt	Water	SW8082 (PCBs Only)	2	aVOA	☐	3/30/2017 16:00	2 days	None	☐	
1703G45-002A	MW15B-Unt	Water	SW8082 (PCBs Only)	2	aVOA	☐	3/30/2017 15:30	2 days	Present	☐	
1703G45-003A	MW26B-Unt	Water	SW8082 (PCBs Only)	2	aVOA	☐	3/30/2017 15:00	2 days	None	☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

RUSH 1703G45

McCampbell Analytical, Inc.

1534 Willow Pass Rd. / Pittsburg, Ca. 94565-1701
www.mccampbell.com / main@mccampbell.com
Telephone: (877) 252-9262 / Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

TURN AROUND TIME: RUSH ☐ 1 DAY ☐ 2 DAY ☒ 3 DAY ☐ 5 DAY ☐
GeoTracker EDF ☐ PDF ☐ EDD ☐ Write On (DW) ☐ EQuIS ☐ 10 DAY ☐
Effluent Sample Requiring "J" flag ☐ UST Clean Up Fund Project ☐; Claim #_____

Report To: Cindy Schreier Bill To: PRIMA
Company: PRIMA ENV
Tele: (916) 939-7300 E-Mail:
Project #: BC-PCBs Project Name:
Project Location: Purchase Order#
Sampler Signature:

SAMPLE ID	Location/ Field Point Name	SAMPLING Date	SAMPLING Time	# Containers	MATRIX: Ground Water	Waste Water	Drinking Water	Sea Water	Soil	Air	Sludge	Other	METHOD PRESERVED: HCL	HNO_3	Other
~~BC-PCBComp SO~~		~~3/30~~	~~1730~~	1					X						
MW15D-Unt		3/30/17	1600	2	X										
MW15B-Unt		3/30/17	1530	2	X										
MW26B-Unt		3/30/17	1500	2	X										

Analysis Request

BTEX & TPH as Gas (8021/ 8015) MTBE	TPH as Diesel (8015)	Total Petroleum Oil & Grease (1664 / 5520 E/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 505/ 608 / 8081 (Cl Pesticides)	EPA 608 / 8082 PCB's ; Aroclors only	EPA 507 / 8141 (NP Pesticides)	EPA 515 / 8151 (Acidic Cl Herbicides)	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.8 / 6020)***	LUFT 5 Metals (200.8 / 6020)***	Metals (200.8 / 6020)***	Lab to Filter sample for Dissolved metals analysis	PCBs
															X
															X
															X
															X

**MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to do business.

*** If metals are requested for water samples and the water type is not specified on the chain of custody, then MAI will default to metals by E200.8.

FedEx # 5 8694 0808 1147

Relinquished By:	Date:	Time:	Received By:
[signature]	3/30/17	~~1800~~	FedEx
FedEx	3/31/17	939	[signature]

ICE/t° 4.1 WET
GOOD CONDITION_____
HEAD SPACE ABSENT_____
DECHLORINATED IN LAB_____
APPROPRIATE CONTAINERS_____
PRESERVED IN LAB_____
PRESERVATION_____ VOAS O&G METALS OTHER pH<2_____

COMMENTS: Quote 7102
PCBs may be very high
HAZARDOUS: *Sample Not Rec'd

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Sample Receipt Checklist

Client Name:	**Prima Environmental**	Date and Time Received	**3/31/2017 09:39**
Project Name:	**BC-PCBs**	Date Logged:	**3/31/2017**
		Received by:	Jena Alfaro
WorkOrder №:	**1703G45** Matrix:	Logged by:	Jena Alfaro
Carrier:	FedEx		

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☑	No ☐

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	NA ☐
Sample/Temp Blank temperature	Temp: 4.1°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☑	No ☐	NA ☐
Sample labels checked for correct preservation?	Yes ☑	No ☐	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	
	(Ice Type: WET ICE)		

UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522?	Yes ☐	No ☐	NA ☑
Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539?	Yes ☐	No ☐	NA ☑

Comments:

McCampbell Analytical, Inc.
"When Quality Counts"

Analytical Report

WorkOrder: 1704002

Report Created for: Prima Environmental

5070 Robert J. Mathews Pkwy, Suite 300
El Dorado Hills, CA 95762

Project Contact: Cindy Schreier
Project P.O.:
Project Name: BC-PCBs

Project Received: 04/01/2017

Analytical Report reviewed & approved for release on 04/04/2017 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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Glossary of Terms & Qualifier Definitions

Client: Prima Environmental
Project: BC-PCBs
WorkOrder: 1704002

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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Glossary of Terms & Qualifier Definitions

Client: Prima Environmental
Project: BC-PCBs
WorkOrder: 1704002

Analytical Qualifiers

S	surrogate spike recovery outside accepted recovery limits
c7	surrogate value diluted out of range
h4	sulfuric acid permanganate (EPA 3665) cleanup

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1704002
Date Received:	4/1/17 10:40	**Extraction Method:**	SW3550B
Date Prepared:	4/3/17	**Analytical Method:**	SW8082
Project:	BC-PCBs	**Unit:**	mg/kg

Polychlorinated Biphenyls (PCBs) Aroclors

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
BC-PCBs Comp SO	**1704002-001A**	**Sludge**	**03/31/2017 14:45**	**GC40**	**136620**

Analytes	Result	MDL	RL	DF	Date Analyzed
Aroclor1016	ND	10	100	2,000	04/04/2017 09:58
Aroclor1221	ND	66	100	2,000	04/04/2017 09:58
Aroclor1232	ND	6.4	100	2,000	04/04/2017 09:58
Aroclor1242	**830**	7.0	100	2,000	04/04/2017 09:58
Aroclor1248	**1300**	7.2	100	2,000	04/04/2017 09:58
Aroclor1254	ND	4.4	100	2,000	04/04/2017 09:58
Aroclor1260	ND	17	100	2,000	04/04/2017 09:58
Aroclor1262	ND	100	100	2,000	04/04/2017 09:58
PCBs, total	**2100**	8.0	100	2,000	04/04/2017 09:58

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	671	S	70-130	04/04/2017 09:58

Analyst(s): SS Analytical Comments: h4,c7

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1704002
Date Received:	4/1/17 10:40	**Extraction Method:**	SW9060A
Date Prepared:	4/3/17	**Analytical Method:**	SW9060A
Project:	BC-PCBs	**Unit:**	mg/Kg

Total Organic Carbon (TOC)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
BC-PCBs Comp SO	**1704002-001A**	**Sludge**	**03/31/2017 14:45**	**WC_CNS**	**136657**

Analytes	Result	MDL	RL	DF	Date Analyzed
TOC	**1600**	200	200	1	04/03/2017 17:44

Analyst(s): RB

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Quality Control Report

Client:	Prima Environmental	**WorkOrder:**	1704002
Date Prepared:	4/3/17	**BatchID:**	136620
Date Analyzed:	4/4/17	**Extraction Method:**	SW3550B
Instrument:	GC40	**Analytical Method:**	SW8082
Matrix:	Soil	**Unit:**	mg/kg
Project:	BC-PCBs	**Sample ID:**	MB/LCS/LCSD-136620

QC Summary Report for SW8082

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Aroclor1016	ND	0.0051	0.050	-	-	-
Aroclor1221	ND	0.033	0.050	-	-	-
Aroclor1232	ND	0.0032	0.050	-	-	-
Aroclor1242	ND	0.0035	0.050	-	-	-
Aroclor1248	ND	0.0036	0.050	-	-	-
Aroclor1254	ND	0.0022	0.050	-	-	-
Aroclor1260	ND	0.0085	0.050	-	-	-
Aroclor1262	ND	0.050	0.050	-	-	-
PCBs, total	ND	0.0040	0.050	-	-	-
Surrogate Recovery						
Decachlorobiphenyl	0.04808			0.050	96	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Aroclor1016	0.148	0.156	0.15	99	104	70-130	5.21	20
Aroclor1260	0.127	0.140	0.15	84	94	70-130	10.3	20
Surrogate Recovery								
Decachlorobiphenyl	0.0394	0.0394	0.050	79	79	70-130	0	20

NELAP 4033ORELAP

QA/QC Officer

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Quality Control Report

Client:	Prima Environmental	**WorkOrder:**	1704002
Date Prepared:	4/3/17	**BatchID:**	136657
Date Analyzed:	4/3/17	**Extraction Method:**	SW9060A
Instrument:	WC_CNS	**Analytical Method:**	SW9060A
Matrix:	Soil	**Unit:**	mg/kg
Project:	BC-PCBs	**Sample ID:**	MB/LCS-136657

QC Summary Report for SW9060A

Analyte	MB Result	LCS Result	MDL	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TOC	ND	8120	200	200	8200	-	99	80-120

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 1704002 **ClientCode: PEM**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Cindy Schreier
Prima Environmental
5070 Robert J. Mathews Pkwy, Suite 300
El Dorado Hills, CA 95762
(916) 363-8798 FAX: (916) 363-8829

Email: data@primaenvironmental.com
cc/3rd Party:
PO:
ProjectNo: BC-PCBs

Bill to:
Accounts Payable
Prima Environmental
5070 Robert J. Mathews Pkwy, Suite 30
El Dorado Hills, CA 95762

Requested TAT: **1 day;**
Date Received: **04/01/2017**
Date Logged: **04/03/2017**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1704002-001	BC-PCBs Comp SO	Sludge	3/31/2017 14:45	☐	A	A										

Test Legend:

1	8082_PCB_S	2	cnsTOC_S	3		4	
5		6		7		8	
9		10		11		12	

Prepared by: Maria Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: PRIMA ENVIRONMENTAL
Client Contact: Cindy Schreier
Contact's Email: data@primaenvironmental.com

Project: BC-PCBs
Comments:

Work Order: 1704002
QC Level: LEVEL 2
Date Logged: 4/3/2017

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1704002-001A	BC-PCBs Comp SO	Sludge	SM5310Bm (TOC)	1	4OZ GJ	☐	3/31/2017 14:45	1 day		☐	
			SW8082 (PCBs Only)			☐		1 day		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

General COC

RUSH 24 hr ASAP

MAI Work Order # 1704002

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CHAIN OF CUSTODY RECORD

Turn Around Time: 1 Day Rush X | 2 Day Rush | 3 Day Rush | STD | Quote #
J-Flag / MDL | ESL | Cleanup Approved | Bottle Order #
Delivery Format: GeoTracker EDF | PDF | EDD | Write On (DW) | EQuIS

Report To: PRIMA Env Bill To: PRIMA
Company: Cindy Schreier
Email: data@primaenvironmental.com
Alt Email: cschreier@primenvironmental.com Tele: 916-939-7300
Project Name/#: BC-PCBs
Project Location: PO #
Sampler Signature:

SAMPLE ID Location / Field Point	Sampling Date	Sampling Time	#Containers	Matrix	Preservative
BC-PCBs Comp SO	3-31-17	1445	1	Soil	—

Analysis Requested

BTEX & TPH as Gas (8021/ 8015) MTBE	TPH as Diesel (8015) + Motor Oil Without Silica Gel	TPH as Diesel (8015) + Motor Oil With Silica Gel	Total Oil & Grease (1664 / 9071) Without Silica Gel	Total Petroleum Hydrocarbons - Oil & Grease (1664 / 9071) With Silica Gel	Total Petroleum Hydrocarbons (418.1) With Silica Gel	EPA 505/ 608 / 8081 (Cl Pesticides)	EPA 608 / 8082 PCB's ; Aroclors only	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.8 / 6020)*	Metals (200.8 / 6020)	Baylands Requirements	Lab to filter sample for dissolved metals analysis	PCBs	TOCs		
															X	X		

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

* If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E2008.

Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
PRIMA	3/31/17	1545	FedEx		
FedEX		Cas	Manna To	4/1/17	1040

Comments / Instructions
Quote 7102 24hr
Need data ASAP
COB 4/4/17 preferred
PCBs may be high

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other
Preservative Code: 1=4°C 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=ZnOAc/NaOH 7=None

TRK# 0215 8694 0808 1136

Temp 4.6 °C Initials

Page ___ of ___

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Sample Receipt Checklist

Client Name:	**Prima Environmental**	Date and Time Received	**4/1/2017 10:40**
Project Name:	**BC-PCBs**	Date Logged:	**4/3/2017**
		Received by:	Maria Venegas
WorkOrder №:	**1704002** Matrix: Sludge	Logged by:	Maria Venegas
Carrier:	FedEx		

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☑	No ☐

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	NA ☐
Sample/Temp Blank temperature	Temp: 4.6°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	
	(Ice Type: WET/BLU)		

UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522?	Yes ☐	No ☐	NA ☑
Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539?	Yes ☐	No ☐	NA ☑

Comments:

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1704814 A

Report Created for: Prima Environmental

5070 Robert J. Mathews Pkwy, Suite 300
El Dorado Hills, CA 95762

Project Contact: Cindy Schreier
Project P.O.:
Project Name: BC-PCB

Project Received: 04/18/2017

Analytical Report reviewed & approved for release on 05/11/2017 by:

Angela Rydelius,
Laboratory Manager

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Glossary of Terms & Qualifier Definitions

Client: Prima Environmental
Project: BC-PCB
WorkOrder: 1704814

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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Glossary of Terms & Qualifier Definitions

Client: Prima Environmental
Project: BC-PCB
WorkOrder: 1704814

Analytical Qualifiers

S	surrogate spike recovery outside accepted recovery limits
c1	surrogate recovery outside of the control limits due to the dilution of the sample.
c10	estimated value.
j1	see attached narrative

Quality Control Qualifiers

F2	LCS/LCSD recovery and/or RPD is out of acceptance criteria.

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Case Narrative

Client: Prima Environmental
Project: BC-PCB

Work Order: 1704814
May 22, 2017

Aroclors are a mixture of PCBs. Normally, Aroclors are identified based on two things when analyzed by ECD dual column system: retention time and the peak pattern, where the relative intensity of the peaks in the pattern of the unknown sample is compared to the known Aroclors/CCV, per the method. Aroclors are quantified by comparing the peak area of representative peaks in the unknown sample to the peak area of the same peaks of a known sample of known concentration.

The data are estimated because the pattern of peaks does not match the pattern of the Aroclor eluting at that retention time. However, after discussion with the client, it was determined that treatment of the sample by the client likely altered the Aroclor pattern. If we, McCampbell, had not known the full scenario, we would have raised the reporting limit above the present value because of the uncertainty of the quality of the pattern present. Instead, estimated values are reported at the request of the client.

A congeners study is recommended due to huge variation in the pattern post sample treatment for better identification.

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1704814
Date Received:	4/18/17 8:53	**Extraction Method:**	SW3510C
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors (Decanted)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-2V1-A	**1704814-001B**	**Water**	**04/14/2017 15:15**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/05/2017 04:44
Aroclor1221	ND	5.0	10	05/05/2017 04:44
Aroclor1232	ND	5.0	10	05/05/2017 04:44
Aroclor1242	**83**	10	20	05/10/2017 17:57
Aroclor1248	ND	5.0	10	05/05/2017 04:44
Aroclor1254	**26**	5.0	10	05/05/2017 04:44
Aroclor1260	ND	5.0	10	05/05/2017 04:44
PCBs, total	**109**	5.0	10	05/05/2017 04:44

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	92	70-130	05/05/2017 04:44

Analyst(s): CK Analytical Comments: j1,c10

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-AP-HP-A	**1704814-002B**	**Water**	**04/14/2017 15:15**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/05/2017 05:32
Aroclor1221	ND	5.0	10	05/05/2017 05:32
Aroclor1232	ND	5.0	10	05/05/2017 05:32
Aroclor1242	**130**	10	20	05/09/2017 23:14
Aroclor1248	ND	5.0	10	05/05/2017 05:32
Aroclor1254	**46**	5.0	10	05/05/2017 05:32
Aroclor1260	ND	5.0	10	05/05/2017 05:32
PCBs, total	**176**	5.0	10	05/05/2017 05:32

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	111	70-130	05/05/2017 05:32

Analyst(s): CK Analytical Comments: j1,c10

(Cont.)

NELAP 4033ORELAP

Angela Rydelius, Lab Manager

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1704814
Date Received:	4/18/17 8:53	**Extraction Method:**	SW3510C
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors (Decanted)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-CHP-A	**1704814-003B**	**Water**	**04/14/2017 15:15**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/05/2017 06:20
Aroclor1221	ND	5.0	10	05/05/2017 06:20
Aroclor1232	ND	5.0	10	05/05/2017 06:20
Aroclor1242	**72**	5.0	10	05/05/2017 06:20
Aroclor1248	ND	5.0	10	05/05/2017 06:20
Aroclor1254	ND	5.0	10	05/05/2017 06:20
Aroclor1260	ND	5.0	10	05/05/2017 06:20
PCBs, total	**72**	5.0	10	05/05/2017 06:20

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	91	70-130	05/05/2017 06:20

Analyst(s): CK Analytical Comments: j1,c10

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Quality Control Report

Client:	Prima Environmental	**WorkOrder:**	1704814
Date Prepared:	5/2/17	**BatchID:**	138135
Date Analyzed:	5/3/17	**Extraction Method:**	SW3510C
Instrument:	GC20	**Analytical Method:**	SW8082
Matrix:	Water	**Unit:**	µg/L
Project:	BC-PCB	**Sample ID:**	MB/LCS/LCSD-138135

QC Summary Report for SW8082

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
Aroclor1016	ND	0.50	-	-	-
Aroclor1221	ND	0.50	-	-	-
Aroclor1232	ND	0.50	-	-	-
Aroclor1242	ND	0.50	-	-	-
Aroclor1248	ND	0.50	-	-	-
Aroclor1254	ND	0.50	-	-	-
Aroclor1260	ND	0.50	-	-	-
PCBs, total	ND	0.50	-	-	-
Surrogate Recovery					
Decachlorobiphenyl	1.185		1.25	95	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Aroclor1016	4.20	4.04	3.75	112	108	70-130	3.78	20
Aroclor1260	5.15	4.82	3.75	137, F2	129	70-130	6.56	20
Surrogate Recovery								
Decachlorobiphenyl	1.13	1.16	1.25	90	93	70-130	2.96	20

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(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1704814 A **ClientCode: PEM**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Cindy Schreier
Prima Environmental
5070 Robert J. Mathews Pkwy, Suite 300
El Dorado Hills, CA 95762
(916) 363-8798 FAX: (916) 363-8829

Email: data@primaenvironmental.com
cc/3rd Party:
PO:
ProjectNo: BC-PCB

Bill to:
Accounts Payable
Prima Environmental
5070 Robert J. Mathews Pkwy, Suite 30
El Dorado Hills, CA 95762

Requested TAT: 5 days;

Date Received: 04/18/2017
Date Logged: 04/18/2017
Date Add-On: 05/02/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
1704814-001	OV-2V1-A	Water	4/14/2017 15:15	☐	B											
1704814-002	OV-AP-HP-A	Water	4/14/2017 15:15	☐	B											
1704814-003	OV-CHP-A	Water	4/14/2017 15:15	☐	B											

Test Legend:

1	8082_PCB_Decant	2		3		4	
5		6		7		8	
9		10		11		12	

Prepared by: Tina Perez

Add-On Prepared By: Jena Alfaro

Comments: 001,2,3 set up for PCBs Decant 5/2/17 STAT

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: PRIMA ENVIRONMENTAL
Client Contact: Cindy Schreier
Contact's Email data@primaenvironmental.com

Project: BC-PCB
Comments: 001,2,3 set up for PCBs Decant 5/2/17 STAT

Work Order: 1704814
QC Level: LEVEL 2
Date Logged: 4/18/2017
Date Add-On: 5/2/2017

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1704814-001B	OV-2V1-A	Water	SW8082 (PCBs Only) (Decanted)	1	aVOA	4/14/2017 15:15	5 days	Trace	☐	
1704814-002B	OV-AP-HP-A	Water	SW8082 (PCBs Only) (Decanted)	1	aVOA	4/14/2017 15:15	5 days	Trace	☐	
1704814-003B	OV-CHP-A	Water	SW8082 (PCBs Only) (Decanted)	1	aVOA	4/14/2017 15:15	5 days	Trace	☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

General COC

MAI Work Order # 1704814

McCAMPBELL ANALYTICAL, INC.

1534 Willow Pass Rd. Pittsburg, Ca. 94565-1701
Telephone: (877) 252-9262 / Fax: (925) 252-9269
main@mccampbell.com

CHAIN OF CUSTODY RECORD

Turn Around Time: 1 Day Rush | 2 Day Rush | 3 Day Rush | STD 5day | Quote #
J-Flag / MDL | ESL | Cleanup Approved | Bottle Order # 6755
Delivery Format: GeoTracker EDF | PDF | EDD | Write On (DW) | EQuIS

PRIMA ENVIRONMENTAL, Inc.
5070 Robert J. Mathews Pkwy, Ste 300
El Dorado Hills, CA 95762
PH: 916-939-7300 FAX: 916-939-7398
data@primaenvironmental.com

Bill To:

Tele:

Project Name/#: BC-PCB

Project Location: PO #

Sampler Signature:

SAMPLE ID Location / Field Point	Sampling Date	Sampling Time	#Containers	Matrix	Preservative	BTEX & TPH as Gas (8021/ 8015) MTBE	TPH as Diesel (8015) + Motor Oil Without Silica Gel	TPH as Diesel (8015) + Motor Oil With Silica Gel	Total Oil & Grease (1664 / 9071) Without Silica Gel	Total Petroleum Hydrocarbons - Oil & Grease (1664 / 9071) With Silica Gel	Total Petroleum Hydrocarbons (418.1) With Silica Gel	EPA 505/ 608 / 8081 (Cl Pesticides)	EPA 608 / 8082 PCB's ; Aroclors only	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.8 / 6020)*	Metals (200.8 / 6020)	Baylands Requirements	Lab to filter sample for dissolved metals analysis	PCBs - 8082	8082 PCB Decant		
OV-2V1-A	4/14/17	1515	2	AQ	HCl																X	X		
OV-AP-HP-A			2																		X	X		
OV-CHP-A			2																		X	X		
Bed-NaMnO4-A			2																		X			
Bed-AP-HP-A			2																		X			

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

* If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E2008.

Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
	4/17/17	1430	FED EX		
				4/18/17	13:53

Comments / Instructions

added 5/2/17 STAT

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other

Preservative Code: 1=4°C 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=ZnOAc/NaOH 7=None

Temp 10.1 °C Initials

Page ___ of ___

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Sample Receipt Checklist

Client Name:	**Prima Environmental**	Date and Time Received	**4/18/2017 08:53**
Project Name:	**BC-PCB**	Date Logged:	**4/18/2017**
		Received by:	Tina Perez
WorkOrder №:	**1704814** Matrix: Water	Logged by:	Tina Perez
Carrier:	FedEx		

Chain of Custody (COC) Information

Chain of custody present?	Yes	☑	No ☐	
Chain of custody signed when relinquished and received?	Yes	☑	No ☐	
Chain of custody agrees with sample labels?	Yes	☑	No ☐	
Sample IDs noted by Client on COC?	Yes	☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes	☑	No ☐	
Sampler's name noted on COC?	Yes	☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes	☐	No ☑	NA ☐
Shipping container/cooler in good condition?	Yes	☑	No ☐	
Samples in proper containers/bottles?	Yes	☑	No ☐	
Sample containers intact?	Yes	☑	No ☐	
Sufficient sample volume for indicated test?	Yes	☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes	☑	No ☐	NA ☐
Sample/Temp Blank temperature		Temp: 10.1°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes	☑	No ☐	NA ☐
Sample labels checked for correct preservation?	Yes	☑	No ☐	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes	☐	No ☐	NA ☑
Samples Received on Ice?	Yes	☐	No ☑	

UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522?	Yes	☐	No ☐	NA ☑
Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539?	Yes	☐	No ☐	NA ☑

Comments:

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1705003

Report Created for: Prima Environmental

5070 Robert J. Mathews Pkwy, Suite 300
El Dorado Hills, CA 95762

Project Contact: Cindy Schreier
Project P.O.:
Project Name: BC-PCB

Project Received: 05/01/2017

Analytical Report reviewed & approved for release on 05/11/2017 by:

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

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Glossary of Terms & Qualifier Definitions

Client: Prima Environmental
Project: BC-PCB
WorkOrder: 1705003

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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Glossary of Terms & Qualifier Definitions

Client: Prima Environmental
Project: BC-PCB
WorkOrder: 1705003

Analytical Qualifiers

S	surrogate spike recovery outside accepted recovery limits
c7	surrogate value diluted out of range
c10	estimated value.
h4	sulfuric acid permanganate (EPA 3665) cleanup
j1	see attached narrative

Quality Control Qualifiers

F2	LCS/LCSD recovery and/or RPD is out of acceptance criteria.

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Case Narrative

Client: Prima Environmental
Project: BC-PCB

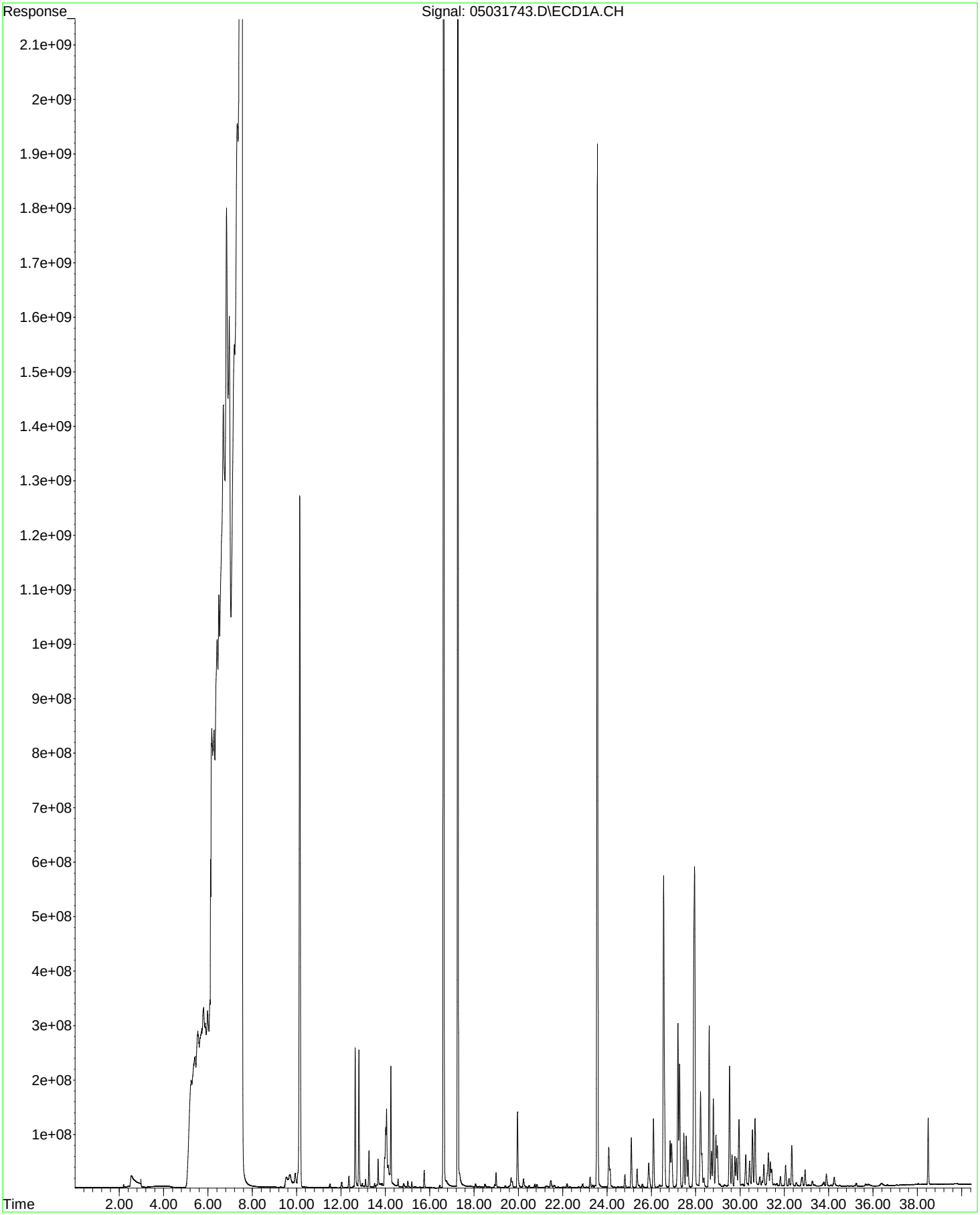
Work Order: 1705003
May 22, 2017

Aroclors are a mixture of PCBs. Normally, Aroclors are identified based on two things when analyzed by ECD dual column system: retention time and the peak pattern, where the relative intensity of the peaks in the pattern of the unknown sample is compared to the known Aroclors/CCV, per the method. Aroclors are quantified by comparing the peak area of representative peaks in the unknown sample to the peak area of the same peaks of a known sample of known concentration.

The data are estimated because the pattern of peaks does not match the pattern of the Aroclor eluting at that retention time. However, after discussion with the client, it was determined that treatment of the sample by the client likely altered the Aroclor pattern. If we, McCampbell, had not known the full scenario, we would have raised the reporting limit above the present value because of the uncertainty of the quality of the pattern present. Instead, estimated values are reported at the request of the client.

A congeners study is recommended due to huge variation in the pattern post sample treatment for better identification.

File : D:\HPCHEM\GC20\DATA\05031743.D
Operator :
Acquired : 5-4-2017 06:07:33 PM using AcqMethod 8081LV_E.M
Instrument : GC-20
Sample Name: 1705003-001A W
Misc Info : 8081PCB_W
Vial Number: 43



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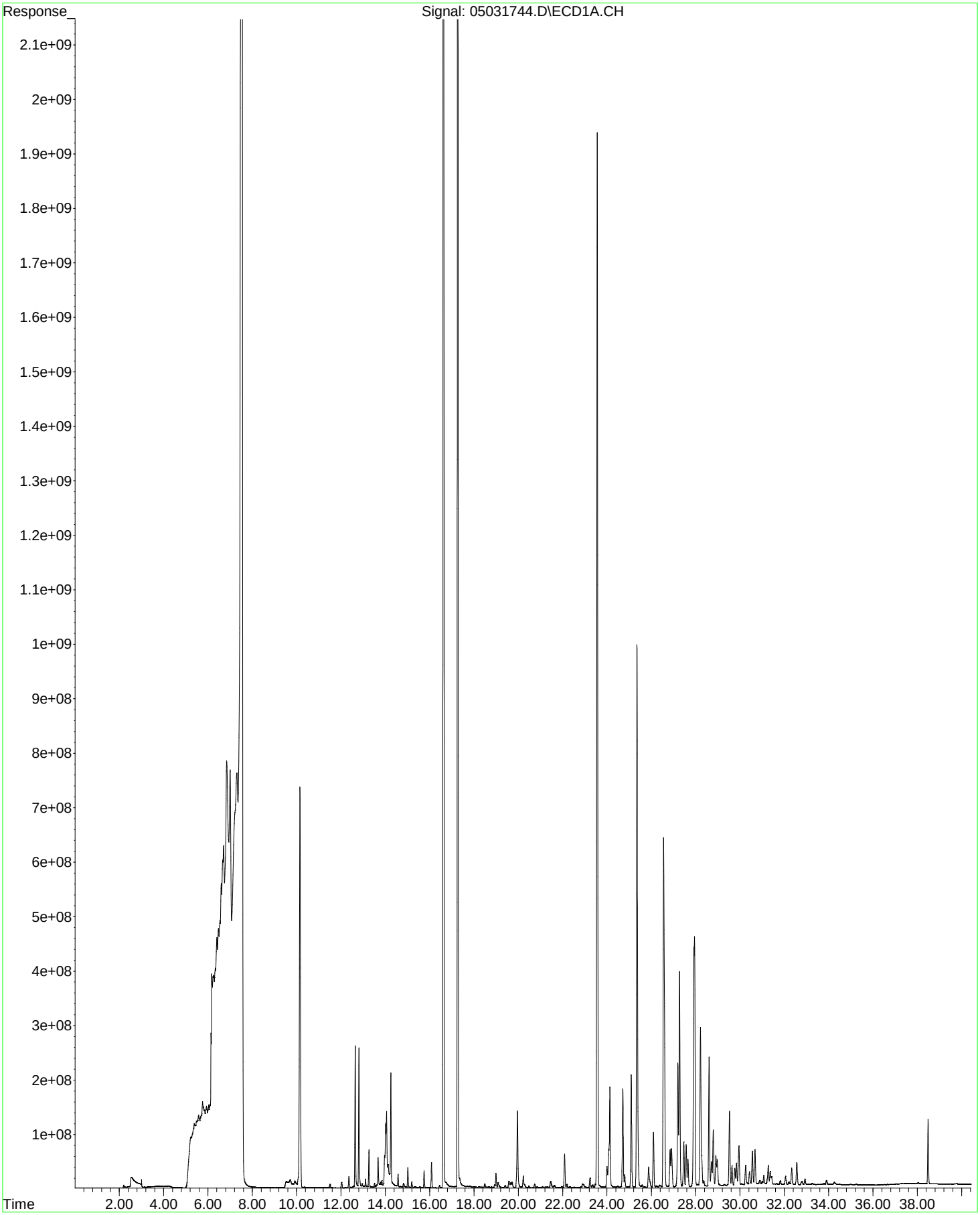
Sample Name: 1705003-002A W
Misc Info : 8081PCB_W
Vial Number: 44



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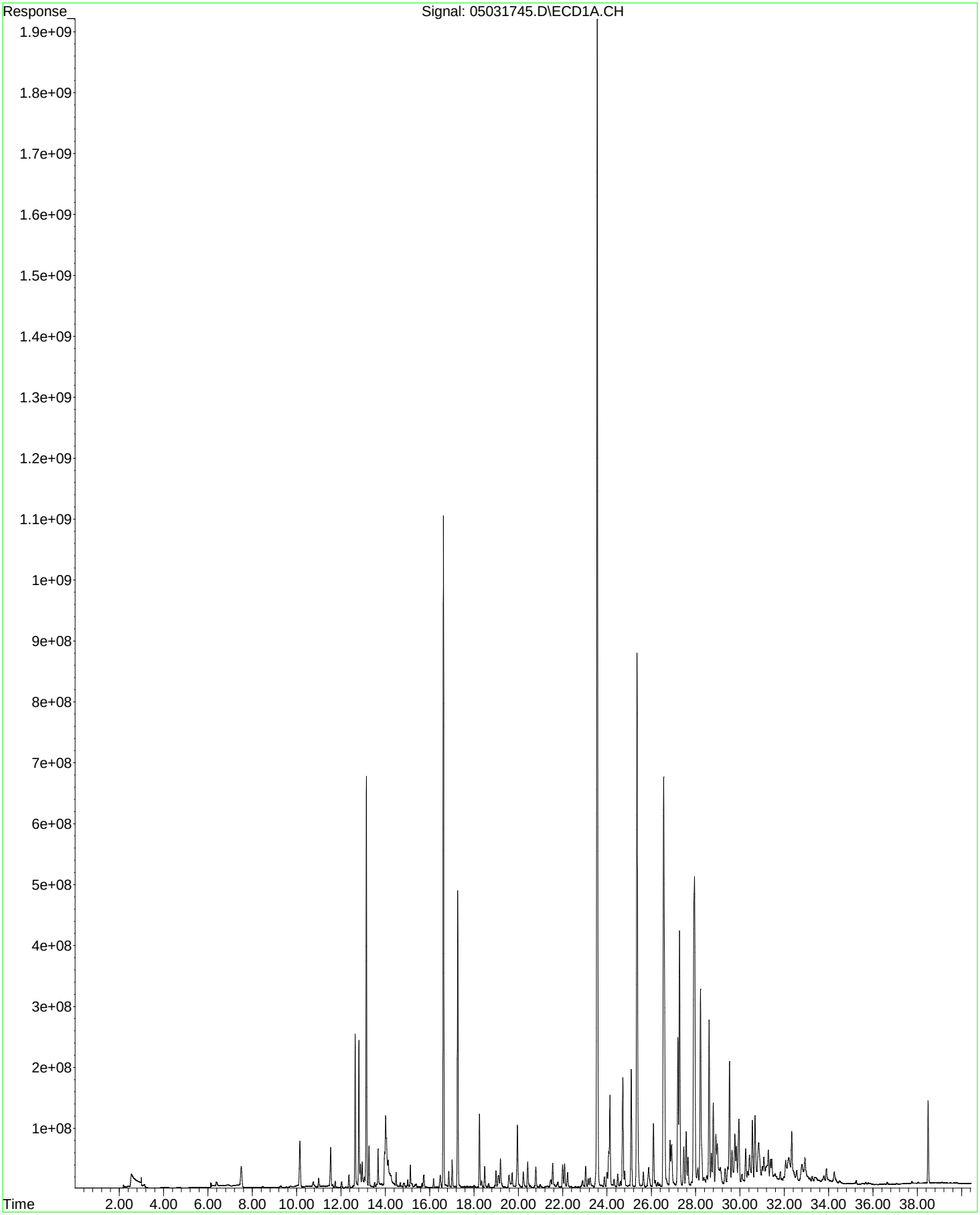
Misc Info : 8081PCB_W
Vial Number: 45



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Instrument : GC-20
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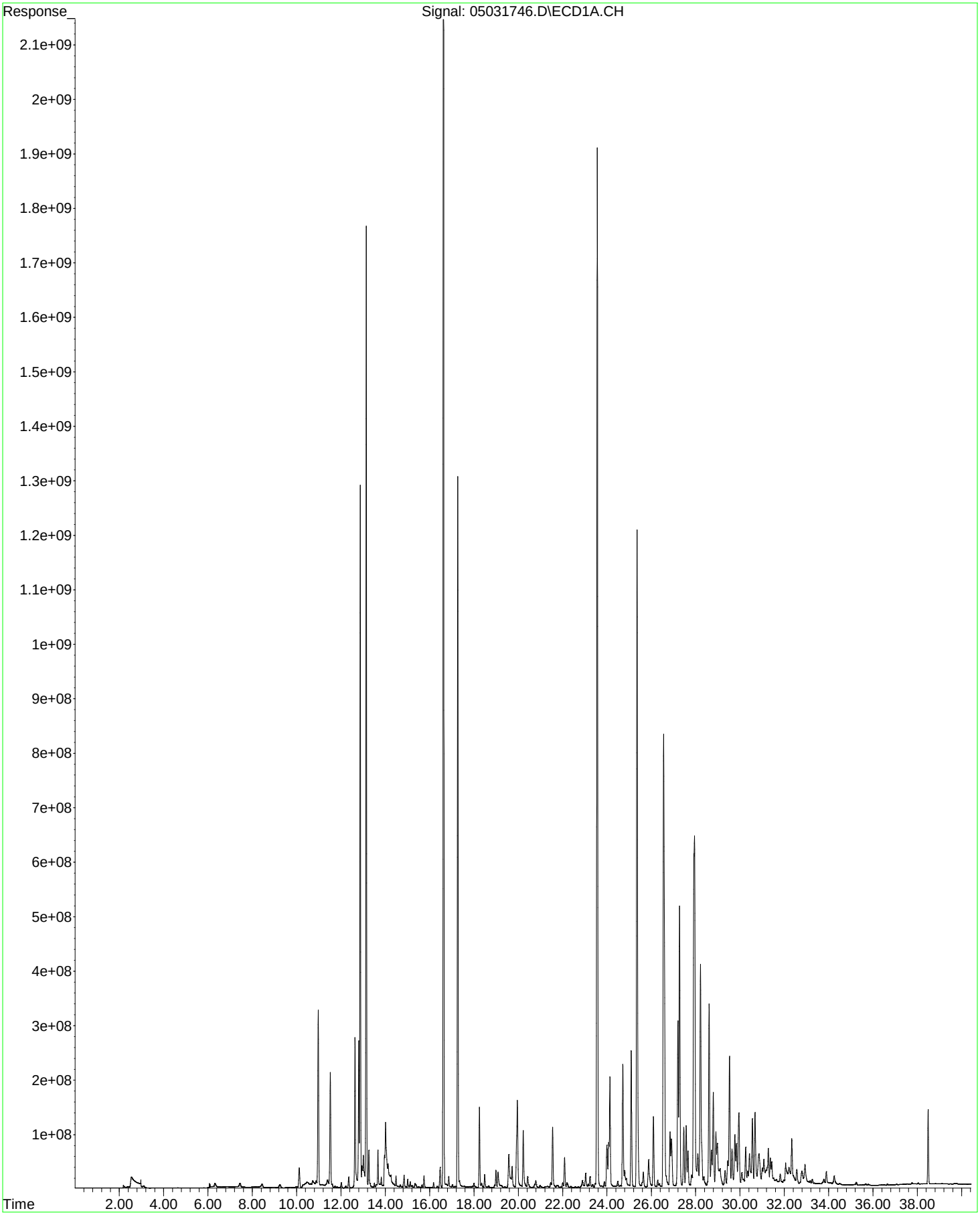
Misc Info : 8081PCB_W
Vial Number: 46



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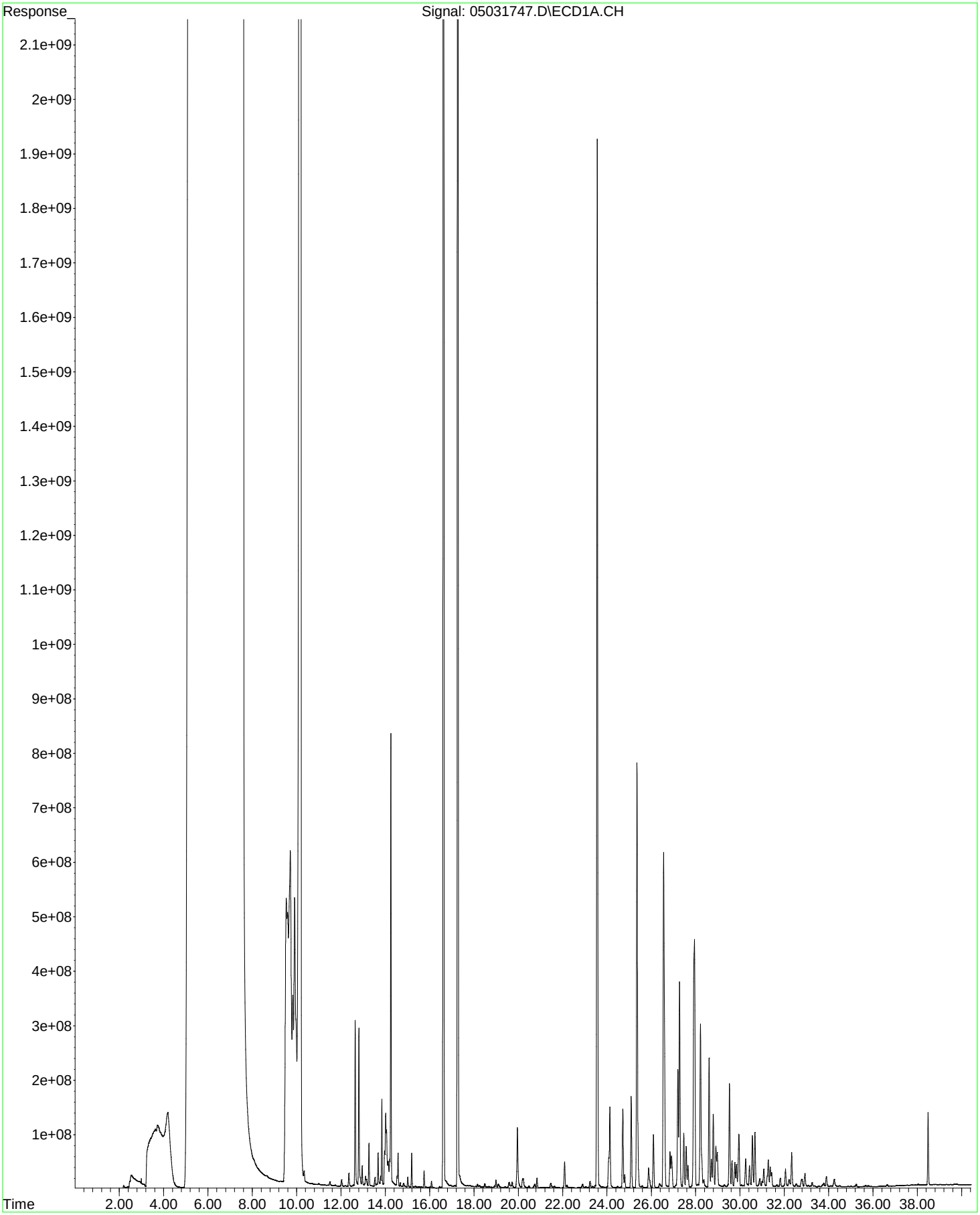
Instrument : GC-20
Sample Name: 1705003-005A W
Misc Info : 8081PCB_W
Vial Number: 47



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Operator :
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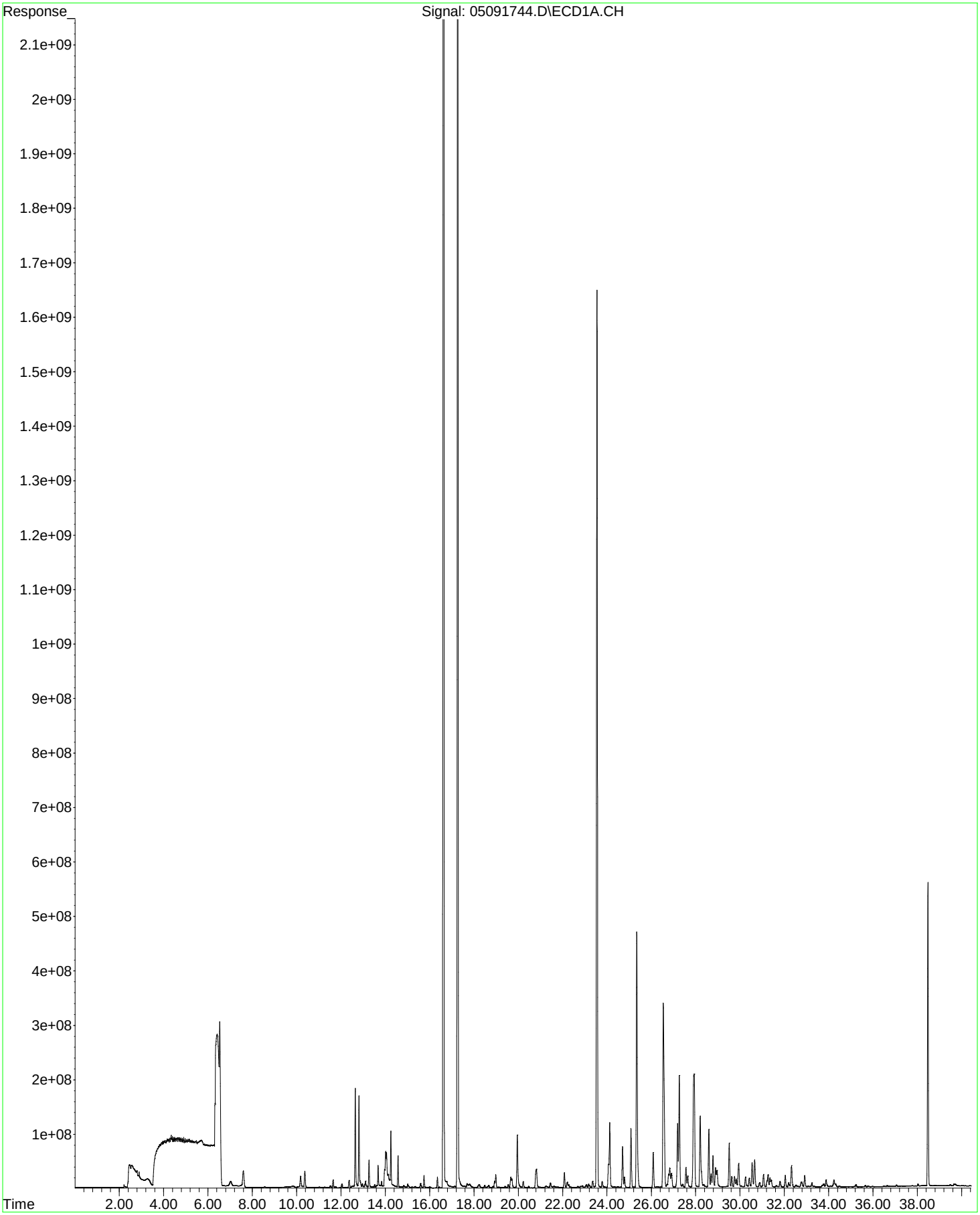
Instrument : GC-20
Sample Name: 1705003-006A W RR
Misc Info : 8081PCB_W
Vial Number: 44



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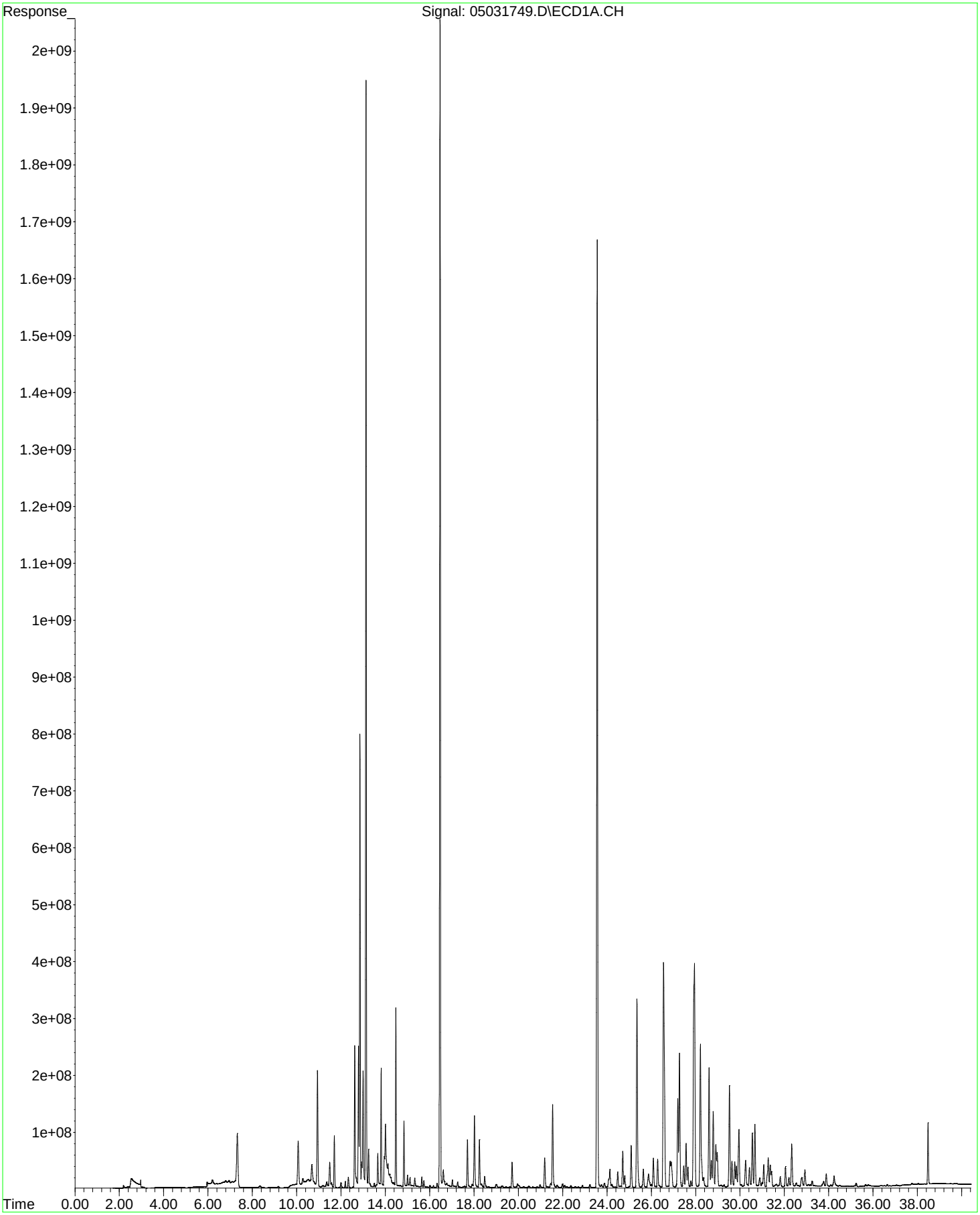
Instrument : GC-20
Sample Name: 1705003-007A W
Misc Info : 8081PCB_W
Vial Number: 49



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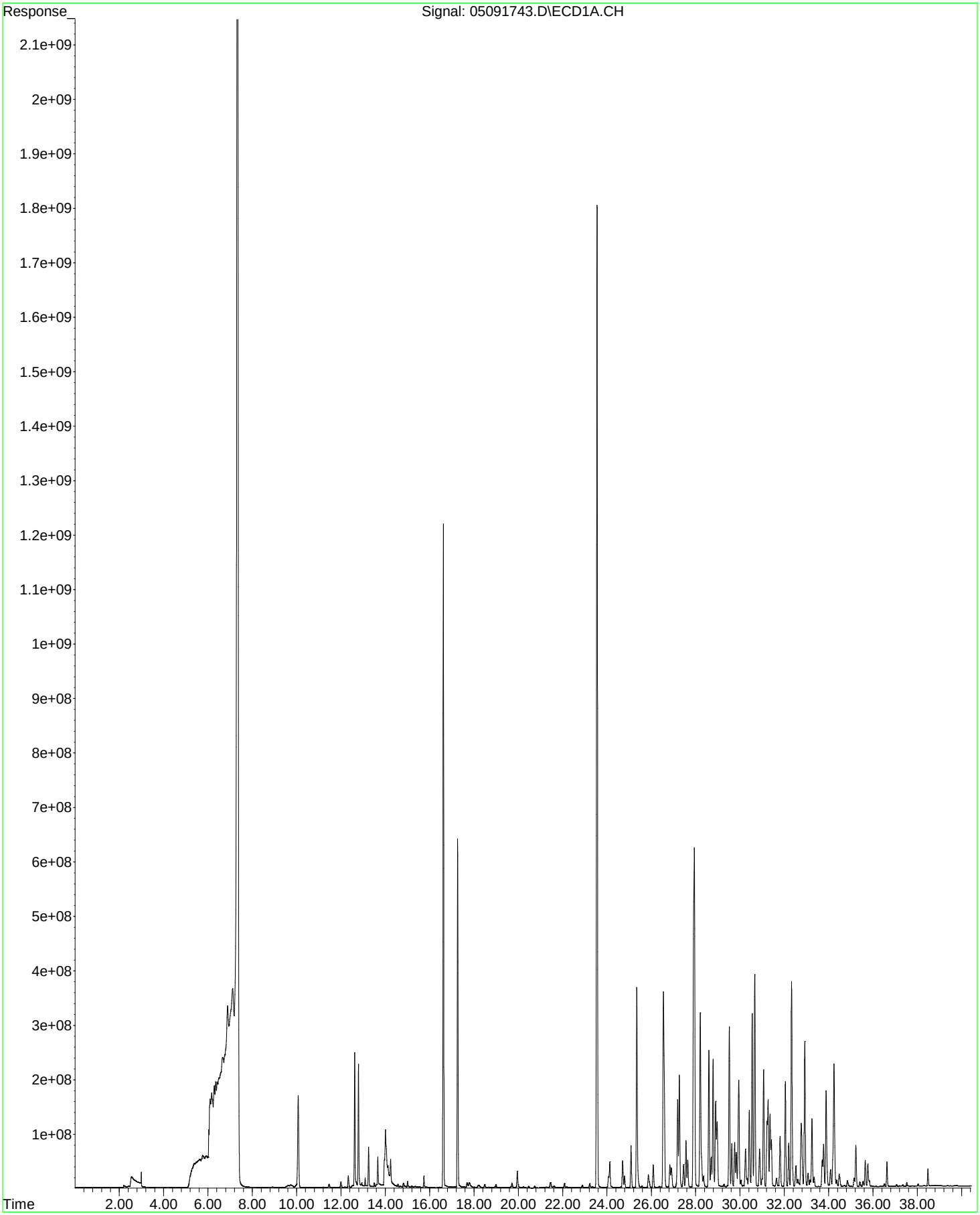
Operator :
Acquired : 5-9-2017 09:35:45 PM using AcqMethod 8081LV_E.M
Instrument : GC-20
Sample Name: 1705003-008A W RR
Misc Info : 8081PCB_W
Vial Number: 43



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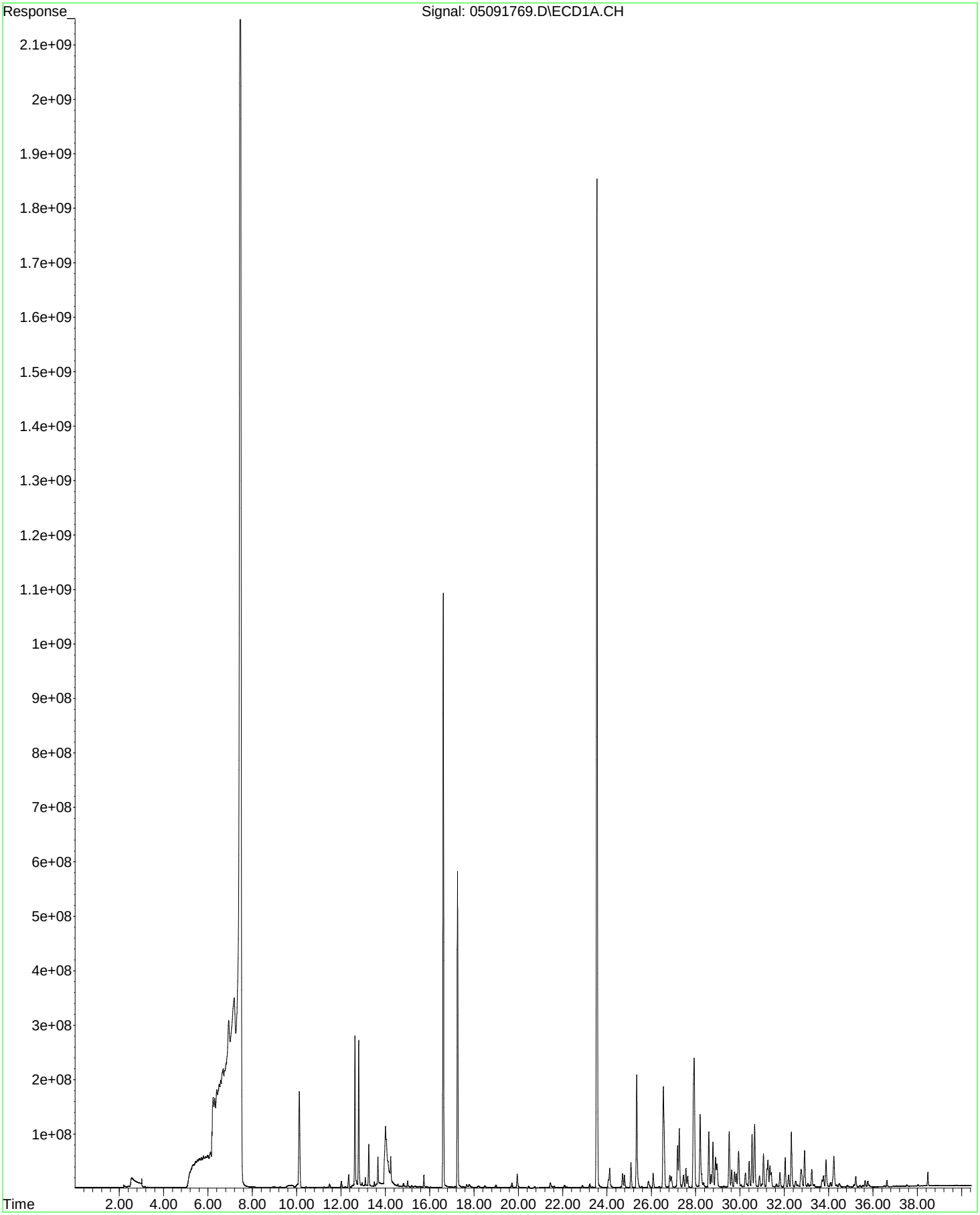
Operator :
Acquired : 5-10-2017 06:46:39 PM using AcqMethod 8081LV_E.M
Instrument : GC-20
Sample Name: 1705003-009A W RR
Misc Info : 8081PCB_W
Vial Number: 69



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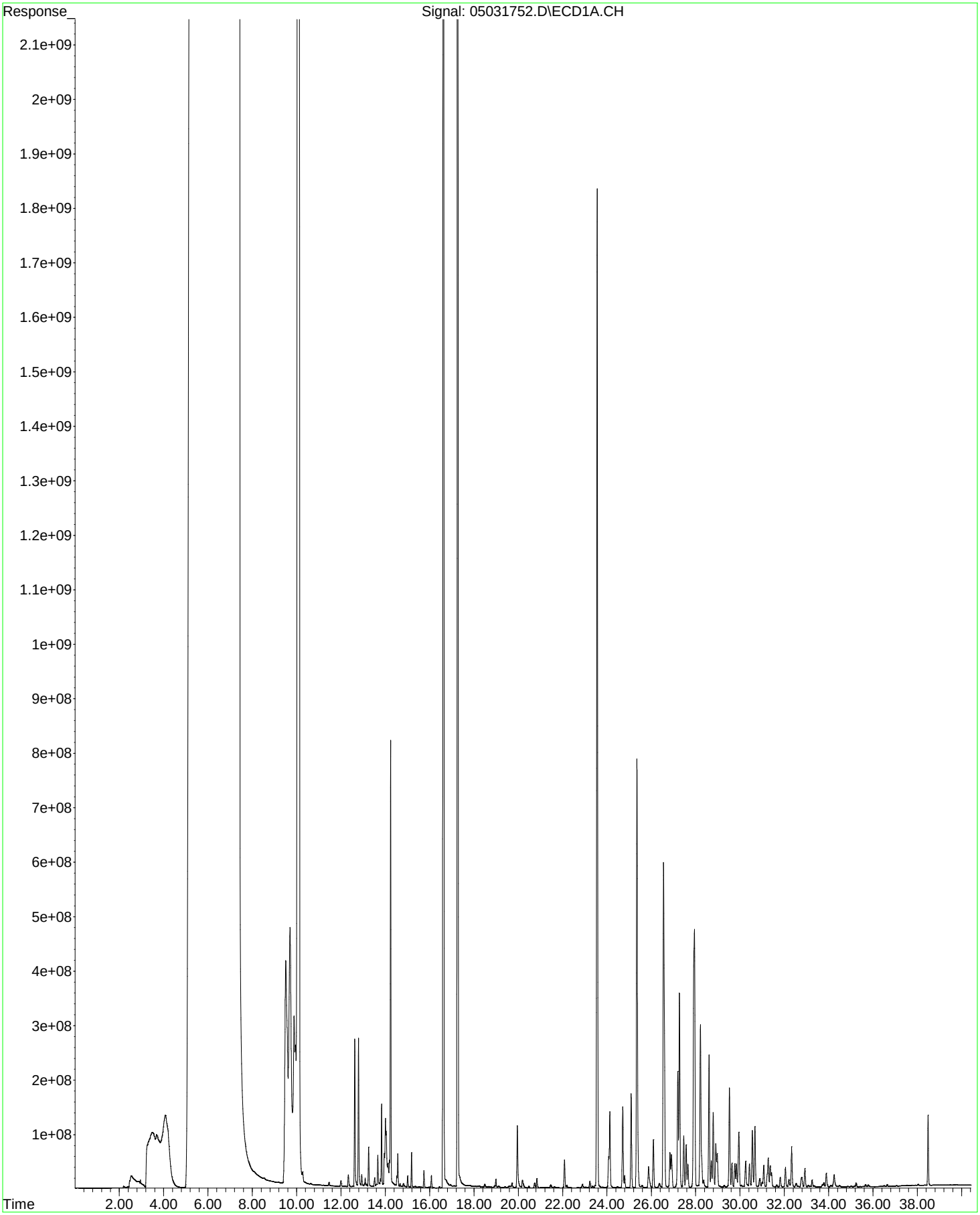
Operator :
Acquired : 5-5-2017 01:30:33 AM using AcqMethod 8081LV_E.M
Instrument : GC-20
Sample Name: 1705003-010A W
Misc Info : 8081PCB_W
Vial Number: 52



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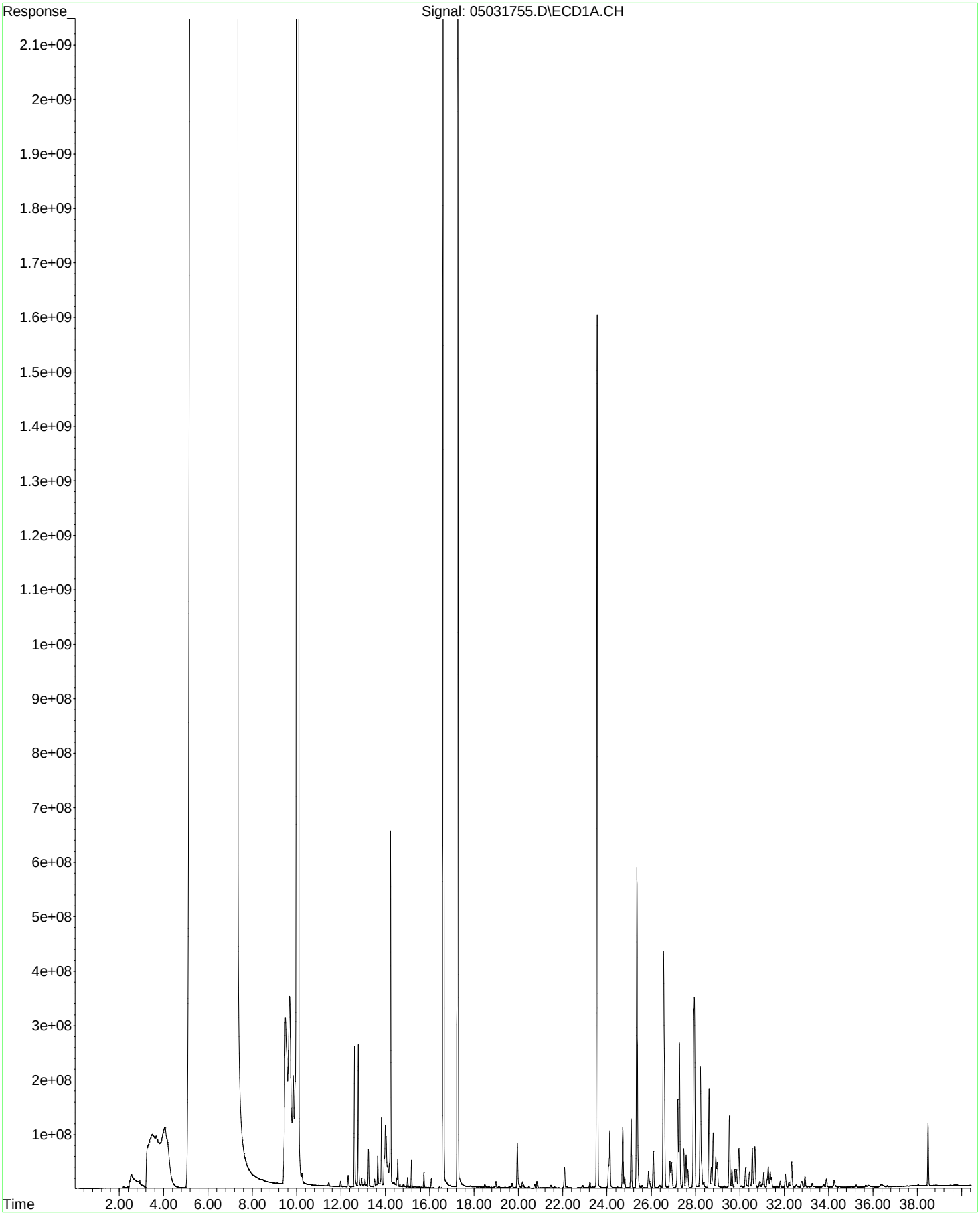
Acquired : 5-5-2017 03:56:11 AM using AcqMethod 8081LV_E.M
Instrument : GC-20
Sample Name: 1705003-011A W
Misc Info : 8081PCB_W
Vial Number: 55



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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Received:	5/1/17 10:23	**Extraction Method:**	SW3510C
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors (Decanted)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-Con	**1705003-001A**	**Water**	**04/28/2017 15:30**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/04/2017 18:07
Aroclor1221	ND	5.0	10	05/04/2017 18:07
Aroclor1232	ND	5.0	10	05/04/2017 18:07
Aroclor1242	**64**	5.0	10	05/04/2017 18:07
Aroclor1248	ND	5.0	10	05/04/2017 18:07
Aroclor1254	**6.0**	5.0	10	05/04/2017 18:07
Aroclor1260	ND	5.0	10	05/04/2017 18:07
PCBs, total	**70**	5.0	10	05/04/2017 18:07

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	75	70-130	05/04/2017 18:07

Analyst(s): CK Analytical Comments: j1,c10

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-ZV1-B	**1705003-002A**	**Water**	**04/28/2017 15:30**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/04/2017 18:57
Aroclor1221	ND	5.0	10	05/04/2017 18:57
Aroclor1232	ND	5.0	10	05/04/2017 18:57
Aroclor1242	**63**	5.0	10	05/04/2017 18:57
Aroclor1248	ND	5.0	10	05/04/2017 18:57
Aroclor1254	ND	5.0	10	05/04/2017 18:57
Aroclor1260	ND	5.0	10	05/04/2017 18:57
PCBs, total	**63**	5.0	10	05/04/2017 18:57

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	70	70-130	05/04/2017 18:57

Analyst(s): CK Analytical Comments: j1,c10

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Received:	5/1/17 10:23	**Extraction Method:**	SW3510C
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors (Decanted)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-AP-HP-B	1705003-003A	Water	04/28/2017 15:30	GC20	138135

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/04/2017 19:47
Aroclor1221	ND	5.0	10	05/04/2017 19:47
Aroclor1232	ND	5.0	10	05/04/2017 19:47
Aroclor1242	**74**	5.0	10	05/04/2017 19:47
Aroclor1248	ND	5.0	10	05/04/2017 19:47
Aroclor1254	**5.1**	5.0	10	05/04/2017 19:47
Aroclor1260	ND	5.0	10	05/04/2017 19:47
PCBs, total	**79**	5.0	10	05/04/2017 19:47

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	83	70-130	05/04/2017 19:47

Analyst(s): CK Analytical Comments: j1,c10

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-CHP-B	1705003-004A	Water	04/28/2017 15:30	GC20	138135

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/04/2017 20:37
Aroclor1221	ND	5.0	10	05/04/2017 20:37
Aroclor1232	ND	5.0	10	05/04/2017 20:37
Aroclor1242	**91**	5.0	10	05/04/2017 20:37
Aroclor1248	ND	5.0	10	05/04/2017 20:37
Aroclor1254	**5.2**	5.0	10	05/04/2017 20:37
Aroclor1260	ND	5.0	10	05/04/2017 20:37
PCBs, total	**96**	5.0	10	05/04/2017 20:37

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	83	70-130	05/04/2017 20:37

Analyst(s): CK Analytical Comments: j1,c10

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Received:	5/1/17 10:23	**Extraction Method:**	SW3510C
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors (Decanted)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Bed-Con	**1705003-005A**	**Water**	**04/28/2017 15:30**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/04/2017 21:26
Aroclor1221	ND	5.0	10	05/04/2017 21:26
Aroclor1232	ND	5.0	10	05/04/2017 21:26
Aroclor1242	**66**	5.0	10	05/04/2017 21:26
Aroclor1248	ND	5.0	10	05/04/2017 21:26
Aroclor1254	ND	5.0	10	05/04/2017 21:26
Aroclor1260	ND	5.0	10	05/04/2017 21:26
PCBs, total	**66**	5.0	10	05/04/2017 21:26

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	78	70-130	05/04/2017 21:26

Analyst(s): CK Analytical Comments: j1,c10

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Bed-NaMnO4-B	**1705003-006A**	**Water**	**04/28/2017 15:30**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	1.0	2	05/09/2017 22:25
Aroclor1221	ND	1.0	2	05/09/2017 22:25
Aroclor1232	ND	1.0	2	05/09/2017 22:25
Aroclor1242	**7.1**	1.0	2	05/09/2017 22:25
Aroclor1248	ND	1.0	2	05/09/2017 22:25
Aroclor1254	ND	1.0	2	05/09/2017 22:25
Aroclor1260	ND	1.0	2	05/09/2017 22:25
PCBs, total	**7.1**	1.0	2	05/09/2017 22:25

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	76	70-130	05/09/2017 22:25

Analyst(s): CK Analytical Comments: j1,c10

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Received:	5/1/17 10:23	**Extraction Method:**	SW3510C
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors (Decanted)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Bed-AP-HP-B	**1705003-007A**	**Water**	**04/28/2017 15:30**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/04/2017 23:04
Aroclor1221	ND	5.0	10	05/04/2017 23:04
Aroclor1232	ND	5.0	10	05/04/2017 23:04
Aroclor1242	**64**	5.0	10	05/04/2017 23:04
Aroclor1248	ND	5.0	10	05/04/2017 23:04
Aroclor1254	**6.4**	5.0	10	05/04/2017 23:04
Aroclor1260	ND	5.0	10	05/04/2017 23:04
PCBs, total	**70**	5.0	10	05/04/2017 23:04

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	79	70-130	05/04/2017 23:04

Analyst(s): CK Analytical Comments: j1,c10

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-T0-A-#2	**1705003-008A**	**Water**	**04/28/2017 15:30**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	25	50	05/09/2017 21:35
Aroclor1221	ND	25	50	05/09/2017 21:35
Aroclor1232	ND	25	50	05/09/2017 21:35
Aroclor1242	**350**	25	50	05/09/2017 21:35
Aroclor1248	ND	25	50	05/09/2017 21:35
Aroclor1254	**190**	25	50	05/09/2017 21:35
Aroclor1260	ND	25	50	05/09/2017 21:35
PCBs, total	**540**	25	50	05/09/2017 21:35

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	100	70-130	05/09/2017 21:35

Analyst(s): CK Analytical Comments: j1,c10

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Received:	5/1/17 10:23	**Extraction Method:**	SW3510C
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors (Decanted)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-T0-B-#2	**1705003-009A**	**Water**	**04/28/2017 15:30**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	25	50	05/10/2017 18:46
Aroclor1221	ND	25	50	05/10/2017 18:46
Aroclor1232	**410**	25	50	05/10/2017 18:46
Aroclor1242	ND	25	50	05/10/2017 18:46
Aroclor1248	ND	25	50	05/10/2017 18:46
Aroclor1254	**51**	25	50	05/10/2017 18:46
Aroclor1260	ND	25	50	05/10/2017 18:46
PCBs, total	**460**	25	50	05/10/2017 18:46

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	77	70-130	05/10/2017 18:46

Analyst(s): CK Analytical Comments: j1,c10

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Bed-15B-T0-A-#2	**1705003-010A**	**Water**	**04/28/2017 15:30**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/05/2017 01:30
Aroclor1221	ND	5.0	10	05/05/2017 01:30
Aroclor1232	ND	5.0	10	05/05/2017 01:30
Aroclor1242	**72**	5.0	10	05/05/2017 01:30
Aroclor1248	ND	5.0	10	05/05/2017 01:30
Aroclor1254	**6.7**	5.0	10	05/05/2017 01:30
Aroclor1260	ND	5.0	10	05/05/2017 01:30
PCBs, total	**79**	5.0	10	05/05/2017 01:30

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	81	70-130	05/05/2017 01:30

Analyst(s): CK Analytical Comments: j1,c10

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Received:	5/1/17 10:23	**Extraction Method:**	SW3510C
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	µg/L

Polychlorinated Biphenyls (PCBs) Aroclors (Decanted)

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
Bed-15B-T0-B-#2	**1705003-011A**	**Water**	**04/28/2017 15:30**	**GC20**	**138135**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	5.0	10	05/05/2017 03:56
Aroclor1221	ND	5.0	10	05/05/2017 03:56
Aroclor1232	ND	5.0	10	05/05/2017 03:56
Aroclor1242	**58**	5.0	10	05/05/2017 03:56
Aroclor1248	ND	5.0	10	05/05/2017 03:56
Aroclor1254	ND	5.0	10	05/05/2017 03:56
Aroclor1260	ND	5.0	10	05/05/2017 03:56
PCBs, total	**58**	5.0	10	05/05/2017 03:56

Surrogates	REC (%)	Limits	
Decachlorobiphenyl	81	70-130	05/05/2017 03:56

Analyst(s): CK

Analytical Comments: j1,c10

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Received:	5/1/17 10:23	**Extraction Method:**	SW3550B
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	mg/kg

Polychlorinated Biphenyls (PCBs) Aroclors

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-Con-So	**1705003-012A**	**Soil**	**04/28/2017 15:30**	**GC23**	**138143**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	100	2,000	05/03/2017 20:55
Aroclor1221	ND	100	2,000	05/03/2017 20:55
Aroclor1232	ND	100	2,000	05/03/2017 20:55
Aroclor1242	**670**	100	2,000	05/03/2017 20:55
Aroclor1248	ND	100	2,000	05/03/2017 20:55
Aroclor1254	**430**	100	2,000	05/03/2017 20:55
Aroclor1260	ND	100	2,000	05/03/2017 20:55
PCBs, total	**1100**	100	2,000	05/03/2017 20:55

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	2037	S	70-130	05/03/2017 20:55

Analyst(s): SS Analytical Comments: h4,c7

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-ZV1-B-So	**1705003-013A**	**Soil**	**04/28/2017 15:30**	**GC23**	**138143**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	100	2,000	05/03/2017 21:08
Aroclor1221	ND	100	2,000	05/03/2017 21:08
Aroclor1232	ND	100	2,000	05/03/2017 21:08
Aroclor1242	**730**	100	2,000	05/03/2017 21:08
Aroclor1248	ND	100	2,000	05/03/2017 21:08
Aroclor1254	**440**	100	2,000	05/03/2017 21:08
Aroclor1260	ND	100	2,000	05/03/2017 21:08
PCBs, total	**1200**	100	2,000	05/03/2017 21:08

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	408	S	70-130	05/03/2017 21:08

Analyst(s): SS Analytical Comments: h4,c7

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Received:	5/1/17 10:23	**Extraction Method:**	SW3550B
Date Prepared:	5/2/17	**Analytical Method:**	SW8082
Project:	BC-PCB	**Unit:**	mg/kg

Polychlorinated Biphenyls (PCBs) Aroclors

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-AP-HP-B-So	**1705003-014A**	**Soil**	**04/28/2017 15:30**	**GC23**	**138143**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	100	2,000	05/03/2017 21:22
Aroclor1221	ND	100	2,000	05/03/2017 21:22
Aroclor1232	ND	100	2,000	05/03/2017 21:22
Aroclor1242	**410**	100	2,000	05/03/2017 21:22
Aroclor1248	ND	100	2,000	05/03/2017 21:22
Aroclor1254	**270**	100	2,000	05/03/2017 21:22
Aroclor1260	ND	100	2,000	05/03/2017 21:22
PCBs, total	**680**	100	2,000	05/03/2017 21:22

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	0	S	70-130	05/03/2017 21:22

Analyst(s): SS Analytical Comments: h4,c7

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-CHP-B-So	**1705003-015A**	**Soil**	**04/28/2017 15:30**	**GC23**	**138143**

Analytes	Result	RL	DF	Date Analyzed
Aroclor1016	ND	100	2,000	05/03/2017 21:35
Aroclor1221	ND	100	2,000	05/03/2017 21:35
Aroclor1232	ND	100	2,000	05/03/2017 21:35
Aroclor1242	**480**	100	2,000	05/03/2017 21:35
Aroclor1248	ND	100	2,000	05/03/2017 21:35
Aroclor1254	**310**	100	2,000	05/03/2017 21:35
Aroclor1260	ND	100	2,000	05/03/2017 21:35
PCBs, total	**790**	100	2,000	05/03/2017 21:35

Surrogates	REC (%)	Qualifiers	Limits	
Decachlorobiphenyl	328	S	70-130	05/03/2017 21:35

Analyst(s): SS Analytical Comments: h4,c7

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Analytical Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Received:	5/1/17 10:23	**Extraction Method:**	E415.3
Date Prepared:	5/3/17	**Analytical Method:**	E415.3
Project:	BC-PCB	**Unit:**	mg/L

Total Organic Carbon (TOC) reported as NPOC

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-Con	**1705003-001B**	**Water**	**04/28/2017 15:30**	**WC_CNS**	**138195**

Analytes	Result	RL	DF	Date Analyzed
TOC	**3.9**	0.30	1	05/03/2017 15:44

Analyst(s): TD

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
OV-ZV1-B	**1705003-002B**	**Water**	**04/28/2017 15:30**	**WC_CNS**	**138195**

Analytes	Result	RL	DF	Date Analyzed
TOC	**930**	3.0	10	05/04/2017 08:12

Analyst(s): TD

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Quality Control Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Prepared:	5/2/17	**BatchID:**	138135
Date Analyzed:	5/3/17	**Extraction Method:**	SW3510C
Instrument:	GC20	**Analytical Method:**	SW8082
Matrix:	Water	**Unit:**	µg/L
Project:	BC-PCB	**Sample ID:**	MB/LCS/LCSD-138135

QC Summary Report for SW8082

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
Aroclor1016	ND	0.50	-	-	-
Aroclor1221	ND	0.50	-	-	-
Aroclor1232	ND	0.50	-	-	-
Aroclor1242	ND	0.50	-	-	-
Aroclor1248	ND	0.50	-	-	-
Aroclor1254	ND	0.50	-	-	-
Aroclor1260	ND	0.50	-	-	-
PCBs, total	ND	0.50	-	-	-
Surrogate Recovery					
Decachlorobiphenyl	1.185		1.25	95	70-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Aroclor1016	4.20	4.04	3.75	112	108	70-130	3.78	20
Aroclor1260	5.15	4.82	3.75	137, F2	129	70-130	6.56	20
Surrogate Recovery								
Decachlorobiphenyl	1.13	1.16	1.25	90	93	70-130	2.96	20

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Quality Control Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Prepared:	5/2/17	**BatchID:**	138143
Date Analyzed:	5/3/17	**Extraction Method:**	SW3550B
Instrument:	GC23	**Analytical Method:**	SW8082
Matrix:	Soil	**Unit:**	mg/kg
Project:	BC-PCB	**Sample ID:**	MB/LCS-138143 1705063-001AMS/MSD

QC Summary Report for SW8082

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Aroclor1016	ND	0.143	0.050	0.15	-	95	70-130
Aroclor1221	ND	-	0.050	-	-	-	-
Aroclor1232	ND	-	0.050	-	-	-	-
Aroclor1242	ND	-	0.050	-	-	-	-
Aroclor1248	ND	-	0.050	-	-	-	-
Aroclor1254	ND	-	0.050	-	-	-	-
Aroclor1260	ND	0.146	0.050	0.15	-	97	70-130
PCBs, total	ND	-	0.050	-	-	-	-
Surrogate Recovery							
Decachlorobiphenyl	0.05714	0.0535		0.050	114	107	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Aroclor1016	NR	NR		ND<2.5	NR	NR	-	NR	-
Aroclor1260	NR	NR		ND<2.5	NR	NR	-	NR	-
Surrogate Recovery									
Decachlorobiphenyl	NR	NR			NR	NR	-	NR	-

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Quality Control Report

Client:	Prima Environmental	**WorkOrder:**	1705003
Date Prepared:	5/3/17	**BatchID:**	138195
Date Analyzed:	5/3/17	**Extraction Method:**	E415.3
Instrument:	WC_CNS	**Analytical Method:**	E415.3
Matrix:	Water	**Unit:**	mg/L
Project:	BC-PCB	**Sample ID:**	MB/LCS-138195 1705103-001AMS/MSD

QC Summary Report for E415.3

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TOC	ND	46.6	0.30	50	-	93	80-120

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TOC	51.5	53.0	50	2.3	98	101	70-130	2.78	20

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Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1705003 **ClientCode: PEM**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ▣ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Cindy Schreier
Prima Environmental
5070 Robert J. Mathews Pkwy, Suite 300
El Dorado Hills, CA 95762
(916) 363-8798 FAX: (916) 363-8829

Email: data@primaenvironmental.com
cc/3rd Party:
PO:
ProjectNo: BC-PCB

Bill to:
Accounts Payable
Prima Environmental
5070 Robert J. Mathews Pkwy, Suite 30
El Dorado Hills, CA 95762

Requested TAT: 5 days;
Date Received: 05/01/2017
Date Logged: 05/02/2017

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1705003-001	OV-Con	Water	4/28/2017 15:30	☐	A		B	A								
1705003-002	OV-ZV1-B	Water	4/28/2017 15:30	☐	A		B									
1705003-003	OV-AP-HP-B	Water	4/28/2017 15:30	☐	A											
1705003-004	OV-CHP-B	Water	4/28/2017 15:30	☐	A											
1705003-005	Bed-Con	Water	4/28/2017 15:30	☐	A											
1705003-006	Bed-NaMnO4-B	Water	4/28/2017 15:30	☐	A											
1705003-007	Bed-AP-HP-B	Water	4/28/2017 15:30	☐	A											
1705003-008	OV-T0-A-#2	Water	4/28/2017 15:30	☐	A											
1705003-009	OV-T0-B-#2	Water	4/28/2017 15:30	☐	A											
1705003-010	Bed-15B-T0-A-#2	Water	4/28/2017 15:30	☐	A											
1705003-011	Bed-15B-T0-B-#2	Water	4/28/2017 15:30	☐	A											
1705003-012	OV-Con-So	Soil	4/28/2017 15:30	☐		A										
1705003-013	OV-ZV1-B-So	Soil	4/28/2017 15:30	☐		A										
1705003-014	OV-AP-HP-B-So	Soil	4/28/2017 15:30	☐		A										
1705003-015	OV-CHP-B-So	Soil	4/28/2017 15:30	☐		A										

Test Legend:

1	8082_PCB_Decant	2	8082_PCB_S	3	cnsTOC_W	4	PRCHROMATOGRAM
5		6		7		8	
9		10		11		12	

Prepared by: Jena Alfaro

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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WORK ORDER SUMMARY

Client Name: PRIMA ENVIRONMENTAL **Project:** BC-PCB **Work Order:** 1705003
Client Contact: Cindy Schreier **QC Level:** LEVEL 2
Contact's Email: data@primaenvironmental.com **Comments:** **Date Logged:** 5/2/2017

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1705003-001A	OV-Con	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-001B	OV-Con	Water	E415.3 (TOC)	2	VOA w/ HCl	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-002A	OV-ZV1-B	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-002B	OV-ZV1-B	Water	E415.3 (TOC)	2	VOA w/ HCl	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-003A	OV-AP-HP-B	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-004A	OV-CHP-B	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-005A	Bed-Con	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	None	☐	
1705003-006A	Bed-NaMnO4-B	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-007A	Bed-AP-HP-B	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-008A	OV-T0-A-#2	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-009A	OV-T0-B-#2	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-010A	Bed-15B-T0-A-#2	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Trace	☐	
1705003-011A	Bed-15B-T0-B-#2	Water	SW8082 (PCBs Only) (Decanted)	2	aVOA	☐	4/28/2017 15:30	5 days	Present	☐	
1705003-012A	OV-Con-So	Soil	SW8082 (PCBs Only)	1	2OZ GJ	☐	4/28/2017 15:30	5 days		☐	
1705003-013A	OV-ZV1-B-So	Soil	SW8082 (PCBs Only)	1	2OZ GJ	☐	4/28/2017 15:30	5 days		☐	
1705003-014A	OV-AP-HP-B-So	Soil	SW8082 (PCBs Only)	1	2OZ GJ	☐	4/28/2017 15:30	5 days		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

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WORK ORDER SUMMARY

Client Name: PRIMA ENVIRONMENTAL **Project:** BC-PCB **Work Order:** 1705003
Client Contact: Cindy Schreier **QC Level:** LEVEL 2
Contact's Email: data@primaenvironmental.com **Comments:** **Date Logged:** 5/2/2017

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1705003-015A	OV-CHP-B-So	Soil	SW8082 (PCBs Only)	1	2OZ GJ	☐	4/28/2017 15:30	5 days		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

General COC

MAI Work Order # 1705003

McCAMPBELL ANALYTICAL, INC.

1534 Willow Pass Rd. Pittsburg, Ca. 94565-1701
Telephone: (877) 252-9262 / Fax: (925) 252-9269
www.mccampbell.com main@mccampbell.com

CHAIN OF CUSTODY RECORD

Turn Around Time: 1 Day Rush		2 Day Rush		3 Day Rush		STD	5 day	Quote #	
J-Flag / MDL		ESL		Cleanup Approved				Bottle Order #	6755
Delivery Format:	PDF		GeoTracker EDF		EDD		Write On (DW)		EQuIS

Report To: Bill To:
Company:
Email:
Alt Email: Tele:
Project Name: BC-PCB Project #:
Project Location: PO #
Sampler Signature: [signature]

Analysis Requested

SAMPLE ID Location / Field Point	Sampling Date	Sampling Time	#Containers	Matrix (CA 4/28/17)	Preservative	BTEX & TPH as Gas (8021/ 8015) MTBE	TPH as Diesel (8015) + Motor Oil Without Silica Gel	TPH as Diesel (8015) + Motor Oil With Silca Gel	Total Oil & Grease (1664 / 9071) Without Silica Gel	Total Petroleum Hydrocarbons - Oil & Grease (1664 / 9071) With Silica Gel	Total Petroleum Hydrocarbons (418.1) With Silica Gel	EPA 505/ 608 / 8081 (Cl Pesticides)	EPA 608 / 8082 PCB's ; Aroclors only	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.8 / 6020)*	Metals (200.8 / 6020)	Baylands Requirements	Lab to filter sample for dissolved metals analysis	PCBs - 8082	~~DOC~~ TOC-9060 (CA 4/28/17)		
OV-Con	4/28/17	1530	~~2~~4	AQ-GW	~~HCl~~																X	X		
OV-ZVI-B					NO PRES for PCBs HCl for TOC																X	X		
OV-AP-HP-B			2																		X			
OV-CHP-B																					X			
Bed-Con																					X			
Bed-NaMnO4-B																					X			
Bed-AP-HP-B																					X			
CA 4/28/17 ~~OV-TØ #2~~ OV-TØ-A-#2																					X			
OV-TØ-B-#2																					X			
Bed-15B-TØ-A-#2																					X			

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

* If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E2008.

Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
CSC PRIMA	4/28/17	~1830	Fedex		
Fedex			[signature]	5/1/17	1020

Comments / Instructions

Exclude sediment when extracting PCBs. PCBs may be high.

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other

Preservative Code: 1=4°C 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=ZnOAc/NaOH 7=None

Temp 3.4 °C Initials [initials]

Exclude sediment from PCBs water samples

Page 1 of 2

MAI Work Order # _____

5

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CHAIN OF CUSTODY RECORD

Turn Around Time: 1 Day Rush | 2 Day Rush | 3 Day Rush | STD 5day | Quote #
J-Flag / MDL | ESL | Cleanup Approved | Bottle Order # 6755
Delivery Format: GeoTracker EDF | PDF | EDD | Write On (DW) | EQuIS

Report To: Bill To:
Company:
Email:
Alt Email: Tele:
Project Name/#: BC-PCB
Project Location: PO #
Sampler Signature: Cathen Lyn

SAMPLE ID Location / Field Point	Sampling Date	Sampling Time	#Containers	Matrix	Preservative
Bed-15B-TP-B-#2	4/28/17	1530	2	AQ-GW	HCl
OV-Con-SO	↓	↓	↓	S	GS 0
OV-2V1-B-SO				S	
OV-AP-HP-B-SO				S	P
OV-CHP-B-SO	↓	↓	↓	S	RESERVATIVE

Analysis Requested

BTEX & TPH as Gas (8021/ 8015) MTBE	TPH as Diesel (8015) + Motor Oil Without Silica Gel	TPH as Diesel (8015) + Motor Oil With Silca Gel	Total Oil & Grease (1664 / 9071) Without Silica Gel	Total Petroleum Hydrocarbons - Oil & Grease (1664 / 9071) With Silica Gel	Total Petroleum Hydrocarbons (418.1) With Silica Gel	EPA 505/ 608 / 8081 (Cl Pesticides)	EPA 608 / 8082 PCB's ; Aroclors only	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.8 / 6020)*	Metals (200.8 / 6020)	Baylands Requirements	Lab to filter sample for dissolved metals analysis	PCBs - 8082
															X

MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

* If metals are requested for water samples and the water type (Matrix) is not specified on the chain of custody, MAI will default to metals by E2008.

Please provide an adequate volume of sample. If the volume is not sufficient for a MS/MSD a LCS/LCSD will be prepared in its place and noted in the report.

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
PRIMA	4/28/17	1830	FedEx		
FedEx				5/1/17	1023

Comments / Instructions
Exclude Sediment when extracting PCBs from water. PCBs may be high.

Matrix Code: DW=Drinking Water, GW=Ground Water, WW=Waste Water, SW=Seawater, S=Soil, SL=Sludge, A=Air, WP=Wipe, O=Other
Preservative Code: 1=4°C 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=ZnOAc/NaOH 7=None

Temp _____ °C Initials _____

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Sample Receipt Checklist

Client Name:	**Prima Environmental**	Date and Time Received	**5/1/2017 10:23**
Project Name:	**BC-PCB**	Date Logged:	**5/2/2017**
		Received by:	Jena Alfaro
WorkOrder №:	**1705003** Matrix: Soil/Water	Logged by:	Jena Alfaro
Carrier:	FedEx		

Chain of Custody (COC) Information

Chain of custody present?	Yes	☑	No	☐	
Chain of custody signed when relinquished and received?	Yes	☑	No	☐	
Chain of custody agrees with sample labels?	Yes	☑	No	☐	
Sample IDs noted by Client on COC?	Yes	☑	No	☐	
Date and Time of collection noted by Client on COC?	Yes	☑	No	☐	
Sampler's name noted on COC?	Yes	☑	No	☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes	☐	No	☐	NA ☑
Shipping container/cooler in good condition?	Yes	☑	No	☐	
Samples in proper containers/bottles?	Yes	☑	No	☐	
Sample containers intact?	Yes	☑	No	☐	
Sufficient sample volume for indicated test?	Yes	☑	No	☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes	☑	No	☐	NA ☐
Sample/Temp Blank temperature	Temp: 3.4°C				NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes	☑	No	☐	NA ☐
Sample labels checked for correct preservation?	Yes	☑	No	☐	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes	☐	No	☐	NA ☑
Samples Received on Ice?	Yes	☑	No	☐	
	(Ice Type: WET ICE)				

UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522?	Yes	☐	No	☐	NA ☑
Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539?	Yes	☐	No	☐	NA ☑

Comments:

ANALYTICAL REPORT

Lab Number:	L1715555
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	PRIMA BATCH TEST
Project Number:	Not Specified
Report Date:	06/05/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1715555-01	OV-TO-A-#2	WATER	Not Specified	04/28/17 15:30	05/12/17
L1715555-02	OV-AP-HP-B	WATER	Not Specified	04/28/17 15:30	05/12/17
L1715555-03	OV-CHP-B	WATER	Not Specified	04/28/17 15:30	05/12/17

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Case Narrative

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

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

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

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

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

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

Project Name:	PRIMA BATCH TEST	**Lab Number:**	L1715555
Project Number:	Not Specified	**Report Date:**	06/05/17

Case Narrative (continued)

PCB Congeners/Homologs

L1715555-01, -02, and -03 were extracted with the method required holding time exceeded, at clent's request.

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

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 06/05/17

ORGANICS

PCBS

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-01 D
Client ID: OV-TO-A-#2
Sample Location: Not Specified

Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 19:43
Analyst: MJS

Date Collected: 04/28/17 15:30
Date Received: 05/12/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl1-BZ#1-Cal/RTW	3000		ng/l	83.3	--	100
Cl1-BZ#2	ND		ng/l	83.3	--	100
Cl1-BZ#3	388		ng/l	83.3	--	100
Cl2-BZ#4/#10	47500		ng/l	167	--	100
Cl2-BZ#9	3490		ng/l	83.3	--	100
Cl2-BZ#7	1330		ng/l	83.3	--	100
Cl2-BZ#6	12900		ng/l	83.3	--	100
Cl2-BZ#5	974		ng/l	83.3	--	100
Cl2-BZ#8	60600		ng/l	83.3	--	100
Cl3-BZ#19	7130		ng/l	83.3	--	100
Cl2-BZ#14	ND		ng/l	83.3	--	100
Cl3-BZ#30	ND		ng/l	83.3	--	100
Cl3-BZ#18	58300		ng/l	83.3	--	100
Cl2-BZ#11	122		ng/l	83.3	--	100
Cl3-BZ#17	23600		ng/l	83.3	--	100
Cl2-BZ#12	334		ng/l	83.3	--	100
Cl3-BZ#27	3070		ng/l	83.3	--	100
Cl2-BZ#13	1420		ng/l	83.3	--	100
Cl3-BZ#24	870		ng/l	83.3	--	100
Cl3-BZ#16	23700		ng/l	83.3	--	100
Cl3-BZ#32	12600		ng/l	83.3	--	100
Cl2-BZ#15	14300		ng/l	83.3	--	100
Cl3-BZ#34	175		ng/l	83.3	--	100
Cl3-BZ#23	ND		ng/l	83.3	--	100
Cl4-BZ#54	ND		ng/l	83.3	--	100
Cl3-BZ#29-Cal	439		ng/l	83.3	--	100
Cl4-BZ#50-Cal	ND		ng/l	83.3	--	100
Cl3-BZ#26	7430		ng/l	83.3	--	100
Cl3-BZ#25	3270		ng/l	83.3	--	100
Cl4-BZ#53	4210		ng/l	83.3	--	100

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-01 D Date Collected: 04/28/17 15:30

Client ID: OV-TO-A-#2 Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl3-BZ#-31	43000		ng/l	83.3	--	100
Cl3-BZ#28	40100		ng/l	83.3	--	100
Cl3-BZ#33	34000		ng/l	83.3	--	100
Cl4-BZ#51	1360		ng/l	83.3	--	100
Cl3-BZ#21/#20	2290		ng/l	167	--	100
Cl4-BZ#45	5470		ng/l	83.3	--	100
Cl3-BZ#22	16300		ng/l	83.3	--	100
Cl4-BZ#73/#46	1740		ng/l	167	--	100
Cl4-BZ#69	ND		ng/l	83.3	--	100
Cl4-BZ#43	953		ng/l	83.3	--	100
Cl3-BZ#36	ND		ng/l	83.3	--	100
Cl4-BZ#52	28100		ng/l	83.3	--	100
Cl4-BZ#48	6300		ng/l	83.3	--	100
Cl4-BZ#49	15900		ng/l	83.3	--	100
Cl5-BZ#104	ND		ng/l	83.3	--	100
Cl4-BZ#47	4390		ng/l	83.3	--	100
Cl4-BZ#65/#75/#62	372		ng/l	250	--	100
Cl3-BZ#39	ND		ng/l	83.3	--	100
Cl3-BZ#38	ND		ng/l	83.3	--	100
Cl4-BZ#44	22200		ng/l	83.3	--	100
Cl4-BZ#59	1760		ng/l	83.3	--	100
Cl4-BZ#42	7110		ng/l	83.3	--	100
Cl4-BZ#71	5480		ng/l	83.3	--	100
Cl3-BZ#35	440		ng/l	83.3	--	100
Cl4-BZ#41	3390		ng/l	83.3	--	100
Cl4-BZ#72	ND		ng/l	83.3	--	100
Cl5-BZ#96	197		ng/l	83.3	--	100
Cl5-BZ#103	89.3		ng/l	83.3	--	100
Cl4-BZ#68/#64	9840		ng/l	167	--	100
Cl4-BZ#40	4900		ng/l	83.3	--	100
Cl3-BZ#37	7670		ng/l	83.3	--	100
Cl5-BZ#100	ND		ng/l	83.3	--	100
Cl5-BZ#94	134		ng/l	83.3	--	100
Cl4-BZ#57	105		ng/l	83.3	--	100
Cl4-BZ#67/#58	698		ng/l	167	--	100
Cl5-BZ#102	493		ng/l	83.3	--	100
Cl4-BZ#61	ND		ng/l	83.3	--	100
Cl5-BZ#98	ND		ng/l	83.3	--	100
Cl4-BZ#76	228		ng/l	83.3	--	100

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-01 D Date Collected: 04/28/17 15:30

Client ID: OV-TO-A-#2 Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl5-BZ#93	126		ng/l	83.3	--	100
Cl4-BZ#63	758		ng/l	83.3	--	100
Cl5-BZ#121/#95/#88	13200		ng/l	250	--	100
Cl4-BZ#74	9640		ng/l	83.3	--	100
Cl6-BZ#155	ND		ng/l	83.3	--	100
Cl4-BZ#70	20500		ng/l	83.3	--	100
Cl5-BZ#91	2760		ng/l	83.3	--	100
Cl4-BZ#66	18200		ng/l	83.3	--	100
Cl4-BZ#80	ND		ng/l	83.3	--	100
Cl4-BZ#55	478		ng/l	83.3	--	100
Cl5-BZ#92	2820		ng/l	83.3	--	100
Cl5-BZ#89/#84	5270		ng/l	167	--	100
Cl5-BZ#101/#90	19500		ng/l	167	--	100
Cl4-BZ#56	9140		ng/l	83.3	--	100
Cl5-BZ#113	ND		ng/l	83.3	--	100
Cl5-BZ#99	7410		ng/l	83.3	--	100
Cl6-BZ#150	ND		ng/l	83.3	--	100
Cl4-BZ#60	4630		ng/l	83.3	--	100
Cl6-BZ#152	ND		ng/l	83.3	--	100
Cl5-BZ#119	245		ng/l	83.3	--	100
Cl5-BZ#83/#125/#112	833		ng/l	250	--	100
Cl5-BZ#86/#109	ND		ng/l	167	--	100
Cl6-BZ#145	ND		ng/l	83.3	--	100
Cl5-BZ#97	6260		ng/l	83.3	--	100
Cl6-BZ#148	ND		ng/l	83.3	--	100
Cl4-BZ#79	ND		ng/l	83.3	--	100
Cl5-BZ#116	ND		ng/l	83.3	--	100
Cl6-BZ#154-Cal	ND		ng/l	83.3	--	100
Cl4-BZ#78	ND		ng/l	83.3	--	100
Cl5-BZ#87/#111	7070		ng/l	167	--	100
Cl6-BZ#136	1350		ng/l	83.3	--	100
Cl5-BZ#117	514		ng/l	83.3	--	100
Cl5-BZ#115	390		ng/l	83.3	--	100
Cl5-BZ#85	3660		ng/l	83.3	--	100
Cl5-BZ#120	ND		ng/l	83.3	--	100
Cl5-BZ#110	19900		ng/l	83.3	--	100
Cl4-BZ#81	ND		ng/l	83.3	--	100
Cl6-BZ#151	1240		ng/l	83.3	--	100
Cl6-BZ#135	1000		ng/l	83.3	--	100

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-01 D Date Collected: 04/28/17 15:30

Client ID: OV-TO-A-#2 Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl5-BZ#82	2330		ng/l	83.3	--	100
Cl6-BZ#144	419		ng/l	83.3	--	100
Cl6-BZ#147/#149	6960		ng/l	167	--	100
Cl4-BZ#77	1400		ng/l	83.3	--	100
Cl6-BZ#143/#139	257		ng/l	167	--	100
Cl5-BZ#124	556		ng/l	83.3	--	100
Cl6-BZ#140	ND		ng/l	83.3	--	100
Cl5-BZ#108	ND		ng/l	83.3	--	100
Cl5-BZ#107/#123	1080		ng/l	167	--	100
Cl7-BZ#188-Cal/RTW	ND		ng/l	83.3	--	100
Cl6-BZ#134	608		ng/l	83.3	--	100
Cl5-BZ#106	ND		ng/l	83.3	--	100
Cl6-BZ#133	97.3		ng/l	83.3	--	100
Cl6-BZ#142	ND		ng/l	83.3	--	100
Cl5-BZ#118	14900		ng/l	83.3	--	100
Cl6-BZ#131	232		ng/l	83.3	--	100
Cl7-BZ#184	ND		ng/l	83.3	--	100
Cl6-BZ#165	ND		ng/l	83.3	--	100
Cl6-BZ#146	1120		ng/l	83.3	--	100
Cl6-BZ#161	ND		ng/l	83.3	--	100
Cl5-BZ#122	198		ng/l	83.3	--	100
Cl6-BZ#168	ND		ng/l	83.3	--	100
Cl5-BZ#114	654		ng/l	83.3	--	100
Cl6-BZ#153	7720		ng/l	83.3	--	100
Cl6-BZ#132	4150		ng/l	83.3	--	100
Cl7-BZ#179	227		ng/l	83.3	--	100
Cl6-BZ#141	1820		ng/l	83.3	--	100
Cl7-BZ#176	93.5		ng/l	83.3	--	100
Cl5-BZ#105	5520		ng/l	83.3	--	100
Cl6-BZ#137	814		ng/l	83.3	--	100
Cl5-BZ#127	ND		ng/l	83.3	--	100
Cl7-BZ#186	ND		ng/l	83.3	--	100
Cl6-BZ#130/#164	1420		ng/l	167	--	100
Cl7-BZ#178	103		ng/l	83.3	--	100
Cl6-BZ#138	8610		ng/l	83.3	--	100
Cl6-BZ#163/#160	1940		ng/l	167	--	100
Cl6-BZ#129/#158	2260		ng/l	167	--	100
Cl7-BZ#182/#175	ND		ng/l	167	--	100
Cl7-BZ#187	544		ng/l	83.3	--	100

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-01 D Date Collected: 04/28/17 15:30

Client ID: OV-TO-A-#2 Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl7-BZ#183	414		ng/l	83.3	--	100
Cl6-BZ#166	ND		ng/l	83.3	--	100
Cl6-BZ#159	ND		ng/l	83.3	--	100
Cl5-BZ#126	ND		ng/l	83.3	--	100
Cl7-BZ#185	ND		ng/l	83.3	--	100
Cl6-BZ#162	ND		ng/l	83.3	--	100
Cl7-BZ#174	669		ng/l	83.3	--	100
Cl6-BZ#128	2390		ng/l	83.3	--	100
Cl8-BZ#202	ND		ng/l	83.3	--	100
Cl6-BZ#167	346		ng/l	83.3	--	100
Cl7-BZ#181	ND		ng/l	83.3	--	100
Cl7-BZ#177	371		ng/l	83.3	--	100
Cl8-BZ#204/#200-CAL	ND		ng/l	167	--	100
Cl7-BZ#171	297		ng/l	83.3	--	100
Cl7-BZ#173	ND		ng/l	83.3	--	100
Cl8-BZ#197	ND		ng/l	83.3	--	100
Cl7-BZ#172	131		ng/l	83.3	--	100
Cl7-BZ#192	ND		ng/l	83.3	--	100
Cl6-BZ#156	1340		ng/l	83.3	--	100
Cl6-BZ#157	377		ng/l	83.3	--	100
Cl7-BZ#180	1450		ng/l	83.3	--	100
Cl7-BZ#193	ND		ng/l	83.3	--	100
Cl8-BZ#199	ND		ng/l	83.3	--	100
Cl7-BZ#191	ND		ng/l	83.3	--	100
Cl8-BZ#198	ND		ng/l	83.3	--	100
Cl8-BZ#201	166		ng/l	83.3	--	100
Cl7-BZ#170	1080		ng/l	83.3	--	100
Cl7-BZ#190	155		ng/l	83.3	--	100
Cl8-BZ#196	ND		ng/l	83.3	--	100
Cl8-BZ#203	111		ng/l	83.3	--	100
Cl6-BZ#169	ND		ng/l	83.3	--	100
Cl9-BZ#208	ND		ng/l	83.3	--	100
Cl9-BZ#207	ND		ng/l	83.3	--	100
Cl7-BZ#189	ND		ng/l	83.3	--	100
Cl8-BZ#195	83.5		ng/l	83.3	--	100
Cl8-BZ#194	156		ng/l	83.3	--	100
Cl8-BZ#205	ND		ng/l	83.3	--	100
Cl9-BZ#206-Cal/RTW	ND		ng/l	83.3	--	100
Cl10-BZ#209-Cal/RTW	ND		ng/l	83.3	--	100

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-01 D Date Collected: 04/28/17 15:30

Client ID: OV-TO-A-#2 Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Monochlorobiphenyls	3460		ng/l	83.3	--	100
Dichlorobiphenyls	143000		ng/l	83.3	--	100
Trichlorobiphenyls	284000		ng/l	83.3	--	100
Tetrachlorobiphenyls	189000		ng/l	83.3	--	100
Pentachlorobiphenyls	116000		ng/l	83.3	--	100
Hexachlorobiphenyls	46700		ng/l	83.3	--	100
Heptachlorobiphenyls	5730		ng/l	83.3	--	100
Octachlorobiphenyls	595		ng/l	83.3	--	100
Nonachlorobiphenyls	ND		ng/l	83.3	--	100
Decachlorobiphenyl	ND		ng/l	83.3	--	100
Total PCB	790000		ng/l	83.3	NA	100

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Cl3-BZ#19-C13 (surr)	70		50-125
Cl8-BZ#202-C13 (surr)	**136**	Q	50-125

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-02 D
Client ID: OV-AP-HP-B
Sample Location: Not Specified

Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 20:57
Analyst: MJS

Date Collected: 04/28/17 15:30
Date Received: 05/12/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl1-BZ#1-Cal/RTW	6700		ng/l	16.1	--	10
Cl1-BZ#2	225		ng/l	16.1	--	10
Cl1-BZ#3	1370		ng/l	16.1	--	10
Cl2-BZ#4/#10	17700		ng/l	32.2	--	10
Cl2-BZ#9	1240		ng/l	16.1	--	10
Cl2-BZ#7	681		ng/l	16.1	--	10
Cl2-BZ#6	3510		ng/l	16.1	--	10
Cl2-BZ#5	470		ng/l	16.1	--	10
Cl2-BZ#8	15700		ng/l	16.1	--	10
Cl3-BZ#19	1720		ng/l	16.1	--	10
Cl2-BZ#14	ND		ng/l	16.1	--	10
Cl3-BZ#30	ND		ng/l	16.1	--	10
Cl3-BZ#18	9210		ng/l	16.1	--	10
Cl2-BZ#11	24.6		ng/l	16.1	--	10
Cl3-BZ#17	2960		ng/l	16.1	--	10
Cl2-BZ#12	106		ng/l	16.1	--	10
Cl3-BZ#27	479		ng/l	16.1	--	10
Cl2-BZ#13	267		ng/l	16.1	--	10
Cl3-BZ#24	139		ng/l	16.1	--	10
Cl3-BZ#16	4290		ng/l	16.1	--	10
Cl3-BZ#32	1620		ng/l	16.1	--	10
Cl2-BZ#15	2530		ng/l	16.1	--	10
Cl3-BZ#34	ND		ng/l	16.1	--	10
Cl3-BZ#23	ND		ng/l	16.1	--	10
Cl4-BZ#54	ND		ng/l	16.1	--	10
Cl3-BZ#29-Cal	35.9		ng/l	16.1	--	10
Cl4-BZ#50-Cal	ND		ng/l	16.1	--	10
Cl3-BZ#26	614		ng/l	16.1	--	10
Cl3-BZ#25	242		ng/l	16.1	--	10
Cl4-BZ#53	317		ng/l	16.1	--	10

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-02 D Date Collected: 04/28/17 15:30

Client ID: OV-AP-HP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl3-BZ#-31	3190		ng/l	16.1	--	10
Cl3-BZ#28	2560		ng/l	16.1	--	10
Cl3-BZ#33	2690		ng/l	16.1	--	10
Cl4-BZ#51	73.3		ng/l	16.1	--	10
Cl3-BZ#21/#20	274		ng/l	32.2	--	10
Cl4-BZ#45	408		ng/l	16.1	--	10
Cl3-BZ#22	1420		ng/l	16.1	--	10
Cl4-BZ#73/#46	139		ng/l	32.2	--	10
Cl4-BZ#69	ND		ng/l	16.1	--	10
Cl4-BZ#43	41.6		ng/l	16.1	--	10
Cl3-BZ#36	ND		ng/l	16.1	--	10
Cl4-BZ#52	1370		ng/l	16.1	--	10
Cl4-BZ#48	268		ng/l	16.1	--	10
Cl4-BZ#49	628		ng/l	16.1	--	10
Cl5-BZ#104	ND		ng/l	16.1	--	10
Cl4-BZ#47	155		ng/l	16.1	--	10
Cl4-BZ#65/#75/#62	ND		ng/l	48.4	--	10
Cl3-BZ#39	ND		ng/l	16.1	--	10
Cl3-BZ#38	ND		ng/l	16.1	--	10
Cl4-BZ#44	1210		ng/l	16.1	--	10
Cl4-BZ#59	94.9		ng/l	16.1	--	10
Cl4-BZ#42	328		ng/l	16.1	--	10
Cl4-BZ#71	261		ng/l	16.1	--	10
Cl3-BZ#35	27.8		ng/l	16.1	--	10
Cl4-BZ#41	174		ng/l	16.1	--	10
Cl4-BZ#72	ND		ng/l	16.1	--	10
Cl5-BZ#96	ND		ng/l	16.1	--	10
Cl5-BZ#103	ND		ng/l	16.1	--	10
Cl4-BZ#68/#64	452		ng/l	32.2	--	10
Cl4-BZ#40	285		ng/l	16.1	--	10
Cl3-BZ#37	478		ng/l	16.1	--	10
Cl5-BZ#100	ND		ng/l	16.1	--	10
Cl5-BZ#94	ND		ng/l	16.1	--	10
Cl4-BZ#57	ND		ng/l	16.1	--	10
Cl4-BZ#67/#58	ND		ng/l	32.2	--	10
Cl5-BZ#102	ND		ng/l	16.1	--	10
Cl4-BZ#61	ND		ng/l	16.1	--	10
Cl5-BZ#98	ND		ng/l	16.1	--	10
Cl4-BZ#76	ND		ng/l	16.1	--	10

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-02 D Date Collected: 04/28/17 15:30

Client ID: OV-AP-HP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl5-BZ#93	ND		ng/l	16.1	--	10
Cl4-BZ#63	25.3		ng/l	16.1	--	10
Cl5-BZ#121/#95/#88	400		ng/l	48.4	--	10
Cl4-BZ#74	258		ng/l	16.1	--	10
Cl6-BZ#155	ND		ng/l	16.1	--	10
Cl4-BZ#70	622		ng/l	16.1	--	10
Cl5-BZ#91	68.6		ng/l	16.1	--	10
Cl4-BZ#66	500		ng/l	16.1	--	10
Cl4-BZ#80	ND		ng/l	16.1	--	10
Cl4-BZ#55	18.7		ng/l	16.1	--	10
Cl5-BZ#92	67.2		ng/l	16.1	--	10
Cl5-BZ#89/#84	167		ng/l	32.2	--	10
Cl5-BZ#101/#90	429		ng/l	32.2	--	10
Cl4-BZ#56	292		ng/l	16.1	--	10
Cl5-BZ#113	ND		ng/l	16.1	--	10
Cl5-BZ#99	152		ng/l	16.1	--	10
Cl6-BZ#150	ND		ng/l	16.1	--	10
Cl4-BZ#60	138		ng/l	16.1	--	10
Cl6-BZ#152	ND		ng/l	16.1	--	10
Cl5-BZ#119	ND		ng/l	16.1	--	10
Cl5-BZ#83/#125/#112	ND		ng/l	48.4	--	10
Cl5-BZ#86/#109	ND		ng/l	32.2	--	10
Cl6-BZ#145	ND		ng/l	16.1	--	10
Cl5-BZ#97	151		ng/l	16.1	--	10
Cl6-BZ#148	ND		ng/l	16.1	--	10
Cl4-BZ#79	ND		ng/l	16.1	--	10
Cl5-BZ#116	ND		ng/l	16.1	--	10
Cl6-BZ#154-Cal	ND		ng/l	16.1	--	10
Cl4-BZ#78	ND		ng/l	16.1	--	10
Cl5-BZ#87/#111	172		ng/l	32.2	--	10
Cl6-BZ#136	26.5		ng/l	16.1	--	10
Cl5-BZ#117	ND		ng/l	16.1	--	10
Cl5-BZ#115	ND		ng/l	16.1	--	10
Cl5-BZ#85	81.2		ng/l	16.1	--	10
Cl5-BZ#120	ND		ng/l	16.1	--	10
Cl5-BZ#110	470		ng/l	16.1	--	10
Cl4-BZ#81	ND		ng/l	16.1	--	10
Cl6-BZ#151	25.4		ng/l	16.1	--	10
Cl6-BZ#135	20.9		ng/l	16.1	--	10

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-02 D Date Collected: 04/28/17 15:30

Client ID: OV-AP-HP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl5-BZ#82	56.9		ng/l	16.1	--	10
Cl6-BZ#144	ND		ng/l	16.1	--	10
Cl6-BZ#147/#149	137		ng/l	32.2	--	10
Cl4-BZ#77	41.4		ng/l	16.1	--	10
Cl6-BZ#143/#139	ND		ng/l	32.2	--	10
Cl5-BZ#124	ND		ng/l	16.1	--	10
Cl6-BZ#140	ND		ng/l	16.1	--	10
Cl5-BZ#108	ND		ng/l	16.1	--	10
Cl5-BZ#107/#123	ND		ng/l	32.2	--	10
Cl7-BZ#188-Cal/RTW	ND		ng/l	16.1	--	10
Cl6-BZ#134	ND		ng/l	16.1	--	10
Cl5-BZ#106	ND		ng/l	16.1	--	10
Cl6-BZ#133	ND		ng/l	16.1	--	10
Cl6-BZ#142	ND		ng/l	16.1	--	10
Cl5-BZ#118	286		ng/l	16.1	--	10
Cl6-BZ#131	ND		ng/l	16.1	--	10
Cl7-BZ#184	ND		ng/l	16.1	--	10
Cl6-BZ#165	ND		ng/l	16.1	--	10
Cl6-BZ#146	22.8		ng/l	16.1	--	10
Cl6-BZ#161	ND		ng/l	16.1	--	10
Cl5-BZ#122	ND		ng/l	16.1	--	10
Cl6-BZ#168	ND		ng/l	16.1	--	10
Cl5-BZ#114	ND		ng/l	16.1	--	10
Cl6-BZ#153	143		ng/l	16.1	--	10
Cl6-BZ#132	83.7		ng/l	16.1	--	10
Cl7-BZ#179	ND		ng/l	16.1	--	10
Cl6-BZ#141	37.4		ng/l	16.1	--	10
Cl7-BZ#176	ND		ng/l	16.1	--	10
Cl5-BZ#105	108		ng/l	16.1	--	10
Cl6-BZ#137	ND		ng/l	16.1	--	10
Cl5-BZ#127	ND		ng/l	16.1	--	10
Cl7-BZ#186	ND		ng/l	16.1	--	10
Cl6-BZ#130/#164	ND		ng/l	32.2	--	10
Cl7-BZ#178	ND		ng/l	16.1	--	10
Cl6-BZ#138	163		ng/l	16.1	--	10
Cl6-BZ#163/#160	35.7		ng/l	32.2	--	10
Cl6-BZ#129/#158	44.2		ng/l	32.2	--	10
Cl7-BZ#182/#175	ND		ng/l	32.2	--	10
Cl7-BZ#187	ND		ng/l	16.1	--	10

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-02 D Date Collected: 04/28/17 15:30

Client ID: OV-AP-HP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl7-BZ#183	ND		ng/l	16.1	--	10
Cl6-BZ#166	ND		ng/l	16.1	--	10
Cl6-BZ#159	ND		ng/l	16.1	--	10
Cl5-BZ#126	ND		ng/l	16.1	--	10
Cl7-BZ#185	ND		ng/l	16.1	--	10
Cl6-BZ#162	ND		ng/l	16.1	--	10
Cl7-BZ#174	ND		ng/l	16.1	--	10
Cl6-BZ#128	48.2		ng/l	16.1	--	10
Cl8-BZ#202	ND		ng/l	16.1	--	10
Cl6-BZ#167	ND		ng/l	16.1	--	10
Cl7-BZ#181	ND		ng/l	16.1	--	10
Cl7-BZ#177	ND		ng/l	16.1	--	10
Cl8-BZ#204/#200-CAL	ND		ng/l	32.2	--	10
Cl7-BZ#171	ND		ng/l	16.1	--	10
Cl7-BZ#173	ND		ng/l	16.1	--	10
Cl8-BZ#197	ND		ng/l	16.1	--	10
Cl7-BZ#172	ND		ng/l	16.1	--	10
Cl7-BZ#192	ND		ng/l	16.1	--	10
Cl6-BZ#156	29.5		ng/l	16.1	--	10
Cl6-BZ#157	ND		ng/l	16.1	--	10
Cl7-BZ#180	29.8		ng/l	16.1	--	10
Cl7-BZ#193	ND		ng/l	16.1	--	10
Cl8-BZ#199	ND		ng/l	16.1	--	10
Cl7-BZ#191	ND		ng/l	16.1	--	10
Cl8-BZ#198	ND		ng/l	16.1	--	10
Cl8-BZ#201	ND		ng/l	16.1	--	10
Cl7-BZ#170	20.4		ng/l	16.1	--	10
Cl7-BZ#190	ND		ng/l	16.1	--	10
Cl8-BZ#196	ND		ng/l	16.1	--	10
Cl8-BZ#203	ND		ng/l	16.1	--	10
Cl6-BZ#169	ND		ng/l	16.1	--	10
Cl9-BZ#208	ND		ng/l	16.1	--	10
Cl9-BZ#207	ND		ng/l	16.1	--	10
Cl7-BZ#189	ND		ng/l	16.1	--	10
Cl8-BZ#195	ND		ng/l	16.1	--	10
Cl8-BZ#194	ND		ng/l	16.1	--	10
Cl8-BZ#205	ND		ng/l	16.1	--	10
Cl9-BZ#206-Cal/RTW	ND		ng/l	16.1	--	10
Cl10-BZ#209-Cal/RTW	ND		ng/l	16.1	--	10

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-02 D Date Collected: 04/28/17 15:30

Client ID: OV-AP-HP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Monochlorobiphenyls	8300		ng/l	16.1	--	10
Dichlorobiphenyls	42200		ng/l	16.1	--	10
Trichlorobiphenyls	32000		ng/l	16.1	--	10
Tetrachlorobiphenyls	8130		ng/l	16.1	--	10
Pentachlorobiphenyls	2700		ng/l	16.1	--	10
Hexachlorobiphenyls	907		ng/l	16.1	--	10
Heptachlorobiphenyls	82.6		ng/l	16.1	--	10
Octachlorobiphenyls	ND		ng/l	16.1	--	10
Nonachlorobiphenyls	ND		ng/l	16.1	--	10
Decachlorobiphenyl	ND		ng/l	16.1	--	10
Total PCB	94300		ng/l	16.1	NA	10

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Cl3-BZ#19-C13 (surr)	71		50-125
Cl8-BZ#202-C13 (surr)	73		50-125

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-03 D
Client ID: OV-CHP-B
Sample Location: Not Specified

Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 22:11
Analyst: MJS

Date Collected: 04/28/17 15:30
Date Received: 05/12/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl1-BZ#1-Cal/RTW	9240		ng/l	32.2	--	20
Cl1-BZ#2	283		ng/l	32.2	--	20
Cl1-BZ#3	1690		ng/l	32.2	--	20
Cl2-BZ#4/#10	23900		ng/l	64.5	--	20
Cl2-BZ#9	1640		ng/l	32.2	--	20
Cl2-BZ#7	900		ng/l	32.2	--	20
Cl2-BZ#6	4620		ng/l	32.2	--	20
Cl2-BZ#5	613		ng/l	32.2	--	20
Cl2-BZ#8	20700		ng/l	32.2	--	20
Cl3-BZ#19	2430		ng/l	32.2	--	20
Cl2-BZ#14	ND		ng/l	32.2	--	20
Cl3-BZ#30	ND		ng/l	32.2	--	20
Cl3-BZ#18	12900		ng/l	32.2	--	20
Cl2-BZ#11	ND		ng/l	32.2	--	20
Cl3-BZ#17	4260		ng/l	32.2	--	20
Cl2-BZ#12	138		ng/l	32.2	--	20
Cl3-BZ#27	679		ng/l	32.2	--	20
Cl2-BZ#13	330		ng/l	32.2	--	20
Cl3-BZ#24	194		ng/l	32.2	--	20
Cl3-BZ#16	5800		ng/l	32.2	--	20
Cl3-BZ#32	2260		ng/l	32.2	--	20
Cl2-BZ#15	3210		ng/l	32.2	--	20
Cl3-BZ#34	ND		ng/l	32.2	--	20
Cl3-BZ#23	ND		ng/l	32.2	--	20
Cl4-BZ#54	ND		ng/l	32.2	--	20
Cl3-BZ#29-Cal	46.9		ng/l	32.2	--	20
Cl4-BZ#50-Cal	ND		ng/l	32.2	--	20
Cl3-BZ#26	806		ng/l	32.2	--	20
Cl3-BZ#25	309		ng/l	32.2	--	20
Cl4-BZ#53	434		ng/l	32.2	--	20

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-03 D Date Collected: 04/28/17 15:30

Client ID: OV-CHP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl3-BZ#-31	4110		ng/l	32.2	--	20
Cl3-BZ#28	3250		ng/l	32.2	--	20
Cl3-BZ#33	3530		ng/l	32.2	--	20
Cl4-BZ#51	99.9		ng/l	32.2	--	20
Cl3-BZ#21/#20	276		ng/l	64.5	--	20
Cl4-BZ#45	577		ng/l	32.2	--	20
Cl3-BZ#22	1760		ng/l	32.2	--	20
Cl4-BZ#73/#46	203		ng/l	64.5	--	20
Cl4-BZ#69	ND		ng/l	32.2	--	20
Cl4-BZ#43	58.9		ng/l	32.2	--	20
Cl3-BZ#36	ND		ng/l	32.2	--	20
Cl4-BZ#52	1680		ng/l	32.2	--	20
Cl4-BZ#48	327		ng/l	32.2	--	20
Cl4-BZ#49	758		ng/l	32.2	--	20
Cl5-BZ#104	ND		ng/l	32.2	--	20
Cl4-BZ#47	173		ng/l	32.2	--	20
Cl4-BZ#65/#75/#62	ND		ng/l	96.8	--	20
Cl3-BZ#39	ND		ng/l	32.2	--	20
Cl3-BZ#38	ND		ng/l	32.2	--	20
Cl4-BZ#44	1430		ng/l	32.2	--	20
Cl4-BZ#59	123		ng/l	32.2	--	20
Cl4-BZ#42	352		ng/l	32.2	--	20
Cl4-BZ#71	304		ng/l	32.2	--	20
Cl3-BZ#35	ND		ng/l	32.2	--	20
Cl4-BZ#41	205		ng/l	32.2	--	20
Cl4-BZ#72	ND		ng/l	32.2	--	20
Cl5-BZ#96	ND		ng/l	32.2	--	20
Cl5-BZ#103	ND		ng/l	32.2	--	20
Cl4-BZ#68/#64	503		ng/l	64.5	--	20
Cl4-BZ#40	350		ng/l	32.2	--	20
Cl3-BZ#37	512		ng/l	32.2	--	20
Cl5-BZ#100	ND		ng/l	32.2	--	20
Cl5-BZ#94	ND		ng/l	32.2	--	20
Cl4-BZ#57	ND		ng/l	32.2	--	20
Cl4-BZ#67/#58	ND		ng/l	64.5	--	20
Cl5-BZ#102	ND		ng/l	32.2	--	20
Cl4-BZ#61	ND		ng/l	32.2	--	20
Cl5-BZ#98	ND		ng/l	32.2	--	20
Cl4-BZ#76	ND		ng/l	32.2	--	20

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-03 D Date Collected: 04/28/17 15:30

Client ID: OV-CHP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl5-BZ#93	ND		ng/l	32.2	--	20
Cl4-BZ#63	ND		ng/l	32.2	--	20
Cl5-BZ#121/#95/#88	422		ng/l	96.8	--	20
Cl4-BZ#74	248		ng/l	32.2	--	20
Cl6-BZ#155	ND		ng/l	32.2	--	20
Cl4-BZ#70	605		ng/l	32.2	--	20
Cl5-BZ#91	75.4		ng/l	32.2	--	20
Cl4-BZ#66	482		ng/l	32.2	--	20
Cl4-BZ#80	ND		ng/l	32.2	--	20
Cl4-BZ#55	ND		ng/l	32.2	--	20
Cl5-BZ#92	63.4		ng/l	32.2	--	20
Cl5-BZ#89/#84	169		ng/l	64.5	--	20
Cl5-BZ#101/#90	364		ng/l	64.5	--	20
Cl4-BZ#56	288		ng/l	32.2	--	20
Cl5-BZ#113	ND		ng/l	32.2	--	20
Cl5-BZ#99	129		ng/l	32.2	--	20
Cl6-BZ#150	ND		ng/l	32.2	--	20
Cl4-BZ#60	128		ng/l	32.2	--	20
Cl6-BZ#152	ND		ng/l	32.2	--	20
Cl5-BZ#119	ND		ng/l	32.2	--	20
Cl5-BZ#83/#125/#112	ND		ng/l	96.8	--	20
Cl5-BZ#86/#109	ND		ng/l	64.5	--	20
Cl6-BZ#145	ND		ng/l	32.2	--	20
Cl5-BZ#97	127		ng/l	32.2	--	20
Cl6-BZ#148	ND		ng/l	32.2	--	20
Cl4-BZ#79	ND		ng/l	32.2	--	20
Cl5-BZ#116	ND		ng/l	32.2	--	20
Cl6-BZ#154-Cal	ND		ng/l	32.2	--	20
Cl4-BZ#78	ND		ng/l	32.2	--	20
Cl5-BZ#87/#111	146		ng/l	64.5	--	20
Cl6-BZ#136	ND		ng/l	32.2	--	20
Cl5-BZ#117	ND		ng/l	32.2	--	20
Cl5-BZ#115	ND		ng/l	32.2	--	20
Cl5-BZ#85	69.8		ng/l	32.2	--	20
Cl5-BZ#120	ND		ng/l	32.2	--	20
Cl5-BZ#110	409		ng/l	32.2	--	20
Cl4-BZ#81	ND		ng/l	32.2	--	20
Cl6-BZ#151	ND		ng/l	32.2	--	20
Cl6-BZ#135	ND		ng/l	32.2	--	20

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-03 D Date Collected: 04/28/17 15:30

Client ID: OV-CHP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl5-BZ#82	53.7		ng/l	32.2	--	20
Cl6-BZ#144	ND		ng/l	32.2	--	20
Cl6-BZ#147/#149	112		ng/l	64.5	--	20
Cl4-BZ#77	37.0		ng/l	32.2	--	20
Cl6-BZ#143/#139	ND		ng/l	64.5	--	20
Cl5-BZ#124	ND		ng/l	32.2	--	20
Cl6-BZ#140	ND		ng/l	32.2	--	20
Cl5-BZ#108	ND		ng/l	32.2	--	20
Cl5-BZ#107/#123	ND		ng/l	64.5	--	20
Cl7-BZ#188-Cal/RTW	ND		ng/l	32.2	--	20
Cl6-BZ#134	ND		ng/l	32.2	--	20
Cl5-BZ#106	ND		ng/l	32.2	--	20
Cl6-BZ#133	ND		ng/l	32.2	--	20
Cl6-BZ#142	ND		ng/l	32.2	--	20
Cl5-BZ#118	223		ng/l	32.2	--	20
Cl6-BZ#131	ND		ng/l	32.2	--	20
Cl7-BZ#184	ND		ng/l	32.2	--	20
Cl6-BZ#165	ND		ng/l	32.2	--	20
Cl6-BZ#146	ND		ng/l	32.2	--	20
Cl6-BZ#161	ND		ng/l	32.2	--	20
Cl5-BZ#122	ND		ng/l	32.2	--	20
Cl6-BZ#168	ND		ng/l	32.2	--	20
Cl5-BZ#114	ND		ng/l	32.2	--	20
Cl6-BZ#153	105		ng/l	32.2	--	20
Cl6-BZ#132	65.9		ng/l	32.2	--	20
Cl7-BZ#179	ND		ng/l	32.2	--	20
Cl6-BZ#141	ND		ng/l	32.2	--	20
Cl7-BZ#176	ND		ng/l	32.2	--	20
Cl5-BZ#105	89.2		ng/l	32.2	--	20
Cl6-BZ#137	ND		ng/l	32.2	--	20
Cl5-BZ#127	ND		ng/l	32.2	--	20
Cl7-BZ#186	ND		ng/l	32.2	--	20
Cl6-BZ#130/#164	ND		ng/l	64.5	--	20
Cl7-BZ#178	ND		ng/l	32.2	--	20
Cl6-BZ#138	119		ng/l	32.2	--	20
Cl6-BZ#163/#160	ND		ng/l	64.5	--	20
Cl6-BZ#129/#158	ND		ng/l	64.5	--	20
Cl7-BZ#182/#175	ND		ng/l	64.5	--	20
Cl7-BZ#187	ND		ng/l	32.2	--	20

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-03 D Date Collected: 04/28/17 15:30

Client ID: OV-CHP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Cl7-BZ#183	ND		ng/l	32.2	--	20
Cl6-BZ#166	ND		ng/l	32.2	--	20
Cl6-BZ#159	ND		ng/l	32.2	--	20
Cl5-BZ#126	ND		ng/l	32.2	--	20
Cl7-BZ#185	ND		ng/l	32.2	--	20
Cl6-BZ#162	ND		ng/l	32.2	--	20
Cl7-BZ#174	ND		ng/l	32.2	--	20
Cl6-BZ#128	40.1		ng/l	32.2	--	20
Cl8-BZ#202	ND		ng/l	32.2	--	20
Cl6-BZ#167	ND		ng/l	32.2	--	20
Cl7-BZ#181	ND		ng/l	32.2	--	20
Cl7-BZ#177	ND		ng/l	32.2	--	20
Cl8-BZ#204/#200-CAL	ND		ng/l	64.5	--	20
Cl7-BZ#171	ND		ng/l	32.2	--	20
Cl7-BZ#173	ND		ng/l	32.2	--	20
Cl8-BZ#197	ND		ng/l	32.2	--	20
Cl7-BZ#172	ND		ng/l	32.2	--	20
Cl7-BZ#192	ND		ng/l	32.2	--	20
Cl6-BZ#156	ND		ng/l	32.2	--	20
Cl6-BZ#157	ND		ng/l	32.2	--	20
Cl7-BZ#180	ND		ng/l	32.2	--	20
Cl7-BZ#193	ND		ng/l	32.2	--	20
Cl8-BZ#199	ND		ng/l	32.2	--	20
Cl7-BZ#191	ND		ng/l	32.2	--	20
Cl8-BZ#198	ND		ng/l	32.2	--	20
Cl8-BZ#201	ND		ng/l	32.2	--	20
Cl7-BZ#170	ND		ng/l	32.2	--	20
Cl7-BZ#190	ND		ng/l	32.2	--	20
Cl8-BZ#196	ND		ng/l	32.2	--	20
Cl8-BZ#203	ND		ng/l	32.2	--	20
Cl6-BZ#169	ND		ng/l	32.2	--	20
Cl9-BZ#208	ND		ng/l	32.2	--	20
Cl9-BZ#207	ND		ng/l	32.2	--	20
Cl7-BZ#189	ND		ng/l	32.2	--	20
Cl8-BZ#195	ND		ng/l	32.2	--	20
Cl8-BZ#194	ND		ng/l	32.2	--	20
Cl8-BZ#205	ND		ng/l	32.2	--	20
Cl9-BZ#206-Cal/RTW	ND		ng/l	32.2	--	20
Cl10-BZ#209-Cal/RTW	ND		ng/l	32.2	--	20

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

SAMPLE RESULTS

Lab ID: L1715555-03 D Date Collected: 04/28/17 15:30

Client ID: OV-CHP-B Date Received: 05/12/17

Sample Location: Not Specified Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners/Homologs - Mansfield Lab						
Monochlorobiphenyls	11200		ng/l	32.2	--	20
Dichlorobiphenyls	56100		ng/l	32.2	--	20
Trichlorobiphenyls	43200		ng/l	32.2	--	20
Tetrachlorobiphenyls	9390		ng/l	32.2	--	20
Pentachlorobiphenyls	2340		ng/l	32.2	--	20
Hexachlorobiphenyls	584		ng/l	32.2	--	20
Heptachlorobiphenyls	40.6		ng/l	32.2	--	20
Octachlorobiphenyls	ND		ng/l	32.2	--	20
Nonachlorobiphenyls	ND		ng/l	32.2	--	20
Decachlorobiphenyl	ND		ng/l	32.2	--	20
Total PCB	123000		ng/l	32.2	NA	20

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Cl3-BZ#19-C13 (surr)	65		50-125
Cl8-BZ#202-C13 (surr)	65		50-125

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 03:49
Analyst: MJS

Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners/Homologs - Mansfield Lab for sample(s): 01-03 Batch: WG1006321-1					
Cl1-BZ#1-Cal/RTW	ND		ng/l	0.500	--
Cl1-BZ#2	ND		ng/l	0.500	--
Cl1-BZ#3	ND		ng/l	0.500	--
Cl2-BZ#4/#10	ND		ng/l	1.00	--
Cl2-BZ#9	ND		ng/l	0.500	--
Cl2-BZ#7	ND		ng/l	0.500	--
Cl2-BZ#6	ND		ng/l	0.500	--
Cl2-BZ#5	ND		ng/l	0.500	--
Cl2-BZ#8	ND		ng/l	0.500	--
Cl3-BZ#19	ND		ng/l	0.500	--
Cl2-BZ#14	ND		ng/l	0.500	--
Cl3-BZ#30	ND		ng/l	0.500	--
Cl3-BZ#18	ND		ng/l	0.500	--
Cl2-BZ#11	ND		ng/l	0.500	--
Cl3-BZ#17	ND		ng/l	0.500	--
Cl2-BZ#12	ND		ng/l	0.500	--
Cl3-BZ#27	ND		ng/l	0.500	--
Cl2-BZ#13	ND		ng/l	0.500	--
Cl3-BZ#24	ND		ng/l	0.500	--
Cl3-BZ#16	ND		ng/l	0.500	--
Cl3-BZ#32	ND		ng/l	0.500	--
Cl2-BZ#15	ND		ng/l	0.500	--
Cl3-BZ#34	ND		ng/l	0.500	--
Cl3-BZ#23	ND		ng/l	0.500	--
Cl4-BZ#54	ND		ng/l	0.500	--
Cl3-BZ#29-Cal	ND		ng/l	0.500	--
Cl4-BZ#50-Cal	ND		ng/l	0.500	--
Cl3-BZ#26	ND		ng/l	0.500	--
Cl3-BZ#25	ND		ng/l	0.500	--

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 03:49
Analyst: MJS

Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners/Homologs - Mansfield Lab for sample(s): 01-03 Batch: WG1006321-1					
Cl4-BZ#53	ND		ng/l	0.500	--
Cl3-BZ#-31	ND		ng/l	0.500	--
Cl3-BZ#28	ND		ng/l	0.500	--
Cl3-BZ#33	ND		ng/l	0.500	--
Cl4-BZ#51	ND		ng/l	0.500	--
Cl3-BZ#21/#20	ND		ng/l	1.00	--
Cl4-BZ#45	ND		ng/l	0.500	--
Cl3-BZ#22	ND		ng/l	0.500	--
Cl4-BZ#73/#46	ND		ng/l	1.00	--
Cl4-BZ#69	ND		ng/l	0.500	--
Cl4-BZ#43	ND		ng/l	0.500	--
Cl3-BZ#36	ND		ng/l	0.500	--
Cl4-BZ#52	ND		ng/l	0.500	--
Cl4-BZ#48	ND		ng/l	0.500	--
Cl4-BZ#49	ND		ng/l	0.500	--
Cl5-BZ#104	ND		ng/l	0.500	--
Cl4-BZ#47	ND		ng/l	0.500	--
Cl4-BZ#65/#75/#62	ND		ng/l	1.50	--
Cl3-BZ#39	ND		ng/l	0.500	--
Cl3-BZ#38	ND		ng/l	0.500	--
Cl4-BZ#44	ND		ng/l	0.500	--
Cl4-BZ#59	ND		ng/l	0.500	--
Cl4-BZ#42	ND		ng/l	0.500	--
Cl4-BZ#71	ND		ng/l	0.500	--
Cl3-BZ#35	ND		ng/l	0.500	--
Cl4-BZ#41	ND		ng/l	0.500	--
Cl4-BZ#72	ND		ng/l	0.500	--
Cl5-BZ#96	ND		ng/l	0.500	--
Cl5-BZ#103	ND		ng/l	0.500	--

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 03:49
Analyst: MJS

Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners/Homologs - Mansfield Lab for sample(s): 01-03 Batch: WG1006321-1					
Cl4-BZ#68/#64	ND		ng/l	1.00	--
Cl4-BZ#40	ND		ng/l	0.500	--
Cl3-BZ#37	ND		ng/l	0.500	--
Cl5-BZ#100	ND		ng/l	0.500	--
Cl5-BZ#94	ND		ng/l	0.500	--
Cl4-BZ#57	ND		ng/l	0.500	--
Cl4-BZ#67/#58	ND		ng/l	1.00	--
Cl5-BZ#102	ND		ng/l	0.500	--
Cl4-BZ#61	ND		ng/l	0.500	--
Cl5-BZ#98	ND		ng/l	0.500	--
Cl4-BZ#76	ND		ng/l	0.500	--
Cl5-BZ#93	ND		ng/l	0.500	--
Cl4-BZ#63	ND		ng/l	0.500	--
Cl5-BZ#121/#95/#88	ND		ng/l	1.50	--
Cl4-BZ#74	ND		ng/l	0.500	--
Cl6-BZ#155	ND		ng/l	0.500	--
Cl4-BZ#70	ND		ng/l	0.500	--
Cl5-BZ#91	ND		ng/l	0.500	--
Cl4-BZ#66	ND		ng/l	0.500	--
Cl4-BZ#80	ND		ng/l	0.500	--
Cl4-BZ#55	ND		ng/l	0.500	--
Cl5-BZ#92	ND		ng/l	0.500	--
Cl5-BZ#89/#84	ND		ng/l	1.00	--
Cl5-BZ#101/#90	ND		ng/l	1.00	--
Cl4-BZ#56	ND		ng/l	0.500	--
Cl5-BZ#113	ND		ng/l	0.500	--
Cl5-BZ#99	ND		ng/l	0.500	--
Cl6-BZ#150	ND		ng/l	0.500	--
Cl4-BZ#60	ND		ng/l	0.500	--

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 03:49
Analyst: MJS

Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners/Homologs - Mansfield Lab for sample(s): 01-03 Batch: WG1006321-1					
Cl6-BZ#152	ND		ng/l	0.500	--
Cl5-BZ#119	ND		ng/l	0.500	--
Cl5-BZ#83/#125/#112	ND		ng/l	1.50	--
Cl5-BZ#86/#109	ND		ng/l	1.00	--
Cl6-BZ#145	ND		ng/l	0.500	--
Cl5-BZ#97	ND		ng/l	0.500	--
Cl6-BZ#148	ND		ng/l	0.500	--
Cl4-BZ#79	ND		ng/l	0.500	--
Cl5-BZ#116	ND		ng/l	0.500	--
Cl6-BZ#154-Cal	ND		ng/l	0.500	--
Cl4-BZ#78	ND		ng/l	0.500	--
Cl5-BZ#87/#111	ND		ng/l	1.00	--
Cl6-BZ#136	ND		ng/l	0.500	--
Cl5-BZ#117	ND		ng/l	0.500	--
Cl5-BZ#115	ND		ng/l	0.500	--
Cl5-BZ#85	ND		ng/l	0.500	--
Cl5-BZ#120	ND		ng/l	0.500	--
Cl5-BZ#110	ND		ng/l	0.500	--
Cl4-BZ#81	ND		ng/l	0.500	--
Cl6-BZ#151	ND		ng/l	0.500	--
Cl6-BZ#135	ND		ng/l	0.500	--
Cl5-BZ#82	ND		ng/l	0.500	--
Cl6-BZ#144	ND		ng/l	0.500	--
Cl6-BZ#147/#149	ND		ng/l	1.00	--
Cl4-BZ#77	ND		ng/l	0.500	--
Cl6-BZ#143/#139	ND		ng/l	1.00	--
Cl5-BZ#124	ND		ng/l	0.500	--
Cl6-BZ#140	ND		ng/l	0.500	--
Cl5-BZ#108	ND		ng/l	0.500	--

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 03:49
Analyst: MJS

Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners/Homologs - Mansfield Lab for sample(s): 01-03 Batch: WG1006321-1					
Cl5-BZ#107/#123	ND		ng/l	1.00	--
Cl7-BZ#188-Cal/RTW	ND		ng/l	0.500	--
Cl6-BZ#134	ND		ng/l	0.500	--
Cl5-BZ#106	ND		ng/l	0.500	--
Cl6-BZ#133	ND		ng/l	0.500	--
Cl6-BZ#142	ND		ng/l	0.500	--
Cl5-BZ#118	ND		ng/l	0.500	--
Cl6-BZ#131	ND		ng/l	0.500	--
Cl7-BZ#184	ND		ng/l	0.500	--
Cl6-BZ#165	ND		ng/l	0.500	--
Cl6-BZ#146	ND		ng/l	0.500	--
Cl6-BZ#161	ND		ng/l	0.500	--
Cl5-BZ#122	ND		ng/l	0.500	--
Cl6-BZ#168	ND		ng/l	0.500	--
Cl5-BZ#114	ND		ng/l	0.500	--
Cl6-BZ#153	ND		ng/l	0.500	--
Cl6-BZ#132	ND		ng/l	0.500	--
Cl7-BZ#179	ND		ng/l	0.500	--
Cl6-BZ#141	ND		ng/l	0.500	--
Cl7-BZ#176	ND		ng/l	0.500	--
Cl5-BZ#105	ND		ng/l	0.500	--
Cl6-BZ#137	ND		ng/l	0.500	--
Cl5-BZ#127	ND		ng/l	0.500	--
Cl7-BZ#186	ND		ng/l	0.500	--
Cl6-BZ#130/#164	ND		ng/l	1.00	--
Cl7-BZ#178	ND		ng/l	0.500	--
Cl6-BZ#138	ND		ng/l	0.500	--
Cl6-BZ#163/#160	ND		ng/l	1.00	--
Cl6-BZ#129/#158	ND		ng/l	1.00	--

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 03:49
Analyst: MJS

Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners/Homologs - Mansfield Lab for sample(s): 01-03 Batch: WG1006321-1					
Cl7-BZ#182/#175	ND		ng/l	1.00	--
Cl7-BZ#187	ND		ng/l	0.500	--
Cl7-BZ#183	ND		ng/l	0.500	--
Cl6-BZ#166	ND		ng/l	0.500	--
Cl6-BZ#159	ND		ng/l	0.500	--
Cl5-BZ#126	ND		ng/l	0.500	--
Cl7-BZ#185	ND		ng/l	0.500	--
Cl6-BZ#162	ND		ng/l	0.500	--
Cl7-BZ#174	ND		ng/l	0.500	--
Cl6-BZ#128	ND		ng/l	0.500	--
Cl8-BZ#202	ND		ng/l	0.500	--
Cl6-BZ#167	ND		ng/l	0.500	--
Cl7-BZ#181	ND		ng/l	0.500	--
Cl7-BZ#177	ND		ng/l	0.500	--
Cl8-BZ#204/#200-CAL	ND		ng/l	1.00	--
Cl7-BZ#171	ND		ng/l	0.500	--
Cl7-BZ#173	ND		ng/l	0.500	--
Cl8-BZ#197	ND		ng/l	0.500	--
Cl7-BZ#172	ND		ng/l	0.500	--
Cl7-BZ#192	ND		ng/l	0.500	--
Cl6-BZ#156	ND		ng/l	0.500	--
Cl6-BZ#157	ND		ng/l	0.500	--
Cl7-BZ#180	ND		ng/l	0.500	--
Cl7-BZ#193	ND		ng/l	0.500	--
Cl8-BZ#199	ND		ng/l	0.500	--
Cl7-BZ#191	ND		ng/l	0.500	--
Cl8-BZ#198	ND		ng/l	0.500	--
Cl8-BZ#201	ND		ng/l	0.500	--
Cl7-BZ#170	ND		ng/l	0.500	--

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 06/01/17 03:49
Analyst: MJS

Extraction Method: EPA 3510C
Extraction Date: 05/23/17 18:00

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners/Homologs - Mansfield Lab for sample(s): 01-03 Batch: WG1006321-1					
Cl7-BZ#190	ND		ng/l	0.500	--
Cl8-BZ#196	ND		ng/l	0.500	--
Cl8-BZ#203	ND		ng/l	0.500	--
Cl6-BZ#169	ND		ng/l	0.500	--
Cl9-BZ#208	ND		ng/l	0.500	--
Cl9-BZ#207	ND		ng/l	0.500	--
Cl7-BZ#189	ND		ng/l	0.500	--
Cl8-BZ#195	ND		ng/l	0.500	--
Cl8-BZ#194	ND		ng/l	0.500	--
Cl8-BZ#205	ND		ng/l	0.500	--
Cl9-BZ#206-Cal/RTW	ND		ng/l	0.500	--
Cl10-BZ#209-Cal/RTW	ND		ng/l	0.500	--
Monochlorobiphenyls	ND		ng/l	0.500	--
Dichlorobiphenyls	ND		ng/l	0.500	--
Trichlorobiphenyls	ND		ng/l	0.500	--
Tetrachlorobiphenyls	ND		ng/l	0.500	--
Pentachlorobiphenyls	ND		ng/l	0.500	--
Hexachlorobiphenyls	ND		ng/l	0.500	--
Heptachlorobiphenyls	ND		ng/l	0.500	--
Octachlorobiphenyls	ND		ng/l	0.500	--
Nonachlorobiphenyls	ND		ng/l	0.500	--
Decachlorobiphenyl	ND		ng/l	0.500	--
Total PCB	ND		ng/l	0.500	NA

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Cl3-BZ#19-C13 (surr)	77		50-125
Cl8-BZ#202-C13 (surr)	92		50-125

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRIMA BATCH TEST

Project Number: Not Specified

Lab Number: L1715555

Report Date: 06/05/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners/Homologs - Mansfield Lab Associated sample(s): 01-03 Batch: WG1006321-2 WG1006321-3								
Cl1-BZ#1	80		79		40-140	1		30
Cl1-BZ#2	81		79		40-140	3		30
CL1-BZ#3	80		79		40-140	1		30
Cl2-BZ#4/#10	82		80		40-140	2		30
Cl2-BZ#9	80		79		40-140	1		30
Cl2-BZ#7	84		82		40-140	2		30
Cl2-BZ#6	81		79		40-140	3		30
Cl2-BZ#5	81		79		40-140	3		30
Cl2-BZ#8	81		79		40-140	3		30
Cl3-BZ#19	82		81		40-140	1		30
Cl2-BZ#14	82		80		40-140	2		30
Cl3-BZ#30	81		80		40-140	1		30
Cl3-BZ#18	81		80		40-140	1		30
Cl2-BZ#11	83		81		40-140	2		30
Cl3-BZ#17	83		80		40-140	4		30
Cl2-BZ#12	80		78		40-140	3		30
Cl3-BZ#27	86		84		40-140	2		30
Cl2-BZ#13	84		81		40-140	4		30
Cl3-BZ#24	85		83		40-140	2		30
Cl3-BZ#16	81		78		40-140	4		30
Cl3-BZ#32	83		80		40-140	4		30
Cl2-BZ#15	81		80		40-140	1		30
Cl3-BZ#34	86		83		40-140	4		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRIMA BATCH TEST

Project Number: Not Specified

Lab Number: L1715555

Report Date: 06/05/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners/Homologs - Mansfield Lab Associated sample(s): 01-03 Batch: WG1006321-2 WG1006321-3								
Cl3-BZ#23	83		81		40-140	2		30
Cl4-BZ#54	84		82		40-140	2		30
Cl3-BZ#29	86		83		40-140	4		30
Cl4-BZ#50	84		82		40-140	2		30
Cl3-BZ#26	84		82		40-140	2		30
Cl3-BZ#25	82		80		40-140	2		30
Cl4-BZ#53	84		82		40-140	2		30
Cl3-BZ#-31	86		84		40-140	2		30
Cl3-BZ#28	83		80		40-140	4		30
Cl3-BZ#33	80		76		40-140	5		30
Cl4-BZ#51	87		85		40-140	2		30
Cl3-BZ#21/#20	90		89		40-140	1		30
Cl4-BZ#45	84		82		40-140	2		30
Cl3-BZ#22	83		80		40-140	4		30
Cl4-BZ#73/#46	87		89		40-140	2		30
Cl4-BZ#69	89		86		40-140	3		30
Cl4-BZ#43	86		86		40-140	0		30
Cl3-BZ#36	86		83		40-140	4		30
Cl4-BZ#52	87		86		40-140	1		30
Cl4-BZ#48	83		82		40-140	1		30
Cl4-BZ#49	84		83		40-140	1		30
Cl5-BZ#104	88		86		40-140	2		30
Cl4-BZ#47	85		82		40-140	4		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRIMA BATCH TEST

Project Number: Not Specified

Lab Number: L1715555

Report Date: 06/05/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners/Homologs - Mansfield Lab Associated sample(s): 01-03 Batch: WG1006321-2 WG1006321-3								
Cl4-BZ#65/#75/#62	89		87		40-140	2		30
Cl3-BZ#39	87		84		40-140	4		30
Cl3-BZ#38	86		85		40-140	1		30
Cl4-BZ#44	85		81		40-140	5		30
Cl4-BZ#59	84		82		40-140	2		30
Cl4-BZ#42	92		91		40-140	1		30
Cl4-BZ#71	84		82		40-140	2		30
Cl3-BZ#35	86		84		40-140	2		30
Cl4-BZ#41	89		86		40-140	3		30
Cl4-BZ#72	87		86		40-140	1		30
Cl5-BZ#96	92		89		40-140	3		30
Cl5-BZ#103	92		90		40-140	2		30
Cl4-BZ#68/#64	88		86		40-140	2		30
Cl4-BZ#40	93		91		40-140	2		30
Cl3-BZ#37	86		84		40-140	2		30
Cl5-BZ#100	94		92		40-140	2		30
Cl5-BZ#94	94		92		40-140	2		30
Cl4-BZ#57	90		88		40-140	2		30
Cl4-BZ#67/#58	88		86		40-140	2		30
Cl5-BZ#102	94		92		40-140	2		30
Cl4-BZ#61	87		85		40-140	2		30
Cl5-BZ#98	93		92		40-140	1		30
Cl4-BZ#76	93		91		40-140	2		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRIMA BATCH TEST

Project Number: Not Specified

Lab Number: L1715555

Report Date: 06/05/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners/Homologs - Mansfield Lab Associated sample(s): 01-03 Batch: WG1006321-2 WG1006321-3								
Cl5-BZ#93	100		98		40-140	2		30
Cl4-BZ#63	87		87		40-140	0		30
Cl5-BZ#121/#95/#88	96		94		40-140	2		30
Cl4-BZ#74	87		85		40-140	2		30
Cl6-BZ#155	94		94		40-140	0		30
Cl4-BZ#70	90		89		40-140	1		30
Cl5-BZ#91	91		89		40-140	2		30
Cl4-BZ#66	89		88		40-140	1		30
Cl4-BZ#80	88		87		40-140	1		30
Cl4-BZ#55	89		87		40-140	2		30
Cl5-BZ#92	95		92		40-140	3		30
Cl5-BZ#89/#84	93		96		40-140	3		30
Cl5-BZ#101/#90	98		92		40-140	6		30
Cl4-BZ#56	88		87		40-140	1		30
Cl5-BZ#113	100		99		40-140	1		30
Cl5-BZ#99	94		92		40-140	2		30
Cl6-BZ#150	96		94		40-140	2		30
Cl4-BZ#60	90		88		40-140	2		30
Cl6-BZ#152	93		92		40-140	1		30
Cl5-BZ#119	98		96		40-140	2		30
Cl5-BZ#83/#125/#112	96		95		40-140	1		30
Cl5-BZ#86/#109	98		99		40-140	1		30
Cl6-BZ#145	98		97		40-140	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRIMA BATCH TEST

Project Number: Not Specified

Lab Number: L1715555

Report Date: 06/05/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners/Homologs - Mansfield Lab Associated sample(s): 01-03 Batch: WG1006321-2 WG1006321-3								
Cl5-BZ#97	94		89		40-140	5		30
Cl6-BZ#148	96		95		40-140	1		30
Cl4-BZ#79	90		89		40-140	1		30
Cl5-BZ#116	90		89		40-140	1		30
Cl6-BZ#154	96		95		40-140	1		30
Cl4-BZ#78	90		89		40-140	1		30
Cl5-BZ#87/#111	97		96		40-140	1		30
Cl6-BZ#136	101		99		40-140	2		30
Cl5-BZ#117	102		98		40-140	4		30
Cl5-BZ#115	93		91		40-140	2		30
Cl5-BZ#85	99		98		40-140	1		30
Cl5-BZ#120	97		96		40-140	1		30
Cl5-BZ#110	96		93		40-140	3		30
Cl4-BZ#81	90		89		40-140	1		30
Cl6-BZ#151	88		88		40-140	0		30
Cl6-BZ#135	86		85		40-140	1		30
Cl5-BZ#82	86		85		40-140	1		30
Cl6-BZ#144	89		89		40-140	0		30
Cl6-BZ#147/#149	88		87		40-140	1		30
Cl4-BZ#77	81		82		40-140	1		30
Cl6-BZ#143/#139	90		89		40-140	1		30
Cl5-BZ#124	86		86		40-140	0		30
Cl6-BZ#140	89		89		40-140	0		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRIMA BATCH TEST

Project Number: Not Specified

Lab Number: L1715555

Report Date: 06/05/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners/Homologs - Mansfield Lab Associated sample(s): 01-03 Batch: WG1006321-2 WG1006321-3								
Cl5-BZ#108	75		74		40-140	1		30
Cl5-BZ#107/#123	86		86		40-140	0		30
Cl7-BZ#188	89		88		40-140	1		30
Cl6-BZ#134	86		86		40-140	0		30
Cl5-BZ#106	90		89		40-140	1		30
Cl6-BZ#133	105		103		40-140	2		30
Cl6-BZ#142	77		78		40-140	1		30
Cl5-BZ#118	88		86		40-140	2		30
Cl6-BZ#131	88		89		40-140	1		30
Cl7-BZ#184	88		87		40-140	1		30
Cl6-BZ#165	86		86		40-140	0		30
Cl6-BZ#146	87		87		40-140	0		30
Cl6-BZ#161	88		88		40-140	0		30
Cl5-BZ#122	88		88		40-140	0		30
Cl6-BZ#168	82		81		40-140	1		30
Cl5-BZ#114	86		85		40-140	1		30
Cl6-BZ#153	94		96		40-140	2		30
Cl6-BZ#132	86		86		40-140	0		30
Cl7-BZ#179	83		84		40-140	1		30
Cl6-BZ#141	85		85		40-140	0		30
Cl7-BZ#176	87		86		40-140	1		30
Cl5-BZ#105	86		85		40-140	1		30
Cl6-BZ#137	87		86		40-140	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRIMA BATCH TEST

Project Number: Not Specified

Lab Number: L1715555

Report Date: 06/05/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners/Homologs - Mansfield Lab Associated sample(s): 01-03 Batch: WG1006321-2 WG1006321-3								
Cl5-BZ#127	87		87		40-140	0		30
Cl7-BZ#186	88		88		40-140	0		30
Cl6-BZ#130/#164	91		92		40-140	1		30
Cl7-BZ#178	86		87		40-140	1		30
Cl6-BZ#138	91		92		40-140	1		30
Cl6-BZ#163/#160	87		88		40-140	1		30
Cl6-BZ#129/#158	92		92		40-140	0		30
Cl7-BZ#182/#175	92		92		40-140	0		30
Cl7-BZ#187	87		88		40-140	1		30
Cl7-BZ#183	87		86		40-140	1		30
Cl6-BZ#166	86		85		40-140	1		30
Cl6-BZ#159	86		86		40-140	0		30
Cl5-BZ#126	86		86		40-140	0		30
Cl7-BZ#185	87		88		40-140	1		30
Cl6-BZ#162	91		92		40-140	1		30
Cl7-BZ#174	89		91		40-140	2		30
Cl6-BZ#128	94		94		40-140	0		30
Cl8-BZ#202	92		93		40-140	1		30
Cl6-BZ#167	92		93		40-140	1		30
Cl7-BZ#181	92		94		40-140	2		30
Cl7-BZ#177	91		92		40-140	1		30
Cl8-BZ#204/#200-CAL	92		92		40-140	0		30
Cl7-BZ#171	89		90		40-140	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRIMA BATCH TEST

Project Number: Not Specified

Lab Number: L1715555

Report Date: 06/05/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners/Homologs - Mansfield Lab Associated sample(s): 01-03 Batch: WG1006321-2 WG1006321-3								
Cl7-BZ#173	89		89		40-140	0		30
Cl8-BZ#197	94		94		40-140	0		30
Cl7-BZ#172	89		90		40-140	1		30
Cl7-BZ#192	92		92		40-140	0		30
Cl6-BZ#156	89		89		40-140	0		30
Cl6-BZ#157	90		90		40-140	0		30
Cl7-BZ#180	82		83		40-140	1		30
Cl7-BZ#193	92		93		40-140	1		30
Cl8-BZ#199	90		90		40-140	0		30
Cl7-BZ#191	92		94		40-140	2		30
Cl8-BZ#198	90		90		40-140	0		30
Cl8-BZ#201	92		94		40-140	2		30
Cl7-BZ#170	92		92		40-140	0		30
Cl7-BZ#190	98		98		40-140	0		30
Cl8-BZ#196	89		89		40-140	0		30
Cl8-BZ#203	95		96		40-140	1		30
Cl6-BZ#169	91		93		40-140	2		30
Cl9-BZ#208	92		93		40-140	1		30
Cl9-BZ#207	92		93		40-140	1		30
Cl7-BZ#189	89		90		40-140	1		30
Cl8-BZ#195	91		92		40-140	1		30
Cl8-BZ#194	92		92		40-140	0		30
Cl8-BZ#205	92		94		40-140	2		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRIMA BATCH TEST

Project Number: Not Specified

Lab Number: L1715555

Report Date: 06/05/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners/Homologs - Mansfield Lab	Associated sample(s): 01-03		Batch: WG1006321-2 WG1006321-3					
Cl9-BZ#206	92		93		40-140	1		30
Cl10-BZ#209	89		92		40-140	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Cl3-BZ#19-C13	80		78		50-125
Cl8-BZ#202-C13	95		96		50-125
Cl5-BZ#101-C13	96		93		50-125
Cl6-BZ#153-C13	83		82		50-125

Project Name: PRIMA BATCH TEST
Project Number: Not Specified

Lab Number: L1715555
Report Date: 06/05/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1715555-01A	Amber 500ml unpreserved	A	7	2.7	Y	Absent	A2-PCB209-C/H-8270(7)
L1715555-01B	Amber 250ml unpreserved	A	7	2.7	Y	Absent	A2-PCB209-C/H-8270(7)
L1715555-02A	Amber 500ml unpreserved	A	7	2.7	Y	Absent	A2-PCB209-C/H-8270(7)
L1715555-03A	Amber 500ml unpreserved	A	7	2.7	Y	Absent	A2-PCB209-C/H-8270(7)

*Values in parentheses indicate holding time in days

Project Name:	PRIMA BATCH TEST	**Lab Number:**	L1715555
Project Number:	Not Specified	**Report Date:**	06/05/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name: PRIMA BATCH TEST **Lab Number:** L1715555

Project Number: Not Specified **Report Date:** 06/05/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	PRIMA BATCH TEST	**Lab Number:**	L1715555
Project Number:	Not Specified	**Report Date:**	06/05/17

REFERENCES

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

MANSFIELD CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 5/12/17

ALPHA Job #: L1715555

Client Information

Client: Brown & Caldwell
Address:
Phone: 978-983-2055
Fax:
Email: MWade@brwncald.com KRamanand@brwncald.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Prima Batch Test
Project Location:
Project #:
Project Manager: Marilyn Wade
ALPHA Quote #: Karnam Ramanand

Turn-Around Time

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

Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program	Criteria

Other Project Specific Requirements/Comments/Detection Limits:

PLEASE NOTE
MS/MSD (at unit cost) will be omitted unless you check here: ☐

SAMPLE HANDLING
Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS: RCB congeners											Sample Specific Comments	TOTAL # BOTTLES
15555.01	OV-TØ-A-#2	4/28/17	1530	AQ	CGS	X										Pls	Exclude Sediment from water before extracting!!	
.02	OV-AP-HP-B	↓	↓	↓	CGS	X												
.03	OV-CHP-B				CGS	X												

Container Type																		
Preservative																		

Relinquished By:	Date/Time	Received By:	Date/Time
FedEx	5/11/17 - 1530	FedEx [signature] - AAL	5/12/17 11:45

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 101-09 (rev. 27-SEP-10)

In-Situ Treatment Batch Treatability Study Work Plan
Former Aerovox Facility
New Bedford, MA

Prepared for

AVX Corporation, Fountain Inn, SC

April 2017

In Situ Treatment Batch Treatability Study Work Plan
Former Aerovox Facility
New Bedford, MA

Prepared for
AVX Corporation, Fountain Inn, SC
April 2017

BC Project Number 149339

Brown AND Caldwell
100 Matsonford Rd, Two Radnor Corporate Center
Radnor, PA 19087

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Section 1

Introduction

This in situ treatment batch treatability study work plan (hereafter "TSWP") has been prepared by Brown and Caldwell (BC) on behalf of AVX Corporation (AVX). The TSWP will evaluate the effectiveness of oxidants and reductants as an active in-situ groundwater treatment option for hot spot areas at the overburden and bedrock to reduce the mass flux of site contaminants migrating toward the proposed permeable reactive barrier (PRB) and to the Acushnet River of the former Aerovox Facility property (Site). The proposed alternatives for Operable Unit (OU) 3 and OU4 include in situ treatment of impacted groundwater and will target the high COCs concentration or hot spot areas at the Site that exceed GW-3 concentration (OU3) or UCL concentrations (OU4). To evaluate the potential for in situ hot spot treatment at a proof of concept level (with further detail to be provided in Phase IV once a basic approach has been identified), bench scale treatability studies will be undertaken.

The Site contaminants of concern (COCs) are chlorinated volatile organic compounds (CVOCs) and polychlorinated biphenyls (PCBs). The CVOCs primarily consists of trichloroethene (TCE) and cis-1,2-dichloroethene (cis,1-2-DCE). Results of this treatability study will be used to evaluate potential effectiveness of oxidants and reductants in reducing mass flux for use in the Feasibility Study (FS) Report.

The activities detailed in this TSWP will follow procedures and requirements meeting the standards available, including soil and groundwater procurement, batch reactor preparation, implementing the testing, sampling and analysis of soils and groundwater, and presentation of results.

Section 2

Site Description and History

This section presents a description of the Site and provides a summary of previous environmental investigation and remediation activities to date.

2.1 Site Description

The Site is industrially-zoned land that was formerly occupied by a 450,000-square foot manufacturing building, associated ancillary buildings, asphalt paved parking lot and several small landscaped areas. All Facility infrastructures on the Site were demolished and removed in 2011 as part of a Non-Time-Critical Removal Action (NTCRA).

Electrical component manufacturing began at the Site in approximately 1938. Use of PCB-containing dielectric fluid in capacitor manufacturing started in the 1940s and was terminated in 1978. Dielectric fluids were stored in above ground storage tanks (ASTs) throughout the building, but mainly in the first floor of the two-story section of the main building. Chlorinated solvents, primarily TCE, were used in the capacitor manufacturing process and these CVOCs solvents were also stored in ASTs.

Industrial properties are present to the south and north of the Site, and residential properties are located to the west, across Belleville Avenue. The Acushnet River borders the eastern end of the Site. The Acushnet River and the area below Mean High Water (MHW) east of the Site is part of the New Bedford Harbor Superfund Site. The Aerovox property, now owned by the City, is currently predominantly paved and partially fenced. A small unpaved corner remains in the northwest as public space and fencing does not extend across the waterfront along the east side. The western portion of the paved area is separated from the remainder of the property by jersey barriers and is used by the City for parking. The Titleist and Precix properties, to the south and north respectively, are active manufacturing facilities and operate multiple shifts seven days a week.

2.2 Remediation Activities

The use of PCBs in the manufacturing process on the Site ceased in October 1978; however, the use of solvents continued through the end of manufacturing operations at the facility. Operations and disposal practices involving the use of PCBs and solvents reportedly resulted in the release of hazardous materials.

The United States Environmental Protection Agency (USEPA) observed “oil impregnated soil…in the culverts leading to and at both outfalls” during a 1981 compliance inspection of the facility. Subsequent facility inspections, assessments and sampling programs were undertaken by the former owner and operator, Aerovox, Inc., as well as by the USEPA from the 1980s through 2010. These investigations confirmed the presence of PCBs and CVOCs in building materials, soils under the concrete foundation and outside the building, in the asphalt used to pave the parking lot and in groundwater. Early response actions by the then site owners included installation of a shallow [estimated 10’ to 13’ below ground surface (bgs)] sheetpile containment wall along the shoreline and capping of impacted soils along the waterfront and along the north side of the manufacturing building.

In 2010, consent agreements were signed, requiring AVX Corporation to complete a Non-Time Critical Removal Action (NTCRA) to demolish the buildings and cap the Site. The consent agreements, and the Action Memorandum for the NTCRA, included a Toxic Substance Control Act (TSCA) Determination which documented work at the Site as meeting the requirements of a TSCA risk based approval under 40 CFR 761.61(c). Field activities for the NTCRA were initiated in April 2011 and completed in December 2011. The final report documenting the NTCRA was submitted in May 2012 and approved by EPA in May 2013. AVX's receipt of EPA's approval letter triggered initiation of the MCP Phase I Initial Site Investigation (Phase I ISI).

AVX submitted a Phase I ISI, Tier Classification, and Phase II Scope of Work in August 2013. The Site was ranked as Tier 1B based on the Numerical Ranking System in place at the time. Massachusetts Department of Environmental Protection (MassDEP) issued the Tier 1B Permit for the Site and approved the Phase II Scope of Work in September 2013, triggering the Phase II CSA submittal requirement. During the period between October 2013 and August 2015, Site investigation activities associated with the Phase II CSA were completed to define the nature and extent of contamination at the Site. The results of the Phase II CSA (AECOM, September 2015) determined the extent of the impacts to the Site's groundwater. This Batch TSWP has been developed as part of the remedial effort, to address the chemicals of concern (COCs) as identified in the Phase II CSA, including PCBs and CVOCs (chlorinated ethenes and chlorinated benzenes).

Section 3

Treatability Study Work Plan

This section describes the Site-specific field and laboratory activities including soil and groundwater procurement, batch reactor preparation, sampling procedures, field documentation, and health and safety procedures that will be followed during the in-situ treatment batch treatability study. Reagents considered to promote in-situ treatment of COCs at the hot spot areas in overburden and/or bedrock are oxidants consisting of catalyzed hydrogen peroxide (CHP), hydrogen peroxide-activated sodium persulfate (AP-HP), and sodium permanganate ($NaMnO_4$) and reductants consisting of zero valent iron (ZVI).

CHP is a mixture of hydrogen peroxide and catalyst. It is known as Fenton's reagent if the reaction is carried out under acidic conditions and the catalyst is ferrous iron. CHP is a powerful oxidant used for the oxidation of a wide range of organic compounds, including TCE and possibly PCBs. AP-HP is a mixture of persulfate activated with hydrogen peroxide used for the destruction of a wide range of organic compounds, including TCE. It may also be effective toward PCBs. $NaMnO_4$ is a relatively long-lived oxidant reported as effective for the oxidation of chlorinated ethenes, but it not expected to be effective toward PCBs. In situ chemical reduction though the use of ZVI is an established technology for the abiotic reduction of chlorinated ethenes to ethene, ethane, and other completely dechlorinated compounds and may also dechlorinate some PCBs. Addition of an organic carbon source such a lactate, as well as Dehalococcoides (DHC) and other bacteria could stimulate biodegradation of TCE and possibly PCBs and may also enhance abiotic degradation through formation of reactive iron sulfide and/or iron oxide minerals.

3.1 Scope of Work

Scope of work of the batch treatability study is to develop a proof of concept for in situ treatment of hot spot overburden areas and bedrock groundwater impacted with Site COCs. Specifically, the objectives of the treatability study for the overburden and bedrock are the following.

Overburden Groundwater:

- Assess the effectiveness of oxidants (CHP and AP-HP) and reductants (ZVI + biostimulation (lactate)/bioaugmentation) to:
  - Reduce the concentration of TCE in groundwater to <5,000 µg/L (GW- standard); and
  - Reduce the concentration of PCBs in groundwater to <10 µg/L (GW-3 standard).

Bedrock Groundwater:

- Assess the effectiveness of oxidant NaMnO4 in reducing the concentration of TCE in deep bedrock groundwater to <50,000 µg/L (UCL standard); and
- Assess the effectiveness of oxidant AP-HP in reducing the concentration of TCE and PCBs in shallow bedrock groundwater to <50,000 µg/L and <100 µg/L, respectively (UCL standards).

The activities involved in conducting the TS to evaluate the above objectives will consist of the following:

- Soil and groundwater procurement from the Site
- Initial soil and groundwater characterization
- Batch reactor preparation using overburden soil and groundwater
- Batch reactor preparation using bedrock groundwater

The above activities are detailed below.

3.1.1 Soil and Groundwater Procurement

Soil drill rig will be required to collect soil cores (samples) from the select overburden areas at the Site, identified as the in situ hot spots, to demonstrate in situ treatment. Samples collected from the soil boring will be biased toward low to medium COCs concentration. Approximately 12 pounds of soil samples will be required for the treatability testing. The soil samples will be collected in glass quart jars. Groundwater from monitoring well MW-15D will be collected to represent the overburden groundwater. Groundwater from MW-15B and MW-26B will be collected from the bedrock – MW-15B will represent shallow bedrock groundwater conditions and MW-26B will represent deep bedrock groundwater conditions. Approximately 13 liters of groundwater from MW-15D, 6 liters from MW-15B, and 6 liters from MW-26B will be required for the treatability testing. The groundwater will be shipped in amber sample bottles with no headspace.

Soil and groundwater samples will be shipped immediately after collection to the selected treatability testing laboratory, PRIMA Environmental (PRIMA) treatability laboratory of El Dorado Hills, California before the start of batch treatability study. Expedited shipment of samples in coolers with ice will be employed to maintain samples at 4°C. When received, the Site soil and groundwater will be stored at 4°C until use in the testing. All precautions will be made to minimize exposure to ambient air and CVOC losses.

BC's activities at the Site will include soil and groundwater sampling. Potential work hazards include chemical exposure and typical physical hazards (e.g., slip/trip/fall, exposure to elements, dehydration, etc.). Hazards associated with possible buried utility lines will be marked prior to beginning the fieldwork. The required personnel Protection Equipment (PPE) for this Site includes steel-toed boots, safety glasses, and high-visibility safety vest (when working outside). A copy of the Health and Safety Plan (HASP) will be on-Site at all times when work is being performed by BC.

3.1.2 Initial Untreated Soil and Groundwater Characterization

The soil samples received from the Site will be homogenized (simple homogenization to limit volatilization) and one composite sample will be analyzed for CVOCs (TCE and daughter products) and PCBs. One groundwater sample each from MW-15B, MW-15D, and MW-26B will be analyzed for CVOCs and PCBs. Historically PCBs released at the Site and found in groundwater (MW-15D, MW-15B and MW-26B) consisted primarily of Aroclor 1242, with occasional detections of lesser amounts of Aroclor 1254 (MW-15B). Due to the age of the release and resultant sample weathering, prior analyses have also detected Aroclor 1221 in these wells.

Soil and groundwater samples will be shipped to outside analytical laboratories for the VOCs and PCBs analysis – VOCs will be analyzed at Alpha Analytical (Sparks, NV) and PCBs at McCampbell Analytical (Pittsburg, CA). Soil and groundwater results will be used to dose the oxidants (CHP, AP-HP, and NaMnO4). Table 1 shows the amounts of oxidants and reductant required to degrade CVOCs and PCBs. The groundwater samples will be spiked with TCE and/or PCBs based on the initial untreated baseline concentrations as follows:

- Spike MW-15D samples with TCE and PCBs (Aroclor 1242) up to 10,000 µg/L and 50 µg/L, respectively, if TCE and PCBs concentrations are <5,000 µg/L and 50 µg/L.
- Spike MW-15B samples with TCE and PCBs (Aroclor 1242) up to 75,000 µg/L and 200 µg/L, respectively, if TCE and PCBs concentrations are <50,000 µg/L and 100 µg/L.
- Spike MW-26B samples with TCE up to 75,000 µg/L if concentrations are <50,000 µg/L.

In addition to the CVOCs and PCBs analysis, two tests will be performed by PRIMA: i) hydrogen peroxide stability test to estimate the longevity of peroxide and ii) soil buffering capacity to determine the amount of acid required to adjust pH to 3.0. Refer to Table 2 for the analysis required to be performed on soils and groundwater.

TABLE 1

Theoretical Stoichiometric Requirements for COCs and other Compounds

COC	Reagent (g / g COC)			
	ZVI*	SP	HP	$NaMnO_4$
Dichloroethene	1.2	9.8	1.4	3.9
Trichloroethene	1.3	5.4	0.8	2.2
Tetrachloroethene	1.3	2.9	0.4	1.1
Trichlorobiphenyl**	0.7	24	3.4	--

* ZVI only. Does not include effects of biostimulation or bioaugmentation.

**Predominant congeners in Aroclor 1242.

3.1.3 Overburden Batch Reactor Design

Following the initial characterization of the soil and groundwater samples, batch reactor testing will be performed. Approximately 2-liter reactor will be prepared containing about 300 g soil and one liter groundwater from MW-15D. The batch reactors will be amended with oxidants (CHP, AP-HP, and $NaMnO_4$) based on soil and groundwater VOC and PCBs concentrations and established stoichiometry. Adequate headspace will be maintained to accommodate potential off gases. For the ZVI test, the headspace will be purged with nitrogen gas to minimize the amount of oxygen present. DHC culture will be added to the ZVI reactors once reducing conditions had been established. The reactors may be re-dosed with oxidants or ZVI during the study depending on the reagents consumption. All reactors will be stored at room temperature in the dark.

At the times specified in Table 1, each reactor will be destructively sampled and the aqueous phases analyzed for COCs, dissolved gases (methane, ethane, and ethene), chloride, dissolved oxygen, iron, ORP, pH, residual oxidant and/or sulfate. Soil will be analyzed for COCs at the Day 20 sample event only. Soil and water will be separated by allowing the contents of each reactor to settle, then syphoning water into appropriate sample containers.

The batch testing design is summarized below for control and experimental reactors. Note that the reactor size described below can be scaled per the laboratory facilities.

i) **Control Reactor**
   a) Homogenized Site soil – 300 grams (g) for each reactor
   b) Site groundwater from MW-15D – 820 mL for each reactor
   c) Number of reactors: Three (two will be sacrificed to serve as time zero samples)
   d) Test sampling: One sampling event on completion of testing
   e) See Table 2 for the sampling times and analytical parameters

ii) **First Experimental Reactor Test using ZVI, Lactate, and Dehalococcoides to Evaluate the ISCR of TCE and Potentially PCBs**
   a) Site soil – 300 g for each reactor
   b) Site groundwater from MW-15D – 820 mL for each reactor
   c) Number of reactors: Two (plus one additional reactor for extended testing if necessary)
   d) Amendments include ZVI, lactate, and Dehalococcoides sp. Dosing can be adjusted based on the reactor size.
      - Each reactor: 2.5 g ZVI per 100 g soil at time zero (2nd ZVI addition as required)
      - Each reactor: 3 g lactate per liter of groundwater at time zero
      - Each reactor: Dehalococcoides sp. (KB-1 Plus from SiREM Lab) equal to 1 x 10^6 CFU/L of groundwater
   e) Baseline time zero sampling: None
   f) Test sampling: Two sampling events between time zero and completion
   g) See Table 2 for the sampling times and analytical parameters

iii) **Second Experimental Reactor Test Using Hydrogen Peroxide-Activated Persulfate (AP-HP) to Evaluate ISCO of TCE and PCBs**
   a) Site soil – 300 g for each reactor
   b) Site groundwater from MW-15D – 820 mL for each reactor
   c) Number of reactors: Two
   d) Dosing of sodium persulfate and hydrogen peroxide will be based on actual TCE and PCBs concentrations in soil and groundwater from initial characterization plus assumed soil oxidant demand.
   e) No limit on the air headspace in the reactors. This mixture may be exothermic.
   f) Baseline time zero sampling: None
   g) Test sampling: Two sampling events between time zero and completion
   h) See Table 2 for the sampling times and analytical parameters

iv) **Third Experimental Reactor Test Using Catalyzed Hydrogen Peroxide (CHP) to Evaluate ISCO of TCE and PCBs**
   a) Site soil – 300 g for each reactor
   b) Site groundwater from MW-15D – 820 mL for each reactor
   c) Number of reactors: Two
   d) Dosing of hydrogen peroxide will be based on actual TCE and PCBs concentrations in soil and groundwater from initial characterization pus assumed soil oxidant demand. Catalyst (ferrous sulfate) concentration will be 250 mg/L.
   e) No limit on the air headspace in the reactors. Reaction may be exothermic.
   f) Baseline time zero sampling: None
   g) Test sampling: Two sampling events between time zero and completion
   h) See Table 2 for the sampling times and analytical parameters

3.1.4 Bedrock Batch Reactor Design

Following the initial characterization of the groundwater samples, batch reactor testing will be performed. Approximately 1 L reactors will be prepared containing about 900-1,100 mL of bedrock groundwater from MW-15B or MW-26B. The batch reactors will be amended with oxidants (AP-HP, and $NaMnO_4$) based on groundwater VOC and PCBs concentrations and established stoichiometry. All reactors will be stored at room temperature in the dark. At the times specified in **Table 1**, each reactor will be destructively sampled and the aqueous phases analyzed for COCs, dissolved gases (methane, ethane, and ethene), chloride, dissolved oxygen, iron, ORP, pH, residual oxidant and/or sulfate.

The batch testing design is summarized below for control and experimental reactors. Note that the reactor size described below can be scaled per the laboratory facilities.

i) **Control Test**
   a) Site Groundwater from MW-15B – 900 mL for each reactor
   b) Number of reactors: Three (two will be sacrificed to serve as time zero samples)
   c) Baseline time zero sampling: Two reactors
   d) Sampling events: One sampling event on completion
   e) See Table 2 for the sampling times and analytical parameters

ii) **First Experimental Reactor Test Using Sodium Permanganate ($NaMnO_4$) to Evaluate ISCO of TCE**
   a) Site Groundwater from MW-26B – 1,100 mL for each reactor
   b) Number of reactors: Two
   c) NaMnO4 dosing will be based on actual TCE groundwater concentration in MW-26B.
   d) Baseline time zero sampling: None
   e) Test sampling: Two sampling events between time zero and completion
   f) See Table 2 for the sampling times and analytical parameters

iii) **Second Experimental Reactor Test Using Peroxide-Activated Persulfate (AP-HP) to Evaluate ISCO of TCE and PCBs**
   a) Site Groundwater from MW-15B – 900 mL for each reactor
   b) Number of reactors: Two
   c) AP-HP dosing will be based on TCE and PCBs groundwater concentrations in MW-15B.
   d) Baseline time zero sampling: None
   e) Test sampling: Two sampling events between time zero and completion
   f) See Table 2 for the sampling times and analytical parameters

Depending on the consumption of oxidants, a second dosing during the treatability testing may be considered. It is anticipated that the treatability study will take up to one month to complete.

Section 4

Reporting

A summary report providing the results and interpretations of the treatability studies will be issued after the in situ treatment batch treatability study is completed and will be included in the revised Feasibility Study Report. This summary report will contain, but not limited to:

- Potentially identify one or two in situ treatment reagents to remediate hot spots areas within overburden and bedrock.
- Summary tables of major results.
- Figures showing data trends and batch reactors photographs.
- Attach the chemical analyses performed along with quality control data package in an appendix.

The results will be interpreted to design pilot-scale or full-scale in situ treatment program for the hot spots at the overburden and bedrock and discuss in terms of their effect on the proposed PRB performance. These interpreted results will be incorporated into the Phase IV of the Remedial Action Plan.

TABLE 2

Sampling Times and Analytical Parameters for the Control and Experimental Reactors for the Overburden and Bedrock

Brown and Caldwell
Treatability Study (PCBs, VOCs)
Summary of Analyses

	Analyte	Lab	Untreated				Overburden									Bedrock							Total
			Soil	Groundwater			Time 0		Control	ZVI/Lac/DHC		AP-HP		CHP		Time 0		Control	NaMnO4	AP-HP			
				MW-15B	MW-15D	MW-26B	Rep A	Rep B	28d	7d	21d	7d	21d	1d	21d	Rep A	Rep B	21d	d7	21d	d7	21d	
Subcontracted Analyses	VOCs - 48 hr TAT	Alpha	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
	VOCs -5 dayTAT	Alpha	-	-	-	-	1	1	2	1	2	1	2	1	2	1	1	1	1	1	1	1	20
	PCBs - 48 hr TAT	McCamp	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
	PCBs - 5 day TAT	McCamp	-	-	-	-	1	1	2	1	2	1	2	1	2	1	1	1	1	1	1	1	20
	Alkalinity - 5 day TAT	Alpha	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
	Chloride - 5 day TAT	Alpha	-	1	1	1	-	-	1	-	1	-	1	-	1	-	-	1	-	1	-	1	10
	Dissolved Gases^ - 5d	Alpha	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	2
	TOC - 5 day TAT	McCamp	1	1	1	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	6
In-House Analyses	Dissolved Oxygen	PRIMA	-	1	1	1	-	-	1	1	1	1	1	1	1	-	-	1	1	1	1	1	15
	Ferrous iron	PRIMA	-	1	1	1	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	6
	Total Iron	PRIMA	-	1	1	1	-	-	1	1	1	-	-	1	1	-	-	-	-	-	-	-	8
	ORP	PRIMA	-	1	1	1	-	-	1	1	1	1	1	1	1	-	-	1	1	1	1	1	15
	pH	PRIMA	-	1	1	1	-	-	1	1	1	1	1	1	1	-	-	1	1	1	1	1	15
	residual HP	PRIMA	-	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	1	1	6
	residual NaMnO4	PRIMA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	2
	residual SP	PRIMA	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	1	1	4
	Sulfate	PRIMA	-	1	1	1	-	-	1	-	1	1	1	-	1	-	-	1	-	-	1	1	11

Alpha Analytical (Sparks, NV); Eurofins (Garden Grove, CA); McCampbell (Pittsburg, CA)

VOC and PCBs will be measured in both soil and water for the Day 28 Overburdern samples. All other analyses on water only, except as specified for untreated soil.

^ Dissolved Gases = carbon dioxide and methane

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Draft

InterimTreatability Study Report

Column Test to Evaluate Remediation of Chlorinated Solvents in Groundwater

Site in Massachusetts

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29 June 2017

siremlab.com

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LIST OF ABBREVIATIONS

1,1-DCE	1,1-dichloroethene
cVOC	chlorinated volatile organic compound
°C	degrees Celsius
°C/min	degrees Celsius per minute
$CaCO_3$	calcium carbonate
cm	centimeters
cDCE	cis-1,2-dichloroethene
DHG	dissolved hydrocarbon gases
ft	feet
ft/day	feet per day
GC	gas chromatograph
g	grams
GAC	granular activated carbon
$t_{½}$	half-life
hrs	hours
IC	ion chromatograph
ICP-AES	inductively coupled plasma – atomic emission spectroscopy
L	liter
MCLs	maximum contaminant levels
µg/L	micrograms per liter
µL	microliters
mg/L	milligrams per liter
mL	milliliters
min	minute
mm	millimeters
millimolar	mM
mV	millivolts
ORP	oxidation reduction potential
%	per cent
PRB	permeable reactive barrier
PCB	polychlorinated biphenyl
PV	pore volume
RPM	revolutions per minute
QL	quantitation limit
r^2	coefficient of determination
SiREM	SiREM Laboratories
PCE	tetrachloroethene
TOC	total organic carbon
TCE	trichloroethene
VC	vinyl chloride
ZVI	zero valent iron

1 Introduction

SiREM Laboratory (SiREM) was retained by Brown and Caldwell (B&C) to perform a laboratory bench scale treatability study to evaluate the performance of commercial zero valent iron (ZVI) and liquid-phase granular activated carbon (LGAC) for a permeable reactive barrier (PRB) application for remediation of groundwater at a site in Massachusetts (the Site). The targeted dissolved compounds include chlorinated volatile organic compounds (cVOCs), namely tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cDCE), vinyl chloride (VC), and polychlorinated biphenyls (PCBs).

The remainder of this report contains:

- study objectives and scope of work (Section 2);
- experimental methods (Section 3);
- cVOC and PCB results and discussion including calculation of cVOC degradation half-lives (Section 4);
- estimation of residence time required for PRB design (Section 5);
- discussion of inorganic chemistry changes during the column study (Section 6);
- study summary and conclusions (Section 7); and
- report references (Section 8).

2 Objectives and Scope of Work

The objective and scope of work completed to satisfy the project objectives are provided in this section.

2.1 Objectives

The primary objectives of the laboratory ZVI column test were to:

- Determine degradation rates for the main compounds of potential concern (i.e., PCE, TCE, cDCE and VC) in site groundwater with the selected commercial granular ZVI material and a mixture of ZVI and LGAC under flowing water conditions;
- Characterize chlorinated breakdown products of cVOCs detected in the Site water and quantify the rates of degradation;
- Estimate the residence time needed in a PRB at the Site, using the obtained degradation parameters, site groundwater cVOC composition and clean-up goals;
- Evaluate treatment of dissolved PCBs by the tested materials; and
- Evaluate changes in inorganic geochemistry caused by ZVI corrosion chemistry, including possible mineral precipitation and their potential implication on ZVI PRB longevity at the Site.

Test data related to kinetics of PCB removal in the test columns are not included in this report. The study is ongoing and this Interim report will be updated with future results and observations.

2.2 Scope of Work

The column test was set up with site groundwater containing cVOCs and PCBs, and performed to evaluate a PRB containing 100 per cent (%) granular ZVI and a mix of ZVI and LGAC applied as a blend of the two materials with sand and as a sequential zone containing two separate ZVI and LGAC zones separated by sand. On 28 and 30 March 2017, the materials were packed into the columns with care. The column and materials specifications are provided in Table 1. A schematic of the columns is provided in Figure 1.

The groundwater for this study was collected by B&C personnel from Site well MW-15D. On 27 March 2017, the Site groundwater was transferred into the influent reservoir with care taken to minimize volatile losses to the extent practicable. On 31 March 2017, the pump was started to feed the water from the influent reservoir vertically upward through the packed columns for a period of seven weeks. A flow velocity of approximately 1.5 feet per day (ft/day) was selected in consultation with B&C which allowed the test to be completed in a reasonable time frame.

Based on information received from B&C, the selected column test velocity is approximately 50% faster than field velocity.

Water samples were collected from sampling ports located along the column length as well as from the column influent and effluent for analysis of pH, oxidation-reduction potential (ORP), cVOCs, PCBs, dissolved hydrocarbon gases (DHGs), cations, anions and alkalinity according to the schedule presented in Table 2. cVOCs, DHGs, pH and ORP were sampled five times within the test period, while anion concentration profiles were collected 3 times. Cations, alkalinity and TOC were sampled at time zero and end-point. PCBs were sampled at three sampling events.

The cVOC concentration trends from the column test were used to calculate the degradation rates for each compound detected using a multicomponent first-order kinetic model. The degradation rates obtained, expressed as half-lives, were used to calculate the residence time for each ZVI source required in the field to achieve the regulatory criteria for all compounds. Finally, the column water chemistry data were used to assess the potential effects of water chemistry on the long-term reactivity of ZVI under Site conditions.

3 Test Methods and Materials

This section describes the methods used to construct and operate the testing columns, and to collect water samples for analyses during the column test.

3.1 Column Construction

The test consisted of four columns containing:

1) Control – high conductivity sand;
2) 100% ZVI;
3) A blend of 20% ZVI, 40% sand and 40% LGAC; and
4) A sequence of distinct layer of ZVI (50% column volume), sand layer (25% column volume) and LGAC (25% column volume).

Silica sand was obtained from Canadian Tire (Guelph, ON). ZVI (14D) was obtained from Peerless Metal Powders Inc. (Detroit, Michigan). LGAC (CC-8x30) was obtained from Continental Carbon Group. Technical specifications for the column materials are included in Appendix A.

The columns were constructed of Plexiglas™ with a length of 1.67 feet (ft) and an internal diameter of 1.5 inches (Figure 1). For the ZVI and ZVI mix columns, seven sampling ports were positioned vertically along the central axis of the column at distances of 0.11, 0.20, 0.36, 0.52, 0.69, 1.02 and 1.35 ft from the influent end. For the sand control column, samples were collected only from the influent end. All sampling ports within the column (excluding influent and effluent) were constructed using a nylon Swagelok compression fitting tapped into the column. A 16-gauge needle was positioned through the fitting and secured by tightening the ferrule. Glass wool was threaded through the needle to minimize the potential for particulates from entering the samples. Each sample port was then fitted with a Luer-Lock™ fitting so that a glass syringe could be attached to the port for collection of water samples.

To ensure a homogeneous column material bed, the columns were packed vertically in the column in 100 gram (g) increments. Values of bulk density, porosity and pore volume were determined by weight and are provided in Table 1. The column experiment was performed at room temperature (22±1 degrees Celsius [°C]). A Masterflex® peristaltic pump was used to feed Site groundwater vertically through the columns. The pump tubing consisted of Viton® 2-stop tubing. All other tubing was 1/8 inch inside diameter Teflon® tubing.

3.2 Site Groundwater Storage and Usage

Ninety 1 liter (L) bottles were received by SiREM personnel on 23 March 2017 and stored in cold storage (4 °C) until study commencement. A Chain of Custody Record for the water received from the Site is provided in Appendix B. Site water was siphoned into the influent reservoir (i.e., a Tedlar® bag) with minimal headspace. The influent reservoir contained two Swagelok

fittings with Teflon® septa. This allowed for sampling, as required, while minimizing cVOC losses during the test.

The initial cVOC concentrations in the influent reservoir were not at the target values. Based on communications with Brown and Caldwell, on 29 March 2017 the influent reservoir water was spiked as outlined in the following table:

	Measured Concentrations (mg/L)	Target Concentrations (mg/L)	Volume of Neat Compound (µL)	Gas (mL)
PCE	0.03	0.16	1.7	--
TCE	4.4	22	241	--
cDCE	0.99	5.7	74	--
VC	0.04	0.92	--	6.7

The initial total PCBs measured in the groundwater as received was 55.1 micrograms per liter (µg/L) and decreased to 25 µg/L after the water was transferred into the influent reservoir. At the third sampling event (20 April 2017) the PCBs in the influent reservoir were measured at levels of non-detect. It was believed that the PCBs were sorbing to the influent reservoir and the influent tubing. Therefore, the influent reservoir was changed to 2 L glass bottles with Teflon lined screw caps. Also, PCBs were spiked into the influent groundwater starting on 6 May 2017 to ensure PCBs were entering the test columns. A PCB spiking stock solution was prepared in methanol with Aroclor 1242 and the influent reservoir was spiked to a target concentration of 200 µg/L. At this time, all influent and effluent lines were changed to viton.

3.3 Sampling Procedure

After removing the stagnant water from the sampling needles, 4.0 milliliter (mL) samples were collected from the sampling ports using glass on glass syringes. A 0.25, 0.5 or 1 mL water sample was removed from the glass syringe and transferred immediately into an auto sampler vial for GC analysis of cVOCs/DHGs. The remaining 3 mL sample was transferred into a 5 mL plastic vial for ORP and pH measurement. When anion sample collection was required, a 0.5 mL sample was transferred to a 1.5 mL Eppendorf tube, which was stored frozen until time of analysis.

Water samples for cation, alkalinity and total organic carbon (TOC) analyses were collected from the column influent and effluent only. For cations, a 50 mL unfiltered sample was collected directly into a 100 mL bottle and acidified to a pH of 2 with nitric acid. For alkalinity, a 100 mL unfiltered sample was collected directly into a 110 mL bottle and left unpreserved. Samples collected for TOC were collected in an unpreserved 40 mL VOA vial. Water samples for cation, alkalinity and TOC analyses were placed in coolers with ice packs and shipped under chain of custody to SGS, Lakefield, Ontario for analysis.

Water samples for PCB analyses were collected from the column influent and effluents only. A 1-L sample was collected for each analysis. Water samples were placed in coolers with ice packs and shipped under chain of custody to Alpha Analytical (Westborough, MA) for analysis.

3.4 Analytical Methods

This section describes the methods of analysis for pH, ORP, cVOCs, DHGs, cations, PCBs, anions, alkalinity and TOC. Measurement of pH, ORP, cVOCs, DHGs and anions were performed by SiREM. Cation, alkalinity and TOC analyses were performed by SGS, Lakefield, Ontario and PCBs were analyzed by Alpha Analytical, Westborough, MA.

3.4.1 Analysis of ORP and pH

ORP was determined using a combination silver chloride (Ag/AgCl) reference electrode with a platinum button and a Corning 313 meter. The electrode was standardized with an ORP standard (Thermo Electron Corporation).

The pH measurements were made using a combination pH/reference electrode and an Oakton™ meter, standardized with the pH buffer 7 and the appropriate buffer of either 4 or 10. A 3.0 mL sample was collected from the sampling ports with a glass syringe and analyzed immediately for ORP and then pH.

3.4.2 Analysis of cVOCs and Dissolved Hydrocarbon Gases

cVOC and DHG (i.e., ethene, ethane and methane) analyses were performed at SiREM using a Hewlett-Packard gas chromatograph (GC) (Hewlett Packard 7890) equipped with an auto sampler (Hewlett Packard G1888) programmed to heat each sample vial to 75 °C for 45 minutes (min.) prior to headspace injection into a GSQ Plot column (0.53 millimeters x 30 meters, J&W) and a flame ionization detector. Sample vials were heated to ensure that all VOCs in the aqueous sample would partition into the headspace. The injector temperature was 200 °C, and the detector temperature was 250 °C. The oven temperature was programmed as follows: 35 °C for 2 min, increased to 100 °C at 50 degrees Celsius per minute (°C/min), then increased to 185 °C at 25 °C/min and held at 185 °C for 6.80 min. The carrier gas was helium at a flow rate of 11 milliliters per minute (mL/min).

After withdrawing a 1.0 mL sample, the sample was injected into a 10 mL auto sampler vial containing 5.0 mL of acidified deionized water (pH ~2). The water was acidified to inhibit microbial activity between microcosm sampling and GC analysis. The vial was sealed with an inert Teflon®-lined septum and aluminum crimp cap for automated injection of 3 mL of headspace onto the GC. One cVOC standard was analyzed with each set of samples to verify the instrument five-point calibration curve using methanolic stock solutions containing known concentrations of the target analytes. Calibration was performed using external standards purchased as standard solutions (Sigma, St. Louis, Missouri), where known volumes of standard solutions were added to acidified water in auto sampler vials and analyzed as described above

for microcosm samples. Data were integrated using Chemstation Software (Agilent Technologies, Santa Clara, California).

The method detection limits achieved at SiREM were as follows:

Organic Compound	MDL (µg/L)
VC	10
1,1-DCE	10
tDCE	10
cDCE	10
TCE	10
PCE	10
Methane	10
Ethene	10
Ethane	10

3.4.3 Analysis of Major Anions

Anion (chloride, nitrate-nitrogen [nitrate], nitrite-nitrogen [nitrite], phosphate and sulfate) analyses were performed at SiREM on a Dionex DX-600 ion chromatograph (IC) equipped with a Dionex AS-40 auto sampler and an AS18 column; the sample loop volume was 25 microliters (µL). An isocratic separation was performed using 33 millimolar (mM) reagent grade sodium hydroxide (Fisher Scientific, Ottawa, Ontario) eluent for 13 min. One standard was analyzed with each set of samples tested in order to verify the seven-point calibration using external standards of known concentrations. External standards were prepared gravimetrically using chemicals of the highest purity available (Sigma St Louis, Missouri or Bioshop, Burlington, Ontario). Data were integrated using Peaknet Chromatography software (Dionex, Oakville, Ontario). The calibration concentrations ranged from 100 to 10,000 µg/L.

A 0.5-mL sample was withdrawn, after which the sample was placed in a 1.5-mL micro-centrifuge tube. Samples were centrifuged for 5 min. at 13,000 revolutions per minute (RPM) to remove solids. The supernatant was removed, diluted 50-fold in deionized water and placed in a Dionex auto sampler vial with a cap that filters the sample during automated injection onto the IC.

3.4.4 Analysis of Cations, Alkalinity and TOC

Cation analyses (e.g., iron, sodium, magnesium, calcium, potassium, manganese) were performed by SGS in Lakefield, Ontario using inductively coupled plasma atomic emission spectroscopy (ICP-AES) (EPA Method 200.8). Carbonate alkalinity (expressed as milligrams of $CaCO_3$ per liter) and TOC in water were determined by SGS using EPA Method SM 2320B and SM 5310, respectively.

3.4.5 PCBs

PCB analyses were performed by Alpha Analytical using EPA Method 8082A.

4 cVOC Results, Reaction Pathways and Degradation Parameters

This section discusses the observed water cVOC concentration trends. The column data are then quantified in terms of anticipated cVOC degradation pathways and kinetic rates.

4.1 cVOC Results

At flow velocities of 1.5 to 1.84 ft/day, approximately 28 to 33 pore volumes (PVs) passed through the columns during the test. One PV corresponded to a residence time of approximately 23.5, 26.8, 25.6 and 26.2 hours (hrs) in the sand, ZVI, ZVI/GAC/Sand-Mix and ZVI/GAC/Sand-Layered columns, respectively (Table 1). Complete water sample cVOC concentration data are provided in Tables 3 to 6. Analytical results for the cVOC compounds (PCE, TCE, cDCE and VC) as well as dechlorination products (ethene and ethane) and methane from the last sampling events are presented in Figures 2 to 5. Results from the control sand column indicated no changes in cVOC concentrations along the column bed during most of the test (Table 3; Figure 2). A decrease in TCE concentration was observed along the sand control column in the last sampling event likely due to volatile losses during sampling.

At the end of the test in the ZVI columns, influent concentrations of PCE, TCE, cDCE and VC concentrations decreased to between 0.01 and 0.02 mg/L within the column at a residence time of 26.8 hrs (Table 4 and Figure 3). In the ZVI/GAC/Sand-Layered column, the influent concentrations of PCE, TCE and VC decreased in the 11.5-inch thick ZVI layer (up to a residence time of 17.1 hrs) to between 0.02 and 0.04 mg/L and the influent cDCE concentration decreased to 3.72 mg/L for cDCE (Table 6 and Figure 5). Further concentration decreases to non-detectable concentrations for all cVOCs were observed in the downgradient part of the column containing GAC. The ZVI/GAC/Sand-Layered column contained a 11.5-inch thick ZVI layer and, therefore, the cVOC treatment in this column was attributed to ZVI-mediated dechlorination and subsequent adsorption onto GAC.

The influent cVOC concentrations were removed much more rapidly in the ZVI/GAC/Sand-Mix column (Table 5 and Figure 4). Non-detectable concentrations of PCE, TCE, cDCE and VC were observed in the first sampling port at a residence time of 1.9 hrs at the end of the test.

As a result of the dechlorination of cVOCs by ZVI, both ethene and ethane were detected in the ZVI and ZVI/GAC/Sand-Layered columns indicating that the observed concentrations decreases were due to complete dechlorination. In contrast, no ethene and ethane generation was observed in the ZVI/GAC/Sand-Mix column. This indicates that the removal of cVOC in this column was primarily due to adsorption onto GAC. Moreover, the lack of cVOC dechlorination products throughout the column length indicate that the cVOC adsorbed onto GAC were not available for the reaction with ZVI.

4.2 PCB Results

Table 7 shows the results for influent and effluent column sampling for PCBs which was performed at a midpoint and at the end of the test period. The influent concentrations of PCBs

ranged from 25 to 61 µg/L. The effluent PCB concentrations in all columns, including the sand control column were below the detection limits, indicating removal via adsorption onto solid particles (i.e., sand, ZVI or GAC). Previous research has shown that ZVI is not effective at degrading PCBs (Lowry and Johnson, 2004) indicating that the primary mechanism for PCB removal was sorption.

4.3 cVOC Reaction Pathways and Kinetic Expressions

Two dominant pathways of degradation of chlorinated hydrocarbon compounds by ZVI include hydrogenolysis and reductive β-elimination (Gillham et al., 2010). In the hydrogenolysis reaction, a chlorine atom is replaced by a hydrogen atom, accompanied by the addition of two electrons (from the iron). Reductive β-elimination involves release of two chlorine atoms and the formation of an additional carbon-carbon bond. Both pathways are thought to occur simultaneously (Arnold and Roberts, 2000). Figure 5 illustrates those pathways for the chlorinated ethene sequence starting from PCE, through TCE, DCE-isomers, VC and finally ethene and ethane. Both of the chlorinated acetylenes are highly unstable and degrade rapidly, primarily through reductive dechlorination to acetylene (Arnold and Roberts, 2000). Another ZVI-mediated transformation mechanism, hydrogenation, involves the addition of two hydrogen atoms across two carbon atoms with the removal of a Carbon-Carbon bond (e.g., reduction of acetylene to ethene, and ethene to ethane as shown in Figure 6).

Based on previous research, the VOC degradation in contact with ZVI appears to be first-order with respect to the concentration of the contaminant (pseudo first-order) (Gillham et al., 2010):

$$\frac{\partial C}{\partial t} = -kt \tag{1}$$

After integration, the equation can be presented in the form of the exponential decay equation:

$$C = C_0 e^{-kt} \tag{2}$$

Where: C is the concentration in solution at a particular time (t),
C_o is the initial concentration, and
k is the first-order rate constant.

The rate constant (k) is a measure of the reaction rate and can be calculated directly from Equation 2. The time at which the initial concentration declines by one-half, ($C/C_o = 0.5$), is the half-life ($t_{1/2}$).

$$t_{1/2} = \frac{\ln(2)}{k} \tag{3}$$

4.4 Determination of Degradation Parameters from Column Data

Due to the complexity of the ZVI-induced dechlorination mechanisms (Figure 6), the laboratory data were interpreted using a multi-component kinetic model to quantify degradation rates of

compounds that are present in the water initially, as well as potential degradation products. In the model, potential breakdown products are concurrently produced and degraded as described by first-order kinetic equations. Each pathway is characterized by a rate constant (k) and the mole fraction of the compound that follows that particular path (f). Since chlorinated acetylenes are unstable, short-lived, intermediates that are rapidly reduced to ethene (Arnold and Roberts, 2000). These compounds are not typically detected in the solution phase and are therefore not explicitly contained in the degradation model. Therefore, first-order rate equations for each VOC included in the model are as follows:

$$\frac{\partial PCE}{\partial t} = -k_{PCE} PCE \tag{4}$$

$$\frac{\partial TCE}{\partial t} = f_{PCE1} k_{PCE} PCE - k_{TCE} TCE \tag{5}$$

$$\frac{\partial cDCE}{\partial t} = f_{PCE2} k_{PCE} PCE + f_{TCE1} k_{TCE} TCE - k_{cDCE} cDCE \tag{6}$$

$$\frac{\partial VC}{\partial t} = f_{PCE3} k_{PCE} PCE + f_{TCE2} k_{TCE} TCE + f_{cDCE} k_{cDCE} cDCE - k_{VC} VC \tag{7}$$

These equations were adapted for the computer program Scientist® Version 3.0 (Micromath Research, 2008). The program can be used to fit the first-order equations to experimental data using the least squares best-fit method. The degradation rate and molar conversion are determined for each compound sequentially starting with the most chlorinated VOC.

The results from the model fitting of column data include half-lives for all VOCs selected and statistical fit data including coefficient of determination (r^2) values and molar conversions from the parent to the breakdown compounds. The half-lives determined from the cVOC profiles from the last three sampling events in the ZVI and ZVI/GAC/Sand-Layered column are shown in Table 7, along with the corresponding r^2 values. Note that the concentration data for the ZVI zone only was used to calculate the half-lives in the ZVI/GAC/Sand-Layered column.

The degradation model provided relatively good fits to the cVOC concentration profiles with r^2 values of more than 0.80 (Table 8). The ZVI half-lives calculated at the end of the test were 5.3 and 6.4 hrs for PCE, 3.5 and 2.4 hrs for TCE, 7.0 and 16.9 hrs for cDCE and 1.8 and 5.1 hrs for VC in for the ZVI and ZVI/GAC/Sand-Layered columns, respectively. The cVOC degradation half-lives achieved at the end of this test were generally higher than typical values achieved in previous commercial ZVI testing for the same compounds, as reported by Gillham et al. (2010).

5 Inorganic Chemistry Results and Discussion

Previous research has shown that the inorganic composition of the treated groundwater can have a profound influence on the reactivity of commercial granular ZVI materials. Most of these effects are related to long-term performance. Therefore, evaluation of changes in inorganic chemistry along the flow path through the ZVI column is a crucial component of design considerations for a ZVI PRB.

The ORP profiles within the columns are presented in Table 8 and Figure 7. Baseline samples were collected and analyzed for carbonate alkalinity and major cation concentrations (Table 9). Major anions were measured in column samples that were analyzed for cVOCs in two sampling events (Table 10). Laboratory reports of analysis for the cations and alkalinity are compiled in Appendix B.

When iron is exposed to water, several reactions occur as a result of iron corrosion:

$$Fe^{\circ} \rightarrow Fe^{2+} + 2e^{-} \quad (8)$$

This iron corrosion drives the geochemical changes that occur as groundwater flows through the PRB. When groundwater first contacts the granular iron, any dissolved oxygen present is consumed via iron corrosion:

$$4Fe^{\circ} + 3O_{2(aq)} + 12H^{+} \rightarrow 4Fe^{3+} + 6H_2O \quad (9)$$

After the initial, rapid depletion of any dissolved oxygen and other oxidizers (e.g., nitrate which was not present in the Site water), the water corrosion of iron dominates to produce hydrogen and hydroxide resulting in an increase in pH and decline in ORP:

$$Fe^{\circ} + 2H_2O \rightarrow Fe^{2+} + H_{2(aq)} + 2OH^{-} \quad (10)$$

Creation of reducing conditions and high pH is the expected effect of ZVI corrosion chemistry shown in Eq. 10. At the end of the test, the ORP in the ZVI, the ZVI/GAC/Sand-Mix and ZVI/GAC/Sand-Layered columns decreased from an influent value of approximately +200 millivolts (mV) to < -200 mV (Table 9). These ORP decreases are expected results of ZVI corrosion.

The trends of pH observed along all columns containing ZVI did not demonstrate a typical pH increase. This is attributed to the exposure of ZVI to relatively high concentrations of cVOC in the influent site water. At these concentrations, the dechlorination of cVOC affects the pH of solution. Dechlorination of cVOCs is a redox reaction, whereby ZVI acts as an electron donor and cVOC compounds are electron acceptors. For example, dechlorination of TCE can be represented by the following reaction:

$$3Fe^{0} + C_2HCl_3 + 3H^{+} \rightarrow C_2H_4 + 3Fe^{2+} + 3Cl^{-} \quad (11)$$

Therefore, degradation of cVOCs consumes (i.e., oxidizes) ZVI and generates dissolved ferrous iron (Fe^{2+}). Dechlorination of high concentrations of cVOCs present in this Site water, resulted in generation of the correspondingly high concentrations of dissolved Fe^{2+}. In these conditions, the subsequent precipitation of ferrous iron becomes an important reaction regulating the pH of the treated water. For example, precipitation of iron (oxy)hydroxide consumes alkalinity or creates acidity and will buffer the pH down:

$$Fe^{2+} + 2OH^- \rightarrow Fe(OH)_{2(s)} \quad (12)$$

$$Fe^{2+} + 2H_2O \rightarrow FeOOH_{(s)} + 3H^+ + e^- \quad (13)$$

These reactions are thought to be responsible for the pH decreases and pH buffering observed in the ZVI-containing columns (Table 9).

The background concentration of sulfate was approximately 170 mg/L and it did not change along the length of all columns (Table 10). Abiotic reduction of sulfate by ZVI is not typically observed in laboratory tests, although microbially mediated sulfate reduction has been observed in mature ZVI PRBs. Low influent concentration of nitrate of approximately 1 mg/L decreased to a non-detectable value within influent ports of the ZVI-containing columns, as expected due to reduction to ammonia. Concentrations of chloride present in the Site water at approximately 1,200 mg/L remained stable and was not affected by the column materials.

The background calcium concentration in the site water was 86 mg/L and carbonate alkalinity was 28 mg/L as calcium carbonate ($CaCO_3$) (Table 11). Given that the pH did not increase significantly in all columns, $CaCO_3$ or iron carbonate precipitation did not likely occur, which was reflected by relatively unchanged column effluent concentrations for these constituents.

Sodium and potassium behave as conservative tracers in iron systems and are expected to remain essentially unchanged within the columns (Table 11).

Silicon (i.e., a measure of dissolved silica) was present in the influent at a concentration of 4.6 mg/L decreased to approximately 2 mg/L in the column effluents (Table 11). Silica (SiO_3^{2-}) is thought to precipitate or adsorb on ZVI surfaces leading to the formation of a silica film or gel on the ZVI surface that may hinder contaminant access to active sites. The influent concentration of TOC was 2 mg/L. TOC increased in the GAC containing columns to 37 and 27 mg/L in the ZVI/GAC/Sand-Mix and ZVI/GAC/Sand-Layered columns, respectively, indicating leaching from the GAC material.

In general, the groundwater inorganic chemistry does not contain strong oxidizers (e.g. nitrate), or high concentrations of potential ZVI-passivating constituents, such as silica or TOC. Previous ZVI tests with Site waters of similar inorganic compositions demonstrated much faster cVOC degradation rates. The cause of slower cVOC reaction rates observed in ZVI in this test compared to other tests is unknown and would require additional time and research effort to investigate.

6 Summary and Conclusions

Bench-scale column treatability testing using site water indicated that:

i) Treatment columns containing ZVI, ZVI/GAC/Sand-Mix and ZVI/GAC/Sand-Layered materials removed the cVOCs present in the Site groundwater. The cVOCs were dechlorinated by ZVI in the ZVI and ZVI/GAC/Sand-Layered columns. The cVOCs were removed in the ZVI/GAC/Sand-Mix column primarily via adsorption onto GAC.

ii) Low concentrations of PCBs were removed in all test columns, including the sand control column. This indicated that aqueous PCB removal was due to physical adsorption onto solid materials.

iii) Degradation half-lives obtained for the ZVI in the ZVI and ZVI/GAC/Sand-Layered columns ranged from 2.2 to 8.8 hrs and were generally higher than the values obtained for these compounds and this type of ZVI in previous testing.

iv) Site groundwater inorganic geochemical composition does not contain strong oxidizers (e.g., nitrate), or high concentrations of potential ZVI-passivating constituents, such as silica or TOC.

v) The test is on-going in the ZVI/GAC/Sand-Mix column to evaluate long-term performance of the system for both cVOCs and PCBs. The results and observations will be presented in a future update to this report.

7 References

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TABLES

TABLE 1
COLUMN AND MATERIALS SPECIFICATIONS
Massachusetts Site

Column	Silica Sand	Peerless ZVI	ZVI/GAC/Sand - Mix	ZVI/GAC/Sand - Layered
Content	100% Sand	100% ZVI	20% ZVI, 40% Silica Sand, 40% GAC	11.5 inch ZVI, 4.5 inch Silica Sand, 4.5 inch GAC
Material Dry Weight (g)	1016.4	2099.8	603.5	1378.5
Column Length (ZVI bed)(ft)	1.80			
Column Inside Diameter (inch)	1.5			
Measured Pore Volume (mL)	221	270	299	306
Volume of Column (cm^3)	567			
Porosity	0.35	0.43	0.48	0.49
Bulk Density (g/cm^3)	1.63	3.36	0.967	2.21
Average Flow Rate (ft/day)	1.84	1.5	1.57	1.54
Average Residence Time (hours)	24	27	26	26

Notes:

% - per cent
cm - centimeter
ft - feet
g - grams
GAC - granular activated carbon
mL - milliliter
ZVI - zero valent iron

TABLE 2
ZVI COLUMN TEST SAMPLING SCHEDULE
Massachusetts Site

Parmeters Samples		cVOCs, DHGs, pH and ORP				PCBs				Major Anions				Cations, Alkalinity, TOC			
Sample Location		**Sand**	**ZVI**	**ZVI/GAC/Sand - Mix**	**ZVI/GAC/Sand - Layered**	**Sand**	**ZVI**	**ZVI/GAC/Sand - Mix**	**ZVI/GAC/Sand - Layered**	**Sand**	**ZVI**	**ZVI/GAC/Sand - Mix**	**ZVI/GAC/Sand - Layered**	**Sand**	**ZVI**	**ZVI/GAC/Sand - Mix**	**ZVI/GAC/Sand - Layered**
No. of Sampling Events		**6**				**3**				**2**				**1**			
Column Influent		●				●				●				●			
Sampling Ports	**A**		●	●	●						●	●	●				
	B		●	●	●						●	●	●				
	C		●	●	●						●	●	●				
	D		●	●	●						●	●	●				
	E		●	●	●						●	●	●				
	F		●	●	●						●	●	●				
	G		●	●	●						●	●	●				
Column Effluent		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Notes:

● indicates sample collected

cVOCs - chlorinated volatile organic compounds

DHGs - dissolved hydrocarbon gases

ORP - oxidation-reduction potential

PCBs - polychlorinated biphenyls

TOC - total organic carbon

TABLE 3
SAND (CONTROL) COLUMN WATER SAMPLE cVOC AND DHG RESULTS
Massachusetts Site

Sample Location		Influent	Effluent
Column Distance (ft)		**0.0**	**1.67**
Residence Time (hours)		**0.0**	**23.5**
Compound	PV	Concentration (mg/L)	
PCE	0.0	0.18	--
	5.3	0.14	0.06
	13.1	0.17	0.14
	19.1	0.18	0.17
	27.0	0.09	0.09
	34.1	0.16	0.16
	46.8	0.15	0.07
TCE	0.0	22.00	--
	5.3	19.17	9.54
	13.1	21.27	20.63
	19.1	22.82	21.16
	27.0	18.56	16.06
	34.1	22.30	22.26
	46.8	22.36	11.98
cDCE	0.0	5.50	--
	5.3	5.41	2.67
	13.1	5.67	5.50
	19.1	5.95	5.78
	27.0	6.15	5.68
	34.1	5.84	5.83
	46.8	5.96	4.16
VC	0.0	1.50	--
	5.3	1.22	0.62
	13.1	1.33	1.31
	19.1	1.30	1.23
	27.0	1.25	1.22
	34.1	1.19	1.10
	46.8	0.54	0.36
Ethene	0.0	<0.01	--
	5.3	<0.01	<0.01
	13.1	<0.01	<0.01
	19.1	<0.01	<0.01
	27.0	<0.01	<0.01
	34.1	<0.01	<0.01
	46.8	<0.01	<0.01

TABLE 3
SAND (CONTROL) COLUMN WATER SAMPLE cVOC AND DHG RESULTS
Massachusetts Site

Sample Location		Influent	Effluent
Column Distance (ft)		**0.0**	**1.67**
Residence Time (hours)		**0.0**	**23.5**
Compound	PV	Concentration (mg/L)	
Ethane	0.0	<0.01	--
	5.3	<0.01	<0.01
	13.1	<0.01	<0.01
	19.1	<0.01	<0.01
	27.0	<0.01	<0.01
	34.1	<0.01	<0.01
	46.8	<0.01	<0.01
Methane	0.0	0.06	--
	5.3	0.03	0.03
	13.1	0.05	0.03
	19.1	0.06	0.05
	27.0	0.05	0.06
	34.1	0.05	0.05
	46.8	0.05	0.05

Notes:

-- - sample not collected

< - the compound is below the detection limit, the associated value is the detection limit

cDCE - cis-1,2-dichloroethene

ft - feet

mg/L - milligrams per liter

PCE - tetrachloroethene

PV - pore volumes

TCE - trichloroethene

VC - vinyl chloride

TABLE 4
ZVI COLUMN WATER SAMPLE cVOC AND DHG RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		**0.00**	**0.11**	**0.20**	**0.36**	**0.52**	**0.69**	**1.02**	**1.35**	**1.67**
Residence Time (hours)		**0.0**	**2.0**	**3.4**	**6.2**	**9.1**	**11.9**	**17.6**	**23.3**	**26.8**
Compound	PV	Concentration (mg/L)								
PCE	0.0	0.18	--	--	--	--	--	--	--	--
	4.2	0.14	0.07	0.05	0.02	<0.01	<0.01	<0.01	<0.01	0.005
	10.5	0.14	0.09	0.09	0.064	0.05	<0.01	<0.01	<0.01	<0.01
	15.6	0.17	0.10	0.09	0.07	0.06	0.03	0.02	<0.01	<0.01
	22.0	0.09	0.07	0.05	0.05	0.04	0.03	<0.01	<0.01	<0.01
	27.8	0.15	0.11	0.11	0.08	0.05	0.05	0.04	0.03	<0.01
	38.0	0.16	0.09	0.07	0.06	0.04	0.04	0.03	0.02	0.01
TCE	0.0	22.0	--	--	--	--	--	--	--	--
	4.2	21.1	11.5	7.64	4.03	1.73	0.50	0.067	0.003	0.02
	10.5	21.5	14.1	12.1	7.93	4.67	2.58	0.91	0.25	0.03
	15.6	22.8	15.2	12.5	8.26	4.71	2.11	0.55	0.12	0.01
	22.0	18.3	11.6	9.30	5.76	3.72	<0.01	<0.01	0.17	0.01
	27.8	22.0	14.6	12.6	8.56	5.32	3.82	2.13	1.15	0.02
	38.0	23.61	15.27	12.13	6.36	3.37	1.12	0.51	0.31	0.02
cDCE	0.0	5.50	--	--	--	--	--	--	--	--
	4.2	5.68	4.73	4.08	3.50	2.95	2.09	1.42	0.89	0.10
	10.5	5.72	4.79	4.58	4.11	3.58	3.00	2.39	1.79	0.21
	15.6	5.96	4.83	4.45	4.00	3.38	2.91	2.03	1.24	0.06
	22.0	6.03	4.53	4.19	3.59	3.10	2.52	1.91	1.29	0.08
	27.8	5.78	4.24	4.03	3.68	3.00	2.60	2.16	1.76	0.40
	38.0	6.20	4.60	4.48	4.25	3.70	2.82	1.38	0.70	0.15
VC	0.0	1.50	--	--	--	--	--	--	--	--
	4.2	1.37	0.86	0.59	0.41	0.31	0.19	0.130	0.090	0.016
	10.5	1.36	0.76	0.65	0.51	0.38	0.29	0.20	0.15	0.023
	15.6	1.29	0.65	0.54	0.42	0.31	0.24	0.14	0.08	0.008
	22.0	1.20	0.50	0.42	0.32	0.25	0.18	0.13	0.08	0.011
	27.8	1.09	0.43	0.36	0.28	0.20	0.16	0.12	0.09	0.029
	38.0	0.57	0.20	0.19	0.18	0.15	0.10	0.05	0.03	0.01
Ethene	0.0	<0.01	--	--	--	--	--	--	--	--
	4.2	<0.01	0.51	0.76	0.89	1.08	0.78	0.86	1.09	0.77
	10.5	<0.01	0.44	0.54	0.85	0.94	0.98	0.98	1.01	0.92
	15.6	<0.01	0.41	0.55	0.75	1.03	1.15	0.88	0.98	0.94
	22.0	<0.01	0.37	0.43	0.63	0.76	0.74	0.76	0.78	0.64
	27.8	<0.01	0.37	0.49	0.66	0.72	0.83	0.94	0.97	1.22
	38.0	<0.01	0.36	0.50	0.65	0.51	0.40	0.25	0.29	0.32

TABLE 4
ZVI COLUMN WATER SAMPLE cVOC AND DHG RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		**0.00**	**0.11**	**0.20**	**0.36**	**0.52**	**0.69**	**1.02**	**1.35**	**1.67**
Residence Time (hours)		**0.0**	**2.0**	**3.4**	**6.2**	**9.1**	**11.9**	**17.6**	**23.3**	**26.8**
Compound	PV	Concentration (mg/L)								
Ethane	0.0	<0.01	--	--	--	--	--	--	--	--
	4.2	<0.01	0.17	0.28	0.35	0.45	0.32	0.42	0.64	0.45
	10.5	<0.01	0.13	0.17	0.29	0.34	0.39	0.42	0.48	0.74
	15.6	<0.01	0.17	0.24	0.33	0.57	0.65	0.55	0.72	1.13
	22.0	<0.01	0.17	0.18	0.27	0.35	0.35	0.40	0.48	0.73
	27.8	0.00	0.22	0.25	0.30	0.33	0.39	0.48	0.53	0.94
	38.0	<0.01	0.14	0.16	0.16	0.13	0.14	0.12	0.15	0.24
Methane	0.0	0.06	--	--	--	--	--	--	--	--
	4.2	0.05	0.04	0.04	0.04	0.04	0.03	0.04	0.04	0.04
	10.5	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05
	15.6	0.05	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.04
	22.0	0.05	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.04
	27.8	0.05	0.04	0.04	0.03	0.02	0.02	0.03	0.03	0.03
	38.0	0.05	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02

Notes:

-- - sample not collected

< - the compound is below the detection limit, the associated value is the detection limit

cDCE - cis-1,2-dichloroethene

cm - centimeters

cVOC - chlorinated volatile organic compounds

DHG - dissolved hydrocarbon gases

mg/L - milligrams per liter

PCE - tetrachloroethene

PV - pore volumes

TCE - trichloroethene

VC - vinyl chloride

ZVI - zero valent iron

TABLE 5
ZVI/GAC/SAND (MIX) COLUMN WATER SAMPLE cVOC AND DHG RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		**0.0**	**0.11**	**0.20**	**0.36**	**0.52**	**0.69**	**1.02**	**1.35**	**1.67**
Residence Time (hours)		**0.0**	**1.9**	**3.2**	**6.0**	**8.7**	**11.4**	**16.8**	**22.2**	**25.6**
Compound	PV	Concentration (mg/L)								
PCE	0.0	0.18	--	--	--	--	--	--	--	--
	4.6	0.18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	11.3	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	17.6	0.16	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	25.6	0.10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	32.9	0.15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	44.9	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TCE	0.0	22.00	--	--	--	--	--	--	--	--
	4.6	21.52	0.07	<0.01	<0.01	0.01	<0.01	0.02	0.010	0.005
	11.3	21.79	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	17.6	23.3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	25.6	20.57	<0.01	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
	32.9	20.82	0.017	<0.01	<0.01	<0.01	<0.01	1.01	<0.01	<0.01
	44.9	24.39	<0.01	<0.01	0.15	<0.01	<0.01	0.01	<0.01	<0.01
c-DCE	0.0	5.50	--	--	--	--	--	--	--	--
	4.6	5.78	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	11.3	5.77	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	17.6	6.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	25.6	6.49	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	32.9	5.41	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	44.9	6.37	<0.01	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
VC	0.0	1.50	--	--	--	--	--	--	--	--
	4.6	1.39	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	11.3	1.40	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	17.6	1.31	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	25.6	1.32	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	32.9	1.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	44.9	0.59	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethene	0.0	<0.01	--	--	--	--	--	--	--	--
	4.6	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	11.3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	17.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	25.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	32.9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	44.9	<0.01	0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

TABLE 5
ZVI/GAC/SAND (MIX) COLUMN WATER SAMPLE cVOC AND DHG RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		**0.0**	**0.11**	**0.20**	**0.36**	**0.52**	**0.69**	**1.02**	**1.35**	**1.67**
Residence Time (hours)		**0.0**	**1.9**	**3.2**	**6.0**	**8.7**	**11.4**	**16.8**	**22.2**	**25.6**
Compound	PV	Concentration (mg/L)								
Ethane	0.0	<0.01	--	--	--	--	--	--	--	--
	4.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	11.3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	17.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	25.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	32.9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	44.9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Methane	0.0	0.06	--	--	--	--	--	--	--	--
	4.6	0.06	0.03	0.03	0.04	0.05	0.06	0.05	0.05	0.04
	11.3	0.06	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.05
	17.6	0.05	0.04	0.03	0.03	0.02	0.02	0.02	0.03	0.04
	25.6	0.06	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.03
	32.9	0.05	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
	44.9	0.05	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02

Notes:

-- - sample not collected

< - the compound is below the detection limit, the associated value is the detection limit

cDCE - cis-1,2-dichloroethene

cm - centimeters

cVOC - chlorinated volatile organic compounds

DHG - dissolved hydrocarbon gases

GAC - granular activated carbon

mg/L - milligrams per liter

PCE - tetrachloroethene

PV - pore volumes

TCE - trichloroethene

VC - vinyl chloride

ZVI - zero valent iron

TABLE 6
ZVI/GAC/SAND (LAYERED) COLUMN WATER SAMPLE cVOC AND DHG RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		**0.0**	**0.11**	**0.20**	**0.36**	**0.52**	**0.69**	**1.02**	**1.35**	**1.67**
Residence Time (hours)		**0.0**	**1.9**	**3.3**	**6.1**	**8.8**	**11.6**	**17.1**	**22.7**	**26.2**
Compound	PV	Concentration (mg/L)								
PCE	0.0	0.18	--	--	--	--	--	--	--	--
	4.1	0.13	0.10	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	10.0	0.15	0.11	0.07	0.070	0.05	0.06	<0.01	0.03	<0.01
	15.5	0.14	0.12	0.09	0.09	0.08	0.05	0.03	0.03	<0.01
	21.9	0.09	<0.01	0.05	0.06	0.05	0.04	0.03	0.03	<0.01
	27.7	0.15	0.12	0.11	0.09	0.07	0.06	0.04	<0.01	<0.01
	38.5	0.18	0.09	0.10	0.08	0.08	0.04	0.03	0.04	<0.01
TCE	0.0	22.00	--	--	--	--	--	--	--	--
	4.1	20.42	14.07	9.80	5.41	2.65	1.22	0.58	0.422	<0.01
	10.0	21.45	15.10	13.03	8.72	5.25	3.05	1.79	1.41	<0.01
	15.5	21.47	15.56	13.42	9.89	6.53	3.61	1.81	1.48	<0.01
	21.9	17.53	11.19	8.56	5.92	3.93	2.32	<0.01	0.94	<0.01
	27.7	22.00	14.27	10.92	6.15	4.18	3.14	1.81	1.86	<0.01
	38.5	23.87	14.26	9.11	3.51	2.32	1.28	0.39	0.27	0.00
cDCE	0.0	5.50	--	--	--	--	--	--	--	--
	4.1	5.60	5.26	4.64	3.88	3.30	2.66	1.98	2.16	<0.01
	10.0	5.77	4.88	4.65	4.06	3.53	3.07	2.58	2.57	<0.01
	15.5	5.79	4.81	4.50	4.17	3.66	3.11	2.68	2.58	<0.01
	21.9	5.82	4.50	4.18	3.99	3.40	2.91	2.44	2.41	<0.01
	27.7	5.80	4.44	4.30	4.28	3.44	3.11	2.73	2.76	<0.01
	38.5	6.39	5.01	4.75	4.82	4.70	4.05	3.73	3.44	<0.01
VC	0.0	1.50	--	--	--	--	--	--	--	--
	4.1	1.35	1.01	0.74	0.47	0.36	0.26	0.18	0.21	<0.01
	10.0	1.37	0.79	0.71	0.52	0.38	0.30	0.24	0.22	<0.01
	15.5	1.24	0.63	0.56	0.45	0.36	0.26	0.21	0.19	<0.01
	21.9	1.16	0.46	0.41	0.37	0.29	0.23	0.18	0.17	<0.01
	27.7	1.09	0.43	0.40	0.32	0.25	0.21	0.18	0.18	<0.01
	38.5	0.60	0.22	0.22	0.23	0.23	0.20	0.18	0.16	<0.01
Ethene	0.0	<0.01	--	--	--	--	--	--	--	--
	4.1	<0.01	0.54	0.61	0.81	0.98	0.99	0.81	0.90	0.05
	10.0	<0.01	0.50	0.56	0.79	0.88	0.92	1.03	1.10	0.08
	15.5	<0.01	0.44	0.49	0.62	0.95	0.84	0.93	1.03	0.16
	21.9	<0.01	0.44	0.36	0.60	0.69	0.78	0.71	0.84	0.19
	27.7	<0.01	0.43	0.50	0.64	0.66	0.87	0.91	1.07	0.21
	38.5	<0.01	0.50	0.54	0.80	0.93	0.82	0.62	0.49	0.42

TABLE 6
ZVI/GAC/SAND (LAYERED) COLUMN WATER SAMPLE cVOC AND DHG RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		**0.0**	**0.11**	**0.20**	**0.36**	**0.52**	**0.69**	**1.02**	**1.35**	**1.67**
Residence Time (hours)		**0.0**	**1.9**	**3.3**	**6.1**	**8.8**	**11.6**	**17.1**	**22.7**	**26.2**
Compound	PV	Concentration (mg/L)								
Ethane	0.0	<0.01	--	--	--	--	--	--	--	--
	4.1	<0.01	0.19	0.21	0.27	0.35	0.35	0.31	0.33	0.04
	10.0	<0.01	0.18	0.19	0.29	0.33	0.34	0.42	0.45	0.05
	15.5	<0.01	0.19	0.20	0.24	0.43	0.35	0.42	0.48	0.10
	21.9	<0.01	0.20	0.14	0.26	0.31	0.35	0.32	0.41	0.11
	27.7	<0.01	0.23	0.24	0.26	0.27	0.38	0.39	0.49	0.12
	38.5	<0.01	0.25	0.24	0.27	0.22	0.21	0.18	0.18	0.13
Methane	0.0	0.06	--	--	--	--	--	--	--	--
	4.1	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	10.0	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.05	0.05
	15.5	0.05	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.04
	21.9	0.05	0.04	0.03	0.04	0.03	0.03	0.03	0.03	0.04
	27.7	0.05	0.04	0.03	0.03	0.02	0.03	0.03	0.03	0.03
	38.5	0.05	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0.02

Notes:

-- - sample not collected

< - the compound is below the detection limit, the associated value is the detection limit

cDCE - cis-1,2-dichloroethene

cm - centimeters

cVOC - chlorinated volatile organic compounds

DHG - dissolved hydrocarbon gases

GAC - granular activated carbon

mg/L - milligrams per liter

PCE - tetrachloroethene

PV - pore volumes

TCE - trichloroethene

VC - vinyl chloride

ZVI - zero valent iron

TABLE 7
COLUMN WATER SAMPLE PCB RESULTS
Massachusetts Site

		Control		ZVI		Mixed		Layered	
Sample Location		**Influent**	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**	**Influent**	**Effluent**
Compound	**Date**	Concentration (µg/L)							
PCBs	31-Mar-17	25	--	25	--	25	--	25	--
	13-Apr-17	--	<0.250	--	<0.250	--	<0.250	--	<0.250
	20-Apr-17	<0.250	--	<0.250	--	<0.250	--	<0.250	--
	11-May-17	61*	<0.250	61*	<0.250	61*	<0.250	61*	<0.250
	15-May-17	39	<0.250	39	<0.250	39	<0.250	39	<0.250

Notes:

* - sample from spiked GW, collected directly from the glass bottle, on this date measured 180 µg/L
ft - feet
µg/L - micrograms per liter
-- - sample not collected

TABLE 8
CALCULATED cVOC HALF-LIFE VALUES
Massachusetts Site

Compound	Pore Volume	Influent Concentration (mg/L)	Half-life[a] (hours)	Molar Conversion rate (molar %)	r^2
100% ZVI					
PCE	15.6	0.17	5.11	--	0.954
	22.0	0.09	6.44		0.918
	27.8	0.15	7.32		0.958
	38.0	0.16	5.26		0.899
TCE				PCE=>TCE	
	15.6	22.75	3.89	55%	0.996
	22.0	18.28	3.40		0.987
	27.8	22.01	4.58		0.994
	38.0	23.61	3.25		0.998
cDCE				TCE=>cDCE	
	15.6	5.96	7.71	10%	0.962
	22.0	6.03	7.47		0.949
	27.8	5.78	8.34		0.921
	38.0	6.2	7.03		0.956
VC				cDCE=>VC	
	15.6	1.29	1.99	10%	0.953
	22.0	1.20	1.20		0.928
	27.8	1.09	2.17		0.927
	38.0	0.57	1.80		0.903
ZVI/GAC/Sand - Layered[b]					
PCE	15.5	0.14	8.39	--	0.952
	21.9	0.09	22.20		0.826
	27.7	0.15	7.91		0.988
	38.5	0.18	6.43		0.829
TCE				PCE=>TCE	
	15.5	21.47	5.00	55%	0.995
	21.9	17.53	3.78		0.988
	27.7	22.00	3.50		0.994
	38.5	23.87	2.41		0.998
cDCE				TCE=>cDCE	
	15.5	5.79	9.76	10%	0.864
	21.9	5.82	8.71		0.876
	27.7	5.80	8.76		0.810
	38.5	6.39	16.90		0.480
VC				cDCE=>VC	
	15.5	1.24	1.75	10%	0.905
	21.9	1.16	2.93		0.836
	27.7	1.09	2.20		0.844
	38.5	0.6	5.12		0.523

TABLE 8
CALCULATED cVOC HALF-LIFE VALUES
Massachusetts Site

Notes:

[a] Half-life calculated based on test temperature of 22°C

[b] Fitting was performed for the column ports located in the 11.5" ZVI zone

% - percent

µg/L - micrograms per liter

cVOC - chlorinated volatile organic compounds

GAC - granular activated carbon

mg/L - milligrams per liter

PCE - tetrachloroethene; TCE - trichloroethene; cDCE - cis-1,2-dichloroethene, VC - vinyl chloride

r^2 - coefficient of determination

ZVI - zero valent iron

TABLE 9
WATER SAMPLE ORP AND pH RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		0.00	0.11	0.20	0.36	0.52	0.69	1.02	1.35	1.67
Parameter	PV	Value								
100% Sand Column										
pH	0	5.92	--	--	--	--	--	--	--	--
	5.28	6.00	--	--	--	--	--	--	--	6.39
	13.1	6.33	--	--	--	--	--	--	--	6.53
	19.1	5.85	--	--	--	--	--	--	--	6.34
	27.0	5.99	--	--	--	--	--	--	--	6.23
	34.1	5.84	--	--	--	--	--	--	--	6.25
	46.8	5.98								6.42
ORP (mV)	0	176	--	--	--	--	--	--	--	--
	0.00	231	--	--	--	--	--	--	--	228
	13.1	112	--	--	--	--	--	--	--	2.00
	19.1	133	--	--	--	--	--	--	--	7.00
	27.0	122	--	--	--	--	--	--	--	109
	34.1	76	--	--	--	--	--	--	--	59
	46.8	153								127
100% ZVI										
pH	0	5.92	--	--	--	--	--	--	--	--
	1.49	5.75	6.45	6.42	6.26	6.29	6.03	6.45	6.55	6.69
	10.5	6.19	6.75	6.63	6.63	6.50	6.36	6.43	6.50	6.96
	15.6	5.95	6.68	6.65	6.26	6.35	6.06	6.18	6.63	6.70
	14.9	5.81	6.47	6.28	6.13	6.22	6.28	5.93	5.37	6.37
	27.8	5.67	6.70	6.40	6.42	6.29	6.18	5.14	4.77	6.22
	38.0	5.86	6.80	6.48	6.03	6.42	6.10	6.37	6.13	6.09
ORP (mV)	0	176	--	--	--	--	--	--	--	--
	0.00	232	-321	-301	-431	-443	-198	-296	-334	-199
	10.5	160	-204	-183	-221	-289	-269	-245	-244	-296
	15.6	169	-428	-365	-405	-270	-326	-327	-387	-170
	22.0	281	-436	-433	-447	-418	-452	-405	-458	-433
	27.8	210	-405	-383	-177	-174	-216	-294	-320	-231
	38.0	149	-288	-243	-244	-194	-244	-153	-283	-201

TABLE 9
WATER SAMPLE ORP AND pH RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		0.00	0.11	0.20	0.36	0.52	0.69	1.02	1.35	1.67
Parameter	PV	Value								
ZVI/GAC/Sand - Mix										
pH	**0.0**	5.92	--	--	--	--	--	--	--	--
	4.6	5.92	5.95	5.96	5.53	5.44	5.47	6.18	6.22	6.09
	11.3	6.31	6.37	6.38	6.27	6.53	6.58	6.27	5.60	5.18
	17.6	5.91	6.29	6.11	6.29	6.38	6.53	6.54	6.43	5.08
	25.6	5.92	6.22	6.08	6.32	6.46	6.70	6.63	6.68	6.14
	32.9	5.64	6.56	6.31	6.31	6.34	6.47	6.53	6.52	6.64
	44.9	5.81	5.97	5.56	6.31	6.56	6.79	6.62	6.70	6.65
ORP (mV)	**0.0**	176	--	--	--	--	--	--	--	--
	4.6	200	-170	-356	-260	-334	-452	-328	-370	-372
	11.3	163	-112	-195	-131	-120	-200	-242	-302	-248
	17.6	141	-224	-150	-322	-297	-304	-229	-257	-288
	25.6	270	-127	-240	-410	-458	-436	-464	-482	-262
	32.9	198	-111	-145	-240	-297	-289	-255	-315	-272
	44.9	145	-90	-189	-187	-173	-160	-234	-260	-251
ZVI/GAC/Sand - Layered										
pH	**0.0**	5.92	--	--	--	--	--	--	--	--
	4.1	5.93	6.37	6.36	6.43	6.35	6.37	6.12	6.46	6.41
	10.0	6.20	6.70	6.57	6.68	6.52	6.55	6.39	6.29	--
	15.5	5.97	6.55	6.53	6.44	6.19	6.16	5.98	6.28	6.03
	21.9	6.01	6.49	6.52	6.43	6.36	6.43	6.45	6.40	6.28
	27.7	5.67	6.51	6.45	6.27	5.65	6.32	6.07	6.30	6.34
	38.5	5.90	6.60	6.48	6.41	6.27	6.19	5.76	6.00	6.61
ORP (mV)	**0.0**	176	--	--	--	--	--	--	--	--
	4.1	235	-381	-293	-302	-299	-441	-298	-318	-326
	10.0	160	-419	-120	-232	-217	-281	-340	-288	-116
	15.5	195	-414	-405	-244	-382	-221	-314	-145	-73
	21.9	279	-473	-290	-401	-428	-448	-445	-462	-417
	27.7	199	-444	-178	-250	-174	-247	-238	-322	-130
	38.5	139	-336	-254	-232	-144	-304	-160	-290	-342

Notes:

-- - sample not collected
% - percent
ft - feet
GAC - granular activated carbon
mV - millivolts
ORP - Oxidation Reduction Potential
PV - pore volumes
ZVI - zero valent iron

TABLE 10
WATER SAMPLE ANION RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		0.00	0.11	0.20	0.36	0.52	0.69	1.02	1.35	1.67
Analyte	**PV**	**Concentration (mg/L)**								
100% Sand Column										
Chloride	0	1,150	--	--	--	--	--	--	--	--
	0.88	1,148	--	--	--	--	--	--	--	1,131
	19.1	1,110	--	--	--	--	--	--	--	1,083
	46.8	1,010								1,098
Nitrate-Nitrogen	0.0	0.84	--	--	--	--	--	--	--	--
	5.3	0.77	--	--	--	--	--	--	--	0.88
	19.1	0.78	--	--	--	--	--	--	--	0.85
	46.8	0.73								0.84
Nitrite-Nitrogen	0.0	<0.09	--	--	--	--	--	--	--	--
	5.3	<0.09	--	--	--	--	--	--	--	<0.09
	19.1	<0.09	--	--	--	--	--	--	--	<0.09
	46.8	<0.09								<0.09
Sulfate	0.0	178	--	--	--	--	--	--	--	--
	5.3	168	--	--	--	--	--	--	--	167
	19.1	168	--	--	--	--	--	--	--	163
	46.8	152								163
100% ZVI										
Chloride	0.0	1150	--	--	--	--	--	--	--	--
	4.2	1133	1189	1191	1163	1250	1243	1232	1184	1149
	15.6	1134	1160	1179	1114	1143	1121	1043	1121	1112
	38.0	1,113	1,066	1,154	1,057	1,205	1,152	1,064	1,140	1158
Nitrate-Nitrogen	0.0	0.84	--	--	--	--	--	--	--	--
	4.2	0.84	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	15.6	0.90	<0.09	<0.09	<0.09	0.38	<0.09	<0.09	0.48	<0.09
	38.0	0.79	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Nitrite-Nitrogen	0.0	<0.09	--	--	--	--	--	--	--	--
	4.2	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	15.6	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	38.0	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Sulfate	0.0	178	--	--	--	--	--	--	--	--
	4.2	173	186	178	171	185	192	178	172	158
	15.6	174	176	180	169	172	167	154	238	158
	38.0	169	161	168	156	186	173	125	148	171
ZVI/GAC/Sand - Mix										
Chloride	0.0	1,150	--	--	--	--	--	--	--	--
	4.6	1,167	1,198	1,159	1,209	1,187	1,184	1,166	1,200	1,142
	17.6	1,099	1,115	1,150	1,085	1,104	1,175	1,155	1,126	1,152
	44.9	1,086	1,012	1,236	1,194	1,090	1,140	1,135	1,136	1,126
Nitrate-Nitrogen	0.0	0.84	--	--	--	--	--	--	--	--
	4.6	0.81	0.51	0.31	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	17.6	0.88	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	44.9	0.97	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Nitrite-Nitrogen	0.0	<0.09	--	--	--	--	--	--	--	--
	4.6	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	17.6	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	44.9	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Sulfate	0.0	178	--	--	--	--	--	--	--	--
	4.6	184	186	181	190	185	185	182	185	171
	17.6	173	173	179	166	171	182	179	174	178
	44.9	170	155	210	184	169	170	174	174	169

TABLE 10
WATER SAMPLE ANION RESULTS
Massachusetts Site

Sample Location		Influent	Port A	Port B	Port C	Port D	Port E	Port F	Port G	Effluent
Column Distance (ft)		0.00	0.11	0.20	0.36	0.52	0.69	1.02	1.35	1.67
Analyte	**PV**	**Concentration (mg/L)**								
ZVI/GAC/Sand - Layered										
Chloride	0.0	1,150	--	--	--	--	--	--	--	--
	4.1	1,163	1,186	1,211	1,309	1,188	1,179	1,162	1,160	1,247
	15.5	1,104	1,186	1,254	1,083	1,168	1,143	1,072	1,112	1,173
	38.5	1,186	1,594	1,149	1,397	1,454	1,177	1,288	1,182	1,195
Nitrate-Nitrogen	0.0	0.84	--	--	--	--	--	--	--	--
	4.1	0.88	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	15.5	0.77	<0.09	0.37	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	38.5	0.95	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Nitrite-Nitrogen	0.0	<0.09	--	--	--	--	--	--	--	--
	4.1	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	15.5	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
	38.5	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Sulfate	0.0	178	--	--	--	--	--	--	--	--
	4.1	183	188	195	197	180	178	174	175	187
	15.5	169	185	197	168	180	176	164	171	164
	38.5	186	277	179	225	237	181	211	178	162

Notes:

% - percent

< - the compound is below the detection limit, the associated value is the detection limit

ft - feet

mg/L - milligrams per liter

PV - pore volumes

TABLE 11
WATER SAMPLE CATION, ALKALINITY AND TOC RESULTS
Massachusetts Site

Constituent	Baseline	Endpoint	Endpoint			
	Influent		Effluent Control Column	Effluent ZVI Column	Effluent ZVI/GAC/Sand (Mix) Column	Effluent ZVI/GAC/Sand (Layered) Column
	mg/L					
Calcium	87.4	86.1	81.7	81.9	71.6	98.4
Iron	0.052	0.034	0.046	0.47	10.6	0.617
Magnesium	70.0	72.1	67.8	65.4	70	82.7
Manganese	3.89	3.73	3.77	1.57	0.929	1.07
Potassium	25.4	24.6	23.1	25.2	24.1	31.6
Silicon	4.55	4.94	4.65	1.76	1.92	2.33
Sodium	727	638	585	635	600	731
Strontium	0.592	0.605	0.605	0.622	0.829	0.808
Total Organic Carbon (TOC)	2	1	1	1	53	7
Alkalinity, Total (as $CaCO_3$)	28	9	42	6	37	27

Notes:

$CaCO_3$ - calcium carbonate

< - not detected, associated value is the detection limit

mg/L - milligram per liter

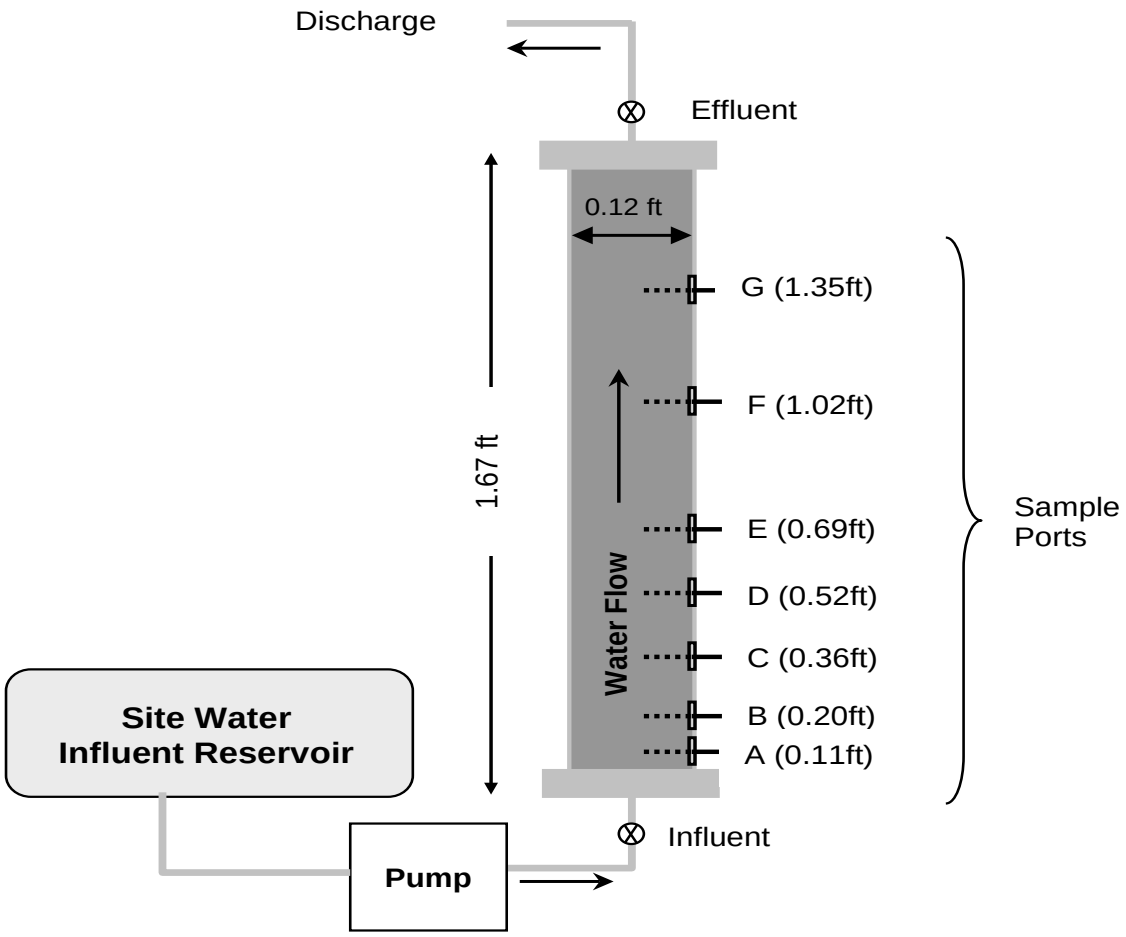
ZVI - micro scale zero valent iron

GAC - granular activated carbon

TOC - total organic carbon

-- - sample not collected

FIGURES



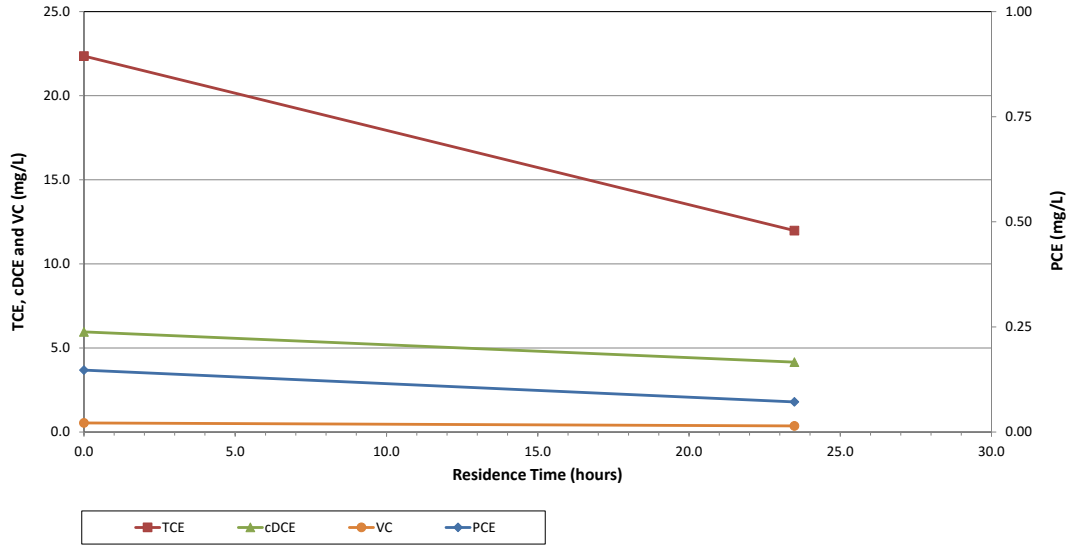
Notes:
ft - feet

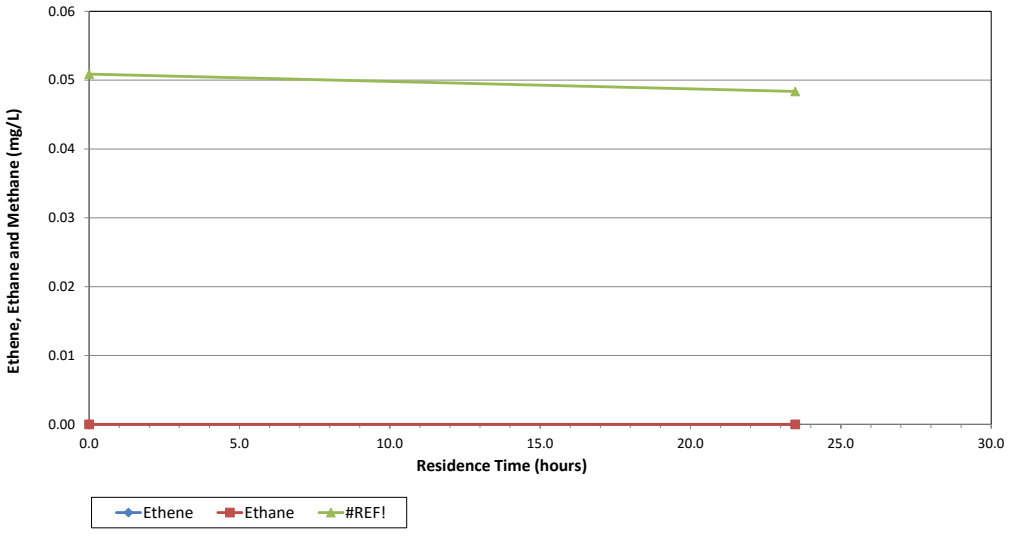
Schematic of Column Test Set Up
Massachusetts Site

SiREM

June 2017

Figure: **1**





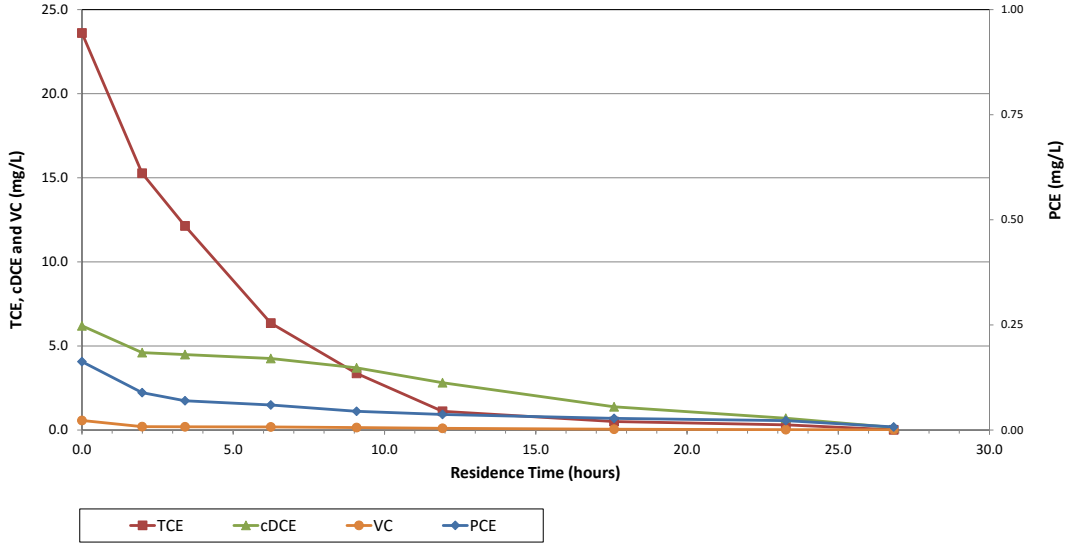
Notes:
cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compounds
DHG - dissolved hydrocarbon gases
mg/L - milligrams per liter
PCE - tetrachloroethene
TCE - trichloroethene
VC - vinly chloride

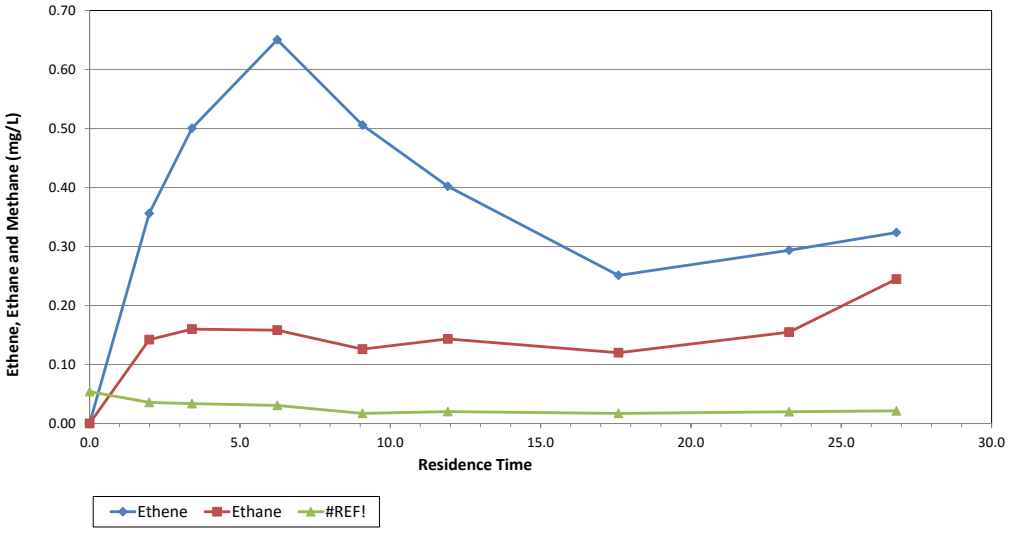
Sand Column Water cVOC and DHG Concentrations versus Residence Time at End of Study
Massachusetts Site

SiREM

June 2017

Figure: **2**





Notes:

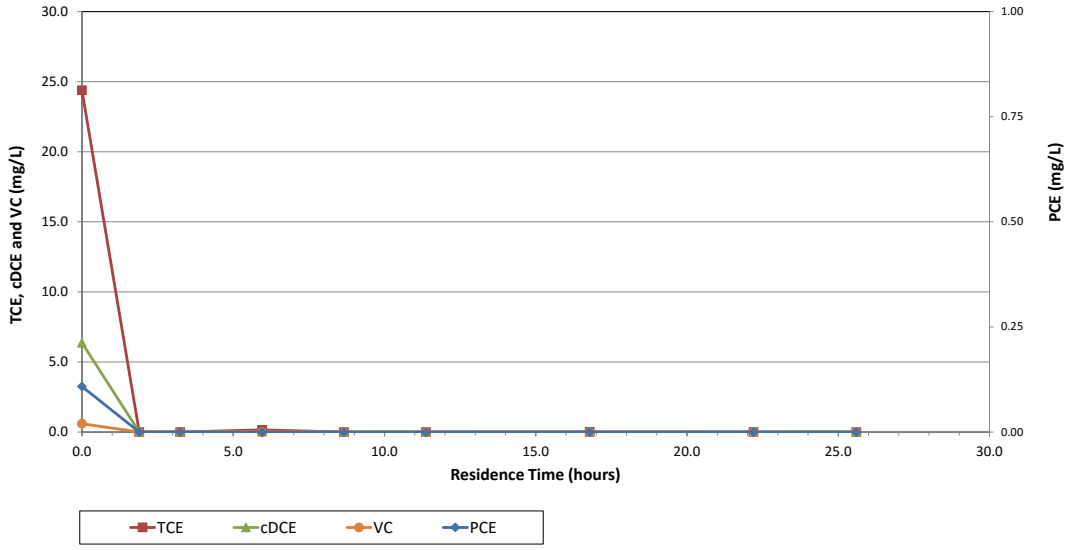
cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compounds
DHG - dissolved hydrocarbon gases
mg/L - milligrams per liter
PCE - tetrachloroethene
TCE - trichloroethene
VC - vinly chloride
ZVI - zero valent iron

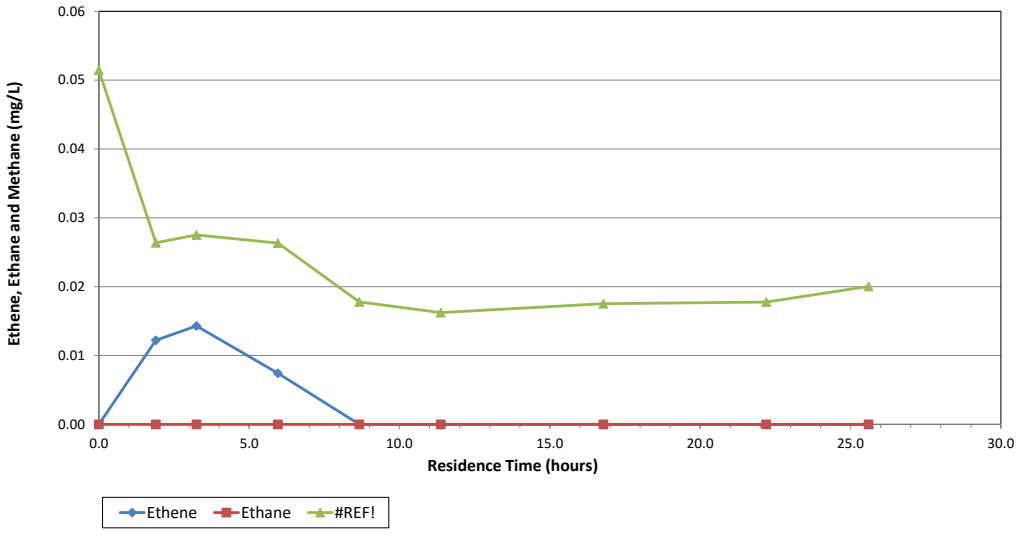
ZVI Column Water cVOC and DHG Concentrations versus Residence Time at End of Study
Massachusetts Site

SiREM

June 2017

Figure: **3**





Notes:

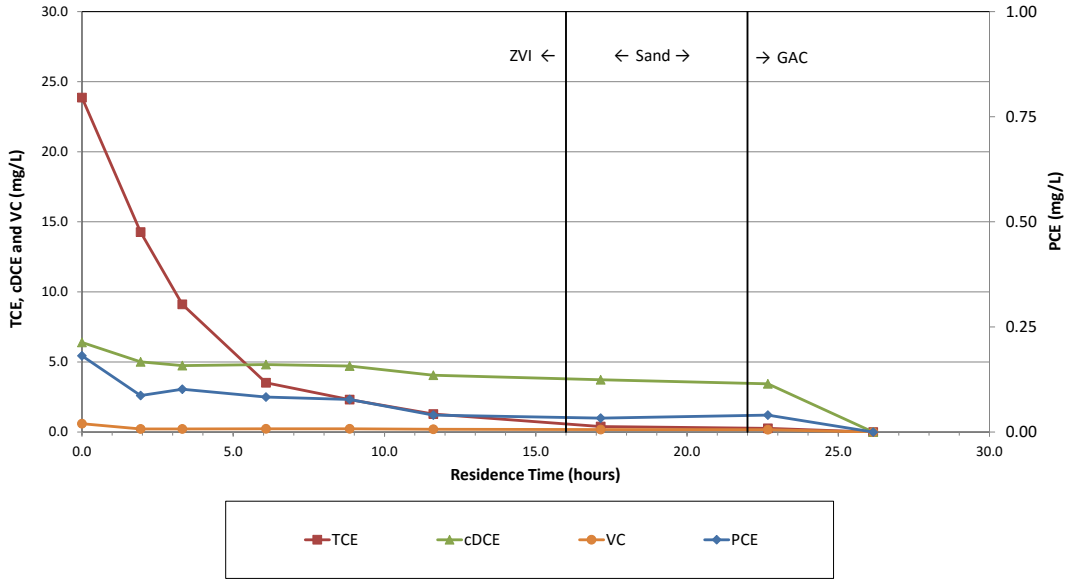
cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compounds
GAC - granular activated carbon
DHG - dissolved hydrocarbon gases
mg/L - milligrams per liter
PCE - tetrachloroethene
TCE - trichloroethene
VC - vinly chloride

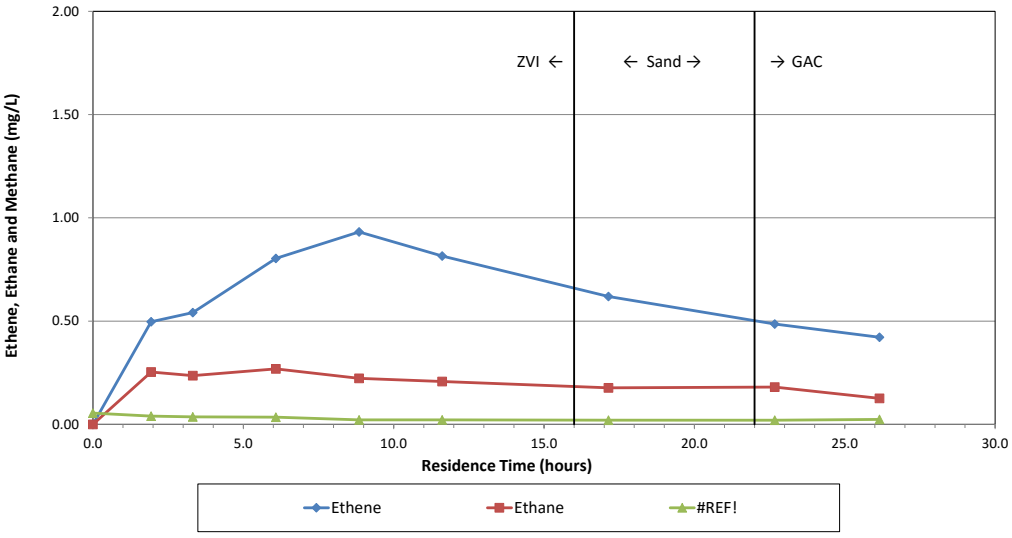
ZVI/GAC/Sand-Mix Column Water cVOC and DHG Concentrations versus Residence Time at End of Study
Massachusetts Site

SiREM

June 2017

Figure: **4**





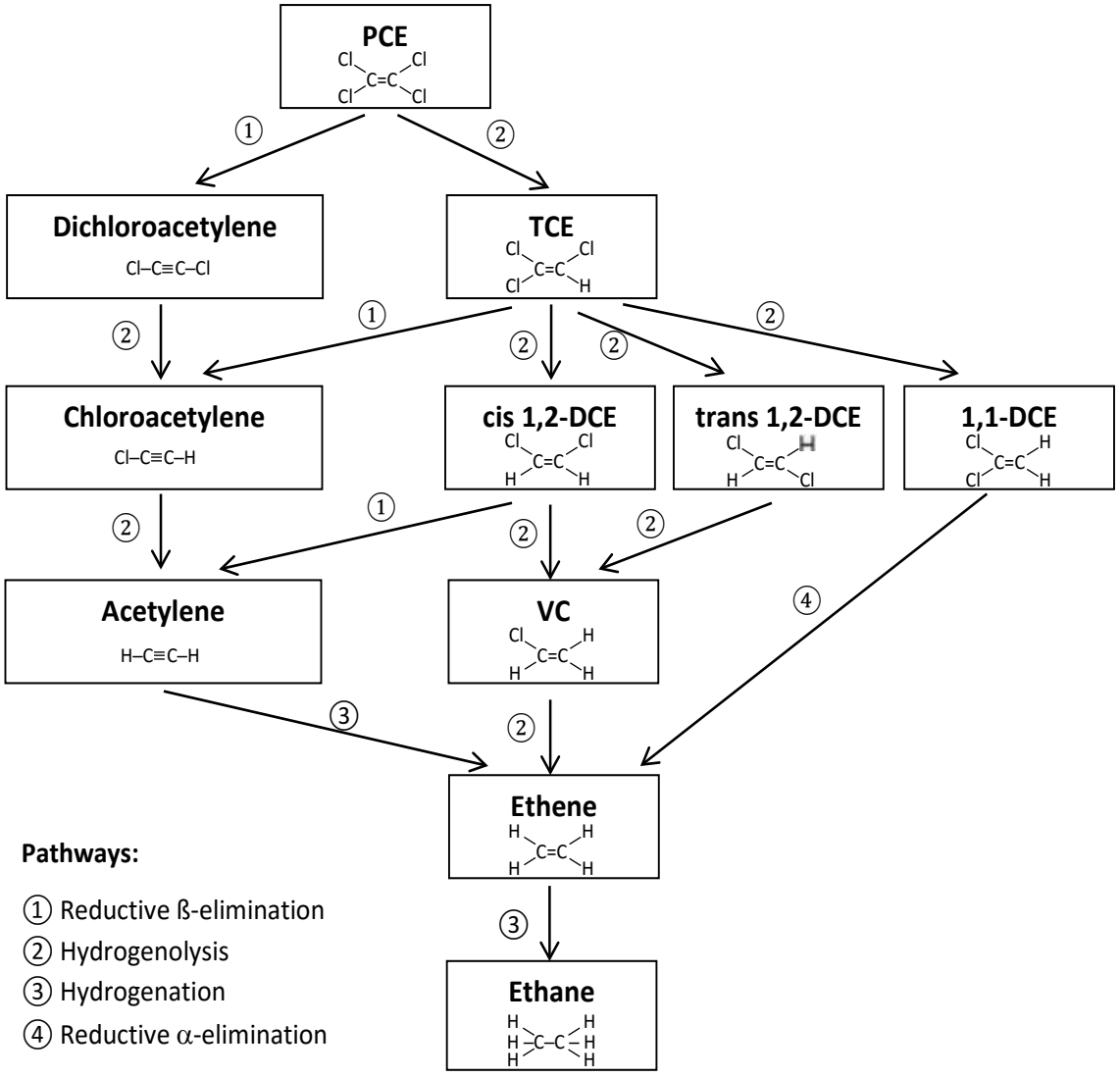
Notes:
cDCE - cis-1,2-dichloroethene
cVOC - chlorinated volatile organic compounds
GAC - granular activated carbon
DHG - dissolved hydrocarbon gases
mg/L - milligrams per liter
PCE - tetrachloroethene
TCE - trichloroethene
VC - vinly chloride
ZVI - zero valent iron

ZVI/GAC Sand (Layered) Column Water cVOC and DHG Concentrations versus Residence Time at End of Study
Massachusetts Site

SiREM

June 2017

Figure: **5**



(modified from Arnold and Roberts, 2000)

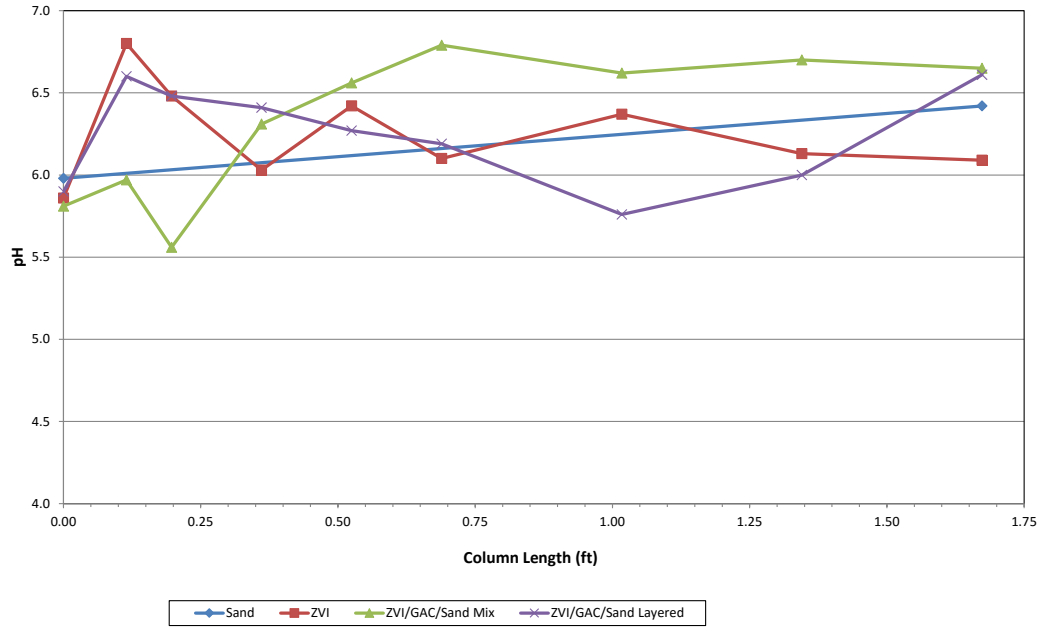
Chlorinated Ethene Degradation Pathways with ZVI

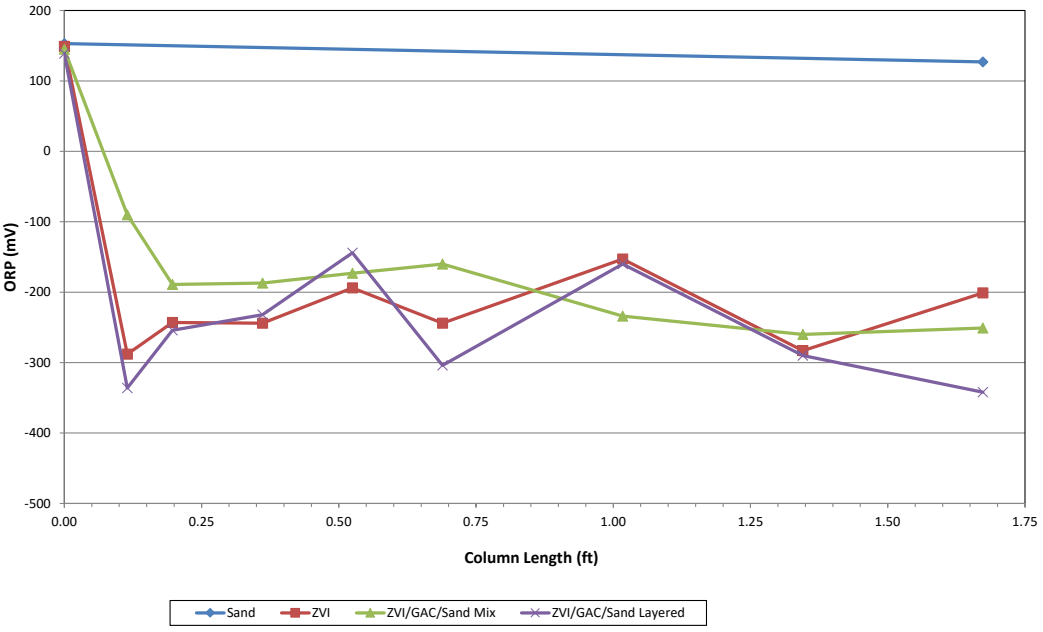
Massachusetts Site

SiREM

June 2017

Figure: **6**





Notes:
ft - feet
GAC - granular activated carbon
mV - millivolts
ORP - oxidation reduction potential
ZVI - zero valent iron

Column Water ORP and pH
Versus Residence Time at End of Study
Massachusetts Site

SiREM

June 2017

Figure: **7**

APPENDIX A

COLUMN MATERIALS SPECIFICATIONS

FairmountSantrol

AquaQuartz®

Keep swimming pools clean and crystal clear at lower maintenance cost

AquaQuartz® pool filter sand is the worry-free, hassle-free choice to keep swimming pools clean and crystal clear. Our premium pool filter sand, which does not stain, ensures easy maintenance at a lower cost by filtering direct dust, algae, suntan lotion, oil, leaves, and insects.

This ecologically safe pool sand does not solidify and will help to prevent clogging. Our inert, odorless 100% natural sand does not have chemicals. It can be easily backwashed.

Choose AquaQuartz pool filter sand for residential and commercial sand filters.

- *Standard #20 grade available for typical use*
- *Private label packaging available*
- *UPC coded for retail stores*
- *Packaged in the most durable 50-pound plastic bags that can be stored outside without UV degradation*
- *Shipments tested for the required size*
- *Shipping can be arranged or pick up as necessary*
- *Meets AWWA B100 recommendations*

For more information and to order AquaQuartz, please email or call:

Fairmount Santrol
11830 Ravenna Road
Chardon, OH 44024
800.255.7263
Fax: 269.465.6075
Sales@FairmountSantrol.com

FairmountSantrol.com

Continental Carbon Group

PRODUCT DATA SHEET

CC-8x30 Granular Activated Carbon (GAC)

DESCRIPTION:

CC-8x30 is a virgin activated carbon derived from bituminous coal. Granular in form, it is ideal for many liquid phase applications including the removal of impurities from water streams. Its superior adsorptive capacity and surface area make it particularly attractive for the removal of organics from wastewater; while its size makes it appealing where low pressure drop is required.

STANDARD PACKAGING:

CC-8x30 is available in 55 lb. bags or 1,100 lb. bulk bags. Other sizes available upon request.

SPECIFICATIONS:

- U.S. standard series sieve size: 8 x 30 mesh (min 90%)
  - Less than No. 30: 5% (max)
  - Greater than No. 8: 5% (max)
- Iodine No.: 900 mg/g (min)
- Surface Area: 900 m^2/g (min)
- Hardness: 90% (min)
- Abrasion No.: 80 (min)
- Moisture (as packaged): 5.0% (max)
- Typical density: 27-30 lbs/ft^3 (0.43 -0.48 g/cc)

SAFETY MESSAGE

Wet activated carbon removes oxygen from air, causing a severe hazard to workers inside carbon vessels. Confined space/low oxygen procedures should be put in place before any entry is made. Such procedures should comply with all applicable local, state and federal guidelines.

For More Information:
Continental Carbon Group
www.continental-carbon.com | info@continental-carbon.com | 905.643.7615

PEERLESS™

PMP ZERO VALENT IRON AGGREGATE SIZE 14D
New Sieve Specification as of 3/1/13

TYPICAL 5 MINUTE ROTAP

SCREEN SIZE	% PASSING
8	100
16	95 - 100
30	55 - 95
50	15 - 80
100	0 - 20
200	0 - 6

TYPICAL BULK DENSITY 165 to 215 POUNDS PER CUBIC FOOT

PMP IRON AGGREGATES ARE 100% DRY AND OIL FREE

TYPICAL CHEMISTRY:

Element	Percentage
Iron	90+
Carbon	1.5 – 2.5
Silicon	2.00
Manganese	0.60
Sulfur	0.12
Phosphorus	0.14
Nickel	0.20
Chromium	0.20
Molybdenum	0.15
Copper	0.20

3/1/13

Peerless Metal Powders & Abrasive

124 South Military • Detroit, Michigan 48209
(313) 841-5400 Fax (313) 841-0240

APPENDIX B

CHAIN OF CUSTODY DOCUMENTATION

SiREM

Chain-of-Custody Form

siremlab.com

130 Stone Rd. W
Guelph, ON N1G 3Z2
(519) 822-2265

Lab # S-42623

*Project Name: Aerovox	*Project #: PRB Column Study
*Project Manager: Marilyn Wade	*Company: Brown and Caldwell
*Email Address: MWade@brwncald.com	
Address (Street): One Tech Drive, Suite 310	
City: Andover	State/Province: MA	Country: USA
*Phone #: 978-794-0336	
*Sampler's Signature: Judith M LeClair	*Sampler's Printed Name: Judith M LeClair

Analysis

Client Sample ID	Sampling Date	Sampling Time	Matrix	# of Containers	Gene-Trac DHC	Gene-Trac VC	Gene-Trac DHB	Gene-Trac DHG	Gene-Trac tceA	Volatile Fatty Acids	Dissolved hydrocarbon gases	Treatability Study				Other Information
												0				
MW-15D	3/21/17	1105-1205	GW	90								X				

Judith M LeClair 3/21/2017

Preservative Key
0. None
1. HCL
2. Other
3. Other
4. Other
5. Other
6. Other

Billing Information
P.O. #
*Bill To: Brown and Caldwell
Marilyn Wade
Andover, MA

Turnaround Time Requested
Normal ☐
Rush ☐
See subcontract & TASK order

For Lab Use Only
Cooler Condition:
Cooler Temperature:
Custody Seals: Yes ☐ No ☐

For Lab Use Only
Proposal #:

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: Judith LeClair	Printed Name: STEPHEN WARE	Printed Name: S WARE 17	Printed Name: Elizabeth Oko	Printed Name: Elizabeth Oko	Printed Name: SIREM
Firm: Brown and Caldwell	Firm: ALPHA	Firm: ALPHA	Firm: ATL	Firm: ATL	Firm: J. WILKINSON
Date/Time: 3/21/17 1239pm	Date/Time: 3/21/17 1245	Date/Time: 3/21/17 14:40	Date/Time: 3/22/17 1440	Date/Time: 3/22/17 10:55	Date/Time: 3/23/17 1535

Distribution: White - return to Originator; Yellow - Lab Copy; Pink - Retained by Client

APPENDIX C

EXTERNAL LABORATORY REPORTS

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

06-April-2017

SiREM Laboratory
Attn : Rita Schofield

130 Research Lane, Suite 2, Guelph
, N1G 5G3
Phone: 519-822-2265, Fax:519-822-3151

Date Rec. : 31 March 2017
LR Report: **CA15757-MAR17**
Reference: Si-3090 B&C PCB Columns

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: MDL	6: S-4263-Baseline
Sample Date & Time				30-Mar-17 11:15
Temperature Upon Receipt [°C]	---	---	---	22.0
Alkalinity [mg/L as CaCO3]	04-Apr-17	12:05	2	28
Total Organic Carbon [mg/L]	03-Apr-17	14:15	1	2
Total Dissolved Solids [mg/L]	03-Apr-17	14:24	30	2260
Silver (total) [mg/L]	04-Apr-17	16:06	0.000002	< 0.00005
Aluminum (total) [mg/L]	04-Apr-17	16:06	0.001	0.080
Arsenic (total) [mg/L]	04-Apr-17	16:06	0.0002	0.0019
Barium (total) [mg/L]	04-Apr-17	16:06	0.00002	0.0641
Beryllium (total) [mg/L]	04-Apr-17	16:06	0.000007	0.000131
Boron (total) [mg/L]	04-Apr-17	16:06	0.002	0.418
Bismuth (total) [mg/L]	04-Apr-17	16:06	0.000007	0.000051
Calcium (total) [mg/L]	04-Apr-17	16:06	0.01	87.4
Cadmium (total) [mg/L]	04-Apr-17	16:06	0.000003	0.00147
Cobalt (total) [mg/L]	04-Apr-17	16:06	0.000004	0.00647
Chromium (total) [mg/L]	04-Apr-17	16:06	0.00003	0.00057
Copper (total) [mg/L]	04-Apr-17	16:06	0.00002	0.00618
Iron (total) [mg/L]	04-Apr-17	16:06	0.007	0.052
Potassium (total) [mg/L]	04-Apr-17	16:06	0.003	25.4
Lithium (total) [mg/L]	04-Apr-17	16:06	0.000006	0.0005
Magnesium (total) [mg/L]	04-Apr-17	16:06	0.001	70.0
Manganese (total) [mg/L]	04-Apr-17	16:06	0.00001	3.89
Molybdenum (total) [mg/L]	04-Apr-17	16:06	0.00001	0.00079
Sodium (total) [mg/L]	06-Apr-17	11:14	0.01	727
Nickel (total) [mg/L]	04-Apr-17	16:06	0.0001	0.0052
Phosphorus (total) [mg/L]	04-Apr-17	16:06	0.003	0.016
Lead (total) [mg/L]	04-Apr-17	16:06	0.00001	0.00029
Antimony (total) [mg/L]	04-Apr-17	16:06	0.0002	< 0.0002
Selenium (total) [mg/L]	04-Apr-17	16:06	0.00004	0.00043
Silicon (total) [mg/L]	04-Apr-17	16:06	0.02	4.55
Tin (total) [mg/L]	04-Apr-17	16:06	0.00001	0.00019

OnLine LIMS

0000958833

Data reported represents the sample submitted to SGS. Reproduction of this analytical report in full or in part is prohibited without prior written approval. Please refer to SGS General Conditions of Services located at http://www.sgs.com/terms_and_conditions_service.htm. (Printed copies are available upon request.)
Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA15757-MAR17**

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	5: MDL	6: S-4263-Baseline
Strontium (total) [mg/L]	04-Apr-17	16:06	0.00002	0.592
Titanium (total) [mg/L]	04-Apr-17	16:06	0.00005	0.00078
Thallium (total) [mg/L]	04-Apr-17	16:06	0.000005	0.000283
Uranium (total) [mg/L]	04-Apr-17	16:06	0.000002	0.000087
Vanadium (total) [mg/L]	04-Apr-17	16:06	0.00001	0.00038
Zinc (total) [mg/L]	04-Apr-17	16:06	0.002	0.257

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

0000958833

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SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

29-May-2017

SiREM Laboratory
Attn : Rita Schofield

130 Research Lane, Suite 2
Guelph, ON
N1G 5G3,

Phone: 519-822-2265
Fax:519-822-3151

Date Rec. : 19 May 2017
LR Report: **CA13461-MAY17**
Reference: Si-3090 B&C PCb Columns

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	6: S-4263 Effluent Control Col 1	7: S-4263 Effluent ZVI Col 2	8: S-4263 Effluent Mixed Col 3	9: S-4263 Effluent Layered Col 4	10: S-4263 Influent
Sample Date & Time			18-May-17 09:00	18-May-17 09:00	18-May-17 09:00	18-May-17 09:00	18-May-17 09:00
Temperature Upon Receipt [°C]	---	---	5.0	5.0	5.0	5.0	5.0
Alkalinity [mg/L as CaCO3]	25-May-17	10:35	42	6	37	27	9
Dissolved Organic Carbon [mg/L]	25-May-17	14:30	1	1	53	7	1
Total Dissolved Solids [mg/L]	25-May-17	10:53	2370	2390	2460	2360	2500
Silver (total) [mg/L]	25-May-17	16:15	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Aluminum (total) [mg/L]	25-May-17	16:15	0.038	0.036	0.032	0.074	0.289
Arsenic (total) [mg/L]	25-May-17	16:15	0.0022	0.0016	0.0013	0.0020	0.0015
Barium (total) [mg/L]	25-May-17	16:15	0.0638	0.0672	0.331	0.114	0.220
Beryllium (total) [mg/L]	25-May-17	16:15	0.000072	0.000008	0.000018	0.000017	0.000144
Boron (total) [mg/L]	25-May-17	16:15	0.530	0.474	0.439	0.540	0.770
Bismuth (total) [mg/L]	25-May-17	16:15	0.000038	0.000048	0.000018	0.000021	0.000015
Calcium (total) [mg/L]	25-May-17	16:15	81.7	81.9	71.6	98.4	86.1
Cadmium (total) [mg/L]	25-May-17	16:15	0.00155	0.000009	0.000003	< 0.000003	0.00157
Cobalt (total) [mg/L]	25-May-17	16:15	0.00626	0.000030	0.000051	0.000959	0.00644
Chromium (total) [mg/L]	25-May-17	16:15	0.00107	0.00040	0.00044	0.00047	0.00089
Copper (total) [mg/L]	25-May-17	16:15	0.00609	0.00098	0.00051	0.00069	0.00839
Iron (total) [mg/L]	25-May-17	16:15	0.046	0.470	10.6	0.617	0.034

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Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

0001013671

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA13461-MAY17**

Analysis	3: Analysis Approval Date	4: Analysis Approval Time	6: S-4263 Effluent Control Col 1	7: S-4263 Effluent ZVI Col 2	8: S-4263 Effluent Mixed Col 3	9: S-4263 Effluent Layered Col 4	10: S-4263 Influent
Potassium (total) [mg/L]	25-May-17	16:15	23.1	25.2	24.1	31.6	24.6
Lithium (total) [mg/L]	25-May-17	16:15	0.0019	0.0046	0.0183	0.0053	0.0030
Magnesium (total) [mg/L]	25-May-17	16:15	67.8	65.4	70.0	82.7	72.1
Manganese (total) [mg/L]	25-May-17	16:15	3.77	1.57	0.929	1.07	3.73
Molybdenum (total) [mg/L]	25-May-17	16:15	0.00053	0.00395	0.00176	0.00068	0.00104
Sodium (total) [mg/L]	29-May-17	13:08	585	635	600	731	638
Nickel (total) [mg/L]	25-May-17	16:15	0.0059	0.0016	0.0001	0.0006	0.0047
Phosphorus (total) [mg/L]	25-May-17	16:15	0.009	0.072	0.017	0.066	0.012
Lead (total) [mg/L]	25-May-17	16:15	0.00041	0.00027	0.00018	0.00023	0.00022
Antimony (total) [mg/L]	25-May-17	16:15	< 0.0002	0.0003	0.0002	0.0007	< 0.0002
Selenium (total) [mg/L]	25-May-17	16:15	0.00034	< 0.00004	< 0.00004	< 0.00004	0.00035
Silicon (total) [mg/L]	25-May-17	16:15	4.65	1.76	1.92	2.33	4.94
Tin (total) [mg/L]	25-May-17	16:15	0.00014	0.00049	0.00012	0.00018	0.00011
Strontium (total) [mg/L]	25-May-17	16:15	0.605	0.622	0.829	0.808	0.605
Titanium (total) [mg/L]	25-May-17	16:15	0.00048	0.00062	0.00037	0.00068	0.00045
Thallium (total) [mg/L]	25-May-17	16:15	0.000296	0.000006	< 0.000005	< 0.000005	0.000304
Uranium (total) [mg/L]	25-May-17	16:15	0.000066	0.000007	0.000007	0.000050	0.000072
Vanadium (total) [mg/L]	25-May-17	16:15	0.00019	0.00019	0.00015	0.00050	0.00025
Zinc (total) [mg/L]	25-May-17	16:15	0.290	0.003	0.003	0.002	0.286

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

OnLine LIMS

0001013671

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Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

ANALYTICAL REPORT

Lab Number:	L1709863
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	SIREM/BROWN & CALDWELL
Project Number:	149339
Report Date:	04/03/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

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

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

Project Name: SIREM/BROWN & CALDWELL
Project Number: 149339

Lab Number: L1709863
Report Date: 04/03/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1709863-01	S-4263-BASELINE	WATER	Not Specified	03/30/17 11:45	03/31/17

Project Name: SIREM/BROWN & CALDWELL **Lab Number:** L1709863

Project Number: 149339 **Report Date:** 04/03/17

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name: SIREM/BROWN & CALDWELL **Lab Number:** L1709863
Project Number: 149339 **Report Date:** 04/03/17

Case Narrative

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

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

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

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

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

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

Project Name:	SIREM/BROWN & CALDWELL	**Lab Number:**	L1709863
Project Number:	149339	**Report Date:**	04/03/17

Case Narrative (continued)

MCP Related Narratives

PCBs

In reference to question G:

L1709863-01: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

The surrogate recoveries for L1709863-01 were outside the acceptance criteria for 2,4,5,6-tetrachloro-m-xylene (171%/185%) and decachlorobiphenyl (212%/168%); however, re-extraction could not be performed due to lack of additional sample. The results of the original analysis are reported; however, all associated compounds are considered to have a potential bias.

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

Authorized Signature: Kelly Stenstrom

Title: Technical Director/Representative Date: 04/03/17

ORGANICS

PCBS

Project Name: SIREM/BROWN & CALDWELL **Lab Number:** L1709863

Project Number: 149339 **Report Date:** 04/03/17

SAMPLE RESULTS

Lab ID:	L1709863-01	D	Date Collected:	03/30/17 11:45
Client ID:	S-4263-BASELINE		Date Received:	03/31/17
Sample Location:	Not Specified		Field Prep:	Not Specified
Matrix:	Water		Extraction Method:	EPA 3510C
Analytical Method:	97,8082A		Extraction Date:	03/31/17 18:12
Analytical Date:	04/03/17 03:44		Cleanup Method:	EPA 3665A
Analyst:	HT		Cleanup Date:	04/01/17
			Cleanup Method:	EPA 3660B
			Cleanup Date:	04/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	1.25	--	5	A
Aroclor 1221	ND		ug/l	1.25	--	5	A
Aroclor 1232	ND		ug/l	1.25	--	5	A
Aroclor 1242	25.2		ug/l	1.25	--	5	A
Aroclor 1248	ND		ug/l	1.25	--	5	A
Aroclor 1254	ND		ug/l	1.25	--	5	A
Aroclor 1260	ND		ug/l	1.25	--	5	A
Aroclor 1262	ND		ug/l	1.25	--	5	A
Aroclor 1268	ND		ug/l	1.25	--	5	A
PCBs, Total	25.2		ug/l	1.25	--	5	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**171**	Q	30-150	A
Decachlorobiphenyl	**212**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**185**	Q	30-150	B
Decachlorobiphenyl	**168**	Q	30-150	B

Project Name: SIREM/BROWN & CALDWELL
Project Number: 149339
Lab Number: L1709863
Report Date: 04/03/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 04/01/17 14:34
Analyst: HT

Extraction Method: EPA 3510C
Extraction Date: 03/31/17 18:12
Cleanup Method: EPA 3665A
Cleanup Date: 04/01/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01 Batch: WG990122-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	90		30-150	A
Decachlorobiphenyl	82		30-150	A
2,4,5,6-Tetrachloro-m-xylene	86		30-150	B
Decachlorobiphenyl	82		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: SIREM/BROWN & CALDWELL

Project Number: 149339

Lab Number: L1709863

Report Date: 04/03/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01 Batch: WG990122-2 WG990122-3									
Aroclor 1016	91		85		40-140	6		20	A
Aroclor 1260	95		92		40-140	3		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	106		96		30-150	A
Decachlorobiphenyl	92		89		30-150	A
2,4,5,6-Tetrachloro-m-xylene	96		89		30-150	B
Decachlorobiphenyl	89		87		30-150	B

Project Name: SIREM/BROWN & CALDWELL
Project Number: 149339

Lab Number: L1709863
Report Date: 04/03/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1709863-01A	Amber 500ml unpreserved	A	7	5.4	Y	Absent	MCP-8082-10(365)
L1709863-01B	Amber 500ml unpreserved	A	7	5.4	Y	Absent	MCP-8082-10(365)

*Values in parentheses indicate holding time in days

Project Name:	SIREM/BROWN & CALDWELL	**Lab Number:**	L1709863
Project Number:	149339	**Report Date:**	04/03/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	SIREM/BROWN & CALDWELL	**Lab Number:**	L1709863
Project Number:	149339	**Report Date:**	04/03/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	SIREM/BROWN & CALDWELL	**Lab Number:**	L1709863
Project Number:	149339	**Report Date:**	04/03/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

Revised MW/DS 3-31-17

CHAIN OF CUSTODY

PAGE OF

ALPHA ANALYTICAL
World Class Chemistry

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 3/31/17

ALPHA Job #: L1709863

Client Information

Client: SiREM Lab
Address: 130 Stone Rd W
Guelph, ON, Canada, N1G 3Z2
Phone: 519-822-2265
Fax:
Email: mhealey@siremlab.com;

☐ These samples have been Previously analyzed by Alpha

Project Information

Project Name: ~~PCB Columns~~ SiREM/Brown & Caldwell
Project Location:
Project #: 149339
Project Manager:
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

Report Information — Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

ANALYSIS

MCP WSC CAM Methods 8082

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☒ Lab to do
(Please specify below)

TOTAL # BOTTLES

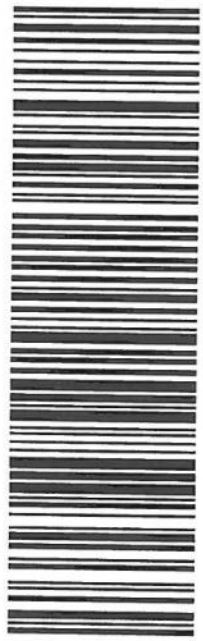
ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Sample Specific Comments
09863 - 01	S-4263-Baseline	30Mar17	11:45	GW	MH	

Container Type	A	-	-	-	-	-	-	-	-	-	-	-	
Preservative	A	-	-	-	-	-	-	-	-	-	-	-	

Relinquished By:	Date/Time	Received By:	Date/Time
Michael Healey	30Mar17/16:00	[signature] AR	3/31/17

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NJ) (rev. 5-JAN-12)



TRK# 0430 7787 8260 6158

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01581
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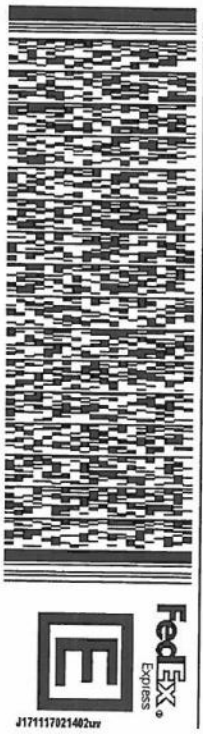
INTL PRIORITY

10:30A



J171117021402zzz

FedEx Express

(US)

546J3/1ADB/53C1

ORIGIN ID:YKFA (519) 822-2265
SIMMY SINGH
SIREM
130 STONE RD W
GUELPH, ON N1G3Z2
CANADA CA

SHIP DATE: 30MAR17
ACTWGT: 15.00 LB
CAD: 102102748/INCA3850

BILL SENDER

TO SAMPLE RECEPTION
ALPHA ANALYTICAL
8 WALKUP DR

WESTBOROUGH MA 01581
(508) 898-9220

REF: NB8150/SREMLAB/0202
INV:
PO:
DEPT:

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2. Place label in shipping pouch and affix it to your shipment.

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FedEx won't be liable for damage, loss, delay, shortage, mis-delivery, non-delivery, misinformation or failure to provide information in connection with shipments of cash, currency or other prohibited items or in instances beyond our control, such as acts of God, perils of the air, weather conditions, mechanical delays, acts of public enemies, war, strike, civil commotion, or acts or omissions of public authorities(including customs and health officials) with actual or apparent authority. NO WARRANTY. We make no warranties, express or implied. CLAIMS FOR LOSS, DAMAGE OR DELAY. ALL CLAIMS MUST BE MADE IN WRITING AND WITHIN STRICT TIME LIMITS. SEE OUR TARIFF, APPLICABLE FEDEX SERVICE GUIDE, OR STANDARD CONDITIONS OF CARRIAGE FOR DETAILS. The Warsaw Convention provides specific written claims procedures for damage, delay or non-delivery of your shipment. Moreover, the interpretation and operation of the Warsaw Convention's claims provisions may vary in each country. Refer to the Convention to determine the claims period for your shipment. The right to damages against us shall be extinguished unless an action is brought within two years, as set forth in the Convention. FedEx is not obligated to act on any claim until all transportation charges have been paid. The claim amount may not be deducted from the transportation charges. If the recipient accepts the shipment without noting any damage on the delivery record, FedEx will assume the shipment was delivered in good condition. In order for us to consider a claim for damage, the contents, original shipping carton and packing must be made available to us for inspection. MANDATORY LAW. Insofar as any provision contained or referred to in this Air Waybill may be contrary to any applicable international treaties, laws, government regulations, orders or requirements such provisions shall remain in effect as a part of our agreement to the extent that it is not overridden. The invalidity or unenforceability of any provisions shall not affect any other part of this Air Waybill. Unless otherwise indicated, FEDERAL EXPRESS CORPORATION, 2005 Corporate Avenue, Memphis, TN 38132, USA, is the first carrier of this shipment. Email address located at www.fedex.com.

Serial_No:04031717:47

This invoice must be completed in English

COMMERCIAL INVOICE

EXPORTER :
Tax ID# :
Contact Name : Simmy Singh
Telephone No. : 519.822.2265
E-Mail : JSchimmel@siremlab.com
Company Name/Address :
SiREM
130 Stone Rd W

GUELPH ON N1G3Z2
Country : Canada
Parties to Transaction:
☐ Related ☐ Non-Related

Payment Terms :

Purpose of Shipment : Commercial

Ship Date : 30 Mar, 2017

Air Waybill No. / Tracking No. / Bill of Lading : 778782606158

Invoice No. : Purchase Order No. :

CONSIGNEE :
Tax ID# :
Contact Name : Sample Reception
Telephone No. : 5088989220
E-Mail :
Company Name/Address :
Alpha Analytical
8 WALKUP DR

WESTBOROUGH MA 015811022
Country : United States

SOLD TO (if different from Consignee) :
☑ Same as CONSIGNEE :

Tax ID# :
Company Name/Address :

Country :

If there is a designated broker for this shipment, please provide contact information
Name of Broker Tel No. Contact Name

Duties and Taxes Payable by ☑ Exporter ☐ Consignee ☐ Other If Other, please specify

No. of Packages	No. of Units	Unit of Measure	Description of Goods	Harmonized Tariff Number	Country of Origin	Unit Value	Total Value
	1.00	LTR	Commercial - groundwater samples for destructive analyses		CA	10.000000	10.00

Total No. of Packages : 1

Total Weight (Indicate LBS or KGS) : 15.00 lbs

Special Instructions :

Declaration Statement(s) :

I declare that all the information contained in this invoice to be true and correct

Originator or Name of Company Representative if the invoice is being completed on behalf of a company or individual :

Signature / Title / Date

Terms of Sale :	FCA
Subtotal :	10.00
Insurance :	0.00
Freight :	0.00
Packing :	0.00
Handling :	0.00
Other :	0.00
Invoice Total :	10.00
Currency Code :	CAD

30 Mar, 2017

Serial_No:04031717:47

TOXIC SUBSTANCE CONTROL ACT (TSCA) CERTIFICATION

Date: March 30, 2017

(CHECK ONE SECTION ONLY)

POSITIVE CERTIFICATION

_____

"I certify that all chemical substances in this shipment comply with all applicable rules or orders under TSCA and that I am not offering a chemical substance for entry in violation of TSCA or any applicable rules order thereunder."

● OR ●

NEGATIVE CERTIFICATION

X

"I certify that all chemical substances in this shipment are not subject to TSCA."

Company Name: Geosyntec Consultants

Company Address: 130 Stone Rd W

City/State: Guelph ON

Country/Zip: N1G 3Z2

Authorized Name: Simmy Singh

Authorized Signature: _____

Title: Administrative Specialist

Federal Express AWB#: 7787 8260 6158

If the certifier is unsure if their chemical substance is subject to TSCA compliance, contact the Environmental Protection Agency, TSCA Assistance Office, Washington, D.C. (202) 554-1404 between 8:30 am and 5:00 pm EST.

Revised 04-2009

Serial_No:04031717:47

After printing this label:

CONSIGNEE COPY - PLEASE PLACE IN FRONT OF POUCH

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Serial_No:04031717:47

This invoice must be completed in English

COMMERCIAL INVOICE

EXPORTER : Tax ID# : Contact Name : Simmy Singh Telephone No. : 519.822.2265 E-Mail : JSchimmel@siremlab.com Company Name/Address : SiREM 130 Stone Rd W GUELPH ON N1G3Z2 Country : Canada Parties to Transaction: ☐ Related ☐ Non-Related Payment Terms : Purpose of Shipment : Commercial	Ship Date : 30 Mar, 2017 Air Waybill No. / Tracking No. / Bill of Lading : 778782606158 Invoice No. : Purchase Order No. :
CONSIGNEE : Tax ID# : Contact Name : Sample Reception Telephone No. : 5088989220 E-Mail : Company Name/Address : Alpha Analytical 8 WALKUP DR WESTBOROUGH MA 015811022 Country : United States	SOLD TO (if different from Consignee) : ☑ Same as CONSIGNEE : Tax ID# : Company Name/Address : Country :
If there is a designated broker for this shipment, please provide contact information Name of Broker Tel No. Contact Name *Duties and Taxes Payable by* ☑ Exporter ☐ Consignee ☐ Other If Other, please specify	

No. of Packages	No. of Units	Unit of Measure	Description of Goods	Harmonized Tariff Number	Country of Origin	Unit Value	Total Value
	1.00	LTR	Commercial - groundwater samples for destructive analyses		CA	10.000000	10.00

Total No. of Packages : 1	Total Weight (Indicate LBS or KGS) : 15.00 lbs	
Special Instructions :		Terms of Sale : FCA
		Subtotal : 10.00
		Insurance : 0.00
		Freight : 0.00
		Packing : 0.00
Declaration Statement(s) :		Handling : 0.00
		Other : 0.00
I declare that all the information contained in this invoice to be true and correct		Invoice Total : 10.00
Originator or Name of Company Representative if the invoice is being completed on behalf of a company or individual :		Currency Code : CAD
Signature / Title / Date		30 Mar, 2017

Serial_No:04031717:47

TOXIC SUBSTANCE CONTROL ACT (TSCA) CERTIFICATION

Date: March 30, 2017

(CHECK ONE SECTION ONLY)

POSITIVE CERTIFICATION

_____

"I certify that all chemical substances in this shipment comply with all applicable rules or orders under TSCA and that I am not offering a chemical substance for entry in violation of TSCA or any applicable rules order thereunder."

● OR ●

NEGATIVE CERTIFICATION

X

"I certify that all chemical substances in this shipment are not subject to TSCA."

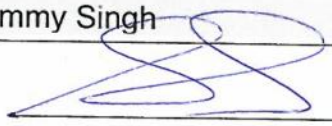
Company Name: Geosyntec Consultants

Company Address: 130 Stone Rd W

City/State: Guelph ON

Country/Zip: N1G 3Z2

Authorized Name: Simmy Singh

Authorized Signature: 

Title: Administrative Specialist

Federal Express AWB#: 7787 8260 6158

If the certifier is unsure if their chemical substance is subject to TSCA compliance, contact the Environmental Protection Agency, TSCA Assistance Office, Washington, D.C. (202) 554-1404 between 8:30 am and 5:00 pm EST.

Revised 04-2009

Serial_No:04031717:47

CHAIN OF CUSTODY

PAGE OF

ALPHA ANALYTICAL
World Class Chemistry

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 3/31/17

ALPHA Job #: L1709863

Client Information

Client: SiREM Lab
Address: 130 Stone Rd W
Guelph, ON, Canada, N1G 3Z2
Phone: 519-822-2265
Fax:
Email: mhealey@siremlab.com;

☐ These samples have been Previously analyzed by Alpha

Project Information

Project Name: PCB Columns
Project Location:
Project #:
Project Manager:
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

Report Information — Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

ANALYSIS

MCP WSC CAM Methods 8082

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☒ Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	MCP WSC CAM Methods 8082	Sample Specific Comments
0863 - 01	S-4263-Baseline	30Mar17	11:45	GW	MH	☒	

Container Type	A	-	-	-	-	-	-	-	-	-	-	-	
Preservative	A	-	-	-	-	-	-	-	-	-	-	-	

Relinquished By:	Date/Time	Received By:	Date/Time
Michael Healey	30Mar17/16:00	[signature] AR	3/31/17

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NJ)
(rev. 5-JAN-12)

After printing this label:

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If there is a designated broker for this shipment, please provide contact information
Name of Broker Tel No. Contact Name

Duties and Taxes Payable by ☑ Exporter ☐ Consignee ☐ Other If Other, please specify

No. of Packages	No. of Units	Unit of Measure	Description of Goods	Harmonized Tariff Number	Country of Origin	Unit Value	Total Value
	1.00	LTR	Commercial - groundwater samples for destructive analyses		CA	10.000000	10.00

Total No. of Packages : 1	Total Weight (Indicate LBS or KGS) : 15.00 lbs	Terms of Sale : FCA
Special Instructions :		Subtotal : 10.00
		Insurance : 0.00
		Freight : 0.00
Declaration Statement(s) :		Packing : 0.00
		Handling : 0.00
I declare that all the information contained in this invoice to be true and correct		Other : 0.00
Originator or Name of Company Representative if the invoice is being completed on behalf of a company or individual :		Invoice Total : 10.00
		Currency Code : CAD
Signature / Title / Date		30 Mar, 2017

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Date: March 30, 2017

(CHECK ONE SECTION ONLY)

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Company Name: Geosyntec Consultants

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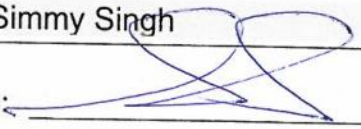
Country/Zip: N1G 3Z2

Authorized Name: Simmy Singh

Authorized Signature: 

Title: Administrative Specialist

Federal Express AWB#: 7787 8260 6158

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Revised 04-2009

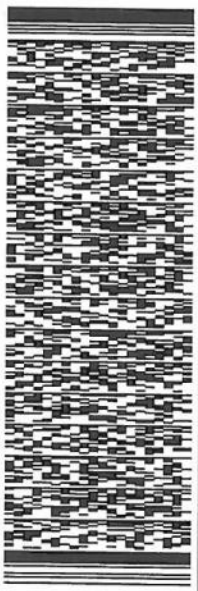
Serial_No:04031717:47

TRK# 0430 7787 8260 6158

NB BBFA

01581
BOS
MA-US

10:30A
INTL PRIORITY



J171117021402uv

FedEx Express

(US)

546J3/1ADB/53C1

ORIGIN ID:YKFA (519) 822-2265
SIMMY SINGH
SIREM
130 STONE RD W
GUELPH, ON N1G3Z2
CANADA CA

SHIP DATE: 30MAR17
ACTWGT: 15.00 LB
CAD: 10210748/INCA3850

BILL SENDER

TO SAMPLE RECEPTION
ALPHA ANALYTICAL
8 WALKUP DR

WESTBOROUGH MA 01581
(508) 898-9220
REF: NB8150/SIREMLAB/0202
INV:
PO: DEPT:

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The Warsaw Convention, as amended, will then govern and in most cases limit FedEx's liability for loss, delay of, or damage to your shipment. The Warsaw Convention, as amended, limits FedEx's liability. For example in the U.S. liability is limited to $9.07 per pound (20$ per kilogram), unless a higher value for carriage is declared as described below and you pay any applicable supplementary charges. The interpretation and operation of the Warsaw Convention's liability limits may vary in each country. There are no specific stopping places which are agreed to and FedEx reserves the right to route the shipment in any way FedEx deems appropriate. ROAD TRANSPORT NOTICE. Shipments transported solely by road to or from a country which is a party to the Warsaw Convention or the Contract for the International Carriage of Goods by Road (the "CMR") are subject to the terms and conditions of the CMR, notwithstanding any other provision of this Air Waybill to the contrary. For those shipments transported solely by road, if a conflict arises between the provisions of the CMR and this Air Waybill, the terms of the CMR shall prevail. LIMITATION OF LIABILITY. If not governed by the Warsaw Convention, the CMR, or other international treaties, laws, other government regulations, orders, or requirements, FedEx's maximum liability for damage, loss, delay, shortage, mis-delivery, nondelivery, misinformation or failure to provide information in connection with your shipment is limited by this Agreement and as set out in the terms and conditions of the contract of carriage. Please refer to the contract of carriage set forth in the applicable FedEx Service Guide or its equivalent to determine the contractual limitation. FedEx does not provide cargo liability or all-risk insurance, but you may pay an additional charge for each additional U.S. $100 (or equivalent local currency for the country of origin) of declared value for carriage. 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FedEx won't be liable for damage, loss, delay, shortage, mis-delivery, non-delivery, misinformation or failure to provide information in connection with shipments of cash, currency or other prohibited items or in instances beyond our control, such as acts of God, perils of the air, weather conditions, mechanical delays, acts of public enemies, war, strike, civil commotion, or acts or omissions of public authorities(including customs and health officials) with actual or apparent authority. NO WARRANTY. We make no warranties, express or implied. CLAIMS FOR LOSS, DAMAGE OR DELAY. ALL CLAIMS MUST BE MADE IN WRITING AND WITHIN STRICT TIME LIMITS. SEE OUR TARIFF, APPLICABLE FEDEX SERVICE GUIDE, OR STANDARD CONDITIONS OF CARRIAGE FOR DETAILS. The Warsaw Convention provides specific written claims procedures for damage, delay or non-delivery of your shipment. Moreover, the interpretation and operation of the Warsaw Convention's claims provisions may vary in each country. Refer to the Convention to determine the claims period for your shipment. The right to damages against us shall be extinguished unless an action is brought within two years, as set forth in the Convention. FedEx is not obligated to act on any claim until all transportation charges have been paid. The claim amount may not be deducted from the transportation charges. If the recipient accepts the shipment without noting any damage on the delivery record, FedEx will assume the shipment was delivered in good condition. In order for us to consider a claim for damage, the contents, original shipping carton and packing must be made available to us for inspection. MANDATORY LAW. Insofar as any provision contained or referred to in this Air Waybill may be contrary to any applicable international treaties, laws, government regulations, orders or requirements such provisions shall remain in effect as a part of our agreement to the extent that it is not overridden. The invalidity or unenforceability of any provisions shall not affect any other part of this Air Waybill. Unless otherwise indicated, FEDERAL EXPRESS CORPORATION, 2005 Corporate Avenue, Memphis, TN 38132, USA, is the first carrier of this shipment. Email address located at www.fedex.com.

Serial_No:04031717:47

This invoice must be completed in English

COMMERCIAL INVOICE

EXPORTER : Tax ID# : Contact Name : Simmy Singh Telephone No. : 519.822.2265 E-Mail : JSchimmel@siremlab.com Company Name/Address : SiREM 130 Stone Rd W GUELPH ON N1G3Z2 Country : Canada Parties to Transaction: ☐ Related ☐ Non-Related Payment Terms : Purpose of Shipment : Commercial	Ship Date : 30 Mar, 2017 Air Waybill No. / Tracking No. / Bill of Lading : 778782606158 Invoice No. : Purchase Order No. :
CONSIGNEE : Tax ID# : Contact Name : Sample Reception Telephone No. : 5088989220 E-Mail : Company Name/Address : Alpha Analytical 8 WALKUP DR WESTBOROUGH MA 015811022 Country : United States	SOLD TO (if different from Consignee) : ☑ Same as CONSIGNEE : Tax ID# : Company Name/Address : Country :
If there is a designated broker for this shipment, please provide contact information Name of Broker Tel No. Contact Name *Duties and Taxes Payable by* ☑ Exporter ☐ Consignee ☐ Other If Other, please specify	

No. of Packages	No. of Units	Unit of Measure	Description of Goods	Harmonized Tariff Number	Country of Origin	Unit Value	Total Value
	1.00	LTR	Commercial - groundwater samples for destructive analyses		CA	10.000000	10.00

Total No. of Packages : 1	Total Weight (Indicate LBS or KGS) : 15.00 lbs	
Special Instructions :		Terms of Sale : FCA
		Subtotal : 10.00
		Insurance : 0.00
		Freight : 0.00
		Packing : 0.00
Declaration Statement(s) :		Handling : 0.00
		Other : 0.00
I declare that all the information contained in this invoice to be true and correct		Invoice Total : 10.00
Originator or Name of Company Representative if the invoice is being completed on behalf of a company or individual :		Currency Code : CAD
Signature / Title / Date		30 Mar, 2017

Serial_No:04031717:47

TOXIC SUBSTANCE CONTROL ACT (TSCA) CERTIFICATION

Date: March 30, 2017

(CHECK ONE SECTION ONLY)

POSITIVE CERTIFICATION

_____

"I certify that all chemical substances in this shipment comply with all applicable rules or orders under TSCA and that I am not offering a chemical substance for entry in violation of TSCA or any applicable rules order thereunder."

● OR ●

NEGATIVE CERTIFICATION

X

"I certify that all chemical substances in this shipment are not subject to TSCA."

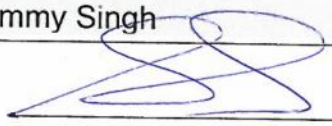
Company Name: Geosyntec Consultants

Company Address: 130 Stone Rd W

City/State: Guelph ON

Country/Zip: N1G 3Z2

Authorized Name: Simmy Singh

Authorized Signature: 

Title: Administrative Specialist

Federal Express AWB#: 7787 8260 6158

If the certifier is unsure if their chemical substance is subject to TSCA compliance, contact the Environmental Protection Agency, TSCA Assistance Office, Washington, D.C. (202) 554-1404 between 8:30 am and 5:00 pm EST.

Revised 04-2009

Serial_No:04031717:47

ANALYTICAL REPORT

Lab Number:	L1711827
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	SIREM / BROWN & CALDWELL
Project Number:	149339
Report Date:	04/18/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

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

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

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339

Lab Number: L1711827
Report Date: 04/18/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1711827-01	1-CONT-130417	WATER	Not Specified	04/13/17 09:30	04/14/17
L1711827-02	2-ZV1-130417	WATER	Not Specified	04/13/17 09:40	04/14/17
L1711827-03	3-MIX-130417	WATER	Not Specified	04/13/17 09:50	04/14/17
L1711827-04	4-LAYER-130417	WATER	Not Specified	04/13/17 10:00	04/14/17

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1711827
Project Number:	149339	**Report Date:**	04/18/17

MADEP MCP Response Action Analytical Report Certification

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

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

A response to questions G, H and I is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	YES
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	YES

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

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

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1711827
Project Number: 149339 **Report Date:** 04/18/17

Case Narrative

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

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

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

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

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

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

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1711827
Project Number:	149339	**Report Date:**	04/18/17

Case Narrative (continued)

MCP Related Narratives

Report Submission

All MCP required questions were answered with affirmative responses; therefore, there are no relevant protocol-specific QC and/or performance standard non-conformances to report.

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

Authorized Signature: Melissa Cripps

Title: Technical Director/Representative Date: 04/18/17

ORGANICS

PCBS

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1711827

Project Number: 149339 **Report Date:** 04/18/17

SAMPLE RESULTS

Lab ID:	L1711827-01	Date Collected:	04/13/17 09:30
Client ID:	1-CONT-130417	Date Received:	04/14/17
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	97,8082A	Extraction Date:	04/15/17 07:27
Analytical Date:	04/16/17 20:36	Cleanup Method:	EPA 3665A
Analyst:	AF	Cleanup Date:	04/15/17
		Cleanup Method:	EPA 3660B
		Cleanup Date:	04/15/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	96		30-150	A
Decachlorobiphenyl	78		30-150	A
2,4,5,6-Tetrachloro-m-xylene	86		30-150	B
Decachlorobiphenyl	80		30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1711827

Project Number: 149339 **Report Date:** 04/18/17

SAMPLE RESULTS

Lab ID: L1711827-02
Client ID: 2-ZV1-130417
Sample Location: Not Specified
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 04/16/17 20:48
Analyst: AF

Date Collected: 04/13/17 09:40
Date Received: 04/14/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/15/17 07:27
Cleanup Method: EPA 3665A
Cleanup Date: 04/15/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/15/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	105		30-150	A
Decachlorobiphenyl	77		30-150	A
2,4,5,6-Tetrachloro-m-xylene	96		30-150	B
Decachlorobiphenyl	77		30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1711827

Project Number: 149339 **Report Date:** 04/18/17

SAMPLE RESULTS

Lab ID:	L1711827-03	Date Collected:	04/13/17 09:50
Client ID:	3-MIX-130417	Date Received:	04/14/17
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	97,8082A	Extraction Date:	04/15/17 07:27
Analytical Date:	04/16/17 21:01	Cleanup Method:	EPA 3665A
Analyst:	AF	Cleanup Date:	04/15/17
		Cleanup Method:	EPA 3660B
		Cleanup Date:	04/15/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		30-150	A
Decachlorobiphenyl	77		30-150	A
2,4,5,6-Tetrachloro-m-xylene	88		30-150	B
Decachlorobiphenyl	75		30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1711827

Project Number: 149339 **Report Date:** 04/18/17

SAMPLE RESULTS

Lab ID:	L1711827-04	Date Collected:	04/13/17 10:00
Client ID:	4-LAYER-130417	Date Received:	04/14/17
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	97,8082A	Extraction Date:	04/15/17 07:27
Analytical Date:	04/16/17 21:13	Cleanup Method:	EPA 3665A
Analyst:	AF	Cleanup Date:	04/15/17
		Cleanup Method:	EPA 3660B
		Cleanup Date:	04/15/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	99		30-150	A
Decachlorobiphenyl	85		30-150	A
2,4,5,6-Tetrachloro-m-xylene	93		30-150	B
Decachlorobiphenyl	84		30-150	B

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339
Lab Number: L1711827
Report Date: 04/18/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 04/16/17 19:33
Analyst: AF

Extraction Method: EPA 3510C
Extraction Date: 04/15/17 07:27
Cleanup Method: EPA 3665A
Cleanup Date: 04/15/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/15/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01-04 Batch: WG994560-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	89		30-150	A
Decachlorobiphenyl	69		30-150	A
2,4,5,6-Tetrachloro-m-xylene	85		30-150	B
Decachlorobiphenyl	73		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: SIREM / BROWN & CALDWELL

Project Number: 149339

Lab Number: L1711827

Report Date: 04/18/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01-04 Batch: WG994560-2 WG994560-3									
Aroclor 1016	89		89		40-140	0		20	A
Aroclor 1260	88		87		40-140	1		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	88		86		30-150	A
Decachlorobiphenyl	78		79		30-150	A
2,4,5,6-Tetrachloro-m-xylene	82		80		30-150	B
Decachlorobiphenyl	83		81		30-150	B

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339

Lab Number: L1711827
Report Date: 04/18/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1711827-01A	Amber 1000ml unpreserved	A	7	4.8	Y	Absent	MCP-8082-10(365)
L1711827-02A	Amber 1000ml unpreserved	A	7	4.8	Y	Absent	MCP-8082-10(365)
L1711827-03A	Amber 1000ml unpreserved	A	7	4.8	Y	Absent	MCP-8082-10(365)
L1711827-04A	Amber 1000ml unpreserved	A	7	4.8	Y	Absent	MCP-8082-10(365)

*Values in parentheses indicate holding time in days

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1711827
Project Number:	149339	**Report Date:**	04/18/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1711827
Project Number:	149339	**Report Date:**	04/18/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1711827
Project Number:	149339	**Report Date:**	04/18/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL
World Class Chemistry

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 4/14/17

ALPHA Job #: L1711827

Project Information

Project Name: PCB Columns

Project Location:

Project #:

Project Manager:

ALPHA Quote #:

Report Information — Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

Client Information

Client: SiREM Lab

Address: 130 Stone Rd W

Guelph, ON, Canada, N1G 3Z2

Phone: 519-822-2265

Fax:

Email: rschofield@siremlab.com;

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☒ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS

MCP WSC CAM Methods 8082

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☒ Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	MCP WSC CAM Methods 8082	Sample Specific Comments
11877-01	1-CONT-130417	13APR17	09:30	GW	AQ	☒	
-02	2-ZV1-130417	13APR17	09:40	GW	AQ	☒	
-03	3-MIX-130417	13APR17	9:50	GW	AQ	☒	
-04	4-LAYER-130417	13APR17	10:00	GW	AQ	☒	
						☐	
						☐	
						☐	
						☐	
						☐	
						☐	
						☐	

Container Type	A	-	-	-	-	-	-	-	-	-	-	-	
Preservative	A	-	-	-	-	-	-	-	-	-	-	-	

Relinquished By:	Date/Time	Received By:	Date/Time
Rita Schofield	13Apr'17 4:45	[signature] AR	4/14/17 10:47

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

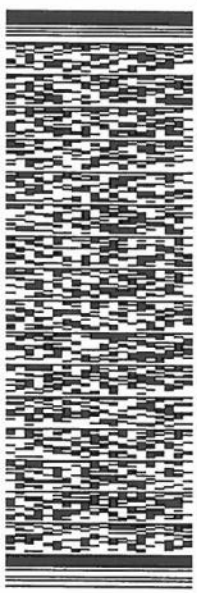
FORM NO: 01-01(1-NJ) (rev. 5-JAN-12)

TRK# 0430 7789 0022 0421

NB BBFA

MA-US BOS 01581

INTL PRIORITY 10:30A



J171117021402uv

FedEx Express

(US) 546J2/CFD6/53C1

WESTBOROUGH MA 01581
(508) 898-9220
INV:
PO:
REF: NB615DSIREMLAB0202
DEPT

TO SAMPLE RECEPTION
ALPHA ANALYTICAL
8 WALKUP DR

ORIGIN ID:YKFA (519) 822-2265
SIMMY SINGH
SIREM
130 STONE RD W
GUELPH, ON N1G3Z2
CANADA CA

SHIP DATE: 13APR17
ACTWGT: 20.00 LB
CAD: 102102748/INCA3850

BILL SENDER

After printing this label:

CONSIGNEE COPY - PLEASE PLACE IN FRONT OF POUCH

1. Fold the printed page along the horizontal line.
2. Place label in shipping pouch and affix it to your shipment.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

LEGAL TERMS AND CONDITIONS OF FEDEX SHIPPING DEFINITIONS. On this Air Waybill, "we", "our", "us", and "FedEx" refer to Federal Express Corporation, its subsidiaries and branches and their respective employees, agents, and independent contractors. The terms "you" and "your" refer to the shipper, its employees, principals and agents. If your shipment originates outside the United States, your contract of carriage is with the FedEx subsidiary, branch or independent contractor who originally accepts the shipment from you. The term "package" means any container or envelope that is accepted by us for delivery, including any such items tendered by you utilizing our automated systems, meters, manifests or waybills. The term "shipment" means all packages which are tendered to and accepted by us on a single Air Waybill. AIR CARRIAGE NOTICE. For any international shipments by air, the Warsaw Convention, as amended, may be applicable. The Warsaw Convention, as amended, will then govern and in most cases limit FedEx's liability for loss, delay of, or damage to your shipment. The Warsaw Convention, as amended, limits FedEx's liability. For example in the U.S. liability is limited to $9.07 per pound (20$ per kilogram), unless a higher value for carriage is declared as described below and you pay any applicable supplementary charges. The interpretation and operation of the Warsaw Convention's liability limits may vary in each country. There are no specific stopping places which are agreed to and FedEx reserves the right to route the shipment in any way FedEx deems appropriate. ROAD TRANSPORT NOTICE. Shipments transported solely by road to or from a country which is a party to the Warsaw Convention or the Contract for the International Carriage of Goods by Road (the "CMR") are subject to the terms and conditions of the CMR, notwithstanding any other provision of this Air Waybill to the contrary. For those shipments transported solely by road, if a conflict arises between the provisions of the CMR and this Air Waybill, the terms of the CMR shall prevail. LIMITATION OF LIABILITY. If not governed by the Warsaw Convention, the CMR, or other international treaties, laws, other government regulations, orders, or requirements, FedEx's maximum liability for damage, loss, delay, shortage, mis-delivery, nondelivery, misinformation or failure to provide information in connection with your shipment is limited by this Agreement and as set out in the terms and conditions of the contract of carriage. Please refer to the contract of carriage set forth in the applicable FedEx Service Guide or its equivalent to determine the contractual limitation. FedEx does not provide cargo liability or all-risk insurance, but you may pay an additional charge for each additional U.S. $100 (or equivalent local currency for the country of origin) of declared value for carriage. If a higher value for carriage is declared and the additional charge is paid, FedEx's maximum liability will be the lesser of the declared value for carriage or your actual damages. LIABILITIES NOT ASSUMED. IN ANY EVENT, FEDEX WON'T BE LIABLE FOR ANY DAMAGES, WHETHER DIRECT, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL IN EXCESS OF THE DECLARED VALUE FOR CARRIAGE (INCLUDING BUT NOT LIMITED TO LOSS OF INCOME OR PROFITS) OR THE ACTUAL VALUE OF THE SHIPMENT, IF LOWER, WHETHER OR NOT FEDEX HAD ANY KNOWLEDGE THAT SUCH DAMAGES MIGHT BE INCURRED. FedEx won't be liable for your acts or omissions, including but not limited to incorrect declaration of cargo, improper or insufficient packaging, securing, marking or addressing of the shipment, or for the acts or omissions of the recipient or anyone else with an interest in the shipment or violations by any party of the terms of this agreement. FedEx won't be liable for damage, loss, delay, shortage, mis-delivery, non-delivery, misinformation or failure to provide information in connection with shipments of cash, currency or other prohibited items or in instances beyond our control, such as acts of God, perils of the air, weather conditions, mechanical delays, acts of public enemies, war, strike, civil commotion, or acts or omissions of public authorities(including customs and health officials) with actual or apparent authority. NO WARRANTY. We make no warranties, express or implied. CLAIMS FOR LOSS, DAMAGE OR DELAY. ALL CLAIMS MUST BE MADE IN WRITING AND WITHIN STRICT TIME LIMITS. SEE OUR TARIFF, APPLICABLE FEDEX SERVICE GUIDE, OR STANDARD CONDITIONS OF CARRIAGE FOR DETAILS. The Warsaw Convention provides specific written claims procedures for damage, delay or non-delivery of your shipment. Moreover, the interpretation and operation of the Warsaw Convention's claims provisions may vary in each country. Refer to the Convention to determine the claims period for your shipment. The right to damages against us shall be extinguished unless an action is brought within two years, as set forth in the Convention. FedEx is not obligated to act on any claim until all transportation charges have been paid. The claim amount may not be deducted from the transportation charges. If the recipient accepts the shipment without noting any damage on the delivery record, FedEx will assume the shipment was delivered in good condition. In order for us to consider a claim for damage, the contents, original shipping carton and packing must be made available to us for inspection. MANDATORY LAW. Insofar as any provision contained or referred to in this Air Waybill may be contrary to any applicable international treaties, laws, government regulations, orders or requirements such provisions shall remain in effect as a part of our agreement to the extent that it is not overridden. The invalidity or unenforceability of any provisions shall not affect any other part of this Air Waybill. Unless otherwise indicated, FEDERAL EXPRESS CORPORATION, 2005 Corporate Avenue, Memphis, TN 38132, USA, is the first carrier of this shipment. Email address located at www.fedex.com.

Serial_No:04181710:57

This invoice must be completed in English

COMMERCIAL INVOICE

EXPORTER : Tax ID# : Contact Name : Simmy Singh Telephone No. : 519.822.2265 E-Mail : JSchimmel@siremlab.com Company Name/Address : SiREM 130 Stone Rd W GUELPH ON N1G3Z2 Country : Canada Parties to Transaction: ☐ Related ☐ Non-Related Payment Terms : Purpose of Shipment : Commercial	Ship Date : 13 Apr, 2017 Air Waybill No. / Tracking No. / Bill of Lading : 778900220421 Invoice No. : Purchase Order No. :
CONSIGNEE : Tax ID# : Contact Name : Sample Reception Telephone No. : 5088989220 E-Mail : Company Name/Address : Alpha Analytical 8 WALKUP DR WESTBOROUGH MA 015811022 Country : United States	SOLD TO (if different from Consignee) : ☑ Same as CONSIGNEE : Tax ID# : Company Name/Address : Country :
If there is a designated broker for this shipment, please provide contact information Name of Broker Tel No. Contact Name Duties and Taxes Payable by ☑ Exporter ☐ Consignee ☐ Other If Other, please specify	

No. of Packages	No. of Units	Unit of Measure	Description of Goods	Harmonized Tariff Number	Country of Origin	Unit Value	Total Value
	1.00	LTR	Commercial - groundwater samples for destructive analyses		CA	10.000000	10.00

Total No. of Packages : 1	Total Weight (Indicate LBS or KGS) : 20.00 lbs	
Special Instructions :		Terms of Sale : FCA
		Subtotal : 10.00
		Insurance : 0.00
		Freight : 0.00
		Packing : 0.00
Declaration Statement(s) :		Handling : 0.00
		Other : 0.00
I declare that all the information contained in this invoice to be true and correct		Invoice Total : 10.00
Originator or Name of Company Representative if the invoice is being completed on behalf of a company or individual :		Currency Code : CAD
Signature / Title / Date		13 Apr, 2017

Serial_No:04181710:57

TOXIC SUBSTANCE CONTROL ACT (TSCA) CERTIFICATION

Date: April 13, 2017

(CHECK ONE SECTION ONLY)

POSITIVE CERTIFICATION

_____

"I certify that all chemical substances in this shipment comply with all applicable rules or orders under TSCA and that I am not offering a chemical substance for entry in violation of TSCA or any applicable rules order thereunder."

● OR ●

NEGATIVE CERTIFICATION

X

"I certify that all chemical substances in this shipment are not subject to TSCA."

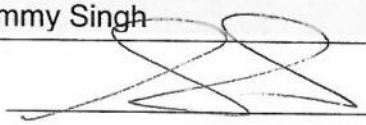
Company Name: Geosyntec Consultants

Company Address: 130 Stone Rd W

City/State: Guelph ON

Country/Zip: N1G 3Z2

Authorized Name: Simmy Singh

Authorized Signature: 

Title: Administrative Specialist

Federal Express AWB#: 7789 0022 0421

If the certifier is unsure if their chemical substance is subject to TSCA compliance, contact the Environmental Protection Agency, TSCA Assistance Office, Washington, D.C. (202) 554-1404 between 8:30 am and 5:00 pm EST.

Revised 04-2009

Serial_No:04181710:57

ANALYTICAL REPORT

Lab Number:	L1712723
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	SIREM / BROWN & CALDWELL
Project Number:	149339
Report Date:	04/25/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

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

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

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339

Lab Number: L1712723
Report Date: 04/25/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1712723-01	INF-200417	WATER	Not Specified	04/20/17 14:30	04/21/17

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1712723

Project Number: 149339 **Report Date:** 04/25/17

MADEP MCP Response Action Analytical Report Certification

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

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

A response to questions G, H and I is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	YES
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	YES

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

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

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1712723
Project Number:	149339	**Report Date:**	04/25/17

Case Narrative

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

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

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

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

HOLD POLICY

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

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

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1712723
Project Number:	149339	**Report Date:**	04/25/17

Case Narrative (continued)

MCP Related Narratives

Report Submission

All MCP required questions were answered with affirmative responses; therefore, there are no relevant protocol-specific QC and/or performance standard non-conformances to report.

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

Authorized Signature: Cristin Walker

Title: Technical Director/Representative Date: 04/25/17

ORGANICS

PCBS

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1712723

Project Number: 149339 **Report Date:** 04/25/17

SAMPLE RESULTS

Lab ID:	L1712723-01	Date Collected:	04/20/17 14:30
Client ID:	INF-200417	Date Received:	04/21/17
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Water	Extraction Method:	EPA 3510C
Analytical Method:	97,8082A	Extraction Date:	04/21/17 22:20
Analytical Date:	04/24/17 13:13	Cleanup Method:	EPA 3665A
Analyst:	HT	Cleanup Date:	04/22/17
		Cleanup Method:	EPA 3660B
		Cleanup Date:	04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	94		30-150	A
Decachlorobiphenyl	92		30-150	A
2,4,5,6-Tetrachloro-m-xylene	91		30-150	B
Decachlorobiphenyl	88		30-150	B

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339
Lab Number: L1712723
Report Date: 04/25/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 04/24/17 13:25
Analyst: HT

Extraction Method: EPA 3510C
Extraction Date: 04/21/17 21:06
Cleanup Method: EPA 3665A
Cleanup Date: 04/22/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/22/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01 Batch: WG996550-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		30-150	A
Decachlorobiphenyl	86		30-150	A
2,4,5,6-Tetrachloro-m-xylene	92		30-150	B
Decachlorobiphenyl	87		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: SIREM / BROWN & CALDWELL

Project Number: 149339

Lab Number: L1712723

Report Date: 04/25/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01 Batch: WG996550-2 WG996550-3									
Aroclor 1016	100		103		40-140	3		20	A
Aroclor 1260	110		112		40-140	2		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	89		91		30-150	A
Decachlorobiphenyl	82		84		30-150	A
2,4,5,6-Tetrachloro-m-xylene	85		86		30-150	B
Decachlorobiphenyl	83		85		30-150	B

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339

Lab Number: L1712723
Report Date: 04/25/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1712723-01A	Amber 1000ml unpreserved	A	7	5.6	Y	Absent	MCP-8082-10(365)

*Values in parentheses indicate holding time in days

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1712723
Project Number:	149339	**Report Date:**	04/25/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1712723
Project Number:	149339	**Report Date:**	04/25/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1712723
Project Number:	149339	**Report Date:**	04/25/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

Revised 4/25/17 MW/DS

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL — World Class Chemistry

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 4/21/17

ALPHA Job #: L1712723

Client Information

Client: SiREM Lab
Address: 130 Stone Rd W
Guelph, ON, Canada, N1G 3Z2
Phone: 519-822-2265
Fax:
Email: rschofield@siremlab.com;

☐ These samples have been Previously analyzed by Alpha

Project Information

Project Name: ~~PCB Columns~~ SIREM / BROWN & CALDWELL
Project Location:
Project #: 149339
Project Manager:
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

Report Information — Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

ANALYSIS

MCP WSC CAM Methods 8082

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☒ Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Sample Specific Comments
1272301	INF-200417	20APR17	14:30	GW	AQ	

Container Type	A	-	-	-	-	-	-	-	-	-	-	-	
Preservative	A	-	-	-	-	-	-	-	-	-	-	-	

Relinquished By:	Date/Time	Received By:	Date/Time
Rita Schofield	20Apr17 4:30	[illegible]	4/21/17 0940

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NJ) (rev. 5-JAN-12)

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL — World Class Chemistry

Westborough, MA
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3288

Date Rec'd in Lab: 4/21/17

ALPHA Job #: L1712723

Client Information

Client: SiREM Lab
Address: 130 Stone Rd W
Guelph, ON, Canada, N1G 3Z2
Phone: 519-822-2265
Fax:
Email: rschofield@siremlab.com;

☐ These samples have been Previously analyzed by Alpha

Project Information

Project Name: PCB Columns
Project Location:
Project #:
Project Manager:
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Report Information — Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS

MCP WSC CAM Methods 8082

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☒ Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	MCP WSC CAM Methods 8082	Sample Specific Comments
1272301	INF-200417	20APR17	14:30	GW	AQ	☒	

Container Type	A	-	-	-	-	-	-	-	-	-	-	-		
Preservative	A	-	-	-	-	-	-	-	-	-	-	-		

Relinquished By:	Date/Time	Received By:	Date/Time
Rita Schofield	20Apr17 4:30	[illegible]	4/21/17 0940

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NJ)
(rev. 5-JAN-12)

ANALYTICAL REPORT

Lab Number:	L1713781
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	SIREM / BROWN & CALDWELL
Project Number:	149339
Report Date:	05/02/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

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

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

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339

Lab Number: L1713781
Report Date: 05/02/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1713781-01	S-4263 COLD ROOM GW	WATER	Not Specified	04/28/17 11:00	04/29/17
L1713781-02	S-4263 VITON EFFLUENT	WATER	Not Specified	04/28/17 11:00	04/29/17

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1713781

Project Number: 149339 **Report Date:** 05/02/17

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1713781
Project Number:	149339	**Report Date:**	05/02/17

Case Narrative

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

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

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

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

HOLD POLICY

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

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

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1713781
Project Number:	149339	**Report Date:**	05/02/17

Case Narrative (continued)

MCP Related Narratives

PCBs

L1713781-01 and -02: The sample contains peaks which match the retention times for Aroclor 1242, but do not match the area ratios typical for this aroclor. The result for Aroclor 1242 is reported as "weathered".

In reference to question G:

L1713781-01 and -02: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

L1713781-01: The surrogate recoveries are below the acceptance criteria for 2,4,5,6-tetrachloro-m-xylene (0%) and decachlorobiphenyl (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

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

Authorized Signature: Melissa Cripps Melissa Cripps

Title: Technical Director/Representative Date: 05/02/17

ORGANICS

PCBS

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1713781

Project Number: 149339 **Report Date:** 05/02/17

SAMPLE RESULTS

Lab ID: L1713781-01 D
Client ID: S-4263 COLD ROOM GW
Sample Location: Not Specified
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/02/17 03:56
Analyst: HT

Date Collected: 04/28/17 11:00
Date Received: 04/29/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/30/17 01:34
Cleanup Method: EPA 3665A
Cleanup Date: 04/30/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	5.00	--	20	A
Aroclor 1221	ND		ug/l	5.00	--	20	A
Aroclor 1232	ND		ug/l	5.00	--	20	A
Aroclor 1242	55.1		ug/l	5.00	--	20	B
Aroclor 1248	ND		ug/l	5.00	--	20	A
Aroclor 1254	ND		ug/l	5.00	--	20	A
Aroclor 1260	ND		ug/l	5.00	--	20	A
Aroclor 1262	ND		ug/l	5.00	--	20	A
Aroclor 1268	ND		ug/l	5.00	--	20	A
PCBs, Total	55.1		ug/l	5.00	--	20	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1713781

Project Number: 149339 **Report Date:** 05/02/17

SAMPLE RESULTS

Lab ID: L1713781-02 D
Client ID: S-4263 VITON EFFLUENT
Sample Location: Not Specified
Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/02/17 14:14
Analyst: JW

Date Collected: 04/28/17 11:00
Date Received: 04/29/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 04/30/17 01:34
Cleanup Method: EPA 3665A
Cleanup Date: 04/30/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.500	--	2	A
Aroclor 1221	ND		ug/l	0.500	--	2	A
Aroclor 1232	ND		ug/l	0.500	--	2	A
Aroclor 1242	4.23		ug/l	0.500	--	2	A
Aroclor 1248	ND		ug/l	0.500	--	2	A
Aroclor 1254	ND		ug/l	0.500	--	2	A
Aroclor 1260	ND		ug/l	0.500	--	2	A
Aroclor 1262	ND		ug/l	0.500	--	2	A
Aroclor 1268	ND		ug/l	0.500	--	2	A
PCBs, Total	4.23		ug/l	0.500	--	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	94		30-150	A
Decachlorobiphenyl	109		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	**902**	Q	30-150	B

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339
Lab Number: L1713781
Report Date: 05/02/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 05/01/17 02:15
Analyst: HT

Extraction Method: EPA 3510C
Extraction Date: 04/30/17 01:34
Cleanup Method: EPA 3665A
Cleanup Date: 04/30/17
Cleanup Method: EPA 3660B
Cleanup Date: 04/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01-02 Batch: WG998917-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	83		30-150	A
Decachlorobiphenyl	71		30-150	A
2,4,5,6-Tetrachloro-m-xylene	83		30-150	B
Decachlorobiphenyl	55		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: SIREM / BROWN & CALDWELL

Project Number: 149339

Lab Number: L1713781

Report Date: 05/02/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01-02 Batch: WG998917-2 WG998917-3									
Aroclor 1016	88		89		40-140	0		20	A
Aroclor 1260	88		89		40-140	1		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	85		86		30-150	A
Decachlorobiphenyl	78		68		30-150	A
2,4,5,6-Tetrachloro-m-xylene	82		83		30-150	B
Decachlorobiphenyl	56		54		30-150	B

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339

Lab Number: L1713781
Report Date: 05/02/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1713781-01A	Amber 1000ml unpreserved	A	8	5.6	Y	Absent	MCP-8082-10(365)
L1713781-02A	Amber 1000ml unpreserved	A	8	5.6	Y	Absent	MCP-8082-10(365)

*Values in parentheses indicate holding time in days

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1713781
Project Number:	149339	**Report Date:**	05/02/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1713781
Project Number:	149339	**Report Date:**	05/02/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1713781
Project Number:	149339	**Report Date:**	05/02/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE A1 OF 1

ALPHA ANALYTICAL
World Class Chemistry

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 4/29/17

ALPHA Job #: L1713781

Project Information

Project Name: PCB Columns

Project Location:

Project #:

Project Manager:

ALPHA Quote #:

Report Information — Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

Client Information

Client: SiREM Lab

Address: 130 Stone Rd W

Guelph, ON, Canada, N1G 3Z2

Phone: 519-822-2265

Fax:

Email: rschofield@siremlab.com;

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☒ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS

MCP WSC CAM Methods 8082

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☒ Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	MCP WSC CAM Methods 8082	Sample Specific Comments
13781-01	S-4263 Cold Room GW	28APR17	11:00	GW	AQ	☒	
-02	S-4263 Viton Effluent	28APR17	11:00	GW	AQ	☒	

Container Type	A	A	A	-	-	-	-	-	-	-	-	-	
Preservative	A	A	-	-	-	-	-	-	-	-	-	-	

Relinquished By:	Date/Time	Received By:	Date/Time
Alicia Quintanilla	28 Apr '17		4/29/17 9:30

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NJ)
(rev. 5-JAN-12)

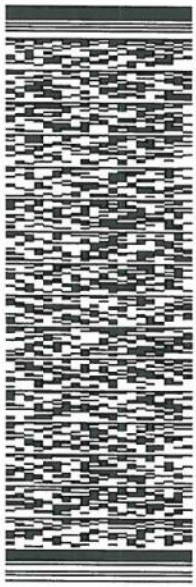
TRK# 0430 7790 1765 5505

XO BBFA

01581
BOS
MA-US

SATURDAY 12:00P

INTL PRIORITY



J171117021402uv

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SIMMY SINGH
SIREM
130 STONE RD W
GUELPH, ON N1G3Z2
CANADA CA

SHIP DATE: 28APR17
ACTWGT: 15.00 LB
CAD: 10210748/INCA3850

BILL SENDER

TO SAMPLE RECEPTION
ALPHA ANALYTICAL
8 WALKUP DR

WESTBOROUGH MA 01581 (US)

(508) 898-9220
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PO:
REF: NB8150/SREMLAB02/02
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ANALYTICAL REPORT

Lab Number:	L1715576
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	SIREM / BROWN & CALDWELL
Project Number:	149339
Report Date:	05/16/17

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Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339

Lab Number: L1715576
Report Date: 05/16/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1715576-01	SPIKED CONTROL	WATER	Not Specified	05/11/17 15:00	05/12/17
L1715576-02	VITON CONTROL	WATER	Not Specified	05/11/17 15:00	05/12/17
L1715576-03	EFFLUENT CONTROL COL. 1	WATER	Not Specified	05/11/17 15:00	05/12/17
L1715576-04	EFFLUENT ZVI COL. 2	WATER	Not Specified	05/11/17 15:00	05/12/17
L1715576-05	EFFLUENT MIXED COL. 3	WATER	Not Specified	05/11/17 15:00	05/12/17
L1715576-06	EFFLUENT LAYERED COL. 4	WATER	Not Specified	05/11/17 15:00	05/12/17

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1715576

Project Number: 149339 **Report Date:** 05/16/17

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1715576
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Case Narrative

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

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

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

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

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

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

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Case Narrative (continued)

MCP Related Narratives

PCBs

In reference to question G:

L1715576-01 and -02: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

L1715576-01 and -02: The surrogate recoveries are below the acceptance criteria for 2,4,5,6-tetrachloro-m-xylene (0%) and decachlorobiphenyl (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

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

Authorized Signature: Melissa Cripps Melissa Cripps

Title: Technical Director/Representative Date: 05/16/17

ORGANICS

PCBS

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1715576

Project Number: 149339 **Report Date:** 05/16/17

SAMPLE RESULTS

Lab ID: L1715576-01 D
Client ID: SPIKED CONTROL
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/15/17 18:09
Analyst: JW

Date Collected: 05/11/17 15:00
Date Received: 05/12/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/12/17 19:33
Cleanup Method: EPA 3665A
Cleanup Date: 05/12/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/12/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	12.5	--	50	A
Aroclor 1221	ND		ug/l	12.5	--	50	A
Aroclor 1232	ND		ug/l	12.5	--	50	A
Aroclor 1242	180		ug/l	12.5	--	50	B
Aroclor 1248	ND		ug/l	12.5	--	50	A
Aroclor 1254	ND		ug/l	12.5	--	50	A
Aroclor 1260	ND		ug/l	12.5	--	50	A
Aroclor 1262	ND		ug/l	12.5	--	50	A
Aroclor 1268	ND		ug/l	12.5	--	50	A
PCBs, Total	180		ug/l	12.5	--	50	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1715576

Project Number: 149339 **Report Date:** 05/16/17

SAMPLE RESULTS

Lab ID: L1715576-02 D
Client ID: VITON CONTROL
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/15/17 18:21
Analyst: HT

Date Collected: 05/11/17 15:00
Date Received: 05/12/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/12/17 19:33
Cleanup Method: EPA 3665A
Cleanup Date: 05/12/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/12/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	5.00	--	20	A
Aroclor 1221	ND		ug/l	5.00	--	20	A
Aroclor 1232	ND		ug/l	5.00	--	20	A
Aroclor 1242	61.2		ug/l	5.00	--	20	B
Aroclor 1248	ND		ug/l	5.00	--	20	A
Aroclor 1254	ND		ug/l	5.00	--	20	A
Aroclor 1260	ND		ug/l	5.00	--	20	A
Aroclor 1262	ND		ug/l	5.00	--	20	A
Aroclor 1268	ND		ug/l	5.00	--	20	A
PCBs, Total	61.2		ug/l	5.00	--	20	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1715576

Project Number: 149339 **Report Date:** 05/16/17

SAMPLE RESULTS

Lab ID: L1715576-03
Client ID: EFFLUENT CONTROL COL. 1
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/13/17 00:57
Analyst: JW

Date Collected: 05/11/17 15:00
Date Received: 05/12/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/12/17 19:33
Cleanup Method: EPA 3665A
Cleanup Date: 05/12/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/12/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	84		30-150	A
Decachlorobiphenyl	104		30-150	A
2,4,5,6-Tetrachloro-m-xylene	91		30-150	B
Decachlorobiphenyl	80		30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1715576

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SAMPLE RESULTS

Lab ID: L1715576-04
Client ID: EFFLUENT ZVI COL. 2
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/13/17 01:10
Analyst: JW

Date Collected: 05/11/17 15:00
Date Received: 05/12/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/12/17 19:33
Cleanup Method: EPA 3665A
Cleanup Date: 05/12/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/12/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	79		30-150	A
Decachlorobiphenyl	78		30-150	A
2,4,5,6-Tetrachloro-m-xylene	88		30-150	B
Decachlorobiphenyl	60		30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1715576

Project Number: 149339 **Report Date:** 05/16/17

SAMPLE RESULTS

Lab ID: L1715576-05
Client ID: EFFLUENT MIXED COL. 3
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/13/17 01:24
Analyst: JW

Date Collected: 05/11/17 15:00
Date Received: 05/12/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/12/17 19:33
Cleanup Method: EPA 3665A
Cleanup Date: 05/12/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/12/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	79		30-150	A
Decachlorobiphenyl	46		30-150	A
2,4,5,6-Tetrachloro-m-xylene	87		30-150	B
Decachlorobiphenyl	34		30-150	B

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SAMPLE RESULTS

Lab ID: L1715576-06
Client ID: EFFLUENT LAYERED COL. 4
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/13/17 01:37
Analyst: JW

Date Collected: 05/11/17 15:00
Date Received: 05/12/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/12/17 19:33
Cleanup Method: EPA 3665A
Cleanup Date: 05/12/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/12/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	77		30-150	A
Decachlorobiphenyl	106		30-150	A
2,4,5,6-Tetrachloro-m-xylene	89		30-150	B
Decachlorobiphenyl	79		30-150	B

Project Name: SIREM / BROWN & CALDWELL
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Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 05/13/17 01:50
Analyst: JW

Extraction Method: EPA 3510C
Extraction Date: 05/12/17 19:33
Cleanup Method: EPA 3665A
Cleanup Date: 05/12/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/12/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01-06 Batch: WG1003055-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	76		30-150	A
Decachlorobiphenyl	112		30-150	A
2,4,5,6-Tetrachloro-m-xylene	84		30-150	B
Decachlorobiphenyl	81		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: SIREM / BROWN & CALDWELL

Project Number: 149339

Lab Number: L1715576

Report Date: 05/16/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01-06 Batch: WG1003055-2 WG1003055-3									
Aroclor 1016	84		85		40-140	2		20	A
Aroclor 1260	106		110		40-140	4		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	77		77		30-150	A
Decachlorobiphenyl	114		118		30-150	A
2,4,5,6-Tetrachloro-m-xylene	87		87		30-150	B
Decachlorobiphenyl	84		87		30-150	B

Project Name: SIREM / BROWN & CALDWELL
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Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1715576-01A	Amber 1000ml unpreserved	A	8	5.7	Y	Absent	MCP-8082-10(365)
L1715576-02A	Amber 1000ml unpreserved	A	8	5.7	Y	Absent	MCP-8082-10(365)
L1715576-03A	Amber 1000ml unpreserved	A	8	5.7	Y	Absent	MCP-8082-10(365)
L1715576-04A	Amber 1000ml unpreserved	A	8	5.7	Y	Absent	MCP-8082-10(365)
L1715576-05A	Amber 1000ml unpreserved	A	8	5.7	Y	Absent	MCP-8082-10(365)
L1715576-06A	Amber 1000ml unpreserved	A	8	5.7	Y	Absent	MCP-8082-10(365)

*Values in parentheses indicate holding time in days

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1715576
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GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1715576
Project Number:	149339	**Report Date:**	05/16/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1715576
Project Number:	149339	**Report Date:**	05/16/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE A1 OF 1

ALPHA ANALYTICAL
World Class Chemistry

Westborough, MA
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3288

Date Rec'd in Lab: 5/12/17

ALPHA Job #: L1715576

Project Information

Project Name: PCB Columns

Project Location:

Project #:

Project Manager:

ALPHA Quote #:

Report Information

☐ FAX
☐ ADEx

Data Deliverables

☒ EMAIL
☐ Add'l Deliverables

Billing Information

☒ Same as Client info
PO #:

Bill goes to Brown & Caldwell

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

Client Information

Client: SiREM Lab
Address: 130 Stone Rd W
Guelph, ON, Canada, N1G 3Z2
Phone: 519-822-2265
Fax:
Email: rschofield@siremlab.com;

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☒ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS

SAMPLE HANDLING
Filtration
☐ Done
☒ Not Needed
☐ Lab to do
Preservation
☒ Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	MCP WSC CAM Methods 8082												Sample Specific Comments
15576 01	Spiked Control	11May17	3:00pm	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
02	Viton Control	11May17	3:00p	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
03	Effluent Control Col. 1	11May17	3:00pm	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
04	Effluent ZVI Col. 2	11May17	3:00pm	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
05	Effluent Mixed Col. 3	11May17	3:00pm	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
06	Effluent Layered Col. 4	11May17	3:00pm	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
					Container Type	A	A	A	-	-	-	-	-	-	-	-	-	
					Preservative	A	A	-	-	-	-	-	-	-	-	-	-	

Relinquished By:	Date/Time	Received By:	Date/Time
Alicia Quintanilla	11May2017	[signature] AQ AM	5/12/17 1021

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NJ)
(rev. 5-JAN-12)

After printing this label:

CONSIGNEE COPY - PLEASE PLACE IN FRONT OF POUCH

1. Fold the printed page along the horizontal line.
2. Place label in shipping pouch and affix it to your shipment.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

LEGAL TERMS AND CONDITIONS OF FEDEX SHIPPING DEFINITIONS. On this Air Waybill, "we", "our", "us", and "FedEx" refer to Federal Express Corporation, its subsidiaries and branches and their respective employees, agents, and independent contractors. The terms "you" and "your" refer to the shipper, its employees, principals and agents. If your shipment originates outside the United States, your contract of carriage is with the FedEx subsidiary, branch or independent contractor who originally accepts the shipment from you. The term "package" means any container or envelope that is accepted by us for delivery, including any such items tendered by you utilizing our automated systems, meters, manifests or waybills. The term "shipment" means all packages which are tendered to and accepted by us on a single Air Waybill. AIR CARRIAGE NOTICE. For any international shipments by air, the Warsaw Convention, as amended, may be applicable. The Warsaw Convention, as amended, will then govern and in most cases limit FedEx's liability for loss, delay of, or damage to your shipment. The Warsaw Convention, as amended, limits FedEx's liability. For example in the U.S. liability is limited to $9.07 per pound (20$ per kilogram), unless a higher value for carriage is declared as described below and you pay any applicable supplementary charges. The interpretation and operation of the Warsaw Convention's liability limits may vary in each country. There are no specific stopping places which are agreed to and FedEx reserves the right to route the shipment in any way FedEx deems appropriate. ROAD TRANSPORT NOTICE. Shipments transported solely by road to or from a country which is a party to the Warsaw Convention or the Contract for the International Carriage of Goods by Road (the "CMR") are subject to the terms and conditions of the CMR, notwithstanding any other provision of this Air Waybill to the contrary. For those shipments transported solely by road, if a conflict arises between the provisions of the CMR and this Air Waybill, the terms of the CMR shall prevail. LIMITATION OF LIABILITY. If not governed by the Warsaw Convention, the CMR, or other international treaties, laws, other government regulations, orders, or requirements, FedEx's maximum liability for damage, loss, delay, shortage, mis-delivery, nondelivery, misinformation or failure to provide information in connection with your shipment is limited by this Agreement and as set out in the terms and conditions of the contract of carriage. Please refer to the contract of carriage set forth in the applicable FedEx Service Guide or its equivalent to determine the contractual limitation. FedEx does not provide cargo liability or all-risk insurance, but you may pay an additional charge for each additional U.S. $100 (or equivalent local currency for the country of origin) of declared value for carriage. If a higher value for carriage is declared and the additional charge is paid, FedEx's maximum liability will be the lesser of the declared value for carriage or your actual damages. LIABILITIES NOT ASSUMED. IN ANY EVENT, FEDEX WON'T BE LIABLE FOR ANY DAMAGES, WHETHER DIRECT, INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL IN EXCESS OF THE DECLARED VALUE FOR CARRIAGE (INCLUDING BUT NOT LIMITED TO LOSS OF INCOME OR PROFITS) OR THE ACTUAL VALUE OF THE SHIPMENT, IF LOWER, WHETHER OR NOT FEDEX HAD ANY KNOWLEDGE THAT SUCH DAMAGES MIGHT BE INCURRED. FedEx won't be liable for your acts or omissions, including but not limited to incorrect declaration of cargo, improper or insufficient packaging, securing, marking or addressing of the shipment, or for the acts or omissions of the recipient or anyone else with an interest in the shipment or violations by any party of the terms of this agreement. FedEx won't be liable for damage, loss, delay, shortage, mis-delivery, non-delivery, misinformation or failure to provide information in connection with shipments of cash, currency or other prohibited items or in instances beyond our control, such as acts of God, perils of the air, weather conditions, mechanical delays, acts of public enemies, war, strike, civil commotion, or acts or omissions of public authorities(including customs and health officials) with actual or apparent authority. NO WARRANTY. We make no warranties, express or implied. CLAIMS FOR LOSS, DAMAGE OR DELAY. ALL CLAIMS MUST BE MADE IN WRITING AND WITHIN STRICT TIME LIMITS. SEE OUR TARIFF, APPLICABLE FEDEX SERVICE GUIDE, OR STANDARD CONDITIONS OF CARRIAGE FOR DETAILS. The Warsaw Convention provides specific written claims procedures for damage, delay or non-delivery of your shipment. Moreover, the interpretation and operation of the Warsaw Convention's claims provisions may vary in each country. Refer to the Convention to determine the claims period for your shipment. The right to damages against us shall be extinguished unless an action is brought within two years, as set forth in the Convention. FedEx is not obligated to act on any claim until all transportation charges have been paid. The claim amount may not be deducted from the transportation charges. If the recipient accepts the shipment without noting any damage on the delivery record, FedEx will assume the shipment was delivered in good condition. In order for us to consider a claim for damage, the contents, original shipping carton and packing must be made available to us for inspection. MANDATORY LAW. Insofar as any provision contained or referred to in this Air Waybill may be contrary to any applicable international treaties, laws, government regulations, orders or requirements such provisions shall remain in effect as a part of our agreement to the extent that it is not overridden. The invalidity or unenforceability of any provisions shall not affect any other part of this Air Waybill. Unless otherwise indicated, FEDERAL EXPRESS CORPORATION, 2005 Corporate Avenue, Memphis, TN 38132, USA, is the first carrier of this shipment. Email address located at www.fedex.com.

Serial_No:05161713:12

TOXIC SUBSTANCE CONTROL ACT (TSCA) CERTIFICATION

Date: May 11, 2017

(CHECK ONE SECTION ONLY)

POSITIVE CERTIFICATION

_____

"I certify that all chemical substances in this shipment comply with all applicable rules or orders under TSCA and that I am not offering a chemical substance for entry in violation of TSCA or any applicable rules order thereunder."

● OR ●

NEGATIVE CERTIFICATION

X

"I certify that all chemical substances in this shipment are not subject to TSCA."

Company Name: Geosyntec Consultants

Company Address: 130 Stone Rd W

City/State: Guelph ON

Country/Zip: N1G 3Z2

Authorized Name: Simmy Singh

Authorized Signature: _____

Title: Administrative Specialist

Federal Express AWB#: 7791 1871 1909

If the certifier is unsure if their chemical substance is subject to TSCA compliance, contact the Environmental Protection Agency, TSCA Assistance Office, Washington, D.C. (202) 554-1404 between 8:30 am and 5:00 pm EST.

Revised 04-2009

Serial_No:05161713:12

ANALYTICAL REPORT

Lab Number:	L1716223
Client:	Brown & Caldwell One Tech Drive Suite 310 Andover, MA 01810
ATTN:	Marilyn Wade
Phone:	(978) 983-2055
Project Name:	SIREM / BROWN & CALDWELL
Project Number:	149339
Report Date:	05/22/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

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

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

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339

Lab Number: L1716223
Report Date: 05/22/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1716223-01	VITON CONTROL	WATER	Not Specified	05/15/17 11:00	05/18/17
L1716223-02	EFFLUENT CONTROL COL. 1	WATER	Not Specified	05/15/17 11:00	05/18/17
L1716223-03	EFFLUENT ZVI COL. 2	WATER	Not Specified	05/15/17 11:00	05/18/17
L1716223-04	EFFLUENT MIXED COL. 3	WATER	Not Specified	05/15/17 11:00	05/18/17
L1716223-05	EFFLUENT LAYERED COL. 4	WATER	Not Specified	05/15/17 11:00	05/18/17

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1716223

Project Number: 149339 **Report Date:** 05/22/17

MADEP MCP Response Action Analytical Report Certification

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

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

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

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

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

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1716223
Project Number: 149339 **Report Date:** 05/22/17

Case Narrative

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

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

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

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

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

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

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1716223
Project Number:	149339	**Report Date:**	05/22/17

Case Narrative (continued)

MCP Related Narratives

Sample Receipt

The project name and number were specified by the client.

PCBs

In reference to question G:

L1716223-01: One or more of the target analytes did not achieve the requested CAM reporting limits.

In reference to question H:

L1716223-01: The surrogate recoveries are below the acceptance criteria for 2,4,5,6-tetrachloro-m-xylene (0%) and decachlorobiphenyl (0%) due to the dilution required to quantitate the sample. Re-extraction was not required; therefore, the results of the original analysis are reported.

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

Authorized Signature: Amita Naik

Title: Technical Director/Representative Date: 05/22/17

ORGANICS

PCBS

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1716223

Project Number: 149339 **Report Date:** 05/22/17

SAMPLE RESULTS

Lab ID: L1716223-01 D
Client ID: VITON CONTROL
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/22/17 00:45
Analyst: HT

Date Collected: 05/15/17 11:00
Date Received: 05/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/18/17 13:15
Cleanup Method: EPA 3665A
Cleanup Date: 05/18/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/18/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	5.00	--	20	A
Aroclor 1221	ND		ug/l	5.00	--	20	A
Aroclor 1232	ND		ug/l	5.00	--	20	A
Aroclor 1242	39.0		ug/l	5.00	--	20	B
Aroclor 1248	ND		ug/l	5.00	--	20	A
Aroclor 1254	ND		ug/l	5.00	--	20	A
Aroclor 1260	ND		ug/l	5.00	--	20	A
Aroclor 1262	ND		ug/l	5.00	--	20	A
Aroclor 1268	ND		ug/l	5.00	--	20	A
PCBs, Total	39.0		ug/l	5.00	--	20	B

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	A
Decachlorobiphenyl	**0**	Q	30-150	A
2,4,5,6-Tetrachloro-m-xylene	**0**	Q	30-150	B
Decachlorobiphenyl	**0**	Q	30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1716223

Project Number: 149339 **Report Date:** 05/22/17

SAMPLE RESULTS

Lab ID: L1716223-02
Client ID: EFFLUENT CONTROL COL. 1
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/19/17 19:34
Analyst: AF

Date Collected: 05/15/17 11:00
Date Received: 05/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/18/17 13:15
Cleanup Method: EPA 3665A
Cleanup Date: 05/18/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/18/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	95		30-150	A
Decachlorobiphenyl	92		30-150	A
2,4,5,6-Tetrachloro-m-xylene	86		30-150	B
Decachlorobiphenyl	96		30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1716223

Project Number: 149339 **Report Date:** 05/22/17

SAMPLE RESULTS

Lab ID: L1716223-03
Client ID: EFFLUENT ZVI COL. 2
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/19/17 19:46
Analyst: AF

Date Collected: 05/15/17 11:00
Date Received: 05/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/18/17 13:15
Cleanup Method: EPA 3665A
Cleanup Date: 05/18/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/18/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	98		30-150	A
Decachlorobiphenyl	92		30-150	A
2,4,5,6-Tetrachloro-m-xylene	87		30-150	B
Decachlorobiphenyl	95		30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1716223

Project Number: 149339 **Report Date:** 05/22/17

SAMPLE RESULTS

Lab ID: L1716223-04
Client ID: EFFLUENT MIXED COL. 3
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/19/17 19:59
Analyst: AF

Date Collected: 05/15/17 11:00
Date Received: 05/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/18/17 13:15
Cleanup Method: EPA 3665A
Cleanup Date: 05/18/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/18/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	99		30-150	A
Decachlorobiphenyl	106		30-150	A
2,4,5,6-Tetrachloro-m-xylene	88		30-150	B
Decachlorobiphenyl	108		30-150	B

Project Name: SIREM / BROWN & CALDWELL **Lab Number:** L1716223

Project Number: 149339 **Report Date:** 05/22/17

SAMPLE RESULTS

Lab ID: L1716223-05
Client ID: EFFLUENT LAYERED COL. 4
Sample Location: Not Specified

Matrix: Water
Analytical Method: 97,8082A
Analytical Date: 05/19/17 20:11
Analyst: AF

Date Collected: 05/15/17 11:00
Date Received: 05/18/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 05/18/17 13:15
Cleanup Method: EPA 3665A
Cleanup Date: 05/18/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/18/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
MCP Polychlorinated Biphenyls - Westborough Lab							
Aroclor 1016	ND		ug/l	0.250	--	1	A
Aroclor 1221	ND		ug/l	0.250	--	1	A
Aroclor 1232	ND		ug/l	0.250	--	1	A
Aroclor 1242	ND		ug/l	0.250	--	1	A
Aroclor 1248	ND		ug/l	0.250	--	1	A
Aroclor 1254	ND		ug/l	0.250	--	1	A
Aroclor 1260	ND		ug/l	0.250	--	1	A
Aroclor 1262	ND		ug/l	0.250	--	1	A
Aroclor 1268	ND		ug/l	0.250	--	1	A
PCBs, Total	ND		ug/l	0.250	--	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	97		30-150	A
Decachlorobiphenyl	90		30-150	A
2,4,5,6-Tetrachloro-m-xylene	87		30-150	B
Decachlorobiphenyl	92		30-150	B

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339
Lab Number: L1716223
Report Date: 05/22/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 97,8082A
Analytical Date: 05/18/17 08:10
Analyst: JW

Extraction Method: EPA 3510C
Extraction Date: 05/18/17 04:49
Cleanup Method: EPA 3665A
Cleanup Date: 05/18/17
Cleanup Method: EPA 3660B
Cleanup Date: 05/18/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
MCP Polychlorinated Biphenyls - Westborough Lab for sample(s): 01-05 Batch: WG1004798-1						
Aroclor 1016	ND		ug/l	0.250	--	A
Aroclor 1221	ND		ug/l	0.250	--	A
Aroclor 1232	ND		ug/l	0.250	--	A
Aroclor 1242	ND		ug/l	0.250	--	A
Aroclor 1248	ND		ug/l	0.250	--	A
Aroclor 1254	ND		ug/l	0.250	--	A
Aroclor 1260	ND		ug/l	0.250	--	A
Aroclor 1262	ND		ug/l	0.250	--	A
Aroclor 1268	ND		ug/l	0.250	--	A
PCBs, Total	ND		ug/l	0.250	--	A

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	66		30-150	A
Decachlorobiphenyl	78		30-150	A
2,4,5,6-Tetrachloro-m-xylene	73		30-150	B
Decachlorobiphenyl	73		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: SIREM / BROWN & CALDWELL

Project Number: 149339

Lab Number: L1716223

Report Date: 05/22/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
MCP Polychlorinated Biphenyls - Westborough Lab Associated sample(s): 01-05 Batch: WG1004798-2 WG1004798-3									
Aroclor 1016	58		57		40-140	1		20	A
Aroclor 1260	62		61		40-140	2		20	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
2,4,5,6-Tetrachloro-m-xylene	67		66		30-150	A
Decachlorobiphenyl	81		69		30-150	A
2,4,5,6-Tetrachloro-m-xylene	73		72		30-150	B
Decachlorobiphenyl	76		64		30-150	B

Project Name: SIREM / BROWN & CALDWELL
Project Number: 149339

Lab Number: L1716223
Report Date: 05/22/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Custody Seal

Cooler	
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1716223-01A	Amber 1000ml unpreserved	A	7	4.9	Y	Absent	MCP-8082-10(365)
L1716223-02A	Amber 1000ml unpreserved	A	7	4.9	Y	Absent	MCP-8082-10(365)
L1716223-03A	Amber 1000ml unpreserved	A	7	4.9	Y	Absent	MCP-8082-10(365)
L1716223-04A	Amber 1000ml unpreserved	A	7	4.9	Y	Absent	MCP-8082-10(365)
L1716223-05A	Amber 1000ml unpreserved	A	7	4.9	Y	Absent	MCP-8082-10(365)

*Values in parentheses indicate holding time in days

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1716223
Project Number:	149339	**Report Date:**	05/22/17

GLOSSARY

Acronyms

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

Footnotes

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

Terms

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

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

Data Qualifiers

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1716223
Project Number:	149339	**Report Date:**	05/22/17

Data Qualifiers

reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

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

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

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

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

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

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

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

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

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

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

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

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

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

Report Format: Data Usability Report

Project Name:	SIREM / BROWN & CALDWELL	**Lab Number:**	L1716223
Project Number:	149339	**Report Date:**	05/22/17

REFERENCES

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

LIMITATION OF LIABILITIES

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

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

Certification Information

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

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

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

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

Westborough Facility:

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

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

Mansfield Facility:

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

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

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

CHAIN OF CUSTODY

PAGE A1 OF 1

ALPHA ANALYTICAL

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 5/18/17

ALPHA Job #: L1716223

Project Information

Project Name: PCB Columns

Project Location:

Project #:

Project Manager:

ALPHA Quote #:

Report Information — Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client info PO #:

Bill Brown & Caldwell

Regulatory Requirements/Report Limits

State/Fed Program: Criteria:

Client Information

Client: SiREM Lab

Address: 130 Stone Rd W

Guelph, ON, Canada, N1G 3Z2

Phone: 519-822-2265

Fax:

Email: rschofield@siremlab.com;

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☒ Standard ☑ Rush (ONLY IF PRE-APPROVED)

As per Brown & Caldwell

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS

MCP WSC CAM Methods 8082

SAMPLE HANDLING

Filtration
☐ Done
☒ Not Needed
☐ Lab to do

Preservation
☒ Lab to do

(Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	MCP WSC CAM Methods 8082												TOTAL # BOTTLES	Sample Specific Comments
16223-01	Viton Control	15May17	11: am	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
2	Effluent Control Col. 1	15May17	11: am	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
3	Effluent ZVI Col. 2	15May17	11: am	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
4	Effluent Mixed Col. 3	15May17	11: am	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
5	Effluent Layered Col. 4	15May17	11: am	GW	AQ	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
						☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		

Container Type	A	A	A	-	-	-	-	-	-	-	-	-	
Preservative	A	A	-	-	-	-	-	-	-	-	-	-	

Relinquished By:	Date/Time	Received By:	Date/Time
Alicia Quintanilla	17 May'17 11:00am	[illegible] AQ AM2	5/18/17 09:53

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NJ) (rev. 5-JAN-12)

Treatability Study Work Plan
Former Aerovox Facility
New Bedford, MA

Prepared for
AVX Corporation, Fountain Inn, SC
Revised April 12, 2017

Treatability Study Work Plan
Former Aerovox Facility
New Bedford, MA

Prepared for
AVX Corporation, Fountain Inn, SC
Revised April 12, 2017

BC Project Number 149339

Brown AND Caldwell
100 Matsonford Rd, Two Radnor Corporate Center
Radnor, PA 19087

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Section 1

Introduction

This Treatability Study Work Plan (TSWP) has been prepared by Brown and Caldwell (BC) on behalf of AVX Corporation (AVX) to evaluate the effectiveness of a Permeable Reactive Barrier (PRB) as a passive in-situ groundwater treatment to remedy the mass flux of site contaminants along the shoreline of the Acushnet River of the former Aerovox Facility property (Site). This treatability study has been developed to evaluate groundwater treatment for chlorinated volatile organic compounds (CVOC's) and polychlorinated biphenyl (PCB) using granular zero valent iron (ZVI) or a combination of ZVI and liquid-phase granular activated carbon (LGAC). This treatability study will be used to evaluate potential effectiveness and determine conceptual design parameters for a PRB for use in Feasibility Study (FS) development.

The activities detailed in this TSWP will follow procedures and requirements meeting the best professional standards available, including:

- Test Method Selection;
- Groundwater Collection;
- Column Testing Setup;
- Column Test Operation and Sampling; and
- Presentation of Results.

Section 2

Site Description and History

This section presents a description of the Site and provides a summary of previous environmental investigation and remediation activities to date.

2.1 Site Description

The Site is industrially-zoned land that was formerly occupied by a 450,000 square foot manufacturing building, associated ancillary buildings, asphalt paved parking lot and several small landscaped areas. All Facility infrastructures on the Site were demolished and removed in 2011 as part of a Non-Time-Critical Removal Action (NTCRA).

Electrical component manufacturing began at the Site in approximately 1938. Use of PCB-containing dielectric fluid in capacitor manufacturing started in the 1940s and was terminated in 1978. Dielectric fluids were stored in above ground storage tanks (ASTs) throughout the building, but mainly in the first floor of the two-story section of the main building. Chlorinated solvents, primarily trichloroethene (TCE), were used in the capacitor manufacturing process and these chlorinated volatile organic compound(CVOC) solvents were also stored in ASTs.

Industrial properties are present to the south and north of the Site, and residential properties are located to the west, across Belleville Avenue. The Acushnet River borders the eastern end of the Site. The Acushnet River and the area below Mean High Water (MHW) east of the Site is part of the New Bedford Harbor Superfund Site. The Aerovox property, now owned by the City, is currently predominantly paved and partially fenced. A small unpaved corner remains in the northwest as public space and fencing does not extend across the waterfront along the east side. The western portion of the paved area is separated from the remainder of the property by jersey barriers and is used by the City for parking. The Titleist and Precix properties, to the south and north respectively, are active manufacturing facilities and operate multiple shifts seven days a week.

2.2 Remediation Activities

The use of PCBs in the manufacturing process on the Site ceased in October 1978; however, the use of solvents continued through the end of manufacturing operations at the facility. Operations and disposal practices involving the use of PCBs and solvents reportedly resulted in the release of hazardous materials.

The Environmental Protection Agency (EPA) observed “oil impregnated soil…in the culverts leading to and at both outfalls” during a 1981 compliance inspection of the facility. Subsequent facility inspections, assessments and sampling programs were undertaken by the former owner and operator, Aerovox, Inc., as well as by the EPA from the 1980s through 2010. These investigations confirmed the presence of PCBs and CVOCs in building materials, soils under the concrete foundation and outside the building, in the asphalt used to pave the parking lot and in groundwater. Early response actions by the then site owners included installation of a shallow [estimated 10’ to 13’ below ground surface (bgs)] sheetpile containment wall along the shoreline and capping of impacted soils along the waterfront and along the north side of the manufacturing building.

In 2010, consent agreements were signed, requiring AVX Corporation to complete a Non-Time Critical Removal Action (NTCRA) to demolish the buildings and cap the Site. The consent

agreements, and the Action Memorandum for the NTCRA, included a Toxic Substance Control Act (TSCA) Determination which documented work at the Site as meeting the requirements of a TSCA risk based approval under 40 CFR 761.61(c). Field activities for the NTCRA were initiated in April 2011 and completed in December 2011. The final report documenting the NTCRA was submitted in May 2012 and approved by EPA in May 2013. AVX's receipt of EPA's approval letter triggered initiation of the MCP Phase I Initial Site Investigation (Phase I ISI).

AVX submitted a Phase I ISI, Tier Classification, and Phase II Scope of Work in August 2013. The Site was ranked as Tier 1B based on the Numerical Ranking System in place at the time. Massachusetts Department of Environmental Protection (MassDEP) issued the Tier 1B Permit for the Site and approved the Phase II Scope of Work in September 2013, triggering the Phase II CSA submittal requirement. During the period between October 2013 and August 2015, Site investigation activities associated with the Phase II CSA were completed to define the nature and extent of contamination at the Site. The results of the Phase II CSA (AECOM, September 2015) determined the extent of the impacts to the Site's groundwater. This TSWP has been developed as part of the remedial effort, to address the Chemicals of Concern (CoC's) as identified in the Phase II CSA, including PCBs and CVOCs (chlorinated ethenes and chlorinated benzenes).

Section 3

Treatability Study Work Plan

This section describes the Site-specific field and lab activities including sampling procedures, field documentation, and health and safety procedures that will be followed during the investigation activities. It is anticipated that study activities will take up to 8 weeks to complete.

3.1 Method Selection

In determining design parameters for permeable reactive barriers, two test methods can be used. The simple method is batch testing. While batch tests are useful in screening different treatment media, these screenings do not provide data on degradability of known contaminants in a flowing system. Bench-scale column tests are the favored method of treatability testing for the following reasons:

- Design parameters are determined under dynamic flow conditions. As concentrations of contaminants and inorganics change with the distance traveled through the reactive cell, they can be measured by installing several intermediate sampling ports along the length of the column
- Half-lives measured through column tests generally are more reliable than half-lives measured through batch tests.
- Nonlinear sorption to non-reactive sorption sites is better simulated in columns.
- Any reaction products formed tend to accumulate in a batch system. Continuous flow through the columns may cause some reaction products to be transported out of the reactive medium or degraded linearly with continued column transport, a condition more representative of field operation. Various types of water may be used to run treatability tests

Bench-scale treatability testing using groundwater from the site and the commercial granular iron material enable a prediction of system performance and provide data for the conceptual field design. These rates are used to determine the theoretical residence time in the reactive material. The bench-scale tests also include inorganic sampling of column influent and effluent. This provides information concerning potential mineral precipitation in the reactive material caused by changing redox potential (Eh) and pH conditions. Using the residence time, the flow rate and potential precipitation, the size of the treatment zone can be determined.

Contaminated groundwater from the site can be adjusted to match known concentrations of the target contaminants by spiking the groundwater. In this way, better control over feed concentrations is obtained. When target contaminants are spiked into the groundwater using laboratory grade compounds, it may be noted that the minor components (e.g., stabilizers) that may be present in industrial grade chemicals (in situ groundwater) may be hard to replicate. However, there is no indication that these minor constituents affect half-lives of the target contaminants to any significant extent. It is important to run at least some tests with groundwater from the site (uncontaminated or contaminated) because of the important role played by native inorganic parameters in the site groundwater.

3.2 Groundwater Sample Collection

To mimic worst-case overburden groundwater impacts onsite, groundwater shall be collected from a Well 15D. Well 15D has historically exhibited the highest concentration of Total PCBs (primarily Aroclor 1242) onsite (approximately 80 µg/L).

A statistical approach (specifically a 95% upper confidence level [UCL]) of all the shallow and deep overburden wells was used to calculate CVOC concentrations to adjust the groundwater sample (Table 3-1) reflecting site data.

Table 3-1: CVOC Concentrations

Analyte	Concentration (in mg/L)
cis-1,2-Dichloroethene	5.7
PCE	0.160
TCE	22
Vinyl Chloride	0.915

Baseline groundwater samples will be shipped immediately to Alpha Analytical Laboratory for PCB analysis. Laboratory results for PCB will be reported to BC and shared with the selected treatability testing laboratory, SiREM of Guelph, Ontario, Canada before commencing column testing. SiRem will analyze for baseline VOC samples in-house.

For column testing, 85 liters of sample groundwater will be collected. The groundwater shall be shipped in amber sample bottles with no headspace to SiREM. Expedited shipment of samples in coolers with ice will be employed to maintain samples at a target temperature of 4°C. When received, the Site water will be stored at 4°C (39°F) until required, at which time it will be siphoned from the sample bottles into a collapsible Teflon® bag. All precautions will be made to minimize exposure to ambient air and CVOC losses. Upon arrival at to the lab, the water will be analyzed to confirm baseline CVOC concentrations.

BC's activities at the Site will include groundwater sampling. Potential work hazards include chemical exposure and typical physical hazards (e.g., slip/trip/fall, exposure to elements, dehydration, etc.). Hazards associated with possible buried utility lines will be marked prior to beginning the fieldwork. The required PPE for this Site includes steel-toed boots, safety glasses, and high-visibility safety vest (when working outside). A copy of the HASP will be on-Site at all times when work is being performed by BC.

3.3 Column Test Preparation

The standard laboratory protocols and measurement methods used to test the site groundwater are designed to provide high quality data at minimal cost. The control and treatment columns will be constructed of Plexiglas® with a length of 1.6 feet (ft) (50 centimeter [cm]) and an internal diameter of 1.5 inches (in) (3.8 cm). The ZVI/LGAC treatment columns will have seven sampling ports positioned along the length of the column at distances of 0.08 (2.4 cm), 0.16 (4.9 cm), 0.33 (10.1 cm), 0.50 (15.2 cm), 0.66 (20.1 cm), 1.00 (30.5 cm) and 1.31 ft (39.9 cm) from the inlet end. No sampling ports will be present along the length of the control column.

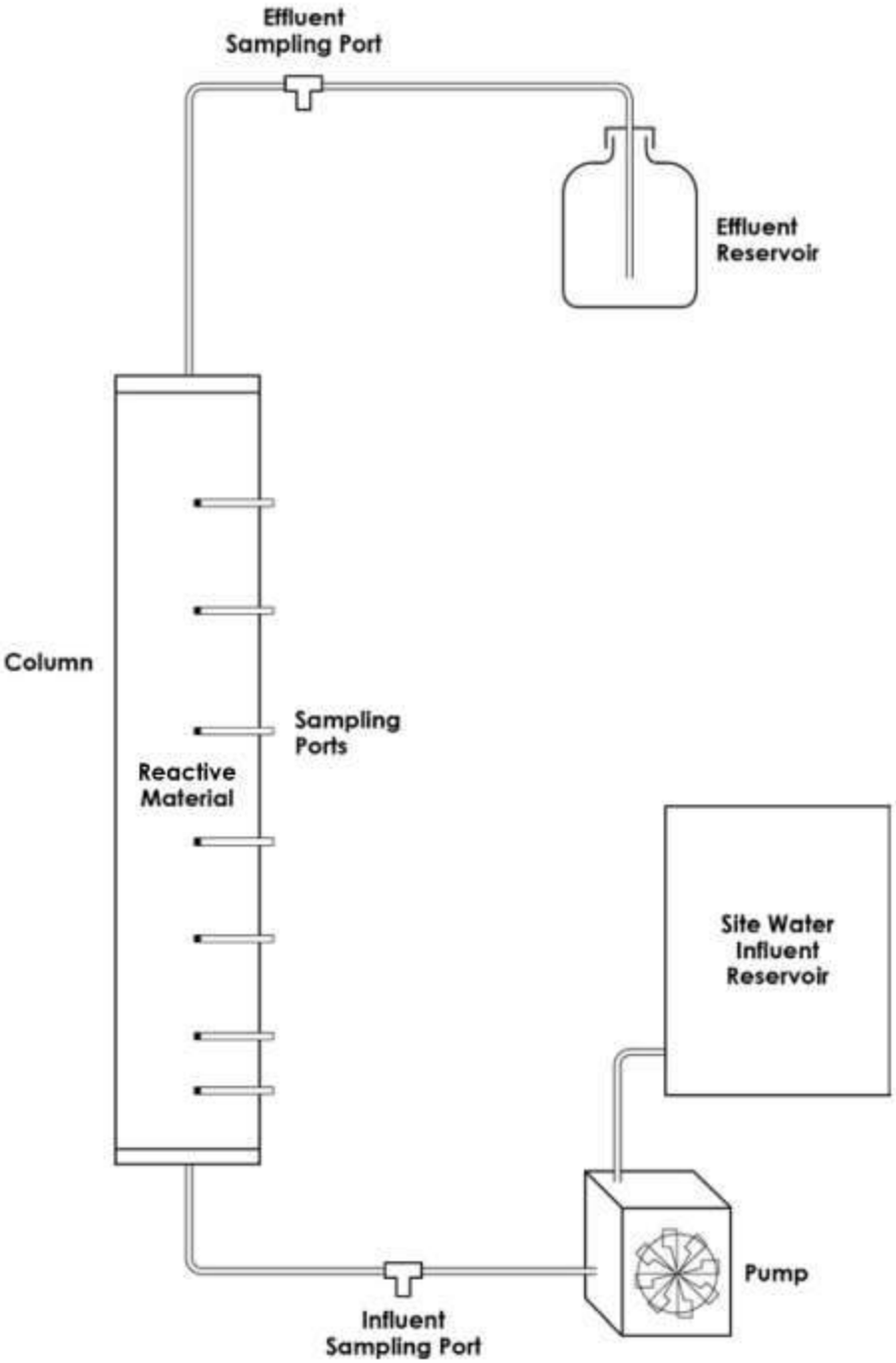

Figure 3-1: Schematic of Column Apparatus

Each sampling port is constructed of a nylon Swagelok® fitting (0.063 in; 0.16 cm) secured into the side of the column. Within each fitting, a 16-gauge needle (Fischer Scientific) will be tightly secured to allow for sampling from the center axis of the column. To prevent solid materials from entering the needle, glass wool will be placed inside the needle. Each sample port will be fitted with a Luer-Lok™ fitting, such that a glass syringe can be attached to the port to collect a sample. When not in operation Luer-Lok™ plugs will seal the ports. Rubber O-rings will be used to seal the top and bottom

of the columns. The top and bottom will also contain fine (500 micron) mesh to inhibit solid material from entering the influent and effluent hose.

Four (4) test columns will be prepared:

1) Control – high conductivity sand (AquaQuartz®)
2) 100% ZVI (12/200 custom blend)
3) 20% ZVI , 40% sand and 40% LGAC (CC-8x30); and
4) 50% ZVI layer, 25% sand layer and 25% LGAC layer, separated by lifts inline.

The ZVI source (Peerless) has been selected in consultation between SiREM and BC. LGAC media (Continental Carbon Group) has been selected by BC. Technical specifications for the media listed above is included in Appendix A. To assure a homogeneous mixture of reactive ZVI material while filling the columns, aliquots of iron material will be packed vertically in lift sections. The silica sand will be used to construct the control column in similar lift sections and the mixed column will have the media premixed and placed in lifts. The final column, the 4th column will be constructed in lifts from the bottom to the top with ZVI, sand then LGAC, respectively. Values of bulk density, porosity and pore volume will be determined gravimetrically. All column experiments will be performed at room temperature (22°C). During the design phase, degradation rates determined in the laboratory can be adjusted for field groundwater temperature.

3.4 Column Test Operation

The columns will operate for a period of six weeks. Site water will be supplied to the influent end of the columns at a constant rate using a laboratory pump. The flow velocity will be set to approximately 1 pore volume per day (equivalent to a velocity of ~1.5 feet/day). Flow velocity expected in a field-scale application would be closer to 1 foot/day so the column setup is more conservative than what is expected in the field.

Water is circulated in the column from bottom to top to better simulate lower flowrates and to minimize the interference of gas production in the column. Sampling ports are equipped with gastight and watertight fittings.

Water samples will be collected from each column, including influent, effluent and individual ports for analysis of CVOCs, dissolved hydrocarbon gases (DHGs, e.g., ethene, ethane or methane), Eh and pH on a weekly basis. Other analyses will include anions (chloride, nitrate, sulfate, and phosphate), cations (total iron, Na, Mg, Ca, K, Mn and Si), alkalinity (as milligrams CaCO3/L), total dissolved solids (TDS) and total organic carbon (TOC) to evaluate the potential for mineral precipitation at time zero (week 0) and end of the study (week 6) from the influent and effluent only. Anions will be sampled at time zero (week 0), the mid-point (week 3) and the end-point (week 6) from influent, effluent and individual ports. At time zero samples for all parameters will be collected from the influent groundwater reservoir to provide the time zero data for the study. Samples for PCB analysis will be collected at baseline and from column effluent (2 mid-study events and at the end point, approximately every 10-14 days). Tables 3-2 and 3-3 provide a summary of the sampling parameters and frequency.

CVOC concentrations will be determined using gas chromatograph-flame ionization detection (GC-FID). A 1.0 mL sample will be collected from the sampling port and transferred into a 10 mL auto sampler vial containing 5.0 mL of acidified deionized water (pH ~2). The vial will be sealed with an inert Teflon®-coated septum and aluminum crimp cap for headspace analysis by GC-FID. Anions will be analyzed by ion chromatography (IC) and conductivity detection. A 0.5 mL sample will be collected from the sampling port and transferred to a 1.5 mL Eppendorf tube; after sample processing and dilution a 25 µL sample will be injected onto the IC.

Eh will be determined using YSI Multilab IDS Meter with YSI 4210 ORP glass electrode (Mandel Scientific, Guelph, ON). The pH measurements will be made using an Oakton pH spear with combination pH electrode. A 3.0 mL sample will be collected from the sampling ports with a glass syringe and analyzed immediately for Eh and then pH.

Samples for inorganic parameters (cations, alkalinity, TDS, and TOC) will be sent to SGS Research Limited, Lakefield, ON for analysis. Cation analyses will be performed using inductively coupled plasma atomic emission spectroscopy (ICP-AES) (U.S. EPA Method No. 200.7). Alkalinity (as mg CaCO3/L) in water will be determined by automated colorimetry (U.S. EPA Method No. 310.2). Samples for PCB analysis will be collected in 1-liter bottles and shipped to an established BC Laboratory (Alpha Analytical, 8 Walkup Drive, Westborough, MA USA 01581) for analysis (MCP WSC CAM Methods 8082).

Table 3-2: Sand Control Column Sampling and Analysis

Analyte	Number of Sampling Events	Number of Samples (Influent/Effluent)	Number of Samples (ports)	Total number of analyses per column
CVOCs + DHGs	7	2	0	16*
Anions	3	2	0	8*
Cations, Alkalinity, TDS and TOC	1	1	0	3*
Eh/pH	7	2	0	16*
PCBs	2	1	0	4*

*Includes duplicate baseline sampling. Only influent reservoir sampled at time zero. Only one influent sample for all columns.

Table 3-3: ZVI Treatment Columns Sampling and Analyses

Analyte	Number of Sampling Events	Number of Samples (Influent/Effluent)	Number of Samples (ports)	Total number of analyses per column
CVOCs + DHGs	7	1	7	49*
Anions	3	1	7	17*
Cations, Alkalinity, TDS and TOC	1	1	0	1
Eh/pH	7	1	7	49*
PCBs	3	1	0	9

*Includes duplicate baseline sampling. Only influent reservoir sampled at time zero. Only one influent sample for all columns. All 7 ports sampled only for the first 2 events with 4 sampling ports for the final 5 events.

3.5 Presentation of Results

A summary report providing the results and interpretations of the treatability studies will be issued after the column testing is completed and will be included in the revised Feasibility Study Report. This summary report will contain, but not limited to:

- All chemical analyses completed on column samples;
- Calculated degradation rates of organic compounds;
- Summary tables of major results; and
- Graphs showing degradation behavior.

These results will be interpreted in the context of the site hydrogeologic data to provide a basic conceptual residence time simulations for field-scale designs.

Appendix A: Column-Study Media Technical Specifications

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This ecologically safe pool sand does not solidify and will help to prevent clogging. Our inert, odorless 100% natural sand does not have chemicals. It can be easily backwashed.

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- *Packaged in the most durable 50-pound plastic bags that can be stored outside without UV degradation*
- *Shipments tested for the required size*
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- *Meets AWWA B100 recommendations*

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Fax: 269.465.6075
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PEERLESS™

PMP ZERO VALENT IRON AGGREGATE SIZE 14D
New Sieve Specification as of 3/1/13

TYPICAL 5 MINUTE ROTAP

SCREEN SIZE	% PASSING
8	100
16	95 - 100
30	55 - 95
50	15 - 80
100	0 - 20
200	0 - 6

TYPICAL BULK DENSITY 165 to 215 POUNDS PER CUBIC FOOT

PMP IRON AGGREGATES ARE 100% DRY AND OIL FREE

TYPICAL CHEMISTRY:

Element	Percentage
Iron	90+
Carbon	1.5 – 2.5
Silicon	2.00
Manganese	0.60
Sulfur	0.12
Phosphorus	0.14
Nickel	0.20
Chromium	0.20
Molybdenum	0.15
Copper	0.20

3/1/13

Peerless Metal Powders & Abrasive

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Continental Carbon Group

PRODUCT DATA SHEET

CC-8x30 Granular Activated Carbon (GAC)

DESCRIPTION:

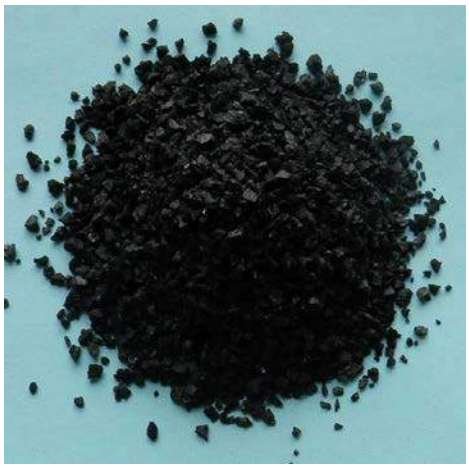
CC-8x30 is a virgin activated carbon derived from bituminous coal. Granular in form, it is ideal for many liquid phase applications including the removal of impurities from water streams. Its superior adsorptive capacity and surface area make it particularly attractive for the removal of organics from wastewater; while its size makes it appealing where low pressure drop is required.

STANDARD PACKAGING:

CC-8x30 is available in 55 lb. bags or 1,100 lb. bulk bags. Other sizes available upon request.

SPECIFICATIONS:

- U.S. standard series sieve size: 8 x 30 mesh (min 90%)
  - Less than No. 30: 5% (max)
  - Greater than No. 8: 5% (max)
- Iodine No.: 900 mg/g (min)
- Surface Area: 900 m^2/g (min)
- Hardness: 90% (min)
- Abrasion No.: 80 (min)
- Moisture (as packaged): 5.0% (max)
- Typical density: 27-30 lbs/ft^3 (0.43 -0.48 g/cc)



SAFETY MESSAGE

Wet activated carbon removes oxygen from air, causing a severe hazard to workers inside carbon vessels. Confined space/low oxygen procedures should be put in place before any entry is made. Such procedures should comply with all applicable local, state and federal guidelines.

For More Information:
Continental Carbon Group
www.continental-carbon.com | info@continental-carbon.com | 905.643.7615

Appendix I: Conceptual-level Cost Estimates

Alternative 1

Removal of PCB Impacted Soils in Upper Two Feet (> 1 mg/kg) and At Depth (> 100 mg/kg)

Phase III RAP - OU 1 (Titleist Property)
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	1	LS	$30,000	$30,000
2	SITE PREPARATION	1	LS	$33,000	$33,000
3	TEMPORARY FACILITIES AND CONTROLS	2	MONTH	$22,000	$44,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	1,000	CY	$20	$20,000
	b. Soil with PCB concentrations > 50 mg/kg	4,890	CY	$20	$98,000
	c. Excavation Shoring	7,700	SF	$35	$270,000
	d Dewatering System Installation/Operation	0	LS	$250,000	$0
5	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	1,600	TON	$85	$136,000
	b. Soils with PCB concentrations > 50 mg/kg	7,820	TON	$275	$2,151,000
	c. Treated Groundwater Disposal	0	GAL	$0.50	$0
6	SITE RESTORATION				
	a. Imported Clean Backfill	5,890	CY	$40	$236,000
	b. Cap Installation (demarcation layer, vegetative cover)	6,540	SY	$4.75	$31,000
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$3,049,000
7	CONTINGENCY:				
	a. 25% of Non-Transportation and Disposal Cost	25	%	$762,000	$190,500
	b. 10% of Transportation and Disposal Cost	10	%	$2,287,000	$228,700
	TOTAL CONSTRUCTION CAPITAL COST:				**$3,470,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
8	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Design and Contractor Procurement	1	LS	$100,000	$100,000
9	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance Phase IV Completion Report, As-builts, Remedy Operation	1	LS	$80,000	$80,000
	b. Status & Final Inspection Reports	1	LS	$15,000	$15,000
10	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$5,000	$5,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$310,000
11	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$310,000	$77,500
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$388,000**
	TOTAL CAPITAL COST:				**$3,860,000**

Alternative 1

Removal of PCB Impacted Soils in Upper Two Feet (> 1 mg/kg) and At Depth (> 100 mg/kg)

Phase III RAP - OU 1 (Titleist Property)
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	ANNUAL O&M COST				
12	Operation and Maintenance				
	a. Soil Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	b. Soil Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$7,000
13	CONTINGENCY: (25% of O&M annual cost)	25	%	$7,000	$1,750
	TOTAL ANNUAL O&M COST:				**$9,000**
	TOTAL PRESENT NET WORTH				
		Yearly Interest Rate	**Number Years**	**O&M Present Worth**	**Total Present Worth**
	30 - Year Present Worth	3%	30	**$177,000**	**$4,040,000**

Alternative 2

Removal of PCB Impacted Soils at Concentrations Greater Than Commerical/Industrial Risk Based Concentration (4 mg/kg)

Phase III RAP - OU 1 (Titleist Property)
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	1	LS	$30,000	$30,000
2	SITE PREPARATION	1	LS	$33,000	$33,000
3	TEMPORARY FACILITIES AND CONTROLS	3	MONTH	$22,000	$66,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentration > 4 mg/kg	7,870	CY	$20	$157,000
	b. Excavation Shoring	15,600	SF	$35	$546,000
	c. Dewatering System Installation/Operation	1	LS	$250,000	$250,000
5	TRANSPORTATION AND DISPOSAL OF EXCAVATED SOILS				
	a. Soils with PCB concentrations > 4 mg/kg	440	TON	$85	$37,000
	b. Soils with PCB concentrations > 50 mg/kg	12,150	TON	$275	$3,341,000
	c. Treated Groundwater Disposal	49,050	GAL	$0.50	$25,000
6	SITE RESTORATION				
	a. Imported Clean Backfill	7,870	CY	$40	$315,000
	b. Cap Installation (demarcation layer, vegetative cover)	6,540	SY	$4.75	$31,000
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$4,831,000
7	CONTINGENCY: (25% of construction costs and 10% of T&D)				
	a. 25% of Non-Transportation and Disposal Cost	25	%	$1,428,000	$357,000
	b. 10% of Transportation and Disposal Cost	10	%	$3,403,000	$340,300
	TOTAL CONSTRUCTION CAPITAL COST:				**$5,529,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
8	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Design and Contractor Procurement	1	LS	$100,000	$100,000
9	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance Phase IV Completion Report, As-builts, Remedy Operation	1	LS	$120,000	$120,000
	b. Status & Final Inspection Reports	1	LS	$15,000	$15,000
10	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$5,000	$5,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$350,000
11	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$350,000	$87,500
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$438,000**
	TOTAL CAPITAL COST:				**$5,967,000**

Alternative 2

Removal of PCB Impacted Soils at Concentrations Greater Than Commerical/Industrial Risk Based Concentration (4 mg/kg)

Phase III RAP - OU 1 (Titleist Property)
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	ANNUAL O&M COST				
12	Operation and Maintenance				
	a. Soil Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	b. Soil Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$7,000
13	CONTINGENCY: (25% of O&M annual cost)	25	%	$7,000	$1,750
	TOTAL ANNUAL O&M COST:				**$9,000**
	TOTAL PRESENT NET WORTH				
		Yearly Interest Rate	**Number Years**	**O&M Present Worth**	**Total Present Worth**
	30 - Year Present Worth	3%	30	**$177,000**	**$6,150,000**

Alternative 3A

Removal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)

Phase III RAP - OU 1 (Titleist Property)
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	1	LS	$30,000	$30,000
2	SITE PREPARATION	1	LS	$33,000	$33,000
3	TEMPORARY FACILITIES & CONTROLS	3	MONTH	$22,000	$66,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations > 1 mg/kg	9,670	CY	$20	$193,000
	b. Excavation Support	12,000	SF	$35	$420,000
	c. Dewatering System Installation/Operation	1	LS	$250,000	$250,000
5	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	1,240	TON	$85	$105,000
	b. Soils with PCB concentrations > 50 mg/kg	14,230	TON	$275	$3,913,000
	c. Treated Groundwater Disposal	48,840	GAL	$0.50	$24,000
6	SITE RESTORATION				
	a. Imported Clean Backfill	9,670	CY	$40	$387,000
	b. Surface restoration (vegetative cover)	6,540	SY	$1.60	$10,000
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$5,431,000
7	CONTINGENCY: (25% of construction costs and 10% of T&D)				
	a. 25% of Non-Transportation and Disposal Cost	25	%	$1,389,000	$347,250
	b. 10% of Transportation and Disposal Cost	10	%	$4,042,000	$404,200
	TOTAL CONSTRUCTION CAPITAL COST:				**$6,190,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
8	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Design and Contractor Procurement	1	LS	$100,000	$100,000
9	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$120,000	$120,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$15,000	$15,000
10	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$5,000	$5,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$330,000
11	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$330,000	$82,500
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$413,000**
	TOTAL CAPITAL COST:				**$6,610,000**

Alternative 3A

Removal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg)

Phase III RAP - OU 1 (Titleist Property)
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	ANNUAL O&M COST				
12	Operation and Maintenance				
	a. Soil Cap Monitoring and Documentation (AUL)	0	LS	$5,000	$0
	b. Soil Cap Maintenance and Repairs	0	LS	$2,000	$0
	Item Subtotal (Annual O&M)				$0
13	CONTINGENCY: (25% of O&M annual cost)	25	%	$0	$0
	TOTAL ANNUAL O&M COST:				**$0**
	TOTAL PRESENT NET WORTH				
		Yearly Interest Rate	**Number Years**	**O&M Present Worth**	**Total Present Worth**
	30 - Year Present Worth	3%	30	**$0**	**$6,610,000**

Alternative 3B

Removal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg) and Consolidation Onsite

Phase III RAP - OU 1 (Titleist Property)
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	1	LS	$30,000	$30,000
2	SITE PREPARATION	1	LS	$33,000	$33,000
3	TEMPORARY FACILITIES & CONTROLS	2	MONTH	$22,000	$44,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations > 1 mg/kg	9,670	CY	$20	$193,000
	b. Excavation Support	12,000	SF	$35	$420,000
	c. Dewatering System Installation/Operation	1	LS	$250,000	$250,000
5	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg	0	TON	$275	$0
	c. Treated Groundwater Disposal	48,840	GAL	$0.50	$24,000
6	CONSOLIDATION CELL CONSTRUCTION				
	a. Engineered Barrier Cap	5,800	SY	$53	$307,000
	b. Harbor Side Armoring	200	TONS	$40	$8,000
7	SITE RESTORATION				
	a. Imported Clean Backfill	9,670	CY	$40	$387,000
	b. Surface restoration (vegetative cover)	6,540	SY	$1.60	$10,000
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$1,706,000
8	CONTINGENCY: (25% of construction costs and 10% of T&D)				
	a. 25% of Non-Transportation and Disposal Cost	25	%	$1,706,000	$426,500
	b. 10% of Transportation and Disposal Cost	10	%	$24,000	$2,400
	TOTAL CONSTRUCTION CAPITAL COST:				**$2,140,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
8	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Design and Contractor Procurement	1	LS	$100,000	$100,000
9	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$80,000	$80,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$15,000	$15,000
10	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$5,000	$5,000
	b. AUL to Restrict Site Use	0	LS	$20,000	$0
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$290,000
11	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$290,000	$72,500
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$363,000**
	TOTAL CAPITAL COST:				**$2,510,000**

Alternative 3B

Removal of PCB Impacted Soils at Concentrations Greater than Unrestricted Use Risk Based Concentration (1 mg/kg) and Consolidation Onsite

Phase III RAP - OU 1 (Titleist Property) Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	ANNUAL O&M COST				
12	Operation and Maintenance			$0	
	a. Soil Cap Monitoring and Documentation (AUL)	0	LS	$5,000	$0
	b. Soil Cap Maintenance and Repairs	0	LS	$2,000	$0
	Item Subtotal (Annual O&M)				$0
13	CONTINGENCY: (25% of O&M annual cost)	25	%	$0	$0
	TOTAL ANNUAL O&M COST:				**$0**
	TOTAL PRESENT NET WORTH				
		Yearly Interest Rate	**Number Years**	**O&M Present Worth**	**Total Present Worth**
	30 - Year Present Worth	3%	30	**$0**	**$2,510,000**

Alternative 4

PCB Impacted Soils Addressed with Asphalt Cap
(> 1 mg/kg and < 100 mg/kg) or Engineered Barrier (> 100 mg/kg)

Phase III RAP - OU 1 (Titleist Property)
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	1	LS	$25,000	$25,000
2	SITE PREPARATION	1	LS	$33,000	$33,000
3	TEMPORARY FACILITIES AND CONTROLS	1	MONTH	$8,000	$8,000
4	SOIL EXCAVATION				
	a. Excavate Soils to Accommodate Remedial Cap	3,333	CY	$20	$67,000
5	TRANSPORTATION AND DISPOSAL OF EXCAVATED SOILS				
	a. Soils with PCB concentrations < 50 mg/kg	907	TON	$85	$249,000
	b. Soils with PCB concentrations > 50 mg/kg	4,426	TON	$275	$1,217,000
6	SITE RESTORATION				
	a. Imported Clean Backfill Subbase	1,100	CY	$40	$44,000
	b. Asphalt Pavement Cap	3,100	SY	$22	$68,000
	c. Engineered Barrier Cap	3,500	SY	$53	$186,000
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$1,897,000
7	CONTINGENCY: (20% of construction capital cost)	20	%	$1,897,000	$379,400
	TOTAL CONSTRUCTION CAPITAL COST:				**$2,280,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
8	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Design and Contractor Procurement	1	LS	$50,000	$50,000
9	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$40,000	$40,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$15,000	$15,000
10	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$5,000	$5,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$220,000
11	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$220,000	$55,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$275,000**
	TOTAL CAPITAL COST:				**$2,555,000**

Alternative 4

PCB Impacted Soils Addressed with Asphalt Cap
(> 1 mg/kg and < 100 mg/kg) or Engineered Barrier (> 100 mg/kg)

Phase III RAP - OU 1 (Titleist Property)
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	ANNUAL O&M COST				
12	O&M				
	a. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	b. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$7,000
13	CONTINGENCY: (25% of O&M annual cost)	25	%	$7,000	$1,750
	TOTAL ANNUAL O&M COST:				**$9,000**
	TOTAL PRESENT NET WORTH				
		Yearly Interest Rate	**Number Years**	**O&M Present Worth**	**Total Present Worth**
	30 - Year Present Worth	3%	30	**$177,000**	**$2,740,000**

Alternative 1

Monitored Subslab Soil Gas Attenuation

Phase III RAP - OU 2
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	1	LS	$2,000	$2,000
2	SITE PREPARATION	1	LS	$7,000	$7,000
3	SUBSLAB SOIL GAS MONITORING POINTS	1	LS	$5,000	$5,000
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$14,000
	CONTINGENCY: (25% of construction capital cost)	25	%	$14,000	$3,500
	TOTAL CONSTRUCTION CAPITAL COST:				**$18,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
4	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$10,000	$10,000
	b Design and Contractor Procurement	1	LS	$10,000	$10,000
5	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$5,000	$5,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$10,000	$10,000
6	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$6,000	$6,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$61,000
	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$61,000	$15,250
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$77,000**
	TOTAL CAPITAL COST:				**$95,000**
	ANNUAL O&M COST				
7	O&M				
	a. 2 Rounds of Subslab Soil Gas Sampling (2 seasons)	2	EA	$5,000	$10,000
	b. 2 Rounds of Indoor Air Sampling (2 seasons)	2	EA	$5,000	$10,000
	c. 2 Rounds of Groundwater Sampling (2 seasons)	2	EA	$4,000	$8,000
	d. Semi-Annual Remedy Operation Status Reports	1	EA	$2,000	$2,000
	Item Subtotal (Annual O&M)				$30,000
	CONTINGENCY: (25% of O&M annual cost)	25	%	$30,000	$7,500
	TOTAL ANNUAL O&M COST:				**$37,500**

TOTAL PRESENT NET WORTH

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
30 - Year Present Worth	3%	30	**$736,000**	**$831,000**

Alternative 2

Vapor Barrier Over Floor Slab

Phase III RAP - OU 2
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	1	LS	$10,000	$10,000
2	SITE PREPARATION	1	LS	$7,000	$7,000
3	VAPOR BARRIER INSTALLATION	90,000	SF	$7	$630,000
4	SUBSLAB SOIL GAS MONITORING POINTS	1	LS	$5,000	$5,000
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$652,000
	CONTINGENCY: (25% of construction capital cost)	25	%	$652,000	$163,000
	TOTAL CONSTRUCTION CAPITAL COST:				**$820,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
5	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$10,000	$10,000
	b Design and Contractor Procurement	1	LS	$85,000	$85,000
6	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	8	WK	$5,000	$40,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$10,000	$10,000
7	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$6,000	$6,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$171,000
	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$171,000	$42,750
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$214,000**
	TOTAL CAPITAL COST:				**$1,034,000**
	ANNUAL O&M COST				
8	O&M				
	a. Vapor Barrier System Inspection and Documentation	1	LS	$5,000	$5,000
	b. Vapor Barrier System Maintenance and Repair	1	LS	$500	$500
	c Annual Subslab Soil Gas Sampling	1	LS	$5,000	$5,000
	d. Annual Indoor Air Sampling	1	LS	$5,000	$5,000
	e. Semi-Annual Remedy Operation Status Reports	1	LS	$6,000	$6,000
	Item Subtotal (Annual O&M)				$22,000
	CONTINGENCY: (25% of O&M annual cost)	25	%	$22,000	$5,500
	TOTAL ANNUAL O&M COST:				**$28,000**
	TOTAL PRESENT NET WORTH				

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
30 - Year Present Worth	3%	30	**$549,000**	**$1,590,000**

Alternative 3

Active Subslab Depressurization System

Phase III RAP - OU 2
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	1	LS	$10,000	$10,000
2	SITE PREPARATION	1	LS	$14,000	$14,000
3	ACTIVE SSDS INSTALLATION	90,000	SF	$5	$450,000
4	SUBSLAB SOIL GAS MONITORING POINTS	1	LS	$5,000	$5,000
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$479,000
	CONTINGENCY: (25% of construction capital cost)	25	%	$479,000	$119,750
	TOTAL CONSTRUCTION CAPITAL COST:				**$599,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
5	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$10,000	$10,000
	b. Pre-Design Pilot Testing	1	LS	$100,000	$100,000
	c. Design and Contractor Procurement	1	LS	$85,000	$85,000
6	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	8	WK	$5,000	$40,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$10,000	$10,000
7	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$6,000	$6,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$271,000
	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$271,000	$67,750
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$339,000**
	TOTAL CAPITAL COST:				**$938,000**
	ANNUAL O&M COST				
8	O&M				
	a. Monthly Inspection and Differential Pressure Monitoring	1	LS	$6,000	$6,000
	c. SSDS Maintenance and Repairs	1	LS	$3,000	$3,000
	d Semi-Annual Remedy Operation Status Reports	1	LS	$7,000	$7,000
	Item Subtotal (Annual O&M)				$16,000
	CONTINGENCY: (25% of O&M annual cost)	25	%	$16,000	$4,000
	TOTAL ANNUAL O&M COST:				**$20,000**

TOTAL PRESENT NET WORTH

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
30 - Year Present Worth	3%	30	**$393,000**	**$1,331,000**

Alternative 1

Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In-Situ Treatment of Plume Hot Spot

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	1	LS	$50,000	$50,000
	d In Situ Treatment Contractor	1	LS	$15,000	$15,000
	e. PRB Installation Contractor	0	LS	$65,000	$0
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$273,000	$273,000
3	TEMPORARY FACILITIES AND CONTROLS	10	MONTH	$33,000	$330,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	0	CY	$20	$0
	b. Soil with PCB concentrations >UCL (TSCA)	19,170	CY	$20	$383,000
	c. Soil as RCRA/TSCA	4,770	CY	$20	$95,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	2,660	CY	$20	$53,000
	e. Excavation Shoring	36,726	SF	$35	$1,285,000
	f Dewatering System Installation/Operation	0.75	LS	$250,000	$188,000
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	42,560	TON	$40	$1,702,000
	b. Compaction Testing	43	days	$1,000	$43,000
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	32,206	TON	$275	$8,857,000
	c. Soil as RCRA/TSCA	8,014	TON	$1,105	$8,855,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	4,469	TON	$1,150	$5,139,000
	e. Treated Groundwater Disposal	0	GAL	$0.50	$0
7	VERTICAL BARRIER WALL	42,500	SF	$25	$1,063,000
8	CONDITIONING SOILS	42,560	TON	$3.16	$134,000
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION	15,044	SY	$24	$361,000
11	COMPLIANCE MW INSTALLATION	1	LS	$25,000	$25,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$29,171,000**
	GROUNDWATER REMEDIATION				
12	HYDRAULIC CONTAINMENT SYSTEM				
	a. Groundwater Pumping Wells	5	EACH	$46,000	$230,000
	b. Groundwater Extraction Conveyance	1,200	LF	$150	$180,000
	c Outdoor Tank Area	1	LS	$134,000	$134,000
	d. Groundwater Treatment System	1	LS	$720,000	$720,000
	e. Treatment Building	2,400	SF	$125	$300,000
	f. Effluent Discharge Conveyance	1	LS	$50,000	$50,000
	g. Utilities to Treatment Building	1	LS	$90,000	$90,000
13	IN SITU TREATMENT				
	a. Reagent Raw Materials	394,700	LB	$1.65	$651,000
	b. Two Rounds of Reagent Injections	1	LS	$358,000	$358,000
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$2,713,000**

Alternative 1

Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, In-Situ Treatment of Plume Hot Spot

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
14	CONTINGENCY: (25% of Non-T&D construction capital cost)				
	a. 25% of Non-Transportation and Disposal Costs	25%		$9,033,000	$2,258,250
	b. 10% of Transportation and Disposal Costs	10%		$22,851,000	$2,285,100
	TOTAL CONSTRUCTION CAPITAL COST:				**$36,427,350**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
15	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	c. Design and Contractor Procurement	1	LS	$250,000	$250,000
16	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$600,000	$600,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
17	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$1,100,000
18	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$1,100,000	$275,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$1,380,000**
	TOTAL CAPITAL COST:				**$37,900,000**
	ANNUAL O&M COST				
19	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Operation and Maintenance	1	LS	$375,000	$375,000
	c. Annual Electric Costs	1,314,000	kW-Hr	$0.20	$263,000
	d. POTW Discharge Fees	34,164,000	gal	$0.003	$85,000
	e. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	f. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$806,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$806,000	$201,500
	TOTAL ANNUAL O&M COST:				**$1,007,500**

TOTAL PRESENT NET WORTH

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
20 - Year Present Worth	3%	20	**$14,990,000**	**$52,900,000**

Alternative 2

Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment and AUL

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	1	LS	$50,000	$50,000
	d In Situ Treatment Contractor	0	LS	$15,000	$0
	e. PRB Installation Contractor	0	LS	$65,000	$0
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$273,000	$273,000
3	TEMPORARY FACILITIES AND CONTROLS	9	MONTH	$33,000	$297,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	0	CY	$20	$0
	b. Soil with PCB concentrations >UCL (TSCA)	19,170	CY	$20	$383,000
	c. Soil as RCRA/TSCA	4,770	CY	$20	$95,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	2,660	CY	$20	$53,000
	e. Excavation Shoring	36,726	SF	$35	$1,285,000
	f Dewatering System Installation/Operation	0.75	LS	$250,000	$188,000
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	42,560	TON	$40	$1,702,000
	b. Compaction Testing	43	days	$1,000	$43,000
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	32,206	TON	$275	$8,857,000
	c. Soil as RCRA/TSCA	8,014	TON	$1,105	$8,855,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	4,469	TON	$1,150	$5,139,000
	e. Treated Groundwater Disposal	0	GAL	$0.50	$0
7	VERTICAL BARRIER WALL	42,500	SF	$25	$1,063,000
8	CONDITIONING SOILS	42,560	TON	$3.16	$134,000
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION	15,044	SY	$24	$361,000
11	COMPLIANCE MW INSTALLATION	1	LS	$25,000	$25,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$29,123,000**
	GROUNDWATER REMEDIATION				
12	HYDRAULIC CONTAINMENT SYSTEM				
	a. Groundwater Pumping Wells	5	EACH	$46,000	$230,000
	b. Groundwater Extraction Conveyance	1,200	LF	$150	$180,000
	c Outdoor Tank Area	1	LS	$134,000	$134,000
	d. Groundwater Treatment System	1	LS	$720,000	$720,000
	e. Treatment Building	2,400	SF	$125	$300,000
	f. Effluent Discharge Conveyance	1	LS	$50,000	$50,000
	g. Utilities to Treatment Building	1	LS	$90,000	$90,000
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$1,704,000**
13	CONTINGENCY: (25% of Non-T&D construction capital cost)				
	a. 25% of Non-Transportation and Disposal Costs	25%		$7,976,000	$1,994,000
	b. 10% of Transportation and Disposal Costs	10%		$22,851,000	$2,285,100

Alternative 2

Removal and Off-Site Disposal of Soils Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment and AUL

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	TOTAL CONSTRUCTION CAPITAL COST:				**$35,106,100**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
14	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
15	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$540,000	$540,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
16	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$1,040,000
17	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$1,040,000	$260,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$1,300,000**
	TOTAL CAPITAL COST:				**$36,500,000**
	ANNUAL O&M COST				
18	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Operation and Maintenance	1	LS	$375,000	$375,000
	c. Annual Electric Costs	1,314,000	kW-Hr	$0.20	$263,000
	d. POTW Discharge Fees	34,164,000	gal	$0.003	$85,000
	e. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	f. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$806,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$806,000	$201,500
	TOTAL ANNUAL O&M COST:				**$1,007,500**
	TOTAL PRESENT NET WORTH				

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
30 - Year Present Worth	3%	30	**$19,748,000**	**$56,300,000**

Alternative 3

Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In-Situ Treatment of Groundwater Contamination Hot Spot and AUL

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	0	LS	$50,000	$0
	d. In Situ Treatment Contractor	1	LS	$15,000	$15,000
	e. PRB Installation Contractor	1	LS	$65,000	$65,000
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$273,000	$273,000
3	TEMPORARY FACILITIES AND CONTROLS	9	MONTH	$33,000	$297,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	0	CY	$20	$0
	b. Soil with PCB concentrations >UCL (TSCA)	21,075	CY	$20	$422,000
	c. Soil as RCRA/TSCA	6,220	CY	$20	$124,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	3,129	CY	$20	$63,000
	e. Excavation Shoring	63,730	SF	$35	$2,231,000
	f. Dewatering System Installation/Operation	1.00	LS	$250,000	$250,000
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	48,679	TON	$40	$1,947,000
	b. Compaction Testing	51	days	$1,000	$51,000
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	35,406	TON	$275	$9,737,000
	c. Soil as RCRA/TSCA	10,450	TON	$1,105	$11,547,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	5,257	TON	$1,150	$6,046,000
	e. Treated Groundwater Disposal	737,750	GAL	$0.50	$369,000
7	VERTICAL BARRIER WALLS				
	a. Impermeable Barrier Wall	25,700	SF	$25	$643,000
	b. Continuous Trenched Permeable Reactive Barrier Installation	20,700	SF	$90	$1,863,000
	c. Permeable Reactive Barrier Media (Sand)	2,500	tons	$60	$150,000
	d. Permeable Reactive Barrier Media (Carbon)	357,075	lb	$1.50	$536,000
	e. Permeable Reactive Barrier Media (ZVI)	1,397	tons	$1,000	$1,397,000
	f. Reactive media mixing contractor	1	LS	$148,800	$149,000
8	CONDITIONING SOILS	48,679	TON	$3.16	$154,000
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION	15,044	SY	$24	$361,000
11	COMPLIANCE MW INSTALLATION	1	LS	$50,000	$50,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$39,060,000**
	GROUNDWATER REMEDIATION				
12	IN SITU TREATMENT				
	a. Reagent Raw Materials	394,700	LB	$1.65	$651,000
	b. Two Rounds of Reagent Injections	1	LS	$358,000	$358,000
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$1,009,000**

Alternative 3

Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat, Within the Northeast Corner down to Bedrock, and Above UCLs, Cap Areas With PCB Concentrations > 2 mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In-Situ Treatment of Groundwater Contamination Hot Spot and AUL

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
13	CONTINGENCY: (25% of Non-T&D construction capital cost)				
	a. 25% of Non-Transportation and Disposal Costs	25%		$12,370,000	$3,092,500
	b. 10% of Transportation and Disposal Costs	10%		$27,699,000	$2,769,900
	TOTAL CONSTRUCTION CAPITAL COST:				**$45,931,400**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
14	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
15	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$540,000	$540,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
16	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$1,040,000
17	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$1,040,000	$260,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$1,300,000**
	TOTAL CAPITAL COST:				**$47,300,000**
	ANNUAL O&M COST				
18	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	c. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$83,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$83,000	$20,750
	TOTAL ANNUAL O&M COST:				**$103,750**

TOTAL PRESENT NET WORTH

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
10 - Year Present Worth - PRB Reinstallation	3%	10	**$4,266,000**	**$4,270,000**
30 - Year Present Worth	3%	30	**$2,034,000**	**$53,610,000**

Alternative 4

Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	1	LS	$50,000	$50,000
	d. In Situ Treatment Contractor	1	LS	$15,000	$15,000
	e. PRB Installation Contractor	0	LS	$65,000	$0
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$184,000	$184,000
3	TEMPORARY FACILITIES AND CONTROLS	8	MONTH	$33,000	$264,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	0	CY	$20	$0
	b. Soil with PCB concentrations >UCL (TSCA)	1,905	CY	$20	$38,000
	c. Soil as RCRA/TSCA	4,250	CY	$20	$85,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	684	CY	$20	$14,000
	e. Excavation Shoring	23,092	SF	$35	$808,000
	f. Dewatering System Installation/Operation	0.75	LS	$250,000	$188,000
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	10,942	TON	$40	$438,000
	b. Compaction Testing	11	days	$1,000	$11,000
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	3,200	TON	$275	$880,000
	c. Soil as RCRA/TSCA	7,140	TON	$1,105	$7,889,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	1,149	TON	$1,150	$1,321,000
	e. Treated Groundwater Disposal	0	GAL	$0.50	$0
7	VERTICAL BARRIER WALLS				
	a. Impermeable Barrier Wall	42,500	SF	$25	$1,063,000
8	CONDITIONING SOILS	10,942	TON	$3.16	$35,000
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION	16,072	SY	$24	$386,000
11	COMPLIANCE MW INSTALLATION	1	LS	$25,000	$25,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$14,014,000**
	GROUNDWATER REMEDIATION				
12	HYDRAULIC CONTAINMENT SYSTEM				
	a. Groundwater Pumping Wells	5	EACH	$46,000	$230,000
	b. Groundwater Extraction Conveyance	1,200	LF	$150	$180,000
	c Outdoor Tank Area	1	LS	$134,000	$134,000
	d. Groundwater Treatment System	1	LS	$720,000	$720,000
	e. Treatment Building	2,400	SF	$125	$300,000
	f. Effluent Discharge Conveyance	1	LS	$50,000	$50,000
	g. Utilities to Treatment Building	1	LS	$90,000	$90,000
13	IN SITU TREATMENT				
	a. Reagent Raw Materials	394,700	LB	$1.65	$651,000
	b. Two Rounds of Reagent Injections	1	LS	$358,000	$358,000

Alternative 4

Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$2,713,000**
14	CONTINGENCY: (25% of Non-T&D construction capital cost)				
	a. 25% of Non-Transportation and Disposal Costs	25%		$6,637,000	$1,659,250
	b. 10% of Transportation and Disposal Costs	10%		$10,090,000	$1,009,000
	TOTAL CONSTRUCTION CAPITAL COST:				**$19,395,250**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
15	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
16	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$480,000	$480,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
17	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$980,000
18	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$980,000	$245,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$1,230,000**
	TOTAL CAPITAL COST:				**$20,700,000**
	ANNUAL O&M COST				
19	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Operation and Maintenance	1	LS	$375,000	$375,000
	c. Annual Electric Costs	1,314,000	kW-Hr	$0.20	$263,000
	d. POTW Discharge Fees	34,164,000	gal	$0.003	$85,000
	e. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	f. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$806,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$806,000	$201,500
	TOTAL ANNUAL O&M COST:				**$1,007,500**
	TOTAL PRESENT NET WORTH				

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
20 - Year Present Worth	3%	20	**$14,990,000**	**$35,700,000**

Alternative 5

Containment via Vertical Barrier Wall and Hydraulic Containment Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	1	LS	$50,000	$50,000
	d. In Situ Treatment Contractor	0	LS	$15,000	$0
	e. PRB Installation Contractor	0	LS	$65,000	$0
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$184,000	$184,000
3	TEMPORARY FACILITIES AND CONTROLS	6	MONTH	$33,000	$198,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	0	CY	$20	$0
	b. Soil with PCB concentrations >UCL (TSCA)	1,905	CY	$20	$38,000
	c. Soil as RCRA/TSCA	4,250	CY	$20	$85,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	684	CY	$20	$14,000
	e. Excavation Shoring	23,092	SF	$35	$808,000
	f. Dewatering System Installation/Operation	0.75	LS	$250,000	$188,000
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	10,942	TON	$40	$438,000
	b. Compaction Testing	11	days	$1,000	$11,000
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	3,200	TON	$275	$880,000
	c. Soil as RCRA/TSCA	7,140	TON	$1,105	$7,889,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	1,149	TON	$1,150	$1,321,000
	e. Treated Groundwater Disposal	0	GAL	$0.50	$0
7	VERTICAL BARRIER WALLS				
	a. Impermeable Barrier Wall	42,500	SF	$25	$1,063,000
8	CONDITIONING SOILS	10,942	TON	$3.16	$35,000
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION	16,072	SY	$24	$386,000
11	COMPLIANCE MW INSTALLATION	1	LS	$25,000	$25,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$13,933,000**
	GROUNDWATER REMEDIATION				
12	HYDRAULIC CONTAINMENT SYSTEM				
	a. Groundwater Pumping Wells	5	EACH	$46,000	$230,000
	b. Groundwater Extraction Conveyance	1,200	LF	$150	$180,000
	c Outdoor Tank Area	1	LS	$134,000	$134,000
	d. Groundwater Treatment System	1	LS	$720,000	$720,000
	e. Treatment Building	2,400	SF	$125	$300,000
	f. Effluent Discharge Conveyance	1	LS	$50,000	$50,000
	g. Utilities to Treatment Building	1	LS	$90,000	$90,000
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$1,704,000**
13	CONTINGENCY: (25% of Non-T&D construction capital cost)				

Alternative 5

Containment via Vertical Barrier Wall and Hydraulic Containment Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	a. 25% of Non-Transportation and Disposal Costs	25%		$5,547,000	$1,386,750
	b. 10% of Transportation and Disposal Costs	10%		$10,090,000	$1,009,000
	TOTAL CONSTRUCTION CAPITAL COST:				**$18,032,750**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
14	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
15	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$360,000	$360,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
16	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$860,000
17	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$860,000	$215,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$1,080,000**
	TOTAL CAPITAL COST:				**$19,200,000**
	ANNUAL O&M COST				
18	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Operation and Maintenance	1	LS	$375,000	$375,000
	c. Annual Electric Costs	1,314,000	kW-Hr	$0.20	$263,000
	d. POTW Discharge Fees	34,164,000	gal	$0.003	$85,000
	e. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	f. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$806,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$806,000	$201,500
	TOTAL ANNUAL O&M COST:				**$1,007,500**

TOTAL PRESENT NET WORTH

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
30 - Year Present Worth	3%	30	**$19,748,000**	**$38,950,000**

Alternative 6

Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	0	LS	$50,000	$0
	d. In Situ Treatment Contractor	1	LS	$15,000	$15,000
	e. PRB Installation Contractor	1	LS	$65,000	$65,000
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$184,000	$184,000
3	TEMPORARY FACILITIES AND CONTROLS	6	MONTH	$33,000	$198,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	0	CY	$20	$0
	b. Soil with PCB concentrations >UCL (TSCA)	2,672	CY	$20	$53,000
	c. Soil as RCRA/TSCA	4,250	CY	$20	$85,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	684	CY	$20	$14,000
	e. Excavation Shoring	23,092	SF	$35	$808,000
	f. Dewatering System Installation/Operation	1.00	LS	$250,000	$250,000
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	12,169	TON	$40	$487,000
	b. Compaction Testing	11	days	$1,000	$11,000
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	4,488	TON	$275	$1,234,000
	c. Soil as RCRA/TSCA	7,140	TON	$1,105	$7,889,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	1,149	TON	$1,150	$1,321,000
	e. Treated Groundwater Disposal	60,750	GAL	$0.50	$30,000
7	VERTICAL BARRIER WALLS				
	a. Impermeable Barrier Wall	25,700	SF	$25	$643,000
	b. Continuous Trenched Permeable Reactive Barrier Installation	20,700	SF	$90	$1,863,000
	c. Permeable Reactive Barrier Media (Sand)	2,500	tons	$60	$150,000
	d. Permeable Reactive Barrier Media (Carbon)	357,075	lb	$1.50	$536,000
	e. Permeable Reactive Barrier Media (ZVI)	1,397	tons	$1,000	$1,397,000
	f. Reactive media mixing contractor	1	LS	$148,800	$149,000
8	CONDITIONING SOILS	12,169	TON	$3.16	$38,000
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION	16,072	SY	$24	$386,000
11	COMPLIANCE MW INSTALLATION	1	LS	$50,000	$50,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$18,176,000**
	GROUNDWATER REMEDIATION				
12	IN SITU TREATMENT				
	a. Reagent Raw Materials	394,700	LB	$1.65	$651,000
	b. Two Rounds of Reagent Injections	1	LS	$358,000	$358,000
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$1,009,000**
13	CONTINGENCY: (25% of Non-T&D construction capital cost)				

Alternative 6

Removal and Off-Site Disposal of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	a. 25% of Non-Transportation and Disposal Costs	25%		$8,711,000	$2,177,750
	b. 10% of Transportation and Disposal Costs	10%		$10,474,000	$1,047,400
	TOTAL CONSTRUCTION CAPITAL COST:				**$22,410,150**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
14	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
15	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$360,000	$360,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
16	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$860,000
17	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$860,000	$215,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$1,080,000**
	TOTAL CAPITAL COST:				**$23,500,000**
	ANNUAL O&M COST				
18	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	c. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$83,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$83,000	$20,750
	TOTAL ANNUAL O&M COST:				**$103,750**

TOTAL PRESENT NET WORTH

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
10 - Year Present Worth - PRB Replacement	3%	10	**$4,266,000**	**$4,270,000**
30 - Year Present Worth	3%	30	**$2,034,000**	**$29,810,000**

Alternative 7

Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	1	LS	$50,000	$50,000
	d. In Situ Treatment Contractor	1	LS	$15,000	$15,000
	e. PRB Installation Contractor	0	LS	$65,000	$0
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$184,000	$184,000
3	TEMPORARY FACILITIES AND CONTROLS	6	MONTH	$33,000	$198,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	3,991	CY	$20	$80,000
	b. Soil with PCB concentrations >UCL (TSCA)	1,905	CY	$20	$38,000
	c. Soil as RCRA/TSCA	4,250	CY	$20	$85,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	684	CY	$20	$14,000
	e. Excavation Shoring	23,092	SF	$35	$808,000
	f. Dewatering System Installation/Operation	0.75	LS	$250,000	$188,000
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	4,557	TON	$40	$182,000
	b. Backfill of Excavated Soils	6,385	TON	$5	$32,000
	c. Compaction Testing	11	days	$1,000	$11,000
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	0	TON	$275	$0
	c. Soil as RCRA/TSCA	0	TON	$1,105	$0
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	0	TON	$1,150	$0
	e. Treated Groundwater Disposal	0	GAL	$0.50	$0
7	VERTICAL BARRIER WALLS				
	a. Impermeable Barrier Wall	42,500	SF	$25	$1,063,000
8	CONDITIONING SOILS	17,327	TON	$3.16	$55,000
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION				
	a. Engineered Barrier	16,072	SY	$24	$386,000
	b. Consolidation Cell Barrier	9,029	SY	$24	$217,000
	c. Consolidation Cell Armoring	1	LS	$58,647	$59,000
11	COMPLIANCE MW INSTALLATION	1	LS	$25,000	$25,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$4,010,000**
	GROUNDWATER REMEDIATION				
12	HYDRAULIC CONTAINMENT SYSTEM				
	a. Groundwater Pumping Wells	5	EACH	$46,000	$230,000
	b. Groundwater Extraction Conveyance	1,200	LF	$150	$180,000
	c Outdoor Tank Area	1	LS	$134,000	$134,000
	d. Groundwater Treatment System	1	LS	$720,000	$720,000
	e. Treatment Building	2,400	SF	$125	$300,000
	f. Effluent Discharge Conveyance	1	LS	$50,000	$50,000
	g. Utilities to Treatment Building	1	LS	$90,000	$90,000

Alternative 7

Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
13	IN SITU TREATMENT				
	a. Reagent Raw Materials	394,700	LB	$1.65	$651,000
	b. Two Rounds of Reagent Injections	1	LS	$358,000	$358,000
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$2,713,000**
14	CONTINGENCY: (25% of Non-T&D construction capital cost)				
	a. 25% of Non-Transportation and Disposal Costs	25%		$6,723,000	$1,680,750
	b. 10% of Transportation and Disposal Costs	10%		$0	$0
	TOTAL CONSTRUCTION CAPITAL COST:				**$8,403,750**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
15	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
16	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$360,000	$360,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
17	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$860,000
18	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$860,000	$215,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$1,080,000**
	TOTAL CAPITAL COST:				**$9,500,000**
	ANNUAL O&M COST				
19	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Operation and Maintenance	1	LS	$375,000	$375,000
	c. Annual Electric Costs	1,314,000	kW-Hr	$0.20	$263,000
	d. POTW Discharge Fees	34,164,000	gal	$0.003	$85,000
	e. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	f. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$806,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$806,000	$201,500
	TOTAL ANNUAL O&M COST:				**$1,007,500**
	TOTAL PRESENT NET WORTH				
		Yearly Interest Rate	**Number Years**	**O&M Present Worth**	**Total Present Worth**

Alternative 7

Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	20 - Year Present Worth	3%	20	**$14,990,000**	**$24,500,000**

Alternative 8

Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	1	LS	$50,000	$50,000
	d. In Situ Treatment Contractor	0	LS	$15,000	$0
	e. PRB Installation Contractor	0	LS	$65,000	$0
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$184,000	$184,000
3	TEMPORARY FACILITIES AND CONTROLS	6	MONTH	$33,000	$198,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	3,991	CY	$20	$80,000
	b. Soil with PCB concentrations >UCL (TSCA)	1,905	CY	$20	$38,000
	c. Soil as RCRA/TSCA	4,250	CY	$20	$85,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	684	CY	$20	$14,000
	e. Excavation Shoring	23,092	SF	$35	$808,000
	f. Dewatering System Installation/Operation	0.75	LS	$250,000	$188,000
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	4,557	TON	$40	$182,000
	b. Backfill of Excavated Soils	6,385	TON	$5	$32,000
	b. Compaction Testing	11	days	$1,000	$11,000
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	0	TON	$275	$0
	c. Soil as RCRA/TSCA	0	TON	$1,105	$0
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	0	TON	$1,150	$0
	e. Treated Groundwater Disposal	0	GAL	$0.50	$0
7	VERTICAL BARRIER WALLS				
	a. Impermeable Barrier Wall	42,500	SF	$25	$1,063,000
8	CONDITIONING SOILS	17,327	TON	$3.16	$55,000
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION				
	a. Engineered Barrier	16,072	SY	$24	$386,000
	b. Consolidation Cell Barrier	9,029	SY	$24	$217,000
	c. Consolidation Cell Armoring	1	LS	$58,647	$59,000
11	COMPLIANCE MW INSTALLATION	1	LS	$25,000	$25,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$3,995,000**
	GROUNDWATER REMEDIATION				
12	HYDRAULIC CONTAINMENT SYSTEM				
	a. Groundwater Pumping Wells	5	EACH	$46,000	$230,000
	b. Groundwater Extraction Conveyance	1,200	LF	$150	$180,000
	c Outdoor Tank Area	1	LS	$134,000	$134,000
	d. Groundwater Treatment System	1	LS	$720,000	$720,000
	e. Treatment Building	2,400	SF	$125	$300,000
	f. Effluent Discharge Conveyance	1	LS	$50,000	$50,000
	g. Utilities to Treatment Building	1	LS	$90,000	$90,000

Alternative 8

Removal and On-Site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, and Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$1,704,000**
14	CONTINGENCY: (25% of Non-T&D construction capital cost)				
	a. 25% of Non-Transportation and Disposal Costs	25%		$5,699,000	$1,424,750
	b. 10% of Transportation and Disposal Costs	10%		$0	$0
	TOTAL CONSTRUCTION CAPITAL COST:				**$7,123,750**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
15	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
16	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$360,000	$360,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
17	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$860,000
18	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$860,000	$215,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$1,080,000**
	TOTAL CAPITAL COST:				**$8,300,000**
	ANNUAL O&M COST				
19	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Operation and Maintenance	1	LS	$375,000	$375,000
	c. Annual Electric Costs	1,314,000	kW-Hr	$0.20	$263,000
	d. POTW Discharge Fees	34,164,000	gal	$0.003	$85,000
	e. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	f. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$806,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$806,000	$201,500
	TOTAL ANNUAL O&M COST:				**$1,007,500**
	TOTAL PRESENT NET WORTH				

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
30 - Year Present Worth	3%	30	**$19,748,000**	**$28,050,000**

Alternative 9

Removal and On-site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	0	LS	$50,000	$0
	d. In Situ Treatment Contractor	1	LS	$15,000	$15,000
	e. PRB Installation Contractor	1	LS	$65,000	$65,000
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$184,000	$184,000
3	TEMPORARY FACILITIES AND CONTROLS	4	MONTH	$33,000	$132,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	3,991	CY	$20	$80,000
	b. Soil with PCB concentrations >UCL (TSCA)	2,672	CY	$20	$53,000
	c. Soil as RCRA/TSCA	4,250	CY	$20	$85,000
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	684	CY	$20	$14,000
	e. Excavation Shoring	23,092	SF	$35	$808,000
	f. Dewatering System Installation/Operation	1.00	LS	$250,000	$250,000
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	5,783	TON	$40	$231,000
	b. Backfill of Excavated Soils	6,385	TON	$5	$32,000
	b. Compaction Testing	11	days	$1,000	$11,000
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	0	TON	$275	$0
	c. Soil as RCRA/TSCA	0	TON	$1,105	$0
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	0	TON	$1,150	$0
	e. Treated Groundwater Disposal	60,750	GAL	$0.50	$30,000
7	VERTICAL BARRIER WALLS				
	a. Impermeable Barrier Wall	25,700	SF	$25	$643,000
	b. Continuous Trenched Permeable Reactive Barrier Installation	20,700	SF	$90	$1,863,000
	c. Permeable Reactive Barrier Media (Sand)	2,500	tons	$60	$150,000
	d. Permeable Reactive Barrier Media (Carbon)	357,075	lb	$1.50	$536,000
	e. Permeable Reactive Barrier Media (ZVI)	1,397	tons	$1,000	$1,397,000
	f. Reactive media mixing contractor	1	LS	$148,800	$149,000
8	CONDITIONING SOILS	18,554	TON	$3.16	$59,000
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION				
	a. Engineered Barrier	16,072	SY	$24	$386,000
	b. Consolidation Cell Barrier	9,029	SY	$24	$217,000
	c. Consolidation Cell Armoring	1	LS	$58,647	$59,000
11	COMPLIANCE MW INSTALLATION	1	LS	$50,000	$50,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$7,819,000**
	GROUNDWATER REMEDIATION				
12	IN SITU TREATMENT				
	a. Reagent Raw Materials	394,700	LB	$1.65	$651,000

Alternative 9

Removal and On-site Consolidation of Soils Within 25-feet of Shoreline above Peat and Down to Bedrock Within the Northeast Corner, Engineered Barrier Over Areas with PCBs >100 mg/kg and Asphalt Cap Over Areas with PCBs >2mg/kg, Partial Containment and Treatment of Groundwater with Permeable Reactive Barrier, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	b. Two Rounds of Reagent Injections	1	LS	$358,000	$358,000
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$1,009,000**
14	CONTINGENCY: (25% of Non-T&D construction capital cost)				
	a. 25% of Non-Transportation and Disposal Costs	25%		$8,798,000	$2,199,500
	b. 10% of Transportation and Disposal Costs	10%		$30,000	$3,000
	TOTAL CONSTRUCTION CAPITAL COST:				**$11,030,500**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
15	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
16	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$240,000	$240,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
17	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$740,000
18	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$740,000	$185,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$930,000**
	TOTAL CAPITAL COST:				**$12,000,000**
	ANNUAL O&M COST				
19	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	c. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$83,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$83,000	$20,750
	TOTAL ANNUAL O&M COST:				**$103,750**

TOTAL PRESENT NET WORTH

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
10 - Year Present Worth - PRB Replacement	3%	10	**$4,266,000**	**$4,300,000**
30 - Year Present Worth	3%	30	**$2,034,000**	**$18,340,000**

Alternative 10

Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	1	LS	$50,000	$50,000
	d. In Situ Treatment Contractor	1	LS	$15,000	$15,000
	e. PRB Installation Contractor	0	LS	$65,000	$0
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$184,000	$184,000
3	TEMPORARY FACILITIES AND CONTROLS	3	MONTH	$33,000	$99,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	0	CY	$20	$0
	b. Soil with PCB concentrations >UCL (TSCA)	0	CY	$20	$0
	c. Soil as RCRA/TSCA	0	CY	$20	$0
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	0	CY	$20	$0
	e. Excavation Shoring	0	SF	$35	$0
	f. Dewatering System Installation/Operation	0.0	LS	$250,000	$0
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	0	TON	$40	$0
	b. Backfill of Excavated Soils	0	TON	$5	$0
	b. Compaction Testing	0	days	$1,000	$0
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	0	TON	$275	$0
	c. Soil as RCRA/TSCA	0	TON	$1,105	$0
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	0	TON	$1,150	$0
	e. Treated Groundwater Disposal	0	GAL	$0.50	$0
7	VERTICAL BARRIER WALLS				
	a. Impermeable Barrier Wall	42,500	SF	$25	$1,063,000
8	CONDITIONING SOILS	0	TON	$3.16	$0
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION				
	a. Engineered Barrier	16,072	SY	$24	$386,000
11	COMPLIANCE MW INSTALLATION	1	LS	$25,000	$25,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$2,142,000**
	GROUNDWATER REMEDIATION				
12	HYDRAULIC CONTAINMENT SYSTEM				
	a. Groundwater Pumping Wells	5	EACH	$46,000	$230,000
	b. Groundwater Extraction Conveyance	1,200	LF	$150	$180,000
	c Outdoor Tank Area	1	LS	$134,000	$134,000
	d. Groundwater Treatment System	1	LS	$720,000	$720,000
	e. Treatment Building	2,400	SF	$125	$300,000
	f. Effluent Discharge Conveyance	1	LS	$50,000	$50,000
	g. Utilities to Treatment Building	1	LS	$90,000	$90,000

Alternative 10

Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment, and In-Situ Treatment of Soils Acting as a Source to Groundwater Contamination

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
13	IN SITU TREATMENT				
	a. Reagent Raw Materials	394,700	LB	$1.65	$651,000
	b. Two Rounds of Reagent Injections	1	LS	$358,000	$358,000
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$2,713,000**
14	CONTINGENCY: (25% of Non-T&D construction capital cost)				
	a. 25% of Non-Transportation and Disposal Costs	25%		$4,855,000	$1,213,750
	b. 10% of Transportation and Disposal Costs	10%		$0	$0
	TOTAL CONSTRUCTION CAPITAL COST:				**$6,068,750**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
15	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
16	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$180,000	$180,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
17	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$680,000
18	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$680,000	$170,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$850,000**
	TOTAL CAPITAL COST:				**$7,000,000**
	ANNUAL O&M COST				
19	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Operation and Maintenance	1	LS	$375,000	$375,000
	c. Annual Electric Costs	1,314,000	kW-Hr	$0.20	$263,000
	d. POTW Discharge Fees	34,164,000	gal	$0.003	$85,000
	e. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	f. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$806,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$806,000	$201,500
	TOTAL ANNUAL O&M COST:				**$1,007,500**

TOTAL PRESENT NET WORTH

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
20 - Year Present Worth	3%	20	**$14,990,000**	**$21,990,000**

Alternative 11

Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION				
	a. Construction General Contractor	1	LS	$50,000	$50,000
	b. Drilling Subcontractor	1	LS	$25,000	$25,000
	c. Groundwater Treatment Plant Installer	1	LS	$50,000	$50,000
	d. In Situ Treatment Contractor	1	LS	$15,000	$15,000
	e. PRB Installation Contractor	0	LS	$65,000	$0
	SITE CIVIL WORK				
2	SITE PREPARATION	1	LS	$184,000	$184,000
3	TEMPORARY FACILITIES AND CONTROLS	3	MONTH	$33,000	$99,000
4	SOIL EXCAVATION				
	a. Soil with PCB concentrations < 50 mg/kg	0	CY	$20	$0
	b. Soil with PCB concentrations >UCL (TSCA)	0	CY	$20	$0
	c. Soil as RCRA/TSCA	0	CY	$20	$0
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	0	CY	$20	$0
	e. Excavation Shoring	0	SF	$35	$0
	f. Dewatering System Installation/Operation	0.0	LS	$250,000	$0
5	BACKFILL AND COMPACTION				
	a. Imported Clean Backfill	0	TON	$40	$0
	b. Backfill of Excavated Soils	0	TON	$5	$0
	b. Compaction Testing	0	days	$1,000	$0
6	TRANSPORTATION AND DISPOSAL				
	a. Soils with PCB concentrations < 50 mg/kg	0	TON	$85	$0
	b. Soils with PCB concentrations > 50 mg/kg (TSCA)	0	TON	$275	$0
	c. Soil as RCRA/TSCA	0	TON	$1,105	$0
	d. Shallow Debris as TSCA or RCRA/TSCA (10% of volume)	0	TON	$1,150	$0
	e. Treated Groundwater Disposal	0	GAL	$0.50	$0
7	VERTICAL BARRIER WALLS				
	a. Impermeable Barrier Wall	42,500	SF	$25	$1,063,000
8	CONDITIONING SOILS	0	TON	$3.16	$0
9	SEWER JETTING/LINING	979	LF	$250.00	$245,000
10	SITE RESTORATION				
	a. Engineered Barrier	16,072	SY	$24	$386,000
11	COMPLIANCE MW INSTALLATION	1	LS	$25,000	$25,000
	SUBTOTAL **CIVIL** CONSTRUCTION CAPITAL COST:				**$2,142,000**
	GROUNDWATER REMEDIATION				
12	HYDRAULIC CONTAINMENT SYSTEM				
	a. Groundwater Pumping Wells	5	EACH	$46,000	$230,000
	b. Groundwater Extraction Conveyance	1,200	LF	$150	$180,000
	c Outdoor Tank Area	1	LS	$134,000	$134,000
	d. Groundwater Treatment System	1	LS	$720,000	$720,000
	e. Treatment Building	2,400	SF	$125	$300,000
	f. Effluent Discharge Conveyance	1	LS	$50,000	$50,000
	g. Utilities to Treatment Building	1	LS	$90,000	$90,000

Alternative 11

Asphalt Cap over Soils With PCB Concentrations > 2 mg/kg and Engineered Barrier Over Soils with Concentrations Above UCLs, Overburden Groundwater Containment via Vertical Barrier Wall with Hydraulic Containment

Phase III RAP - OU 3
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	SUBTOTAL **GROUNDWATER REMEDIATION** CAPITAL COST:				**$1,704,000**
14	CONTINGENCY: (25% of Non-T&D construction capital cost)				
	a. 25% of Non-Transportation and Disposal Costs	25%		$3,846,000	$961,500
	b. 10% of Transportation and Disposal Costs	10%		$0	$0
	TOTAL CONSTRUCTION CAPITAL COST:				**$4,807,500**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
15	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$90,000	$90,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	b. Design and Contractor Procurement	1	LS	$250,000	$250,000
16	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$180,000	$180,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$50,000	$50,000
17	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$20,000	$20,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$680,000
18	CONTINGENCY: (25% of engineering and permitting capital cost)	25%		$680,000	$170,000
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$850,000**
	TOTAL CAPITAL COST:				**$5,700,000**
	ANNUAL O&M COST				
19	O&M				
	a. Quarterly Groundwater Monitoring and Reporting	4	EA	$19,000	$76,000
	b. Operation and Maintenance	1	LS	$375,000	$375,000
	c. Annual Electric Costs	1,314,000	kW-Hr	$0.20	$263,000
	d. POTW Discharge Fees	34,164,000	gal	$0.003	$85,000
	e. Remedial Cap Monitoring and Documentation (AUL)	1	LS	$5,000	$5,000
	f. Remedial Cap Maintenance and Repairs	1	LS	$2,000	$2,000
	Item Subtotal (Annual O&M)				$806,000
	CONTINGENCY: (25% of O&M annual cost)	25%		$806,000	$201,500
	TOTAL ANNUAL O&M COST:				**$1,007,500**
	TOTAL PRESENT NET WORTH				

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
30 - Year Present Worth	3%	30	**$19,748,000**	**$25,450,000**

Alternative 1

In-Situ Chemical Oxidation of Hot Spots and Monitored Natural Attenuation

Phase III RAP - OU 4
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	4	ea	$ 15,000	$60,000
2	WELL DECOMMISSIONING	36	EACH	$1,000	$36,000
3	NEW MONITORING WELLS (IF NEEDED)				
	a. 3 Wells per Hotspot Group	8	EACH	$20,000	$160,000
4	IN SITU CHEMICAL OXIDATION OF HOT SPOTS				
	a. Injection and Extraction Well Installation	1,550	LF	$275	$426,000
	b. Oxidant/Reagent Raw Materials	243,000	LB	$2.01	$488,400
	c. First Injection and Pulsed Recirculation	1	LS	$633,600	$633,600
	d. Second Injection and Pulsed Recirculation	1	LS	$280,500	$280,500
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$2,085,000
5	CONTINGENCY: (25% of construction capital cost)	25	%	$2,085,000	$521,250
	TOTAL CONSTRUCTION CAPITAL COST:				**$2,607,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
6	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$25,000	$25,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	c. Design and Contractor Procurement	1	LS	$100,000	$100,000
7	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$120,000	$120,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$15,000	$15,000
8	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$5,000	$5,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$355,000
9	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$355,000	$88,750
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$444,000**
	TOTAL CAPITAL COST:				**$3,100,000**
	ANNUAL O&M COST				
10	O&M				
	a. Groundwater Monitoring and Reporting	1	LS	$27,000	$27,000
	Item Subtotal (Annual O&M)				$27,000
11	CONTINGENCY: (25% of O&M annual cost)	25	%	$27,000	$6,750
	TOTAL ANNUAL O&M COST:				**$34,000**
	TOTAL PRESENT NET WORTH				

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
30 - Year Present Worth	3%	30	**$667,000**	**$3,770,000**

Alternative 2

In-Situ Thermal Treatment of Deep Bedrock Hot Spots, In-Situ Chemical Oxidation of Shallow Bedrock Hot Spots and Monitored Natural Attenuation

Phase III RAP - OU 4
Former Aerovox Facility

Item	Cost Component	Quantity	Units	Unit Costs	Line Item Costs
	CONSTRUCTION CAPITAL COST				
1	MOBILIZATION & DEMOBILIZATION	1	LS	$ 168,000	$168,000
2	EXISTING WELL DECOMMISSIONING	36	EACH	$1,000	$36,000
3	NEW MONITORING WELLS				
	a. 3 Wells per Hotspot Group	2	EACH	$20,000	$40,000
4	IN SITU TREATMENT OF HOT SPOTS				
	a. Thermal Treatment (Deep Bedrock)	60,100	CY	$132	$7,933,000
	b. Chemical Oxidation (Shallow Bedrock)				
	i. Injection Well Installation	140	LF	$275	$39,000
	ii. Oxidant/Reagent Raw Materials	122,000	LB	$1.27	$155,000
	iii. Injection and Pulsed Recirculation	1	LS	$201,300	$201,000
	SUBTOTAL CONSTRUCTION CAPITAL COST:				$8,572,000
5	CONTINGENCY: (25% of construction capital cost)	25	%	$8,572,000	$2,143,000
	TOTAL CONSTRUCTION CAPITAL COST:				**$10,715,000**
	ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST				
6	PRE-CONSTRUCTION ENGINEERING AND PERMITTING				
	a. Remedial Implementation Plan	1	LS	$25,000	$25,000
	b. Treatability/Field Pilot Testing	1	LS	$70,000	$70,000
	c. Design and Contractor Procurement	1	LS	$100,000	$100,000
7	CONSTRUCTION SUPPORT, OBSERVATION AND DOCUMENTATION				
	a. Construction Observation & Quality Assurance	1	LS	$90,000	$90,000
	b. Phase IV Completion Report, As-builts, Remedy Operation Status & Final Inspection Reports	1	LS	$15,000	$15,000
8	POST-CONSTRUCTION DOCUMENTATION				
	a. Phase V Completion Statement	1	LS	$5,000	$5,000
	b. AUL to Restrict Site Use	1	LS	$20,000	$20,000
	SUBTOTAL ENGINEERING, PERMITTING, AND DOCUMENTATION CAPITAL COST:				$325,000
9	CONTINGENCY: (25% of engineering and permitting capital cost)	25	%	$325,000	$81,250
	TOTAL ENGINEERING, PERMITTING AND DOCUMENTATION CAPITAL COST:				**$407,000**
	TOTAL CAPITAL COST:				**$11,200,000**
	ANNUAL O&M COST				
10	O&M				
	a. Groundwater Monitoring and Reporting	1	LS	$27,000	$27,000
	Item Subtotal (Annual O&M)				$27,000
11	CONTINGENCY: (25% of O&M annual cost)	25	%	$27,000	$6,750
	TOTAL ANNUAL O&M COST:				**$34,000**
	TOTAL PRESENT NET WORTH				

	Yearly Interest Rate	Number Years	O&M Present Worth	Total Present Worth
30 - Year Present Worth	3%	30	**$667,000**	**$11,900,000**

Appendix J: Greener Cleanups Supporting Information

Appendix J – Greener Cleanups

Technical Summary Form

1.0 General Information: The user's name and organization, date, property name, site location, cleanup program, and lead oversight agency are all provided in the Phase III Remedial Action Plan to which this appendix is attached. The MADEP Site Tracking No. and Administrative Consent Order Numbers Phase III Remedial Action Plan.

2.0 Site Status Information: The current cleanup phase is described in the Phase III Remedial Action Plan. The contaminants at the site; current, historical and reasonably anticipated future uses of the site; potential human or ecological receptors, and uses of adjacent properties are described in the Phase III Remedial Action Plan. Stakeholder involvement in the site includes the City of New Bedford, property abutters, and neighboring residents and business owners. Past or ongoing cleanup activities; technologies or engineering controls implemented, and cleanup goals are described in the Phase III Remedial Action Plan. Portions of the site are proposed for activity and use limitations for the Site are planned at this time, specifically, capping of areas and limitations on future use of groundwater.

3.0 Application of Guide: The Best Management Practices (BMP) Evaluation Process has been applied to the selected remedy for each of the Operable Units. The alternatives evaluated are:

- OU1-3B: Excavation of All Soils with PCB Concentrations Greater Than 1 mg/kg and On-Site Consolidation;
- OU2-1: Monitored Subslab Soil Gas Attenuation and an AUL;
- OU3-9: Excavation and on-site consolidation of soils within 25 feet of shoreline above peat and down to bedrock within the northeast corner, engineered barrier over areas with PCBs >100 mg/kg and asphalt cap over areas with PCBs >2 mg/kg, partial containment and treatment of groundwater with permeable reactive barrier, in-situ treatment of plume hot spot;
- Alternative OU4-1: In situ Chemical Oxidation of Hot Spots and Monitored Natural Attenuation

4.0 Environmental Footprint Reduction: The selected remedy alternative for each OU was the remedy that had the highest green remediation value. Estimated environmental footprint reductions anticipated through incorporation of additional BMPs during the design and construction process as described by the BMP evaluation are in the following core elements: energy, air, materials and waste, and land and ecosystems. The largest reduction core element for each of the OUs is quantitatively evaluated to be:

- OU1-3B: energy, materials and waste
- OU2-1: materials and waste
- OU3-9: energy, materials and waste
- OU4-1: materials and waste

5.0 BMP Process Summary: Tables J-1, J-2, J-3, and J-4 provides a summary of the BMP Evaluation Process for each of the four OUs. All BMPs that are listed as potentially applicable to each of these remedies as described in Table X3.1 of the ASTM standard were included in the evaluation. Each of these BMPs were ranked as either low, medium or high with respect to their

potential for a greener cleanup. A comment was provided to explain the rationale for those BMPs that were considered not applicable, or were not retained for further consideration.

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Buildings	Use graywater collection systems at on-site buildings for water during cleanup activities, to minimize freshwater use.	Excavation and Surface Restoration			X			Not Applicable	No	Access to building not part of remedy.
Materials	For landfill covers, use minimum slope while maintaining proper drainage to reduce the volume of fill material required.	Excavation and Surface Restoration				X	X	Not applicable	No	Not applicable to this remedy.
Materials	Select oxidants/reagents with a smaller environmental footprint.	Excavation and Surface Restoration				X	X	Not applicable	No	No oxidants/reagents incorporated in this remedy.
Materials	Select products that are environmentally preferable (when compared to other products serving the same purpose) with respect to raw materials consumption, manufacturing processes and locations, packaging, distribution, recycled content and recycling capability, maintenance needs, and disposal procedures.	Excavation and Surface Restoration				X		High	Yes	
Materials	Steam-clean or use phosphate-free detergents or biodegradable cleaning products instead of organic solvents or acids to decontaminate sampling and other equipment.	Excavation and Surface Restoration			X	X	X	Low	Yes	

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Use biobased products to reduce petroleum use or enhance degradation of material. For example, use biodegradable seed matting, or erosion control fabrics containing agricultural by-products; use algae based oils, soybean oil, or waste/by-products from forestries, plant nurseries, or food processing/retail industries as a substrate for bioremediation.	Excavation and Surface Restoration				X		Medium	Yes	
Materials	Use materials with recycled content (for example, concrete and/or asphalt from recycled, crushed concrete and/or asphalt; plastic made from recycled plastic; geotextile fabrics/tarps made with recycled content).	Excavation and Surface Restoration				X		High	Yes	
Power and Fuel	Purchase renewable energy via local utility and Green Energy Programs or RECs/Green Tags to power cleanup activities.	Excavation and Surface Restoration	X	X				Medium	No	Not applicable to this remedy.
Power and Fuel	Use a flexible on-site renewable energy system to meet energy demands of multiple activities or consumption needs beyond the lifespan of the cleanup.	Excavation and Surface Restoration	X	X				Low	No	Not applicable to this remedy.
Power and Fuel	Use biodiesel produced from waste or cellulose-based products to power equipment.	Excavation and Surface Restoration	X			X		Medium	Yes	If biodiesel is not applicable, low-sulfur diesel is an option to consider as well.

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Power and Fuel	Use on-site generated renewable energy such as solar photovoltaic, wind turbines, landfill gas, geothermal, and biomass combustion to fully or partially provide power otherwise generated through on-site fuel consumption or use of grid electricity,	Excavation and Surface Restoration	X	X				Low	No	Renewable energy systems are not available on Site.
Power and Fuel	Use solar power pack system for low-power system demands (for example, security lighting, system telemetry).	Excavation and Surface Restoration	X					Low	Yes	Evaluate for use for on-site weather or air monitoring stations
Project Planning and Team Management	Buy carbon offset credits (for example, for airline flights) when in-person meetings are required.	Excavation and Surface Restoration		X				Medium	No	Local staff for project
Project Planning and Team Management	Choose equipment and product vendors with production and distribution centers near the site to minimize fuel consumption associated with delivery.	Excavation and Surface Restoration	X	X				High	Yes	
Project Planning and Team Management	Choose suppliers that will take back scraps or unused materials.	Excavation and Surface Restoration				X		Low	Yes	
Project Planning and Team Management	Contract a laboratory that uses green practices and/or chemicals.	Excavation and Surface Restoration	X	X	X	X	X	Low	Yes	

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Project Planning and Team Management	Designate collection points for compostable materials and routine recycling of single-use items such as metal, plastic, and glass containers; paper and cardboard; and other items that may be recycled locally.	Excavation and Surface Restoration	X			X		High	Yes	
Project Planning and Team Management	Establish green requirements as evaluation criteria in the selection of contractors and include language in RFPs, RFQs, subcontracts, contracts, etc. (e.g. procure remediation reagents from vendors with sustainable policies).	Excavation and Surface Restoration	X	X	X	X	X	High	Yes	
Project Planning and Team Management	Select facilities with green policies for worker accommodations and periodic meetings.	Excavation and Surface Restoration	X	X	X	X		Low	No	Not expected to be a large component of total site remedy environmental footprint.
Project Planning and Team Management	Select local waste disposal and recycling facilities to minimize transportation impacts.	Excavation and Surface Restoration	X	X				High	Yes	
Project Planning and Team Management	Use a local laboratory to minimize transportation impacts.	Excavation and Surface Restoration	X	X				High	Yes	
Project Planning and Team Management	Use local staff (including subcontractors) when possible to minimize transportation impacts.	Excavation and Surface Restoration	X	X				High	Yes	
Residual Solid and Liquid Waste	Reuse or recycle recovered product and materials.	Excavation and Surface Restoration				X		High	Yes	

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Residual Solid and Liquid Waste	Salvage uncontaminated objects/infrastructure with potential to recycle, re-sell, donate, or reuse.	Excavation and Surface Restoration				X		High	Yes	
Residual Solid and Liquid Waste	Employ close-loop graywater washing system for truck decontamination.	Excavation and Surface Restoration			X			Medium	Yes	
Residual Solid and Liquid Waste	Segregate drilling or excavation waste based on location and composition to reduce the volume of drilling waste disposed off-site; collect needed analytical data to make on-site reuse decisions.	Excavation and Surface Restoration	X	X		X		High	Yes	
Sampling and Analysis	Use a multi-port sampling system in monitoring wells to minimize the number of wells needing to be installed.	Excavation and Surface Restoration				X	X	Not applicable	No	Not applicable to this phase of work.
Sampling and Analysis	Use dedicated materials (that is, re-use of sampling equipment and non-use of disposable materials/equipment) when performing multiple rounds of sampling.	Excavation and Surface Restoration				X		Low	No	
Sampling and Analysis	Use direct sensing non-invasive, technology such as membrane interface probe, x-ray fluorescence etc.	Excavation and Surface Restoration	X	X		X	X	Not applicable	No	Not applicable to this remedy.
Sampling and Analysis	Use drilling methods which minimize the generation and disposal of cuttings (for example, sonic technology).	Excavation and Surface Restoration	X	X		X	X	Not applicable	No	Not applicable to this remedy.

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Sampling and Analysis	Use field test kits for screening analysis of soil and groundwater contaminants such as petroleum, polychlorinated biphenyls, pesticides, explosives, and inorganics to minimize the need for off-site laboratory analyses and associated sample packing and shipping.	Excavation and Surface Restoration	X	X		X		Medium	Yes	
Sampling and Analysis	Use on-site mobile laboratory or other field analyses (for example, portable gas chromatography/mass spectrometry for fuel-related compounds and VOCs) to minimize the need for off-site laboratory analyses and associated sample packing and shipping.	Excavation and Surface Restoration	X	X		X		Low	No	On-site laboratory not cost effective and rapid turnaround is not required.
Site Preparation and Land Restoration	Cover filled excavations with biodegradable fabric to control erosion and serve as a substrate for ecosystems.	Excavation and Surface Restoration			X	X	X	High	Yes	
Site Preparation and Land Restoration	For restoration, use a suitable mix of trees, shrubs, grasses, and forbs to preserve or improve biodiversity and related ecosystem services.	Excavation and Surface Restoration			X		X	High	Yes	
Site Preparation and Land Restoration	If grass is required, use no- or low-mowing species to minimize mowing.	Excavation and Surface Restoration	X	X				High	Yes	

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Incorporate wetlands, grassed swales, or grass-lined channels, bioswales, and other types of vegetated areas to enhance gradual infiltration and evapotranspiration, prevent soil and sediment runoff, and promote carbon sequestration.	Excavation and Surface Restoration		X	X		X	High	Yes	
Site Preparation and Land Restoration	Minimize clearing of trees throughout investigation and cleanup.	Excavation and Surface Restoration	X	X	X	X	X	High	Yes	
Site Preparation and Land Restoration	Minimize dewatering prior to excavation by relying on cold conditions or using ground-freezing technologies, if environmentally beneficial.	Excavation and Surface Restoration	X	X	X	X		Not applicable	No	Not applicable to proposed remedy.
Site Preparation and Land Restoration	Restore and/or maintain ecosystems in ways that mirror natural conditions.	Excavation and Surface Restoration			X		X	High	Yes	
Site Preparation and Land Restoration	Minimize soil compaction and land disturbance during site activities by restricting traffic to confined corridors and protecting ground surface.	Excavation and Surface Restoration			X		X	Medium	Yes	
Site Preparation and Land Restoration	Reuse on-site or local clean materials rather than importing borrowed fill.	Excavation and Surface Restoration	X	X		X		High	Yes	
Site Preparation and Land Restoration	Maximize use of non-invasive, and/or drought resistant vegetative cover during restoration to minimize use of water and amendments.	Excavation and Surface Restoration				X	X	High	Yes	

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Use an integrated pest management plan or green alternatives (e.g. non-chemical solarizing techniques) to minimize use of chemical pesticides.	Excavation and Surface Restoration			X	X	X	Medium	Yes	
Site Preparation and Land Restoration	Use biodegradable covers to protect and preserve healthy plants from land-disturbing activities.	Excavation and Surface Restoration			X		X	Medium	Yes	
Site Preparation and Land Restoration	Use crushed concrete as a construction aggregate for road base, pipe bedding, or landscaping.	Excavation and Surface Restoration				X		Low	No	Evaluate for use in construction of temporary roads during remedy implementation.
Site Preparation and Land Restoration	Use excavated areas to serve as retention basins in final storm water control plan.	Excavation and Surface Restoration	X	X	X	X	X	Not applicable	No	
Site Preparation and Land Restoration	Use pervious surface material such as porous pavement or gravel and separated pervious surfaces, rather than impermeable materials, when installing hardscape to maximize infiltration.	Excavation and Surface Restoration			X		X	Medium	Yes	
Site Preparation and Land Restoration	Use reclaimed asphalt pavement as a granular base for new roads.	Excavation and Surface Restoration				X		Not applicable	No	No new permanent roads to be constructed for this remedy.
Site Preparation and Land Restoration	Use silica-based spent foundry sands from iron, steel, and aluminum foundries in soil-related applications such as manufactured soils and roadway subbase.	Excavation and Surface Restoration				X		Not applicable	No	No new permanent roads to be constructed for this remedy.

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Downed trees and snags provide habitat for numerous species, do not remove unless required for safety or access, and allow leaf litter to remain for natural mulching and weed control.	Excavation and Surface Restoration			X	X	X	Low	Yes	
Surface/ Storm Water	Capture rainwater for tasks such as wash water, irrigation, dust control, constructed wetlands, etc.	Excavation and Surface Restoration			X		X	Medium	Yes	
Surface/ Storm Water	For a landfarm, use a leachate collection and treatment system to fully preserve the quality of downgradient water bodies, soil, and groundwater.	Excavation and Surface Restoration			X		X	Not applicable	No	Not applicable to this remedy.
Surface/ Storm Water	Install a landfarm rain shield to capture rainwater for potential onsite use.	Excavation and Surface Restoration			X			Not applicable	No	Not applicable to this remedy.
Surface/ Storm Water	Use subsurface/vertical flow wetlands rather than surface flow wetlands when possible to allow use of a greater range of plant species.	Excavation and Surface Restoration			X		X	Not applicable	No	Not applicable to this remedy.
Vehicles and Equipment	When using large equipment, employ auxiliary power units to power cab heating and cooling when a machine/vehicle is not operating (such as SmartWay generator or plug in outlet) to reduce idling.	Excavation and Surface Restoration	X	X				Low	Yes	
Vehicles and Equipment	Implement an idle reduction plan.	Excavation and Surface Restoration	X	X			X	High	Yes	

Table J-1: Greener Cleanups BMPs (OU1-3B) Excavation, On-site Consolidation of Soils, and Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Vehicles and Equipment	Use biodegradable hydraulic fluids on hydraulic equipment such as drill rigs.	Excavation and Surface Restoration					X	Med	Yes	
Vehicles and Equipment	Replace conventional vehicles with electric, hybrid, ethanol, or compressed gas vehicles.	Excavation and Surface Restoration	X	X				Not applicable	No	Evaluate for long-term on-site vehicles such as buggies or mules.
Vehicles and Equipment	Use retrofitted engines that use ultra-low, low-sulfur diesel, or alternative fuels; or filter treatment devices to achieve BACT or MACT.	Excavation and Surface Restoration		X				Low	Yes	
Vehicles and Equipment	Use SmartWay transportation retrofits on tractor trailers whenever possible.	Excavation and Surface Restoration	X	X				Not applicable	No	Use of tractor-trailers is not anticipated.

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Buildings	Use graywater collection systems at on-site buildings for water during cleanup activities, to minimize freshwater use.	Monitored and Natural Attenuation			X			Not applicable	No	Access to building for sampling only.
Materials	Implement a flexible network of piping to allow for shorter piping runs and future modular increases or decreases in the extraction or injection rates and treatment modifications.	Monitored and Natural Attenuation	X	X	X	X	X	Low	No	Not applicable to this remedy.
Materials	Insulate all applicable pipes and equipment to improve energy efficiency with greener insulation material.	Monitored and Natural Attenuation	X			X		Low	No	Not applicable to this remedy.
Materials	Link a deconstruction project with a replacement construction project to facilitate reuse of clean, salvaged materials.	Monitored and Natural Attenuation				X		Not applicable	No	Not applicable to this remedy.
Materials	Maximize the reuse of existing wells for sampling, injections, or extractions, where appropriate, and/or design wells for future reuse.	Monitored and Natural Attenuation	X	X		X	X	High	Yes	Reuse existing wells where possible.
Materials	Select oxidants/reagents with a smaller environmental footprint.	Monitored and Natural Attenuation				X	X	Low	No	Not applicable to this remedy.
Materials	Select piping materials and treatment equipment to facilitate their reuse.	Monitored and Natural Attenuation				X		Medium	No	All materials to be installed are expected to be dedicated/one-use.

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Select products that are environmentally preferable (when compared to other products serving the same purpose) with respect to raw materials consumption, manufacturing processes and locations, packaging, distribution, recycled content and recycling capability, maintenance needs, and disposal procedures.	Monitored and Natural Attenuation				X		High	Yes	
Materials	Steam-clean or use phosphate-free detergents or biodegradable cleaning products instead of organic solvents or acids to decontaminate sampling and other equipment.	Monitored and Natural Attenuation			X	X	X	Low	Yes	
Materials	Use biobased products to reduce petroleum use or enhance degradation of material. For example, use biodegradable seed matting, or erosion control fabrics containing agricultural by-products; use algae based oils, soybean oil, or waste/by-products from forestries, plant nurseries, or food processing/retail industries as a substrate for bioremediation.	Monitored and Natural Attenuation				X		Medium	Yes	Not applicable to this remedy.

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Use by-products, waste, or less refined materials in place of refined chemicals or materials.	Monitored and Natural Attenuation				X		Medium	No	Not applicable to this remedy.
Materials	Use materials with recycled content (for example, concrete and/or asphalt from recycled, crushed concrete and/or asphalt; plastic made from recycled plastic; geotextile fabrics/tarps made with recycled content).	Monitored and Natural Attenuation				X		High	Yes	
Power and Fuel	Install amp meters to evaluate electricity consumption rates on a real-time basis and options for off-peak energy usage.	Monitored and Natural Attenuation	X					Low	No	Not applicable to this remedy.
Power and Fuel	Purchase renewable energy via local utility and Green Energy Programs or RECs/Green Tags to power cleanup activities.	Monitored and Natural Attenuation	X	X				Medium	No	MNA will not have long-term power usage, and installation of new wells not expected to have high electrical energy use.
Power and Fuel	Use a flexible on-site renewable energy system to meet energy demands of multiple activities or consumption needs beyond the lifespan of the cleanup.	Monitored and Natural Attenuation	X	X				Low	No	Not applicable to this remedy
Power and Fuel	Use biodiesel produced from waste or cellulose-based products to power equipment.	Monitored and Natural Attenuation	X			X		Medium	Yes	If biodiesel is not applicable, low-sulfur diesel is an option to consider as well.

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Power and Fuel	Use gravity flow to introduce amendments or chemical oxidants to the subsurface when high-pressure injection is unnecessary.	Monitored and Natural Attenuation	X			X		High	No	Not applicable to this remedy
Power and Fuel	Use on-site generated renewable energy such as solar photovoltaic, wind turbines, landfill gas, geothermal, and biomass combustion to fully or partially provide power otherwise generated through on-site fuel consumption or use of grid electricity.	Monitored and Natural Attenuation	X	X				Low	No	Not applicable for this remedy
Power and Fuel	Use solar power pack system for low-power system demands (for example, security lighting, system telemetry).	Monitored and Natural Attenuation	X					Low	Yes	
Power and Fuel	When possible, operate remediation system during off-peak hours of electrical demand without compromising cleanup progress.	Monitored and Natural Attenuation	X					Low	No	Dependent upon local requirements for hours of construction.
Project Planning and Team Management	Buy carbon offset credits (for example, for airline flights) when in-person meetings are required.	Monitored and Natural Attenuation		X				Medium	No	Local staff for project
Project Planning and Team Management	Choose equipment and product vendors with production and distribution centers near the site to minimize fuel consumption associated with delivery.	Monitored and Natural Attenuation	X	X				High	Yes	

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Project Planning and Team Management	Choose suppliers that will take back scraps or unused materials.	Monitored and Natural Attenuation				X		Low	Yes	
Project Planning and Team Management	Contract a laboratory that uses green practices and/or chemicals.	Monitored and Natural Attenuation	X	X	X	X	X	Low	Yes	
Project Planning and Team Management	Designate collection points for compostable materials and routine recycling of single-use items such as metal, plastic, and glass containers; paper and cardboard; and other items that may be recycled locally.	Monitored and Natural Attenuation	X			X		High	Yes	
Project Planning and Team Management	Establish green requirements as evaluation criteria in the selection of contractors and include language in RFPs, RFQs, subcontracts, contracts, etc. (e.g. procure remediation reagents from vendors with sustainable policies).	Monitored and Natural Attenuation	X	X	X	X	X	High	Yes	
Project Planning and Team Management	Select facilities with green policies for worker accommodations and periodic meetings.	Monitored and Natural Attenuation	X	X	X	X		Low	No	Not applicable to this remedy.
Project Planning and Team Management	Select local waste disposal and recycling facilities to minimize transportation impacts.	Monitored and Natural Attenuation	X	X				High	Yes	

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Project Planning and Team Management	Use a local laboratory to minimize transportation impacts.	Monitored and Natural Attenuation	X	X				High	Yes	
Project Planning and Team Management	Use local staff (including subcontractors) when possible to minimize transportation impacts.	Monitored and Natural Attenuation	X	X				High	Yes	
Residual Solid and Liquid Waste	Reuse or recycle recovered product and materials.	Monitored and Natural Attenuation				X		High	Yes	
Residual Solid and Liquid Waste	Salvage uncontaminated objects/infrastructure with potential to recycle, re-sell, donate, or reuse.	Monitored and Natural Attenuation				X		High	Yes	
Residual Solid and Liquid Waste	Employ close-loop graywater washing system for truck decontamination.	Monitored and Natural Attenuation			X			Medium	Yes	
Residual Solid and Liquid Waste	Segregate drilling or excavation waste based on location and composition to reduce the volume of drilling waste disposed off-site; collect needed analytical data to make on-site reuse decisions.	Monitored and Natural Attenuation	X	X		X		High	Yes	
Sampling and Analysis	Use a multi-port sampling system in monitoring wells to minimize the number of wells needing to be installed.	Monitored and Natural Attenuation				X	X	Low	No	Not applicable to the remedy
Sampling and Analysis	Use a passive/no purge groundwater sampling system.	Monitored and Natural Attenuation			X	X		High	Yes	

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Sampling and Analysis	Use dedicated materials (that is, re-use of sampling equipment and non-use of disposable materials/equipment) when performing multiple rounds of sampling.	Monitored and Natural Attenuation				X		Low	Yes	
Sampling and Analysis	Use direct sensing non-invasive, technology such as membrane interface probe, x-ray fluorescence etc.	Monitored and Natural Attenuation	X	X		X	X	Not applicable	No	Not applicable to this remedy.
Sampling and Analysis	Use drilling methods which minimize the generation and disposal of cuttings (for example, sonic technology).	Monitored and Natural Attenuation	X	X		X	X	High	Yes	
Sampling and Analysis	Use field test kits for screening analysis of soil and groundwater contaminants such as petroleum, polychlorinated biphenyls, pesticides, explosives, and inorganics to minimize the need for off-site laboratory analyses and associated sample packing and shipping.	Monitored and Natural Attenuation	X	X		X		Medium	Yes	

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Sampling and Analysis	Use on-site mobile laboratory or other field analyses (for example, portable gas chromatography/mass spectrometry for fuel-related compounds and VOCs) to minimize the need for off-site laboratory analyses and associated sample packing and shipping.	Monitored and Natural Attenuation	X	X		X		Low	No	On-site laboratory not cost effective and rapid turnaround is not required.
Site Preparation and Land Restoration	For restoration, use a suitable mix of trees, shrubs, grasses, and forbs to preserve or improve biodiversity and related ecosystem services.	Monitored and Natural Attenuation			X		X	High	No	Not applicable for this remedy
Site Preparation and Land Restoration	Minimize clearing of trees throughout investigation and cleanup.	Monitored and Natural Attenuation	X	X	X	X	X	High	No	Not applicable for this remedy
Site Preparation and Land Restoration	Minimize soil compaction and land disturbance during site activities by restricting traffic to confined corridors and protecting ground surface.	Monitored and Natural Attenuation			X		X	Medium	No	Not applicable for this remedy
Site Preparation and Land Restoration	Use biodegradable covers to protect and preserve healthy plants from land-disturbing activities.	Monitored and Natural Attenuation			X		X	Medium	Yes	
Site Preparation and Land Restoration	Use crushed concrete as a construction aggregate for road base, pipe bedding, or landscaping.	Monitored and Natural Attenuation				X		High	No	Not applicable to this remedy.

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Use excavated areas to serve as retention basins in final storm water control plan.	Monitored and Natural Attenuation	X	X	X	X	X	Not applicable	No	Not applicable to this remedy.
Site Preparation and Land Restoration	Use pervious surface material such as porous pavement or gravel and separated pervious surfaces, rather than impermeable materials, when installing hardscape to maximize infiltration.	Monitored and Natural Attenuation			X		X	Medium	No	Not applicable to this remedy.
Site Preparation and Land Restoration	Use reclaimed asphalt pavement as a granular base for new roads.	Monitored and Natural Attenuation				X		Not applicable	No	Not applicable to this remedy.
Site Preparation and Land Restoration	Use silica-based spent foundry sands from iron, steel, and aluminum foundries in soil-related applications such as manufactured soils and roadway subbase.	Monitored and Natural Attenuation				X		Not applicable	No	Not applicable to this remedy.
Surface/ Storm Water	Capture rainwater for tasks such as wash water, irrigation, dust control, constructed wetlands, etc.	Monitored and Natural Attenuation			X		X	Medium	Yes	
Vehicles and Equipment	Implement an idle reduction plan.	Monitored and Natural Attenuation	X	X			X	High	Yes	
Vehicles and Equipment	Use biodegradable hydraulic fluids on hydraulic equipment such as drill rigs.	Monitored and Natural Attenuation					X	Med	Yes	

Table J-2: Greener Cleanup BMPs (OU2-1)

Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Vehicles and Equipment	Replace conventional vehicles with electric, hybrid, ethanol, or compressed gas vehicles.	Monitored and Natural Attenuation	X	X				Low	Yes	Evaluate for long-term on-site vehicles such as buggies or mules.
Vehicles and Equipment	Use equipment to increase automation such as electronic pressure transducers, thermo-couples, and water quality monitoring devices coupled with an automatic data logger to optimize operation and minimize transportation of staff to the site.	Monitored and Natural Attenuation	X	X	X			Medium	Yes	
Vehicles and Equipment	Use retrofitted engines that use ultra-low, low-sulfur diesel, or alternative fuels; or filter treatment devices to achieve BACT or MACT.	Monitored and Natural Attenuation		X				Low	Yes	
Vehicles and Equipment	Use SmartWay transportation retrofits on tractor trailers whenever possible.	Monitored and Natural Attenuation	X	X				Not applicable	No	Use of tractor-trailers is not anticipated.

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Buildings	Capture roof runoff for on-site use, as appropriate based on the water quality.	In-situ Chemical Oxidation/ Bioremediation			X			Low	No	No buildings on site
Buildings	Use graywater collection systems at on-site buildings for water during cleanup activities, to minimize freshwater use.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X			Low	No	No buildings on site
Materials	For landfill covers, use minimum slope while maintaining proper drainage to reduce the volume of fill material required.	Excavation & Surface Restoration				X	X	Not applicable	No	No landfill covers are proposed as part of remedy.
Materials	For the reactive component of permeable subsurface treatment barriers, use locally available materials, by-products, or less-refined materials in place of refined chemicals or materials, where possible, without compromising site-specific performance and longevity goals.	Subsurface Containment & Treatment Barriers				x		Medium	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Implement a flexible network of piping (under and/or aboveground) to allow for shorter piping runs and future modular increases or decreases in the extraction or injection rates and treatment modifications	In-situ Chemical Oxidation/ Bioremediation	X	X	X	X	X	Medium	Yes	
Materials	Insulate all applicable pipes and equipment to improve energy efficiency with greener insulation material.	In-situ Chemical Oxidation/ Bioremediation	X			X		Low	Yes	
Materials	Link a deconstruction project with a replacement construction project to facilitate reuse of clean, salvaged materials.	In-situ Chemical Oxidation/ Bioremediation				X		Not applicable	No	Not applicable to this remedy.
Materials	Maximize the reuse of existing wells for sampling, injections, or extractions, where appropriate, and/or design wells for future reuse.	In-situ Chemical Oxidation/ Bioremediation Subsurface Containment & Treatment Barriers	X	X		X	X	High	Yes	
Materials	Select oxidants/reagents with a smaller environmental footprint.	In-situ Chemical Oxidation/ Bioremediation Excavation & Surface Restoration				X	X	Medium	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Select piping materials and treatment equipment to facilitate their reuse.	In-situ Chemical Oxidation/ Bioremediation				X		Medium	Yes	
Materials	Select products that are environmentally preferable (when compared to other products serving the same purpose) with respect to raw materials consumption, manufacturing processes and locations, packaging, distribution, recycled content and recycling capability, maintenance needs, and disposal procedures.	In-situ Chemical Oxidation/ Bioremediation Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X		High	Yes	
Materials	Steam-clean or use phosphate-free detergents or biodegradable cleaning products instead of organic solvents or acids to decontaminate sampling and other equipment.	In-situ Chemical Oxidation/ Bioremediation Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X	X	X	Low	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Use biobased products to reduce petroleum use or enhance degradation of material. For example, use biodegradable seed matting, or erosion control fabrics containing agricultural by-products; use algae based oils, soybean oil, or waste/by-products from forestries, plant nurseries, or food processing/retail industries as a substrate for bioremediation.	In-situ Chemical Oxidation/ Bioremediation , Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X		Medium	Yes	
Materials	Use by-products, waste, or less refined materials in place of refined chemicals or materials.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers				X		Medium	Yes	
Materials	Use materials with recycled content (for example, concrete and/or asphalt from recycled, crushed concrete and/or asphalt; plastic made from recycled plastic; geotextile fabrics/tarps made with recycled content).	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X		High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Use reconstituted reactive media or regenerate ionic adsorption material whenever feasible.	In-situ Chemical Oxidation/ Bioremediation				X		Medium	Yes	
Power and Fuel	Install amp meters to evaluate electricity consumption rates on a real-time basis and options for off-peak energy usage.	In-situ Chemical Oxidation/ Bioremediation	X					Low	Yes	
Power and Fuel	Purchase renewable energy via local utility and Green Energy Programs or RECs/Green Tags to power cleanup activities.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				Low	Yes	
Power and Fuel	Use a flexible on-site renewable energy system to meet energy demands of multiple activities or consumption needs beyond the lifespan of the cleanup.	In-situ Chemical Oxidation/ Bioremediation Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				Low	No	Long term operation will not require on-going energy needs

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Power and Fuel	Use biodiesel produced from waste or cellulose-based products to power equipment.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X			X		Medium	Yes	If biodiesel is not applicable, low-sulfur diesel is an option to consider as well.
Power and Fuel	Use gravity flow to introduce amendments or chemical oxidants to the subsurface when high-pressure injection is unnecessary	In-situ Chemical Oxidation/ Bioremediation	X			X		High	Yes	
Power and Fuel	Use on-site generated renewable energy such as solar photovoltaic, wind turbines, landfill gas, geothermal, and biomass combustion to fully or partially provide power otherwise generated through on-site fuel consumption or use of grid electricity.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				Low	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Power and Fuel	Use solar power pack system for low-power system demands (for example, security lighting, system telemetry).	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X					Low	Yes	
Power and Fuel	When possible, operate remediation system during off-peak hours of electrical demand without compromising cleanup progress.	In-situ Chemical Oxidation/ Bioremediation	X					Low	No	Dependent upon local requirements for hours of construction, overnight operations not expected.
Project Planning and Team Management	Buy carbon offset credits (for example, for airline flights) when in-person meetings are required.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration		X				Medium	No	Local staff for project

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Project Planning and Team Management	Choose equipment and product vendors with production and distribution centers near the site to minimize fuel consumption associated with delivery.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				High	Yes	
Project Planning and Team Management	Choose suppliers that will take back scraps or unused materials.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X		Low	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Project Planning and Team Management	Contract a laboratory that uses green practices and/or chemicals.	In-situ Chemical Oxidation/ Bioremediation,, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X	X	X	X	Low	Yes	
Project Planning and Team Management	Designate collection points for compostable materials and routine recycling of single-use items such as metal, plastic, and glass containers; paper and cardboard; and other items that may be recycled locally.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X			X		High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Project Planning and Team Management	Establish green requirements as evaluation criteria in the selection of contractors and include language in RFPs, RFQs, subcontracts, contracts, etc. (e.g. procure remediation reagents from vendors with sustainable policies).	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X	X	X	X	High	Yes	
Project Planning and Team Management	Select facilities with green policies for worker accommodations and periodic meetings.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X	X	X		Low	No	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Project Planning and Team Management	Select local waste disposal and recycling facilities to minimize transportation impacts.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				High	Yes	
Project Planning and Team Management	Use a local laboratory to minimize transportation impacts.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				High	Yes	
Project Planning and Team Management	Use local staff (including subcontractors) when possible to minimize transportation impacts.	In-situ Chemical Oxidation/ Bioremediation, Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Residual Solid and Liquid Waste	For PRBs, use existing excavation, deep soil mixing, injection or other subsurface infrastructure to minimize volume of excavated soil.	Subsurface Containment & Treatment Barriers	X	X		X	X	Medium	Yes	
Residual Solid and Liquid Waste	Reuse or recycle recovered product and materials.	In-situ Chemical Oxidation/ Bioremediation, Excavation & Surface Restoration				X		High	No	Product recovery not applicable for this remedy
Residual Solid and Liquid Waste	Salvage uncontaminated objects/infrastructure with potential to recycle, re-sell, donate, or reuse.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X		High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Residual Solid and Liquid Waste	Employ close-loop graywater washing system for truck decontamination.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X			Medium	Yes	
Residual Solid and Liquid Waste	Segregate drilling or excavation waste based on location and composition to reduce the volume of drilling waste disposed off-site; collect needed analytical data to make on-site reuse decisions.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X		X		High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Sampling and Analysis	Use a multi-port sampling system in monitoring wells to minimize the number of wells needing to be installed.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X	X	Low	Yes	
Sampling and Analysis	Use a passive/no purge groundwater sampling system.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers			X	X		High	Yes	
Sampling and Analysis	Use dedicated materials (that is, re-use of sampling equipment and non-use of disposable materials/equipment) when performing multiple rounds of sampling.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X		Low	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Sampling and Analysis	Use direct sensing non-invasive, technology such as membrane interface probe, x-ray fluorescence etc.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X		X	X	Not applicable	No	Not applicable to this remedy.
Sampling and Analysis	Use drilling methods which minimize the generation and disposal of cuttings (for example, sonic technology).	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X		X	X	High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Sampling and Analysis	Use field test kits for screening analysis of soil and groundwater contaminants such as petroleum, polychlorinated biphenyls, pesticides, explosives, and inorganics to minimize the need for off-site laboratory analyses and associated sample packing and shipping.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X		X		Medium	Yes	
Sampling and Analysis	Use on-site mobile laboratory or other field analyses (for example, portable gas chromatography/mass spectrometry for fuel-related compounds and VOCs) to minimize the need for off-site laboratory analyses and associated sample packing and shipping.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X		X		Low	No	On-site laboratory not cost effective and rapid turnaround is not required.
Sampling and Analysis	Use tree core sampling as a screening tool to map the source and extent of a contaminant plume.	Subsurface Containment & Treatment Barriers	X	X		X	X	Low	No	Not applicable to this stage in the remedy.
Site Preparation and Land Restoration	Cover filled excavations with biodegradable fabric to control erosion and serve as a substrate for ecosystems.	Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X	X	X	High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	For restoration, use a suitable mix of trees, shrubs, grasses, and forbs to preserve or improve biodiversity and related ecosystem services.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X		X	High	Yes	
Site Preparation and Land Restoration	If grass is required, use no- or low-mowing species to minimize mowing.	Excavation & Surface Restoration	X	X				High	Yes	
Site Preparation and Land Restoration	Incorporate wetlands, grassed swales, or grass-lined channels, bioswales, and other types of vegetated areas to enhance gradual infiltration and evapotranspiration, prevent soil and sediment runoff, and promote carbon sequestration.	Excavation & Surface Restoration		X	X		X	High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Minimize clearing of trees throughout investigation and cleanup.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X	X	X	X	Low	No	Site is paved
Site Preparation and Land Restoration	Minimize dewatering prior to excavation by relying on cold conditions or using ground-freezing technologies, if environmentally beneficial.	Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X	X	X		Not applicable	No	Not applicable to this remedy.
Site Preparation and Land Restoration	Restore and/or maintain ecosystems in ways that mirror natural conditions.	Excavation & Surface Restoration			X		X	High	Yes	
Site Preparation and Land Restoration	Minimize soil compaction and land disturbance during site activities by restricting traffic to confined corridors and protecting ground surface.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X		X	Medium	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Reuse on-site or local clean materials rather than importing borrowed fill.	Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X		X		High	Yes	
Site Preparation and Land Restoration	Maximize use of non-invasive, and/or drought resistant vegetative cover during restoration to minimize use of water and amendments.	Excavation & Surface Restoration				X	X	High	Yes	
Site Preparation and Land Restoration	Use an integrated pest management plan or green alternatives (e.g. non-chemical solarizing techniques) to minimize use of chemical pesticides.	Excavation & Surface Restoration			X	X	X	Medium	Yes	
Site Preparation and Land Restoration	Use biodegradable covers to protect and preserve healthy plants from land-disturbing activities.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X		X	Medium	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Use crushed concrete as a construction aggregate for road base, pipe bedding, or landscaping.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X		Low	No	Not applicable to remedy
Site Preparation and Land Restoration	Use excavated areas to serve as retention basins in final storm water control plan.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X	X	X	X	Med	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Use pervious surface material such as porous pavement or gravel and separated pervious surfaces, rather than impermeable materials, when installing hardscape to maximize infiltration.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X		X	Low	No	Impermeable barrier part of remedy
Site Preparation and Land Restoration	Use reclaimed asphalt pavement as a granular base for new roads.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X		High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Use silica-based spent foundry sands from iron, steel, and aluminum foundries in soil-related applications such as manufactured soils and roadway subbase.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration				X		Low	Yes	
Site Preparation and Land Restoration	Downed trees and snags provide habitat for numerous species, do not remove unless required for safety or access, and allow leaf litter to remain for natural mulching and weed control.	Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X	X	X	Low	Yes	
Surface/ Storm Water	Capture rainwater for tasks such as wash water, irrigation, dust control, constructed wetlands, etc.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration			X		X	Medium	Yes	Implementation dependent upon site availability for storage.

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Surface/ Storm Water	For a landfarm, use a leachate collection and treatment system to fully preserve the quality of downgradient water bodies, soil, and groundwater.	Excavation & Surface Restoration			X		X	Not applicable	No	Not applicable to this remedy.
Surface/ Storm Water	Use subsurface/vertical flow wetlands rather than surface flow wetlands when possible to allow use of a greater range of plant species.	Excavation & Surface Restoration			X		X	Not applicable	No	Not applicable to this remedy.
Vehicles and Equipment	When using large equipment, employ auxiliary power units to power cab heating and cooling when a machine/vehicle is not operating (such as SmartWay generator or plug in outlet) to reduce idling.	Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				Low	Yes	
Vehicles and Equipment	Implement an idle reduction plan.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X			X	High	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Vehicles and Equipment	Use biodegradable hydraulic fluids on hydraulic equipment such as drill rigs.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration					X	Medium	Yes	
Vehicles and Equipment	Replace conventional vehicles with electric, hybrid, ethanol, or compressed gas vehicles.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				Low	Yes	Evaluate for long-term on-site vehicles such as buggies or mules.
Vehicles and Equipment	Use equipment to increase automation such as electronic pressure transducers, thermos-couples, and water quality monitoring devices coupled with an automatic data logger to optimize operation and minimize transportation of staff to the site.	In-situ Chemical Oxidation/ Bioremediation,	X	X	X			Low	Yes	

Table J-3: Greener Cleanup BMPs (OU3-9)

In-situ Treatment (oxidant or bioremediation), Subsurface Containment & Treatment Barriers, and Excavation & Surface Restoration

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Vehicles and Equipment	Use retrofitted engines that use ultra-low, low-sulfur diesel, or alternative fuels; or filter treatment devices to achieve BACT or MACT.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration		X				Low	Yes	
Vehicles and Equipment	Use SmartWay transportation retrofits on tractor trailers whenever possible.	In-situ Chemical Oxidation/ Bioremediation, Subsurface Containment & Treatment Barriers, Excavation & Surface Restoration	X	X				Not applicable	No	Use of tractor-trailers is not anticipated.
Vehicles and Equipment	Use timers or feedback loops and process controls for dosing chemical injections to minimize transportation of staff to the site	In-situ Chemical Oxidation	X	X		X		Medium	Yes	

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Buildings	Use graywater collection systems at on-site buildings for water during cleanup activities, to minimize freshwater use.	In-situ Chemical Oxidation, Monitored and Natural Attenuation			X			Low	No	No buildings on site
Materials	Implement a flexible network of piping to allow for shorter piping runs and future modular increases or decreases in the extraction or injection rates and treatment modifications.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X	X	X	X	Low	Yes	
Materials	Insulate all applicable pipes and equipment to improve energy efficiency with greener insulation material.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X			X		Low	Yes	
Materials	Link a deconstruction project with a replacement construction project to facilitate reuse of clean, salvaged materials.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		Not applicable	No	Not applicable to this remedy.
Materials	Maximize the reuse of existing wells for sampling, injections, or extractions, where appropriate, and/or design wells for future reuse.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X		X	X	High	Yes	

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Select oxidants/reagents with a smaller environmental footprint.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X	X	Low	Yes	
Materials	Select piping materials and treatment equipment to facilitate their reuse.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		Medium	Yes	
Materials	Select products that are environmentally preferable (when compared to other products serving the same purpose) with respect to raw materials consumption, manufacturing processes and locations, packaging, distribution, recycled content and recycling capability, maintenance needs, and disposal procedures.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		High	Yes	
Materials	Steam-clean or use phosphate-free detergents or biodegradable cleaning products instead of organic solvents or acids to decontaminate sampling and other equipment.	In-situ Chemical Oxidation, Monitored and Natural Attenuation			X	X	X	Low	Yes	

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Materials	Use biobased products to reduce petroleum use or enhance degradation of material. For example, use biodegradable seed matting, or erosion control fabrics containing agricultural by-products; use algae based oils, soybean oil, or waste/by-products from forestries, plant nurseries, or food processing/retail industries as a substrate for bioremediation.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		Medium	Yes	
Materials	Use by-products, waste, or less refined materials in place of refined chemicals or materials.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		Medium	Yes	
Materials	Use materials with recycled content (for example, concrete and/or asphalt from recycled, crushed concrete and/or asphalt; plastic made from recycled plastic; geotextile fabrics/tarps made with recycled content).	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		High	Yes	
Power and Fuel	Install amp meters to evaluate electricity consumption rates on a real-time basis and options for off-peak energy usage.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X					Low	Yes	

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Power and Fuel	Purchase renewable energy via local utility and Green Energy Programs or RECs/Green Tags to power cleanup activities.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X				Medium	No	Not applicable to this remedy.
Power and Fuel	Use a flexible on-site renewable energy system to meet energy demands of multiple activities or consumption needs beyond the lifespan of the cleanup.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X				Low	No	Long-term energy use not anticipated for this remedy
Power and Fuel	Use biodiesel produced from waste or cellulose-based products to power equipment.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X			X		Med	Yes	If biodiesel is not applicable, low-sulfur diesel is an option to consider as well.
Power and Fuel	Use gravity flow to introduce amendments or chemical oxidants to the subsurface when high-pressure injection is unnecessary.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X			X		High	Yes	
Power and Fuel	Use on-site generated renewable energy such as solar photovoltaic, wind turbines, landfill gas, geothermal, and biomass combustion to fully or partially provide power otherwise generated through on-site fuel consumption or use of grid electricity.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X				Low	Yes	Evaluate energy needs and consider impact of incorporating on-site renewable energy

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Power and Fuel	Use solar power pack system for low-power system demands (for example, security lighting, system telemetry).	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X					Low	Yes	
Power and Fuel	When possible, operate remediation system during off-peak hours of electrical demand without compromising cleanup progress.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X					Low	No	Dependent upon local requirements for hours of construction.
Project Planning and Team Management	Buy carbon offset credits (for example, for airline flights) when in-person meetings are required.	In-situ Chemical Oxidation, Monitored and Natural Attenuation		X				Medium	No	Local Staffing for project
Project Planning and Team Management	Choose equipment and product vendors with production and distribution centers near the site to minimize fuel consumption associated with delivery.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X				High	Yes	
Project Planning and Team Management	Choose suppliers that will take back scraps or unused materials.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		Low	Yes	

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Project Planning and Team Management	Contract a laboratory that uses green practices and/or chemicals.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X	X	X	X	Low	Yes	
Project Planning and Team Management	Designate collection points for compostable materials and routine recycling of single-use items such as metal, plastic, and glass containers; paper and cardboard; and other items that may be recycled locally.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X			X		High	Yes	
Project Planning and Team Management	Establish green requirements as evaluation criteria in the selection of contractors and include language in RFPs, RFQs, subcontracts, contracts, etc. (e.g. procure remediation reagents from vendors with sustainable policies).	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X	X	X	X	High	Yes	
Project Planning and Team Management	Select facilities with green policies for worker accommodations and periodic meetings.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X	X	X		Low	No	
Project Planning and Team Management	Select local waste disposal and recycling facilities to minimize transportation impacts.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X				High	Yes	

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Project Planning and Team Management	Use a local laboratory to minimize transportation impacts.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X				High	Yes	
Project Planning and Team Management	Use local staff (including subcontractors) when possible to minimize transportation impacts.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X				High	Yes	
Residual Solid and Liquid Waste	Reuse or recycle recovered product and materials.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		High	Yes	
Residual Solid and Liquid Waste	Salvage uncontaminated objects/infrastructure with potential to recycle, re-sell, donate, or reuse.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		High	Yes	
Residual Solid and Liquid Waste	Employ close-loop graywater washing system for truck decontamination.	In-situ Chemical Oxidation, Monitored and Natural Attenuation			X			Medium	Yes	

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Residual Solid and Liquid Waste	Segregate drilling or excavation waste based on location and composition to reduce the volume of drilling waste disposed off-site; collect needed analytical data to make on-site reuse decisions.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X		X		High	Yes	
Sampling and Analysis	Use a multi-port sampling system in monitoring wells to minimize the number of wells needing to be installed.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X	X	High	Yes	
Sampling and Analysis	Use a passive/no purge groundwater sampling system.	In-situ Chemical Oxidation, Monitored and Natural Attenuation			X	X		High	Yes	
Sampling and Analysis	Use dedicated materials (that is, re-use of sampling equipment and non-use of disposable materials/equipment) when performing multiple rounds of sampling.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		Low	Yes	
Sampling and Analysis	Use direct sensing non-invasive, technology such as membrane interface probe, x-ray fluorescence etc.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X		X	X	Not applicable	No	Not applicable to this remedy.

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Sampling and Analysis	Use drilling methods which minimize the generation and disposal of cuttings (for example, sonic technology).	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X		X	X	High	Yes	
Sampling and Analysis	Use field test kits for screening analysis of soil and groundwater contaminants such as petroleum, polychlorinated biphenyls, pesticides, explosives, and inorganics to minimize the need for off-site laboratory analyses and associated sample packing and shipping.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X		X		Medium	Yes	
Sampling and Analysis	Use on-site mobile laboratory or other field analyses (for example, portable gas chromatography/mass spectrometry for fuel-related compounds and VOCs) to minimize the need for off-site laboratory analyses and associated sample packing and shipping.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X		X		Low	No	On-site laboratory not cost effective and rapid turnaround is not required.
Site Preparation and Land Restoration	For restoration, use a suitable mix of trees, shrubs, grasses, and forbs to preserve or improve biodiversity and related ecosystem services.	In-situ Chemical Oxidation, Monitored and Natural Attenuation			X		X	High	No	

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Minimize clearing of trees throughout investigation and cleanup.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X	X	X	X	Low	No	No trees on site
Site Preparation and Land Restoration	Minimize soil compaction and land disturbance during site activities by restricting traffic to confined corridors and protecting ground surface.	In-situ Chemical Oxidation, Monitored and Natural Attenuation			X		X	Medium	Yes	
Site Preparation and Land Restoration	Use biodegradable covers to protect and preserve healthy plants from land-disturbing activities.	In-situ Chemical Oxidation, Monitored and Natural Attenuation			X		X	Medium	Yes	
Site Preparation and Land Restoration	Use crushed concrete as a construction aggregate for road base, pipe bedding, or landscaping.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		High	No	Not applicable to this remedy.
Site Preparation and Land Restoration	Use excavated areas to serve as retention basins in final storm water control plan.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X	X	X	X	Not applicable	No	Not applicable to this remedy.

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Site Preparation and Land Restoration	Use pervious surface material such as porous pavement or gravel and separated pervious surfaces, rather than impermeable materials, when installing hardscape to maximize infiltration.	In-situ Chemical Oxidation, Monitored and Natural Attenuation			X		X	Medium	Yes	
Site Preparation and Land Restoration	Use reclaimed asphalt pavement as a granular base for new roads.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		Not applicable	No	Not applicable to this remedy.
Site Preparation and Land Restoration	Use silica-based spent foundry sands from iron, steel, and aluminum foundries in soil-related applications such as manufactured soils and roadway subbase.	In-situ Chemical Oxidation, Monitored and Natural Attenuation				X		Not applicable	No	Not applicable to this remedy.
Surface/ Storm Water	Capture rainwater for tasks such as wash water, irrigation, dust control, constructed wetlands, etc.	In-situ Chemical Oxidation, Monitored and Natural Attenuation			X		X	Medium	Yes	
Vehicles and Equipment	Implement an idle reduction plan.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X			X	High	Yes	

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Vehicles and Equipment	Use biodegradable hydraulic fluids on hydraulic equipment such as drill rigs.	In-situ Chemical Oxidation, Monitored and Natural Attenuation					X	Med	Yes	
Vehicles and Equipment	Replace conventional vehicles with electric, hybrid, ethanol, or compressed gas vehicles.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X				Low	Yes	Evaluate for long-term on-site vehicles such as buggies or mules.
Vehicles and Equipment	Use equipment to increase automation such as electronic pressure transducers, thermos-couples, and water quality monitoring devices coupled with an automatic data logger to optimize operation and minimize transportation of staff to the site.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X	X			Low	Yes	
Vehicles and Equipment	Use retrofitted engines that use ultra-low, low-sulfur diesel, or alternative fuels; or filter treatment devices to achieve BACT or MACT.	In-situ Chemical Oxidation, Monitored and Natural Attenuation		X				Low	Yes	
Vehicles and Equipment	Use SmartWay transportation retrofits on tractor trailers whenever possible.	In-situ Chemical Oxidation, Monitored and Natural Attenuation	X	X				Not applicable	No	Use of tractor-trailers is not anticipated.

Table J-4: Greener Cleanups BMPs (OU4-1)

In-situ Chemical Oxidation and Monitored and Natural Attenuation

Category	Best Management Practice	Remedy	Core Element Addressed					Priority	Retained?	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems			
Vehicles and Equipment	Use timers or feedback loops and process controls for dosing chemical injections to minimize transportation of staff to the site.	In-situ Chemical Oxidation	X	X		X		Low	Yes	

Appendix K: Public Notifications

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Andover, MA 01810-2435

T: 978.794.0336
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June 29, 2017

Mr. Jonathan F. Mitchell, Mayor
City of New Bedford
133 William Street
New Bedford, MA 02740

Project Number: 149339

Subject: Notification of Revised Phase III Remedial Action Plan
Former Aerovox Facility
740 Belleville Avenue, New Bedford, Massachusetts
Release Tracking Number (RTN) 4-0601

Honorable Mayor Mitchell:

On behalf of AVX Corporation (AVX) and as required by the Massachusetts Contingency Plan (MCP) subpart 310 CMR 40.1403(3)(e), this letter is notification to the Chief Municipal Officer and Board of Health of the submittal of a Revised Phase III Remedial Action Plan (Revised Phase III) for the above-referenced Site. The Revised Phase III is being submitted to the Massachusetts Department of Environmental Protection (MassDEP) in accordance with the MCP, pursuant to 310 CMR 40.0850, the provisions of an Administrative Consent Order between AVX and MassDEP, and MassDEP's March 8, 2017 Interim Deadline correspondence.

The Revised Phase III report will be filed electronically, and may be accessed by searching for the referenced RTN number on the MassDEP web site: http://public.dep.state.ma.us/SearchableSites2/Search.aspx. The full report may also be reviewed by contacting the Southeast Regional Office of MassDEP located at 20 Riverside Drive in Lakeville, Massachusetts. For information about accessing files for review, contact the MassDEP file review coordinator at (508) 946-2718 or submit a file review request online at http://www.mass.gov/eea/agencies/massdep/about/contacts/southeast-region-file-review-and-public-records-request.html

Based on the results of the Revised Phase III RAP evaluation, the following findings and conclusions are presented:

1. For the purpose of evaluating remedial actions, the site has been divided into four operable units (OUs) based on the media and identified exposure pathways where the Method 3 Risk Characterization identified the presence of Significant Risk to human health and/or the environment and a Risk to Public Welfare. The OUs are identified as OU1 through OU4 and include:
    - OU1 - Uncapped soils impacted by PCBs between the ground surface and an identified peat layer on the east end of the Titleist property;

- OU2 - Vapor intrusion associated with CVOC contaminated groundwater in shallow overburden in Hadley Street adjacent to Precix;
- OU3 – Aerovox source area including overburden soil (OU3A) and groundwater (OU3B) contaminants (sources), and
- OU4 – Bedrock groundwater.

2. Remedial technologies for various site media were screened for further evaluation as potential remedial action alternatives including:
   - Soil
     - Treatment (in-situ and ex-situ)
     - Containment
     - Excavation and off-site disposal or on-site consolidation of impacted soils
     - Activity and Use Limitation (AUL)
   - Groundwater:
     - Treatment (in-situ, ex-situ and permeable reactive barrier)
     - Containment
   - Soil Gas/Indoor Air
     - Monitored attenuation
     - Vapor barrier
     - Sub-slab depressurization system
     - AUL
   - Dense Non-Aqueous Phase Liquid (DNAPL)
     - Free product recovery and off-site disposal
     - Excavation
   - Sewer Line Contaminants
     - Removal and replacement
     - Cleaning and re-lining

3. Between two and eleven remedial action alternatives were formulated for each of the identified site media, which included one or more remedial technologies that would result in reaching the remedial goals for each OU. Each of the alternatives were evaluated based on effectiveness, reliability, implementability, cost, risk, benefits, timeliness, non-pecuniary considerations and sustainable remediation.

4. The selected remedial action alternatives for the four OUs are:
   - OU1 – Removal and off-site consolidation: The selected alternative includes excavation of soils with PCB concentrations greater than 1 milligram per kilogram (mg/kg). Excavated soils will be consolidated on the Aerovox portion of the Disposal Site. This remedy is estimated to take two to three months to implement.
   - OU2 – Precix Property Vapor Intrusion: The selected alternative includes an AUL, monitoring of sub-slab soil gas and indoor air within the area of concern on the Precix property, and monitoring of groundwater chlorinated volatile organic compounds (CVOCs). An AUL will be placed on the property to restrict foreseeable future building uses to those activities and uses that would result

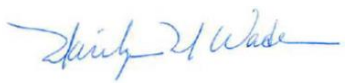
in no greater exposure of occupants to indoor air than the current use. Under existing conditions and current site use a condition of No Significant Risk exists, so the selected alternative is targeted to address potential changes in future conditions or uses. This remedy will remain in effect until attenuation demonstrates vapor intrusion related restrictions are no longer required.

- OU3 – Aerovox Source Area Overburden Soils and Groundwater: Soils within 25 feet of the shoreline down to the peat layer and soils in the northeast corner of the Aerovox property down to bedrock will be excavated and placed into an on-site consolidation cell. An engineered barrier and asphalt cap will be constructed over soils impacted with contamination greater than UCLs and PCBs greater than 2 mg/kg, respectively. An AUL will be placed on the property to restrict current and foreseeable future uses and activities. A permeable reactive barrier will be installed on the west side of the 25-foot excavation area and vertical barrier walls will be installed along the north and south sides of the site. The vertical walls and permeable reactive barrier will extend to bedrock. In situ treatment of hot spot soils will be completed. Subsequent to installation of the barrier system and the initial in-situ treatment, a monitoring program will be initiated to evaluate containment and treatment of the source area. Excavation, construction and restoration of the engineered barrier and asphalt cap are estimated to be completed in four to five months. The in-situ groundwater treatment and barrier wall system will operate an estimated 10 years to achieve remedial goals.
- OU4 – Site-Wide Bedrock Groundwater: the selected remedial action alternative for this OU is in-situ chemical oxidation of fractured bedrock groundwater hot spots. Subsequent to treatment, a groundwater monitoring program will be implemented to monitor natural attenuation. Achieving remedial goals in the hot spot areas is estimated to take three to four years.

5. Implementation of these remedial measures will lead to closure of the site with a Permanent Solution. It is estimated that the site will be maintained in Remedy Operation Status for a minimum of 4, and up to 10 years before conditions supporting a Permanent Solution are achieved.

If you have any questions regarding the Revised Phase III Remedial Action Plan findings and conclusions, please contact the undersigned at 978-983-2055.

Very truly yours,
Brown and Caldwell



Marilyn Wade, PE, LSP, Project Manager
Andover, Massachusetts

cc: Sandra Manning, Acting Health Director, City of New Bedford Board of Health
Michele Paul, Director, City of New Bedford Department of Environmental Stewardship
Evan Slavitt, Vice President, AVX Corporation

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June 29, 2017

Sandra Manning, Acting Health Director
City of New Bedford Board of Health
1213 Purchase Street
New Bedford, MA 02740

Project Number: 149339

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Former Aerovox Facility
740 Belleville Avenue, New Bedford, Massachusetts
Release Tracking Number (RTN) 4-0601

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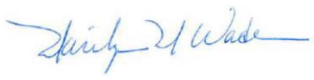
Brown and Caldwell



Marilyn Wade, PE, LSP, Project Manager
Andover, Massachusetts

cc: Jonathan F. Mitchell, Mayor, City of New Bedford