FIFTH FIVE-YEAR REVIEW REPORT FOR BAIRD AND MCGUIRE SUPERFUND SITE NORFOLK COUNTY, MASSACHUSETTS

Prepared by

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Region 1
Boston, Massachusetts

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Date

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COD	Chemical Oxygen Demand
DEQE	Massachusetts Department of Environmental Quality Engineering
EPA	Environmental Protection Agency (U.S. EPA - Region 1)
ERA	Ecological Risk Assessment
ESD	Explanation of Significant Differences
EW	Extraction Well
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act of 1947
FS	Feasibility Study
FYR	Five Year Review
GWTF	Groundwater Treatment Facility
HQ	Hazard Quotient
ICs	Institutional Controls
LNAPL	Light Non-Aqueous Phase Liquid
MassDEP	Massachusetts Department of Environmental Protection
MCLs	Maximum Contaminant Levels
MGD	Million Gallons Per Day
NAUL	Notice of Activity and Use Limitations
NCP	National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300
NPL	National Priority List
O&M	Operation and Maintenance
ORP	Oxidation-Reduction Potential
OU	Operable Unit
PAHs	Polycyclic Aromatic Hydrocarbons
PFAS	Per- and polyfluoroalkyl substances
PFBS	Perfluorobutanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PLC	Programmable Logic Controller
RAO	Remedial Action Objective
RfD	Reference Dose
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SQC	Sediment Quality Criteria
SVOCs	Semivolatile Organic Compounds

TBC	To Be Considered
TLA	TLA-Holbrook LLC
TPH	Total Petroleum Hydrocarbon
UCL	Upper Concentration Limit
VFD	Variable Frequency Drive
VOCs	Volatile Organic Compounds

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the Baird & McGuire Superfund Site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of four operable units (OUs), three of which will be addressed in this FYR. EPA issued three Record of Decisions (RODs) for the Site, defining the four operable units and describing selected remedial alternatives. The first ROD, issued in September 1986, specified groundwater extraction and treatment via an on-site treatment plant (OU-1) and soil excavation and treatment via an on-site incinerator (OU-2). The second ROD, issued in September 1989, addressed contamination in the Cochato River sediments (OU-3). EPA issued the final ROD in 1990, which called for reopening the Donna Road public drinking water supply well field to replace the lost supply resulting from contamination of the South Street well field (OU-4). However, two ESDs were issued in 2003, one to expand the water capacity in the Upper Reservoir/Great Pond and as part of OU-1; and a second, in connection with OU-4, that determined the reactivation of the Donna Road well field was no longer necessary. Therefore, this FYR addresses only OU-1, OU-2, and OU-3, since OU-4 was eliminated.

The Baird & McGuire Superfund Site Five-Year Review was led by Kimberly White, Remedial Project Manager for the Baird & McGuire Site, with support from AECOM, contractor to EPA Region 1. Participants included ZaNetta Purnell, the Community Involvement Coordinator (CIC); Bart Hoskins, Ecological Risk Assessor; Chau Vu, Human Health Risk Assessor; Maximilian Boal, Attorney; and Dorothy Allen, representative for the support agency, Massachusetts Department of Environmental Protection (MassDEP). The review began on 2/13/2019.

Site Background

The Baird & McGuire Superfund Site is located on South Street in Holbrook, Massachusetts (Figure 1 in Appendix C). The Site boundary and coincident fence line are shown on Figure 2, based on Site surveys conducted in May 1988 and in 2016. The Site has been determined to consist of approximately 33.1 acres. As illustrated on Figure 2, the Site is not limited to land within the former Baird & McGuire properties. Historically, Lots 25-130-00-0, 25-130-01-0 and 25-130-02-0 have had Baird & McGuire ownership. These lots consist of 9.57 acres, of which approximately 8.7 acres are within the Site boundaries. The remaining 24.4 acres of the Site consist of portions of two privately owned lots and three municipally-owned lots. Town-owned properties include lots 25-129-00-0 and 25-129-02-0, which are owned jointly by the Towns of Holbrook and Randolph, and 19-003-00-0 (the TLA property), which is owned by the Town of Holbrook. The privately-owned properties include 19-012-00-0 and a portion of 14-102-00-0. In addition, properties located around the Site have institutional controls in place to restrict the use of groundwater and stormwater, including on three lots located to the north of the Cochato River (Lots 19-006-00-0, 19-007-00-0 and 19-010-00-0) and a residential sub-division carved out of Lot 14-102-00-0. Access to the river is restricted due to the presence of the security fence and institutional controls. Currently, the Site is occupied by the Groundwater Treatment Facility. Current and planned uses are still commercial/industrial in nature.

From 1912 to 1983, Baird & McGuire Inc. operated a chemical mixing and batching facility. Manufactured products included herbicides, pesticides, disinfectants, soaps, floor waxes and solvents. Waste disposal methods at the site included direct discharge into the soil, a nearby brook and wetlands, and a former gravel pit in the eastern portion of the site. Underground disposal systems were also used. Following a series of violations and fines issued by the state from 1954 to 1977 and the identification of questionable disposal practices at the Site, the Town of Holbrook revoked Baird & McGuire's permit to store chemicals at the Site and operations were terminated. Initial response actions at the Site included some remedial actions by Baird & McGuire Inc, before becoming bankrupt in 1983. The Site was added to the National Priority List (NPL) on September 8, 1983. EPA initiated removal actions also in 1983, which resulted in the disposal of 1,020 cubic yards of contaminated soil, 1 ton of waste creosote, 25 gallons of waste coal tar, 155 pounds of solid hazardous waste and 47 drums of flammable liquids and solids, and 2 drums of corrosives. EPA also oversaw construction of a clay cap, installation of a groundwater interception-recirculation system, and erection of fencing.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Baird & McGuire		
EPA ID: MAD001041987		
Region: 1	**State:** MA	**City/County:** Holbrook/Norfolk

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Kimberly White
Author affiliation: EPA Region 1
Review period: 2/13/2019 - 9/30/2019
Date of site inspection: 3/19/2019
Type of review: Statutory
Review number: 5
Triggering action date: 9/30/2014
Due date *(five years after triggering action date)*: 9/30/2019

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The following summarizes the contaminants detected at the Site, as identified in the Remedial Investigation (RI) Addendum Report (GHR, 1986b) and during subsequent investigations.

Soil. Contaminants such as volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), other organic compounds, pesticides, dioxin, and heavy metals such as lead and arsenic have been detected in soils across the site. Dioxin also has been detected in area wetland soils. Although the Site was fenced off, both direct contact and accidental human ingestion of site soils posed an imminent threat to human health due to the high levels of pesticides and dioxin, as identified in the RI.

Groundwater. During the RI, VOCs, semi-volatile organic compounds (SVOCs), PAHs, pesticides, and metals (arsenic and lead) were detected in site groundwater and downgradient of the site, beyond the Cochato River. Direct contact or accidental ingestion of groundwater posed an imminent threat to public health. The contaminated groundwater resulted in the shutdown of public wells (South Street well field). In a subsequent investigation, conducted by EPA in 1997, it was confirmed that light non-aqueous phase liquids (LNAPL) exist near the center of the plume. LNAPL, undissolved chemicals that are less dense than water and thus float on top of the groundwater, have been determined to be a source of contamination in groundwater at this site.

Sediments. Contaminants of concern detected in Cochato River and Unnamed Brook sediments at the site include VOCs, PAHs, arsenic, and pesticides including dichlorodiphenyltrichloroethane (DDT) and chlordane. The concentrations detected were greatest in the portions of the river on Site and approximately 500 feet downgradient of the existing site fence. These sediments were determined to be acutely toxic to aquatic life (EPA, 1989) and were associated with an excess cancer risk level in excess of $1x10^{-6}$.

Response Actions

EPA issued three RODs for the Site, defining four operable units and describing selected remedial alternatives. The first ROD, issued in September 1986, specified groundwater extraction and treatment via an on-site treatment plant (OU-1) and soil excavation and treatment via an on-site incinerator (OU-2). The second ROD, issued in September 1989, addressed contamination in the Cochato River sediments (OU-3). EPA issued the final ROD in 1990, which called for reopening the Donna Road well field to replace the lost supply resulting from contamination of the South Street wellfield (OU-4). The following sections summarize the selected remedies for Operable Units 1, 2, 3, and 4. A more detailed description of the selected remedy for OU2 is presented in the Remedial Action Report (USACE, 1999) .

Operable Unit 1

The remedial objectives for OU-1 groundwater are:

- Remediate the contaminated aquifer within a reasonable time period to prevent present or future impacts to groundwater drinking supplies;
- Protect surface waters from future contaminant migration; and
- Minimize long-term damage and/or maintenance requirements.

The selected remedial action for OU-1 includes the following components:

- Groundwater Extraction System;
- On-site Groundwater Treatment Facility; and
- Groundwater Recharge System.

Operable Unit 2

The remedial objectives for OU-2 soil are:

- Minimize the risk to the human population from direct contact with contaminated soils/sediments;
- Protect surface waters from future contaminant migration; and
- Minimize long-term damage and/or maintenance requirements.

Based on the nature and extent of soil contamination documented in the RI/FS, the 1986 ROD specified the excavation of soil from "hot areas" with subsequent treatment in an on-site incinerator, and on-site disposal of the treated soil (ash). The hot areas were delineated in the ROD based on contamination profiles developed in the RI Addendum (GHR, 1986b). The limits of excavation were established so that contaminant concentrations outside of the hot areas were one to two orders of magnitude lower than the concentrations inside the hot areas. Also considered was the presence of wetlands and the extent of contamination in those wetlands, with the intent of minimizing disruption to wetlands. The ROD notes that although this approach results in residual soil contamination, future health risk for a trespasser scenario would be within an acceptable range.

The selected remedial actions for OU-2 include the following components:

- Excavation with associated dewatering and erosion control;
- Backfilling using treated soil into the excavation area;
- Extraction Well Piping Relocation at the end of the excavation process;
- Temporary relocation of the Unnamed Stream during remediation followed by restoration of its natural course;
- On-Site Incineration and Stabilization (IS) Facility;
- Site Closure upon the completion of soil excavation and treatment;
- Site Restoration;
- Wetlands Restoration; and
- Continued Monitoring.

Operable Unit 3

The remedial objectives for OU-3 (sediment in river) were:

- Reduce human exposure to arsenic, DDT, PAHs, and chlordane in sediment by excavating to an average depth of six (6) inches and by achieving the following levels of contaminants: 250 ppm for arsenic; 19 ppm for DDT; 5 ppm for chlordane; and 22 ppm for total PAHs. These concentrations correspond to a 1 x 10^{-5} to 1 x 10^{-6} excess cancer risk level; and
- Reduce environmental exposure to those contaminants of concern to concentrations corresponding to the mean sediment quality criteria (SQC) (EPA, 1989) in the river bed, and to the upper bound SQC in the wetland area north of Ice Pond.

The ROD specified excavation and incineration of approximately 1,500 cubic yards of contaminated sediments for protection of public health and the environment. Sediments were to be excavated to an average depth of six inches from approximately the center of the fenced Site area downstream to Union Street. Sediments were to be transported to the on-site treatment facility, implemented under OU-2, and subsequently placed as backfill on the Site. The ROD also required erosion control, wetlands restoration, placement of organic fill in the excavated areas of the river in the vicinity of the groundwater plume and long-term monitoring of downstream portions of the river where sediments were not excavated. To minimize the disruption of wetlands, sediments were not to be removed from areas of the river where contaminant concentrations were low, calculated risks were low, and no impacts were observed. In accordance with the ROD for OU-3, long term monitoring is to be conducted to evaluate remaining contaminant levels and their behavior over time (EPA, 1989).

Operable Unit 4

The remedial objectives for OU-4 were:

- To identify a candidate water source to replace the 0.31 million gallons per day (MGD) lost supply from the closing of the South Street municipal well field in an environmentally sound, cost effective manner without placing additional stress on the Great Pond Reservoir system or existing water treatment facilities.

The selected remedy for OU-4 consisted of the following components:

- Permitting/Pre-design Studies;
- Groundwater Extraction;
- Groundwater Treatment; and
- Delivery to the Distribution System

ESDs

On August 21, 2003, an Explanation of Significant Differences document (ESD) was issued for the groundwater remedy (OU-1) specified in the 1986 ROD. The ROD was changed to include excavation of soil from the Upper Reservoir/Great Pond located in Braintree and Randolph (approximately 400,000 cubic yards) to provide an additional storage capacity resulting in an estimated additional supply of 0.31 MGD to be used in the interim to supplement the community's drinking water until the groundwater remedial action is complete. On this date, EPA also issued an ESD document for OU-4 stating that no further action will be taken under this ROD. In 2005, EPA issued an ESD to incorporate comprehensive institutional controls into the OU-1 and OU-2 remedies.

Status of Implementation

OU-1

The groundwater remedy at the Site is ongoing. A groundwater treatment facility (GWTF) and extraction/recharge system were built in 1991 and remain in operation, with modifications. The three main components of the groundwater remedy are extraction, on-site treatment, and recharge as specified by the 1986 ROD. The current system consists of eight extraction wells (EW-3, EW-4A, EW-5, EW-6A, EW-7, EW-8, EW-9, and EW-10) that pump contaminated groundwater to a groundwater treatment facility, and four recharge basins for discharge of treated groundwater back to the aquifer. Extraction wells EW-1, EW-2, EW-4, and EW-6 have been removed from service. The groundwater extraction wells were located to contain the plume. MassDEP continues to make improvements and is conducting investigations intended to optimize operations.

OU-2

All components of the OU-2 Remedy have been completed. The RAO of protecting surface waters from future contaminant migration is being addressed by containment via the groundwater extraction system. Surface water monitoring data are no longer collected as prior five-year reviews (2004 and 2009) evaluated the most recent data (from 2000) and found results to be well below EPA's target risk range of 10^{-6} to 10^{-4}.

OU-3

All components of the OU-3 Remedy have been completed and long-term monitoring of river sediment continues as required by the ROD.

Institutional controls, in the form of Notices of Activity and Use Limitations, were recorded at the Norfolk County Registry of Deeds in 2017 and 2018 for the properties listed in Table 1.

IC Summary Table

Table 1: Summary of Implemented ICs.

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Multiple Media (soils, groundwater, sediments)	Yes	Yes	25-129-00-0, 25-129-02-0, 25-130-00-0, 25-130-01-0, 25-130-02-0, 19-003-00-0, 19-006-00-0, 19-007-00-0, 19-010-00-0, 19-012-00-0, 14-102-00-0	To establish land use restrictions as necessary to restrict access to and contact with hazardous substances remaining on-site and prohibit activities that would interfere with or compromise the remedy.	NAULs for each property are on file with the Norfolk Registry of Deeds. The NAULs were recorded in October 2017, September 2018, and November 2018.

The NAULs for each property are available at the Norfolk Registry of Deeds and on EPA's website for the Site at: www.epa.gov/region01/superfund/sites/baird. In addition to the institutional controls identified above, fish advisory signs in multiple languages have been installed on the banks of the Cochato River and downstream on the banks of the Sylvan Lake warning residents of the risks associated with eating the fish.

Systems Operations/Operation & Maintenance

The majority of O&M activities at the site are related to the operations of the GWTF (OU-1). Since the last FYR, the O&M Contractor (Clean Harbors) has made a number of repairs and upgrades, including installation of energy efficient LED lamps on the exterior of the building, a new permanganate feed system, a new programmable logic controller (PLC) for the sludge filter press and new sludge pumps to allow for automatic operation, new variable frequency drives, and new pumps and piping for Effluent Holding Tank T-17 to allow for reuse of treated groundwater for chemical mixing and other process uses. Level sensors in T-10 and T-17 were replaced with an ultrasonic units and old carbon steel piping was replaced with Schedule 80 PVC piping. Two new extraction wells have been incorporated into the extraction system. Extraction well EW-10 was installed in 2014 and EW-6a, which replaced EW-6, was installed in 2015. Frequency of extraction well redevelopment has been increased, with all wells having been redeveloped once during the past five years, with the exception of EW-10, which was redeveloped twice. Based on information provided in the 2017 annual report (CHES, 2019), total flow to the GWTF is approximately 72 gpm. An updated O&M Manual has was developed in 2018. O&M requirements have not changed significantly since the last FYR. The upgrades described above have allowed for a reduction in staffing requirements. GWTF monitoring frequency has not changed since the last FYR with the exception a decrease in barium and copper sampling, which has been reduced from monthly to quarterly. A summary of the inspection of the treatment plant inspection and findings, along with a summary of the interview with the state and the treatment plant staff is provided Appendix D.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the **last** five-year review as well as the recommendations from the **last** five-year review and the current status of those recommendations.

Table 2: Protectiveness Determinations/Statements from the 2014 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	The remedy at OU-1 currently protects human health and the environment because the current pathway for human health exposures has been eliminated as the contaminated aquifer is no longer being used as a drinking water source. The aquifer is being remediated to mitigate a future human health exposure pathway. However, in order for the remedy to be protective in the long-term, groundwater should not be used for any purpose or directly contacted, due to its contamination and to the negative impact pumping could have on the effectiveness of the extraction and treatment system. Comprehensive institutional controls at the site, including OU-1, must be implemented to ensure long-term protectiveness in and around the site.
2	Short-term Protective	The remedy at OU-2 currently protects human health and the environment. As long as the Site is not used for residential purposes or other purposes where children are present at a high frequency (e.g., day care or parks), human health protectiveness will be within the risk-based concentrations established by EPA. Protectiveness is achieved for future workers in a commercial or industrial use scenario. However, in order for the remedy to be protective in the long-term, comprehensive institutional controls should be implemented or an evaluation should be performed to determine the potential risk to workers prior to initiating intrusive activities as part of site re-development.
3	Short-term Protective	The remedy at OU-3 is currently protective of human health and the environment because sediment with high levels of contaminants was excavated and treated, and clean fill was used to replace materials excavated. However, to minimize disruption to wetlands, sediments were not removed from areas of the river where contaminant concentrations were low. Although contaminated sediments remain, it is expected that natural degradative, depositional, and dispersal processes will gradually reduce remaining concentrations in the sediment. In order for the remedy to be protective in the long-term, it is recommended that long-term sediment and fish tissue monitoring continue to evaluate contaminant levels/risks, and contaminant behavior over time, and maintain the current fish advisory signage.
Sitewide	Short-term Protective	The remedies for the Site currently protect human health and the environment because current exposure pathways that could result in unacceptable risks are being controlled. All threats at the Site have been or are being addressed through groundwater treatment; removal, incineration, and stabilization of contaminated soil and ash; site fencing; warning signage, and expansion of an alternate water supply. However, in order for the remedy to be protective in the long-term, comprehensive institutional controls must be implemented to maintain a complete level of protectiveness for future activities in and around the site. Interim cleanup levels and recommendations which ensure the remedy is functioning as intended will also be evaluated. Continued monitoring of groundwater, sediment, and fish tissue is also needed to evaluate progress.

Table 3: Status of Recommendations from the 2014 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1, 2, 3	Institutional controls restricting land uses that may impact the protectiveness of the remedy (including preventing the use of groundwater and preventing excavation into areas of the Site with residual soil and/or shallow groundwater) need to be established. The implementation of comprehensive institutional controls is on-going, and when complete, will provide long-term protectiveness for soil and groundwater remedies.	EPA, MassDEP, and the property owners should complete development of the ICs and record them by the next five-year review.	Completed	Institutional Controls in the form of NAULs have been recorded for all Site properties at the Norfolk Registry of Deeds.	11/8/2018
	The 1986 OU-1 ROD states that "after five (5) years of operation, the Agency will determine in a supplemental decision document if the restoration target levels are achievable and if they are adequate to protect public health and environment."	Determine whether current interim groundwater cleanup levels are appropriate, and document changes as necessary.	Under Discussion		9/30/2024

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	Arsenic, benzene, ethylbenzene, lindane, benzo(a)pyrene, bis(2-ethylhexyl)phthalate, mercury, and pentachlorophenol in select monitoring wells continue to exceed MCLs.	Evaluate recommendations from the 2013 Optimization Report and implement investigations, as appropriate. In the interim, operation and maintenance of the extraction wells and GWTF should continue to contain the plume, and investigations should continue to determine what improvements, if any, need to be made. Following completion of the investigations, a meeting between EPA and MassDEP is recommended to discuss the results of the investigations. ICs, as noted in a previous recommendation, should also be implemented to ensure that no private wells are installed at or near the site.	Completed	EPA and MassDEP evaluated the 2013 optimization recommendations and are implementing investigations. Investigations have been conducted to update the CSM for the site,determine distribution of remaining contamination in soil and in the groundwater and evaluate alternative clean-up technologies to existing pump and treat system.. The state continues to improve the GWTF infrastructure and operation processes. The ICs have been implemented. NAULs for each property are on file with the Norfolk Registry of Deeds. The NAULs were recorded in October 2017, September 2018, and November 2018.	11/8/2018

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
3	The 2013 sediment data show exceedances of the PAH cleanup level at a sampling location adjacent to the site. The exceedance at the location adjacent to the site does not impact current protectiveness since the area is within the site perimeter fence.	Further monitoring should be performed for confirmation of the exceedance.	Completed	MassDEP completed sediment sampling in 2018. PAHs were detected in all the samples including upstream samples, indicating that all contamination may not be site-related. Sediment sampling will continue as required by the ROD.	9/13/2018
3	Elevated concentrations of PAHs and pesticides in samples from Ice Pond and Mary Lee Wetlands indicate some uncertainty in the distribution of these contaminants along the banks of the river and wetlands downstream of the site.	In order to confirm the protectiveness of the remedy, the soils and sediment downstream of the site should be further sampled and evaluated prior to the next Five-Year Review.	Completed	MassDEP completed sediment sampling in 2018. Pesticide and PAHs samples collected from Ice Pond and Mary Lee Wetlands were similar to upstream samples. Sediment sampling will continue as required by the ROD.	9/13/2018

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by EPA on 2/21/19, in which the initiation of 14 FYRs in Region 1 was announced. The release announcing the five-year reviews also invited the public to submit any comments to the U.S. EPA community involvement coordinators for each site. The results of the review and the report will be made available at the Site information repository located at the OSRR Records and Information Center, 1st Floor, 5 Post Office Square, Suite 100 (HSC), Boston, MA 02109-3912, and on EPA's website at: https://www.epa.gov/superfund/baird.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** The MassDEP Project Manager, the O&M Contractor (Clean Harbors) personnel, the Town Administrator for the Town of Holbrook, the owner of the 6 Phillips Road Property (lot 19-012-00-0), and two community members submitted interview responses via email as part of the five-year review process. The results of these interviews are summarized below. More detail is provided in Appendix E.

The overall sentiment of the MassDEP Project Manager is that the GWTF is effective at removing contaminants from the influent and discharging effluent to recharge basin below discharge criteria; however, the effectiveness

of the extraction wells is declining and the treatment plant needs constant maintenance. The MassDEP Project Manager also noted that the remedy has not achieved the site clean-up levels in the expected timeframe and that, new/alternative cleanup levels have not been established , as required by the ROD, five years after the start of the GWTF operations. O&M Contractor personnel stated that the GWTF is functioning well, although it was noted that the length of time for Site closure seems to be extended, especially regarding arsenic. No complaints or intruders were noted. The representative for the trust which owns Property 19-012-00-0 said that, while there have been no noticeable concerns on day-to-day operations on the property, plans for the TLA development have had to change because of the NAUL. One community member noted that they are pleased that EPA is still involved at the Site and commented that their understanding is that the Site will never be entirely cleaned up. Their biggest concern is that there has been talk of allowing the Cochato River to connect to the reservoir. Another community member expressed concern that the Town keeps residents in the dark regarding the Site, and commented that EPA needs to reach out to the community. Both residents expressed concern about possible redevelopment on the Site, and on the TLA Property. In general, the Holbrook Town Administrator was not aware of any problems or complaints related to the Site and noted that the Holbrook Fire Department conducts annual Fire Safety and Code Compliance visits. The most recent visit was conducted on April 23, 2019, during which no new issues were identified. The Fire Department has responded to three minor incidents involving alarm malfunctions. The Holbrook Police Department has received 4 calls to the Site over the past five years for either false alarms or minor vandalism on the street outside of the facility.

Data Review

Treatment Plant Effluent

Available effluent data from October 2012 to September 2017 was reviewed with respect to the discharge criteria. This includes data that was collected prior to this five-year review period, but was not available for the previous 2014 five-year review. Effluent monitoring data are presented in Evaluation of Groundwater Remediation Progress Annual Reports (CHES, 2015; CHES, 2016; CHES, 2017a; CHES, 2017b, CHES, 2019). pH and turbidity measurements did not meet discharge criteria (6.5 to 8.5 pH units and turbidity of 1 NTU or less) on certain occasions over the 5-year period and were generally attributed to maintenance activities that had occurred, such as carbon change outs and backwashing activities. Iron detections exceeded the discharge limit (Secondary MCL of 0.3 mg/l) once in 2015, once in 2016, and three times in 2017. Finally, arsenic detections exceeded the discharge criteria (MCL of 0.010 mg/l) four times in 2017. In general, the arsenic and iron exceedances in 2017 were attributed to issues with the metals treatment system or more specifically, the potassium permanganate system. These issues were addressed as they occurred and the operators began a process of inspecting the system daily (CHES, 2019). No other effluent concentrations exceeded the discharge criteria.

Over the period from October 2012 to September 2017, the final effluent contained only sporadic detections of VOCs, SVOCs, and pesticides, with no detections during a few annual reporting periods. Where there were detections, they were generally low and below MCLs where available. Iron and arsenic were detected more frequently, but with few exceedances of discharge criteria as noted above. Overall, VOC, SVOC, and pesticide effluent results indicated greater than 99.99% removal and indicate that the groundwater treatment plant has been effective in treating the groundwater influent to meet discharge criteria that allow for discharge of the effluent back to groundwater. Note that the frequency of monitoring for copper and barium was reduced from monthly to quarterly in 2014 due to lack of significant detections.

Groundwater

Monitoring of Site groundwater monitoring wells has been conducted on an annual basis over the past 5 years. The results of the annual groundwater sampling events for 2014 through 2017 are presented in Evaluation of Groundwater Remediation Progress Annual Reports (CHES, 2016; CHES, 2017a; CHES, 2017b; CHES, 2019). Well locations are shown on Figure 3 in Appendix B. The annual progress report that will document the August/September 2018 annual monitoring event has not been completed; however, the analytical data was made available for review and is included as Table C-1 in Appendix C. The August/September 2016 annual monitoring

event was the most comprehensive "5-year groundwater sampling round" that included 51 overburden monitoring wells, 10 bedrock monitoring wells, and 5 piezometers. The 2014, 2015, 2017, and 2018 events included fewer wells (a subset of 23 to 36 wells) and fewer analyses. Groundwater samples over the past five years have been analyzed for arsenic (nearly all wells) and VOCs, SVOCs, and pesticides (all wells in 2016; select wells other years). The 2016 comprehensive monitoring round included a larger number of metals. Additionally, chemical oxygen demand (COD), total petroleum hydrocarbons (TPH), and total organic carbon (TOC) were included in the 2014, 2016 (overburden wells only), 2017, and 2018 annual monitoring events at all wells. In the past 5 years, two new monitoring wells were installed and sampled beginning in 2014 and 5 new piezometers were installed in the Cochato River and sampled beginning in 2015.

In December 2018, groundwater samples were collected from selected wells for analysis of per- and polyfluoroalkyl substances (PFAS) by MassDEP's contractor. A table summarizing the PFAS results is included as Table C-2 in Appendix C. Further discussion of this data is provided below. A copy of the laboratory report with the PFAS data is available in the EPA Records Center.

Interim Cleanup Level (MCL) Exceedances. Table C-3 in Appendix C summarizes compounds which were detected in the 2016 comprehensive sampling round at concentrations above the MCLs. Exceedances are presented for this sampling round in Table C-3 since it was the most comprehensive round of sampling in the past 5 years. In summary, MCLs were exceeded for two VOCs (benzene and ethylbenzene), one pesticide (chlordane), 3 SVOCs (benzo(a)pyrene, bis(2-ethylhexyl)phthalate, and pentachlorophenol), and 4 metals (arsenic, antimony, beryllium, and selenium). As shown in the table, bis(2-ethylhexyl)phthalate and arsenic were detected above MCLs in the largest number of monitoring wells, while several contaminants (benzene, ethylbenzene, chlordane, benzo(a)pyrene, beryllium, and selenium) were only detected above MCLs in one to three monitoring wells. In the more recent 2017 and 2018 annual sampling rounds, MCLs were exceeded for chlordane, bis(2-ethylhexyl)phthalate, and arsenic during both rounds in a majority of the wells, with the MCL for chlordane exceeded in just one or two wells.

Comparison can also be made to the previous (2011) comprehensive sampling round and the groundwater MCL exceedances that were documented in the previous 2014 five-year review. It is noted that mercury and lindane (gamma-BHC) were detected above MCLs at one or two monitoring well locations in 2011, but were not detected above the MCL in 2016. Conversely, chlordane, beryllium, and selenium were detected above MCLs in one monitoring well each in 2016, but were not detected above the MCL in 2011. The highest total arsenic concentration was 1,670 ppb in the 2011 comprehensive sampling round, whereas the highest total arsenic concentration was somewhat lower at 1,220 ppb in 2016.

Plume Contour Maps. For the 2016 comprehensive 5-year groundwater sampling round, contour maps depicting the magnitude and location of remaining contamination for total VOCs, total SVOCs, total pesticides, and total arsenic were included in the Groundwater Remediation Progress Annual Report (CHES, 2017b). For total arsenic, it is noted in the annual report that the arsenic data is from wells that may not be screened in the most appropriate interval to transect the elevated arsenic concentrations of the arsenic plume and therefore, may underestimate the actual extent of arsenic contamination. However, this depiction of arsenic concentrations is the most complete to date, since it includes data from the piezometers installed in 2015 in the Cochato River. Vertical gradients assessed in the piezometers in 2016 and again in 2017 show a consistent upward movement of groundwater to the surface water, indicating a possible migratory pathway for site contaminants to the Cochato River.

LNAPL. An LNAPL recovery system has been in place since March 1999 to remove LNAPL; however, the system became inactive in March 2009 due to diminishing recovery of LNAPL. LNAPL has continued to be detected in some wells; however, the specific gravity of the LNAPL appears to be close to water making LNAPL recovery unsuccessful. The fluid entering the system was found to be in an emulsified state which is not readily separated by the system's oil/water separator (OWS). During the period of October 1, 2016 to October 30, 2017, a total of 20 wells at the site were gauged on a monthly basis to evaluate the presence and thickness of LNAPL. LNAPL was only detected in relatively minimal amounts (0.20 feet or less) within extraction wells EW-6, EW-

6A, and EW-8 during the monthly evaluations. The apparent LNAPL thickness observed during this reporting period is generally consistent with recent years, as is the absence of LNAPL in most site wells where LNAPL was previously observed. Since the last FYR, approximately 13.5 gallons of LNAPL have been recovered from EW-6 (CHES 2015, CHES 2016, CHES2017). Recoverable LNAPL within wells at the site has waned and recoverable LNAPL has not been collected since a May 28, 2015 recovery effort at EW-6 (CHES, 2019).

PFAS. In December 2018, groundwater samples from wells EW-4A, EW-3, EW-6A, EW-7, EW-8, and MW97-2 were analyzed for PFAS (see Table C-2 in Appendix C) in order to assess their presence in site groundwater and evaluate the results against risk-based screening levels for perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS) (refer to the Question B response for this evaluation). The analytical results for PFBS indicate no detections and results for PFOS and PFOA indicate that these compounds were either not detected or detected at low estimated (J-flagged) concentrations below detection limits. The maximum PFOA concentration was 0.0096 J ppb and the maximum PFOS concentration was 0.0077 J ppb.

Conceptual Site Model Update. In 2018, a study was completed by Parsons, on behalf of MassDEP, to update the Conceptual Site Model (CSM) for the Site. The overall objective of the CSM update was to investigate subsurface conditions and update the possible contaminant sources on the Site. The major findings of the CSM investigations were that source for the groundwater plume of organic contamination is an area of residual NAPL, which is immobile and will not flow into monitoring or extraction wells and is therefore not recoverable. The residual NAPL zone is up to 30 feet thick in the western upland part of the site and thins to the east, being present mostly as a fairly thin layer at the water table near the Cochato River. The NAPL, which extends over an area about 200 feet wide and 700 feet long, was found to be a moderately heavy NAPL falling mainly within the diesel range containing abundant aromatic hydrocarbons (46%). This layer of NAPL is found 25 to 30 feet below ground surface. The NAPL was found to contain VOCs, SVOCs (PAHs, and largely naphthalene), several organochlorine pesticides (largely 4,4'-DDD), and arsenic. The NAPL does not contain enough arsenic to be the primary source of that contaminant, nor is the arsenic in the ash at the Site. Instead, it was determined that the large quantity of arsenic in the soils of the saturated zone is the primary source for the current arsenic plume. That arsenic originated in the source area on the western side of the site and was transported throughout the organics plume, where it partially adsorbed to silts and iron hydroxides. With the original source of organics and arsenic removed, the arsenic in the saturated zone is still mobilized by the geochemical conditions that were created by the organics plume. Even in areas where dissolved organic concentrations have declined, arsenic concentrations have declined more slowly because of the residual geochemical effects; e.g., high reduced iron concentrations, low ORP. Arsenic concentrations are highest and not apparently declining in the fine-grained silty sand unit that underlies the Cochato River; however, due to the low permeability of these materials, they are not the predominant source of the arsenic flux to the river. The CSM Update is to be supplemented by ongoing bench-scale treatability studies that are evaluating different in-situ remedial technologies for the Site. The results were not available at the time of the FYR (Parsons, 2018).

Cochato River Monitoring

Sediment. Appendix C contains analytical results for sediment and fish. Sediment, bank soil, and fish tissue samples were collected in September 2018 in support of this five-year review (ES&M, 2019). Thirteen sediment samples and six soil samples were collected from in and along the Cochato River between September 10 and September 13, 2018 (see Figure 4 in Appendix C). Station progression (upstream to downstream) is A, E (next to site), B (parallel to Sylvan Lake), C (extending to Ice Pond), and D (within the Mary Lee Wetlands). Bank soil samples were only collected at stations C and D. Samples were analyzed for TOC, grain size, PAHs, organochlorine pesticides, and arsenic.

In 2018, PAHs were detected in all the samples including upstream samples collected from station A. The highest concentrations were detected in the sediment sample collected at station D (transect 5) where fluoranthene was detected at 3.71 mg/kg. The highest pesticide concentrations were detected in the sediment samples collected at Station D farthest downstream of the site where Total DDT was detected at a concentration of 1.53 mg/kg. Similar pesticide concentrations were detected at upstream location Station B. Arsenic concentrations above 100

mg/kg were detected in some bank soil samples collected at stations C and D, but the mean arsenic concentrations in these bank soil samples were less than 100 mg/kg.

Table C-4 in Appendix C compares the 2018 sediment and soil results to historical results and the sediment cleanup levels developed in the 1989 ROD (listed under "Program Action Limit – River" in the table). Values listed as Program Action Limits for bank soils are not established project cleanup levels, but rather concentrations used for evaluation of results in historic trend analysis documents, developed to be protective of humans participating in recreational activities. The results presented show total PAH concentrations were higher than the 2002 monitoring round in all samples in 2013, but all except one location (sediment samples at station D) decreased in the 2018 round. The total concentrations of PAHs, pesticides, and arsenic did not exceed the either the sediment or the soil Program Action Limits at any location in the most recent 2018 monitoring round. In general, concentrations of detected contaminants were less than the previous monitoring round in 2013. In 2013, the mean total PAH concentrations for the Station A (upstream of the site) and Station E (next to site) were above the Program ActionLimit, but the total PAHs concentrations at all locations further downstream were below the Project Action Levels.

Table C-4 also compares the results to ecological screening values, which represent maximum concentrations at which ecological receptors are protected. Comparison to the ecological screening values indicates exceedances for total DDT, total chlordane, total PAHs, and arsenic, in multiple downstream locations, while results for Station E (next site) were below the screening levels in 2018. In 2013, screening levels were exceeded both upstream for one or more parameter in samples from both upstream, next to the site, and downstream locations.

Fish Tissue. Table C-5 in Appendix C presents the 2018 fish tissue results compared to historical results. Fish samples were collected from Stations A through E in the Cochato River and from Sylvan Lake (see Figure 4 in Appendix C and descriptions in the sediment discussion above). The results presented show that there were PAHs detected in the majority of the fish tissue samples in 2018, whereas there were none detected in 2013 (fillet only), due in part to high laboratory reporting limits. During the September 2018 event, low PAH concentrations were detected above the laboratory reporting limits at all four stations with the highest total PAH concentrations detected in a sample from Station A with total of 90.8 µg/kg in fillet tissue and 157 µg/kg in offal tissue. This sample was a composite from five small pumpkinseed fish. There was no chlordane detected in any samples in 2018 in fillet samples, with low concentrations in each of the offal samples. Detections of total DDT were similar in magnitude to the previous two monitoring rounds with generally similar concentrations in fillet and offal tissues.

Site Inspection

The inspection of the Site was conducted on 3/19/2019. In attendance were Kimberly White, EPA Remedial Project Manager; Dorothy Allen and Patrick Hurley of the MassDEP; Lisa Irwin, Project Scientist, Ken McDermott, Project Manager, and George Bergman, GWTF Operator of Clean Harbors (the O&M Contractor for the MassDEP); and Cinthia McLane, AECOM (contractor to the EPA). The purpose of the inspection was to assess the protectiveness of the remedy. Patrick Hurley of the MassDEP led a tour of the GWTF and provided information on improvements that have been made within the past five years, along with maintenance issues resulting from the age of much of the equipment. In general, the GWTF continues to meet effluent discharge limits; however, the age of the equipment continues to cause some difficulties for the operators, as described in Section II, System Operation and Maintenance. During inspection of the extraction well field, it was noted that the unnamed brook has a modified flow path that travels along the access road. Extraction wells EW-4A, EW-6A, and EW-7 were inspected during the visit. Well vaults for EW-3, EW-5, EW8, EW-9, and EW-10 were not opened due to limited access at the time of the visit. There have been no changes since the prior Five Year Review. The LNAPL collection system is no longer in use. NAPL is measured weekly in four wells and monthly in others. It is only observed sporadically and is no longer being removed. The infiltration basins appeared to be in good condition. The fish advisory signs that were installed in 2014 were observed during the site inspection. Of the five signs that were installed, three were found to be in good condition (one on the banks of the Cochato River near the intersection of Centre and Union Streets and two on the west side of Sylvan Lake). A fourth sign,

located on the east side of Sylvan Lake near the end of Mt. Pleasant Avenue, had been removed from its post and was missing. (The sign was replaced following the site inspection.) The fifth sign, also located on the east side of Sylvan Lake in a wooded area was not seen at the time of the visit. The perimeter fence, where visible from the Site and from a parking lot off of Mear Road, appeared to be in intact and generally in good condition.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Remedial Action Performance. The review of documents, monitoring data, and the results of the site inspection indicate that the remedies are performing as intended in the RODs and that monitoring frequency is sufficient. Investigations to improve the remedy are ongoing and interim cleanup levels are being evaluated to determine if they remain appropriate. A final determination on these issues will be completed once the conceptual site model update, additional investigations and field test are finalized.

System Operations/O&M. GWTF O&M is effective at treating contaminated groundwater and maintaining plume capture. Annual reports show that the O&M is working in a manner that will continue to maintain the effectiveness of the remedy. However, the age of the equipment has resulted in increased downtime and some difficulty in locating spare and replacement parts. The State has continued to implement measures to optimize performance and reduce costs.

Implementation of Institutional Controls and Other Measures. Institutional controls in the form of NAULs have been implemented on all Site properties. Fish warning signs are in place, with the exception of the missing sign on the east side of Sylvan Lake, which is being replaced.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

No. There have been changes in exposure assumptions, risk assessment methodologies, and toxicity values since the RODs were issued, however the RAOs selected for the Site are still valid. The changes as described below do not affect the protectiveness of the remedy because current and future exposures are being prevented by implementation of comprehensive institutional controls.

Changes in Standards and TBCs

A review of Applicable or Relevant and Appropriate Requirements (ARARs) was performed to check the impact on the remedy due to any changes in standards that were identified as ARARs in the three RODs and in the previous five-year review reports, newly promulgated standards for chemicals of potential concern, and TBCs (to be considered) that may affect the protectiveness of the remedy. There were no changes in the location-specific or action-specific ARARs since the last FYR.

Regarding chemical-specific ARARs, as noted in previous five-year reviews, interim groundwater cleanup levels for the Site are based on federal Maximum Contaminant Levels (MCLs). No changes in MCLs have occurred since the previous five-year review; however, several MCLs and Maximum Contaminant Level Goals (MCLGs) have changed since the 1986 ROD. Several groundwater constituents remain above current MCLs; however, institutional controls are in place to control groundwater use in the vicinity of the Site, until such time as groundwater cleanup levels are achieved.

Review of Human Health Risk Assessment.

The risk assessment performed for the 1986 Feasibility Study (FS) report (GHR, 1986a) concluded that there would be significant risk to human health if groundwater from the Site containing VOCs, SVOCs, and metals was ingested in the future. The risk assessment further determined that trespasser exposures to Site soil containing arsenic, chlordane, and dioxins exceeded EPA risk management guidelines. Direct contact recreational exposures to Cochato River sediments containing elevated levels of arsenic, DDT, PAHs, and chlordane also exceeded Program Action Limits, as presented in the Data Review section (see Section IV). MCLs were selected as interim cleanup levels for groundwater. The results of the risk assessment were used to determine the lateral and vertical limits of soil excavation, and to establish cleanup levels for sediment.

The toxicity values that served as the basis for the sediment cleanup levels, as contained in the RODs, have been re-evaluated to determine whether any changes in toxicity impact the protectiveness of the remedy. Changes in toxicity values since the previous five-year review report was conducted in 2014 are discussed to determine whether reuse decisions remain valid. Any changes in current or potential future exposure pathways or exposure assumptions that may impact remedy protectiveness are also noted.

Changes in toxicity values for groundwater COPCs would not affect remedy protectiveness since cleanup levels for groundwater are based on federal MCLs. As noted above under "Changes in Standards and TBCs", some of the MCLs and MCLGs have changed since ROD completion. Until groundwater cleanup levels are achieved and groundwater use is demonstrated to not pose a risk to human health, the installation of private wells and associated groundwater exposure pathways should be prevented. Institutional controls, in the form of NAULs, are in place to control groundwater use in the vicinity of the Site, and prohibit extraction, consumption, or utilization of groundwater on the properties within the Site for any purpose, including, but not limited to potable, industrial, irrigation, or agricultural purposes.

Changes in Toxicity and Other Contaminant Characteristics

Toxicity values have changed since the 1986 and 1997 risk assessments were performed for the Baird & McGuire Site. While some of these changes would potentially increase the cancer risk and non-cancer hazard associated with the exposures to soil, groundwater, and sediment evaluated, these toxicity changes do not affect the current protectiveness of the remedy, because source control measures and institutional controls will prevent exposures.

- **2017 1,3,5-Trimethylbenzene** non-cancer toxicity value

In June 2017, EPA finalized an inhalation reference concentration (RfC) for 1,3,5-trimethylbenzene based on a new IRIS value. Previously, there was no RfC value for 1,3,5-trimethylbenzene. Inhalation of volatile analytes is typically included during evaluation of exposures to various media (e.g., contaminants may volatilize from groundwater during bathing/showering). Although 1,3,5-trimethylbenzene is not a target analyte in soil or sediment at the Site, it was analyzed and detected in Site groundwater samples collected prior to and in 2016 at concentrations greater than EPA's November 2018 Regional Screening Levels for tapwater (6 µg/L based on Hazard Quotient of 0.1 and 60 µg/L based on Hazard Quotient of 1). The maximum detection of 1,3,5-trimethylbenzene was 298 µg/L in 2016. 1,3,5-Trimethylbenzene was not detected in 2017 or 2018; however, this is because it was not analyzed for in the majority of locations, rather than due to a decrease in concentrations in Site-impacted groundwater. There is no current exposure to Site-impacted groundwater and institutional controls prevent exposures until cleanup levels have been achieved. Therefore, the interim protectiveness of the remedy is not affected by this change to the toxicity values.

- **2017 1,2,4-Trimethylbenzene** non-cancer toxicity value

In June 2017, EPA finalized a new inhalation reference concentration (RfC) for 1,2,4-trimethylbenzene. The new IRIS value replaces a PPRTV that was used previously and indicates that 1,2,4-trimethylbenzene is less toxic from non-cancer health effects. This change would result in decreased non-cancer hazard from inhalation exposure to 1,2,4-trimethylbenzene. Inhalation of volatile analytes is typically included during evaluation of exposures to various media (e.g., contaminants may volatilize from groundwater during bathing/showering).

Although 1,2,4-trimethylbenzene is not a target analyte in soil or sediment at the Site, it was analyzed and detected in Site groundwater samples collected prior to and in 2016 greater than EPA's November 2018 RSLs for tapwater (5.6 µg/L based on Hazard Quotient of 0.1 and 56 µg/L based on Hazard Quotient of 1). 1,2,4-Trimethylbenzene was detected at a maximum concentration of 896 µg/L in 2016. 1,2,4-Trimethylbenzene was not detected in Site groundwater samples collected in 2017 and 2018; however, this is because it was not analyzed for in the majority of locations, rather than due to a decrease in concentrations in Site-impacted groundwater. There is no current exposure to Site-impacted groundwater and institutional controls will prevent future exposures until cleanup levels have been achieved. Therefore, the interim protectiveness of the remedy is not affected by this change to the toxicity values.

- **2016 PFOA/PFOS** non-cancer toxicity values

In May 2016, EPA issued final lifetime drinking water health advisories for PFOA and PFOS, which identified a chronic oral reference dose (RfD) of $2x10^{-5}$ mg/kg-day for PFOA and PFOS (USEPA, 2016a and USEPA, 2016b). These RfD values should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFOA and PFOS might be present based on site history. Potential estimated health risks from PFOA and PFOS, if identified, would likely increase total site risks due to groundwater exposure. Further evaluation of potential risks from exposure to PFOA and PFOS in other media at the site might be needed based on site conditions and may also affect total Site risks.

PFOA and PFOS belong to a group of compounds known as per- and polyfluoroalkyl substances (PFAS), which are used in a variety of industrial applications. Groundwater samples were collected for PFAS analysis at the Baird & McGuire Site in December 2018 because processes at the Site could have used PFAS-containing material including the manufacturing of pesticides, herbicides and cleaning products; and the possible use of PFAS-containing foam to extinguish fires associated with the on-site incineration of contaminated soil. Analytical results for PFOS and PFOA from groundwater samples from the Site indicate that PFOS and PFOA are either not detected or detected at low estimated concentrations (i.e., J-flagged results identified between the method detection limit and the reporting detection limit). The 2018 PFOA and PFOS groundwater results are less than the USEPA risk-based residential tapwater Regional Screening Levels (RSL) for PFOA and PFOS (0.041 µg/L) for a hazard quotient of 0.1. The groundwater results indicate that additional risk evaluation of PFOS and PFOA is unnecessary. PFAS should be included in a future monitoring event to confirm that levels are below the RSLs which would indicate that PFAS are not contaminants of concern. There is no current exposure to Site-impacted groundwater and institutional controls will prevent future exposures until cleanup levels have been achieved. Therefore, the presence of PFOA and PFOS in groundwater at concentrations below the screening levels does not affect the protectiveness of the remedy.

- **2014 PFBS** non-cancer toxicity value

Perfluorobutanesulfonic acid (PFBS) has a chronic oral RfD of $2x10^{-2}$ mg/kg-day based on an EPA Provisional Peer Reviewed Toxicity Value (PPRTV) (USEPA, 2014a). This RfD value should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFBS might be present based on Site history. Potential estimated health risks from PFBS, if identified, would likely increase total Site risks due to groundwater exposure. Further evaluation of potential risks from exposure to PFBS in other media at the Site might be needed based on site conditions and may also affect total Site risks.

PFBS belongs to a group of compounds known as PFAS, which are used in a variety of industrial applications. Groundwater samples were collected for PFAS analysis at the Baird & McGuire Site in December 2018 because PFAS compounds are commonly associated with landfills containing industrial and chemical waste. Analytical groundwater results for PFBS from groundwater samples indicate concentrations of PFBS in groundwater are not detected at or above method detection limits less than the risk-based residential tapwater EPA Regional Screening Level (RSL) for PFBS (40.1 µg/L) for a hazard quotient of 0.1. The groundwater results indicate that additional risk evaluation of PFBS is unnecessary. PFAS should be included in a future monitoring event to confirm that levels are below the RSLs which would indicate that PFAS are not a contaminant of concernThere is no current exposure to Site-impacted groundwater and institutional controls will prevent future exposures until cleanup levels have been achieved. Therefore, the presence of PFBS in groundwater at concentrations below the screening level does not affect the protectiveness of the remedy.

- **2016 Lead** in Soil Cleanups

EPA's 2016 Office of Land and Emergency Management (OLEM) memorandum "Updated Scientific Considerations for Lead in Soil Cleanups" (OLEM Directive 9200.2-167) indicates that adverse health effects are associated with blood lead levels (BLLs) at less than 10 µg/dL. The memo mentioned that several studies have observed "clear evidence of cognitive function decrements in young children with mean or group BLLs between 2 and 8 µg/dL." Any soil screening, action or cleanup level developed based on previous BLL of 10 µg/dL may not be protective.

EPA's approach to evaluate potential lead risks is to limit exposure to residential and commercial soil lead levels such that a typical (or hypothetical) child or group of similarly exposed children would have an estimated risk of no more than 5% of the population exceeding a 5 µg/dL BLL. This is based on evidence indicating cognitive impacts at BLLs below 10 µg/dL. Additionally, this approach aligns with the Lead Technical Review Workgroup's current support for using a BLL of 5 µg/dL as the level of concern in the Integrated Exposure Uptake Biokinetic Model (IEUBK) and Adult Lead Methodology (ALM). A target BLL of 5 µg/dL reflects current scientific literature on lead toxicology and epidemiology that provides evidence that the adverse health effects of lead exposure do not have a threshold.

EPA's 2017 OLEM memorandum "Transmittal of Update to the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters" (OLEM Directive 9285.6-56) provides updates on the default baseline blood lead concentration and default geometric standard deviation input parameters for the Adult Lead Methodology. These updates are based on the analysis of the NHANES 2009-2014 data, with recommended updated values for baseline blood lead concentration being 0.6 µg/dL and geometric standard deviation being 1.8.

Using updated default IEUBK and ALM parameters at a target BLL of 5 µg/dL, site-specific lead soil screening levels (SLs) of 200 ppm and 1,000 ppm are developed for residential and commercial/industrial exposures, respectively.

The maximum residual soil concentration of lead in backfilled ash in the soil excavation areas is 82.7 ppm (M&E, 1998), which is less than EPA's site-specific lead soil SLs of 200 ppm and 1,000 ppm for residential and commercial/industrial exposure, respectively. The backfilled ash is covered with a layer of clean topsoil, varying in depth from one to two feet. Therefore, the update to the Region 1 lead strategy would not impact the current protectiveness of the remedy.

- **2017 Polycyclic Aromatic Hydrocarbons (PAHs)** cancer and non-cancer toxicity values

On January 19, 2017, EPA issued revised (less carcinogenic) cancer toxicity values and new non-cancer toxicity values for benzo(a)pyrene. Benzo(a)pyrene did not have non-cancer toxicity values prior to January 19, 2017. Benzo(a)pyrene is now considered to be carcinogenic by a mutagenic mode of action; therefore, cancer risks must

be evaluated for different human developmental stages using age dependent potency adjustment factors (ADAFs) for different age groups. The cancer potency of other carcinogenic PAHs is adjusted by the use of relative potency factors (RPFs), which are expressed relative to the potency of benzo(a)pyrene. The non-cancer effects of benzo(a)pyrene were not evaluated in the past due to the absence of non-cancer values. At the Baird & McGuire Site, there were risk-based sediment cleanup levels for PAHs, set at a cancer risk of $1x10^{-5}$. The remedy performed achieved these cleanup levels. Using the current toxicity values, the cleanup levels would be higher for the same risk level. Therefore, these changes do not affect the protectiveness of the remedy.

Changes in Risk Assessment Methods

There have been multiple changes to EPA's risk assessment methodologies since the 1986 and 1997 risk assessments. As noted above, the source control measures and institutional controls prevent exposures and therefore changes in methodologies do not affect the current protectiveness of the remedy for the Site.

- **2014 OSWER Directive Determining Groundwater Exposure Point Concentrations, Supplemental Guidance**

In 2014, EPA finalized a Directive to determine groundwater exposure point concentrations (EPCs). https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236917. This Directive provides recommendations to develop groundwater EPCs. The recommendations to calculate the 95% Upper Confidence Limit (UCL) of the arithmetic mean concentration for each contaminant from wells within the core/center of the plume, using the statistical software ProUCL, could result in lower groundwater EPCs than the maximum concentrations routinely used for EPCs as past practice in risk assessment, leading to changes in groundwater risk screening and evaluation. In general, this approach could result in slightly lower risk or higher screening levels (USEPA, 2014b).

With the levels of groundwater contamination detected at the Baird & McGuire Site above EPA MCLs, this change would not have resulted in a different risk determination at the Site. However, this Directive needs to be considered for any future groundwater evaluations performed as concentrations decrease and the Site approaches closure.

Changes in Exposure Pathways/Assumptions

There have been no changes in land use since the last five-year review. Current and future planned uses are still commercial/industrial in nature within the Site boundaries. As further discussed below, there have been changes to exposure parameters, but these do not affect the protectiveness of the remedy due to no current exposure to Site-impacted groundwater and institutional controls preventing future exposures.

- **2014 OSWER Directive on the Update of Standard Default Exposure Factors**

In 2014, EPA finalized a Directive to update standard default exposure factors and frequently asked questions associated with these updates. https://www.epa.gov/sites/production/files/2015-11/documents/oswer_directive_9200.1-120_exposurefactors_corrected2.pdf. Many of these exposure factors differ from those used in the 1986 and 1997 risk assessments supporting the RODs (GHR, 1986a; M&E, 1998). These changes in general would result in a slight decrease of the risk estimates for most chemicals (USEPA, 2014c).

Because of the significant changes in risk assessment methods and assumptions since the 1986 risk assessment was performed, the previous five-year reviews performed re-evaluations of the sediment cleanup levels to determine whether the changes in risk assessment methods and assumptions affect remedy protectiveness. The evaluation performed in 2009 concluded that the sediment Program Action Limits (i.e., the 1989 ROD cleanup levels for sediment (arsenic – 250 mg/kg; PAHs – 2.2 mg/kg; DDT – 19 mg/kg; and chlordane – 5 mg/kg)) were within EPA's target risk range (10^{-6} to 10^{-4}), with arsenic and PAHs being at the high end of the target risk range

when using conservative assumptions in the evaluation. The 2014 five-year review further documented that the reduced bioavailability of arsenic (USEPA, 2012) would lower the overall risk associated with the ROD cleanup levels. The 2014 OSWER Directive noted above, along with the 2017 toxicity value changes discussed above, would further lower the overall risk related to the sediment exposures, and would therefore not affect the protectiveness of the Site remedy.

With respect to these recent exposure assumption changes, the 1997 evaluation of residual soil/ash would show a lowered risk related to the exposures evaluated, thereby maintaining the conclusion of protectiveness of the remedy.

- **2018 EPA VISL Calculator**

In February 2018, EPA launched an online Vapor Intrusion Screening Level (VISL) calculator which can be used to obtain risk-based screening level concentrations for groundwater, sub-slab soil gas, and indoor air. The VISL calculator uses the same database as the Regional Screening Levels for toxicity values and physiochemical parameters and is automatically updated during the semi-annual RSL updates. Please see the User's Guide for further details on how to use the VISL calculator. https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator.

The vapor intrusion pathway was not evaluated in the 1989 risk assessment. This pathway may be of concern at sites where soil and shallow groundwater contaminated with VOCs exists in close proximity to occupied buildings. Except for the NAPL building and the control building for the groundwater treatment system, there are no buildings located above the shallow groundwater VOC plume that contains concentrations of naphthalene, 2-methylnaphthalene, ethylbenzene, toluene, xylene and other VOCs above vapor intrusion groundwater screening values. These two buildings are only visited occasionally (i.e., a few hours per week) to make sure they are secure or to perform periodic maintenance on and monitoring of equipment, therefore further evaluation of the vapor intrusion pathway is not warranted at this time. However, should shallow groundwater VOC contamination continue to exist coincident with future site development involving the construction of buildings that will be occupied consistently (e.g., office space), the vapor intrusion pathway should be further evaluated to determine the potential risk to on-site workers. EPA implemented institutional controls in the form of Notices of Activity and Use Limitations on properties within and neighboring the Site in 2018. These institutional controls restrict development within the Site and create a process through which landowners must receive approval from EPA and MassDEP before developing impacted properties, including development involving excavation and usage of groundwater and stormwater. In addition, because much of the Site is located within wetland areas or the 100-year floodplain, existing zoning by-laws which establish use restrictions in floodplains and wetlands provide a degree of protection in that Site re-development will be monitored or discouraged. If Site redevelopment or building construction occurs in the future, either a full evaluation of the vapor intrusion pathway should be conducted or a vapor intrusion mitigation system should be installed in the new building to prevent exposure to volatiles in shallow groundwater.

EPA updates Regional Screening Level tables twice a year and the most current ones are available at the EPA Regional Screening Levels web page (https://www.epa.gov/risk/regional-screening-levels-rsls), updated November 2018.

- **Construction/Excavation Worker**

As indicated in the 2014 Five-Year Review, neither the 1986 risk assessment nor the 1997 supplemental risk evaluation specifically assessed the risk to construction or excavation workers exposed to residual soil or shallow groundwater contamination during intrusive activities. Because this receptor population has not been evaluated, institutional controls requiring pre-approval and appropriate safety measures of any excavations into areas of the Site with residual soil and/or shallow groundwater contamination have been established.

- **Fish Tissue**

The 2018 analytical results for fish fillets analyzed for total DDT, total PAHs, total chlordane, and benzo(a)pyrene, indicate non-detect levels of total chlordane and benzo(a)pyrene. DDT and total PAHs were detected in the 2018 fillet samples. The current version of the EPA Regional Screening Level (RSL) online calculator in November 2018 (https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search) was used to generate screening levels for a range of fish consumption rates (i.e., 50th percentile and 95th percentile) taken from Table 8b of EPA-820-R-14-002 (Estimated Fish Consumption Rates for the U. S. Population and Selected Subpopulations (NHANES 2003-2010 Final Report, April 2014) for the inland northeast adult population at or older than 21 years old. These values are 22.1 g/day for the 50th percentile and 76.1 g/day for the 95th percentile. The resulting screening levels are as follows:

Analyte	**Screening Levels (µg/kg)**							
	Ingestion Rate = 76.1 g/day (95th percentile)				Ingestion Rate = 22.1 g/day (50th percentile)			
	Risk = $1x10^{-6}$	Risk = $1x10^{-5}$	Risk = $1x10^{-4}$	HQ = 1	Risk = $1x10^{-6}$	Risk = $1x10^{-5}$	Risk = $1x10^{-4}$	HQ = 1
Chlordane	8.43	84.3	843	548	29	290	2900	1890
DDT	8.68	86.8	868	548	29.9	299	2999	1890
Benzo(a)pyrene	2.95	29.5	295	329	10.2	102	1020	1130

Note that the RSL calculator does not evaluate total PAHs, so benzo(a)pyrene is used as a surrogate.

Concentrations of total DDT in all fillet samples collected in 2018, ranging from 3.86 to 53.3 µg/kg, are less than the screening levels derived based on a target risk level = $1x10^{-5}$ and target hazard quotient (HQ) = 1 presented above. The maximum detected DDT concentration of 53.3 µg/kg in fillet would result in estimated cancer risk of $6x10^{-6}$ (based on the 95th percentile ingestion rate of 76.1 g/day), which is within EPA's acceptable risk range (10^{-6} to 10^{-4}). Concentrations of total PAHs in all of the fillet samples collected in 2018, ranging from non-detect to 90.8 µg/kg, are less than the screening levels for benzo(a)pyrene derived based on a target risk level = $1x10^{-4}$ and target HQ = 1. Total PAH concentrations in three of the ten 2018 fillet samples are also less than the screening levels derived based on a target risk level = $1x10^{-5}$. The estimated potential risks associated with the maximum total PAH concentration in fish tissue is approximately $3x10^{-5}$ (based on the 95th percentile ingestion rate of 76.1 g/day), which is within EPA's acceptable risk range (10^{-6} to 10^{-4}). Therefore, the 2018 fish fillet results do not pose a potential risk and/or hazard in excess of EPA's acceptable risk range or hazard index level, and thus, do not affect the protectiveness of the Site remedy.

Summary and Conclusions Relative to Human Health Risks

While there have been changes to toxicity values, risk assessment methods and exposure parameters, the changes do not impact the protectiveness of the remedy.

Review of Ecological Risk Assessment

The ecological risk assessment (ERA) performed for the FS Report (GHR, 1986a) was conducted using standard science, methodologies, and professional judgment available at the time. The media of concern were on-site soils and Cochato River sediments. The ERA concluded that there would be significant risk to ecological receptors from pesticides, SVOCs, and dioxin, although the ERA did not recommend site specific clean-up levels derived from ecological endpoints. The limits of cleanup were based on the nature and extent of soil contamination documented in the RI/FS; the ROD specified the excavation of soil from areas based on contamination profiles developed in the RI Addendum (GHR, 1986b). The limits of excavation were established so that contaminant concentrations outside of the hot areas were one to two orders of magnitude lower than the concentrations inside the hot areas.

The 1989 ROD for the sediment study area (designated as Operable Unit 3 [OU-3]) covered the excavation of sediments from a length of the Cochato River extending from the Baird & McGuire Site to the Union Street crossing, placement of clean backfill in excavated areas, and long-term monitoring of downstream portions of the Cochato River beyond the excavated areas. A small portion of the riverbed where contaminated groundwater was suspected to discharge to the river was backfilled with clean organic fill.

Since the ERA was written in 1986, EPA has promulgated guidelines to address screening chemicals, selecting contaminants of concern, and performing risk calculations. In order to address these changes in guidelines and available toxicity reference values, additional evaluations were performed in the second five-year review (2004) to assess risk to ecological receptors. These evaluations included modeling of the exposure of a small mammalian receptor exposed to the soils in the remediation area and comparison of fish tissue concentrations to toxicity reference values to assess potential adverse effects on fish exposed to site contaminants in the Cochato River.

Since the last five-year review, there are no newly promulgated standards, relevant to the Site, which bear on the evaluation of ecological risk or the protectiveness of the remedy. Since the risk evaluation performed during the last five-year review, there have not been any significant changes in recommended ecological benchmarks utilized for sediment or soil. There are no major changes in site conditions or exposure assumptions on which the risk assessment was based that would result in increased exposure or risk.

A review of the currently available toxicity values that correspond to freshwater fish species for chronic no-observed effects dose (NOED) studies with reproductive endpoints in the Environmental Residue Effected Database (ERED) (USACE, 2018), did not indicate lower values applicable for comparison to the fish tissue data collected. The only species collected in 2018 for which ERED exposure concentration data are available are for DDT and include Pumpkinseed and Bluegill. The maximum concentration of DDT detected in Pumpkinseed was 0.053 mg/kg, which was below the NOED of 24 mg/kg. The maximum concentration of DDT detected in Bluegill was 0.022 mg/kg which was below the NOED of 4.2 mg/kg. The measured values remain well below concentrations likely to cause effects in fish indicating negligible risk to fish populations.

Expected Progress Towards Meeting RAOs

OU-1
The operation and maintenance of the GWTF is meeting the RAOs of protecting surface waters from future contaminant migration by containing the groundwater contaminant plume . However, the efficiency of the GWTF is declining therefore, investigations should continue to identify measures to expedite the groundwater cleanup.

OU-2
Contaminated soils and sediments have been excavated and treated; the wetlands have been restored and monitoring is on-going. With the implementation of the institutional controls, all RAOs for OU-2 are being met.

OU-3
The sediment data collected in 2018 show mean concentrations below Program Action Limits and sediment ecological screening values at all locations for PAHs (Table C-4; see the Data Review section in Section IV). These samples in 2018 were also all lower than PAHs measured in sediment in 2013 indicating progress toward meeting RAOs. Concentrations of pesticides in sediment were above screening values but below Program Action Limits at downstream sampling locations (B, C and D) in 2018; however, with the exception of Station B, sediment samples had lower concentrations of pesticides in 2018. Arsenic concentrations in 2018 were also lower in sediments than measured in 2013, with the exception of Station B. These results indicate progress towards meeting RAOs is likely being made.

QUESTION C: Has any **other** information come to light that could call into question the protectiveness of the remedy?

No other information that calls into question the protectiveness of the remedy has been identified during this Five-Year Review process.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU-2 and OU-3

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 1	**Issue Category: OtherCleanup Levels**			
	Issue: The 1986 OU1 ROD states that "after five (5) years of operation, the Agency will determine in a supplemental decision document if the restoration target levels are achievable and if they are adequate to protect public health and environment"; this determination has not been made.			
	Recommendation: Determine whether current interim groundwater cleanup levels are appropriate, and document changes as necessary.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA	9/30/2025

OU(s): 1	**Issue Category: Remedy Performance**			
	Issue: LNAPL recovery system is not effectively recovering product.			
	Recommendation: Complete the studies related to the CSM update and determine next response action (e.g. source recovery action). The use of other technologies for removing LNAPL sources or enhancing groundwater remediation may be necessary.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA	9/30/2023

OTHER FINDINGS

In addition, the following are recommendations that were identified during the FYR and may improve performance of the remedy, reduce costs, improve management of O&M, and accelerate Site close out, but do not affect current and/or future protectiveness:

- *While the remediation of the contaminated aquifer is on-going and investigations are being conducted, MassDEP should continue make improvements to the GWTF, including defining the groundwater-surface water interaction with the Cochato River, and defining/refining the capture zones of the extraction wells.*
- *Pilot field test of LNAPL in-situ treatment from bench-scale feasibility study. (The LNAPL field pilot study of in-situ treatment will be limited to contamination close to the river that is shallow and accessible.)*
- *In 2017, EPA finalized toxicity values for 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene and 1,2,3-Trimethylbenzene. The compounds 1,3,5-Trimethylbenzene and 1,2,4-Trimethylbenzene were detected in groundwater at concentrations above EPA's RSLs; however, 1,2,3-Trimethylbenzene has not been included in past sampling events. During the next comprehensive sampling event, it is recommended that samples be analyzed for 1,2,3-trimethylbenzene to determine whether this compound is present in Site groundwater at levels that exceed the EPA RSL.*
- *A second round of PFAS sampling should be included in a future monitoring event to confirm that levels are below the RSLs which would indicate that PFAS are not contaminants of concern.*
- *Current fish advisory signage should be checked and maintained regularly.*

VII. PROTECTIVNESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: 1	*Protectiveness Determination:* Short-term Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy at OU-1 currently protects human health and the environment because construction of the remedy is complete, O&M and monitoring of the remedy is being performed, and the current pathway for human health exposures has been eliminated as the contaminated aquifer is no longer being used as a drinking water source. In addition, Institutional Controls are in place to prevent the use of groundwater. However, in order for the remedy to be protective in the long-term, the interim cleanup levels will need to be evaluated to determine if they remain appropriate. This determination can be completed once the conceptual site model update,additional investigations and field test are finalized.		

Protectiveness Statement(s)		
Operable Unit: *2*	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy at OU-2 is protective of human health and the environment because construction of the remedy is complete and comprehensive institutional controls have been established.		

Protectiveness Statement(s)		
Operable Unit: 3	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy at OU-3 protects human health and the environment because sediment with high levels of contaminants was excavated and treated, and clean fill was used to replace materials excavated. Contaminant concentrations in areas of the river where sediments were not removed are decreasing due to natural degradative, depositional, and dispersal processes. In order for the remedy to remain protective, the required long-term sediment and fish tissue monitoring should continue to evaluate contaminant levels/risks, and contaminant behavior over time, and the current fish advisory signage needs to be maintained.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedies at the Baird & McGuire Site currently protect human health and the environment, as exposure pathways that could result in unacceptable risk are being controlled. However, in order for the remedy to be protective in the long-term, the interim cleanup levels will need to be evaluated to determine if they remain appropriate. This determination can be completed once the conceptual site model update , additional investigations and field test are finalized.	

VIII. NEXT REVIEW

The next five-year review report for the Baird & McGuire Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Clean Harbors Environmental Services (CHES), 2015. *Evaluation of Groundwater Remediation Progress, Annual Report – Operable Unit-1, October 1, 2012 through September 30, 2013, Baird & McGuire Superfund Site*. Prepared for Massachusetts Department of Environmental Protection. February 19, 2015.

Clean Harbors Environmental Services (CHES), 2016. *Evaluation of Groundwater Remediation Progress, Annual Report – Operable Unit-1, October 1, 2013 through September 30, 2014, Baird & McGuire Superfund Site*. Prepared for Massachusetts Department of Environmental Protection. June 14, 2016.

Clean Harbors Environmental Services (CHES), 2017a. *Evaluation of Groundwater Remediation Progress, Annual Report – Operable Unit-1, October 1, 2014 through September 30, 2015, Baird & McGuire Superfund Site*. Prepared for Massachusetts Department of Environmental Protection. January 6, 2017.

Clean Harbors Environmental Services (CHES), 2017b. *Evaluation of Groundwater Remediation Progress, Annual Report – Operable Unit-1, October 1, 2015 through September 30, 2016, Baird & McGuire Superfund Site*. Prepared for Massachusetts Department of Environmental Protection. July 26, 2017.

Clean Harbors Environmental Services (CHES), 2019. *Evaluation of Groundwater Remediation Progress, Annual Report – Operable Unit-1, October 1, 2016 through September 30, 2017, Baird & McGuire Superfund Site*. Prepared for Massachusetts Department of Environmental Protection. February 4, 2019.

Environmental Strategies & Management, Inc (EMS). 2019. *Field Investigation and Data Evaluation Summary Report, SARSS VI, Baird & McGuire Superfund Site.* January 2019.

GHR Engineering Associates (GHR). 1986a. *Final Feasibility Study Report, Baird & McGuire Site, Holbrook, MA.* Prepared for NUS Corporation. and U.S. Environmental Protection Agency. July 8, 1986a.

GHR Engineering Associates (GHR). 1986b. *Final Addendum Report, Remedial Investigation Phase II.* June 1986.Parsons. 2018. *Conceptual Site Model Update Report, Baird & McGuire Superfund Site, Holbrook, Massachusetts*. August 2018.

Metcalf & Eddy, Inc. (M&E). 1998. *Evaluation of Potential Future Reuse Opportunities for the Baird & McGuire Site*. Prepared for the U.S. Environmental Protection Agency. June 5, 1998.

Parsons. 2018. *Conceptual Site Model Update Report, Baird & McGuire Superfund Site, Holbrook, Massachusetts*. April 2019.

U.S. Army Corps of Engineers (USACE). 1999. *Remedial Action Report, Baird & McGuire Superfund Site Operable Unit 2 On-site Soil Incineration.* August 1999.

U.S. Army Corps of Engineers (USACE). 2018. Environmental Residue Effects Database (ERED). https://ered.el.erdc.dren.mil/

U.S. Environmental Protection Agency (USEPA). 1989. *Record of Decision Summary, Baird & McGuire Site/ Sediment Study Area, Holbrook, Massachusetts*. September 14, 1989.

U.S. Environmental Protection Agency (USEPA). 2012. *Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil and Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil Documents*. OSWER Directive 9200.1-113. December 31, 2012.

U.S. Environmental Protection Agency (USEPA). 2014a. *Provisional Peer-Reviewed Toxicity Values for Perfluorobutane Sulfonate and Related Compound Potassium Perfluorobutane Sulfonate.* Office of Research and Development.
EPA 690-R-14-012F. July 17, 2014.

U.S. Environmental Protection Agency (USEPA). 2014b. *Determining Groundwater Exposure Point Concentrations.* OSWER Directive 9283.1-42. February 2014.

U.S. Environmental Protection Agency (USEPA). 2014b. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. February 6, 2014c.

APPENDIX B

SITE FIGURES

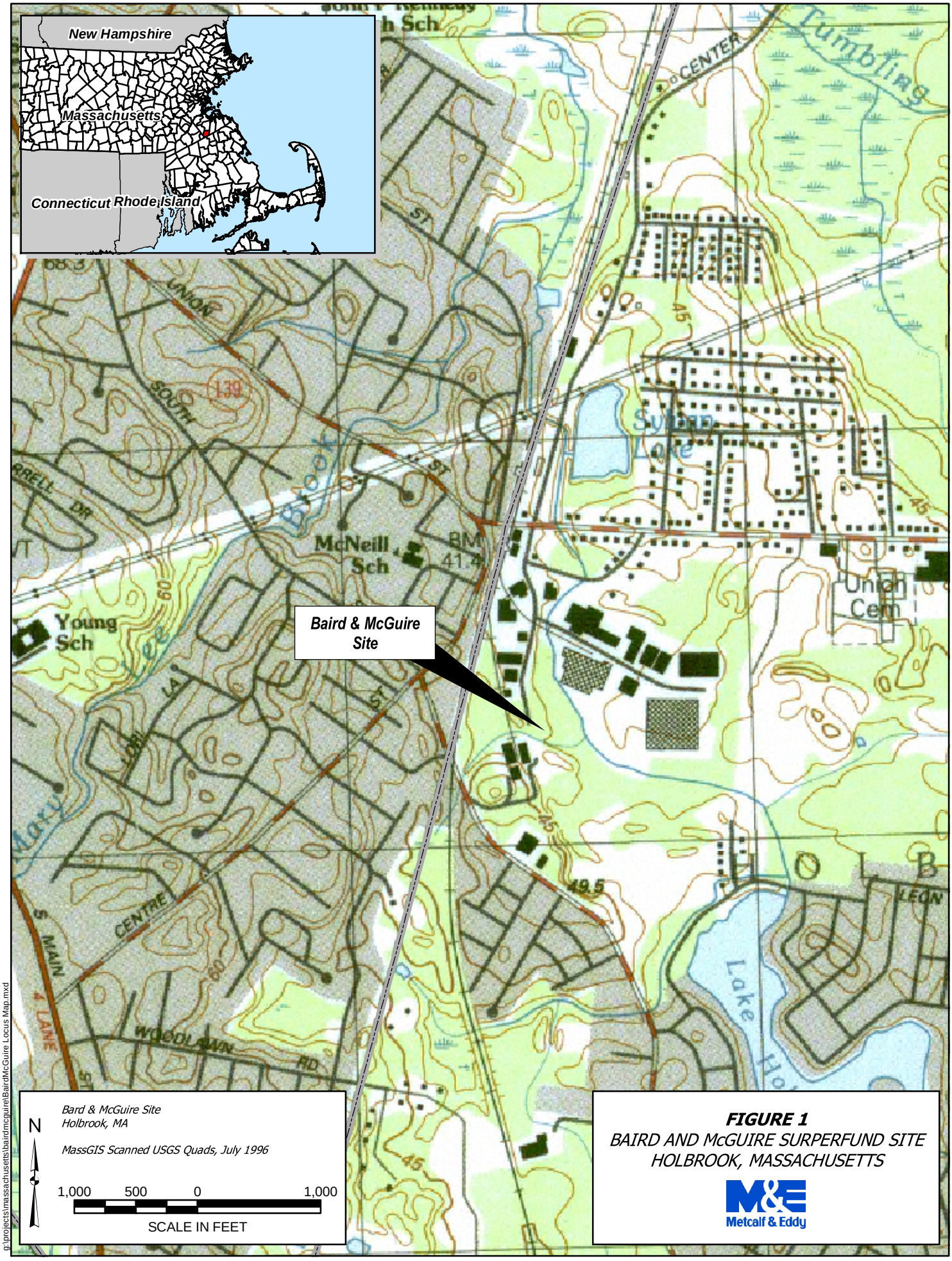
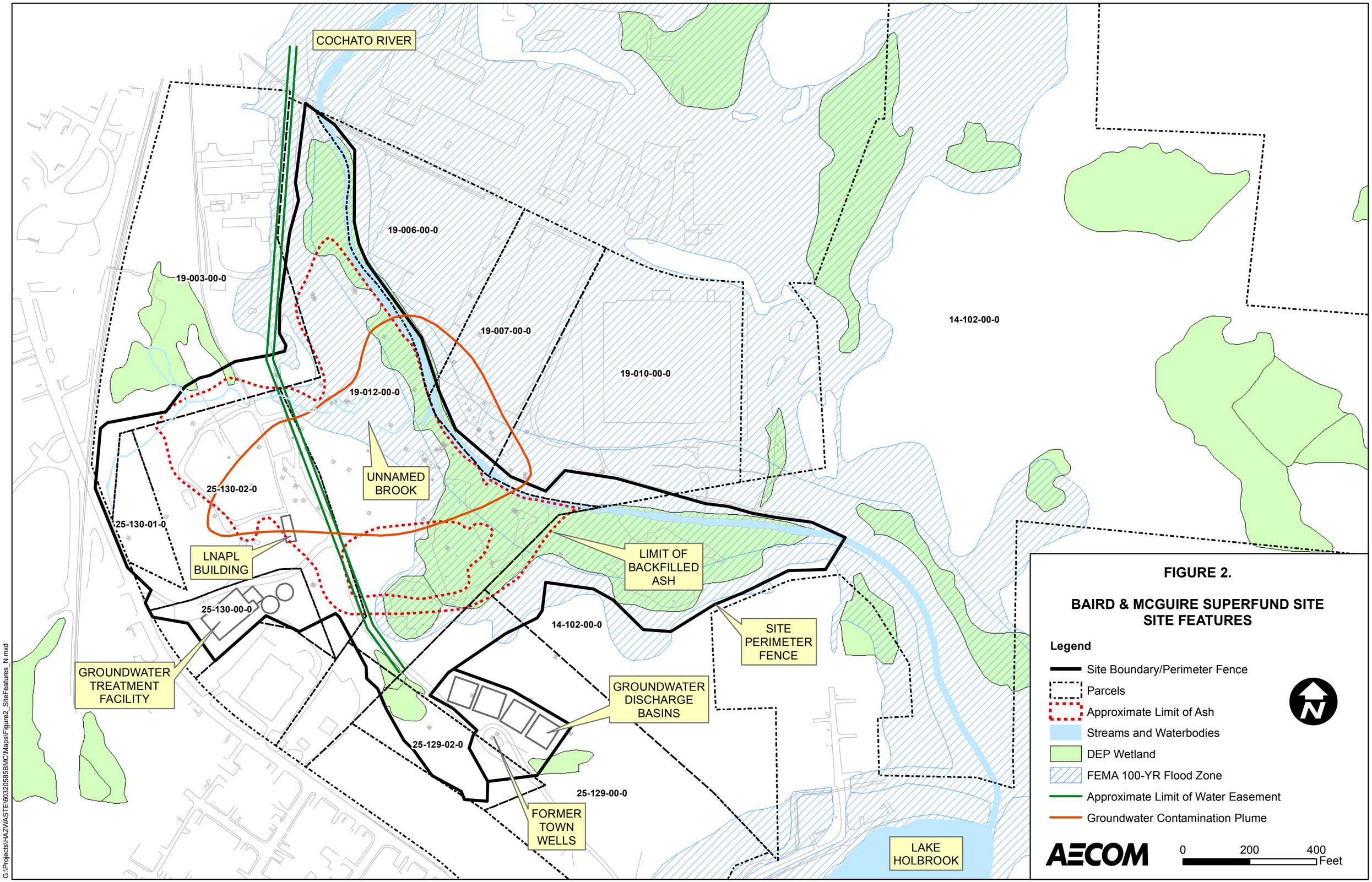


FIGURE 1

BAIRD AND McGUIRE SURPERFUND SITE
HOLBROOK, MASSACHUSETTS

Metcalf & Eddy

g:\projects\massachusetts\bairdmcguire\BairdMcGuire Locus Map.mxd


COCHATO RIVER
19-006-00-0
19-003-00-0
19-007-00-0
19-010-00-0
14-102-00-0
19-012-00-0
UNNAMED BROOK
25-130-02-0
25-130-01-0
LNAPL BUILDING
LIMIT OF BACKFILLED ASH
25-130-00-0
14-102-00-0
SITE PERIMETER FENCE
GROUNDWATER TREATMENT FACILITY
GROUNDWATER DISCHARGE BASINS
25-129-02-0
25-129-00-0
FORMER TOWN WELLS
LAKE HOLBROOK
FIGURE 2.
BAIRD & MCGUIRE SUPERFUND SITE
SITE FEATURES
Legend
Site Boundary/Perimeter Fence
Parcels
Approximate Limit of Ash
Streams and Waterbodies
DEP Wetland
FEMA 100-YR Flood Zone
Approximate Limit of Water Easement
Groundwater Contamination Plume
AECOM
0
200
400
Feet
G:\Projects\HAZWASTE\60320585BMC\Maps\Figure2_SiteFeatures_N.mxd

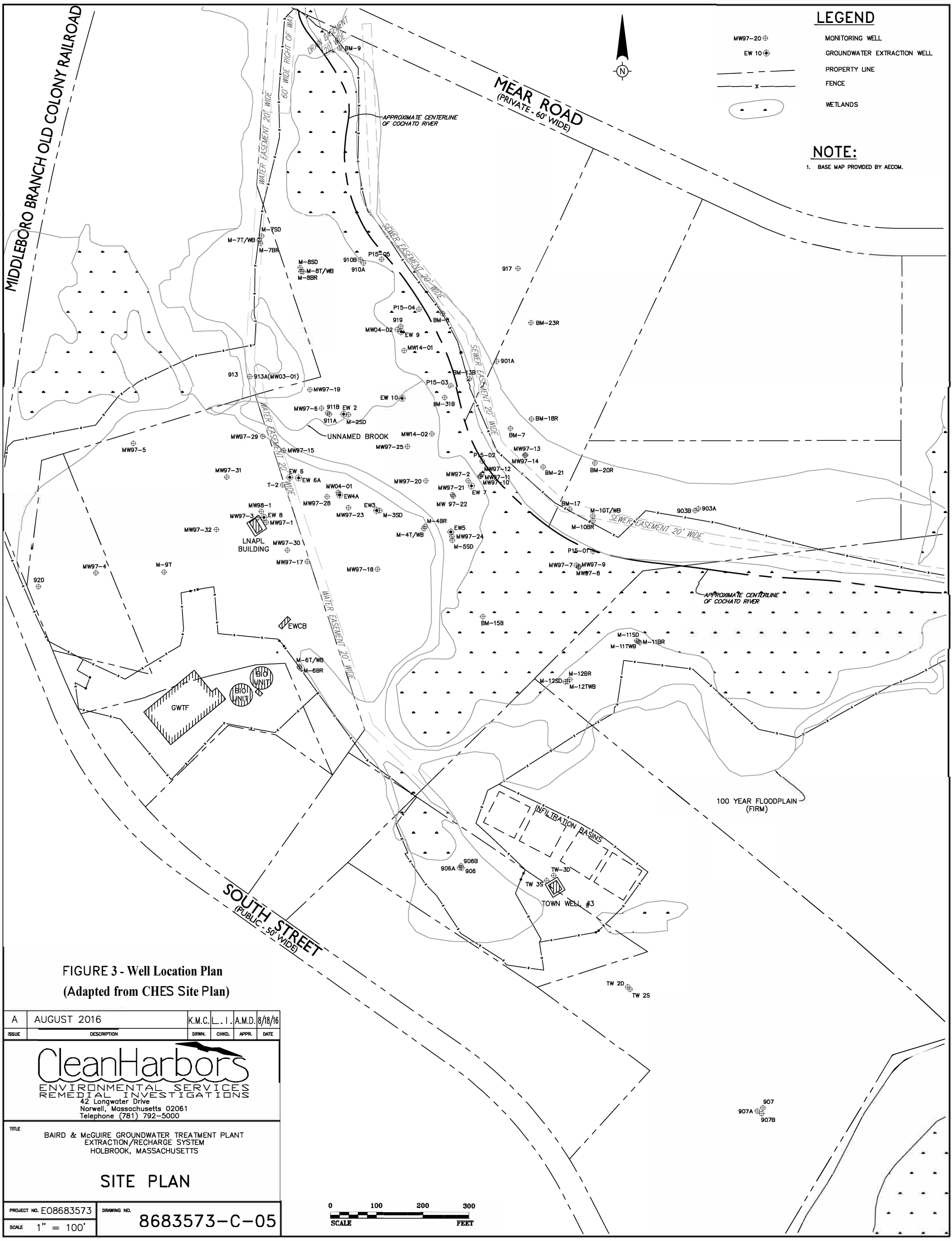


FIGURE 3 - Well Location Plan
(Adapted from CHES Site Plan)

ISSUE	DESCRIPTION	DRWN.	CHKD.	APPR.	DATE
A	AUGUST 2016	K.M.C.	L. I.	A.M.D.	8/18/16

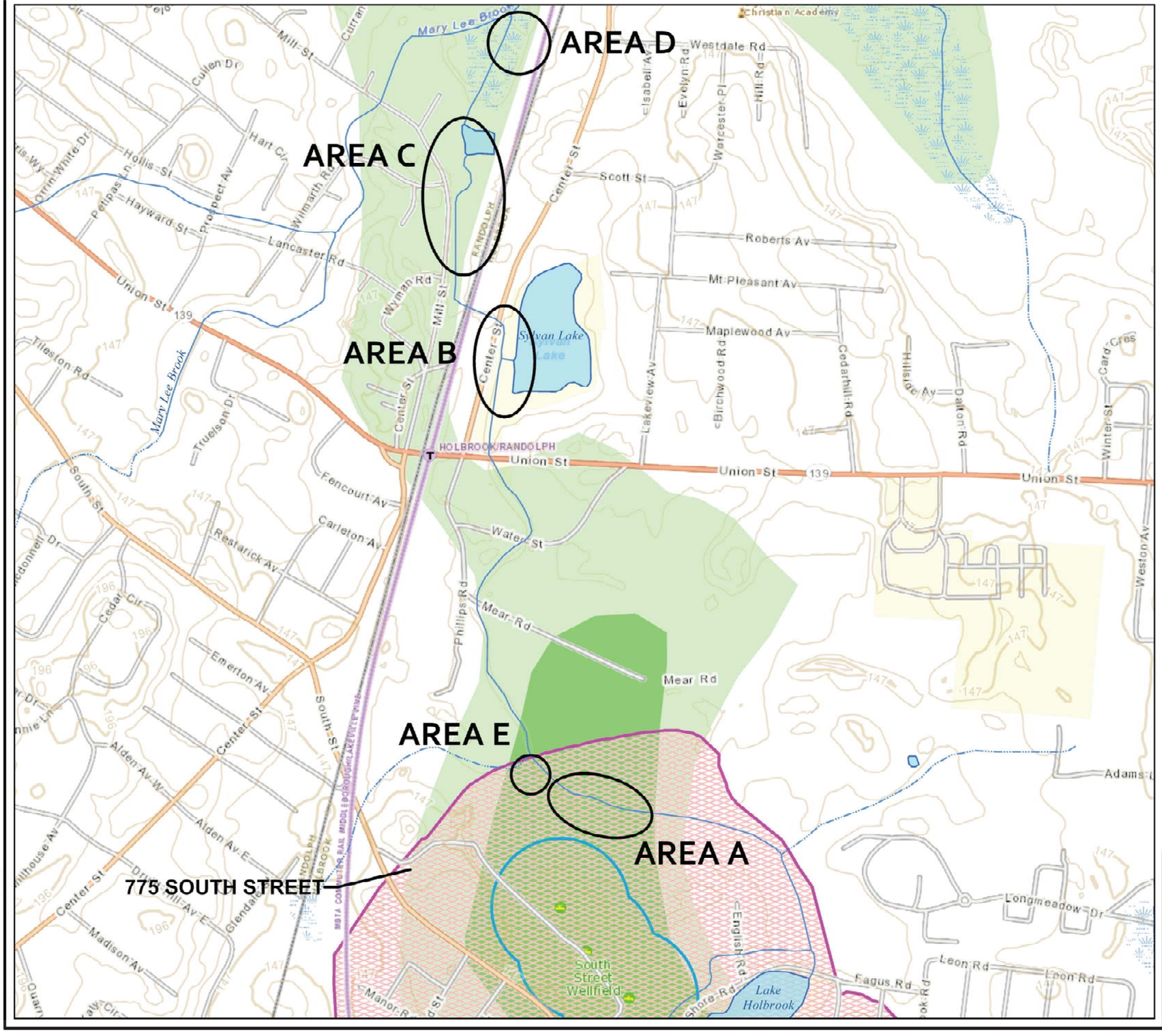
CleanHarbors
ENVIRONMENTAL SERVICES
REMEDIAL INVESTIGATIONS
42 Longwater Drive
Norwell, Massachusetts 02061
Telephone (781) 792-5000

TITLE

BAIRD & McGUIRE GROUNDWATER TREATMENT PLANT
EXTRACTION/RECHARGE SYSTEM
HOLBROOK, MASSACHUSETTS

SITE PLAN

PROJECT NO.	DRAWING NO.
E08683573	8683573-C-05
SCALE 1" = 100'	



Legend

Aquifers
- High Yield
- Medium Yield

Non Potential Drinking Water Source Area
- High Yield
- Medium Yield

DEP Approved Zone I
- Wellhead Protection Area

DEP Approved Zone II
- Wellhead Protection Area

Public Water Supplies
- Community Groundwater Source
- Surface Water Intake
- Non-Community Groundwater Source
- Emergency Surface Water

Protected and Recreational Open Space

N

0 300 600 1,200 Feet

1 inch equals 600 feet (printed 11x17)

Sources: 1] Datalayers for Basemap, DEP Wetlands (2005), USGS Hydrography, Surface Contours, Aquifers, Non Potential Drinking Water Source Areas, Public Water Supplies, and Wellhead Protection Areas are from the Bureau of Geographic Informaton (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

FIGURE 4

PREPARED BY

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Pawtucket, RI 401-728-6660
Newburyport, MA 617-840-0363
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SAMPLE LOCATION AREAS

FINAL DATA EVALUATION REPORT
BAIRD MCGUIRE SUPERFUND SITE
775 SOUTH STREET
HOLBROOK, MASSACHUSETTS

DRAWN	CHECKED	PROJ MGR	PROJECT	DATE	FIGURE
DMR	CN	JC	8018-001	11/13/2018	2

File: SARSS-Baird-McGuire-Holbrook.qxd

APPENDIX C – DATA

Table C-1A Summary of 2018 Groundwater Monitoring Well Analytical Data
- COD, TPH, TOC, and Metals
(obtained from Clean Harbors Environmental Services)

WELL	Date Sampled	COD (mg/L)	TPH (mg/L)	TOC (mg/L)	METALS (mg/L)	
					ARSENIC (TOTAL)	MERCURY
901A	08/31/2018	31	0.308	5.9	<0.005	**---**
903A	09/04/2018	<10	<0.098	2.2	<0.010	**---**
903B	09/04/2018	11	<0.0935	2.0	<0.005	**---**
911A	08/29/2018	<10	<0.100	3.2	<0.005	**---**
917	09/04/2018	---	---	2.9	<0.005	**---**
BM-7	08/31/2018	69	<0.0976	29.1	<0.005	<0.0002
BM-8	09/04/2018	16	<0.0935	0.9	<0.005	**---**
BM-13B	08/31/2018	<10	<0.0943	1.7	0.0066	**---**
BM-17	08/31/2018	<10	<0.0935	2.1	**0.118**	**---**
BM-18R	08/31/2018	<10	<0.0976	0.8	<0.005	<0.0002
BM-20R	09/04/2018	<10	0.14	<0.5	<0.005	**---**
BM-23R	09/04/2018	14	<0.098	1.0	<0.005	**---**
M9-TWB	08/27/2018	<10	<0.0943	4.5	<0.005	---
M10-TWB	08/30/2018	<10	<0.0952	2.8	<0.005	---
M10-BR	08/30/2018	<10	<0.0935	2.6	**0.025**	<0.0002
MW04-02	08/29/2018	10	<0.098	2.8	**0.317**	**---**
MW97-9	08/28/2018	<10	<0.0935	1.3	**---**	**---**
MW97-10	08/28/2018	<10	<0.0952	2.4	**---**	**---**
MW97-12	08/28/2018	14	0.101	5.9	**1.29**	**---**
MW97-13	08/31/2018	<10	<0.0935	2.1	<0.005	**---**
MW97-14	08/31/2018	<10	<0.100	2.3	**0.0336**	**---**
MW97-17	08/29/2018	<10	0.328	7.5	**0.419**	**---**
MW97-18	08/27/2018	<10	<0.098	5.1	<0.005	**---**
MW97-21	08/28/2018	<10	0.711	4.0	**0.564**	**---**
MW97-21 (DUP-2)	08/28/2018	11	0.594	4.0	**0.587**	**---**
MW97-23	08/30/2018	18	3.56	1.9	**0.158**	**---**
MW97-25	08/30/2018	<10	<0.0935	2.5	**0.121**	<0.0002
MW97-25 (DUP-5)	08/30/2018	---	---	---	**---**	<0.0002
MW97-27 (A.K.A. MW5SD)	08/27/2018	<10	<0.0935	0.8	**0.0818**	**---**
MW97-27 "DUP-3"	08/27/2018	---	---	---	**0.125**	**---**
MW97-29	08/30/2018	<10	<0.0935	2.7	0.0096	**---**
MW97-29 (DUP-4)	08/30/2018	<10	<0.0935	2.7	**0.0100**	**---**
MW97-31	08/27/2018	<10	0.134	2.9	**0.0119**	**---**
MW97-31 (DUP-1)	08/27/2018	<10	<0.0935	2.9	**0.0128**	**---**
P15-01	08/28/2018	---	---	---	<0.005	---
P15-02	08/28/2018	---	---	---	<0.005	---
P15-03	08/29/2018	**---**	**---**	**---**	**0.506**	**---**
P15-04	08/29/2018	---	---	---	<0.005	---
P15-05	08/29/2018	**---**	**---**	**---**	<0.005	**---**

Shaded = Compound detected in the laboratory analysis
BOLD = Compound was detected at or above Federal 1989 MCLs or when no MCL is listed, above MCP Method 1 Standard
mg/L = milligram per liter; **ug/L** = mircrogram per liter
secondary MCL is set only for aesthetic considerations, such as taste, color and odor, and the EPA doesn't enforce the SMCLs.
ND = Not Detected; **---** = not analyzed
TPH = Total Petroleum Hydrocarbon; **TOC** = Total Organic Carbon
COD = Chemical Oxygen Demand

Table C-1B Summary of 2018 Groundwater Monitoring Well Analytical Data
- Pesticides
(obtained from Clean Harbors Environmental Services)

WELL	911A	M10-BR	MW97-9	MW97-17	MW97-23	MW97-25	MW97-29	MW97-29 (DUP-4)	MW97-31	MW97-31 (DUP-1)	P15-01	P15-02	P15-03	P15-04	P15-05
	1808832-14	**1808887-02**	**1808832-04**	**1808832-15**	**1808832-17**	**1808887-01**	**1808832-16**	**1808832-18**	**1808739-02**	**1808739-04**	**1808832-03**	**1808832-07**	**1808832-12**	**1808832-10**	**1808832-11**
Date Sampled	08/29/2018	08/30/2018	08/28/2018	08/29/2018	08/30/2018	08/30/2018	08/30/2018	08/30/2018	08/27/2018	08/27/2018	08/28/2018	08/28/2018	08/29/2018	08/29/2018	08/29/2018
PESTICIDES (ug/L)															
4 4-DDD	<0.047	<0.047	<0.049	<0.047	**42.4**	<0.047	**0.207**	**0.206**	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
4 4-DDE	<0.047	<0.047	<0.049	<0.047	**1.23**	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
4 4-DDT	<0.047	<0.047	<0.049	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
ALDRIN	<0.047	<0.047	<0.049	<0.047	**2.10**	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
ALPHA-BHC	<0.047	<0.047	<0.049	<0.047	0.078	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
ALPHA-CHLORDANE	<0.047	<0.047	<0.049	<0.047	4.88	<0.047	0.144	0.147	<0.047	<0.047	<0.049	<0.049	**0.098**	<0.049	<0.048
ALACHLOR	**---**	---	**---**	**---**	---	---	**---**	**---**	**---**	**---**	---	---	---	---	---
BETA-BHC	<0.047	<0.047	<0.049	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
CHLORDANE (multicomponent mixture)	0.216	<0.187	<0.194	<0.187	**48.9**	1.690	1.47	1.44	0.249	0.239	<0.194	<0.194	**2.23**	<0.196	<0.192
DELTA-BHC	<0.047	<0.047	<0.049	<0.047	0.103	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
DIELDRIN	<0.047	<0.047	<0.049	<0.047	**7.62**	0.067	**0.231**	**0.153**	0.092	0.09	<0.049	<0.049	**0.245**	<0.049	<0.048
ENDOSULFAN I (alpha)	<0.047	<0.047	<0.049	<0.047	0.282	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
ENDOSULFAN II (beta)	<0.047	<0.047	<0.049	<0.047	0.094	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
ENDOSULFAN SULFATE	<0.047	<0.047	<0.049	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
ENDRIN	<0.047	<0.047	<0.049	<0.047	1.10	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
ENDRIN ALDEHYDE	<0.047	<0.047	<0.049	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
ENDRIN KETONE	<0.047	<0.047	<0.049	<0.047	0.209	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
GAMMA-BHC	<0.047	<0.047	<0.049	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
GAMMA-CHLORDANE	<0.047	<0.047	<0.049	<0.047	5.51	<0.047	0.070	0.072	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
HEPTACHLOR	<0.047	<0.047	<0.049	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
HEPTACHLOR EPOXIDE	<0.047	<0.047	<0.049	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
HEXACHLOROBENZENE	<0.047	<0.047	<0.049	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
METHOXYCHLOR	<0.047	<0.047	<0.049	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.047	<0.049	<0.049	<0.049	<0.049	<0.048
TOXAPHENE	<1.21	<1.21	<1.26	<1.21	<1.21	<1.21	<1.21	<1.21	<1.21	<1.21	<1.26	<1.26	<1.26	<1.27	<1.25
Total Pesticides	*0.216*	*ND*	*ND*	*ND*	*114.5*	*1.757*	*2.12*	*2.02*	*0.341*	*0.329*	*ND*	*ND*	*2.57*	*ND*	*ND*

* Results for individual VOCs are not shown as there were no detections in wells sampled in 2018.
Shaded = Compound detected in the laboratory analysis
mg/L = milligram per liter; **ug/L** = mircrogram per liter
ND = Not Detected; **---** = not analyzed

Table C-1C Summary of 2018 Groundwater Monitoring Well Analytical Data
- Semivolatile and Volatile Organic Compounds
(obtained from Clean Harbors Environmental Services)

WELL	911A	BM-8	BM-13B	M9-TWB	M10-BR	MW04-02	MW97-10	MW97-17	MW97-18	MW97-21	MW97-21 (DUP-2)	MW97-25	MW97-27 (A.K.A. MW5SD)	MW97-27 "DUP-3"	MW97-29
	1808832-14	**1809086-01**	**1808887-06**	**1808739-03**	**1808887-02**	**1808832-13**	**1808832-06**	**1808832-15**	**1808739-01**	**1808832-08**	**1808832-09**	**1808887-01**	**1808832-02**	**1808832-01**	**1808832-16**
Date Sampled	08/29/2018	09/04/2018	08/31/2018	08/27/2018	08/30/2018	08/29/2018	08/28/2018	08/29/2018	08/27/2018	08/28/2018	08/28/2018	08/30/2018	08/27/2018	08/27/2018	08/30/2018
SEMI VOLATILES (ug/L)										SH					
1,2,4-TRICHLOROBENZENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
1,2-DICHLOROBENZENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
1,2-DINITROBENZENE	---			---		---	---	---	---	---	---		---	---	---
1,3-DICHLOROBENZENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
1,3-DINITROBENZENE	---			---		---	---	---	---	---	---		---	---	---
1,4-DICHLOROBENZENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
1,4-DINITROBENZENE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2,3,4,6-TETRACHLOROPHENOL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2,4,5-TRICHLOROPHENOL	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
2,4,6-TRICHLOROPHENOL	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
2,4-DICHLOROPHENOL	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
2,4-DIMETHYLPHENOL	<46.7	<49	---	<48.1	<46.7	<48.5	<46.7	<47.2	<47.2	<50	<49	<46.7	<50	---	<46.7
2,4-DINITROPHENOL	<46.7	<49	---	<48.1	<46.7	<48.5	<46.7	<47.2	<47.2	<50	<49	<46.7	<50	---	<46.7
2,4-DINITROTOLUENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
2,6-DINITROTOLUENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
2-CHLORONAPHTHALENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
2-CHLOROPHENOL	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
2-METHYLNAPHTHALENE	<0.19	<0.2	---	<0.19	<0.75	<0.19	<0.19	<0.19	<0.19	0.54	0.42	<0.75	<0.2	---	**10.6**
2-METHYLPHENOL	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
2-NITROANILINE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
2-NITROPHENOL	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
3,3'-DICHLOROBENZIDINE	<18.7	<19.6	---	<19.2	<18.7	<19.4	<18.7	<18.9	<18.9	<20	<19.6	<18.7	<20	---	<18.7
3-METHYLPHENOL/4-METHYLPHENOL	<18.7	<19.6	---	<19.2	<18.7	<19.4	<18.7	<18.9	<18.9	<20	<19.6	<18.7	<20	---	<18.7
3-NITROANILINE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
4,6-DINITRO-2-METHYLPHENOL	<46.7	<49	---	<48.1	<46.7	<48.5	<46.7	<47.2	<47.2	<50	<49	<46.7	<50	---	<46.7
4-BROMOPHENYL PHENYL ETHER	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
4-CHLORO-3-METHYLPHENOL	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
4-CHLOROANALINE	<18.7	<19.6	---	<19.2	<18.7	<19.4	<18.7	<18.9	<18.9	<20	<19.6	<18.7	<20	---	<18.7
4-CHLOROPHENYL PHENYL ETHER	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4-METHYLPHENOL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4-NITROANILINE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
4-NITROPHENOL	<46.7	<49	---	<48.1	<46.7	<48.5	<46.7	<47.2	<47.2	<50	<49	<46.7	<50	---	<46.7
ACENAPHTHENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	12.3	<9.4	93.1	96.5	<9.3	<10	---	<9.3
ACENAPHTHYLENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
ACETOPHENONE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
ANILINE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
ANTHRACENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
AZOBENZENE	<18.7	<19.6	---	<19.2	<18.7	<19.4	<18.7	<18.9	<18.9	<20	<19.6	<18.7	<20	---	<18.7
BENZO (A) ANTHRACENE	<0.05	<0.05	---	<0.05	<0.19	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.19	<0.05	---	<0.05
BENZIDINE	<46.7	<49	---	<48.1	<46.7	<48.5	<46.7	<47.2	<47.2	<50	<49	<46.7	<50	---	<46.7
BENZO (A) PYRENE	<0.05	<0.05	---	<0.05	<0.19	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.19	<0.05	---	<0.05
BENZO (B) FLUORANTHENE	<0.05	<0.05	---	<0.05	<0.19	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.19	<0.05	---	<0.05
BENZO (G,H,I) PERYLENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
BENZO (K) FLUORANTHENE	<0.05	<0.05	---	<0.05	<0.19	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.19	<0.05	---	<0.05
BENZYL ALCOHOL	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3

Table C-1C Summary of 2018 Groundwater Monitoring Well Analytical Data
- Semivolatile and Volatile Organic Compounds
(obtained from Clean Harbors Environmental Services)

WELL	911A	BM-8	BM-13B	M9-TWB	M10-BR	MW04-02	MW97-10	MW97-17	MW97-18	MW97-21	MW97-21 (DUP-2)	MW97-25	MW97-27 (A.K.A. MW5SD)	MW97-27 "DUP-3"	MW97-29
	1808832-14	**1809086-01**	**1808887-06**	**1808739-03**	**1808887-02**	**1808832-13**	**1808832-06**	**1808832-15**	**1808739-01**	**1808832-08**	**1808832-09**	**1808887-01**	**1808832-02**	**1808832-01**	**1808832-16**
Date Sampled	08/29/2018	09/04/2018	08/31/2018	08/27/2018	08/30/2018	08/29/2018	08/28/2018	08/29/2018	08/27/2018	08/28/2018	08/28/2018	08/30/2018	08/27/2018	08/27/2018	08/30/2018
BIS(2-CHLOROETHOXY) METHANE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
BIS(2-CHLOROETHYL) ETHER	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
BIS-(2-CHLOROISOPROPYL) ETHER	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
BIS-(2-ETHYLHEXYL) PHTHALATE	<5.6	33.2	---	12.6	<5.6	<5.8	<5.6	<5.7	20.3	19.2	7.9	<5.6	18.0	---	7.0
BUTYL BENZYL PHTHALATE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
CARBAZOLE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
CHRYSENE	<0.05	<0.05	---	<0.05	<0.19	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.19	<0.05	---	<0.05
DIBENZ (A,H) ANTHRACENE	<0.05	<0.05	---	<0.05	<0.19	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.19	<0.05	---	<0.05
DIBENZOFURAN	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	10.6	10.9	<9.3	<10	---	<9.3
DIETHYLPHTHALATE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
DIMETHYLPHTHALATE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
DI-N-BUTYLPHTHALATE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
DI-N-OCTYL PHTHALATE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
FLUORANTHENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
FLUORENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	31.0	32.3	<9.3	<10	---	<9.3
HEXACHLOROBENZENE	<0.19	<0.2	---	<0.19	<0.75	<0.19	<0.19	<0.19	<0.19	<0.2	<0.2	<0.75	<0.2	---	<0.19
HEXACHLOROBUTADIENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
HEXACHLOROCYCLOPENTADIENE	<23.4	<24.5	---	<24	<23.4	<24.3	<23.4	<23.6	<23.6	<25	<24.5	<23.4	<25	---	<23.4
HEXACHLOROETHANE	<4.7	<4.9	---	<4.8	<4.7	<4.9	<4.7	<4.7	<4.7	<5	<4.9	<4.7	<5	---	<4.7
INDENO (1,2,3-CD) PYRENE	<0.05	<0.05	---	<0.05	<0.19	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.19	<0.05	---	<0.05
ISOPHORONE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
NAPHTHALENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	43.7	<9.4	<10	<9.8	<9.3	<10	---	<9.3
NITROBENZENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
N-NITROSODIMETHYLAMINE (DUPLICATE)	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
N-NITROSO-DI-N-PROPYLAMINE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
N-NITROSODIPHENYLAMINE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
PENTACHLOROPHENOL	<0.84	<0.88	---	<0.87	<3.36	<0.87	<0.84	<0.85	<0.85	<0.9	<0.88	<3.36	<0.9	---	<0.84
PHENANTHRENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
PHENOL	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
PYRENE	<9.3	<9.8	---	<9.6	<9.3	<9.7	<9.3	<9.4	<9.4	<10	<9.8	<9.3	<10	---	<9.3
PYRIDINE	<93.5	<98	---	<96.2	<93.5	<97.1	<93.5	<94.3	<94.3	<100	<98	<93.5	<100	---	<93.5
BENZOIC ACID (reported as TIC by Geolabs)	<93.5	<98	---	<96.2	<93.5	<97.1	<93.5	<94.3	<94.3	<100	<98	<93.5	<100	---	<93.5
Total Semi Volatiles	*ND*	*33.2*	---	*12.6*	*ND*	*ND*	*ND*	*56.0*	*20.3*	*154.4*	*148.0*	*ND*	*18.0*	---	*17.6*
VOC (ug/L)															
*Total Volatiles **	---	---	*ND **	---	---	*ND **	*ND **	---	---	---	---	*ND **	*ND **	*ND **	---

* Results for individual VOCs are not shown as there were no detections in wells sampled in 2018.
Shaded = Compound detected in the laboratory analysis
BOLD = Compound was detected at or above Federal 1989 MCLs or when no MCL is listed, above MCP Method 1 Standard
secondary MCL is set only for aesthetic considerations, such as taste, color and odor, and the EPA doesn't enforce the SMCLs.
TPH = Total Petroleum Hydrocarbon; **TOC** = Total Organic Carbon
COD = Chemical Oxygen Demand

Table C-1C Summary of 2018 Groundwater Monitoring Well Analytical Data
- Semivolatile and Volatile Organic Compounds
(obtained from Clean Harbors Environmental Services)

WELL	MW97-31	MW97-31 (DUP-1)	P15-01	P15-02	P15-03	P15-04	P15-05
	1808739-02	**1808739-04**	**1808832-03**	**1808832-07**	**1808832-12**	**1808832-10**	**1808832-11**
Date Sampled	08/27/2018	08/27/2018	08/28/2018	08/28/2018	08/29/2018	08/29/2018	08/29/2018
SEMI VOLATILES (ug/L)							
1,2,4-TRICHLOROBENZENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
1,2-DICHLOROBENZENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
1,2-DINITROBENZENE	---	---	---	---	---	---	**---**
1,3-DICHLOROBENZENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
1,3-DINITROBENZENE	---	---	---	---	---	---	**---**
1,4-DICHLOROBENZENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
1,4-DINITROBENZENE	---	---	---	---	---	---	**---**
2,3,4,6-TETRACHLOROPHENOL	---	---	---	---	---	---	**---**
2,4,5-TRICHLOROPHENOL	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
2,4,6-TRICHLOROPHENOL	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
2,4-DICHLOROPHENOL	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
2,4-DIMETHYLPHENOL	<48.1	<46.7	<48.1	<48.5	<50	<50	<50
2,4-DINITROPHENOL	<48.1	<46.7	<48.1	<48.5	<50	<50	<50
2,4-DINITROTOLUENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
2,6-DINITROTOLUENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
2-CHLORONAPHTHALENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
2-CHLOROPHENOL	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
2-METHYLNAPHTHALENE	4.37	1.11	<0.19	<0.19	<0.2	<0.2	<0.2
2-METHYLPHENOL	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
2-NITROANILINE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
2-NITROPHENOL	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
3,3'-DICHLOROBENZIDINE	<19.2	<18.7	<19.2	<19.4	<20	<20	<20
3-METHYLPHENOL/4-METHYLPHENOL	<19.2	<18.7	<19.2	<19.4	<20	<20	<20
3-NITROANILINE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
4,6-DINITRO-2-METHYLPHENOL	<48.1	<46.7	<48.1	<48.5	<50	<50	<50
4-BROMOPHENYL PHENYL ETHER	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
4-CHLORO-3-METHYLPHENOL	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
4-CHLOROANALINE	<19.2	<18.7	<19.2	<19.4	<20	<20	<20
4-CHLOROPHENYL PHENYL ETHER	---	---	---	---	---	---	**---**
4-METHYLPHENOL	---	---	---	---	---	---	**---**
4-NITROANILINE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
4-NITROPHENOL	<48.1	<46.7	<48.1	<48.5	<50	<50	<50
ACENAPHTHENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
ACENAPHTHYLENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
ACETOPHENONE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
ANILINE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
ANTHRACENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
AZOBENZENE	<19.2	<18.7	<19.2	<19.4	<20	<20	<20
BENZO (A) ANTHRACENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BENZIDINE	<48.1	<46.7	<48.1	<48.5	<50	<50	<50
BENZO (A) PYRENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BENZO (B) FLUORANTHENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BENZO (G,H,I) PERYLENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
BENZO (K) FLUORANTHENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BENZYL ALCOHOL	<9.6	<9.3	<9.6	<9.7	<10	<10	<10

Table C-1C Summary of 2018 Groundwater Monitoring Well Analytical Data
- Semivolatile and Volatile Organic Compounds
(obtained from Clean Harbors Environmental Services)

WELL	MW97-31	MW97-31 (DUP-1)	P15-01	P15-02	P15-03	P15-04	P15-05
	1808739-02	**1808739-04**	**1808832-03**	**1808832-07**	**1808832-12**	**1808832-10**	**1808832-11**
Date Sampled	08/27/2018	08/27/2018	08/28/2018	08/28/2018	08/29/2018	08/29/2018	08/29/2018
BIS(2-CHLOROETHOXY) METHANE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
BIS(2-CHLOROETHYL) ETHER	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
BIS-(2-CHLOROISOPROPYL) ETHER	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
BIS-(2-ETHYLHEXYL) PHTHALATE	10.3	12.8	15.3	5.9	<6	<6	<6
BUTYL BENZYL PHTHALATE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
CARBAZOLE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
CHRYSENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DIBENZ (A,H) ANTHRACENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DIBENZOFURAN	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
DIETHYLPHTHALATE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
DIMETHYLPHTHALATE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
DI-N-BUTYLPHTHALATE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
DI-N-OCTYL PHTHALATE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
FLUORANTHENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
FLUORENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
HEXACHLOROBENZENE	<0.19	<0.19	<0.19	<0.19	<0.2	<0.2	<0.2
HEXACHLOROBUTADIENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
HEXACHLOROCYCLOPENTADIENE	<24	<23.4	<24	<24.3	<25	<25	<25
HEXACHLOROETHANE	<4.8	<4.7	<4.8	<4.9	<5	<5	<5
INDENO (1,2,3-CD) PYRENE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ISOPHORONE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
NAPHTHALENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
NITROBENZENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
N-NITROSODIMETHYLAMINE (DUPLICATE)	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
N-NITROSO-DI-N-PROPYLAMINE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
N-NITROSODIPHENYLAMINE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
PENTACHLOROPHENOL	<0.87	<0.84	<0.87	<0.87	<0.9	<0.9	<0.9
PHENANTHRENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
PHENOL	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
PYRENE	<9.6	<9.3	<9.6	<9.7	<10	<10	<10
PYRIDINE	<96.2	<93.5	<96.2	<97.1	<100	<100	<100
BENZOIC ACID (reported as TIC by Geolabs)	<96.2	<93.5	<96.2	<97.1	<100	<100	<100
Total Semi Volatiles	*14.7*	*13.9*	*15.3*	*5.90*	*ND*	*ND*	*ND*
VOC (ug/L)							
Total Volatiles *	---	---	---	---	---	---	---

* Results for individual VOCs are not shown as th
Shaded = Compound detected in the laboratory a
BOLD = Compound was detected at or above Fe
secondary MCL is set only for aesthetic considera
TPH = Total Petroleum Hydrocarbon; **TOC** = Tota
COD = Chemical Oxygen Demand

Table C-3 Groundwater MCL Exceedances in 2016

Contaminant	SDWA MCL (µg/l)	Location	Concentration (µg/l) in 2016
Benzene	5	MW04-01, MW98-1	6.28/6.19(FD) – 9.14/8.94 (FD)
Ethylbenzene	700	MW04-01, MW97-28, MW98-1	799/759 (FD) – 1,410/1,400 (FD)
Chlordane	2	MW97-23	2.8/0.65 (FD)
Benzo(a)pyrene	0.2	MW97-1	1.64
Bis(2-ethylhexyl)phthalate	6	40 monitoring wells	6.26 – 104
Pentachlorophenol	1	7 monitoring wells	1.54 – 13.8
Selenium	50	P15-04	76
Beryllium	4	MW97-1	21
Arsenic	10	26 monitoring wells	15.7 – 639/1,220 (FD)
Antimony	6	12 monitoring wells	10 – 24

Notes:

FD - Field duplicate result

SDWA MCL - Safe Drinking Water Act Maximum Contaminant Level

Table C-4 Sediment/Soil Results for Common Contaminant Parameters, 1996 - 2018 and Comparison to Project Action Limits

Parameter	Units	1996		1997		1998		1999		2000		2001		2002		2013		2018		Program Action Limit		Screening Value	
		Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev	Mean	St Dev	River	Bank	Sediment[3]	Soil[4]
Station A, Upstream of Project Area (control) (n=3 for each station and year)																							
Total PAHs	ng/g, dry	1,770	758	1,540	1,270	357	618	1,940	971	2,549	1,374	2,500	1,500	2,853	2,272	29,870		1,594		22,000	33,000	22,800[a]	1,100[b]
Total DDT	ng/g, dry	36	62.4	33	15.1	43.3	75.1	124	75.7	14.8	5.95	27.4	13.0	11.7	2.9	61.2		28.6		19,000	28,500	572[a]	21[c]
Total Chlordane	ng/g, dry	23.3	40.4	ND	ND	ND	ND	9	6.98	5.48	3.86	3.76	2.58	2.37	0.32	6.12		2.29		5,000	7,500	17.2[a]	224[d]
Arsenic	µg/g, dry	ND	ND	1.5	0.755	1.29	0.873	2.18	0.628	1.33	0.420	1.27	0.70	1.9	0.72	61.3		2.0		250	375	33[a]	18[e]
Station E, Adjacent to on-site well EW-7 (n=1 for each station and year)[1, 2]																							
Total PAHs	ng/g, dry	--	--	--	--	--	--	1,080	--	122,720	--	4,300	--	7,909	--	76,664		6,451		22,000	33,000	22,800[a]	1,100[b]
Total DDT	ng/g, dry	--	--	--	--	--	--	26	--	1852	--	161	--	820	--	5,961		8		19,000	28,500	572[a]	21[c]
Total Chlordane	ng/g, dry	--	--	--	--	--	--	2.89	--	293	--	19	--	54	--	831		1.07		5,000	7,500	17.2[a]	224[d]
Arsenic	µg/g, dry	--	--	--	--	--	--	5.97	--	10.8	--	6.6	--	6.7	--	18.5		12.9		250	375	33[a]	18[e]
Total VOCs	µg/Kg, dry	--	--	--	--	--	--	--	--	251	--	2,301	--	49	--	--		--		--	--	--	--
Station B, Between Union St., bridge and Center St. (n=3 for each station and year)																							
Total PAHs	ng/g, dry	12,400	776	4,590	2,940	2,960	1,210	3,830	275	11,128	6,781	5,500	4,300	7,119	3,623	9,386		4,684		22,000	33,000	22,800[a]	1,100[b]
Total DDT	ng/g, dry	2,570	42.4	838	1,120	1,010	918	1,070	637	833	1,082	1,190	967	796	238	402		1,457		19,000	28,500	572[a]	21[c]
Total Chlordane	ng/g, dry	513	168	50	86.6	177	232	385	244	487	614	250	160	133	15	87		297		5,000	7,500	17.2[a]	224[d]
Arsenic	µg/g, dry	ND	ND	10.2	6.44	11.5	7.52	24.2	15.4	20.2	22.3	12	4.4	10	2.6	7.4		30.9		250	375	33[a]	18[e]
Station C, Ice Pond (River Locations) (n=3 for each station and year)																							
Total PAHs	ng/g, dry	5,780	4,380	1,690	1,820	3,470	3,840	2,790	1,670	7,335	7,671	4,000	4,400	1,911	1,863	8,441		2,554		22,000	33,000	22,800[a]	1,100[b]
Total DDT	ng/g, dry	1,420	231	955	1,440	1,730	1,590	243	130	653	951	960	845	645	1,003	5,644		816		19,000	28,500	572[a]	21[c]
Total Chlordane	ng/g, dry	381	120	846	1350	373	647	85.7	59.8	236	338	273	232	159	252	1,493		170		5,000	7,500	17.2[a]	224[d]
Arsenic	µg/g, dry	ND	ND	26.2	24.9	39	20.4	11	6.1	15.3	12.2	15	11	20	14	61		12		250	375	33[a]	18[e]
Station C, Ice Pond (Bank Locations) (n=3 for each station and year)[2]																							
Total PAHs	ng/g, dry	10,100	5,090	8,870	5,910	10,500	5,710	14,100	9,630	28,078	10,266	26,000	22,000	6,618	3,976	20,558		12,445		22,000	33,000	22,800[a]	1,100[b]
Total DDT	ng/g, dry	2,570	1,010	2,230	2,130	2,910	1,920	981	691	2,525	810	1,650	984	1,369	918	1,028		715		19,000	28,500	572[a]	21[c]
Total Chlordane	ng/g, dry	1,250	265	2,310	2,540	947	850	294	232	1,045	170	166	141	320	269	327		194		5,000	7,500	17.2[a]	224[d]
Arsenic	µg/g, dry	49	43	93	34	34	24	48	36	80	13.7	27	22	95	14	29		70		250	375	33[a]	18[e]
Station D, Mary Lee Wetlands (River Locations) (n=3 for each station and year except 2013, where n=1)																							
Total PAHs	ng/g, dry	5,100	2,150	7,200	7,830	ND	ND	2,250	721	5,567	1,414	10,000	5,900	3140	2,372	12,802		16,249		22,000	33,000	22,800[a]	1,100[b]
Total DDT	ng/g, dry	2,480	996	3,240	1,960	701	691	620	684	1,457	728	7,980	4,890	734	324	19,559		1,531		19,000	28,500	572[a]	21[c]
Total Chlordane	ng/g, dry	3,330	1,410	2,190	2,250	154	139	198	190	636	347	2,460	1,490	150	50	3,940		308		5,000	7,500	17.2[a]	224[d]
Arsenic	µg/g, dry	ND	ND	93	47	9	4	45	29	29.9	6.9	80.7	56.1	56	6.9	115		64		250	375	33[a]	18[e]
Station D, Mary Lee Wetlands (Bank Locations) (n=3 for each station and year except 2013, where n=1)																							
Total PAHs	ng/g, dry	995	452	11,900	9,930	20,700	7,900	3,710	2,160	3,628	500	2,030	1,340	900	288	29,886		14,655		22,000	33,000	22,800[a]	1,100[b]
Total DDT	ng/g, dry	72	81	3,920	3,060	2,430	437	455	330	120	23.9	81.6	77.2	76	19	1,286		989		19,000	28,500	572[a]	21[c]
Total Chlordane	ng/g, dry	ND	ND	910	1,370	263	237	124	104	28.2	11.3	18	22	14	4.2	273		211		5,000	7,500	17.2[a]	224[d]
Arsenic	µg/g, dry	ND	ND	109	82	124	69	25	19	5.9	1.2	5	3	7.4	1.4	64		64		250	375	33[a]	18[e]

(1) Sampling at Station E began in 1999.

(2) Field duplicate samples for 2001and 2002 survey were combined prior to calculation of station averages.

(3) Sediment screening values apply to river samples only

(4) Soil screening values apply to bank samples only

(a) Probable effects concentration (PEC), MacDonald et al., 2001

(b) EcoSSL (USEPA, 2007) based on High Molecular Weighr (HMW) exposure to mammalian insectivore (shrew)

(c) EcoSSL (USEPA, 2007) based on exposure to mammalian carnivore (weasel)

(d) USEPA, Region 5, Ecological Screening Levels(USEPA, 2003) based on exposure to plants

(e) EcoSSL (USEPA, 2005) based on exposure to plants

Highlighted cells exceed corresponding soil or sediment screening values

Highlighted cells exceed corresponding soil or sediment screening values and Project Action Limits

Table C-5 Results for Common Contaminant Parameters Analyzed in Fish Tissue (Fillet) - 1992, 1996, 1999-2002, 2013, 2018

Parameter	Units (Wet)	Station and Species																														
		A					B					C						D			E				Sylvan Lake (SL)								
		GS	PS	AE	BB	RP	PS	LMB	BG	SMB	YP	GS	RP	PS	LMB	AE	BG	GS	PS	RP	BB	RP	PS	SMB	AE	BB	LMB	PS	BG	WP	BC	YP	CP
1992 Fillet Results																																
Lipid Content	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26.2	8.20	1.53	--	--	--	--	--	--
Total DDT	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3,470	1,900	317	--	--	--	--	--	--
Total Chlordane	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,720	2,530	137	--	--	--	--	--	--
Total PAHs	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	--	--	--	--	--	--
Benzo(a)pyrene	µg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	ND	--	--	--	--	--	--
1996 Fillet Results																																
Lipid Content	%	NR	NR	--	--	--	NR	--	--	--	--	NR	--	NR	--	--	--	NR	NR	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total DDT	µg/kg	5,200	1,480	--	--	--	10,200	--	--	--	--	7,190	--	11,100	--	--	--	14,200	8,540	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Chlordane	µg/kg	670	83	--	--	--	400	--	--	--	--	476	--	1,800	--	--	--	1,690	740	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PAHs	µg/kg	ND	ND	--	--	--	ND	--	--	--	--	ND	--	ND	--	--	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	µg/kg	ND	ND	--	--	--	ND	--	--	--	--	ND	--	ND	--	--	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1999 Fillet (skin-on) Results																																
Lipid Content	%	--	1.15	--	--	1.74	--	--	0.741	--	--	--	--	--	--	--	0.775	--	--	1.98	--	--	--	--	--	1.95	--	--	--	--	--	--	0.665
Total DDT	µg/kg	--	159	--	--	16.4	--	--	167	--	--	--	--	--	--	--	88.7	--	--	187	--	--	--	--	--	279	--	--	--	--	--	--	149
Total Chlordane	µg/kg	--	6.3	--	--	1.85	--	--	5.44	--	--	--	--	--	--	--	3.95	--	--	10.8	--	--	--	--	--	45.4	--	--	--	--	--	--	7.45
Total PAHs	µg/kg	--	12.5	--	--	6.08	--	--	2.37	--	--	--	--	--	--	--	2.98	--	--	2.2	--	--	--	--	--	18.1	--	--	--	--	--	--	3.38
Benzo(a)pyrene	µg/kg	--	0.294	--	--	ND	--	--	ND	--	--	--	--	--	--	--	ND	--	--	ND	--	--	--	--	--	0.415	--	--	--	--	--	--	ND
2000 Fillet Results[3]																																
Lipid Content	%	--	--	5.4	--	--	--	--	--	--	--	--	--	--	--	3.17	--	--	--	--	--	--	--	--	--	2.7	--	--	--	--	--	1.4	--
Total DDT	µg/kg	--	--	420	--	--	--	--	--	--	--	--	--	--	--	1.2	--	--	--	--	--	--	--	--	--	560	--	--	--	--	--	934	--
Total Chlordane	µg/kg	--	--	39	--	--	--	--	--	--	--	--	--	--	--	1,578	--	--	--	--	--	--	--	--	--	37	--	--	--	--	--	50	--
Total PAHs	µg/kg	--	--	9.6	--	--	--	--	--	--	--	--	--	--	--	174	--	--	--	--	--	--	--	--	--	15	--	--	--	--	--	15	--
Benzo(a)pyrene	µg/kg	--	--	NR[1]	--	--	--	--	--	--	--	--	--	--	--	NR[1]	--	--	--	--	--	--	--	--	--	0.1	--	--	--	--	--	ND/ NR[2]	--
2001 Fillet Results																																
Lipid Content	%	--	--	--	--	0.95	--	0.85	0.94	--	--	--	1.0	--	--	--	--	--	--	1.0	--	--	--	--	--	1.6	--	1.0	1.1	--	--	0.78	--
Total DDT	µg/kg	--	--	--	--	7.3	--	167	111	--	--	--	163	--	--	--	--	--	--	112	--	--	--	--	--	645	--	189	157	--	--	245	--
Total Chlordane	µg/kg	--	--	--	--	1.4	--	22	5.3	--	--	--	20	--	--	--	--	--	--	26	--	--	--	--	--	84	--	16	13	--	--	30	--
Total PAHs	µg/kg	--	--	--	--	2.1	--	4.8	5.5	--	--	--	10	--	--	--	--	--	--	5.9	--	--	--	--	--	18	--	12	6.7	--	--	4.9	--
Benzo(a)pyrene	µg/kg	--	--	--	--	ND	--	ND	ND	--	--	--	ND	--	--	--	--	--	--	ND	--	--	--	--	--	ND	--	ND	ND	--	--	ND	--
2002 Fillet Results																																
Lipid Content	%	--	0.17	--	0.32	1.1	0.22	0.39	0.27	--	--	--	0.07	0.57	--	--	3.2	--	--	1.1	--	--	--	--	--	0.44	0.23	4.1	0.20	0.65	0.40	0.30	--
Total DDT	µg/kg	--	9.7	--	74.3	2.1	48.0	42.6	25.9	--	--	--	20.8	71.1	--	--	66.6	--	--	20.9	--	--	--	--	--	181	51.6	26.5	25.5	183	26.4	135	--
Total Chlordane	µg/kg	--	0.96	--	13.7	0.32	4.3	3.4	2.4	--	--	--	2.7	7.7	--	--	7.0	--	--	2.7	--	--	--	--	--	18.5	4.5	0.48	0.26	15.0	1.2	11.3	--
Total PAHs	µg/kg	--	ND	--	ND	ND	ND	1.0	23.1	--	--	--	ND	0.48	--	--	ND	--	--	ND	--	--	--	--	--	ND	14.9	ND	ND	ND	8.4	ND	--
Benzo(a)pyrene	µg/kg	--	ND	--	ND	ND	ND	ND	ND	--	--	--		ND	--	--	ND	--	--	ND	--	--	--	--	--	ND	ND	ND	ND	ND	ND	ND	--
2013 Fillet Results																																
Lipid Content	%	--	0.74	8.56	1.56	--	--	--	--	--	--	--	0.78	0.87	0.76	8.08	--	--	--	--	5.11	0.76	1.1	--	--	2.34	8.36	0.62	0.67	--	0.65	--	--
Total DDT	µg/kg	--	21.7	799	128	--	--	--	--	--	--	--	117	31.9	81.0	294	--	--	--	--	122	43.6	27.7	--	--	155	22.9	45.0	148	--	41.3	--	--
Total Chlordane	µg/kg	--	ND	395	15.3	--	--	--	--	--	--	--	8.7	ND	11.5	107	--	--	--	--	19.4	ND	ND	--	--	17.2	ND	ND	ND	--	ND	--	--
Total PAHs	µg/kg	--	ND	ND	ND	--	--	--	--	--	--	--	ND	ND	ND	ND	--	--	--	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	ND	--	--
Benzo(a)pyrene	µg/kg	--	ND	ND	ND	--	--	--	--	--	--	--	ND	ND	ND	ND	--	--	--	--	ND	ND	ND	--	--	ND	ND	ND	ND	--	ND	--	--
2018 Fillet Results																																
Lipid Content	%	--	0.38	--	--	0.89	0.45	--	--	0.46	0.76	--	0.53	--	--	--	0.44	--	--	--	--	0.63	0.74	0.92	--	--	--	--	--	--	--	--	--
Total DDT	µg/kg	--	53.30	--	--	3.86	6.84	--	--	20.21	19.53	--	53.01	--	--	--	22.30	--	--	--	--	15.69	11.91	27.84	--	--	--	--	--	--	--	--	--
Total Chlordane	µg/kg	--	ND	--	--	ND	ND	--	--	ND	ND	--	ND	--	--	--	ND	--	--	--	--	ND	ND	ND	--	--	--	--	--	--	--	--	--
Total PAHs	µg/kg	--	90.80	--	--	39.79	7.26	--	--	2.00	ND	--	23.77	--	--	--	12.54	--	--	--	--	25.07	27.03	39.08	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	µg/kg	--	ND	--	--	ND	ND	--	--	ND	ND	--	ND	--	--	--	ND	--	--	--	--	ND	ND	ND	--	--	--	--	--	--	--	--	--
2018 Offal Results																																
Total DDT	µg/kg	--	24.30	--	--	5.67	7.56	--	--	10.92	20.53	--	52.63	--	--	--	19.63	--	--	--	--	3.90	10.94	5.45	--	--	--	--	--	--	--	--	--
Total Chlordane	µg/kg	--	1.99	--	--	1.30	2.15	--	--	2.53	7.37	--	13.82	--	--	--	10.23	--	--	--	--	1.95	4.63	1.95	--	--	--	--	--	--	--	--	--
Total PAHs	µg/kg	--	156.79	--	--	108.57	29.51	--	--	23.31	25.44	--	50.81	--	--	--	45.41	--	--	--	--	102.54	60.80	95.60	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	µg/kg	--	ND	--	--	4.04	ND	--	--	ND	ND	--	ND	--	--	--	ND	--	--	--	--	ND	ND	ND	--	--	--	--	--	--	--	--	--

N/A - Not applicable/available; ND - Not Detected; NR- Not Reported. AE- American eel; BB- brown bullhead; BC- black crappie; BG - bluegill; CP - chain pickerel; GS - golden shiner; LMB - largemouth bass; PS- pumpkinseed; RP - redfin pickerel; SMB - smallmouth bass; WP-white perch; YP- yellow perch

[1]Result(s) determined to be unusable following data validation.

[2]Non-detect Results and unusable results(determined through data validation) were reported.

[3]Table from September 2001 report presented concentrations as total for all fish in station. Concentrations are now presented as averages where applicable.

APPENDIX D

SITE INSPECTION/MANAGEMENT SYSTEM REVIEW

TECHNICAL MEMORANDUM
MANAGEMENT SYSTEM REVIEW AND TECHNICAL COMPLIANCE EVALUATION
BAIRD AND MCGUIRE SUPERFUND SITE
HOLBROOK, MASSACHUSETTS

As part of the Five-Year Review for the Baird & McGuire Superfund Site in Holbrook, MA, a Management System Review (MSR) has been performed which includes performance of a site inspection, review of the remedy, and a technical compliance evaluation in order to evaluate whether each element of the remedy is being maintained and operated in accordance with its intended function. This technical memorandum includes a summary of the site inspection performed on March 19, 2019, as well as annotated photographs of various site features taken on that date, and a technical assessment of physical features of the remedy.

Site Inspection

On March 19, 2019, Kimberly White of the US EPA and Cinthia McLane of AECOM performed an inspection of the Baird & McGuire site. Also present were Dorothy Allen and Patrick Hurley of MassDEP; and Lisa Irwin, Project Scientist, Ken McDermott, Project Manager, and George Bergman, GWTF Operator of Clean Harbors (the O&M Contractor for the MassDEP). The site inspection photos are included as Attachment 1. The Inspection Checklist is included as Attachment 2.

Patrick Hurley of the MassDEP led a tour of the GWTF and provided information on improvements that have been made within the past five years, along with maintenance issues resulting from the age of much of the equipment. In general, the GWTF continues to meet effluent discharge limits; however, the age of the equipment continues to cause some difficulties for the operators, including difficulty finding spare and replacement parts, some of which have been located on eBay. Various upgrades and safety measures have been implemented, including installation of energy efficient LED lamps on the exterior of the building; installation of a new permanganate feed system; a new programmable logic controller (PLC) for the sludge filter press and new sludge pumps to allow for automatic operation; the addition of new variable frequency drives; new pumps and piping for Effluent Holding Tank T-17 to allow for reuse of treated groundwater for chemical mixing and other process uses; level sensors in T-10 and T-17 were replaced with an ultrasonic units; and replacement of old carbon steel piping with Schedule 80 PVC piping. See photos 1 through 6 in Attachment 1. More detail of the improvements is provided in the attached Interview Record for the O&M Contractor.

The unnamed brook has a modified flow path that travels along the access road, creating difficulty accessing several of the extraction wells (see photos #8 and #9). Eight extraction wells are in service. Personnel from the O&M Contractor said that EW-6 was replaced by EW-6a in 2015. EW-10 was put into service in 2014. EW-7 retrofitted with pitless adapter installed to allow for eased redevelopment (see photo #15). Frequency of extraction well redevelopment has been increased, with all wells having been redeveloped once during the past five years, with the exception of EW-10, which was redeveloped twice. Budget has been included for annual redevelopment, with each well to be redeveloped in alternating years. Additional detail on well redevelopment is included in the attached CH Interview Record.

The Extraction Well Control Building was briefly visited. There have been no changes since the prior Five Year Review. Based on information provided in the 2017 annual report (CHES, 2019), total flow to the GWTF is approximately 72 gpm. The LNAPL collection system is no longer in use. NAPL is measured weekly in four wells and monthly in others. It is only observed sporadically and is no longer being removed.

The infiltration basins appeared to be in good condition, with discharge from the GWTF visible in Infiltration Basin #3 at the time of the site inspection (see photos 20 and 21). The fish advisory signs that were installed in 2014 were observed during the site inspection. Of the five signs that were installed, three were found to be in good condition (one on the banks of the Cochato River near the intersection of Centre and Union Streets and two on the west side of Sylvan Lake). A fourth sign, located on the east side of Sylvan Lake near the end of Mt. Pleasant Avenue, had been removed from its post and was missing (note that the missing sign was replaced subsequent to the site inspection). The fifth sign, also located on the east side of Sylvan Lake in a wooded area, was not located (see photos 21 through 25).

The perimeter fence, where visible from the Site and from a parking lot off of Mear Road, appeared to be in intact and generally in good condition (see photo 26).

Technical Compliance Evaluation of Remedy Components

The technical compliance evaluation is conducted to determine whether the individual components of the remedy are being maintained and operated in accordance with their intended functions.

Evaluation of Intended Function:

OU1 and OU2

- The MassDEP and O&M Contractor Clean Harbors continue to operate and maintain the GWTF. While the operation of the GWTF is remediating the contaminated aquifer, concern has been expressed that RAO of accomplishing this objective within a reasonable time period is not being addressed by the GWTF. Improvements and investigations intended to optimize operations are ongoing.

- The RAO of protecting surface waters from future contaminant migration is being addressed by containment via the groundwater extraction system. Surface water monitoring data are no longer collected as prior five-year reviews (2004 and 2009) evaluated the most recent data (from 2000) and found results to be well below EPA's target risk range of 10^{-6} to 10^{-4}.

- In 2013, the EPA conducted an Optimization Review which considered remedy performance, protectiveness, cost-effectiveness, technical improvement, and site closure strategy. During the last five year review period, the MassDEP implemented some of the recommendations of the Optimization Review and evaluated and attempted others. This effort is ongoing. During this five year review period, field studies were conducted and a report to refine the Conceptual Site Model (Parsons, 2018), additional Cochato River sampling (fish and sediment), continued efforts to optimize the extraction system. This effort addresses the RAO of minimizing long-term management and/or maintenance.

OU3

- Sampling was conducted in 2018 to confirm exceedances detected during the prior five year review period in Station E (adjacent to the site) and Station A (upstream of the project area). The 2018 data show no exceedances of the cleanup levels at either Stations E or at Station A (ESM, 2019). Based on these results, it appears that the RAOs are being addressed.

ATTACHMENT 1

SITE PHOTOS

1. New sludge pumps

2. Permanganate feed system upgrade

3. New filter press PLC

4. Tank T-2 may be in need of repair soon

5. Pumps and new piping from Effluent Holding Tank T-17 configured to recycle treated effluent for reuse as process water

6. Newly replaced VFDs

7. Looking north over NAPL area towards EW-6 (no longer in use) and EW-8

8. Unnamed Brook flooding extraction well access road.

9. Unnamed Brook flooding extraction well access road

10. View looking north towards EW-10

11. View of Extraction well EW-9

s

12. TLA Property (Property #19-003-00-0) with monitoring wells and flagged trees. Fencing appeared to be intact in locations observed

13. Trees flagged on TLA property

14. Extraction well EW-6a (installed in 2015 to replace EW-6). White posts in background were installed for the Parsons study

15. EW-4A with rainwater in vault

16. EW-7 retrofitted with pitless adapter installed to allow for eased redevelopment

17. Piezometers installed in 2015 in the Cochato River by Clean Harbors

18. View of Site, looking to the northeast over NAPL area

19. Paved road to the infiltration basins. Brush on the side of the road was recently cleared as part of ongoing site maintenance

20. Infiltration basin #1

21. Infiltration Basin #3 with discharge from the GWTP visible

22. Fish Advisory sign on Centre Street (location #1)

23. Fish Advisory sign on Centre Street (location #2)

24. Fish advisory sign on Cochato River at Union St. bridge

25. Fish advisory sign missing from its post, on the East side of Sylvan Lake at the end of Mt. Pleasant Ave

26. Site fencing along North side of the Cochato River, as visible from Property 19-006-00-0.

ATTACHMENT 2

SITE INSPECTION CHECKLIST

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Baird & McGuire Superfund Site	**Date of inspection:** March 19, 2019
Location and Region: Holbrook, MA EPA Region 1	**EPA ID:** MAD001041987
Agency, office, or company leading the five-year review: EPA Region 1	**Weather/temperature:** Sunny/Mid-40s F.
Remedy Includes: (Check all that apply) ☐ Landfill cover/containment ■ Access controls ■Institutional controls ■ Groundwater pump and treatment ■ Surface water collection and treatment ☐ Other_____ _____	☐ Monitored natural attenuation ☐ Groundwater containment ☐ Vertical barrier walls
Attachments: ☐ Inspection team roster attached ☐ Site map attached	
II. INTERVIEWS	
Interviews are included separately.	

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ■ O&M manual — ■ Readily available — ■ Up to date — □ N/A
   - □ As-built drawings — □ Readily available — □ Up to date — □ N/A
   - ■ Maintenance logs — ■ Readily available — □ Up to date — □ N/A

   Remarks: Availability was noted. Maintenance logs are electronic and were not reviewed during visit.

2. **Site-Specific Health and Safety Plan** — ■ Readily available — □ Up to date — □ N/A
   - □ Contingency plan/emergency response plan — □ Readily available — □ Up to date — □ N/A

   Remarks_____

3. **O&M and OSHA Training Records** — □ Readily available — □ Up to date — □ N/A

   Remarks_____

4. **Permits and Service Agreements**
   - □ Air discharge permit — □ Readily available — □ Up to date — ■ N/A
   - □ Effluent discharge — □ Readily available — □ Up to date — ■ N/A
   - □ Waste disposal, POTW — □ Readily available — □ Up to date — ■ N/A
   - □ Other permits_____ — □ Readily available — □ Up to date — □ N/A

   Remarks_____

5. **Gas Generation Records** — □ Readily available — □ Up to date — ■ N/A

   Remarks_____

6. **Settlement Monument Records** — □ Readily available — □ Up to date — ■ N/A

   Remarks_____

7. **Groundwater Monitoring Records** — □ Readily available — □ Up to date — □ N/A

   Remarks: Availability was noted. Maintenance logs are electronic and were not reviewed during visit. Records were reviewed as part of document review.

8. **Leachate Extraction Records** — □ Readily available — □ Up to date — ■ N/A

   Remarks_____

9. **Discharge Compliance Records**
   - □ Air — □ Readily available — □ Up to date — ■ N/A
   - □ Water (effluent) — □ Readily available — □ Up to date — □ N/A

   Remarks: Availability was noted. Maintenance logs are electronic and were not reviewed during visit. Records were reviewed as part of document review.

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☐ N/A
Remarks_____
_____

IV. O&M COSTS

1. **O&M Organization**
☐ State in-house ■ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____
_____

2. **O&M Cost Records**
Costs are provided in the interview record.

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: _____
_____
_____
_____
_____
_____

V. ACCESS AND INSTITUTIONAL CONTROLS ■ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ■ Gates secured ☐ N/A
Remarks_____
_____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks: Fish advisory sign have been installed at select locations. One sign was missing at the time of the inspection.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

_____
_____
_____
_____

2. **Adequacy** ■ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks_____
_____
_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ■ No vandalism evident
Remarks_____
_____

2. **Land use changes on site** ☐ N/A
Remarks_____
_____

3. **Land use changes off site** ☐ N/A
Remarks_____
_____

VI. GENERAL SITE CONDITIONS

A. Roads ■ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
Remarks: The flow path of the Unnamed Brook has changed and now travels along one of the Site access roads, creating difficulty in accessing several of the extraction wells.

B. Other Site Conditions
Remarks : Generally, the Site appeared to be in good condition.

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☐ N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A	
1.	**Pumps, Wellhead Plumbing, and Electrical** ■ Good condition■ All required wells properly operating ☐ Needs Maintenance ☐ N/A Remarks___Annual redevelopment is included in the budget. Individual extraction wells are scheduled to be redeveloped every other year.___
2.	**Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ■ Good condition☐ Needs Maintenance Remarks_____ _____
3.	**Spare Parts and Equipment** ☐ Readily available ☐ Good condition■ Requires upgrade ☐ Needs to be provided Remarks:_ Spare parts and equipment is often hard to located due to the age of the equipment. In some instances, the O&M Contractor has had to located parts on eBay. _____

C. Treatment System ■ Applicable □ N/A

1. **Treatment Train** (Check components that apply)
   ■ Metals removal □ Oil/water separation □ Bioremediation
   □ Air stripping ■ Carbon adsorbers
   ■ Filters_____
   ■ Additive (*e.g.*, chelation agent, flocculent)_____
   □ Others_____
   □ Good condition □ Needs Maintenance
   ■ Sampling ports properly marked and functional
   ■ Sampling/maintenance log displayed and up to date
   ■Equipment properly identified
   □ Quantity of groundwater treated annually_____
   □ Quantity of surface water treated annually_____
   Remarks_____
   _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   □ N/A ■ Good condition□ Needs Maintenance
   Remarks_____
   _____

3. **Tanks, Vaults, Storage Vessels**
   □ N/A ■ Good condition* ■ Proper secondary containment □ Needs Maintenance
   Remarks The false bottom of one tank may need repair soon.
   _____

4. **Discharge Structure and Appurtenances**
   □ N/A ■ Good condition□ Needs Maintenance
   Remarks_____
   _____

5. **Treatment Building(s)**
   □ N/A ■ Good condition (esp. roof and doorways) □ Needs repair
   □ Chemicals and equipment properly stored
   Remarks Roof was not observed.
   _____

6. **Monitoring Wells** (pump and treatment remedy)
   ■ Properly secured/locked □ Functioning ■ Routinely sampled ■ Good condition
   □ All required wells located □ Needs Maintenance □ N/A
   Remarks: Not all wells were observed.

D. Monitoring Data

1. Monitoring Data
   ■ Is routinely submitted on time ■ Is of acceptable quality

2. Monitoring data suggests:
   ■ Groundwater plume is effectively contained □ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

A robust O&M program is in place. Issues related to equipment age and persistent arsenic plume continue.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. The age of the GWTF and availability of replacement and spare parts is an ongoing problem.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. This is an ongoing process. Most recently a number of field studies were conducted for the purpose of updating the Conceptual Site Model. A CSM Update Report was prepared in 2018.

APPENDIX E

INTERVIEWS

INTERVIEW RECORD

Site Name: Baird & McGuire Superfund Site (Holbrook, MA)	**EPA ID No.:** MAD001041987	
Subject: Five Year Review	**Time:**	**Date:**
Type: ☐ Telephone ☐ Visit X Other (email) **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: ZaNetta Purnell	**Title:** Community Affairs Coordinator	**Organization:** EPA

Individual Contacted:

Name: Ron Gillis	**Title:** trustee	**Organization:** Six Phillips Road Trust
Telephone No: 781-737-1705 **E-Mail:** rgillis@barlettaco.com	**Street Address:** 40 Shawmut Rd, Canton MA	

5-YEAR REVIEW QUESTIONS FOR PROPERTY OWNER

1. **What is your overall impression of the project? (general sentiment)**

Day-to-day operations don't have noticeable effect on 6 Phillips property, but concern about impact on future development of property.

2. **What effects have site operations had on your property?**

Because of the location of the fence on 6 Phillips Road property, we've been required to confirm and coordinate continued access to the site with DEP.
Part of the 6 Phillips Road property is included in the TLA-Holbrook LLC (TLA) transfer station project, and development plans have had to change because of the NAULs.

3. **What impact have the Institutional Controls (Notice of Activity and Use Limitations) had on your property or your operations?**

The NAULs have already impacted development plans for the TLA project, requiring revisions of existing permitted plans to accommodate implementation of NAULs. For the rest of the 6 Phillips Road property, there is concern that NAULs will inhibit drainage, paving, and other development for the site in the future.

4. **Have you returned the Institutional Controls Certification Form submittal to the MassDEP?**

Yes

5. What concerns do you have about the site? We are concerned that changes to any NAULs and continued remediation at the site may impact our ability to develop the 6 Phillips Road property.
6. Are you aware of any community concerns regarding the site's operation and administration? If so, please give details. Not aware of general concerns about operation and administration of the site.
7. Are you aware of any other community concerns? Aware of general concerns about the site not being "clean" and remediated and will always remain "dirty"; concerns that there remain pathways for the contaminants to get into the community.
8. Are you aware of any events, incidents, or activities at the site (such as emergency responses, flooding, etc.)? If so, please give details. No.
9. Do you feel well informed about the site's activities and progress? Generally good communication from EPA.
10. Do you have any comments, suggestions, or recommendations regarding the site's management or operation? N/A
11. Have the activities to date at the site helped the neighborhood and/or community? N/A
12. Are you aware of any events of vandalism or trespassing at the site? N/A
13. Is there any other information that you wish to share that might be of use? N/A

INTERVIEW RECORD

Site Name: Baird & McGuire Superfund Site (Holbrook, MA)		**EPA ID No.:** MAD001041987
Subject: Five Year Review	**Time:**	**Date:** 04/05/19
Type: ☐ Telephone ☐ Visit ■ Other **Location of Visit:**		☐ Incoming ☐ Outgoing

Contact Made By:

Name: Purnell ZaNetta	**Title:** Public Affairs Specialist, Community Involvement Coordinator	**Organization:** AECOM

Individual Contacted:

Name: [redacted]	**Title:**	**Organization:** Holbrook Resident
Telephone No: [redacted] **E-Mail:**	**Street Address:** [redacted]	

1. **What is your overall impression of the project? (general sentiment)**

Town Reps keep residents in the dark.

2. **What concerns do you have about the site?**

Transfer Station is going in and we have been told it will be going on to the B&M land and feel chemicals in the ground will be release back into the ground water.

3. **What effects have site operations had on the surrounding community?**

Very Negative. Residents Do not want that land touch or built on.

4. **Are you aware of any community concerns regarding the site's operation and administration? If so, please give details.**

We have been told in Town Hall meetings the Transfer Station will be built on the site. about 40-60ft of the land will occupy the transfer station.

5. **Are you aware of any other community concerns or complaints ?**

Braintree, Randolph has voice major concerns.

6. **Are you aware of any events, incidents, or activities at the site (such as vandalism, trespassing, emergency responses)? If so, please give details.**

Residents have posted on social media that the South Street Gate has had Trucks going in and out of that gate. I have seen Trucks my self.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**

The EPA need to reach out to the resident and Let then know they are in the best interest of the residents.

8. **Have the activities to date at the site helped the neighborhood and/or community?**

NO!

9. **Are you concerned about the site's future reuse? If so, please give details.**
Yes. I feel the ground water will be contaminated again if the Clay bed is distributed. The lake on Center Street still can not be fished in and and the Holbrook lake also can not be fish in and this seems to be an issue that the problem is Still there!
10. **Is there any other information that you wish to share that might be of use?**
Yes. Our local Government seems to think they can use a site that is not fully done being inspected. I feel they are about to open a can of worms and the residents will pay the price.

INTERVIEW RECORD

Site Name: Baird & McGuire Superfund Site (Holbrook, MA)	**EPA ID No.: MAD001041987**	
Subject: Five Year Review	**Time:**	**Date:**
Type: ☐ Telephone ☐ Visit ☐ Other **Location of Visit:** Baird & McGuire GWTF	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Kimberly White	**Title:** Remedial Project Manager	**Organization:** EPA

Individual Contacted:

Name: Dorothy Allen	**Title:** State Remedial Project manager	**Organization:** MassDEP
Telephone No: (617) 292-5795 **E-Mail Address:** dorothy.t.allen@state.ma.us	**Street Address:** 1 Winter Street Boston, MA 02108	

1. What is your overall impression of the project? (General sentiment).

The groundwater treatment plant is effectively removing contamination from the influent and discharging the effluent to recharge basin below discharge criteria.
The overall site contamination remains unchanged for LNAPL, some SVOCs and arsenic.
Effectiveness of extraction wells is declining and these wells as well as treatment plant components need constant investment to maintain in adequate operational status.

2. Is the remedy functioning as expected? How well is the remedy performing?

The remedy has not achieved site clean-up in expected timeframe.

EPA has not set new alternative clean-up levels as directed by the ROD.

The design life of the treatment plant, 10 years as per ROD and 15 years as per SSC, has been exceeded by 15 and 10 years, respectively.

3. Have there been opportunities to optimize O&M or sampling efforts since the last Five Year Review? Please describe changes and resultant or desired cost savings or improved efficiency. Yes. Please review answer to question 7 in Interview Record for O&M Contractor Manager and Operator and review Annual Reports for details.

4. Have any recommendations identified in the Optimization Review Report (May 2013) been implemented since the last Five Year Review?

MassDEP has been funding and implementing the recommendations of the 2013 Optimization Report by hiring a contractor and conducting investigations (using high resolution characterization methods) to update the Conceptual Site Model, conducting treatability and leachability studies, and planning and designing in-situ pilot studies for 2019.

In addition, the following is the status of the last Five Year Review recommendations:

MassDEP and EPA have implemented ICs.

EPA has not developed alternate clean-up levels for the site.

Cochato River has been monitored in 2018.

Areas on Cochato River further downstream from the site are inaccessible due to significant vegetation growth.

5. What are the annual system operation/O&M costs for OU-1 since the previous 5-year review in 2014?

Total Cost	
FY 2014	630K and 100K utilities (W/S,elec,gas, phone)
2015	570 and 100K
2016	650K and 100K
2017	640K and 80K
2018	705K and 80K
2019 (est.)	700K and 80K

6. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.

No

7. Are you aware of or has your office been contacted by anyone regarding future or current uses of the Site and the surrounding area?

Solar power developers have been interested in reusing Baird and McGuire properties for solar development. Permission for this development has been granted by Ann McGuire. No one has followed through with a solar project likely since properties have liens for non-payment of taxes to Holbrook.

8. Have any community involvement activities been conducted in the last 5 years?

EPA has reached out to Holbrook and other property owners to implement the ICs.

9. Did your office receive the Institutional Controls Certification Form submittal from the property owners following the ICs were recorded? If not, have there been other communications from the property owners regarding the ICs?

Certification forms have been received for some properties.

10. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

MassDEP would like to continue close cooperation with EPA on implementation of Optimization Report recommendations as the state moves forward specific tasks.

EPA should develop alternative clean-up levels for the remedy based on the existing groundwater classification and environmental receptors to allow for implementation of alternative in-situ remedies.

11. Is there any other information that you wish to share that might be of use?

INTERVIEW RECORD

Site Name: Baird & McGuire Superfund Site (Holbrook, MA)		**EPA ID No.:** MAD001041987
Subject: Five Year Review		**Time:** **Date:**
Type: ☐ Telephone ☐ Visit X Other (email) **Location of Visit:**		☐ Incoming ☐ Outgoing

Contact Made By:

Name: ZaNetta Purnell	**Title:** Community Affairs Coordinator	**Organization:** EPA

Individual Contacted:

Name: Timothy J. Gordon	**Title:** Town Administrator	**Organization:** Town of Holbrook
Telephone No: 781-767-4312 **E-Mail:** tgordon@holbrookmassachusetts.us	**Street Address:**	Holbrook Town Hall 50 North Franklin Street Holbrook, MA 02343

1. **Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.**
   The Holbrook Fire Department conducts routine Fire Safety and Code Compliance visits to the site on a regular basis which occur no less frequently than annually. In response to this five year review, we conducted a site visit on April 23, 2019 (last year's annual inspection took place on June 28, 2018) so as to have current information available for this review. No new issues of concern to the Fire Department were apparent during this visit and we will continue to conduct these routine site visits/activities as a regular activity in future years.

2. **Have any problems been encountered or changes in the site conditions that affect the current institutional controls at the site? No**

3. **Have there been any planned changes in projected land use / zoning at or near the site? Since the last 5-year review, with the exception of the Mass Medicum Facility and the proposed Trash Transfer Station, there are no land use/zoning changes that the Fire Department is aware of either at or near the site.**

4. **Have any interested parties approached the Town about the site's future reuse (if different from current uses)? If so, what is the schedule for future development?** **No**
5. **Do you have any recommendations for reducing or increasing activities at the site?** **No**
6. **Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If yes, how often and what type of activities did they engage in?** **The Holbrook Police Department has responded to 4 calls to the site over the past 5 year for the following: Burglar alarm/ all secure; Burglar alarm/ All Secure; Suspicious activity/ unfounded; Vandalism/ Cut wires to light systems on south Street/ repaired** **Holbrook Fire Department records indicate that there were approximately three (3) responses to this location over the past five years. All were for Sprinkler System and/or Fire Alarm System malfunctions and were resolved without incident.**
7. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the response.** **No**
8. **Do you have any comments, suggestions, or recommendations regarding site management or operation?** **No**
9. **Is there any other information that you wish to share that might be of use?** **No**

INTERVIEW RECORD

Site Name: Baird & McGuire Superfund Site (Holbrook, MA)	**EPA ID No.: MAD001041987**	
Subject: Five Year Review	**Time:**	**Date:**
Type: ☐ Telephone ☐ Visit X Other (email) **Location of Visit:** Baird & McGuire GWTF	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Kimberly White	**Title:** Remedial Project Manager	**Organization:** EPA

Individual Contacted:

Name: Patrick Hurley, MassDEP Lisa Irwin, Clean Harbors	**Title:** O&M Contractor Manager/Operator	**Organization:** Clean Harbors
Telephone No: 617-292-5641 **E-Mail Address:** patrick.hurley@state.ma.us	**Street Address:** 775 South Street Holbrook, MA 02343	

1. Is the remedy functioning as expected? How well is the remedy performing?

Yes, however the length of time for site closure seems to be extended, especially regarding arsenic.

2. What does the monitoring data show? Are there any data trends that appear unusual? What is the current monitoring program for the GWTF and LNAPL systems?

Data shows removal of contaminants. EW-6A's flow is decreasing. The groundwater contour mapping show peculiar mounding near MW97-21/22.

The GWTF is sampled weekly, monthly, and quarterly. The LNAPL system is off-line due to limited LNAPL occurring in the wells; therefore, no sampling is conducted on that system.

3. Please describe the O&M staff and activities, including frequency of inspections and O&M activities.

The staff include a Lead Operator (5 x 8 hr days), Operator (5 x 8 hr days & 2 x 4 hr shifts on weekends), and a Mechanic (2 X8hr days/week). The plant staff run the system, monitor the system, and do reporting, ops entry, maintenance on the entire property and building, housekeeping, preventative maintenance, replacement of pumps, identifying operational issues and consulting with vendors. Inspections are done daily, 7 days per week.

4. Have there been unexpected O&M difficulties or costs at the site in the last five years? If so, give details.

There has been failure/deterioration of the sludge pumps and parts were increasingly difficult to procure. As such, two replacement sludge press pumps were installed & the PLC for the sludge press controls was also installed. Various replacement vfds and well pumps have been installed. Various electrical and system component have required troubleshooting. The T17 level controller failed and was replaced with a new ultrasonic level sensor and level controller. Extraction wells are generally yielding less water, especially EW-6A, which is inexplicably yielding little water despite water present in the well. The site's equipment and tanks are generally old and some parts are difficult to procure. A new paco pump motor was installed for T17 effluent water. A new pump was installed for the use of T17 effluent water as rinse water. A new level indicator controller and ultrasonic sensor was installed for T10. A new atrium sump pump and check valve were installed. New plumbing and hoses for the replacement sludge pumps (sepex pumps) were installed. Influent line leak & welding repair occurred. The drier for air compressors was rebuilt. Two on-site backflow preventors for town water have been replaced. The EWCB vault floods out regularly. Piping broke at a PVC weld and a coupling was secured in the EWCB vault. An overview display of the sludge press system was installed to allow for troubleshooting the system. There has been difficulty maintaining ORP with several KMNO4 issues. Three new pumps, a new mixing auger system, and new lines and flushing system were installed for the larger KMNO4 system.

Two replacement EW's' were installed due to screen failure; EW-10 to replace EW-5 and EW-6A to replace EW-6. Pump test data for EW-6A indicated that the well would provide much higher flow rates, which the well was initially achieving for a prolonged period of time; EW-10 data indicated an initial 10 gpm (+), but has dropped off significantly a short time after operating. EW-10 and EW-9 have significant iron related buildup. Re-development activities have been increased over the last few years with mixed results. Some of the EW's respond to redevelopment activities with GPM increases of over 50% but other are not impacted as much. Moving forward re-development events of the EW's are budgeted yearly as part of the O&M at the site.

5. Have there been any updates to the O&M manual since the last 5-year review, and are the O&M activities being performed consistently with the approved O&M and monitoring plans?

Yes; however the system has been down more in recent years due to aged equipment and their issues and upgrades to the system.

The DEP has scheduled for the re-development of EW's on a yearly basis. The plan is to re-develop 3-4 EW's per year so that every two years all the wells will be re-developed.

6. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

There was a decrease in frequency of copper and barium analysis in Feb 2014 for process control samples. Additional wells have been added to the "typical" wells detailed in the sampling plan, and TPH, COD, and TOC have been analyzed annually.

PFAS were also analyzed at the site extraction wells.

7. Have there been opportunities to optimize O&M, or sampling efforts since the last five year review? Please describe changes and resultant or desired cost savings or improved efficiency.

Yes. Copper and barium decrease analysis (mentioned above); installation of VFDs to regulate and minimize energy consumption; the sludge pumps have been replaced (less town water use [old pumps leaked and water bill significantly reduced]; there is more efficiency in water removal for filter cake (i.e. less shipments being made); and a system has been

installed to use T17 effluent water for hoses and water use in much of plant. External lights have been upgraded to LED to conserve on energy consumption. Sodium lights in plant changed to fluorescent, which reduced the electric bill considerably.

8. Have there been any security issues in the last 5 years? Is there evidence or sightings of trespassers on the property, or evidence of vandalism? If yes, how often and what type of activities do they engage in?

NO

9. Have there been any complaints, violations, or other incidents related to the site? If so, please give details of the events and results of the responses.

NO

10. Have there been any unusual or unexpected activities or events at the site (e.g., flooding)? If so, has this resulted in any damage or had an impact on operations at the site?

The unnamed brook has a modified flow path that travels along the access road. The wet nature of some of the roads limits vehicle access to extraction wells EW-7, EW-9 and EW-10.

11. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

The OPS32 system is not working properly, the reports function and exports function have missing and incorrect data. All data is manually entered into OPS and typos occur and require QC. XL Reporter is missing flow data sporadically which includes additional time for QC. This is one of a few contributing delays in the data deliverables. There is currently no accurate reporting of the EW-6A flow data (1 gpm on the SCADA screen, no flow currently reported in XL reporter, and bucket tests yield approx. 4 gpm). It is recommended that new data collection/monitoring systems be considered. It is unclear why EW-6A flows have dropped so significantly in short timeframe – assessment has been done; however, the issue has not yet been determined. Additional troubleshooting will be done on EW-6A during spring of 2019.

Floor drains are commonly used to allow water to flow back to the influent T-1 tank. Considering the age of the lines, it may be worth evaluating their competency or the nature in which they were installed to gain confidence that they are not providing a migratory pathway for contaminants to be introduced to the subsurface in the area of the building.

12. Is there any other information that you wish to share that might be of use?

INTERVIEW RECORD

Site Name: Baird & McGuire Superfund Site (Holbrook, MA)		**EPA ID No.:** MAD001041987
Subject: Five Year Review		**Time:** **Date:**
Type: ☐ Telephone ☐ Visit X Other (email) **Location of Visit:**		☐ Incoming ☐ Outgoing

Contact Made By:

Name: ZaNetta Purnell	**Title:** Community Affairs Coordinator	**Organization:** EPA

Individual Contacted:

Name: [redacted] Community Member	**Title:**	**Organization:**
Telephone No: [redacted]	**Street Address:** [redacted]	

1. What is your overall impression of the project? (general sentiment)

I believe we had the best remediation available at the time. I'm pleased that the EPA is still involved in the property as I don't believe any complete remediation is or was available and the site requires oversight that is separate from the town.

2. **What concerns do you have about the site?** My biggest concerns are that there has been talk about opening the Cochato River to the reservoir. This comes up periodically and it was my impression at the time of remediation that the soil near and under the river could not be remediated. Although the ground water pumps were designed to hold the plume of contaminants to the site at the time the project was active, we were told that the water should never be allowed to go back to the reservoir. I hope that this is never allowed to happen. Second, the trash transfer station that is proposed for the adjacent property would risk disturbing soils that we know are contaminated (under a different DEP number) and that also partially overlay a part of the Baird project. The fear of further contamination with this project is high.

3. **What effects have site operations had on the surrounding community?**

It is my impression that most people currently believe the site is "cleaned". Unfortunately that will never truly be the case. There are those of us who were involved in in the clean-up who recognize that the property should not be used within the scope noted by the EPA. People who are new to the town become concerned when they find out the site is there. Those who have lived here prior to the factory closing down and the clean up have some fatigue about the issue. Of course, this is just my impression.

4. **Are you aware of any community concerns regarding the site's operation and administration? If so, please give details.**

Although I am currently on the "fringe" of the politically active community at this time, I have heard many concerns expressed regarding the site. Many of us are concerned about whether or not the pumps have actually done their job of holding back contamination. I know I have called EPA as have others regarding projects proposed for the site and surrounding areas. We still have fear of contamination and concerns regarding oversite.

5. **Are you aware of any other community concerns or complaints ?**

No. Those outlined above.

6. **Are you aware of any events, incidents, or activities at the site (such as vandalism, trespassing, emergency responses)? If so, please give details.**

No. I would guess it would be an attractive nuisance for teens. I have not heard of anything in particular.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**

Only as stated above. I am pleased that the EPA is doing five year reviews. I am concerned that there may be the ability to excavate anywhere on the site. At the time of the clean-up I remember being told that the site could not ever be used for any activity that required people to be on the site on a regular basis. It appears now that it is residence, childcare, etc. are the only restrictions. I noted in the documents that a solar energy farm is a possibility. That would probably be a good idea as long as there was no possible discharge of contanminants.

8. **Have the activities to date at the site helped the neighborhood and/or community?**

If you mean the clean-up, then yes. If there are other activities there, I am not aware of them.

9. **Are you concerned about the site's future reuse? If so, please give details.**

Yes. As noted above.

10. **Is there any other information that you wish to share that might be of use?**

There are many areas in town, including those areas near the site, that have a frequent turn over of "first time homeowners". There is no disclosure required when people buy in the area. I believe we need to be aware that as people move in and out of town they may not be aware of how serious this contamination and clean -up were/are. We depend on the EPA and DPA to continue to monitor the site and any movement of contaminants to keep the community safe from any further damage from this site.