FINAL

2019 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT

SHEPLEY'S HILL LANDFILL

FORMER FORT DEVENS ARMY INSTALLATION

MARCH 2021

Prepared for:
Department of the Army
Base Realignment and Closure Division
Fort Devens, Massachusetts

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| NOTICE |

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DEVENS, MASSACHUSETTS

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CERTIFICATION:

I hereby certify that the enclosed Report, shown and marked in this submittal, is that proposed to be incorporated with Contract Number W912WJ-18-C-0011. This Document has been prepared in accordance with USACE Scope of Work and is hereby submitted for Government Approval.

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LIST OF ACRONYMS AND ABBREVIATIONS

%	Percent
^{o}F	Degrees Fahrenheit
ADR	Automated Data Review
AOC	Area of Contamination
ATP	Arsenic Treatment Plant
bgs	Below Ground Surface
BOH	Board of Health
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH_4	Methane
CIP	Clean-in-Place
ClO_2	Chlorine Dioxide
CMR	Code of Massachusetts Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COC	Contaminant of Concern
cy	Cubic Yard
DO	dissolved oxygen
DOC	Dissolved Organic Carbon
DoD	Department of Defense
DPW	Department of Public Works
DQO	Data Quality Objective
ELAP	Environmental Laboratory Accreditation Program
ESD	Explanation of Significant Differences
EW	Extraction Well
FBRO	Filter Bed Roll-off
FS	Feasibility Study
GE	General Electric
Global	Global Remediation Services Inc.
Gpd	gallons per day
gpm	gallons per minute
H_2S	Hydrogen Sulfide
H_2SO_4	Sulfuric Acid
Hg	Mercury
IC	Institutional Control
IPC	Inclined Plate Clarifier
KGS	KOMAN Government Solutions, LLC

LEL	Lower Explosive Limit
LGP	Landfill Gas Points
LTM	Long-Term Monitoring
LTMMP	Long Term Monitoring and Maintenance Plan
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
MassDEP	Massachusetts Department of Environmental Protection
MassDevelopment	Massachusetts Development and Finance Agency
MCL	Maximum Contaminant Level
MF	Microfiltration
mg/L	milligrams per liter
MS/MSD	Matrix Spike/ Matrix Spike Duplicate
NAD	North American Datum
NaOH	Sodium Hydroxide
NAVD	North American Vertical Datum
NELAP	National Environmental Laboratory Accreditation Program
ηg/L	nanograms per liter
NIA	North Impact Area
O_2	Oxygen
O&M	Operations and Maintenance
ORP	Oxidation reduction potential
PARCCS	Precision, accuracy, representativeness, completeness, comparability, and sensitivity
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
POTW	Publicly-Owned Treatment Works
ppm	parts per million
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QC	Quality Control
QSM	Quality Systems Manual
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
SGS	SGS North America Inc. – Environment, Health & Safety
SHL	Shepley's Hill Landfill

Sovereign	Sovereign Consulting, Inc.
TIN	Triangulated Irregular Network
USEPA	United States Environmental Protection Agency
USACE	United States Army Corps of Engineers
µg/L	micrograms per liter
µm	micrometer (micron)
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This Annual Report presents a summary of the groundwater monitoring program and the operation and maintenance (O&M) activities conducted during 2019 at the Shepley's Hill Landfill (SHL) site, located at the former Fort Devens Army Installation, Massachusetts. SHL is also known as Area of Contamination (AOC) 5. The summary includes data from the Army's operation of the groundwater extraction, treatment, and discharge system, the landfill monitoring and maintenance program, and the groundwater monitoring results for 2019. These activities were conducted in accordance with the Final Long-Term Monitoring and Maintenance Plan (LTMMP) Update (Sovereign Consulting, Inc [Sovereign], 2015) and LTMMP Addendum (KOMAN Government Solutions, LLC [KGS], 2018a).

The Army is conducting a Remedial Investigation (RI) for Per- and Polyfluoroalkyl Substances (PFAS) at the former Fort Devens, including the SHL. In fall 2019, a subset of the SHL LTMMP monitoring wells were sampled for PFAS as part of the RI program. Nineteen monitoring wells at SHL were sampled, and the sum of two PFAS compounds, PFOS and PFOA, ranged from 6.5 nanograms per liter (ηg/L) to 120 ηg/L. In 2017, the two onsite groundwater extraction wells (EW-01 and EW-04) were also sampled as part of the PFAS site inspection, and the sum of two PFAS compounds, PFOS and PFOA, were 53 and 22 ng/L, respectively (BERs-Weston, 2017). The PFAS RI is ongoing.

1.1 BACKGROUND

The former Fort Devens, Massachusetts is located approximately 35 miles northwest of the city of Boston, within the towns of Ayer, Shirley (Middlesex County), Harvard, and Lancaster (Worcester County). The former Fort Devens was established in 1917 for military training and logistical support during World War I. Fort Devens became a permanent base in 1931 and continued service until its Base Realignment and Closure (BRAC) Committee closure in 1996. Figure 1-1 depicts the area and topography of the former base and surrounding area.

SHL encompasses approximately 84 acres in the northeast corner of the Main Post of the former Fort Devens (Figure 1-2). The landfill is bordered to the east by Plow Shop Pond and land formerly containing a railroad roundhouse, to the west by Shepley's Hill, to the south by recent commercial development, and to the north by wooded and residential areas. Nonacoicus Brook, which drains Plow Shop Pond, is located north of the landfill in the North Impact Area (NIA) (Figure 1-3).

The Army reportedly operated SHL by the early 1940s; however, evidence from test pits within the landfill suggests earlier usage, possibly as early as the mid-nineteenth century. The landfill contains a variety of waste materials including, but not limited to, demolition debris, asbestos, sanitary wastes, glass, and incinerator ash. The maximum depth of the refuse occurs in the central portion of the landfill and is estimated to extend approximately 40 feet below ground surface (bgs). The volume of waste in the landfill has been estimated at over 1.5 million cubic yards (cy), of which approximately 160,000 cy (11 percent [%]) is below the water table. The saturated wastes appear to be emplaced in a wetland; at least two areas previously mapped as wetlands were filled (Harding ESE, 2003), and the waste has been found to be underlain by peat deposits (Sovereign, 2011a).

The Massachusetts Department of Environmental Protection (MassDEP) approved the landfill closure plan in 1985. The landfill was closed in five phases between 1987 and 1993 in accordance with 310 Code of Massachusetts Regulations (CMR) 19.000. Closure consisted of capping the landfill with a 30 to 40-mil polyvinyl chloride (PVC) membrane, covering the cap with soil and vegetation, and installing gas vents. Closure also included installation of wells to monitor groundwater quality around the landfill, and construction of drainage swales to control surface water runoff. MassDEP issued a Landfill Capping Compliance Letter approving the closure in February 1996.

After closure of the landfill, the Army completed Remedial Investigations (RIs) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) that evaluated soil, sediment, surface water, and groundwater conditions at and in the immediate vicinity of the landfill. The results confirmed the presence of various contaminants at the site, particularly certain inorganics (e.g., arsenic) and volatile organic compounds (VOCs) in groundwater, sediment, and surface water at and adjacent to SHL. The Army's Feasibility Study (FS) and Record of Decision (ROD) resulted in a Remedial Action that specified long-term monitoring and maintenance of the landfill cap, and long-term groundwater monitoring, and a contingent remedial component requiring design and construction of a groundwater extraction and treatment system if the landfill cap did not result in a reduction of groundwater contaminant concentrations, primarily arsenic, by 2008. Table 1-1 lists the relevant contaminants of concern (COCs) identified in the ROD, and their target cleanup levels.

As described in the ROD (United States Army Corps of Engineers [USACE], 1995), the Remedial Action Objectives (RAOs) for the SHL Remedial Action are to:

- Protect potential residential receptors from exposure to impacted groundwater migrating from the landfill having chemicals in excess of maximum contaminant levels (MCLs).
- Prevent impacted groundwater from contributing to the contamination of Plow Shop Pond sediments in excess of human health and ecological risk-based concentrations.

In addition to requiring Five-Year Reviews, the ROD stipulated that arsenic concentrations in groundwater must be monitored to assess the landfill cap's effectiveness in attaining risk-based, cleanup goals by 2008 and if the required reductions in risk were not achieved within this timeframe, the Army would design and implement a groundwater extraction and treatment system to address continued migration of contamination emanating from the landfill. In March 2006, when it was realized that the risk-reduction goals would not be attained, the Army constructed and began operating a two-well (EW-01 and EW-04) groundwater extraction and treatment system at an initial pumping rate of 25 gallons per minute (gpm), which was gradually increased to a combined extraction rate of 50 gpm. In 2019, an average extraction rate of 54.2 gpm was achieved.

Adjacent to SHL, the Army investigated Red Cove/Plow Shop Pond known as AOC 72. In 2011, the AOC 72 RI (AMEC, 2011) concluded that components of the current SHL remedy (landfill capping and groundwater extraction) did not eliminate groundwater flow and arsenic migration from SHL into Red Cove/Plow Shop Pond. The AOC 72 RI results suggested that groundwater

discharge contributed arsenic to sediment that could accumulate to levels resulting in conditions that posed unacceptable risks, and therefore a remedy component that minimized arsenic-in-groundwater flux to Red Cove was most protective (AMEC, 2011). Consequently, during August-September 2012, the Army installed a slurry barrier wall between the SHL and AOC 72 as part of a Non-Time Critical Removal Action in order to mitigate the arsenic flux to Red Cove/Plow Shop Pond by groundwater flow from the SHL. Documentation of the barrier wall installation was provided in the July 2013, Final Removal Action Completion Report for Shepley's Hill Landfill Barrier Wall (Sovereign, 2013a).

As stated earlier, one of the RAOs for SHL is to protect potential residents from exposure to impacted groundwater migrating from the landfill at levels that pose a risk to human health and the environment. Because the extent of the impact was not defined at the time, the SHL ROD did not specifically address implementation of Land Use Controls (LUCs) for any non-Army property located north of the landfill. Consequently, LUCs were established for the NIA in 2013 and were documented in the December 2013 Explanation of Significant Differences (ESD) for Land Use Controls to Restrict Groundwater Use (Sovereign, 2013b). The Army subsequently issued a Land Use Control Implementation Plan (LUCIP) in August 2014 to describe the procedures for implementing the LUCs in the NIA (Sovereign, 2014). The specific LUCs are discussed in Section 4.0. The area of LUCs is shown on Figure 1-4.

1.2 OBJECTIVES

The objectives of this Annual Report are as follows:

- Summarize landfill maintenance activities;
- Document the landfill cap inspection which was performed to identify areas that may require future maintenance;
- Present landfill gas measurements from 18 gas vents and 25 permanent landfill perimeter gas monitoring wells to evaluate long-term trends with regard to gas production and venting;
- Summarize O&M, sampling, and reporting associated with the Arsenic Treatment Plant (ATP) and provide recommendations for any modifications; and,
- Present the results of the long-term monitoring (LTM) program for groundwater, including groundwater hydraulics, COC analytical monitoring, and field parameters.

1.3 REPORT ORGANIZATION

- Section 2.0 documents the routine landfill maintenance and inspection activities and includes the results of landfill gas monitoring in both gas vents and perimeter soil gas wells.
- Section 3.0 summarizes the ATP operations, maintenance, and monitoring.
- Section 4.0 summarizes the LUCs monitoring conducted in accordance with the LUCIP.

- Section 5.0 summarizes the LTMMP groundwater monitoring results, including synoptic water level measurements, arsenic concentrations, and other water quality data.
- Section 6.0 presents conclusions and recommendations for future system operations, monitoring, and assessments.
- Section 7.0 presents references used to prepare this report.

2.0 LANDFILL MAINTENANCE AND MONITORING

In accordance with the *LTMMP Update* (Sovereign, 2015), SHL was inspected and routine maintenance was performed during 2019. The annual inspection identifies and corrects any problems pertaining to the effectiveness of the cap system, erosion, and the conditions of gas vents and sampling points. A summary of the landfill cap maintenance, the findings of the inspection, and the results of landfill gas monitoring are presented in the following sections. The landfill inspection report with supporting photographs are presented in Appendix A.

2.1 GENERAL LANDFILL MAINTENANCE

The landfill grass cover and the vegetation atop the utility berm were mowed from 30 September to 01 October 2019 by Gatsby Grounds Co., Inc. of Lancaster, Massachusetts. Small shrub growth on the margins of the landfill was removed to maintain an effective cap system. The berm was intact and no adverse effects to the berm were noted. Normal vegetative growth was removed from the landfill cap during the mowing activities. Large vegetative growth was removed from the southern and northern drainage swales and grass mowing was conducted to the edge of the swales.

2.2 LANDFILL INSPECTION

An annual inspection of SHL was conducted on 15 October 2019. Features of the landfill that were inspected included the cover system, drainage system, gas vent system, access road, monitoring wells, and piezometers. Observations were made regarding the vegetative cover, vegetative types, erosion, settlement, and general conditions. The overall condition of the landfill was found to be satisfactory. A summary of findings and observations are presented below and within the landfill inspection report included in Appendix A along with supporting photographs.

2.2.1 Cover Surface

There was no evidence of poor conditions affecting the cover surface. No new depressions were observed on the cover surface. No new tree or shrub growth was observed on the landfill surface and observed small tree and shrub growth in the drainage areas was removed during the September-October 2019 mowing event. The utility berm was intact and no adverse effects to the berm were noted.

2.2.2 Vegetative Growth

The vegetative growth was normal and appeared to have no major stressed areas. The landfill had been properly mowed during the September-October 2019 mowing event.

2.2.3 Landfill Gas Vents and Gas Points

The landfill gas vents were observed to be in good condition. The vent pipes were functioning, and screens were present to prevent wildlife or debris from entering the vents. The landfill gas points were observed to be in good condition. Gas vents and gas points are located on Figure 2-1.

2.2.4 Monitoring Wells and Piezometers

Monitoring wells and piezometers located on the landfill cap or perimeter that are currently part of the LTMMP network were inspected in accordance with the revised 2015 LTMMP (Sovereign, 2015) checklist and were inspected during spring and fall sampling events (Figure 2-1). Network wells were in good condition overall. Dedicated LDPE tubing obstructing access to the bottom of the well was removed from SHM-05-41C. During the LTM fall sample event, a visible obstruction at SHM-13-03 was observed at approximately 6 feet below the top of casing. Passage of the water level meter and sample tubing around the obstruction was successful after several attempts. It was noted that the Royer well cap locking mechanism is broken at SHM-13-03.

2.2.5 Drainage Swales

Most of the southern drainage swale exhibited vegetative growth. Large growth was removed during September-October 2019 as part of the landfill mowing activities. Small vegetative growth and wetland plant life were not disturbed, as they help prevent erosion of the landfill cover. The northern drainage swales near the ATP also exhibited some large vegetative growth. Large growth was removed from the drainage swales during the September 2019 mowing event. Drainage swales are shown on Figure 2-1.

2.2.6 Settlement

No new topographic depressions were observed within the landfill cover.

2.2.7 Erosion

No significant erosion was observed across the landfill.

2.2.8 Access Roads

The landfill access road is in good condition and no erosion of the road was observed. The access road is shown on Figure 1-2.

2.2.9 Culverts and Catch Basins

Three adjacent culverts located at the northern portion of the landfill beneath the access driveway to the ATP were observed to be in good condition. Vegetative growth was removed during the September 2019 mowing event along the entrance road to the ATP building and the area around the culverts. No catch basins are present at the landfill or along the landfill boundary. The culverts are shown on Figure 2-1.

2.2.10 Security/Fencing

There is no perimeter fencing along the majority of the wooded western boundary of the landfill (along Shepley’s Hill) and along the southeastern landfill boundary near the railroad tracks; however, no public roads have open access to the landfill. Fence gates across roads that access the landfill are secured with chains and padlocks, and the security fence surrounding the ATP remains in good condition.

2.2.11 Wetland Encroachment

Wetland encroachment was observed in the swales located in the southern portion of the landfill. Overall, the individual areas of encroachment are infrequent, small, and confined to the swales. Extensive encroachment by wetland plants is controlled by mowing of the landfill surface. This will prevent the development and expansion of a wetland beyond the swale areas already invaded by wetland species.

2.2.12 Other Observations

The recreational field located south of the access road in the middle of the southern half of the landfill appeared to be in good condition. The field is being used through a lease to Massachusetts Development and Finance Agency (MassDevelopment) for recreational use of aerial drones (launching/landing). The recreational area was routinely mowed by the drone users during the spring, summer and fall of 2019 (Figure 2-1). No tire rutting was observed from recreational activity between the field and the landfill access road other than worn down grass where vehicles enter and exit the mowed area. No damage to the landfill cap was observed at the mowed location or access routes to the mowed area. Drone users erected a windsock in the recreational field area affixed to an existing (stickup) monitoring well. No other outstanding issues were observed.

2.2.13 Recommendations

During the October 2019 inspection, the landfill was observed to be in good condition overall. The inspection was limited to the landfill area and did not include an inspection of off-landfill wells.

The following recommendations are suggested for 2020:

- Continue annual landfill inspections;
- Continue monitoring for tree and shrub growth on cover surface. Remove tree and shrub growth as necessary;
- Continue monitoring the utility berm for negative impacts on the drainage patterns;
- Continue landfill cover and drainage swale mowing on an annual basis in the fall to maintain the effectiveness of the cover system;
- Continue to monitor the condition of the landfill gas points;
- Continue to monitor the condition of the landfill monitoring wells;
- Continue to monitor and clear drainage swales of invasive vegetative growth;
- Continue to monitor for new depressions or settlement within the landfill and repair as necessary;
- Continue to monitor the landfill cover and access roads for erosion on an annual basis;
- Continue to monitor culverts along the northern portion of the landfill and remove vegetative growth as necessary;

- Ensure that the post closure uses of the landfill during MassDevelopment's leased project period do not compromise the integrity of the landfill cover or the network of landfill gas vents and groundwater monitoring wells; and,
- Conduct routine, drive-by monitoring checks of the condition of the landfill cap in the leased recreational area.

2.3 LANDFILL GAS MONITORING

Annual sampling of landfill gas vents and landfill gas points (LGPs) was completed on October 16, 2019. Sampling activities were conducted in accordance with procedures described in the MassDEP Landfill Technical Guidance Manual, as revised May 1997. Landfill gas sampling included the following parameters:

- VOCs concentration in parts per million (ppm)
- Percent oxygen (O_2)
- Hydrogen sulfide (H_2S) concentration in ppm
- Percent lower explosive limit (LEL)
- Carbon monoxide (CO) concentration in ppm
- Percent carbon dioxide (CO_2)
- Percent methane (CH_4)

Landfill gas sampling was conducted using properly calibrated equipment. A LandTech Gem™ 2000 meter was used to measure CO_2, O_2, LEL, and CH_4. A MultiRAE® chemical gas detector was used to measure total VOC, CO, and H_2S. Each gas sampling device was connected directly to the sampling port at the top of the probe/vent to measure initial levels of gas concentrations. After the initial measurements were recorded, two probe/vent volumes were purged from each probe/vent. Following purging, the gas sampling equipment was connected directly to the sampling port and post purge gas concentrations were measured and recorded. Figure 2-1 depicts the locations of landfill gas vents and LGPs. Results of the annual landfill gas monitoring are presented in Table 2-1 and are discussed in the following sections. Refer to Table 2-2 for landfill gas probe construction details. Landfill gas monitoring field forms (2019) are provided in Appendix B.

2.3.1 Perimeter Gas Monitoring and Results

Annual LGP monitoring was performed on October 16, 2019 during which field readings of barometric pressure ranged from 30.02 to 30.10 inches of mercury (Hg). Barometric pressure data are provided in Table 2-1. Background barometric pressure was recorded as 30.01 inches Hg at the ATP at the start of the day. Pressure readings were then collected at each well and were relatively stable throughout the day. Pressure readings ranged from 29.64 inches Hg from seven north toe locations to 29.71 inches Hg at fifteen locations within the landfill to a range of 29.85 to 29.95 inches Hg at fourteen locations mainly in the southeast and southwest toes of the landfill.

Nine LGPs located at the northern toe of the landfill were screened during the 2019 monitoring event. Methane (CH_4) was detected in landfill gas at all nine LGPs in initial landfill gas monitoring with concentrations of 0.1% (2% LEL). In post purge monitoring, methane was detected in all nine LGPs. Concentrations ranged from 0.1% (2% LEL) to 0.2% (4% LEL). Hydrogen sulfide (H_2S) and carbon monoxide (CO) were not detected above the instrument detection limit in any of the northern LGPs during initial or post purge readings. No VOCs were detected during initial or post reading. O_2 and CO_2 concentrations ranged from 20.7% to 21.0% and 0.2% to 1.1%, respectively in initial landfill gas perimeter measurements and 20.7% to 21.2% and 0.5% to 1.2%, respectively in post purge monitoring.

Sixteen LGPs located along the southwest and southeast toe of the landfill were screened during the October 2019 monitoring event. CH_4 was detected in landfill gas at all sixteen LGPs in initial landfill gas monitoring with concentrations ranging from 0.2% (4% of LEL) to 0.8% (16% of LEL). In post purge monitoring, methane was detected all 16 LGPs. Concentrations ranged from 0.2% (4 % LEL) to 0.5% (10% LEL).

Oxygen (O_2) and CO_2 were measured at concentrations ranging from 2.5% to 22.0% and 0.2% to 16.5%, respectively, in initial landfill gas monitoring and 2.7% to 20.9% and 0.1% to 19.3%, respectively, in post-purge monitoring.

H_2S and CO were below instrument detection levels at all perimeter LGPs during initial and post-purge screening. The 2019 perimeter gas monitoring results (Table 2-1) are generally consistent with previous year's results.

2.3.2 Landfill Gas Monitoring and Results

Annual landfill gas vent monitoring was performed on October 16, 2019 in conjunction with the annual LGP monitoring. Landfill gas vents in the southwest section of the landfill typically exhibited some of the highest levels of CH_4/LEL and CO_2. The 2019 gas monitoring results (Table 2-1) are consistent with the results during the previous year's measurements. A summary of historical gas vent measurements is presented in Appendix I.

CH_4 was detected in landfill gas at all of the eighteen gas vents in initial monitoring with concentrations ranging from 0.1% (2% of LEL) to 25.6% (>100% of LEL). In post purge monitoring, CH_4 was detected in landfill gas at all of the eighteen gas vents ranging from 0.1% (2% of LEL) to 29.3% (>100% of LEL). In 2018, none of the eighteen vents had CH_4 concentrations greater than 100% of LEL in post purge monitoring and in 2019 ten vents were greater than 100% of LEL, a substantial increase. The highest CH_4 concentrations were measured at GV-17 during initial monitoring and at GV-14 during post-purging monitoring.

O_2 and CO_2 concentrations ranged from 0.0% to 21.1% and 0.0% to 23.4%, respectively, during initial landfill gas monitoring and 0.0 % to 20.9% and 0.0% to 23.4%, respectively, during post-purge monitoring.

VOCs were detected in landfill gas in GV-6 in the initial monitoring; no VOCs were detected in the post-purging monitoring in 2019. H_2S and CO concentrations were below instrument detection levels at all landfill gas vents during initial and post purge monitoring.

3.0 ARSENIC TREATMENT PLANT OPERATIONS, MAINTENANCE, AND MONITORING

The SHL ATP treated and discharged 24,953,500 gallons of groundwater between January 1 and December 31, 2019, bringing the cumulative treated volume total to approximately 297.2 million gallons since system startup in 2006.

3.1 OPERATIONS

The ATP operations, maintenance, and monitoring for the period of January 1 through December 31, 2019 was conducted by Sovereign. The 2019 data are presented in the following sections.

3.1.1 System Description

The treatment system is designed to remove dissolved arsenic from extracted groundwater through co-precipitation with iron followed by microfiltration. The treatment system is housed in a 40-foot by 40-foot steel building and consists of the following components:

- Extraction system (two extraction wells)
- Chlorine dioxide (ClO_2) generation and addition in order to oxidize iron
- Coagulation via a contact tank with a direct drive batch tank mixer
- Microfiltration (MF) of the water to concentrate precipitated solids
- Solids removal via an inclined plate clarifier (IPC)
- Bag filtration and discharge of the IPC decant water
- Polymer aided flocculation of sludge using a filter bed roll-off (FBRO)
- Treated water discharge to the Devens Publicly Owned Treatment Works (POTW)

The extraction system consists of two extraction wells (EW) located at the northwestern portion of the landfill cap. These extraction wells, EW-01 and EW-04 (Figure 1-2), can achieve the required combined extraction rate of 50 gpm by operating simultaneously. Extracted groundwater enters the ATP and is dosed with ClO_2 which oxidizes and precipitates dissolved metals, including arsenic, iron, and manganese. These precipitates are then filtered by the MF system and the effluent or treated water is discharged to the Devens POTW collection system. Every 15 minutes, the MF control unit conducts Flux Maintenance, which backwashes the filtered precipitates from the membranes. These solids are fed to the IPC and allowed to settle out of suspension and form a residual sludge. The backwash effluent supernatant is fed through two bag filters configured in parallel and discharged to the plant effluent sump. The sludge is then pumped out of the IPC, dosed with polymer to increase flocculation, and pumped to the FBRO. The accumulated sludge in the FBRO is removed from the plant at least twice a month for disposal.

An operational summary of the monthly on-line hours, flow totals, and operating status during 2019 is presented in Table 3-1. Historical monthly discharge totals are shown in Table 3-2.

3.1.2 System Efficiency and Routine Maintenance

During 2019, the treatment plant was operational approximately 87.4% of the total available hours during the calendar year (i.e., “up-time”), which is an increase from the 2018 up-time of 85.9%. A portion of the non-operational time is associated with routine plant maintenance and system repairs and performing clean-in-place (CIP) maintenance on the MF skid. Significant additional downtime is associated with non-routine systems maintenance, repairs, and upgrades as noted below in Section 3.2. When online, the average flow through the plant during the year was 54.2 gpm. The plant achieved an effective average extraction rate (i.e., the extraction rate calculated by dividing the volume pumped by the elapsed time during the year, not the actual on-line time) of 47.5 gpm over the year. This is the same as the previous year average rate in 2018.

The ATP system continues to generate a significant amount of sludge. The FBRO was emptied routinely every one to two weeks in 2019, depending on the flow and after treatment of approximately 445,000 to 1,100,000 gallons of groundwater. The cause of the high sludge generation is the high concentration of inorganics (primarily iron) in the influent. Influent arsenic concentrations have continued to decrease when compared to influent arsenic concentrations at the time of startup of the ATP in 2006; however, the average annual inorganic concentrations (iron, arsenic, and manganese) remain high at approximately 59.09 milligrams per liter (mg/L). Influent inorganic loading is discussed in more detail in Section 3.3.1.

A subcontracted vendor, Global Remediation Services Inc. (Global), uses a vacuum truck to remove the dewatered sludge from the FBRO. The sludge is transported by Global under a Non-Hazardous Waste Manifest for disposal at Tradebe Treatment & Recycling of Stoughton, Massachusetts. By coordinating FBRO pump-outs with Global before the container was full, the sludge removal process was optimized which resulted in zero downtime attributable to the FBRO operations for the ATP in 2019. A total of 294.02 tons of sludge was removed in 2019. The FBRO disposal totals for 2019 are shown in Table 3-3.

The ATP microfiltration system continues to require periodic CIP procedures to prevent long-term fouling of the filter membranes. The CIP procedure is a multistep process that begins by flushing potable water through the MF skid after it is taken offline. Next, a 98% sulfuric acid (H_2SO_4) solution is cycled through the MF skid followed by a flush of potable water, a cycle of a 25% sodium hydroxide (NaOH) solution and then another flush of potable water. Prior to restart, the MF skid is filled with potable water one last time. The acid and caustic solutions are cycled through the MF skid at approximately 90 degrees Fahrenheit (°F) and allow for the dissolution of the iron and manganese precipitate that accumulate on the filter membranes during forward flow.

Modifications have been made to the CIP procedure since March 2009. Prior to March 2009, the CIP events were conducted for approximately 30 hours every two weeks. The Army has continued to optimize system operations, and currently CIP events are conducted approximately every 21 to 60 days. The optimization was accomplished by further modifying the CIP procedure to include air scouring during acid and caustic circulation to facilitate the removal of precipitate. This modification appears to have increased the effectiveness of the CIP events, thereby increasing the time between CIP cycles, and resulting in a greater average extraction rate.

Optimizations to the CIP process have reduced the likelihood that an extended CIP (prolonged acid and caustic circulation times) or double CIP (acid solution recirculation/soak repeated after caustic solution recirculation) would be required. Currently, extended CIPs are only conducted in situations when the level of filter fouling is greater than normal, most likely because of non-optimal dosage concentration of ClO_2. The CIP process continues to be evaluated and refined to improve the process and minimize system non-pumping time. The system non-operational time associated with CIP procedures are detailed in Table 3-1 for each month.

3.2 NON-ROUTINE SYSTEM MAINTENANCE, REPAIRS, AND UPGRADES

This section details major system non-routine maintenance activities encountered or implemented, along with system upgrades completed during 2019. Shutdown and maintenance events, along with associated system downtimes, are presented in Table 3-1 for each month. A summary of routine and non-routine maintenance activities is presented in Table 3-4.

3.2.1 Sodium Chlorite Overdose

On 21 January 2019, the system was overdosed with sodium chlorite. Due to the overdose, excess sodium chlorite accumulated in the roll-off container used for sludge collection and resulted in an alarm which shut the system down late that evening. The system was then run intermittently between 22 January and 23 January 2019 while the cause of the overdose was diagnosed. In the morning of 24 January 2019, the sodium chlorite dosage was subsequently corrected, and the system was fully restarted. Due to the comingling of sodium chlorite with the sludge in the roll-off container, the system was then shutdown between 29 January and 30 January 2019 to allow for special waste handling and disposal operations. On 30 January 2019, the system was returned to normal operation.

3.2.2 Replacement of Check Valves and Pump Head on LMI Pump

On 9 March 2019, the check valves and pump head on the LMI pump were replaced due to normal operational wear.

3.2.3 Replacement of Chlorine Dioxide Injection Pump

On 21 March 2019, the system was offline due to an alarm on the chlorine dioxide generation skid. Upon investigation, it was determined that the chlorine dioxide injection pump was failing due to normal operational wear, and the pump was subsequently replaced on 24 March 2019. The system was online intermittently during this period to diagnose the issue and test the new pump. The system was returned to normal operation on 24 March 2019.

3.2.4 Installation of Static Mixer

On 9 April 2019, a static mixer was installed on the polymer skid to ensure full mixing of sludge and polymer before deposition in the roll-off container.

3.2.5 Installation of Chlorine Flexible Connector (Whip)

On 3 May 2019, a new chlorine flexible connector (whip) was installed due to normal operational wear.

3.2.6 Chlorine Regulator Rebuild

On 13 May 2019, the chlorine vacuum regulator was rebuilt due to leaks in the vacuum connection.

3.2.7 Replacement of the Chlorine Dioxide PLC

On 1 June 2019, the chlorine dioxide skid Programmable Logic Controller (PLC) experienced a critical failure. As a result of this failure, the skid was unresponsive and inoperable, and because the ATP requires chlorine dioxide to operate, the entire system was brought offline. Upon running diagnostics on the PLC, it was determined that the PLC was not repairable and that the program which was housed within the PLC had been lost. As a result, a new PLC was obtained, and a new operating program was written. The new PLC was then installed on 25 June 2019, and upon completion of testing, the system was brought fully online on 26 June 2019. Because the system was offline for the majority of June 2019, the MassDevelopment Devens Utilities Department, which issues the system discharge permit, was contacted, and approval was received to collect the quarterly effluent and influent samples from the system in July 2019 rather than June 2019.

3.2.8 Chlorine Dioxide Injection Pump Maintenance

On 22 July 2019, the system was briefly offline to complete maintenance on the chlorine dioxide injection pump to repair a leak.

3.2.9 Floor Sump Pump Float Replaced

On 12 December 2019, the floor sump pump float failed due to normal operational wear, and the system was shutdown. The float was subsequently replaced, and the system was online by the end of the day.

3.3 ATP MONITORING

The following sections detail ATP influent and effluent sampling for arsenic and other COCs conducted during 2019. The associated laboratory analytical reports for the ATP monitoring conducted by Sovereign are included as Appendix C.1.

3.3.1 ATP Influent Monitoring

3.3.1.1 Influent Inorganic Monitoring

Influent inorganic loading characteristics are assessed quarterly and analyzed by SGS in Northborough, MA. Influent inorganic sampling is not required either by the ATP's MassDevelopment Landfill Discharge Permit 020 or by the LTMMP Update (Sovereign, 2015), but is monitored to gauge system loading and to ensure that a sufficient iron concentration is maintained to promote iron and arsenic co-precipitation and coagulation. The original system design recommended a minimum iron concentration of 40 mg/L. Current influent iron concentrations remain well above this level. The ATP was designed with a ferric chloride addition system with ability to add ferric chloride to the influent if deemed necessary based on results of influent inorganic sampling; however, because of dissolved iron concentrations in the

groundwater, this component of the system has not been necessary to activate and has subsequently been decommissioned.

Loading of iron, arsenic, and manganese has declined since system start-up in 2006, but remains high enough for effective treatment, averaging 64.99 mg/L during 2006-2019. Individual average concentrations for iron, arsenic, and manganese are 59.95, 2.87 and 2.18 mg/L, respectively for that time period. During 2019, the average iron, arsenic, and manganese concentrations were 54.4, 2.47, and 2.21 mg/L, respectively (59.09 mg/L total combined). Influent loading concentrations of iron, arsenic, and manganese are presented in Table 3-5 and are graphically illustrated on Figure 3-1.

3.3.1.2 Influent Dissolved Gases and VOC Monitoring

In accordance with the LTMMP, and as part of the landfill closure monitoring program, annual ATP influent sampling was conducted for VOCs and dissolved gas (methane and ethane) using off-site analysis on September 6, 2019. Influent samples were collected by an ATP operator and submitted to SGS Laboratories of Northborough, Massachusetts for analysis. Annual influent VOC and dissolved gas sampling results for EW-01 and EW-04 are detailed in Table 3-6.

The concentrations of methane were 2,040 micrograms per liter (µg/L) and 4.9 µg/L in the influent sampled from EW-01 and EW-04, respectively. Current methane concentrations are greater than the 2018 sampling results of 1,930 µg/L at EW-01 and less than the 2018 sampling results of 1,010 µg/L at EW-04. Ethane was not detected above laboratory detection limits in the influent sample at EW-01 or EW-04. Results of influent ethane concentrations sampling are consistent with 2018 sampling results for EW-04. Ethane was non-detect in 2019 compared to 0.32 µg/L in 2018 in EW-01.

Results of the influent VOC sampling indicated total VOC concentrations of 24.11 µg/L and 3.57 µg/L in influent sampled from EW-01 and EW-04, respectively. Influent from extraction well EW-01 had detections of chlorobenzene at 0.76 J µg/L, p/m-xylenes at 11.8 µg/L, ethyl ether at 7.2 µg/L, benzene at 1.1 µg/L, ethylbenzene at 1.5 µg/L, 1,4-Dichlorobenzene at 1.1 µg/L and cis-1,2-Dichlorothene at 0.65 J µg/L. Sampling results from EW-04 indicated detections of ethyl ether at 3.0 µg/L, and chlorobenzene at 0.57 J µg/L. The detections of low concentrations of VOCs in the ATP influent are consistent with the previous year's sampling results.

3.3.2 ATP Landfill Discharge Permit and Effluent Monitoring

The USACE is authorized to discharge treated groundwater from the ATP to the Devens Municipal Sewerage System in accordance with Landfill Discharge Permit Number 020. The current permit, which mandates effluent sampling for arsenic and other select parameters on a monthly, quarterly, and/or annual basis and a maximum daily flow of 93,600 gallons per day (gpd), was last renewed on June 28, 2019 and is in effect until June 28, 2022. There were no changes to the permit in 2019. A copy of the renewed permit is provided in Appendix C.1.

3.3.2.1 Permit-Required Effluent Arsenic Monitoring

In accordance with the ATP discharge permit, the collection of effluent samples for the off-site analysis of arsenic concentration is required monthly. The discharge permit contains a Special Condition which applies an effluent limitation of 75 µg/L of arsenic for each monthly sampling event. Effluent samples were collected by an ATP operator each month throughout the year and submitted to SGS for analysis.

Overall the plant has been effective at removing arsenic from the influent water stream. The analytical results did not exceed the effluent limitation of 75 µg/L. The monthly effluent arsenic in 2019 results ranged from 10.9 µg/L (January 2019) to 38.4 µg/L (March 2019) with an average effluent arsenic concentration of 25.4 µg/L. The current and historical monthly effluent arsenic sampling results are presented in Table 3-7.

3.3.2.2 Quarterly Permit-Required Effluent Monitoring

The ATP's discharge permit requires quarterly sampling of plant effluent for metals (barium, manganese, and magnesium) and other select parameters (chloride, nitrate, and sulfate) for laboratory analysis. Quarterly effluent samples were collected on March 12, July 8, September 6, and December 6, 2019. The samples were submitted to SGS for analysis. Concentrations of all parameters sampled as part of the quarterly effluent monitoring were within permit defined discharge limitations. The current and historical quarterly effluent sampling results are presented in Table 3-8.

3.3.2.3 Annual Permit-Required Effluent Monitoring

The ATP's discharge permit requires annual sampling of plant effluent for laboratory analysis of select metals along with Total Toxic Organics (TTO) and Total Petroleum Hydrocarbons (TPH). Total Toxic Organics are determined by the summation of results of VOCs, semi-volatile organic compounds, pesticides, and polychlorinated biphenyls. Annual effluent samples were collected during the September 6, 2019 quarterly event and submitted to SGS for analysis. Concentrations of all parameters sampled including TTO (non-detect) and TPH (1.0 J mg/l) as part of the annual effluent monitoring were within permit defined discharge limitations. The TTO discharge limit is 5.0 mg/l, and the TPH discharge limit is 100 mg/l. Annual effluent sampling results are presented in Table 3-9.

3.4 ATP OPTIMIZATION

The deployment of pressure transducers in the extraction wells and the MF module upgrades in January 2015 have allowed for further optimization of the ATP. The pressure transducers deployed in the extraction wells have eliminated the potential exposure of the well screen to air that is known to cause iron fouling. Thus, system downtime has been reduced and the system can now be controlled in a manner to optimize flow rates to best meet hydrogeologic capture goals. The MF module upgrades have increased the total number of MF modules to a total of ten and have allowed for an increase in the average flow rate and throughput of the ATP.

3.5 RECOMMENDATIONS

No major system modifications were necessary in 2019 with the exception of the replacement of the chlorine dioxide PLC unit. The system non-routine maintenance activities, along with system upgrades completed during 2019 are discussed in detail in Section 3.2.

The plant will continue to operate at 50+ gpm each month, with continued maintenance to include the following:

- To prevent unscheduled downtime because of the build-up of precipitate within the system influent piping that could restrict influent flow, the influent piping will be inspected annually and cleaned, if necessary, during a scheduled CIP event.
- To minimize operational downtime associated with equipment failure, system components will be regularly inspected and replaced prior to the end of their operational life.

4.0 LAND USE CONTROLS

In accordance with the LUCIP (Sovereign, 2014), the Army conducts annual monitoring and maintenance activities, which include Institutional Controls (ICs) and Affirmative Measures. The ICs include monitoring the LUCs in accordance with the LTMMP Update (Sovereign, 2015), as well as the Town of Ayer and MassDEP enforcement related to the moratorium on groundwater extraction in the NIA. Affirmative Measures include annual reminder mailings sent by the Army to residents and property owners in the NIA, a door to door survey of the NIA properties every five years, as well as annual communications between the Army and the town Board of Health (BOH) to review the groundwater restrictions.

As outlined in the LUCIP, the monitoring and maintenance activities include annual review to ensure LUC performance objectives are met. These include:

Institutional Controls

- The LUC Area (Figure 1-4) is actively monitored and any required changes to the LUCs Area will be made to the LUCIP, in consultation with and concurrence from the United States Environmental Protection Agency (USEPA) and MassDEP.
- Monitor and report on the implementation and enforcement of the ICs by the Town of Ayer and MassDEP, including the restriction of groundwater extraction and use within the NIA; record any instances where the groundwater use was identified, and corrective actions taken.

Affirmative Measures

- The informational pamphlet and contact information will be distributed annually to properties within the NIA and is included on the Ayer BOH website at https://www.ayer.ma.us/board-health/pages/shepleys-hill-landfill-resources under the title: *Land Use Control Implementation Plan: Restriction of Groundwater Use, October 2017*.
- A door to door survey is to be conducted every five years to residents within the LUC area to provide the information pamphlet in person and provide general information on the groundwater moratorium.
- A list of all property owners and resident addresses within the LUCs Area will be generated for implementation of the LUCIP actions noted.
- The LUCIP will be distributed to appropriate parties.
- The Army will meet with the BOH annually, or if a change in the groundwater contamination distribution in the aquifer occurs.

A review of the ICs was conducted during 2019. Interviews were conducted with the USACE, the Ayer Department of Public Works (DPW), the Ayer Building Inspector, the Ayer BOH, and the Nashoba Associated BOH. These interviews confirmed that no new drinking water or irrigation wells were installed in the LUCs Area to their knowledge. No new construction activities or other changes were observed in the LUCs Area in 2019. The results of the interviews are provided in Appendix D.

Affirmative measures identified in the LUCIP, including educational pamphlets, were hand delivered to occupants of properties identified within the LUC area in 2019 as part of a door to door survey conducted every five years in the NIA. Ten days prior to the door to door survey, the Army sent a letter to LUC Area properties notifying occupants and property owners of the upcoming door to door survey. The educational pamphlets were hand delivered to doors or mailboxes on September 3 and 5, 2019 to ensure that owners and current residents were informed of the restriction of groundwater use north of SHL in the Town of Ayer, Massachusetts. The educational pamphlet was also provided to the Ayer Board of Health on September 4, 2019 to post on their public website. Additional door to door handouts offered included a copy of the groundwater moratorium, Ayer Board of Health well regulations and a figure of the LUC area.

In summary, no deficiencies or deviations from the LUCs were noted; no corrective actions are required. The door-to-door survey is to be conducted every five years as required by the LUCIP and the next survey is scheduled for fall 2024.

The completed LUCIP checklist, a copy of the educational pamphlet, the occupant notification letter, and a summary table of the door to door survey results is presented in Appendix D.

5.0 GROUNDWATER AND HYDRAULIC MONITORING

Groundwater monitoring activities were conducted at SHL in accordance with the LTMMP Update (Sovereign, 2015) with inclusion of additional wells added by the USEPA in 2016. The inclusion of the additional USEPA-requested wells into the LTM program for SHL was formally documented in a LTMMP Addendum (KGS, 2018a). Spring and fall 2019 sampling events were conducted in April 2019 and October/November 2019, respectively. The results of these sampling events are presented in the following sections.

Groundwater monitoring field forms with low flow data from each LTM groundwater sampling event are provided in Appendix E. Laboratory analytical reports are provided in Appendix C.2 and C.3. Data Validation Reports are provided in Appendix F.

For background, additional monitoring from USEPA's scope of work dated February 2016 was incorporated into the LTM well network described in the *LTMMP Update* (Sovereign, 2015). The inclusion of the additional USEPA-requested wells into the LTM program for SHL began in 2017 and was formally documented in a *LTMMP Addendum* (KGS, 2018a). These additional wells will be gauged and monitored for five years until 2021 to evaluate the remediation effectiveness in key sub-areas of the SHL remedy.

The LTM wells used in the monitoring program include wells in the upgradient area; wells located within the landfill; wells located on or near the west base of Shepley's Hill; wells at the barrier wall area to monitor performance of the barrier wall; nearfield area wells to evaluate hydraulic capture at the ATP extraction wells; and NIA wells to monitor groundwater downgradient of the ATP. LTM network monitoring wells were inspected and maintained as described in Section 2.2.4.

Two piezometers, SHP-2017-01 and SHP-2017-02, were installed in October 2017 to refine the SHL groundwater flow model and for creating more accurate potentiometric surface maps near the two existing extractions wells (EW-01 and EW-04). The piezometers were included in the 2019 spring and fall hydraulic monitoring program (Figures 5-2 and 5-3).

5.1 LONG TERM MONITORING AND MAINTENANCE PLAN MODIFICATIONS

The LTMMP sampling and hydraulic monitoring program conducted in 2019 is presented in Table 5-1 and Table 5-2. The layout of the long-term monitoring well network is displayed in Figure 5-1. Spring and fall 2019 groundwater elevations (Figures 5-2 and 5-3) were developed based on the 2017 and 2018 monitoring well survey reports using the Massachusetts State Plane Coordinate System of North American Datum (NAD) 1983 and vertically on North American Vertical Datum (NAVD) 1988.

5.2 GROUNDWATER ELEVATION MONITORING

Groundwater elevation monitoring was performed on April 11, 2019 and October 22, 2019 at monitoring wells at the SHL area, upgradient area of the landfill, barrier wall area, nearfield area of the extraction wells, and the NIA downgradient of the landfill. The Plow Shop Pond staff gauge was also monitored for surface water elevation during the spring and fall synoptic events. In summary, 76 monitoring wells and one staff gauge were monitored in April, no wells were

dry. In October, 182 monitoring wells and three staff gauges were monitored with eight wells recorded as dry.

5.2.1 Site-Wide Monitoring Events

Groundwater elevations at SHL monitoring wells and piezometers, including the barrier wall piezometers, were gauged as part of site-wide monitoring events in April and October 2019. During each event, an electronic water level meter was used to measure depth to water with an accuracy of ±0.01 feet from the marked reference point at the top of inside casing of each monitoring well/piezometer.

Similar to previous years' monitoring events, the results of each 2019 site-wide monitoring event illustrate a general groundwater flow from the southwest to the north towards Nonacoicus Brook with a deflection of groundwater flow to the north in the area west of the barrier wall in the overburden. Tables 5-1 and 5-2 provide the relevant characteristics of the LTMMP monitoring wells/piezometers including the geological unit(s) the wells are screened in, screen depths and lengths, and top of casing elevations. Twenty-five bedrock wells were included in the synoptic round in the fall but were not used in the construction of the overburden groundwater elevation contours. Table 5-3 summarizes spring and fall hydraulic monitoring measurements. Groundwater elevations for site-wide monitoring events between 2012 and 2019 are listed in Table 5-4. Potentiometric maps showing the interpreted overburden water table elevations, measured under extraction well pumping conditions in April and October 2019, are presented on Figure 5-2 and Figure 5-3, respectively.

Groundwater elevations were typically seasonably higher in the spring compared to the fall. For example, spring and fall, groundwater was encountered at approximately 18.47 feet bgs and 19.23 feet below top of riser, respectively in the NIA at well SHM-13-07 and approximately 38.17 and 40.23 feet below top of riser at the southern end of the landfill at well SHM-10-11.

The groundwater hydraulic gradient in the landfill area using landfill well SHM-10-11 and downgradient nearfield overburden well SHP-2016-2A was calculated to be 0.0060 feet/foot (ft/ft) in April 2019 and 0.0059 ft/ft in October 2019. The groundwater hydraulic gradient in the north impact area using nearfield well SHP-2016-2A and NIA well SHM-13-07 was calculated to be 0.0064 feet/foot (ft/ft) in April 2019 and 0.0052 ft/ft in October 2019. In general, the horizontal hydraulic gradient is steeper between the Nearfield and the NIA than between the landfill and the Nearfield.

The vertical gradient at landfill well cluster N7-P1 (bedrock well) and N7-P2 (overburden well) in the fall was 0.01081 and downward trending. The vertical gradient at NIA well cluster SHP-99-31A (shallow overburden well) and SHP-99-31C (deep overburden well) in the fall was 0.01418 and downward trending.

5.2.2 Barrier Wall Monitoring

As described below, a barrier wall assessment per the 2015 (revised) SHL LTMMP (Sovereign, 2015) was not completed in 2019 to determine if the barrier wall is having a beneficial impact by significantly diverting groundwater flow from the landfill to Red Cove and reducing arsenic flux from the landfill to Red Cove.

The barrier wall was installed in fall 2012 to mitigate arsenic in groundwater from entering Plow Shop Pond at Red Cove. The purpose of the barrier wall installation was to redirect groundwater from flowing east toward the pond to a more north-northwest direction toward the capture zone of the two extraction wells and arsenic treatment plant and to reduce arsenic concentrations to the pond. Groundwater modelling had indicated that it would take at least five years post barrier wall installation to see a reduction of arsenic flux to Red Cove on the east side of the wall (Sovereign, 2015). The hydraulic conditions east of the barrier wall continues to change at the water table and at deeper depths. As an interim step, a barrier wall area hydraulic vector figure was presented in the 2017 SHL Annual Report using groundwater measurements from the fall synoptic event and 3PE gradient analysis to determine groundwater hydraulic magnitude and direction east and west of the barrier wall (KGS, 2018b). In the 2017 barrier wall assessment, most of the hydraulic gradients west of the wall were oriented in a northwesterly or northerly direction, indicating the groundwater flow direction west of the wall was being diverted away from Red Cove. Most of the hydraulic gradients east of the wall were oriented toward Plow Shop Pond, particularly Red Cove.

Due to limited data collection from the spring 2019 monitoring event and suspected erroneous measurements during the fall 2019 monitoring event, a seasonal barrier wall assessment using reliable assessment of hydraulic gradients was not completed in 2019. Some of the fall 2019 water level elevations were suspected to be erroneous after review of the 3PE gradient analysis for groundwater hydraulic magnitude and direction at some 3PE triangles east and west of the barrier wall. The erroneous water level readings when compared to previous years measurements were identified at well locations PZ-12-02, PZ-12-03, and PZ-12-08. However, as shown on Figure 5-3, the 2019 contoured groundwater elevations in general indicate groundwater flow direction to the north on the upgradient/west side of the barrier wall and to the east or northeast on the downgradient/east side of the wall. This is consistent with contoured groundwater elevation figures provided in the 2015, 2016, 2017, and 2018 Annual Reports.

Recommendations for future assessments include continued monitoring of the barrier wall with expansion of the monitoring well network west and east of the wall during spring and fall LTM events in order to provide a more complete hydraulic assessment using these datasets. An updated evaluation of the barrier wall will be prepared following additional data collection. Additionally, surface water and sediment sampling in Red Cove is recommended to evaluate current arsenic concentrations and geochemical changes since the installation of the barrier wall with the orphaned groundwater plume to the east and the dredging of Red Cove in 2013.

5.3 GROUNDWATER SAMPLING

Groundwater sampling events were conducted at SHL in the spring and fall of 2019. A total of 63 well locations were sampled for groundwater (13 well locations from the LTM program plus 50 additional well locations) during the spring sampling event from April 12 through April 23, 2019. A total of 106 well locations were sampled for groundwater (74 well locations from the LTM program plus 32 additional well locations) during the fall sampling event from October 24 through November 14, 2019. Two extraction wells, EW-01 and EW-04, were sampled in the spring and fall from the ports inside the ATP.

Groundwater samples were collected in accordance with the procedures outlined in the Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells Revision 3 and 4 (USEPA, 2017). Dissolved metals and dissolved organic carbon samples were field-filtered using a 0.45-micrometer (µm) filter. Groundwater was purged using either a submersible stainless-steel bladder pump with a compressed nitrogen gas source or a peristaltic/inertial pump, depending on the water level within the monitoring well. Because of lift limitations when using a peristaltic pump, a bladder pump was used at wells where the water table exceeded depths greater than 25 feet below ground surface. In all cases, groundwater was purged through a properly-calibrated YSI multi-meter and a turbidity meter to monitor groundwater chemistry parameters, and samples were collected upon achievement of field parameter stability. If the field parameters did not stabilize within two hours, samples were collected at the 2-hour time mark. Groundwater samples were submitted to Eurofins/Test America, Savanah, Georgia and Arvada, Colorado facilities, for the following analyses: dissolved (field filtered) metals (arsenic, iron, and manganese), sulfate, total alkalinity, dissolved organic carbon (field filtered), and chloride. As part of this sampling program, quality assurance/quality control (QA/QC) procedures included the collection of field duplicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples and equipment blank samples.

The spring 2019 sample results are summarized in Table 5-5 and the fall 2019 sample results are summarized in Table 5-6. A summary of historical total and dissolved arsenic analytical results from 1991 to 2019 is provided in Table 5-7.

5.3.1 Supplemental Sampling to Support 2020 Five Year Review

At the request of EPA in support of the upcoming 2020 Five Year Review, the Army collected supplemental groundwater samples for selected VOCs and metals analyses from ten historical LTM well locations along the eastern edge of the landfill and downgradient of the landfill. EPA requested samples be collected in Fall 2019 and Spring 2020 (Fall 2019 results are provided in this report). At each location, samples were collected for field parameters and offsite laboratory analysis of three VOCs and eight dissolved metals. The supplemental VOCs analyzed included COCs identified in the ROD: 1,2-dichlorobenzene, 1,2-dichloroethane and 1,4-dichlorobenzene. The supplemental dissolved metals analyzed included the COC identified in the ROD: aluminum, arsenic, chromium, iron, lead, manganese, nickel, and sodium. Field parameters were recorded including turbidity, dissolved oxygen, temperature, pH, specific conductivity, and oxygen reduction potential (ORP). The field and laboratory parameters are used as indicators of current conditions at the landfill's eastern edge and downgradient of the treatment plant. Parameters were compared to the cleanup levels referenced in the 1995 ROD and are presented in Appendix G.

The supplemental sampling analytical results are summarized below:

- <u>SHL-10, SHL-11, SHL-19, SHL-20, and SHM-93-22C</u> (wells selected based on the historical detections of VOCs/inorganics at these locations near the barrier wall and eastern boundary of landfill). Arsenic, iron, manganese, and sodium exceeded cleanup levels only at SHL-11. The other metals did not exceed the cleanup levels. No VOCs exceeded cleanup levels. Chemistry results from SHL-10 and SHL-20 were rejected, as it

was concluded that a field error occurred with sample labelling from these two well locations.

- SHM-10-16, SHP-99-31C, and SHM-99-32X (wells selected downgradient of the historical VOCs/inorganics detections). Arsenic, iron, manganese, and sodium exceeded cleanup levels at these locations with the exception of iron at SHM-99-32X. The other metals did not exceed the cleanup levels. No VOCs exceeded cleanup levels.

- EW-01 and EW-04 (located at the ATP to assess COCs at the influent sampling ports of each extraction well). Arsenic, iron, and manganese exceeded cleanup levels at these locations. The other metals did not exceed the cleanup levels. No VOCs exceeded cleanup levels.

5.4 GROUNDWATER SAMPLING RESULTS

5.4.1 Arsenic Concentration Results

Dissolved arsenic results from the sampling events conducted in 2019 are as follows:

- During the April 2019 sampling event (Table 5-5), concentrations of dissolved arsenic exceeded the cleanup level of 10 µg/L in groundwater sampled from 45 of the 63 monitoring wells (71%, not including duplicate samples), with the highest concentration of 3,100 µg/L detected in monitoring well SHM-13-06 located in the north impact area of SHL, along Old West Main Street. Arsenic in groundwater at wells detected over the cleanup level increased from 68% in 2018 to 71% in 2019. Dissolved arsenic concentrations detected above the action level were found in approximately 23 shallow to mid-depth overburden wells and in 22 deep overburden or bedrock wells in the spring.
- During the October/November 2019 sampling event (Table 5-6), concentrations of dissolved arsenic exceeded the cleanup level of 10 µg/L in groundwater sampled from 66 of the 106 monitoring wells/piezometers 62%, not including field duplicate samples or rejected data), with the highest concentration of 5,600 µg/L detected in well SHM-10-15 located in the northwest quadrant of the landfill (down from 5,800 in 2018, down from 6,400 µg/L in 2017 and its originally measured concentration of 8,110 µg/L in 2010, as shown in Table 5-7). Arsenic in groundwater at wells detected over the cleanup level remained similar from 2018 (59%) to 2019 (62%). Dissolved arsenic concentrations detected above the action level were found in approximately 32 shallow to mid-depth overburden wells and in 34 deep overburden or bedrock wells in the fall.

Figures 5-4 and 5-5 present dissolved arsenic concentration results for the spring and fall 2019 sampling events. Arsenic concentration trend graphs for select wells are presented in Appendix H. A summary of historical LTM groundwater monitoring well analytical and field parameter results are included in Appendix I.

5.4.2 Arsenic Concentration Trends

Arsenic data from 40 site-wide monitoring wells were evaluated using ProUCL Mann-Kendall statistical software for environmental applications. Criteria used for performing the statistical analyses included using well locations in accordance with the *LTMMP Update* (Sovereign, 2015) with a minimum of four rounds of data available and which have had total and/or dissolved arsenic concentrations greater than or equal to 10 µg/L. Arsenic data from 24 wells listed in the *LTMMP Update* did not have statistical analysis performed because of arsenic levels below detection limits or below 10 µg/L. Statistical analysis for arsenic were performed for 40 of the wells sampled during 2019. Of these 40 wells, 19 (48%) were found to have statistically significant decreasing concentration, one (3%) was found to have increasing concentrations, and 20 (50%) showed no statistically significant trend at the selected 95% confidence level. Figure 5-6 shows the arsenic concentration trend results using ProUCL Mann-Kendall statistical software.

Mann-Kendall tests were performed on the data set for each monitoring well to determine statistically significant trends for arsenic concentrations. The arsenic concentration trends identified were either decreasing, increasing, or had insufficient statistical evidence of a significant trend at the specified, 95% level of significance. ProUCL outputs for each well are included as Appendix J. The ProUCL trends do not appear to be related to the well screen locations within the overburden or bedrock intervals of the aquifer. Based on the results of the ProUCL analysis, the following statistical trends were identified at a 95% confidence level:

Statistically Significant Evidence of a Decreasing Trend	Statistically Significant Evidence of an Increasing Trend	Insufficient Evidence of a Statistically Significant Trend
EPA-PZ-2012-3B	SHM-10-11	EPA-PZ-2012-1B
EPA-PZ-2012-4B		EPA-PZ-2012-3A
N5-P1		EPA-PZ-2012-6B
SHL-5		EPA-PZ-2012-7B
SHL-22		SHL-9
SHM-05-40X		SHL-15
SHM-05-41A		SHL-24
SHM-05-41B		SHM-05-41C
SHM-05-42B		SHM-10-06A
SHM-10-06		SHM-10-07
SHM-10-13		SHM-10-12
SHM-13-03		SHM-10-14
SHM-13-07		SHM-10-15
SHM-13-08		SHM-10-16

Statistically Significant Evidence of a Decreasing Trend	Statistically Significant Evidence of an Increasing Trend	Insufficient Evidence of a Statistically Significant Trend
SHM-93-22B		SHM-13-04
SHM-96-5B		SHM-13-05
SHM-96-5C		SHM-13-06
SHM-99-31C		SHM-13-14D
SHM-99-32X		SHM-93-22C
		SHP-99-29X

Table Note: Rules using Mann-Kendall statistical software included 1) use of half-detection limits if non-detect data was present; 2) averaging of duplicate sample measurements from the same day; 3) use of sample measurements from LTM semiannual or annual data sets only; use of data sets when available from Pre- and Post- Arsenic Treatment Plant online (2006); and 4) use of 4 or more rounds of data.

5.4.3 Other Contaminants of Concern Results

Iron and manganese were detected at concentrations above their established cleanup levels in groundwater during the 2019 groundwater sampling events. Spring and fall chemical results for iron and manganese can be found in Tables 5-5 and 5-6.

Iron

- During the April 2019 sampling event (Table 5-5), concentrations of dissolved iron exceeded the cleanup level of 9,100 µg/L in groundwater sampled from 34 of the 63 monitoring wells (54%, not including field duplicate samples), with the highest concentration of 73,000 µg/L detected at well PZ-12-02 located on the landfill side of the barrier wall at the northern end. Iron concentrations in groundwater at wells detected over the cleanup level increased from 52% in 2018 to 54% in 2019.
- During the November 2019 sampling event (Table 5-6), concentrations of dissolved iron exceeded the cleanup level of 9,100 µg/L in groundwater sampled from 42 of 104 monitoring wells/piezometers (40%, not including field duplicate samples or two rejected well results), with the highest concentration of 81,000 µg/L detected at well SHM-10-06 located approximately 300 feet east of the extraction wells. Iron concentrations in groundwater at wells detected over the cleanup level did not change from 42% in 2018 to 2019.

Manganese

- During the April 2019 sampling event (Table 5-5), concentrations of dissolved manganese exceeded the cleanup level of 1,715 µg/L in groundwater sampled from 24 of the 63 monitoring wells (38%, not including field duplicate samples), with the highest concentration of 13,000 µg/L detected in deep overburden at well EPA-PZ-2012-1B, located approximately 300 feet east northeast of the extraction wells.

Manganese concentrations in groundwater at wells detected over the cleanup level decreased from 41% in 2018 to 38% in 2019.

- During the November 2019 sampling event (Table 5-6), concentrations of dissolved manganese exceeded the cleanup level of 1,715 µg/L in groundwater sampled from 40 of the 104 monitoring wells/piezometers (39%, not including field duplicate samples or two rejected well results;), with the highest concentration of 14,000 µg/L detected at well SHM-96-5C located in the nearfield approximately 75 feet northeast of the treatment plant. Manganese concentrations in groundwater at wells detected over the cleanup level increased from 33% in 2018 to 39% in 2019.

5.4.4 Groundwater Monitoring Field Parameters

Water quality parameters were measured during groundwater sampling. Groundwater was purged through a flow-through cell equipped with a YSI multi-meter and used to monitor field parameters including pH, specific conductivity, dissolved oxygen (DO), temperature, and oxidation reduction potential (ORP). ORP and DO are particularly significant field parameters at SHL. Arsenic and iron are mobilized under reducing conditions and higher arsenic and iron concentrations are expected in locations where low/negative ORP values and low DO concentrations are present (Gannett Fleming, Inc., 2011). Based on 2019 chemical results and field parameter measurements, high arsenic/high iron and negative ORP/low DO was observed approximately half the time at the sampled well locations across SHL and NIA. Negative ORP and corresponding dissolved arsenic concentration trends (greater than the cleanup level of 10 µg/L) were observed for 34 of 63 wells (54%) in the spring and 36 of 106 wells (34%) in the fall. Arsenic concentrations and associated field ORP measurements from the spring and fall 2019 groundwater sampling events are shown in Table 5-5 and Table 5-6.

5.4.5 Quality Assurance/Quality Control

Eurofins/Test America was the primary contract laboratory used for the analysis of groundwater samples for the spring and fall 2019 LTM sampling events. Eurofins/Test America is compliant with the *Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, version 5.3* (DoD, 2019) under the DoD Environmental Laboratory Accreditation Program (ELAP) and holds current National Environmental Laboratory Accreditation Program (NELAP) accreditation for all applicable analytical methods.

As part of the 2019 groundwater sampling events, QA/QC samples were collected to ensure that the data quality objectives were met for the laboratory analysis. Field duplicate samples were collected during sampling events to evaluate field precision at the rate of 10% (1 per 10 samples). MS/MSD pairs were also submitted at a rate of 5% (1 per 20 samples) to evaluate matrix effects on analytical precision and accuracy.

The analytical results from the 2019 sampling events were reviewed and evaluated for data acceptability in accordance with the USEPA Region 1 data validation guidelines (USEPA, 2013), the *Quality Assurance Project Plan (QAPP) for the Annual Long-Term Monitoring (LTM) Program* (KGS, 2016), and the DoD *General Data Validation Guidelines* (DoD, 2018). The method requirements from the *DoD QSM* version 5.3 (DoD, 2019) and the USEPA SW-846

Quality Control (QC) guidance (USEPA, 2014) were also used as supplemental information. The data validation reports for the Shepley's Hill Landfill 2019 LTM sampling events are presented in Appendix F. The data from the SHL LTM and supplemental sampling events are acceptable for use with minimal QC deviations. Specific QC deviations requiring qualification in the 2019 data sets included:

- Low level calibration blank and/or method blank cross-contamination for dissolved organic carbon (DOC), alkalinity, dissolved manganese, and dissolved iron;
- Low level equipment blank contamination for DOC and/or chloride;
- MS/MSD recovery and precision results outside the acceptance criteria for iron, and/or manganese in select samples.

MS/MSD recoveries and precision non-compliances are limited to select samples which had levels of target compounds which were greater than four times the matrix spike levels. The percent recoveries could not be calculated for these compounds; qualifications were not required. Associated blank spike recoveries were within acceptance limits. Appropriate qualifiers have been added to the 2019 analytical data in Tables 5-5 through 5-7**.**

The ATP monitoring data are included as Appendix C.1 and data validation reports are included in Appendix F.

5.4.5.1 Laboratory and Field Corrective Actions

<u>Laboratory</u>

Analyses were performed in general compliance with the precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) requirements listed in the LTMMP QAPP (KGS, 2016). No significant laboratory QC deficiencies were noted. Although some results required qualification based on the QC issues listed in Section 5.4.5, the analytical results for all reviewed samples were acceptable for use. The results for four samples were rejected after evaluating the data against historical values. It was determined that the reported arsenic results in these samples did not correlate with historical trends and therefore was not used in data discussions. This data did not have any analytical data deficiencies but was likely a result of field error and rejected in the database. Field QC deficiencies are discussed below.

<u>Field</u>

There were some field corrective actions required in 2019. Discrepancy issues were identified in real time by review of chains of custody and laboratory logins as they were received by the project chemist. After results were reviewed, corrective actions include:

- For barrier wall monitoring wells SHL-10 and SHL-20, the results from samples collected during the fall 2019 supplemental sampling event indicated arsenic concentrations not correlating to historical trends; therefore, the results from these two wells have been rejected. A field error likely occurred. Samples were collected from these locations during the fall 2019 LTM sampling event with comparable arsenic results; the LTM results were used in data evaluation.

- For nearfield monitoring wells SHP-2016-3A and SHP-2016-3B, fall 2019 LTM sample results indicated arsenic concentrations not correlating to historical trends therefore the results from these two wells have been rejected. A field error likely occurred.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations resulting from the landfill monitoring and maintenance, remedy operations and performance, and long-term monitoring at the SHL during 2019 are summarized below.

6.1 CONCLUSIONS

6.1.1 Landfill Monitoring and Maintenance

During the October 2019 inspection, the landfill was observed to be in good condition overall. The inspection was limited to the landfill area and did not include an inspection of off-landfill wells.

- The landfill cover system remained in good condition during 2019.
- The landfill was mowed in October 2019. Larger vegetative growth, such as tree saplings and shrub growth, were removed in various areas to prevent damage to, and potential erosion of, the landfill cover system.
- Landfill gas vents results were generally consistent with historical results and indicate proper landfill gas venting.

6.1.2 SHL Remedy Operations

The overall condition of the landfill cap system is satisfactory, and the cap continues to impede the infiltration of precipitation to the underlying aquifer.

- The consistency of landfill gas vent results with historical data confirms that the cap continues to maintain an effective barrier to water infiltration into the landfill. The northern toe of the landfill shows a decreasing trend of the monitored landfill gases.
- The ATP was operational approximately 87.4% of the total available hours during the calendar year (i.e., “up-time”), which is an increase from the 2018 average up-time of 85.9%. A significant part of the non-operational time is associated with equipment replacement or upgrades, routine plant maintenance and system repairs, and performing CIP maintenance on the MF skid.
- The ATP achieved an average extraction rate of 54.2 gpm in 2019 while on-line, with an average effective extraction rate of 47.5 gpm (includes uptime and downtime). This is the same as the previous year rate of 47.5 gpm.
- The monthly effluent arsenic concentrations in 2019 ranged from 10.9 µg/L (January 2019) to 38.4 µg/L (March 2019) with an average effluent arsenic concentration

of 25.4 µg/L. This is well below the Special Permit Condition discharge limitation of 75 µg/L.

- The ATP landfill discharge permit was renewed on June 28, 2019 and is effective until June 28, 2022.

6.1.3 Land Use Control

- A door to door survey was conducted in the LUC area in 2019. The door to door survey is conducted every five years, and includes the hand delivery of the LUC educational pamphlet to all occupants in the LUC. The door to door survey was performed in place of the annual mailing of the LUC educational pamphlet.

6.1.4 Groundwater Monitoring

- The results of the spring and fall 2019 site-wide monitoring events illustrate a general groundwater flow direction from the west/southwest corresponding to Shepley's Hill to the north towards Nonacoicus Brook with a deflection of groundwater flow to the north in the area west of the barrier wall near Red Cove at Plow Shop Pond.
- Potentiometric surfaces in the overburden for spring and fall hydraulic measurements were constructed using Surfer® software and the Kriging gridding method and further refined using a hand contouring triangulated irregular network (TIN) method. No bedrock wells were used for construction of the potentiometric maps.
- Concentrations of arsenic, iron, and manganese continue to exceed cleanup goals in various wells at SHL and in the NIA. Concentrations of other site COCs did not exceed their respective cleanup goals.
- Statistical analyses of dissolved arsenic concentration trends were performed for 40 of the wells sampled during 2019. Of these 40 wells, 19 (48%) were found to have statistically significant decreasing concentration, one (3%) was found to have increasing concentrations, and 20 (50%) showed no statistically significant trend at the selected 95% confidence level.
- Continued observation of arsenic concentrations above the cleanup level (50 µg/L in ROD; 10 µg/L proposed alternative) is indicative of complex interplay between the geochemical and hydrogeological processes that are controlling the dissolved arsenic concentrations downgradient of the landfill. These arsenic data indicate that a significant decrease in dissolved arsenic concentrations off-site and in the NIA may not be achievable through continued operation of the groundwater extraction system. As described in the 1995 SHL ROD, the intent of the groundwater extraction system and the ATP (installed as a contingency remedy to address groundwater contamination still present after landfill capping) is to capture dissolved arsenic and low-ORP groundwater flowing northward from the beneath the landfill cap and thereby reducing or controlling exposure to arsenic and reducing arsenic levels in the downgradient NIA to achieve MCLs. Groundwater that may be bypassing the capture zone outside the footprint of the landfill was not intended to be addressed by this contingency remedy. The current

approved SHL groundwater model provides a useful tool, in addition to potentiometric contour maps developed from measured water levels, to evaluate capture of arsenic impacted groundwater from the landfill and flow to the east of the current extraction wells. The results of model flow path analyses indicate that under the current pumping conditions, the zone of capture extends beyond the full width of the landfill, but 3PE analyses indicate that the capture along the eastern edge may be overestimated. However, in the area east of the landfill where capture effectiveness is less certain, arsenic concentrations are substantially lower than concentrations within the landfill footprint. If bypass is occurring, then the mass of arsenic that could be bypassing east of the system is a small portion of the overall total arsenic mass that would otherwise be migrating from beneath the landfill cap (Geosyntec, 2020).

The effectiveness of the groundwater extraction system for capturing groundwater migrating from the SHL is being addressed through technical analysis to be conducted under SOW Phase 1 (Demonstrate Plume Capture) and Phase 2 Task 2 (Designation of Arsenic Background). Determination of background concentration for arsenic in the hydrogeologic setting for SHL will provide a critical piece of information to support reliable assessment of the existing remedy.

6.2 RECOMMENDATIONS

The following provides recommendations for landfill monitoring and maintenance, SHL remedy operations and performance, and groundwater monitoring.

6.2.1 Landfill Monitoring and Maintenance

Based on the site inspection conducted in October 2019, the following recommendations were made with respect to landfill maintenance:

- Continue annual landfill inspections;
- Continue monitoring for tree and shrub growth on cover surface. Remove tree and shrub growth as necessary;
- Continue monitoring the utility berm for negative impacts on the drainage patterns;
- Continue landfill cover and drainage swale mowing on an annual basis in the fall to maintain the effectiveness of the cover system;
- Continue to monitor the condition of the landfill gas points;
- Continue to monitor the condition of the landfill monitoring wells;
- Continue to monitor the condition of the off-landfill LTM monitoring wells;
- Perform maintenance at SHM-13-03 for well obstruction and locking cap;
- Continue to monitor and clear drainage swales of invasive vegetative growth;
- Continue to monitor for new depressions or settlement within the landfill and repair as necessary;

- Continue to monitor the landfill cover and access roads for erosion on an annual basis;
- Continue to monitor culverts along the northern portion of the landfill and remove vegetative growth as necessary;
- Ensure that the post closure uses of the landfill during MassDevelopment's leased project period do not compromise the integrity of the landfill cover or the network of landfill gas vents and groundwater monitoring wells; and,
- Conduct routine, drive-by monitoring checks of the condition of the landfill cap in the leased recreational area.

6.2.2 SHL Remedy Operations and Performance

System modifications were necessary in 2019 and expected system upgrades were performed as needed. The chlorine dioxide skid Programmable Logic Controller (PLC) experienced a critical failure. As a result of this failure, the entire system was brought offline. A new PLC was obtained, and a new operating program was written. The new PLC was then installed, tested and the system was brought fully online on 26 June 2019.

The plant will continue to operate at 50+ gpm each month, with continued maintenance to include the following recommendations:

- To prevent unscheduled downtime because of the build-up of precipitate within the system influent piping that could restrict influent flow, the influent piping will be inspected annually and cleaned, if necessary, during a scheduled CIP event.
- To minimize operational downtime associated with equipment failure, system components will be regularly inspected and replaced prior to the end of their operational life.

6.2.3 Land Use Control

- Continue annual mailings of educational pamphlet in 2020.
- Perform the next door to door survey in fall 2024.

6.2.4 Groundwater Monitoring

The groundwater monitoring program should continue to be performed in accordance with the *LTMMP Update* (Sovereign, 2015), as amended by the *LTMMP Addendum* (KGS, 2018a) which includes the additional USEPA-requested wells. This work includes:

- Continued collection of geochemical and hydrologic data from the nested piezometers (SHP-2016-1A/B through 5A/B) in spring and fall until fall 2021.
- Continued collection of geochemical and hydrologic data for a minimum of five years (through 2021) for USEPA-added wells to the monitoring network.
- Consider manganese and iron analysis and implications to landfill redox zones.
- Continued collection of water level data from piezometers SHP-2017-01 and -02 located near the extraction wells in spring and fall until fall 2021.

- Continued collection of geochemical and hydrologic data from bedrock wells SHP-2016-06A/B/C and SHP-2016-07A/B in spring and fall until fall 2021.
- Continued collection of hydrologic data from wells SHM-10-11, N6-P1 and SHP-99-35X in spring and fall to provide more hydraulic control in the southern portion of the landfill through fall 2021.
- Optimize the location and frequency of monitoring based on historical arsenic results consistently below the MCL of 10 µg/L. Optimize other LTM analytical parameters based on historical results of non-detects. Propose recommended optimizations for review by USEPA and MassDEP and incorporate approved changes in an update to the LTMMP.
- Review arsenic and geochemical field parameters from barrier wall monitoring wells and other monitoring wells east of the barrier wall. Consider adding select barrier wall area monitoring wells for Mann-Kendall trend analysis for arsenic to the revised LTMMP.
- Provide a geochemical analysis and make a recommendation whether or not to sample the surface water and sediment in Red Cove in support of the barrier wall evaluation.
- Following the collection of additional seasonal data from the barrier wall area (see Section 5.2.2), evaluate the performance of the barrier wall to determine whether the wall is achieving a significant decrease in arsenic concentrations in groundwater east of the barrier wall. The evaluation should address the following questions:
    - Why are elevated arsenic concentrations still occurring east of the barrier wall?
    - Is groundwater east of the wall migrating to Red Cove?
- Update the DQOs for the barrier wall performance and reduction of arsenic concentrations to the pond (see barrier wall monitoring DQOs from 2015 LTMMP). DQOs should identify how the collection of additional arsenic data (surface water/sediment/groundwater) would relate to the effectiveness of the barrier wall and overall protectiveness of human health and welfare or the environment.
- Continue the technical analysis of the ATP effectiveness under SOW Phase 1 (Demonstrate Plume Capture) and Phase 2 Task 2 (Designation of Arsenic Background). Determination of background concentration for arsenic in the hydrogeologic setting for SHL will provide a critical piece of information to support reliable assessment of the existing remedy.

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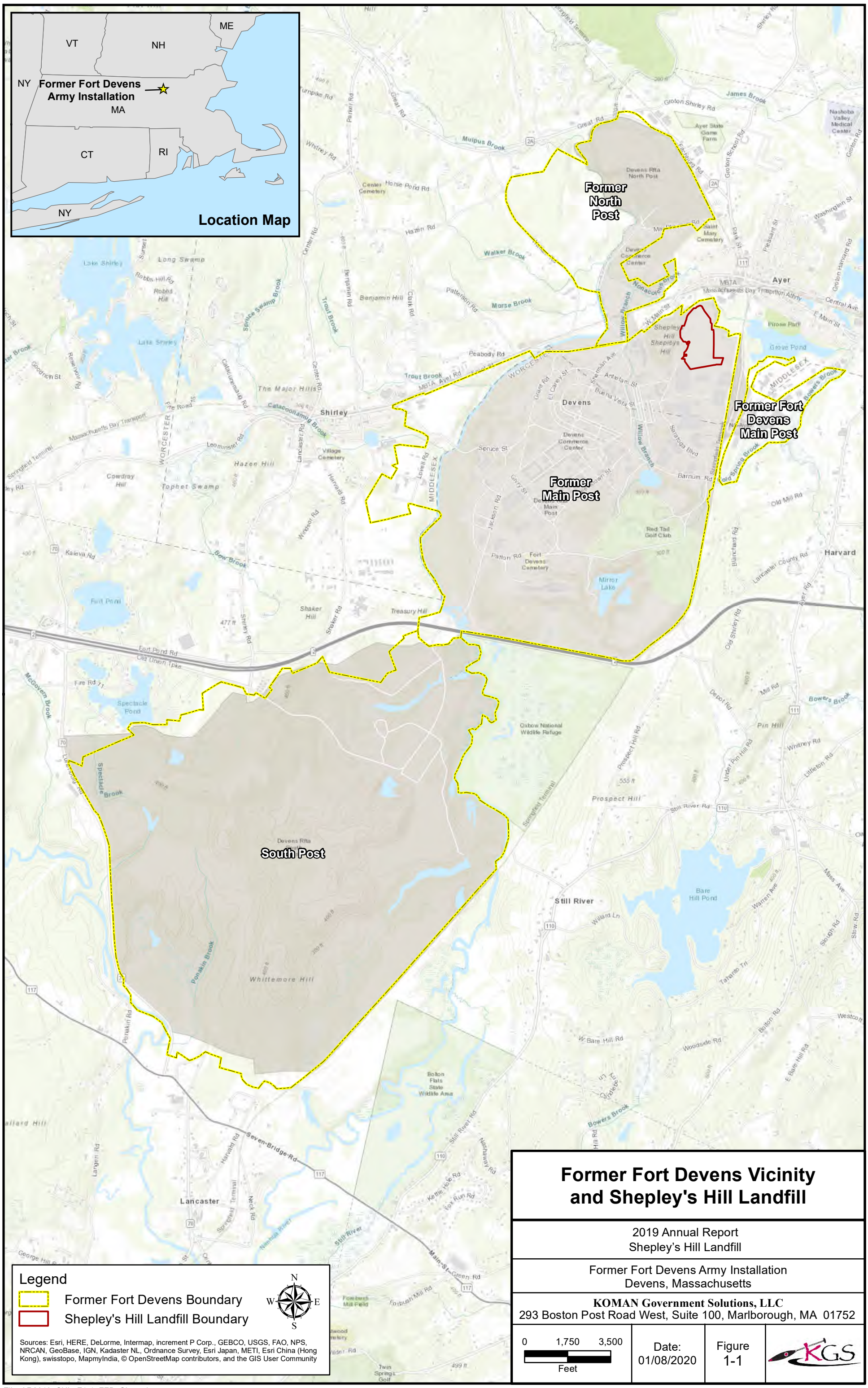
FIGURES



Former Fort Devens Vicinity and Shepley's Hill Landfill

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 1,750 3,500
Feet

Date: 01/08/2020

Figure 1-1

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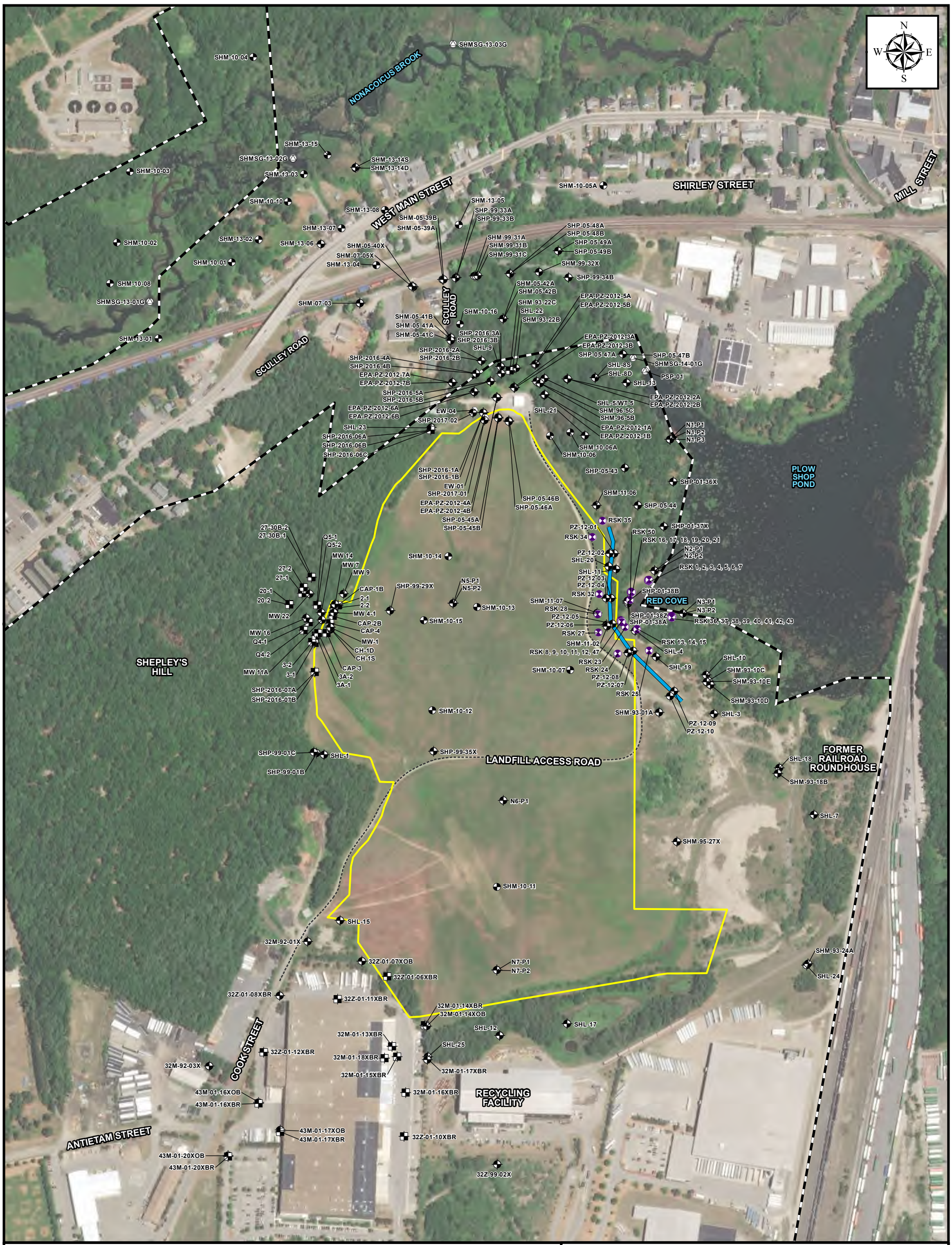

Legend

- Overburden Monitoring Well/Piezometer
- Groundwater Profiling Location/Monitoring Well
- Monitoring Well
- Bedrock Monitoring Well
- Bedrock Study Core
- Extraction Well
- Stream Gauge
- Barrier Wall
- Landfill Access Road
- Shepley's Hill Landfill Boundary
- Former Fort Devens Boundary

References: LTMMP Update (Sovereign, 2015)

AerialSource: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

North Impact Area and Shepley's Hill Landfill Site Plan

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

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293 Boston Post Road West, Suite 100, Marlborough, MA 01752

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Feet

Date: 01/08/2020

Figure 1-2

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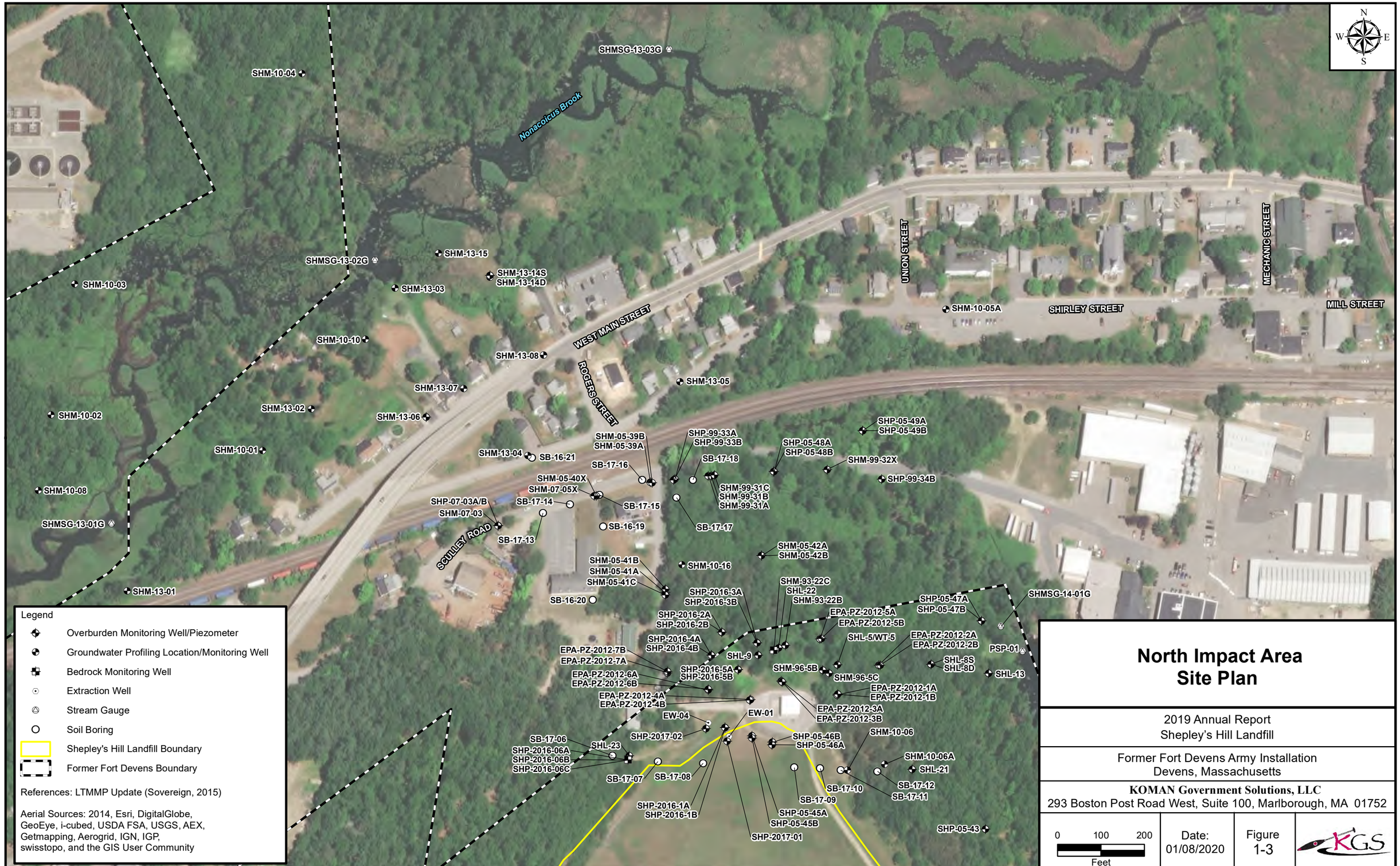

North Impact Area Site Plan

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

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293 Boston Post Road West, Suite 100, Marlborough, MA 01752

Date: 01/08/2020

Figure 1-3

File: AR2019_SHL_F1-3_NIA_SITEPLAN.mxd

Area of Land Use Controls

2019 Annual Report
Shepley's Hill Landfill

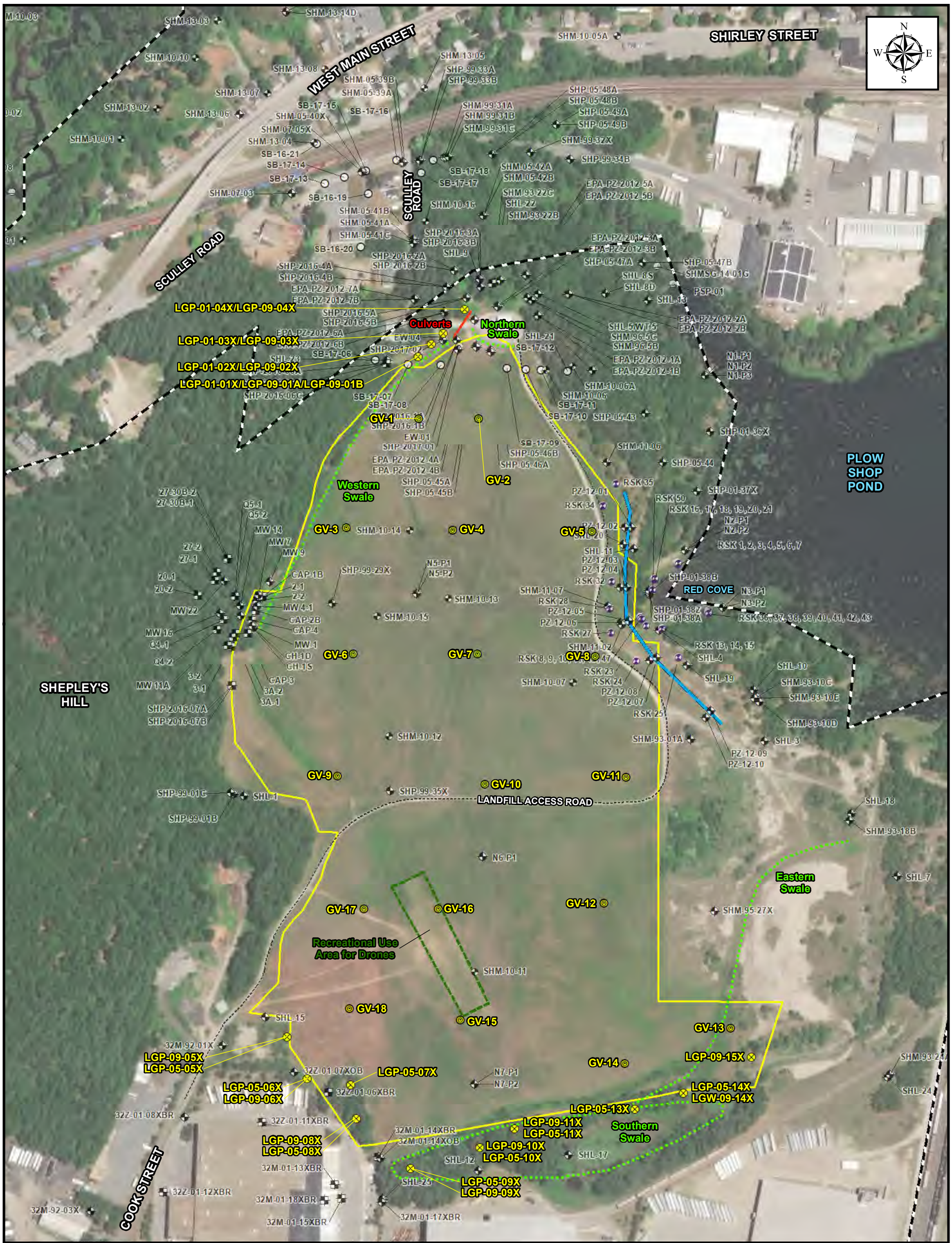
Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

Date: 01/08/2020

Figure 1-4

File: AR2019_SHL_F1-4_LUC.mxd



Legend

- Overburden Monitoring Well/Piezometer
- Groundwater Profiling Location/Monitoring Well
- Monitoring Well
- Bedrock Monitoring Well
- Bedrock Study Core
- Extraction Well
- Stream Gauge
- Soil Boring
- Gas Vent
- Gas Probe
- Culvert
- Drainage Swale
- Landfill Access Road
- Barrier Wall
- Recreational Use Area for Drones
- Shepley's Hill Landfill Boundary
- Former Fort Devens Boundary

References: LTMMP Update (Sovereign, 2015)

AerialSource: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Shepley's Hill Landfill Gas Probes and Vents

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

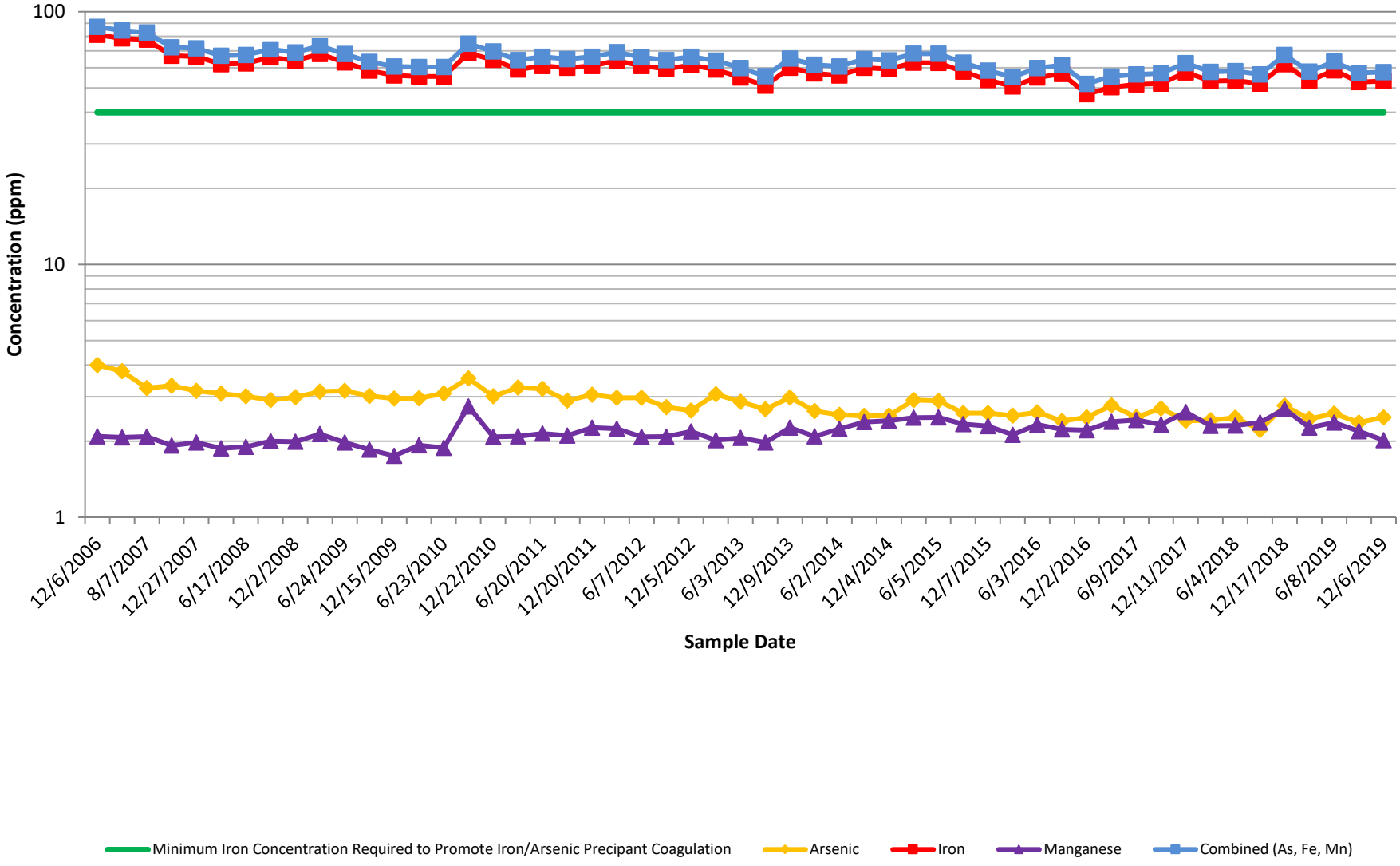
0 150 300 Feet

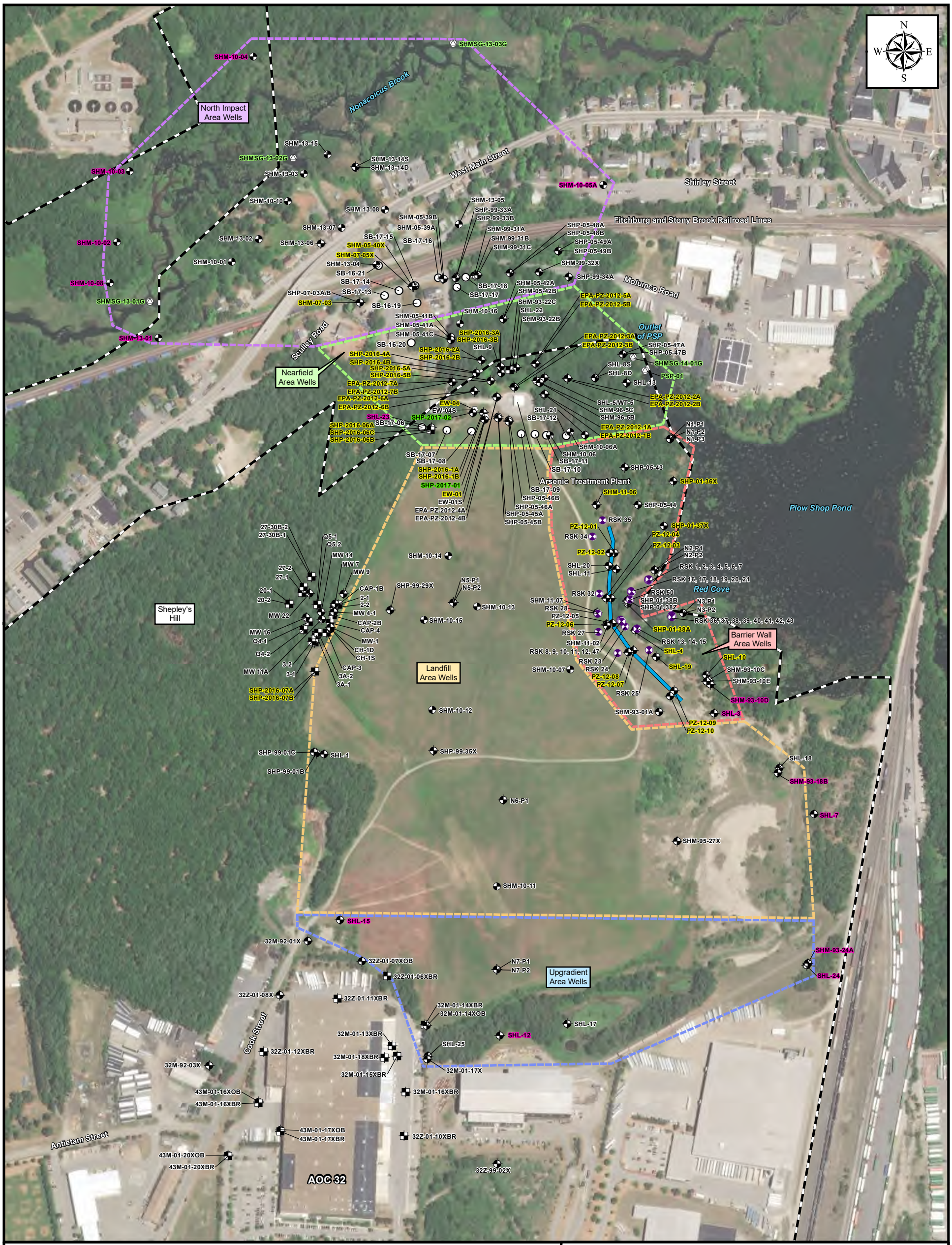
Date: 01/08/2020

Figure 2-1

File: AR2019_SHL_F2-1_GASPTS.mxd

Figure 3-1
Influent Metals Concentrations - GWTP
Shepley's Hill Landfill





Legend

- Overburden Monitoring Well/Piezometer
- Groundwater Profiling Location/Monitoring Well
- Monitoring Well
- Bedrock Monitoring Well
- Bedrock Study Core
- Extraction Well
- Stream Gauge
- Soil Boring
- Barrier Wall
- Former Fort Devens Boundary

PZ-12-07	Well/Boring/Gauge Identification
SHM-13-01	LTM Well/Piezometer Annual Sampling (Fall)
SHL-10	LTM Well/PiezometerSemi-Annual Sampling (Spring/Fall)
SHP-99-01B	LTM Well/Piezometer Hydraulic Monitoring Only

References: LTMMP Update (Sovereign 2015) and selected EPA Added wells for 2017

Aerial Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Long-Term Monitoring Well Network

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

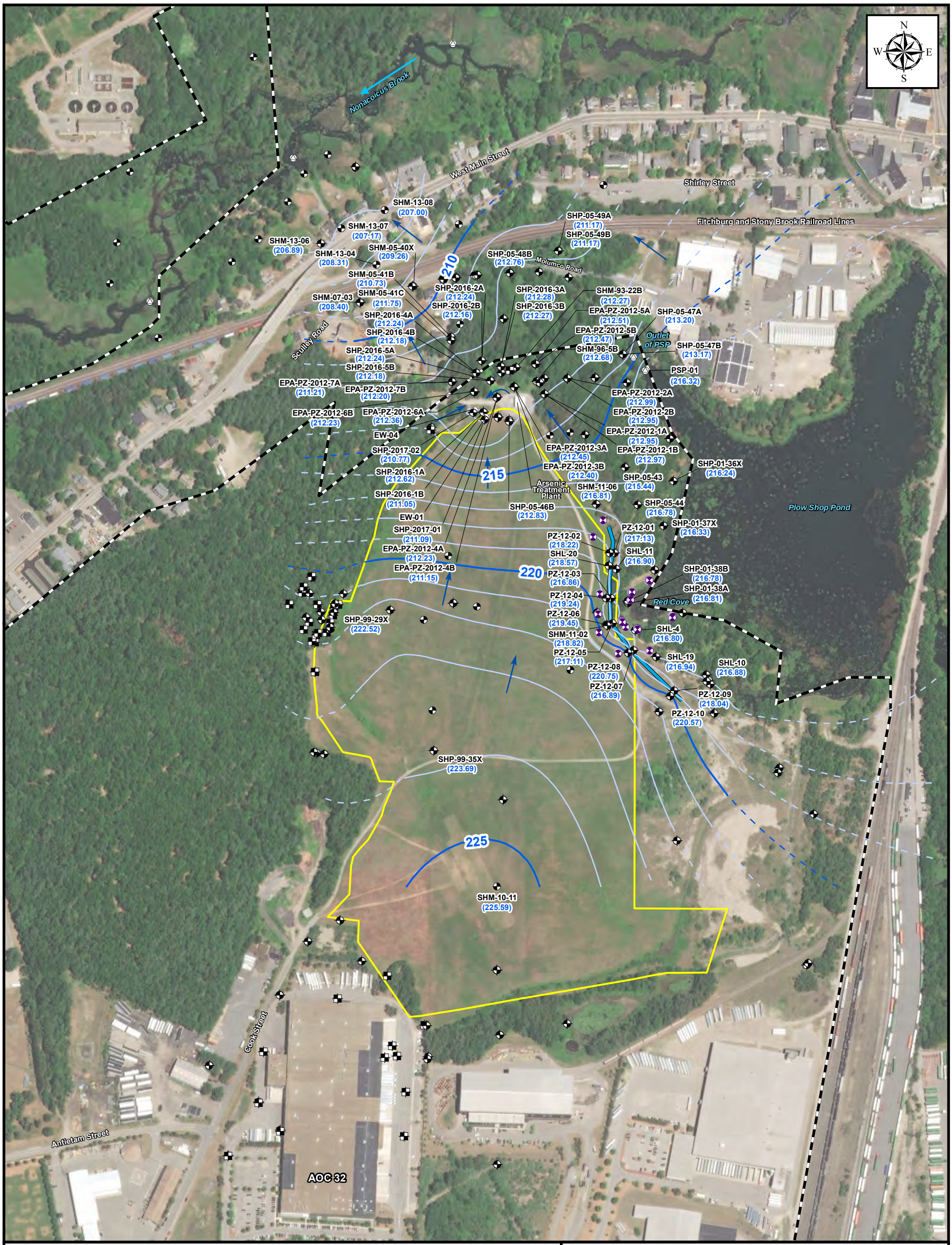
KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 200 400
Feet

Date: 01/08/2020

Figure 5-1

File: AR2019_SHL_F5-1_LTM.mxd



Legend

- Overburden Monitoring Well/Piezometer
- Groundwater Profiling Location/Monitoring Well
- Monitoring Well
- Bedrock Monitoring Well
- Bedrock Study Core
- Extraction Well
- Stream Gauge
- Barrier Wall
- Shepley's Hill Landfill Boundary
- Former Fort Devens Boundary
- (209.26) Groundwater Elevation - April 11, 2019
- Contour (5 Foot Interval)
- Contour (1 Foot Interval)
- Inferred Contour (5 Foot Interval)
- Inferred Contour (1 Foot Interval)
- Groundwater Flow Direction
- Surface Water Flow Direction

Notes:
1) Combined pumping rate of EW-01 and EW-04 on April 11, 2019 was 54.5 gpm.
2) Water levels plotted used average value of the cluster wells in creating the contour figure.

Aerial: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Groundwater Elevations April 11, 2019 North Impact Area and Shepley's Hill Landfill

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
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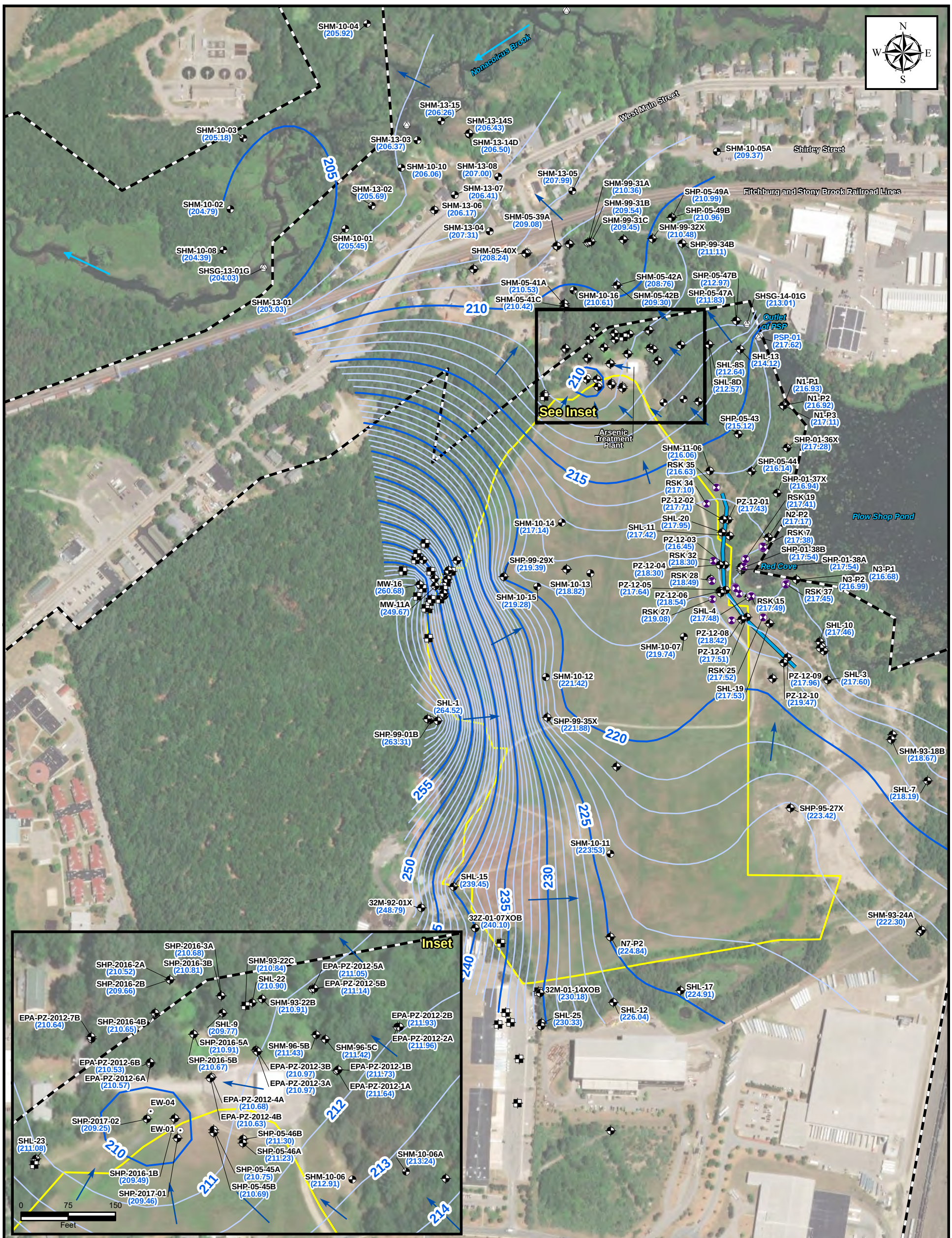
0 200 400
Feet

Date: 03/25/2020

Figure 5-2

File: AR2019_SHL_F5-2_GWC_April2019.mxd



Legend

- Overburden Monitoring Well/Piezometer
- Groundwater Profiling Location/Monitoring Well
- Monitoring Well
- Bedrock Monitoring Well
- Bedrock Study Core
- Extraction Well
- Stream Gauge
- Barrier Wall
- Shepley's Hill Landfill Boundary
- Former Fort Devens Boundary
- (213.24) Groundwater Elevation - October 22, 2019
- Contour (5 Foot Interval)
- Contour (1 Foot Interval)
- Inferred Contour (5 Foot Interval)
- Inferred Contour (1 Foot Interval)
- Groundwater Flow Direction
- Surface Water Flow Direction

Notes:
1) Combined pumping rate at EW-01 and EW-04 on October 22, 2019 was 53.4 gpm.
2) Water levels plotted used average value of the cluster wells in creating the contour figure.

Aerial Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Groundwater Elevations October 22, 2019 North Impact Area and Shepley's Hill Landfill

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
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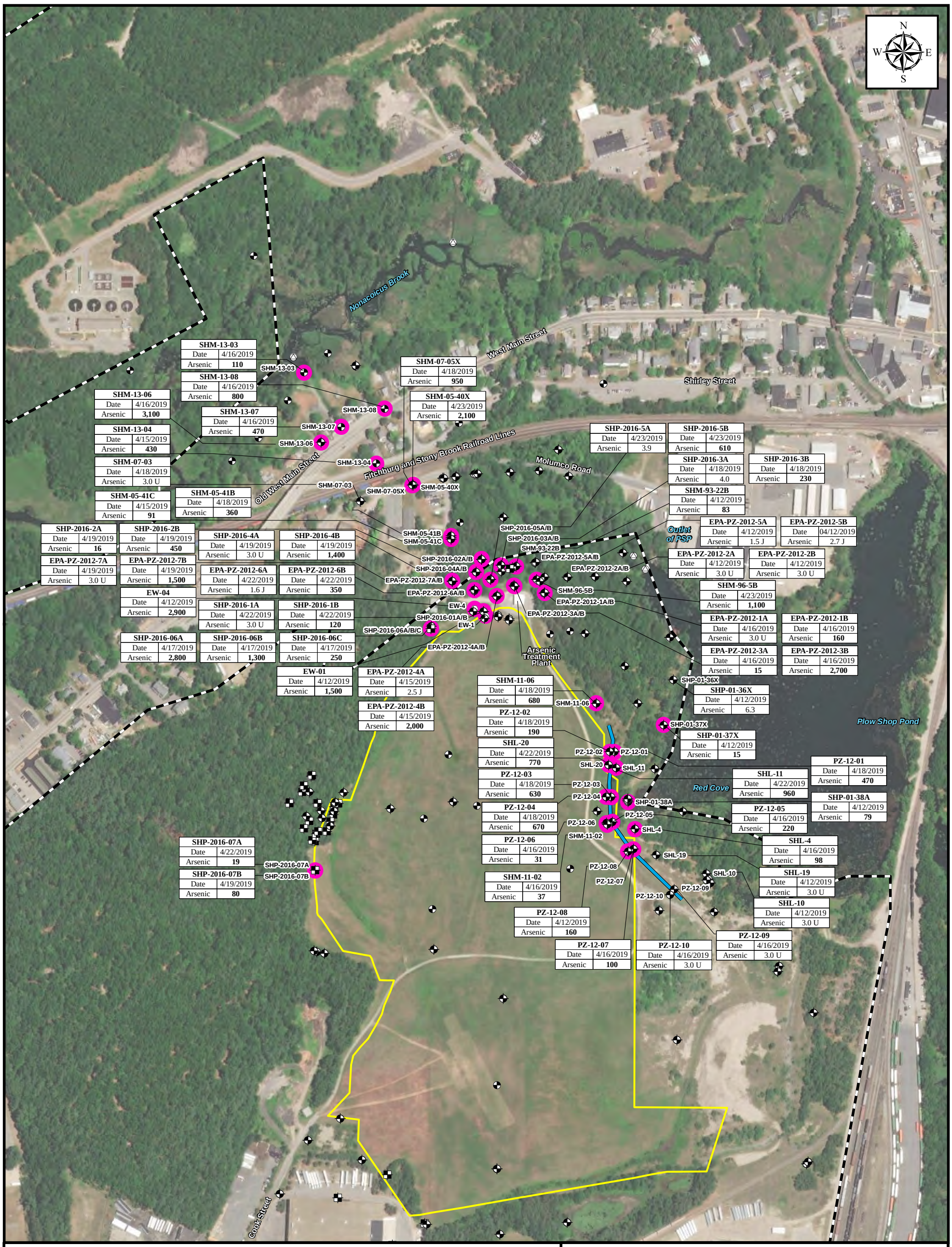
0 200 400 Feet

Date: 04/15/2020

Figure 5-3

File: AR2019_SHL_F5-3_GWC_Oct2019_V2.mxd



Legend

- Indicates Well with Arsenic Concentration Above 10 µg/L
- Overburden Monitoring Well/Piezometer
- Groundwater Profiling Location/Monitoring Well
- Bedrock Monitoring Well
- Extraction Well
- Stream Gauge
- Barrier Wall
- Shepley's Hill Landfill Boundary
- Former Fort Devens Boundary

Notes:

All concentrations in micrograms per liter (µg/L)
J = Estimated Results
U = Non-detect
Arsenic GW=1 Standard = 10 µg/L
BOLD values indicate GW -1 Exceedances

Aerial Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Dissolved Arsenic in Groundwater
April 2019
North Impact Area and
Shepley's Hill Landfill

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

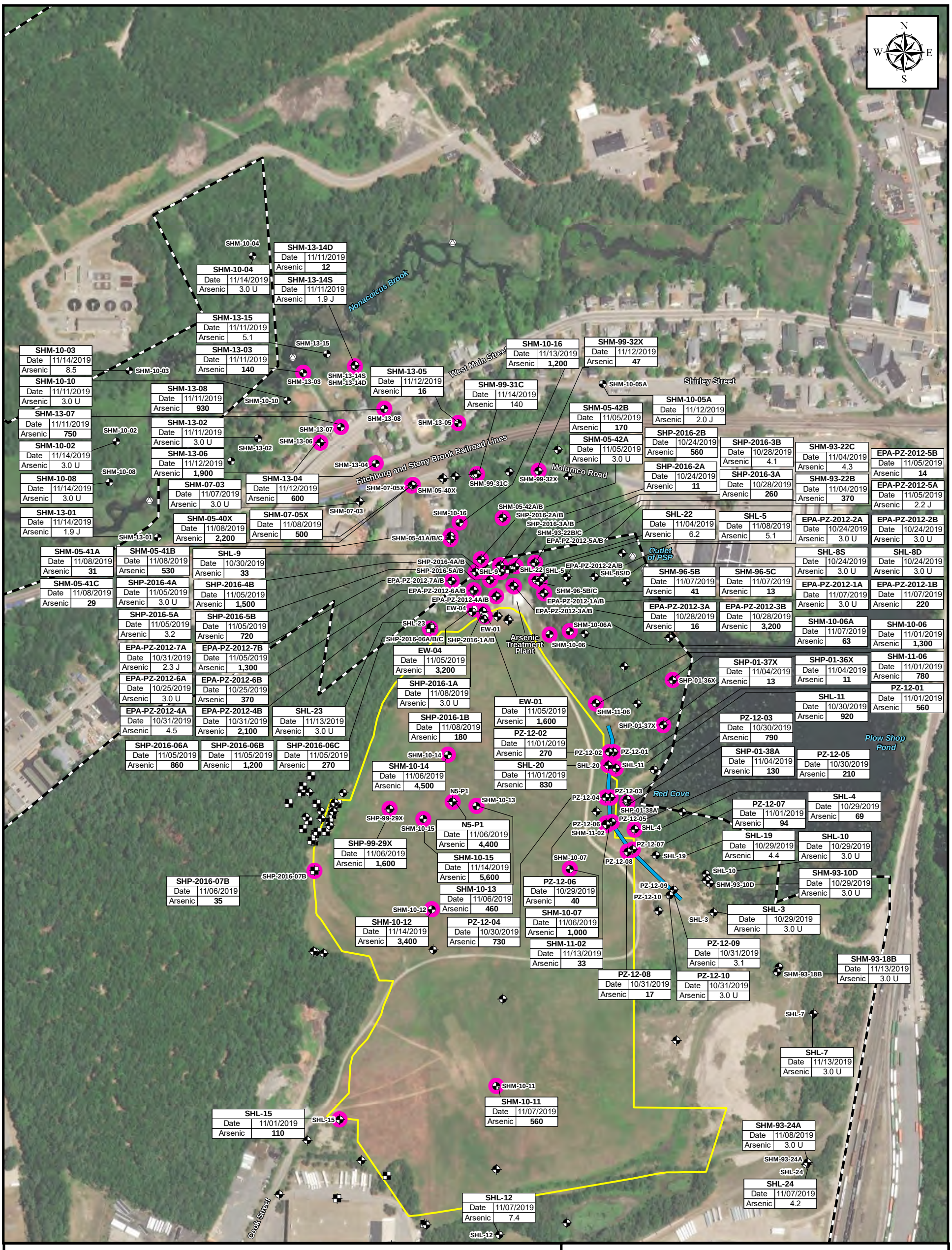
KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 200 400
Feet

Date: 02/04/2020

Figure 5-4

File: AR2019_SHL_F5-4_Arsenic_Spring2019.mxd



Legend

- Indicates Well with Arsenic Concentration Above 10 µg/L
- Overburden Monitoring Well/Piezometer
- Groundwater Profiling Location/Monitoring Well
- Bedrock Monitoring Well
- Extraction Well
- Stream Gauge
- Barrier Wall
- Shepley's Hill Landfill Boundary
- Former Fort Devens Boundary

Notes:

All concentrations in micrograms per liter (µg/L)
J = Estimated Results
U = Non-detect
NS = Not Sampled
Arsenic GW=1 Standard = 10 µg/L
BOLD values indicate GW-1 exceedances

Aerial Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Dissolved Arsenic in Groundwater October - November 2019 North Impact Area and Shepley's Hill Landfill

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
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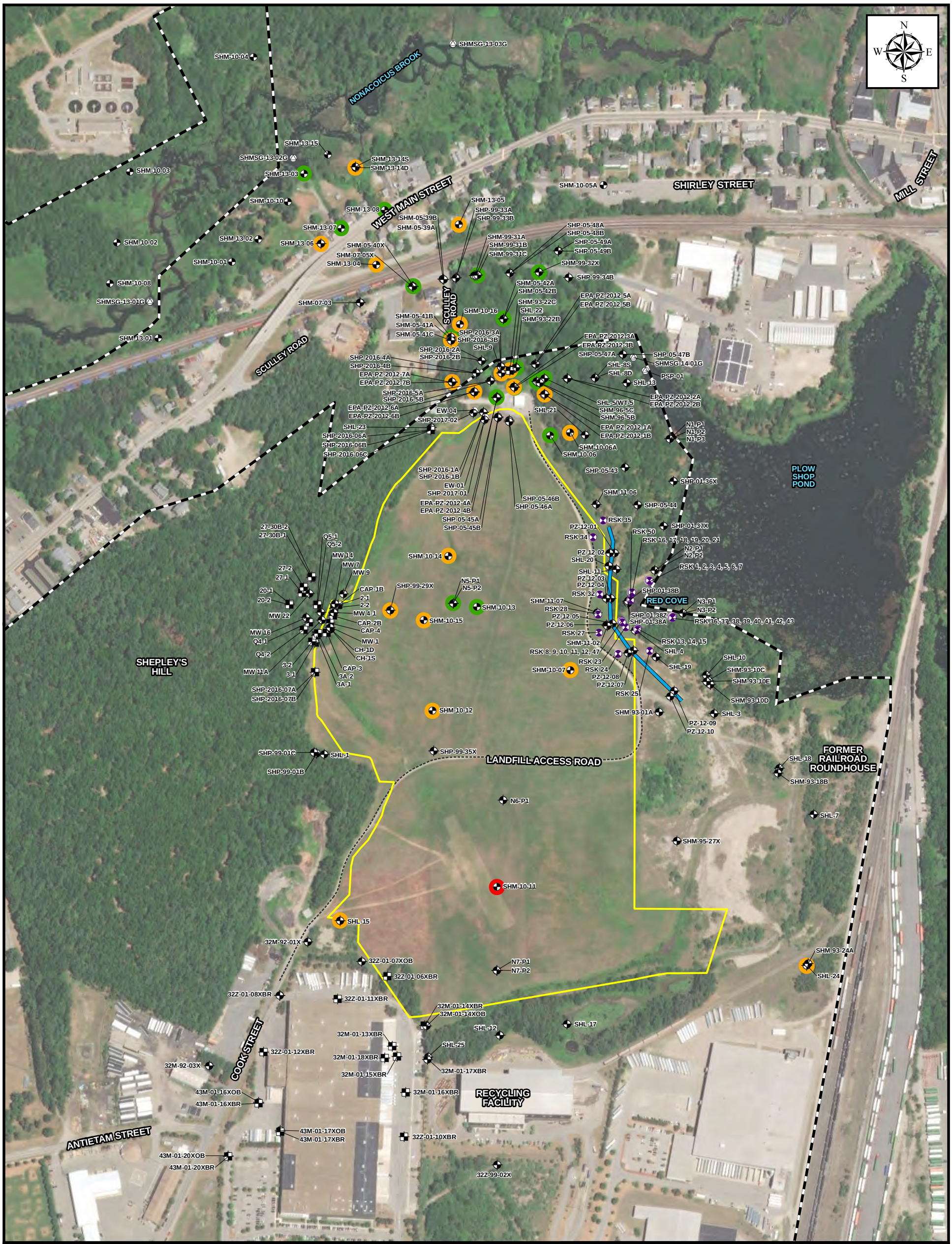
0 200 400
Feet

Date: 02/05/2020

Figure 5-5

File: AR2019_SHL_F5-5_Arsenic_FALL2019.mxd



Legend

- Overburden Monitoring Well/Piezometer
- Groundwater Profiling Location/Monitoring Well
- Monitoring Well
- Bedrock Monitoring Well
- Bedrock Study Core
- Extraction Well
- Stream Gauge
- Barrier Wall
- Landfill Access Road
- Shepley's Hill Landfill Boundary
- Former Fort Devens Boundary

- Insufficient Evidence of a Statistically Significant Trend
- Statistically Significant Evidence of a Decreasing Trend
- Statistically Significant Evidence of an Increasing Trend

References: LTMMP Update (Sovereign, 2015), Arsenic concentration trends evaluated using ProUCL Mann-Kendall statistical software.

Aerial Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Northern Impact Area and Shepley's Hill Landfill Arsenic Concentration Trends in 2019

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
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0 200 400
Feet

Date: 03/24/2020

Figure 5-6

File: AR2019_SHL_F5-6_ArsenicTrends2019.mxd

TABLES

Table 1-1
Contaminants of Concern (COC) Cleanup Levels
Shepley's Hill Landfill
Devens, Massachusetts

COC	Cleanup Level (µg/L)	Selection Basis
Arsenic	10	MCL[1]
Manganese	1,715	Background [2]
Iron	9,100	Background [2]
Chromium	100	MCL
1,2-Dichlorobenzene	600	MCL
1,4-Dichlorobenzene	5	MCL
1,2-Dichloroethane	5	MCL
Lead	15	Action Level
Nickel	100	MCL
Sodium	20,000	Health Advisory
Aluminum	6,870	Background

Notes:

MCL = Maximum Contaminant Level

[1] Revised from ROD cleanup level of 50 µg/L

[2] Revised from ROD cleanup level based on background evaluation

Only arsenic, iron, and manganese are currently sampled as part of the LTM program, in accordance with the *LTMMP Update* (Sovereign, 2015) and *LTMMP Addendum* (KGS, 2017)

Table 2-1
Annual Landfill Gas Monitoring Results
Shepley's Hill Landfill
Devens, Massachusetts

Date: 10/16/19 **Weather: Sunny, 50 Degrees F** **Field Team: Joe Rogers, Liam Henry**

			Initial Readings									Post Purge Readings							
Location	ID	Time	VOC (ppm)	0_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	$C0_2$ (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	0_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	$C0_2$ (%)	CH_4 (%)	Bar. Pres.("Hg)
Landfill	Background	8:38	0.0	20.89	0.0	0.0	0.0	0.1	0.2										30.01
	GV-1	14:07	0.0	9.1	0.0	64.0	0.0	8.4	1.3	4	167	0.0	5.6	0.0	66.0	0.0	11.0	3.3	29.71
	GV-2	14:15	0.0	11.5	0.0	74.0	0.0	7.5	3.0	4	167	0.0	2.6	0.0	99.0	0.0	13.7	7.7	29.71
	GV-3	13:40	0.0	21.1	0.0	3.0	0.0	0.0	0.1	4	167	0.0	20.9	0.0	0.0	0.0	0.0	0.1	29.71
	GV-4	13:58	0.0	5.5	0.0	91.0	0.0	11.7	5.1	4	167	0.0	9.3	0.0	63.0	0.0	8.5	2.7	29.71
	GV-5	14:43	0.0	12.2	0.0	6.0	0.0	6.4	6.2	4	167	0.0	12.6	0.0	0.0	0.0	6.2	0.2	29.71
	GV-6	13:38	1.0	1.6	0.0	97.0	0.0	14.4	6.5	4	167	0.0	1.6	0.0	51.0	0.0	14.7	5.4	29.71
	GV-7	14:27	0.0	0.3	0.0	99.0	0.0	15.2	13.3	4	167	0.0	0.1	0.0	99.0	0.0	15.1	12.1	29.71
	GV-8	14:26	0.0	8.2	0.0	49.0	0.0	9.0	2.5	4	167	0.0	5.8	0.0	5.0	0.0	11.1	0.3	29.71
	GV-9	13:27	0.0	0.0	0.0	40.0	0.0	16.0	8.8	4	167	0.0	0.1	0.0	99.0	0.0	17.0	13.1	29.71
	GV-10	13:17	0.0	1.1	0.0	51.0	0.0	14.1	3.0	4	167	0.0	2.0	0.0	45.0	0.0	13.6	2.4	29.71
	GV-11	13:09	0.0	10.9	0.0	99.0	0.0	6.8	2.5	4	167	0.0	5.9	0.0	99.0	0.0	10.5	9.0	29.71
	GV-12	13:00	0.0	3.3	0.0	95.0	0.0	10.7	7.0	4	167	0.0	0.0	0.0	99.0	0.0	12.4	8.8	29.71
	GV-13	11:44	0.0	12.4	0.0	47.0	0.0	5.0	3.4	4	167	0.0	16.2	0.0	30.0	0.0	2.5	2.1	29.85
	GV-14	11:55	0.0	20.6	0.0	99.0	0.0	0.2	0.2	4	167	0.0	3.7	0.0	99.0	0.0	15.1	29.3	29.85
	GV-15	12:10	0.0	1.8	0.0	99.0	0.0	21.9	23.5	4	375	0.0	0.0	0.0	99.0	0.0	21.0	26.5	29.85
	GV-16	12:48	0.0	0.0	0.0	99.0	22.1	0.0	20.2	4	375	0.0	0.0	0.0	99.0	0.0	22.4	19.2	29.71
	GV-17	12:36	0.0	2.6	0.0	99.0	0.0	23.4	25.6	4	375	0.0	0.0	0.0	99.0	0.0	23.4	26.1	29.71
	GV-18	12:21	0.0	0.7	0.0	99.0	0.0	21.3	23.4	4	375	0.0	1.0	0.0	99.0	0.0	21.2	23.4	29.71
North Toe of Landfill	LGP-01-01X	15:37	0.0	21.0	0.0	0.0	0.0	0.5	0.1	2	83	0.0	21.1	0.0	0.0	0.0	0.5	0.1	29.64
	LGP-09-01XA	15:48	0.0	21.0	0.0	0.0	0.0	0.5	0.1	2	157	0.0	21.2	0.0	0.0	0.0	0.6	0.1	29.64
	LGP-09-01XB	15:43	0.0	20.8	0.0	0.0	0.0	0.7	0.1	2	157	0.0	20.9	0.0	0.0	0.0	0.8	0.1	29.64
	LGP-01-02X	15:28	0.0	20.8	0.0	0.0	0.0	0.9	0.1	2	83	0.0	20.8	0.0	0.0	0.0	0.9	0.1	29.64
	LGP-09-02X	15:26	0.0	20.7	0.0	0.0	0.0	1.1	0.1	2	204	0.0	20.9	0.0	0.0	0.0	1.2	0.2	29.64
	LGP-01-03X	15:22	0.0	20.8	0.0	0.0	0.0	0.8	0.1	2	83	0.0	20.9	0.0	0.0	0.0	0.8	0.1	29.64
	LGP-09-03X	15:16	0.0	20.8	0.0	0.0	0.0	1.0	0.1	2	167	0.0	20.7	0.0	0.0	0.0	1.0	0.1	29.64
	LGP-01-04X	15:05	0.0	20.9	0.0	0.0	0.0	0.5	0.1	2	83	0.0	20.9	0.0	0.0	0.0	0.5	0.2	29.65
	LGP-09-04X	15:11	0.0	21.0	0.0	0.0	0.0	0.2	0.1	2	120	0.0	21.0	0.0	0.0	0.0	0.6	0.1	29.65
Southwest Toe of Landfill	LGP-05-05X	8:33	0.0	11.7	0.0	12.0	0.0	11.7	0.8	2	93	0.0	9.9	0.0	0.0	0.0	0.1	0.2	29.95
	LGP-09-05X	8:43	0.55	22.0	0.0	53.0	0.0	0.2	0.2	2	167	0.0	3.0	0.0	31.0	0.0	0.2	0.2	29.95
	LGP-05-06X	9:00	0.0	18.3	0.0	0.0	0.0	2.3	0.2	2	93	0.0	18.8	0.0	0.0	0.0	2.5	0.2	29.93
	LGP-09-06X	8:52	0.0	16.2	0.0	0.0	0.0	0.2	0.2	2	120	0.0	16.1	0.0	0.0	0.0	5.0	0.2	29.93
	LGP-05-07X	9:09	0.0	18.2	0.0	0.0	0.0	3.7	0.2	2	65	0.0	15.4	0.0	0.0	0.0	6.0	0.2	NR
	LGP-05-08X	9:25	0.0	15.7	0.0	0.0	0.0	6.6	0.2	2	93	0.0	7.0	0.0	0.0	0.0	14.5	0.2	29.93
	LGP-09-08X	9:18	0.0	5.9	0.0	0.0	0.0	16.5	0.2	2	185	0.0	2.8	0.0	5.0	0.0	19.3	0.3	NR
Southeast Toe of Landfill	LGP-05-09X	9:53	0.0	14.4	0.0	0.0	0.0	15.2	0.2	2	93	0.0	20.9	0.0	0.0	0.0	7.4	0.2	29.86
	LGP-09-09X	9:37	0.0	10.1	0.0	0.0	0.0	10.9	0.2	2	185	0.0	5.4	0.0	0.0	0.0	15.3	0.2	29.93
	LGP-05-10X	10:06	0.0	15.4	0.0	0.0	0.0	5.2	0.2	2	93	0.0	8.3	0.0	0.0	0.0	11.9	0.2	29.86
	LGP-09-10X	10:15	0.0	2.5	0.0	5.0	0.0	14.1	0.3	2	148	0.0	2.7	0.0	7.0	0.0	17.7	0.5	29.86
	LGP-05-11X	10:36	0.0	14.8	0.0	0.0	0.0	5.6	0.2	2	83	0.0	8.5	0.0	0.0	0.0	10.9	0.2	29.86
	LGP-09-11X	10:30	0.0	6.8	0.0	0.0	0.0	11.9	0.2	2	139	0.0	4.6	0.0	0.0	0.0	15.0	0.2	29.86
	LGP-05-13X	11:16	0.0	17.0	0.0	0.0	0.0	3.8	0.2	2	56	0.0	12.5	0.0	0.0	0.0	6.6	0.2	29.85
	LGP-05-14X	11:22	0.0	12.4	0.0	0.0	0.0	7.7	0.2	2	93	0.0	12.5	0.0	0.0	0.0	7.5	0.2	29.85
	LGP-09-15X	11:33	0.0	17.0	0.0	0.0	0.0	4.2	0.2	2	111	0.0	16.0	0.0	0.0	0.0	5.7	0.2	29.85

Notes:

VOC = Volatile Organic Compounds
O_2 = Oxygen
LEL = Lower Explosive Limit
CO = Carbon Monoxide
CO_2 = Carbon Dioxide
CH_4 = Methane
H_2S = Hydrogen Sulfide
"Hg = inches of Mercury
lpm = Liters per minute
sec = Seconds
ppm = Parts per million
% = Percentage

Reference: Sovereign Annual Landfill Montoring Results, 10/16/19

Table 2-2
Landfill Gas Probe Construction Detail
Shepley's Hill Landfill
Devens, Massachusetts

Gas Probe ID	Gas Probe Screen Interval (ft bgs)	Screen Length (ft)
LGP-01-01X	6.4 to 7.4	1
LGP-09-01XA	7.0 to 17.0	10
LGP-09-01XB	19.0 to 28.0	9
LGP-01-02X	5.0 to 6.0	1
LGP-09-02X	6.0 to 21.0	15
LGP-01-03X	5.0 to 6.0	1
LGP-09-03X	6.0 to 18.0	12
LGP-01-04X	3.0 to 4.0	1
LGP-09-04X	4.0 to 9.0	5
LGP-05-05X	6.0 to 7.0	1
LGP-09-05X (1)	7.0 to 14.5	7.5
LGP-05-06X	6.0 to 7.0	1
LGP-09-06X	7.0 to 12.0	5
LGP-05-07X (2)	3.0 to 4.0	1
LGP-05-08X	6.0 to 7.0	1
LGP-09-08X	7.0 to 19.0	12
LGP-05-09X	6.0 to 7.0	1
LGP-09-09X	7.0 to 19.0	12
LGP-05-10X	6.0 to 7.0	1
LGP-09-10X	7.0 to 14.0	7
LGP-05-11X	5.0 to 6.0	1
LGP-09-11X	7.0 to 14.0	7
LGP-05-13X	2.0 to 3.0	1
LGP-05-14X	6.0 to 7.0	1
LGP-09-15X	4.0 to 10.0	6

Notes:

(1) Bedrock was encountered at a depth of 15 ft bgs. Proposed total depth (19.60 ft) was unattainable due to refusal.

(2) Bedrock was encountered at a depth of 4 ft bgs. Installation of additonal gas probe was unattainable due to refusal.

Table 3-1
Operations Summary - GWTP
January 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
1/1/2019	24	71,700	49.8	System online and operating.
1/2/2019	24	74,900	52.0	System online and operating. FBRO pumped out. Air sparged IPC. Manually pumped excess sludge.
1/3/2019	24	77,300	53.7	System online and operating.
1/4/2019	24	78,000	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
1/5/2019	24	78,200	54.3	System online and operating.
1/6/2019	24	77,300	53.7	System online and operating.
1/7/2019	9.0	31,200	57.8	System offline at 0900 for CIP activities.
1/8/2019	8.5	28,600	56.1	System online at 1530 following CIP activities.
1/9/2019	24	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
1/10/2019	24	78,100	54.2	System online and operating.
1/11/2019	24	73,800	51.3	System online and operating. Air sparged IPC. Manually pumped excess sludge.
1/12/2019	24	72,200	50.1	System online and operating.
1/13/2019	24	71,100	49.4	System online and operating.
1/14/2019	24	72,100	50.1	System online and operating. Air sparged IPC. Manually pumped excess sludge.
1/15/2019	24	79,000	54.9	System online and operating. FBRO pumped out. Air sparged IPC. Manually pumped excess sludge.
1/16/2019	24	84,200	58.5	System online and operating. Air sparged IPC. Manually pumped excess sludge.
1/17/2019	24	84,100	58.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
1/18/2019	24	77,900	54.1	System online and operating. Air sparged IPC. Manually pumped excess sludge.
1/19/2019	24	72,200	50.1	System online and operating.
1/20/2019	24	70,700	49.1	System online and operating.
1/21/2019	21.3	67,100	52.6	System offline from 1645 to 1800 due to a MF pump alarm. Reset pump and restarted system. System offline at 2230 due to a Cl2 alarm.
1/22/2019	5.0	19,100	63.7	System on intermittently from 1015 to 1515 in an attempt to diagnose Cl2 alarm from 1/21/19.
1/23/2019	0.0	1,900	0.0	System offline.
1/24/2019	16.0	52,700	54.9	System online at 0800 after correcting NaClO2 dosage.
1/25/2019	24	75,500	52.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
1/26/2019	24	71,700	49.8	System online and operating.
1/27/2019	24	71,700	49.8	System online and operating.
1/28/2019	24	71,400	49.6	System online and operating. Air sparged IPC. Manually pumped excess sludge.
1/29/2019	11.3	35,100	52.0	System offline at 1115 to allow for special sludge waste disposal operations.
1/30/2019	9.5	29,300	51.4	System online at 1430 following special sludge waste disposal operations.
1/31/2019	24	77,900	54.1	System online and operating. Air sparged IPC. Manually pumped excess sludge.

Total	**632.5**	**2,004,100**	
Total Available Hours	**744**	**Average On-line Flow**	**52.8**
Percent Online	**85**		

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
February 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
2/1/2019	23.5	76,100	54.0	System offline between 1030 and 1100 to change Cl2 cylinders. Air sparged IPC. Manually pumped excess sludge.
2/2/2019	24	78,200	54.3	System online and operating.
2/3/2019	24	78,200	54.3	System online and operating.
2/4/2019	9.3	31,700	57.1	System offline at 0915 for CIP activities.
2/5/2019	8.8	29,800	56.8	System online at 1515 following CIP activities.
2/6/2019	24	78,400	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
2/7/2019	24	78,600	54.6	System online and operating.
2/8/2019	24	77,600	53.9	System online and operating. Air sparged IPC. Manually pumped excess sludge.
2/9/2019	24	78,100	54.2	System online and operating.
2/10/2019	24	77,900	54.1	System online and operating.
2/11/2019	24	78,200	54.3	System online and operating. Air sparged IPC. Manually pumped excess sludge.
2/12/2019	24	76,900	53.4	System online and operating. FBRO pumped out. Air sparged IPC. Manually pumped excess sludge.
2/13/2019	24	78,800	54.7	System online and operating.
2/14/2019	24	77,500	53.8	System online and operating.
2/15/2019	24	77,900	54.1	System online and operating. Air sparged IPC. Manually pumped excess sludge.
2/16/2019	24	78,400	54.4	System online and operating.
2/17/2019	24	78,200	54.3	System online and operating.
2/18/2019	24	78,000	54.2	System online and operating.
2/19/2019	24	78,000	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
2/20/2019	24	78,400	54.4	System online and operating.
2/21/2019	24	77,900	54.1	System online and operating.
2/22/2019	24	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
2/23/2019	24	77,500	53.8	System online and operating.
2/24/2019	24	78,500	54.5	System online and operating.
2/25/2019	17.5	59,700	56.9	System offline between 0815 and 1445 for one-day CIP.
2/26/2019	23.3	74,600	53.5	System was offline between 1015 and 1100 for floor sump maintenance. FBRO pumped out. Air sparged IPC. Manually pumped excess sludge.
2/27/2019	24	78,300	54.4	System online and operating.
2/28/2019	23.5	76,400	54.2	System offline between 0815 and 0845 for NaClO2 delivery. Air sparged IPC. Manually pumped excess sludge.

Total	**633.8**	**2,066,100**	
Total Available Hours	**672**	**Average On-line Flow**	**54.3**
Percent Online	**94**		

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
March 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
3/1/2019	24	77,400	53.8	System online and operating. Air sparged IPC. Manually pumped excess sludge.
3/2/2019	24	78,800	54.7	System online and operating.
3/3/2019	24	78,800	54.7	System online and operating.
3/4/2019	9.0	31,100	57.6	System offline at 0900 for CIP activities.
3/5/2019	7.8	25,800	55.5	System online at 1615 following CIP activities.
3/6/2019	24	78,000	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
3/7/2019	24	79,000	54.9	System online and operating.
3/8/2019	24	77,900	54.1	System online and operating. Air sparged IPC. Manually pumped excess sludge.
3/9/2019	24	78,600	54.6	System online and operating. Air sparged IPC. Manually pumped excess sludge.
3/10/2019	24	74,500	51.7	System online and operating.
3/11/2019	24	78,400	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
3/12/2019	24	78,100	54.2	System online and operating. FBRO pumped out. Air sparged IPC. Manually pumped excess sludge.
3/13/2019	24	78,000	54.2	System online and operating.
3/14/2019	24	78,300	54.4	System online and operating.
3/15/2019	24	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
3/16/2019	24	78,600	54.6	System online and operating.
3/17/2019	24	78,100	54.2	System online and operating.
3/18/2019	24	77,700	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
3/19/2019	24	78,900	54.8	System online and operating.
3/20/2019	24	78,100	54.2	System online and operating.
3/21/2019	12.8	43,700	57.1	System offline at 1245 due to a ClO2 alarm.
3/22/2019	15.8	54,300	57.5	System restarted at 0815 after reseting ClO2 skid.
3/23/2019	21.5	75,900	58.8	System offline at 2130 due to a ClO2 alarm.
3/24/2019	11.5	41,600	60.3	System periodically online during day to diagnose ClO2 alarm. Full restart at 1500 following replacement of ClO2 injection pump.
3/25/2019	24	84,000	58.3	System online and operating. Air sparged IPC. Manually pumped excess sludge.
3/26/2019	24	84,200	58.5	System online and operating. FBRO pumped out. Air sparged IPC. Manually pumped excess sludge.
3/27/2019	24	83,900	58.3	System online and operating.
3/28/2019	24	84,600	58.8	System online and operating.
3/29/2019	24	84,700	58.8	System online and operating. Air sparged IPC. Manually pumped excess sludge.
3/30/2019	24	84,400	58.6	System online and operating.
3/31/2019	24	84,300	58.5	System online and operating.

Total	**678.3**	**2,268,000**	
Total Available Hours	**744**	**Average On line Flow**	**55.7**
Percent Online	**91**		

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
April 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
4/1/2019	7.8	28,300	60.9	System offline at 0745 for CIP activities.
4/2/2019	10.5	34,700	55.1	System online at 1330 following CIP activities.
4/3/2019	24	78,300	54.4	System online and operating.
4/4/2019	24	78,400	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
4/5/2019	24	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
4/6/2019	24	77,800	54.0	System online and operating.
4/7/2019	24	78,700	54.7	System online and operating.
4/8/2019	24	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
4/9/2019	24	77,600	53.9	System online and operating. FBRO pumped out. Air sparged IPC. Manually pumped excess sludge.
4/10/2019	24	77,600	53.9	System online and operating.
4/11/2019	24	78,500	54.5	System online and operating.
4/12/2019	24	77,300	53.7	System online and operating. Air sparged IPC. Manually pumped excess sludge.
4/13/2019	24	78,100	54.2	System online and operating.
4/14/2019	24	78,100	54.2	System online and operating.
4/15/2019	24	78,500	54.5	System online and operating. Air sparged IPC. Manually pumped excess sludge.
4/16/2019	24	78,100	54.2	System online and operating.
4/17/2019	24	78,100	54.2	System online and operating.
4/18/2019	24	78,000	54.2	System online and operating.
4/19/2019	24	77,800	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
4/20/2019	24	77,800	54.0	System online and operating.
4/21/2019	24	78,100	54.2	System online and operating.
4/22/2019	24	78,000	54.2	System online and operating.
4/23/2019	24	77,900	54.1	System online and operating. FBRO pumped out. Air sparged IPC. Manually pumped excess sludge.
4/24/2019	24	77,800	54.0	System online and operating.
4/25/2019	23.5	76,100	54.0	System offline between 0830 and 0900 to change Cl2 cylinders. Air sparged IPC. Manually pumped excess sludge.
4/26/2019	24	77,900	54.1	System online and operating. Air sparged IPC. Manually pumped excess sludge.
4/27/2019	24	78,200	54.3	System online and operating.
4/28/2019	24	78,100	54.2	System online and operating.
4/29/2019	24	78,000	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
4/30/2019	24	78,000	54.2	System online and operating.

Total	**689.8**	**2,246,200**	
Total Available Hours	**720**	**Average On-line Flow**	**54.3**
Percent Online	**96**		

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
May 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
5/1/2019	24.0	78,200	54.3	System online and operating.
5/2/2019	24.0	78,300	54.4	System online and operating.
5/3/2019	24.0	77,600	53.9	System online and operating. Air sparged IPC. Manually pumped excess sludge.
5/4/2019	24.0	78,300	54.4	System online and operating.
5/5/2019	24.0	78,200	54.3	System online and operating.
5/6/2019	8.5	27,800	54.5	System offline at 0830 for CIP activities.
5/7/2019	10.0	32,600	54.3	System online at 1355 following CIP activities. FBRO pumped out.
5/8/2019	24.0	78,500	54.5	System online and operating. Air sparged IPC. Manually pumped excess sludge.
5/9/2019	24.0	78,500	54.5	System online and operating.
5/10/2019	24.0	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
5/11/2019	24.0	78,400	54.4	System online and operating.
5/12/2019	24.0	78,400	54.4	System online and operating.
5/13/2019	24.0	78,000	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
5/14/2019	24.0	78,400	54.4	System online and operating.
5/15/2019	24.0	78,400	54.4	System online and operating.
5/16/2019	24.0	78,300	54.4	System online and operating.
5/17/2019	24.0	78,400	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
5/18/2019	24.0	78,300	54.4	System online and operating.
5/19/2019	24.0	78,300	54.4	System online and operating.
5/20/2019	24.0	78,300	54.4	System online and operating.
5/21/2019	24.0	77,800	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pumped out.
5/22/2019	24.0	78,300	54.4	System online and operating.
5/23/2019	24.0	78,300	54.4	System online and operating.
5/24/2019	24.0	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
5/25/2019	24.0	78,200	54.3	System online and operating.
5/26/2019	24.0	78,300	54.4	System online and operating.
5/27/2019	24.0	78,300	54.4	System online and operating.
5/28/2019	24.0	78,200	54.3	System online and operating. Air sparged IPC. Manually pumped excess sludge.
5/29/2019	24.0	78,300	54.4	System online and operating.
5/30/2019	24.0	78,200	54.3	System online and operating.
5/31/2019	24.0	78,200	54.3	System online and operating. Air sparged IPC. Manually pumped excess sludge.

Total	**714.5**	**2,329,900**	
Total Available Hours	**744**	**Average On-line Flow**	**54.3**

Percent Online	**96**

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
June 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
6/1/2019	8.0	26,300	54.8	System offline at 0800 due to a malfunction of the PLC for the chlorine dioxide skid
6/2/2019	0.0	1,000	0.0	System offline
6/3/2019	0.0	0	0.0	Conducted CIP activities.
6/4/2019	0.0	0	0.0	Conducted CIP activities. FBRO pumped out.
6/5/2019	0.0	0	0.0	System offline
6/6/2019	0.0	0	0.0	System offline
6/7/2019	0.0	0	0.0	System offline
6/8/2019	0.0	0	0.0	System offline
6/9/2019	0.0	0	0.0	System offline
6/10/2019	0.0	0	0.0	System offline
6/11/2019	0.0	0	0.0	System offline
6/12/2019	0.0	0	0.0	System offline
6/13/2019	0.0	0	0.0	System offline
6/14/2019	0.0	0	0.0	System offline
6/15/2019	0.0	0	0.0	System offline
6/16/2019	0.0	0	0.0	System offline
6/17/2019	0.0	0	0.0	System offline
6/18/2019	0.0	0	0.0	System offline
6/19/2019	0.0	0	0.0	System offline
6/20/2019	0.0	0	0.0	System offline
6/21/2019	0.0	0	0.0	System offline
6/22/2019	0.0	0	0.0	System offline
6/23/2019	0.0	0	0.0	System offline
6/24/2019	0.0	0	0.0	System offline
6/25/2019	2.0	4,800	40.0	Installed new PLC on chlorine dioxide skid. Tested system for approximately 2 hours.
6/26/2019	16.0	48,600	50.6	Continued testing system following installation of new chlorine dioxide PLC. System fully online at 1000.
6/27/2019	24.0	77,900	54.1	System online and operating. Air sparged IPC. Manually pumped excess sludge.
6/28/2019	24.0	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
6/29/2019	24.0	78,200	54.3	System online and operating.
6/30/2019	24.0	78,200	54.3	System online and operating.

Total	**122.0**	**393,300**	
Total Available Hours	**720**	**Average On-line Flow**	**53.7**
Percent Online	**17**		

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
July 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
7/1/2019	24.0	77,400	53.8	System online and operating. Air sparged IPC. Manually pumped excess sludge.
7/2/2019	24.0	78,200	54.3	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pumped out.
7/3/2019	24.0	77,800	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
7/4/2019	24.0	77,000	53.5	System online and operating.
7/5/2019	24.0	78,500	54.5	System online and operating.
7/6/2019	24.0	78,100	54.2	System online and operating.
7/7/2019	24.0	78,200	54.3	System online and operating.
7/8/2019	24.0	77,600	53.9	System online and operating. Air sparged IPC. Manually pumped excess sludge.
7/9/2019	24.0	78,100	54.2	System online and operating.
7/10/2019	24.0	77,900	54.1	System online and operating. Air sparged IPC. Manually pumped excess sludge.
7/11/2019	24.0	78,000	54.2	System online and operating.
7/12/2019	24.0	78,000	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
7/13/2019	24.0	78,400	54.4	System online and operating.
7/14/2019	24.0	77,600	53.9	System online and operating.
7/15/2019	24.0	77,700	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
7/16/2019	24.0	77,400	53.8	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pumped out.
7/17/2019	24.0	78,100	54.2	System online and operating.
7/18/2019	24.0	77,600	53.9	System online and operating.
7/19/2019	24.0	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
7/20/2019	24.0	78,300	54.4	System online and operating.
7/21/2019	24.0	78,000	54.2	System online and operating.
7/22/2019	23.0	74,300	53.8	System offline between 0900 and 1000 for ClO2 injection pump maintenance. Air Sparged IPC. Mannually pumped excess sludge.
7/23/2019	24.0	78,100	54.2	System online and operating.
7/24/2019	24.0	78,100	54.2	System online and operating.
7/25/2019	24.0	78,100	54.2	System online and operating.
7/26/2019	22.0	71,900	54.5	System offline between 0800 and 1000 for chlorine gas cylinder change. Air sparged IPC. Manually pumped excess sludge.
7/27/2019	15.0	49,200	54.7	System offline at 1500 due to VFD alarm at pump on microfilter skid.
7/28/2019	0.0	0	0.0	System offline.
7/29/2019	13.5	44,300	54.7	System online at 1030 after reseting pump VFD. Air sparged IPC. Manually pumped excess sludge.
7/30/2019	24.0	77,300	53.7	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pumped out.
7/31/2019	24.0	77,900	54.1	System online and operating.

Total	**697.5**	**2,265,400**	
Total Available Hours	**744**	**Average On-line Flow**	**54.1**
Percent Online	**94**		

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
August 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
8/1/2019	24.0	78,100	54.2	System online and operating.
8/2/2019	24.0	77,600	53.9	System online and operating. Air sparged IPC. Manually pumped excess sludge.
8/3/2019	24.0	78,400	54.4	System online and operating.
8/4/2019	24.0	78,100	54.2	System online and operating.
8/5/2019	8.0	26,500	55.2	System offline at 0800 for CIP activities.
8/6/2019	9.0	29,500	54.6	System back online at 1500 following CIP activities.
8/7/2019	24.0	78,500	54.5	System online and operating.
8/8/2019	24.0	77,600	53.9	System online and operating
8/9/2019	24.0	78,800	54.7	System online and operating. Air sparged IPC. Manually pumped excess sludge.
8/10/2019	24.0	78,100	54.2	System online and operating.
8/11/2019	24.0	78,000	54.2	System online and operating.
8/12/2019	24.0	77,800	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
8/13/2019	23.8	76,400	53.6	System offline between 0820 and 0835 due to sump maintenance. Air sparged IPC. Mannually pumped excess sludge. FBRO pump out.
8/14/2019	24.0	77,900	54.1	System online and operating.
8/15/2019	24.0	78,200	54.3	System online and operating.
8/16/2019	24.0	78,400	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
8/17/2019	24.0	78,200	54.3	System online and operating.
8/18/2019	24.0	78,100	54.2	System online and operating.
8/19/2019	24.0	77,700	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
8/20/2019	24.0	77,800	54.0	System online and operating.
8/21/2019	24.0	78,100	54.2	System online and operating.
8/22/2019	24.0	78,300	54.4	System online and operating.
8/23/2019	24.0	78,000	54.2	System online and operating. Air sparged IPC. Mannually pumped excess sludge.
8/24/2019	24.0	78,600	54.6	System online and operating.
8/25/2019	24.0	78,700	54.7	System online and operating.
8/26/2019	24.0	77,800	54.0	System online and operating. Air sparged IPC. Mannually pumped excess sludge.
8/27/2019	24.0	77,400	53.8	System online and operating. Air sparged IPC. Mannually pumped excess sludge. FBRO pump out
8/28/2019	24.0	78,100	54.2	System online and operating.
8/29/2019	24.0	77,600	53.9	System online and operating.
8/30/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
8/31/2019	21.0	69,300	55.0	System offline between 0945 and 1245 due to microfilter skid alarm. Reset microfilter pumps and restart system.

Total	**709.8**	**2,309,700**	
Total Available Hours	**744**	**Average On-line Flow**	**54.2**
Percent Online	**95**		

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
September 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
9/1/2019	24.0	77,800	54.0	System online and operating.
9/2/2019	24.0	78,200	54.3	System online and operating.
9/3/2019	24.0	77,700	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
9/4/2019	24.0	78,100	54.2	System online and operating.
9/5/2019	24.0	78,000	54.2	System online and operating.
9/6/2019	24.0	77,700	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
9/7/2019	24.0	78,000	54.2	System online and operating.
9/8/2019	24.0	77,900	54.1	System online and operating
9/9/2019	8.5	29,000	56.9	System offline at 0830 for CIP activities.
9/10/2019	7.8	24,900	53.5	System back online at 1615 following CIP activities. FBRO pumped out.
9/11/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
9/12/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
9/13/2019	24.0	78,200	54.3	System online and operating. Air sparged IPC. Manually pumped excess sludge.
9/14/2019	24.0	78,000	54.2	System online and operating.
9/15/2019	24.0	78,200	54.3	System online and operating.
9/16/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
9/17/2019	24.0	78,100	54.2	System online and operating.
9/18/2019	24.0	77,900	54.1	System online and operating.
9/19/2019	24.0	78,100	54.2	System online and operating.
9/20/2019	24.0	77,500	53.8	System online and operating. Air sparged IPC. Manually pumped excess sludge.
9/21/2019	24.0	78,100	54.2	System online and operating.
9/22/2019	24.0	78,200	54.3	System online and operating.
9/23/2019	24.0	78,200	54.3	System online and operating. Air sparged IPC. Mannually pumped excess sludge.
9/24/2019	23.8	77,100	54.0	System offline at 0855 to 0905 for FBRO pumped out. Air sparged IPC. Manually pumped excess sludge.
9/25/2019	24.0	78,500	54.5	System online and operating.
9/26/2019	24.0	77,300	53.7	System online and operating.
9/27/2019	24.0	77,900	54.1	System online and operating. Air sparged IPC. Mannually pumped excess sludge.
9/28/2019	24.0	78,100	54.2	System online and operating.
9/29/2019	24.0	78,000	54.2	System online and operating.
9/30/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Mannually pumped excess sludge.

Total	**688.1**	**2,237,100**	
Total Available Hours	**720**	**Average On-line Flow**	**54.2**

Percent Online	**96**

Note:
Flowrate in Gallons per Minute (GPM)
CIP - Clean in Place - Microfilters
FBRO - Filter Bed Roll Off
IPC -Inclined Plate Clarifier
MF - Micro-filter
EFF - effluent
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
October 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
10/1/2019	24.0	78,000	54.2	System online and operating.
10/2/2019	24.0	78,000	54.2	System online and operating.
10/3/2019	24.0	78,000	54.2	System online and operating.
10/4/2019	24.0	77,800	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
10/5/2019	24.0	78,000	54.2	System online and operating.
10/6/2019	24.0	78,200	54.3	System online and operating.
10/7/2019	9.8	34,100	58.3	System online and operating. Air sparged IPC. Manually pumped excess sludge. System offline at 0945 for CIP activities.
10/8/2019	8.5	28,700	56.3	System back online at 1521 following CIP activities.
10/9/2019	24.0	77,800	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
10/10/2019	24.0	78,100	54.2	System online and operating.
10/11/2019	23.8	77,300	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge. System offline between 0835 and 0848 for Cl2 tank change.
10/12/2019	24.0	78,100	54.2	System online and operating.
10/13/2019	24.0	78,200	54.3	System online and operating.
10/14/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
10/15/2019	24.0	78,100	54.2	System online and operating.
10/16/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
10/17/2019	19.0	62,100	54.5	System offline between 0115 and 0640 due to power loss
10/18/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
10/19/2019	24.0	78,400	54.4	System online and operating.
10/20/2019	24.0	78,000	54.2	System online and operating.
10/21/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
10/22/2019	24.0	76,900	53.4	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pump out
10/23/2019	24.0	77,600	53.9	System online and operating.
10/24/2019	24.0	78,400	54.4	System online and operating.
10/25/2019	24.0	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
10/26/2019	24.0	77,900	54.1	System online and operating.
10/27/2019	24.0	77,600	53.9	System online and operating.
10/28/2019	24.0	78,000	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
10/29/2019	24.0	77,600	53.9	System online and operating.
10/30/2019	24.0	78,000	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
10/31/2019	24.0	78,400	54.4	System online and operating.

Total	**709.0**	**2,308,000**	
Total Available Hours	**744**	**Average On-line Flow**	**54.3**
Percent Online	**95**		

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
November 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
11/1/2019	24.0	78,200	54.3	System online and operating. Air sparged IPC. Manually pumped excess sludge.
11/2/2019	24.0	77,100	53.5	System online and operating.
11/3/2019	24.0	82,400	57.2	System online and operating.
11/4/2019	24.0	77,900	54.1	System online and operating. Air sparged IPC. Manually pumped excess sludge.
11/5/2019	24.0	77,400	53.8	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pump out.
11/6/2019	24.0	77,200	53.6	System online and operating.
11/7/2019	24.0	78,400	54.4	System online and operating.
11/8/2019	24.0	77,600	53.9	System online and operating. Air sparged IPC. Manually pumped excess sludge.
11/9/2019	24.0	77,700	54.0	System online and operating.
11/10/2019	24.0	78,500	54.5	System online and operating.
11/11/2019	8.8	30,300	57.7	System offline at 0844 for CIP activities.
11/12/2019	8.8	30,000	57.1	System online at 1514 following CIP activities.
11/13/2019	24.0	78,300	54.4	System online and operating.
11/14/2019	24.0	74,300	51.6	System online and operating.
11/15/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
11/16/2019	24.0	78,200	54.3	System online and operating.
11/17/2019	24.0	78,200	54.3	System online and operating.
11/18/2019	24.0	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
11/19/2019	23.5	75,800	53.8	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pump out. System offline between 816 and 846 for floor sump pump out.
11/20/2019	24.0	77,500	53.8	System online and operating.
11/21/2019	24.0	77,200	53.6	System online and operating.
11/22/2019	24.0	79,200	55.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
11/23/2019	24.0	77,600	53.9	System online and operating.
11/24/2019	24.0	78,300	54.4	System online and operating.
11/25/2019	24.0	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
11/26/2019	24.0	77,700	54.0	System online and operating.
11/27/2019	24.0	77,300	53.7	System online and operating. Air sparged IPC. Manually pumped excess sludge.
11/28/2019	24.0	77,700	54.0	System online and operating.
11/29/2019	24.0	77,900	54.1	System online and operating.
11/30/2019	24.0	78,600	54.6	System online and operating.

Total	**689.0**	**2,241,200**	
Total Available Hours	**720**	**Average On-line Flow**	**54.2**
Percent Online	**96**		

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-1
Operations Summary - GWTP
December 2019
Shepley's Hill Landfill
Devens, Massachusetts

Date	Hours Online	Gallons Discharged	Average Effluent Flowrate	Status
12/1/2019	24.0	77,900	54.1	System online and operating.
12/2/2019	24.0	78,600	54.6	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/3/2019	24.0	77,900	54.1	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pump out.
12/4/2019	24.0	77,900	54.1	System online and operating.
12/5/2019	24.0	76,300	53.0	System online and operating.
12/6/2019	24.0	78,400	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/7/2019	24.0	78,000	54.2	System online and operating.
12/8/2019	24.0	78,100	54.2	System online and operating.
12/9/2019	8.5	31,000	60.8	System offline at 0840 for CIP activities.
12/10/2019	7.0	24,400	58.1	System online at 1655 following CIP activities.
12/11/2019	24.0	77,800	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/12/2019	15.0	49,300	54.8	System offline at 0600 due to high floor sump alarm. Replaced floor sump float, system online at 1500
12/13/2019	24.0	78,200	54.3	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/14/2019	24.0	78,200	54.3	System online and operating.
12/15/2019	24.0	78,100	54.2	System online and operating.
12/16/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/17/2019	24.0	78,100	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pump out.
12/18/2019	24.0	78,400	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/19/2019	24.0	78,100	54.2	System online and operating.
12/20/2019	24.0	77,700	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/21/2019	24.0	78,100	54.2	System online and operating.
12/22/2019	24.0	78,000	54.2	System online and operating.
12/23/2019	24.0	77,300	53.7	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/24/2019	24.0	78,300	54.4	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/25/2019	24.0	78,000	54.2	System online and operating.
12/26/2019	24.0	78,100	54.2	System online and operating.
12/27/2019	24.0	78,000	54.2	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/28/2019	24.0	78,300	54.4	System online and operating.
12/29/2019	24.0	77,800	54.0	System online and operating.
12/30/2019	24.0	77,700	54.0	System online and operating. Air sparged IPC. Manually pumped excess sludge.
12/31/2019	23.0	74,400	53.9	System online and operating. Air sparged IPC. Manually pumped excess sludge. FBRO pump out. System offline between 1030 and 1130 for Cl2 tank change.

Total	**701.5**	**2,284,500**	
Total Available Hours	**744**	**Average On-line Flow**	**54.3**

Percent Online	**94**

Note:
Flowrate in Gallons per Minute (GPM)
Clean in Place (CIP)

Table 3-2
2019 Monthly Discharge Totals - GWTP
Shepley's Hill Landfill
Devens, Massachusetts

Month	Discharge Flow (gallons)	Month	Discharge Flow (gallons)	Month	Discharge Flow (gallons)
startup 8&9/2005	213,900	Nov-10	1,869,600	Aug-15	2,454,900
Mar-06	555,800	Dec-10	1,833,600	Sep-15	2,530,300
Apr-06	833,600	Jan-11	1,907,600	Oct-15	2,577,600
May-06	941,700	Feb-11	1,766,400	Nov-15	2,522,000
Jun-06	979,000	Mar-11	1,413,900	Dec-15	2,399,400
Jul-06	646,600	Apr-11	1,834,200	Jan-16	2,583,000
Aug-06	327,200	May-11	2,064,700	Feb-16	2,209,000
Sep-06	453,500	Jun-11	1,872,000	Mar-16	2,359,700
Oct-06	597,500	Jul-11	1,642,500	Apr-16	2,242,200
Nov-06	562,500	Aug-11	1,904,500	May-16	2,366,500
Dec-06	606,800	Sep-11	1,825,500	Jun-16	2,277,300
Jan-07	739,600	Oct-11	1,438,700	Jul-16	2,369,200
Feb-07	0	Nov-11	1,907,200	Aug-16	2,344,800
Mar-07	672,400	Dec-11	1,843,300	Sep-16	2,292,000
Apr-07	854,000	Jan-12	1,814,900	Oct-16	2,347,300
May-07	974,700	Feb-12	1,641,400	Nov-16	2,259,400
Jun-07	942,200	Mar-12	1,530,400	Dec-16	2,332,600
Jul-07	970,500	Apr-12	1,512,300	Jan-17	2,318,600
Aug-07	1,563,400	May-12	1,374,700	Feb-17	2,072,500
Sep-07	1,809,100	Jun-12	1,938,100	Mar-17	2,325,100
Oct-07	1,616,000	Jul-12	1,557,500	Apr-17	2,182,300
Nov-07	1,436,200	Aug-12	1,595,800	May-17	2,287,400
Dec-07	1,629,200	Sep-12	1,807,400	Jun-17	2,234,300
Jan-08	1,589,100	Oct-12	1,729,100	Jul-17	2,289,200
Feb-08	1,418,100	Nov-12	1,979,100	Aug-17	2,249,500
Mar-08	1,596,600	Dec-12	1,915,900	Sep-17	2,337,900
Apr-08	1,586,500	Jan-13	1,776,000	Oct-17	2,328,400
May-08	1,616,300	Feb-13	1,310,700	Nov-17	1,975,400
Jun-08	1,424,400	Mar-13	1,926,400	Dec-17	2,049,700
Jul-08	1,591,800	Apr-13	2,055,600	Jan-18	2,347,800
Aug-08	1,101,700	May-13	1,492,100	Feb-18	2,108,500
Sep-08	1,652,800	Jun-13	2,055,700	Mar-18	2,340,000
Oct-08	1,238,900	Jul-13	2,023,050	Apr-18	2,208,300
Nov-08	1,649,500	Aug-13	2,185,000	May-18	2,285,700
Dec-08	1,521,400	Sep-13	1,679,300	Jun-18	2,244,200
Jan-09	1,602,500	Oct-13	1,697,700	Jul-18	2,301,600
Feb-09	1,625,700	Nov-13	1,865,600	Aug-18	2,313,500
Mar-09	909,400	Dec-13	2,054,300	Sep-18	2,215,300
Apr-09	1,292,500	Jan-14	1,905,500	Oct-18	2,276,800
May-09	1,631,000	Feb-14	1,773,000	Nov-18	903,800
Jun-09	1,793,400	Mar-14	2,108,500	Dec-18	1,404,300
Jul-09	1,830,700	Apr-14	1,696,300	Jan-19	2,004,100
Aug-09	1,935,700	May-14	2,124,000	Feb-19	2,066,100
Sep-09	1,879,100	Jun-14	1,943,600	Mar-19	2,268,000
Oct-09	1,832,600	Jul-14	2,019,100	Apr-19	2,246,200
Nov-09	1,909,100	Aug-14	2,182,900	May-19	2,329,900
Dec-09	1,773,100	Sep-14	1,871,900	Jun-19	393,300
Jan-10	2,030,000	Oct-14	1,646,600	Jul-19	2,265,400
Feb-10	1,695,500	Nov-14	1,980,900	Aug-19	2,309,700
Mar-10	1,922,900	Dec-14	1,948,100	Sep-19	2,237,100
Apr-10	1,986,900	Jan-15	1,600,100	Oct-19	2,308,000
May-10	1,997,200	Feb-15	1,779,800	Nov-19	2,241,200
Jun-10	1,882,400	Mar-15	1,992,100	Dec-19	2,284,500
Jul-10	1,606,700	Apr-15	2,198,900		
Aug-10	1,552,700	May-15	2,118,300		
Sep-10	1,207,200	Jun-15	2,071,100		
Oct-10	1,768,600	Jul-15	2,037,000		
				Cummulative Total	297,237,650

Table 3-3
2019 Filter Bed Roll-Off Disposal Totals - GWTP
Shepley's Hill Landfill
Devens, Massachusetts

Date	Sludge Removed for Disposal (Tons)
1/2/2019	11.13
1/15/2019	11.47
1/29/2019	10.50
2/12/2019	11.19
2/26/2019	10.80
3/12/2019	11.49
3/26/2019	11.33
4/9/2019	12.83
4/23/2019	10.09
5/7/2019	9.36
5/21/2019	10.94
6/4/2019	7.92
7/2/2019	9.07
7/16/2019	12.23
7/30/2019	10.05
8/13/2019	11.30
8/27/2019	11.58
9/10/2019	11.59
9/24/2019	11.67
10/8/2019	9.93
10/22/2019	11.20
11/5/2019	11.26
11/19/2019	11.72
12/3/2019	10.63
12/10/2019	10.92
12/17/2019	9.67
12/31/2019	12.20
YEARLY TOTAL	**294.02**

Note:
All Filter Bed Roll-off disposal activities completed by Gobal Remdiation Services Inc. (East Taunton, MA)
All Filter Bed Roll-off sludge disposed of at Tradebe Treatment & Recycling (Stoughton, MA)

Table 3-4
2019 Routine and Non-Routine System Maintenance, Repairs and Upgrades - GWTP
Shepley's Hill Landfill
Devens, Massachusetts

Activity	Type	Description	Shutdown Period
Routine MF Skid CIPs	Routine	Routine MF Skid CIPs are conducted monthly, or as needed, to clean and maintain each MF module.	January - 1/7/19 at 09:00 to 1/8/19 at 15:30 February - 2/4/19 at 9:15 to 2/5/19 at 15:15 February - 2/25/19 at 08:15 to 14:45 March - 3/4/19 at 09:00 to 3/5/19 at 16:15 April - 4/1/19 at 07:45 to 4/2/19 at 13:30 May - 5/6/19 at 08:30 to 5/7/19 at 13:55 June - 6/3/19 and 6/4/19 (Conducted during PLC failure) August - 8/5/19 at 08:00 to 8/6/19 at 15:00 September - 9/9/19 at 08:30 to 9/10/19 at 16:15 October - 10/7/19 at 09:45 to 10/8/19 at 15:21 November - 11/11/19 at 08:44 to 11/12/19 at 15:14 December- 12/9/19 at 08:00 to 12/10/19 at 16:00
Chlorine Gas Cylinder Replacement	Routine	Chlorine gas cylinders are replaced as necessary as part of plant operations. During replacement activities, the system is offline.	2/1/19 from 10:30 to 11:00 4/25/19 from 08:30 to 09:00 7/26/19 from 08:00 to 10:00 10/11/19 from 08:35 to 08:48 12/31/19 from 10:30 to 11:30
Air Compressor Maintenance	Routine	The air compressor requires routine annual oil changes and general maintenance.	4/1/19 - Conducted during a routine CIP to minimize downtime.
Sodium Chlorite Overdose	Non-Routine	On 1/21/19, the system was overdosed with sodium chlorite which comingled with sludge in the roll-off container. On 1/24/19, the dosing was corrected, and the sludge was removed between 1/29/19 and 1/30/19.	1/21/19 - System offline at 2230 due to alarm. 1/22/19 - 1/23/19 - System online intermittently to diagnose. 1/24/19 - System online at 0800 after correcting dosage. 1/29/19 - 1/30/19 - System offline to allow for special waste handling and disposal operations
Check Valves and Pump Head Replacement	Non-Routine	On 3/9/19, the check valves and pump head on the LMI pump were replaced due to normal operational wear.	None - System did not need to be offline for this maintenance.
Chlorine Dioxide Injection Pump Replacement	Non-Routine	On 3/21/19, the chlorine dioxide injection pump failed due to normal operational wear. The pump was replaced on 3/24/19.	3/21/19 to 3/24/19 - System was online intermintently with full operation at 1500 on 3/24/19.
Polymer Static Mixer Installation	Non-Routine	On 4/9/19, a static mixer was installed on the polymer skid.	None - System did not need to be offline for this maintenance.
Chlorine Flexable Connector (Whip) Installation	Non-Routine	On 5/3/19, a new chlorine flexable connector (whip) was installed due to normal operational wear.	None - System did not need to be offline for this maintenance.
Chlorine Regulator Rebuild	Non-Routine	On 5/13/19, the chlorine vacuum regulator was rebuilt due to leaks in the vacuum connection.	None - System did not need to be offline for this maintenance.
Chlorine Dioxide PLC Replacement	Non-Routine	On 6/1/19, the chlorine dioxide PLC failed resulting in system shutdown. The PLC was subsequently replaced, and the system was brought online on 6/26/19.	The system was offline from 6/1/19 at 0800 until 6/26/19 at 1000.
Chlorine Dioxide Injection Pump Maintenance	Non-Routine	On 7/22/19, maintenance was completed on the chlorine dioxide injection pump to repair a leak.	7/22/19 - System offline from 09:00 to 10:00 for maintenance.
Floor Sump Pump Float Replacement	Non-Routine	On 12/12/19, the floor sump pump float failed due to normal operational wear and was replaced.	12/12/19 - System offline from 0600 to 1500.

Notes:
CIP = Clean-in-Place
GWTP = groundwater treatment plant
MF = Microfilter

Table 3-5
2019 As/Fe/Mn Influent Concentrations - GWTP
Shepley's Hill Landfill - Devens, Massachusetts

		EW-01			EW-04			Total Average EW-01 and EW-04			Total Combined
Date	**Flow**	**As**	**Fe**	**Mn**	**As**	**Fe**	**Mn**	**As**	**Fe**	**Mn**	**As/Fe/Mn**
12/6/2006	40	2.77	92.00	2.47	5.00	72.00	1.75	3.89	82.00	2.11	88.00
12/6/2006	50	2.76	90.00	2.45	5.24	72.00	1.73	4.00	81.00	2.09	87.09
12/7/2006	25	2.64	87.00	2.43	4.93	70.00	1.71	3.79	78.50	2.07	84.36
8/7/2007	55	2.40	88.00	2.46	4.09	67.00	1.71	3.25	77.50	2.09	82.83
9/11/2007	55	2.58	80.00	2.32	4.04	54.00	1.52	3.31	67.00	1.92	72.23
12/27/2007	51	2.45	77	2.29	3.88	56	1.66	3.17	66.50	1.98	71.64
3/6/2008	52	2.43	74	2.2	3.74	50	1.55	3.09	62.00	1.88	66.96
6/17/2008	52	2.43	75.00	2.20	3.59	50.00	1.60	3.01	62.50	1.90	67.41
9/10/2008	52	2.22	78.00	2.22	3.60	54.00	1.78	2.91	66.00	2.00	70.91
12/2/2008	52	2.33	78.0	2.25	3.63	50.0	1.73	2.98	64.0	1.99	68.97
4/13/2009	53	2.51	81.0	2.37	3.77	55.0	1.90	3.14	68.0	2.14	73.28
6/24/2009	53	2.41	78.0	2.22	3.91	48.0	1.73	3.16	63.0	1.98	68.14
9/15/2009	54	2.32	76.0	2.14	3.72	41.0	1.56	3.02	58.5	1.85	63.37
12/15/2009	52	2.36	72.0	1.99	3.53	40.0	1.51	2.95	56.0	1.75	60.70
3/16/2010	52	2.37	73.0	2.19	3.54	38.0	1.66	2.96	55.5	1.93	60.38
6/23/2010	52	2.4	72.0	2.09	3.78	39.0	1.67	3.09	55.5	1.88	60.47
9/24/2010	50	2.79	81.0	3.3	4.29	56.0	2.19	3.54	68.5	2.75	74.79
12/22/2010	55	2.21	81.0	2.17	3.81	48.0	1.99	3.01	64.5	2.08	69.59
3/16/2011	55	2.14	76.0	2.22	4.38	42.0	1.96	3.26	59.0	2.09	64.35
6/20/2011	56	2.08	72.0	2.12	4.36	50.0	2.17	3.22	61.0	2.15	66.37
9/13/2011	56	2.04	74.0	2.05	3.75	46.0	2.16	2.90	60.0	2.11	65.00
12/20/2011	56	2.19	77.0	2.26	3.91	45.0	2.26	3.05	61.0	2.26	66.31
3/6/2012	49	2.23	81.0	2.26	3.71	47.0	2.22	2.97	64.0	2.24	69.21
6/7/2012	50	2.28	74.0	2.03	3.66	48.0	2.13	2.97	61.0	2.08	66.05
9/14/2012	50	2.31	76.0	2.13	3.15	43.0	2.04	2.73	59.5	2.09	64.31
12/5/2012	50	2.04	78.0	2.25	3.25	45.0	2.12	2.64	61.5	2.19	66.33
3/1/2013	50	2.29	73.0	2.04	3.85	45.0	2.00	3.07	59.0	2.02	64.09
6/3/2013	50	2.05	63.0	1.86	3.67	47.0	2.26	2.86	55.0	2.06	59.92
9/10/2013	50	1.91	65.0	1.97	3.44	37.0	1.98	2.68	51.0	1.98	55.65
12/9/2013	52	2.13	78.0	2.33	3.82	42.0	2.19	2.97	60.0	2.26	65.23
3/6/2014	50	1.98	72.0	2.10	3.28	42.0	2.08	2.63	57.0	2.09	61.72
6/2/2014	49	1.90	73.0	2.26	3.19	39.0	2.21	2.54	56.0	2.24	60.78
9/5/2014	50	1.83	76.1	2.32	3.20	43.9	2.44	2.52	60.0	2.38	64.90
12/4/2014	50.1	1.80	73.6	2.29	3.24	45.0	2.52	2.52	59.3	2.41	64.23
3/5/2015	56.2	2.00	75.5	2.34	3.82	50.3	2.61	2.91	62.9	2.48	68.29
6/5/2015	57.6	2.09	75.5	2.35	3.69	50.1	2.61	2.89	62.8	2.48	68.17
9/9/2015	61.7	1.89	72.5	2.28	3.28	43.3	2.39	2.59	57.9	2.34	62.82
12/7/2015	62.0	1.92	68.3	2.24	3.24	39.0	2.35	2.58	53.7	2.30	58.53
3/2/2016	55.1	1.87	64.7	2.06	3.18	36.5	2.18	2.53	50.6	2.12	55.25
6/3/2016	55.3	1.82	68.6	2.18	3.38	41.4	2.47	2.60	55.0	2.33	59.93
9/7/2016	55.3	1.82	71.7	2.13	2.99	41.9	2.32	2.41	56.8	2.23	61.43
12/2/2016	54.5	1.82	57.4	1.99	3.14	37.0	2.43	2.48	47.2	2.21	51.89
3/2/2017	54.5	1.81	61.9	2.21	3.73	38.7	2.56	2.77	50.3	2.39	55.46
6/9/2017	54.5	1.71	62.1	2.19	3.26	41.1	2.66	2.49	51.6	2.43	56.51
9/13/2017	55.0	1.91	64.1	2.18	3.47	39.9	2.47	2.69	52.0	2.33	57.02
12/11/2017	45.9	1.74	68.6	2.36	3.08	46.6	2.85	2.41	57.6	2.61	62.62
3/8/2018	54.9	1.74	64.3	2.11	3.10	42.0	2.49	2.42	53.2	2.30	57.87
6/4/2018	55.1	1.75	65.4	2.14	3.20	41.4	2.47	2.48	53.4	2.31	58.18
9/7/2018	55.4	1.60	65.1	2.25	2.83	38.8	2.49	2.22	52.0	2.37	56.54
12/17/2018	53.7	1.74	68.0	2.22	3.78	55.9	3.14	2.76	62.0	2.68	67.39
3/12/2019	55.7	1.61	64.6	2.09	3.28	41.8	2.42	2.45	53.2	2.26	57.90
7/8/2019	54.1	1.62	69.3	2.17	3.52	47.8	2.56	2.57	58.6	2.37	63.49
9/6/2019	54.2	1.63	65.3	2.09	3.11	40.1	2.29	2.37	52.7	2.19	57.26
12/6/2019	54.3	1.64	65.9	1.92	3.32	40.5	2.12	2.48	53.2	2.02	57.70

Notes:
Concentrations reported in mg/l (ppm)
Flow reported in gallons per a minute (gpm)

As = Arsenic
Fe = Iron
Mn = Manganese

Table 3-6
Influent VOC and Dissolved Gasses Concentrations - GWTP
September 6, 2019
Shepley's Hill Landfill
Devens, Massachusetts

EW-01			EW-04		
Analyte	**Result**		**Analyte**	**Result**	
Methylene Chloride	ND		Methylene Chloride	ND	
1,1-Dichloroethane	ND		1,1-Dichloroethane	ND	
Chloroform	ND		Chloroform	ND	
Carbon Tetrachloride	ND		Carbon Tetrachloride	ND	
1,2-Dichloropropane	ND		1,2-Dichloropropane	ND	
Dibromochloromethane	ND		Dibromochloromethane	ND	
1,1,2-Trichloroethane	ND		1,1,2-Trichloroethane	ND	
Tetrachloroethene	ND		Tetrachloroethene	ND	
Chlorobenzene	0.76	J	Chlorobenzene	0.57	J
Trichlorofluoromethane	ND		Trichlorofluoromethane	ND	
1,2-Dichloroethane	ND		1,2-Dichloroethane	ND	
1,1,1-Trichloroethane	ND		1,1,1-Trichloroethane	ND	
Bromodichloromethane	ND		Bromodichloromethane	ND	
trans-1,3-Dichloropropene	ND		trans-1,3-Dichloropropene	ND	
cis-1,3-Dichloropropene	ND		cis-1,3-Dichloropropene	ND	
1,1-Dichloropropene	ND		1,1-Dichloropropene	ND	
Bromoform	ND		Bromoform	ND	
1,1,2,2-Tetrachloroethane	ND		1,1,2,2-Tetrachloroethane	ND	
Benzene	1.1		Benzene	ND	
Toluene	ND		Toluene	ND	
Ethylbenzene	1.5		Ethylbenzene	ND	
Chloromethane	ND		Chloromethane	ND	
Bromomethane	ND		Bromomethane	ND	
Vinyl chloride	ND		Vinyl chloride	ND	
Chloroethane	ND		Chloroethane	ND	
1,1-Dichloroethene	ND		1,1-Dichloroethene	ND	
trans-1,2-Dichloroethe	ND		trans-1,2-Dichloroethe	ND	
Trichloroethene	ND		Trichloroethene	ND	
1,2-Dichlorobenzene	ND		1,2-Dichlorobenzene	ND	
1,3-Dichlorobenzene	ND		1,3-Dichlorobenzene	ND	
1,4-Dichlorobenzene	1.1		1,4-Dichlorobenzene	ND	
Methyl tert butyl ether	ND		Methyl tert butyl ether	ND	
p/m-Xylene	11.8		p/m-Xylene	ND	
o-Xylene	ND		o-Xylene	ND	
cis-1,2-Dichlorothene	0.65	J	cis-1,2-Dichlorothene	ND	
Methylene Bromide	ND		Methylene Bromide	ND	
1,2,3-Trichloropropane	ND		1,2,3-Trichloropropane	ND	
Styrene	ND		Styrene	ND	
Dichlorodifluoromethane	ND		Dichlorodifluoromethane	ND	
Acetone	ND		Acetone	ND	
Carbon disulfide	ND		Carbon disulfide	ND	
2-Butanone	ND		2-Butanone	ND	
4-Methyl-2-pentone	ND		4-Methyl-2-pentone	ND	
2-Hexanone	ND		2-Hexanone	ND	
Bromochloromethane	ND		Bromochloromethane	ND	
Tetrahydrofuran	ND		Tetrahydrofuran	ND	
2,2-Dichloropropane	ND		2,2-Dichloropropane	ND	
1,2-Dibromoethane	ND		1,2-Dibromoethane	ND	
1,3-Dichloropropane	ND		1,3-Dichloropropane	ND	
1,1,1,2-Tetrachloroethane	ND		1,1,1,2-Tetrachloroethane	ND	
Bromobenzene	ND		Bromobenzene	ND	
n-Butylbenzene	ND		n-Butylbenzene	ND	
sec-Butylbenzene	ND		sec-Butylbenzene	ND	
tert-Butylbenzene	ND		tert-Butylbenzene	ND	
o-Chlorotoluene	ND		o-Chlorotoluene	ND	
p-Chorotoluene	ND		p-Chorotoluene	ND	
1,2-Dibromo-3-chloropropane	ND		1,2-Dibromo-3-chloropropane	ND	
Hexachlorobutadiene	ND		Hexachlorobutadiene	ND	
Isopropylbenzene	ND		Isopropylbenzene	ND	
p-Isopropyltoluene	ND		p-Isopropyltoluene	ND	
Naphthalene	ND		Naphthalene	ND	
n-Propylbenzene	ND		n-Propylbenzene	ND	
1,2,3-Trichlorobenzene	ND		1,2,3-Trichlorobenzene	ND	
1,2,4-Trichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,3,5-Trimethylbenzene	ND		1,3,5-Trimethylbenzene	ND	
1,2,4-Trimethylbenzene	ND		1,2,4-Trimethylbenzene	ND	
Ethyl ether	7.2		Ethyl ether	3.0	
Di-Isopropyl Ether	ND		Di-Isopropyl Ether	ND	
Ethyl-tert-butyl-ether	ND		Ethyl-tert-butyl-ether	ND	
Tertiary-amyl Methyl Ether	ND		Tertiary-amyl Methyl Ether	ND	
1,4-Dioxane	ND		1,4-Dioxane	ND	
EW-01 Totals	**24.11**		**EW-04 Totals**	**3.57**	

EW-01		EW-04	
Analyte	**Result**	**Analyte**	**Result**
Methane	2,040	Methane	4.9
Ethane	ND	Ethane	ND

Notes:
J = Value is estimated. It is below the reportable detection limit but greater than the method detection limits.
ND = Non-detect at laboratory
All units in µg/L.

Table 3-7
Monthly Effluent Arsenic Sampling Results - GWTP
Shepley's Hill Landfill
Devens, Massachusetts

Date	Effluent As Conc. (ppb)	Date	Effluent As Conc. (ppb)	Date	Effluent As Conc. (ppb)	Date	Effluent As Conc. (ppb)
8/29/2005	1.5	11/17/2009	11.6	7/1/2014	45.3	5/10/2019	19.6
8/30/2005	1.2	12/15/2009	43	8/7/2014	68.0	7/8/2019	16.2
8/31/2005	17.1	12/22/2009	9.4	9/5/2014	37.7	8/9/2019	25.3
9/1/2005	1	1/7/2010	25.2	10/1/2014	10.6	9/6/2019	24.8
9/2/2005	1	2/18/2010	33.1	11/6/2014	742	10/4/2019	24.9
9/6/2005	1	3/16/2010	3.2	11/14/2014	5.2	11/8/2019	31.5
9/8/2005	0.9	4/21/2010	14.4	12/4/2014	11.1	12/9/2019	34.6
9/9/2005	3	5/13/2010	10.4	1/2/2015	34.8		
3/10/2006	0.9	6/23/2010	24.6	2/12/2015	27.5		
3/15/2006	2	7/15/2010	17.5	3/5/2015	58.4		
3/23/2006	1	8/19/2010	29	4/10/2015	6.6		
4/7/2006	2	9/24/2010	13.9	5/7/2015	6.5		
4/14/2006	1.3	10/27/2010	22.3	6/5/2015	11.1		
4/20/2006	9	11/23/2010	26.1	7/10/2015	11.2		
4/27/2006	2	12/22/2010	10.3	8/10/2015	37.4		
5/22/2006	2	1/24/2011	55.8	9/9/2015	5.5		
6/27/2006	ND	2/16/2011	9.8	10/6/2015	6.2		
7/12/2006	2	3/16/2011	14.1	11/2/2015	15.5		
8/31/2006	13	4/21/2011	17.4	12/7/2015	5.9		
9/28/2006	28	5/16/2011	7.7	1/4/2016	11.7		
10/16/2006	4	6/20/2011	5.2	2/1/2016	13.5		
11/14/2006	2	7/22/2011	4.6	3/2/2016	19.5		
12/26/2006	34	8/11/2011	2.3	4/4/2016	11.3		
1/5/2007	19	9/13/2011	38.1	5/2/016	16.0		
1/16/2007	2	10/24/2011	20.3	6/3/2016	18.6		
1/23/2007	4	11/21/2011	12.5	7/5/2016	16.0		
1/30/2007	1	12/20/2011	15.1	8/1//16	17.4		
3/22/2007	1	1/24/2012	18.2	9/7/2016	15.3		
4/11/2007	ND	2/7/2012	28.1	10/3/2016	13.5		
5/16/2007	1.2	3/6/2012	16.1	11/1/2016	15.3		
6/13/2007	1.3	4/13/2012	269.3	12/2/2016	45.1		
7/12/2007	1.4	4/30/2012	14.9	1/6/2017	13.3		
8/7/2007	1.5	5/14/2012	90.5	2/8/2017	13.1		
9/11/2007	1.3	5/25/2012	8.7	3/2/2017	39.4		
10/10/2007	1.2	6/7/2012	12.7	4/12/2017	16.8		
11/6/2007	1.3	7/2/2012	23.0	5/18/2017	17.7		
12/27/2007	1.2	8/3/2012	17.1	6/9/2017	20.6		
1/10/2008	3	9/14/2012	23.9	7/14/2017	12.1		
2/13/2008	1	10/10/2012	15.6	8/16/2017	13.8		
3/6/2008	1.1	11/6/2012	32.9	9/13/2017	1.0		
4/10/2008	1	12/5/2012	11.9	10/10/2017	2.7		
5/15/2008	1	1/2/2013	14.3	11/10/2017	0.96 J		
6/17/2008	1	2/6/2013	15.7	12/11/2017	3.3		
7/8/2008	1.25	3/1/2013	15.1	1/8/2018	7.5		
8/6/2008	1	4/3/2013	14.1	2/7/2018	42.8		
9/10/2008	5.3	5/1/2013	13.9	3/8/2018	1.4 J		
10/14/2008	1.1	6/3/2013	20.5	4/5/2018	38.4		
11/4/2008	1	7/8/2013	15.5	5/4/2018	14.4		
12/2/2008	0.87	8/5/2013	15.0	6/4/2018	13.7		
1/13/2009	1.3	9/10/2013	11.0	7/6/2018	10.9		
2/3/2009	1.6	10/2/2013	13.9	8/10/2018	9.8		
3/5/2009	1.1	11/12/2013	19.2	9/7/2018	10.5		
4/13/2009	24.7	12/9/2013	20.7	10/4/2018	11.7		
5/26/2009	6.1	1/6/2014	17.8	11/12/2018	10.6		
6/24/2009	25.2	2/6/2014	20.2	12/17/2018	12.5		
7/16/2009	6.3	3/6/2014	19.2	1/11/2019	10.9		
8/18/2009	9.7	4/3/2014	15.1	2/8/2019	18.1		
9/15/2009	3.5	5/5/2014	19.3	3/12/2019	38.4		
10/20/2009	15.5	6/9/2014	7.2	4/5/2019	35.0		

Notes:

Table includes all daily/weekly (when required) Arsenic sampling results. All units in microgram per liter (ug/L)

ND - Non-detect

Table 3-8
Quarterly Effluent Sampling Results - GWTP
Shepley's Hill Landfill
Devens, Massachusetts

Sample Date	9/2/2005	3/15/2006	6/27/2006	9/2/2006	12/26/2006	3/22/2007	6/13/2007	9/11/2007	12/27/2007	3/6/2008	6/17/2008	9/10/2008	12/2/2008	4/13/2009	6/24/2009	9/15/2009	12/8/2009	3/16/2010
Analyte																		
BOD	NA	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, Total Suspended	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Total	ND	ND	0.007	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--
Chloride	54	44	50	100	50	68	56	60	67	80	60	58	62	63	58	58	62	68
pH	6.7	5.8	6.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, Nitrate	ND	ND	ND	ND	ND	ND	0.18	0.32	0.21	0.36	0.26	0.16	0.3	0.19	0.14	0.14	0.18	0.38
Sulfate	ND	ND	ND	2.6	160	70	2.2	2.7	3.3	3	3.1	2.8	3.2	3.3	7.9	7.9	4.3	4.6
Oil & Grease	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals																		
Aluminium	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--
Anitmony	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.001	0.002	ND	0.028	0.034	0.002	0.0013	0.0013	0.0012	0.0011	0.00094	0.0053	0.00087	0.0247	0.0252	0.0035	0.043	0.0032
Barium	ND	0.02	0.03	0.02	0.015	0.029	0.023	0.023	0.023	0.023	0.022	0.024	0.022	0.022	0.023	0.024	0.021	0.022
Beryllium	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	ND	NA	NA	NA	ND	NA	NA
Chromium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	0.026	0.017	0.015	0.0049	0.0076 J	0.015	0.13	0.0096 J	0.011	0.0054 J	0.0059 J	0.01	0.015	0.0088 J
Lead	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0022 J	ND	ND
Magnesium	ND	8.5	8.8	9.1	8.4	8.1	7.5	7.1	7.6	6.9	6.9	7.1	6.8	6.8	6.9	6.6	6.5	6.4
Manganese	ND	0.87	2.1	0.26	0.876	0.709	0.001	0.0026	0.0011 J	0.0008 J	ND	0.0026 J	ND	0.017	0.02	0.0041 J	0.029	0.0026 J
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	0.0002 J	0.0002 J	0.0005 J	ND	ND	ND	ND	0.00003 J	0.00002 J	ND
Nickel	ND	ND	ND	ND	ND	0.010	0.005	--	--	--	--	--	--	--	--	--	--	--
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND	0.0009 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--
Zinc	ND	ND	ND	ND	ND	0.007	0.005	--	--	--	--	--	--	--	--	--	--	--
VOCs																		
Bis(2-ethylhexyl)phthalate	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--

Notes:

All unit in mg/l, except for pH (standard pH units)
NA: Not Analyzed
ND: Non-detect at laboratory detection limit
--: Parameter no longer required per Discharge Permit # 020
**: Metal is no longer required as part of quaterly sampling. Metal sampled as part of annual sampling per Discharge Permit # 020
All dectection limits are below discharge limits
J: Estimated value. The Target analyte concentration is below the quanitation limit (RL) but above the Method Dectection Limit (MDL)

Table 3-8
Quarterly Effluent Sampling Results - GWTP
Shepley's Hill Landfill
Devens, Massachusetts

Sample Date	6/23/2010	9/24/2010	12/22/2010	3/16/2011	6/20/2011	9/13/2011	12/20/2011	3/6/2012	6/7/2012	9/14/2012	12/5/2012	3/1/2013	6/3/2013	9/10/2013	12/9/2013	3/6/2014	6/2/2014	9/5/2014	12/4/2014	3/5/2015	6/5/2015
Analyte																					
BOD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, Total Suspended	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	67	59	73	44	28	44	42	46	36	28	43	41.2	28	35	39	37	41	39	38.7	38.0	34.0
pH	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, Nitrate	0.69	0.15	0.35	0.06	0.12	0.09 J	0.09 J	0.06 J	0.07 J	0.099 J	0.12	ND	0.081 J	0.10	0.054 J	0.077 J	0.098 J	0.43	0.43	ND	0.20
Sulfate	5.3	4.4	3.9	4	3.5	3.6	3.5	3.4	2.6	58	3.9	3.35	2.97	3.64	4.30	4.97	4.74	4.8 J	6.0 J	3.4 J	3.5
Oil & Grease	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals																					
Aluminium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anitmony	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.0246	0.0139	0.0103	0.0141	0.0052	0.0381	0.0151	0.0161	0.0127	0.0239	0.0119	0.0151	0.0205	0.0110	0.0207	0.0192	0.0072	0.0377	0.0111	0.0584	0.0111
Barium	0.018	0.025	0.021	0.024	0.018	0.023	0.023	0.023	0.022	0.020	0.023	0.023	0.020	0.021	0.023	0.025	0.023	0.025	ND	ND	ND
Beryllium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	NA	ND	**	**	**	ND	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Chromium	ND	ND	**	**	**	ND	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Copper	0.013	0.0063 J	**	**	**	0.009 J	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Lead	ND	ND	**	**	**	ND	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Magnesium	5.7	5.7	6	6	5.9	5.8	6.2	6.2	5.9	5.2	6.2	5.6	5.5	5.1	5.8	6.3	5.3	6.14	6.37	6.06	6.11
Manganese	0.017	0.656	0.007	1.09	0.912	0.66	1.1	0.757	1.15	0.031	0.279	1.27	1.19	1.40	0.908	1.59	1.64	1.62	1.55	1.69	1.67
Mercury	ND	ND	**	**	**	ND	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Nickel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	ND	ND	**	**	**	ND	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Silver	ND	ND	**	**	**	ND	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Thallium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
Bis(2-ethylhexyl)phthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

All unit in mg/l, except for pH (standard pH units)
NA: Not Analyzed
ND: Non-detect at laboratory detection limit
--: Parameter no longer requirerd per Discharge Permit # 020
**: Metal is no longer required as part of quaterly sampling. Metal sampled as part of annual sampling per Discharge Permit # 020
All dectection limits are below discharge limits
J: Estimated value. The Target analyte concentration is below the quanitation limit (RL) but above the Method Dectection Limit (MDL)

Table 3-8
Quarterly Effluent Sampling Results - GWTP
Shepley's Hill Landfill
Devens, Massachusetts

Sample Date	9/9/2015	12/7/2015	3/2/2016	6/3/2016	9/7/2016	12/2/2016	3/2/2017	6/9/2017	9/13/2017	12/11/2017	3/8/2018	6/4/2018	9/7/2018	12/17/2018	3/12/2019	7/8/2019	9/6/2019	12/6/2019
Analyte																		
BOD	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Solids, Total Suspended	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride	33.7	33.5	34.5	34.0	33.5	33.2	34.4	34.1	35.0	34.6	36.0	35.6	36.1	37.4	32.6	37.9	34.0	35.5
pH	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrogen, Nitrate	0.34	0.22	0.13 J	0.19	0.24	0.34	0.35	0.30	0.22	0.37	0.11	0.40	0.23	0.22	0.098J	0.21	0.14	0.28
Sulfate	3.7 J	6.5 J	3.5 J	4.3 J	4.1 J	5.3 J	4.9 J	5.1 J	6.0	5.6	5.8	6.3	6.0	3.6	7.9	5.7	6.1	5.7
Oil & Grease	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals																		
Aluminium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anitmony	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.0055	0.0059	0.0195	0.0186	0.0153	0.0451	0.0394	0.0206	0.0010	0.0033	0.0014 J	0.0137	0.0105	0.0125	0.0384	0.0162	0.0248	0.0346
Barium	ND	ND	ND	ND	ND	0.0206 J	0.0206 J	0.0188 J	0.0198 J	0.0229 J	0.0221 J	0.0231 J	0.0221 J	0.0216 J	0.0147J	0.0142J	0.0154J	0.0144J
Beryllium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Chromium	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Copper	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Lead	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Magnesium	5.88	5.74	5.27	5.62	5.45	5.33	5.32	5.23	5.03 J	5.62	5.6	5.6	5.44	6.23	5.51	5.94	5.4	5.33
Manganese	1.75	1.77	1.44	1.53	1.46	1.40	1.61	1.57	1.66	1.91	1.65	1.60	1.55	1.16	0.0434	0.0184	0.0259	0.0373
Mercury	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Nickel	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Silver	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Thallium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																		
Bis(2-ethylhexyl)phthalate	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

All unit in mg/l, except for pH (standard pH units)
NA: Not Analyzed
ND: Non-detect at laboratory detection limit
--: Parameter no longer requirerd per Discharge Permit # 020
**: Metal is no longer required as part of quaterly sampling. Metal sampled as part of annual sampling per Discharge Permit # 020
All dectection limits are below discharge limits
J: Estimated value. The Target analyte concentration is below the quanitation limit (RL) but above the Method Dectection Limit (MDL)

Table 3-9
Annual Effluent Sampling Results - GWTP
September 6, 2019
Shepley's Hill Landfill
Devens, Massachusetts

Analyte	Conc. (mg/l)	Analyte	Conc. (mg/l)	Analyte	Conc. (mg/l)	Analyte	Conc. (mg/l)
VOCs		**Semi-volatiles**		**Pesticdes and PCBSs**		**Metals and TPH**	
Acetone	ND	1,2,4-Trichlorobenzene	ND	Aldrin	ND	Cadmium	ND
Acrolein	ND	1-Methylnaphthalene	ND	Alpha-BHC	ND	Chromium (Total)	ND
Acrylonitrile	ND	2,4,5-Trichlorophenol	ND	Beta-BHC	ND	Copper	ND
Benzene	ND	2,4,6-Trichlorophenol	ND	Delta-BHC	ND	Lead	ND
Bromodichloromethane	ND	2,4-Dichlorophenol	ND	Chlordane	ND	Mercury	ND
Bromoform	ND	2,4-Dinitrololuene	ND	cis-Chlordane	ND	Selenium	ND
Bromomethane	ND	2,6-Dinitrololuene	ND	trans-Chlordane	ND	Silver	ND
2-Butanone	ND	2-Chloronaphthalene	ND	Dieldrin	ND		
Carbon disulfide	ND	2-Chlorophenol	ND	4,4'-DDD	ND	TPH	1.0 J
Carbon tetrachloride	ND	2-Methylnapthalene	ND	4,4'-DDE	ND		
Chlorobenzene	ND	2-Methylphenol	ND	4,4'-DDT	ND		
Chloroethane	ND	2-Nitroaniline	ND	Endosulfan I	ND		
2-Chloroethyl vinyl ether	ND	2-Nitrophenol	ND	Endosulfan II	ND		
Chloroform	ND	3-Methylphenol/4-Methylphenol	ND	Endosulfan sulfate	ND		
Chloromethane	ND	3-Nitroaniline	ND	Endrin	ND		
Dibromochloromethane	ND	4,6-Dinitro-o-cresol	ND	Endrin aldehyde	ND		
Dibromomethane	ND	4-Bromophenyl phenyl ether	ND	Endrin ketone	ND		
1,2-Dichlorobenzene	ND	4-Chloroaniline	ND	Heptachlor	ND		
1,3-Dichlorobenzene	ND	4-Chlorophenyl phenyl ether	ND	Heptachlor epoxide	ND		
1,4-Dichlorobenzene	ND	4-Nitroaniline	ND	Lindane	ND		
1,1-Dichloroethane	ND	4-Nitrophenol	ND	Methoxychlor	ND		
1,2-Dichloroethane	ND	Acenaphthylene	ND	Toxaphene	ND		
1,1-Dichloroethene	ND	Acenapthene	ND				
cis-1,2-Dichloroethene	ND	Anthracene	ND	Aroclor 1016	ND		
trans-1,2-Dichloroethene	ND	Azobenzene	ND	Aroclor 1221	ND		
1,2-Dichloropropane	ND	Benzo(a)anthracene	ND	Aroclor 1232	ND		
cis-1,3-Dichloropropene	ND	Benzo(a)pyrene	ND	Aroclor 1242	ND		
trans-1,3-Dichloropropene	ND	Benzo(b)fluoranthene	ND	Aroclor 1248	ND		
Ethylbenzene	ND	Benzo(ghi)perylene	ND	Aroclor 1254	ND		
2-Hexanone	ND	Benzo(k)fluoranthene	ND	Aroclor 1260	ND		
4-Methyl-2-pentanone	ND	Benzoic Acid	ND				
Methylene chloride	ND	Benzyl Alcohol	ND				
Styrene	ND	Bis(2-chloroethoxy) methane	ND				
1,1,2,2-Tetrachloroethane	ND	Bis(2-chloroethyl)ether	ND				
Tetrachloroethene	ND	Bis(2-chloroisopropyll)ether	ND				
Toluene	ND	Bis(2-ethylhexy)phthalate	ND				
1,1,1-Trichloroethane	ND	Butyl benzyl phthalate	ND				
1,1,2-Trichloroethane	ND	Carbazole	ND				
Trichloroethene	ND	Chrysene	ND				
Trichlorofluoromethane	ND	Dibenzo(a,h)anthracene	ND				
Vinyl acetate	ND	Dibenzofuran	ND				
Vinyl chloride	ND	Diethyl phthalate	ND				
o-Xylene	ND	Dimethyl phthalate	ND				
p/m-Xylene	ND	Di-n-butylphthalate	ND				
Xylene (Total)	ND	Di-n-octylphthalate	ND				
		Flourene	ND				
		Fluoranthene	ND				
		Hexachlorobenzene	ND				
		Hexachlorobutadiene	ND				
		Hexachlorocyclopentadiene	ND				
		Hexachloroethane	ND				
		Indeno(1,2,3-cd)pyrene	ND				
		Isophorone	ND				
		Naphthalene	ND				
		NDPA/DPA	ND				
		Nitrobenzene	ND				
		n-Nitrosodimethylamine	ND				
		n-Nitrosodi-n-propylamine	ND				
		p-Chloro-m-cresol	ND				
		Pentachlorophenol	ND				
		Phenanthrene	ND				
		Phenol	ND				
		Pyrene	ND				

Notes:
ND - Non-detect
J is estimated value - the target analyte concentration is below the quanitation limit but above the method dectection limit (TPH).

Table 5-1
LTMMP Sampling Program - 2019
Shepley's Hill Landfill - Devens Massachusetts

Monitoring Frequency	Well ID	TOR Elevation (ft)	Screen Interval (ft bgs)	Screen Elevation (ft)	Formation Type at Screen Interval	DQO for Inclusion into the LTMMP Addendum
UPGRADIENT AREA						
Annual	SHL-12	248.62	15.0 - 30.0	233.62 - 218.62	Overburden	Wells upgradient of source are necessary for determining groundwater parameters o what is entering the source zone
	SHL-15	259.92	14.5 - 24.5	245.42 - 235.42	Overburden	Wells upgradient of source are necessary for determining groundwater parameters o what is entering the source zone
	SHL-24	238.75	110.0 - 120.0*	128.75 - 118.75	Overburden/Till/Bedrock	Wells upgradient of source are necessary for determining groundwater parameters o what is entering the source zone
	SHL-7	236.33	11.0 - 21.0	225.33 - 215.33	Overburden	Wells upgradient of source are necessary for determining groundwater parameters o what is entering the source zone
	SHM-93-10D	248.01	46.0 - 56.0	202.01 - 192.01	Bedrock	Wells upgradient of source are necessary for determining groundwater parameters o what is entering the source zone
	SHM-93-18B	237.31	78.5 - 88.5	158.81 - 148.81	Overburden	Wells upgradient of source are necessary for determining groundwater parameters o what is entering the source zone
	SHM-93-24A	238.42	13.2 - 23.2	225.22 - 215.22	Overburden	Wells upgradient of source are necessary for determining groundwater parameters o what is entering the source zone
LANDFILL AREA						
Annual	N5-P1	242.65	95.5 - 97.5*	147.15 - 145.15	Bedrock	Well provides the bedrock monitoring within the landfill source area. Sampled historically, use to chart trends in source zone chemistry
	SHM-10-07	246.82	40.0 - 50.0	206.82 - 196.82	Mid-depth Overburden	Provides and additional sampling point within the landfill, east of historically sampl wells.
	SHM-10-11	263.76	50.0 - 60.0	213.76 - 203.76	Deep Overburden	Wells upgradient of source are necessary for determining groundwater parameters o what is entering the source zone
	SHM-10-12	255.17	45.0 - 55.0	210.17 - 200.17	Mid-depth Overburden	Provides and additional sampling point within the landfill, south of historically sampled wells.
	SHM-10-13	244.77	60.0 - 70.0	184.77 - 174.77	Deep Overburden	Provides and additional sampling point within the landfill, east of historically sampl wells.
	SHM-10-14	237.62	60.0 - 80.0	177.62 - 157.62	Deep Overburden	Provides and additional sampling point within the landfill, north of historically sampled wells.
	SHM-10-15	243.68	45.0 - 55.0	198.68 - 188.68	Mid-depth Overburden	Provides and additional sampling point within the landfill, south and east of historically sampled wells
	SHP-99-29X	243.34	19.0 - 29.0	254.16 - 244.16	Shallow Overburden	Similar screen interval/close proximity to N5-P2 but much higher As conc. Sampled historically, use to chart trends in source zone chem.
Semi-Annual	SHP-2016-07A	265.30	22.0 - 32.0	243.30 - 233.30	Bedrock	New well provides the bedrock monitoring adjacent the landfill source area and Shepley's Hil
	SHP-2016-07B	265.33	70.0 - 80.0	195.33 - 185.33	Bedrock	New well provides the bedrock monitoring adjacent the landfill source area and Shepley's Hill
BARRIER WALL AREA						
Annual	SHL-3	246.95	24.0 - 34.0	222.95 - 212.95	Mid-Overburden	Added to annual sampling to monitor As concentrations as groundwater upgradient of the barrier wall.
Semi-Annual	PZ-12-01	237.55	24.0 - 34.0	213.55 - 203.55	Shallow Overburden	Supplemental barrier wall performance monitoring of As concentrations on downgradient side of barrier wall.
	PZ-12-02	237.79	24.0 - 34.0	213.79 - 203.79	Shallow Overburden	Supplemental barrier wall performance monitoring of As concentrations on upgradient side of barrier wall.
	PZ-12-03	236.40	22.0 - 32.0	214.4 - 204.40	Shallow Overburden	Supplemental barrier wall performance monitoring of As concentrations on downgradient side of barrier wall.
	PZ-12-04	238.20	22.0 - 32.0	216.2 - 206.20	Shallow Overburden	Supplemental barrier wall performance monitoring of As concentrations on upgradient side of barrier wall.
	PZ-12-05	238.73	26.0 - 36.0	212.73 - 202.73	Mid-Overburden	Supplemental barrier wall performance monitoring of As concentrations on downgradient side of barrier wall.
	PZ-12-06	242.18	26.0 - 36.0	216.18 - 206.18	Mid-Overburden	Supplemental barrier wall performance monitoring of As concentrations on upgradient side of barrier wall.
	PZ-12-07	244.59	18.0 - 28.0	226.59 - 216.59	Mid-Overburden	Supplemental barrier wall performance monitoring of As concentrations on downgradient side of barrier wall.
	PZ-12-08	244.83	18.0 - 28.0	226.83 - 216.83	Mid-Overburden	Supplemental barrier wall performance monitoring of As concentrations on upgradient side of barrier wall.
	PZ-12-09	241.93	22.0 - 32.0	219.93 - 209.93	Shallow Overburden	Supplemental barrier wall performance monitoring of As concentrations on downgradient side of barrier wall.
	PZ-12-10	242.28	22.0 - 32.0	220.28 - 210.28	Shallow Overburden	Supplemental barrier wall performance monitoring of As concentrations on upgradient side of barrier wall.
	SHL-10	248.02	24.0 - 39.0	224.02 - 216.02	Shallow Overburden	Historically sampled bi-annually; remains part of LTM plan to monitor As concentrations on the downgradient/southern side of barrier wall
	SHL-11	235.47	12.0 - 27.0	223.47 - 208.47	Shallow Overburden	Evaluates barrier wall contaminant removal performance. Sampled historically, used to chart trends in source zone chemistry.
	SHL-19	240.50	20.0 - 30.0	220.5 - 210.50	Shallow Overburden	Historically sampled annually, continued annual sampling to monitor As concentrations on downgradient side of barrier wall.
	SHL-20	235.95	39.0 - 49.0	196.95 - 186.95	Deep Overburden	Evaluates barrier wall contaminant removal performance. Sampled historically, used to chart trends in source zone chemistry.
	SHL-4	227.48	3.0 - 13.0	224.48 - 214.48	Shallow Overburden	Historically sampled annually, continued annual sampling to monitor As concentrations on downgradient side of barrier wall.
	SHM-11-02	240.73	39.0 - 49.0	201.73 - 191.73	Bedrock	Monitors potential As migration through bedrock beneath the barrier wall.
	SHM-11-06	236.17	25.0 - 35.0	211.17 - 201.17	Shallow Overburden	Added to annual sampling to monitor As concentrations in groundwater
	SHP-01-36X	223.95	3.0 - 8.0	220.95 - 215.95	Shallow Overburden	Historically sampled annually, continue annual sampling to monitor As concentrations along Plow Shop Pond boundary.
	SHP-01-37X	222.79	1.0 - 6.0	221.79 - 216.79	Shallow Overburden	Historically sampled annually, continue annual sampling to monitor As concentrations along Plow Shop Pond boundary.
	SHP-01-38A	220.86	1.5 - 6.5	219.36 - 214.36	Shallow Overburden	Historically sampled annually, continue annual sampling to monitor As concentrations along Plow Shop Pond and downgradient of wall.
NEARFIELD AREA						
Annual	SHL-5	217.60	3.0 - 13.0	214.60 - 204.60	Shallow Overburden	Historically sampled to evaluate ATP effectiveness and trends; relatively low detects therefore a reduction to annual sampling.
	SHL-8D	220.78	68.0 - 70.0	152.78 - 150.78	Deep Overburden	Historically sampled to evaluate ATP effectiveness and trends; relatively low detects therefore a reduction to annual sampling.
	SHL-8S	220.97	52.0 - 54.0	168.97 - 166.97	Shallow Overburden	Historically sampled to evaluate ATP effectiveness and trends; relatively low detects therefore a reduction to annual sampling.
	SHL-9	221.95	15.0 - 25.0	206.95 - 196.95	Shallow Overburden	Historically sampled to evaluate ATP effectiveness and trends; relatively low detects therefore a reduction to annual sampling.
	SHL-22	219.58	105.0 - 115.0	114.58 - 104.58	Deep Overburden/Till	Historically sampled to evaluate ATP effectiveness and trends; relatively low detects therefore a reduction to annual sampling.
	SHL-23	241.29	23.0 - 33.0	218.29 - 208.29	Overburden	Historically sampled biannually to monitor potential western migration route downgradient of source area.
	SHM-05-41A	222.48	42.0 - 44.0	180.48 - 178.48	Shallow Overburden	Sampled historically, to evaluate ATP effectiveness and trends.
	SHM-05-42A	216.81	40.0 - 42.0	176.81 - 174.81	Shallow Overburden	Historically sampled to evaluate ATP effectiveness and trends; relatively low detects therefore a reduction to annual sampling.
	SHM-05-42B	216.80	70.0 - 72.0	146.8 - 144.80	Mid-depth Overburden	Historically sampled to evaluate ATP effectiveness and trends; relatively low detects therefore a reduction to annual sampling.
	SHM-10-06	232.91	69.5 - 79.5	163.41 - 153.41	Deep Overburden	Added to annual sampling to provide an additional monitoring point along the eastern perimeter of landfill
	SHM-10-06A	248.54	77.0 - 87.0	171.54 - 161.54	Deep Overburden	Added to annual sampling to replace SHL-21. SHM-10-06A has a deeper screen interval and higher As concentrations than SHL-21
	SHM-10-16	219.23	75.0 - 85.0	144.23 - 134.23	Deep Overburden	Added to annual sampling to provide an additional monitoring point northwest of the ATP.
	SHM-93-22C	220.69	124.3 - 134.3	96.39 - 86.39	Deep Bedrock	Historically sampled to evaluate ATP effectiveness and trends; relatively low detects therefore a reduction to annual sampling.
	SHM-96-5C	218.39	50.0 - 60.0	168.39 - 158.39	Mid-Depth Overburden	Historically sampled historically to evaluate ATP effectiveness and trends; relatively low detects therefore a reduction to annual sampling.
Semi-Annual	EW-01 @ ATP Port	226.80	60.0 - 85.0	166.8 - 141.80	Overburden	Provides monitoring of As concentrations at the extraction wells and provide ATP effectiveness and trends.
	EW-04 @ ATP Port	227.03	70.0 - 95.0	157.03 - 132.03	Overburden	Provides monitoring of As concentrations at the extraction wells and provide ATP effectiveness and trends.
	EPA-PZ-2012-1A	223.79	20.0 - 25.0	203.79 - 198.79	Shallow Overburden	Provides an additional shallow/deep overburden sampling point east of the ATP.
	EPA-PZ-2012-1B	223.53	70.0 - 75.0	153.53 - 148.53	Deep Overburden	Provides an additional shallow/deep overburden sampling point east of the ATP.
	EPA-PZ-2012-2A	223.38	20.0 - 25.0	203.38 - 198.38	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, northeast o the ATP.
	EPA-PZ-2012-2B	223.37	75.0 - 80.0	148.37 - 143.47	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, northeast o the ATP.
	EPA-PZ-2012-3A	222.65	20.0 - 25.0	202.65 - 197.65	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, north of the ATP.
	EPA-PZ-2012-3B	222.57	70.0 - 75.0	152.57 - 147.57	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, north of the ATP.
	EPA-PZ-2012-4A	226.60	20.0 - 25.0	206.6 - 201.60	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, north of the ATP.
	EPA-PZ-2012-4B	226.39	70.0 - 75.0	156.39 - 151.39	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, north of the ATP.

Table 5-1
LTMMP Sampling Program - 2019
Shepley's Hill Landfill - Devens Massachusetts

Monitoring Frequency	Well ID	TOR Elevation (ft)	Screen Interval (ft bgs)	Screen Elevation (ft)	Formation Type at Screen Interval	DQO for Inclusion into the LTMMP Addendum
NEARFIELD AREA (continued)						
Semi-Annual	EPA-PZ-2012-5A	220.01	20.0 - 25.0	200.01 - 195.01	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	EPA-PZ-2012-5B	219.38	80.0 - 85.0	139.38 - 134.38	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	EPA-PZ-2012-6A	234.25	25.0 - 30.0	209.25 - 204.25	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	EPA-PZ-2012-6B	234.08	75.0 - 80.0	159.08 - 154.08	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	EPA-PZ-2012-7A	234.16	25.0 - 30.0	209.16 - 204.16	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	EPA-PZ-2012-7B	234.03	60.0 - 65.0	174.03 - 169.03	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-1A	227.27	13.9 - 23.0	213.37 - 204.27	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-1B	227.24	75.0 - 85.0	152.24 -142.24	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-2A	225.93	20.0 - 25.0	205.93 - 200.93	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-2B	225.95	80.0 - 85.0	145.95 - 140.95	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-3A	223.18	20.0 - 25.0	203.18 - 198.18	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-3B	223.18	80.0 - 85.0	143.18 - 138.18	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-4A	229.97	25.0 - 30.0	204.97 - 199.97	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-4B	229.75	85.0 - 90.0	144.75 - 139.75	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-5A	227.01	25.0 - 30.0	202.01 - 197.01	Shallow Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-5B	226.95	85.0 - 90.0	141.95 - 136.95	Deep Overburden	Provides an additional shallow/deep sampling point in the nearfield area, west of the ATP.
	SHP-2016-06A	241.90	81.0 - 86.0	160.90 - 155.90	Bedrock	New bedrock well cluster to monitor potential western migration route of Arsenic within the bedrock.
	SHP-2016-06B	241.89	102.0 -112.0	139.89 - 129.89	Bedrock	New bedrock well cluster to monitor potential western migration route of Arsenic within the bedrock.
	SHP-2016-06C	241.92	123.0 - 133.0	118.92 - 108.92	Bedrock	New bedrock well cluster to monitor potential western migration route of Arsenic within the bedrock.
	SHM-05-41B	222.33	62.0 - 64.0	160.33 - 158.33	Mid-depth Overburden	Sampled historically, to evaluate ATP effectiveness and trends.
	SHM-05-41C	222.57	88.0 - 93.0	134.57 - 129.57	Deep Overburden/Till	Sampled historically, to evaluate ATP effectiveness and trends.
	SHM-93-22B	219.39	82.3 - 92.3	137.09 - 127.09	Mid-depth Overburden	Sampled historically, to evaluate ATP effectiveness and trends.
	SHM-96-5B	218.92	80.0 - 90.0	138.92 - 128.92	Sand/Till	Sampled historically, to evaluate ATP effectiveness and trends.
NORTHERN IMPACT AREA						
Annual	SHM-10-02	223.03	53.0 - 63.0	170.03 - 160.03	Mid-depth Overburden	Added sample location to monitor/evaluate possible western migration route.
	SHM-10-03	232.05	58.5 - 68.5	173.55 - 163.55	Mid-depth Overburden	Added sample location to monitor/evaluate possible western migration route.
	SHM-10-04	212.61	55.0 - 65.0	157.61 - 147.61	Mid-depth Overburden	Added sample location to monitor/evaluate possible western migration route.
	SHM-10-05A	235.09	50.0 - 60.0	185.09 - 175.09	Mid-depth Overburden	Added sample location to monitor/evaluate possible western migration route.
	SHM-10-08	214.36	46.0 - 56.0	168.36 - 158.36	Deep Overburden /Till	Added sample location to monitor/evaluate possible western migration route.
	SHM-10-10	217.11	56.0 - 66.0	161.11 - 151.11	Deep Overburden /Till	Monitors the northern edge of the As impacted groundwater.
	SHM-13-01	208.08	39.0 - 49.0	169.08 - 159.08	Mid-depth Overburden	Added sample location to monitor/evaluate possible western migration route.
	SHM-13-02	218.72	60.0 - 70.0	158.72 - 148.72	Deep Overburden	Monitors the northern edge of the As impacted groundwater.
	SHM-13-05	225.14	75.0 - 85.0	150.14 - 140.14	Deep Overburden	Monitors As concentrations within the core of the As impacted groundwater
	SHM-13-14D	210.48	45.0 - 55.0	165.68 - 155.68	Deep Overburden	Monitors As concentrations within 10 to 20 feet of Nonacoicus Brook at depth.
	SHM-13-14S	210.55	5.0 - 15.0	206.03 - 196.03	Shallow Overburden	Monitors As concentrations within 10 to 20 feet of Nonacoicus Brook
	SHM-13-15	210.58	50.0 - 60.0	160.58 - 150.58	Deep Overburden	Monitors the northern edge of the As impacted groundwater.
	SHM-99-32X	221.28	72.0 - 82.0	149.28 - 139.28	Deep Overburden	Sampled historically annually. Monitors As concentrations within the core of As impacted groundwater.
	SHM-99-31C	214.60	68.0 - 78.0	146.6 - 136.60	Deep Overburden	Sampled historically annually. Monitors As concentrations within the core of As impacted groundwater at depth.
Semi-Annual	SHM-05-40X	223.19	32.0 - 34.0	191.34 - 189.34	Mid-Overburden/Till	Sampled historically annually, Monitors As concentrations within the core of the As impacted groundwater.
	SHM-07-03	227.90	25.0 - 35.0	202.9 - 192.90	Shallow Overburden	Added sample location to monitor/evaluate possible western migration route.
	SHM-07-05X	223.40	56.0 - 66.0	167.4 - 157.40	Mid-Depth Overburden	Monitors As concentrations within the core of the As impacted groundwater
	SHM-13-03	212.05	42.0 - 52.0	170.05 - 160.05	Deep Overburden /Till	Monitors the leading/northern edge of the As impacted groundwater
	SHM-13-04	227.02	20.0 - 30.0	207.02 - 197.02	Shallow Overburden	Monitors As concentrations within the core of the As impacted groundwater
	SHM-13-06	223.89	36.0 - 46.0	187.89 - 177.89	Deep Overburden/Till	Monitors As concentrations within the core of the As impacted groundwater
	SHM-13-07	225.64	27.0 - 37.0	198.64 - 188.64	Unknown	Monitors As concentrations within the core of the As impacted groundwater
	SHM-13-08	227.90	55.0 - 65.0	172.9 - 162.90	Mid Overburden/Till	Monitors As concentrations within the core of the As impacted groundwater

Notes:

TOR - top of RISER elevation using November 2017 SHL Survey data.

All elevations on Massachusetts State Planar Coordinate System of NAVD 1988.

Destroyed wells removed from program: N4-P1, N4-P2, N4-P3, and SHP-99-34A. SHP-13-03 in Nonacoicus Brook not found.

* - estimated value derived from Supplemental Groundwater Investigation (Harding ESE, 2003).

SHL Long-Term Monitoring and Maintenance Plan Update (Sovereign, Revised Septemer 2015).

SHL Long-Term Monitoring and Maintenance Plan Addendum (KGS, 2018).

ft bgs = feet below ground surface

Annual Sampling (Fall)
Semi-Annual Sampling (Spring/Fall)

Table 5-2
LTMMP Hydraulic Monitoring Program - 2019
Shepley's Hill Landfill - Devens Massachusetts

Monitoring Frequency	Well ID	TOR Elevation (ft)	Screen Interval (ft bgs)	Screen Elevation (ft)	Formation Type at Screen Interval	DQO for Inclusion within the LTMMP Addendum
UPGRADIENT AREA						
Annual	SHL-12	248.62	15.0 - 30.0	233.62 - 218.62	Overburden	Hydraulic monitoring point upgradient of the landfill
	SHL-15	259.92	14.5 - 24.5	245.42 - 235.42	Overburden	Hydraulic monitoring point upgradient of the landfill
	SHL-17	233.79	6.0 - 16.0	227.79 - 217.79	Overburden	Hydraulic monitoring point upgradient of the landfill
	SHL-24	238.75	110.0 - 120.0*	128.75 - 118.75	OB/Till/BR	Hydraulic monitoring point upgradient of the landfill
	SHM-93-24A	238.42	13.2 - 23.2	225.22 - 215.22	Overburden	Hydraulic monitoring point upgradient of the landfill
	SHL-7	236.33	11.0 - 21.0	225.33 - 215.33	Overburden	Hydraulic monitoring point upgradient of the landfill
LANDFILL AREA						
Annual	N5-P1	242.65	95.5 - 97.5	147.15 - 145.15	Bedrock	Provides hydraulic monitoring point within the landfill area
	N5-P2	242.69	23.0 - 28.0*	219.69 - 214.69	Bedrock	Provides hydraulic monitoring point within the landfill area
	N6-P1	259.02	85.5 - 87.5*	173.52 - 171.52	Bedrock	Provides hydraulic monitoring point within the landfill area
	N7-P1	255.59	66.0 - 68.0*	189.59 - 187.59	Bedrock	Provides hydraulic monitoring point within the landfill area
	N7-P2	256.04	29.0 - 34.0*	227.04 - 222.04	Overburden	Provides hydraulic monitoring point within the landfill area
	SHL-18	237.56	16.0 - 26.0	221.56 - 211.56	Overburden	Provides hydraulic monitoring point within the landfill area
	SHM-93-18B	237.31	78.5 - 88.5	158.81 - 148.81	Overburden	Provides hydraulic monitoring point within the landfill area
	SHM-10-07	246.82	40.0 - 50.0	206.82 - 196.82	Mid Overburden	Provides hydraulic monitoring point within the landfill area
	SHM-10-11	263.76	50.0 - 60.0	213.76 - 203.76	Deep Overburden	Provides hydraulic monitoring point within the landfill area
	SHM-10-12	255.17	45.0 - 55.0	210.17 - 200.17	Mid Overburden	Provides hydraulic monitoring point within the landfill area
	SHM-10-13	244.77	60.0 - 70.0	184.77 - 174.77	Deep Overburden	Provides hydraulic monitoring point within the landfill area
	SHM-10-14	237.62	60.0 - 80.0	177.62 - 157.62	Deep Overburden	Provides hydraulic monitoring point within the landfill area
	SHM-10-15	243.68	45.0 - 55.0	198.68 - 188.68	Mid Overburden	Provides hydraulic monitoring point within the landfill area
	SHP-95-27X	237.45	30.5 - 40.5	206.95 - 196.95	Overburden	Provides hydraulic monitoring point within the landfill area
	SHP-99-01C	274.15	19.7 - 29.7	254.45 - 244.45	Bedrock	Provides hydraulic monitoring point within the landfill area
	SHP-99-29X	243.34	19.0 - 29.0	254.16 - 244.16	Shallow Overburden	Provides hydraulic monitoring point within the landfill area
	SHP-99-35X	258.49	30.2 - 40.2	228.29 - 218.29	Shallow Overburden	Provides hydraulic monitoring point within the landfill area
Semi-Annual	SHP-2016-07A	265.30	22.0 - 32.0	243.30 - 233.30	Bedrock	Hydraulic monitoring point on western edge of the landfill
	SHP-2016-07B	265.33	70.0 - 80.0	195.33 - 185.33	Bedrock	Hydraulic monitoring point on western edge of the landfill
BARRIER WALL AREA						
Annual	N1-P1	229.92	65.0 - 70.0	164.92 - 159.92	Deep Overburden	Historically used for hydraulic monitoring purposes
	N1-P2	229.93	40.0 - 45.0	189.93 - 184.93	Mid Overburden	Historically used for hydraulic monitoring purposes
	N1-P3	230.08	12.0 - 17.0	218.08 - 213.08	Shallow Overburden	Historically used for hydraulic monitoring purposes
	N2-P1	222.01	35.0 - 40.0	187.01 - 182.01	Bedrock	Historically used for hydraulic monitoring purposes
	N2-P2	222.16	4.0 - 9.0	218.16 - 213.16	Shallow Water Table	Historically used for hydraulic monitoring purposes
	N3-P1	220.83	33.0 - 35.0*	187.83 - 185.83	Bedrock	Historically used for hydraulic monitoring purposes
	N3-P2	220.84	4.0 - 9.0*	216.84 - 211.84	Shallow Water Table	Historically used for hydraulic monitoring purposes
	SHL-10	248.02	24.0 - 39.0	224.02 - 216.02	Shallow Overburden	Hydraulic monitoring point further east of barrier wall
	SHM-93-10D	248.01	46.0 - 56.0	202.01 - 192.01	Bedrock	Hydraulic monitoring point upgradient of the landfill
	SHL-11	235.47	12.0 - 27.0	223.47 - 208.47	Shallow Overburden	Hydraulic monitoring point east of barrier wall
	SHL-19	240.50	20.0 - 30.0	220.5 - 210.50	Shallow Overburden	Hydraulic monitoring point east of barrier wall
	SHL-20	235.95	39.0 - 49.0	196.95 - 186.95	Deep Overburden	Hydraulic monitoring point west of barrier wall
	SHL-3	246.95	24.0 - 34.0	222.95 - 212.95	Mid-Overburden	Hydraulic monitoring point east/upgradient of barrier wall
	SHL-4	227.48	3.0 - 13.0	224.48 - 214.48	Shallow Overburden	Hydraulic monitoring point east of barrier wall
	SHM-11-02	240.73	39.0 - 49.0	201.73 - 191.73	Bedrock	Hydraulic monitoring point west of barrier wall
	SHM-11-06	236.17	25.0 - 35.0	211.17 - 201.17	Shallow Overburden	Hydraulic monitoring point north of barrier wall
	SHM-11-07	240.83	41.0 - 46.0	199.83 - 194.83	Bedrock	Hydraulic monitoring point west of barrier wall
	SHP-01-36X	223.95	3.0 - 8.0	220.95 - 215.95	Shallow Overburden	Hydraulic monitoring point north of barrier wall
	SHP-01-37X	222.79	1.0 - 6.0	221.79 - 216.79	Shallow Overburden	Hydraulic monitoring point west of barrier wall
	SHP-01-38A	220.86	1.5 - 6.5	219.36 - 214.36	Shallow Overburden	Hydraulic monitoring point west of barrier wall
	SHP-01-38B	221.03	18.0 - 23.0	203.03 - 198.03	Deep Overburden	Hydraulic monitoring point west of barrier wall
	SHP-05-43	260.17	50.5 - 60.5	209.67 - 199.67	Shallow Overburden	Hydraulic monitoring point north of barrier wall
	SHP-05-44	258.55	51.0 - 61.0	207.55 - 197.55	Mid Overburden	Hydraulic monitoring point north of barrier wall
Semi-Annual	PZ-12-01	237.55	24.0 - 34.0	213.55 - 203.55	Shallow Overburden	Hydraulic monitoring point east of barrier wall
	PZ-12-02	237.79	24.0 - 34.0	213.79 - 203.79	Shallow Overburden	Hydraulic monitoring point west of barrier wall
	PZ-12-03	236.40	22.0 - 32.0	214.4 - 204.40	Shallow Overburden	Hydraulic monitoring point east of barrier wall
	PZ-12-04	238.20	22.0 - 32.0	216.2 - 206.20	Shallow Overburden	Hydraulic monitoring point west of barrier wall
	PZ-12-05	238.73	26.0 - 36.0	212.73 - 202.73	Mid-Overburden	Hydraulic monitoring point east of barrier wall
	PZ-12-06	242.18	26.0 - 36.0	216.18 - 206.18	Mid-Overburden	Hydraulic monitoring point west of barrier wall
	PZ-12-07	244.59	18.0 - 28.0	226.59 - 216.59	Mid-Overburden	Hydraulic monitoring point east of barrier wall
	PZ-12-08	244.83	18.0 - 28.0	226.83 - 216.83	Mid-Overburden	Hydraulic monitoring point west of barrier wall
	PZ-12-09	241.93	22.0 - 32.0	219.93 - 209.93	Shallow Overburden	Hydraulic monitoring point east of barrier wall
	PZ-12-10	242.28	22.0 - 32.0	220.28 - 210.28	Shallow Overburden	Hydraulic monitoring point west of barrier wall
NEARFIELD AREA						
Annual	SHL-13	220.71	5.0 - 20.0	215.71 - 200.71	Shallow Overburden	Historically used for hydraulic monitoring purposes
	SHL-22	219.58	105.0 - 115.0	114.58 - 104.58	Deep Overburden/Till	Additional hydraulic monitoring point in nearfield
	SHL-23	241.29	23.0 - 33.0	218.29 - 208.29	Overburden	Additional hydraulic monitoring point in nearfield
	SHL-5	217.60	3.0 - 13.0	214.60 - 204.60	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHL-8D	220.78	68.0 - 70.0	152.78 - 150.78	Deep Overburden	Additional hydraulic monitoring point in nearfield
	SHL-8S	220.97	52.0 - 54.0	168.97 - 166.97	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHL-9	221.95	15.0 - 25.0	206.95 - 196.95	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHM-05-41A	222.48	42.0 - 44.0	180.48 - 178.48	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHM-05-41B	222.33	62.0 - 64.0	160.33 - 158.33	Mid Overburden	Additional hydraulic monitoring point in nearfield
	SHM-05-41C	222.57	88.0 - 93.0	134.57 - 129.57	Deep Overburden/Till	Additional hydraulic monitoring point in nearfield
	SHM-05-42A	216.81	40.0 - 42.0	176.81 - 174.81	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHM-05-42B	216.80	70.0 - 72.0	146.8 - 144.80	Mid Overburden	Additional hydraulic monitoring point in nearfield
	SHM-10-06	232.91	69.5 - 79.5	163.41 - 153.41	Deep Overburden	Additional hydraulic monitoring point in nearfield

Table 5-2
LTMMP Hydraulic Monitoring Program - 2019
Shepley's Hill Landfill - Devens Massachusetts

Monitoring Frequency	Well ID	TOR Elevation (ft)	Screen Interval (ft bgs)	Screen Elevation (ft)	Formation Type at Screen Interval	DQO for Inclusion within the LTMMP Addendum
NEARFIELD AREA (continued)						
Annual	SHM-10-06A	248.54	77.0 - 87.0	171.54 - 161.54	Deep Overburden	Additional hydraulic monitoring point in nearfield
	SHM-10-16	219.23	75.0 - 85.0	144.23 - 134.23	Deep Overburden	Additional hydraulic monitoring point in nearfield
	SHM-93-22B	219.39	82.3 - 92.3	137.09 - 127.09	Mid-depth Overburden	Additional hydraulic monitoring point in nearfield
	SHM-93-22C	220.69	124.3 - 134.3	96.39 - 86.39	Bedrock	Historically used for hydraulic monitoring purposes
	SHM-96-5B	218.92	80.0 - 90.0	138.92 - 128.92	Sand/Till	Additional hydraulic monitoring point in nearfield
	SHM-96-5C	218.39	50.0 - 60.0	168.39 - 158.39	Mid Overburden	Additional hydraulic monitoring point in nearfield
	SHP-05-45A	228.48	20.0 - 25.0	208.48 - 203.48	Shallow Overburden	Historically used for hydraulic monitoring purposes
	SHP-05-45B	229.11	65.0 - 75.0	164.11 - 154.11	Mid Overburden	Historically used for hydraulic monitoring purposes
	SHP-05-46A	228.18	20.0 - 25.0	208.18 - 203.18	Mid Overburden	Historically used for hydraulic monitoring purposes
	SHP-05-46B	227.60	65.0 - 75.0	162.60 - 152.60	Shallow Overburden	Historically used for hydraulic monitoring purposes
	SHP-05-47A	217.39	1.0 - 2.0	216.39 - 215.39	Shallow Water Table	Historically used for hydraulic monitoring purposes
	SHP-05-47B	215.40	3.0 - 4.0	212.4 - 211.40	Shallow Water Table	Historically used for hydraulic monitoring purposes
Semi-Annual	SHP-2017-01	229.63	74.0 - 79.0	155.63 - 150.63	Overburden	New hydraulic monitoring point near extraction wells
	SHP-2017-02	230.05	89.5 - 94.5	140.55 - 135.55	Overburden	New hydraulic monitoring point near extraction wells
	EPA-PZ-2012-1A	223.79	20.0 - 25.0	203.79 - 198.79	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-1B	223.53	70.0 - 75.0	153.53 - 148.53	Deep Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-2A	223.38	20.0 - 25.0	203.38 - 198.38	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-2B	223.37	75.0 - 80.0	148.37 - 143.47	Deep Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-3A	222.65	20.0 - 25.0	202.65 - 197.65	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-3B	222.57	70.0 - 75.0	152.57 - 147.57	Deep Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-4A	226.60	20.0 - 25.0	206.6 - 201.60	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-4B	226.39	70.0 - 75.0	156.39 - 151.39	Deep Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-5A	220.01	20.0 - 25.0	200.01 - 195.01	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-5B	219.38	80.0 - 85.0	139.38 - 134.38	Deep Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-6A	234.25	25.0 - 30.0	209.25 - 204.25	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-6B	234.08	75.0 - 80.0	159.08 - 154.08	Deep Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-7A	234.16	25.0 - 30.0	209.16 - 204.16	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	EPA-PZ-2012-7B	234.03	60.0 - 65.0	174.03 - 169.03	Deep Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-1A	227.27	13.9 - 23.0	213.37 - 204.27	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-1B	227.24	75.0 - 85.0	152.24 -142.24	Deep Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-2A	225.93	20.0 - 25.0	205.93 - 200.93	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-2B	225.95	80.0 - 85.0	145.95 - 140.95	Deep Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-3A	223.18	20.0 - 25.0	203.18 - 198.18	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-3B	223.18	80.0 - 85.0	143.18 - 138.18	Deep Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-4A	229.97	25.0 - 30.0	204.97 - 199.97	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-4B	229.75	85.0 - 90.0	144.75 - 139.75	Deep Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-5A	227.01	25.0 - 30.0	202.01 - 197.01	Shallow Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-5B	226.95	85.0 - 90.0	141.95 - 136.95	Deep Overburden	Additional hydraulic monitoring point in nearfield
	SHP-2016-06A	241.90	81.0 - 86.0	160.90 - 155.90	Bedrock	Additional hydraulic monitoring point in nearfield
	SHP-2016-06B	241.89	102.0 -112.0	139.89 - 129.89	Bedrock	Additional hydraulic monitoring point in nearfield
	SHP-2016-06C	241.92	123.0 - 133.0	118.92 - 108.92	Bedrock	Additional hydraulic monitoring point in nearfield
NORTHERN IMPACT AREA						
Annual	SHM-10-01	209.65	60.5 - 70.5	149.15 - 139.15	Deep Overburden/Till	Hydraulic monitoring point along western portion of NIA
	SHM-10-02	223.03	53.0 - 63.0	170.03 - 160.03	Mid Overburden	Hydraulic monitoring point along western portion of NIA
	SHM-10-03	232.05	58.5 - 68.5	173.55 - 163.55	Mid Overburden	Hydraulic monitoring point along western portion of NIA
	SHM-10-04	212.61	55.0 - 65.0	157.61 - 147.61	Mid Overburden	Hydraulic monitoring point along western portion of NIA
	SHM-10-05A	235.09	50.0 - 60.0	185.09 - 175.09	Mid Overburden	Additional hydraulic monitoring point in north impact area
	SHM-10-08	214.36	46.0 - 56.0	168.36 - 158.36	Deep OB / Till	Additional hydraulic monitoring point in north impact area
	SHM-10-10	217.11	56.0 - 66.0	161.11 - 151.11	Deep OB / Till	Additional hydraulic monitoring point in north impact area
	SHM-05-39A	221.53	37.0 - 39.0	184.53 - 182.53	Mid Overburden	Additional hydraulic monitoring point in north impact area
	SHM-05-39B	221.51	66.0 - 68.0	155.51 - 153.51	Deep Overburden	Additional hydraulic monitoring point in north impact area
	SHM-13-01	208.08	39.0 - 49.0	169.08 - 159.08	Mid Overburden	Additional hydraulic monitoring point in north impact area
	SHM-13-02	218.72	60.0 - 70.0	158.72 - 148.72	Deep Overburden	Additional hydraulic monitoring point in north impact area
	SHM-13-05	225.14	75.0 - 85.0	150.14 - 140.14	Deep Overburden	Additional hydraulic monitoring point in north impact area
	SHM-13-14D	210.68	45.0 - 55.0	165.68 - 155.68	Deep Overburden	Additional hydraulic monitoring point in north impact area
	SHM-13-14S	211.03	5.0 - 15.0	206.03 - 196.03	Shallow Overburden	Additional hydraulic monitoring point in north impact area
	SHM-13-15	210.58	50.0 - 60.0	160.58 - 150.58	Deep Overburden	Additional hydraulic monitoring point in north impact area
	SHM-99-32X	221.28	72.0 - 82.0	149.28 - 139.28	Deep Overburden	Additional hydraulic monitoring point in north impact area
	SHM-99-31A	214.34	4.0 - 14.0	210.34 - 200.34	Shallow OB / WT	Historically used for hydraulic monitoring purposes
	SHM-99-31B	214.39	50.0 - 60.0	164.39 - 154.39	Mid Overburden	Historically used for hydraulic monitoring purposes
	SHM-99-31C	214.60	68.0 - 78.0	146.6 - 136.60	Deep Overburden	Historically used for hydraulic monitoring purposes
	SHM-99-34B	224.91	74.5-79.5	150.4 - 145.4	Deep Overburden	Historically used for hydraulic monitoring purposes
	SHP-05-48A	217.31	1.0 - 2.0	216.31 - 215.31	Shallow Water Table	Historically used for hydraulic monitoring purposes
	SHP-05-48B	215.96	2.0 - 3.0	213.96 - 212.96	Shallow Water Table	Historically used for hydraulic monitoring purposes
	SHP-05-49A	216.67	1.0 - 2.0	215.67 - 214.67	Shallow Water Table	Historically used for hydraulic monitoring purposes
	SHP-05-49B	215.14	2.5 - 3.5	212.64 - 211.64	Shallow Water Table	Historically used for hydraulic monitoring purposes
Semi-Annual	SHM-05-40X	223.34	32.0 - 34.0	191.34 - 189.34	Mid Overburden/Till	Additional hydraulic monitoring point in north impact area
	SHM-07-03	227.90	25.0 - 35.0	202.9 - 192.90	Shallow Overburden	Additional hydraulic monitoring point in north impact area
	SHM-07-05X	223.40	56.0 - 66.0	167.4 - 157.40	Bedrock	Additional hydraulic monitoring point in north impact area
	SHM-13-03	212.05	42.0 - 52.0	170.05 - 160.05	Deep OB / Till	Additional hydraulic monitoring point in north impact area
	SHM-13-04	227.02	20.0 - 30.0	207.02 - 197.02	Shallow Overburden	Additional hydraulic monitoring point in north impact area
	SHM-13-06	223.89	36.0 - 46.0	187.89 - 177.89	Deep Overburden/Till	Additional hydraulic monitoring point in north impact area
	SHM-13-07	225.64	27.0 - 37.0	198.64 - 188.64	Unknown	Additional hydraulic monitoring point in north impact area
	SHM-13-08	227.90	55.0 - 65.0	172.9 - 162.90	Mid Overburden/Till	Additional hydraulic monitoring point in north impact area

Table 5-2
LTMMP Hydraulic Monitoring Program - 2019
Shepley's Hill Landfill - Devens Massachusetts

Monitoring Frequency	Well ID	TOR Elevation (ft)	Screen Interval (ft bgs)	Screen Elevation (ft)	Formation Type at Screen Interval	DQO for Inclusion within the LTMMP Addendum
SURFACE WATER						
Annual	PSP-01	218.14	--	--	Staff Gauge	Used for monitoring surface water elevations within PSP
	SHSG-13-01G	205.53	--	--	Staff Gauge	Monitor water levels in Nonacoicus Brook
	SHSG-13-02G	208.25	--	--	Staff Gauge	Monitor water levels in Nonacoicus Brook
	SHSG-13-03G	209.99	--	--	Staff Gauge	Monitor water levels in Nonacoicus Brook
	SHSG-14-01G	213.71	--	--	Staff Gauge	Monitoring water level elevations northwest outlet of PSP

Notes:
All wells included in the SHL LTM sampling program are to be gauged at minimum annually in addition to those wells listed in Table 5-1(b).
Adapted from *SHL Long Term Monitoring and Maintenance Plan Update* (Sovereign, Revised September 2015).
SHL Long-Term Monitoring and Maintenance Plan Addendum (KGS, 2018).
(*) estimated value derived from Supplemental Groundwater Investigation (Harding ESE, 2003).
ft bgs = feet below ground surface
Destroyed wells removed from program (2017): N4-P1, N4-P2, N4-P3, and SHP-99-34A
TOR - top of RISER elevation using November 2017 SHL Survey data.
All elevations on Massachusetts State Planar Coordinate System of NAVD 1988.

Annual Hydraulic Only (Fall)
Semi-Annual Hydraulic Only (Spring/Fall)

Table 5-3
Hydraulic Monitoring Data for Spring and Fall 2019
Shepley's Hill Landfill - Devens Massachusetts

Location	Well Identification	TOR Elevation (ft)	Depth to Bottom (ft bPVC)	Depth to Water (ft bTOR) April 11 2019	Groundwater Elevations (ft bTOR)[1] April 11 2019	Depth to Water (ft bTOR) October 22 2019	Groundwater Elevations (ft bTOR)[1] October 22 2019	Screen Interval (ft TOR)	Formation Type
North Impact Area	SHM-05-39A	221.53	38.5	--	--	12.45	209.08	36.74 - 38.74	M
North Impact Area	SHM-05-39B	221.51	66.28	--	--	dry	--	65.74 - 67.74	D
North Impact Area	SHM-05-40X	223.19	33.05	13.93	209.26	14.95	208.24	31.93 - 33.93	M
North Impact Area	SHM-07-03	227.90	33.20	19.5	208.40	**24.00**	**203.90**	24.94 - 34.94	S
North Impact Area	SHM-07-05X	223.40	63.90	**14.19**	**209.21**	**15.30**	**208.10**	54.83 - 64.83	B
North Impact Area	SHM-10-01	209.65	70.46	--	--	4.20	205.45	63.46 - 73.46	D
North Impact Area	SHM-10-02	223.03	63.92	--	--	18.24	204.79	55.84 - 65.84	M
North Impact Area	SHM-10-03	232.05	56.22	--	--	26.87	205.18	60.78 - 70.78	M
North Impact Area	SHM-10-04	212.61	64.05	--	--	6.69	205.92	57.61 - 67.61	M
North Impact Area	SHM-10-05A	235.09	57.50	--	--	25.72	209.37	49.68 - 59.68	M
North Impact Area	SHM-10-08	214.36	56.33	--	--	9.97	204.39	48.50 - 58.50	D
North Impact Area	SHM-10-10	217.11	66.30	--	--	11.05	206.06	57.71 - 67.71	D
North Impact Area	SHM-13-01	208.08	50.68	--	--	3.48	204.60	41.31 - 51.31	M
North Impact Area	SHM-13-02	218.72	71.88	--	--	13.03	205.69	61.80 - 71.80	D
North Impact Area	SHM-13-03	212.05	50.96	4.88	207.17	5.68	206.37	44.14 - 54.14	D
North Impact Area	SHM-13-04	227.02	29.46	18.71	208.31	19.71	207.31	19.68 - 29.68	S
North Impact Area	SHM-13-05	225.14	84.80	--	--	17.15	207.99	74.75 - 84.75	D
North Impact Area	SHM-13-06	223.89	44.94	17.00	206.89	17.72	206.17	35.66 - 45.66	D
North Impact Area	SHM-13-07	225.64	34.79	18.47	207.17	19.23	206.41	26.53 - 36.53	M
North Impact Area	SHM-13-08	227.90	64.05	20.9	207.00	20.90	207.00	54.71 - 64.71	D
North Impact Area	SHM-13-14D	210.48	56.63	--	--	3.98	206.50	48.20 - 58.20	D
North Impact Area	SHM-13-14S	210.55	17.55	--	--	4.12	206.43	8.36 - 18.36	S
North Impact Area	SHM-13-15	210.58	61.88	--	--	4.32	206.26	54.60 - 64.60	D
North Impact Area	SHM-99-31A	214.34	15.83	--	--	3.98	210.36	5.52 - 15.52	S
North Impact Area	SHM-99-31B	214.39	61.50	--	--	4.85	209.54	51.87 - 61.87	M
North Impact Area	SHM-99-31C	214.60	78.85	--	--	5.15	209.45	69.96 - 79.96	D
North Impact Area	SHM-99-32X	221.28	84.10	--	--	10.80	210.48	74.16 - 84.16	D
North Impact Area	SHP-99-34B	224.91	74.20	--	--	13.80	211.11	76.72 - 81.72	D
North Impact Area	SHP-05-48A	217.31	5.42	--	--	**3.82**	**213.49**	5.22 -6.22	S
North Impact Area	SHP-05-48B	215.96	5.25	3.20	212.76	**2.84**	**213.12**	4.93 - 5.93	S
North Impact Area	SHP-05-49A	216.67	6.02	5.50	211.17	5.68	210.99	5.33 - 6.33	S
North Impact Area	SHP-05-49B	215.14	5.40	3.97	211.17	4.18	210.96	4.25 - 6.25	S
Nearfield Area	EPA-PZ-2012-1A	223.79	27.90	10.84	212.95	12.15	211.64	23.88 -28.88	S
Nearfield Area	EPA-PZ-2012-1B	223.53	77.80	10.56	212.97	11.80	211.73	23.72 - 78.72	D
Nearfield Area	EPA-PZ-2012-2A	223.38	28.40	10.39	212.99	11.42	211.96	23.66 - 28.66	S
Nearfield Area	EPA-PZ-2012-2B	223.37	83.40	10.42	212.95	11.44	211.93	78.62 - 83.62	D
Nearfield Area	EPA-PZ-2012-3A	222.65	27.93	10.2	212.45	11.68	210.97	23.45 - 28.45	S
Nearfield Area	EPA-PZ-2012-3B	222.57	77.05	10.17	212.40	11.60	210.97	73.32 - 78.32	D
Nearfield Area	EPA-PZ-2012-4A	226.60	28.00	14.37	212.23	15.92	210.68	23.30 - 28.30	S
Nearfield Area	EPA-PZ-2012-4B	226.39	77.00	15.24	211.15	15.76	210.63	72.88 - 77.88	D
Nearfield Area	EPA-PZ-2012-5A	220.01	27.43	7.50	212.51	8.96	211.05	23.68 - 28.68	S
Nearfield Area	EPA-PZ-2012-5B	219.38	85.78	6.91	212.47	8.24	211.14	83.18 - 88.18	D
Nearfield Area	EPA-PZ-2012-6A	234.25	33.40	21.89	212.36	23.68	210.57	28.54 - 33.54	S
Nearfield Area	EPA-PZ-2012-6B	234.08	82.00	21.85	212.23	23.55	210.53	78.23 - 83.23	D
Nearfield Area	EPA-PZ-2012-7A	234.16	29.40	22.95	211.21	**27.79**	**206.37**	24.74 - 29.74	S
Nearfield Area	EPA-PZ-2012-7B	234.03	64.55	21.83	212.20	23.39	210.64	59.75 - 64.75	D
Nearfield Area	SHP-2017-01	229.63	78.35	18.54	211.09	20.17	209.46	74.0 - 79.0	O
Nearfield Area	SHP-2017-02	230.05	94.02	19.28	210.77	20.80	209.25	89.5 - 94.5	O
Nearfield Area	SHL-13	220.71	21.00	--	--	6.59	214.12	6.73 - 21.73	S
Nearfield Area	SHL-22	219.58	112.95	--	--	8.68	210.90	105.68 - 115.68	D/T
Nearfield Area	SHL-23	241.29	35.66	--	--	30.21	211.08	24.85 - 34.85	O
Nearfield Area	SHL-5	217.60	13.95	--	--	**5.65 R**	**211.95 R**	3.70 - 13.70	D
Nearfield Area	SHL-8D	220.78	69.00	--	--	8.21	212.57	70.95 - 72.95	D
Nearfield Area	SHL-8S	220.97	56.24	--	--	8.33	212.64	54.14 - 56.14	S
Nearfield Area	SHL-9	221.95	24.12	--	--	12.18	209.77	16.23 - 26.23	S
Nearfield Area	SHM-10-06	232.91	81.30	--	--	20.00	212.91	72.38 -82.38	D
Nearfield Area	SHM-10-06A	248.54	89.23	--	--	35.30	213.24	79.58 - 89.58	D
Nearfield Area	SHM-93-22B	219.39	92.70	7.12	212.27	8.48	210.91	82.55 - 92.55	M
Nearfield Area	SHM-93-22C	220.69	142.80	--	--	9.85	210.84	126.07 - 136.07	D
Nearfield Area	SHM-96-5B	218.92	88.75	6.24	212.68	7.49	211.43	81.54 - 91.54	D/T
Nearfield Area	SHM-96-5C	218.39	79.75	--	--	6.97	211.42	51.0 - 61.0	M
Nearfield Area	SHP-05-45A	228.48	27.30	--	--	17.73	210.75	22.16 - 27.16	S
Nearfield Area	SHP-05-45B	229.11	75.30	--	--	18.42	210.69	67.39 - 77.39	M
Nearfield Area	SHP-05-46A	228.18	27.30	--	--	16.95	211.23	21.87 - 26.87	M
Nearfield Area	SHP-05-46B	227.60	75.80	14.77	212.83	16.30	211.30	66.57 - 76.57	S
Nearfield Area	SHP-05-47A	217.39	6.02	4.19	213.20	5.56	211.83	5.04 - 6.04	S
Nearfield Area	SHP-05-47B	215.40	5.95	2.23	213.17	2.43	212.97	5.07 - 6.07	S
Nearfield Area	SHP-2016-06A	241.90	85.65	**27.79**	**214.11**	**30.17**	**211.73**	82.85 - 87.85	B
Nearfield Area	SHP-2016-06B	241.89	112.00	**20.31**	**221.58**	**24.05**	**217.84**	103.84 - 113.84	B
Nearfield Area	SHP-2016-06C	241.92	133.60	**19.49**	**222.43**	**23.75**	**218.17**	124.87 - 134.87	B

Table 5-3
Hydraulic Monitoring Data for Spring and Fall 2019
Shepley's Hill Landfill - Devens Massachusetts

Location	Well Identification	TOR Elevation (ft)	Depth to Bottom (ft bPVC)	Depth to Water (ft bTOR) April 11 2019	Groundwater Elevations (ft bTOR)[1] April 11 2019	Depth to Water (ft bTOR) October 22 2019	Groundwater Elevations (ft bTOR)[1] October 22 2019	Screen Interval (ft TOR)	Formation Type
Nearfield Area	SHP-2016-1A	227.27	25.82	14.65	212.62	16.85	212.47 R	15.59 - 25.59	S
Nearfield Area	SHP-2016-1B	227.24	86.50	16.19	211.05	17.75	209.49	77.56 - 87.56	D
Nearfield Area	SHP-2016-2A	225.93	27.45	13.69	212.24	15.41	210.52	22.20 - 27.20	S
Nearfield Area	SHP-2016-2B	225.95	87.98	13.78	212.17	16.29	209.66	82.22 - 87.22	D
Nearfield Area	SHP-2016-3A	223.18	27.58	10.90	212.28	12.50	210.68	22.05 - 27.05	S
Nearfield Area	SHP-2016-3B	223.18	87.74	10.91	212.27	12.37	210.81	82.05 - 87.05	D
Nearfield Area	SHP-2016-4A	229.97	32.83	17.73	212.24	24.83	205.14	27.40 - 32.40	S
Nearfield Area	SHP-2016-4B	229.75	92.70	17.57	212.18	19.10	210.65	87.18 - 92.18	D
Nearfield Area	SHP-2016-5A	227.01	32.84	14.77	212.24	16.10	210.91	27.13 - 32.13	S
Nearfield Area	SHP-2016-5B	226.95	92.71	14.77	212.18	16.28	210.67	87.07 - 92.07	D
Nearfield Area [2]	SHM-05-41A	222.48	40.75	--	--	11.95	210.53	41.76 - 43.76	S
Nearfield Area [2]	SHM-05-41B	222.33	64.05	11.60	210.73	**R**	--	61.83 - 63.83	M
Nearfield Area [2]	SHM-05-41C	222.57	87.71	10.82	211.75	12.15	210.42	97.66 - 92.66	D
Nearfield Area [2]	SHM-05-42A	216.81	44.19	--	--	8.05	208.76	43.16 - 45.16	S
Nearfield Area [2]	SHM-05-42B	216.80	73.71	--	--	7.50	209.30	73.15 - 75.15	M
Nearfield Area [2]	SHM-10-16	219.23	87.48	--	--	8.62	210.61	77.51 - 87.51	D
Landfill Area	N5-P1	242.65	99.75	--	--	**24.00**	**218.65**	97.69 - 99.69	B
Landfill Area	N5-P2	242.69	32.80	--	--	**24.25**	**218.44**	25.23 - 30.23	B
Landfill Area	N6-P1	258.60	90.78	**34.59**	**224.01**	**36.68**	**221.92**	88.39 - 90.39	B
Landfill Area	N7-P1	255.59	71.30	--	--	**31.15**	**224.44**	68.41 - 70.41	B
Landfill Area	N7-P2	256.04	37.32	--	--	31.20	224.84	31.86 - 36.86	O
Landfill Area	SHL-1	272.27	8.13	--	--	7.75	264.52	2.51 - 5.51	O
Landfill Area	SHL-18	237.56	28.51	--	--	**25.12**	**212.44**	7.89 - 27.89	O
Landfill Area	SHM-10-07	246.82	50.18	--	--	27.08	219.74	41.84 - 51.84	M
Landfill Area	SHM-10-11	263.76	62.30	38.17	225.59	40.23	223.53	52.60 - 62.60	D
Landfill Area	SHM-10-12	255.17	57.34	--	--	33.75	221.42	47.60 - 57.60	M
Landfill Area	SHM-10-13	244.77	73.30	--	--	25.95	218.82	63.26 - 73.26	D
Landfill Area	SHM-10-14	237.62	82.85	--	--	20.48	217.14	62.82 - 82.82	D
Landfill Area	SHM-10-15	243.68	56.70	--	--	24.40	219.28	46.73 - 56.73	M
Landfill Area	SHP-2016-07A	265.30	31.80	**15.56**	**249.74**	dry	--	24.32 - 34.32	B
Landfill Area	SHP-2016-07B	265.33	79.90	**22.02**	**243.31**	**35.80**	**229.53**	72.35 - 82.35	B
Landfill Area	SHP-95-27X	237.45	`42.72	--	--	14.03	223.42	32.64 - 42.64	O
Landfill Area	SHP-99-01B	273.16	10.00	--	--	9.85	263.31	5.40 - 9.40	O
Landfill Area	SHP-99-01C	274.15	32.05	--	--	**24.54**	**249.61**	21.69 - 31.69	B
Landfill Area	SHP-99-29X	243.34	30.90	20.82	222.52	23.95	219.39	20.88 - 30.88	S
Landfill Area	SHP-99-35X	258.23	41.60	34.54	223.69	36.35	**221.88**	31.96 - 41.96	S
Shepley's Hill	20-1	278.52	56.33	--	--	**39.50**	**239.02**	40.74 - 56.44	B
Shepley's Hill	27-1	270.66	66.30	--	--	**41.12**	**229.54**	60.82 - 65.82	B
Shepley's Hill	27-2	275.15	69.62	--	--	**47.45**	**227.70**	60.08 - 70.08	B
Shepley's Hill	CAP-2B	250.21	58.27	--	--	**22.80**	**227.41**	53.55 -58.55	B
Shepley's Hill	CH-1D	250.59	97.32	--	--	**21.80**	**228.79**	87.13 - 97.13	B
Shepley's Hill	CH-1S	250.63	43.00	--	--	**22.00**	**228.63**	38.17 - 43.17	B
Shepley's Hill	MW-1	251.84	11.52	--	--	dry	--	6.58 - 8.58[3]	O
Shepley's Hill	MW-11A	258.57	9.05	--	--	8.90	249.67	4.18 - 6.18[3]	O
Shepley's Hill	MW-14	256.61	9.65	--	--	dry	--	5.14 - 7.14[3]	O
Shepley's Hill	MW-16	270.23	9.56	--	--	9.55	260.68	5.18 - 7.18[3]	O
Shepley's Hill	MW-22	267.64	8.80	--	--	dry	--	4.70 - 6.70[3]	O
Shepley's Hill	MW-4-1	247.33	7.70	--	--	dry	--	3.72 - 5.72[3]	O
Shepley's Hill	MW-7	249.10	12.02	--	--	dry	--	6.98 - 8.98[3]	O
Shepley's Hill	MW-9	243.91	12.20	--	--	dry	--	7.65 - 9.65[3]	O
Shepley's Hill	Q4-1	268.38	42.32	--	--	**32.70**	**235.68**	32.18 - 42.18	B
Shepley's Hill	Q5-1	260.99	53.43	--	--	**28.53**	**232.46**	50.67 - 53.67	B
Shepley's Hill	Well 3-2	268.20	58.95	--	--	**39.53**	**228.67**	55.92 - 59.92	B
Barrier Wall	N1-P1	229.92	73.00	--	--	12.99	216.93	67.14 - 72.14	D
Barrier Wall	N1-P2	229.93	48.25	--	--	13.01	216.92	42.15 - 47.15	M
Barrier Wall	N1-P3	230.08	21.10	--	--	12.97	217.11	14.30 - 19.30	S
Barrier Wall	N2-P1	222.01	41.76	--	--	**4.65**	**217.36**	36.46 - 41.46	B
Barrier Wall	N2-P2	222.16	12.73	--	--	4.99	217.17	5.61 - 10.61	S
Barrier Wall	N3-P1	220.83	37.95	--	--	4.15	216.68	35.02 - 37.02	S
Barrier Wall	N3-P2	220.84	12.51	--	--	3.85	216.99	6.03 - 11.03	S
Barrier Wall	PZ-12-01	237.55	35.70	20.42	217.13	20.12	217.43	27.70 - 37.70	S
Barrier Wall	PZ-12-02	237.79	34.45	19.57	218.22	20.08	217.71	28.04 - 38.04	S
Barrier Wall	PZ-12-03	236.40	36.60	19.54	216.86	19.95	216.45	27.55 - 37.55	S
Barrier Wall	PZ-12-04	238.20	32.00	18.96	219.24	19.90	218.30	27.15 - 37.15	S
Barrier Wall	PZ-12-05	238.73	34.71	21.62	217.11	21.09	217.64	28.65 - 38.65	M
Barrier Wall	PZ-12-06	242.18	33.85	22.73	219.45	23.64	218.54	28.76 - 38.76	M
Barrier Wall	PZ-12-07	244.59	33.19	27.70	216.89	27.08	217.51	23.79 - 33.79	M
Barrier Wall	PZ-12-08	244.83	32.34	24.08	220.75	26.41	218.42	21.09 - 35.09	M
Barrier Wall	PZ-12-09	241.93	33.19	23.89	218.04	23.97	217.96	23.50 - 33.50	S
Barrier Wall	PZ-12-10	242.28	32.35	21.71	220.57	22.81	219.47	23.30 - 33.30	S

Table 5-3
Hydraulic Monitoring Data for Spring and Fall 2019
Shepley's Hill Landfill - Devens Massachusetts

Location	Well Identification	TOR Elevation (ft)	Depth to Bottom (ft bPVC)	Depth to Water (ft bTOR) April 11 2019	Groundwater Elevations (ft bTOR)[1] April 11 2019	Depth to Water (ft bTOR) October 22 2019	Groundwater Elevations (ft bTOR)[1] October 22 2019	Screen Interval (ft TOR)	Formation Type
Barrier Wall	SHL-10	248.02	38.62	31.14	216.88	30.56	217.46	25.40 - 40.40	S
Barrier Wall	SHL-11	235.47	29.81	18.57	216.90	18.05	217.42	13.52 - 28.52	S
Barrier Wall	SHL-19	240.50	32.52	23.56	216.94	22.97	217.53	21.91 - 31.91	S
Barrier Wall	SHL-20	235.95	49.45	17.38	218.57	18.00	217.95	40.23 - 50.23	D
Barrier Wall	SHL-3	246.95	33.95	--	--	29.35	217.60	25.15 - 35.15	M
Barrier Wall	SHL-4	227.48	14.70	10.68	216.80	10.00	217.48	4.40 - 14.40	S
Barrier Wall	SHM-11-02	240.73	68.59	21.91	218.82	**22.32**	**218.41**	41.07 - 51.07[3]	B
Barrier Wall	SHM-11-06	236.17	35.80	19.36	216.81	20.11	216.06	27.84 - 37.84	S
Barrier Wall	SHM-11-07	240.83	48.01	--	--	**22.40**	**218.43**	43.61 - 48.61	B
Barrier Wall	SHP-01-36X	223.95	12.80	7.71	216.24	6.67	217.28	6.96 - 11.98	S
Barrier Wall	SHP-01-37X	222.79	10.40	6.46	216.33	5.85	216.94	5.12 - 10.12	S
Barrier Wall	SHP-01-38A	220.86	9.07	4.05	216.81	3.32	217.54	3.59 - 8.59	S
Barrier Wall	SHP-01-38B	221.03	25.53	4.25	216.78	3.49	217.54	20.15 - 25.15	D
Barrier Wall	SHP-05-43	260.17	61.18	44.73	215.44	45.05	215.12	52.29 - 62.29	S
Barrier Wall	SHP-05-44	258.55	60.70	41.77	216.78	42.41	216.14	53.99 - 63.99	M
Barrier Wall	RSK-7	222.01	11.10	--	--	4.63	217.38	5.45 - 10.45	S
Barrier Wall	RSK-15	225.54	14.62	--	--	8.05	217.49	9.85 - 14.85	S
Barrier Wall	RSK-19	218.76	9.54	--	--	1.35	217.41	4.98 - 9.98	S
Barrier Wall	RSK-25	239.21	26.39	--	--	21.69	217.52	20.68 - 25.68	S
Barrier Wall	RSK-27	241.45	26.11	--	--	22.37	219.08	21.22 - 26.22	S
Barrier Wall	RSK-28	239.24	25.91	--	--	20.75	218.49	21.40 - 26.40	S
Barrier Wall	RSK-32	236.91	25.93	--	--	18.61	218.30	21.04 - 26.04	S
Barrier Wall	RSK-34	233.16	23.85	--	--	16.06	217.10	18.61 - 23.61	S
Barrier Wall	RSK-35	233.64	25.49	--	--	17.01	216.63	22.65 - 26.65	S
Barrier Wall	RSK-37	220.55	8.78	--	--	3.10	217.45	33.91 - 38.91	S
Upgradient	SHL-12	248.62	28.23	--	--	22.58	226.04	16.40 - 31.40	O
Upgradient	SHL-15	259.92	26.16	--	--	20.47	239.45	15.40 - 25.40	O
Upgradient	SHL-17	233.79	18.17	--	--	8.88	224.91	7.91 - 17.91	O
Upgradient	SHL-24	238.75	120.38	--	--	**15.79**	**222.96**	111.96 - 121.96	D/B
Upgradient	SHL-7	236.33	23.50	--	--	18.14	218.19	12.55 - 22.55	O
Upgradient	SHM-93-10D	248.01	58.41	--	--	**30.03**	**217.98**	48.70 - 58.70[3]	B
Upgradient	SHM-93-18B	237.31	91.17	--	--	18.64	218.67	80.60 - 90.60	O
Upgradient	SHM-93-24A	238.42	25.22	--	--	16.12	222.30	16.23 - 26.23	O
Upgradient/AOC32	32M-01-14XOB	256.56	29.49	--	--	26.38	230.18	19.56 -29.56	O
Upgradient/AOC32	32M-92-01X	260.17	25.80	--	--	11.38	248.79	15.61 - 25.61	O
Upgradient/AOC32	32Z-01-07XOB	259.48	24.34	--	--	19.38	240.10	14.50 - 24.50	O
Upgradient/AOC32	SHL-25	258.01	36.01	--	--	27.68	230.33	25.23 - 35.23	O
Upgradient/AOC32	32M-01-14XBR	255.26	42.05	--	--	**24.65**	**230.61**	35.80 - 45.80	B
Upgradient/AOC32	32M-01-15XBR	257.70	43.64	--	--	**22.57**	**235.13**	34.50 - 44.50	B
Upgradient/AOC32	32M-01-16XBR	257.50	30.11	--	--	**24.54**	**232.96**	21.0 - 31.0	B
Surface Water	PSP-01	218.14	--	1.50	216.32	2.8	217.62	(3.32 ft mark)	SW
Surface Water	SHSG-13-01G	205.53	--	--	--	1.5	203.03	(4 ft mark)	SW
Surface Water	SHSG-13-02G	208.25	--	--	--	obstructed view	--	(4 ft mark)	SW
Surface Water	SHSG-13-03G	209.99	--	--	--	obstructed view	--	(6 ft mark)	SW
Surface Water	SHSG-14-01G	213.71	--	--	--	2.3	213.01	(3 ft mark)	SW

Notes:

[1] = Groundwater Elevations used to construct 2019 SHL Annual Report Figures 5-2 and 5-3, unless rejected (**R**) or bedrock well **(bolded).** Elevations that were an anomaly from historical trends were not used in contouring. Bedrock wells were not used in contouring.
[2] = wells listed in LTMMP Table 1 as located in NIA but verified to be in Nearfield Area
[3] = screen interval approximated based boring log depth and DTB (no well construction log)
R = rejected gauging measurement or use in contouring
TOR = top of riser (referenced measuring point)
ft bPVC = feet below top of PVC riser
ft bTOR = feet below top of riser
Destroyed wells removed from program (2017): N4-P1, N4-P2, N4-P3, and SHP-99-34A
All coordinates are on the Massachusetts State Plane Coordinate System of NAD 1983 and vertically on NAVD 1988.
Control Point S127-S is referenced benchmark per 2017 Survey Report Rev 3 Nov 2017 and Survey Report Jan 2018.

S = shallow overburden
M = mid overburden
D = deep overburden
O = overburden
T = till
B = bedrock
SW = surface water
"--" = no data

Indicates well clusters where interpreted contours based on average of water levels

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
N-1, P-1 (3/4 inch, stickup)	-	**DTW (ft)**	14.24	14.39	13.31	-	17.44	-	13.89	-	14.05	-	-	16.88	-	-	-	-	-	13.86	-	-	-	14.53	-	-	-	14.02	14.39	13.8	-	14.26	-	12.99
	229.92	**GW/SW Elev. (ft)**	215.68	215.53	216.61	-	212.48	-	216.03	-	215.87	-	-	213.04	-	-	-	-	-	216.06	-	-	-	215.39	-	-	-	215.9	215.53	216.12	-	215.66	-	216.93
N-1, P-2 (3/4 inch, stickup)	-	**DTW (ft)**	13.89	14.34	13.26	-	17.44	-	13.85	-	13.95	-	-	13.84	-	-	-	-	-	13.74	-	-	-	14.44	-	-	13.84	-	13.94	13.75	-	14.11	-	13.01
	229.93	**GW/SW Elev. (ft)**	216.04	215.59	216.67	-	212.49	-	216.08	-	215.98	-	-	216.09	-	-	-	-	-	216.19	-	-	-	215.49	-	-	216.09	-	215.99	216.18	-	215.82	-	216.92
N-1, P-3 (3/4 inch, stickup)	-	**DTW (ft)**	13.48	13.81	13.80	-	17.48	-	13.55	-	13.21	-	-	13.29	-	-	-	-	-	13.02	-	-	-	13.85	-	-	13.28	-	13.64	13.40	-	13.85	-	12.97
	230.08	**GW/SW Elev. (ft)**	216.60	216.27	216.28	-	212.60	-	216.53	-	216.87	-	-	216.79	-	-	-	-	-	217.06	-	-	-	216.23	-	-	216.80	-	216.44	216.68	-	216.23	-	217.11
N-2, P-1 (3/4 inch, stickup)	-	**DTW (ft)**	5.30	5.59	4.49	-	9.08	-	5.40	-	4.99	-	-	5.12	-	-	-	-	-	4.79	-	-	-	-	-	-	4.94	-	-	5.00	-	5.41	-	4.65
	222.01	**GW/SW Elev. (ft)**	216.71	216.42	217.52	-	212.93	-	216.61	-	217.02	-	-	216.89	-	-	-	-	-	217.22	-	-	-	-	-	-	217.07	-	-	217.01	-	216.6	-	217.36
N-2, P-2 (3/4 inch, stickup)	-	**DTW (ft)**	5.15	5.35	4.31	-	8.09	-	5.20	-	4.86	-	-	4.92	-	-	-	-	-	4.60	-	-	-	-	-	-	5.03	-	-	5.21	-	5.50	-	4.99
	222.16	**GW/SW Elev. (ft)**	217.01	216.81	217.85	-	214.07	-	216.96	-	217.30	-	-	217.24	-	-	-	-	-	217.56	-	-	-	-	-	-	217.13	-	-	216.95	-	216.66	-	217.17
N-3, P-1 (3/4 inch, stickup)	-	**DTW (ft)**	3.93	4.20	3.18	-	7.70	-	4.05	-	3.60	-	-	3.77	-	-	-	-	-	3.39	-	-	-	-	-	-	3.71	-	-	4.30	-	4.45	-	4.15
	220.83	**GW/SW Elev. (ft)**	216.9	216.63	217.65	-	213.13	-	216.78	-	217.23	-	-	217.06	-	-	-	-	-	217.44	-	-	-	-	-	-	217.12	-	-	216.53	-	216.38	-	216.68
N-3, P-2 (3/4 inch, stickup)	-	**DTW (ft)**	3.96	4.22	3.12	-	8.70	-	4.05	-	3.64	-	-	3.81	-	-	-	-	-	3.43	-	-	-	-	-	-	3.68	-	-	3.80	-	4.23	-	3.85
	220.84	**GW/SW Elev. (ft)**	216.88	216.62	217.72	-	212.14	-	216.79	-	217.2	-	-	217.03	-	-	-	-	-	217.41	-	-	-	-	-	-	217.16	-	-	217.04	-	216.61	-	216.99
N-5, P-1 (3/4 inch, stickup)	-	**DTW (ft)**	24.36	23.54	23.27	-	24.70	-	23.87	-	24.22	-	-	-	23.26	-	-	-	-	24.80	-	-	-	24.09	-	-	-	25.01	22.67	23.80	-	23.02	-	24.00
	242.65	**GW/SW Elev. (ft)**	218.29	219.11	219.38	-	217.95	-	218.78	-	218.43	-	-	-	219.39	-	-	-	-	217.85	-	-	-	218.56	-	-	-	217.64	219.98	218.85	-	219.63	-	218.65
N-5, P-2 (3/4 inch, stickup)	-	**DTW (ft)**	24.88	23.70	23.47	-	24.40	-	24.58	-	24.74	-	-	-	23.32	-	-	-	-	24.75	-	-	-	24.00	-	-	-	-	23.06	24.11	-	23.36	-	24.25
	242.69	**GW/SW Elev. (ft)**	217.81	218.99	219.22	-	218.29	-	218.11	-	217.95	-	-	-	219.37	-	-	-	-	217.94	-	-	-	218.69	-	-	-	-	219.63	218.58	-	219.33	-	218.44
N-6, P-1 (3/4 inch, stickup)	-	**DTW (ft)**	37.95	37.04	36.94	-	37.88	-	37.75	-	38.10	-	-	-	36.62	-	-	-	-	38.10	-	-	-	-	-	-	38.86	-	-	37.25	35.92	35.85	34.59	36.68
	258.60	**GW/SW Elev. (ft)**	220.65	221.56	221.66	-	220.72	-	220.85	-	220.50	-	-	-	221.98	-	-	-	-	220.50	-	-	-	-	-	-	219.74	-	-	221.35	222.68	222.75	224.01	221.92
N-7, P-1 (3/4 inch, stickup)	-	**DTW (ft)**	31.70	31.29	30.83	-	31.81	-	31.45	-	32.21	-	-	-	30.27	-	-	-	-	32.30	-	-	-	-	-	-	33.01	-	30.32	30.95	-	29.54	-	31.15
	255.59	**GW/SW Elev. (ft)**	223.89	224.30	224.76	-	223.78	-	224.14	-	223.38	-	-	-	225.32	-	-	-	-	223.29	-	-	-	-	-	-	222.58	-	225.27	224.64	-	226.05	-	224.44
N-7, P-2 (3/4 inch, stickup)	-	**DTW (ft)**	31.85	31.49	31.09	-	32.00	-	31.61	-	32.41	-	-	-	30.43	-	-	-	-	-	32.43	-	-	32.28	-	-	33.23	-	30.51	31.18	-	30.08	-	31.20
	256.04	**GW/SW Elev. (ft)**	224.19	224.55	224.95	-	224.04	-	224.43	-	223.63	-	-	-	225.61	-	-	-	-	-	223.61	-	-	223.76	-	-	222.81	-	225.53	224.86	-	225.96	-	224.84
SHL-1 (2 inch, stickup)	-	**DTW (ft)**	-	-	NR - Obst.	-	Dry	-	2.27	-	Dry	-	-	-	-	-	-	-	-	-	-	-	-	8.01	-	-	Dry	-	2.69	4.83	-	3.27	-	7.75
	272.27	**GW/SW Elev. (ft)**	-	-	@ 7.53'	-	-	-	270.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	264.26	-	-	-	-	269.58	267.44	-	269.00	-	264.52
SHL-3 (2 inch, stickup)	-	**DTW (ft)**	29.05	29.70	28.71	-	32.00	-	29.20	-	29.56	-	-	30.33	-	-	-	-	-	29.20	-	-	-	-	-	-	29.24	-	-	29.24	-	30.14	-	29.35
	246.95	**GW/SW Elev. (ft)**	217.90	217.25	218.24	-	214.95	-	217.75	-	217.39	-	-	216.62	-	-	-	-	-	217.75	-	-	-	-	-	-	217.71	-	-	217.71	-	216.81	-	217.60
SHL-4 (2 inch, stickup)	-	**DTW (ft)**	10.29	10.62	9.89	-	13.75	-	10.49	-	10.40	-	-	10.38	-	-	-	-	-	10.13	-	-	-	-	-	-	9.27	-	10.51	10.00	10.40	10.70	10.68	10.00
	227.48	**GW/SW Elev. (ft)**	217.19	216.86	217.59	-	213.73	-	216.99	-	217.08	-	-	217.10	-	-	-	-	-	217.35	-	-	-	-	-	-	218.21	-	216.97	217.48	217.08	216.78	216.80	217.48
SHL-5 (2 inch, stickup)	-	**DTW (ft)**	2.86	4.79	1.50	-	6.60	-	2.55	-	6.45	-	-	2.77	-	-	-	-	-	6.56	-	-	-	-	-	-	4.27	-	-	2.50	-	2.72	-	5.65
	217.60	**GW/SW Elev. (ft)**	214.74	212.81	216.10	-	211.00	-	215.05	-	211.15	-	-	214.83	-	-	-	-	-	211.04	-	-	-	-	-	-	213.33	-	-	215.10	-	214.88	-	211.95
SHL-7 (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.86	17.19	-	16.50	-	18.14
	236.33	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	220.47	219.14	-	219.83	-	218.19
SHL-8S (2 inch, stickup)	-	**DTW (ft)**	7.54	8.21	6.81	-	9.70	-	6.90	-	8.57	-	-	7.58	-	-	-	-	-	8.48	-	-	-	-	-	-	8.01	-	-	7.27	-	7.52	-	8.33
	220.97	**GW/SW Elev. (ft)**	213.43	212.76	214.16	-	211.27	-	214.07	-	212.40	-	-	213.39	-	-	-	-	-	212.49	-	-	-	-	-	-	212.96	-	-	213.70	-	213.45	-	212.64
SHL-8D (2 inch, stickup)	-	**DTW (ft)**	7.46	8.11	6.80	-	9.55	-	6.80	-	8.56	-	-	7.52	-	-	-	-	-	8.48	-	-	-	-	-	-	7.94	-	-	7.12	-	7.42	-	8.21
	220.78	**GW/SW Elev. (ft)**	213.32	212.67	213.98	-	211.23	-	213.98	-	212.22	-	-	213.26	-	-	-	-	-	212.30	-	-	-	-	-	-	212.84	-	-	213.66	-	213.36	-	212.57
SHL-9 (2 inch, stickup)	-	**DTW (ft)**	9.68	10.31	16.09	-	11.10	-	8.67	-	11.36	-	-	9.56	-	-	-	-	-	11.46	-	-	-	-	-	-	10.48	-	-	9.30	-	9.46	-	12.18
	221.95	**GW/SW Elev. (ft)**	212.27	211.64	205.86	-	210.85	-	213.28	-	210.59	-	-	212.39	-	-	-	-	-	210.49	-	-	-	-	-	-	211.47	-	-	212.65	-	212.49	-	209.77
SHL-10 (2 inch, stickup)	-	**DTW (ft)**	30.28	31.04	30.01	-	33.70	-	30.56	-	31.09	-	-	33.94	-	-	-	-	-	30.78	-	-	-	-	-	-	-	-	30.71	29.94	30.69	37.45	31.14	30.56
	248.02	**GW/SW Elev. (ft)**	217.74	216.98	218.01	-	214.32	-	217.46	-	216.93	-	-	214.08	-	-	-	-	-	217.24	-	-	-	-	-	-	-	-	217.31	218.08	217.33	210.57	216.88	217.46
SHL-11 (2 inch, stickup)	-	**DTW (ft)**	18.55	18.70	17.81	-	21.70	-	18.50	-	18.49	-	-	-	-	18.42	-	-	-	19.70	-	-	18.88	-	19.16	-	18.43	-	18.44	18.20	18.36	18.57	18.57	18.05
	235.47	**GW/SW Elev. (ft)**	216.92	216.77	217.66	-	213.77	-	216.97	-	216.98	-	-	-	-	217.05	-	-	-	215.77	-	-	216.59	-	216.31	-	217.04	-	217.03	217.27	217.11	216.90	216.90	217.42
SHL-12 (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	22.65	-	23.70	-	-	-	-	-	-	21.61	-	-	-	-	-	18.49	-	-	-	24.59	21.91	22.10	-	20.73	-	22.58
	248.62	**GW/SW Elev. (ft)**	-	-	-	-	-	-	225.97	-	224.92	-	-	-	-	-	-	227.01	-	-	-	-	-	230.13	-	-	-	224.03	226.71	226.52	-	227.89	-	226.04
SHL-13 (2 inch, stickup)	-	**DTW (ft)**	6.61	7.30	5.58	-	9.23	-	6.02	-	6.95	-	-	6.36	-	-	-	-	-	6.83	-	-	-	-	-	-	6.73	-	-	6.21	-	6.59	-	6.59
	220.71	**GW/SW Elev. (ft)**	214.10	213.41	215.13	-	211.48	-	214.69	-	213.76	-	-	214.35	-	-	-	-	-	213.88	-	-	-	-	-	-	213.98	-	-	214.50	-	214.12	-	214.12
SHL-15 (4 inch, stickup)	-	**DTW (ft)**	18.87	17.58	17.44	-	20.32	-	16.11	-	20.23	-	-	-	-	-	-	17.81	-	-	-	-	-	18.49	-	-	20.46	-	16.63	18.38	-	17.68	-	20.47
	259.92	**GW/SW Elev. (ft)**	241.05	242.34	242.48	-	239.60	-	243.81	-	239.69	-	-	-	-	-	-	242.11	-	-	-	-	-	241.43	-	-	239.46	-	243.29	241.54	-	242.24	-	239.45
SHL-17 (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	7.75	-	IA	-	-	6.87	-	-	-	-	-	-	-	-	-	-	-	-	9.74	-	7.04	6.86	-	5.60	-	8.88
	233.79	**GW/SW Elev. (ft)**	-	-	-	-	-	-	226.04	-	Flooding	-	-	226.92	-	-	-	-	-	-	-	-	-	-	-	-	224.05	-	226.75	226.93	-	228.19	-	224.91
SHL-18 (4 inch, stickup)	-	**DTW (ft)**	18.61	19.39	18.30	-	21.55	-	18.71	-	19.60	-	-	18.97	-	-	-	-	-	19.38	-	-	-	19.76	-	-	19.39	-	18.75	18.26	-	18.64	-	25.12
	237.56	**GW/SW Elev. (ft)**	218.95	218.17	219.26	-	216.01	-	218.85	-	217.96	-	-	218.59	-	-	-	-	-	218.18	-	-	-	217.80	-	-	218.17	-	218.81	219.30	-	218.92	-	212.44
SHL-19 (4 inch, stickup)	-	**DTW (ft)**	22.61	23.39	22.14	-	26.25	-	22.98	-	23.55	-	-	-	-	23.47	-	-	-	23.20	-	-	-	-	-	-	23.19	-	23.13	20.09	23.04	23.18	23.56	22.97

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
	240.50	**GW/SW Elev. (ft)**	217.89	217.11	218.36	-	214.25	-	217.52	-	216.95	-	-	-	-	217.03	-	-	-	217.30	-	-	-	-	-	-	217.31	-	217.37	220.41	217.46	217.32	216.94	217.53
SHL-20 (4 inch, stickup)	-	**DTW (ft)**	18.48	18.30	17.84	-	20.30	-	18.40	-	18.79	-	-	-	-	18.07	-	-	-	18.58	-	-	18.60	-	19.10	-	18.76	-	17.70	18.00	17.68	18.91	17.38	18.00
	235.95	**GW/SW Elev. (ft)**	217.47	217.65	218.11	-	215.65	-	217.55	-	217.16	-	-	-	-	217.88	-	-	-	217.37	-	-	217.35	-	216.85	-	217.19	-	218.25	217.95	218.27	217.04	218.57	217.95
SHL-21 (4 inch, stickup)	-	**DTW (ft)**	45.24	45.89	44.94	-	47.85	-	44.70	-	46.71	-	-	-	-	-	-	-	-	46.41	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	260.00	**GW/SW Elev. (ft)**	214.76	214.11	215.06	-	212.15	-	215.30	-	213.29	-	-	-	-	-	-	-	-	213.59	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHL-22 (4 inch, stickup)	-	**DTW (ft)**	7.32	8.09	6.67	-	8.70	-	6.46	-	8.86	-	-	-	-	7.50	-	-	-	9.07	-	-	-	-	-	-	-	8.17	-	7.15	-	7.22	-	8.68
	219.58	**GW/SW Elev. (ft)**	212.26	211.49	212.91	-	210.88	-	213.12	-	210.72	-	-	-	-	212.08	-	-	-	210.51	-	-	-	-	-	-	-	211.41	-	212.43	-	212.36	-	210.90
SHL-23 (4 inch, stickup)	-	**DTW (ft)**	28.35	28.69	27.70	-	29.70	-	26.30	-	30.35	-	-	-	-	-	-	-	28.58	30.71	-	-	-	29.69	-	-	-	29.63	26.79	28.76	-	27.89	-	30.21
	241.29	**GW/SW Elev. (ft)**	212.94	212.60	213.59	-	211.59	-	214.99	-	210.94	-	-	-	-	-	-	-	212.71	210.58	-	-	-	211.60	-	-	-	211.66	214.50	212.53	-	213.40	-	211.08
SHL-24 (4 inch, stickup)	-	**DTW (ft)**	15.74	16.27	14.93	-	16.98	-	15.75	-	-	-	-	-	-	-	-	-	15.24	16.89	-	-	-	16.97	-	-	17.10	-	15.37	14.95	-	14.59	-	15.79
	238.75	**GW/SW Elev. (ft)**	223.01	222.48	223.82	-	221.77	-	223.00	-	-	-	-	-	-	-	-	-	223.51	221.86	-	-	-	221.78	-	-	221.65	-	223.38	223.80	-	224.16	-	222.96
SHL-25 (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	26.08	-	28.64	-	-	-	-	-	-	-	-	-	-	-	-	27.83	-	-	29.00	-	25.06	27.54	-	25.97	-	27.68
	258.01	**GW/SW Elev. (ft)**	-	-	-	-	-	-	231.93	-	229.37	-	-	-	-	-	-	-	-	-	-	-	-	230.18	-	-	229.01	-	232.95	230.47	-	232.04	-	230.33
SHM-05-39A (2 inch, roadbox)	-	**DTW (ft)**	11.41	11.92	10.93	-	12.49	-	10.54	-	12.35	-	-	11.66	-	-	-	-	-	12.51	-	-	-	-	-	-	-	-	-	11.07	-	11.30	-	12.45
	221.53	**GW/SW Elev. (ft)**	210.12	209.61	210.60	-	209.04	-	210.99	-	209.18	-	-	209.87	-	-	-	-	-	209.02	-	-	-	-	-	-	-	-	-	210.46	-	210.23	-	209.08
SHM-05-39B (2 inch, roadbox)	-	**DTW (ft)**	12.32	12.71	11.77	-	13.08	-	11.29	-	13.00	-	-	12.42	-	-	-	-	-	13.15	-	-	-	-	-	-	-	-	-	11.84	-	12.10	-	Dry
	221.51	**GW/SW Elev. (ft)**	209.19	208.80	209.74	-	208.43	-	210.22	-	208.51	-	-	209.09	-	-	-	-	-	208.36	-	-	-	-	-	-	-	-	-	209.67	-	209.41	-	-
SHM-05-40X (2 inch, roadbox)	-	**DTW (ft)**	14.21	14.65	13.86	-	15.10	-	13.11	-	15.05	-	-	14.49	-	-	-	-	-	15.19	-	-	14.79	-	-	15.28	-	14.49	13.67	13.93	10.37	13.93	13.93	14.95
	223.19	**GW/SW Elev. (ft)**	208.98	208.54	209.33	-	208.09	-	210.08	-	208.14	-	-	208.70	-	-	-	-	-	208.00	-	-	208.40	-	-	207.91	-	208.70	209.52	209.26	212.82	209.26	209.26	208.24
SHM-05-41A (2 inch, roadbox)	-	**DTW (ft)**	10.60	11.29	9.95	-	11.90	-	9.66	-	12.11	-	-	10.84	-	-	-	-	-	12.35	-	-	-	-	-	-	-	11.38	-	10.42	-	10.47	-	11.95
	222.48	**GW/SW Elev. (ft)**	211.88	211.19	212.53	-	210.58	-	212.82	-	210.37	-	-	211.64	-	-	-	-	-	210.13	-	-	-	-	-	-	-	211.10	-	212.06	-	212.01	-	210.53
SHM-05-41B (2 inch, roadbox)	-	**DTW (ft)**	10.40	11.09	9.79	-	11.70	-	9.48	-	11.96	-	-	10.42	-	-	-	-	-	12.20	-	-	11.67	-	-	11.92	-	11.22	9.99	10.25	9.90	10.30	11.60	40.09 R
	222.33	**GW/SW Elev. (ft)**	211.93	211.24	212.54	-	210.63	-	212.85	-	210.37	-	-	211.91	-	-	-	-	-	210.13	-	-	210.66	-	-	210.41	-	211.11	212.34	212.08	212.43	212.03	210.73	182.24 R
SHM-05-41C (2 inch, roadbox)	-	**DTW (ft)**	10.67	11.42	10.09	-	11.95	-	9.78	-	12.41	-	-	10.91	-	-	-	-	-	12.41	-	-	11.84	-	-	12.13	-	11.43	10.15	10.53	10.09	10.60	10.82	12.15
	222.57	**GW/SW Elev. (ft)**	211.90	211.15	212.48	-	210.62	-	212.79	-	210.16	-	-	211.66	-	-	-	-	-	210.16	-	-	210.73	-	-	210.44	-	211.14	212.42	212.04	212.48	211.97	211.75	210.42
SHM-05-42A (3/4 inch, stickup)	-	**DTW (ft)**	4.71	5.45	4.00	-	6.16	-	3.90	-	6.13	-	-	4.82	-	-	-	-	-	6.28	-	-	-	-	-	-	-	5.38	-	4.43	-	4.52	-	8.05
	216.81	**GW/SW Elev. (ft)**	212.10	211.36	212.81	-	210.65	-	212.91	-	210.68	-	-	211.99	-	-	-	-	-	210.53	-	-	-	-	-	-	-	211.43	-	212.38	-	212.29	-	208.76
SHM-05-42B (3/4 inch, stickup)	-	**DTW (ft)**	4.73	5.45	4.04	-	6.14	-	3.90	-	6.20	-	-	4.93	-	-	-	-	-	6.35	-	-	-	-	-	6.66	5.47	-	-	4.52	-	4.68	-	7.50
	216.80	**GW/SW Elev. (ft)**	212.07	211.35	212.76	-	210.66	-	212.90	-	210.60	-	-	211.87	-	-	-	-	-	210.45	-	-	-	-	-	210.14	211.33	-	-	212.28	-	212.12	-	209.30
SHM-93-10C (4 inch, stickup)	-	**DTW (ft)**	28.93	29.45	28.47	-	31.50	-	29.03	-	29.75	-	-	-	-	-	-	-	-	29.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	247.68	**GW/SW Elev. (ft)**	218.75	218.23	219.21	-	216.18	-	218.65	-	217.93	-	-	-	-	-	-	-	-	218.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHM-93-10D (4 inch, stickup)	-	**DTW (ft)**	29.90	30.55	29.84	-	32.80	-	30.11	-	30.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29.99	-	30.22	-	30.03
	248.01	**GW/SW Elev. (ft)**	218.11	217.46	218.17	-	215.21	-	217.90	-	217.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	218.02	-	217.79	-	217.98
SHM-93-10E (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	247.54	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHM-93-18B (4 inch, stickup)	-	**DTW (ft)**	18.35	19.12	17.96	-	21.20	-	18.39	-	19.30	-	-	-	-	-	-	-	-	19.05	-	-	-	19.45	-	-	19.07	-	18.42	17.91	-	18.20	-	18.64
	237.31	**GW/SW Elev. (ft)**	218.96	218.19	219.35	-	216.11	-	218.92	-	218.01	-	-	-	-	-	-	-	-	218.26	-	-	-	217.86	-	-	218.24	-	218.89	219.40	-	219.11	-	218.67
SHM-93-22B (4 inch, stickup)	-	**DTW (ft)**	7.15	8.92	6.53	-	8.50	-	9.30	-	8.74	-	-	8.37	-	-	-	-	-	9.00	-	-	-	8.43	10.31	-	-	8.02	7.65	6.91	6.62	7.05	7.12	8.48
	219.39	**GW/SW Elev. (ft)**	212.24	210.47	212.86	-	210.89	-	210.09	-	210.65	-	-	211.02	-	-	-	-	-	210.39	-	-	-	210.96	209.08	-	-	211.37	211.74	212.48	212.77	212.34	212.27	210.91
SHM-93-22C (4 inch, stickup)	-	**DTW (ft)**	8.33	9.10	7.81	-	9.96	-	7.42	-	9.95	-	-	-	-	-	-	-	-	10.19	-	-	-	-	-	-	-	9.27	-	8.38	-	8.26	-	9.85
	220.69	**GW/SW Elev. (ft)**	212.36	211.59	212.88	-	210.73	-	213.27	-	210.74	-	-	-	-	-	-	-	-	210.50	-	-	-	-	-	-	-	211.42	-	212.31	-	212.43	-	210.84
SHM-96-5B (4 inch, stickup)	-	**DTW (ft)**	6.26	7.01	6.56	-	7.80	-	5.50	-	7.77	-	-	6.43	-	-	-	-	-	7.82	-	-	7.51	-	7.81	-	7.09	-	5.76	6.08	5.73	6.10	6.24	7.49
	218.92	**GW/SW Elev. (ft)**	212.66	211.91	212.36	-	211.12	-	213.42	-	211.15	-	-	212.49	-	-	-	-	-	211.10	-	-	211.41	-	211.11	-	211.83	-	213.16	212.84	213.19	212.82	212.68	211.43
SHM-96-5C (4 inch, stickup)	-	**DTW (ft)**	5.69	6.46	5.04	-	7.30	-	5.00	-	7.22	-	-	-	5.97	-	-	-	-	7.35	-	-	-	-	-	-	6.93	-	-	5.49	-	5.58	-	6.97
	218.39	**GW/SW Elev. (ft)**	212.70	211.93	213.35	-	211.09	-	213.39	-	211.17	-	-	-	212.42	-	-	-	-	211.04	-	-	-	-	-	-	211.46	-	-	212.90	-	212.81	-	211.42
SHM-99-31A (2 inch, stickup)	-	**DTW (ft)**	2.10	3.81	3.90	-	4.42	-	3.30	-	4.42	-	-	-	4.04	-	-	-	-	-	4.77	-	-	-	-	-	-	-	-	0.68	-	1.78	-	3.98
	214.34	**GW/SW Elev. (ft)**	212.24	210.53	210.44	-	209.92	-	211.04	-	209.92	-	-	-	210.30	-	-	-	-	-	209.57	-	-	-	-	-	-	-	-	213.66	-	212.56	-	210.36
SHM-99-31B (2 inch, stickup)	-	**DTW (ft)**	3.86	4.43	3.29	-	4.98	-	3.03	-	4.85	-	-	-	4.04	-	-	-	-	4.92	-	-	-	-	-	-	-	-	-	3.47	-	3.75	-	4.85
	214.39	**GW/SW Elev. (ft)**	210.53	209.96	211.10	-	209.41	-	211.36	-	209.54	-	-	-	210.35	-	-	-	-	209.47	-	-	-	-	-	-	-	-	-	210.92	-	210.64	-	209.54
SHM-99-31C (2 inch, stickup)	-	**DTW (ft)**	4.13	4.71	3.58	-	5.31	-	1.90	-	5.10	-	-	-	4.34	-	-	-	-	5.21	-	-	-	-	-	-	-	4.41	-	3.73	-	4.02	-	5.15
	214.60	**GW/SW Elev. (ft)**	210.47	209.89	211.02	-	209.29	-	212.70	-	209.50	-	-	-	210.26	-	-	-	-	209.39	-	-	-	-	-	-	-	210.19	-	210.87	-	210.58	-	209.45
SHM-99-32X (2 inch, stickup)	-	**DTW (ft)**	9.70	10.32	9.09	-	11.15	-	8.98	-	10.75	-	-	-	-	-	-	-	-	10.80	-	-	-	-	-	-	-	10.00	-	9.32	-	9.26	-	10.80
	221.28	**GW/SW Elev. (ft)**	211.58	210.96	212.19	-	210.13	-	212.30	-	210.53	-	-	-	-	-	-	-	-	210.48	-	-	-	-	-	-	-	211.28	-	211.96	-	212.02	-	210.48
SHP-01-36X (3/4 inch, stickup)	-	**DTW (ft)**	7.27	7.55	6.43	-	11.15	-	7.39	-	6.89	-	-	-	7.07	-	-	-	-	6.42	-	-	-	-	-	-	6.93	-	7.60	7.15	7.32	7.61	7.71	6.67
	223.95	**GW/SW Elev. (ft)**	216.68	216.40	217.52	-	212.80	-	216.56	-	217.06	-	-	-	216.88	-	-	-	-	217.53	-	-	-	-	-	-	217.02	-	216.35	216.80	216.63	216.34	216.24	217.28

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
SHP-01-37X (3/4 inch, stickup)	-	**DTW (ft)**	5.98	6.21	5.15	-	9.95	-	6.12	-	5.61	-	-	-	5.84	-	-	-	-	5.42	-	-	-	-	-	-	5.66	-	6.38	5.95	6.10	6.42	6.46	5.85
	222.79	**GW/SW Elev. (ft)**	216.81	216.58	217.64	-	212.84	-	216.67	-	217.18	-	-	-	216.95	-	-	-	-	217.37	-	-	-	-	-	-	217.13	-	216.41	216.84	216.69	216.37	216.33	216.94
SHP-01-38A (3/4 inch, stickup)	-	**DTW (ft)**	3.85	4.11	3.06	-	7.30	-	3.97	-	3.69	-	-	-	3.67	-	-	-	-	3.45	-	-	-	-	-	-	-	3.52	4.01	3.59	3.82	4.07	4.05	3.32
	220.86	**GW/SW Elev. (ft)**	217.01	216.75	217.80	-	213.56	-	216.89	-	217.17	-	-	-	217.19	-	-	-	-	217.41	-	-	-	-	-	-	-	217.34	216.85	217.27	217.04	216.79	216.81	217.54
SHP-01-38B (3/4 inch, stickup)	-	**DTW (ft)**	4.00	4.23	3.19	-	7.45	-	4.10	-	3.87	-	-	-	3.84	-	-	-	-	3.61	-	-	-	-	-	-	-	-	-	3.72	3.95	4.21	4.25	3.49
	221.03	**GW/SW Elev. (ft)**	217.03	216.80	217.84	-	213.58	-	216.93	-	217.16	-	-	-	217.19	-	-	-	-	217.42	-	-	-	-	-	-	-	-	-	217.31	217.08	216.82	216.78	217.54
SHP-05-43 (3/4 inch, stickup)	-	**DTW (ft)**	44.68	45.15	44.39	-	47.65	-	44.52	-	45.45	-	-	44.82	-	-	-	-	-	45.35	-	-	-	-	-	-	-	-	-	44.60	44.40	44.69	44.73	45.05
	260.17	**GW/SW Elev. (ft)**	215.49	215.02	215.78	-	212.52	-	215.65	-	214.72	-	-	215.35	-	-	-	-	-	214.82	-	-	-	-	-	-	-	-	-	215.57	215.77	215.48	215.44	215.12
SHP-05-44 (3/4 inch, stickup)	-	**DTW (ft)**	41.68	42.04	41.20	-	44.90	-	41.65	-	41.99	-	-	41.66	-	-	-	-	-	52.00	-	-	-	-	-	-	41.87	-	-	41.55	41.51	41.32	41.77	42.41
	258.55	**GW/SW Elev. (ft)**	216.87	216.51	217.35	-	213.65	-	216.90	-	216.56	-	-	216.89	-	-	-	-	-	206.55	-	-	-	-	-	-	216.68	-	-	217.00	217.04	217.23	216.78	216.14
SHP-05-45A (2 inch, stickup)	-	**DTW (ft)**	16.12	16.82	15.57	-	17.07	-	15.24	-	17.89	-	-	-	15.94	-	-	-	-	18.23	-	-	-	-	-	-	-	-	-	16.08	-	16.12	-	17.73
	228.48	**GW/SW Elev. (ft)**	212.36	211.66	212.91	-	211.41	-	213.24	-	210.59	-	-	-	212.54	-	-	-	-	210.25	-	-	-	-	-	-	-	-	-	212.40	-	212.36	-	210.75
SHP-05-45B (2 inch, stickup)	-	**DTW (ft)**	16.85	17.53	16.25	-	17.65	-	15.90	-	18.31	-	-	-	16.47	-	-	-	-	18.75	-	-	-	-	-	18.98	-	-	-	16.87	-	16.89	-	18.42
	229.11	**GW/SW Elev. (ft)**	212.26	211.58	212.86	-	211.46	-	213.21	-	210.80	-	-	-	212.64	-	-	-	-	210.36	-	-	-	-	-	210.13	-	-	-	212.24	-	212.22	-	210.69
SHP-05-46A (2 inch, stickup)	-	**DTW (ft)**	14.79	15.56	14.26	-	16.00	-	14.05	-	17.43	-	-	-	14.71	-	-	-	-	16.74	-	-	-	-	-	-	-	-	-	15.42	-	14.89	-	16.95
	228.18	**GW/SW Elev. (ft)**	213.39	212.62	213.92	-	212.18	-	214.13	-	210.75	-	-	-	213.47	-	-	-	-	211.44	-	-	-	-	-	-	-	-	-	212.76	-	213.29	-	211.23
SHP-05-46B (2 inch, stickup)	-	**DTW (ft)**	15.48	16.23	14.91	-	16.68	-	14.70	-	17.15	-	-	-	15.38	-	-	-	-	17.50	-	-	-	-	-	17.68	-	-	-	14.74	14.21	14.74	14.77	16.30
	227.60	**GW/SW Elev. (ft)**	212.12	211.37	212.69	-	210.92	-	212.90	-	210.45	-	-	-	212.22	-	-	-	-	210.10	-	-	-	-	-	209.92	-	-	-	212.86	213.39	212.86	212.83	211.30
SHP-05-47A (1 inch, no standpipe)	-	**DTW (ft)**	4.79	5.39	IA	-	Dry	-	4.69	-	-	-	-	-	4.41	-	-	-	-	5.06	-	-	-	-	-	-	4.54	-	-	3.79	4.47	4.75	4.19	5.56
	217.39	**GW/SW Elev. (ft)**	212.60	212.00	HWL	-	@ 5.75'	-	212.70	-	-	-	-	-	212.98	-	-	-	-	212.33	-	-	-	-	-	-	212.85	-	-	213.60	212.92	212.64	213.20	211.83
SHP-05-47B (1 inch, no standpipe)	-	**DTW (ft)**	2.63	2.82	IA	-	3.95	-	1.92	-	-	-	-	-	4.41	-	-	-	-	3.05	-	-	-	-	-	-	2.41	-	-	1.69	2.18	2.80	2.23	2.43
	215.40	**GW/SW Elev. (ft)**	212.77	212.58	HWL	-	211.45	-	213.48	-	-	-	-	-	210.99	-	-	-	-	212.35	-	-	-	-	-	-	212.99	-	-	213.71	213.22	212.60	213.17	212.97
SHP-05-48A (1 inch, no standpipe)	-	**DTW (ft)**	5.94	Dry	IA	-	Dry	-	4.71	-	Dry	-	-	-	4.86	-	-	-	-	Dry	-	-	-	-	-	-	-	-	-	3.58	-	4.61	-	3.82
	217.31	**GW/SW Elev. (ft)**	211.37	-	HWL	-	@ 5.25'	-	212.60	-	@ 5.5'	-	-	-	212.45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	213.73	-	212.70	-	213.49
SHP-05-48B (1 inch, no standpipe)	-	**DTW (ft)**	3.53	4.03	IA	-	Dry	-	3.47	-	Dry	-	-	-	3.53	-	-	-	-	Dry	-	-	-	-	-	-	-	-	-	2.17	3.31	3.23	3.20	2.84
	215.96	**GW/SW Elev. (ft)**	212.43	211.93	HWL	-	@ 5.00'	-	212.49	-	@ 5.25'	-	-	-	212.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	213.79	212.65	212.73	212.76	213.12
SHP-05-49A (1 inch, no standpipe)	-	**DTW (ft)**	5.63	Dry	IA	-	Dry	-	5.63	-	Dry	-	-	-	3.81	-	-	-	-	Dry	-	-	-	-	-	-	-	-	-	5.65	5.49	5.42	5.50	5.68
	216.67	**GW/SW Elev. (ft)**	211.04	-	HWL	-	@ 5.76'	-	211.04	-	@ 6.0'	-	-	-	212.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	211.02	211.18	211.25	211.17	210.99
SHP-05-49B (1 inch, no standpipe)	-	**DTW (ft)**	3.95	4.42	IA	-	4.33	-	3.85	-	4.45	-	-	-	4.46	-	-	-	-	4.72	-	-	-	-	-	-	-	-	-	3.96	3.79	3.68	3.97	4.18
	215.14	**GW/SW Elev. (ft)**	211.19	210.72	HWL	-	210.81	-	211.29	-	210.69	-	-	-	210.68	-	-	-	-	210.42	-	-	-	-	-	-	-	-	-	211.18	211.35	211.46	211.17	210.96
SHP-95-27X (3/4 inch, stickup)	-	**DTW (ft)**	14.23	16.45	13.88	-	17.88	-	14.83	-	17.23	-	-	CNR	-	-	-	-	-	17.28	-	-	-	17.02	-	-	16.85	-	14.63	14.27	-	14.00	-	14.03
	237.45	**GW/SW Elev. (ft)**	223.22	221.00	223.57	-	219.57	-	222.62	-	220.22	-	-	-	-	-	-	-	-	220.17	-	-	-	220.43	-	-	220.60	-	222.82	223.18	-	223.45	-	223.42
SHP-99-29X (2 inch, stickup)	-	**DTW (ft)**	24.58	22.79	22.73	-	24.50	-	23.34	-	24.85	-	-	-	22.61	-	-	-	-	24.90	-	-	-	-	-	-	-	25.22	-	23.97	21.86	22.77	20.82	23.95
	243.34	**GW/SW Elev. (ft)**	218.76	220.55	220.61	-	218.84	-	220.00	-	218.49	-	-	-	220.73	-	-	-	-	218.44	-	-	-	-	-	-	-	218.12	-	219.37	221.48	220.57	222.52	219.39
SHP-99-34A (NSVD)	NSVD	**DTW (ft)**	Damaged	Damaged	Damaged	-	-	-	Damaged	-	Damaged	-	-	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	-	-	-	-		-
	NSVD	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHP-99-34B (1 inch, stickup)	-	**DTW (ft)**	13.26	13.29	12.66	-	14.20	-	-	-	13.83	-	-	-	12.91	-	-	-	-	13.90	-	-	-	-	-	-	-	-	-	12.12	-	12.60		13.80
	224.91	**GW/SW Elev. (ft)**	211.65	211.62	212.25	-	210.71	-	-	-	211.08	-	-	-	212.00	-	-	-	-	211.01	-	-	-	-	-	-	-	-	-	212.79	-	212.31	224.91	211.11
SHP-99-35X (2 inch, stickup)	-	**DTW (ft)**	37.50	36.85	36.87	-	36.90	-	37.05	-	34.90	-	-	-	36.32	-	-	-	-	35.55	-	-	-	-	-	-	-	37.70	-	36.78	35.78	25.95	34.54	36.35
	258.23	**GW/SW Elev. (ft)**	220.73	221.38	221.36	-	221.33	-	221.18	-	223.33	-	-	-	221.91	-	-	-	-	222.68	-	-	-	-	-	-	-	220.53	-	221.45	222.45	232.28	223.69	221.88
EW-01 (8 inch, vault)	-	**DTW (ft)**	-	27.86	14.17	-	15.51	-	13.85	-	16.57	-	-	-	-	-	-	-	-	-	-	-	16.22	-	33.95	-	-	-	-	-	-	-	-	-
	226.80	**GW/SW Elev. (ft)**	-	198.94	212.63	-	211.29	-	212.95	-	210.23	-	-	-	-	-	-	-	-	-	-	-	210.58	-	192.85	-	-	-	-	-	-	-	-	-
EW-01S (2 inch, vault)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.20	-	-	-	-	16.38
	226.79	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	212.59	-	-	-	-	210.41
EW-04 (8 inch, vault)	-	**DTW (ft)**	-	37.53	14.19	-	15.85	-	13.88	-	16.61	-	-	-	-	-	-	-	-	-	-	-	33.45	-	28.34	-	-	-	-	-	-	-	-	-
	227.03	**GW/SW Elev. (ft)**	-	189.50	212.84	-	211.18	-	213.15	-	210.42	-	-	-	-	-	-	-	-	-	-	-	193.58	-	198.69	-	-	-	-	-	-	-	-	-
EW-04S (2 inch, vault)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.58	-	-	-	-	16.30
	227.06	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	212.48	-	-	-	-	210.76
PZ-12-01 (2 inch, stickup)	-	**DTW (ft)**	20.51	20.67	19.90	-	23.50	21.55	20.55	-	20.61	-	-	-	20.52	-	-	-	-	19.37	-	-	20.86	-	21.21	-	20.53	-	20.37	20.16	20.23	20.45	20.42	20.12
	237.55	**GW/SW Elev. (ft)**	217.04	216.88	217.65	-	214.05	216.00	217.00	-	216.94	-	-	-	217.03	-	-	-	-	218.18	-	-	216.69	-	216.34	-	217.02	-	217.18	217.39	217.32	217.10	217.13	217.43
PZ-12-02 (2 inch, stickup)	-	**DTW (ft)**	20.47	20.37	19.88	-	22.50	21.51	20.40	-	20.80	-	-	-	22.02	-	-	-	-	20.65	-	-	20.66	-	21.17	-	20.77	-	19.82	20.05	19.80	19.99	19.57	20.80
	237.79	**GW/SW Elev. (ft)**	217.32	217.42	217.91	-	215.29	216.28	217.39	-	216.99	-	-	-	215.77	-	-	-	-	217.14	-	-	217.13	-	216.62	-	217.02	-	217.97	217.74	217.99	217.80	218.22	216.99
PZ-12-03 (2 inch, stickup)	-	**DTW (ft)**	19.37	19.63	19.55	-	22.80	20.34	19.48	-	19.29	-	-	-	19.42	-	-	-	-	19.06	-	-	19.79	-	20.03	-	19.24	-	19.46	19.06	19.32	19.50	19.54	19.95
	236.40	**GW/SW Elev. (ft)**	217.03	216.77	216.85	-	213.60	216.06	216.92	-	217.11	-	-	-	216.98	-	-	-	-	217.34	-	-	216.61	-	216.37	-	217.16	-	216.94	217.34	217.08	216.90	216.86	216.45
PZ-12-04 (2 inch, stickup)	-	**DTW (ft)**	20.42	20.10	19.73	-	21.85	22.31	20.33	-	20.73	-	-	-	19.81	-	-	-	-	26.60	-	-	20.33	-	20.99	-	20.76	-	19.46	19.86	19.41	19.58	18.96	19.90

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
	238.20	**GW/SW Elev. (ft)**	217.78	218.10	218.47	-	216.35	215.89	217.87	-	217.47	-	-	-	218.39	-	-	-	-	211.60	-	-	217.87	-	217.21	-	217.44	-	218.74	218.34	218.79	218.62	219.24	218.30
PZ-12-05 (2 inch, stickup)	-	**DTW (ft)**	21.49	21.73	20.70	-	24.77	22.45	21.64	-	20.47	-	-	-	21.52	-	-	-	-	21.24	-	-	22.10	-	22.19	-	21.27	-	21.52	21.18	21.43	21.57	21.62	21.09
	238.73	**GW/SW Elev. (ft)**	217.24	217.00	218.03	-	213.96	216.28	217.09	-	218.26	-	-	-	217.21	-	-	-	-	217.49	-	-	216.63	-	216.54	-	217.46	-	217.21	217.55	217.30	217.16	217.11	217.64
PZ-12-06 (2 inch, stickup)	-	**DTW (ft)**	24.24	23.91	23.54	-	25.70	25.53	24.19	-	24.52	-	-	-	23.64	-	-	-	-	24.36	-	-	24.19	-	24.78	-	24.62	-	23.27	23.55	23.17	23.31	22.73	23.64
	242.18	**GW/SW Elev. (ft)**	217.94	218.27	218.64	-	216.48	216.65	217.99	-	217.66	-	-	-	218.54	-	-	-	-	217.82	-	-	217.99	-	217.40	-	217.56	-	218.91	218.63	219.01	218.87	219.45	218.54
PZ-12-07 (2 inch, stickup)	-	**DTW (ft)**	26.89	27.49	26.95	-	30.43	28.49	27.23	-	27.57	-	-	-	27.05	-	-	-	-	27.30	-	-	27.83	-	28.14	-	27.28	-	27.31	26.40	27.22	27.35	27.70	27.08
	244.59	**GW/SW Elev. (ft)**	217.70	217.10	217.64	-	214.16	216.10	217.36	-	217.02	-	-	-	217.54	-	-	-	-	217.29	-	-	216.76	-	216.45	-	217.31	-	217.28	218.19	217.37	217.24	216.89	217.51
PZ-12-08 (2 inch, stickup)	-	**DTW (ft)**	26.26	26.02	25.59	-	27.50	27.22	26.14	-	26.58	-	-	-	25.51	-	-	-	-	26.40	-	-	25.97	-	27.71	-	26.58	-	24.75	25.02	24.51	26.70	24.08	26.41
	244.83	**GW/SW Elev. (ft)**	218.57	218.81	219.24	-	217.33	217.61	218.69	-	218.25	-	-	-	219.32	-	-	-	-	218.43	-	-	218.86	-	217.12	-	218.25	-	220.08	219.81	220.32	218.13	220.75	218.42
PZ-12-09 (2 inch, stickup)	-	**DTW (ft)**	23.03	24.32	22.80	-	25.20	24.70	23.49	-	24.60	-	-	-	24.28	-	-	-	-	24.40	-	-	23.36	-	24.80	-	-	23.94	23.64	21.98	23.47	23.55	23.89	23.97
	241.93	**GW/SW Elev. (ft)**	218.90	217.61	219.13	-	216.73	217.23	218.44	-	217.33	-	-	-	217.65	-	-	-	-	217.53	-	-	218.57	-	217.13	-	-	217.99	218.29	219.95	218.46	218.38	218.04	217.96
PZ-12-10 (2 inch, stickup)	-	**DTW (ft)**	22.35	22.89	23.16	-	23.55	23.76	22.42	-	23.58	-	-	-	22.84	-	-	-	-	23.45	-	-	23.07	-	23.56	-	-	23.07	21.68	21.35	21.56	21.74	21.71	22.81
	242.28	**GW/SW Elev. (ft)**	219.93	219.39	219.12	-	218.73	218.52	219.86	-	218.70	-	-	-	219.44	-	-	-	-	218.83	-	-	219.21	-	218.72	-	-	219.21	220.60	220.93	220.72	220.54	220.57	219.47
SHM-10-01 (1.5 inch, stickup)	-	**DTW (ft)**	4.15	3.52	2.45	-	4.02	-	2.96	-	4.09	-	3.65	-	-	-	-	-	-	4.35	-	-	-	-	-	-	-	-		1.91	-	3.45	-	4.20
	209.65	**GW/SW Elev. (ft)**	205.50	206.13	207.20	-	205.63	-	206.69	-	205.56	-	206.00	-	-	-	-	-	-	205.30	-	-	-	-	-	-	-	-	209.65	207.74	-	206.20	-	205.45
SHM-10-02 (1.5 inch, stickup)	-	**DTW (ft)**	17.25	18.64	16.50	-	18.35	-	17.21	-	18.46	-	-	-	-	-	-	18.08	-	-	-	-	-	-	-	-	-	-		15.71	-	16.74	-	18.24
	223.03	**GW/SW Elev. (ft)**	205.78	204.39	206.53	-	204.68	-	205.82	-	204.57	-	-	-	-	-	-	204.95	-	-	-	-	-	-	-	-	-	-	223.03	207.32	-	206.29	-	204.79
SHM-10-03 (1.5 inch, stickup)	-	**DTW (ft)**	26.16	26.38	25.47	-	26.97	-	25.68	-	27.10	-	-	-	-	-	-	-	26.60	-	-	-	-	-	-	-	-	-		24.64	-	25.65	-	26.87
	232.05	**GW/SW Elev. (ft)**	205.89	205.67	206.58	-	205.08	-	206.37	-	204.95	-	-	-	-	-	-	-	205.45	-	-	-	-	-	-	-	-	-	232.05	207.41	-	206.40	-	205.18
SHM-10-04 (1.5 inch, stickup)	-	**DTW (ft)**	6.25	6.11	5.26	-	6.18	-	5.11	-	6.24	-	-	-	-	-	-	5.80	-	-	-	-	-	-	-	-	-	-		5.11	-	4.75	-	6.69
	212.61	**GW/SW Elev. (ft)**	206.36	206.50	207.35	-	206.43	-	207.50	-	206.37	-	-	-	-	-	-	206.81	-	-	-	-	-	-	-	-	-	-	212.61	207.50	-	207.86	-	205.92
SHM-10-05A (1.5 inch, stickup)	-	**DTW (ft)**	25.18	25.56	24.67	-	26.14	-	24.23	-	25.41	-	-	-	-	-	-	-	25.20	-	-	-	-	-	-	-	-	25.03	-	24.73	-	25.00	-	25.72
	235.09	**GW/SW Elev. (ft)**	209.91	209.53	210.42	-	208.95	-	210.86	-	209.68	-	-	-	-	-	-	-	209.89	-	-	-	-	-	-	-	-	210.06	-	210.36	-	210.09	-	209.37
SHM-10-06 (1.5 inch, stickup)	-	**DTW (ft)**	18.84	19.46	19.18	-	20.80	-	18.23	-	20.32	-	-	19.04	-	-	-	-	-	20.42	-	-	-	-	-	20.82	-	19.52	-	18.60	-	18.55	-	20.00
	232.91	**GW/SW Elev. (ft)**	214.07	213.45	213.73	-	212.11	-	214.68	-	212.59	-	-	213.87	-	-	-	-	-	212.49	-	-	-	-	-	212.09	-	213.39	-	214.31	-	214.36	-	212.91
SHM-10-06A (1.5 inch, stickup)	-	**DTW (ft)**	34.29	34.93	33.64	-	36.50	-	33.77	-	35.67	-	-	34.53	-	-	-	-	-	35.76	-	-	-	-	-	36.16	-	34.84	-	34.02	-	33.98	-	35.30
	248.54	**GW/SW Elev. (ft)**	214.25	213.61	214.90	-	212.04	-	214.77	-	212.87	-	-	214.01	-	-	-	-	-	212.78	-	-	-	-	-	212.38	-	213.70	-	214.52	-	214.56	-	213.24
SHM-10-07 (1.5 inch, stickup)	-	**DTW (ft)**	28.76	27.07	26.95	-	28.20	-	27.74	-	28.02	-	-	-	26.78	-	-	-	-	28.00	-	-	-	-	-	-	-	28.37	-	27.11	39.87	26.48		27.08
	246.82	**GW/SW Elev. (ft)**	218.06	219.75	219.87	-	218.62	-	219.08	-	218.80	-	-	-	220.04	-	-	-	-	218.82	-	-	-	-	-	-	-	218.45	-	219.71	206.95	220.34	246.82	219.74
SHM-10-08 (1.5 inch, stickup)	-	**DTW (ft)**	8.59	9.01	7.78	-	9.81	-	8.75	-	9.90	-	-	-	-	-	9.55	-	-	-	-	-	-	-	-	-	-	-	-	7.12	-	9.00	-	9.97
	214.36	**GW/SW Elev. (ft)**	205.77	205.35	206.58	-	204.55	-	205.61	-	204.46	-	-	-	-	-	204.81	-	-	-	-	-	-	-	-	-	-	-	-	207.24	-	205.36	-	204.39
SHM-10-10 (1.5 inch, stickup)	-	**DTW (ft)**	10.51	10.63	9.74	-	10.76	-	9.90	-	10.82	-	-	-	10.22	-	-	-	-	10.93	-	-	-	-	-	-	-	-	-	9.19	-	10.25	-	11.75
	217.11	**GW/SW Elev. (ft)**	206.60	206.48	207.37	-	206.35	-	207.21	-	206.29	-	-	-	206.89	-	-	-	-	206.18	-	-	-	-	-	-	-	-	-	207.92	-	206.86	-	205.36
SHM-10-11 (2 inch, stickup)	-	**DTW (ft)**	41.14	40.36	33.62	-	41.00	-	40.99	-	41.46	-	-	-	39.32	-	-	-	-	41.40	-	-	-	-	-	-	42.21	-	-	40.48	-	39.20	38.17	40.23
	263.76	**GW/SW Elev. (ft)**	222.62	223.40	230.14	-	222.76	-	222.77	-	222.30	-	-	-	224.44	-	-	-	-	222.36	-	-	-	-	-	-	221.55	-	-	223.28	-	224.56	225.59	223.53
SHM-10-12 (2 inch, stickup)	-	**DTW (ft)**	34.80	33.09	40.22	-	34.61	-	34.55	-	34.93	-	-	-	33.35	-	-	-	-	34.88	-	-	-	-	-	-	35.62	-	-	34.01	-	33.13	-	33.75
	255.17	**GW/SW Elev. (ft)**	220.37	222.08	214.95	-	220.56	-	220.62	-	220.24	-	-	-	221.82	-	-	-	-	220.29	-	-	-	-	-	-	219.55	-	-	221.16	-	222.04	-	221.42
SHM-10-13 (2 inch, stickup)	-	**DTW (ft)**	26.51	25.73	25.47	-	26.86	-	26.09	-	26.92	-	-	-	25.47	-	-	-	-	26.85	-	-	-	-	-	-	-	27.12	-	25.93	-	25.20	-	25.95
	244.77	**GW/SW Elev. (ft)**	218.26	219.04	219.30	-	217.91	-	218.68	-	217.85	-	-	-	219.30	-	-	-	-	217.92	-	-	-	-	-	-	-	217.65	-	218.84	-	219.57	-	218.82
SHM-10-14 (2 inch, stickup)	-	**DTW (ft)**	20.49	19.93	19.46	-	21.20	-	19.68	-	21.22	-	-	-	19.65	-	-	-	-	21.25	-	-	-	-	-	-	-	21.12	-	20.09	-	19.24	-	20.48
	237.62	**GW/SW Elev. (ft)**	217.13	217.69	218.16	-	216.42	-	217.94	-	216.40	-	-	-	217.97	-	-	-	-	216.37	-	-	-	-	-	-	-	216.50	-	217.53	-	218.38	-	217.14
SHM-10-15 (2 inch, stickup)	-	**DTW (ft)**	25.09	23.86	24.74	-	25.15	-	24.43	-	25.41	-	-	-	23.58	-	-	-	-	25.36	-	-	-	-	-	-	-	25.72	-	24.42	-	23.50	-	24.40
	243.68	**GW/SW Elev. (ft)**	218.59	219.82	218.94	-	218.53	-	219.25	-	218.27	-	-	-	220.10	-	-	-	-	218.32	-	-	-	-	-	-	-	217.96	-	219.26	-	220.18	-	219.28
SHM-10-16 (2 inch, stickup)	-	**DTW (ft)**	7.31	8.03	7.70	-	8.64	-	6.40	-	8.80	-	-	-	7.57	-	-	-	-	9.02	-	-	8.55	-	8.81	-	-	8.08	18.25	7.13	-	7.20	-	8.62
	219.23	**GW/SW Elev. (ft)**	211.92	211.20	211.53	-	210.59	-	212.83	-	210.43	-	-	-	211.66	-	-	-	-	210.21	-	-	210.68	-	210.42	-	-	211.15	200.98	212.10	-	212.03	-	210.61
SHM-11-02 (bedrock, standpipe)	-	**DTW (ft)**	22.81	22.74	22.10	-	24.79	-	22.83	-	23.11	-	-	22.53	-	-	-	-	-	22.92	-	-	22.95	-	23.50	-	-	22.96	22.29	22.32	22.15	22.30	21.91	22.32
	240.73	**GW/SW Elev. (ft)**	217.92	217.99	218.63	-	215.94	-	217.90	-	217.62	-	-	218.20	-	-	-	-	-	217.81	-	-	217.78	-	217.23	-	-	217.77	218.44	218.41	218.58	218.43	218.82	218.41
SHM-11-06 (2 inch, stickup)	-	**DTW (ft)**	19.82	20.11	19.39	-	22.30	-	19.60	-	20.71	-	-	-	19.90	-	-	-	-	20.55	-	-	-	-	-	-	-	-	17.81	19.42	19.21	19.47	19.36	20.11
	236.17	**GW/SW Elev. (ft)**	216.35	216.06	216.78	-	213.87	-	216.57	-	215.46	-	-	-	216.27	-	-	-	-	215.62	-	-	-	-	-	-	-	-	218.36	216.75	216.96	216.70	216.81	216.06
SHM-11-07 (3/4 inch, stickup)	-	**DTW (ft)**	22.95	22.61	22.19	-	24.28	-	22.89	-	23.26	-	-	-	22.33	-	-	-	-	20.55	-	-	-	-	-	-	-	-	-	22.35	-	22.02	-	22.40
	240.83	**GW/SW Elev. (ft)**	217.88	218.22	218.64	-	216.55	-	217.94	-	217.57	-	-	-	218.50	-	-	-	-	220.28	-	-	-	-	-	-	-	-	-	218.48	-	218.81	-	218.43
SHM-13-01 (2 inch, stickup)	-	**DTW (ft)**	-	-	IA	-	3.22	-	2.06	-	3.36	-	-	-	2.89	-	-	-	-	3.46	-	-	-	-	-	-	-	2.71	-	1.80	-	2.38	-	3.48
	208.08	**GW/SW Elev. (ft)**	-	-	HWL	-	204.86	-	206.02	-	204.72	-	-	-	205.19	-	-	-	-	204.62	-	-	-	-	-	-	-	205.37	-	206.28	-	205.70	-	204.60
SHM-13-02 (2 inch, stickup)	-	**DTW (ft)**	-	12.50	11.50	-	12.91	-	11.92	-	12.97	-	-	-	-	-	-	-	-	13.05	-	-	-	-	-	-	-	-	-	10.79	-	12.24	-	13.03
	218.72	**GW/SW Elev. (ft)**	-	206.22	207.22	-	205.81	-	206.80	-	205.75	-	-	-	-	-	-	-	-	205.67	-	-	-	-	-	-	-	-	-	207.93	-	206.48	-	205.69

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
SHM-13-03 (2 inch, stickup)	-	**DTW (ft)**	-	5.10	4.23	-	5.08	-	4.33	-	5.12	-	-	5.14	-	-	-	-	-	5.75	-	-	5.42	-	-	5.58	-	-	5.03	4.31	10.30	4.85	4.88	5.68
	212.05	**GW/SW Elev. (ft)**	-	206.95	207.82	-	206.97	-	207.72	-	206.93	-	-	206.91	-	-	-	-	-	206.30	-	-	206.63	-	-	206.47	-	-	207.02	207.74	201.75	207.20	207.17	206.37
SHM-13-04 (2 inch, stickup)	-	**DTW (ft)**	-	19.15	18.49	-	19.45	-	17.79	-	19.55	-	-	19.00	-	-	-	-	-	19.60	-	-	-	19.29	-	19.73	-	Dry	18.47	18.33	18.50	18.85	18.71	19.71
	227.02	**GW/SW Elev. (ft)**	-	207.87	208.53	-	207.57	-	209.23	-	207.47	-	-	208.02	-	-	-	-	-	207.42	-	-	-	207.73	-	207.29	-	-	208.55	208.69	208.52	208.17	208.31	207.31
SHM-13-05 (2 inch, stickup)	-	**DTW (ft)**	-	16.78	15.99	-	17.06	-	15.50	-	17.95	-	-	-	16.41	-	-	-	-	17.00	-	-	-	-	-	-	-	-	-	15.87	-	16.25	-	17.15
	225.14	**GW/SW Elev. (ft)**	-	208.36	209.15	-	208.08	-	209.64	-	207.19	-	-	-	208.73	-	-	-	-	208.14	-	-	-	-	-	-	-	-	-	209.27	-	208.89	-	207.99
SHM-13-06 (2 inch, roadbox)	-	**DTW (ft)**	-	-	16.39	-	17.50	-	16.32	-	17.55	-	-	17.03	-	-	-	-	-	-	-	17.44	-	17.47	-	17.73	-	Dry	35.78	15.61	16.88	16.89	17.00	17.72
	223.89	**GW/SW Elev. (ft)**	-	-	207.50	-	206.39	-	207.57	-	206.34	-	-	206.86	-	-	-	-	-	-	-	206.45	-	206.42	-	206.16	-	-	188.11	208.28	207.01	207.00	206.89	206.17
SHM-13-07 (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	17.79	-	18.97	-	-	18.35	-	-	-	-	-	19.08	-	-	-	18.87	-	19.23	-	-	18.19	6.13	18.32	-	18.47	19.23
	225.64	**GW/SW Elev. (ft)**	-	-	-	-	-	-	207.85	-	206.67	-	-	207.29	-	-	-	-	-	206.56	-	-	-	206.77	-	206.41	-	-	207.45	219.51	207.32	-	207.17	206.41
SHM-13-08 (2 inch, roadbox)	-	**DTW (ft)**	-	-	19.71	-	20.05	-	19.33	-	19.69	-	-	20.07	-	-	-	-	-	20.60	-	-	-	20.33	-	20.65	-	-	19.78	19.36	19.91	20.00	20.90	20.90
	227.90	**GW/SW Elev. (ft)**	-	-	208.19	-	207.85	-	208.57	-	208.21	-	-	207.83	-	-	-	-	-	207.30	-	-	-	207.57	-	207.25	-	-	208.12	208.54	207.99	207.90	207.00	207.00
SHM-13-14S (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	3.36	3.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.48	-	3.34	-	4.12
	210.55	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	207.19	206.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	207.07	-	207.21	-	206.43
SHM-13-14D (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	2.91	3.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.78	-	3.15	-	3.98
	210.48	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	207.57	206.88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	207.70	-	207.33	-	206.50
SHM-13-15 (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	3.11	3.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.01	-	-	-	4.32
	210.58	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	207.47	206.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	207.57	-	-	-	206.26
SHM-07-03 (2 inch, roadbox)	-	**DTW (ft)**	-	19.85	19.24	-	20.50	-	18.23	-	20.52	-	-	-	-	-	-	-	19.72	-	-	-	20.19	-	-	20.78	-	20.10	19.02	19.53	19.11	19.44	19.50	24.00
	227.90	**GW/SW Elev. (ft)**	-	208.05	208.66	-	207.40	-	209.67	-	207.38	-	-	-	-	-	-	-	208.18	-	-	-	207.71	-	-	207.12	-	207.80	208.88	208.37	208.79	208.46	208.40	203.90
SHM-07-03A (1 inch, stickup PZ)	-	**DTW (ft)**	-	-	11.13	-	13.21	-	Dry	-	13.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	217.80	**GW/SW Elev. (ft)**	-	-	206.67	-	204.59	-	@ 11.45'	-	204.48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHM-07-05 X (2 inch, roadbox)	-	**DTW (ft)**	-	14.57	14.39	-	14.85	-	13.22	-	14.85	-	-	-	-	-	-	14.52	-	-	-	-	14.89	-	-	15.38	-	14.44	16.10	14.33	13.99	14.50	14.19	15.30
	223.40	**GW/SW Elev. (ft)**	-	208.83	209.01	-	208.55	-	210.18	-	208.55	-	-	-	-	-	-	208.88	-	-	-	-	208.51	-	-	208.02	-	208.96	207.30	209.07	209.41	208.90	209.21	208.10
SHP-99-01C (2 inch, stickup)	-	**DTW (ft)**	-	11.00	9.25	-	24.33	-	8.03	-	24.19	-	-	12.00	-	-	-	-	-	24.60	-	-	-	-	-	-	25.06	-	9.16	19.80	-	10.54	-	24.54
	274.15	**GW/SW Elev. (ft)**	-	263.15	264.90	-	249.82	-	266.12	-	249.96	-	-	262.15	-	-	-	-	-	249.55	-	-	-	-	-	-	249.09	-	264.99	254.35	-	263.61	-	249.61
SHP-99-01B (2 inch, stickup)	-	**DTW (ft)**	-	5.91	4.84	-	Dry	-	4.01	-	Dry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry	-	4.73	9.72	-	5.48	-	9.85
	273.16	**GW/SW Elev. (ft)**	-	267.25	268.32	-	@ 9.80'	-	269.15	-	@ 9.81'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	268.43	263.44	-	267.68	-	263.31
SHP-93-24A (4 inch, stickup)	-	**DTW (ft)**	-	16.64	15.00	-	17.41	-	16.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.35	-	15.71	15.20	-	15.09	-	16.12
	238.42	**GW/SW Elev. (ft)**	-	221.78	223.42	-	221.01	-	222.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	221.07	-	222.71	223.22	-	223.33	-	222.30
PSP-01 (staff gauge) @ 3.32ft mark	-	**DTW (ft)**	2.00	1.75	3.85	1.50	Dry	-	1.82	-	-	-	-	2.15	-	-	-	-	-	2.60	-	-	-	-	-	-	-	-	-	2.00	1.85	1.68	1.50	2.80
	218.14	**GW/SW Elev. (ft)**	216.82	216.57	218.67	216.32	Pd Const.	-	216.64	-	-	-	-	216.97	-	-	-	-	-	217.42	-	-	-	-	-	-	-	-	-	216.82	216.67	216.50	216.32	217.62
SHSG-13-01G (staff gauge) @ 4ft mark	-	**DTW (ft)**	-	-	-	3.50	NR	-	-	3.05	-	2.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.60	-	1.75	-	1.50
	205.53	**GW/SW Elev. (ft)**	-	-	-	205.03	Muddy G.	-	-	204.58	-	204.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	203.13	-	203.78	-	203.03
SHSG-13-02G (staff gauge) @ 4ft mark	-	**DTW (ft)**	-	-	-	2.12	NR	-	-	2.55	-	2.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.30	-	3.50	-	-
	208.25	**GW/SW Elev. (ft)**	-	-	-	206.37	Muddy G.	-	-	206.80	-	207.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	207.55	-	204.75	-	-
SHSG-13-03G (staff gauge) @ 6ft mark	-	**DTW (ft)**	-	-	-	2.86	NR	-	-	3.45	-	3.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NL	-	-	-	-
	209.99	**GW/SW Elev. (ft)**	-	-	-	206.85	Muddy G.	-	-	207.44	-	207.78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHP-13-03 (2-inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	2.55	-	-	2.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NSVD	**GW/SW Elev. (ft)**	-	-	-	-	-	-	NSVD	-	-	NSVD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHSG-14-01G (staff gauge) @ 3ft mark	-	**DTW (ft)**	-	-	-	-	-	-	-	2.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.10	-	1.56	-	2.30
	213.71	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	212.71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	213.81	-	212.15	-	213.01
EPA-PZ-2012-1A (EPA Piezometer)	-	**DTW (ft)**	-	11.59	-	-	-	-	10.10	-	12.39	-	-	-	-	11.21	-	-	-	12.53	-	-	12.12	-	12.49	-	-	11.67	10.39	10.62	10.34	10.69	10.84	12.15
	223.79	**GW/SW Elev. (ft)**	-	212.20	-	-	-	-	213.69	-	211.40	-	-	-	-	212.58	-	-	-	211.26	-	-	211.67	-	211.30	-	-	212.12	213.40	213.17	213.45	213.10	212.95	211.64
EPA-PZ-2012-1B (EPA Piezometer)	-	**DTW (ft)**	-	11.34	-	-	-	-	9.85	-	12.09	-	-	-	-	10.81	-	-	-	12.21	-	-	11.80	-	12.18	-	-	11.37	10.14	10.35	10.08	10.43	10.56	11.80
	223.53	**GW/SW Elev. (ft)**	-	212.19	-	-	-	-	213.68	-	211.44	-	-	-	-	212.72	-	-	-	211.32	-	-	211.73	-	211.35	-	-	212.16	213.39	213.18	213.45	213.10	212.97	211.73
EPA-PZ-2012-2A (EPA Piezometer)	-	**DTW (ft)**	-	11.11	-	-	-	-	9.60	-	11.77	-	-	-	-	10.45	-	-	-	11.81	-	-	11.59	-	12.03	-	-	10.86	9.98	9.96	9.88	10.15	10.39	11.42
	223.38	**GW/SW Elev. (ft)**	-	212.27	-	-	-	-	213.78	-	211.61	-	-	-	-	212.93	-	-	-	211.57	-	-	211.79	-	211.35	-	-	212.52	213.40	213.42	213.50	213.23	212.99	211.96
EPA-PZ-2012-2B (EPA Piezometer)	-	**DTW (ft)**	-	11.10	-	-	-	-	9.70	-	11.71	-	-	-	-	10.53	-	-	-	11.77	-	-	11.48	-	11.89	-	-	10.84	10.03	10.11	9.99	10.29	10.42	11.44
	223.37	**GW/SW Elev. (ft)**	-	212.27	-	-	-	-	213.67	-	211.66	-	-	-	-	212.84	-	-	-	211.60	-	-	211.89	-	211.48	-	-	212.53	213.34	213.26	213.38	213.08	212.95	211.93
EPA-PZ-2012-3A (EPA Piezometer)	-	**DTW (ft)**	-	11.03	-	-	-	-	9.40	-	11.84	-	-	-	-	10.48	-	-	-	12.08	-	-	11.56	-	11.84	-	-	11.18	9.80	10.10	9.74	10.20	10.20	11.68
	222.65	**GW/SW Elev. (ft)**	-	211.62	-	-	-	-	213.25	-	210.81	-	-	-	-	212.17	-	-	-	210.57	-	-	211.09	-	210.81	-	-	211.47	212.85	212.55	212.91	212.45	212.45	210.97
EPA-PZ-2012-3B (EPA Piezometer)	-	**DTW (ft)**	-	10.95	-	-	-	-	9.45	-	11.15	-	-	-	-	10.45	-	-	-	12.02	-	-	11.49	-	11.74	-	-	11.18	9.78	10.11	9.75	10.20	10.17	11.60
	222.57	**GW/SW Elev. (ft)**	-	211.62	-	-	-	-	213.12	-	211.42	-	-	-	-	212.12	-	-	-	210.55	-	-	211.08	-	210.83	-	-	211.39	212.79	212.46	212.82	212.37	212.40	210.97
EPA-PZ-2012-4A (EPA Piezometer)	-	**DTW (ft)**	-	15.18	-	-	-	-	13.56	-	16.06	-	-	-	-	14.71	-	-	-	16.25	-	-	15.77	-	15.88	-	-	15.33	14.00	14.35	13.88	14.36	14.37	15.92

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
	226.60	**GW/SW Elev. (ft)**	-	211.42	-	-	-	-	213.04	-	210.54	-	-	-	-	211.89	-	-	-	210.35	-	-	210.83	-	210.72	-	-	211.27	212.60	212.25	212.72	212.24	212.23	210.68
EPA-PZ-2012-4B (EPA Piezometer)	-	**DTW (ft)**	-	15.09	-	-	-	-	13.34	-	16.15	-	-	-	-	14.73	-	-	-	16.30	-	-	15.62	-	15.67	-	-	15.24	13.93	14.31	13.79	14.18	15.24	15.76
	226.39	**GW/SW Elev. (ft)**	-	211.30	-	-	-	-	213.05	-	210.24	-	-	-	-	211.66	-	-	-	210.09	-	-	210.77	-	210.72	-	-	211.15	212.46	212.08	212.60	212.21	211.15	210.63
EPA-PZ-2012-5A (EPA Piezometer)	-	**DTW (ft)**	-	6.69	-	-	-	-	9.07	-	9.33	-	-	-	-	7.71	-	-	-	9.33	-	-	8.85	-	9.47	-	-	8.21	7.09	7.19	7.09	7.41	7.50	8.96
	220.01	**GW/SW Elev. (ft)**	-	213.32	-	-	-	-	210.94	-	210.68	-	-	-	-	212.30	-	-	-	210.68	-	-	211.16	-	210.54	-	-	211.80	212.92	212.82	212.92	212.60	212.51	211.05
EPA-PZ-2012-5B (EPA Piezometer)	-	**DTW (ft)**	-	7.68	-	-	-	-	6.12	-	8.38	-	-	-	-	7.11	-	-	-	8.52	-	-	8.15	-	8.50	-	-	7.64	6.49	6.70	6.49	6.83	6.91	8.24
	219.38	**GW/SW Elev. (ft)**	-	211.70	-	-	-	-	213.26	-	211.00	-	-	-	-	212.27	-	-	-	210.86	-	-	211.23	-	210.88	-	-	211.74	212.89	212.68	212.89	212.55	212.47	211.14
EPA-PZ-2012-6A (EPA Piezometer)	-	**DTW (ft)**	-	22.82	-	-	-	-	21.28	-	23.83	-	-	-	-	22.13	-	-	-	24.20	-	-	NR - Obst	-	23.89	-	-	23.18	21.53	22.01	21.45	21.99	21.89	23.68
	234.25	**GW/SW Elev. (ft)**	-	211.43	-	-	-	-	212.97	-	210.42	-	-	-	-	212.12	-	-	-	210.05	-	-	-	-	210.36	-	-	211.07	212.72	212.24	212.80	212.26	212.36	210.57
EPA-PZ-2012-6B (EPA Piezometer)	-	**DTW (ft)**	-	22.78	-	-	-	-	21.27	-	23.67	-	-	-	-	22.27	-	-	-	24.10	-	-	23.35	-	23.54	-	-	23.02	22.55	21.92	21.49	21.87	21.85	23.55
	234.08	**GW/SW Elev. (ft)**	-	211.30	-	-	-	-	212.81	-	210.41	-	-	-	-	211.81	-	-	-	209.98	-	-	210.73	-	210.54	-	-	211.06	211.53	212.16	212.59	212.21	212.23	210.53
EPA-PZ-2012-7A (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	20.95	-	23.71	-	-	-	-	22.22	-	-	-	24.06	-	-	23.31	-	23.84	-	-	23.07	21.35	22.12	21.32	22.21	22.95	27.79
	234.16	**GW/SW Elev. (ft)**	-	-	-	-	-	-	213.21	-	210.45	-	-	-	-	211.94	-	-	-	210.10	-	-	210.85	-	210.32	-	-	211.09	212.81	212.04	212.84	211.95	211.21	206.37
EPA-PZ-2012-7B (EPA Piezometer)	-	**DTW (ft)**	-	22.72	-	-	-	-	21.00	-	23.59	-	-	-	-	22.18	-	-	-	23.94	-	-	23.24	-	23.38	-	-	22.84	21.36	21.87	21.30	22.05	21.83	23.39
	234.03	**GW/SW Elev. (ft)**	-	211.31	-	-	-	-	213.03	-	210.44	-	-	-	-	211.85	-	-	-	210.09	-	-	210.79	-	210.65	-	-	211.19	212.67	212.16	212.73	211.98	212.20	210.64
SHP-2016-01A (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.04	-	-	17.90	14.25	14.89	14.17	14.80	14.65	16.85
	227.27	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210.23	-	-	209.37	213.02	212.38	213.10	212.47	212.62	210.42
SHP-2016-01B (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.47	-	-	17.43	16.47	16.01	15.85	16.65	16.19	17.75
	227.24	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210.77	-	-	209.81	210.77	211.23	211.39	210.59	211.05	209.49
SHP-2016-02A (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.98	-	-	14.67	13.40	13.65	13.27	13.15	13.69	15.41
	225.93	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	209.95	-	-	211.26	212.53	212.28	212.66	212.78	212.24	210.52
SHP-2016-02B (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.97	-	-	14.73	13.40	13.69	13.32	13.22	13.78	16.29
	225.95	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	209.98	-	-	211.22	212.55	212.26	212.63	212.73	212.17	209.66
SHP-2016-03A (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.79	-	-	11.67	10.58	10.92	10.42	11.10	10.90	12.50
	223.18	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210.39	-	-	211.51	212.60	212.26	212.76	212.08	212.28	210.68
SHP-2016-03B (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.65	-	-	11.80	10.52	10.86	10.51	10.95	10.91	12.37
	223.18	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210.53	-	-	211.38	212.66	212.32	212.67	212.23	212.27	210.81
SHP-2016-04A (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.60	-	-	18.76	17.40	17.78	17.31	17.80	17.73	24.83
	229.97	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210.37	-	-	211.21	212.57	212.19	212.66	212.17	212.24	205.14
SHP-2016-04B (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.27	-	-	18.57	17.25	17.52	17.10	17.56	17.57	19.10
	229.75	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210.48	-	-	211.18	212.50	212.23	212.65	212.19	212.18	210.65
SHP-2016-05A (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.55	-	-	11.18	14.43	14.72	14.28	14.80	14.77	16.10
	227.01	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210.46	-	-	215.83	212.58	212.29	212.73	212.21	212.24	210.91
SHP-2016-05B (EPA Piezometer)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.43	-	-	11.18	14.40	14.70	14.22	14.79	14.77	16.28
	226.95	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210.52	-	-	215.77	212.55	212.25	212.73	212.16	212.18	210.67
SHP-2016-06A (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.35	28.35	27.12	29.73	27.79	30.17
	241.90	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	215.55	213.55	214.78	212.17	214.11	211.73
SHP-2016-06B (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.80	22.90	20.17	21.26	20.31	24.05
	241.89	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	222.09	218.99	221.72	220.63	221.58	217.84
SHP-2016-06C (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.75	22.80	19.97	21.15	19.49	23.75
	241.92	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	222.17	219.12	221.95	220.77	222.43	218.17
SHP-2016-07A (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.27	31.44	13.95	16.59	15.56	Dry
	265.30	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	251.03	233.86	251.35	248.71	249.74	-
SHP-2016-07B (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.46	32.85	20.90	23.43	22.02	35.80
	265.33	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	242.87	232.48	244.43	241.90	243.31	229.53
20-1 (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.78	36.86	-	18.33	-	39.50
	278.52	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	260.74	241.66	-	260.19	-	239.02
27-1 (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.71	34.32	-	12.59	-	41.12
	270.66	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	258.95	236.34	-	258.07	-	229.54
20-2 (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	277.71	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-2 (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.40	44.45	-	21.00	-	47.45
	275.15	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	255.75	230.70	-	254.15	-	227.70
2-1 (3 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	245.90	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
2-2 (3 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	248.06	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAP-1B (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	245.98	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAP-2B (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.36	20.66	-	9.32	-	22.80
	250.21	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	242.85	229.55	-	240.89	-	227.41
CAP-3 (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	252.63	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CAP-4 (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	248.63	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CH-1D (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.09	19.15	-	9.66	-	21.80
	250.59	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	242.50	231.44	-	240.93	-	228.79
CH-1S (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.42	18.98	-	9.95	-	22.00
	250.63	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	242.21	231.65	-	240.68	-	228.63
MW-1 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.31	11.50	-	9.37	-	Dry
	251.84	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	243.53	240.34	-	242.47	-	-
MW-11A (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry	8.75	-	-	-	8.90
	258.57	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	249.82	-	-	-	249.67
MW-14 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.47	Dry	-	6.83	-	Dry
	256.61	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250.14	-	-	249.78	-	-
MW-16 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry	9.55	-	9.54	-	9.55
	270.23	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	260.68	-	260.69	-	260.68
MW-22 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.13	Dry	-	6.36	-	Dry
	267.64	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	261.51	-	-	261.28	-	-
MW-4-1 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.26	7.58	-	3.75	-	Dry
	247.33	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	244.07	239.75	-	243.58	-	-
MW-7 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.03	11.98	-	-	-	Dry
	249.10	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	243.07	237.12	-	-	-	-
MW-9 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.21	11.88	-	-	-	Dry
	243.91	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	234.70	232.03	-	-	-	-
Q4-1 (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.79	30.70	-	10.09	-	32.70
	268.38	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	258.59	237.68	-	258.29	-	235.68
Q4-2 (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	273.37	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q5-1 (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.27	26.40	-	5.57	-	28.53
	260.99	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	255.72	234.59	-	255.42	-	232.46
Q5-2 (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	259.90	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-1 (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	265.18	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Well 3-2 (1.5 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.39	36.45	-	27.13	-	39.53
	268.20	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	242.81	231.75	-	241.07	-	228.67
32M-01-13XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	257.88	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32M-01-14XBR (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.65
	256.06	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	231.41
32M-01-14XOB (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.14	25.57	-	24.28	-	26.38
	256.56	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	235.42	230.99	-	232.28	-	230.18
32M-01-15XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.57
	257.70	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	235.13
32M-01-16XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.54
	257.50	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	232.96
32M-01-17X (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	259.11	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32M-01-18XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
	258.32	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32M-92-01X (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.11	18.51	-	17.66	-	11.38
	260.17	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	244.06	241.66	-	242.51	-	248.79
32M-92-03X (4 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	260.02	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32Z-01-08X (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	260.49	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32Z-01-10XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	257.41	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32Z-01-11XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	261.50	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32Z-01-12XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	257.85	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32Z-01-06X (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	261.85	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32Z-01-07XOB (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.99	16.17	-	15.29	-	19.38
	259.48	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	245.49	243.31	-	244.19	-	240.10
32Z-99-02X (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	259.71	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43M-01-16XOB (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	256.88	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43M-01-16XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	256.84	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43M-01-17XOB (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	258.08	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43M-01-17XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	258.29	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43M-01-20XOB (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	257.40	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43M-01-20XBR (2 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	257.30	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-1 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	222.58	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-2 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	222.15	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-3 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	222.95	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-4 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	222.97	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-5 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	222.75	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-6 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	222.49	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-7 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.00	-	5.40	-	4.63
	222.01	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	217.01	-	216.61	-	217.38
RSK-8 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	226.96	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-9 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	226.45	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-10 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	226.37	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-11 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	226.75	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-12 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	226.42	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
RSK-13 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	225.37	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-14 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	225.30	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-15 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.06	-	8.65	-	8.05
	225.54	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	217.48	-	216.89	-	217.49
RSK-16 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	218.58	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-17 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	218.85	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-18 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	218.73	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-19 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.58	-	1.98	-	1.35
	218.76	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	217.18	-	216.78	-	217.41
RSK-20 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	219.05	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-21 (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220.04	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-23 (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	227.80	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-24 (1 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	240.41	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-25 (1 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.01	-	21.95	-	21.69
	239.21	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	218.20	-	217.26	-	217.52
RSK-27 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.70	-	22.45	-	22.37
	241.45	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	218.75	-	219.00	-	219.08
RSK-28 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.75	-	20.45	-	20.75
	239.24	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	218.49	-	218.79	-	218.49
RSK-32 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.60	-	18.34	-	18.61
	236.91	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	218.31	-	218.57	-	218.30
RSK-34 (1 inch, roadbox)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.82	-	15.44	-	16.06
	233.16	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	217.34	-	217.72	-	217.10
RSK-35 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.71	-	16.72	-	17.01
	233.64	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	216.93	-	216.92	-	216.63
RSK-36 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220.22	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-37 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.47	-	8.80	-	3.10
	220.55	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	216.08	-	211.75	-	217.45
RSK-38 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220.53	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-39 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220.33	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-40 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220.39	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-41 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220.41	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-42 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220.57	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-43 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220.43	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-47 (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	226.83	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSK-50 (1 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	220.23	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SHP-2017-1 (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.55	17.57	18.71	18.54	20.17

Table 5-4
Site-Wide Hydraulic Monitoring Results from 2012 to 2019
Shepley's Hill Landfill
Devens, Massachusetts

Well ID	Ref. Elev.		11/05/12	05/15/13	06/11/13	07/20/13	10/21/13	11/19/13	04/22/14	04/23/14	10/06/14	10/07/14	06/01/15	06/02/15	06/03/15	06/04/15	06/08/15	06/09/15	06/10/15	10/20/15	10/21/15	12/22/15	06/23/16	06/24/16	08/23/16	08/24/16	11/15/16	11/16/16	05/22/17	11/02/17	04/11/18	11/01/18	04/11/19	10/22/19
	229.63	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	211.08	212.06	210.92	211.09	209.46
SHP-2017-2 (2 inch, stickup)	-	**DTW (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.24	18.69	18.82	19.28	20.80
	230.05	**GW/SW Elev. (ft)**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	210.81	211.36	211.23	210.77	209.25

Notes:

ft = feet
DTW = Depth to Water
GW = Groundwater
SW = Surface water
Elev. = Elevation in feet

Pd. Const. = Pond Construction
NR/ - = Not Recorded
DS = Destroyed
Muddy G. = Muddy Gauge
Vertical datum in NAVD88

NSVD = not surveyed
NL = not located
Ref. = Reference
HWL = High water level
IA = Inaccessible

Obst. = Obstruction
Post-2017 GW Elev. = Top of Riser (measuring point post-2017 survey)
R = rejected measurement
"--" = no data

Table 5-5
Spring 2019 LTM Analytical Results and Field Parameters
Shepley's Hill Landfill
Devens, Massachusetts

				Analytical Method	Anions		General Chemistry		Dissolved Metals			Field Parameters					
				Analyte	Chloride	Sulfate	Alkalinity	DOC	Arsenic	Iron	Manganese	DO	ORP	pH	SPC	Temp	Turbidity
				Units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	mv	pH Units	µS/cm	°C	NTU
Location	**Sample ID**	**SBD**	**SED**	**Date**					**10***	**9,100***	**1,715***						
EPA-PZ-2012-1A	EPA-PZ-2012-1A_SPR19	23.7	28.7	04/16/2019	**3.3**	**3.2**	**51**	**2.4**	3.0 U	**270**	**250**	0.59	140	6.1	120	7.4	2.3
EPA-PZ-2012-1B	EPA-PZ-2012-1B_SPR19	73.56	78.56	04/16/2019	**26**	**3.4**	**240**	**2.1**	**160**	**15,000**	**13,000**	0.68	11	6.5	590	8.3	35
EPA-PZ-2012-2A	EPA-PZ-2012-2A_SPR19	18.14	23.14	04/12/2019	**2.6**	**5.8**	**10**	0.50	3.0 U	50 U	**1.5 J**	5.3	190	5.8	47	7.1	0.72
EPA-PZ-2012-2B	EPA-PZ-2012-2B_SPR19	73.16	78.16	04/12/2019	**35**	**13**	**130**	**1.7**	3.0 U	**97**	**6,400**	0.57	150	6.2	390	8.4	12
EPA-PZ-2012-3A	EPA-PZ-2012-3A_SPR19	19.09	24.09	04/16/2019	**32**	1.0 U	**89**	**11**	**15**	**16,000**	**920**	0.51	16	6.1	340	11	8.0
EPA-PZ-2012-3B	EPA-PZ-2012-3B_SPR19	68.7	73.7	04/16/2019	**28**	**12**	**180**	**1.9**	**2,700**	**45,000**	**5,800**	0.42	-80	6.7	610	12	33
EPA-PZ-2012-3B	SHL-DUP03_SPR19	68.7	73.7	04/16/2019	**28**	**11**	**180**	**1.9**	**3,000**	**45,000**	**5,700**	0.42	-80	6.7	610	12	33
EPA-PZ-2012-4A	EPA-PZ-2012-4A_SPR19	19.56	24.56	04/15/2019	**29**	**3.4**	**79**	**11**	**2.5 J**	**4,100**	**560**	0.71	2.0	6.4	290	11	2.7
EPA-PZ-2012-4B	EPA-PZ-2012-4B_SPR19	79.5	84.5	04/15/2019	**22**	**6.8**	**140**	**2.9**	**2,000**	**72,000**	**880**	0.60	-63	6.6	600	12	14
EPA-PZ-2012-5A	EPA-PZ-2012-5A_SPR19	17.95	22.95	04/12/2019	**15**	**4.2**	**22**	**6.5**	**1.5 J**	**7,200**	**96**	0.39	36	5.7	120	7.9	5.2
EPA-PZ-2012-5B	EPA-PZ-2012-5B_SPR19	68.46	73.46	04/12/2019	**42**	**8.9**	**200**	**1.7**	**2.7 J**	**390**	**11,000**	0.33	38	6.4	530	8.8	4.4
EPA-PZ-2012-6A	EPA-PZ-2012-6A_SPR19	24.19	29.19	04/22/2019	**58**	**3.7**	**25**	0.50	**1.6 J**	50 U	**7.8 J**	9.2	160	6.3	260	12	5.0
EPA-PZ-2012-6B	EPA-PZ-2012-6B_SPR19	74.23	79.23	04/22/2019	**17**	**12**	**39**	**1.6**	**350**	**19,000**	**950**	6.8	-55	6.8	200	12	36
EPA-PZ-2012-7A	EPA-PZ-2012-7A_SPR19	23.87	28.87	04/19/2019	**180**	**2.1**	**21**	0.50	3.0 U	50 U	3.0 U	6.0	120	5.7	660	10	1.8
EPA-PZ-2012-7B	EPA-PZ-2012-7B_SPR19	58.82	63.82	04/19/2019	**9.6**	**5.0**	**52**	0.50	**1,500**	**22,000**	**2,700**	0.77	-34	6.2	210	11	1.0
EW-01	EW-1@ATP Port_SPR19	60	85	04/12/2019	**15**	**4.0**	**200**	**4.4**	**1,500**	**64,000**	**2,100**	---	---	---	---	---	---
EW-04	EW-4@ATP Port_SPR19	70	95	04/12/2019	**5.2**	**4.4**	**100**	**1.9**	**2,900**	**41,000**	**2,400**	---	---	---	---	---	---
PZ-12-01	PZ-12-01_SPR19	24	34	04/18/2019	**58**	**11**	**170**	**3.3**	**470**	**54,000**	**1,700**	0.71	-54	6.5	660	10	9.6
PZ-12-02	PZ-12-02_SPR19	24	34	04/18/2019	**47**	**6.0**	**240**	**5.8**	**190**	**73,000**	**1,300**	1.2	-57	6.4	780	9.8	5.5
PZ-12-03	PZ-12-03_SPR19	24	34	04/18/2019	---	---	**170**	**2.0**	**630**	**39,000**	**3,900**	0.64	-65	6.7	600	10	12
PZ-12-03	SHL-DUP01	24	34	04/18/2019	**55**	**3.4**	**170**	**2.0**	**640**	**38,000**	**3,800**	0.64	-65	6.7	600	10	12
PZ-12-04	PZ-12-04_SPR19	24	34	04/18/2019	**44**	**1.8**	**150**	**2.2**	**670**	**66,000**	**1,700**	0.52	-61	6.5	580	11	4.0
PZ-12-05	PZ-12-05_SPR19	26	36	04/16/2019	**9.1**	**23**	**59**	**1.4**	**220**	**56,000**	**3,600**	0.65	-66	6.2	340	12	4.8
PZ-12-06	PZ-12-06_SPR19	25	35	04/16/2019	**7.6**	**70**	**100**	**2.8**	**31**	**23,000**	**6,800**	0.56	-9.6	5.9	430	12	5.7
PZ-12-07	PZ-12-07_SPR19	20	30	04/16/2019	**2.2**	**44**	**120**	**1.7**	**100**	**4,500**	**1,500**	2.5	-14	6.7	350	11	9.7
PZ-12-08	PZ-12-08_SPR19	22	32	04/12/2019	**1.0**	**26**	**70**	0.50	**160**	**23,000**	**1,200**	3.9	52	6.1	240	10	89
PZ-12-09	PZ-12-09_SPR19	20	30	04/16/2019	**1.3**	**13**	**72**	0.50	3.0 U	50 U	**37**	1.9	120	6.8	200	11	8.7
PZ-12-10	PZ-12-10_SPR19	20	30	04/16/2019	**0.91**	**6.1**	**44**	0.50	3.0 U	**790**	**8.8 J**	3.5	170	6.1	97	9.1	2.6
SHL-10	SHL-10_SPR19	24	39	04/12/2019	**0.97 J**	**2.5**	**14**	0.50	3.0 U	50 U	3.0 U	5.7	170	6.3	41	10	3.9
SHL-11	SHL-11_SPR19	12	27	04/22/2019	**65**	**4.7**	**140**	**2.0**	**960**	**58,000**	**1,700**	0.84	-82	6.7	640	11	32
SHL-11	SHL-DUP02_SPR19	12	27	04/22/2019	**65**	**4.3**	**140**	**2.1**	**950**	**60,000**	**1,700**	0.84	-82	6.7	640	11	32
SHL-19	SHL-19_SPR19	20	30	04/12/2019	**1.3**	**26**	**71**	0.50	3.0 U	**23 J**	3.0 U	5.6	170	6.4	210	8.2	26
SHL-20	SHL-20_SPR19	39	49	04/22/2019	**61**	**40**	**80**	**1.7**	**770**	**41,000**	**2,200**	0.42	-68	6.2	520	9.2	3.9
SHL-4	SHL-4_SPR19	3	13	04/16/2019	**0.93**	**18**	**55**	**1.6**	**98**	**14,000**	**2,900**	0.59	-28	6.3	190	11	7.7
SHM-05-40X	SHM-05-40X_SPR19	32	34	04/23/2019	**38**	**3.5**	**74**	**1.9**	**2,100**	**27,000**	**690**	0.41	-110	6.8	360	10	3.0

Table 5-5
Spring 2019 LTM Analytical Results and Field Parameters
Shepley's Hill Landfill
Devens, Massachusetts

				Analytical Method	Anions		General Chemistry		Dissolved Metals			Field Parameters					
				Analyte	Chloride	Sulfate	Alkalinity	DOC	Arsenic	Iron	Manganese	DO	ORP	pH	SPC	Temp	Turbidity
				Units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	mv	pH Units	µS/cm	°C	NTU
Location	**Sample ID**	**SBD**	**SED**	**Date**					**10***	**9,100***	**1,715***						
SHM-05-41B	SHM-05-41B_SPR19	62	64	04/18/2019	**430**	**11**	**65**	**2.2**	**360**	**23,000**	**840**	0.41	-44	6.4	1,400	6.6	14
SHM-05-41C	SHM-05-41C_SPR19	88	93	04/15/2019	**550**	10 U	**280**	**6.0**	**91**	**10,000**	**3,700**	1.2	-90	6.8	2,600	9.8	4.5
SHM-07-03	SHM-07-03_SPR19	25	35	04/18/2019	**170**	**10**	**28**	**1.6**	3.0 U	**260**	3.0 U	5.4	1,700	5.6	650	8.3	22
SHM-07-05X	SHM-07-05X_SPR19	0	0	04/18/2019	**130**	**8.0**	**220**	**2.8**	**950**	**23,000**	**1,900**	2.0	-66	6.7	1,500	7.6	35
SHM-11-02	SHM-11-02_SPR19	52	66	04/16/2019	**44**	1.0 U	**280**	**2.6**	**37**	**34,000**	**2,300**	0.40	-240	7.6	750	12	8.6
SHM-11-06	SHM-11-06_SPR19	25	35	04/18/2019	**48**	**8.4**	**140**	**1.9**	**680**	**59,000**	**1,300**	0.90	-72	6.6	590	9.3	17
SHM-13-03	SHM-13-03_SPR19	42	52	04/16/2019	**200**	**4.6**	**200**	**2.5**	**110**	**7,000**	**8,400**	0.37	4.0	6.4	1,100	8.1	3.6
SHM-13-04	SHM-13-04_SPR19	20	30	04/15/2019	**75**	**9.8**	**41**	0.50	**430**	**2,400**	**100**	4.7	40	6.5	380	11	26
SHM-13-06	SHL-DUP06	36	46	04/16/2019	**65**	**6.3**	**74**	0.50	**2,900**	**17,000**	**1,000**	0.79	-51	6.4	450	7.8	6.6
SHM-13-06	SHM-13-06_SPR19	36	46	04/16/2019	**70**	**6.3**	**73**	**1.4**	**3,100**	**18,000**	**1,100**	0.79	-51	6.4	450	7.8	6.6
SHM-13-07	SHM-13-07_SPR19	27	37	04/16/2019	**100**	**5.8**	**60**	**1.4**	**470**	**23,000**	**3,100**	0.49	-18	6.2	560	8.6	12
SHM-13-08	SHM-13-08_SPR19	55	65	04/16/2019	**31**	**3.7**	**73**	**2.0**	**800**	**30,000**	**760**	0.36	-66	6.5	320	9.4	5.3
SHM-93-22B	SHM-93-22B_SPR19	82.3	92.3	04/12/2019	**31**	**5.6**	**260**	**1.8**	**83**	**3,000**	**9,500**	0.45	13	6.7	600	6.8	6.1
SHM-96-5B	SHM-96-5B_SPR19	80	90	04/23/2019	**33**	**14**	**220**	**1.8**	**1,100**	**14,000**	**8,300**	0.87	-41	6.5	550	8.6	19
SHP-01-36X	SHP-01-36X_SPR19	3	8	04/12/2019	**81**	**7.3**	**22**	**2.1**	**6.3**	**870**	**33**	1.3	170	7.3	330	7.5	1.3
SHP-01-37X	SHP-01-37X_SPR19	1	6	04/12/2019	**28**	**21**	**65**	**2.1**	**15**	**5,400**	**440**	0.62	140	7.0	290	8.5	7.4
SHP-01-38A	SHP-01-38A_SPR19	1.5	6.5	04/12/2019	**1.3**	**8.6**	**41**	**1.3**	**79**	**15,000**	**1,300**	0.59	130	6.8	140	7.3	2.4
SHP-2016-06A	SHP-2016-06A_SPR19	81	86	04/17/2019	**16**	**150**	**190**	**22**	**2,800**	**1,400**	**1,900**	1.5	-97	7.3	720	8.1	2.3
SHP-2016-06B	SHP-2016-06B_SPR19	102	112	04/17/2019	**27**	**440**	**260**	**21**	**1,300**	**990**	**1,200**	0.42	-110	7.5	1,600	9.6	20
SHP-2016-06C	SHP-2016-06C_SPR19	123	133	04/17/2019	**1.5**	**9.2**	**120**	0.50	**250**	**130**	**220**	1.4	-42	7.3	260	9.3	4.1
SHP-2016-07A	SHP-2016-7A_SPR19	22	32	04/22/2019	**1.5**	**3.4**	**20**	0.50	**19**	**3,400**	**3,600**	0.90	89	5.1	58	8.3	1.7
SHP-2016-07B	SHP-2016-07B_SPR19	70	80	04/19/2019	**4.1**	**71**	**120**	**3.0**	**80**	**210**	**700**	0.87	-8.8	7.0	380	14	12
SHP-2016-1A	SHP-2016-1A_SPR19	13	23	04/22/2019	**1.2**	**3.0**	**20**	0.50	3.0 U	50 U	**2.3 J**	8.1	170	5.1	56	8.5	4.8
SHP-2016-1B	SHP-2016-1B_SPR19	75	85	04/22/2019	**12**	**2.6**	**68**	**2.2**	**120**	**18,000**	**1,200**	0.48	-22	5.7	230	11	1.4
SHP-2016-2A	SHP-2016-2A_SPR19	20	25	04/19/2019	**3.3**	**4.8**	**64**	0.50	**16**	**22 J**	**450**	1.1	-31	8.7	150	9.8	8.5
SHP-2016-2B	SHP-2016-2B_SPR19	80	85	04/19/2019	**9.6**	**4.3**	**150**	**2.2**	**450**	**43,000**	**2,200**	0.48	-49	6.3	440	8.5	2.5
SHP-2016-2B	SHP-DUP04	80	85	04/19/2019	**9.9**	**4.3**	**150**	**2.1**	**410**	**41,000**	**2,100**	0.48	-49	6.3	440	8.5	2.5
SHP-2016-3A	SHP-2016-03A_SPR19	20	25	04/18/2019	**2.5**	**1.4**	**43**	0.50	**4.0**	**8,100**	**530**	1.1	-34	6.3	120	4.3	2.0
SHP-2016-3B	SHP-2016-03B_SPR19	80	85	04/18/2019	**12**	**3.4**	**150**	**2.3**	**230**	**42,000**	**3,000**	0.52	-44	6.2	420	6.0	2.7
SHP-2016-4A	SHP-2016-4A_SPR19	25	30	04/19/2019	**6.2**	**6.6**	**24**	0.50	3.0 U	**84**	**640**	4.8	210	5.6	82	9.9	7.4
SHP-2016-4B	SHP-2016-4B_SPR19	85	90	04/19/2019	**10**	**4.7**	**130**	**1.9**	**1,400**	**41,000**	**1,300**	0.62	-62	6.1	370	10	4.2
SHP-2016-5A	SHP-2016-5A_SPR19	25	30	04/23/2019	**25**	**6.7**	**67**	**6.3**	**3.9**	**3,200**	**100**	0.59	-9.9	6.5	240	8.8	7.9
SHP-2016-5B	SHL-DUP05_SPR19	85	90	04/23/2019	**20**	**0.82 J**	**180**	**2.8**	**620**	**64,000**	**5,100**	0.69	-81	6.7	600	9.2	37
SHP-2016-5B	SHP-2016-5B_SPR19	85	90	04/23/2019	**21**	**0.81 J**	**180**	**2.6**	**610**	**64,000**	**5,100**	0.69	-81	6.7	600	9.2	37

Table 5-5
Spring 2019 LTM Analytical Results and Field Parameters
Shepley's Hill Landfill
Devens, Massachusetts

				Analytical Method	Anions		General Chemistry		Dissolved Metals			Field Parameters					
				Analyte	Chloride	Sulfate	Alkalinity	DOC	Arsenic	Iron	Manganese	DO	ORP	pH	SPC	Temp	Turbidity
				Units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	mv	pH Units	µS/cm	°C	NTU
Location	**Sample ID**	**SBD**	**SED**	**Date**					**10***	**9,100***	**1,715***						

Notes:

*Screening Limits: SHL Cleanup Goals
Screening Limits Source: EPA Superfund ROD for SHL, Fort Devens, 1995
SBD Sample Beginning Depth (ft)
SED Sample Ending Depth (ft)
mg/L Milligrams per Liter
µg/L Micrograms per Liter
mv Millivolts
pH Units pH Units
µS/cm Microsiemens per Centimeter
°C Degrees Celsius
SPC Specific Conductivity
NTU Nephelometric Turbidity Units
DOC Dissolved Organic Carbon
DO Dissolved Oxygen
ORP Oxidation Reduction Potential
"--" No data available

Analytical Parameters

#	=Detection
#	=Above Cleanup Goal

Qualifiers

J	The analtye was positively identified, the quantitation is an estimation.
U	The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.

Table 5-6
Fall 2019 LTM Analytical Results and Field Parameters
Shepley's Hill Landfill
Devens, Massachusetts

				Analytical Method	Anions		General Chemistry		Dissolved Metals			Field Parameters					
				Analyte	Chloride	Sulfate	Alkalinity	DOC	Arsenic	Iron	Manganese	DO	ORP	pH	SPC	Temp	Turbidity
				Units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	mv	pH Units	µS/cm	°C	NTU
Location	**Sample ID**	**SBD**	**SED**	**Date**					**10***	**9,100***	**1,715***						
EPA-PZ-2012-1A	EPA-PZ-2012-1A_FAL19	23.7	28.7	11/07/2019	**11**	**3.6**	**43**	**3.0**	3.0 U	**190**	**240**	0.24	79	6.1	120	9.6	4.1
EPA-PZ-2012-1B	EPA-PZ-2012-1B_FAL19	73.56	78.56	11/07/2019	**30**	**20**	**190**	**2.7**	**220**	**13,000**	**9,400**	0.28	-33	6.4	480	9.8	18
EPA-PZ-2012-2A	EPA-PZ-2012-2A_FAL19	18.14	23.14	10/24/2019	**4.4**	**6.9**	**9.4 J**	**0.46**	3.0 U	50 U	**1.6 J**	6.6	160	5.4	51	10	1.4
EPA-PZ-2012-2B	EPA-PZ-2012-2B_FAL19	73.16	78.16	10/24/2019	**35**	**10**	**140**	**1.6**	3.0 U	**250**	**6,200**	0.35	180	5.9	380	11	27
EPA-PZ-2012-3A	EPA-PZ-2012-3A_FAL19	19.09	24.09	10/28/2019	**34**	**0.94 J**	**96**	**9.7**	**16**	**17,000**	**950**	0.38	50	5.6	320	11	1.9
EPA-PZ-2012-3B	EPA-PZ-2012-3B_FAL19	68.7	73.7	10/28/2019	**29**	**15**	**180**	**1.7**	**3,200**	**49,000**	**5,900**	0.27	-54	6.5	560	10	9.7
EPA-PZ-2012-4A	EPA-PZ-2012-4A_FAL19	19.56	24.56	10/31/2019	**55**	**2.7**	**79**	**8.9**	**4.5**	**7,000**	**920**	0.30	-33	6.2	360	13	2.7
EPA-PZ-2012-4B	EPA-PZ-2012-4B_FAL19	79.5	84.5	10/31/2019	**26**	**17**	**130**	**2.1**	**2,100**	**62,000**	**690**	1.7	-98	6.5	510	12	9.5
EPA-PZ-2012-4B	SHL-DUP06_FAL19	79.5	84.5	10/31/2019	**26**	**17**	**130**	**2.0**	**2,000**	**74,000**	**740**	1.7	-98	6.5	510	12	9.5
EPA-PZ-2012-5A	EPA-PZ-2012-5A_FAL19	17.95	22.95	11/05/2019	**16**	**5.1**	**24**	**6.3**	**2.2 J**	**6,800**	**96**	0.20	80	5.2	110	9.5	3.3
EPA-PZ-2012-5B	EPA-PZ-2012-5B_FAL19	68.46	73.46	11/05/2019	**40**	**12**	**190**	**1.3**	**14**	**940**	**9,800**	0.28	-22	6.2	450	9.4	2.0
EPA-PZ-2012-6A	EPA-PZ-2012-6A_FAL19	24.19	29.19	10/25/2019	**4.7**	**4.0**	**32**	**0.85**	3.0 U	50 U	3.0 U	7.0	180	6.1	88	9.7	13
EPA-PZ-2012-6B	EPA-PZ-2012-6B_FAL19	74.23	79.23	10/25/2019	**10**	**9.4**	**47**	**1.3**	**370**	**17,000**	**960**	0.15	-60	6.6	190	10	9.9
EPA-PZ-2012-7A	EPA-PZ-2012-7A_FAL19	23.87	28.87	10/31/2019	**120**	**5.0**	**22**	**0.67**	**2.3 J**	50 U	**47**	3.6	94	6.0	450	12	2.8
EPA-PZ-2012-7B	EPA-PZ-2012-7B_FAL19	58.82	63.82	11/05/2019	**1.3**	**4.7**	**50**	**1.3**	**1,300**	**23,000**	**1,900**	0.23	-93	6.7	150	9.8	6.4
EW-01	EW-1_FAL19	60	85	11/05/2019	**18**	**6.6**	**210**	**4.2**	**1,600**	**65,000**	**2,100**	---	---	---	---	---	---
EW-04	EW-4_FAL19	70	95	11/05/2019	**6.8**	**6.4**	**110**	**1.7**	**3,200**	**38,000**	**2,100**	---	---	---	---	---	---
N5-P1	N5-P1_FAL19	95.5	97.5	11/06/2019	**21**	**12**	**240**	**2.6**	**4,400**	**43,000**	**6,200**	0.55	-43	6.6	590	11	9.9
PZ-12-01	PZ-12-01_FAL19	24	34	11/01/2019	**62**	**14**	**140**	**2.0**	**560**	**52,000**	**1,800**	0.36	-64	6.4	600	11	4.5
PZ-12-02	PZ-12-02_FAL19	24	34	11/01/2019	**68**	**2.8**	**220**	**3.9**	**270**	**74,000**	**1,200**	1.5	-64	6.4	770	12	3.1
PZ-12-03	PZ-12-03_FAL19	24	34	10/30/2019	**51**	**20**	**190**	**1.9**	**790**	**63,000**	**4,600**	0.29	-80	6.3	630	11	2.7
PZ-12-04	PZ-12-04_FAL19	24	34	10/30/2019	**62**	**2.4**	**180**	**2.2**	**730**	**78,000**	**2,000**	0.26	-72	6.4	630	12	5.2
PZ-12-05	PZ-12-05_FAL19	26	36	10/30/2019	**7.7**	**13**	**120**	**1.1**	**210**	**38,000**	**2,500**	2.0	-39	6.2	290	12	3.5
PZ-12-06	PZ-12-06_FAL19	25	35	10/29/2019	**2.0**	**15**	**100**	**0.96**	**40**	**16,000**	**2,900**	0.31	-29	6.0	230	16	6.6
PZ-12-06	SHL-DUP01_FAL19	25	35	10/29/2019	**2.0**	**15**	**100**	**0.97**	**43**	**17,000**	**3,000**	0.31	-29	6.0	230	16	6.6
PZ-12-07	PZ-12-07_FAL19	20	30	11/01/2019	**4.2**	**99**	**94**	**2.2**	**94**	**5,100**	**1,400**	2.9	47	6.4	440	12	8.7
PZ-12-08	PZ-12-08_FAL19	22	32	10/31/2019	**5.6**	**13**	**88**	**1.2**	**17**	**14,000**	**2,600**	0.35	64	5.8	230	13	26
PZ-12-09	PZ-12-09_FAL19	20	30	10/31/2019	**1.4**	**20**	**69**	**0.64**	**3.1**	50 U	**12**	0.86	160	6.3	180	12	10
PZ-12-10	PZ-12-10_FAL19	20	30	10/31/2019	**0.86**	**11**	**36**	**0.69**	3.0 U	50 U	**1.2 J**	6.8	180	5.2	95	13	1.9
SHL-10	SHL-10_FAL19	24	39	10/29/2019	**1.4**	**6.8**	**28**	**0.58**	3.0 U	50 U	3.0 U	8.8	150	6.8	75	11	9.8
SHL-11	SHL-11_FAL19	12	27	10/30/2019	**64**	**14**	**140**	**1.7**	**920**	**50,000**	**1,900**	0.23	-110	6.6	550	12	3.8
SHL-12	SHL-12_FAL19	15	30	11/07/2019	**40**	**98**	**69**	**3.2**	**7.4**	**660**	**890**	3.14	105	5.9	439	10.4	12.2
SHL-15	SHL-15_FAL19	14	24	11/01/2019	**7.0**	**29**	**100**	**2.6**	**110**	**1,500**	**540**	0.21	71	5.8	290	12	2.9
SHL-15	SHL-DUP11_FAL19	14	24	11/01/2019	**7.3**	**29**	**100**	**2.6**	**110**	**1,700**	**530**	0.21	71	5.8	290	12	2.9
SHL-19	SHL-19_FAL19	20	30	10/29/2019	**1.1**	**23**	**90**	**0.74**	**4.4**	**100**	**56**	9.0	110	6.2	210	11	15
SHL-20	SHL-20_FAL19	39	49	11/01/2019	**62**	**29**	**99**	**1.3**	**830**	**45,000**	**1,900**	0.17	-91	6.6	550	11	3.0

Table 5-6
Fall 2019 LTM Analytical Results and Field Parameters
Shepley's Hill Landfill
Devens, Massachusetts

				Analytical Method	Anions		General Chemistry		Dissolved Metals			Field Parameters					
				Analyte	Chloride	Sulfate	Alkalinity	DOC	Arsenic	Iron	Manganese	DO	ORP	pH	SPC	Temp	Turbidity
				Units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	mv	pH Units	µS/cm	°C	NTU
Location	**Sample ID**	**SBD**	**SED**	**Date**					**10***	**9,100***	**1,715***						
SHL-20	SHL-DUP02_FAL19	39	49	11/01/2019	**61**	**29**	**98**	**1.4**	**810**	**46,000**	**1,900**	0.17	-91	6.6	550	11	3.0
SHL-22	SHL-22_FAL19	105	115	11/04/2019	**26**	**10**	**320**	**1.5**	**6.2**	**74**	**8,900**	0.55	47	66	680	9.8	4.0
SHL-23	SHL-23_FAL19	23	33	11/13/2019	**4.8**	**6.7**	**4.5 J**	1.0	3.0 U	50 U	**14**	7.5	250	4.5	44	8.6	4.6
SHL-24	SHL-24_FAL19	110	120	11/07/2019	**38**	**26**	**49**	**1.6**	**4.2**	50 U	3.0 U	1.9	95	7.2	270	11	11
SHL-3	SHL-3_FAL19	24	34	10/29/2019	**1.3**	**7.3**	**99**	**1.4**	3.0 U	50 U	**1.3 J**	5.1	160	6.0	220	12	3.6
SHL-4	SHL-4_FAL19	3	13	10/29/2019	**1.5**	**17**	**90**	**1.5**	**69**	**11,000**	**3,900**	0.29	-4.1	6.1	210	12	18
SHL-5	SHL-5_FAL19	3	13	11/08/2019	**12**	**11**	**41**	**8.0**	**5.1**	**390**	**170**	-0.81	63	5.5	140	12	3.6
SHL-7	SHL-7_FAL19	11	21	11/13/2019	**26**	**12**	**61**	**1.0**	3.0 U	**160**	**13**	3.3	-4.5	7.7	190	9.4	4.2
SHL-8D	SHL-8D_FAL19	68	70	10/24/2019	**38**	**7.4**	**24**	**0.68**	3.0 U	**22 J**	**11**	0.19	120	6.0	190	10	0.72
SHL-8S	SHL-8S_FAL19	52	54	10/24/2019	**5.9**	**6.7**	**26**	**0.37**	3.0 U	50 U	**1.7 J**	4.7	170	6.0	82	9.6	1.1
SHL-9	SHL-9_FAL19	15	25	10/30/2019	**20**	**3.8**	**100**	**8.7**	**33**	**3,800**	**190**	0.36	5.0	6.3	270	11	21
SHL-9	SHL-DUP07_FAL19	15	25	10/30/2019	**20**	**4.1**	**100**	**8.8**	**30**	**3,800**	**190**	0.36	5.0	6.3	270	11	21
SHM-05-40X	SHL-DUP10_FAL19	32	34	11/08/2019	**22**	**5.4**	**140**	**2.8**	**2,100**	**32,000**	**770**	0.44	20	6.5	390	8.1	13
SHM-05-40X	SHM-05-40X_FAL19	32	34	11/08/2019	**23**	**5.4**	**140**	**2.8**	**2,200**	**33,000**	**820**	0.44	20	6.5	390	8.1	13
SHM-05-41A	SHM-05-41A_FAL19	42	44	11/08/2019	**5.8**	**8.5**	**36**	1.0	**31**	**6,300**	**260**	0.10	9.5	6.1	120	8.0	36
SHM-05-41B	SHM-05-41B_FAL19	62	64	11/08/2019	**2.3**	**6.4**	**62**	1.0	**530**	**24,000**	**720**	0.13	-60	6.6	190	9.3	25
SHM-05-41C	SHM-05-41C_FAL19	88	93	11/08/2019	**1,900**	**14 J**	**86**	1.0	**29**	**3,400**	**820 J**	0.050	-53	6.8	5,900	8.3	6.9
SHM-05-42A	SHM-05-42A_FAL19	40	42	11/05/2019	**8.3**	**5.8**	**26**	**0.78**	3.0 U	50 U	**50**	0.23	100	5.8	84	9.8	2.3
SHM-05-42B	SHM-05-42B_FAL19	70	72	11/05/2019	**34**	**9.7**	**170**	**1.6**	**170**	**29,000**	**6,300**	0.19	-54	6.4	450	9.6	4.7
SHM-07-03	SHM-07-03_FAL19	25	35	11/07/2019	**130**	**8.8**	**16**	**1.9**	3.0 U	**200**	**7.3 J**	7.8	117.6	5.6	444	9.2	602
SHM-07-05X	SHM-07-05X_FAL19	0	0	11/08/2019	**68**	**8.7**	**240**	**3.1**	**500**	**18,000**	**1,900**	0.46	11	6.8	660	7.4	14
SHM-10-02	SHM-10-02_FAL19	53	63	11/14/2019	**120**	**7.8**	**90**	**1.3**	3.0 U	50 U	**1,400**	9.6	150	6.7	500	11	1.1
SHM-10-03	SHM-10-03_FAL19	58.5	68.5	11/14/2019	**120**	**11**	**150**	**1.4**	**8.5**	50 U	**4.0 J**	4.2	120	7.1	580	9.6	2.6
SHM-10-04	SHM-10-04_FAL19	55	65	11/14/2019	**89**	**20**	**71**	**1.1**	3.0 U	50 U	**330**	0.43	100	6.8	420	11	3.1
SHM-10-05A	SHM-10-05A_FAL19	50	60	11/12/2019	**32**	**9.5**	**32**	**0.62**	**2.0 J**	50 U	**2.4 J**	2.6	180	5.7	210	11	4.2
SHM-10-06	SHM-10-06_FAL19	69.5	79.5	11/01/2019	**29**	**11**	**150**	**2.2**	**1,300**	**81,000**	**2,400**	0.080	-75	6.6	580	11	3.4
SHM-10-06A	SHM-10-06A_FAL19	77	87	11/07/2019	**13**	**6.1**	**93**	1.0	**63**	**8,900**	**710**	0.99	40	6.0	220	11	9.9
SHM-10-07	SHM-10-07_FAL19	40	50	11/06/2019	**64**	**7.7**	**150**	**1.9**	**1,000**	**52,000**	**2,000**	3.1	-97	6.6	580	11	15
SHM-10-08	SHM-10-08_FAL19	46	56	11/14/2019	**69**	**7.9**	**350**	**2.1**	3.0 U	50 U	**550**	4.2	170	6.3	710	9.8	3.6
SHM-10-10	SHM-10-10_FAL19	56	66	11/11/2019	**93**	**4.9**	**260**	**2.6**	3.0 U	50 U	**8,400**	0.58	43	6.5	790	11	1.2
SHM-10-11	SHM-10-11_FAL19	50	60	11/07/2019	**32**	**51**	**150**	1.0	**560**	**63,000**	**2,800**	0.20	-21	6.2	500	11	15
SHM-10-12	SHL-DUP05_FAL19	45	55	11/14/2019	**3.1**	**2.2**	**160**	**2.9**	**3,200**	**71,000**	**5,800**	0.26	20	5.4	400	9.5	25
SHM-10-12	SHM-10-12_FAL19	45	55	11/14/2019	**4.1**	**2.6**	**170**	**2.9**	**3,400**	**65,000**	**5,400**	0.26	20	5.4	400	9.5	25
SHM-10-13	SHM-10-13_FAL19	60	70	11/06/2019	**30**	**2.5**	**260**	**4.1**	**460**	**69,000**	**960**	0.55	-39	6.5	710	10	12
SHM-10-14	SHL-DUP09_FAL19	60	80	11/06/2019	**4.0**	**2.3**	**210**	**3.4**	**4,500**	**80,000**	**2,400**	11	31	6.5	470	11	13
SHM-10-14	SHM-10-14_FAL19	60	80	11/06/2019	**4.0**	**2.4**	**200**	**3.4**	**4,500**	**78,000**	**2,400**	11	31	6.5	470	11	13

Table 5-6
Fall 2019 LTM Analytical Results and Field Parameters
Shepley's Hill Landfill
Devens, Massachusetts

				Analytical Method	Anions		General Chemistry		Dissolved Metals			Field Parameters					
				Analyte	Chloride	Sulfate	Alkalinity	DOC	Arsenic	Iron	Manganese	DO	ORP	pH	SPC	Temp	Turbidity
				Units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	mv	pH Units	µS/cm	°C	NTU
Location	**Sample ID**	**SBD**	**SED**	**Date**					**10***	**9,100***	**1,715***						
SHM-10-15	SHM-10-15_FAL19	45	55	11/14/2019	**12**	**14**	**200**	**2.4**	**5,600**	**44,000**	**7,300**	0.16	79	6.4	430	10	6.8
SHM-10-16	SHL-DUP08_FAL19	75	85	11/13/2019	**24**	**3.7**	**280**	**1.9**	**1,100**	**38,000**	**1,700**	0.69	42	6.5	560	7.6	11
SHM-10-16	SHM-10-16_FAL19	75	85	11/13/2019	**24**	**3.7**	**280**	**1.9**	**1,200**	**37,000**	**1,700**	0.69	42	6.5	560	7.6	11
SHM-11-02	SHM-11-02_FAL19	52	66	11/13/2019	**47**	**1.1**	**250**	1.0	**33**	**22,000**	**1,600**	0.24	-190	7.4	630	9.5	9.9
SHM-11-06	SHL-DUP03_FAL19	25	35	11/01/2019	**46**	**8.1**	**190**	**1.9**	**810**	**68,000**	**1,600**	0.18	-61	6.3	640	10	3.4
SHM-11-06	SHM-11-06_FAL19	25	35	11/01/2019	**46**	**8.6**	**190**	**2.1**	**780**	**69,000**	**1,700**	0.18	-61	6.3	640	10	3.4
SHM-13-01	SHM-13-01_FAL19	39	49	11/14/2019	**340**	**9.5**	**17**	**0.93**	**1.9 J**	50 U	**3.3 J**	4.5	110	5.8	1,100	11	9.0
SHM-13-02	SHM-13-02_FAL19	60	70	11/11/2019	**51**	**7.1**	**160**	**1.7**	3.0 U	50 U	**9,400**	4.3	46	6.5	430	11	4.6
SHM-13-03	SHM-13-03_FAL19	42	52	11/11/2019	**32**	**6.0**	**280**	**2.5**	**140**	**8,600**	**10,000**	0.40	-1.0	6.4	620	11	0.98
SHM-13-04	SHM-13-04_FAL19	20	30	11/12/2019	**250**	**11**	**46**	**1.1**	**600**	**3,400**	**84**	4.0	58	6.3	1.0	10	2.5
SHM-13-05	SHM-13-05_FAL19	75	85	11/12/2019	**39**	**12**	**410**	**2.5**	**16**	**3,100**	**3,400**	0.36	48	6.8	740	9.3	15
SHM-13-06	SHM-13-06_FAL19	36	46	11/12/2019	**100**	**5.7**	**44**	**1.0**	**1,900**	**18,000**	**880**	0.45	41	6.4	440	10.0	11
SHM-13-07	SHM-13-07_FAL19	27	37	11/11/2019	**180**	**4.9**	**65**	**1.2**	**750**	**27,000**	**4,700**	0.15	-39	6.4	770	12	16
SHM-13-08	SHM-13-08_FAL19	55	65	11/11/2019	**33**	**4.4**	**100**	**1.9**	**930**	**41,000**	**970**	0.55	70	6.4	390	11	4.7
SHM-13-14D	SHM-13-14D_FAL19	45	55	11/11/2019	**120**	**7.0**	**74**	**1.4**	**12**	**2,600**	**470**	0.24	29	6.4	490	11	0.78
SHM-13-14S	SHM-13-14S_FAL19	5	15	11/11/2019	**140**	**19**	**42**	**1.8**	**1.9 J**	50 U	**410**	0.39	57	5.9	650	11	0.71
SHM-13-15	SHM-13-15_FAL19	50	60	11/11/2019	**43**	**9.6**	**430**	**3.2**	**5.1**	**770**	**5,800**	0.41	44	6.1	920	11	2.9
SHM-93-10D	SHM-93-10D_FAL19	0	0	10/29/2019	**29**	**17 J**	**54**	**0.95**	3.0 U	**73**	**2.1 J**	0.51	88	12	400	11	20
SHM-93-18B	SHM-93-18B_FAL19	78.5	88.5	11/13/2019	**51**	**33**	**60**	**0.61**	3.0 U	50 U	**1.4 J**	7.6	2.3	7.7	320	9.2	1.9
SHM-93-22B	SHM-93-22B_FAL19	82.3	92.3	11/04/2019	**35**	**10**	**250**	**1.6**	**370**	**11,000**	**10,000**	0.62	1.5	6.3	620	9.1	12
SHM-93-22C	SHM-93-22C_FAL19	124.3	134.3	11/04/2019	**22**	**7.6**	**120**	**3.2**	**4.3**	50 U	3.0 U	2.3	31	7.6	320	9.0	4.3
SHM-93-24A	SHM-93-24A_FAL19	13.2	23.2	11/08/2019	**180**	**54**	**22**	**2.1**	3.0 U	50 U	**7.7 J**	9.4	124	5.8	713	11.5	12.4
SHM-96-5B	SHM-96-5B_FAL19	80	90	11/07/2019	**23**	**9.6**	**230**	**2.5**	**41**	50 U	**23**	3.4	150	6.8	490	10	4.4
SHM-96-5C	SHM-96-5C_FAL19	50	60	11/07/2019	**28**	**8.1**	**240**	**3.3**	**13**	**1,900**	**14,000**	0.31	-37	6.4	540	9.8	3.8
SHM-99-31C	SHM-99-31C_FAL19	68	78	11/14/2019	**31**	**5.4**	**250**	**2.0**	**140**	**11,000**	**4,700**	0.78	-78	6.7	300	9.4	6.4
SHM-99-32X	SHM-99-32X_FAL19	72	82	11/12/2019	**64**	**17**	**78**	**1.4**	**47**	**6,700**	**4,100**	0.16	12	6.4	370	9.2	7.8
SHP-01-36X	SHP-01-36X_FAL19	3	8	11/04/2019	**67**	**6.0**	**27**	**3.5**	**11**	**1,500**	**78**	0.30	37	6.4	300	12	=
SHP-01-37X	SHP-01-37X_FAL19	1	6	11/04/2019	**69**	**7.8**	**28**	**3.9**	**13**	**4,500**	**210**	0.39	-4.3	6.6	310	13	2.6
SHP-01-38A	SHL-DUP04_FAL19	1.5	6.5	11/04/2019	**8.6**	**13**	**95**	**1.4**	**140**	**25,000**	**2,000**	0.37	0.80	6.0	250	12	2.2
SHP-01-38A	SHP-01-38A_FAL19	1.5	6.5	11/04/2019	**8.5**	**13**	**94**	**1.3**	**130**	**25,000**	**2,000**	0.37	0.80	6.0	250	12	2.2
SHP-2016-06A	SHP-2016-06A_FAL19	81	86	11/05/2019	**15**	**180**	**230**	**18**	**860**	**400**	**2,300**	0.68	-67	7.2	690	10	1.7
SHP-2016-06B	SHP-2016-06B_FAL19	102	112	11/05/2019	**17**	**380**	**310**	**36**	**1,200**	**1,100**	**1,200**	0.56	-96	7.6	1,100	11	6.2
SHP-2016-06C	SHP-2016-06C_FAL19	123	133	11/05/2019	**1.8**	**12**	**120**	**0.40**	**270**	**110**	**170**	2.2	-64	7.9	240	11	8.0
SHP-2016-07B	SHP-2016-07B_FAL19	70	80	11/06/2019	**2.9**	**36**	**110**	**1.5**	**35**	**84**	**350**	0.98	18	7.1	300	13	28
SHP-2016-1A	SHP-2016-1A_FAL19	13	23	11/08/2019	**0.48 J**	**4.8**	**24**	**1.7**	3.0 U	**20 J**	**4.7 J**	-0.26	36	5.7	68	11	6.8
SHP-2016-1B	SHP-2016-1B_FAL19	75	85	11/08/2019	**11**	**7.3**	**140**	**4.0**	**180**	**34,000**	**1,700**	0.89	36	5.7	330	10	6.8

Table 5-6
Fall 2019 LTM Analytical Results and Field Parameters
Shepley's Hill Landfill
Devens, Massachusetts

				Analytical Method	Anions		General Chemistry		Dissolved Metals			Field Parameters					
				Analyte	Chloride	Sulfate	Alkalinity	DOC	Arsenic	Iron	Manganese	DO	ORP	pH	SPC	Temp	Turbidity
				Units	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	mg/L	mv	pH Units	µS/cm	°C	NTU
Location	**Sample ID**	**SBD**	**SED**	**Date**					**10***	**9,100***	**1,715***						
SHP-2016-2A	SHP-2016-2A_FAL19	20	25	10/24/2019	**2.5**	**5.0**	**51**	**1.2**	**11**	**25 J**	**400**	2.5	160	8.1	120	11	4.6
SHP-2016-2B	SHP-2016-2B_FAL19	80	85	10/24/2019	**15**	**5.1**	**170**	**2.2**	**560**	**46,000**	**2,400**	0.19	-33	6.5	490	9.9	3.0
SHP-2016-3A	SHP-2016-3A_FAL19	20	25	10/28/2019	**11 R**	**4.5 R**	**130 R**	**1.8 R**	**260 R**	**36,000 R**	**2,800 R**	0.37	-52	6.5	160	8.7	3.0
SHP-2016-3B	SHP-2016-3B_FAL19	80	85	10/28/2019	**14 R**	**2.5 R**	**49 R**	**1.1 R**	**4.1 R**	**11,000 R**	**740 R**	0.21	-86	6.5	240	9.1	2.9
SHP-2016-4A	SHP-2016-04A_FAL19	25	30	11/05/2019	**8.9**	**7.8**	**16**	**0.63**	3.0 U	**24 J**	**580**	2.7	50	6.3	84	8.1	9.1
SHP-2016-4B	SHP-2016-04B_FAL19	85	90	11/05/2019	**17**	**5.4**	**170**	**1.8**	**1,500**	**50,000**	**2,000**	31	-60	6.5	490	8.3	8.1
SHP-2016-5A	SHP-2016-05A_FAL19	25	30	11/05/2019	**67**	**4.8**	**65**	**4.1**	**3.2**	**4,400**	**190**	0.45	30	6.2	380	8.1	8.1
SHP-2016-5B	SHP-2016-05B_FAL19	85	90	11/05/2019	**20**	**5.2**	**210**	**2.5**	**720**	**66,000**	**3,500**	0.34	-70	6.5	590	8.5	13
SHP-99-29X	SHP-99-29X_FAL19	19	29	11/06/2019	**5.5**	**5.1**	**110**	**2.8**	**1,600**	**42,000**	**3,900**	0.51	14	5.6	240	11	4.1

Notes:

*Screening Limits:	SHL Cleanup Goals
Screening Limits Source:	EPA Superfund ROD for SHL, Fort Devens,1995
SBD	Sample Beginning Depth (ft)
SED	Sample Ending Depth (ft)
mg/L	Milligrams per Liter
µg/L	Micrograms per Liter
mv	Millivolts
pH Units	pH Units
µS/cm	Microsiemens per Centimeter
SPC	Specific Conductivity
°C	Degrees Celsius
NTU	Nephelometric Turbidity Units
DOC	Dissolved Organic Carbon
DO	Dissolved Oxygen
ORP	Oxidation Reduction Potential
"--"	No data available

Analytical Parameters

#	=Detection
#	=Above Cleanup Goal

Qualifiers

J	The analtye was positively identified, the quantitation is an estimation.
U	The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
R	The result is rejected.

Table 5-7
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	IPC (T)	N-5, P-1 (T)	N-5, P-1 (D)	N-5, P-2 (T)	N-5, P-2 (D)	PSP-01 (T)	PSP-01 (D)	SHL-3 (T)	SHL-3 (D)	SHL-4 (T)	SHL-4 (D)	SHL-5 (T)	SHL-5 (D)	SHL-7 (D)	SHL-8S (T)	SHL-8S (D)	SHL-8D (T)	SHL-8D (D)	SHL-9 (T)	SHL-9 (D)	SHL-10 (T)	SHL-10 (D)	SHL-11 (T)	SHL-11 (D)
Sample Month-Year	**Units**																								
Aug-91	µg/L								35		260		23							37		67		320	
Dec-91	µg/L								120		140		38							67		120		320	
Mar-93	µg/L								6.5		2.54		11.4							42.4		280		340	
Jun-93	µg/L																								
Nov-96	µg/L								NS		48.8		12							46.9		3.4 B		332	
May-97	µg/L								10 U		73.6 J		10 U							16.1 J		10 U		252 J	
Oct-97	µg/L								10 U		180		10 U							25.2		209		366	
May-98	µg/L								5 U		37.4		5 U							15		5 U		346	
Nov-98	µg/L								5.4 U		89.1		11.5							27.2		5.4 U		376	
May-99	µg/L								2.7 B		78.2		5.0 B							71.3		2.7 B		431	
Nov-99	µg/L		5800		30.1				1.9 U		61.3		6.5							28.5		1.9 U		492	
May-00	µg/L								2.5 U		116		2.5 U							15		2.5 U		404	
Nov-00	µg/L								17.4		91.5		13.8							31.4		4.2 U		523	
May-01	µg/L								4.1 U		50.8		13.8							15.1		4.1 U		487	
Oct-01	µg/L								1.5 U		66		14.8							28.1		1.5 U		573	
Nov-01	µg/L		5800		43											5 U		5 U							
May-02	µg/L								2.8 B		47.8 B		11.9 B							144		4.0 B		469	
Oct-02	µg/L								3.2 U		66.1		3.2 U							29		3.2 U		648	
May-03	µg/L								4.7 U		26.6		7.3							13.4		4.7 U		498	
Nov-03	µg/L								4.1 U		13.4		4.7 B							30.6		4.1 U		639	
May-04	µg/L								2.6 U		27.2		7.4 B							19.8		2.6 U		502	
Nov-04	µg/L								5.8 U		19.5		6.8 B							32.2		5.8 U		617	
Jun-05	µg/L								4.5 U		10.1		7.0 B									4.5 U		524	
Jan-06	µg/L										5 U		5 U							18		5 U		567	
Apr-06	µg/L		4940		22		5 U									5 U		5 U		21					
Jun-06	µg/L		5970		46		6		5 U		5 U		6			5 U		5 U		21		5 U		700	
Sep-06	µg/L		4560		22		10									5 U		5 U		46					
Dec-06	µg/L		1930		30		5 U		5 U		5 U		8			5 U		5 U		51		5 U		668	
Apr-07	µg/L															3 U		3 U		26					
May-07	µg/L												6.2												
Oct-07	µg/L		4856		28.1						7.5		16.2			22.6		11.8		34.1		0.59 J		686.5	
Apr-08	µg/L												4.1			0.5 U		0.5 U		14.6					
Oct-08	µg/L		1748		26.8						2.3		4.9			1 UJ		1 UJ		40.7		1 UJ		663.5	
Jan-09	µg/L	188.9																							
Apr-09	µg/L												3.6			0.5 U		0.5 U		18.1					
Oct-09	µg/L		4429		30.5						15.1		12.3			0.5 U		0.5 U		37.6				709.1	
Apr-10	µg/L												3.4			0.6		0.6		25.2					
Jul-10	µg/L																								
Aug-10	µg/L																								
Sep-10	µg/L																								
Oct-10	µg/L		3488		24.5						3.1		4.8			0.5 U		0.5 U		38.4		0.9		694	
Apr-11	µg/L												1			0.5 U		0.5 U		25.7					
Oct-11	µg/L		4942		27.4						1.4		5.5			0.5 U		0.5 U		39.8				654.9	
Apr-12	µg/L												3.7			0.6		0.5 U		29.5					
Oct-12	µg/L		2286		26.1						3.8		4.5			0.5 U		0.5 U		36.4		0.7		647	
May-13	µg/L											2.6		3.7			0.93 U		0.72 U		30.0		1.2		496
Oct-13	µg/L			2500		21.2								15.1			2.0 U		2.0 U		33.1		1.2		752
Nov-13	µg/L											6.2									22.2				
Feb-14	µg/L																								
Apr-14	µg/L													2.0 U			2.0 U		2.0 U						587
Oct-14	µg/L			327								37		13.3			2.0 U		2.0 U		28.5		2.0 U		793
Jun-15	µg/L																								925
Oct-15	µg/L			2170		25.7		2.1 J		4.0 U		37.4		12.6			4.0 U		4.0 U		18.5		4.0 U		642
Jun-16	µg/L																								970
Nov-16	µg/L			4200								110		3.0 U			3.0 U		3.0 U		38		3.0 U		520
Jun-17	µg/L			4700								74											3.0 U		880
Nov-17	µg/L			4700						3.0 U		130		3.7	3.0		3.0 U		3.0 U		25		3.0 U		870
May-18	µg/L											110											3.0 U		820
Nov-18	µg/L			540						3.0 U		150		2.8J	3.0 U		3.0 U		3.0 U		28		3.0 U		910
May-19	ug/L											98											3.0 U		960
Oct-19	ug/L									3.0 U		69					3.0 U		3.0 U		33		3.0 U		920
Nov-19	ug/L			4400											3.0 U										

Notes:

µg/l = microgram per liter
U = non detect
UJ = estimated non detect
J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Table 5-7
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHL-12 (D)	SHL-13 (T)	SHL-13 (D)	SHL-15 (T)	SHL-15 (D)	SHL-18 (D)	SHL-19 (T)	SHL-19 (D)	SHL-20 (T)	SHL-20 (D)	SHL-21 (T)	SHL-21 (D)	SHL-22 (T)	SHL-22 (D)	SHL-23 (T)	SHL-23 (D)	SHL-24(D)	SHM-93-10C (T)	SHM-93-10D (T)	SHM-93-10D (D)	SHM-93-18B (D)	SHM-93-22B (T)	SHM-93-22B (D)	SHM-93-22C (T)
Sample Month-Year	**Units**																								
Aug-91	µg/L							340		98				27											
Dec-91	µg/L							710		89				25											
Mar-93	µg/L							390		330				32.9					21.3						68.9
Jun-93	µg/L																		18.1						49.8
Nov-96	µg/L							138		244				24.8					12.4				324		44.6
May-97	µg/L							10 U		10 U				10 U					10 U				318 J		40.4
Oct-97	µg/L							298		227				34.8					10.5				352		10 U
May-98	µg/L							77.5		238				10.6					7.5				365		31.6
Nov-98	µg/L							145		218				5.4 U					10.2				406		51.1
May-99	µg/L							156		216				12.2 B					10.8 B				707		42.8
Nov-99	µg/L				215			176		215				7.3					8.7				1440		33.2
May-00	µg/L							41.4		216				14.6					5.9 J				1360		34.4
Nov-00	µg/L							154		172				45					8.8				1180		47.8
May-01	µg/L							129		186				47.6					6.9				1540		19.7
Oct-01	µg/L							183		165				44.2					10.1				1670		31.6
Nov-01	µg/L		5 U									5 U				5 U									
May-02	µg/L							66.9		154				55.9 B					11.0 B				2040		30.5 B
Oct-02	µg/L							164		175				77.1					7.1				159		30.1
May-03	µg/L							36.1		197				101					9.8				2070		21
Nov-03	µg/L							83.6		194				76.4					5.2 U				2500		29.8
May-04	µg/L							75		136				88.1					7.2 B				1690		27.8
Nov-04	µg/L							121		156				65.4					10.6 B				2360		34.9
Jun-05	µg/L							26.3		159									8.1 B						15.8
Jan-06	µg/L							156		189				154					11				3320		23
Apr-06	µg/L		5 U		18							5 U		171		5 U				14			3690		
Jun-06	µg/L		5 U		16			1790		346				167		5 U			12				3440		17
Sep-06	µg/L		5 U		44							5 U		109		5 U				14			3110		
Dec-06	µg/L		5 U		93			142		361		5 U		115		5 U			10	12			3100		73
Apr-07	µg/L											3 U		98		3 U							2800		76
May-07	µg/L																								
Oct-07	µg/L		1.6		42			885.1		336.2		0.81 J		55.1		0.73 J			9.8	10.3			1978		72.5
Apr-08	µg/L											1.1		106.2		0.19 J							1721		29.4
Oct-08	µg/L		3.3		75			173.6	28	7.9		1 U		81		1 UJ			10.1	23.4			1374		17.7
Jan-09	µg/L																								
Apr-09	µg/L											1.2		98.7		0.5 U							1128		21.7
Oct-09	µg/L		0.5 U		26.7			136.9	38.8	23.8				48.3									832.3		74.7
Apr-10	µg/L													69.6									947.5		14.6
Jul-10	µg/L																								
Aug-10	µg/L																								
Sep-10	µg/L																								
Oct-10	µg/L		0.5 U		25			234.8	56.1	4.4		0.9		46.5		0.5 U			8.7				827.6		15.8
Apr-11	µg/L													57.9									1039		13.9
Oct-11	µg/L		2.8		70.4			62.9		7.3				45.7									1072		13.9
Apr-12	µg/L													41.9									1271		25.4
Oct-12	µg/L		1.0		24.2			138.3		139.3		1.1		43.6		0.5 U			8.1				879		21.7
May-13	µg/L								3.8		621				33.3									1150	
Oct-13	µg/L			2.0 U		34.9			33.6		641				54.3									1150	
Nov-13	µg/L																								
Feb-14	µg/L																								
Apr-14	µg/L										701				49.2									997	
Oct-14	µg/L								3.1		763				44.5									690	
Jun-15	µg/L	2.0 J				31.6					794						2.0 U	4.9						1050	
Oct-15	µg/L			2.9 J					3.1 J		855		4.0 U		15.9		4.0 U	6.5			11.6			670	
Jun-16	µg/L										880													630	
Nov-16	µg/L	1.6 J				19			3.0 U		830				9.4		3.0 U	5.5						480	
Jun-17	µg/L								1.6 J		860													310	
Nov-17	µg/L	2.4 J				200			3.0 U		860				6.1		3.0 U	4.8			3.0 U	3.0 U		360	
May-18	µg/L								3.0 U		830													270	
Nov-18	µg/L	1.90 J				44			20 J		970				5		3.0 U	3.4			3.0 U	3.0 U		170	
May-19	ug/L								3.0 U		770													83	
Oct-19	ug/L								4.4												3.0 U				
Nov-19	ug/L	7.4				110					830				6.2		3.0 U	4.2				3.0 U		370	

Notes:

µg/l = microgram per liter
U = non detect
UJ = estimated non detect
J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Table 5-7
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-93-22C (D)	SHM-93-24A (D)	SHM-96-5B (T)	SHM-96-5B (D)	SHM-96-5C (T)	SHM-96-5C (D)	SHP-99-29X (T)	SHP-99-29X (D)	SHM-99-31A (T)	SHM-99-31A (D)	SHM-99-31B (T)	SHM-99-31B (D)	SHM-99-31C (T)	SHM-99-31C (D)	SHM-99-32X (T)	SHM-99-32X (D)	SHP-01-36X (T)	SHP-01-36X (D)	SHP-01-37X (T)	SHP-01-37X (D)	SHP-01-38A (T)	SHP-01-38A (D)	SHP-01-38B (D)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L			**1440**		**71**																		
May-97	µg/L			**3,300 J**		**43.2**																		
Oct-97	µg/L			**2040**		**43.1**																		
May-98	µg/L			**4300**		**49.5**																		
Nov-98	µg/L			**3080**		**46.8**																		
May-99	µg/L			**3490**		**57**																		
Nov-99	µg/L			**2700**		**44.8**		**4380**																
May-00	µg/L			**5110**		**52.2**																		
Nov-00	µg/L			**2500**		**40.3**																		
May-01	µg/L			**3800**		**80.5**																		
Oct-01	µg/L			**1850**		**41.1**																		
Nov-01	µg/L							**3800**																
May-02	µg/L			**3800**		**50.4 B**																		
Oct-02	µg/L			**1970**		**41.3**																		
May-03	µg/L			**3920**		**55.1**																		
Nov-03	µg/L			**3380**		**48.3**																		
May-04	µg/L			**3950**		**47.1**																		
Nov-04	µg/L			**2110**		**49.5**																		
Jun-05	µg/L																							
Jan-06	µg/L			**4130**		**43**																		
Apr-06	µg/L			**2110**		**47**				**9**		**56**		**270**		**168**		**24**		**41**		**550**		
Jun-06	µg/L			**2760**		**51**				**12**		**53**		**273**		**186**		**22**		**49**		**496**		
Sep-06	µg/L			**1570**		**37**				**23**		**74**		**305**		**202**		**30**		**46**		**681**		
Dec-06	µg/L			**2980**		**24**				**16**		**72**		**301**		**176**		**19**		**46**		**623**		
Apr-07	µg/L			**2030**		**47**																		
May-07	µg/L																							
Oct-07	µg/L			**750**		**61.1**		**2953**		**22.7**		**85.5**		**292.1**		**206.2**		**16.7**		**26.6**		**781.4**		
Apr-08	µg/L			**1597**		**54.7**																		
Oct-08	µg/L			**747.8**		**51.8**		**2106**		**16.2**		**79.5**		**260.3**		**203.9**		**27.9**		**38.1**		**602.4**		
Jan-09	µg/L																							
Apr-09	µg/L			**1401**		**44.2**																		
Oct-09	µg/L			**776.3**		**27.5**		**1686**		**20.4**		**56.7**		**223.5**		**196.8**		**18.7**		**35.1**		**663.7**		
Apr-10	µg/L			**1504 J**		**31.2**																		
Jul-10	µg/L																							
Aug-10	µg/L												**28.8**											
Sep-10	µg/L																							
Oct-10	µg/L			**846.2**		**26.4**		**3156**		**17.4**		**39.2**		**239.4**		**173.4**		**14.2**		**22.5**		**651.8**		
Apr-11	µg/L			**2030**		**35**																		
Oct-11	µg/L			**1895**		**24.5**		**1457**		**18.4**		**59.3**		**244**		**172.8**		**30.8**		**20.2**		**557.9**		
Apr-12	µg/L			**1681**		8.7																		
Oct-12	µg/L			**1376**		7.7		**2739**		**17.7**		**60.1**		**206.4**		**130.6**		**17.8**		**10.2**		**660.5**		
May-13	µg/L	**19.7**			**1400**		**10.4**																	**900**
Oct-13	µg/L	**25.1**			**1660**		5.5		**2760**		**14.6**		**61.6**		**205**		**107**							
Nov-13	µg/L																		4.8		4.7		**247**	
Feb-14	µg/L																							
Apr-14	µg/L	31.9			**1340**		**10.9**																	
Oct-14	µg/L	45.6			**991**		**17.7**		**3000**						**180**		**93.5**		**10.8**		8.5		**263**	
Jun-15	µg/L				**1210**																			
Oct-15	µg/L	**137**			**799**		**39.6**		**3810**		**18.7**		**58.7**		**194**				9.0		**14**		**314**	**903**
Jun-16	µg/L				**1100**																			
Nov-16	µg/L	**120**			**990**		**42**		**3900**						**200**		**59**		4.5		**11**		**320**	
Jun-17	µg/L				**1200**														4.3		6.5		**190**	
Nov-17	µg/L	3.8	2.2 J		**990**		**34**		**2100**						**200**		**60**		**17**		**13**		**190**	
May-18	µg/L				**980**														**11**		9.9		**140**	
Nov-18	µg/L	3.8	3.0 U		**100**		**31**		**1200**						**160**		6.3		7.8		**17**		**130**	
May-19	ug/L				**1100**														6.3		**15**		**79**	
Oct-19	ug/L																							
Nov-19	ug/L	4.3	3.0 U		**41**		**13**		**1600**						**140**		**47**		**11**		**13**		**130**	

Notes:

µg/l = microgram per liter
U = non detect
UJ = estimated non detect
J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Table 5-7
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-05-39A (T)	SHM-05-39A (D)	SHM-05-39B (T)	SHM-05-39B (D)	SHM-05-40X (T)	SHM-05-40X (D)	SHM-05-41A (T)	SHM-05-41A (D)	SHM-05-41B (T)	SHM-05-41B (D)	SHM-05-41C (T)	SHM-05-41C (D)	SHM-05-42A (T)	SHM-05-42A (D)	SHM-05-42B (T)	SHM-05-42B (D)	SHM-07-03 (D)	SHM-07-05 (T)	SHM-07-05 (D)	SHM-10-01 (T)	SHM-10-01 (D)	SHM-10-02 (T)	SHM-10-02 (D)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L																							
May-97	µg/L																							
Oct-97	µg/L																							
May-98	µg/L																							
Nov-98	µg/L																							
May-99	µg/L																							
Nov-99	µg/L																							
May-00	µg/L																							
Nov-00	µg/L																							
May-01	µg/L																							
Oct-01	µg/L																							
Nov-01	µg/L																							
May-02	µg/L																							
Oct-02	µg/L																							
May-03	µg/L																							
Nov-03	µg/L																							
May-04	µg/L																							
Nov-04	µg/L																							
Jun-05	µg/L																							
Jan-06	µg/L																							
Apr-06	µg/L	**289**		**590**		**3610**		**54**		**2420**		**626**		5 U		**266**								
Jun-06	µg/L	**288**		**634**		**3420**		**52**		**2720**		**614**		5 U		**241**								
Sep-06	µg/L	**270**		**415**		**3510**		**41**		**2730**		**640**		5 U		**276**								
Dec-06	µg/L	**248**		**412**		**4070**		**36**		**2280**		**666**		5 U		**296**								
Apr-07	µg/L							**30**		**1990**		**627**		3 U		**249**								
May-07	µg/L																							
Oct-07	µg/L	**241.5**		**309.4**		**4445**		**24.9**		**2591**		**684.5**		1.01 J		**304.4**		<0.5	**14.7**					
Apr-08	µg/L							**26.9**		**2349**		**662.2**		2.5		**266.2**								
Oct-08	µg/L	**275.6**		**241.2**		**4920**		**18.7**		**1910**		**789.3**		1 U		**256**								
Jan-09	µg/L																							
Apr-09	µg/L							**22.1**		**1497**		**895.3**		2		**255.7**								
Oct-09	µg/L	**259.5**		**338.8**		**3833**		**16.3**		**1464**		**828.7**		1 U		**211.4**								
Apr-10	µg/L							**26.9**		**1372**		**896**		2.5		**72.2**								
Jul-10	µg/L																				1.16 J	0.68 J	0.74	0.43 J
Aug-10	µg/L						**3180**											0.29 J				3.51 J		
Sep-10	µg/L																				8.15	7.87	1.11	1.07
Oct-10	µg/L	**246.3**		**162**		**3637**		**66.7**		**1036**		**787**		1.2		**197.2**								
Apr-11	µg/L							**20.9**		**1045**		**749.8**		1.1		**188.9**								
Oct-11	µg/L	**227.1**		**308.1**		**3703**		**18.4**		**1369**		**917**		0.8		**230**								
Apr-12	µg/L							**15.5**		**770.8**		**764.8**		2.3		**238.7**								
Oct-12	µg/L	**76.3**		**364.4**		**2974**		**10.3**		**859.5**		**782.2**		0.7		**240.6**						1.4		1.1
May-13	µg/L								**12.3**		**812**		**709**		0.89 U		**238**	1.0				1.3		1.5
Oct-13	µg/L		**146**		**113**		**3100**		**12.5**		**716**		**890**		2.0 U		**232**							
Nov-13	µg/L																							
Feb-14	µg/L																							
Apr-14	µg/L								9.7		**678**		**1490**		2.0 U		**229**							
Oct-14	µg/L						**3070**		**14.2**		**638**		**946**		2.0 U		**215**							
Jun-15	µg/L										**626**		**883**					2.0 U		4.8		2.0 U		3.2 J
Oct-15	µg/L		4.0 U		**293**		**3060**		**15**		**614**		**851**		4.0 U		**206**							
Jun-16	µg/L										**670**		**810**					3.2		**11**				
Nov-16	µg/L						**2400**		**19**		**730**		**820**		3.0 U		**180**							
Jun-17	µg/L						**R**				**630**		**390**					3.0 U		**54**				
Nov-17	µg/L						**2200**		**18**		**620**		**740**		3.0 U		**160**	3.0 U		**890**				3.0 U
May-18	µg/L						**1900**				**330**		**800**					3.1		**430**				
Nov-18	µg/L						**2400**		**16**		**510**				3.0 U		**160**	3.0 U		**100**				3.0 U
May-19	ug/L						**2100**				**360**		**91**					3.0 U		**950**				
Oct-19	ug/L																							
Nov-19	ug/L						**2200**		**31**		**530**		**29**		3.0 U		**170**	3.0 U		**500**				3.0 U

Notes:
µg/l = microgram per liter
U = non detect
UJ = estimated non detect
J = estimated result

Table 5-7
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-10-03 (T)	SHM-10-03 (D)	SHM-10-04 (T)	SHM-10-04 (D)	SHM-10-05A (T)	SHM-10-05A (D)	SHM-10-06 (T)	SHM-10-06 (D)	SHM-10-06A (T)	SHM-10-06A (D)	SHM-10-07 (T)	SHM-10-07 (D)	SHM-10-08 (T)	SHM-10-08 (D)	SHM-10-10 (T)	SHM-10-10 (D)	SHM-10-11 (T)	SHM-10-11 (D)	SHM-10-12 (T)	SHM-10-12 (D)	SHM-10-13 (T)	SHM-10-13 (D)	SHM-10-14 (T)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L																							
May-97	µg/L																							
Oct-97	µg/L																							
May-98	µg/L																							
Nov-98	µg/L																							
May-99	µg/L																							
Nov-99	µg/L																							
May-00	µg/L																							
Nov-00	µg/L																							
May-01	µg/L																							
Oct-01	µg/L																							
Nov-01	µg/L																							
May-02	µg/L																							
Oct-02	µg/L																							
May-03	µg/L																							
Nov-03	µg/L																							
May-04	µg/L																							
Nov-04	µg/L																							
Jun-05	µg/L																							
Jan-06	µg/L																							
Apr-06	µg/L																							
Jun-06	µg/L																							
Sep-06	µg/L																							
Dec-06	µg/L																							
Apr-07	µg/L																							
May-07	µg/L																							
Oct-07	µg/L																							
Apr-08	µg/L																							
Oct-08	µg/L																							
Jan-09	µg/L																							
Apr-09	µg/L																							
Oct-09	µg/L																							
Apr-10	µg/L																							
Jul-10	µg/L	2.36	0.78 J	1.62	0.64	4.7	4.6	**2210 J**	**1680 J**	**64.8**	**61**	**816 J**	**818 J**	2.72	0.73 J	2.0 J	1.25 J							
Aug-10	µg/L																3.62 J	**356**	**342 J**	**2880**	**3560**			
Sep-10	µg/L	1.47 J	0.51 J	1.0 J	0.79 J	5.68	5.21	**2580**	**2710**	**102**	**94.2**	**979**	**918**	1.4	1.55	2.57 J	2.4 J					**619 J**	**575**	**4280**
Oct-10	µg/L																	**470**	**463**	**2980**	**3120**	**700**	**672**	**5990 J**
Apr-11	µg/L																							
Oct-11	µg/L																							
Apr-12	µg/L																							
Oct-12	µg/L		1.0 U		1.0 U		3.0		**2300**		**72**		**1100**		1.9		1.0		**440**		**4100**		**670**	
May-13	µg/L		1.5		1.0		3.1		**1980**		**72.8**		**1210**		1.9		1.7		**460**		**3580**		**565**	
Oct-13	µg/L																							
Nov-13	µg/L										**22.9**						2.0 J		**432**		**3570**			
Feb-14	µg/L																							
Apr-14	µg/L																							
Oct-14	µg/L								**1900**		**95.6**		**861**				2.6 J				**3510**		**532**	
Jun-15	µg/L		4.2		2.0 U		3.0 J								3.6 J									
Oct-15	µg/L								**2150**		4.0 U		**926**				2.9 J		**503**		**3850**		4.5	
Jun-16	µg/L																							
Nov-16	µg/L								**1700**		**76**		**750**				3.5		**520**		**2900**		**530**	
Jun-17	µg/L																							
Nov-17	µg/L		3.0 U		3.0 U		2.1 J		**1600**		**74**		**970**		3.0 U		3.0 U		**540**		**3300**		**450**	
May-18	µg/L																							
Nov-18	µg/L		3.0 U		3.0 U		3.0 U		**1200**		**64**		**900**		2.0 J		3.0 U		**620**		**3300**		**570**	
May-19	ug/L																							
Oct-19	ug/L																							
Nov-19	ug/L		8.5		3.0 U		2.0 J		**1300**		**63**		**1000**		3.0 U		3.0 U		**560**		**3400**		**460**	

Notes:

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J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Table 5-7
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-10-14 (D)	SHM-10-15 (T)	SHM-10-15 (D)	SHM-10-16 (T)	SHM-10-16 (D)	SHM-11-02 (D)	SHM-11-06 (D)	PZ-12-01 (D)	PZ-12-02 (D)	PZ-12-03 (D)	PZ-12-04 (D)	PZ-12-05 (D)	PZ-12-06 (D)	PZ-12-07 (D)	PZ-12-08 (D)	PZ-12-09 (D)	PZ-12-10 (D)	SHM-13-01 (D)	SHM-13-02 (D)	SHM-13-03 (D)	SHM-13-04 (D)	SHM-13-05 (D)	SHM-13-06 (D)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L																							
May-97	µg/L																							
Oct-97	µg/L																							
May-98	µg/L																							
Nov-98	µg/L																							
May-99	µg/L																							
Nov-99	µg/L																							
May-00	µg/L																							
Nov-00	µg/L																							
May-01	µg/L																							
Oct-01	µg/L																							
Nov-01	µg/L																							
May-02	µg/L																							
Oct-02	µg/L																							
May-03	µg/L																							
Nov-03	µg/L																							
May-04	µg/L																							
Nov-04	µg/L																							
Jun-05	µg/L																							
Jan-06	µg/L																							
Apr-06	µg/L																							
Jun-06	µg/L																							
Sep-06	µg/L																							
Dec-06	µg/L																							
Apr-07	µg/L																							
May-07	µg/L																							
Oct-07	µg/L																							
Apr-08	µg/L																							
Oct-08	µg/L																							
Jan-09	µg/L																							
Apr-09	µg/L																							
Oct-09	µg/L																							
Apr-10	µg/L																							
Jul-10	µg/L																							
Aug-10	µg/L																							
Sep-10	µg/L	**4100**	**7930**	**8110**	**487**	**495**																		
Oct-10	µg/L	**5860**	**6090**	**6230**	**1180**	**1090**																		
Apr-11	µg/L																							
Oct-11	µg/L																							
Apr-12	µg/L																							
Oct-12	µg/L	**6200 J**		**7000**		**1600**	7.1	**920**																
May-13	µg/L	**5540**		**1090**		**1350**		**1020**	**441**	**627**	**659**	**610**	**741**	**224**	**484**	1.9	1.1	0.69 J		2.5	**318**	**2060**	8.9	**3180 J**
Oct-13	µg/L																							
Nov-13	µg/L			**5740**		**1530**	3.2 J	**1000**											2.2 J	2.7 J	**137**		6.8	**2540**
Feb-14	µg/L																							
Apr-14	µg/L						2.0 U														**120**	**61.1**		**2850**
Oct-14	µg/L	**5380**		**5870 J**			2.0 U	**825**												2.6 J	**80.8**	**693**	**11**	**2360**
Jun-15	µg/L						2.0 U														**75.5**	**620**		**2460**
Oct-15	µg/L	**2320**		**5450**		**1760**	4.0 U	**821**											2.1 J	2.6	**68.7**	**212**	**12.3**	**2160**
Jun-16	µg/L					**1900**	3.0														**53**	**20**		**2500**
Nov-16	µg/L	**4900**		**5100**		**1600**	3.0 U	**900**												1.8 J	**55**	**140**	**11**	**2700**
Jun-17	µg/L					**1800**	3.0 U	**730**	**680**	**500**	**600**	**640**	**260**	**41 J**	**110**	3.1	3.0 U	3.0 U			**46**	**350**		**2800**
Nov-17	µg/L	**5400**		**6400**		**1200**	2.5 J	**780**	**420**	**660**	**620**	**68**	**260**	**49**	3.8	2.3 J	3.0 U	3.0 U	1.5 J	3.0 U	**46**	**160**	8.4	**2700**
May-18	µg/L						2.0 J	**600**	**700**	**400**	**610**	**690**	**190**	**25**	**72**	1.5 J	3.0 U	3.0 U			**26**	**340**		**2700**
Nov-18	µg/L	**3900**		**5800**		**1100**	8.7	**750**	**570**	**300**	**560**	**630**	**140**	**48**	**58**	3.0 U	3.0 U	3.0 U	1.5 J	3.0 U	**44**	**190 J**	**12**	**2400**
May-19	ug/L						**37.0**	**680**	**470**	**190**	**630**	**670**	**220**	**31**	**100**	**160**	3.0 U	3.0 U			**110**	**430**		**3100**
Oct-19	ug/L										**790**	**730**	**210**	**40**		**17**	3.1	3.0 U						
Nov-19	ug/L	**4500**		**5600**		**1200**	**33.0**	**780**	**560**	**270**					**94**				1.90 J	3.0 U	**140**	**600**	**16**	**1900**

Notes:

µg/l = microgram per liter
U = non detect
UJ = estimated non detect
J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Table 5-7
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-13-07 (D)	SHM-13-08 (D)	SHM-13-14S (D)	SHM-13-14D (D)	SHM-13-15 (D)	EPA-PZ-2012-1A (D)	EPA-PZ-2012-1B (D)	EPA-PZ-2012-2A (D)	EPA-PZ-2012-2B (D)	EPA-PZ-2012-3A (D)	EPA-PZ-2012-3B (D)	EPA-PZ-2012-4A (D)	EPA-PZ-2012-4B (D)	EPA-PZ-2012-5A (D)	EPA-PZ-2012-5B (D)	EPA-PZ-2012-6A (D)	EPA-PZ-2012-6B (D)	EPA-PZ-2012-7A (D)	EPA-PZ-2012-7B (D)	SHP-2016-1A (D)	SHP-2016-1B (D)	SHP-2016-2A (D)	SHP-2016-2B (D)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L																							
May-97	µg/L																							
Oct-97	µg/L																							
May-98	µg/L																							
Nov-98	µg/L																							
May-99	µg/L																							
Nov-99	µg/L																							
May-00	µg/L																							
Nov-00	µg/L																							
May-01	µg/L																							
Oct-01	µg/L																							
Nov-01	µg/L																							
May-02	µg/L																							
Oct-02	µg/L																							
May-03	µg/L																							
Nov-03	µg/L																							
May-04	µg/L																							
Nov-04	µg/L																							
Jun-05	µg/L																							
Jan-06	µg/L																							
Apr-06	µg/L																							
Jun-06	µg/L																							
Sep-06	µg/L																							
Dec-06	µg/L																							
Apr-07	µg/L																							
May-07	µg/L																							
Oct-07	µg/L																							
Apr-08	µg/L																							
Oct-08	µg/L																							
Jan-09	µg/L																							
Apr-09	µg/L																							
Oct-09	µg/L																							
Apr-10	µg/L																							
Jul-10	µg/L																							
Aug-10	µg/L																							
Sep-10	µg/L																							
Oct-10	µg/L																							
Apr-11	µg/L																							
Oct-11	µg/L																							
Apr-12	µg/L																							
Oct-12	µg/L																							
May-13	µg/L		**928**																					
Oct-13	µg/L																							
Nov-13	µg/L	**1340**	**994**																					
Feb-14	µg/L			2.0 U	7.9	3.8 J																		
Apr-14	µg/L	**1280**	**1040**																					
Oct-14	µg/L	**962**	**978**	2.0 U	9.6	8.1	2.0 U	**160**	2.0 U	2.0 U	**21.2**	**3830**	4.8	**2680**	2.0 U	3.2 J	2.0 U	**515**	2.0 U	**1250**				
Jun-15	µg/L	**946**	**975**																					
Oct-15	µg/L	**531**	**954**				4.0 U	**288**	4.0 U	4.0 U	**16.4**	**4070**	5.6	**3520**	4.0 U	3.7	4.0 U	**386**	4.0 U	**1330**				
Jun-16	µg/L	**320**	**770**							.														
Nov-16	µg/L	**140**	**870**	4.0	9.1	5.5	3.0 U	**260**	3.0 U	3.0 U	**23**	**3600**	5.1	**2200**	3.0 U	2.4 J	1.6 J	**370**	3.0 U	**1000**				
Jun-17	µg/L	230	**900**				3.0 U	**240**	3.0 U	3.3	**19**	**4000**	2.9 J	**2300**	3.0 U	1.6 J	3.0 U	**430**	3.0 U	**1500**	3.0 U	**120**	**58**	**350**
Nov-17	µg/L	**620**	**810**	3.0 U	**11**	5.7	3.0 U	**200**	3.0 U	3.0 U	**12**	**3400**	3.4	**2300**	3.0 U	3.0 U	3.0 U	**350**	3.0 U	**1200**	3.0 U	**170**	**51**	**550**
May-18	µg/L	**470**	**830**				3.0 U	**170**	3.0 U	3.0 U	**13**	**2900**	2.5 J	**1900**	1.5 J	3.0 U	3.0 U	**96**	3.0 U	**1300**	3.0 U	**130**	**32**	**420**
Nov-18	µg/L	**490**	**310**	3.0 U	6.1	1.6 J	3.0 U	**170**	1.9 J	3.0 U	**15**	**3000**	3.5	**2000**	1.5 J	**12**	3.0 U	**300**	3.0 U	**1100**	3.0 U	**130**	**17**	**430**
May-19	ug/L	**470**	**800**				3.0 U	**160**	3.0 U	3.0 U	**15**	**2700**	2.5 J	**2000**	1.5 J	2.7 J	1.6 J	**350**	3.0 U	**1500**	3.0 U	**120**	**16**	**450**
Oct-19	ug/L								3.0 U	3.0 U	**16**	**3200**	4.5	**2100**			3.0 U	**370**	2.30 J				**11**	**560**
Nov-19	ug/L	**750**	**930**	1.90 J	**12**	5.1	3.0 U	**220**							2.20 J	**14**				**1300**	3.0 U	**180**		

Notes:

µg/l = microgram per liter
U = non detect
UJ = estimated non detect
J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Table 5-7
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHP-2016-3A (D)	SHP-2016-3B (D)	SHP-2016-4A (D)	SHP-2016-4B (D)	SHP-2016-5A (D)	SHP-2016-5B (D)	SHP-2016-6A (D)	SHP-2016-6B (D)	SHP-2016-6C (D)	SHP-2016-7A (D)	SHP-2016-7B (D)	EW-1² (D)	EW-4² (D)
Sample Month-Year	**Units**													
Aug-91	µg/L													
Dec-91	µg/L													
Mar-93	µg/L													
Jun-93	µg/L													
Nov-96	µg/L													
May-97	µg/L													
Oct-97	µg/L													
May-98	µg/L													
Nov-98	µg/L													
May-99	µg/L													
Nov-99	µg/L													
May-00	µg/L													
Nov-00	µg/L													
May-01	µg/L													
Oct-01	µg/L													
Nov-01	µg/L													
May-02	µg/L													
Oct-02	µg/L													
May-03	µg/L													
Nov-03	µg/L													
May-04	µg/L													
Nov-04	µg/L													
Jun-05	µg/L													
Jan-06	µg/L													
Apr-06	µg/L													
Jun-06	µg/L													
Sep-06	µg/L													
Dec-06	µg/L													
Apr-07	µg/L													
May-07	µg/L													
Oct-07	µg/L													
Apr-08	µg/L													
Oct-08	µg/L													
Jan-09	µg/L													
Apr-09	µg/L													
Oct-09	µg/L													
Apr-10	µg/L													
Jul-10	µg/L													
Aug-10	µg/L													
Sep-10	µg/L													
Oct-10	µg/L													
Apr-11	µg/L													
Oct-11	µg/L													
Apr-12	µg/L													
Oct-12	µg/L													
May-13	µg/L													
Oct-13	µg/L													
Nov-13	µg/L													
Feb-14	µg/L													
Apr-14	µg/L													
Oct-14	µg/L													
Jun-15	µg/L													
Oct-15	µg/L													
Jun-16	µg/L												**1500**	**2400**
Nov-16	µg/L													
Jun-17	µg/L	4.8	**240**	**10**	**1100**	2.3 J	**620**	**520**	**830**	**320**	**81**	7.9	**1900**	**3500**
Nov-17	µg/L	7.0	**270**	4.6	**1800**	2.2 J	**700**	**600**	**1300**	**280**	**12**	**11**	**1800**	**3500**
May-18	µg/L	3.2	**240**	3.8	**1300**	2.5 J	**620**	**280**	**1300**	**210**	**84**	**200**	**1500**	**3300**
Nov-18	µg/L	4.5	**240**	1.5 J	**1400**	2.8 J	**520**	**480**	**1300**	**300**	**200**	**150**	**1900**	**4000**
May-19	ug/L	4.0	**230**	3.0 U	**1400**	3.9	**610**	**2800**	**1300**	**250**	**19**	**80**	**1500**	**2900**
Oct-19	ug/L	**260 R**	4.1 R											
Nov-19	ug/L			3.0 U	**1500**	3.2	**720**	**860**	**1200**	**270**		**35**	**1600**	**3200**

Notes:

µg/l = microgram per liter
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UJ = estimated non detect
J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

APPENDIX A
LANDFILL INSPECTION REPORT

Sovereign Consulting Inc.
9 Payson Road, Suite 150
Foxborough, MA 02035

ANNUAL LANDFILL INSPECTION
Shepley's Hill Landfill
Devens, Massachusetts

Date of Inspection: 15 October 2019
Inspector/Company: Steven Passafaro, PE, and Rebekah Rose of Sovereign Consulting Inc.
Site Location: Shepley's Hill Landfill, Devens, Massachusetts

Weather Conditions:
Temperature: 50º F
Weather: Clear

Type of Inspection:
- ☒ Annual
- ☐ Post-Major Weather Event
- ☐ Re-Inspection of Deficiencies
- ☐ Other

Landfill Attribute & Observations	Comments and Recommendations	SAT	UNSAT
Cover Surface			
1. There are no new depressions on the cover surface	Continue monitoring for settlement that creates depressions.	☒	☐
2. No tree or shrub growth was observed on the landfill surface during the inspection. Small tree and shrub growth on the margins of the landfill were removed during annual mowing event.	Continue monitoring for tree and shrub growth on cover surface. Remove tree/shrub growth as necessary.	☒	☐
3. The utility berm that was constructed through the middle of the landfill in 2004 provides utility service to the pumping station at the northeastern corner of the landfill. The vegetation atop the utility berm was mowed during the September 2019 mowing event. The berm is intact and no adverse effects to the berm were observed.	Continue monitoring the utility berm for negative impacts on the drainage patterns.	☒	☐

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ANNUAL LANDFILL INSPECTION
Shepley's Hill Landfill
Devens, Massachusetts

Landfill Attribute & Observations	Comments and Recommendations	SAT	UNSAT
Vegetative Growth			
1. The vegetation growth was normal and appeared to have no major stressed areas. The annual landfill mowing event was conducted from 30 September to 1 October 2019.	Continue mowing on an annual basis.	☒	☐
Landfill Gas Vents & Monitoring Wells			
1. The landfill gas vents are in good condition. All pipes are in functional condition with screens installed on all vents.	Continue to monitor the condition of the landfill gas vents.	☒	☐
2. The landfill gas points are in good condition.	Continue to monitor the condition of the landfill gas points.	☒	☐
3. All monitoring wells located on the landfill appeared to be in good condition.	Continue to monitor the condition of the landfill monitoring wells.	☒	☐
Drainage Swales			
1. Most of the southern drainage swale exhibited vegetative growth. Large growth was removed during the September 2019 mowing activities. Small growth and wetland plant life were not disturbed, as they have become a natural retardant to erosive forces.	Continue to monitor and clear drainage swales of invasive vegetative growth.	☒	☐
2. Vegetative growth was removed from all northern drainage swales during the September 2019 mowing activities.	Continue to monitor and clear drainage swales of invasive vegetative growth.	☒	☐

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Shepley's Hill Landfill
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Landfill Attribute & Observations	Comments and Recommendations	SAT	UNSAT
3. Mowing is conducted to the edge of the swales.	Continue mowing annually.	☒	☐
Settlement			
1. No new depressions were observed within the landfill.	Continue to monitor for new depressions or settlement and repair as necessary.	☒	☐
Erosion			
1. There was no erosion observed.	Continue to monitor for erosion annually.	☒	☐
Access Roads			
1. The landfill access road is in good condition, and no erosion of the road was observed.	Continue to monitor condition of road.	☒	☐
Culverts and Catch Basins			
1. The culverts along the northern portion of the landfill were observed to be in good condition; some growth was removed from the culverts along the entrance road to the ATP during the September 2019 mowing event to ensure proper use.	Continue to monitor and remove growth as necessary.	☒	☐

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Shepley's Hill Landfill
Devens, Massachusetts

Landfill Attribute & Observations	Comments and Recommendations	SAT	UNSAT
Security/Fencing			
1. Perimeter fencing is non-existent along much of the western boundary of the landfill (wooded area along Shepley's Hill), and along the southeastern boundary near the railroad tracks. However, no roads have open access to the landfill, and existing fence gates across roads that access the landfill are secured with chains and padlocks.	Continue to maintain proper security measures including ensure lockage of all landfill fence gates.	☒	☐
Wetland Encroachment			
1. Wetland encroachment was observed in the swales located in the southern portion of the landfill. Overall, the areas of encroachment are small and confined to the swales.	Continue to monitor wetland encroachment and continued mowing of the areas close to the existing growth will prevent the development of wide-spread wetland encroachment issues.	☒	☐
Other Observations			
1. The recreation field located south of the landfill access road in the middle of the southern area of the landfill appears to be in good condition, and although tire rutting was not observed between the field and the landfill access road, grass has been worn away between the landfill access road and the recreation field by frequent vehicle use. 2. No other outstanding issues were observed.	1. Gravel has been added to part of the recreation access road. It is recommended that gravel be installed across the remaining distance between the landfill access road and the recreation field to ensure that tire rutting does not develop and that there is minimal impact to the landfill cover by vehicle usage. 2. Ensure all post closure uses of the landfill do not compromise the integrity of the landfill cover or the network of landfill gas vents and groundwater monitoring wells.	☒	☐

Shepley's Hill Landfill
Annual Inspection
October 2019

Description - Current Conditions of Northern Portion of Landfill

Description - Current Conditions of Western Portion of Landfill and Western Drainage Swale

Shepley's Hill Landfill
Annual Inspection
October 2019

Description - Current Conditions of Southern Portion of Landfill

Description - Current Conditions of Eastern Portion of Landfill

Shepley's Hill Landfill
Annual Inspection
October 2019

Description - Current Condition of the Northern Barrier Wall Area

Description - Current Condition of the Southern Barrier Wall Area

Shepley's Hill Landfill
Annual Inspection
October 2019

Description - Current Conditions of Red Cove Area

Description - Current Condtion of Southern Drainage Swale

Shepley's Hill Landfill
Annual Inspection
October 2019

Description - Current Condition of Eastern Drainage Swale

Description - Current Condition of the Northern Landfill Access Road

Shepley's Hill Landfill
Annual Inspection
October 2019

Description - Current Condition of the Southern Landfill Access Road

Description - Current condition of Recreation Field Access Point

Shepley's Hill Landfill
Annual Inspection
October 2019

Description - Current Condtions of Southern Portion of Recreation Field

Description - Current Condtions of Northern Portion of Recreation Field

APPENDIX B
LANDFILL GAS MONITORING FIELD FORMS

Ambient VOC

-16

21/43

Sunny 50's

Date: 10-16-19 Weather: Field Team: JWR + LJH

ID	Time	Initial Readings VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	Post Purge Readings VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
GV-1	1407	0	9.1	0	64	0	8.4	1.3	4	167	0	5.6	0	66	0	11.0	3.3	29.71
GV-2	1415	0	11.5	0	74	0	7.5	3.0	4	167	0	2.6	0	99	0	13.7	7.7	29.71
GV-3	1346	0	21.1	0	3	0	0.0	0.1	4	167	0	20.9	0	0	0	0	0.1	29.71
GV-4	1358	0	5.5	0	91	0	11.7	5.1	4	167	0	9.3	0	63	0	8.5	2.7	29.71
GV-5	1443	0	12.2	0	6	5.0	6.4	8.2	4	167	0	17.6	0	0	0	0.2	0.2	29.71
GV-6	1338	1	1.6	0	97	0	14.4	6.5	4	167	0	1.6	0	51	0	14.7	5.4	29.71
GV-7	1427	0	0.3	0	99	0	15.2	13.3	4	167	0	0.1	0	99	0	15.1	12.1	29.71
GV-8	1426	0	8.2	0	19	0	7.0	2.1	4	167	0	5.0	0	5	0	11.1	0.3	29.71
GV-9	1327	0	0	0	40	0	16.0	8.8	4	167	0	0.1	0	99	0	17.0	13.1	29.71
GV-10	1347	0	1.1	0	51	0	14.1	3	4	167	0	2.0	0	45	0	13.6	7.4	29.71
GV-11	1309	0	10.9	0	99	0	6.8	2.5	4	167	0	5.9	0	99	0	10.5	9.0	29.71
GV-12	1300	0	3.3	0	95	0	10.7	7.0	4	167	0	0	0	99	0	12.4	5.8	29.71
GV-13	1144	0	12.4	0	47	0	5.0	3.4	4	167	0	16.2	0	30	0	2.5	2.1	29.85
GV-14	1155	0	20.6	0	99	0	0.2	0.2	4	167	0	3.7	0	99	0	15.1	29.3	29.85
GV-15	1210	0	1.8	0	99	0	21.9	23.5	4	375	0	0	0	99	0	21.0	26.5	29.85
GV-16	1248	0	0	0	99	22.1	0	30.2	4	375	0	0	0	99	0	22.4	19.2	29.71
GV-17	1236	0	2.6	0	99	0	23.4	25.6	4	375	0	0	0	99	0	23.4	26.1	29.71
GV-18	1221	0	0.7	0	99	0	21.3	23.4	4	375	0	1.0	0	99	0	21.2	23.4	29.71
LGP-01-01X	1537	0	21.0	0	0	0	0.5	0.1	2	83	0	21.1	0	0	0	0.5	0.1	29.64
LGP-09-01XA	1518	0	21.0	0	0	0	0.5	0.1	2	157	0	21.2	0	0	0	0.6	0.1	29.64
LGP-09-01XB	1543	0	20.8	0	0	0	0.7	0.1	2	157	0	20.9	0	0	0	0.8	0.1	29.64
LGP-01-02X	1528	0	20.8	0	0	0	0.9	0.1	2	83	0	20.8	0	0	0	0.9	0.1	29.64
LGP-09-02X	1526	0	20.7	0	0	0	1.1	0.1	2	204	0	20.9	0	0	0	1.2	0.2	29.64
LGP-01-03X	1522	0	20.8	0	0	0	0.8	0.1	2	83	0	20.9	0	0	0	0.8	0.1	29.64
LGP-09-03X	1516	0	20.8	0	0	0	1.0	0.1	2	167	0	22.7	0	0	0	1.3	0.1	29.64
LGP-01-04X	1505	0	20.9	0	0	0	0.5	0.1	2	83	0	20.9	0	0	0	0.5	0.2	29.65
LGP-09-04X	1511	0	21.0	0	0	0	0.2	0.1	2	120	0	21.0	0	0	0	0.6	0.1	29.65
LGP-05-05X	833	0	11.7	0	12	0	11.7	0.8	2	93	0	9.9	0	0	0	0.1	0.2	29.95
LGP-09-05X	843	0.55	~~20.2~~	0	53	0	0.2	0.2	2	167	0	3.0	0	31	0	0.2	0.2	29.95
LGP-05-06X	0900	0	18.3	0	0	0	2.3	0.2	2	93	0	18.8	0	0	0	2.5	0.2	29.93
LGP-09-06X	852	0	16.2	0	0	0	0.2	0.2	2	120	0	16.1	0	0	0	5.0	0.2	29.93
LGP-05-07X	909	0	18.2	0	0	0	3.7	0.2	2	65	0	15.4	0	0	0	6.0	0.2	NR
LGP-05-08X	935	0	15.7	0	0	0	6.6	0.2	2	93	0	7.0	0	0	0	14.5	0.2	29.93
LGP-09-08X	918	0	5.9	0	0	0	16.5	0.2	2	185	0	2.8	0	5	0	19.3	0.3	NR
LGP-05-09X	953	0	14.7	0	0	0	15.7	0.2	2	93	0	2.9	0	0	0	7.4	0.2	29.86
LGP-09-09X	937	0	~~5.9~~ 10.1	0	0	0	~~17.2~~ 10.5	0.2	2	185	0	5.4	0	0	0	15.3	0.2	29.93
LGP-05-10X	1006	0	15.4	0	0	0	15.2	0.2	2	93	0	8.3	0	0	0	11.9	0.2	29.86
LGP-09-10X	1015	0	2.6	0	5	0	14.1	0.3	2	148	0	2.7	0	7.0	0	17.7	0.5	29.86
LGP-05-11X	1036	0	14.8	0	0	0	5.6	0.2	2	83	0	8.5	0	0	0	10.4	0.2	29.86
LGP-09-11X	1030	0	6.9	0	0	0	11.9	0.2	2	139	0	4.6	0	0	0	15.0	0.2	29.86
LGP-05-13X	1116	0	17.0	0	0	0	3.8	0.2	2	56	0	12.5	0	0	0	6.6	0.2	29.85
LGP-05-14X	1122	0	12.4	0	0	0	7.7	0.2	2	93	0	12.5	0	0	0	7.5	0.2	29.85
LGP-09-15X	1133	0	17.0	0	0	0	4.2	0.2	2	111	0	16.0	0	0	0	5.7	0.2	29.85

H_2S 0

ambient readings 0838 30.01 ~~29.71~~ "Hg CH4 0.2% CO_2 0.1% O_2 20.8 % LEL 0 VOC 0 CO 0

1019 29.86 "Hg VOC 0

1510 VOC 0

US Environmental Rental Corporation

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166 Riverview Ave, Waltham, MA 02453 (781) 899-1560
91 Prestige Park Circle, Suite 5, East Hartford, CT 06108 (860) 289-8700
5C South Gold Dr, Hamilton, NJ 08691 (609) 570-8555
1202 Tech Blvd., Suite 108, Tampa, FL 33619 (813) 628-4200

Order No.: 34095
Date: 10/14/2019
Technician: JT

Company: Sovereign
Contact: Steve Passafaro
Phone #: #N/A

Packing List

Item	Serial Number	Included	QC
MultiRAE Lite	**M01CA09883**	✓	
Manual		✓	
Charger		✓	
Sample Tubing		✓	
Alkaline Battery Pack		✓	
External Filters		✓	
Software			
Comm. Cable			
Regulator		✓	
Tedlar Bag		✓	
Calibration Gas		✓	

Calibration Report

MultiRAE Lite **M01CA09883**

Calibrated with the following calibration gas:

10 H2S /50 CO/ 50 LEL/ 18 O2/	*Lot #:*	4917204
100ppm Iso	*Lot #:*	4915508
	Lot #:	

	Span Setting	Calibrated Reading	Post-Calibration Bump Test
H_2S	10 ppm	10 ppm	10 ppm
CO	50 ppm	50 ppm	50 ppm
LEL	50 %	50 %	50 %
O_2	20.9 %	20.9 %	20.9 %
PID	100 ppm	100 ppm	100 ppm

This document certifies that US Environmental Rental Corporation has provided this rental equipment and all accessories in good working order. It is the renter's responsibility to: a) review all included items upon receipt, b) verify that all items are in acceptable condition and function properly, and c) contact a US Environmental associate immediately if any item is missing, damaged, and/or not functioning properly. Any delay in notifying US Environmental will be considered as the Renter taking responsibility for such missing, damaged, and/or malfunctioning item.

Missing, damaged, and/or malfunctioning equipment and accessories will result in additional fees.

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Order No.: 34095
Date: 10/15/2019
Technician: JT

LANDTEC

Company: Sovereign
Contact: Steve Passafaro
Phone #: 631 454 3182

Packing List

Item	Serial Number	Included	QC
GEM 2000	**GM07305**	✓	
H2S Sensor	**5080/08**	✓	
Manual		✓	
Charger		✓	
External Filters		✓	
Sample Line		✓	
Pressure Line		✓	
Temperature Probe		✓	
Quick Connects		✓	
Regulator			
Tedlar Bag			
Calibration Gas			
Software			
Comm. Cable			

Calibration Report

Item		Information	
GEM 2000	**GM07305**		
Calibration Gas:		**15% CO2 / 15% CH4**	
Lot Number:		***4820065***	
H2S Concentration		***25.0***	***ppm***
Lot Number:		***4913709***	
CO_2 Calibrated Reading		***15.0***	***%***
CO_2 Post-Cal Bump		***15.0***	***%***
CH_4 Calibrated Reading		***15.0***	***%***
CH_4 Post-Cal Bump		***15.2***	***%***
O_2 Calibrated Reading		***20.9***	***%***
O_2 Post-Cal Bump		***20.9***	***%***
H_2S Calibrated Reading		***25.0***	***ppm***
H_2S Post-Cal Bump		***25.0***	***ppm***

This document certifies that US Environmental Rental Corporation has provided this rental equipment and all accessories in good working order. It is the renter's responsibility to: a) review all included items upon receipt, b) verify that all items are in acceptable condition and function properly, and c) contact a US Environmental associate immediately if any item is missing, damaged, and/or not functioning properly. Any delay in notifying US Environmental will be considered as the Renter taking responsibility for such missing, damaged, and/or malfunctioning item.

Missing, damaged, and/or malfunctioning equipment and accessories will result in additional fees.

Appendix B
Landfill Gas Monitoring 2019
Devens, Massachusetts

Date: 10/16/19 **Weather: Sunny, 50 Degrees F** **Field Team: Joe Rogers, Liam Henry**

		Initial Readings									Post Purge Readings							
ID	**Time**	**VOC (ppm)**	**0_2 (%)**	**H_2S (ppm)**	**LEL (%)**	**CO (ppm)**	**$C0_2$ (%)**	**CH_4 (%)**	**rge Rate (lp**	**rge Time (se**	**VOC (ppm)**	**0_2 (%)**	**H_2S (ppm)**	**LEL (%)**	**CO (ppm)**	**$C0_2$ (%)**	**CH_4 (%)**	**Bar. Pres.("Hg)**
Background	8:38	0.0	20.89	0.0	0.0	0.0	0.1	0.2										30.01
GV-1	14:07	0.0	9.1	0.0	64.0	0.0	8.4	1.3	4	167	0.0	5.6	0.0	66.0	0.0	11.0	3.3	29.71
GV-2	14:15	0.0	11.5	0.0	74.0	0.0	7.5	3.0	4	167	0.0	2.6	0.0	99.0	0.0	13.7	7.7	29.71
GV-3	13:40	0.0	21.1	0.0	3.0	0.0	0.0	0.1	4	167	0.0	20.9	0.0	0.0	0.0	0.0	0.1	29.71
GV-4	13:58	0.0	5.5	0.0	91.0	0.0	11.7	5.1	4	167	0.0	9.3	0.0	63.0	0.0	8.5	2.7	29.71
GV-5	14:43	0.0	12.2	0.0	6.0	0.0	6.4	6.2	4	167	0.0	12.6	0.0	0.0	0.0	6.2	0.2	29.71
GV-6	13:38	1.0	1.6	0.0	97.0	0.0	14.4	6.5	4	167	0.0	1.6	0.0	51.0	0.0	14.7	5.4	29.71
GV-7	14:27	0.0	0.3	0.0	99.0	0.0	15.2	13.3	4	167	0.0	0.1	0.0	99.0	0.0	15.1	12.1	29.71
GV-8	14:26	0.0	8.2	0.0	49.0	0.0	9.0	2.5	4	167	0.0	5.8	0.0	5.0	0.0	11.1	0.3	29.71
GV-9	13:27	0.0	0.0	0.0	40.0	0.0	16.0	8.8	4	167	0.0	0.1	0.0	99.0	0.0	17.0	13.1	29.71
GV-10	13:17	0.0	1.1	0.0	51.0	0.0	14.1	3.0	4	167	0.0	2.0	0.0	45.0	0.0	13.6	2.4	29.71
GV-11	13:09	0.0	10.9	0.0	99.0	0.0	6.8	2.5	4	167	0.0	5.9	0.0	99.0	0.0	10.5	9.0	29.71
GV-12	13:00	0.0	3.3	0.0	95.0	0.0	10.7	7.0	4	167	0.0	0.0	0.0	99.0	0.0	12.4	8.8	29.71
GV-13	11:44	0.0	12.4	0.0	47.0	0.0	5.0	3.4	4	167	0.0	16.2	0.0	30.0	0.0	2.5	2.1	29.85
GV-14	11:55	0.0	20.6	0.0	99.0	0.0	0.2	0.2	4	167	0.0	3.7	0.0	99.0	0.0	15.1	29.3	29.85
GV-15	12:10	0.0	1.8	0.0	99.0	0.0	21.9	23.5	4	375	0.0	0.0	0.0	99.0	0.0	21.0	26.5	29.85
GV-16	12:48	0.0	0.0	0.0	99.0	22.1	0.0	20.2	4	375	0.0	0.0	0.0	99.0	0.0	22.4	19.2	29.71
GV-17	12:36	0.0	2.6	0.0	99.0	0.0	23.4	25.6	4	375	0.0	0.0	0.0	99.0	0.0	23.4	26.1	29.71
GV-18	12:21	0.0	0.7	0.0	99.0	0.0	21.3	23.4	4	375	0.0	1.0	0.0	99.0	0.0	21.2	23.4	29.71
LGP-01-01X	15:37	0.0	21.0	0.0	0.0	0.0	0.5	0.1	2	83	0.0	21.1	0.0	0.0	0.0	0.5	0.1	29.64
LGP-09-01XA	15:48	0.0	21.0	0.0	0.0	0.0	0.5	0.1	2	157	0.0	21.2	0.0	0.0	0.0	0.6	0.1	29.64
LGP-09-01XB	15:43	0.0	20.8	0.0	0.0	0.0	0.7	0.1	2	157	0.0	20.9	0.0	0.0	0.0	0.8	0.1	29.64
LGP-01-02X	15:28	0.0	20.8	0.0	0.0	0.0	0.9	0.1	2	83	0.0	20.8	0.0	0.0	0.0	0.9	0.1	29.64
LGP-09-02X	15:26	0.0	20.7	0.0	0.0	0.0	1.1	0.1	2	204	0.0	20.9	0.0	0.0	0.0	1.2	0.2	29.64
LGP-01-03X	15:22	0.0	20.8	0.0	0.0	0.0	0.8	0.1	2	83	0.0	20.9	0.0	0.0	0.0	0.8	0.1	29.64
LGP-09-03X	15:16	0.0	20.8	0.0	0.0	0.0	1.0	0.1	2	167	0.0	20.7	0.0	0.0	0.0	1.0	0.1	29.64
LGP-01-04X	15:05	0.0	20.9	0.0	0.0	0.0	0.5	0.1	2	83	0.0	20.9	0.0	0.0	0.0	0.5	0.2	29.65
LGP-09-04X	15:11	0.0	21.0	0.0	0.0	0.0	0.2	0.1	2	120	0.0	21.0	0.0	0.0	0.0	0.6	0.1	29.65
LGP-05-05X	8:33	0.0	11.7	0.0	12.0	0.0	11.7	0.8	2	93	0.0	9.9	0.0	0.0	0.0	0.1	0.2	29.95
LGP-09-05X	8:43	0.55	22.0	0.0	53.0	0.0	0.2	0.2	2	167	0.0	3.0	0.0	31.0	0.0	0.2	0.2	29.95
LGP-05-06X	9:00	0.0	18.3	0.0	0.0	0.0	2.3	0.2	2	93	0.0	18.8	0.0	0.0	0.0	2.5	0.2	29.93
LGP-09-06X	8:52	0.0	16.2	0.0	0.0	0.0	0.2	0.2	2	120	0.0	16.1	0.0	0.0	0.0	5.0	0.2	29.93
LGP-05-07X	9:09	0.0	18.2	0.0	0.0	0.0	3.7	0.2	2	65	0.0	15.4	0.0	0.0	0.0	6.0	0.2	NR
LGP-05-08X	9:25	0.0	15.7	0.0	0.0	0.0	6.6	0.2	2	93	0.0	7.0	0.0	0.0	0.0	14.5	0.2	29.93
LGP-09-08X	9:18	0.0	5.9	0.0	0.0	0.0	16.5	0.2	2	185	0.0	2.8	0.0	5.0	0.0	19.3	0.3	NR
LGP-05-09X	9:53	0.0	14.4	0.0	0.0	0.0	15.2	0.2	2	93	0.0	20.9	0.0	0.0	0.0	7.4	0.2	29.86
LGP-09-09X	9:37	0.0	10.1	0.0	0.0	0.0	10.9	0.2	2	185	0.0	5.4	0.0	0.0	0.0	15.3	0.2	29.93
LGP-05-10X	10:06	0.0	15.4	0.0	0.0	0.0	5.2	0.2	2	93	0.0	8.3	0.0	0.0	0.0	11.9	0.2	29.86
LGP-09-10X	10:15	0.0	2.5	0.0	5.0	0.0	14.1	0.3	2	148	0.0	2.7	0.0	7.0	0.0	17.7	0.5	29.86
LGP-05-11X	10:36	0.0	14.8	0.0	0.0	0.0	5.6	0.2	2	83	0.0	8.5	0.0	0.0	0.0	10.9	0.2	29.86
LGP-09-11X	10:30	0.0	6.8	0.0	0.0	0.0	11.9	0.2	2	139	0.0	4.6	0.0	0.0	0.0	15.0	0.2	29.86
LGP-05-13X	11:16	0.0	17.0	0.0	0.0	0.0	3.8	0.2	2	56	0.0	12.5	0.0	0.0	0.0	6.6	0.2	29.85
LGP-05-14X	11:22	0.0	12.4	0.0	0.0	0.0	7.7	0.2	2	93	0.0	12.5	0.0	0.0	0.0	7.5	0.2	29.85
LGP-09-15X	11:33	0.0	17.0	0.0	0.0	0.0	4.2	0.2	2	111	0.0	16.0	0.0	0.0	0.0	5.7	0.2	29.85

Appendix B
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Devens, Massachusetts

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
GV-1	10/26/2012	12:54	0.2	8.6	0	16	0	9.5	0.8	4	167	0.5	8.0	0	23	0	10.8	1.1	29.87
	11/12/2013	8:46	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.2	0.0	29.98
	10/17/2014	14:49	0.0	21.0	0.0	0.0	0.0	0.0	0.0	4	167	0.0	18.4	0.0	3.0	4.0	1.9	0.1	29.32
	10/20/2015	9:21	0.0	20.8	0.0	0.0	0.0	0.1	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.0	0.0	29.90
	10/18/2016	17:48	0.1	8.8	0.0	21	0.0	9.4	1.1	4	167	0.1	6.1	0.0	24	0.0	11.8	1.2	29.55
	10/18/2017	15:05	0.0	19.6	0.0	0.0	0.0	1.0	0.0	4	167	0.0	11.4	0.0	12.0	0.0	6.9	0.3	29.98
	10/18/2018	14:28	0.0	21.3	0.0	0.0	0.0	0.4	0.0	4	167	0.0	21.1	0.0	0.0	0.0	0.5	0.0	30.03
	10/16/2019	14:07	0.0	9.1	0.0	64.0	0.0	8.4	1.3	4	167	0.0	5.6	0.0	66.0	0.0	11.0	3.3	29.71
GV-2	10/26/2012	13:05	0.4	9.9	0	87	0	9.6	4.3	4	167	0.6	4.0	0	>100	0	15.4	9.3	29.87
	11/12/2013	8:56	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:40	0.0	20.8	1.0	0.0	0.0	0.1	0.0	4	167	0.0	15.2	0.0	68.0	4.0	5.1	3.5	29.32
	10/20/2015	10:50	0.1	19.4	0.0	27.0	0.0	1.2	0.8	4	167	0.1	16.4	0.0	83.0	1.0	4.2	2.5	29.89
	10/18/2016	17:43	0.1	8.7	0.0	99	0.0	10.3	4.9	4	167	0.0	3.9	0.0	100	0.0	14.8	7.2	29.55
	10/18/2017	14:58	0.0	20.5	0.0	5.0	0.0	0.5	0.1	4	167	0.0	11.3	0.0	69.0	0.0	6.7	2.7	29.99
	10/18/2018	14:23	0.0	21.6	0.0	0.0	0.0	0.0	0.0	4	167	0.0	21.6	0.0	0.0	0.0	0.1	0.0	30.03
	10/16/2019	14:15	0.0	11.5	0.0	74.0	0.0	7.5	3.0	4	167	0.0	2.6	0.0	99.0	0.0	13.7	7.7	29.71
GV-3	10/26/2012	13:22	0.0	20.9	0	0	0	0.0	0.0	4	167	0.0	20.9	0	0	0	0.0	0.0	29.87
	11/12/2013	9:09	0.1	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:25	0.0	20.7	0.0	0.0	0.0	0.0	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.0	0.0	29.32
	10/20/2015	8:50	0.0	20.5	0.0	0.0	0.0	0.0	0.0	4	167	0.0	20.5	0.0	0.0	0.0	0.1	0.1	29.88
	10/18/2016	17:31	0.0	18.3	0.0	13	0.0	1.8	0.6	4	167	0.0	19.9	0.0	0	0.0	0.0	0.0	29.55
	10/18/2017	14:39	0.0	20.9	0.0	0.0	0.0	0.1	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.1	0.0	29.98
	10/18/2018	14:12	0.0	21.3	0.0	0.0	0.0	0.0	0.0	4	167	0.0	21.4	0.0	0.0	0.0	0.0	0.0	30.03
	10/16/2019	13:40	0.0	21.1	0.0	3.0	0.0	0.0	0.1	4	167	0.0	20.9	0.0	0.0	0.0	0.0	0.1	29.71
GV-4	10/26/2012	13:15	0.6	7.4	0	72	0	10.4	3.4	4	167	0.5	11.3	0	39	0	6.8	1.9	29.87
	11/12/2013	9:18	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:33	0.0	18.0	0.0	21.0	5.0	2.5	1.0	4	167	0.2	1.8	0.0	100.0	0.0	14.3	8.1	29.32
	10/20/2015	9:00	0.1	10.0	0.0	71.0	0.0	8.7	2.1	4	167	0.2	10.1	0.0	100.0	0.0	10.1	3.1	29.88
	10/18/2016	17:37	0.2	8.7	0.0	80	0.0	11.0	4.0	4	167	0.2	5.2	0.0	100	0.0	14.0	5.3	29.55
	10/18/2017	14:48	0.0	13.3	0.0	61.0	0.0	4.8	2.1	4	167	0.0	15.2	0.0	30.0	0.0	4.1	1.0	29.97
	10/18/2018	14:18	0.0	21.5	0.0	0.0	0.0	0.0	0.0	4	167	0.0	21.5	0.0	0.0	0.0	0.0	0.0	30.03
	10/16/2019	13:58	0.0	5.5	0.0	91.0	0.0	11.7	5.1	4	167	0.0	9.3	0.0	63.0	0.0	8.5	2.7	29.71
GV-5	10/26/2012	13:55	1.5	13.4	0	1	0	5.2	0.0	4	167	0.2	14.0	0	0	0	4.8	0.0	29.87
	11/12/2013	9:48	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:02	0.0	6.9	0.0	0.0	5.0	6.7	0.0	4	167	0.0	5.9	0.0	0.0	5.0	7.9	0.0	29.32
	10/20/2015	9:12	0.1	19.7	0.0	4.0	0.0	0.6	0.1	4	167	0.0	20.5	0.0	0.0	0.0	0.4	0.0	29.88
	10/18/2016	17:01	0.0	14.2	0.0	0	0.0	5.0	0.0	4	167	0.0	12.4	0.0	0	0.0	6.3	0.0	29.55
	10/18/2017	13:47	0.0	18.0	0.0	0.0	0.0	1.3	0.0	4	167	0.0	18.1	0.0	0.0	0.0	1.9	0.0	29.98
	10/18/2018	12:58	0.0	21.7	0.0	0.0	0.0	0.1	0.0	4	167	0.0	21.8	0.0	1.0	0.0	0.1	0.1	30.02
	10/16/2019	14:43	0.0	12.2	0.0	6.0	0.0	6.4	6.2	4	167	0.0	12.6	0.0	0.0	0.0	6.2	0.2	29.71
GV-6	10/26/2012	13:31	0.4	5.8	0	>100	0	12.8	7.5	4	167	0.7	5.7	0	85	0	11.4	4.2	29.87
	11/12/2013	9:29	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:14	70.1	2.6	0.0	>100	3.0	14.3	8.0	4	167	0.1	0.5	0.0	>100	0.0	17.5	9.4	29.32
	10/20/2015	13:16	0.0	3.3	0.0	100.0	0.0	13.7	7.6	4	167	0.0	1.7	0.0	100.0	0.0	14.8	7.8	29.88
	10/18/2016	17:29	0.0	6.5	0.0	100	0.0	14.1	6.0	4	167	0.1	6.9	0.0	100	0.0	14.0	5.7	29.55
	10/18/2017	14:31	0.0	14.8	0.0	46.0	0.0	4.0	1.0	4	167	0.0	14.3	0.0	49.0	0.0	43.0	1.8	29.97
	10/18/2018	14:06	0.0	21.1	0.0	0.0	0.0	0.1	0.0	4	167	0.0	21.1	0.0	0.0	0.0	0.1	0.0	30.03
	10/16/2019	13:38	1.0	1.6	0.0	97.0	0.0	14.4	6.5	4	167	0.0	1.6	0.0	51.0	0.0	14.7	5.4	29.71
GV-7	10/26/2012	14:15	0.5	1.1	0	>100	2	12.1	6.6	4	167	0.4	1.2	0	63	0	11.1	3.2	29.87
	11/12/2013	9:57	0.0	20.7	0	0	0	0.1	0.0	4	167	0.0	20.5	0	0	0	0.1	0.0	29.98
	10/17/2014	13:47	0.0	2.9	0.0	>100	0.0	11.4	7.6	4	167	0.0	0.6	0.0	>100	0.0	13.8	8.2	29.32
	10/20/2015	11:30	0.0	5.4	0.0	100.0	0.0	11.6	8.2	4	167	0.0	1.1	0.0	100.0	1.0	14.1	7.9	29.89
	10/18/2016	17:10	0.0	11.8	0.0	100	0.0	7.7	5.6	4	167	0.0	2.5	0.0	100	0.0	16.8	11.0	29.55
	10/18/2017	13:37	0.0	18.2	0.0	10.0	0.0	0.9	0.3	4	167	0.0	18.6	0.0	5.0	0.0	0.8	0.0	29.98
	10/18/2018	12:47	0.0	21.6	1.0	1.0	0.0	0.0	0.1	4	167	0.0	21.6	1.0	0.0	0.0	0.0	0.0	30.02
	10/16/2019	14:27	0.0	0.3	0.0	99.0	0.0	15.2	13.3	4	167	0.0	0.1	0.0	99.0	0.0	15.1	12.1	29.71

Appendix B
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Devens, Massachusetts

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
GV-8	10/26/2012	14:05	0.7	10.1	0	1	0	7.0	0.1	4	167	0.1	9.1	0	0	1	7.4	0.0	29.87
	11/12/2013	10:04	0.0	20.3	0	0	0	0.1	0.0	4	167	0.0	20.2	0	0	0	0.1	0.0	29.98
	10/17/2014	13:54	0.0	6.7	0.0	15.0	6.0	6.6	0.8	4	167	0.0	5.8	0.0	9.0	6.0	7.7	0.4	29.32
	10/20/2015	11:39	0.0	12.7	0.0	45.0	0.0	6.2	1.4	4	167	0.0	10.6	0.0	27.0	0.0	7.3	0.8	29.89
	10/18/2016	16:53	0.0	13.6	0.0	9	0.0	5.2	0.4	4	167	0.0	8.1	0.0	2	0.0	9.6	0.1	29.55
	10/18/2017	13:56	0.0	17.7	0.0	9.0	0.0	1.8	0.1	4	167	0.0	17.8	0.0	0.0	0.0	1.9	0.0	29.95
	10/18/2018	12:52	0.0	21.7	1.0	0.0	0.0	0.1	0.0	4	167	0.0	21.5	0.0	0.0	0.0	0.1	0.0	30.02
	10/16/2019	14:26	0.0	8.2	0.0	49.0	0.0	9.0	2.5	4	167	0.0	5.8	0.0	5.0	0.0	11.1	0.3	29.71
GV-9	10/26/2012	13:40	0.6	3.0	0	99	0	11.7	4.9	4	167	1.2	3.2	0	>100	0	18.1	22.0	29.87
	11/12/2013	9:39	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:10	0.2	1.0	0.0	>100	0.0	16.8	9.1	4	167	0.2	0.3	0.0	0.0	0.0	18.7	17.0	29.32
	10/20/2015	13:24	0.2	7.1	0.0	100.0	0.0	11.2	5.9	4	167	0.4	0.7	0.0	100.0	0.0	19.1	17.8	29.88
	10/18/2016	17:17	0.0	5.5	0.0	100	0.0	15.7	7.6	4	167	0.0	4.9	0.0	100	0.0	17.1	13.7	29.55
	10/18/2017	14:23	0.0	14.9	0.0	49.0	0.0	3.3	1.5	4	167	0.0	10.1	0.0	100.0	0.0	9.1	10.3	29.98
	10/18/2018	14:00	0.0	20.7	0.0	3.0	0.0	0.3	0.2	4	167	0.0	20.1	0.0	11.0	0.0	0.7	0.5	30.03
	10/16/2019	13:27	0.0	0.0	0.0	40.0	0.0	16.0	8.8	4	167	0.0	0.1	0.0	99.0	0.0	17.0	13.1	29.71
GV-10	10/26/2012	14:22	0.3	2.8	0	50	2	10.5	2.6	4	167	0.2	4.0	0	30	2	9.5	1.5	29.87
	11/12/2013	10:22	0.0	20.7	0	0	0	0.2	0.0	4	167	0.0	20.6	0	0	0	0.1	0.0	29.98
	10/17/2014	13:30	0.0	1.9	0.0	55.0	0.0	11.6	2.7	4	167	0.0	1.3	0.0	54.0	0.0	12.1	2.7	29.32
	10/20/2015	13:03	0.0	4.2	0.0	100.0	0.0	11.6	4.2	4	167	0.0	2.0	0.0	100.0	0.0	12.4	4.3	29.89
	10/18/2016	16:40	0.0	6.1	0.0	100	0.0	14.4	8.4	4	167	0.0	2.2	0.0	100	0.0	16.3	7.8	29.55
	10/18/2017	14:17	0.0	18.6	0.0	0.0	0.0	0.9	0.0	4	167	0.0	17.6	0.0	0.0	0.0	1.3	0.0	29.98
	10/18/2018	12:41	0.0	21.6	1.0	0.0	0.0	0.0	0.0	4	167	0.0	21.6	1.0	0.0	0.0	0.0	0.0	30.02
	10/16/2019	13:17	0.0	1.1	0.0	51.0	0.0	14.1	3.0	4	167	0.0	2.0	0.0	45.0	0.0	13.6	2.4	29.71
GV-11	10/26/2012	14:30	0.2	11.8	0	9	0	5.2	0.5	4	167	0.1	11.3	0	16	0	5.1	0.8	29.87
	11/12/2013	10:14	0.0	20.6	0	0	0	0.1	0.0	4	167	0.0	20.6	0	0	0	0.2	0.0	29.98
	10/17/2014	13:37	0.0	13.3	0.0	5.0	4.0	4.9	0.2	4	167	0.0	6.9	0.0	2.0	6.0	5.0	1.0	29.32
	10/20/2015	12:54	0.0	14.1	0.0	0.0	0.0	4.5	1.1	4	167	0.0	13.7	0.0	22.0	1.0	4.8	0.6	29.89
	10/18/2016	16:46	0.1	13.8	0.0	23	0.0	4.9	1.1	4	167	0.0	12.2	0.0	15	0.0	5.6	0.7	29.55
	10/18/2017	14:12	0.0	19.5	0.0	3.0	0.0	0.7	0.0	4	167	0.0	18.0	0.0	5.0	0.0	1.5	0.0	29.98
	10/18/2018	12:35	0.0	21.3	0.0	0.0	0.0	0.0	0.0	4	167	0.0	21.4	0.0	0.0	0.0	0.1	0.0	30.02
	10/16/2019	13:09	0.0	10.9	0.0	99.0	0.0	6.8	2.5	4	167	0.0	5.9	0.0	99.0	0.0	6.5	9.0	29.71
GV-12	10/26/2012	14:40	0.1	0.9	0	>100	0	9.3	6.1	4	167	0.2	1.0	0	>100	1	10.1	6.5	29.87
	11/12/2013	11:00	0.0	20.4	0	0	0	0.2	0.0	4	167	0.0	20.6	0	0	0	0.2	0.0	29.98
	10/17/2014	12:55	0.0	12.6	1.0	14.0	2.0	5.3	0.7	4	167	0.0	4.9	0.0	24.0	5.0	7.4	1.2	29.32
	10/20/2015	13:35	0.1	7.5	0.0	100.0	0.0	10.2	8.3	4	167	0.0	0.8	0.0	100.0	0.0	14.6	11.8	29.88
	10/18/2016	16:16	0.0	3.1	0.0	100	0.0	14.7	9.5	4	167	0.0	1.5	0.0	100	0.0	15.7	9.7	29.55
	10/18/2017	13:11	0.0	20.5	0.0	0.0	0.0	0.2	0.0	4	167	0.0	20.3	0.0	0.0	10.0	0.4	0.0	29.99
	10/18/2018	12:28	0.0	21.2	1.0	0.0	0.0	0.0	0.0	4	167	0.0	21.3	1.0	0.0	0.0	0.0	0.0	30.02
	10/16/2019	13:00	0.0	3.3	0.0	95.0	0.0	10.7	7.0	4	167	0.0	0.0	0.0	99.0	0.0	12.4	8.8	29.71
GV-13	10/26/2012	15:51	1.5	19.4	0	77	0	2.0	3.8	4	167	0.5	18.1	0	>100	0	3.7	5.2	29.77
	11/12/2013	11:11	0.1	20.6	0	0	0	0.4	0.0	4	167	0.0	20.5	0	6	0	0.4	0.0	29.98
	10/17/2014	10:01	0.0	20.9	0.0	0.0	0.0	0.1	0.0	4	167	0.0	20.7	0.0	0.0	0.0	0.2	0.0	29.40
	10/20/2015	13:45	0.1	20.1	0.0	15.0	0.0	0.7	0.4	4	167	0.1	19.3	0.0	32.0	0.0	1.2	0.8	29.88
	10/18/2016	8:44	0.0	19.6	0.0	0	0.0	0.3	0.0	4	167	0.0	19.7	0.0	0	0.0	0.1	0.0	29.73
	10/18/2017	9:40	0.0	20.9	0.0	0.0	0.0	0.4	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.4	0.0	30.02
	10/18/2018	9:04	0.0	20.9	0.0	0.0	0.0	0.1	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.1	0.0	30.06
	10/16/2019	11:44	0.0	12.4	0.0	47.0	0.0	5.0	3.4	4	167	0.0	16.2	0.0	30.0	0.0	2.5	2.1	29.85
GV-14	10/26/2012	15:37	0.6	20.9	0	>100	0	15.7	29.5	4	167	0.5	3.0	0	>100	0	19.7	34.9	29.87
	11/12/2013	12:30	0.2	11.2	0	>100	0	6.3	7.9	4	167	0.3	8.1	0	>100	0	8.3	10.3	29.91
	10/17/2014	10:12	0.0	20.1	0.0	29.0	30.0	1.6	1.7	4	167	0.2	17.1	0.0	100.0	0.0	4.4	6.1	29.40
	10/20/2015	14:00	0.1	20.4	0.0	15.0	0.0	0.6	0.3	4	167	0.0	13.9	0.0	100.0	0.0	7.0	11.9	29.88
	10/18/2016	10:00	0.0	19.3	0.0	7	0.0	0.7	0.3	4	167	0.0	19.7	0.0	2	0.0	0.3	0.1	29.72
	10/18/2017	10:20	0.0	20.5	0.0	0.0	0.0	0.6	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.3	0.0	30.02
	10/18/2018	12:21	0.0	21.3	1.0	0.0	0.0	0.0	0.0	4	167	0.0	21.3	1.0	0.0	0.0	0.0	0.0	30.02
	10/16/2019	11:55	0.0	20.6	0.0	99.0	0.0	0.2	0.2	4	167	0.0	3.7	0.0	99.0	0.0	15.1	29.3	29.85

Appendix B
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Devens, Massachusetts

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
GV-15	10/26/2012	15:27	1.0	1.5	0	>100	4	22.5	24.3	4	375	0.4	1.5	0	>100	1	22.6	23.9	29.87
	11/12/2013	14:39	0.3	6.4	0	75	0	10.5	7.9	4	375	0.2	4.8	0	>100	0	11.4	8.6	29.91
	10/17/2014	10:56	0.0	15.2	1.0	25.0	5.0	5.0	1.3	4	375	0.0	20.7	0.0	0.0	0.0	0.1	0.0	29.33
	10/20/2015	16:15	0.1	20.6	0.0	23.0	0.0	0.7	0.6	4	375	0.1	3.1	0.0	100.0	0.0	21.2	24.9	29.88
	10/18/2016	16:05	0.0	2.7	0.0	100	0.0	23.3	22.3	4	375	0.0	2.8	0.0	100	0.0	22.9	21.2	29.55
	10/18/2017	13:02	0.0	16.9	0.0	35.0	0.0	2.4	1.1	4	375	0.0	16.0	0.0	42.0	0.0	3.2	1.4	29.98
	10/18/2018	12:11	0.0	21.5	0.0	0.0	0.0	0.0	0.1	4	375	0.0	21.4	0.0	0.0	0.0	0.0	0.0	30.10
	10/16/2019	12:10	0.0	1.8	0.0	99.0	0.0	21.9	23.5	4	375	0.0	0.0	0.0	99.0	0.0	21.0	26.5	29.85
GV-16	10/26/2012	14:50	0.3	1.2	0	>100	2	20.3	14.1	4	375	0.4	2.2	0	>100	2	20.3	13.7	29.87
	11/12/2013	10:45	0.0	20.8	0	0	0	0.3	0.0	4	375	0.0	20.0	0	0	0	0.3	0.0	29.98
	10/17/2014	13:04	0.0	1.2	0.0	100.0	0.0	19.5	15.8	4	375	0.1	0.7	0.0	100.0	0.0	20.2	17.0	29.32
	10/20/2015	15:55	0.1	20.1	0.0	27.0	0.0	23.7	17.3	4	375	0.2	6.1	0.0	100.0	0.0	16.7	11.0	29.88
	10/18/2016	16:22	0.0	1.7	0.0	100	0.0	25.5	19.9	4	375	0.0	1.9	0.0	100	0.0	25.5	19.9	29.55
	10/18/2017	13:19	0.0	17.2	0.0	14.0	0.0	2.4	0.4	4	375	0.0	16.8	0.0	12.0	0.0	2.7	0.3	29.90
	10/18/2018	12:00	0.0	21.6	0.0	0.0	0.0	0.0	0.0	4	375	0.0	21.7	0.0	0.0	0.0	0.0	0.0	30.10
	10/16/2019	12:48	0.0	0.0	0.0	99.0	22.1	0.0	20.2	4	375	0.0	0.0	0.0	99.0	0.0	22.4	19.2	29.71
GV-17	10/26/2012	15:02	0.0	3.3	0	>100	2	22.7	20.7	4	375	0.3	2.7	0	>100	2	22.9	20.9	29.87
	11/12/2013	10:30	0.0	20.5	0	0	0	0.3	0.0	4	375	0.0	20.0	0	0	0	0.3	0.0	29.98
	10/17/2014	13:16	0.0	0.2	97.0	100.0	0.0	24.6	27.5	4	375	0.1	0.0	0.0	100.0	0.0	25.0	28.4	29.32
	10/20/2015	16:08	0.2	2.2	0.0	100.0	0.0	23.2	21.5	4	375	0.1	1.1	0.0	100.0	0.0	24.3	22.8	29.88
	10/18/2016	16:30	0.0	1.7	0.0	100	0.0	27.5	26.0	4	375	0.0	3.6	0.0	100	0.0	25.1	24.3	29.55
	10/18/2017	13:27	0.0	16.1	0.0	20.0	0.0	2.4	0.4	4	375	0.0	15.8	0.0	21.0	0.0	3.2	0.6	29.94
	10/18/2018	11:51	0.0	21.2	0.0	0.0	0.0	0.1	0.0	4	375	0.0	21.4	0.0	0.0	0.0	0.1	0.0	30.10
	10/16/2019	12:36	0.0	2.6	0.0	99.0	0.0	23.4	25.6	4	375	0.0	0.0	0.0	99.0	0.0	23.4	26.1	29.71
GV-18	10/26/2012	15:15	0.5	5.3	0	>100	4	25.8	34.6	4	375	0.4	0.8	0	>100	3	26.3	35.5	29.87
	11/12/2013	14:23	0.2	5.9	0	>100	0	15.5	16.2	4	375	0.2	3.2	0	>100	0	17.9	18.9	29.91
	10/17/2014	11:12	0.0	20.8	0.0	0.0	0.0	0.1	0.0	4	375	0.0	20.7	0.0	0.0	0.0	0.1	0.0	29.33
	10/20/2015	16:25	0.1	5.6	0.0	100.0	0.0	21.2	29.1	4	375	0.2	8.8	0.0	100.0	0.0	17.1	24.1	29.88
	10/18/2016	15:55	0.0	4.8	0.0	100	0.0	22.9	25.2	4	375	0.0	2.6	0.0	100	0.0	26.4	29.3	29.55
	10/18/2017	12:55	0.0	20.2	0.0	7.0	0.0	0.5	0.1	4	375	0.0	20.3	0.0	0.0	0.0	0.5	0.1	29.98
	10/18/2018	11:40	0.0	20.9	0.0	0.0	0.0	0.2	0.0	4	375	0.0	21.2	0.0	0.0	0.0	0.1	0.0	30.10
	10/16/2019	12:21	0.0	0.7	0.0	99.0	0.0	21.3	23.4	4	375	0.0	1.0	0.0	99.0	0.0	21.2	23.4	29.71
LGP-01-01X	10/26/2012	7:55	0.0	20.9	0	0	0	0.7	0.0	2	83	0.0	20.3	0	0	0	0.7	0.0	29.88
	11/12/2013	7:36	0.0	20.8	0	0	0	0.4	0.0	2	83	0.0	20.9	0	0	0	0.5	0.0	29.98
	10/17/2014	15:00	0.0	20.4	0.0	0.0	0.0	0.6	0.0	2	83	0.0	20.6	0.0	0.0	0.0	0.6	0.0	29.32
	10/20/2015	9:45	0.0	20.6	0.0	0.0	0.0	0.7	0.0	2	83	0.0	20.5	0.0	0.0	0.0	0.7	0.0	29.90
	10/18/2016	17:56	0.0	18.9	0.0	0	0.0	1.4	0.0	2	83	0.0	19.3	0.0	0	0.0	0.9	0.0	29.55
	10/18/2017	8:55	0.0	20.3	0.0	0.0	0.0	0.8	0.0	2	83	0.0	20.4	0.0	0.0	0.0	0.9	0.0	30.00
	10/18/2018	14:48	0.0	20.9	0.0	0.0	0.0	1.0	0.0	2	83	0.0	20.9	0.0	0.0	0.0	1.0	0.0	30.03
	10/16/2019	15:37	0.0	21.0	0.0	0.0	0.0	0.5	0.1	2	83	0.0	21.1	0.0	0.0	0.0	0.5	0.1	29.64
LGP-09-01XA	10/26/2012	8:00	0.0	20.3	0	0	0	0.8	0.0	2	157	0.0	20.4	0	0	0	0.8	0.0	29.89
	11/12/2013	7:42	0.0	20.9	0	0	0	0.7	0.0	2	157	0.0	20.9	0	0	0	0.7	0.0	29.98
	10/17/2014	15:03	0.4	20.6	0.0	0.0	0.0	0.6	0.0	2	157	0.0	20.7	0.0	0.0	0.0	0.6	0.0	29.32
	10/20/2015	9:33	0.0	20.8	0.0	0.0	0.0	0.8	0.0	2	157	0.0	20.3	0.0	0.0	0.0	0.9	0.0	29.90
	10/18/2016	18:01	0.0	19.7	0.0	0	0.0	0.5	0.0	2	157	0.0	19.6	0.0	0	0.0	0.6	0.0	29.55
	10/18/2017	9:00	0.0	20.2	0.0	0.0	0.0	0.8	0.0	2	157	0.0	20.2	0.0	0.0	0.0	1.0	0.0	30.00
	10/18/2018	14:43	0.0	20.6	0.0	0.0	0.0	1.2	0.0	2	157	0.0	20.6	0.0	0.0	0.0	1.2	0.0	30.03
	10/16/2019	15:48	0.0	21.0	0.0	0.0	0.0	0.5	0.1	2	157	0.0	21.2	0.0	0.0	0.0	0.6	0.1	29.64
LGP-09-01XB	10/26/2012	8:06	0.1	20.9	0	0	0	0.9	0.0	2	259	0.0	20.9	0	0	0	0.9	0.0	29.89
	11/12/2013	7:50	0.2	20.9	0	0	0	0.2	0.0	2	259	0.0	20.9	0	0	0	1.0	0.0	29.98
	10/17/2014	15:02	0.7	20.5	0.0	0.0	0.0	0.6	0.0	2	157	0.0	20.6	0.0	0.0	0.0	0.6	0.0	29.32
	10/20/2015	9:40	0.0	20.2	0.0	0.0	0.0	0.9	0.0	2	157	0.0	20.2	0.0	0.0	0.0	0.9	0.0	29.90
	10/18/2016	18:05	0.0	19.5	0.0	0	0.0	0.7	0.0	2	157	0.0	19.5	0.0	0	0.0	0.7	0.0	29.55
	10/18/2017	9:05	1.0	20.1	0.0	0.0	0.0	1.0	0.0	2	157	0.0	20.1	0.0	0.0	0.0	1.0	0.0	30.00
	10/18/2018	14:38	0.0	20.8	0.0	1.0	0.0	0.9	0.1	2	157	0.0	20.6	0.0	0.0	0.0	1.0	0.0	30.03
	10/16/2019	15:43	0.0	20.8	0.0	0.0	0.0	0.7	0.1	2	157	0.0	20.9	0.0	0.0	0.0	0.8	0.1	29.64

Appendix B
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Devens, Massachusetts

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
LGP-01-02X	10/26/2012	8:26	0.0	19.8	0	0	0	1.4	0.0	2	83	0.0	20.2	0	0	0	1.5	0.0	29.89
	11/12/2013	8:02	0.0	20.9	0	0	0	0.9	0.0	2	83	0.0	20.8	0	0	0	0.9	0.0	29.98
	10/17/2014	15:18	0.0	20.2	0.0	0.0	0.0	0.8	0.0	2	83	0.0	20.2	0.0	0.0	0.0	0.9	0.0	29.32
	10/20/2015	9:58	0.0	20.3	0.0	0.0	0.0	1.1	0.0	2	83	0.0	20.2	0.0	0.0	0.0	1.3	0.0	29.90
	10/18/2016	18:09	0.0	19.4	0.0	0	0.0	1.0	0.0	2	83	0.0	19.3	0.0	0	0.0	1.2	0.0	29.55
	10/18/2017	9:18	0.0	19.9	0.0	0.0	0.0	1.3	0.0	2	83	0.0	20.0	0.0	0.0	0.0	1.2	0.0	30.01
	10/18/2018	15:01	0.0	18.7	0.0	0.0	0.0	3.2	0.0	2	83	0.0	18.8	1.0	0.0	0.0	3.2	0.0	30.03
	10/16/2019	15:28	0.0	20.8	0.0	0.0	0.0	0.9	0.1	2	83	0.0	20.8	0.0	0.0	0.0	0.9	0.1	29.64
LGP-09-02X	10/26/2012	8:20	0.1	19.6	0	0	0	1.7	0.0	2	204	0.0	19.7	0	0	0	1.7	0.0	29.89
	11/12/2013	8:07	0.2	20.9	0	0	0	1.1	0.0	2	204	0.1	20.6	0	0	0	1.3	0.0	29.98
	10/17/2014	15:20	0.0	20.2	0.0	0.0	0.0	1.0	0.0	2	204	0.0	20.3	1.0	0.0	0.0	1.1	0.0	29.32
	10/20/2015	9:52	0.0	20.1	0.0	0.0	0.0	1.4	0.0	2	204	0.0	20.0	0.0	0.0	0.0	0.3	0.0	29.90
	10/18/2016	18:12	0.0	19.4	0.0	0	0.0	1.0	0.0	2	204	0.0	19.5	0.0	0	0.0	0.9	0.0	29.55
	10/18/2017	9:13	0.0	19.8	0.0	0.0	0.0	1.1	0.0	2	204	0.0	19.9	0.0	0.0	0.0	1.2	0.0	30.00
	10/18/2018	14:56	0.0	18.9	1.0	0.0	0.0	3.2	0.0	2	204	0.0	18.5	2.0	0.0	0.0	3.5	0.0	30.03
	10/16/2019	15:26	0.0	20.7	0.0	0.0	0.0	1.1	0.1	2	204	0.0	20.9	0.0	0.0	0.0	1.2	0.2	29.64
LGP-01-03X	10/26/2012	8:47	0.0	20.2	0	0	0	1.1	0.0	2	83	0.0	20.2	0	0	0	1.1	0.0	29.91
	11/12/2013	8:15	0.0	20.8	0	0	0	0.9	0.0	2	83	0.0	20.7	0	0	0	0.9	0.0	29.98
	10/17/2014	15:29	0.0	20.2	0.0	0.0	0.0	0.8	0.0	2	83	0.0	20.2	0.0	0.0	0.0	0.8	0.0	29.32
	10/20/2015	10:10	0.0	20.3	0.0	0.0	0.0	1.1	0.0	2	83	0.0	20.3	0.0	0.0	0.0	1.1	0.0	29.90
	10/18/2016	18:15	0.0	19.6	0.0	0	0.0	0.7	0.0	2	83	0.0	19.6	0.0	0	0.0	0.7	0.0	29.55
	10/18/2017	8:40	0.0	20.2	0.0	0.0	0.0	1.0	0.0	2	83	0.0	20.1	0.0	0.0	0.0	1.2	0.0	30.00
	10/18/2018	15:07	0.0	19.9	1.0	0.0	0.0	1.8	0.0	2	83	0.0	20.0	0.0	0.0	0.0	1.6	0.0	30.03
	10/16/2019	15:22	0.0	20.8	0.0	0.0	0.0	0.8	0.1	2	83	0.0	20.9	0.0	0.0	0.0	0.8	0.1	29.64
LGP-09-03X	10/26/2012	8:40	0.4	19.8	0	0	0	1.4	0.0	2	167	0.0	19.9	0	0	0	1.5	0.0	29.91
	11/12/2013	8:20	0.1	20.7	0	0	0	1.2	0.0	2	167	0.0	20.6	0	0	0	1.3	0.0	29.98
	10/17/2014	15:31	0.5	20.1	0.0	0.0	0.0	1.0	0.0	2	167	0.0	20.8	0.0	0.0	0.0	0.3	0.0	29.32
	10/20/2015	10:19	0.0	20.1	0.0	0.0	0.0	1.2	0.0	2	167	0.0	20.2	0.0	0.0	0.0	1.3	0.0	29.90
	10/18/2016	18:19	0.0	19.4	0.0	0	0.0	0.9	0.0	2	167	0.0	19.4	0.0	0	0.0	1.0	0.0	29.55
	10/18/2017	8:46	0.0	19.8	0.0	0.0	0.0	1.5	0.0	2	167	0.0	19.8	0.0	0.0	0.0	1.6	0.0	30.00
	10/18/2018	15:12	0.0	19.8	0.0	0.0	0.0	1.9	0.0	2	167	0.0	19.6	0.0	0.0	0.0	2.0	0.0	30.03
	10/16/2019	15:16	0.0	20.8	0.0	0.0	0.0	1.0	0.1	2	167	0.0	20.7	0.0	0.0	0.0	1.0	0.1	29.64
LGP-01-04X	10/26/2012	8:54	0.0	20.5	0	0	0	0.8	0.0	2	83	0.0	20.9	0	0	0	0.8	0.0	29.91
	11/12/2013	8:27	0.0	20.9	0	0	0	0.5	0.0	2	83	0.0	20.9	0	0	0	0.5	0.0	29.98
	10/17/2014	15:38	0.0	20.5	0.0	0.0	0.0	0.5	0.0	2	83	0.0	20.5	0.0	0.0	0.0	0.5	0.0	29.32
	10/20/2015	11:11	0.0	20.1	0.0	0.0	0.0	0.7	0.0	2	83	0.0	20.2	0.0	0.0	0.0	0.8	0.0	29.89
	10/18/2016	18:23	0.0	19.7	0.0	0	0.0	0.5	0.0	2	83	0.0	19.6	0.0	0	0.0	0.7	0.0	29.55
	10/18/2017	8:20	0.0	20.4	0.0	0.0	0.0	0.8	0.1	2	83	0.0	20.3	0.0	0.0	0.0	1.0	0.1	30.00
	10/18/2018	15:20	0.0	20.4	0.0	0.0	0.0	1.6	0.0	2	83	0.0	20.4	0.0	0.0	0.0	1.6	0.0	30.03
	10/16/2019	15:05	0.0	20.9	0.0	0.0	0.0	0.5	0.1	2	83	0.0	20.9	0.0	0.0	0.0	0.5	0.2	29.65
LGP-09-04X	10/26/2012	9:00	0.0	20.4	0	0	0	0.8	0.0	2	120	0.0	20.4	0	0	0	0.9	0.0	29.91
	11/12/2013	8:33	0.1	20.9	0	0	0	0.6	0.0	2	120	0.0	20.8	0	0	0	0.7	0.0	29.98
	10/17/2014	15:40	0.1	20.6	0.0	0.0	0.0	0.5	0.0	2	120	0.0	20.5	0.0	0.0	0.0	0.5	0.0	29.32
	10/20/2015	11:18	0.0	20.8	0.0	0.0	0.0	0.8	0.0	2	120	0.0	20.3	0.0	0.0	0.0	0.9	0.0	29.89
	10/18/2016	18:27	0.0	19.7	0.0	0	0.0	0.6	0.0	2	120	0.0	19.6	0.0	0	0.0	0.7	0.0	29.55
	10/18/2017	8:27	0.0	20.5	0.0	0.0	0.0	0.6	0.0	2	120	0.0	20.3	0.0	0.0	0.0	1.0	0.0	30.00
	10/18/2018	15:24	0.0	19.9	0.0	0.0	0.0	1.8	0.0	2	120	0.0	19.7	0.0	0.0	0.0	1.9	0.0	30.03
	10/16/2019	15:11	0.0	21.0	0.0	0.0	0.0	0.2	0.1	2	120	0.0	21.0	0.0	0.0	0.0	0.6	0.1	29.65
LGP-05-05X	10/26/2012	9:10	0.3	14.4	0	3	0	7.1	0.2	2	93	0.0	12.4	0	0	0	9.7	0.0	29.91
	11/12/2013	14:10	0.2	17.1	0	13	0	7.6	0.4	2	93	0.1	18.1	0	2	0	5.6	0.0	29.91
	10/17/2014	11:43	0.0	2.5	1.0	100.0	0.0	17.1	12.2	2	93	0.2	0.0	1.0	100.0	0.0	29.7	30.1	29.33
	10/20/2015	15:35	0.2	14.4	0.0	6.0	0.0	6.0	0.0	2	93	0.3	1.1	0.0	44.0	0.0	18.9	1.5	29.88
	10/18/2016	15:41	0.0	8.0	0.0	100	0.0	16.7	9.7	2	93	0.0	2.6	0.0	100	0.0	27.6	16.7	29.65
	10/18/2017	11:55	0.0	15.2	0.0	40.0	0.0	8.1	1.5	2	93	0.0	14.3	0.0	0.0	0.0	6.9	0.0	30.00
	10/18/2018	11:27	0.0	14.9	1.0	66.0	0.0	8.7	3.3	2	93	0.0	19.5	1.0	6.0	0.0	2.6	0.3	30.10
	10/16/2019	8:33	0.0	11.7	0.0	12.0	0.0	11.7	0.8	2	93	0.0	9.9	0.0	0.0	0.0	0.1	0.2	29.95

Appendix B
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Devens, Massachusetts

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
LGP-09-05X	10/26/2012	9:18	2.5	10.6	0	30	0	14.4	1.5	2	167	0.2	9.3	0	0	0	13.0	0.0	29.91
	11/12/2013	14:15	0.8	10.4	0	42	0	14.2	2.4	2	167	0.1	11.4	0	0	0	13.0	0.0	29.91
	10/17/2014	11:45	0.3	1.7	1.0	100.0	0.0	20.2	16.0	2	167	0.3	0.0	1.0	100.0	0.0	30.1	33.5	29.33
	10/20/2015	15:40	0.6	9.3	0.0	65.0	0.0	13.1	1.7	2	167	0.3	0.5	0.0	100.0	0.0	24.7	9.1	29.88
	10/18/2016	15:36	0.0	6.1	0.0	100	0.0	20.5	13.2	2	167	0.0	1.6	0.0	100	0.0	30.1	21.9	29.65
	10/18/2017	11:48	0.0	10.6	0.0	100.0	0.0	13.8	4.6	2	167	0.0	12.8	0.0	0.0	0.0	9.4	0.0	30.00
	10/18/2018	11:32	1.0	18.0	1.0	34.0	0.0	5.1	1.7	2	167	0.0	19.3	1.0	3.0	0.0	2.8	0.2	30.10
	10/16/2019	8:43	0.55	22.0	0.0	53.0	0.0	0.2	0.2	2	167	0.0	3.0	0.0	31.0	0.0	0.2	0.2	29.95
LGP-05-06X	10/26/2012	9:37	0.0	17.5	0	0	0	0.0	0.0	2	93	0.0	15.9	0	0	0	4.9	0.0	29.91
	11/12/2013	14:01	0.1	18.7	0	2	0	2.6	0.0	2	93	0.1	19.7	0	2	0	2.7	0.0	29.91
	10/17/2014	11:34	0.0	17.2	0.0	0.0	0.0	3.0	0.0	2	93	0.0	16.5	0.0	0.0	5.0	3.6	0.0	29.33
	10/20/2015	15:23	0.0	17.0	0.0	0.0	0.0	3.7	0.0	2	93	0.0	17.3	0.0	0.0	0.0	3.5	0.0	29.88
	10/18/2016	15:29	0.0	16.8	0.0	0	0.0	3.0	0.0	2	93	0.0	16.3	0.0	0	0.0	3.5	0.0	29.65
	10/18/2017	11:36	0.0	17.6	0.0	0.0	0.0	2.7	0.0	2	93	0.0	17.6	0.0	0.0	0.0	3.5	0.0	30.00
	10/18/2018	11:20	0.0	14.2	2.0	0.0	0.0	5.3	0.0	2	93	0.0	14.6	2.0	0.0	0.0	5.2	0.0	30.10
	10/16/2019	9:00	0.0	18.3	0.0	0.0	0.0	2.3	0.2	2	93	0.0	18.8	0.0	0.0	0.0	2.5	0.2	29.93
LGP-09-06X	10/26/2012	9:28	0.2	10.2	0	0	0	8.6	0.0	2	120	0.0	10.9	0	0	0	8.4	0.0	29.91
	11/12/2013	14:06	0.1	15.5	0	1	0	5.8	0.0	2	120	0.1	15.7	0	1	0	5.8	0.0	29.91
	10/17/2014	11:32	0.5	6.9	7.0	0.0	5.0	6.2	0.0	2	120	0.0	6.6	1.0	0.0	5.0	6.5	0.0	29.32
	10/20/2015	15:30	0.2	14.1	0.0	0.0	0.0	5.6	0.0	2	120	0.0	14.1	0.0	0.0	0.0	5.8	0.0	29.88
	10/18/2016	15:23	0.0	14.4	0.0	0	0.0	5.0	0.0	2	120	0.0	13.7	0.0	0	0.0	5.5	0.0	29.65
	10/18/2017	11:41	0.0	14.4	0.0	0.0	0.0	6.1	0.0	2	120	0.0	14.5	0.0	0.0	0.0	6.1	0.0	30.01
	10/18/2018	11:15	0.0	9.5	0.0	0.0	0.0	10.1	0.0	2	120	0.0	11.6	1.0	0.0	0.0	8.5	0.0	30.10
	10/16/2019	8:52	0.0	16.2	0.0	0.0	0.0	0.2	0.2	2	120	0.0	16.1	0.0	0.0	0.0	5.0	0.2	29.93
LGP-05-07X	10/26/2012	9:45	0.1	15.4	0	0	0	7.7	0.0	2	65	0.0	13.2	0	0	0	6.8	0.0	29.91
	11/12/2013	13:55	0.1	19.8	0	1	0	2.0	0.0	2	65	0.0	19.6	0	0	0	2.7	0.0	29.91
	10/17/2014	11:25	0.1	1.1	0.0	100.0	0.0	20.6	10.4	2	65	0.2	0.0	0.0	100.0	0.0	21.9	8.4	29.33
	10/20/2015	15:17	0.1	10.8	0.0	0.0	0.0	7.3	0.0	2	65	0.0	8.1	0.0	0.0	0.0	12.7	0.0	29.88
	10/18/2016	15:15	0.1	10.7	0.0	4	0.0	10.4	0.2	2	65	0.0	9.4	0.0	0	0.0	11.9	0.0	29.65
	10/18/2017	11:27	0.0	17.9	0.0	0.0	0.0	3.9	0.0	2	65	0.0	18.4	0.0	0.0	0.0	3.8	0.0	30.01
	10/18/2018	11:08	0.0	12.5	1.0	7.0	0.0	10.5	0.4	2	65	0.0	16.3	0.0	0.0	0.0	6.7	0.0	30.10
	10/16/2019	9:09	0.0	18.2	0.0	0.0	0.0	3.7	0.2	2	65	0.0	15.4	0.0	0.0	0.0	6.0	0.2	NR
LGP-05-08X	10/26/2012	9:55	0.8	9.8	0	0	0	4.4	0.0	2	93	0.0	7.7	0	0	0	13.5	0.0	29.91
	11/12/2013	13:42	0.1	17.7	0	0	0	5.2	0.0	2	93	0.0	14.1	0	0	0	8.6	0.0	29.91
	10/17/2014	11:38	0.3	3.8	20.0	17.0	1.0	13.2	0.9	2	93	0.2	0.0	0.0	69.0	4.0	19.8	3.4	29.33
	10/20/2015	15:05	0.0	16.9	0.0	0.0	0.0	7.2	0.0	2	93	0.0	4.7	0.0	0.0	0.0	14.8	0.0	29.88
	10/18/2016	15:10	0.0	9.7	0.0	2	0.0	10.4	0.1	2	93	0.0	1.8	0.0	8	0.0	10.1	0.4	29.65
	10/18/2017	11:18	0.0	12.4	0.0	0.0	0.0	0.4	0.0	2	93	0.0	10.7	0.0	0.0	0.0	10.3	0.0	30.01
	10/18/2018	10:50	0.0	20.9	1.0	0.0	0.0	0.4	0.0	2	93	0.0	17.6	1.0	0.0	0.0	2.5	0.0	30.10
	10/16/2019	9:25	0.0	15.7	0.0	0.0	0.0	6.6	0.2	2	93	0.0	7.0	0.0	0.0	0.0	14.5	0.2	29.93
LGP-09-08X	10/26/2012	10:05	0.8	5.6	0	0	1	3.8	0.0	2	185	0.1	2.2	0	4	0	18.6	0.2	29.91
	11/12/2013	13:48	0.2	7.7	0	7	0	14.6	0.2	2	185	0.1	1.8	0	3	0	18.7	0.0	29.91
	10/17/2014	10:40	0.4	1.0	0.0	21.0	5.0	17.2	1.1	2	185	0.3	0.0	0.0	90.0	4.0	20.3	4.4	29.40
	10/20/2015	15:10	0.1	10.5	0.0	5.0	0.0	13.9	0.0	2	185	0.1	0.7	0.0	9.0	0.0	20.3	0.3	29.88
	10/18/2016	15:05	0.1	8.4	0.0	13	0.0	12.0	0.6	2	185	0.2	4.4	0.0	27	0.0	19.3	1.3	29.65
	10/18/2017	11:09	0.0	7.3	0.0	11.0	0.0	15.0	0.5	2	185	0.0	7.8	0.0	0.0	0.0	14.4	0.0	30.01
	10/18/2018	10:56	0.0	8.4	2.0	4.0	0.0	15.7	0.2	2	185	0.0	7.8	2.0	0.0	0.0	16.1	0.0	30.10
	10/16/2019	9:18	0.0	5.9	0.0	0.0	0.0	16.5	0.2	2	185	0.0	2.8	0.0	5.0	0.0	19.3	0.3	NR
LGP-05-09X	10/26/2012	10:15	0.1	13.8	0	0	0	7.2	0.0	2	93	0.0	13.2	0	0	0	7.9	0.0	29.91
	11/12/2013	13:27	0.0	16.9	0	0	0	6.0	0.0	2	93	0.0	18.1	0	0	0	5.4	0.0	29.91
	10/17/2014	8:46	0.0	5.8	0.0	0.0	0.0	9.0	0.0	2	93	0.0	0.5	0.0	0.0	0.0	16.7	0.0	29.40
	10/20/2015	14:55	0.0	16.0	0.0	0.0	0.0	5.1	0.0	2	93	0.0	14.0	0.0	0.0	0.0	6.6	0.0	29.88
	10/18/2016	14:58	0.0	10.6	0.0	0	0.0	9.0	0.0	2	93	0.0	8.3	0.0	0	0.0	11.4	0.0	29.65
	10/18/2017	10:56	0.0	14.3	0.0	0.0	0.0	7.2	0.0	2	93	0.0	14.0	0.0	0.0	0.0	7.5	0.0	30.01
	10/18/2018	10:32	0.0	8.7	1.0	4.0	0.0	13.7	0.2	2	93	0.0	9.9	1.0	0.0	0.0	12.9	0.0	30.10
	10/16/2019	9:53	0.0	14.4	0.0	0.0	0.0	15.2	0.2	2	93	0.0	20.9	0.0	0.0	0.0	7.4	0.2	29.86

Appendix B
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Devens, Massachusetts

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
LGP-09-09X	10/26/2012	10:25	0.4	17.5	0	0	0	1.0	0.0	2	185	0.1	7.3	0	4	0	13.1	0.0	29.91
	11/12/2013	13:32	0.2	11.9	0	0	0	10.2	0.0	2	185	0.0	5.2	0	0	0	15.0	0.0	29.91
	10/17/2014	8:49	0.0	20.7	0.0	0.0	0.0	0.1	0.0	2	185	0.0	0.2	0.0	28.0	6.0	18.5	1.4	29.40
	10/20/2015	15:00	0.1	11.3	0.0	0.0	0.0	9.7	0.0	2	185	0.0	3.7	0.0	0.0	6.0	16.7	0.0	29.88
	10/18/2016	14:48	0.1	5.9	0.0	5	0.0	13.5	0.2	2	185	0.0	1.8	0.0	2	0.0	18.2	0.1	29.65
	10/18/2017	11:00	0.0	10.5	0.0	5.0	0.0	0.1	0.0	2	185	0.0	10.5	0.0	0.0	0.0	11.1	0.0	30.01
	10/18/2018	10:26	1.0	6.7	1.0	32.0	0.0	15.1	1.6	2	185	0.0	7.1	1.0	2.0	0.0	15.2	0.1	30.10
	10/16/2019	9:37	0.0	10.1	0.0	0.0	0.0	10.9	0.2	2	185	0.0	5.4	0.0	0.0	0.0	15.3	0.2	29.93
LGP-05-10X	10/26/2012	10:51	0.1	14.6	0	0	0	4.6	0.0	2	93	0.1	10.1	0	0	0	10.5	0.0	29.89
	11/12/2013	13:15	0.0	20.2	0	0	0	1.9	0.0	2	93	0.0	19.0	0	0	0	4.1	0.0	29.91
	10/17/2014	9:07	0.0	2.3	0.0	10.0	0.0	16.4	8.0	2	93	0.0	0.0	0.0	100.0	0.0	21.4	14.0	29.40
	10/20/2015	14:40	0.0	14.8	0.0	0.0	0.0	5.3	0.0	2	93	0.0	6.7	0.0	0.0	0.0	10.2	0.0	29.88
	10/18/2016	14:38	0.3	8.3	0.0	46	0.0	11.7	2.3	2	93	0.0	1.6	0.0	100	0.0	20.1	5.2	29.65
	10/18/2017	10:47	0.0	16.9	0.0	0.0	0.0	3.2	0.0	2	93	0.0	15.4	0.0	0.0	0.0	6.1	0.0	30.02
	10/18/2018	10:05	0.0	19.3	1.0	7.0	0.0	2.8	0.4	2	93	0.0	20.0	1.0	0.0	0.0	2.3	0.0	30.10
	10/16/2019	10:06	0.0	15.4	0.0	0.0	0.0	5.2	0.2	2	93	0.0	8.3	0.0	0.0	0.0	11.9	0.2	29.86
LGP-09-10X	10/26/2012	11:00	0.1	17.2	0	0	0	9.5	0.0	2	148	0.1	7.0	0	0	0	14.4	0.0	29.89
	11/12/2013	13:20	0.1	15.0	0	0	0	8.3	0.0	2	148	0.0	14.3	0	0	0	8.9	0.0	29.91
	10/17/2014	9:09	0.0	1.2	0.0	100.0	0.0	19.8	14.0	2	148	0.1	0.0	0.0	100.0	0.0	23.1	20.5	29.40
	10/20/2015	14:45	0.1	10.4	0.0	0.0	0.0	9.7	0.0	2	148	0.0	2.9	0.0	5.0	0.0	16.5	0.0	29.88
	10/18/2016	14:32	0.0	6.1	0.0	100	0.0	15.9	6.2	2	148	0.0	1.4	0.0	100	0.0	22.0	10.1	29.65
	10/18/2017	10:42	0.0	18.6	0.0	0.0	0.0	2.2	0.0	2	148	0.0	12.0	0.0	0.0	0.0	9.8	0.0	30.02
	10/18/2018	10:11	0.0	20.8	1.0	0.0	0.0	1.6	0.0	2	148	1.0	12.1	1.0	0.0	0.0	11.8	0.0	30.10
	10/16/2019	10:15	0.0	2.5	0.0	5.0	0.0	14.1	0.3	2	148	0.0	2.7	0.0	7.0	0.0	17.7	0.5	29.86
LGP-05-11X	10/26/2012	10:35	0.2	15.9	0	0	0	12.6	0.0	2	83	0.0	9.8	0	0	0	10.8	0.0	29.91
	11/12/2013	13:02	0.1	19.2	0	0	0	2.8	0.0	2	83	0.1	16.1	0	0	0	6.5	0.0	29.91
	10/17/2014	9:20	0.1	3.1	0.0	44.0	5.0	13.2	2.2	2	83	0.0	0.0	0.0	100.0	0.0	19.8	8.7	29.40
	10/20/2015	14:25	0.1	15.5	0.0	0.0	0.0	5.5	0.0	2	83	0.0	8.5	0.0	0.0	0.0	11.6	0.0	29.88
	10/18/2016	14:22	0.2	7.8	0.0	24	0.0	11.7	1.2	2	83	0.1	2.7	0.0	54	0.0	17.8	2.7	29.65
	10/18/2017	10:09	0.0	12.9	0.0	4.0	0.0	9.1	0.1	2	83	0.0	10.4	0.0	0.0	0.0	12.0	0.0	30.02
	10/18/2018	9:58	1.0	11.1	1.0	5.0	0.0	13.0	0.3	2	83	1.0	14.2	1.0	25.0	0.0	11.1	1.3	30.06
	10/16/2019	10:36	0.0	14.8	0.0	0.0	0.0	5.6	0.2	2	83	0.0	8.5	0.0	0.0	0.0	10.9	0.2	29.86
LGP-09-11X	10/26/2012	10:41	1.0	1.5	0	54	0	10.5	0.8	2	139	0.2	0.8	0	3	0	18.8	0.1	29.91
	11/12/2013	13:10	0.4	12.2	0	0	0	9.1	0.0	2	139	0.1	14.0	0	0	0	8.7	0.0	29.91
	10/17/2014	9:22	0.0	16.1	0.0	26.0	5.0	12.6	1.9	2	139	0.2	20.5	0.0	1.0	3.0	0.9	0.2	29.40
	10/20/2015	14:30	0.3	7.7	0.0	20.0	0.0	14.1	0.5	2	139	0.1	2.9	0.0	2.0	3.0	17.2	0.0	29.88
	10/18/2016	14:10	0.1	3.8	0.0	61	0.0	16.3	3.0	2	139	0.1	2.7	0.0	100	0.0	18.4	5.8	29.65
	10/18/2017	10:17	0.0	8.9	0.0	18.0	0.0	15.2	1.0	2	139	0.0	6.5	0.0	0.0	0.0	15.8	0.0	30.02
	10/18/2018	9:51	0.0	8.1	0.0	85.0	0.0	14.1	4.3	2	139	0.0	2.9	1.0	24.0	0.0	18.7	1.2	30.06
	10/16/2019	10:30	0.0	6.8	0.0	0.0	0.0	11.9	0.2	2	139	0.0	4.6	0.0	0.0	0.0	15.0	0.2	29.86
LGP-05-13X	10/26/2012	11:21	0.0	18.0	0	0	0	5.4	0.0	2	56	0.0	13.3	0	0	0	6.8	0.0	29.88
	11/12/2013	12:43	0.1	19.5	0	0	0	1.6	0.0	2	56	0.0	19.8	0	0	0	2.4	0.0	29.91
	10/17/2014	9:35	0.0	1.3	0.0	56.0	4.0	14.3	2.0	2	56	0.1	0.0	0.0	100.0	0.0	15.3	6.7	29.40
	10/20/2015	14:20	0.1	14.8	0.0	0.0	0.0	4.4	0.0	2	56	0.1	9.5	0.0	0.0	0.0	8.2	0.0	29.88
	10/18/2016	9:40	0.0	14.8	0.0	0	0.0	5.0	0.0	2	56	0.0	13.3	0.0	0	0.0	6.6	0.0	29.72
	10/18/2017	10:00	0.0	18.0	0.0	0.0	0.0	3.2	0.0	2	56	0.0	16.9	0.0	0.0	0.0	4.3	0.0	30.03
	10/18/2018	9:39	0.0	18.6	0.0	2.0	0.0	3.1	0.1	2	56	0.0	18.5	1.0	0.0	0.0	3.8	0.0	30.06
	10/16/2019	11:16	0.0	17.0	0.0	0.0	0.0	3.8	0.2	2	56	0.0	12.5	0.0	0.0	0.0	6.6	0.2	29.85
LGP-05-14X	10/26/2012	11:30	0.0	6.1	0	0	0	13.3	0.0	2	93	0.0	8.5	0	0	0	13.4	0.0	29.88
	11/12/2013	12:53	0.1	15.2	0	0	0	7.2	0.0	2	93	0.0	14.2	0	0	0	8.7	0.0	29.91
	10/17/2014	9:44	0.0	5.6	0.0	100.0	5.0	8.8	0.6	2	93	0.0	0.0	0.0	37.0	5.0	15.5	1.9	29.40
	10/20/2015	14:10	0.2	15.7	0.0	13.0	0.0	4.7	0.4	2	93	0.1	9.9	0.0	6.0	5.0	9.6	0.1	29.88
	10/18/2016	9:05	0.0	9.4	0.0	0	0.0	10.2	0.0	2	93	0.0	8.9	0.0	0	0.0	10.8	0.0	29.73
	10/18/2017	9:52	0.0	11.8	0.0	0.0	0.0	9.7	0.0	2	93	0.0	11.5	0.0	0.0	0.0	11.1	0.0	29.95
	10/18/2018	9:31	0.0	1.0	1.0	31.0	0.0	11.0	1.6	2	93	0.0	0.2	0.0	39.0	0.0	11.9	1.9	30.06
	10/16/2019	11:22	0.0	12.4	0.0	0.0	0.0	7.7	0.2	2	93	0.0	12.5	0.0	0.0	0.0	7.5	0.2	29.85

Appendix B
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Devens, Massachusetts

			Initial Readings									Post Purge Readings							
ID	**Date**	**Time**	**VOC (ppm)**	**O_2 (%)**	**H_2S (ppm)**	**LEL (%)**	**CO (ppm)**	**CO_2 (%)**	**CH_4 (%)**	**Purge Rate (lpm)**	**Purge Time (sec)**	**VOC (ppm)**	**O_2 (%)**	**H_2S (ppm)**	**LEL (%)**	**CO (ppm)**	**CO_2 (%)**	**CH_4 (%)**	**Bar. Pres.("Hg)**
LGP-09-15X	10/26/2012	11:39	0.1	15.9	0	0	0	6.6	0.0	2	111	0.0	13.7	0	0	0	7.0	0.0	29.88
	11/12/2013	11:25	0.0	16.4	0	0	0	5.8	0.0	2	111	0.0	16.4	0	0	0	5.9	0.0	29.98
	10/17/2014	9:53	0.0	16.7	1.0	0.0	60.0	5.1	0.0	2	111	0.0	16.4	0.0	0.0	0.0	5.6	0.0	29.40
	10/20/2015	13:50	0.1	16.3	0.0	0.0	0.0	4.6	0.0	2	111	0.0	15.3	0.0	0.0	0.0	6.1	0.0	29.88
	10/18/2016	8:29	0.0	15.6	0.0	0	0.0	4.8	0.0	2	111	0.0	14.8	0.0	0	0.0	5.8	0.0	29.73
	10/18/2017	9:34	0.0	18.0	0.0	0.0	0.0	4.1	0.0	2	111	0.0	16.6	0.0	0.0	0.0	6.0	0.0	30.01
	10/18/2018	9:15	0.0	11.7	1.0	0.0	0.0	9.3	0.0	2	111	0.0	10.6	1.0	0.0	0.0	10.5	0.0	30.06
	10/16/2019	11:33	0.0	17.0	0.0	0.0	0.0	4.2	0.2	2	111	0.0	16.0	0.0	0.0	0.0	5.7	0.2	29.85

Notes:

VOC = Volatile Organic Compounds
O_2 = Oxygen
LEL = Lower Explosive Limit
CO = Carbon Monoxide
CO_2 = Carbon Dioxide
CH_4 = Methane

H_2S = Hydrogen Sulfide
"Hg = inches of Mercury
lpm = Liters per minute
sec = Seconds
ppm = Parts per million
% = Percentage

APPENDIX D
LUCIP DOCUMENTATION

How Are People Being Protected from Arsenic In Groundwater?

In August 2014, the Army released the final report called a "Land Use Control Implementation Plan" (LUCIP), based on the land use controls (LUCs) established per the Shepley Hill Landfill remedy. The LUCIP is part of the remedy for Shepley's Hill landfill. It establishes the framework for land use controls to protect people from exposure to contaminated groundwater. The final LUCIP is available at:

- Town of Ayer website (www.ayer.ma.us)
- Ayer Public Library
- Ayer Town Hall
  - The Board of Health Office
  - The Board of Selectman's Office
  - The Town Clerk

The Army has implemented Land Use Controls that will reduce the risk of arsenic exposure by:

- Supporting compliance with the Ayer Zoning By-laws and the Subdivision Control Regulations.
- Supporting compliance with a Moratorium on Groundwater Use issued by the Town of Ayer Board of Health limiting groundwater use where arsenic groundwater contamination is present.
- Supporting compliance with the Ayer Board of Health Well Regulations (Adopted January 10, 2001) – Town of Ayer permitting requirements for the installation and use of new drinking water wells.
- Continued public education and outreach.
- Continued groundwater monitoring and inspections where arsenic groundwater contamination is present.
- Conducting meetings with the Ayer Board of Health at least once a year.

Where to Get More Information

Comments on the Land Use Control Implementation Plan can be sent to the Army by mail or email:

Army BRAC Environmental Coordinator
30 Quebec Street (Unit 100)
Devens, MA 01434-4479
Robert.j.simeone.civ@mail.mil

If you have a water well in or near the affected area contact the Army and the Board of Health with your comments and well information:

Ayer Board of Health
1 Main Street (3rd Floor)
Ayer, MA -1432

References & Other Resources

Arsenic in Drinking Water-EPA Fact Sheet
http://www.epa.gov/dwreginfo/chemical-contaminant-rules

Toxicological Profile for Arsenic
http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=3

Town of Ayer 2018 Annual Drinking Water Quality Report
http://www.ayer.ma.us/sites/ayerma/files/uploads/water_quality_report_2018.pdf

Town of Ayer Water Department
http://www.ayer.ma.us/water-department

Fort Devens Restoration Program Website
https://ftdevens.org

Land Use Control Implementation Plan:

Restriction of Groundwater Use

SHEPLEY'S HILL LANDFILL

Introduction

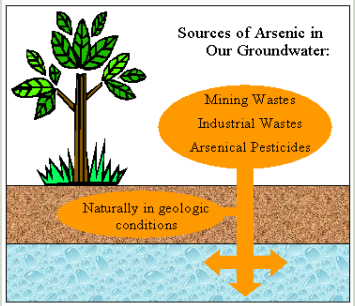
A Land Use Control Implementation Plan has been established by the Army to protect human health and the environment from arsenic contamination in groundwater affecting a localized portion of the aquifer in the Town of Ayer. Arsenic contamination in groundwater is attributable to both naturally occurring causes and groundwater discharge from the former Shepley's Hill Landfill (SHL). SHL is located on the northeast corner of the former Main Post at Fort Devens.

What Area is Affected?

Groundwater contaminated with arsenic is located north of the SHL. Approximately 65 to 70 homes in the Town of Ayer are located within the impacted area.

What Is Arsenic?

Arsenic is an odorless and tasteless metal that is both naturally occurring in the environment and also a by-product of agricultural, mining and industrial activities. It can enter the groundwater from runoff or infiltration through the ground.



http://www.idwr.idaho.gov/WaterInformation/GWQuality/FactSheets/Arsenic/Arsenic.htm

Where Does Arsenic Drinking Water Come From?

Arsenic in groundwater can be from anthropogenic sources, originating from human activity, or from natural sources, such as minerals in soil and bedrock. Many arsenic compounds dissolve in water and can enter the groundwater by dissolving in rain or snow or through the discharge of industrial wastes. The arsenic in groundwater in the Town of Ayer is occurring in groundwater because of both natural conditions and from the former operation of the SHL. The SHL has been closed and capped since 1993. Since its closure, the SHL has had long term monitoring and maintenance of the existing landfill cap and groundwater monitoring. A groundwater extraction and treatment system has operated at the SHL since 2006, however, arsenic is still present at high levels in groundwater in an area north of the landfill.

What Are Health Effects of Consuming Water With Arsenic?

Arsenic is known to cause cancer and is classified as a carcinogen by the Environmental Protection Agency (EPA). Specifically, exposure to arsenic can result in cancer of the bladder, lungs, skin, kidneys, nasal passages, liver and prostate. Arsenic in drinking water can result in the following symptoms:

- Discoloration of the skin
- Irritation of the stomach and intestines
- Fatigue
- Abnormal heart rhythm
- Blood-vessel damage resulting in bruising
- Impaired nerve function causing "pins and needles" sensation in your hands and feet

How to Avoid Arsenic

Not using private well water for drinking or irrigation purposes where arsenic groundwater contamination is present will prevent exposure of arsenic from groundwater. Drinking public water provided from the Town of Ayer and avoiding drinking private well water will mitigate the risk of arsenic exposure. The Town of Ayer's public drinking water supply meets all state and federal standards. The Town of Ayer Department of Public Works Water Division conducts annual water quality reports to document that the Town of Ayer drinking water quality is safe for drinking. **If you have a private well, you need to notify the Town of Ayer Board of Health at the contact number provided below.** The Ayer Board of Health will work with the Army to make necessary arrangements to properly abandon the well and obtain a new source of water, if necessary.

APPENDIX D
LUCIP ANNUAL REVIEW CHECKLIST AND INTERVIEWS
NORTHERN IMPACT AREA
FORMER FORT DEVENS, DEVENS, MA

Check	Task	Notes	
Site Update: The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.			
LAND USE CONTROLS			
√	Annual meeting with BOH, DPW and Building Department personnel	Name(s) and title(s) of person(s) interviewed	Mark Wetzel, DPW (mwetzel@ayer.ma.us) phone: (978)772-8240 Bridgette Braley, Nashoba Associated-BOH (bbraley@nashoba.org) Phone: (978)772-3335 X303 Charles Shultz, Building Commissioner (cshultz@ayer.ma.us) Phone: (978)772-8214
		Date of Interview	**January 13, 2020** – Emails were sent to M. Wetzel, B. Braley, C. Shultz and P. Peters to verify their knowledge of the LUCIP for Shepley's Hill Landfill. **January 16, 2020** – spoke to Mark Wetzel on the phone. He is aware of the LUCs and has no issues with the current LUC implementation or coverage area. 1/16/2020 - Left voice mail messages for Bridgette Braley and Charles Schultz. 1/16/2020 - Bridgette Braley called back and indicted she is aware of the pamphlet and is going to print it off and distribute to the BOH. 1/17/2020 – Spoke to the Building Commissioner, Charles Shultz, on the phone to follow up on earlier email. He noted he is familiar with the pamphlet and has no issues with LUC implementation. A copy of the pamphlet is included as **Attachment 1.**
		January 9, 2020 – KGS confirmed that the "Restriction of Groundwater Use" pamphlet has been updated and is posted on the Ayer BOH website: www.ayer.ma.us/board-health/pages/shepleys-hill-landfill-resources	

APPENDIX D
LUCIP ANNUAL REVIEW CHECKLIST AND INTERVIEWS
NORTHERN IMPACT AREA
FORMER FORT DEVENS, DEVENS, MA

LAND USE CONTROLS			
√	Verify any changes to SHL or NIA impact area. Provide updated maps as necessary.	Name(s) and title(s) of person(s) interviewed	Penny Reddy, USACE RPM
		Date of Interview	**January 9, 2020** – sent email to Penny Reddy asked her to verify if she was aware of any changes to SHL or the NIA. Penny responded in an email dated 1/9/2020: "*I am not aware of any significant changes in concentration of COCs specified in groundwater within the landfill or NIA impact area.*" The Army is currently investigating PFAS which have been detected at Former Fort Devens. A record of decision has not been completed for PFAS.

AFFIRMATIVE MEASURES			
√	Verify Annual distribution of educational materials.	Name(s) and title(s) of person(s) interviewed	**September 2019** - KGS conducted a door-to door survey of the properties north of the Shepley's Hill Landfill (SHL) along West Main Street. This survey is conducted every five years as part of public outreach. The purpose of the survey was to 1) collect updated information on the property record, 2) explain the arsenic distribution in the groundwater aquifer and the health impacts that may result from drinking contaminated groundwater, 3) explain that using contaminated groundwater for irrigation or dermal contact of contaminated groundwater is prohibited and 4) explain that installation of a private well or well point that draws groundwater from the contaminated aquifer is prohibited. The pamphlet was distributed during the door-to-door survey, as noted in the attached spreadsheet. A summary spreadsheet of the names and addresses visited, and the survey results is included as **Attachment 2.**
		Date of Interviews	September 3 and 5, 2019

APPENDIX D
LUCIP ANNUAL REVIEW CHECKLIST AND INTERVIEWS
NORTHERN IMPACT AREA
FORMER FORT DEVENS, DEVENS, MA

AFFIRMATIVE MEASURES			
√	Annual preparation of a list of land owners and residents within the LUCs Area	Name(s) and title(s) of person(s) interviewed	**August, 2019** - Confirmed owners names and addresses through Assessors Office online database (www.ayer.ma.us/assesor/pages/assessors-maps).
		Date of Interview	Reviewed town database in August 2019. Used updated list to conduct door-to-door survey which is included as **Attachment 2**.
√	Completion of door to door survey every five years.	Name(s) and title(s) of person(s) interviewed	KGS employees, Melissa Miller, Brett Anchukaitis conducted the door-to-door survey
		Date of Interview	September 3-5, 2019
√	Meeting with the Town DPW and Building Department to discuss LUCs implementation, confirm water supply connections, and assess presence of private wells in the LUCs Area (every 5 years).	Emails and phone interviews were conducted with town personnel listed above to verify the LUCs implementation. All are aware of the LUCs and have no issues with LUC compliance. The door-to-door survey confirmed water supply connections, assessed the presence/absence of private wells and confirmed that homeowners were informed about SHL LUCs. The *"Restriction of Groundwater Use"* pamphlet was distributed to each residence or resident mailbox during the door-to-door survey. The pamphlet is included as Attachment 1 and the door-to-door survey list is included as Attachment 2.	

NA = Not Applicable.

August 21, 2019

RE: Upcoming Door to Door Survey regarding Groundwater Use Restrictions for Properties North of the Shepley's Hill Landfill, Ayer, Massachusetts

Dear Landowner or Occupant:

The Army in collaboration with the Town of Ayer Board of Health implemented Land Use Controls (LUCs) to restrict the use of groundwater for any non-Army property located north of the Shepley's Hill Landfill (SHL) along West Main Street. The property at _____falls within the boundaries of the LUC area and outlined in the enclosed pamphlet. Groundwater in this area is known to contain concentrations of arsenic that are unsafe for human consumption. Arsenic in groundwater is due to both naturally occurring causes and the presence of the landfill.

To inform residents in this area of the prohibited groundwater use, the Army has been providing annual mailings of an educational pamphlet since 2014. The Army also conducts a door to door survey every five years as part of public outreach and education to landowners and property occupants. The previous door to door survey was conducted in 2014. The intent of this letter is to notify residents of the upcoming door to door survey planned for September 3 and 5, 2019. The purpose of the survey is to 1) collect updated information on the property record, 2) explain the arsenic distribution in the groundwater aquifer and the health impacts that may result from drinking contaminated groundwater, 3) explain that using contaminated groundwater for irrigation or dermal contact of contaminated groundwater is prohibited and 4) explain that installation of a private well or well point that draws groundwater from the contaminated aquifer is prohibited.

If the occupant of the property is not at home during the door to door survey, then the educational pamphlet will be delivered to the residence with contact information for any questions. The pamphlet (Land Use Control Implementation Plan: Restriction of Groundwater Use) and other Shepley's Hill Landfill documents can also be found at the Board of Health online repository at https://www.ayer.ma.us/board-health/pages/shepleys-hill-landfill-resources.

The door to door survey will be conducted by the Army's contractor, KOMAN Government Solutions (KGS), approximately 7 to 10 days after this mailing is completed. If you have any questions, please contact Army representative, Mr. Robert Simeone, at Robert.J.Simeone.civ@mail.mil.

Sincerely,
KOMAN Government Solutions, LLC

James Ropp, P.E.
Project Manager

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100
Marlborough, Massachusetts 01752
Phone (508) 366-7442
Fax (508) 366-7445
www.komangs.com

Appendix D
2019 Door to Door Survey
Northern Impact Area Land Use Control for Ayer MA
Shepley's Hill Landfill, Devens MA

Map ID	LUC Street Address	Owner Name	Owner Address	City	State	Zip Code	Occupant Name	Occupant Home (Y/N)	Occupant Not Home (Y/N)	Address Listed Under Ayer 2019 Metered Water User List (Y/N)	Cross referenced to Assessors online database for property owner information (Y/N)	Confirm water supply connections (Y/N)	Any private wells onsite? (Y/N))	Confirm owners and renters are informed about LUCs (Y/N)	Received Mailing of Public Educational Pamphlet (Y/N)	Confirm no GW well usage for consumption, irrigation, or dermal contact (Y/N)	Abandoned well present (Y/N)	Any cross connections (i.e. hose bibs, lawn irrigation, Jacuzzis, swimming pools, toilet ball-cocks) (Y/N)	Additional Notes
25-1	139 WEST MAIN STREET	[redacted]	139 WEST MAIN STREET	AYER	MA	01432	Owner	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
25-10	107 WEST MAIN STREET	[redacted]	107 WEST MAIN STREET	AYER	MA	01432	Owner	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
25-11	0 WEST MAIN STREET	[redacted]	7 PAR LANE	HUDSON	NH	03051	Vacant Land	NA	NA	N	Y	-	-	-	-	-	-	-	No Buildings
25-12	130 WEST MAIN STREET	[redacted]	130 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-13	2 ROGERS STREET, Apt. 1	[redacted]	PO BOX 664	AYER	MA	01432	Apt. 1 - Renter	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Residential Duplex, Left Pamphlet
25-13	2 ROGERS STREET, Apt. 2	[redacted]	PO BOX 664	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Residential Duplex, Left Pamphlet
25-14	122 WEST MAIN STREET	[redacted]	79 PLEASANT STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-15	118 WEST MAIN STREET	[redacted]	118 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-16	116 WEST MAIN STREET, Apt.1	[redacted]	116 WEST MAIN STREET	AYER	MA	01432	Apt. 1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-16	116 WEST MAIN STREET, Apt. 2	[redacted]	116 WEST MAIN STREET	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-17	114 WEST MAIN STREET	[redacted]	114 WEST MAIN STREET	AYER	MA	01432	Owner/Renter	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Owner informed Tenant
25-18	108 WEST MAIN STREET	[redacted]	108 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-19	65 SHIRLEY STREET	[redacted]	65 SHIRLEY STREET	AYER	MA	01432	Dighton	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-20	59 SHIRLEY STREET	[redacted]	59 SHIRLEY STREET	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
25-21	57 SHIRLEY STREET	[redacted]	57 SHIRLEY STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-22	55 SHIRLEY STREET	[redacted]	55 SHIRLEY STREET	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
25-2	137 WEST MAIN STREET	[redacted]	137 OLD WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-2	137 WEST MAIN STREET	[redacted]	137 OLD WEST MAIN STREET	AYER	MA	01432	Renter	Y	N	N	Y	N	N	N	N	Y	N	N	Duplex
25-24	0 WEST MAIN STREET	[redacted]	137 WEST MAIN STREET	AYER	MA	01432	Lawn to Parcel 24-2	Y	N	N	Y	N	N	N	N	Y	N	N	
25-3	131 WEST MAIN STREET	[redacted]	37 PEABODY ROAD	SHIRLEY	MA	01464	Renter	Y	N	Y	Y	Y	N	N	N	Y	N	N	
25-3	131 -1/2 WEST MAIN STREET	[redacted]	37 PEABODY ROAD	SHIRLEY	MA	01464	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-3	133 WEST MAIN STREET	[redacted]	37 PEABODY ROAD	SHIRLEY	MA	01464	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-4	127 WEST MAIN STREET	[redacted]	127 WEST MAIN STREET	AYER	MA	01432	Owner	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Duplex
25-4	127 WEST MAIN STREET	[redacted]	127 WEST MAIN STREET	AYER	MA	01432	Renter	N	Y	N	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
25-5	123 WEST MAIN STREET, Apt 1	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Renter	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Duplex
25-5	123 WEST MAIN STREET, Apt. 2	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 1	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 2	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 3	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 3 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 4	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 4 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 5	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 5 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 6	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 6 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 7	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 7 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 8	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 8 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 9	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 9 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	123-1/2 WEST MAIN STREET Apt. 10	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Apt. 10 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-5	125 WEST MAIN STREET	[redacted]	125 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
25-6	117 WEST MAIN STREET	[redacted]	117 WEST MAIN STREET	AYER	MA	01432	Vacant Building	N	Y	Y	Y	-	-	-	-	-	-	-	Appears Abandoned, Left Pamphlet
25-7	111 WEST MAIN STREET	[redacted]	111 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
25-7	113 WEST MAIN STREET	[redacted]	111 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
25-9	109 WEST MAIN STREET	[redacted]	109 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-30	43 WEST MAIN STREET	[redacted]	1 LEDGEWAY	AYER	MA	01432	Vacant Land	NA	NA	N	Y	-	-	-	-	-	-	-	
26-31	0 WEST MAIN STREET	[redacted]	1 MAIN ST	AYER	MA	01432	Vacant Land	NA	NA	N	Y	-	-	-	-	-	-	-	
26-32	95 WEST MAIN STREET	[redacted]	95 WEST MAIN STREET	AYER	MA	01432	Owner	Y	N	Y	Y	Y	N	Y	N	Y	N	N	
26-33	91 WEST MAIN STREET, Apt. L1	[redacted]	57 SANDY POND RD	AYER	MA	01432	Apt. L1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-33	91 WEST MAIN STREET, Apt. L2	[redacted]	57 SANDY POND RD	AYER	MA	01432	Apt. L2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-33	91 WEST MAIN STREET, Apt. L3	[redacted]	57 SANDY POND RD	AYER	MA	01432	Apt. L3 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-33	91 WEST MAIN STREET, Apt. R1	[redacted]	57 SANDY POND RD	AYER	MA	01432	Apt. R1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-33	91 WEST MAIN STREET, Apt. R2	[redacted]	57 SANDY POND RD	AYER	MA	01432	Apt. R2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-332	82 WEST MAIN STREET	[redacted]	82 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-339	65 WEST MAIN STREET	[redacted]	163 EAST RINGE ROAD	ASHBURNHAM	MA	01430	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-351	5 MECHANIC STREET	[redacted]	5 MECHNIC STREET	AYER	MA	01432	Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-34	87 WEST MAIN STREET, Apt. 1	[redacted]	280 GREAT ROAD	SHIRLEY	MA	01464	Apt. 1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
26-34	87 WEST MAIN STREET, Apt. 2	[redacted]	280 GREAT ROAD	SHIRLEY	MA	01464	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
26-35	83 WEST MAIN STREET, Apt. 1	[redacted]	83 WEST MAIN STREET	AYER	MA	01432	Apt. 1 - Renter	Y	N	Y	Y	Y	N	N	N	Y	N	N	
26-35	83 WEST MAIN STREET, Apt. 2	[redacted]	83 WEST MAIN STREET	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-35	83 WEST MAIN STREET, Apt.1	[redacted]	83 WEST MAIN STREET	AYER	MA	01432	Apt. 1 - Owner	Y	N	Y	Y	Y	N	N	N	Y	N	N	
26-35	83 WEST MAIN STREET, Apt. 2	[redacted]	83 WEST MAIN STREET	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-36	81 WEST MAIN STREET, Apt. 1	[redacted]	81 WEST MAIN STREET	AYER	MA	01432	Apt. 1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
26-36	81 WEST MAIN STREET, Apt. 2	[redacted]	81 WEST MAIN STREET	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
26-37	73 WEST MAIN STREET, Apt. 1	[redacted]	PO BOX 315	NUTTING LAKE	MA	01865	Apt. 1 - Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-37	73 WEST MAIN STREET, Apt. 2	[redacted]	PO BOX 315	NUTTING LAKE	MA	01865	Apt. 2 - Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-37	75 WEST MAIN STREET, Apt. 1	[redacted]	PO BOX 315	NUTTING LAKE	MA	01865	Apt. 1 - Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-37	75 WEST MAIN STREET, Apt. 2	[redacted]	PO BOX 315	NUTTING LAKE	MA	01865	Apt. 2 - Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-38	71 WEST MAIN STREET, Apt. 1R	[redacted]	1810 MARINER DRIVE #402	TARPON SPRINGS	FL	34689	Apt. L1 - Renter	Y	N	Y	Y	Y	N	N	N	Y	N	N	
26-38	71 WEST MAIN STREET, Apt. 2R	[redacted]	1810 MARINER DRIVE #402	TARPON SPRINGS	FL	34689	Apt. L2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-38	71 WEST MAIN STREET, Apt. 1L	[redacted]	1810 MARINER DRIVE #402	TARPON SPRINGS	FL	34689	Apt. R1 - Renter	Y	N	Y	Y	Y	N	N	N	Y	N	N	
26-38	71 WEST MAIN STREET, Apt. 2R	[redacted]	1810 MARINER DRIVE #402	TARPON SPRINGS	FL	34689	Apt. R2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-39	61 -WEST MAIN STREET, Apt 1	[redacted]	63 WEST MAIN STREET	AYER	MA	01432	Apt. 1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet

Appendix D
2019 Door to Door Survey
Northern Impact Area Land Use Control for Ayer MA
Shepley's Hill Landfill, Devens MA

Map ID	LUC Street Address	Owner Name	Owner Address	City	State	Zip Code	Occupant Name	Occupant Home (Y/N)	Occupant Not Home (Y/N)	Address Listed Under Ayer 2019 Metered Water User List (Y/N)	Cross referenced to Assessors online database for property owner information (Y/N)	Confirm water supply connections (Y/N)	Any private wells onsite? (Y/N))	Confirm owners and renters are informed about LUCs (Y/N)	Received Mailing of Public Educational Pamphlet (Y/N)	Confirm no GW well usage for consumption, irrigation, or dermal contact (Y/N)	Abandoned well present (Y/N)	Any cross connections (i.e. hose bibs, lawn irrigation, Jacuzzis, swimming pools, toilet ball-cocks) (Y/N)	Additional Notes
26-39	61 -WEST MAIN STREET, Apt 2	[redacted]	63 WEST MAIN STREET	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-39	63 -WEST MAIN STREET, Apt 1	[redacted]	63 WEST MAIN STREET	AYER	MA	01432	Owner	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
26-39	63-WEST MAIN STREET, Apt 3	[redacted]	63 WEST MAIN STREET	AYER	MA	01432	Apt.3 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Apartment, Occupant Not Home, Left Pamphlet
26-40	108 WEST MAIN STREET	[redacted]	108 WEST MAIN STREET	AYER	MA	01432	Residential Yard to 25-18	NA	NA	N	Y	-	-	-	-	-	-	-	
26-42	53 SHIRLEY STREET	[redacted]	53 SHIRLEY STREET	AYER	MA	01432	Owner	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-43	0 WEST MAIN STREET	[redacted]	NA	NA	NA	NA	Vacant Land	NA	NA	-	-	-	-	-	-	-	-	-	No Buildings
26-44	0 SHIRLEY STREET	[redacted]	7 UNION STREET	AYER	MA	01432	Driveway to 26-48	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
26-45	98 WEST MAIN STREET	[redacted]	98 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-46	3 UNION STREET	[redacted]	3 UNION STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-47	5 UNION STREET	[redacted]	5 UNION STREET	AYER	MA	01432	Occupant Did not Answer	Y	N	Y	Y	-	-	-	-	-	-	-	Left Pamphlet
26-48	7 UNION STREET	[redacted]	7 UNION STREET	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Duplex
26-49	0 SHIRLEY STREET	[redacted]	55 SHIRLEY ST	AYER	MA	01432	[redacted]	Y	N	N	Y	N	N	Y	Y	Y	N	N	Garage, no water or sewer connections
26-50	50 SHIRLEY STREET	[redacted]	50 SHIRLEY STREET	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
26-51	44 SHIRLEY STREET, Apt. A	[redacted]	44 SHIRLEY STREET	AYER	MA	01432	Apt. A. - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-51	44 SHIRLEY STREET, Apt. B	[redacted]	44 SHIRLEY STREET	AYER	MA	01432	Apt. B - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-51	44 SHIRLEY STREET, Apt. C	[redacted]	44 SHIRLEY STREET	AYER	MA	01432	[redacted]	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-52	0 SHIRLEY STREET	[redacted]	29 SHIRLEY ST	AYER	MA	01432	Paved Parking Lot	N	Y	N	Y	-	-	-	-	-	-	-	No Buildings
26-53	22 SHIRLEY STREET	[redacted]	22 SHIRLEY STREET	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
26-54	20 SHIRLEY STREET	[redacted]	20 SHIRLEY STREET	AYER	MA	01432	[redacted]	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-55, 25-56	12 SHIRLEY STREET	[redacted]	12 SHIRLEY STREET	AYER	MA	01432	Vacant Building	NA	NA	Y	Y	-	-	-	-	-	-	-	
26-61	92 WEST MAIN STREET	[redacted]	92 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-62	8 UNION STREET	[redacted]	29 SHIRLEY ST	AYER	MA	01432	Ayer Kiddie Depot Playground	Y	N	N	Y	Y	N	N	Y	N	N	N	
26-63	41 SHIRLEY STREET	[redacted]	75 MYSTIC STREET, APT 3	ARLINGTON	MA	02474	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-64	86 WEST MAIN STREET, Apt.1	[redacted]	88 WEST MAIN STREET	AYER	MA	01432	Apt. 1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-64	86 WEST MAIN STREET, Apt.2	[redacted]	88 WEST MAIN STREET	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-64	88 WEST MAIN STREET, Apt. 1	[redacted]	88 WEST MAIN STREET	AYER	MA	01432	Apt. 1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-64	88 WEST MAIN STREET, Apt.2	[redacted]	88 WEST MAIN STREET	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-65	84 WEST MAIN STREET	[redacted]	13 BELL HILL ROAD	BEDFORD	NH	03110	Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-66	76 WEST MAIN STREET	[redacted]	69 MASSACHUSETTS AVENUE	LUNENBURG	MA	01462	Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
26-66	78 WEST MAIN STREET	[redacted]	69 MASSACHUSETTS AVENUE	LUNENBURG	MA	01462	Occupant - Renter	Y	N	N	Y	Y	N	Y	Y	Y	N	N	Duplex with 78 W Main Street
26-67	70 WEST MAIN STREET, Apt. 1	[redacted]	25 WESTFORD ROAD #2	AYER	MA	01432	Apt. 1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
26-67	70 WEST MAIN STREET, Apt. 2	[redacted]	25 WESTFORD ROAD #2	AYER	MA	01432	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, Left Pamphlet
26-68	29 SHIRLEY STREET	[redacted]	33 SHIRLEY STREET	AYER	MA	01432	Ayer Kiddie Depot	Y	N	Y	Y	Y	N	N	Y	N	N	N	
26-68	29 SHIRLEY STREET	[redacted]	33 SHIRLEY STREET	AYER	MA	01432	St. Mary St/ Anthony Parish Office	Y	N	Y	Y	Y	N	Y	Y	N	N	N	
26-69	64A WEST MAIN STREET	[redacted]	1810 MARINER DRIVE #402	TARPON SPRINGS	FL	34689	Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-69	64B WEST MAIN STREET	[redacted]	1810 MARINER DRIVE #402	TARPON SPRINGS	FL	34689	Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-69	66 WEST MAIN STREET	[redacted]	1810 MARINER DRIVE #402	TARPON SPRINGS	FL	34689	Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-70	23 SHIRLEY STREET	[redacted]	23 SHIRLEY ST	AYER	MA	01432	Occupant Not Home	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
26-71	17 SHIRLEY STREET	[redacted]	343 AYER ROAD	HARVARD	MA	01451	Renter, 17 Shirley Street	Y	N	Y	Y	Y	N	Y	N	Y	N	N	Duplex
26-71	19 SHIRLEY STREET	[redacted]	343 AYER ROAD	HARVARD	MA	01451	Renter, 19 Shirley Street, Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, left Pamphlet
26-72	60 WEST MAIN STREET	[redacted]	63 PARKER RD	SHIRLEY	MA	01464	Junction RPD Pizza	Y	N	N	Y	Y	N	N	N	Y	N	N	Commercial Building
26-72	60 WEST MAIN STREET	[redacted]	63 PARKER RD	SHIRLEY	MA	01464	Bakery (Junction RPD)	Y	N	N	Y	Y	N	N	N	Y	N	N	Commercial Building
26-72	60 WEST MAIN STREET	[redacted]	63 PARKER RD	SHIRLEY	MA	01464	Lei's Nail and Spa	Y	N	N	Y	Y	N	N	N	Y	N	N	Commercial Building
26-73	13 SHIRLEY STREET	[redacted]	11 HUGH STREET	CLINTON	MA	01510	Renter, 13 Shirley Street, Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Left Pamphlet, Duplex
26-73	15 SHIRLEY STREET	[redacted]	11 HUGH STREET	CLINTON	MA	01510	Renter, 15 Shirley Street	Y	N	Y	Y	Y	N	Y	N	Y	N	N	Duplex
26-74	11 SHIRLEY STREET	[redacted]	15480 LAGUNA CANYTON RD SUITE 100	IRVINE	CA	92618	Condemned Building	N	Y	Y	Y	-	-	-	-	-	-	-	Condemned Two-Family home
26-75	50 WEST MAIN STREET	[redacted]	82 SANDY POND ROAD	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Commercial Building
26-75	50 WEST MAIN STREET	[redacted]	82 SANDY POND ROAD	AYER	MA	01432	Debbie's Staffing	N	Y	Y	Y	-	-	-	-	-	-	-	Commercial Building, Left Pamphlet
26-75	50 WEST MAIN STREET	[redacted]	82 SANDY POND ROAD	AYER	MA	01432	The Farmer's Daughter	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Commercial Building
26-75	50 WEST MAIN STREET	[redacted]	82 SANDY POND ROAD	AYER	MA	01432	Atamis Travel Agency	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Commercial Building
26-75	50 WEST MAIN STREET	[redacted]	82 SANDY POND ROAD	AYER	MA	01432	SOS Green	N	Y	Y	Y	-	-	-	-	-	-	-	Commercial Building, Left Pamphlet
26-75	50 WEST MAIN STREET	[redacted]	82 SANDY POND ROAD	AYER	MA	01432	Custom Medical Billing	N	Y	Y	Y	-	-	-	-	-	-	-	Commercial Building, Left Pamphlet
26-75	50 WEST MAIN STREET	[redacted]	82 SANDY POND ROAD	AYER	MA	01432	Law Office of Christopher J. Reardon, PC	N	Y	Y	Y	-	-	-	-	-	-	-	Commercial Building, Left Pamphlet
26-77	9 SHIRLEY STREET, Apt 1	[redacted]	8 REDSKIN TRAIL	GROTON	MA	01450	Renter, Apt. 1	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Duplex
26-77	9 SHIRLEY STREET, Apt 2	[redacted]	8 REDSKIN TRAIL	GROTON	MA	01450	Renter, Apt. 2	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	Duplex
32-10	71 SHIRLEY STREET	[redacted]	71 SHIRLEY STREET	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
32-2	161 WEST MAIN STREET, Apt. 1	[redacted]	PO BOX 393	LUNENBURG	MA	01462	Apt. 1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Left Pamphlet
32-2	161 WEST MAIN STREET, Apt. 2	[redacted]	PO BOX 393	LUNENBURG	MA	01462	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Left Pamphlet
32-2	161 WEST MAIN STREET, Apt. 3	[redacted]	PO BOX 393	LUNENBURG	MA	01462	Apt. 2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Left Pamphlet
32-7	0 WEST MAIN STREET	[redacted]	NA	NA	NA	NA	Vacant Land	N	Y	N	Y	-	-	-	-	-	-	-	No Buildings

Appendix D
2019 Door to Door Survey
Northern Impact Area Land Use Control for Ayer MA
Shepley's Hill Landfill, Devens MA

Map ID	LUC Street Address	Owner Name	Owner Address	City	State	Zip Code	Occupant Name	Occupant Home (Y/N)	Occupant Not Home (Y/N)	Address Listed Under Ayer 2019 Metered Water User List (Y/N)	Cross referenced to Assessors online database for property owner information (Y/N)	Confirm water supply connections (Y/N)	Any private wells onsite? (Y/N))	Confirm owners and renters are informed about LUCs (Y/N)	Received Mailing of Public Educational Pamphlet (Y/N)	Confirm no GW well usage for consumption, irrigation, or dermal contact (Y/N)	Abandoned well present (Y/N)	Any cross connections (i.e. hose bibs, lawn irrigation, Jacuzzis, swimming pools, toilet ball-cocks) (Y/N)	Additional Notes
32-24	173 WEST MAIN STREET	[redacted]	173 WEST MAIN STREET	AYER	MA	1432	Pinards Landscape Supply Yard	N	Y	N	Y	-	-	-	-	-	-	-	Occupant Not Home, left Pamphlet
32-25	167 WEST MAIN STREET	[redacted]	1 MAIN ST	AYER	MA	01432	Storage Yard	NA	NA	N	Y	-	-	-	-	-	-	-	
32-26	163 WEST MAIN STREET	[redacted]	10 PARK PLAZA ROOM 6160	BOSTON	MA	02116 3973	Storage Yard	NA	NA	N	Y	-	-	-	-	-	-	-	
32-27	0 WEST MAIN STREET	[redacted]	998 RESERVOIR ROAD	LUNENBURG	MA	01462	Roadway	NA	NA	N	Y	-	-	-	-	-	-	-	
32-28	2 SCULLY ROAD	[redacted]	1564 BOTTLEBRUSH STREET	THE VILLAGES	FL	32162	Vacant Building	NA	NA	Y	Y	-	-	-	-	-	-	-	
32-29	4 SCULLY ROAD	[redacted]	4 SCULLY ROAD	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
32-3	157 WEST MAIN STREET	[redacted]	157 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
32-4	149 WEST MAIN STREET	[redacted]	149 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home, Left Pamphlet
32-42	0 WEST MAIN STREET	[redacted]	1 MAIN ST	AYER	MA	01432	Vacant Land	NA	NA	N	Y	-	-	-	-	-	-	-	
32-43	7 SCULLY ROAD	[redacted]	7 SCULLY ROAD	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Residential
32-43	7 SCULLY ROAD	[redacted]	7 SCULLY ROAD	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	N	N	Y	N	Y	Hose.
32-44	11 SCULLY ROAD	[redacted]	P O BOX 330	AYER	MA	01432	Ayer Masonic Association	N	Y	Y	Y	-	-	-	-	-	-	-	Occupant Not Home
32-45	13 SCULLY ROAD, Apt. A	[redacted]	13 SCULLY ROAD	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, left Pamphlet
32-45	13 SCULLY ROAD, Apt. B	[redacted]	13 SCULLY ROAD	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Duplex, Occupant Not Home, left Pamphlet
32-46	17 SCULLY ROAD	[redacted]	120 CENTRAL AVENUE	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Left Pamphlet
32-47	19 SCULLY ROAD	[redacted]	19 SCULLY ROAD	AYER	MA	01432	Vacant Building	NA	NA	Y	Y	-	-	-	-	-	-	-	
32-49	33 SCULLY ROAD	[redacted]	33 SCULLY ROAD	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
32-5	147 WEST MAIN STREET	[redacted]	147 WEST MAIN STREET	AYER	MA	01432	[redacted]	Y	N	Y	Y	Y	N	Y	Y	Y	N	N	
32-50, 33-1, 33-4	0 SCULLY ROAD	[redacted]	22 WEST MAIN STREET	AYER	MA	01432	Vacant Land	N	Y	N	Y	-	-	-	-	-	-	-	No Buildings
32-52	31 SCULLY ROAD	[redacted]	31 SCULLEY ROAD	AYER	MA	01432	[redacted]	Y	N	Y	X	Y	N	Y	Y	Y	N	N	
32-6	0 WEST MAIN STREET	[redacted]	10 PARK PLAZA ROOM 6160	BOSTON	MA	02116 3973	Roadway	NA	NA	N	Y	-	-	-	-	-	-	-	
32-8	134 WEST MAIN STREET , Apt. 1L	[redacted]	PO BOX 393	LUNENBURG	MA	01462	Apt. L1 - Renter	Y	N	N	Y	Y	N	Y	Y	Y	N	N	Buildings Actual Number is 136
32-8	134 WEST MAIN STREET, Apt. 2L	[redacted]	PO BOX 393	LUNENBURG	MA	01462	Apt. L2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Left Pamphlet
32-8	134 WEST MAIN STREET, Apt. 1R	[redacted]	PO BOX 393	LUNENBURG	MA	01462	Apt. R1 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Left Pamphlet
32-8	134 WEST MAIN STREET , Apt.2R	[redacted]	PO BOX 393	LUNENBURG	MA	01462	Apt. R2 - Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Left Pamphlet
32-9	132 WEST MAIN STREET	[redacted]	132 WEST MAIN STREET	AYER	MA	01432	Occupant Not Home	N	Y	Y	Y	-	-	-	-	-	-	-	Left Pamphlet
33-28, 33-31, 33-26, 33-29	0 SCULLY ROAD	[redacted]	1 SCULLY ROAD	AYER	MA	01432	Newco Hauling LLC	Y	N	N	X	Y	N	Y	Y	Y	N	N	
33-3	0 SCULLY ROAD	[redacted]	67 DALE LANE	GROTON	MA	01450	Vacant Land	N	Y	N	X	-	-	-	-	-	-	-	No Buildings
33-32	1 SCULLY ROAD	[redacted]	39 MAIN STREET	AYER	MA	01432	Moores Warehouse	Y	N	N	X	Y	N	Y	Y	Y	N	N	
33-36	0 SCULLY ROAD	[redacted]	39 MAIN STREET	AYER	MA	01432	Vacant Land	N	Y	N	X	-	-	-	-	-	-	-	No Buildings

Door to Door Survey Supporting Handout Documents:

LUC educational pamphlet	Moratorium of GW Wells in Ayer
Figure of LUC Area	BOH Well Regulations

Owner/resident name blocked for privacy
Returned mail in 2018.
Vacant land, No buildings
Onsite Interview Questions

2019 LUC Door to Door Survey to be Performed on 9/03/19 and 9/05/19
Ayer, Massachusetts

Name:

General Address Information

LUC Street Address:		Date:	
Occupant Name:		Owner or Renter?	
Occupant Home?	(y/n)	Occupant Not Home?	(y/n)
Address Listed Under Ayer 2019 Metered Water User List?	(y/n)		(y/n)
Cross referenced to Assessors online database for property owner information?	(y/n)		(y/n)

Interview Questions

Confirm water supply connections?	(y/n)
Any private wells onsite?	(y/n)
Confirm owners and renters are informed about LUCs	(y/n)
Received mailing of Public Educational Pamphlet?	(y/n)
Confirm no groundwater well usage for consumption, irrigation, or dermal contact?	(y/n)
Abandoned well present?	(y/n)
List any cross connections (i.e. hose bibs, lawn irrigation, Jacuzzis, swimming pools, toilet ball-cocks)?	(y/n)

Additional Notes

Notes:

LUC - Land Use Control

LUC door to door survey conducted every 5 years per the Land Use Control Implementation Plan (LUCIP) (Sovereign, 2014)

APPENDIX E

GROUNDWATER MONITORING FIELD FORMS (on CD)

Field Copy BA

KGS

Project/Site Name: Shepley's Hill Landfill Spring 2019

Field Team Member: RMA, EAS

Water Level Meter Model: Solinst 101 / Heron Dipper T

Date: 4/11/19

Weather: Sun, 50F

Confirm ATP On/Off: On (sound)

	Location	Well ID	TOR Elevation (ft-bgs)	Depth to Water (ft bTOR)	Depth to Bottom (ft bTOR)	Previous Depth to Water (ft bTOC)	Comments
0900	North Impact Area	SHM-05-40X	223 34	13.93	33.38	13 67	2"PVC, FM, VB VC, DT, good
0847	North Impact Area	SHM-07-03 L	227 90	19.50	33.23	19 02	2"PVC, DT, FM, XB, VC
0856	North Impact Area	SHM-07-05X L	223 40	14.19	64.30	16 10	2"PVC, FM, VB, good
0758	North Impact Area	SHM-13-03	212 05	4.88	50.49	5 03	Good, s/o, 2"PVC, VC XL block @ 4.5' in corr
0840	North Impact Area	SHM-13-04 L	227 02	18.71	30.0	18 47	GD, DT, 2"PVC, VB, FM
0744	North Impact Area	SHM-13-06	223 89	17.06	45.70	15 61	DT, Good, FM, 2"PVC, VB, cap
0751	North Impact Area	SHM-13-07	225 64	18.47	35.19	18 19	DT, good, FM, 2"PVC, VB, cap
0809	North Impact Area	SHM-13-08	227.90	20.90	64.37	19 78	DT, good, FM, 2"PVC, VB
0944	North Impact Area	SHP-05-48B	215.96	3.20	5.25	2 17	↑
0915	North Impact Area	SHP-05-49A	216.67	5.50	5.98	5 65	↑
0910	North Impact Area	SHP-05-49B	215 14	3.97	5.34	3.96	1"PVC, PZ, s/o, VC, XL, good
	Nearfield Area	SHM-05-41B	222 33			9.99	
	Nearfield Area	SHM-05-41C	222.57			10.15	
	Nearfield Area	SHM-93-22B	219.39			7.65	
	Nearfield Area	SHM-96-5B	218.92			5.76	
	Nearfield Area	SHP-05-46B	227.60			14 74	
	Nearfield Area	SHP-05-47A	217 39			3 79	
	Nearfield Area	SHP-05-47B	215 40			1 69	
	Plow Shop Pond	**PSP-01**	218.14			2 00	
	Nearfield Area	SHP-2017-01	229 63			18 55	
	Nearfield Area	SHP-2017-02	230 05			19 24	
	Nearfield Area	EPA-PZ-2012-1A	223 79			10 39	
	Nearfield Area	EPA-PZ-2012-1B	223 53			10 14	
	Nearfield Area	EPA-PZ-2012-2A	223 38			9 98	
	Nearfield Area	EPA-PZ-2012-2B	223 37			10 03	
	Nearfield Area	EPA-PZ-2012-3A	222 65			9 80	
	Nearfield Area	EPA-PZ-2012-3B	222 57			9 78	
	Nearfield Area	EPA-PZ-2012-4A	226 60			14.00	
	Nearfield Area	EPA-PZ-2012-4B	226 39			13 93	
	Nearfield Area	EPA-PZ-2012-5A	220.01			7 09	
	Nearfield Area	EPA-PZ-2012-5B	219 38			6 49	
	Nearfield Area	EPA-PZ-2012-6A	234.25			21 53	
	Nearfield Area	EPA-PZ-2012-6B	234 08			22 55	
	Nearfield Area	EPA-PZ-2012-7A	234.16			21 35	
	Nearfield Area	EPA-PZ-2012-7B	234.03			21 36	
	Nearfield Area	SHP-2016-1A	227 27			14 25	

L = Need relabel

○ = Fish tubing (need to)

4/11/19

KGS

Project/Site Name: Shepley's Hill Landfill Spring 2019

Field Team Member: BrA / EAS

Date: 4/11/19

Weather:

Confirm ATP On/Off:

Water Level Meter Model:

	Location	Well ID	TOR Elevation (ft-bgs)	Depth to Water (ft bTOR)	Depth to Bottom (ft bTOR)	Previous Depth to Water (ft bTOC)	Comments
	Nearfield Area	SHP-2016-1B	227.24	16.19	85.63	16.47	
	Nearfield Area	SHP-2016-2A	225.93	13.69	28.50	13.40	
	Nearfield Area	SHP-2016-2B	225.95	13.78	88.00	13.40	
	Nearfield Area	SHP-2016-3A	223.18			10.58	
	Nearfield Area	SHP-2016-3B	223.18			10.52	
	Nearfield Area	SHP-2016-4A	229.97			17.40	
	Nearfield Area	SHP-2016-4B	229.75			17.25	
	Nearfield Area	SHP-2016-5A	227.01			14.43	
	Nearfield Area	SHP-2016-5B	226.95			14.40	
	Nearfield Area	SHP-2016-06A	241.90			26.35	
	Nearfield Area	SHP-2016-06B	241.89			19.80	
	Nearfield Area	SHP-2016-06C	241.92			19.75	
1125	Landfill Area	SHM-99-29X	243.34	20.82	30.90	23.97	2" PVC, good, DT, VL, VC
1135	Landfill Area	SHP-99-35X	258.49	34.54	41.59	36.78	2" PVC, good, VL, VC
1212	Landfill Area	N6-P1	259.02	34.59	90.70	37.25	4" PVC, good, VL, VC
1214	Landfill Area	SHM-10-11	263.76	38.17	62.28	40.48	2" PVC, good, (BP) DT, VL, VC
1225	Landfill Area	SHP-2016-07A	265.30	15.56	31.79	31.44	1.5" PVC, DT, good, VL, VC
1224	Landfill Area	SHP-2016-07B	265.33	22.02	79.82	32.85	2" PVC; DT(BP), good, VL, VC
0954	Barrier Wall	SHL-10	248.02	31.14	38.66	30.71	2"PVC, DT (BP), Good, XL, VC
1038	Barrier Wall	SHL-11	235.47	15.57	29.90	18.44	2" PVC, DT, good, VL, VC
1004	Barrier Wall	SHL-19	240.50	23.56	32.57	23.13	4" PVC, DT, VL, VC, good
1041	Barrier Wall	SHL-20	235.95	17.38	50.48	17.70	4" PVC, DT, VL, VC, good
1016	Barrier Wall	SHL-4	227.48	10.68	14.75	10.51	2" PV, XL, VC, good
027	Barrier Wall	SHM-11-02	240.73	21.91	68.44	22.29	4" Steel, XL, open st. good, DT
1155	Barrier Wall	SHM-11-06	236.17	19.36	35.82	17.81	2" PVC, DT, XL, VC, good
1105	Barrier Wall	SHP-01-36X	223.95	7.71	12.91	7.60	1" Steel s/u, XL, VC, good
1059	Barrier Wall	SHP-01-37X	222.79	6.46	11.01	6.38	1" Steel s/u, VL, VC, good
112	Barrier Wall	PZ-12-01	237.55	20.42	35.70	20.37	2" PVC, XL, VC, good
1115	Barrier Wall	PZ-12-02	237.79	19.57	34.43	19.82	2" PVC, XL, VC, good
1034	Barrier Wall	PZ-12-03	236.40	19.54	36.66	19.46	2" PVC, DT, VL, VC, good
1031	Barrier Wall	PZ-12-04	238.20	18.96	36.98	19.46	2" PVC, DT, XL, VC, good
1020	Barrier Wall	PZ-12-05	238.73	21.62	34.69	21.52	2" PVC, DT, XL, VC, good
	Barrier Wall 1004	PZ-12-06	242.18	22.73	35.88	23.27	2" PVC, DT, XL, VC, good
1008	Barrier Wall	PZ-12-07	244.59	27.70	33.24	27.31	2" PVC, DT, VV, good, PZ
1012	Barrier Wall	PZ-12-08	244.83	24.08	32.35	24.75	↓
0958	Barrier Wall	PZ-12-09	241.93	23.89	33.19	23.64	2" PVC, DT, Good, VL, VC,

KGS

Project/Site Name: Shepley's Hill Landfill Spring 2019

Field Team Member: BVA, EAS

Water Level Meter Model:

Date: 4/11/19

Weather:

Confirm ATP On/Off:

	Location	Well ID	TOR Elevation (ft-bgs)	Depth to Water (ft bTOR)	Depth to Bottom (ft bTOR)	Previous Depth to Water (ft bTOC)	Comments
000	Barrier Wall	PZ-12-10	242 28	21.71	32.33	21 68	2" PVC, DT, VL VC,
050	Barrier Wall	SHP-01-38A	220 86	4.05	9.08	4.01	1" Steel s/u, DT, XL, VCap, good
047	Barrier Wall	SHP-01-38B	221 03	4.25	20.28	3.72	1" steel s/u, DT, NL, VCap, good
145	Barrier Wall	SHP-05-43	260 17	44.73	61.01	44 60	1" PVC s/u, VL, VC, good
140	Barrier Wall	SHP-05-44	258 55	41.77	60.61	41 55	1" PVC, VL, VC, good

Notes:
Reference: LTMMP Addendum (KGS)
bolded added per request of model support

NIA = 11 (BA)
NA = 37 (EAS)
LA = 6 (BA/EAS)
BW = 23 (BA)

23
6
29
37
6
6
11
(23)

KGS

Field Copy ES

KGS

Project/Site Name: Shepley's Hill Landfill Spring 2019

Field Team Member: Seiler

Water Level Meter Model: Solinist 101 / Heron Dipper T

Date: 4/11/2019

Weather: Clear, sunny, 32-42°F

Confirm ATP On/Off: on

Location	Well ID	TOR Elevation (ft-bgs)	Depth to Water (ft bTOR)	Depth to Bottom (ft bTOR)	Previous Depth to Water (ft bTOC)	Comments
North Impact Area	SHM-05-40X	223 34			13 67	
North Impact Area	SHM-07-03	227.90			19.02	
North Impact Area	SHM-07-05X	223 40			16.10	
North Impact Area	SHM-13-03	212 05			5.03	
North Impact Area	SHM-13-04	227 02			18 47	
North Impact Area	SHM-13-06	223 89			15 61	
North Impact Area	SHM-13-07	225.64			18 19	
North Impact Area	SHM-13-08	227.90			19 78	
North Impact Area	SHP-05-48B	215.96			2 17	
North Impact Area	SHP-05-49A	216 67			5 65	
North Impact Area	SHP-05-49B	215 14			3 96	
Nearfield Area	SHM-05-41B	222.33	11.60	54.45	9.99	@1453
Nearfield Area	SHM-05-41C	222 57	10.82	88.20	10.15	@1450
Nearfield Area	SHM-93-22B	219 39	7.12	93.53	7.65	@1037
Nearfield Area	SHM-96-5B	218 92	6.24	89.40	5.76	@0939
Nearfield Area	SHP-05-46B	227 60	14.77	76.05	14 74	@0758
Nearfield Area	SHP-05-47A	217 39	~~22.45~~ 4.14	5.97	3 79	@ ~~1445~~ 1400
Nearfield Area	SHP-05-47B	215 40	~~21.83~~ 3.13	~~30.80~~ 5.41	1 69	@ ~~1440~~ 1402
Plow Shop Pond	**PSP-01**	218 14	41.5	—	2 00	@1357 top of shaft = 3.0
Nearfield Area	SHP-2017-01	229 63	18.54	78.50	18 55	@1002
Nearfield Area	SHP-2017-02	230.05	19.28	94.85	19 24	@0743
Nearfield Area	EPA-PZ-2012-1A	223 79	10.84	28.03	10 39	@0820
Nearfield Area	EPA-PZ-2012-1B	223 53	10.56	77.65	10 14	@0945
Nearfield Area	EPA-PZ-2012-2A	223 38	10.39	28.42	9 98	@0825
Nearfield Area	EPA-PZ-2012-2B	223 37	10.42	84.54	10 03	@0829
Nearfield Area	EPA-PZ-2012-3A	222 65	10.20	27.95	9 80	@0931
Nearfield Area	EPA-PZ-2012-3B	222 57	10.17	77.18	9 78	@0924
Nearfield Area	EPA-PZ-2012-4A	226 60	14.37	28.06	14 00	@1009
Nearfield Area	EPA-PZ-2012-4B	226 39	15 24	77.13	13 93	@1012
Nearfield Area	EPA-PZ-2012-5A	220 01	7.50	27.34	7 09	@1407
Nearfield Area	EPA-PZ-2012-5B	219 38	6.91	85.62	6 49	@1410
Nearfield Area	EPA-PZ-2012-6A	234 25	21.89	33.31	21 53	@1308
Nearfield Area	EPA-PZ-2012-6B	234 08	21.85	81.86	22 55	@1311
Nearfield Area	EPA-PZ-2012-7A	234 16	22.95	29.40	21 35	@1445
Nearfield Area	EPA-PZ-2012-7B	234 03	21.83	30.80	21 36	@1440
Nearfield Area	SHP-2016-1A	227 27	14.65	96.10	14 25	@1428

KGS

Project/Site Name: Shepley's Hill Landfill Spring 2019

Date: 4/11/19

Field Team Member: Seller

Weather:

Confirm ATP On/Off:

Water Level Meter Model:

Location	Well ID	TOR Elevation (ft-bgs)	Depth to Water (ft bTOR)	Depth to Bottom (ft bTOR)	Previous Depth to Water (ft bTOC)	Comments
Nearfield Area	SHP-2016-1B	227 24	16.19	85.63	16 47	@ 1430
Nearfield Area	SHP-2016-2A	225.93	13.69	28.50	13 40	@ 1120
Nearfield Area	SHP-2016-2B	225 95	13.78	88.00	13 40	@ 1125
Nearfield Area	SHP-2016-3A	223.18	10.90	27.49	10 58	@ 1420
Nearfield Area	SHP-2016-3B	223 18	10.91	87.60	10 52	@ 1416
Nearfield Area	SHP-2016-4A	229 97	17.73	32.89	17 40	@ 1000
Nearfield Area	SHP-2016-4B	229 75	17.57	92.80	17 25	@ 1105
Nearfield Area	SHP-2016-5A	227 01	14.77	32.88	14 43	@ 1137
Nearfield Area	SHP-2016-5B	226.95	14.77	92.70	14.40	@ 1140
Nearfield Area	SHP-2016-06A	241.90	~~27.69~~ 27.79	~~83.37~~ 83.37	26.35	@ ~~1308~~ 1316
Nearfield Area	SHP-2016-06B	241.89	20.31	111.75	19.80	@ 1322
Nearfield Area	SHP-2016-06C	241.92	19.49	132.75	19 75	@ 1326
Landfill Area	**SHM-99-29X**	243.34			23 97	
Landfill Area	**SHP-99-35X**	258.49			36.78	
Landfill Area	**N6-P1**	259 02			37 25	
Landfill Area	**SHM-10-11**	263.76			40 48	
Landfill Area	SHP-2016-07A	265 30			31 44	
Landfill Area	SHP-2016-07B	265 33			32 85	
Barrier Wall	SHL-10	248 02			30.71	
Barrier Wall	SHL-11	235 47			18.44	
Barrier Wall	SHL-19	240 50			23.13	
Barrier Wall	SHL-20	235 95			17.70	
Barrier Wall	SHL-4	227 48			10.51	
Barrier Wall	SHM-11-02	240 73			22.29	
Barrier Wall	SHM-11-06	236.17			17.81	
Barrier Wall	SHP-01-36X	223 95			7.60	
Barrier Wall	SHP-01-37X	222 79			6.38	
Barrier Wall	PZ-12-01	237 55			20 37	
Barrier Wall	PZ-12-02	237 79			19 82	
Barrier Wall	PZ-12-03	236 40			19 46	
Barrier Wall	PZ-12-04	238 20			19 46	
Barrier Wall	PZ-12-05	238.73			21 52	
Barrier Wall	PZ-12-06	242 18			23 27	
Barrier Wall	PZ-12-07	244 59			27 31	
Barrier Wall	PZ-12-08	244 83			24 75	
Barrier Wall	PZ-12-09	241 93			23 64	

Project/Site Name: Shepley's Hill Landfill Spring 2019

Date: 4/11/19

Field Team Member: Seiler

Weather:

Confirm ATP On/Off:

Water Level Meter Model: 5

Location	Well ID	TOR Elevation (ft-bgs)	Depth to Water (ft bTOR)	Depth to Bottom (ft bTOR)	Previous Depth to Water (ft bTOC)	Comments
Barrier Wall	PZ-12-10	242 28			21.68	
Barrier Wall	SHP-01-38A	220 86			4.01	
Barrier Wall	SHP-01-38B	221.03			3 72	
Barrier Wall	SHP-05-43	260 17			44 60	
Barrier Wall	SHP-05-44	258 55			41 55	

Notes:

Reference: LTMMP Addendum (KGS)

bolded added per request of model support

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: EPA-PZ-2012-1A

Project: Devens LTM
Location: SHL

Date: 4/16/2014
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	10.41
Depth to bottom (ft BTOR)	28.03
Pump Set Depth (ft BTOR)	22.5
Screen Interval (ft BTOR)	20-23
Total volume purged (gal)	7.22 (1.9 gal)

Sampling Type

Purging Method: Peri. Tubing type: LDPE Dedicated pump (Y/N): no
Purge start/stop time: 0841/0934 Tubing diameter: 1/4" OD Air source: —

Field Instrument (Model/S/N): YSI 556 ~~0625~~ 06C265741
Lamotte 2020t 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0854	150	10.49	6.89	6.43	134	5.50	168.0	61.5	hazy
0859	150	10.47	6.83	6.05	130	1.54	147.1	64.0	hazy
0904	150	10.46	6.89	6.01	124	1.02	143.1	33.6	hazy/clear
0909	150	10.46	6.93	6.05	123	0.85	130.4	19.6	clear
0914	150	10.49	6.93	6.06	122	0.76	144.2	17.9	clear
0919	150	10.49	7.17	6.08	121	0.65	146.8	13.8	clear
0924	150	10.49	7.34	6.11	121	0.60	142.9	9.11	clear
0929	150	10.49	7.33	6.12	121	0.60	142.7	4.38	clear
0934	150	10.49	7.39	6.12	122	0.59	139.2	2.33	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	no	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: EPA-PZ-2012-1A_SPR19
Sample Time: 0934 Duplicate (Y/N): no MS/MSD (Y/N): no
Field Filtered (Y/N): yes Dup ID: —
Filter Size: 0.45 um Dup Time: —

Comments

[signature]
Signature

4/16/2014
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: EPA-PZ-2012-1B

Project: Devens LTM
Location: SHL
Date: 4/16/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	10.14
Depth to bottom (ft BTOR)	77.84
Pump Set Depth (ft BTOR)	72.5
Screen Interval (ft BTOR)	70-75
Total volume purged (gal)	4.86 (1.2 gal)

Sampling Type

Purging Method: Peri
Purge start/stop time: 1003/1042
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: —

Field Instrument (Model/S/N): YSI 556 0602657AI
Lamotte 2020t 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1005	150	10.32	7.72	6.34	216	3.18	88.5	34.9	clear
1010	150	10.32	7.77	6.42	530	2.39	52.4	34.3	Clear
1015	150	10.32	7.96	6.47	530	1.13	31.5	38.9	Clear
1020	150	10.32	8.15	6.49	554	0.87	16.3	37.8	clear
1025	150	10.32	8.09	6.48	576	0.78	12.1	36.1	Clear
1030	150	10.32	8.21	6.49	585	0.69	11.2	35.3	clear
1035	150	10.32	8.29	6.50	588	0.68	10.8	34.5	" "
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	no	

Sampling Details

Sampling ID: EPA-PZ-2012-1B-SPR19
Sample Time: 1035
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 um
Dup Time: —

Comments

Erich Smith
Signature

4/16/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: EPA - PZ - 2012 - 2A

Project: Devens LTM
Location: SHL
Date: 4/12/2019
Sampler: Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	10.37
Depth to bottom (ft BTOR)	28.42
Pump Set Depth (ft BTOR)	22.50
Screen Interval (ft BTOR)	20-25
Total volume purged (gal)	5.25L (1.38gal) ~~1.0+3L~~

Sampling Type

Purging Method: Perri
Purge start/stop time: 0812/0831
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: —

Field Instrument (Model/S/N): YSI 556 06C2657 AI
Lamotte E 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0816	175	10.45	7.08	5.52	68	7.87	215.8	5.43	clear
0821	175	10.45	7.01	5.54	58	6.18	212.4	2.47	Clear
0826	175	10.45	7.04	5.60	57	5.81	204.5	2.67	Clear
0831	175	10.46	7.05	5.76	51	5.57	195.6	0.97	Clear
0836	175	10.46	7.09	5.79	48	5.45	193.6	0.86	Clear
0841	175	10.46	7.14	5.81	47	5.38	196.6	0.77	Clear
0846	175	10.47	7.13	5.82	47	5.30	193.8	0.72	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: EPA - PZ - 2012 - 2A - SPR19
Sample Time: 0846
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45µm
Dup Time: —

Comments

Eric Seiler
Signature

4/12/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-2B

Project: Devens LTM
Location: SHL
Date: 4/12/2019
Sampler: Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	10.42
Depth to bottom (ft BTOR)	84.54
Pump Set Depth (ft BTOR)	44.30
Screen Interval (ft BTOR)	78.62 – 83.62
Total volume purged (gal)	~~5.25 L (1.38 gal)~~ 0.13 L (1.68 gal)

Sampling Type

Purging Method: 0914/0959
Tubing type: LDPE
Dedicated pump (Y/N): no
Purge start/stop time: pend
Tubing diameter: 1/4" OD
Air source: —

Field Instrument (Model/S/N): YSI 556 06C2657 AI
Lamotte 2020t 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0918	175	10.52	8.16	6.04	318	2.60	221.3	5.17	Clear
0923	175	10.52	7.83	6.07	352	1.23	212.5	3.19	Clear
0928	175	10.52	7.97	6.12	363	0.92	190.6	3.51	Clear
0933	175	10.52	8.08	6.13	368	0.73	168.8	13.0	Clear
0938	175	10.52	8.13	6.15	380	0.64	153.8	15.9	Clear
0943	175	10.52	8.23	6.15	386	0.60	150.0	13.2	Clear
0948	175	10.52	8.30	6.14	387	0.56	149.5	12.8	Clear
0953	175	10.52	8.36	6.16	387	0.57	149.9	12.1	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: EPA-PZ-2012-2B-SPR19
Sample Time: 0953
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 um
Dup Time: —

Comments

Kyle Seiler
Signature

4/12/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-3A

Project: Devens LTM
Location: SHL

Date: 4/16/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	~~10.77~~ 9.77
Depth to bottom (ft BTOR)	27.96
Pump Set Depth (ft BTOR)	22.5
Screen Interval (ft BTOR)	20-25
Total volume purged (gal)	9L (2.3 gal)

Sampling Type

Purging Method: Peri
Purge start/stop time: 1130/1221
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: —

Field Instrument (Model/S/N): YSI 556 06L2657 AI
Lamotte 2020t 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1135	200	9.87	10.42	6.41	344	3.38	20.3	67.4	hazy
1140	200	~~10.72~~	10.72	6.23	345	1.03	13.5	58.6	hazy
1145	200	9.87	10.70	6.18	346	0.81	10.8	46.7	hazy/clear
1150	200	9.87	10.79	6.14	347	0.69	10.5	21.6	hazy/clear
1155	200	9.87	10.93	6.12	346	0.66	12.6	14.9	clear
1200	200	9.87	11.11	6.14	345	0.64	14.3	11.6	clear
1205	200	9.87	11.11	6.13	346	0.58	16.5	9.26	clear
1210	200	9.87	11.06	6.12	345	0.55	16.8	8.47	clear
1215	200	9.87	11.01	6.12	344	0.51	16.4	8.02	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	no	

Sampling Details

Sampling ID: EPA-PZ-2012-3A_SPR19
Sample Time: 1215
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45um
Dup Time: —

Comments

Eric Sillo
Signature

4/16/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-3R

Project:	Devens CTM	Date:	4/16/2019
Location:	SHL	Sampler:	KS

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)		X	

Well Information

Diameter	1" PVC
Material	PVC
Depth to water (ft BTOR)	9.80
Depth to bottom (ft BTOR)	77.25
Pump Set Depth (ft BTOR)	72.50
Screen Interval (ft BTOR)	70-75
Total volume purged (gal)	8.4 L (2.2 gal)

Sampling Type

Purging Method: Peri Tubing type: LDPE Dedicated pump (Y/N): no
Purge start/stop time: 1233/1333 Tubing diameter: 1/4" OD Air source: —

Field Instrument (Model/S/N): YSI 556 06E 2657 AI
LaMotte 2020E 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1240	200	9.93	11.26	6.46	577	2.03	-36.6	10.01	Clear
1245	200	9.93	11.33	6.61	597	0.93	-57.6	11.9	Clear
1250	200	9.93	11.45	6.68	604	0.65	-70.0	22.5	Clear
1255	200	9.93	11.47	6.70	604	0.54	-78.2	23.8	Clear
1300	200	9.93	11.65	6.71	607	0.50	-83.1	32.9	Clear
1305	200	9.93	11.56	6.72	609	0.47	-83.0	32.6	Clear
1310	200	9.93	11.22	6.72	610	0.44	-79.4	33.0	Clear
1315	200	9.93	11.62	6.72	607	0.42	-80.0	32.8	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	no	

Sampling Details

Sampling ID: EPA-PZ-2012-3R_SPR19
Sample Time: 1315 Duplicate (Y/N): yes MS/MSD (Y/N): no
Field Filtered (Y/N): yes Dup ID: SHL-DUP03_SPR19
Filter Size: 0.45 um Dup Time: 1320

Comments

Signature Date: 4/16/2019

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: EPA-PZ-2012-4A

Project: Devens LTM
Location: SHL
Date: 4/15/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	14.22
Depth to bottom (ft BTOR)	28.02
Pump Set Depth (ft BTOR)	22.5
Screen Interval (ft BTOR)	20-25
Total volume purged (gal)	7.72 (2.03 gal)

Sampling Type

Purging Method: Peri
Purge start/stop time: ~~0848~~ 0901 / 0950
Tubing type: ~~Teflon~~ LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: —
Field Instrument (Model/S/N): YSI 556 06C2657 AI
Lamotte 2020E 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0905	175	14.30	10.46	6.17	296	3.56	109.4	28.3	Clear
0910	175	14.23	10.40	6.22	290	1.97	80.9	108.8	Cloudy
0915	175	14.30	10.63	6.30	283	1.11	18.7	37.3	hazy
0920	175	14.31	10.72	6.35	286	0.80	3.6	11.12	hazy/clear
0925	175	14.31	10.82	6.37	286	0.66	10.3	8.83	Clear
0930	175	14.31	10.95	6.37	286	0.71	8.9	5.99	Clear
0935	175	14.31	10.96	6.38	286	0.74	3.8	2.71	Clear
0940	175	14.31	10.84	6.38	286	0.70	2.7	3.71	Clear
0945	175	14.31	10.93	6.39	285	0.71	2.0	2.70	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: EPA-PZ-2012-4A_SPR19
Sample Time: 0945
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 um
Dup Time: —

Comments * consistent heavy rain before purging

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Signature

4/15/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: EPA-PZ-2012-4B

Project: Devens LTM
Location: SHL
Date: 4/15/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	14.19
Depth to bottom (ft BTOR)	77.15
Pump Set Depth (ft BTOR)	72.5
Screen Interval (ft BTOR)	70-75
Total volume purged (gal)	7.2 L (1.9 gal)

Sampling Type

Purging Method: Perri
Purge start/stop time: 1002/1058
Tubing type: ~~Teflon~~ LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: —

Field Instrument (Model/S/N): YSI 556 06C2657 AI
Lamotte 2020E 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1010	150	14.07	11.92	6.50	534	2.25	-61.1	22.6	Clear
1015	150	14.22	12.16	6.53	543	1.58	-68.7	27.8	Clear
1020	150	14.22	12.43	6.55	551	1.06	-62.8	31.8	Clear
1025	150	14.22	11.95	6.55	583	0.82	-74.4	23.3	Clear
1030	150	14.22	11.91	6.55	590	0.71	-74.2	22.1	Clear
1035	150	14.22	11.80	6.55	596	0.68	-65.8	19.9	Clear
1040	150	14.22	11.80	6.55	597	0.58	-61.7	14.2	Clear
1045	150	14.22	11.72	6.56	599	0.61	-61.7	13.9	Clear
1050	150	14.22	11.71	6.56	601	0.60	-62.5	13.7	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: EPA-PZ-2012-4B-SPR19
Sample Time: 1050
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 um
Dup Time: —

Comments

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Signature

4/15/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: EPA - PZ-2012-5A

Project: Devens LTM
Location: SHL
Date: 4/12/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1" PVC
Material	PVC
Depth to water (ft BTOR)	7.52
Depth to bottom (ft BTOR)	27.34
Pump Set Depth (ft BTOR)	22.5
Screen Interval (ft BTOR)	20 → 25
Total volume purged (gal)	7.6L (2.0 gal)

Sampling Type

Purging Method 1034/1117
Purge start/stop time peri
Tubing type Teflon
Tubing diameter 1/4" OD
Dedicated pump (Y/N) no
Air source —

Field Instrument (Model/S/N) YSI 556 06C2657 AI
Lamotte 2020t 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1037	200	7.65	7.47	6.01	120	6.15	61.9	27.9	Clear
1042	200	7.65	7.57	5.86	121	1.32	56.7	26.7	Clear
1047	200	7.66	7.66	5.77	119	0.79	50.7	17.2	Clear
1052	200	7.66	7.71	5.72	117	0.64	49.1	12.0	Clear
1057	200	7.66	7.79	5.69	116	0.54	44.7	5.97	Clear
1102	200	7.66	7.83	5.67	117	0.46	41.0	5.52	Clear
1107	200	7.66	7.87	5.66	117	0.43	38.6	5.01	Clear
1112	200	7.66	7.92	5.66	117	0.39	36.1	5.18	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: EPA - PZ-2012-5A_SPR19
Sample Time: 1112
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 µ
Dup Time: —

Comments

Erich Silo
Signature

4/12/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-5B

Project: Devens LTM
Location: SHL
Date: 4/12/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	5.01
Depth to bottom (ft BTOR)	85.62
Pump Set Depth (ft BTOR)	82.5
Screen Interval (ft BTOR)	80 → 85
Total volume purged (gal)	8L (2.1 gal)

Sampling Type

Purging Method: Peri.
Purge start/stop time: 1126/1211
Tubing type: Teflon
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: —

Field Instrument (Model/S/N): YSI 556 06L2657AI
Lamotte 2020t 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1130	200	7.17	8.30	6.27	504	1.37	-11.4	9.70	Clear
1135	200	7.12	8.47	6.34	519	0.50	-11.2	10.05	Clear
1140	200	7.12	8.59	6.35	522	0.41	4.4	5.13	Clear
1145	200	7.12	8.67	6.36	523	0.37	13.9	4.79	Clear
1150	200	7.12	8.74	6.37	524	0.36	21.8	5.16	Clear
1155	200	7.12	8.78	6.37	525	0.34	29.0	3.72	Clear
1200	200	7.12	8.80	6.37	525	0.32	35.5	4.02	Clear
1205	200	7.12	8.80	6.38	526	0.33	38.1	4.39	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Variance Observed (Y/N):				no	yes	yes	no	no	

Sampling Details

Sampling ID: EPA-PZ-2012-5B_SPR19
Sample Time: 1205
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments

Signature

4/12/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: EPA-PZ-2012-6A

Project: Devens LTM
Location: SHL
Date: 4/22/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	21.57
Depth to bottom (ft BTOR)	33.42
Pump Set Depth (ft BTOR)	27.5
Screen Interval (ft BTOR)	25-30
Total volume purged (gal)	8.2 L (2.1 gal)

Sampling Type

Purging Method: Perri
Purge start/stop time: 1124 / 1215
Tubing type: 1/4" OD
Tubing diameter: ~~LDPE~~ teflon
Dedicated pump (Y/N): no
Air source: —

Field Instrument (Model/S/N): YSI 556 06C2657 AI
Lamotte 2020WC 3711-3913

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1125	200	21.60	11.79	6.43	255	10.75	158.9	—	cloudy
1140	200	21.59	13.46	6.25	253	8.48	158.2	60.2	cloudy
1145	200	21.60	11.80	6.27	251	9.28	159.2	41.6	cloudy
1150	200	21.60	11.66	6.26	254	9.07	161.6	33.0	cloudy/hazy
1155	200	21.60	11.66	6.29	255	8.91	157.2	14.4	hazy/clear
1200	200	21.60	11.62	6.31	256	9.02	155.7	12.0	clear/hazy
1205	200	21.60	11.54	6.31	256	9.14	157.5	9.60	Clear
1210	200	21.60	11.51	6.31	257	9.19	158.8	5.02	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				no	no	yes	no	yes	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: EPA-PZ-2012-6A_SPR19
Sample Time: 1210
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments *Stopped pumping from 1129-1139

[signature]
Signature

4/22/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: EPA-PZ-2012-6B

Project: Devens LTM
Location: SHL

Date: 4/22/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	21.50
Depth to bottom (ft BTOR)	82.20
Pump Set Depth (ft BTOR)	~~78.23~~ 77.50
Screen Interval (ft BTOR)	75-80
Total volume purged (gal)	4.6 L (2.9 gal)

Sampling Type

Purging Method: peri
Purge start/stop time: 1227/1319
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: —

Field Instrument (Model/S/N): YSI 556 06C ~~2567~~ 2657 AI
Lamotte 2020 we 3711-3419

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1230	200	21.52	12.12	6.53	111	8.07	151.4	37.4	hazy
1235	200	21.55	12.33	6.45	114	4.79	134.8	30.9	hazy
1240	200	21.55	11.93	6.56	131	2.75	57.3	32.3	hazy
1245	200	21.57	11.81	6.64	139	1.91	3.5	35.1	hazy
1250	200	21.60	11.59	6.68	146	1.68	-26.3	43.0	hazy
1255	200	21.62	11.64	6.71	157	4.61	-44.1	39.8	hazy
1300	200	21.61	11.69	6.71	176	6.21	-52.6	38.7	hazy
1305	200	21.61	11.66	6.76	193	6.78	-53.8	34.4	hazy
1310	200	21.62	11.77	6.79	198	6.60	-54.2	36.2	hazy
1315	200	21.62	11.73	6.79	200	6.78	-55.3	35.8	hazy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	no	yes	no	yes	

Sampling Details

Sampling ID: EPA-PZ-2012-6B_SPR19
Sample Time: 1315
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 um
Dup Time: —

Comments

Signature

4/22/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-7A

Project: Drums LTM Spring 2019 Date: 4/19/19
Location: Shoplays Sampler: CV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	21.46
Depth to bottom (ft BTOR)	29.44
Pump Set Depth (ft BTOR)	27.0
Screen Interval (ft BTOR)	24.74-29.74
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peri Tubing type: TLPE Dedicated pump (Y/N): N
Purge start/stop time: 1220-1300 Tubing diameter: 1/4" Air source: –

Field Instrument (Model/S/N): YSI 650: 02E0534AM 3175 HACH 2100Q: 12080C019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1235	150	21.46	10.94	5.87	656	6.05	96.9	2.44	clear/clear
1240	↓	↓	10.82	5.75	662	5.95	105.9	2.11	↓
1245	↓	↓	10.52	5.70	663	5.93	114.9	1.64	↓
1250	↓	↓	10.41	5.69	663	5.97	117.4	1.89	↓
1255	↓	↓	10.35	5.67	663	5.98	123.1	1.83	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: EPA-PZ-2012-7A_SPR19
Sample Time: 1255 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: –
Filter Size: 0.45 µm Dup Time: –

Comments

Signature: [signature] Date: 4/19/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-7B

Project: Devens LTM Spring 2014 Date: 4/19/19

Location: Shepley's Sampler: CV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	21.44
Depth to bottom (ft BTOR)	63.85
Pump Set Depth (ft BTOR)	63.0
Screen Interval (ft BTOR)	59.75-64.75
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peri Tubing type: TLPE Dedicated pump (Y/N): N

Purge start/stop time: 1310 - 1350 Tubing diameter: 1/4" Air source: –

Field Instrument (Model/S/N): YSI 650 .02E0534AM 3D5 HACH 2100Q : 12080C019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1325	150	21.44	10.57	6.29	232	1.50	26.7	3.57	clear/clear
1330	↓	↓	10.55	6.25	220	0.89	-10.4	1.27	↓
1335	↓	↓	10.65	6.23	219	0.86	-28.9	1.04	↓
1340	↓	↓	10.73	6.22	218	0.84	-33.3	0.98	↓
1345	↓	↓	10.81	6.21	214	0.77	-34.4	1.04	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: EPA-PZ-2012-7B_SPR14

Sample Time: 1345 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID: –

Filter Size: 0.45µm Dup Time: –

Comments

Signature

4/19/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-4

Project: Devens LTM
Location: SHL

Date: 4/16/19
Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	—		
Well gripper present	—		
Bolts present			✓
Locked (stickup wells)	—		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	10.41
Depth to bottom (ft BTOR)	14.74
Pump Set Depth (ft BTOR)	10
Screen Interval (ft BTOR)	4.4-14.4
Total volume purged (gal)	3.5

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1315-
Tubing type: LDPE
Tubing diameter: 1/4"ID
Dedicated pump (Y/N): N
Air source: —

Field Instrument (Model/S/N): YSI 650XL 15K100513
Lamotte 2020we 3711-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1325	200	10.41	10.64	6.24	199	1.55	-25.0	60.3	Light Brown
1330	200	10.41	10.77	6.25	196	0.61	-26.6	24.6	"
1335	200	10.41	10.74	6.28	193	0.45	-27.5	12.7	clear
1340	200	10.41	10.90	6.30	191	0.61	-28.5	7.67	"
1345	200	10.41	10.99	6.30	189	0.63	-28.0	7.81	"
1350	200	10.41	10.67	6.29	189	0.60	-28.1	7.63	"
1355	200	10.41	10.70	6.29	189	0.59	-27.9	7.65	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N)								X	

Sampling Details

Sampling ID: SHL-4-SPR19
Sample Time: 1355
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45µm
Dup Time: —

Comments

Signature

4/16/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-10

Project: Devens LTM
Location: SHL
Date: 4/12/19
Sampler: B.A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	31.13
Depth to bottom (ft BTOR)	38.66
Pump Set Depth (ft BTOR)	33.0
Screen Interval (ft BTOR)	25.40-40.40
Total volume purged (gal)	2.5

Sampling Type Bladder Pump
Purging Method
Purge start/stop time 0900-1010
Tubing type Bonded LDPE
Tubing diameter 1/4" OD
Dedicated pump (Y/N)
Air source Nitrogen

Field Instrument (Model/S/N) YSI 650XL 15K100583
Lamotte 2020we 3711-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0920	200	31.20	10.31	7.04	111	8.41	214.0	13.2	Clear
0925	200	31.20	10.31	6.61	84	7.31	200.1	9.55	Clear
0930	↓	↓	10.33	6.46	62	6.14	191.2	8.37	↓
0935	↓	↓	10.33	6.40	54	5.90	181.8	7.01	↓
0940	↓	↓	10.33	6.37	47	5.81	175.0	5.84	↓
0945	↓	↓	10.31	6.36	44	5.78	172.6	4.57	↓
0950	↓	↓	10.33	6.34	42	5.74	170.8	3.96	↓
0955	↓	↓	10.35	6.33	41	5.70	169.2	3.90	↓
1000	✓	✓	10.35	6.33	41	5.72	168.8	3.89	✓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHL-10-SP215
Sample Time: 1000
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: -
Filter Size: 0.45um
Dup Time: -

Comments Bladder Pump - no peri available

Signature

4/12/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-11

Project: Devens L+M
Location: SHL
Date: 4/22/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	18.53
Depth to bottom (ft BTOR)	29.91
Pump Set Depth (ft BTOR)	19.00
Screen Interval (ft BTOR)	12-27
Total volume purged (gal)	7.5 L (1.9 gal)

Sampling Type

Purging Method: peri.
Purge start/stop time: 1345/1422
Tubing type: LDPE
Tubing diameter: 3/8" OD
Dedicated pump (Y/N): no
Air source: –

Field Instrument (Model/S/N): YSI 556 06C2657 AI
Lamotte 2020 WR 3711-3919

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1350	250	18.55	11.48	6.52	640	2.21	-64.3	47.6	hazy
1355	250	18.55	11.41	6.57	641	1.25	-75.5	43.4	hazy
1400	250	18.55	11.50	6.63	642	1.05	-81.8	34.5	hazy
1405	250	18.55	11.40	6.66	641	0.88	-76.8	33.3	hazy
1410	250	18.55	11.40	6.67	641	0.81	-78.1	32.8	hazy
1415	250	18.55	11.40	6.68	642	0.84	-81.6	31.5	hazy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	no	yes	no	yes	

Sampling Details

Sampling ID: SHL-11=SPR19
Sample Time: 1415
Duplicate (Y/N): yes
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: SHL-DUP02=SPR19
Filter Size: 0.45 um
Dup Time: 1420

Comments

Signature

4/22/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-19

Project: Devens LTM
Location: SHL
Date: 4/12/19
Sampler: BCA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2" ~~pvc~~
Material	PVC
Depth to water (ft BTOR)	22.57
Depth to bottom (ft BTOR)	32.57
Pump Set Depth (ft BTOR)	30.0
Screen Interval (ft BTOR)	21.91-31.91
Total volume purged (gal)	3.5

Sampling Type
Purging Method: Bladder Pump
Purge start/stop time: 1050-1140
Tubing type: Bonded ~~PE~~ LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): N
Air source: Nitrogen

Field Instrument (Model/S/N): YSI 650XL 15L100983
Lamotte 2020w 3711-3913

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1100	200	23.60	8.10	6.39	196	6.10	168.1	38.6	cloudy
1105	200	23.60	8.11	6.40	198	5.73	168.6	35.2	cloudy
1110	↓	↓	8.07	6.40	200	5.91	168.0	31.7	↓
1115	↓	↓	8.11	6.42	201	5.84	166.9	28.3	↓
1120	↓	↓	8.17	6.41	204	5.62	165.9	26.4	↓
1125	↓	↓	8.17	6.41	204	5.59	164.8	26.0	↓
1130	↓	↓	8.18	6.41	205	5.60	165.1	25.9	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHL-19-SPR19
Sample Time: 1130
Duplicate (Y/N): N
MS/MSD (Y/N): Y
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45µm
Dup Time: –

Comments BP → no pen available

Beth Q
Signature

4/12/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHL-20

Project: Devens LTM Spring 2019
Location: Shepley's
Date: 4/22/19
Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		✓
Concrete Pad intact	✓		✓
PVC casing intact	✓		
Well gripper present	✓		✓
Bolts present	✓		✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	17.17
Depth to bottom (ft BTOR)	50.45
Pump Set Depth (ft BTOR)	45
Screen Interval (ft BTOR)	40.23-50.23
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peri
Purge start/stop time: ~~1245~~ 1245-1325
Tubing type: LDPE
Tubing diameter: 3/8"
Dedicated pump (Y/N): N
Air source: -

Field Instrument (Model/S/N): YSI 650: 02E0534AM HACH 2100Q: 12080C019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1300	200	17.17	9.34	6.09	508	0.70	-60.1	4.25	clear/clear
1305	↓	↓	9.33	6.01	508	0.66	-58.2	3.84	↓
1310			9.27	6.07	571	0.44	-63.4	4.00	
1315			9.24	6.13	576	0.44	-67.2	3.93	
1320	↓	↓	9.21	6.15	576	0.42	-68.4	3.94	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: SHL-20_SPR19
Sample Time: 1320
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: -
Filter Size: 0.45 µm
Dup Time: -

Comments

Signature

4/22/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-05-40X

Project: Devens LTM
Location: SHL
Date: 4/23/19
Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	13.55
Depth to bottom (ft BTOR)	33.87
Pump Set Depth (ft BTOR)	30
Screen Interval (ft BTOR)	31.93-33.93
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peri
Purge start/stop time: 0840-0930
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): N
Air source: —

Field Instrument (Model/S/N): YSI 650XL
Lamotte 3882 we

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0850	150	13.65	10.42	6.92	377	2.11	-94.2	12.7	clear
0855	150	13.65	10.42	6.83	374	1.26	-105.7	5.67	clear
0900	↓	↓	10.45	6.82	370	1.03	-107.5	4.21	↓
0905	↓	↓	10.45	6.81	369	0.96	-108.2	3.75	↓
0910	↓	↓	10.44	6.79	365	0.55	-104.1	2.92	↓
0915	↓	↓	10.48	6.79	359	0.49	-105.5	3.24	↓
0920	↓	↓	10.47	6.79	357	0.47	-106.7	2.95	↓
0925	↓	↓	10.46	6.78	358	0.41	-105.7	3.04	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):			N					—	

Sampling Details

Sampling ID: SHM-05-40X_SPRIS
Sample Time: 0925
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45µm
Dup Time: —

Comments

Signature: [signature]
Date: 4/23/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-05-41B

Project: Devens - SPR/9 - L+M
Location: SHL
Date: 04/18/19
Sampler: Melissa Miller

Well Integrity

	Yes	No	N/A
Casing Secure		X	
Concrete Pad intact		X	
PVC casing intact	X		
Well gripper present	X		
Bolts present		X	
Locked (stickup wells)			X

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	10.15
Depth to bottom (ft BTOR)	59.85
Pump Set Depth (ft BTOR)	62.50
Screen Interval (ft BTOR)	61.83-63.83
Total volume purged (gal)	2.25

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1125/1215
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS-02 E0534 AM
Lamotte 2020 WC-5108-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
150	175	12.75	6.70	6.51	2235	0.54	-36.7	17.3	Clear
1155	175	12.7	6.59	6.50	1766	0.51	-40.7	16.1	Clear
1200	150	12.10	6.62	6.43	1643	0.45	-42.1	15.3	Clear
1205	150	11.90	6.66	6.42	1443	0.40	-43.0	14.5	Clear
1210	150	11.85	6.64	6.41	1442	0.41	-43.3	14.3	Clear
1215	150	11.80	6.62	6.41	1440	0.41	-43.6	14.1	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHM-05-41B
Sample Time: 1215
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID:
Filter Size: .45µm
Dup Time:

Comments: Pad Has 3 Large cracks Present

Signature

04/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-05-41C

Project: Devens LTM
Location: SHL
Date: 4/15/15
Sampler: DW, BA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	10.59
Depth to bottom (ft BTOR)	87.68
Pump Set Depth (ft BTOR)	85
Screen Interval (ft BTOR)	97.66 - 92.66
Total volume purged (gal)	~4 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1020 - 1115
Tubing type: LDPE
Tubing diameter: 3/8" OD
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 15K100983
Lamotte 2020 [illegible] 3711-3913

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1030	200	10.86	9.78	6.21	6470	~~1.63~~ 1.63	34.2	8.31	clear/clear
1035	↓	↓	9.83	6.53	5201	1.33	-52.9	6.91	
1040			9.81	6.62	4520	1.26	-71.7	4.27	
1045			9.76	6.73	3570	1.20	-91.4	4.41	
1050			9.75	6.78	3033	1.20	-96.9	4.59	
1055			9.69	6.81	2789	1.19	-95.5	4.30	
1100			9.80	6.82	2636	1.21	-90.4	4.50	
1105			9.82	6.83	2601	1.27	-90.8	4.43	
1110	↓	↓	9.83	6.84	2598	1.23	-90.1	4.47	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHM-05-41C_SPR15
Sample Time: 1110
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45µm
Dup Time:

Comments

Signature

4/15/15
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-07-03

Project: Devens- Spring 2019 LTM
Location: SHL

Date: 04/18/19
Sampler: Melissa Miller

Well Integrity

	Yes	No	N/A
Casing Secure		X	
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present		X	
Locked (stickup wells)			X

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.35
Depth to bottom (ft BTOR)	33.25
Pump Set Depth (ft BTOR)	30.0
Screen Interval (ft BTOR)	24.94-34.94
Total volume purged (gal)	2.50

Sampling Type

Purging Method: peristaltic
Purge start/stop time: 0815/0915
Tubing type: L
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS-02E0534 AM
Lamotte 2020 we - 5108-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0835	175	20.13	8.28	6.51	671	7.75	243.2	774	Brown
0840	175	20.25	8.21	5.79	618	6.25	239.9	513	cloudy
0845	150	20.32	8.23	5.75	615	5.65	249.7	217	Cloudy
0850	150	20.35	8.30	5.67	616	5.47	237.7	113.7	cloudy
0855	125	20.32	8.37	5.65	626	5.32	220.7	55.6	Cloudy
0900	125	20.30	8.38	5.55	625	5.51	186.6	34.2	cloudy
0905	125	20.28	8.32	5.55	645	5.40	179.2	22.2	clear
0910	125	20.25	8.30	5.56	647	5.38	175.3	22.0	Clear
0915	125	20.25	8.29	5.56	649	5.35	173.3	21.8	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	Y	

Sampling Details

Sampling ID: SHM-07-03-SPR19
Sample Time: 0915
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID:
Filter Size: .45um
Dup Time:

Comments: Bolts sheared off, need replacement, Plug will eventually need to be Replaced

Signature

04/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-07-05x

Project: Stevens, SPR 2019
Location: SHL

Date: 04/18/19
Sampler: Melissa Miller

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present	X		
Locked (stickup wells)			X

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	14.15
Depth to bottom (ft BTOR)	65.42
Pump Set Depth (ft BTOR)	60.00
Screen Interval (ft BTOR)	54.33-64.83
Total volume purged (gal)	2.25

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1015 / 1050
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 650 MDS - 07E0534 AM
Lamotte 2020we - SL08-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1030	175	22.0	7.64	6.71	1858	2.58	-65.3	29.5	Cloudy
1035	175	22.1	7.61	6.74	1878	2.13	-66.0	46.1	Clear
1040	150	22.0	7.61	6.70	1518	2.10	-66.0	36.0	Clear
1045	150	22.1	7.60	6.69	1515	2.05	-65.7	35.7	Clear
1050	150	22.0	7.58	6.69	1510	2.03	-65.8	35.2	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	Y	

Sampling Details

Sampling ID: SHM-07-05x-SPR19
Sample Time: 1050
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID:
Filter Size: .45 um
Dup Time:

Comments Might have fallen tubing

Melissa Miller
Signature

04/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-11-02

Project: Devens LTM
Location: SHL

Date: 4/16/19
Sampler: BA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact			✓
Well gripper present			✓
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	Steel
Depth to water (ft BTOR)	21.74
Depth to bottom (ft BTOR)	68.44
Pump Set Depth (ft BTOR)	45
Screen Interval (ft BTOR)	41.07-51.07
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1040-1125
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): N
Air source: –

Field Instrument (Model/S/N): TSI 650XL 15K100983
Lamotte 2020we 3711-3913

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1055	150	22.80	11.73	7.40	751	2.32	-224.5	11.99	Clear
1100	150	22.80	11.30	7.52	754	1.09	-239.5	11.06	"
1105	100	23.31	11.62	7.56	754	0.53	-237.9	10.24	"
1110	100	23.35	11.62	7.56	753	0.42	-239.7	9.03	"
1115	100	23.41	11.68	7.56	753	0.43	-238.7	8.82	"
1120	100	23.48	11.74	7.56	751	0.42	-238.8	8.70	"
1125	100	23.56	11.75	7.56	752	0.40	-238.3	8.64	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHM-11-02_SP1219
Sample Time: 1125
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45µm
Dup Time: –

Comments

Signature

4/16/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-11-06

Project: Dennis LTM Spring 2019 Date: 4/18/19
Location: Shepley's Sampler: CW

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.05
Depth to bottom (ft BTOR)	35.83
Pump Set Depth (ft BTOR)	32.5
Screen Interval (ft BTOR)	23.84-37.84
Total volume purged (gal)	~1.75

Sampling Type

Purging Method Pump Tubing type TUPE Dedicated pump (Y/N) N
Purge start/stop time 0740-0820 Tubing diameter 1/4" Air source –

Field Instrument (Model/S/N) YSI 556 - 0602657 A1 LaMotte: SN 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0750	~~100~~ 150	19.16	9.24	6.56	574	1.98	-52.0	82.7	clear/c/pur
0755	↓	↓	9.25	6.58	577	1.20	-56.5	36.5	↓
0800	↓	↓	9.25	6.58	579	1.09	-61.9	27.4	↓
0805	↓	↓	9.28	6.59	585	0.95	-68.2	17.0	↓
0810	↓	↓	9.26	6.58	587	0.91	-69.9	16.7	↓
0815	↓	↓	9.25	6.58	587	0.90	-72.1	16.6	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID SHM-11-06_SPR19
Sample Time 0815 Duplicate (Y/N) N MS/MSD (Y/N): N
Field Filtered (Y/N) Y Dup ID –
Filter Size 0.45 µm Dup Time –

Comments

Signature

4/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-13-03

Project: Devens LTM Spring 2019 Date: 04/16/19
Location: Shepleys Sampler: CV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	4.96
Depth to bottom (ft BTOR)	50.97
Pump Set Depth (ft BTOR)	49.0
Screen Interval (ft BTOR)	44.14-54.14
Total volume purged (gal)	~3 gal

Sampling Type

Purging Method: Peri Tubing type: TLPE Dedicated pump (Y/N): N
Purge start/stop time: 1045-130 Tubing diameter: 1/4" Air source: —

Field Instrument (Model/S/N): YSI 650 : 02E053 YAM 3175 LaMotte: 5108-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1100	250	4.96	7.92	6.23	1,077	0.60	22.5	5.74	clear/clear
1105	↓	↓	7.97	6.29	1,082	0.51	20.7	4.82	↓
1110	↓	↓	8.01	6.34	1,082	0.50	13.6	4.19	↓
1115	↓	↓	8.02	6.34	1,079	0.40	9.2	3.96	↓
1120	↓	↓	8.02	6.39	1,077	0.38	8.5	3.89	↓
1125	↓	↓	8.06	6.37	1,076	0.37	4.0	3.56	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHM-13-03_SPR19
Sample Time: 1125 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: —
Filter Size: 0.45 µm Dup Time: —

Comments

Signature

4/16/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-13-04

Project: Devens LTM
Location: SHL
Date: 4/15/19
Sampler: BCA, CN

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	18.72
Depth to bottom (ft BTOR)	29.99
Pump Set Depth (ft BTOR)	25.0
Screen Interval (ft BTOR)	19.68-25.68
Total volume purged (gal)	~3 gal

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0845
Tubing type: Teflon
Tubing diameter: 1/4" OD
Dedicated pump (Y/N):
Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 15K100583
Lamotte 2020we 3711-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0905	200	18.78	11.50	6.84	551	7.90	64.0	116	Rust brown
0910	↓	↓	11.48	6.45	520	7.36	63.9	66.8	Rust brown/cloudy
0915			11.47	6.43	573	7.13	60.9	56.0	Rust brown/cloudy
0920			11.53	6.43	463	6.30	52.1	36.4	clear/clear
0925			11.61	6.44	458	6.11	51.5	42.8	clear/clear
0930			11.45	6.44	447	5.78	48.8	28.7	↓
0935			11.48	6.44	410	5.35	45.6	27.7	
0940			11.45	6.45	399	4.99	41.9	27.5	
0945			11.45	6.46	388	4.95	41.0	26.3	
0950	↓	↓	11.48	6.45	380	4.69	39.9	25.9	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHM-13-04_SPR19
Sample Time: 0950
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45 µm
Dup Time: –

Comments ST: 0950

Signature

4/15/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-13-06

Project: Devens LTM Spring 2019 Date: 04/16/19
Location: Shipley's Sampler: CW

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	16.92'
Depth to bottom (ft BTOR)	44.92
Pump Set Depth (ft BTOR)	40.5'
Screen Interval (ft BTOR)	35.66-45.66
Total volume purged (gal)	2.75

Sampling Type

Purging Method: Peri Tubing type: TLPE Dedicated pump (Y/N): N
Purge start/stop time: 0745 - 0835 Tubing diameter: ~~1/2"~~ 1/4" Air source: –

Field Instrument (Model/S/N): YSI 650 : 02E053446M 3175 LaMotte: 5108-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0800	200	16.92	7.55	6.99	458	~~0.9~~ 1.00	0.9	6.93	clear/clear
0805	↓	↓	7.66	6.73	453	1.20	-33.1	6.39	↓
0810			7.73	6.55	450	1.03	-37.4	5.96	
0815			7.72	6.53	450	0.99	-41.5	6.82	
0820			7.77	6.45	446	0.84	-45.7	6.46	
0825	↓	↓	7.81	6.44	445	0.79	-50.8	6.60	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHM-13-06_SPR19
Sample Time: 0825 Duplicate (Y/N): Y MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: SHL_DUP06
Filter Size: 0.45µm Dup Time: 0830

Comments: Field Dup

Signature: [signature] Date: 4/16/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-13-07

Project: Devens LTM Spring 2019
Location: Shepley's
Date: 04/16/19
Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	18.45
Depth to bottom (ft BTOR)	35.59
Pump Set Depth (ft BTOR)	31.5
Screen Interval (ft BTOR)	26.53 36.53
Total volume purged (gal)	~2.5

Sampling Type
Purging Method: Peri
Purge start/stop time: 0910-0955
Tubing type: TLPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: -
Field Instrument (Model/S/N): YSI 650 02E0534AM La Motte 5108-5014 3175

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0920	200mL/min	18.45	8.13	6.04	586	1.34	24.5	51.5	clear/clear
0925	↓	↓	8.39	6.01	590	0.72	18.1	32.0	↓
0930	↓	↓	8.48	6.02	588	0.64	14.5	19.1	↓
0935	↓	↓	8.47	6.04	583	0.58	-1.9	15.8	↓
0940	↓	↓	8.50	6.11	575	0.52	-9.8	11.8	↓
0945	↓	↓	8.53	6.12	572	0.54	-14.6	12.1	↓
0950	↓	↓	8.56	6.18	562	0.49	-18.4	12.4	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHM-13-07_SPR19
Sample Time: 0950
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: -
Filter Size: 0.45 µm
Dup Time: -

Comments

[signature]
Signature

4/16/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-13-08

Project: Downs LTM Spring 2019 Date: 4/16/19
Location: Shepiley's Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.95'
Depth to bottom (ft BTOR)	64.41
Pump Set Depth (ft BTOR)	59.5
Screen Interval (ft BTOR)	54.71-64.71
Total volume purged (gal)	~2.25

Sampling Type
Purging Method: Pori
Purge start/stop time: 1245-1325
Tubing type: TLPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: —

Field Instrument (Model/S/N): YSI 650 : 02E053 YAM 3175 LaMotte: 5208-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1255	200	19.95	9.94	6.36	343	0.89	32.4	8.66	clear/clear
1300	↓	↓	9.71	6.39	328	0.71	-19.0	6.99	↓
1305	↓	↓	9.52	6.46	320	0.50	-57.9	5.29	↓
1310	↓	↓	9.53	6.49	319	0.46	-63.5	5.43	↓
1315	↓	↓	9.48	6.50	318	0.40	-64.3	5.67	↓
1320	↓	↓	9.44	6.52	318	0.36	-65.5	5.29	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHM-13-08_SPR19
Sample Time: 1320
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments

[signature]
Signature

4/16/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-93-22B

Project: Devens LTM
Location: SHL
Date: 4/12/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	7.15
Depth to bottom (ft BTOR)	93.53
Pump Set Depth (ft BTOR)	87.3
Screen Interval (ft BTOR)	82.3 → 92.3
Total volume purged (gal)	6.81 (2.1 gal)

Sampling Type

Purging Method: Peri
Purge start/stop time: 1240 / 1321
Tubing type: Teflon
Tubing diameter: 1/4 OD
Dedicated pump (Y/N): no
Air source: —

Field Instrument (Model/S/N): YSI 556 06C2657AI
Lamotte 2020t 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1244	200	7.15	7.08	6.72	587	11.14	59.6	18.2	Clear
1249	200	7.17	6.93	6.72	592	1.05	23.1	14.4	Clear
1254	200	7.17	6.92	6.71	595	0.73	20.2	16.1	Clear
1259	200	7.16	6.87	6.71	595	0.58	16.8	8.98	Clear
1304	200	7.16	6.76	6.70	597	0.47	15.7	5.06	Clear
1309	200	7.16	6.77	6.70	600	0.42	15.4	7.05	Clear
1314	200	7.16	6.81	6.70	603	0.45	13.3	6.09	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	yes	no	no	

Sampling Details

Sampling ID: SHM-93-22B_SPR19
Sample Time: 1314
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments: *well gripper should be replaced

Erich Smith
Signature

4/12/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM - 96-513

Project: Devens $ LTM
Location: SHL
Date: 4/23/19
Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	5.56
Depth to bottom (ft BTOR)	89.40
Pump Set Depth (ft BTOR)	85
Screen Interval (ft BTOR)	81.54-91.54
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peri
Tubing type: LDPE
Dedicated pump (Y/N): N
Purge start/stop time: 0715-0820
Tubing diameter: 1/4" x 3/8"
Air source: —

Field Instrument (Model/S/N): YSI 650XL
Lamotte 2020wi

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0730	200	5.74	8.54	6.52	544	2.59	-32.6	48.1	cloudy
0735	200	5.74	8.62	6.46	546	2.18	-34.1	43.2	cloudy
0740	↓	↓	8.51	6.44	547	1.80	-35.7	37.3	cloudy
0745	↓	↓	8.53	6.45	~~546~~ 547	1.70	-37.5	30.1	clear
0750	↓	↓	8.52	6.46	547	1.59	-38.7	26.1	clear
0755	↓	↓	8.52	6.48	549	1.18	-40.1	22.7	↓
0800	↓	↓	8.56	6.49	549	1.11	-40.5	20.9	↓
0805	↓	↓	8.56	6.50	550	0.92	-40.8	19.7	↓
0810	↓	↓	8.56	6.49	550	0.89	-40.4	19.2	↓
0815	✓	✓	8.56	6.49	550	0.87	-40.6	18.9	✓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHM-96-513_SPR19
Sample Time: 0815
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45um
Dup Time: —

Comments

Signature

4/23/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-01-36X

Project: Devens LTM Spring 2019 Date: 4/12/19
Location: Shepley's Hill Landfill Sampler: CV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		✓
Concrete Pad intact			✓
PVC casing intact			✓
Well gripper present			✓
Bolts present		✓	✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	Steel
Depth to water (ft BTOR)	7.87'
Depth to bottom (ft BTOR)	11.80
Pump Set Depth (ft BTOR)	[redacted] 10.0
Screen Interval (ft BTOR)	~~7.0 - 9.0~~ 6.96-11.98
Total volume purged (gal)	~2.5 gal

Sampling Type
Purging Method: Peri Pump Tubing type: TLPE Dedicated pump (Y/N): N
Purge start/stop time: 0835-0920 Tubing diameter: 1/4" Air source: –
Field Instrument (Model/S/N): YSI 650 2427 LaMotte: 5108 - 5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0855	250	[redacted]	7.60	7.21	330	1.57	173.5	1.76	clear/clear
0900	↓	7.87	7.55	7.37	329	1.42	172.9	1.48	↓
0905	↓	↓	7.52	7.40	329	1.34	173.0	1.32	↓
0910	↓	↓	7.52	7.35	330	1.31	171.1	1.30	↓
0915	↓	↓	7.51	7.32	330	1.27	169.4	1.18	↓
0920	↓	↓	7.51	7.32	330	1.25	168.3	1.26	↓
ST↑									
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				Y	N	Y	Y	N	

Sampling Details

Sampling ID: SHP-01-36X SPR19
Sample Time: 0920 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: –
Filter Size: 0.45 µm Dup Time: –

Comments: Field filtered for Metals and DOC

Signature: [signature] Date: 4/12/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-01-37X

Project: Ottawa LTM Spring 2019
Location: Shipley's Hill Landfill
Date: 04/12/19
Sampler: CN

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact			✓
Well gripper present			✓
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	Steel
Depth to water (ft BTOR)	3.58
Depth to bottom (ft BTOR)	10.01
Pump Set Depth (ft BTOR)	8.0'
Screen Interval (ft BTOR)	5.12-10.12
Total volume purged (gal)	~2.5 gal

Sampling Type

Purging Method: Peri
Purge start/stop time: 0955 - 1035
Tubing type: TLPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: –
Field Instrument (Model/S/N): YSI 650-2427 LaMotte: 5708-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1010	250	3.58	8.53	7.15	323	1.15	144.6	6.88	clear/clear
1015	↓	↓	8.53	7.16	320	1.10	143.7	7.23	↓
1020	↓	↓	8.49	7.07	300	0.69	140.4	6.96	↓
1025	↓	↓	8.50	7.04	294	0.64	139.1	7.05	↓
1030	↓	↓	8.47	6.99	292	0.56	139.0	7.43	↓
1035	↓	↓	8.45	6.95	291	0.62	138.8	7.38	↓
ST↑									
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				Y	N	Y	Y	N	

Sampling Details

Sampling ID: SHP-01-37X_SPR19
Sample Time: 1035
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45 µm
Dup Time: –

Comments: Field Filtered for µ metals and DOC.

Signature

4/12/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-01-38A

Project: Navy LTM Spring 2019
Location: Shepley's Hill Landfill
Date: 04/12/19
Sampler: CV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact			✓
Well gripper present			✓
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	Steel
Depth to water (ft BTOR)	4.25
Depth to bottom (ft BTOR)	8.45
Pump Set Depth (ft BTOR)	6.0
Screen Interval (ft BTOR)	3.59-8.59
Total volume purged (gal)	~2.5 gal

Sampling Type

Purging Method: Peri
Purge start/stop time: 1125-
Tubing type: TLPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: -

Field Instrument (Model/S/N): YSI 650 : 2427 LaMotte: 5708-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1140	200	4.25	7.35	6.79	146	0.98	137.4	5.13	clear/clear
1145	↓	↓	7.35	6.78	146	0.93	137.6	4.96	↓
1150	↓	↓	7.39	6.77	146	0.89	136.7	3.80	↓
1155	↓	↓	7.39	6.77	145	0.80	133.2	2.79	↓
1200	↓	↓	7.33	6.75	142	0.61	131.4	2.45	↓
1205	↓	↓	7.31	6.75	141	0.59	129.6	2.37	↓
ST↑									
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				Y	N	Y	Y	N	

Sampling Details

Sampling ID: SHP-01-38A_SPR19
Sample Time: 1205
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: -
Filter Size: 0.45 µm
Dup Time: -

Comments: Field Filtered for Metals and DOC

Signature

4/12/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-1A

Project: Dennis LTM Spring 2019
Location: Shipley's

Date: 4/22/19
Sampler: CK

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	14.35
Depth to bottom (ft BTOR)	26.10
Pump Set Depth (ft BTOR)	20.5
Screen Interval (ft BTOR)	15.59-25.59
Total volume purged (gal)	~2.0

Sampling Type

Purging Method: Pur
Purge start/stop time: 1050-1130
Tubing type: TLPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: –

Field Instrument (Model/S/N): YSI 650:02E0534AM HACH 2100Q:12080C019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1105	150	14.35	8.14	5.03	57	8.40	160.8	15.5	clear/clear
1110	↓	↓	8.23	5.07	57	8.31	160.0	10.8	↓
1115			8.42	5.08	56	8.16	163.6	4.83	
1120			8.41	5.09	57	8.08	164.6	4.73	
1125	↓	↓	8.45	5.08	56	8.05	165.3	4.84	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: SHP-2016-1A_SPR19
Sample Time: 1125
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45 µm
Dup Time: –

Comments: DO seemed a bit high, probe was in great shape though...

Signature

4/22/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-113

Project: Weavons LTM Spring 2019
Location: Shoyaly 5
Date: 4/22/19
Sampler: CC

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	15.32
Depth to bottom (ft BTOR)	86.73
Pump Set Depth (ft BTOR)	~~77~~ 82.5
Screen Interval (ft BTOR)	77.56-87.56
Total volume purged (gal)	~1.75

Sampling Type

Purging Method: Peri
Purge start/stop time: 1140-1220
Tubing type: TLPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: -

Field Instrument (Model/S/N): YSI 650 '02E0534AM HACH 2100Q : 12080C019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1155	100	15.61	10.56	5.65	217	1.09	-8.9	3.37	clear/clear
1200	↓	↓	10.59	5.64	224	0.77	-12.9	2.54	↓
1205			10.42	5.67	225	0.47	-20.9	1.64	
1210			10.49	5.69	226	0.45	-21.0	1.49	
1215			10.51	5.71	227	0.48	-21.5	1.39	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: SHP-2016-113_SPR19
Sample Time: 1215
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: -
Filter Size: 0.45 µm
Dup Time: -

Comments

Signature

4/22/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-2A

Project: Divers LTM Spring 2019
Location: Shipleys

Date: 4/18/19
Sampler: EV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	19.44
Depth to bottom (ft BTOR)	27.34
Pump Set Depth (ft BTOR)	25.5
Screen Interval (ft BTOR)	22.70-27.70
Total volume purged (gal)	1.5

Sampling Type
Purging Method: Peri
Purge start/stop time: 1015-1100
Tubing type: TLPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: –

Field Instrument (Model/S/N): YSI 650-02E0534AM 3175 HACH 2100Q: 12080C019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1030	100	19.44	10.58	8.62	150	1.38	-36.5	10.1	clear/color
1035	↓	↓	10.59	8.63	150	1.37	-36.8	8.36	↓
1040	↓	↓	10.15	8.64	151	1.20	-35.2	9.32	↓
1045	↓	↓	9.77	8.66	150	1.12	-34.2	8.77	↓
1050	↓	↓	9.75	8.66	149	1.12	-31.3	8.77	↓
1055	↓	↓	9.81	8.66	149	1.14	-30.9	8.53	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHP-2016-2A_SPR19
Sample Time: 1055
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45 µm
Dup Time: –

Comments

Signature

4/19/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-2B

Project: Devons LTM Spring 2019 Date: 4/19/19
Location: Shipyard Sampler: CV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	13.43
Depth to bottom (ft BTOR)	88.85
Pump Set Depth (ft BTOR)	85.0
Screen Interval (ft BTOR)	82.22-87.22
Total volume purged (gal)	1.5

Sampling Type
Purging Method: Pori Tubing type: TLPE Dedicated pump (Y/N): N
Purge start/stop time: 1110- Tubing diameter: 1/4" Air source: -

Field Instrument (Model/S/N): YSI 650 : 02E0534AM 3175 HACH2100Q : 12080C019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
125	100	13.43	8.49	6.26	391	0.62	-54.2	2.56	clear/clear
1130	↓	↓	8.56	6.22	425	0.52	-51.6	2.14	↓
1135	↓	↓	8.52	6.24	436	0.53	-48.9	2.46	↓
1140	↓	↓	8.53	6.26	435	0.55	-49.4	2.54	↓
1145	↓	↓	8.46	6.28	436	0.49	-50.1	2.47	↓
1150	↓	↓	8.50	6.29	435	0.48	-49.4	2.49	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHP-2016-2B_SPR19
Sample Time: 1150 Duplicate (Y/N): Y MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: SH1-DUP04
Filter Size: 0.45 µm Dup Time: 1155

Comments

Signature

4/19/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-03A

Project: Devens – Spring LTM 2019
Location: SHI
Date: 04/18/19
Sampler: Melissa Miller

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	10.40
Depth to bottom (ft BTOR)	27.54
Pump Set Depth (ft BTOR)	25.0
Screen Interval (ft BTOR)	22.05-27.05
Total volume purged (gal)	2w25

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1245
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N

Field Instrument (Model/S/N): YSI 650 MDS – 02E0534AM
Lamotte 3080Wc – 5108-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
00	200	12.0	4.13	6.28	141	1.58	-32.4	32.7	Cloudy
1305	139	12.05	4.22	6.27	130	1.08	-37.5	10.21	Clear
1310	150	12.10	4.31	6.25	125	1.08	-36.4	2.20	Clear
1315	150	12.11	4.33	6.25	123	1.10	-34.9	2.10	Clear
1320	150	12.11	4.34	6.26	122	1.12	-33.5	1.98	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	Y	

Sampling Details

Sampling ID: SHP-2016-03A-SPR19
Sample Time: 1320
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID:
Filter Size: 1.45µm
Dup Time:

Comments

Signature

04/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

'ell Identification: SHP-2016-03B

Project: Devens SPR'19 LTM
Location: SHL

Date: 04/18/19
Sampler: Melissa Miller

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	10.05
Depth to bottom (ft BTOR)	87.9
Pump Set Depth (ft BTOR)	86.0
Screen Interval (ft BTOR)	82.05-87.05
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1230/1410
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 650 MDS-02E0534AM
Lamotte 2020we-5108-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1345	175	10.85	5.20	5.98	350	1.30	-19.9	19.7	Cloudy
1350	175	10.85	5.91	6.10	383	0.51	-35.2	8.57	Clear
1355	150	10.78	6.01	6.15	402	0.41	-41.2	5.32	Clear
1400	150	10.73	6.02	6.18	413	0.48	-42.3	2.80	Clear
1405	150	10.70	6.01	6.19	415	0.50	-42.1	2.79	Clear
1410	150	10.70	6.01	6.20	418	0.52	-44.1	2.69	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	Y	

Sampling Details

Sampling ID: SHP-2016-03B-SPR19
Sample Time: 1410
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID:
Filter Size: .45µm
Dup Time:

Comments

Signature

04/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-4A

Project: Downs LTM Spring 2019 Date: 4/19/19
Location Highways Sampler: ~~[illegible]~~ CN

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	18.40
Depth to bottom (ft BTOR)	32.75
Pump Set Depth (ft BTOR)	29.5
Screen Interval (ft BTOR)	27.40-32.40
Total volume purged (gal)	~1.5

Sampling Type
Purging Method Peri Tubing type TLPE Dedicated pump (Y/N) N
Purge start/stop time 0755-0840 Tubing diameter 1/4" Air source ~

Field Instrument (Model/S/N) YSI 650:02E0534AM 3175 HACH 2100Q:120800019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1810	100	18.40	9.95	5.77	89	~~5.77~~ 4.92	216.6	14.4	clear/clear
0815	↓	↓	9.95	5.73	88	4.86	216.3	14.5	↓
0820			9.98	5.67	84	4.67	224.1	8.07	
0825			9.86	5.59	82	4.71	210.6	7.20	
0830			9.90	5.58	83	4.76	209.5	7.49	
0835	↓	↓	9.92	5.57	82	4.78	208.3	7.41	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHP-2016-4A_SPR19
Sample Time: 0835 Duplicate (Y/N): N MS/MSD (Y/N) N
Field Filtered (Y/N): Y Dup ID: -
Filter Size: 0.45 µm Dup Time: -

Comments

Signature

4/19/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-4B

Project: Dtuns LTM Spring 2019 Date: 4/19/19
Location: Sluplays Sampler: CV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	17.17
Depth to bottom (ft BTOR)	92.54
Pump Set Depth (ft BTOR)	89.0
Screen Interval (ft BTOR)	87.18-92.18
Total volume purged (gal)	1.5

Sampling Type

Purging Method: Peri Tubing type: TLPE Dedicated pump (Y/N): N
Purge start/stop time: 0900-0945 Tubing diameter: 1/4" Air source: –

Field Instrument (Model/S/N): YSI 650:02E0534AM 3175 HACH 2100 Q: 12080C019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0915	100	17.17	9.66	5.95	382	0.86	-48.4	8.04	clear/clear
0920	↓	↓	9.61	5.96	390	0.78	-51.5	7.13	↓
0925	↓	↓	9.86	6.04	353	0.71	-54.3	4.87	↓
0930	↓	↓	9.94	6.05	365	0.65	-59.5	4.57	↓
0935	↓	↓	10.01	6.07	367	0.62	-61.2	4.14	↓
0940	↓	↓	10.03	6.09	370	0.62	-62.0	4.19	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHP-2016-4B_SPR19
Sample Time: 0940 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: –
Filter Size: 0.45 µm Dup Time: –

Comments

[signature]
Signature

4/19/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-5A

Project: Devens LTM
Location: SHL
Date: 4/23/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	14.15
Depth to bottom (ft BTOR)	32.90
Pump Set Depth (ft BTOR)	27.5
Screen Interval (ft BTOR)	25-30
Total volume purged (gal)	7 L (1.8 gal)

Sampling Type

Purging Method: Pvc
Purge start/stop time: ~~0800~~/0855 0805/
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: —
Field Instrument (Model/S/N): YSI 556 06C2657AI
Lamotte 2020 WE 3711-3919

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0810	200	14.27	8.79	6.39	260	2.25	79.2	39.7	hazy
0815	200	14.27	8.88	6.42	244	1.23	42.3	17.0	hazy/clear
0820	200	14.27	8.82	6.46	240	0.89	23.6	13.10	clear
0825	200	14.27	8.82	6.50	240	0.73	7.7	8.93	clear
0830	200	14.27	8.82	6.51	238	0.67	1.6	6.72	Clear
0835	200	14.27	8.84	6.53	239	0.62	-4.9	7.63	Clear
0840	200	14.27	8.83	6.54	238	0.59	-9.9	7.89	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	yes	no	no	

Sampling Details

Sampling ID: SHP-2016-5A_SPR19
Sample Time: 0840
Duplicate (Y/N): no
MS/MSD (Y/N): yes
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 um
Dup Time: —

Comments

[signature]
Signature

4/23/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-5B

Project: ~~Devens AOC60W Fall 2017 LTM~~ Devens LTM
Location: Fort Devens Massachusetts
Date: 4/23/2019
Sampler: ES

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	13.20
Depth to bottom (ft BTOR)	92.85
Screen Interval (ft BTOR)	85-90
Total volume purged (gal)	~~85-90~~ 12 L

Sampling Type

Purging Method: Peri
Purge start/stop time: 0936/1025
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: —
Field Instrument (Model/S/N): YSI 556 ~~oct~~ 0002657-AI
Lamotte 2020WE 3711-3919

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0940	300	14.25	9.15	6.52	505	5.39	-11.2	9.96	Clear
0945	300	14.27	9.12	6.59	514	1.43	-56.9	11.30	Clear
0950	300	14.29	9.16	6.60	523	1.08	-63.9	21.4	Clear/hazy
0955	300	14.29	9.18	6.60	559	0.89	-69.9	4.0	clear
1000	300	14.27	9.19	6.61	592	0.79	-75.6	1260 AU	Black
1005	300	14.27	9.17	6.64	606	0.68	-78.4	814 AU	Gray
1010	300	14.27	9.14	6.64	607	0.66	-79.8	38 NTU	Gray
1015	300	14.27	9.19	6.65	600	0.69	-81.2	37 NTU	Gray
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	
Variance:		no	yes	yes	no	no			

2" Screen Volume = 0.163 gal/ft or 616 ml per foot

Sampling Details

Field Filtered (Y/N): yes
Filter Size: 0.45 um
Duplicate (Y/N): ~~AO~~ yes
Dup ID/Time: — SHL-DUP05-SPR19 @ 1020
MS/MSD (Y/N): no

Dedicated Tubing: (Y/N): yes

Sample Time: 1015

Comments Sample ID: SHP-2016-5B_SPR19

Erich Seiler
Signature

4/23/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-06A

Project: Devens LTM - Spring '19
Location: Sheepleys
Date: 04/17/19
Sampler: Melissa Miller

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact			X
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	27.20
Depth to bottom (ft BTOR)	85.25
Pump Set Depth (ft BTOR)	84.0
Screen Interval (ft BTOR)	82.25-87.25
Total volume purged (gal)	2.50

Sampling Type

Purging Method: Micro Bladder
Purge start/stop time: 0930/
Tubing type: Double Bonded
Tubing diameter: 1/4"/1/4"
Dedicated pump (Y/N): N
Air source: Nitrogen

Field Instrument (Model/S/N): YSI 650 MDS - SN 08E0534 AM
Lamotte 2020WE - 5108-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1050	150	30.40	8.31	7.27	304	2.18	-78.1	32.28	Clear
1055	150	33.95	8.13	7.26	737	2.09	-85.0	21.10	Clear
1100	150	37.23	8.04	7.28	727	1.84	-90.1	6.33	Clear
1105	125	39.79	8.05	7.27	722	1.60	-90.0	2.73	Clear
1110	125	39.95	8.06	7.31	716	1.56	-94.0	2.35	Clear
1115	125	40.30	8.10	7.32	715	1.52	-97.1	2.28	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	Y	

Sampling Details

Sampling ID: SHP-2016-06A-SPR19
Sample Time: 1115
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID:
Filter Size: .45µm
Dup Time:

Comments: Micro Bladder Needed to sample Slow Recharge

Signature

04/17/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

'ell Identification: SHP-2016-06B

Project: Devens-LTM- SPRing'19 Date: 04/17/19
Location: Sheepleys Sampler: Melissa Miller

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact			X
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	12.15
Depth to bottom (ft BTOR)	111.62
Pump Set Depth (ft BTOR)	110
Screen Interval (ft BTOR)	103.84- 113.84
Total volume purged (gal)	2.5

Sampling Type

Purging Method Micro Bladder Tubing type Double Banded Dedicated pump (Y/N) N
Purge start/stop time 1135 Tubing diameter 1/4"/14/" Air source Nitrogen

Field Instrument (Model/S/N) YSI 650 MDS - SN 02E0534AM
Lamotte 2020WC - SN 5108-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1210	150	24.5	9.41	7.42	1340	1.07	-83.2	30.2	Cloudy
1215	150	24.7	9.43	7.43	1347	1.00	-85.3	28.7	Cloudy
1220	150	24.6	9.70	7.50	1377	0.75	-89.0	24.3	Cloudy
1225	125	24.8	9.72	7.52	1524	0.54	-109.2	24.2	Cloudy
1230	125	24.9	9.65	7.52	1608	0.45	-110.4	20.1	Cloudy
1235	125	25.0	9.64	7.53	1610	0.46	-111.0	19.9	Cloudy
1240	125	25.1	9.62	7.54	1612	0.42	-111.4	19.88	Cloudy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	Y	

Sampling Details

Sampling ID: SHP-2016-06B-SPR19
Sample Time: 1240 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID:
Filter Size: .45µm Dup Time:

Comments Micro Bladder needed to sample

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Signature

04/17/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-06C

Project: Deven - LTM - Spring '19
Location: Shepleys

Date: 04/17/19
Sampler: Melissa Miller

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact			X
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	21.0
Depth to bottom (ft BTOR)	133.88
Pump Set Depth (ft BTOR)	130.0
Screen Interval (ft BTOR)	124.87-134.87
Total volume purged (gal)	2.25

Sampling Type

Purging Method: Micro Bladder
Tubing type: Double Bonded
Dedicated pump (Y/N): N
Purge start/stop time: 0900/1000
Tubing diameter: 1/4"
Air source: Nitrogen

Field Instrument (Model/S/N): YSI 650 MDS - 02E0534 AM
Lamotte 2020WE - 5108-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0940	175	20.5	8.07	7.25	262	1.67	-28.3	27.8	Cloudy
0945	175	20.6	9.13	7.28	259	1.58	-28.6	14.6	Clear
0950	150	20.5	9.31	7.30	259	1.47	-38.2	4.23	Clear
0955	150	20.4	9.33	7.31	258	1.46	-39.1	4.18	Clear
1000	150	20.4	9.32	7.33	258	1.40	-41.7	4.14	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	Y	

Sampling Details

Sampling ID: SHP-2016-06C-SPR19
Sample Time: 1000
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID:
Filter Size: .45µm
Dup Time:

Comments: Dedicated Bonded tubing. Need to use Micro Bladder to sample

Signature

04/17/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-7A

Project: Devens LTM Spring 2019 Date: 4/22/19
Location: Shepley's Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		✓
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1½"
Material	PVC
Depth to water (ft BTOR)	14.57
Depth to bottom (ft BTOR)	32.79
Pump Set Depth (ft BTOR)	25.5
Screen Interval (ft BTOR)	24.32-34.32
Total volume purged (gal)	~20 gal

Sampling Type

Purging Method: Pur. Tubing type: TLPE Dedicated pump (Y/N): N
Purge start/stop time: 0920 - 1000 Tubing diameter: ¼" Air source: –

Field Instrument (Model/S/N): YSI 650: 02E0534AM HACH 2100Q: 12080C019983

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0935	150	14.61	8.08	5.40	72	1.13	90.9	3.68	clear/clear
0940	↓	14.63	8.05	5.33	71	1.04	90.7	1.91	↓
0945	↓	14.64	8.22	5.18	60	0.87	86.6	1.71	↓
0950	↓	↓	8.29	5.13	58	0.91	88.7	1.79	↓
0955	↓	↓	8.25	5.10	58	0.90	89.2	1.69	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: SHP-2016-7A_SPR19
Sample Time: 0955 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: –
Filter Size: 0.45µm Dup Time: –

Comments –

[signature]
Signature

4/22/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: ~~SHP-2016-073~~ SHP-2016-07B

Project:	Devons LTM	Date:	4/19/15
Location:	SAL	Sampler:	BA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	20.90
Depth to bottom (ft BTOR)	79.81
Pump Set Depth (ft BTOR)	76
Screen Interval (ft BTOR)	72.35-82.35
Total volume purged (gal)	2.0

Sampling Type

Purging Method: micro-bladder
Tubing type: Boned TUPE
Dedicated pump (Y/N): N
Purge start/stop time: 1240-1345
Tubing diameter: 1/4" OD
Air source: N_2

Field Instrument (Model/S/N): YSI 650XL
Lamotte 2020we

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1255	50	21.04	14.69	7.25	385	1.80	-31.1	17.1	clear
1300	50	21.32	14.55	7.19	380	1.58	-26.7	13.9	
1305	50	21.76	13.90	6.95	374	0.99	-7.8	13.5	
1310	50	22.81	13.75	6.95	374	0.94	-6.3	13.0	
1315	50	22.95	13.95	6.98	373	0.90	-6.8	12.35	
1320	50	23.80	13.80	7.00	374	0.88	-6.0	12.19	
1325	50	23.87	13.80	7.00	377	0.89	-8.4	12.20	
1330	50	23.98	13.80	7.01	378	0.87	-8.8	12.34	✓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHP-2016-07B_SPR19
Sample Time: 1330
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments DTW does not stabilize, slow recharge.

Signature

4/19/15
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: P7-12-01

Project: Doving LTM Spring 2019
Location: Shaylor
Date: 4/18/19
Sampler: CV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	20.24
Depth to bottom (ft BTOR)	35.69
Pump Set Depth (ft BTOR)	32.5
Screen Interval (ft BTOR)	27.70-37.70
Total volume purged (gal)	1.25

Sampling Type

Purging Method: Pump
Purge start/stop time: 0845-0925
Tubing type: TLPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: –

Field Instrument (Model/S/N): YSI 556 06026571 A1 Lo Flow: SN MG-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0855	200	20.24	9.97	6.48	644	3.57	-44.9	22.3	clear/clear
0900	↓	↓	10.25	6.48	650	1.50	-50.6	12.7	↓
0905			10.41	6.48	654	1.59	-53.2	11.57	
0910			10.48	6.49	655	0.81	-54.5	10.00	
0915			10.47	6.49	656	0.75	-54.7	9.86	
0920	✓	✓	10.45	6.49	657	0.71	-54.4	9.59	✓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: P7-12-01_SPR19
Sample Time: 0920
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45 µm
Dup Time: –

Comments

Signature

4/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: PZ-12-02

Project: Dennis LTM Spring 2019 Date: 04/18/19
Location: Shepleys Sampler: CV

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓	✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.39
Depth to bottom (ft BTOR)	35.99
Pump Set Depth (ft BTOR)	33.0
Screen Interval (ft BTOR)	28.04-38.04
Total volume purged (gal)	2.25

Sampling Type

Purging Method Peri Tubing type TLPE Dedicated pump (Y/N) N
Purge start/stop time 0935 - 1015 Tubing diameter 1/4" Air source –

Field Instrument (Model/S/N) YSI 556: 0602657A1 LaMotte: SN 1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0945	200	19.39	9.56	6.42	733	4.01	-38.7	6.41	clear/clear
0950	↓	↓	9.94	6.43	772	1.23	-57.0	5.25	↓
0955	↓	↓	9.95	6.43	773	1.05	-58.0	5.45	↓
1000	↓	↓	9.85	6.45	774	1.10	-58.9	5.48	↓
1005	↓	↓	9.81	6.44	775	1.16	-57.1	5.53	↓
1010	↓	↓	9.80	6.44	775	1.19	-57.7		↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: PZ-12-02 SPR19
Sample Time: 1010 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: –
Filter Size: 0.45 µm Dup Time: –

Comments

Signature

4/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: PZ-12-03

Project: Drums LTM Spring 2019
Location: Skagway
Date: 4/18/19
Sampler: CN

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.36
Depth to bottom (ft BTOR)	36.58
Pump Set Depth (ft BTOR)	32.5
Screen Interval (ft BTOR)	27.55-37.55
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peri
Purge start/stop time: 1035-1120
Tubing type: HDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source:

Field Instrument (Model/S/N): YSI 556 - 06012657-A1 LaMotte: SN1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1045	~~ft.36~~ 200	19.36	9.81	6.80	436	4.32	5.7	52.2	clear/clear
1050	↓	↓	9.83	6.77	443	4.08	9.4	53.9	↓
1055			10.14	6.69	457	3.75	-8.2	12.2	
1100			10.38	6.64	580	0.97	-55.4	12.3	
1105			10.42	6.65	601	0.68	-60.4	12.2	
1110	↓	↓	10.43	6.66	604	0.64	-64.7	12.1	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: PZ-12-03_SPR19
Sample Time: 1110
Duplicate (Y/N): Y
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: SHL-DUP01
Filter Size: 0.45 µm
Dup Time: 1115

Comments

Signature

4/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: PZ-12-04

Project: Dunnus LTM Spring 2019 Date: 04/18/19
Location: Shepleys Sampler: CN

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	18.84
Depth to bottom (ft BTOR)	37.02
Pump Set Depth (ft BTOR)	32.0
Screen Interval (ft BTOR)	27.15-37.15
Total volume purged (gal)	3 gall

Sampling Type

Purging Method: Pool Tubing type: TLPE Dedicated pump (Y/N): N
Purge start/stop time: 1150 - 1235 Tubing diameter: 1/4" Air source: -

Field Instrument (Model/S/N): YSI 556 : 0602657A1 LaMotte: SN1116-0719

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1205 ~~0945~~	250	18.84	10.91	6.56	580	0.85	-59.9	8.41	clear/clear
1210 ~~0950~~	↓	↓	10.92	6.56	580	0.76	-62.8	8.63	↓
1215 ~~0955~~	↓	↓	10.89	6.55	579	0.64	-62.1	5.63	↓
1220 ~~1000~~	↓	↓	10.95	6.55	578	0.54	-63.9	4.29	↓
1225 ~~1005~~	↓	↓	10.98	6.54	578	0.55	-61.0	4.07	↓
1230	↓	↓	11.02	6.54	578	0.52	-60.5	3.95	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: PZ-12-04 SPR19
Sample Time: 1230 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: -
Filter Size: 0.45 µm Dup Time: -

Comments

Signature

4/18/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-05

Project: Devens UM
Location: SHL

Date: 4/16/15
Sampler: B.A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	21.32
Depth to bottom (ft BTOR)	34.69
Pump Set Depth (ft BTOR)	30
Screen Interval (ft BTOR)	28.65-38.65
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1230
Tubing type: LDPE
Tubing diameter: 3/8" OD
Dedicated pump (Y/N): —
Air source: —

Field Instrument (Model/S/N): YSI 650 XL 15K100983
Lamotte 2020 we 3711-3913

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1240	200	21.33	12.09	6.18	343	1.52	-59.3	6.33	clear
1245	200	21.33	11.94	6.18	344	0.84	-63.9	5.03	clear
1250	200	21.33	11.83	6.16	344	0.69	-63.7	4.81	clear
1255	200	21.33	11.82	6.16	343	0.67	-65.5	4.72	clear
1300	200	21.33	11.81	6.15	343	0.65	-66.1	4.78	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):			—					X	

Sampling Details

Sampling ID: PZ-12-05-SPR15
Sample Time: 1300
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45µm
Dup Time: —

Comments

Signature

4/16/15
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: PZ-12-06

Project: Devens LTM
Location: SHL
Date: 4/16/19
Sampler: B/A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	22.60
Depth to bottom (ft BTOR)	35.88
Pump Set Depth (ft BTOR)	32
Screen Interval (ft BTOR)	25.76-35.76
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 1135
Tubing type: LDPE
Tubing diameter: 1/4" ID
Dedicated pump (Y/N): —
Air source: —

Field Instrument (Model/S/N): YSI 650XL 15K100983
Lamotte 2020wq 3711-3913

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1145	200	22.60	11.55	5.99	419	1.77	4.9	5.81	clear
1150	200	22.60	11.80	5.90	419	0.85	2.0	5.59	clear
1155	200	22.60	11.89	5.87	420	0.57	-2.4	6.21	clear
1200	200	22.60	11.74	5.86	422	0.70	-4.3	5.96	clear
1205	200	22.60	11.60	5.85	425	0.59	-6.8	5.83	clear
1210	200	22.60	11.76	5.85	425	0.58	-7.1	5.73	clear
1215	200	22.60	11.74	5.85	425	0.56	-9.6	5.70	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N)									

Sampling Details

Sampling ID: PZ-12-06-SPRIN
Sample Time: 1215
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): N
Dup ID: —
Filter Size: 0.45µm
Dup Time: —

Comments

Signature

4/16/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: PZ-12-07

Project: Devens LTM
Location: SHL
Date: 4/16/15
Sampler: B/A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	27.38
Depth to bottom (ft BTOR)	33.24
Pump Set Depth (ft BTOR)	29.0
Screen Interval (ft BTOR)	23.79-33.79
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0925-
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): N
Air source: —

Field Instrument (Model/S/N): YSI 650XL 15K100983
Lamotte 2020ue 3711-3913

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0940	200	27.38	10.53	6.78	412	2.20	-33.6	53.7	Light brown
0945	200	27.38	10.85	6.73	386	1.99	-28.0	50.2	"
0950	200	27.38	10.86	6.72	374	2.13	-25.8	32.7	"
0955	200	27.38	10.97	6.70	364	2.18	-21.3	29.3	"
1000	200	27.38	10.84	6.69	359	2.23	-18.1	17.9	"
1005	200	27.38	10.78	6.67	357	2.30	-17.3	13.8	clear
1010	200	27.38	10.73	6.66	354	2.45	-15.2	12.1	clear
1015	200	27.38	10.88	6.65	350	2.48	-15.8	10.4	clear
1020	200	27.38	10.91	6.65	347	2.46	-14.9	9.81	clear
1025	200	27.38	11.01	6.65	346	2.47	-14.5	9.80	clear
1030	200	27.38	10.99	6.65	345	2.53	-14.3	9.72	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N)								X	

Sampling Details

Sampling ID: PZ-12-07-SPR19
Sample Time: 1030
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45µm
Dup Time: —

Comments

Signature

4/16/15
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: PZ-12-08

Project: Devens LTM
Location: SHL
Date: 4/12/19
Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	24.07
Depth to bottom (ft BTOR)	32.35
Pump Set Depth (ft BTOR)	22.0
Screen Interval (ft BTOR)	25.0 - 35.0
Total volume purged (gal)	4.0

Sampling Type
Purging Method: Bladder Pump
Purge start/stop time: 1225-1315
Tubing type: Bonded LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): N
Air source: Nitrogen

Field Instrument (Model/S/N): YSI 650XL 15K100983
Lamotte 20-10 WE 3711-3913

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1240	200	24.14	10.54	6.08	234	3.34	40.7	730	Rust Brown cloudy
1245	200	24.14	10.44	6.05	235	2.93	44.4	637	↓
1250	↓	↓	10.41	6.06	236	3.53	47.3	106	↓
1255	↓	↓	10.35	6.08	238	3.59	50.4	98.0	↓
1300	↓	↓	10.32	6.08	236	3.74	51.4	92.0	↓
1305	↓	↓	10.31	6.09	241	3.83	51.9	91.3	↓
1310	↓	↓	10.30	6.09	242	3.87	52.0	89.0	↓
1315	↓	↓	10.30	6.09	242	3.89	52.4	89.1	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):								X	

Sampling Details

Sampling ID: PZ-12-08-SPR15
Sample Time: 1315
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45 um
Dup Time: –

Comments BP - no peri available

[signature]
Signature

4/12/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: PZ-12-09

Project: Devens LTM
Location: SHL
Date: 4/16/19
Sampler: B.A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	23.64
Depth to bottom (ft BTOR)	33.19
Pump Set Depth (ft BTOR)	~~28~~ 29.0
Screen Interval (ft BTOR)	23.5-33.5
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0820
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): —
Air source: —

Field Instrument (Model/S/N): YSI 650XL 15K-100983
Lamotte 2020we 3711-3913

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0830	200	23.70	10.51	6.74	211	2.18	135.5	9.40	clear
0835	200	23.70	10.79	6.81	209	1.83	128.2	8.66	clear
0840	200	23.70	10.69	6.83	208	1.88	127.2	8.70	clear
0845	200	23.70	10.85	6.83	205	1.89	122.7	8.88	clear
0850	200	23.70	10.66	6.83	204	1.87	119.3	8.73	clear
0855	200	23.70	10.70	6.83	203	1.87	118.3	8.70	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: PZ-12-09-SPR19
Sample Time: 0855
Duplicate (Y/N): N
MS/MSD (Y/N): Y
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45um
Dup Time: —

Comments

Signature

4/16/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-10

Project: Devens LTM
Location: SHL
Date: 4/16/19
Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	21.32
Depth to bottom (ft BTOR)	32.33
Pump Set Depth (ft BTOR)	28
Screen Interval (ft BTOR)	23.30-33.30
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peristaltic
Purge start/stop time: 0715-0810
Tubing type: LDPE
Tubing diameter: 1/4" ID
Dedicated pump (Y/N):
Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 15K100583
Lamotte 2020we 3711-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0730	150	21.32	9.08	6.73	116	4.49	205.6	4.33	clear
0735	150	21.32	9.09	6.13	107	3.62	197.7	4.21	clear
0740	150	21.32	8.91	6.06	102	3.56	206.1	4.09	clear
0745	150	21.32	8.83	6.07	99	3.49	188.8	3.06	clear
0750	150	21.32	8.81	6.07	98	3.48	181.6	2.14	clear
0755	150	21.32	9.01	6.10	98	3.44	175.2	2.70	clear
0800	150	21.32	8.42	6.12	97	3.43	172.8	2.65	clear
0805	150	21.32	9.05	6.13	97	3.45	170.9	2.60	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):								X	

Sampling Details

Sampling ID: PZ-12-10-SPR19
Sample Time: 0805
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: -
Filter Size: 0.45µm
Dup Time: -

Comments

Signature

4/16/19
Date

KGS

Field Instrument Calibration Log

Date: 4/12/2019 **Weather:** Sunny 50°F

Project/Site Name: Devens LTM **Instrument:** YSI 556

Calibrated By: Seiler **Serial Number:** 06C2657 AI

Parameters	Solution Expiration Date	AM Calibration Time 0610		Cal. Temp. (°C)	PM Post Cal. Check Time 1355	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	11/2019	1431	1413	14.74	1438 → 1413	14.82	±10 µS/cm	yes
pH (7)	10/2020	6.99	7.00	14.67	6.92 → 7.00	14.86	± 0.3 Ph *	no
pH (4)	3/2020	3.95	4.00	14.74	4.11 → 4.00	14.71	± 0.3 Ph *	no
pH (10)	12/31/2019	9.99	10.00	14.80	10.08 → 10.0	14.81	± 0.3 Ph *	no
ORP (240 mv)	10/2019	241.6	240.0	14.91	241.0 → 240.0	14.83	±10 mv	no
Dissolved Oxygen (%)	—	~~104.3~~ ~~116~~ 99.9	100.0 ~~100.8~~	13.89	94.0 → 100.0	13.61	-	
Dissolved Oxygen (mg/L)	—	10.29	10.32	13.89	9.74 → 10.40	13.61	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	yes
Barometric Pressure (mmHg)	~~760~~	760			760		-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Brad Seiler **Date:** 4/12/2019

KGS

Field Instrument Calibration Log

Date: 4/15/2019 **Weather:** Clouds 45°F

Project/Site Name: Devens LTM **Instrument:** YSI 556

Calibrated By: Seiler **Serial Number:** 06C2657 AI

Parameters	Solution Expiration Date	AM Calibration Time 0610		Cal. Temp. (°C)	PM Post Cal. Check Time 1200	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	11/2019	1330	1413	17.85	1476 → 1413	17.32	±10 µS/cm	yes
~~pH (7)~~ pH 10	12/31/2019	10.09	10.02	17.68	10.14 → 10.02	17.27	± 0.3 Ph *	no
pH (4)	3/2020	3.96	4.00	17.85	4.06 → 4.00	17.25	± 0.3 Ph *	no
~~pH (10)~~ PH 7	10/2020	7.00	7.00	17.67	6.90 → 7.00	17.20	± 0.3 Ph *	no
ORP (240 mv)	10/2019	233.5	240.0	17.65	~~441~~ 241 → 240	17.48	±10 mv	no
Dissolved Oxygen (%)	—	96.9	100.0	17.00	98.3 → 100.0	17.67	-	—
Dissolved Oxygen (mg/L)	—	9.36	9.68	17.00	9.29 → 9.54	17.67	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	no
Barometric Pressure (mmHg)	—	760	—	—	760	—	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

KGS

Field Instrument Calibration Log

Date: 4/16/2019 **Weather:** Sunny/Clouds 40°F

Project/Site Name: Devens LTM **Instrument:** YSI 556

Calibrated By: Seiler **Serial Number:** ~~066~~ 06C2657 AI

Parameters	Solution Expiration Date	AM Calibration Time 0610		Cal. Temp. (°C)	PM Post Cal. Check Time 1420	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	11/2019	1389	1413	15.54	1449 → 1413	15.31	±10 µS/cm	yes
pH (7)	10/2020	6.98	7.00	15.62	6.86 → 7.00	15.51	± 0.3 Ph *	no
pH (4)	3/2020	3.92	4.00	15.56	4.06 → 4.00	15.59	± 0.3 Ph *	no
pH (10)	12/31/2019	10.15	10.03	15.51	10.09 → 10.02	15.49	± 0.3 Ph *	no
ORP (240 mv)	10/2019	242.1	240.0	15.31	239.6 → 240.0	15.37	±10 mv	no ~~yes~~
Dissolved Oxygen (%)	—	101.9	100.0	15.02	96.4 → 100.0	14.99	-	
Dissolved Oxygen (mg/L)	—	10.29	10.08	15.02	9.72 → 10.09	14.99	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	no
Barometric Pressure (mmHg)	—	760	—	—	760	—	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

Eric Seiler 4/16/2019

(Mark Noted Variences on Field Forms)

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM

Instrument: LaMotte 2020t

Calibrated By: Seiler

Serial Number: 1116-0719

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 1.0 NTU	Post-Cal 1.0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
4/9/2019	0.06	—	8.66	9.78	0.00 ✓	9.78 → 9.98	
4/10/2019	1.22	0.92	8.29	10.03	1.21 → 1.01	8.64 → 9.47	yes
4/12/2019	1.14	0.99	8.30	9.99	0.99 → 1.00	9.66 → 9.90	no
4/15/2019	1.27 ~~0.99~~	0.98	8.32	9.97	1.36 → 1.08	7.70 → 9.94	yes
4/16/2019	1.08	0.95	8.96	9.88	1.27 → 1.00	7.85 → 9.98	no
							yes
							05
							4/26

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: Erich Seiler

Erich Seiler

Erich Seiler

Erich Seiler

Erich Seiler

Date: 4/9/2019

4/10/2019

4/12/2019

4/15/2019

4/16/2019

KGS

Field Instrument Calibration Log

Date: 4/12/19 **Weather:** Cloudy, 40s - 50s

Project/Site Name: Dennis LTM & Shepley's 2019 **Instrument:** YSI ~~556~~ 650

Calibrated By: CV **Serial Number:** 2427

Parameters	Solution Expiration Date	AM Calibration Time 0645		Cal. Temp. (°C)	PM Post Cal. Check Time 1345	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	10/2019	1425	1413	13.13	1,418	13.30	±10 µS/cm	N
pH (7)	10/2020	6.86	7.00	13.48	6.80	12.94	± 0.3 Ph *	N
pH (4)	03/2020	4.02	4.00	13.32	4.64	13.10	± 0.3 Ph *	Y
pH (10)	02/2020	9.84	10.00	13.21	9.75	12.50	± 0.3 Ph *	N
ORP (240 mv)	10/2019	236.7	240.0	13.54	262.0	13.15	±10 mv	Y
Dissolved Oxygen (%)	—	91.1	100.0	14.20	104.0	10.47	-	—
Dissolved Oxygen (mg/L)	—	9.34	10.26	14.20	11.15	10.47	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	—	760	—	—	760	—	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 4/12/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Ocean LTM Shipley's 2019 **Instrument:** LaMotte

Calibrated By: CV **Serial Number:** 5108-5014

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
4/12/19	0.02	0.02	7.32	10.00	0.01	10.00	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature] **Date:** 4/12/19

KGS

Field Instrument Calibration Log

Date: 4/12/19 **Weather:** Sunny, 50°F

Project/Site Name: Devens LFG **Instrument:** YSI 650XL

Calibrated By: BJA **Serial Number:** 15K100183

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1604	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm[c])	11/19	1455	1413	15.89	1410	15.49	±10 µS/cm	N
pH (7)	10/20	7.08	7.00	15.97	6.97	15.47	± 0.3 Ph *	
pH (4)	03/20	3.98	4.00	15.98	4.06	15.90	± 0.3 Ph *	
pH (10)	02/20	10.00	10.00	16.06	10.10	15.62	± 0.3 Ph *	
ORP (240 mv)	10/19	240.3	240.0	16.19	241.3	15.666	±10 mv	
Dissolved Oxygen (%)	–	91.4	100	15.57	100.9	15.18	-	
Dissolved Oxygen (mg/L)	–	9.11	9.47	15.57	9.79	15.18	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	760	–	760	15.18	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: BJA **Date:** 4/12/19

KGS

Field Instrument Calibration Log

Date: 4/16/19 **Weather:** Sun/clouds, 40°F

Project/Site Name: Devens LTM **Instrument:** YSI 650XL

Calibrated By: BrA **Serial Number:** 15K100983

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1420	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm[c])	11/19	1445	1413	16.63	1408	16.40	±10 µS/cm	N
pH (7)	10/20	7.01	7.00	16.63	6.95	16.28	± 0.3 Ph *	
pH (4)	03/20	3.97	4.00	16.67	4.05	16.32	± 0.3 Ph *	
pH (10)	02/20	9.96	10.00	16.40	10.07	16.28	± 0.3 Ph *	
ORP (240 mv)	10/19	241.5	240.0	16.11	240.7	16.30	±10 mv	
Dissolved Oxygen (%)	—	92.8	100	15.79	92.2	15.74	-	
Dissolved Oxygen (mg/L)	—	9.20	9.92	15.79	9.84	15.74	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	760	760	-	760	-	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Brett Ca **Date:** 4/16/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM - SHL

Instrument: Lamotte 2020we

Calibrated By: BrA

Serial Number: 3711-3513

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
4/12/19	0.02	0.01	10.2	10.0	0.00	10.0	N
4/15/19	0.04	0.02	10.7	10.2	0.02	10.1	N
4/16/19	0.01	0.00	10.26	10.00	0.01	10.03	N

Post Calibration Criteria	
-	± 0.5

Notes: Mark Noted Variences on Field Forms

Signature: [signature]

Date: 4/16/19

KGS

Field Instrument Calibration Log

Date: 04/17/19 **Weather:** 50°F

Project/Site Name: Dewens LTM- Spring 2019 - SHL **Instrument:** YSI 650 MDS -

Calibrated By: Melissa Miller **Serial Number:** 02E0534 AM

Parameters	Solution Expiration Date	AM Calibration Time 745		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	12/19	1410	1413	13.72	1404	13.94	±10 µS/cm	N
pH (7)	10/20	7.00	7.00	13.99	7.25	13.80	± 0.3 Ph *	N
pH (4)	09/19	3.91	4.00	13.68	4.21	13.73	± 0.3 Ph *	N
pH (10)	12/19	9.94	9.99	13.74	10.13	13.78	± 0.3 Ph *	N
ORP (240 mv)	10/19	240.1	240	13.81	236.6	13.81	±10 mv	N
Dissolved Oxygen (%)	—	99.0	99.3	13.6	202.1	15.55	-	~~N/A~~
Dissolved Oxygen (mg/L)	—	10.28	10.27	13.6	21.51	15.55	± 0.5 mg/L < 0 5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	754.8	—	—	—	757.5	—	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Melissa Miller 04/17/19

KGS

Field Instrument Calibration Log

Date: 04/18/19 **Weather:** 45°F Partly Rain

Project/Site Name: Devens LTM-Spr19-SHL **Instrument:** YSI 650 MDS

Calibrated By: Melissa Miller **Serial Number:** 02E0534 AM

Parameters	Solution Expiration Date	AM Calibration Time 0730		Cal. Temp. (°C)	PM Post Cal. Check Time 1450	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	12/19	1415	1413	12.97	1410	10.89	±10 µS/cm	N
pH (7)	10/20	7.10	7.00	13.47	6.95	12.93	± 0.3 Ph *	N
pH (4)	09/19	3.80	4.00	13.68	3.93	12.89	± 0.3 Ph *	N
pH (10)	12/19	9.88	9.98	13.66	9.85	12.83	± 0.3 Ph *	N
ORP (240 mv)	10/19	241.5	239.9	13.09	240.1	11.13	±10 mv	N
Dissolved Oxygen (%)	—	118.5	99.9	12.46	100.3	10.49	-	N
Dissolved Oxygen (mg/L)	—	12.63	10.63	12.46	11.03	10.49	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	757.4	—	—	—	753.7	—	—	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Melissa Mi 04/18/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM – Spring 2019 – Sheeley's **Instrument:** Lamotte 2020 we

Calibrated By: Melissa Miller **Serial Number:** 5108-5014

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
4/17/19	0.09	0.02	9.76	9.99	0.75	7.97	Y
4/18/19	0.25	0.18	7.01	9.98	0.50	7.23	Y

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
–	± 0.5

Signature: Melissa Miller **Date:** 04/18/19

KGS

Field Instrument Calibration Log

Date: 4/15/19

Weather: Rainy ~50's (Thunder & lightning intermittent)

Project/Site Name: Dennis ITM Spring 2019 Shepley's

Instrument: YSI 650 MDS

Calibrated By: CV

Serial Number: 02E0534AM 3175

Parameters	Solution Expiration Date	AM Calibration Time 1030		Cal. Temp. (°C)	PM Post Cal. Check Time _____	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	12/31/2018	1,409	1,413	16.01			~~±10 µS/cm~~	
pH (7)	10/2020	7.09	7.00	15.58			~~±0.3 Ph~~ *	
pH (4)	09/03/2019	3.88	4.00	15.32			~~± 0.3 Ph~~ *	
pH (10)	12/31/2019	9.90	10.00	15.30			± 0.3 Ph *	
ORP (240 mv)	10/2019	244.5	240.0	15.89			~~±10 mv~~	
Dissolved Oxygen (%)	–	100.7	100	16.00			–	
Dissolved Oxygen (mg/L)	–	9.96	9.56	16.00			~~± 0.5 mg/L~~ < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	–	–			–	

Notes: Pine delivered expired Spland solution, will replace next calibration (was calibrating in the field) - NO post calibration since meter was not used during sampling due to thunder/lightning*.

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

CV 4/15/19

KGS

Field Instrument Calibration Log

Date: 4/15/19 **Weather:** Heavy Rain, T-storm, 50°F

Project/Site Name: Devens GTM **Instrument:** YSI 650 XL

Calibrated By: BJA **Serial Number:** 15K100983

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1200	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	11/19	1421	1413	17.96	1420	17.58	±10 µS/cm	N
pH (7)	10/20	7.01	7.00	18.08	6.99	17.41	± 0.3 Ph *	
pH (4)	03/20	4.00	4.00	18.08	4.05	17.58	± 0.3 Ph *	
pH (10)	02/20	9.97	10.00	18.23	10.08	17.66	± 0.3 Ph *	
ORP (240 mv)	10/19	235.4	240.0	18.70	240.8	17.72	±10 mv	
Dissolved Oxygen (%)	–	85.2	100	17.34	97.7	17.54	–	
Dissolved Oxygen (mg/L)	–	8.18	9.60	17.34	9.56	17.54	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	760	–	760	–	–	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: BJA **Date:** 4/15/19

KGS

Field Instrument Calibration Log

Date: 4/16/19

Weather: Sunny ~40-50 ; Windy

Project/Site Name: Dawn's LTM Spring 2019 Shuplays

Instrument: YSI 650

Calibrated By: CV

Serial Number: 02F0534AM 3175

Parameters	Solution Expiration Date	AM Calibration Time 0630		Cal. Temp. (°C)	PM Post Cal. Check Time 1415	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	12/31/2018	1,406	1,413	13.01	1,411	13.50	±10 µS/cm	N
pH (7)		7.02	7.06	13.32	7.16	13.43	± 0.3 Ph *	N
pH (4)	09/30/2019	3.82	4.00	13.38	4.01	13.48	± 0.3 Ph *	N
pH (10)	12/31/2019	9.82	10.00	13.28	9.78	13.21	± 0.3 Ph *	N
ORP (240 mv)	10/2019	243.2	240.0	12.87	237.7	13.31	±10 mv	N
Dissolved Oxygen (%)	—	98.1	100.0	12.98	96.4	12.31	-	N
Dissolved Oxygen (mg/L)	—	10.10	10.25	12.98	10.50	12.31	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	—
Barometric Pressure (mmHg)	—	760	—	—	760	—	-	—

Notes: Conductivity solution is expired, but calibrates fine; don't have new solution available yet
- still calibrates fine

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

4/16/19

KGS

Field Instrument Calibration Log

Date: 4/18/19 **Weather:** Cloudy ~40's ; Little rain on/off all day

Project/Site Name: Dennis LTM Spring 2019 **Instrument:** YSI 556

Calibrated By: CW **Serial Number:** 0602657 A1

Parameters	Solution Expiration Date	AM Calibration Time 0615		Cal. Temp. (°C)	PM Post Cal. Check Time 1325	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	11/2019	1,383	1,413	16.12	1,404	14.86	±10 µS/cm	N
pH (7)	10/2020	7.06	7.00	16.16	6.99	14.75	± 0.3 Ph *	N
pH (4)	3/2020	3.94	4.00	15.78	4.07	14.75	± 0.3 Ph *	N
pH (10)	12/31/2019	9.98	10.00	15.98	9.97	14.96	± 0.3 Ph *	N
ORP (240 mv)	10/2019	237.4	240.0	16.15	241.2	14.81	±10 mv	N
Dissolved Oxygen (%)	—	103.1	100.0	15.12	100.2	14.77	-	—
Dissolved Oxygen (mg/L)	—	10.39	10.07	15.12	10.11	14.77	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	760	—	—	760	—	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

4/18/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM Spring 2019 **Instrument:** LaMotte

Calibrated By: CV **Serial Number:** 5108 - 5014 => 4/15/19 - 4/16/19

SN1116 0719 => 4/18/

	AM Calibration				PM Post Calibration Check		
Date	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	Variance Noted
* 4/15/19	0.00	0.00	8.68	10.00	—	—	—
4/16/19 **	0.98 with 1 NTU	1.00	11.10	10.00	with 1 NTU 0.89	10.00	N
4/18/19	0.22	0.16	7.43	10.00	0.00	10.12	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature] **Date:** 4/18/19

* Meter was not used during sampling; Brett's equipment was used

** "DuvBlank" not calibrating properly, calibrated with "TwoBlank" instead

KGS

Field Instrument Calibration Log

Date: 4/19/19 **Weather:** Sunny 60's

Project/Site Name: Dennis LTM Spring 2019 **Instrument:** YSI 650

Calibrated By: CV **Serial Number:** 02E0534 AM 3175

Parameters	Solution Expiration Date	AM Calibration Time 0630		Cal. Temp. (°C)	PM Post Cal. Check Time 1575	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	12/31/19	1,372	1,413	13.30	1,406	16.55	±10 µS/cm	N
pH (7)	3/2020	6.98	7.00	12.91	7.01	16.35	± 0.3 Ph *	N
pH (4)	3/2020	4.15	4.00	13.07	4.08	16.44	± 0.3 Ph *	N
pH (10)	3/2020	9.80	10.00	13.09	9.82	16.57	± 0.3 Ph *	N
ORP (240 mv)	10/2019	236.8	240.0	13.20	238.1	16.57	±10 mv	N
Dissolved Oxygen (%)	–	102.6	100.0	13.38	103.1	13.40	-	–
Dissolved Oxygen (mg/L)	–	10.73	10.26	13.38	9.86	13.40	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	–	760	-	–	760	–	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

4/19/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Dennis Spring LTM 2019 Sharpley's

Calibrated By: CV

Instrument: HACH 2100 Q

Serial Number: 12080C019983

Date	AM Calibration				PM Post Calibration Check				Variance Noted
	Pre/Post - Cal 10 NTU	Pre/Post - Cal 20 NTU	Pre/Post - Cal 100 NTU	Pre/Post - Cal 800 NTU	10 NTU	20 NTU	100 NTU	800 NTU	
4/19/19	9.46/10	19.8/20.0	97.9/100	787/800	10.2	19.6	100	807	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria			
± 0.5	± 1	± 5	± 40

Signature: [signature]

Date: 4/19/19

KGS

Field Instrument Calibration Log

Date: 4/22/2019 **Weather:**

Project/Site Name: Devens LTM **Instrument:** YSI 556

Calibrated By: Seiler **Serial Number:** 06C2657 AI

Parameters	Solution Expiration Date	AM Calibration Time 1040		Cal. Temp. (°C)	PM Post Cal. Check Time 1445	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	4/2019	1465	1413	17.51	1420 → 1413	18.81	±10 µS/cm	no
pH (7)	10/2020	6.92	7.00	17.54	6.86 → 7.00	18.58	± 0.3 Ph *	no
pH (4)	3/2020	4.07	4.00	17.48	4.06 → 4.00	18.61	± 0.3 Ph *	no
pH (10)	12/31/2019	10.07	10.02	17.60	10.20 → 10.04	18.77	± 0.3 Ph *	no
ORP (240 mv)	10/2019	233.0	240.0	17.62	238.1 → 240.0	18.92	±10 mv	no
Dissolved Oxygen (%)	—	92.5	100.0	17.51	95.2 → 100.0	19.04	-	—
Dissolved Oxygen (mg/L)	—	8.84	9.57	17.51	8.82 → 9.27	19.04	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	yes
Barometric Pressure (mmHg)	—	760	—	—	760	—	-	—

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Ethan Seiler 4/22/2019

KGS

Field Instrument Calibration Log

Date: 4/23/2019 **Weather:**

Project/Site Name: Devens LTM **Instrument:** YSI 556

Calibrated By: Seiler **Serial Number:** 06C2657 AI

Parameters	Solution Expiration Date	AM Calibration Time 0610		Cal. Temp. (°C)	PM Post Cal. Check Time 1045	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	11/2019	1402	1413	16.71	1437 → 1413	16.25	±10 µS/cm	yes
pH (7)	10/2020	6.99	7.00	16.79	6.87 → 7.00	16.21	± 0.3 Ph *	no
pH (4)	3/2020	3.98	4.00	16.75	4.10 → 4.00	15.97	± 0.3 Ph *	no
pH (10)	12/31/2019	10.12	10.02	16.80	10.20 → 10.03	16.50	± 0.3 Ph *	no
ORP (240 mv)	10/2019	242.3	240.0	16.79	240.8 → 240.0	16.46	±10 mv	no
Dissolved Oxygen (%)	—	106.1	100.0	16.71	88.1 → 99.9	16.06	-	—
Dissolved Oxygen (mg/L)	—	10.32	9.72	16.71	8.68 → 98.6	16.06	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	yes
Barometric Pressure (mmHg)	—	760	—	—	760	—	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Earl Seiler **Date:** 4/23/2019

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM

Instrument: La Motte 2020t

Calibrated By: Seiler

Serial Number: * 1116-0719 / ** 3711-3913 ~~3711~~

	Date	AM Calibration				PM Post Calibration Check		Variance Noted
		Pre-Cal 1 Ø NTU	Post-Cal 1 Ø NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	1 Ø NTU	10 NTU	
*	4/19/2019	1.23	0.99	9.67	9.99	—	—	NA
**	4/22/2019	0.76	0.88 → 1.02	11.37	9.78	1.24 → 0.93	11.24 → 9.84	yes
**	4/23/2019	0.84	0.97	8.76	9.40 → 9.96	1.18 → 1.00	9.78 → 10.32	no

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: Ethan Seiler

Ethan Seiler

Date: 4/22/2019

4/23/2019

KGS

Field Instrument Calibration Log

Date: 4/22/19 **Weather:** Partly Sunny 50's

Project/Site Name: Devins Spring LTM 2019 **Instrument:** YSI 650

Calibrated By: CV **Serial Number:** 02E0534AM 3175

Parameters	Solution Expiration Date	AM Calibration Time 0805		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	12/31/2019	1,443	1,413	15.38	1,397	15.26	±10 µS/cm	Y
pH (7)	3/2020	7.27	7.00	15.14	6.98	15.56	± 0.3 Ph *	N
pH (4)	3/2020	3.88	4.00	15.28	4.00	16.28	± 0.3 Ph *	N
pH (10)	3/2020	9.81	10.00	15.29	9.92	15.41	± 0.3 Ph *	N
ORP (240 mv)	10/2019	239.0	240.0	14.86	233.2	15.71	±10 mv	N
Dissolved Oxygen (%)	—	98.6	100.0	13.45	104.1	13.98	-	—
Dissolved Oxygen (mg/L)	—	9.86	10.19	13.45	10.34	13.98	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	760	—	—	760	—	-	—

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

4/22/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Dennis Spring LTM 2019

Instrument: HACH 2100Q

Calibrated By: CJ

Serial Number: 12080C019983

Date	AM Calibration				PM Post Calibration Check				Variance Noted
	Pre/Post - Cal 10 NTU	Pre/Post - Cal 20 NTU	Pre/Post - Cal 100 NTU	Pre/Post - Cal 800 NTU	10 NTU	20 NTU	100 NTU	800 NTU	
4/22/19	10.2/10.0	20.2/20.0	102/100	800/800	10.1	20.3	99.3	790	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria			
± 0.5	± 1	± 5	± 40

Signature: [signature]

Date: 4/22/19

KGS

Field Instrument Calibration Log

Date: 4/23/19 **Weather:** Overcast, Sun

Project/Site Name: SHL LTM **Instrument:** YSI 650 XL

Calibrated By: BrA **Serial Number:** 15K100983

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1100	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	11/19	1413	1413	17.10	1355	17.64	±10 µS/cm	Y
pH (7)	10/20	7.05	7.00	17.08	6.96	16.76	± 0.3 Ph *	N
pH (4)	03/20	4.04	4.00	17.15	4.05	16.83	± 0.3 Ph *	N
pH (10)	02/20	10.06	10.00	17.06	10.15	16.90	± 0.3 Ph *	|
ORP (240 mv)	10/19	236.5	240.0	17.20	240.5	16.80	±10 mv	|
Dissolved Oxygen (%)	–	92.1	100.0	15.70	98.7	16.30	-	|
Dissolved Oxygen (mg/L)	–	9.23	10.03	15.70	9.86	16.30	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	|
Barometric Pressure (mmHg)	–	760	760	–	760	—	-	|

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 4/23/19

KGS

Field Instrument Calibration Log

Date: ~~4/25~~ 4/19/19 **Weather:** windy, overcast

Project/Site Name: SHL EM **Instrument:** YSI 650 XL

Calibrated By: BrA **Serial Number:** 15K100883

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1413 µS/cm°)	11/19	1391	1413	14.62	1411	16.42	±10 µS/cm	N
pH (7)	10/20	7.02	7.00	14.62	7.01	16.50	± 0.3 Ph *	
pH (4)	03/20	3.96	4.00	15.13	3.98	16.37	± 0.3 Ph *	
pH (10)	02/20	9.91	10.00	14.78	9.96	16.35	± 0.3 Ph *	
ORP (240 mv)	10/19	243.2	240.0	15.74	239.5	16.46	±10 mv	
Dissolved Oxygen (%)	–	98.0	100.0	15.44	96.1	16.30	-	
Dissolved Oxygen (mg/L)	–	9.87	9.99	15.44	9.72	16.30	± 0.5 mg/L < 0 5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	760	–	760	–	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

4/19/19

(Mark Noted Variences on Field Forms)

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Dayens UM-SHL

Instrument: Lamotte 2020we

Calibrated By: BrA

Serial Number: 37-11-3513

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
4/15/15	0.12	0.01	11.3	10.2	0.03	10.4	N
4/23/15	0.08	0.03	10.9	10.1	0.05	10.2	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature]

Date: 4/23/15

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 0820
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-1A	–	10.84	28.03	

Well Construction Details

Total Depth (ft) 690R	Ground Elevation (NVGD88)	Screened Interval 695
28.03	219.91	~~23.7 – 28.70~~ 20.0 – 25.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 0945
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-13	—	10.56	77.05	

Well Construction Details

Total Depth (ft) bTOR	Ground Elevation (NVGD88)	Screened Interval ft bgs
77.65	219.81	70–75

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	PZ
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 0825
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-2A	—	10.39	28.42	

Well Construction Details

Total Depth (ft) TOR	Ground Elevation (NVGD88)	Screened Interval ft bgs
28.42	219.72	20.0 - 25.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SITL	Time: 0829
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-2B	—	10.42	84.54	

Well Construction Details

Total Depth (ft) BTOR	Ground Elevation (NVGD88)	Screened Interval ft bgs
84.54	219.76	75—80

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	yes
Sediment in Well:	yes

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 0931
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA - PZ - 2012 - 3A ~~EPA - 2012 - 3A~~	—	10.20	27.95	

Well Construction Details

Total Depth (ft) BTOR	Ground Elevation (NVGD88)	Screened Interval ft bgs
27.95	219.20	20 - 25

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked Toc
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 0924
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA - PZ - 2012 - 3B	—	10.17	77.18	

Well Construction Details

Total Depth (ft) BTOR	Ground Elevation (NVGD88)	Screened Interval BGS
77.18	219.25	70 – 75

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked toc
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	PZ
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1007
Tidally Influenced (yes/no): no	**Field Crew:** ES

~~EPA-PZ-2012-4A~~

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-4A	—	14.37	28.06	

Well Construction Details

Total Depth (ft) ~~ft bTOC~~	Ground Elevation (NVGD88)	Screened Interval ft bgs
28.06	223.3	20 - 25

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1012
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-4B	—	15.24	77.13	

Well Construction Details

Total Depth (ft) ft btoc	Ground Elevation (NVGD88)	Screened Interval ft bgs
77.13	223.51	70-75

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	PZ
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1407
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-5A	—	7.50	27.34	

Well Construction Details

Total Depth (ft) LTOR	Ground Elevation (NVGD88)	Screened Interval bGS
27.34	216.33	20-25

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1410
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-5B	—	6.91	85.62	

Well Construction Details

Total Depth (ft) bTOR	Ground Elevation (NVGD88)	Screened Interval bGS
85.62	216.20	80-85

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	~~Tubing~~ PZ
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1308
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-6A	—	21.89	33.31	

Well Construction Details

Total Depth (ft) BTOR	Ground Elevation (NVGD88)	Screened Interval bgs
33.31	230.71	25-30

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens	**Date:** 4/11/2019
Location: SHL	**Time:** 1311
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-6B	—	21.85	81.86	

Well Construction Details

Total Depth (ft) btOR	Ground Elevation (NVGD88)	Screened Interval bgs
81.86	230.85	75-80

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	PZ
Sediment in Well:	yes

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1445
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-7A	—	22.95	29.40	

Well Construction Details

Total Depth (ft) TOR	Ground Elevation (NVGD88)	Screened Interval BGS
29.40	234.42	25.0-30.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1440
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-7B	–	21.83	30.80	Need to fish tubing d

Well Construction Details

Total Depth (ft) ft bgs ~~FOR~~	Ground Elevation (NVGD88)	Screened Interval ft bgs
65	234.28	60-65

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	PZ
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1212
Tidally Influenced (yes/no):	Field Crew: BrA, EAS

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
N6-P1	—	34.59	90.70	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
87.5	259.02	85.5-87.5

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	N/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1112
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
PZ-12-01	—	20.42	35.70	no lock

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
34	237.55	24-34

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	~~[illegible]~~ no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1115
Tidally Influenced (yes/no):	Field Crew: B.A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
PZ 12-02	–	19.57	34.43	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
34	237.75	24-34

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens GTM	Date: 4/11/19
Location: SHL	Time: 1034
Tidally Influenced (yes/no):	Field Crew: B/A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
PZ-12-03	—	19.54	36.60	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
34	236.40	24-34

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/10/19
Location: SHL	Time: 1031
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOC	Total Well Depth (feet) bTOC	Comments
PZ-12-04	—	18.96	36.98	no lock

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
34	235.20	24-34

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1020
Tidally Influenced (yes/no):	Field Crew: B+A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-05	–	21.62	34.69	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
36	238.73	26-36

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 1024
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOC	Total Well Depth (feet) bTOC	Comments
PZ-12-06	–	22.73	35.88	no lock

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
35	242.18	25-35

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 1008
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
PZ-12-07	–	27.70	33.24	

Well Construction Details

Total Depth (ft) bgs	TOC ~~Ground~~ Elevation (NVGD88)	Screened Interval ft bgs
30	244.59	20-30

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devers LTM	Date: 4/11/19
Location: SHL	Time: ~~100~~ 1012
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOC	Total Well Depth (feet) BTOC	Comments
PZ-12-08	–	24.08	32.35	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval
32	244.83	22-32

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/15
Location: SHL	**Time:** 0958
Tidally Influenced (yes/no): no	**Field Crew:** B/A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
PZ-12-09	—	23.89	33.19	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
30	241.93	20-30

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 1000
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
PZ-12-10	-	21.71	32.33	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
30	242.28	20-30

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1016
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHL-4	–	10.68	14.75	no lock

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
13	227.48	3-13

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing (added Spring 2019)
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 0954
Tidally Influenced (yes/no):	**Field Crew:** B,A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoR	Total Well Depth (feet) btoR	Comments
SHL-10	—	31.14	38.66	no lock

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ ToC Elevation (NVGD88)	Screened Interval ft bgs
39	248.02	24-39

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	N/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1038
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
SHL-11	–	18.57	29.90	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
27	235.47	12-27

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1004
Tidally Influenced (yes/no):	Field Crew: B.A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
SHL-19	–	28.56	32.57	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
30	240.50	20-30

Checklist

Well Material and Diameter:	4" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 1041
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
SHL-20	–	17.38	50.48	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
49	235.95	39-49

Checklist

Well Material and Diameter:	4" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1453
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-05-41B	—	11.60	54.45	

Well Construction Details

Total Depth (ft) ~~at~~ BTOR	Ground Elevation (NVGD88)	Screened Interval ~~fr~~ ~~top~~
54.45	222.5	62 - 64

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	no
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	flush mount
Well Pad:	~~na~~ good
Other (Posts, Tags, Paint, etc.):	no paint on lid
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1450
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHm-05-41C	—	10.82	88.20	Fish Tubing

Well Construction Details

Total Depth (ft) ~~or TOR~~	Ground Elevation (NVGD88)	Screened Interval ft bgs
88.20	222.91	88-93

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	no
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	flushmount
Well Pad:	~~na~~ good
Other (Posts, Tags, Paint, etc.):	no paint on lid
Standing Water Around Well?	no
Dedicated Equipment Present?	~~yes~~ Tubing
Sediment in Well::	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 0900
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
SHM-05-40X	–	13.93	33.38	

Well Construction Details

Total Depth (ft) BTOR	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft ~~bgs~~ TOR
~~33.38~~ 33.93	223.~~34~~ 19	31.93 - 33.93

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	flush mount
Well ID Tag Present?	Re-label well
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	Re-label
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	1"

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 0847
Tidally Influenced (yes/no):	Field Crew: B/A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHM-07-03	—	19.50	33.23	Needs to be relabeled

Well Construction Details

Total Depth (ft) bTOR	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bTOR
~~33.23~~ 34.94	227.90	24.94-34.94

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	flush mount
Well ID Tag Present?	Re-label well
Well Secured?	no bolts
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	Re-label
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	1"

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 0856
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHM-07-05X	–	14.19	64.30	Needs to be relabeled

Well Construction Details

Total Depth (ft) bTOR	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bTOR
~~64.30~~ 64.83	223.40	54.83-64.83

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	flush mount
Well ID Tag Present?	Re-label well
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	Re-label
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	1"

Monitoring Well Evaluation Form

KGS

Project Name: Devers LTM	**Date:** 4/11/19
Location: SHL	**Time:** 1242
Tidally Influenced (yes/no):	**Field Crew:** BrA, EAS

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHM-10-11	—	38.17	62.28	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88) msl	Screened Interval ft bgs
60	263.76	50-60

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1027
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHM-11-02	--	21.91	68.44	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
66	240.73	52-66

Checklist

Well Material and Diameter:	4" steel
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	~~[illegible]~~ yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 1155
Tidally Influenced (yes/no):	**Field Crew:** B+A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoR	Total Well Depth (feet) btoR	Comments
SHM-11-06	–	19.36	35.82	no lock

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ Elevation toR (NVGD88)	Screened Interval ft bgs
35	236.17	25-35

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 0758
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHM-13-03	—	4.88	50.49	Blockage 80% at ~5 ft bTOR

Well Construction Details

Total Depth (ft) bTOR	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bTOR
54.14	212.05	44.14-54.14

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good - see comments above
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 0840
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
SHM-13-04	—	18.71	30.00	Needs to be relabeled

Well Construction Details

Total Depth (ft) BTOR	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft BTOR
29.68	227.02	19.68-29.68

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC, flushmount
Well ID Tag Present?	Re-label well
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	Re-label well
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 0744
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHM-13-06	–	17.00	45.70	

Well Construction Details

Total Depth (ft) bTOR	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bTOR
45.66	223.89	35.66 - 45.66

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	flush mount
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 0751
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHM-13-07	—	18.47	35.19	

Well Construction Details

Total Depth (ft) ft bTOR	Ground Elevation (NVGD88)	Screened Interval ft bTOR
36.53	225.64	26.53-36.53

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	flush mount
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	1"

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 0809
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) BTOR	Total Well Depth (feet) BTOR	Comments
SHM-13-08	—	20.90	64.37	

Well Construction Details

Total Depth (ft) BTOR	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft BTOR
64.71	227.90	54.71 - 64.71

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	flush mount
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1037
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-99-22B	—	7.12	93.53	

Well Construction Details

Total Depth (ft) ft btoc	Ground Elevation (NVGD88)	Screened Interval ft bgs
93.53	218.84	82.3-92.3

Checklist

Well Material and Diameter:	4" pvc
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing + PZ
Sediment in Well:	yes

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 09.39
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-96-6B	–	6.24	89.40	

Well Construction Details

Total Depth (ft) bTOR	Ground Elevation (NVGD88)	Screened Interval f bgs
89.40	217.38	80 - 90

Checklist

Well Material and Diameter:	4" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 1253
Tidally Influenced (yes/no):	**Field Crew:** BrA, EAS

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHM-99-29X	—	20.82	30.90	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
29	243.34	19-29

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/a
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1105
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOC	Total Well Depth (feet) bTOC	Comments
SHP-01-36X	–	7.71	12.91	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
8	223.95	3-8

Checklist

Well Material and Diameter:	1" Steel
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 1059
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHP-01-37x	—	6.46	11.01	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
6	222.79	1-6

Checklist

Well Material and Diameter:	1" Steel
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/4/19
Location: SHL	Time: 1050
Tidally Influenced (yes/no):	Field Crew: B/A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHP-01-38A	—	4.05	9.08	no lock

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
6.5	220.86	1.5-6.5

Checklist

Well Material and Diameter:	1" steel
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/a
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1047
Tidally Influenced (yes/no):	Field Crew: B/A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHP-01-38B	–	4.25	20.28	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
23	221.03	18-23

Checklist

Well Material and Diameter:	1" steel
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1145
Tidally Influenced (yes/no):	Field Crew: BIA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHP-05-43	—	44.73	61.01	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
60.5	260.17	50.5-60.5

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	~~n/a~~ good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devons EIM	**Date:** 4/11/19
Location: SHL	**Time:** 1140
Tidally Influenced (yes/no):	**Field Crew:** BM

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHP-05-44	—	41.77	60.61	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
61	258.55	51-61

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 0758
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-46B	—	14.77	76.05	

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval ft bgs
76.05	226.03	65 - 75

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1400
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-47A	—	4.19	5.97	

Well Construction Details

Total Depth (ft) btoR	Ground Elevation (NVGD88)	Screened Interval bgs
5.97	213.35	1.0-2.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1402
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-47B	—	2.23	5.91	

Well Construction Details

Total Depth (ft) ~~bgs~~ bTOR	Ground Elevation (NVGD88)	Screened Interval bgs
5.91	213.33	3.0-4.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 0944
Tidally Influenced (yes/no):	**Field Crew:** B/A

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHP-05-48B	—	3.20	5.25	

Well Construction Details

Total Depth (ft) bTOR	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ~~bTOR~~ bgs
3.0	215.96	2-3

Checklist

Well Material and Diameter:	* 1" PVC
Well Casing Reference Point:	marked top PVC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devers LTM	**Date:** 4/11/19
Location: SHL	**Time:** 0915
Tidally Influenced (yes/no):	**Field Crew:** BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHP-05-49A	–	5.50	5.98	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval ft bgs
2	216.67	1-2

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked top PVC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: ~~0915~~ 0910
Tidally Influenced (yes/no):	Field Crew: BrA

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHP-05-49B	–	3.97	5.34	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ toc Elevation (NVGD88)	Screened Interval ft bgs
3.5	215.14	2.5-3.5

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked top PVC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/19
Location: SHL	**Time:** 1235
Tidally Influenced (yes/no): no	**Field Crew:** BrA, EAS

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHP-99-35X	–	34.54	41.59	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOC Elevation (NVGD88)	Screened Interval ft bgs
40.2	258.49	30.2-40.2

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1428
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-1A	—	14.65	26.10	

Well Construction Details

Total Depth (ft) bTOR	Ground Elevation (NVGD88)	Screened Interval bGS
26.10	224.69	13.0 - 23.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	~~yes~~ no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	no lock
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1430
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-1B	—	16.19	85.63	

Well Construction Details

Total Depth (ft) bTOR	Ground Elevation (NVGD88)	Screened Interval bGS
85.63	224.69	75.0- 85.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	no lock
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1120
Tidally Influenced (yes/no): No	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-2A	—	13.69	28.50	

Well Construction Details

Total Depth (ft) btoR	Ground Elevation (NVGD88)	Screened Interval
28.50	223.73	20.0-25.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	none
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1125
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-2B	—	13.78	88.0	

Well Construction Details

Total Depth (ft) LTOR	Ground Elevation (NVGD88)	Screened Interval bgs
88.0	223.73	80-85

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	PZ
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1420
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-3A	—	10.90	27.49	

Well Construction Details

Total Depth (ft) bTOR	Ground Elevation (NVGD88)	Screened Interval bgs
27.49	221.13	20-25

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1416
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-3B	—	10.91	87.60	

Well Construction Details

Total Depth (ft) ft TOR	Ground Elevation (NVGD88)	Screened Interval ft bGS
87.60	221.13	80-85

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	PZ
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1100
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-4A	—	~~dry~~ 17.73	32.89	

Well Construction Details

Total Depth (ft) bTOR	Ground Elevation (NVGD88)	Screened Interval bgs
32.89	227.57	25.0-30.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good → should be more clearly marked inside
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens L+M	**Date:** 4/11/2019
Location: SHL	**Time:** 1105
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-4B	—	17.57	92.80	

Well Construction Details

Total Depth (ft) btoc	Ground Elevation (NVGD88)	Screened Interval bgs
92.80	227.57	85.0 - 90.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good → should be more clearly marked inside
Standing Water Around Well?	no
Dedicated Equipment Present?	PZ
Sediment in Well:	yes

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1137
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-5A	—	14.77	32.88	

Well Construction Details

Total Depth (ft) bTOR	Ground Elevation (NVGD88)	Screened Interval bGS
32.88	224.88	25-30

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1140
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-5B	—	14.77	92.70	

Well Construction Details

Total Depth (ft) BTOR	Ground Elevation (NVGD88)	Screened Interval bgs
92.70	224.88	85-90

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	PZ
Sediment in Well:	yes

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1316
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-6A	—	27.79	85.57	

Well Construction Details

Total Depth (ft) btoR	Ground Elevation (NVGD88)	Screened Interval bgs
85.57	240.05	81-86

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Double Bonded Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/2019
Location: SHL	Time: 1322
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-6B	—	20.31	111.75	

Well Construction Details

Total Depth (ft) btoc	Ground Elevation (NVGD88)	Screened Interval bgs
111.75	240.05	102 - 112

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Double Banded Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens	Date: 4/11/2019
Location: SHL	Time: 1326
Tidally Influenced (yes/no): no	Field Crew: ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-~~10~~16-6C	—	19.49	132.75	

Well Construction Details

Total Depth (ft) BTOR	Ground Elevation (NVGD88)	Screened Interval bgs
132.75	240.05	123-133

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked on TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Double Bonded Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1225
Tidally Influenced (yes/no):	Field Crew: BrA, EAS

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) btoc	Total Well Depth (feet) btoc	Comments
SHP-2016-07A	–	15.56	31.79	

Well Construction Details

Total Depth (ft) bgs	Ground Elevation (NVGD88)	Screened Interval ft bgs
32	262.18	22-32

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	N/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens LTM	Date: 4/11/19
Location: SHL	Time: 1222
Tidally Influenced (yes/no):	Field Crew: B/A, EAS

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet) bTOR	Total Well Depth (feet) bTOR	Comments
SHP-2016-07B	—	22.02	79.82	

Well Construction Details

Total Depth (ft) bgs	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
80	265.33	70-80

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	n/A
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 1002
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2017-01	—	18.54	78.50	

Well Construction Details

Total Depth (ft) bTOR	Ground Elevation (NVGD88)	Screened Interval ft bgs
78.50	227.22	74 – 79

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	some

Monitoring Well Evaluation Form

KGS

Project Name: Devens LTM	**Date:** 4/11/2019
Location: SHL	**Time:** 0743
Tidally Influenced (yes/no): no	**Field Crew:** ES

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2017-02	—	19.28	94.85	

Well Construction Details

Total Depth (ft) ~~BTOR~~	Ground Elevation (NVGD88)	Screened Interval bgs
94.85	227.26	89.5 - 94.50

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	
Well ID Tag Present?	yes
Well Secured?	~~no lock~~ BR → yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	none
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	yes

Field Master
B.A

10/22/19

Hydraulic Monitoring Field Record for Fall 2019
Shenley's Hill Landfill - Devens Massachusetts

Location	Well Identification	TOR Elevation (ft)	Time	Fall 2019 Depth to Water (ft bTOR)	Fall 2019 Depth to Bottom (ft bTOR)	Screen Interval (ft TOR)	Depth to Bottom November 2017 (ft bPVC)	Depth to Water November 2017 (ft bTOR)	Formation Type
North Impact Area	SHM-05-39A	221.53	1505	12.45	38.50	36.74 - 38.74	38.66	11.07	M
North Impact Area	SHM-05-39B	221.51	1510	Dry	66.28	65.74 - 67.74	66.33	11.84	D
North Impact Area	SHM-05-40X	223.34	1500	14.95	33.05	31.93 - 33.93	33.14	13.93	M
North Impact Area	SHM-07-03	227.90	1452	24.00	33.2	24.94 - 34.94	33.26	19.53	S
North Impact Area	SHM-07-05X	223.40	1458	15.30	63.9	54.83 - 64.83	64.52	14.33	B
North Impact Area	SHM-10-01	209.65	1145	4.20	70.46	63.46 - 73.46	70.72	1.91	D
North Impact Area	SHM-10-02	223.03	0813	18.24	63.92	55.84 - 65.84	64.09	15.71	M
North Impact Area	SHM-10-03	232.05	0808	26.87	56.22	60.78 - 70.78	69.63	24.64	M
North Impact Area	SHM-10-04	212.61	0833	6.69	64.05	57.61 - 67.61	64.49	5.11	M
North Impact Area	SHM-10-05A	235.09	1231	25.72	59.50	49.68 - 59.68	59.90	24.73	M
North Impact Area	SHM-10-08	214.36	0818	9.97	56.33	48.50 - 58.50	56.69	7.12	D
North Impact Area	SHM-10-10	217.11	1208	~~9.97~~ 11.15	66.30	57.71 - 67.71	66.57	9.19	D
North Impact Area	SHM-13-01	208.08	1129	3.48	50.68	41.31 - 51.31	50.77	1.8	M
North Impact Area	SHM-13-02	218.72	1142	13.03	71.88	61.80 - 71.80	72.73	10.79	D
North Impact Area	SHM-13-03	212.05	1159	5.68	50.96	44.14 - 54.14	51.01	4.31	D
North Impact Area	SHM-13-04	227.02	1220	19.71	29.46	19.68 - 29.68	29.97	18.33	S
North Impact Area	SHM-13-05	225.14	1224	17.15	84.80	74.75 - 84.75	86.06	15.87	D
North Impact Area	SHM-13-06	223.89	1139	17.72	44.94	35.66 - 45.66	45.68	15.61	D
North Impact Area	SHM-13-07	225.64	1155	19.23	34.79	26.53 - 36.53	35.01	R	--
North Impact Area	SHM-13-08	227.90	1212	20.90	64.05	54.71 - 64.71	54.54	19.36	D
North Impact Area	SHM-13-14D	210.68	1315	3.98	56.63	48.20 - 58.20	57.22	2.78	D
North Impact Area	SHM-13-14S	211.03	1330	4.12	17.55	8.36 - 18.36	17.13	3.48	S
North Impact Area	SHM-13-15	210.58	1345	4.32	61.88	54.60 - 64.60	62.11	3.01	D
North Impact Area	SHM-99-31A	214.34	1410	3.98	15.83	5.52 - 15.52	15.39	0.68	S
North Impact Area	SHM-99-31B	214.39	1405	4.89	61.50	51.87 - 61.87	61.47	3.47	M
North Impact Area	SHM-99-31C	214.60	1400	5.15	78.85	69.96 - 79.96	78.83	3.73	D
North Impact Area	SHM-99-32X	221.28	0750	10.80	84.10	74.16 - 84.16	84.06	9.32	D
North Impact Area	SHP-99-34B	224.91	0755	13.80	74.20	76.72 - 81.72	74.14	12.12	D
North Impact Area	SHP-05-48A	217.31	0815	3.82	5.42	5.22 -6.22	5.49	3.58	S
North Impact Area	SHP-05-48B	215.96	0820	2.84	5.25	4.93 - 5.93	5.22	2.17	S
North Impact Area	SHP-05-49A	216.67	0800	5.68	6.02	5.33 - 6.33	6.02	5.65	S
North Impact Area	SHP-05-49B	215.14	0805	4.18	5.40	4.25 - 6.25	5.35	3.96	S
Nearfield Area	EPA-PZ-2012-1A	223.79	0925	12.15	27.90	23.88 -28.88	27.97	10.62	S
Nearfield Area	EPA-PZ-2012-1B	223.53	0930	11.80	77.80	23.72 - 78.72	77.60	10.35	D
Nearfield Area	EPA-PZ-2012-2A	223.38	0912	11.42	28.40	23.66 - 28.66	28.34	9.96	S
Nearfield Area	EPA-PZ-2012-2B	223.37	0918	11.44	83.40	78.62 - 83.62	83.49	10.11	D
Nearfield Area	EPA-PZ-2012-3A	222.65	1125	11.68	27.93	23.45 - 28.45	27.90	10.10	S
Nearfield Area	EPA-PZ-2012-3B	222.57	1129	11.60	77.05	73.32 - 78.32	76.95	10.11	D
Nearfield Area	EPA-PZ-2012-4A	226.60	1140	15.92	28.00	23.30 - 28.30	27.98	14.35	S
Nearfield Area	EPA-PZ-2012-4B	226.39	1144	15.76	77.00	72.88 - 77.88	77.30	14.31	D
Nearfield Area	EPA-PZ-2012-5A	220.01	1438	8.96	27.43	23.68 - 28.68	27.37	7.19	S
Nearfield Area	EPA-PZ-2012-5B	219.38	1442	8.24	85.78	83.18 - 88.18	85.70	6.70	D
Nearfield Area	EPA-PZ-2012-6A	234.25	0739	23.68	33.40	28.54 - 33.54	33.30	22.01	S
Nearfield Area	EPA-PZ-2012-6B	234.08	0733	23.55	82.00	78.23 - 83.23	82.15	21.92	D
Nearfield Area	EPA-PZ-2012-7A	234.16	1513	27.79	29.40	24.74 - 29.74	29.33	22.12	S
Nearfield Area	EPA-PZ-2012-7B	234.03	~~0759~~ 1513	~~20.17~~ 23.39	~~75.35~~ 64.55	59.75 - 64.75	64.28	21.87	D
Nearfield Area	SHP-2017-01	229.63	~~0746~~ 0759	~~20.50~~ 20.17	~~94.02~~ 78.35	74.0 - 79.0	79.00	18.55	O
Nearfield Area	SHP-2017-02	230.05	0746	20.80	94.02	89.5 - 94.5	94.50	19.24	O
Nearfield Area	EW-1S	226.79	1305	16.38	43.35	35.0 - 45.0	43.17	--	O
Nearfield Area	EW-4S	227.06	1507	16.30	42.04	40.0 - 50.0	42.05	--	O
Nearfield Area	SHL-13	220.71	0853	6.59	21.00	6.73 - 21.73	21.40	6.21	S
Nearfield Area	SHL-22	219.58	1055	8.68	112.95	105.68 - 115.6	113.50	7.15	D/T
Nearfield Area	SHL-23	241.29	1234	30.21	35.66	24.85 - 34.85	35.70	28.76	O

Hydraulic Monitoring Field Record for Fall 2019
Shepley's Hill Landfill - Devens Massachusetts

Location	Well Identification	TOR Elevation (ft)	Time	Fall 2019 Depth to Water (ft bTOR)	Fall 2019 Depth to Bottom (ft bTOR)	Screen Interval (ft TOR)	Depth to Bottom November 2017 (ft bPVC)	Depth to Water November 2017 (ft bTOR)	Formation Type
Nearfield Area	SHL-5	217.60	0938	5.65	13.95	3.70 - 13.70	13.90	2.50	D
Nearfield Area	SHL-8D	220.78	0906	8.21	69.00	70.95 - 72.95	69.55	7.12	D
Nearfield Area	SHL-8S	220.97	0902	8.33	56.24	54.14 - 56.14	56.60	7.27	S
Nearfield Area	SHL-9	221.95	1118	12.18	24.12	16.23 - 26.23	26.37	9.30	S
MMNearfield Area	SHM-10-06	232.91	1457	20.00	81.30	72.38 -82.38	81.70	18.60	D
MMNearfield Area	SHM-10-06A	248.54	1500	35.30	89.23	79.58 - 89.58	89.95	34.02	D
Nearfield Area	SHM-93-22B	219.39	1049	8.48	92.70	82.55 - 92.55	94.00	6.91	M
Nearfield Area	SHM-93-22C	220.69	1102	9.85	142.80	126.07 - 136.0	141.10	8.38	D
Nearfield Area	SHM-96-5B	218.92	0948	7.49	88.75	81.54 - 91.54	91.59	6.08	D/T
Nearfield Area	SHM-96-5C	218.39	0942	6.97	79.75	51.0 - 61.0	81.00	5.49	M
Nearfield Area	SHP-05-45A	228.48	0805	17.73	27.30	22.16 - 27.16	27.25	16.08	S
Nearfield Area	SHP-05-45B	229.11	0810	15.42	75.30	67.39 - 77.39	76.70	16.87	M
Nearfield Area	SHP-05-46A	228.18	0830	16.95	27.30	21.87 - 26.87	27.25	15.42	M
Nearfield Area	SHP-05-46B	227.60	0822	16.30	75.80	66.57 - 76.57	76.65	14.74	S
Nearfield Area	SHP-05-47A	217.39	1450	5.56	6.02	5.04 - 6.04	5.93	3.79	S
Nearfield Area	SHP-05-47B	215.40	1448	2.43	5.95	5.07 - 6.07	5.91	1.69	S
Nearfield Area	SHP-2016-06A	241.90	1239	30.17	85.65	82.85 - 87.85	86.05	28.35	B
Nearfield Area	SHP-2016-06B	241.89	1243	24.05	112.00	103.84 - 113.8	112.55	22.90	B
Nearfield Area	SHP-2016-06C	241.92	1246	23.75	133.60	124.87 - 134.8	133.95	22.80	B
Nearfield Area	SHP-2016-1A	227.27	1435	16.85	25.82	15.59 - 25.59	25.64	14.89	S
Nearfield Area	SHP-2016-1B	227.24	1440	17.75	86.50	77.56 - 87.56	86.48	16.01	D
Nearfield Area	SHP-2016-2A	225.93	1355	15.41	27.45	22.20 - 27.20	27.39	13.65	S
Nearfield Area	SHP-2016-2B	225.95	1328	16.29	87.98	82.22 - 87.22	87.90	13.69	D
Nearfield Area	SHP-2016-3A	223.18	1108	12.50	27.58	22.05 - 27.05	27.50	10.92	S
Nearfield Area	SHP-2016-3B	223.18	1113	12.37	87.74	82.05 - 87.05	87.90	10.86	D
Nearfield Area	SHP-2016-4A	229.97	1334	24.83	32.83	27.40 - 32.40	32.74	17.78	S
Nearfield Area	SHP-2016-4B	229.75	1338	19.10	92.70	87.18 - 92.18	92.85	17.52	D
Nearfield Area	SHP-2016-5A	227.01	1345	16.10	32.84	27.13 - 32.13	37.75	14.72	S
Nearfield Area	SHP-2016-5B	226.95	1350	16.28	92.71	87.07 - 92.07	92.90	14.70	D
Nearfield Area [2]	SHM-05-41A	222.48	1304	11.95	40.75	41.76 - 43.76	40.45	10.42	S
Nearfield Area [2]	SHM-05-41B	222.33	1256	40.09	64.05	61.83 - 63.83	60.87	10.25	M
Nearfield Area [2]	SHM-05-41C	222.57	1318	12.15	87.71	97.66 - 92.66	87.82	10.53	D
Nearfield Area [2]	SHM-05-42A	216.81	1405	8.05	44.19	43.16 - 45.16	44.28	4.43	S
Nearfield Area [2]	SHM-05-42B	216.80	1400	7.50	73.71	73.15 - 75.15	73.38	4.52	M
Nearfield Area [2]	SHM-10-16	219.23	1410	8.62	87.48	77.51 - 87.51	87.22	7.13	D
Landfill Area	N5-P1	242.65	1310	24.0	99.75	97.69 - 99.69	99.76	23.80	B
Landfill Area	N5-P2	242.69	1315	24.25	32.80	25.23 - 30.23	32.73	24.11	B
Landfill Area	N6-P1	259.02	0950	36.68	90.78	88.39 - 90.39	91.29	37.25	B
Landfill Area	N7-P1	255.59	0930	31.15	71.30	68.41 - 70.41	71.32	30.95	B
Landfill Area	N7-P2	256.04	0935	31.20	37.32	31.86 - 36.86	37.34	31.18	O
Landfill Area	SHL-1	272.27	1025	7.75	8.13	2.51 - 5.51	8.13	4.83	O
Landfill Area	SHL-18	237.56	0954	25.12	28.51	7.89 - 27.89	28.77	18.26	O T/L
Landfill Area	SHM-10-07	246.82	0900	27.08	50.18	41.84 - 51.84	50.42	27.11	M
Landfill Area	SHM-10-11	263.76	0945	40.23	62.30	52.60 - 62.60	62.57	40.48	D
Landfill Area	SHM-10-12	255.17	1015	33.75	57.34	47.60 - 57.60	57.29	34.01	M
Landfill Area	SHM-10-13	244.77	1320	25.95	73.30	63.26 - 73.26	73.26	25.93	D
Landfill Area	SHM-10-14	237.62	1325	20.48	82.85	62.82 - 82.82	82.85	20.09	D
Landfill Area	SHM-10-15	243.68	1305	24.40	56.70	46.73 - 56.73	56.66	24.42	M
Landfill Area	SHP-2016-07A	265.30	1046	Dry	31.80	24.32 - 34.32	31.79	31.44	B
Landfill Area	SHP-2016-07B	265.33	1052	35.80	79.90	72.35 - 82.35	80.62	32.85	B
Landfill Area	SHP-95-27X	237.45	0915	14.03	42.72	32.64 - 42.64	42.71	14.27	O
Landfill Area	SHP-99-01B	273.16	1040	9.85	~~24~~. 10.00	5.40 - 9.40	9.90	9.72	O
Landfill Area	SHP-99-01C	274.15	1035	24.54	32.05	21.69 - 31.69	32.08	19.80	B

Hydraulic Monitoring Field Record for Fall 2019
Shepley's Hill Landfill - Devens Massachusetts

Location	Well Identification	TOR Elevation (ft)	Time	Fall 2019 Depth to Water (ft bTOR)	Fall 2019 Depth to Bottom (ft bTOR)	Screen Interval (ft TOR)	Depth to Bottom November 2017 (ft bPVC)	Depth to Water November 2017 (ft bTOR)	Formation Type
Landfill Area	SHP-99-29X	243.34	1255	23.95	30.90	20.88 - 30.88	30.92	23.97	S
Landfill Area	SHP-99-35X	258.49	1005	36.35	41.60	31.96 - 41.96	41.81	36.78	S
Shepley's Hill	20-1	278.52	1125	39.90	56.33	40.74 - 56.44	56.50	36.86	B
Shepley's Hill	27-1	270.66	1130	41.12	66.30	60.82 - 65.82	66.28	34.32	B
Shepley's Hill	27-2	275.15	1137	47.45	69.62	60.08 - 70.08	69.35	44.45	B
Shepley's Hill	CAP-2B	250.21	1225	22.80	58.27	53.55 -58.55	58.25	20.66	B
Shepley's Hill	CH-1D	250.59	1210	21.80	97.32	87.13 - 97.13	97.47	19.15	B
Shepley's Hill	CH-1S	250.63	1215	22.00	43.00	38.17 - 43.17	43.06	18.98	B
Shepley's Hill	MW-1	251.84	1220	Dry	11.52	6.58 - 8.58[3]	11.52	11.50	O
Shepley's Hill	MW-11A	258.57	1205	8.90	9.05	4.18 - 6.18[3]	9.00	8.75	O
Shepley's Hill	MW-14	256.61	1155	Dry	9.65	5.14 - 7.14[3]	9.60	Dry	O
Shepley's Hill	MW-16	270.23	1120	9.55	9.56	5.18 - 7.18[3]	9.56	9.55	O
Shepley's Hill	MW-22	267.70	1145	Dry	8.80	4.70 - 6.70[3]	8.80	Dry	O
Shepley's Hill	MW-4-1	247.33	1232	Dry	7.70	3.72 - 5.72[3]	7.68	7.58	O
Shepley's Hill	MW-7	249.10	1240	Dry	12.02	6.98 - 8.98[3]	12.02	11.98	O
Shepley's Hill	MW-9	243.91	1247	Dry	12.10	7.65 - 9.65[3]	12.09	11.88	O
Shepley's Hill	Q4-1	268.38	1112	32.70	42.32	32.18 - 42.18	42.50	30.70	B
Shepley's Hill	Q5-1	260.99	1150	28.53	53.43	50.67 - 53.67	53.39	26.40	B
Shepley's Hill	Well 3-2	268.20	1105	39.53	58.95	55.92 - 59.92	59.00	36.45	B
Barrier Wall	N1-P1	229.92	1109	12.99	73.00	67.14 - 72.14	72.95	13.80	D
Barrier Wall	N1-P2	229.93	1111	13.01	48.25	42.15 - 47.15	48.23	13.75	M
Barrier Wall	N1-P3	230.08	1113	12.97	21.10	14.30 - 19.30	21.09	13.40	S
Barrier Wall	N2-P1	222.01	1129	4.65	41.76	36.46 - 41.46	41.78	5.00	B
Barrier Wall	N2-P2	222.16	1132	4.99	12.73	5.61 - 10.61	12.75	5.21	S
Barrier Wall	N3-P1	220.83	1042	4.15	37.95	35.02 - 37.02	37.98	4.30	S
Barrier Wall	N3-P2	220.84	1037	3.85	12.51	6.03 - 11.03	12.55	3.80	S
Barrier Wall	PZ-12-01	237.55	0942	20.12	35.70	27.70 - 37.70	35.70	20.16	S
Barrier Wall	PZ-12-02	237.79	0939	20.08	34.45	28.04 - 38.04	34.39	20.05	S
Barrier Wall	PZ-12-03	236.40	0928	19.95	36.60	27.55 - 37.55	36.55	19.06	S
Barrier Wall	PZ-12-04	238.20	0926	19.90	37.00	27.15 - 37.15	37.00	19.86	S
Barrier Wall	PZ-12-05	238.73	0905	21.09	34.71	28.65 - 38.65	34.70	21.18	M
Barrier Wall	PZ-12-06	242.18	0901	23.64	33.85	28.76 - 38.76	35.85	23.55	M
Barrier Wall	PZ-12-07	244.59	0824	27.08	33.19	23.79 - 33.79	33.22	26.40	M
Barrier Wall	PZ-12-08	244.83	0827	26.41	32.34	21.09 - 35.09	32.35	25.02	M
Barrier Wall	PZ-12-09	241.93	0742	23.97	33.19	23.50 - 33.50	32.15	21.98	S
Barrier Wall	PZ-12-10	242.28	0735	22.81	32.35	23.30 - 33.30	32.32	21.35	S
Barrier Wall	SHL-10	248.02	0756	30.56	38.62	25.40 - 40.40	38.67	29.94	S
Barrier Wall	SHL-11	235.47	0951	18.05	29.81	13.52 - 28.52	29.85	18.20	S
Barrier Wall	SHL-19	240.50	0803	22.99	32.52	21.91 - 31.91	32.45	20.09	S
Barrier Wall	SHL-20	235.95	0946	18.00	49.45	40.23 - 50.23	50.40	18.00	D
Barrier Wall	SHL-3	246.95	0750	29.35	33.95	25.15 - 35.15	34.15	29.57	M
Barrier Wall	SHL-4	227.48	0809	10.00	14.70	4.40 - 14.40	14.65	10.00	S
Barrier Wall	SHM-11-02	240.73	0857	22.32	68.59	41.07 - 51.07	68.90	22.32	B
Barrier Wall	SHM-11-06	236.17	1053	20.11	35.80	27.84 - 37.84	35.82	19.42	S
Barrier Wall	SHM-11-07	240.83	0914	22.40	48.01	43.61 - 48.61	48.00	22.35	B
Barrier Wall	SHP-01-36X	223.95	1117	6.67	12.80	6.96 - 11.98	12.89	7.15	S
Barrier Wall	SHP-01-37X	222.79	1125	5.85	10.40	5.12 - 10.12	10.44	5.95	S
Barrier Wall	SHP-01-38A	220.86	0956	3.32	9.07	3.59 - 8.59	9.06	3.59	S
Barrier Wall	SHP-01-38B	221.03	1001	3.49	25.53	20.15 - 25.15	25.52	3.72	D
Barrier Wall	SHP-05-43	260.17	1105	45.05	61.18	52.29 - 62.29	61.21	44.60	S
Barrier Wall	SHP-05-44	258.55	1059	42.41	60.70	53.99 - 63.99	60.74	41.55	M
Barrier Wall	RSK-7	222.01	1137	4.63	11.16	5.45 - 10.45	11.15	5.00	S
Barrier Wall	RSK-15	225.54	0813	8.05	14.62	9.85 - 14.85	14.62	8.06	S

Hydraulic Monitoring Field Record for Fall 2019
Shepley's Hill Landfill - Devens Massachusetts

Location	Well Identification	TOR Elevation (ft)	Time	Fall 2019 Depth to Water (ft bTOR)	Fall 2019 Depth to Bottom (ft bTOR)	Screen Interval (ft TOR)	Depth to Bottom November 2017 (ft bPVC)	Depth to Water November 2017 (ft bTOR)	Formation Type	
Barrier Wall	RSK-19	218.76	1005	1.35	9.54	4.98 - 9.98	9.66	1.58	S	
Barrier Wall	RSK-25	239.21	0818	21.69	26.39	20.68 - 25.68	26.36	21.01	S	
Barrier Wall	RSK-27	241.45	0851	22.37	26.11	21.22 - 26.22	26.10	22.70	S	
Barrier Wall	RSK-28	239.24	0911	20.75	25.91	21.40 - 26.40	26.10	20.75	S	
Barrier Wall	RSK-32	236.91	0921	18.61	25.93	21.04 - 26.04	25.95	18.60	S	
MM Barrier Wall	RSK-34	233.16	1525	16.06	23.85	18.61 - 23.61	24.00	15.82	S	
Barrier Wall	RSK-35	233.64	1046	17.01	25.49	22.65 - 26.65	25.51	16.71	S	
Barrier Wall	RSK-37	220.55	1028	3.10	8.78	33.91 - 38.91	8.80	4.47	S	
Upgradient	SHL-12	248.62	0920	22.58	28.23	16.40 - 31.40	28.71	22.10	O	T/L
Upgradient	SHL-15	259.92	0904	20.47	26.16	15.40 - 25.40	26.53	18.38	O	T/L
Upgradient	SHL-17	233.79	0925	8.88	18.17	7.91 - 17.91	18.49	6.86	O	NT
Upgradient	SHL-24	238.75	0938	15.79	120.38	111.96 - 121.9	120.45	14.95	D/B	T/L
Upgradient	SHL-7	236.33	0945	18.14 (steel) icy	23.50	12.55 - 22.55	23.74	17.19	O	T/L
Upgradient	SHM-93-10D	248.01	1000	30.03	58.41	48.70 - 58.70	58.80	29.99	B	T/L
Upgradient	SHM-93-18B	237.31	0948	18.64	91.17	80.60 - 90.60	91.23	17.91	O	T/L
Upgradient	SHM-93-24A	238.42	0934	16.12	25.22	16.23 - 26.23	25.84	15.20	O	T/L
Upgradient/AOC32	32M-01-14XOB	256.56	0913	26.38	29.49	19.56 -29.56	30.00	25.57	O	P
Upgradient/AOC32	32M-92-01X	260.17	0900	11.35	25.80	15.61 - 25.61	26.03	18.51	O	T/L
Upgradient/AOC32	32Z-01-07XOB	259.48	0908	19.38	24.34	14.50 - 24.50	24.92	16.17	O	T/L
Upgradient/AOC32	SHL-25	258.01	0916	27.68	36.01	25.23 - 35.23	36.32	27.54	O	T/L
Surface Water	PSP-01	218.14	1107	Completely submerged.	2.8	--	--	2.00	SW	
Surface Water	SHSG-13-01G	205.53	0818	1.5	-	--	--	1.60	SW	
Surface Water	SHSG-13-02G	208.25	—	Grass too high to see		--	--	3.30	SW	
Surface Water	SHSG-13-03G	209.99	—	cannot see beyond grasses		--	--	not gauged	SW	
Surface Water	SHSG-14-01G	213.71	1243	2.3	—	--	--	3.10	SW	
AOC 32	32M-01-14XBR	255.26	0911	25.65	42.05	35.81 - 45.81	--	21.63	B	P
AOC 32	32M-01-15XBR	257.70	1050	22.57	43.64	34.16 - 44.16	--	19.18	B	T/B
AOC 32	32M-01-16XBR	257.50	1054	24.54	30.11	20.79 - 30.79	--	20.37	B	T/MB

12" off

Notes:

[1] = Groundwater Elevations used to construct 2017 SHL Annual Report Figures 5-2 and 5-3, unless rejected or **bolded**

[2] = wells listed in LTMMP Table 1 as located in NIA but verified to be in Nearfield Area

[3] = screen interval approximated based boring log depth and DTB (no well construction log)

R = rejected gauging measurement

TOR = top of riser (referenced measuring point)

ft bPVC = feet below top of PVC riser

ft bTOR = feet below top of riser

Destroyed wells removed from program (2017): N4-P1, N4-P2, N4-P3, and SHP-99-34A

All coordinates are on the Massachusetts State Plane Coordinate System of NAD 1983 and vertically on NAVD

Control Point S127-S is referenced benchmark per 2017 Survey Report Rev 3 (November 2017)

S = shallow overburden
M = mid overburden
D = deep overburden
O = overburden
T = till
B = bedrock
SW = surface water
"--" = no data
Indicates well clusters

	MM	46
	CV	42
	ES	56
	BrA / BGA	39

micro level
Slurry Diver

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-1B

Project: LTM - Fall 2019 | Date: 11/7/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	11.65
Depth to bottom (ft BTOR)	78.70
Pump Set Depth (ft BTOR)	76.0
Screen Interval (ft BTOR)	23.72-78.72
Total volume purged (gal)	2.85

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1205/1215 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG

LaMotte 2020we 5083-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm[c])	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
12:15	240	~~11.80~~ 11.65	9.77	6.19	420	4.00	8.5	4.39	clear
12:20	240	~~11.80~~ 11.65	9.69	6.21	430	0.68	-0.2	4.95	clear
12:25	240	11.65	9.67	6.23	434	0.55	-3.7	3.78	clear
12:30	240	11.65	9.65	6.28	451	0.46	-11.7	4.25	clear
12:35	240	11.65	9.67	6.32	457	0.39	-20.6	8.62	clear
12:40	240	11.65	9.73	6.35	468	0.29	-25.5	12.70	clear
12:50	240	11.65	9.79	6.38	475	0.27	-30.0	17.89	clear
12:55	240	11.65	9.77	6.39	475	0.29	-31.5	18.59	clear
13:00	240	11.65	9.78	6.41	477	0.28	-33.2	17.81	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: EPA-PZ-2012-1B_FAL19

Sample Time: 13:00 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright

Signature

11/7/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA - PZ-2012-1A

Project: LTM - Fall 2019 | Date: 11/7/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	11.62
Depth to bottom (ft BTOR)	28.90
Pump Set Depth (ft BTOR)	26.5
Screen Interval (ft BTOR)	23.88 - 28.88
Total volume purged (gal)	2.64

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1105/1115 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG
LaMotte 2020 we 5083-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
11:15	250	11.80	9.68	6.76	133	1.83	54.4	5.12	clear
11:20	250	11.80	9.60	6.32	124	0.53	71.8	4.75	clear
11:25	250	11.80	9.58	6.25	121	0.46	74.0	5.19	clear
11:30	250	11.80	9.59	6.17	119	0.36	74.1	5.13	clear
11:35	250	11.80	9.57	6.13	118	0.35	75.6	4.07	clear
11:40	250	11.80	9.56	6.10	118	0.32	75.7	4.34	clear
11:45	250	11.80	9.61	6.08	117	0.28	78.3	4.70	clear
11:50	250	11.80	9.60	6.07	117	0.26	78.5	4.38	clear
11:55	250	11.80	9.60	6.07	117	0.24	79.1	4.12	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: EPA-PZ-2012-1A_FAL19

Sample Time: 11:55 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

11/7/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-2A

Project: LTM - Fall 2019 | Date: 10/24/2019

Location: Fort Devens, Massachusetts | Sampler: Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	x		
Concrete Pad intact	x		
PVC casing intact	x		
Well gripper present	x		
Bolts present			x
Locked (stickup wells)	x		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	11.29
Depth to bottom (ft BTOR)	28.40 ~~28.40~~ ~~28.54~~
Pump Set Depth (ft BTOR)	26.16
Screen Interval (ft BTOR)	23.66 – 28.66
Total volume purged (gal)	1.9

Sampling Type

Purging Method: peri. | Tubing type: LDPE | Dedicated pump (Y/N): no

Purge start/stop time: 0954/1636 | Tubing diameter: 1/4" OD | Air source: none

Field Instrument (Model/S/N): YSI 556 MPS # 15F101567
HACH 2100Q # 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0957	200	11.45	10.12	5.73	50	8.70	127.9	6.25	clear
1002	200	11.46	10.10	5.57	51	6.57	137.7	1.47	clear
1007	200	11.46	10.12	5.49	52	6.64	140.9	1.94	clear
1012	200	11.47	10.14	5.36	52	6.67	149.3	0.49	clear
1017	200	11.47	10.14	5.40	52	6.67	151.7	0.54	clear
1022	200	11.47	10.16	5.37	52	6.61	153.6	1.17	clear
1027	200	11.47	10.14	5.38	52	6.66	157.3	1.63	clear
1032	200	11.47	10.20	5.40	51	6.55	158.2	1.44	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: EPA-PZ-2012-2A_FAL19

Sample Time: 1032 | Duplicate (Y/N): no | MS/MSD (Y/N): no

Field Filtered (Y/N): yes | Dup ID: –

Filter Size: 0.45um | Dup Time: –

Comments

Brian Seiler
Signature

10/24/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-2B

Project: LTM - Fall 2019 | Date: 10/24/2019

Location: Fort Devens Massachusetts | Sampler: Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	11.35
Depth to bottom (ft BTOR)	83.40
Pump Set Depth (ft BTOR)	81.12
Screen Interval (ft BTOR)	78.62-83.62
Total volume purged (gal)	2.4

Sampling Type

Purging Method: Peristaltic | Tubing type: LDPE | Dedicated pump (Y/N): no

Purge start/stop time: 1119/1207 | Tubing diameter: 1/4" OD | Air source: none

Field Instrument (Model/S/N): YSI 556 MPS # 15F101567

HACH 2100Q # 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1122	200	11.47	10.66	5.40	302	13.30	198.3	6.30	clear
1127	200	11.49	10.68	5.80	353	1.78	186.1	39.8	clear
1132	200	11.52	10.55	5.84	381	3.29	184.9	46.6	clear
1137	200	11.52	10.61	5.87	378	2.26	182.7	30.1	clear
1142	200	11.52	10.57	5.90	378	1.47	181.6	22.7	clear
1147	200	11.52	10.68	5.95	378	0.78	178.5	27.4	clear
1152	200	11.52	10.68	5.94	379	0.58	178.3	27.6	clear
1157	200	11.52	10.66	5.95	378	0.42	177.6	28.1	clear
1202	200	11.52	10.67	5.92	375	0.41	177.9	26.2	clear
1207	200	11.52	10.69	5.94	375	0.35	177.6	26.9	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: EPA-PZ-2012-2B_FAL19

Sample Time: 1207 | Duplicate (Y/N): no | MS/MSD (Y/N): no

Field Filtered (Y/N): yes | Dup ID: —

Filter Size: 0.45um | Dup Time: —

Comments

Eric Seiler — Signature

10/24/2019 — Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-3A

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 10/28/19
Sampler: BM

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	11.35
Depth to bottom (ft BTOR)	27.52
Pump Set Depth (ft BTOR)	25
Screen Interval (ft bgs)	23.45-28.45
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri
Purge start/stop time: 1150-
Tubing type: #4 LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): N
Air source: —

Field Instrument (Model/S/N): YSI 556 MPS
Hach 2100Q

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1210	150	11.40	10.94	5.64	334	3.40	80.1	20.7	clear
1215	150	11.50	10.88	5.63	332	2.71	75.0	16.4	
1220	150	11.50	10.80	5.62	331	1.08	70.5	9.62	
1225	200	11.50	10.76	5.62	330	0.71	65.1	8.42	
1230	200	11.50	10.74	5.62	329	0.65	63.0	7.13	
1235	200	11.50	10.74	5.62	328	0.51	60.1	6.28	
1240	200	11.50	10.74	5.61	327	0.40	55.4	2.16	
1245	200	11.50	10.78	5.61	326	0.38	53.3	1.98	
1250	200	11.50	10.78	5.61	323	0.36	52.1	1.96	
1255	200	11.50	10.79	5.60	320	0.38	50.0	1.90	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: EPA-PZ-2012-3A-FALL
Sample Time: 1255
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45µm
Dup Time: —

Comments

Signature

10/28/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-3B

Project: LTM - Fall 2019 | Date: 10/28/19

Location: Fort Devens, Massachusetts | Sampler: B.A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	11.35
Depth to bottom (ft BTOR)	76.95
Pump Set Depth (ft BTOR)	72
Screen Interval (ft BTOR)	73.32-78.32
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1305- | Tubing diameter: 1/4" OD | Air source: NA

Field Instrument (Model/S/N): YSI 556 MPS
Hach 2100Q

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1315	250	11.45	10.54	6.37	565	0.97	-15.1	29.5	clear
1320	250	11.45	10.51	6.40	564	0.72	-23.5	24.7	clear
1325	250	11.45	10.48	6.44	564	0.57	-31.4	20.6	clear
1330	250	11.45	10.48	6.47	563	0.44	-37.3	18.1	clear
1335	250	11.45	10.48	6.48	562	0.35	-40.8	17.9	↓
1340	250	11.45	10.48	6.49	562	0.30	-47.0	16.1	↓
1345	250	11.45	10.48	6.50	561	0.28	-48.6	12.3	↓
1350	250	11.45	10.48	6.51	561	0.29	-50.8	9.78	↓
1355	250	11.45	10.48	6.51	561	0.28	-51.9	9.68	↓
1400	250	11.45	10.48	6.52	560	0.27	-53.6	9.71	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: EPA-PZ-2012-3B-FALL19

Sample Time: 1400 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments

Signature: [signature] | Date: 10/28/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-4A

Project: LTM - Fall 2019 | Date: 10/31/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	15.5
Depth to bottom (ft BTOR)	28
Pump Set Depth (ft BTOR)	25.8
Screen Interval (ft BTOR)	23.3 - 28.3
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 09:30/09:40 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743AG
Hach 2KOQ 170600059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
09:40	250	15.5	13.66	6.38	362	2.36	-11.0	5.08	clear/light orange
09:45	250	15.6	13.62	6.32	361	1.20	-12.9	3.60	clear/light orange
09:50	250	15.6	13.60	6.25	358	0.61	-20.0	3.74	clear/light orange
09:55	250	15.6	13.55	6.24	358	0.43	-22.9	2.70	clear/light orange
10:00	250	15.6	13.47	6.22	357	0.42	-27.4	2.12	clear/light orange
10:05	250	15.6	13.50	6.21	356	0.33	-29.3	2.93	clear/light orange
10:10	250	15.6	13.43	6.20	355	0.31	-31.3	2.70	clear/orange
10:15	250	15.6	13.39	6.19	355	0.30	-33.3	2.66	clear/orange
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: EPA-PZ-2012-4A_FAL19

Sample Time: 10:15 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

10/31/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-4B

Project: LTM - Fall 2019 | Date: 10/31/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	15.5
Depth to bottom (ft BTOR)	77.1
Pump Set Depth (ft BTOR)	75
Screen Interval (ft BTOR)	72.88-77.8
Total volume purged (gal)	3.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 08:10/08:20 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743AG
Hach 2100Q 1706C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
08:20	250	15.55	12.75	6.84	505	1.65	-66.6	43.2	light orange/brown tint
08:25	250	15.55	12.63	6.59	498	0.93	-72.2	54.1	light orange/brown tint
08:30	250	15.55	12.44	6.42	496	0.65	-81.3	38.7	light orange/brown tint
08:35	250	15.55	12.33	6.38	500	0.56	-85.8	31.9	light orange/brown tint
08:40	250	15.55	12.24	6.38	502	2.68	-90.4	24.1	light orange tint
08:45	250	15.55	12.20	6.38	506	2.74	-92.7	19.8	clear
08:50	250	15.55	12.25	6.39	506	2.39	-93.4	17.3	clear
08:55	250	15.55	12.26	6.41	505	2.30	-95.7	13.3	clear
09:00	250	15.55	12.27	6.42	506	2.03	-95.7	9.38	clear
09:05	250	15.55	12.32	6.43	506	1.82	-97.3	9.51	clear
09:10	250		12.34	6.45	507	1.67	-98.0	9.49	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: EPA-PZ-2012-4B_FAL19

Sample Time: 09:10 | Duplicate (Y/N): Y | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP06_FAL19

Filter Size: 0.45 µm | Dup Time: 09:15

Comments

Abigail Cartwright
Signature

10/31/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA - PZ - 2012 - 5A

Project: LTM - Fall 2019 Date: 11/5/19

Location: Fort Devens, Massachusetts Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	8.4
Depth to bottom (ft BTOR)	27.4
Pump Set Depth (ft BTOR)	26
Screen Interval (ft BTOR)	23.68-28.68
Total volume purged (gal)	2.6

Sampling Type

Purging Method: Peri Tubing type: LDPE Dedicated pump (Y/N): N

Purge start/stop time: 0832/0840 Tubing diameter: 1/4" OD Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743AG
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
08:40	250	8.5	10.10	6.21	218	0.81	99.9	5.54	clear
08:45	250	8.5	9.56	6.02	156	0.69	98.7	4.97	clear
08:50	250	8.5	9.51	5.89	143	0.61	99.5	5.39	clear
08:55	250	8.5	9.49	5.68	132	0.52	99.0	5.65	clear
09:00	250	8.5	9.48	5.41	122	0.36	92.5	3.86	clear
09:05	250	8.5	9.48	5.32	112	0.27	87.3	3.41	clear
09:10	250	8.5	9.47	5.27	111	0.23	84.4	2.86	clear
09:15	250	8.5	9.48	5.24	110	0.23	80.7	3.13	clear
09:20	250	8.5	9.47	5.23	109	0.20	80.2	3.33	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

Sampling Details

Sampling ID: EPA - PZ - 2012-5A_FAL19

Sample Time: 09:20 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID:

Filter Size: 0.45 µm Dup Time:

Comments

Abigail Cartwright
Signature

11/5/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA - PZ - 2012 - 5B

Project: LTM - Fall 2019 | Date: 11/5/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	7.7
Depth to bottom (ft BTOR)	86.1 ?
Pump Set Depth (ft BTOR)	85.5
Screen Interval (ft BTOR)	83.18-88.18
Total volume purged (gal)	2.6

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0936/0945 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG

HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
09:45	250	7.85	9.39	6.02	450	1.29	-27.4	5.50	visible dirt particles
09:50	250	7.9	9.38	6.06	450	1.07	-29.9	2.61	clear
09:55	250	7.9	9.43	6.13	454	0.57	-35.9	2.41	clear
10:00	250	7.9	9.44	6.16	454	0.50	-31.7	2.77	clear
10:05	250	7.9	9.43	6.18	454	0.34	-28.9	2.07	clear
10:10	250	7.9	9.47	6.20	455	0.23	-25.6	2.19	clear
10:15	250	7.9	9.46	6.21	454	0.30	-24.4	1.89	clear
10:20	250	7.9	9.44	6.21	454	0.30	-22.9	2.05	clear
10:25	250	7.9	9.44	6.22	454	0.28	-22.0	1.97	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

Sampling Details

Sampling ID: EPA-PZ-2012-5B_FAL19

Sample Time: 10:25 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright

Signature

11/5/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-6A

Project: LTM - Fall 2019 | Date: 10/25/2019

Location: Fort Devens, Massachusetts | Sampler: Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	23.65
Depth to bottom (ft BTOR)	33.30
Pump Set Depth (ft BTOR)	31.04
Screen Interval (ft BTOR)	28.54 - 33.54
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Perri | Tubing type: LDPE | Dedicated pump (Y/N): no

Purge start/stop time: 0747/0835 | Tubing diameter: 1/4" OD | Air source: none

Field Instrument (Model/S/N): YSI 556 MPS # 15F101567

HACH 2100Q #

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0750	200	23.63	10.07	6.82	91	10.48	211.2	166	hazy
0755	200	23.66	9.90	6.38	88	7.53	207.3	131	hazy
0800	200	23.66	9.81	6.24	88	7.08	198.2	91.5	hazy
0805	200	23.66	9.74	6.17	88	7.03	189.0	38.9	hazy
0810	200	23.66	9.72	6.15	88	7.09	185.8	21.8	clear/hazy
0815	200	23.66	9.72	6.16	88	7.00	182.2	16.7	clear
0820	200	23.66	9.69	6.14	88	7.03	180.2	13.4	clear
0825	200	23.66	9.69	6.15	88	7.06	178.1	12.0	clear
0830	200	23.66	9.70	6.13	88	7.00	177.0	12.6	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: EPA-PZ-2012-6A_FALL19

Sample Time: 0830 | Duplicate (Y/N): no | MS/MSD (Y/N): no

Field Filtered (Y/N): yes | Dup ID: —

Filter Size: 0.45 um* | Dup Time: —

Comments

Signature: [signature] | Date: 10/25/2019

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2016-6B

Project: LTM - Fall 2019 | Date: 10/25/19

Location: Fort Devens, Massachusetts | Sampler: Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	23.48
Depth to bottom (ft BTOR)	82.0
Pump Set Depth (ft BTOR)	80.73
Screen Interval (ft BTOR)	78.23 - 83.23
Total volume purged (gal)	2.75

Sampling Type

Purging Method: peri. | Tubing type: LDPE | Dedicated pump (Y/N): no

Purge start/stop time: 0840/0932 | Tubing diameter: 1/4" OD | Air source: none

Field Instrument (Model/S/N): YSI 556MPS #
HACH 210000 #

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0843	200	23.45	9.90	6.16	141	6.35	67.6	20.4	clear
0848	200	23.52	9.98	6.27	145	2.51	15.6	17.2	clear
0853	200	23.58	10.00	6.37	151	0.71	-9.1	14.6	clear
0858	200	23.58	10.01	6.41	163	0.54	-20.9	13.1	clear
0903	200	23.58	9.97	6.48	186	0.29	-38.7	14.4	clear
0908	200	23.58	9.98	6.53	188	0.33	-45.7	15.5	clear
0913	200	23.58	9.99	6.57	190	0.24	-52.6	12.8	clear
0918	200	23.58	9.99	6.60	190	0.17	-57.1	9.48	clear
0923	200	23.58	9.99	6.63	190	0.11	-56.4	10.02	clear
0928	200	23.58	10.00	6.64	191	0.15	-60.2	9.90	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: EPA-PZ-2016-6B_FAL19

Sample Time: 0928 | Duplicate (Y/N): no | MS/MSD (Y/N): no

Field Filtered (Y/N): yes | Dup ID: —

Filter Size: 0.45 µm | Dup Time: —

Comments

Eric Seiler
Signature

10/25/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-7A

Project: LTM - Fall 2019 Date: 10/31/19

Location: Fort Devens, Massachusetts Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	23.3
Depth to bottom (ft BTOR)	28.4
Pump Set Depth (ft BTOR)	27.5
Screen Interval (ft BTOR)	24.74-29.74
Total volume purged (gal)	1.84

Sampling Type

Purging Method peri Tubing type LDPE Dedicated pump (Y/N) N

Purge start/stop time 10:45/10:55 Tubing diameter 1/4" OD Air source —

Field Instrument (Model/S/N) YSI 650 MDS 00M0743AG
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm[c])	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
10:55	200	23.3	11.22	6.28	460	3.46	73.7	4.45	clear
11:00	200	23.3	11.65	6.16	460	3.30	81.5	5.39	clear
11:05	200	23.3	11.65	6.08	457	3.37	85.1	5.45	clear
11:10	200	23.3	11.69	6.07	454	3.37	88.2	4.39	clear
11:15	200	23.3	11.68	6.06	451	3.52	91.2	2.61	clear
11:20	200	23.3	11.72	6.04	450	3.52	92.2	2.94	clear
11:25	200	23.3	11.75	6.04	449	3.54	93.0	2.78	clear
11:30	200	23.3	11.78	6.04	448	3.58	93.8	2.80	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: EPA-PZ-2012-7A_FAL19

Sample Time: 11:30 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID: —

Filter Size: 0.45 µm Dup Time: —

Comments

Abigail Cartwright
Signature

10/31/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: EPA-PZ-2012-7B

Project: LTM - Fall 2019 | Date: 11/5/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	28.0
Depth to bottom (ft BTOR)	
Pump Set Depth (ft BTOR)	62.5
Screen Interval (ft BTOR)	54.75-64.75
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1417/1425 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
14:25	250	28.0	9.95	6.74	153	0.87	-72.5	12.1	clear
14:30	250	28.0	9.89	6.73	151	0.68	-77.7	19.5	clear
14:35	250	28.0	9.84	6.72	149	0.54	-86.2	7.61	clear
14:40	250	28.0	9.87	6.72	149	0.30	-88.7	6.64	clear
14:45	250	28.0	9.84	6.73	148	0.35	-91.7	4.31	clear
14:50	250	28.0	9.83	6.72	148	0.24	-93.7	6.23	clear
14:55	250	28.0	9.84	6.73	148	0.24	-93.5	5.92	clear
15:00	250	28.0	9.83	6.72	148	0.23	-93.2	6.42	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

Sampling Details

Sampling ID: EPA-PZ-2012-7B_FAL19

Sample Time: 15:00 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

11/5/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: N1-P1

Project: LTM - Fall 2019 | Date: 11/14/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Baker

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	15'
Depth to bottom (ft BTOR)	23.60'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	65-70
Total volume purged (gal)	3.7

Sampling Type

Purging Method: Peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1050 | Tubing diameter: 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 1050 MDS / 11G 100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1055	300.0	15.1	10.81	6.87	0.303	1.12	82.4	16.9	slightly cloudy
1100	300.0	15.1	11.08	6.68	0.304	0.89	79.3	15.8	slightly cloudy
1105	300.0	15.1	11.23	6.48	0.385	0.54	69.8	15.6	slightly cloudy
1110	300.0	15.1	11.28	6.52	0.396	0.47	65.6	15.2	slightly cloudy
1115	300.0	15.1	11.25	6.54	0.401	0.41	64.5	15.1	slightly cloudy
1120	300.0	15.1	11.22	6.56	0.406	0.37	62.7	15.1	slightly cloudy
1125	300.0	15.1	11.17	6.57	0.410	0.34	61.6	15.2	slightly cloudy
1130	300.0	15.1	11.18	6.58	0.407	0.35	60.7	15.2	slightly cloudy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: N1-P1_FALL19

Sample Time: 1130 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): N | Dup ID: —

Filter Size: — | Dup Time: —

Comments PFAS sample only

Signature | Date: 11/14/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: N1-P2

Project: LTM - Fall 2019 | Date: 11/14/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Fisher

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	15'
Depth to bottom (ft BTOR)	48.91
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	40 - 45'
Total volume purged (gal)	3.7

Sampling Type

Purging Method: peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1210 | Tubing diameter: 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 650MDS/11A100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1215	300.0	15.1	11.75	6.72	0.325	0.39	59.4	15.2	Slightly cloudy
1220	300.0	15.1	11.83	6.67	0.328	0.30	49.6	15.2	Slightly cloudy
1225	300.0	15.1	11.85	6.66	0.328	0.27	44.0	14.9	Slightly cloudy
1230	300.0	15.1	11.88	6.63	0.329	0.25	36.7	14.8	Slightly cloudy
1235	300.0	15.1	11.89	6.62	0.329	0.25	30.7	14.7	Slightly cloudy
1240	300.0	15.1	11.87	6.62	0.329	0.24	28.4	14.6	Slightly cloudy
1245	300.0	15.1	11.88	6.61	0.329	0.23	21.7	14.6	Slightly cloudy
1250	300.0	15.1	11.91	6.61	0.328	0.22	19.4	14.5	Slightly cloudy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: N1 - P2 - FALL19

Sample Time: 1250 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): N | Dup ID: —

Filter Size: — | Dup Time: —

Comments: PFAS Sample Only

Signature | Date: 11/14/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: N2 - P1

Project: LTM - Fall 2019 | Date: 11/4/19

Location: Fort Devens Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	6.10
Depth to bottom (ft BTOR)	13.5 ?
Pump Set Depth (ft BTOR)	37 ?
Screen Interval (ft BTOR)	35 - 40
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1315/1325 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG
HACH 2100Q 1706QC059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1325	250	6.15	13.45	6.43	589	0.88	-47.1	2.77	clear
1330	250	6.15	13.33	6.48	592	0.55	-55.3	2.77	clear
1335	250	6.15	13.56	6.50	593	0.47	-58.4	2.24	clear
1340	250	6.15	13.37	6.51	595	0.36	-50.2	2.41	clear
1345	250	6.15	13.44	6.52	594	0.29	-61.6	2.87	clear
1350	250	6.15	13.56	6.53	595	0.26	-62.4	3.00	clear
1355	250	6.15	13.34	6.54	596	0.28	-63.2	3.14	clear
1400	250	6.15	13.22	6.53	596	0.27	-62.7	3.12	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	Y	

Sampling Details

Sampling ID: N2 - P1_FAL19

Sample Time: 1400 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

11/4/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: N2 – P2

Project: LTM - Fall 2019 | Date: 11/14/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Ebber

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	6'
Depth to bottom (ft BTOR)	13.45'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	4-9
Total volume purged (gal)	3.7

Sampling Type

Purging Method: peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0830 / | Tubing diameter: 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 556 MDS / 16 100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0835	300.0	6.1	10.68	5.98	0.492	0.66	133.0	61.7	cloudy
0840	300.0	6.1	10.94	6.06	0.500	0.46	110.1	16.7	clear
0845	300.0	6.1	10.94	6.09	0.501	0.46	102.7	13.0	clear
0850	300.0	6.1	10.94	6.12	0.502	0.39	91.5	12.8	clear
0855	300.0	6.1	10.96	6.14	0.502	0.38	85.7	12.4	clear
0900	300.0	6.1	10.98	6.15	0.502	0.37	77.6	12.3	clear
0905	300.0	6.1	11.04	6.17	0.503	0.36	71.1	12.4	clear
0910	300.0	6.1	11.01	6.19	0.503	0.35	69.8	12.3	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: N2 – P2 _FALL19

Sample Time: 0910 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): N | Dup ID: —

Filter Size: — | Dup Time: —

Comments PFAS Sample only

Signature | Date: 11/14/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: N3-P1

Project: LTM - Fall 2019 | Date: 11/15/19

Location: Fort Devens, Massachusetts | Sampler: M. VIDAL

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	4.19
Depth to bottom (ft BTOR)	38.02
Pump Set Depth (ft BTOR)	~34
Screen Interval (ft BTOR)	22-35
Total volume purged (gal)	~4.25

Sampling Type

Purging Method: Low-Flow | Tubing type: HDPE | Dedicated pump (Y/N): PERISTALTIC

Purge start/stop time: 8:50/9:40 | Tubing diameter: 1/4" | Air source: N/A

Field Instrument (Model/S/N): YSI 650 MDS S/N 00M0743AG

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
855	300	5.46	9.45	9.21	0.386	2.30	80.8	28.7	CLEAR
900	↑	5.46	9.50	8.83	356	0.76	-1.7	33.3	↓
905		5.48	9.55	8.76	353	0.57	-15.6	NM	
910		5.49	9.61	8.73	353	0.51	-23.7	21.6	
915		5.49	9.57	8.68	353	0.43	-22.5	17.0	
920		5.52	9.64	8.67	352	0.38	-21.7	14.8	
925		5.55	9.69	8.60	351	0.36	-20.8	11.4	
930		5.50	9.66	8.60	351	0.34	-20.5	10.9	
935		5.50	9.65	8.60	351	0.33	-19.6	9.7	
940	↓	5.49	9.63	8.60	351	0.33	-19.1	9.05	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: N3-P1_FAL19

Sample Time: 0940 | Duplicate (Y/N): N/A | MS/MSD (Y/N): N/A

Field Filtered (Y/N): N/A | Dup ID: N/A

Filter Size: N/A | Dup Time: N/A

Comments

Signature | Date: 11/15/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: N3-P2

Project: LTM - Fall 2019 | Date: 11/15/19

Location: Fort Devens, Massachusetts | Sampler: M. VIDAL

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	8.10 ? *
Depth to bottom (ft BTOR)	12.61
Pump Set Depth (ft BTOR)	* 4-9 ?
Screen Interval (ft BTOR)	6-8
Total volume purged (gal)	~5.0

Sampling Type

Purging Method: Low-Flow | Tubing type: HDPE | Dedicated pump (Y/N): PERISTALTIC

Purge start/stop time: 9:55/10:45 | Tubing diameter: 1/4" | Air source: N/A

Field Instrument (Model/S/N): YSI 650 MDS S/N: 00M0743AG

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
10:00	400	8.92	10.56	8.24	58	3.54	20.3	51.6	SLIGHTLY GRAY + CLOUDY
10:05	400	8.98	10.68	7.97	58	3.45	50.2	32.1	↓
10:10	↓	9.03	10.82	7.72	56	3.37	63.1	49.0	↓
10:15	↓	9.03	10.85	7.51	56	3.23	72.7	36.3	↓
10:20	↓	9.04	10.86	7.33	55	3.15	81.9	24.8	SLIGHLY CLOUDY
10:25	↓	9.05	10.89	7.20	55	3.06	84.6	17.3	CLEAR
10:30	↓	9.05	10.93	6.94	56	3.02	89.2	12.0	↓
10:35	↓	9.02	10.97	6.92	55	3.02	90.7	10.7	↓
10:40	↓	9.00	11.01	6.92	55	3.00	93.2	11.3	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: N3-P2_FAL19

Sample Time: 10:40 | Duplicate (Y/N): N/A | MS/MSD (Y/N): N/A

Field Filtered (Y/N): N/A | Dup ID: N/A

Filter Size: N/A | Dup Time: N/A

Comments * WL METER WAS HAVING INTERFERENCE DUE TO SMALL WELL DIAMETER

Signature | Date: 11/15/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: N5-P1

Project: LTM - Fall 2019 | Date: 11/6/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Ebner

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	24.8'
Depth to bottom (ft BTOR)	102.4'
Pump Set Depth (ft BTOR)	~~102.4'~~ NA
Screen Interval (ft BTOR)	97.69 – 99.69
Total volume purged (gal)	4.0

Sampling Type

Purging Method: peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1150/ | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 6920 MDS / 11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1155	320.5	25.55	10.53	7.41	0.363	0.67	9.8	13.04	clear
1200	300.7	25.45	10.43	7.38	0.403	0.59	-8.5	11.93	clear
1205	300.5	25.45	10.18	7.10	0.514	0.60	-1.0	12.21	clear
1210	300.0	25.44	10.33	6.82	0.570	0.60	1.3	11.19	clear
1215	300.5	25.42	10.28	6.79	0.576	0.60	-6.4	11.56	clear
1220	300.7	25.25	10.35	6.70	0.582	0.57	-19.9	10.67	clear
1225	300.4	25.25	10.43	6.67	0.584	0.56	-27.2	11.45	clear
1230	300.5	25.20	10.73	6.60	0.585	0.54	-36.9	9.84	clear
1235	300.4	25.18	10.59	6.60	0.588	0.54	-39.9	10.53	clear
1240	300.4	25.20	10.56	6.58	0.589	0.55	-43.2	9.85	clear
Acceptance Criteria:		<0.3ft ✓	±3% ✓	±0.1 ✓	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	–				

Sampling Details

Sampling ID: N5 – P1 – FA19

Sample Time: 1240 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45 µm | Dup Time: —

Comments

Signature | Date: 11/6/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: N7-P2

Project: LTM - Fall 2019 | Date: 11/7/19

Location: Fort Devens, Massachusetts | Sampler: B.A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	31.25
Depth to bottom (ft BTOR)	37.33
Pump Set Depth (ft BTOR)	35
Screen Interval (ft BTOR)	31.86-36.86
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peri | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0815-0910 | Tubing diameter: 1/4" OD | Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0830	60	31.30	11.56	6.31	357	0.70	52.2	21.6	clear
0835	60	31.30	11.48	6.21	354	0.58	25.4	18.0	"
0840	60	31.30	11.29	6.17	353	0.27	3.2	9.28	"
0845	60	31.30	11.25	6.15	351	0.20	-4.4	8.36	"
0850	60	31.30	11.20	6.18	350	0.18	-11.6	7.26	"
0855	60	31.30	11.05	6.14	349	0.17	-19.4	5.01	"
0900	60	31.30	11.03	6.16	349	0.18	-22.9	4.96	"
0905	60	31.30	11.04	6.16	348	0.21	-23.4	4.94	"
0910	60	31.30	11.03	6.14	347	0.22	-23.4	4.90	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: N7-P2-FAL19

Sample Time: 0910 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): N | Dup ID: —

Filter Size: — | Dup Time: —

Comments PFAS only

Signature | Date: 11/7/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-01

Project: LTM - Fall 2019 | Date: 11/1/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	20.4
Depth to bottom (ft BTOR)	36.4
Pump Set Depth (ft BTOR)	32.7
Screen Interval (ft BTOR)	27.7 - 37.7
Total volume purged (gal)	2.64

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0900/1010 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743AG
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
10:10	250	20.4	10.41	6.47	595	4.49	-43.2	15.2	clear
10:15	250	20.4	10.40	6.36	597	0.86	-54.9	12.2	clear
10:20	250	20.4	10.44	6.37	598	0.67	-60.0	8.53	clear
10:25	250	20.45	10.53	6.38	597	0.55	-63.1	5.99	clear
10:30	250	20.45	10.60	6.39	597	0.46	-65.9	4.21	clear
10:35	250	20.45	10.68	6.39	597	0.40	-66.9	4.62	clear
10:40	250	20.45	10.68	6.39	596	0.37	-67.5	5.03	clear
10:45	250	20.45	10.70	6.40	596	0.34	-58.0	4.82	clear
10:50	250	20.45	10.80	6.4	599	0.36	-63.9	4.51	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: PZ-12-01_FAL19

Sample Time: 10:50 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

11/1/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-02

Project: LTM - Fall 2019 | Date: 11/1/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	20.2
Depth to bottom (ft BTOR)	34.5
Pump Set Depth (ft BTOR)	33
Screen Interval (ft BTOR)	28.04 - 38.04
Total volume purged (gal)	2.9

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 11:15/11:25 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743AG
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
11:25	200	20.3	12.19	6.41	780	0.81	-60.3	8.54	light orange/brown
11:30	200	20.3	12.24	6.23	778	0.65	-55.6	8.01	clear
11:35	200	20.3	12.09	6.28	776	0.51	-56.5	5.84	clear
11:40	200	20.3	12.12	6.28	777	0.40	-52.5	4.85	clear
11:45	200	20.3	11.87	6.30	770	0.38	-62.4	5.41	clear
11:50	200	20.3	11.68	6.31	771	0.33	-66.2	4.89	clear
11:55	200	20.3	11.82	6.33	776	1.95*	-69.3	4.46	clear
12:00	200	20.3	11.92	6.34	770	3.15*	-71.3	3.44*	clear
12:05	200	20.3	11.96	6.36	771	2.84	-72.1	3.69	clear
12:10	200	20.3	12.06	6.36	772	1.92*	-72.3	2.78*	clear
12:15	200	20.3	12.24	6.37	768	1.72	-67.3	3.03	clear
12:20	200	20.3	12.28	6.36	768	1.54	-64.1	3.14	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: PZ-12-02_FAL19

Sample Time: 12:20 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

11/1/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-03

Project: LTM - Fall 2019 Date: 10/30/19

Location: Fort Devens, Massachusetts Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.1
Depth to bottom (ft BTOR)	38.1
Pump Set Depth (ft BTOR)	32
Screen Interval (ft BTOR)	27.55-37.55
Total volume purged (gal)	2.3

Sampling Type

Purging Method Peri Tubing type LDPE Dedicated pump (Y/N) N

Purge start/stop time 07:55/8:05 Tubing diameter 1/4" OD Air source

Field Instrument (Model/S/N) YSI 650 MDS 00M0743AG
Hach 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
08:05	250	19.1	11.45	6.47	481	1.14	-34.3	2.97	clear
08:10	250	19.1	11.16	6.36	630	2.43	-58.2	2.32	clear
08:15	250	19.1	11.15	6.28	627	0.74	-57.1	1.96	clear
08:20	250	19.1	11.07	6.28	627	0.44	-67.9	3.52	clear
08:25	250	19.1	11.05	6.27	626	0.50	-71.8	3.48	clear
08:30	250	19.1	11.06	6.28	626	0.35	-73.0	3.08	clear
08:35	250	19.1	11.03	6.28	626	0.32	-76.4	2.81	clear
08:40	250	19.1	11.03	6.29	626	0.29	-80.4	2.65	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: PZ-12-03-FAL19

Sample Time: 08:40 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID:

Filter Size: 0.45 µm Dup Time:

Comments

Abigail Cartwright
Signature

10/30/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-04

Project: LTM – Fall 2019 Date: 10/30/19

Location: Fort Devens, Massachusetts Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.85
Depth to bottom (ft BTOR)	37.15
Pump Set Depth (ft BTOR)	32
Screen Interval (ft BTOR)	27.15-37.15
Total volume purged (gal)	2.97

Sampling Type

Purging Method Peri Tubing type ~~PVC~~ LDPE Dedicated pump (Y/N) N

Purge start/stop time 09:20/09:30 Tubing diameter 1/4" OD Air source

Field Instrument (Model/S/N) YSI 650 MDS 00M0743AG

HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
09:30	250	19.85	11.66	6.33	625	3.14	-62.5	22.8	clear
09:35	250	19.90	11.66	6.28	622	2.04	-61.9	31.8	clear
09:40	250	19.90	11.51	6.31	629	0.61	-70.4	21.3	clear
09:45	250	19.90	11.45	6.35	632	0.38	-74.1	14.3	clear
09:50	250	19.90	11.50	6.36	630	0.39	-75.7	11.4	clear
09:55	250	19.90	11.47	6.37	630	0.34	-75.3	10.7	clear
10:00	250	19.90	11.56	6.38	628	0.35	-73.6	8.03	clear
10:05	250	19.90	11.58	6.38	628	0.25	-75.2	6.25	clear
10:10	250	19.90	11.61	6.39	626	0.24	-72.1	5.71	clear
10:15	250	19.90	11.52	6.39	628	0.26	-71.8	5.20	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: PZ-12-04_FAL19

Sample Time: 10:15 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID:

Filter Size: .45 µm Dup Time:

Comments

Abigail Cartwright 10/30/19

Signature **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-05

Project: LTM - Fall 2019 | Date: 10/30/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	21.25
Depth to bottom (ft BTOR)	24.7
Pump Set Depth (ft BTOR)	33.5
Screen Interval (ft BTOR)	28.65 - 38.65
Total volume purged (gal)	2.64

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 10:50/11:00 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743AG

Hach 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
11:00	250	21.25	11.84	6.36	290	1.91	-22.5	8.44	clear
11:05	250	21.25	11.52	6.10	287	1.42	-27.0	3.36	clear
11:10	250	21.25	11.43	6.15	288	0.95	-31.4	2.19	clear
11:15	250	21.25	11.43	6.18	287	2.42	-33.9	2.53	clear
11:20	250	21.25	11.52	6.19	286	2.54	-37.5	2.82	clear
11:25	250	21.25	11.54	6.21	288	2.23	-39.4	3.19	clear
11:30	250	21.25	11.60	6.22	290	2.26	-40.2	4.07	clear
11:35	250	21.25	11.70	6.23	290	2.22	-39.9	3.70	clear
11:40	250	21.25	11.72	6.23	290	1.99	-38.5	3.54	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: PZ-12-05_FAL19

Sample Time: 11:40 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright — **Signature**

10/30/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-06

Project: LTM - Fall 2019 | Date: 10/29/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	23.65
Depth to bottom (ft BTOR)	35.91
Pump Set Depth (ft BTOR)	34
Screen Interval (ft BTOR)	28.76-38.76
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 13:20/13:30 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
13:30	250	23.65	11.44	5.96	239	0.70	6.1	18.5	clear
13:35	250	23.65	11.36	5.99	233	3.09	-5.2	10.3	clear
13:40	250	23.65	11.38	6.00	230	3.71	-10.2	7.03	clear
13:45	250	23.65	11.37	5.99	228	0.90	-12.3	4.98	clear
13:50	250	23.65	11.36	6.00	227	0.35	-14.6	4.86	clear
13:55	250	23.65	11.39	5.99	227	0.24	-20.2	4.29	clear
14:00	250	23.65	11.37	6.00	226	0.23	-23.0	6.52	clear
14:05	250	23.65	11.47	6.00	225	0.39	-27.2	6.37	clear
14:10	250	23.65	11.52	6.02	226	0.31	-28.7	6.63	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: PZ-12-06_FAL19

Sample Time: 14:10 | Duplicate (Y/N): Y | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP01_FAL19

Filter Size: 0.45 µm | Dup Time: 14:15

Comments

Abigail Cartwright

Signature

10/29/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: P2-12-07

Project: LTM - Fall 2019 | Date: 11/1/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	27.20
Depth to bottom (ft BTOR)	33.20
Pump Set Depth (ft BTOR)	29
Screen Interval (ft BTOR)	23.75-33.75
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0955- 1100 | Tubing diameter: 1/4" OD | Air source: MA

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 2100Q 16010047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1010	250	27.20	11.62	6.04	297	4.46	185.3	67.9	clr - light orange
1015	250	27.20	11.44	6.10	384	3.33	154.6	53.1	"
1020	250	27.20	11.47	6.23	424	3.12	114.6	47.0	"
1025	250	27.20	11.52	6.25	431	3.03	104.8	32.6	"
1030	250	27.20	11.55	6.31	434	2.96	82.9	27.4	clear
1035	250	27.20	11.55	6.32	434	2.91	72.5	18.8	clear
1040	250	27.20	11.58	6.35	436	2.90	63.0	12.6	clear
1045	250	27.20	11.54	6.36	435	2.86	53.8	10.1	clear
1050	250	27.20	11.52	6.37	431	2.92	50.6	8.72	clear
1055	250	27.20	11.53	6.37	434	2.89	48.7	8.67	clear
1100	250	27.20	11.54	6.37	435	2.88	47.1	8.70	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: P2-12-07 FAL19

Sample Time: 1100 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: –

Filter Size: 0.45µm | Dup Time: –

Comments Full Suite + VOCs

Signature | Date: 11/1/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-08

Project: LTM - Fall 2019 | Date: 10/31/19

Location: Fort Devens, Massachusetts | Sampler: BCA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	25.40
Depth to bottom (ft BTOR)	32.35
Pump Set Depth (ft BTOR)	30
Screen Interval (ft BTOR)	21.05-35.09
Total volume purged (gal)	4.0

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: ~~1000~~ 1005 - | Tubing diameter: 1/4" OD | Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15F106567 Hach 2100Q

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1015	250	25.40	12.82	5.69	223	3.30	132.7	108	cloudy-orange
1020	250	25.40	12.76	5.75	223	0.83	106.1	140	cloudy-orange
1025	250	25.40	12.64	5.74	224	0.50	94.9	151	cloudy-orange
1030	250	25.40	12.68	5.76	223	0.41	86.7	126	cloudy-orange
1035	250	25.40	12.62	5.76	224	0.33	82.8	108	cloudy-orange
1040	250	25.40	12.58	5.73	225	0.30	77.8	73.9	cloudy-orange
1045	250	25.40	12.59	5.74	225	0.35	75.0	57.3	clear-orange
1050	250	25.40	12.58	5.75	225	0.31	72.4	42.4	clear
1055	250	25.40	12.55	5.75	225	0.32	70.8	28.6	clear
1100	250	25.40	12.61	5.77	225	0.33	67.3	27.0	clear
1105	250	25.40	12.67	5.77	225	0.34	65.3	26.5	clear
1110	250	25.40	12.71	5.78	225	0.35	63.9	25.8	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: PZ-12-08_FA19

Sample Time: 1110 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: -

Filter Size: 0.45µm | Dup Time: -

Comments

Signature

10/31/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ 12-09

Project: LTM - Fall 2019 | Date: 10/31/19

Location: Fort Devens Massachusetts | Sampler: B/A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	23.73
Depth to bottom (ft BTOR)	33.15
Pump Set Depth (ft BTOR)	30
Screen Interval (ft BTOR)	23.50-33.50
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0910-0955 | Tubing diameter: 1/4" OD | Air source: MA

Field Instrument (Model/S/N): YSI 556MPS 15F101567
Hach 21008

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0920	250	23.80	12.46	5.90	210	4.14	175.6	31.7	clear
0925	250	23.80	12.26	6.24	206	1.11	166.1	23.6	clear
0930	250	23.80	12.25	6.30	204	0.92	164.4	19.6	clear
0935	250	23.80	12.36	6.35	201	0.82	162.8	15.1	clear
0940	250	23.80	12.39	6.38	194	0.96	161.3	12.6	clear
0945	250	23.80	12.46	6.35	187	0.91	161.0	10.9	clear
0950	250	23.80	12.49	6.30	184	0.88	162.5	10.4	clear
0955	250	23.80	12.47	6.31	182	0.86	162.9	10.0	clear
		~~23.80~~							
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: PZ-12-09-FAL19

Sample Time: 0955 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: -

Filter Size: 0.45µm | Dup Time: -

Comments

Signature | Date: 10/31/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: PZ-12-10

Project: LTM - Fall 2019 | Date: 10/31/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	22.55
Depth to bottom (ft BTOR)	32.32
Pump Set Depth (ft BTOR)	30
Screen Interval (ft BTOR)	23.30-33.30
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0810-0855 | Tubing diameter: 1/4"OD | Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15F101567 Hach 21008

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0820	250	22.60	12.76	5.25	96	7.04	201.8	13.8	clear
0825	250	22.60	12.72	5.17	95	7.06	194.4	4.57	clear
0830	250	22.60	12.73	5.15	95	6.89	189.2	3.14	clear
0835	250	22.60	12.71	5.18	95	6.86	186.7	2.03	clear
0840	250	22.60	12.77	5.21	95	6.79	185.8	1.96	clear
0845	250	22.60	12.77	5.23	95	6.79	185.0	1.90	clear
0850	250	22.60	12.76	5.23	95	6.77	185.2	1.88	clear
0855	250	22.60 ✓	12.76 ✓	5.23 ✓	95 ✓	6.76 ✓	184.3 ✓	1.89 ✓	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: PZ-12-10-FAL19

Sample Time: 0855 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: -

Filter Size: 0.45um | Dup Time: -

Comments

Signature: [signature] | Date: 10/31/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SML-7

Project:	LTM - Fall 2019	Date:	11/13/19
Location:	Fort Devens, Massachusetts	Sampler:	MK

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	18.15
Depth to bottom (ft BTOR)	~22'
Pump Set Depth (ft BTOR)	~17'
Screen Interval (ft BTOR)	12.55 – 22.55
Total volume purged (gal)	3.0

Sampling Type

Purging Method: geotech

Purge start/stop time: 1145/1225

Tubing type: HDPE

Tubing diameter: 1/4"

Dedicated pump (Y/N): Tubing

Air source: N/A

Field Instrument (Model/S/N): YSI 650 XL 11B100186

Laquatwin 201DVE 3E90-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1145	200	18.15	10.38	8.09	216	5.19	-1.0	9.86	Clear
1150		18.15	10.21	7.99	209	3.47	-2.7	5.90	Clear
1155		18.15	10.09	7.88	206	3.39	-3.6	4.20	Clear
1200		18.15	9.67	7.90	201	3.28	-4.0	4.17	Clear
1205		18.15	9.45	7.77	197	3.27	-4.2	4.15	Clear
1210		18.15	9.43	7.76	196	3.28	-4.3	4.16	Clear
1215		18.15	9.41	7.73	192	3.26	-4.6	4.19	Clear
1220	↓	18.15	9.37	7.71	190	3.25	-4.5	4.21	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SML-7

Sample Time: 1225

Duplicate (Y/N): N

MS/MSD (Y/N): N

Field Filtered (Y/N): N

Dup ID: N

Filter Size: .45

Dup Time: N

Comments

Signature

11/13/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-12

Project: LTM - Fall 2019 | Date: 11/7/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Eisner

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	22.87
Depth to bottom (ft BTOR)	29.55?
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	16.40 – 31.40
Total volume purged (gal)	4.75

Sampling Type

Purging Method: Peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1155/1245 | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS / 16G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1200	360.2	22.95	10.38	6.51	0.556	1.45	121.5	13.02	clear
1205	360.4	22.98	10.36	6.29	0.467	2.45	117.0	12.47	clear
1210	360.2	23.00	10.35	6.21	0.447	2.60	113.5	12.61	clear
1215	360.3	23.01	10.36	6.12	0.438	2.85	112.0	11.54	clear
1220	360.5	23.00	10.36	6.10	0.437	3.20	109.6	11.76	clear
1225	360.3	23.00	10.36	6.04	0.435	3.47	109.5	12.17	clear
1230	360.4	23.05	10.36	6.07	0.436	3.42	107.3	10.97	clear
1235	360.3	23.00	10.37	6.04	0.436	3.40	106.3	12.11	clear
1240	360.3	23.00	10.38	5.99	0.435	3.37	108.1	11.73	clear
1245	360.4	23.00	10.39	6.04	0.439	3.04	105.2	12.18	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	–				

Sampling Details

Sampling ID: SHL-12_FA2_19

Sample Time: 1245 | Duplicate (Y/N): N | MS/MSD (Y/N): Y, PFAS only

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45 µm | Dup Time: —

Comments Depth to Bottom is higher than end of screen

Signature | Date: 11/7/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-24

Project: LTM - Fall 2019 | Date: 11/7/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Eger

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	16.85
Depth to bottom (ft BTOR)	127.8
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	111.96 - 121.96
Total volume purged (gal)	3.0

Sampling Type

Purging Method: peristaltic | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0935/1015 | Tubing diameter: 3/16" | Air source: NA

Field Instrument (Model/S/N): YSI ~~[illegible]~~ 650MDS/11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0940	280.5	16.90	10.74	6.79	0.268	2.42	92.2	11.29	clear
0945	300.7	17.20	10.76	6.89	0.268	2.18	91.4	11.69	clear
0950	300.2	17.85	10.78	6.98	0.267	2.03	91.6	11.42	clear
0955	300.1	17.90	10.81	7.05	0.267	1.95	92.4	11.32	clear
~~0101~~ 1000	290.4	19.08	10.82	7.08	0.268	1.93	92.5	11.98	clear
1005	290.5	19.10	10.83	7.12	0.266	1.88	93.2	11.59	clear
1010	250.7	19.20	10.84	7.14	0.266	1.88	93.9	11.50	clear
1015	250.4	19.30	10.84	7.16	0.265	1.91	94.6	11.43	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHL-24_FALL19

Sample Time: 1015 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments

Signature | Date: 11/7/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-3

Project: LTM - Fall 2019 | Date: 10/29/19

Location: Fort Devens, Massachusetts | Sampler: BCA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	29.75
Depth to bottom (ft BTOR)	33.90
Pump Set Depth (ft BTOR)	~~30~~ 33
Screen Interval (ft BTOR)	25.15-35.15
Total volume purged (gal)	3.0

Sampling Type

Purging Method: 1.75" Bladder | Tubing type: LDPE | Dedicated pump (Y/N): ~~Y~~ N

Purge start/stop time: 0810- | Tubing diameter: 1/4" OD | Air source: N_2

Field Instrument (Model/S/N): YSI 556 MPS, Hach 2100Q

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0825	150	29.90	12.18	5.92	214	5.99	177.6	15.6	clear
0830	150	29.90	12.09	5.90	219	5.45	170.8	10.8	clear
0835	150	29.90	12.05	5.92	226	5.17	164.2	7.48	clear
0840	150	29.90	12.04	5.93	228	5.14	161.1	5.81	clear
0845	150	29.90	12.02	5.94	224	5.10	160.2	4.44	clear
0850	150	29.90	12.01	5.95	224	5.06	159.1	4.03	clear
0855	150	29.90	12.01	5.96	224	5.03	158.3	3.61	clear
0900	150	29.90	12.01	5.96	222	5.04	158.2	3.58	clear
0905	150	29.90	12.00	5.97	220	5.07	158.1	3.60	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHL-3-FAL19

Sample Time: 0905 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: -

Filter Size: 0.45µm | Dup Time: -

Comments

Signature | Date: 10/29/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-3

Project: LTM - Fall 2019 | Date: 11/15/19

Location: Fort Devens, Massachusetts | Sampler: Brd

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	—		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	30.20
Depth to bottom (ft BTOR)	33.95
Pump Set Depth (ft BTOR)	32
Screen Interval (ft BTOR)	25.15-35.15
Total volume purged (gal)	2.0

Sampling Type

Purging Method: 1.75" Bladder | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1040-1130 | Tubing diameter: 1/4"OD | Air source: N2

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 21008 160100047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1050	250	30.40	11.78	6.44	179	5.66	159.0	14.7	clear
1055	250	30.40	11.73	6.23	176	5.01	157.9	12.8	"
1100	250	30.40	11.78	6.11	176	4.84	155.9	11.6	"
1105	250	30.40	11.78	6.08	176	4.81	156.2	10.2	"
1110	250	30.40	11.67	5.97	177	4.82	160.2	9.97	"
1115	250	30.40	11.72	6.01	177	4.80	158.7	10.1	"
1120	250	30.40	11.70	5.94	177	4.80	161.0	9.90	"
1125	250	30.40	11.75	6.00	178	4.80	159.3	9.98	"
1130	250	30.40	11.73	5.98	178	4.83	160.8	10.0	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHL-3-FAL19

Sample Time: 1130 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): N | Dup ID: –

Filter Size: – | Dup Time: –

Comments PFAS only

Signature | Date: 11/15/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL - 4

Project: LTM - Fall 2019 | Date: 10/29/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	10.0
Depth to bottom (ft BTOR)	14.7
Pump Set Depth (ft BTOR)	9.5
Screen Interval (ft BTOR)	4.4 - 14.4
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 11:55/12:05 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
12:05	250	10	11.96	6.18	216	3.91	16.8	53.7	orange/brown tint
12:10	250	10	11.91	6.08	215	0.46	-0.4	46.1	orange/brown tint
12:15	250	10	11.91	6.09	213	0.40	-1.7	40.2	orange/brown tint
12:20	250	10.5	11.92	6.08	213	0.22	-1.5	27.0	orange/brown tint
12:25	250	10.5	11.92	6.08	213	0.27	-1.5	22.0	clear
12:30	250	10.5	11.92	6.08	212	0.31	-3.3	17.3	clear
12:35	250	10.5	11.93	6.08	212	0.29	-4.0	19.9	clear
12:40	250	10.5	11.93	6.09	211	0.29	-4.1	18.2	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):									0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: SHL-4_FAL19

Sample Time: 12:40 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright — **Signature**

10/29/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-5

Project: LTM - Fall 2019 | Date: 11/8/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	3.5
Depth to bottom (ft BTOR)	13.90
Pump Set Depth (ft BTOR)	8.5
Screen Interval (ft BTOR)	3.70-13.70
Total volume purged (gal)	2.3

Sampling Type

Purging Method: peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1135/1145 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 11B100186
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
11:45	250	3.9	11.45	6.09	133	1.70	48.4	8.55	clear
11:50	250	3.95	11.51	5.74	131	-0.49	58.3	7.93	clear
11:55	250	3.97	11.52	5.72	131	-0.60	68.5	7.52	clear
12:00	250	3.97	11.41	5.55	133	-0.50	60.7	5.40	clear
12:05	250	3.97	11.49	5.52	133	-0.45	61.0	5.21	clear
12:10	250	3.97	11.57	5.48	135	-0.76	61.8	4.09	clear
12:15	250	3.97	11.64	5.51	136	-0.77	62.1	3.82	clear
12:20	250	3.97	11.82	5.47	137	-0.81	63.1	3.57	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	Y	Y	

Sampling Details

Sampling ID: SHL-5_FAL19

Sample Time: 12:20 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments DO probe malfunctioned

Abigail Cartwright
Signature

11/8/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL -8D

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 10/24/2019
Sampler: Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact		X	
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	8.19
Depth to bottom (ft BTOR)	69.00
Pump Set Depth (ft BTOR)	71.95
Screen Interval (ft BTOR)	70.95 - 72.95
Total volume purged (gal)	~~[illegible]~~ ≈ 1.73

Sampling Type

Purging Method: Peri
Purge start/stop time: ~~[illegible]~~ 0852/0937
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): no
Air source: none

Field Instrument (Model/S/N): YSI 556 MPS # 15F101567
HACH 2100Q # 170000054342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0855	175	8.29	9.80	6.21	179	6.85	170.8	2.60	clear
0900	175	8.24	9.84	6.13	182	1.55	175.6	2.35	clear
0905	175	8.29	9.65	6.03	184	0.63	148.0	1.42	clear
0910	175	8.29	9.94	6.08	184	0.49	134.0	2.43	clear
0915	175	8.29	10.05	6.04	184	0.33	128.5	1.09	clear
0920	175	8.29	10.11	6.03	184	0.30	124.6	0.96	clear
0925	175	8.29	10.18	5.99	184	0.23	118.0	0.88	clear
0930	175	8.29	10.19	5.97	186	0.19	116.7	0.72	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: SHL - 8D _ FAL19
Sample Time: 0930
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments

[signature]
Signature

10/24/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-8S

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 10/24/2019
Sampler: Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact		X	
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	8.12
Depth to bottom (ft BTOR)	56.24
Pump Set Depth (ft BTOR)	55.14
Screen Interval (ft BTOR)	54.14-56.14
Total volume purged (gal)	≈1.3

Sampling Type

Purging Method: Perri
Purge start/stop time: 0755 / 0840
Tubing type: LDPE
Tubing diameter: 1/2" OD
Dedicated pump (Y/N): no
Air source: none

Field Instrument (Model/S/N): YSI 556MPS #15E101567
HACH 2100Q #17060000059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0758	200	9.32	9.606	7.16	85	8.10	147	8.95	clear
0803	200	9.44	9.63	6.67	82	5.68	189.5	2.64	clear
0808	200	9.55	9.69	6.44	82	5.03	181.4	2.34	clear
0813	100	9.21	9.39	6.22	83	4.93	181.8	1.36	clear
0818	100	9.04	9.36	6.16	82	4.79	176.1	1.09	clear
0823	100	9.01	9.42	6.12	82	4.78	172.3	1.62	clear
0828	100	9.00	9.50	6.09	82	4.72	171.2	1.27	clear
0833	100	9.00	9.55	6.01	82	4.70	171.1	1.13	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: SHL-8S_FAL19
Sample Time: 0833
Duplicate (Y/N): no
MS/MSD (Y/N): no
Field Filtered (Y/N): yes
Dup ID: –
Filter Size: 0.45 µm
Dup Time: –

Comments

Ernest Seiler
Signature

10/24/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-9

Project: LTM - Fall 2019 | Date: 10/30/19

Location: Fort Devens, Massachusetts | Sampler: BCA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	10.56
Depth to bottom (ft BTOR)	24.12
Pump Set Depth (ft BTOR)	~~24~~ 20
Screen Interval (ft BTOR)	16.23-26.23
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1255-1340 | Tubing diameter: 1/4" OD | Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15F101567 Hach 2100Q

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1305	200	10.85	11.41	6.67	283	7.30	20.1	30.8	clear
1310	200	10.85	11.31	6.41	280	2.60	20.6	24.2	clear
1315	200	10.85	11.17	6.37	280	1.47	17.7	24.0	clear
1320 ~~1320~~	200	10.85	10.94	6.35	280	0.70	11.0	24.8	clear
1325	200	10.85	10.93	6.34	276	0.56	8.5	22.1	clear
1330	200	10.85	10.95	6.32	273	0.41	7.1	21.9	clear
1335	200	10.85	10.95	6.32	272	0.38	5.5	21.8	clear
1340	200	10.85	10.92	6.32	272	0.36	5.0	20.9	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHL-9-FAL19

Sample Time: 1340 | Duplicate (Y/N): Y | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP07-FAL19

Filter Size: 0.45µm | Dup Time: 1345

Comments

Signature | Date: 10/30/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-10

Project: LTM - Fall 2019 | Date: 10/29/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	30.40
Depth to bottom (ft BTOR)	38.05
Pump Set Depth (ft BTOR)	35
Screen Interval (ft BTOR)	25.40-40.40
Total volume purged (gal)	2.5

Sampling Type

Purging Method: 1.75" Bladder | Tubing type: Bonded LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1130-1240 | Tubing diameter: 1/4" OD | Air source: N_2

Field Instrument (Model/S/N): YSI 556 MPS 15F101567
Hach 2100Q

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1145	200	30.40	10.59	8.68	84	8.61	124.1	28.6	clear
1150	200	30.40	10.59	8.00	73	8.50	128.4	21.9	clear
1155	200	30.40	10.59	7.86	73	8.85	131.0	17.9	clear
1200	200	30.40	10.58	7.55	73	8.84	136.1	16.2	clear
1205	200	30.40	10.58	7.35	73	8.81	141.2	14.7	clear
1210	200	30.40	10.58	7.22	74	8.78	142.3	12.8	clear
1215 ~~1220~~	200	30.40	10.52	7.02	75	8.82	145.6	11.8	clear
1220 ~~1225~~	200	30.40	10.50	6.96	75	8.87	147.1	11.1	clear
1225	200	30.40	10.65	6.85	75	8.59	147.3	10.6	clear
1230	200	30.40	10.63	6.89	75	8.86	149.1	9.81	clear
1235	200	30.40	10.59	6.85	75	8.85	149.6	9.78	clear
1240	200	30.40	10.58	6.80	75	8.82	150.4	9.75	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHL-10-FAL19

Sample Time: 1240 | Duplicate (Y/N): N | MS/MSD (Y/N): ~~N~~ Y

Field Filtered (Y/N): Y | Dup ID: –

Filter Size: 0.45µm | Dup Time: –

Replace N_2 bottle @ 1220

Comments

Signature | Date: 10/29/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-10 (Resample VOCs)

Project: LTM - Fall 2019 | Date: 11/13/19

Location: Fort Devens, Massachusetts | Sampler: BJA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	34.765
Depth to bottom (ft BTOR)	38.65
Pump Set Depth (ft BTOR)	35.8
Screen Interval (ft BTOR)	25.40-40.40
Total volume purged (gal)	3.0

Sampling Type

Purging Method: 1.25" Bladder | Tubing type: Bonded TLPE | Dedicated pump (Y/N): N

Purge start/stop time: 0950-1035 | Tubing diameter: 1/4" OD | Air source: N_2

Field Instrument (Model/S/N): YSI 556MPS 15F101567

Hach 2100Q 16060C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1000	300	31.20	9.88	5.69	46	6.35	196.4	9.84	clear
1005	300	31.20	10.01	5.53	34	6.40	205.4	3.96	clear
1010	300	31.20	9.91	5.48	33	6.33	212.2	3.80	clear
1015	300	31.20	9.79	5.45	33	6.42	213.7	3.71	clear
1020	300	31.20	9.85	5.40	32	6.32	213.3	3.58	clear
1025	300	31.20	9.90	5.47	32	6.27	211.6	3.50	clear
1030	300	31.20	9.96	5.46	32	6.25	207.6	3.51	clear
1035	300	31.20	10.00	5.50	32	6.20	210.1	3.46	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHL-10-FAL19

Sample Time: 1035 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): N | Dup ID: –

Filter Size: – | Dup Time: –

Comments VOCs only (supplemental) - previously sampled on LTM Fall '19

TOC changes potentially due to weather

Signature | Date: 11/13/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-11

Project: LTM - Fall 2019 | Date: 10/30/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	18.2
Depth to bottom (ft BTOR)	29.85
Pump Set Depth (ft BTOR)	21.5
Screen Interval (ft BTOR)	13.52-28.52
Total volume purged (gal)	2.03

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 12:22/12:30 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743AG
Hach 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
12:30	220	18.2	12.82	6.23	268	6.72	-56.2	7.20	clear / slightly orange
12:35	220	18.2	12.32	6.38	537	1.16	-89.6	6.40	clear / slightly orange
12:40	220	18.2	12.05	6.50	544	0.54	-98.7	5.41	clear
12:45	220	18.2	12.08	6.55	545	0.35	-103.0	4.56	clear
12:50	220	18.2	12.08	6.59	548	0.32	-104.3	4.36	clear
12:55	220	18.2	11.96	6.61	547	0.28	-106.8	4.67	clear
13:00	220	18.2	11.97	6.64	551	0.25	-106.9	4.22	clear
13:05	220	18.2	11.99	6.64	551	0.23	-107.8	3.81	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: SHL-11_FAL19

Sample Time: 13:05 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

10/30/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-11

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/11/19
Sampler: Vanessa Fisher

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.05'
Depth to bottom (ft BTOR)	30.81'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	17.00'- 27.00'
Total volume purged (gal)	3.1

Sampling Type

Purging Method: peristaltic
Purge start/stop time: 1110
Tubing type: Teflon lined
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS/1161003587

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1115	260.5	19.07	10.11	6.00	0.505	1.25	76.3	16.01	clear
1120	260.7	19.10	10.11	5.97	0.508	0.95	64.3	15.53	clear
1125	260.6	19.08	10.10	6.09	0.511	0.65	32.6	15.63	clear
1130	260.5	19.07	10.10	6.14	0.511	0.59	20.6	15.60	clear
1135	260.5	19.10	10.11	6.23	0.511	0.50	-8.1	11.30	clear
1140	260.5	19.08	10.10	6.26	0.512	0.45	-15.6	15.05	clear
1145	260.6	19.10	10.10	6.28	0.512	0.44	-20.3	15.27	clear
1150	260.6	19.10	10.12	6.31	0.511	0.42	-24.9	14.96	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHL-11_NOV19
Sample Time: 1150
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID:
Filter Size: 0.45µm
Dup Time: —

Comments

Signature

11/11/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-15

Project: LTM - Fall 2019 | Date: 11/1/19

Location: Fort Devens, Massachusetts | Sampler: B/A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	19.67
Depth to bottom (ft BTOR)	21.16
Pump Set Depth (ft BTOR)	20
Screen Interval (ft BTOR)	15.40-25.40
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri | Tubing type: HDPE (Dedicated) | Dedicated pump (Y/N): N

Purge start/stop time: 1125-1210 | Tubing diameter: 1/4" OD | Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 21000 16010047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1135	200	20.10	12.41	5.83	285	0.44	73.7	18.6	clear
1140	~~200~~ 100	20.40	12.36	5.74	283	0.48	77.3	12.2	clear
1145	100	20.40	12.35	5.74	284	1.98	78.0	10.4	clear
1150	100	20.40	12.36	5.74	285	1.84	78.0	6.91	clear
1155	100	20.40	12.35	5.80	287	0.31	72.9	3.85	clear
1200	100	20.40	12.35	5.78	288	0.27	73.1	3.02	clear
1205	100	20.40	12.39	5.81	290	0.24	71.4	2.97	clear
1210	100	20.40	12.40	5.81	291	0.21	71.0	2.90	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHL-15-FAL19

Sample Time: 1210 | Duplicate (Y/N): Y | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP11-FAL19

Filter Size: 0.45um | Dup Time: 1215

Comments

Signature | Date: 11/1/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL - 19

Project: LTM - Fall 2019 | Date: 11/11/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Esser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	23.70'
Depth to bottom (ft BTOR)	33.70'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	20.00' - 30.00'
Total volume purged (gal)	4.1

Sampling Type

Purging Method: peristaltic | Tubing type: Teflon lined | Dedicated pump (Y/N): N

Purge start/stop time: ~~0950~~ 0945 / 1025 | Tubing diameter: ~~1/4"~~ 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 556 MPS / 16A100587

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0950	310.5	23.70	10.35	6.93	0.183	4.01	86.0	12.1	clear
0955	310.4	23.71	10.38	6.78	0.185	4.09	84.5	11.9	clear
1000	310.5	23.70	10.36	6.50	0.194	4.74	83.9	11.7	clear
1005	310.6	23.70	10.27	6.37	0.203	5.41	83.8	11.7	clear
1010	310.5	23.72	10.23	6.34	0.205	5.63	84.2	11.8	clear
1015	310.4	23.71	10.18	6.32	0.208	5.87	84.1	11.3	clear
1020	310.5	23.70	10.10	6.30	0.213	5.59	84.7	11.14	clear
1025	310.3	23.70	10.11	6.30	0.214	5.60	84.2	11.96	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHL-19 - NOV19

Sample Time: 1025 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments VOC + filtered metals sample

Signature | Date: 11/11/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL - 19

Project: LTM - Fall 2019 Date: 10/29/19

Location: Fort Devens, Massachusetts Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	3"
Material	PVC
Depth to water (ft BTOR)	22.8
Depth to bottom (ft BTOR)	32.55
Pump Set Depth (ft BTOR)	27
Screen Interval (ft BTOR)	21.91 - 31.91
Total volume purged (gal)	2.3

Sampling Type

Purging Method Peri Tubing type LDPE Dedicated pump (Y/N) N

Purge start/stop time 10:30/10:40 Tubing diameter 1/4" OD Air source

Field Instrument (Model/S/N) YSI 650 MDS

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
10:40	250	22.8	11.00	6.09	207	5.14	206.6	32.5	clear
10:45	250	22.82	10.74	5.82	201	9.38	180.9	24.5	clear
10:50	250	22.82	10.65	5.90	202	9.07	165.5	19.8	clear
10:55	250	22.85	10.61	6.01	204	7.05	148.4	19.5	clear
11:00	250	22.85	10.60	6.07	206	9.15	139.7	22.9	clear / slight orange tint
11:05	250	22.85	10.60	6.10	209	8.69	131.1	16.4	clear
11:10	250	22.85	10.62	6.15	211	9.34	122.7	15.7	clear
11:15	250	22.85	10.66	6.18	213	8.96	114.5	14.8	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHL-19_FAL19

Sample Time: 11:15 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID:

Filter Size: 0.45 µm Dup Time:

Comments

Abigail Cartwright 10/29/19

Signature **Date**

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHL-20

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/11/19
Sampler: Kristen Essex

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	18.25'
Depth to bottom (ft BTOR)	~~39-49~~ 52.5'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	39-49
Total volume purged (gal)	3.5

Sampling Type

Purging Method: peristaltic
Purge start/stop time: 1240/
Tubing type: Teflon lined - VOCs, HDPE - PFAS
Tubing diameter: 1/4"
Dedicated pump (Y/N): N
Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS/11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1245	320.5	18.30	10.93	6.20	0.344	3.77	76.8	14.92	clear
1250	275.0	18.32	10.83	6.04	0.344	3.13	71.5	14.24	clear
1255	275.2	18.30	10.79	6.04	0.344	2.77	67.9	14.35	clear
1300	275.1	18.30	10.78	6.04	0.344	2.73	67.1	14.23	clear
1305	275.3	18.31	10.72	6.02	0.345	2.69	66.3	14.06	clear
1310	275.2	18.30	10.69	6.01	0.343	2.61	66.1	13.45	clear
1315	275.2	18.30	10.62	5.99	0.343	2.66	66.3	13.94	clear
1320	275.3	18.30	10.57	5.99	0.343	2.60	66.6	13.91	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: SHL-20-NOV19
Sample Time: 1320
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments

[signature]
Signature

11/11/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL - 20

Project: LTM - Fall 2019 | Date: 11/1/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	18.12
Depth to bottom (ft BTOR)	50.53
Pump Set Depth (ft BTOR)	45.2
Screen Interval (ft BTOR)	40.23-50.23
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1303/1310 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743AG

Hach 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
13:10	250	18.15	11.53	6.57	548	0.54	-73.6	7.32	clear
13:15	250	18.15	11.46	6.51	544	0.36	-77.6	4.96	clear
13:20	250	18.15	11.43	6.52	545	0.28	-86.8	5.21	clear
13:25	250	18.15	11.43	6.54	543	0.31	-87.3	4.51	clear
13:30	250	18.15	11.53	6.56	545	0.23	-92.8	5.02	clear
13:35	250	18.15	11.31	6.58	545	0.18	-97.1	3.57	clear
13:40	250	18.15	11.30	6.58	546	0.18	-95.1	3.31	clear
13:45	250	18.15	11.37	6.60	546	0.17	-90.8	2.99	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: SHL-20-FAL19

Sample Time: 13:45 | Duplicate (Y/N): Y | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP02_FAL19

Filter Size: 0.45 µm | Dup Time: 13:50

Comments

Abigail Cartwright — **Signature**

11/1/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-22

Project: LTM - Fall 2019 | Date: 11/4/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Eaker

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	11.85
Depth to bottom (ft BTOR)	~~140.00~~ 117
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	~~126.07-136.07~~ 105.68 - 115.68
Total volume purged (gal)	4.2

Sampling Type

Purging Method: peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1040 | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 650 MS / ~~[illegible]~~ 11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1045	315.2	12.3	9.51	6.72	0.677	0.96	66.3	10.7	clear
1050	315.1	12.35	9.82	6.61	0.683	0.72	53.6	6.39	clear
1055	315.2	12.34	9.83	6.61	0.680	0.61	50.5	4.64	clear
1100	314.9	12.36	9.72	6.62	0.678	0.61	50.2	3.61	clear
1105	315.0	12.35	9.86	6.59	0.677	0.57	49.4	4.07	clear
1110	315.3	12.39	9.84	6.58	0.681	0.55	48.5	3.60	clear
1115	315.1	12.41	9.96	6.57	0.680	0.56	49.4	4.81	clear
1120	315.2	12.39	9.71	6.59	0.681	0.57	50.3	4.08	clear
1125	315.1	12.38	9.73	6.54	0.682	0.53	50.9	4.06	clear
1130	315.3	12.40	9.70	6.58	0.680	0.55	47.2	3.96	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHL-22-FAL19

Sample Time: 1130 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45 µm | Dup Time: —

Comments: Field Filter Batch MPB 5-22-2018 Lot E1809

Signature | Date: 11/4/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-23

Project: LTM - Fall 2019 | Date: 11/13/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	29.31
Depth to bottom (ft BTOR)	35.85
Pump Set Depth (ft BTOR)	34
Screen Interval (ft BTOR)	24.85-34.85
Total volume purged (gal)	3.0

Sampling Type

Purging Method: 1.75" Bladder | Tubing type: Bonded TLFE | Dedicated pump (Y/N): N

Purge start/stop time: 0815-0905 | Tubing diameter: 1/4" OD | Air source: N2

Field Instrument (Model/S/N): YSI 556 MPS 15101567

Horiba 21002 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0825	300	29.40	8.87	6.03	50	8.57	239.8	5.21	clear
0830	300	29.40	8.81	5.34	49	8.01	249.7	4.73	clear
0835	300	29.40	8.71	5.00	47	7.85	251.1	3.62	clear
0840	300	29.40	8.65	4.78	45	7.69	251.4	4.04	clear
0845	300	29.40	8.58	4.60	45	7.62	252.6	3.98	clear
0850	300	29.40	8.52	4.55	44	7.51	~~29~~ 253	4.71	clear
0855	300	29.40	8.56	4.53	44	7.51	252.1	4.68	clear
0900	300	29.40	8.60	4.46	44	7.50	253.2	4.50	clear
0905	300	29.40	8.63	4.49	44	7.48	249.5	4.51	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHL-23-FA19

Sample Time: 0905 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments LTM

Signature

11/13/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-05-40X

Project: LTM - Fall 2019 | Date: 11/8/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Elsner

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	14.95
Depth to bottom (ft BTOR)	34.35
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	31.93-33.93
Total volume purged (gal)	3.2

Sampling Type

Purging Method: Peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: ~~1016~~/1105 (1025) | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 556MPS / 11B100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1030	300.15	15.10	8.24	6.18	0.407	1.02	73.3	11.7	clear
1035	300.2	15.10	8.22	6.22	0.409	0.81	64.3	14.66	clear
1040	300.3	15.11	7.75	6.35	0.392	0.59	47.7	13.11	clear
1045	300.4	15.11	7.68	6.39	0.392	0.54	41.8	12.41	clear
1050	300.4	15.12	7.83	6.41	0.390	0.52	38.9	12.62	clear
1055	300.3	15.10	8.13	6.50	0.388	0.48	24.6	12.48	clear
1100	300.2	15.10	8.10	6.51	0.388	0.47	20.4	12.97	clear
1105	300.3	15.12	8.14	6.52	0.387	0.44	19.7	12.67	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: SHM-05-40X_FALL19

Sample Time: 1105 | Duplicate (Y/N): Y | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP10_FALL19

Filter Size: 0.45µm | Dup Time: 1110

Comments Replaced degraded tubing due to failure to pump from old tubing with HDPE

Signature | Date: 11/8/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-05-41A

Project: LTM - Fall 2019 Date: 11/8/19

Location: Fort Devens, Massachusetts Sampler: B.A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	11.40
Depth to bottom (ft BTOR)	40.75
Pump Set Depth (ft BTOR)	38
Screen Interval (ft BTOR)	41.76-43.76
Total volume purged (gal)	2.0

Sampling Type

Purging Method Peri Tubing type HDPE Dedicated pump (Y/N) N

Purge start/stop time 0940-1040 Tubing diameter 1/4" OD Air source N/A

Field Instrument (Model/S/N) YSI 556 MPS 15F101567

Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0950	150	11.55	7.85	7.50	182	0.38	-46.4	278	orange
0955	150	11.55	7.92		150	0.40	-28.1	245	"
1000	150	11.55	8.12	7.00	107	0.42	-16.5	200	"
1005	150	11.55	7.98	6.78	119	0.22	-7.3	186	"
1010	150	11.55	8.02	6.41	118	0.14	0.3	75.3	"
1015	150	11.55	8.04	6.30	117	0.10	4.2	51.4	"
1020	150	11.55	8.05	6.24	117	0.08	6.1	43.1	slight orange
1025	150	11.55	8.12	6.16	119	0.11	7.5	40.7	"
1030	150	11.55	8.16	6.13	117	0.07	7.3	38.8	"
1035	150	11.55	7.99	6.09	117	0.10	11.0	37.6	"
1040	150 ✓	11.55 ✓	8.02 ✓	6.08 ✓	118 ✓	0.10 ✓	9.5 ✓	35.9 ✓	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-05-41A FAL19

Sample Time 1040 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N) Y Dup ID: -

Filter Size: 0.45um Dup Time: -

Comments

Signature

11/8/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-05-41B

Project: LTM - Fall 2019 | Date: 11/8/19

Location: Fort Devens, Massachusetts | Sampler: BNA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact		✓	
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	11.20
Depth to bottom (ft BTOR)	92.68
Pump Set Depth (ft BTOR)	88
Screen Interval (ft BTOR)	61.83-63.83
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1055-1205 | Tubing diameter: 1/4" OD | Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1110	150	11.30	9.06	6.22	95	1.16	-10.8	107	orange/cloudy
1115	150	11.30	8.99	6.10	169	0.39	-35.8	40.7	cloudy
1120	150	11.30	9.01	6.30	185	0.27	-32.9	38.6	"
1125	150	11.30	9.06	6.41	188	0.23	-44.9	35.1	"
1130	150	11.30	8.99	6.30	189	0.23	-50.9	32.7	"
1135	150	11.30	8.76	6.64	190	0.26	-59.2	28.6	"
1140	150	11.30	8.55	6.43	190	0.24	-50.4	27.9	"
1145	150	11.30	8.69	6.32	188	0.22	-47.3	26.5	clear
1150	150	11.30	9.23	6.64	190	0.14	-58.7	25.1	"
1155	150	11.30	9.25	6.62	191	0.13	-64.5	25.0	"
1200	150	11.30	9.27	6.61	192	0.11	-59.8	24.7	"
1205	150	11.30	9.31	6.61	191	0.13	-60.4	25.4	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N				N	

Sampling Details

Sampling ID: SHM-05-41B-FALL5

Sample Time: 1205 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments

Signature | Date: 11/8/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-05-41C

Project: LTM - Fall 2019 | Date: 11/8/19

Location: Fort Devens, Massachusetts | Sampler: BVA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	NA
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	11.70
Depth to bottom (ft BTOR)	87.71
Pump Set Depth (ft BTOR)	85
Screen Interval (ft BTOR)	82.66-87.66
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0830-0910 | Tubing diameter: 1/4" OD | Air source: MA

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0835	150	11.80	8.50	6.92	5895	1.36	75.0	216.1	clear
0840	150	11.80	8.47	6.85	5926	0.54	34.3	19.8	"
0845	150	11.80	8.24	6.78	5950	0.16	-27.9	13.1	"
0850	150	11.80	8.13	6.80	5949	0.14	-38.9	9.14	"
0855	150	11.80	8.13	6.80	5960	0.13	-41.7	7.01	"
0900	150	11.80	8.20	6.79	5955	0.09	-48.7	6.90	"
0905	150	11.80	8.29	6.77	5942	0.08	-50.8	6.93	"
0910	150	11.80	8.30	6.77	5940	0.05	-52.7	6.89	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-05-41C-FALL9

Sample Time: 0910 | Duplicate (Y/N): N | MS/MSD (Y/N): Y (LTM)

Field Filtered (Y/N): Y | Dup ID: -

Filter Size: 0.45um | Dup Time: -

Comments LTM + PFAS

Signature | Date: 11/8/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-05-42A

Project: LTM - Fall 2019 | Date: 11/5/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	5.8
Depth to bottom (ft BTOR)	45.25
Pump Set Depth (ft BTOR)	44
Screen Interval (ft BTOR)	43.16-45.16
Total volume purged (gal)	3.63

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1135/1145 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG
HACH 3100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
11:45	250	5.8	10.14	6.87	78	2.98	53.2	6.95	visible particles / cloudy
11:50	250	5.8	9.90	6.34	76	1.04	73.5	6.59	visible particles
11:55	250	5.8	10.04	6.20	75	0.88	82.0	915	very cloudy + orange
12:00	250	5.8	9.81	6.05	83	0.36	90.0	897	very cloudy + orange
~~12:05~~	~~250~~	* Disconnected YSI and drained the orange junk *							
12:10	250	5.8	9.80	5.97	84	1.11	96.6	11.9	clear
12:15	250	5.8	9.77	5.90	84	0.41	97.1	3.68	clear
12:20	250	5.8	9.75	5.87	84	0.33	100.1	2.67	clear
12:25	250	5.8	9.76	5.84	84	0.26	101.0	2.29	clear
12:30	250	5.8	9.77	5.83	84	0.23	100.9	2.49	clear
12:35	250	5.8	9.77	5.83	84	0.23	101.2	2.31	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

Sampling Details

Sampling ID: SHM-05-42A_FAL19

Sample Time: 12:35 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

11/5/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM - 05 - 42B

Project: LTM - Fall 2019 | Date: 11/5/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	5.8
Depth to bottom (ft BTOR)	73.75
Pump Set Depth (ft BTOR)	74
Screen Interval (ft BTOR)	73.15 - 75.15
Total volume purged (gal)	1.85

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1245 / 1255 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00A0743 A6
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
12:55	200	5.8	9.71	6.06	357	2.23	-32.5	2.99	clear
13:00	200	5.8	9.63	6.15	380	0.72	-37.5	2.51	clear
13:05	200	5.8	9.58	6.23	426	0.40	-45.3	2.23	clear
13:10	200	5.8	9.57	6.32	438	0.25	-50.1	2.78	clear
13:15	200	5.8	9.56	6.34	444	0.22	-51.1	3.56	clear
13:20	200	5.8	9.55	6.36	443	0.21	-52.4	4.31	clear
13:25	200	5.8	9.58	6.39	448	0.19	-53.6	4.59	clear
13:30	200	5.8	9.60	6.39	449	0.19	-54.0	4.66	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	N	

Sampling Details

Sampling ID: SHM-05-42B-FAL19

Sample Time: 13:30 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

11/5/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-07-03

Project: LTM - Fall 2019 | Date: 11/8/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Ebner

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	20.56'
Depth to bottom (ft BTOR)	~~38.8~~ 38.3
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	24.94 - 34.94
Total volume purged (gal)	3.2

Sampling Type

Purging Method: Peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0820/0900 | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 650MDS / 11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0825	319.6	21.70	9.26	5.52	0.435	6.52	116.9	776	cloudy - slightly reduced
0830	300.5	21.65	9.20	5.51	0.444	8.23	118.5	656	cloudy
0835	300.4	21.67	9.16	5.53	0.411	8.37	140.6	658	cloudy
0840	300.2	21.67	9.11	5.53	0.439	8.12	144.3	619	cloudy
0845	300.1	21.65	9.11	5.55	0.441	7.96	128.8	609	clear-cloudy
0850	300.6	21.66	9.13	5.56	0.442	7.86	124.4	611	clear-cloudy
0855	300.4	21.67	9.16	5.57	0.449	7.83	119.4	601	clear-cloudy
0900	300.6	21.66	9.15	5.57	0.444	7.81	117.6	602	clear-cloudy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: SHM-07-03_FAL19

Sample Time: 0900 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments

Signature: [signature] | Date: 11/8/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-07-05X

Project: LTM - Fall 2019 | Date: 11/8/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Esser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present			
Bolts present	✓		~~N/A~~
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	15.47
Depth to bottom (ft BTOR)	67.3
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	55.83 - 64.83
Total volume purged (gal)	3.25

Sampling Type

Purging Method: peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1200/1240 | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 6820MDS/11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1205	300.5	15.80	7.84	6.62	0.646	0.72	32.4	19.5	slightly cloudy
1210	300.4	15.81	7.51	6.67	0.652	0.61	24.2	19.6	slightly cloudy
1215	300.3	15.82	7.83	6.71	0.656	0.53	22.9	16.9	slightly cloudy
1220	300.4	15.81	7.82	6.76	0.660	0.48	21.5	15.3	slightly cloudy
1225	300.5	15.82	7.77	6.79	0.660	0.44	18.7	14.8	slightly cloudy
1230	300.4	15.82	7.32	6.83	0.663	0.47	16.2	14.4	slightly cloudy
1235	300.3	15.81	7.34	6.84	0.658	0.46	15.1	14.3	slightly cloudy
1240	300.4	15.81	7.35	6.82	0.660	0.46	10.6	13.7	slightly cloudy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: SHM-07-05X_FAL19

Sample Time: 1240 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45 µm | Dup Time: —

Comments

Signature

11/8/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SMM-10-02

Project: LTM - Fall 2019 | Date: 11/14/19

Location: Fort Devens Massachusetts | Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	✓
Locked (stickup wells)	✓	✓	

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	18.09
Depth to bottom (ft BTOR)	65'
Pump Set Depth (ft BTOR)	60'
Screen Interval (ft BTOR)	55.84 – 65.84
Total volume purged (gal)	2.5

Sampling Type

Purging Method: peristaltic | Tubing type: LDPE | Dedicated pump (Y/N): Yes

Purge start/stop time: 840/920 | Tubing diameter: 3/8" | Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 11B100986

LaMotte 2020wq 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
840	200	18.09	10.68	6.70	491	10.03	160.3	1.34	clear
845		18.09	10.70	6.69	493	10.00	159.9	1.20	clear
850		18.09	10.05	6.69	495	9.70	158.0	1.12	clear
855		18.09	10.93	6.69	496	9.70	154.9	1.11	clear
900		18.09	10.92	6.69	496	10.03	153.7	1.10	clear
905		18.09	10.90	6.69	498	9.60	153.1	1.08	clear
910		18.09	10.83	6.68	499	9.58	152.9	1.07	clear
915		18.09	10.80	6.69	500	9.57	152.6	1.05	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SMM-10-02

Sample Time: 920 | Duplicate (Y/N): ✓ | MS/MSD (Y/N): ✓

Field Filtered (Y/N): Y | Dup ID: ✓

Filter Size: .45 | Dup Time: ✓

Comments

[signature] **Signature**

11/14/19 **Date**

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-10-03

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/14/19
Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1.5"
Material	
Depth to water (ft BTOR)	
Depth to bottom (ft BTOR)	
Pump Set Depth (ft BTOR)	
Screen Interval (ft BTOR)	60.78-70.78
Total volume purged (gal)	

Sampling Type

Purging Method: geotech
Purge start/stop time: 1010/1050
Tubing type: LDPE
Tubing diameter: 1/4"
Dedicated pump (Y/N): Tubing
Air source: N/A

Field Instrument (Model/S/N): YSI 650 11B100186
[illegible] 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1010	200	26.74	9.20	6.82	598	6.89	121.9	3.96	clear
1015	↓	26.74	9.50	6.93	590	5.00	120.7	3.00	clear
1020		26.74	9.49	7.06	586	4.28	119.2	2.63	clear
1025		26.74	9.53	7.04	584	4.27	119.0	2.66	clear
1030		26.74	9.56	7.07	582	4.23	118.6	2.62	clear
1035		26.74	9.57	7.07	590	4.22	119.0	2.58	clear
1040		26.74	9.58	7.09	588	4.19	117.8	2.57	clear
1045		26.74	9.59	7.07	584	4.20	118.3	2.61	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				✓					

Sampling Details

Sampling ID: SHM-10-03
Sample Time: 1325
Duplicate (Y/N): ✓
MS/MSD (Y/N): ✓
Field Filtered (Y/N): Y
Dup ID: ✓
Filter Size: .45
Dup Time: ✓

Comments

[signature]
Signature

11/14/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-10-04

Project: LTM - Fall 2019 | Date: 11/14/19

Location: Fort Devens, Massachusetts | Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	
Locked (stickup wells)		✓	

Well Information

Diameter	1.54
Material	PVC
Depth to water (ft BTOR)	6.54
Depth to bottom (ft BTOR)	~67'
Pump Set Depth (ft BTOR)	62'
Screen Interval (ft BTOR)	57.61-67.61
Total volume purged (gal)	3.0

Sampling Type

Purging Method: geotech | Tubing type: LDPE | Dedicated pump (Y/N): 1.45 [illegible]

Purge start/stop time: 1145/1225 | Tubing diameter: 3/8" | Air source: N

Field Instrument (Model/S/N): YSI 650XL 11B100186 Landsite 20LOWE 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1145	200	6.54	10.64	7.33	397	1.42	101.9	9.90	Clear
1150		6.54	10.70	6.90	400	0.69	101.4	4.07	Clear
1155		6.54	10.65	6.82	405	0.49	101.3	3.26	Clear
1200		6.54	10.64	6.80	409	0.47	101.2	3.19	Clear
1205		6.54	10.63	6.81	411	0.43	100.3	3.17	Clear
1210		6.54	10.61	6.80	412	0.46	101.2	3.10	Clear
1215		6.54	10.60	6.80	415	0.45	100.4	3.07	Clear
1220		6.54	10.63	6.80	418	0.43	100.3	3.10	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-10-04

Sample Time: 1225 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: N

Filter Size: .45 | Dup Time: N

Comments

[signature] | 11/14/19

Signature | **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-10-05A

Project: LTM - Fall 2019 | Date: 11/12/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	
Locked (stickup wells)			✓

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	25.50
Depth to bottom (ft BTOR)	60.15
Pump Set Depth (ft BTOR)	58
Screen Interval (ft BTOR)	49.68-59.68
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0730-0820 | Tubing diameter: 1/4"OD | Air source: N/A

Field Instrument (Model/S/N): YSI 556MPS 15F101567

Horiba 2008B 16010604720[illegible]

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0745	250	25.50	11.62	6.42	207	6.83	200.7	18.1	clear
0750	250	25.50	11.31	5.85	202	4.60	197.2	12.2	clear
0755	250	25.50	10.95	5.73	203	3.44	191.8	8.61	clear
0800	250	25.50	10.99	5.73	205	3.15	188.3	5.70	clear
0805	250	25.50	11.19	5.69	206	2.77	180.7	4.23	clear
0810	250	25.50	11.21	5.69	206	2.66	178.7	4.19	clear
0815	250	25.50	11.14	5.68	207	2.58	178.6	4.14	clear
0820	250	25.50	11.12	5.68	207	2.55	178.4	4.16	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Variance Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-10-05A_FA19

Sample Time: 0820 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: –

Filter Size: 0.45µm | Dup Time: –

Comments

Signature | Date: 11/12/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-10-06

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/1/19
Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.45
Depth to bottom (ft BTOR)	81.30
Pump Set Depth (ft BTOR)	75
Screen Interval (ft BTOR)	72.38-82.38
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri
Purge start/stop time: 1255-1345
Tubing type: LDPE
Tubing diameter: 3/8" OD
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15F101567
Hooks 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1305	250	19.55	11.34	6.19	591	0.87	26.9	14.1	clear
1310	250	19.55	11.22	6.45	596	0.38	-14.4	6.89	clear
1315	250	19.55	11.21	6.52	593	0.35	-38.5	5.67	clear
1320	250	19.55	11.13	6.52	591	0.28	-43.5	4.91	clear
1325	250	19.55	11.12	6.57	588	0.18	-58.5	3.90	clear
1330	250	19.55	11.15	6.59	587	0.13	-64.9	3.72	clear
1335	250	19.55	11.21	6.62	585	0.10	-70.1	3.51	clear
1340	250	19.55	11.15	6.62	584	0.07	-73.3	3.48	clear
1345	250	19.55	11.17	6.62	583	0.08	-75.1	3.42	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-10-06-FAL19
Sample Time: 1345
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45µm
Dup Time: –

Comments full suite + VOCs

[signature]
Signature

11/1/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-10-6A

Project: LTM - Fall 2019 Date: 11/7/19
Location: Fort Devens, Massachusetts Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	—		
Concrete Pad intact			—
PVC casing intact	—		
Well gripper present	—		
Bolts present			—
Locked (stickup wells)	—		

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	30.38
Depth to bottom (ft BTOR)	89.23
Pump Set Depth (ft BTOR)	85
Screen Interval (ft BTOR)	79.58-89.58
Total volume purged (gal)	3.0

Sampling Type
Purging Method 0.675" microbladder Tubing type Bonded LDPE Dedicated pump (Y/N) N
Purge start/stop time 1130-1230 Tubing diameter 1/4" OD Air source N2

Field Instrument (Model/S/N) YSI 556MPS 15F101567
Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1150	60	30.40	10.76	5.91	210	1.30	44.4	12.1	clear
1155	60	30.40	10.74	5.93	209	1.28	43.6	9.85	"
1200	60	30.40	10.67	5.96	209	1.05	42.7	11.6	"
1205	60	30.40	10.62	5.95	209	1.03	42.3	10.8	"
1210	60	30.40	10.60	5.97	209	0.99	41.6	10.1	"
1215	60	30.40	10.59	5.97	211	1.03	41.1	9.96	"
1220	60	30.40	10.60	5.99	212	1.00	40.8	9.90	"
1225	60	30.40	10.59	5.99	214	0.98	40.0	9.86	"
1230	60	30.40	10.58	5.98	215	0.99	39.8	9.88	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-10-06A-FAL19
Sample Time: 1230 Duplicate (Y/N): N MS/MSD (Y/N): N
Field Filtered (Y/N): Y Dup ID: —
Filter Size: 0.45µm Dup Time: —

Comments

[signature] 11/7/19
Signature **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-10-07

Project: LTM - Fall 2019 | Date: 11/6/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	27.03
Depth to bottom (ft BTOR)	52.0
Pump Set Depth (ft BTOR)	47
Screen Interval (ft BTOR)	41.84-51.84
Total volume purged (gal)	2.97

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1143/1150 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG
HACH 3100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
11:50	250	27.28	11.03	6.34	526	4.50	-67.4	175	cloudy
11:55	250	27.28	11.13	6.27	527	4.31	-70.6	135	cloudy
12:00	250	27.28	11.04	6.46	532	4.20	-72.0	49.3	cloudy
12:05	250	27.28	11.19	6.49	570	7.04	-79.5	35.4	cloudy
12:10	250	27.28	11.20	6.50	573	6.89	-76.3	31.2	cloudy
12:15	250	27.28	11.28	6.54	577	5.62	-81.0	27.0	clear
12:20	250	27.28	11.05	6.57	581	4.48	-90.0	17.7	clear
12:25	250	27.28	11.08	6.59	578	3.85	-92.4	14.3	clear
12:30	250	27.28	11.12	6.61	578	3.46	-94.2	15.0	clear
12:35	250	27.28	11.09	6.61	580	3.12	-96.5	14.6	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				Y	Y	N	N	Y	

Sampling Details

Sampling ID: SHM-10-07_FAL19

Sample Time: 12:35 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Margaret Cartwright
Signature

11/6/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SMM-10-08

Project: LTM - Fall 2019 | Date: 11/14/19

Location: Fort Devens, Massachusetts | Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	9.72
Depth to bottom (ft BTOR)	~58'
Pump Set Depth (ft BTOR)	~53'
Screen Interval (ft BTOR)	48.50-58.50
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Geotech | Tubing type: LDPE | Dedicated pump (Y/N): Tubing

Purge start/stop time: 745/825 | Tubing diameter: 3/8" | Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 11B100186

LaMotte 2020WE 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
745	200	9.72	9.82	5.97	717	7.89	203.1	18.9	clear
750	↓	9.72	9.83	6.00	719	7.00	191.7	4.11	clear
755	↓	9.72	9.82	6.14	708	6.70	183.9	3.72	clear
800	↓	9.72	9.80	6.19	711	4.49	176.1	3.63	clear
805	↓	9.72	9.77	6.30	712	4.35	173.4	3.60	clear
810	↓	9.72	9.80	6.31	710	4.31	171.9	3.62	clear
815	↓	9.72	9.79	6.31	714	4.29	170.3	3.58	clear
820	↓	9.72	9.78	6.30	713	4.20	168.9	3.59	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SMM-10-08

Sample Time: 825 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: N

Filter Size: 1.45 | Dup Time: N

Comments

Signature: [illegible] | Date: 11/14/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SMM-10-10

Project:	LTM - Fall 2019	Date:	11/11/19
Location:	Fort Devens, Massachusetts	Sampler:	[illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	10.78
Depth to bottom (ft BTOR)	~67'
Pump Set Depth (ft BTOR)	~62
Screen Interval (ft BTOR)	57.71 – 67.71
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Geotech

Purge start/stop time: 1245/1325

Tubing type: LDPE

Tubing diameter: 1/4"

Dedicated pump (Y/N): Tubing

Air source: N/A

Field Instrument (Model/S/N): YSI 650VC 11B100186
Lamotte 2020VE 3570-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1245	200	10.78	11.61	6.50	890	1.39	66.7	1.30	clear
1250	↓	10.78	11.53	6.53	873	1.00	50.2	1.27	clear
1255		10.78	11.52	6.51	864	0.68	45.3	1.24	clear
1300		10.78	11.48	6.49	831	0.66	44.9	1.20	clear
1305		10.78	11.46	6.47	806	0.63	44.7	1.19	clear
1310		10.78	11.47	6.46	802	0.62	43.9	1.20	clear
1315		10.78	11.49	6.45	798	0.61	43.8	1.21	clear
1320	↓	10.78	11.46	6.47	793	0.58	43.2	1.17	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID:	SMM-10-10				
Sample Time:	1325	Duplicate (Y/N)	N	MS/MSD (Y/N):	N
Field Filtered (Y/N):	Y	Dup ID	N		
Filter Size:	.45	Dup Time	N		

Comments

[signature]
Signature

11/11/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-10-11

Project: LTM - Fall 2019 | Date: ~~1st~~ 11/7/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	40.43
Depth to bottom (ft BTOR)	62.30
Pump Set Depth (ft BTOR)	60
Screen Interval (ft BTOR)	52.60-62.60
Total volume purged (gal)	3.0

Sampling Type

Purging Method: 1.75" Bladder | Tubing type: Bonded LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0925- | Tubing diameter: 1/4"OD | Air source: N_2

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 21008 16010C047207

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0940	150	40.50	10.93	6.25	510	2.53	4.6	101	cloudy
0945	150	40.50	11.01	6.19	504	0.88	-7.3	81.9	cloudy
0950	150	40.50	11.06	6.20	501	0.58	-11.2	70.6	cloudy
0955	150	40.50	11.07	6.18	501	0.44	-13.5	55.4	cloudy
1000	~~1600~~ 150	40.50	11.09	6.18	501	0.38	-14.9	30.6	cloudy
1005	150	40.50	11.10	6.19	502	0.32	-15.6	28.7	clear
1010	150	40.50	11.11	6.18	502	0.30	-17.1	20.4	clear
1015	150	40.50	11.10	6.19	502	0.28	-19.3	17.1	clear
1020	150	40.50	11.11	6.17	501	0.20	-19.4	15.1	
~~1025~~	150	40.50	11.10	6.17	501	0.17	-19.6	14.8	
1030	150	40.50	11.10	6.18	501	0.20	-20.9	14.6	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N				—	

Sampling Details

Sampling ID: SHM-10-11_FAL19

Sample Time: 1030 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: -

Filter Size: 0.45µm | Dup Time: -

Comments

Signature: BrA | Date: 11/7/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-10-12

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/14/19
Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	34.60
Depth to bottom (ft BTOR)	57.35
Pump Set Depth (ft BTOR)	55
Screen Interval (ft BTOR)	47.60-57.60
Total volume purged (gal)	20

Sampling Type

Purging Method: 1.75" Bladder
Purge start/stop time: 0845-0955
Tubing type: Bonded LDPE
Tubing diameter: 1/4"OD
Dedicated pump (Y/N): N
Air source: N2

Field Instrument (Model/S/N): YSI 556 MPS 15F101567
Hach 2100Q 1601000472[illegible]

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0900	250	34.60	9.47	6.02	396	0.72	114.6	192	cloudy
0905	250	34.60	9.47	5.86	396	0.55	107.2	157	cloudy
0910	250	34.60	9.46	5.68	399	0.68	86.6	128	"
0915	250	34.60	9.45	5.59	402	0.64	75.1	98.6	"
0920	250	34.60	9.59	5.52	406	0.44	53.4	71.8	"
0925	250	34.60	9.57	5.47	406	0.39	46.7	46.9	"
0930	250	34.60	9.50	5.42	405	0.32	35.0	41.6	"
0935	250	34.60	9.48	5.43	405	0.29	30.0	30.8	"
0940	250	34.60	9.53	5.40	404	0.27	23.2	27.0	clear
0945	250	34.60	9.53	5.43	403	0.25	21.1	25.8	"
0950	250	34.60	9.53	5.42	403	0.25	20.6	25.1	"
0955	250	34.60	9.54	5.42	403	0.26	20.4	25.0	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-10-12-FAL19
Sample Time: 0955
Duplicate (Y/N): Y
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: SHL-DUP05-FAL19
Filter Size: 0.45µm
Dup Time: 1000

Comments

[signature]
Signature

11/14/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-10-13

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/6/19
Sampler: Kristen Esser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	26.1'
Depth to bottom (ft BTOR)	74.4'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	63.26 - 73.26
Total volume purged (gal)	3.2

Sampling Type

Purging Method: peristaltic
Tubing type: HDPE
Dedicated pump (Y/N): N
Purge start/stop time: 1005/1045
Tubing diameter: 3/8"
Air source: NA

Field Instrument (Model/S/N): YSI 650MDS/11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1010	260.5	26.20	10.99	6.97	0.536	1.44	73.9	19.8	Slightly cloudy
1015	275.2	26.15	10.84	6.81	0.538	0.80	75.4	24.2	slightly cloudy
1020	300.5	26.20	10.58	6.76	0.549	0.64	65.8	24.1	slightly cloudy
1025	300.7	26.15	10.36	6.58	0.653	0.56	27.6	15.0	slightly cloudy
1030	300.6	26.15	10.38	6.56	0.684	0.55	4.7	11.2	clear - cloudy
1035	300.5	26.20	10.40	6.51	0.705	0.57	-30.9	12.15	clear
1040	300.6	26.20	10.42	6.50	0.708	0.53	-40.1	11.75	clear
1045	300.5	210.20	10.46	6.51	0.711	0.55	-39.2	11.79	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	→				

Sampling Details

Sampling ID: SHM-10-13_FAL19
Sample Time: 1045
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments ~~Needs lock~~ KE Put new lock on casing

[signature]
Signature

11/6/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-10-14

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/6/19
Sampler: Kristen Esser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	20.30'
Depth to bottom (ft BTOR)	83.8'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	62.82 - 82.82
Total volume purged (gal)	2.9

Sampling Type

Purging Method: peristaltic
Tubing type: HDPE
Dedicated pump (Y/N): N
Purge start/stop time: 0820/
Tubing diameter: 3/8"
Air source: NA
Field Instrument (Model/S/N): YSI 650MDS / 11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0825	250.5	20.36	10.89	6.10	0.437	9.95	132.6	21.4	slightly cloudy
0830	250.7	20.31	10.82	6.26	0.441	9.86	109.3	19.5	slightly cloudy
0835	250.5	20.31	10.77	6.32	0.445	9.92	101.2	16.2	slightly cloudy
0840	270.2	20.40	10.66	6.45	0.453	10.19	79.8	12.5	clear
0845	275.3	20.42	10.61	6.48	0.457	10.30	70.5	12.5	clear
0850	275.5	20.41	10.57	6.52	0.462	10.59	40.3	13.28	clear
0855	275.2	20.42	10.52	6.53	0.470	10.67	32.3	12.88	clear
0900	275.5	20.40	10.56	6.50	0.466	10.61	30.7	12.94	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):					N →				

Sampling Details

Sampling ID: SHM-10-14_FAL19
Sample Time: 0900
Duplicate (Y/N): Y
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: SHL-DUP09_FAL19
Filter Size: 0.45 µm
Dup Time: 0905

Comments

[signature]
Signature

11/6/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SMM-10-15

Project: LTM - Fall 2019 Date: 11/14/19

Location: Fort Devens, Massachusetts Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	24.44
Depth to bottom (ft BTOR)	~56'
Pump Set Depth (ft BTOR)	51'
Screen Interval (ft BTOR)	46.73 - 56.73
Total volume purged (gal)	3.0

Sampling Type

Purging Method: geotech Tubing type: LDPE Dedicated pump (Y/N): N

Purge start/stop time: 1315/1355 Tubing diameter: 1/4" Air source: N/A

Field Instrument (Model/S/N): YSI 650 XL 11B100186

Conductivity 20Lavel 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1315	200	24.44	10.10	6.38	379	0.43	91.6	21.6	clear
1320	↓	24.44	10.12	6.39	387	0.39	85.6	13.6	clear
1325	↓	24.44	10.13	6.40	396	0.27	81.2	9.68	clear
1330	↓	24.44	10.16	6.41	418	0.19	79.8	9.21	clear
1335	↓	24.44	10.18	6.41	422	0.19	79.3	6.90	clear
1340	↓	24.44	10.17	6.41	426	0.17	79.0	6.87	clear
1345	↓	24.44	10.16	6.42	427	0.16	78.9	6.58	clear
1350	↓	24.44	10.17	6.42	429	0.16	78.6	6.54	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SMM-10-15

Sample Time: 1355 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID: N

Filter Size: 1.45 Dup Time: N

Comments

[signature] 11/14/19

Signature **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-10-16

Project: LTM - Fall 2019 | Date: 11/13/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Fisher

Well Integrity

	Yes	No	N/A
Casing Secure	√		
Concrete Pad intact			√
PVC casing intact	√		
Well gripper present	√		
Bolts present			√
Locked (stickup wells)	√		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	8.25'
Depth to bottom (ft BTOR)	89'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	77.51 - 87.51
Total volume purged (gal)	3.7

Sampling Type

Purging Method: Peristaltic | Tubing type: Teflon lined | Dedicated pump (Y/N): N

Purge start/stop time: ~~1232~~/1235 1155' | Tubing diameter: 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS / 116, 100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1200.	300.0	8.35	8.11	7.01	0.445	10.01	101.3	23.10	clear
1205.	300.0	8.35	7.79	6.94	0.451	5.60	100.0	22.41	clear
1210.	300.0	8.35	7.69	6.69	0.505	2.40	91.5	14.9	clear
1215.	300.0	8.35	7.65	6.51	0.556	1.03	73.6	11.6	clear
1220.	300.0	8.35	7.59	6.50	0.558	0.92	68.3	11.2	clear
1225.	300.0	8.35	7.55	6.49	0.559	0.75	50.6	11.1	clear
1230	300.0	8.35	7.54	6.50	0.560	0.69	45.7	11.2	clear
1235	300.0	8.35	7.59	6.52	0.562	0.69	41.8	11.1	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N →					

Sampling Details

Sampling ID: SHM-10-16_FAL19

Sample Time: 1235 | Duplicate (Y/N): Y | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP08_FAL19

Filter Size: 0.45 µm | Dup Time: 1240

Comments Water freezing in tubes + YSI intake.; VOC samples id: SHM-10-16_NOV19, SHL-DUP08_NOV19

Signature | Date: 11/13/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-11-02

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/13/19
Sampler: BnA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	4"
Material	Steel
Depth to water (ft BTOR)	23.70
Depth to bottom (ft BTOR)	68.95
Pump Set Depth (ft BTOR)	60
Screen Interval (ft BTOR)	41.07-51.07
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri
Purge start/stop time: 1058-1150
Tubing type: LDPE
Tubing diameter: 1/4"OD
Dedicated pump (Y/N): N
Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15F101567
Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1110	150	23.00	9.16	6.60	643	1.67	-49.5	21.7	clear
1115	~~150~~ 100	23.51	9.10	6.79	646	0.97	-136.1	18.9	clear
1120	~~150~~ 100	24.00	9.08	7.14	629	0.48	-187.0	13.1	"
1125	~~150~~ 100	24.30	9.25	7.25	624	0.39	-194.5	12.0	"
1130	~~150~~ 100	24.61	9.46	7.39	623	0.31	-202.7	10.6	"
1135	~~150~~ 100	24.75	9.55	7.42	624	0.28	-201.8	9.97	"
1140	~~150~~ 100	25.10	9.48	7.44	627	0.26	-199.1	9.88	"
1145	~~150~~ 100	25.10	9.55	7.46	629	0.24	-195.8	10.1	"
1150	100	25.10	9.47	7.42	629	0.24	-192.6	9.90	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-11-02-FAL19
Sample Time: 1150
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45µm
Dup Time: —

Comments ~~DO not stable at lowest pumping rate, T°C not stable due to weather + slow pump rate~~

[signature]
Signature

11/13/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-11-06

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/1/19
Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	20
Depth to bottom (ft BTOR)	36.2
Pump Set Depth (ft BTOR)	33
Screen Interval (ft BTOR)	27.84-37.84
Total volume purged (gal)	3.63

Sampling Type

Purging Method: Peri
Purge start/stop time: 0825/0835
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): N
Air source: —

Field Instrument (Model/S/N): YSI 650 MDS 00M0143AC
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
08:35	250	20.2	10.47	7.31	703	3.93	-45.7	16.0	cloudy, brownish
08:40	250	20.25	10.40	6.70	657	0.73	-48.6	11.1	cloudy, brownish
08:45	250	20.25	10.37	6.50	649	0.48	-50.7	11.5	visible particles/cloudy
08:50	250	20.25	10.35	6.33	640	0.39	-57.1	7.65	clear
08:55	250	20.25	10.40	6.28	638	0.28	-61.0	5.18	clear
09:00	250	20.25	10.34	6.26	638	0.32	-61.9	4.47	clear
09:05	250	20.25	10.38	6.26	637	0.27°	-62.0	4.01°	clear
09:10	250	20.25	10.39	6.26	638	0.22°	-63.5	3.21°	clear
09:15	250	20.25	10.39	6.26	635	0.19°	-59.7	3.50	clear
09:20	250	20.25	10.42	6.27	634	0.19	-60.3	3.34	clear
09:25	250	20.25	10.45	6.27	635	0.18	-61.0	3.41	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHM-11-06_FAL19
Sample Time: 09:25
Duplicate (Y/N): Y
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: SHL-DUP03_FAL19
Filter Size: 0.45 µm
Dup Time: 09:30

Comments

Abigail Cartwright
Signature

11/1/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-13-01

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/14/19
Sampler: M. VIDAL

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	3.22
Depth to bottom (ft BTOR)	50.23
Pump Set Depth (ft BTOR)	~45
Screen Interval (ft BTOR)	41.31-51.31
Total volume purged (gal)	~4.25

Sampling Type

Purging Method: Low Flow
Tubing type: TEFLON LINED
Dedicated pump (Y/N): PERISTALTIC
Purge start/stop time: 12:50/13:45
Tubing diameter: 1/4"
Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS S/N 15L102308

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1255	400	3.24	10.88	6.19	761	5.10	76.9	49.6	SLIGHTLY CLOUDY
1300	400	3.24	10.83	6.03	796	5.03	82.3	55.1	↓
1305	300	3.24	10.78	5.95	848	4.86	87.1	28.0	↓
1310	300	3.24	10.75	5.88	861	4.81	88.9	34.9	↓
1315	300	3.24	10.73	5.84	873	4.78	90.3	19.3	↓
1320	↓	3.24	10.69	5.86	929	4.72	98.9	14.7	CLEAR
1325	↓	3.24	10.64	5.82	1018	4.64	104.2	11.2	↓
1330	↓	3.24	10.63	5.80	1126	4.54	109.1	9.37	↓
1335	↓	3.24	10.62	5.80	1133	4.54	108.6	9.52	↓
1340	↓	3.24	10.63	5.80	1140	4.53	108.8	8.97	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	Y	Y	

Sampling Details

Sampling ID: SHM-13-01_FAL19
Sample Time: 13:40
Duplicate (Y/N): N/A
MS/MSD (Y/N): N/A
Field Filtered (Y/N): METALS + DOC
Dup ID: N/A
Filter Size: 0.45 µm
Dup Time: N/A

Comments

Marvin Vidal
Signature

11/14/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-13-02

Project: LTM - Fall 2019 Date: 11/11/19

Location: Fort Devens Massachusetts Sampler: B/A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	12.75
Depth to bottom (ft BTOR)	71.88
Pump Set Depth (ft BTOR)	65
Screen Interval (ft BTOR)	61.80-71.80
Total volume purged (gal)	3.0

Sampling Type

Purging Method Peri Tubing type LDPE Dedicated pump (Y/N) N

Purge start/stop time 1240-1320 Tubing diameter 1/4" OD Air source —

Field Instrument (Model/S/N) YSI 556MPS 15F101567

Hach 2100Q 16010000472202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1245	250	12.75	11.11	6.66	431	5.84	34.9	5.81	clear
1250	250	12.75	11.07	6.68	430	5.40	34.1	4.91	"
1255	↓	↓	10.98	6.64	430	5.14	36.1	4.86	"
1300			10.95	6.61	430	4.89	38.6	4.70	"
1305			10.93	6.58	430	4.77	39.8	4.60	"
1310			10.94	6.56	430	4.63	41.5	4.58	"
1315			10.90	6.52	431	4.38	44.0	4.61	"
1320	↓	↓	10.86	6.50	431	4.25	46.1	4.55	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-1302-FALL

Sample Time: 1320 Duplicate (Y/N) N MS/MSD (Y/N): Y

Field Filtered (Y/N): Y Dup ID —

Filter Size: 0.45µm Dup Time —

Comments

Signature

11/11/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-13-03

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/11/19
Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	5.30
Depth to bottom (ft BTOR)	50.96
Pump Set Depth (ft BTOR)	45
Screen Interval (ft BTOR)	44.14-54.14
Total volume purged (gal)	2.0

Sampling Type

Purging Method: Peri
Purge start/stop time: 1045-1130
Tubing type: LDPE
Tubing diameter: 1/4" OD
Dedicated pump (Y/N): N
Air source: –

Field Instrument (Model/S/N): YSI 556MPS ~~1510~~ 15F101567
Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1055	250	5.30	10.95	6.52	593	1.55	23.0	3.91	clear
1100	250	5.30	11.00	6.47	593	1.03	19.7	2.08	"
1105	↓	↓	11.04	6.46	593	0.96	17.2	1.71	"
1110			11.15	6.45	593	0.83	11.3	1.04	"
1115			11.16	6.44	597	0.57	5.7	0.96	"
1120			11.20	6.44	603	0.49	3.0	0.99	"
1125			11.20	6.44	614	0.42	-0.5	0.96	"
1130	↓	↓	11.20	6.44	616	0.40	-1.0	0.98	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-13-03
Sample Time: 1130
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: –
Filter Size: 0.45µm
Dup Time: –

Comments

[signature]
Signature

11/11/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-13-04

Project: LTM - Fall 2019 | Date: 11/12/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Esser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.65
Depth to bottom (ft BTOR)	30.65
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	19.68 - 29.68
Total volume purged (gal)	3.25

Sampling Type

Purging Method: Peristaltic | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: ~~0945~~ 0945 | Tubing diameter: 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 650MDS/11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0950	300.0	19.70	10.43	6.02	1.329	5.74	85.4	2655	rust red, opaque
0955	300.0	19.70	10.50	6.23	1.3105	6.09	75.2	1119	rust red, cloudy
1000	300.2	19.75	10.57	6.24	1.335	5.89	70.8	657	rust red, cloudy
1005	300.2	19.75	10.51	6.24	1.204	5.23	66.2	601	rust red, cloudy
1010	300.0	19.73	10.47	6.26	1.160	5.04	64.8	590	rust red, cloudy
1015	300.0	19.75	10.41	6.28	1.016	4.13	62.5	4	orange, cloudy
1020	300.2	19.75	10.42	6.30	1.013	3.98	59.4	2.4	orange, cloudy
1025	300.5	19.75	10.41	6.30	1.005	4.02	59.9	2.5	orange, cloudy
1030	300.5	19.74	10.41	6.30	1.007	3.99	58.3	2.47	orange, cloudy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-13-04-FALL19

Sample Time: 1030 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments: Original tubing clogged, had to replace tubing

Signature | Date: 11/12/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-13-05

Project: LTM - Fall 2019 | Date: 11/12/19

Location: Fort Devens, Massachusetts | Sampler: Kasten Esser

Well Integrity

	Yes	No	N/A
Casing Secure	√		
Concrete Pad intact	√		
PVC casing intact	√		
Well gripper present	√		
Bolts present	√		
Locked (stickup wells)			√

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	17.25'
Depth to bottom (ft BTOR)	86.60'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	74.75 – 84.75
Total volume purged (gal)	3.25

Sampling Type

Purging Method: peristaltic | Tubing type: Teflon lined | Dedicated pump (Y/N): N

Purge start/stop time: 1110/ | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 650MDS/ 11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1115	300.0	17.30	9.38	6.68	0.314	2.29	53.7	13.2	clear
1120	300.0	17.30	9.36	6.62	0.543	0.71	54.1	15.58	clear
1125	300.0	17.30	9.34	6.64	0.723	0.48	58.1	15.21	clear
1130	300.0	17.30	9.34	6.70	0.735	0.42	54.9	14.28	clear
1135	300.0	17.30	9.31	6.73	0.737	0.42	53.3	14.08	clear
1140	300.0	17.30	9.28	6.74	0.738	0.39	52.6	14.53	clear
1145	300.0	17.30	9.28	6.76	0.736	0.37	50.3	15.00	clear
1150	300.0	17.30	9.26	6.77	0.740	0.36	48.2	14.74	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0 163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-13-05_FAL19

Sample Time: 1150 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45 µm | Dup Time: —

Comments: PFAS sample @ 1200

Signature: [signature] | Date: 11/12/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-13-06

Project: LTM - Fall 2019 | Date: 11/12/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Eaker

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	17.75
Depth to bottom (ft BTOR)	410.605
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	35.606-45.606
Total volume purged (gal)	3.60

Sampling Type

Purging Method: peristaltic | Tubing type: Teflon lined | Dedicated pump (Y/N): N

Purge start/stop time: 0750/ | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 6920 MDS/11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm[c])	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0755	340.0	17.90	10.12	5.56	0.564	0.99	171.4	17.0	cloudy
0800	340.0	17.90	10.08	5.64	0.540	0.76	154.0	17.3	cloudy
0805	340.2	17.88	10.04	5.87	0.506	0.65	124.2	15.9	cloudy
0810	340.1	17.90	9.99	6.07	0.483	0.57	96.5	13.0	slightly cloudy
0815	340.0	17.90	9.96	6.20	0.453	0.53	76.4	11.7	slightly cloudy
0820	340.0	17.90	9.93	6.34	0.444	0.48	47.6	11.1	slightly cloudy
0825	340.0	17.90	9.95	6.41	0.443	0.46	43.9	11.0	slightly cloudy
0830	340.0	17.90	9.95	6.42	0.440	0.45	40.9	11.1	slightly cloudy
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N		Y			

Sampling Details

Sampling ID: SHM-13-06-FAL19

Sample Time: 0830 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments

Signature

11/12/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-13-07

Project: LTM - Fall 2019 | Date: 11/11/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact		✓	
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	18.95
Depth to bottom (ft BTOR)	34.79
Pump Set Depth (ft BTOR)	~~26.53~~ 32
Screen Interval (ft BTOR)	26.53-36.53
Total volume purged (gal)	3.0

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0737-0835 | Tubing diameter: 1/4" OD | Air source: MA

Field Instrument (Model/S/N): YSI 556 MPS 15F195607

Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0750	250	18.99	12.00	6.66	927	1.03	135.6	40.5	clear
0755	250	18.99	11.96	6.45	894	0.37	94.9	37.0	"
0800	250	18.99	11.91	6.38	861	0.72	56.6	20.8	"
0805	250	18.99	11.93	6.37	823	0.18	11.7	19.7	"
0810	250	18.99	11.97	6.38	801	0.16	-11.2	18.8	"
0815	250	18.99	11.90	6.37	788	0.17	-21.4	17.2	"
0820	250	18.99	11.90	6.37	778	0.16	-26.5	16.9	"
0825	250	18.99	11.91	6.38	772	0.13	-34.8	16.4	"
0830	250	18.99	11.90	6.39	771	0.13	-36.1	16.0	"
0835	250	18.99	11.95	6.39	769	0.15	-39.2	15.8	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-13-07-FAL19

Sample Time: 0835 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments

Signature | Date: 11/11/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-B-08

Project:	LTM - Fall 2019	Date:	11/11/19
Location:	Fort Devens, Massachusetts	Sampler:	MN

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	2/3		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	20.54
Depth to bottom (ft BTOR)	64'
Pump Set Depth (ft BTOR)	59'
Screen Interval (ft BTOR)	54.71-64.71
Total volume purged (gal)	3.0

Sampling Type

Purging Method: geotech

Purge start/stop time: 800 / 830

Tubing type: LDPE

Tubing diameter: 1/4"

Dedicated pump (Y/N): Tubing

Air source: N/A

Field Instrument (Model/S/N): YSI 650YL 11B100986
Lamotte 2020WE 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
800	200	20.54	11.84	7.32	446	9.70	79.9	5.94	Clear
805	↓	20.54	11.69	6.45	397	1.47	75.9	4.90	Clear
810		20.54	11.54	6.37	362	1.11	74.2	4.80	Clear
815		20.54	11.49	6.36	377	0.66	70.1	4.79	Clear
820		20.54	11.46	6.35	390	0.56	69.7	4.77	Clear
825	↓	20.54	11.49	6.36	391	0.55	69.6	4.73	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				✓					

Sampling Details

Sampling ID: SHM-13-08

Sample Time: 830

Duplicate (Y/N): N

MS/MSD (Y/N): N

Field Filtered (Y/N): ~~MS~~ 4

Dup ID: N

Filter Size: .45

Dup Time: N

Comments

[signature]

Signature

11/11/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-13-145

Project:	LTM - Fall 2019	Date:	11/11/19
Location:	Fort Devens, Massachusetts	Sampler:	WG

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	3.81
Depth to bottom (ft BTOR)	~18'
Pump Set Depth (ft BTOR)	~13'
Screen Interval (ft BTOR)	5.36 – 18.36
Total volume purged (gal)	3.5 gallons

Sampling Type

Purging Method: peristaltic — Tubing type: LDPE — Dedicated pump (Y/N): Tubing

Purge start/stop time: 940/1020 — Tubing diameter: 1/4" — Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 11B100186; Lamotte 2020we 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
940	200	3.81	10.70	5.80	642	0.22	60.8	3.70	Clear
945		3.81	11.29	5.79	648	0.38	65.5	1.93	Clear
950		3.81	11.35	5.79	649	0.32	63.3	0.86	Clear
955		3.81	11.37	5.81	649	0.31	61.2	0.83	Clear
1000		3.81	11.35	5.86	648	0.33	60.2	0.77	Clear
1005		3.81	11.37	5.85	648	0.35	58.5	0.73	Clear
1010		3.81	11.35	5.84	649	0.37	57.4	0.71	Clear
1015	✓	3.81	11.33	5.85	648	0.39	56.6	0.71	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				✓					

Sampling Details

Sampling ID: SHM-13-145

Sample Time: 1020 — Duplicate (Y/N): N — MS/MSD (Y/N): N

Field Filtered (Y/N): N — Dup ID: N

Filter Size: .45 — Dup Time: N

Comments

Signature

11/11/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-13-14D

Project: LTM - Fall 2019 | Date: 11/11/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	3.65
Depth to bottom (ft BTOR)	53.80
Pump Set Depth (ft BTOR)	50
Screen Interval (ft BTOR)	48.20-58.20
Total volume purged (gal)	2.0

Sampling Type

Purging Method Peri | Tubing type LDPE | Dedicated pump (Y/N) N

Purge start/stop time 0930-1015 | Tubing diameter 1/4"OD | Air source N/A

Field Instrument (Model/S/N) YSI556MPS 15F101567
Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0940	250	3.70	11.10	6.77	472	2.92	11.7	1.00	clear
0945	250	3.70	11.20	6.61	475	0.94	18.3	0.86	↓
0950	↓	↓	11.18	6.55	477	0.77	20.8	0.91	↓
0955	↓	↓	11.14	6.49	478	0.59	22.6	0.80	↓
1000	↓	↓	11.03	6.42	479	0.36	25.7	0.78	↓
1005	↓	↓	10.98	6.39	479	0.35	27.3	0.75	↓
1010	↓	↓	10.94	6.38	482	0.29	27.6	0.75	↓
1015	↓	↓	10.98	6.38	485	0.24	29.1	0.78	↓
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-13-14D-FA19

Sample Time: 1015 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments

Signature | Date 11/11/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification SMM- 13-15

Project: LTM - Fall 2019 | Date: 11/11/19

Location: Fort Devens, Massachusetts | Sampler: WM

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present		✓	✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	4.06
Depth to bottom (ft BTOR)	~64
Pump Set Depth (ft BTOR)	~59
Screen Interval (ft BTOR)	54.60-64.60
Total volume purged (gal)	3.0

Sampling Type

Purging Method: geotech | Tubing type: LDPE | Dedicated pump (Y/N): Tubing

Purge start/stop time: 1050/1130 | Tubing diameter: 1/4" | Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 11B100186

LaMotte 2020WE 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1050	200	4.06	10.75	5.90	890	0.22	50.8	3.98	Clear
1055	↓	4.06	10.90	5.97	901	0.32	50.2	3.18	Clear
1100	↓	4.06	10.81	5.98	928	0.35	48.1	3.02	Clear
1105	↓	4.06	10.79	6.06	927	0.37	46.9	2.90	Clear
1110	↓	4.06	10.88	6.06	921	0.40	45.6	2.97	Clear
1115	↓	4.06	10.87	6.09	930	0.36	44.9	2.96	Clear
1120	↓	4.06	10.87	6.10	921	0.38	44.7	2.94	Clear
1125	↓	4.06	10.79	6.10	922	0.41	44.3	2.91	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SMM- 13-15

Sample Time: 1130 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: N

Filter Size: .45 | Dup Time: N

Comments

Signature

11/11/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SMM-93-01A

Project:	LTM - Fall 2019	Date:	6/13/19
Location:	Fort Devens, Massachusetts	Sampler:	MA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	22.47
Depth to bottom (ft BTOR)	~25'
Pump Set Depth (ft BTOR)	~20'
Screen Interval (ft BTOR)	15.5-25.5
Total volume purged (gal)	3.5

Sampling Type

Purging Method: geotech

Purge start/stop time: 805/845

Tubing type: HDPE

Tubing diameter: 1/4"

Dedicated pump (Y/N): Y

Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 11B100186

LaMotte 2020we 3590-5513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
805	200	22.47	7.14	7.69	225	9.80	49.4	1.90	Clear
810		22.47	6.90	6.91	192	9.70	46.1	0.92	Clear
815		22.47	6.89	6.88	185	9.60	43.1	0.97	Clear
820		22.47	6.87	7.01	163	9.49	40.1	0.92	Clear
825		22.47	6.84	7.00	159	9.40	37.1	0.89	Clear
830		22.47	6.83	7.03	157	9.30	36.2	0.83	Clear
835		22.47	6.82	7.02	155	9.27	35.9	0.81	Clear
840	↓	22.47	6.81	7.06	154	9.26	34.7	0.79	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SMM-93-01A

Sample Time: 845

Duplicate (Y/N): N

MS/MSD (Y/N): N

Field Filtered (Y/N): N

Dup ID: N

Filter Size: N/A

Dup Time: N

Comments

Signature

Date: 6/13/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-93-10D

Project: LTM - Fall 2019 | Date: 10/29/19
Location: Fort Devens, Massachusetts | Sampler: B/A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	Steel
Depth to water (ft BTOR)	30.05
Depth to bottom (ft BTOR)	57.72
Pump Set Depth (ft BTOR)	52
Screen Interval (ft BTOR)	48.70-58.70
Total volume purged (gal)	3.0

Sampling Type

Purging Method: 1.75" Bladder | Tubing type: Bonded LDPE | Dedicated pump (Y/N): N
Purge start/stop time: 0930- | Tubing diameter: 1/4" OD | Air source: N_2

Field Instrument (Model/S/N): YSI 556 MPS Hach 2100Q

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0945	200	30.70	10.57	10.05	387	6.34	130.7	48.1	clear
0950	100	30.92	10.60	10.61	391	2.80	119.0	37.4	clear
0955	100	31.20	10.65	11.03	395	1.50	109.8	36.1	clear
1000	100	31.50	10.66	11.17	396	1.18	106.4	38.3	clear
1005	100	31.85	10.65	11.31	396	0.91	102.5	36.4	clear
1010	100	32.10	10.66	11.39	397	0.80	99.9	35.8	clear
1015	100	32.20	10.69	11.44	397	0.70	97.2	31.6	clear
1020	100	32.50	10.73	11.50	397	0.62	94.3	28.1	clear
1025	100	32.75	10.74	11.54	397	0.58	92.9	26.3	clear
1030	100	32.90	10.82	11.63	397	0.53	90.6	21.7	
1035	100	32.98	10.85	11.65	397	0.54	89.1	22.8	
1040	100	33.04	10.86	11.67	397	0.51	88.3	20.1	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHM-93-10D-FAL19
Sample Time: 1040 | Duplicate (Y/N): N | MS/MSD (Y/N): Y
Field Filtered (Y/N): Y | Dup ID: -
Filter Size: 0.45um | Dup Time: -

Comments DTW not stabilizing, constant drawdown

Signature | Date: 10/29/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-93-10D

Project:	LTM - Fall 2019	Date:	11/14/19
Location:	Fort Devens, Massachusetts	Sampler:	BCA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	Steel
Depth to water (ft BTOR)	30.60
Depth to bottom (ft BTOR)	58.05
Pump Set Depth (ft BTOR)	53
Screen Interval (ft BTOR)	48.70-58.70
Total volume purged (gal)	2.0

Sampling Type

Purging Method: 1.75" Bladder
Tubing type: HDPE
Dedicated pump (Y/N): N
Purge start/stop time: 1230 - 1325
Tubing diameter: 1/4" OD
Air source: N_2

Field Instrument (Model/S/N): YSI 556 MPS 15F101567
Hach 21020 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1240	100	31.20	9.59	8.94	285	1.24	-85.4	47.1	clear
1245	100	31.50	9.55	9.51	290	0.88	-116.0	46.8	clear
1250	100	32.00	9.47	10.03	295	0.68	-143.7	42.1	"
1255	100	32.40	9.43	10.38	296	0.58	-157.1	40.6	"
1300	100	32.80	9.46	10.59	297	0.46	-163.0	29.84	"
1305	100	33.10	9.47	10.70	297	0.41	-167.9	29.23	"
1310	100	33.28	9.50	10.77	297	0.38	-168.4	28.04	"
1315	100	33.70	9.46	10.80	297	0.32	-169.4	28.00	"
1320	100	34.21	9.49	10.85	297	0.26	-168.9	27.51	"
1325	100	34.51	9.48	10.89	297	0.27	-171.8	27.45	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-93-10D-FAL19
Sample Time: 1325
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): N
Dup ID: -
Filter Size: -
Dup Time: -

Comments Re-LF for PFAS only. DTW not stable at lowest pump rate

Signature: [signature]
Date: 11/14/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM93-18B

Project: LTM - Fall 2019 | Date: 11/13/19

Location: Fort Devens, Massachusetts | Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	18.87
Depth to bottom (ft BTOR)	~90'
Pump Set Depth (ft BTOR)	~85'
Screen Interval (ft BTOR)	80.60-90.60
Total volume purged (gal)	3.5

Sampling Type

Purging Method: geotech | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 945/1025 | Tubing diameter: 1/4" | Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 11B100186

Remote Probe 3590-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
945	200	18.87	9.38	7.40	298	9.87	5.1	2.06	Clear
950		18.87	9.30	7.50	309	7.77	4.2	2.09	Clear
955		18.87	9.22	7.64	305	7.69	2.9	1.97	Clear
1000		18.87	9.29	7.64	309	7.68	2.8	1.98	Clear
1005		18.87	9.26	7.68	311	7.66	2.6	1.92	Clear
1010		18.87	9.22	7.69	313	7.65	2.4	1.90	Clear
1015		18.87	9.21	7.68	315	7.64	2.2	1.91	Clear
1020		18.87	9.22	7.67	317	7.59	2.3	1.89	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHM-93-18B

Sample Time: 1025 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: N

Filter Size: .45 | Dup Time: ✓

Comments

Signature | Date: 11/13/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-93-22B

Project: LTM - Fall 2019 | Date: 11/4/19

Location: Fort Devens Massachusetts | Sampler: Kristen Baker

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	8.51
Depth to bottom (ft BTOR)	97.5
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	82.55-92.55
Total volume purged (gal)	4.5

Sampling Type

Purging Method: peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 8:35/0920 | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS / 11G100387 (YE)

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0840	473.1	8.5	8.38	6.15	0.1038	2.39	149.5	80.0	clear
0845	350.2	8.6	8.55	6.16	0.1033	1.35	78.3	62.1	clear
0850	352.1	8.6	8.65	6.23	0.1030	1.09	47.6	40.1	clear
0855	351.3	8.7	8.66	6.30	0.1030	0.79	23.8	27.1	clear
0900	345.6	8.7	8.89	6.31	0.1024	0.73	17.3	12.3	clear
0905	340.7	8.7	9.04	6.32	0.1024	0.70	9.1	12.8	clear
0910	340.5	8.75	9.09	6.36	0.1023	0.67	4.0	12.2	clear
0915	340.6	8.7	9.08	6.34	0.1023	0.65	4.2	12.0	clear
0920	340.5	8.7	9.08	6.34	0.1021	0.62	1.5	12.1	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	—	—	—	—	

1/8

Sampling Details

Sampling ID: SHM-93-22B-FAL19

Sample Time: 0920 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45 µm | Dup Time: —

Comments: Field filter: Batch MPB 5-22-20 Lot: E1809

Signature | Date: 11/4/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-93-22C

Project: LTM - Fall 2019 | Date: 11/11/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Fisher

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	9.75
Depth to bottom (ft BTOR)	143.0
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	124.30 — 134.30
Total volume purged (gal)	3.0

Sampling Type

Purging Method: peristaltic | Tubing type: Teflon lined | Dedicated pump (Y/N): N

Purge start/stop time: 0800/ | Tubing diameter: 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS / 11L100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0805	320.0	10.30	8.68	5.82	0.282	4.84	161.8	15.17	clear
0810	300.6	11.21	8.63	6.11	0.273	3.87	142.5	15.20	clear
0815	200.7	11.45	8.65	6.46	0.275	3.86	127.5	13.79	clear
0820	200.8	11.75	8.64	6.52	0.276	3.87	124.3	14.13	clear
0825	200.5	12.10	8.67	6.76	0.275	3.95	114.3	14.74	clear
0830	200.7	12.24	8.66	6.85	0.275	3.99	110.9	14.01	clear
0835	200.5	12.34	8.63	6.94	0.274	4.05	107.2	14.10	clear
0840	200.6	12.40	8.61	6.95	0.274	4.12	102.9	14.08	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHM-93-22C-NOV19

Sample Time: 0840 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments VOC & filtered metals sample

Signature | Date: 11/11/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-93-22C

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/4/19
Sampler: Kristen Esser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	9.90
Depth to bottom (ft BTOR)	142.3
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	126.07 - 136.07
Total volume purged (gal)	4.1

Sampling Type

Purging Method: peristaltic
Purge start/stop time: ~~1240~~ 1235 (1240)
Tubing type: HDPE
Tubing diameter: 3/8" (1/8)
Dedicated pump (Y/N): N
Air source: NA
Field Instrument (Model/S/N): YSI 650MS / ~~16~~ 11G 100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
~~1245~~ 1240	320.6	10.1	9.14	7.55	0.329	3.43	49.4	6.80	clear
1245	310.4	9.98	9.21	7.59	0.326	2.67	31.0	4.67	clear
1250	310.2	9.95	9.13	7.60	0.327	2.60	28.8	4.39	clear
1255	310.5	9.96	9.19	7.59	0.326	2.52	26.7	3.97	clear
1300	310.4	9.95	9.12	7.56	0.325	2.42	27.4	4.82	clear
1305	310.6	10.15	9.04	7.53	0.325	2.39	29.0	4.94	clear
1310	310.6	10.05	9.04	7.55	0.324	2.36	31.8	4.48	clear
1315	310.5	10.04	9.01	7.55	0.325	2.33	29.9	4.24	clear
1320	310.6	10.06	8.98	7.54	0.325	2.31	30.4	4.46	clear
1325	310.5	10.05	8.98	7.56	0.324	2.29	30.6	4.32	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-93-22C_FAL19
Sample Time: 1325
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments Field Filter Batch MPB 5-22-2018 lot E1809

[signature]
Signature

11/4/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-93-24A

Project: LTM - Fall 2019 | Date: 11/7/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Eisler

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	16.31
Depth to bottom (ft BTOR)	27.35'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	16.23-26.23
Total volume purged (gal)	4.0

Sampling Type

Purging Method: peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0825/0910 | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS / 16G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0830	340.5	16.32	11.37	5.62	0.734	9.48	168.1	2.90	clear
0835	340.0	16.35	11.41	5.67	0.723	9.57	151.1	11.98	clear
0840	340.0	16.33	11.48	5.73	0.718	9.34	141.0	9.83	clear
0845	340.4	16.32	11.51	5.73	0.718	9.33	138.2	10.70	clear
0850	340.5	16.33	11.50	5.76	0.719	9.36	133.7	10.89	clear
0855	340.0	16.35	11.49	5.77	0.716	9.40	130.1	9.74	clear
0900	340.5	16.35	11.49	5.78	0.714	9.39	127.9	12.68	clear
0905	340.5	16.33	11.50	5.78	0.713	9.39	124.6	12.01	clear
0910	340.0	16.32	11.48	5.79	0.713	9.38	123.7	12.44	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-93-24A

Sample Time: 0910 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45µm | Dup Time: —

Comments

Signature | Date: 11/7/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-96-5B

Project: LTM - Fall 2019 | Date: 11/7/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	6.95
Depth to bottom (ft BTOR)	90.65
Pump Set Depth (ft BTOR)	86
Screen Interval (ft BTOR)	81.54-91.54
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0830/0840 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG

LaMotte 2020 we 5033-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
08:40	250	7.25	10.52	8.39	609	5.51	202.1	11.0	clear
08:45	250	7.3	10.47	7.64	532	3.87	215.9	9.67	clear
08:50	250	7.3	10.41	7.29	503	3.64	213.9	6.19	clear
08:55	250	7.3	10.32	7.10	498	3.57	197.3	5.63	clear
09:00	250	7.3	10.25	6.95	496	3.47	176.6	5.21	clear
09:05	250	7.3	10.18	6.88	495	3.33	158.0	4.39	clear
09:10	250	7.3	10.13	6.84	494	3.36	153.6	4.49	clear
09:15	250	7.3	10.11	6.82	494	3.35	149.4	4.42	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: SHM-96-5B_FAL19

Sample Time: 09:15 | Duplicate (Y/N): Y (PFAS) | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP-110719

Filter Size: 0.45 µm | Dup Time: 09:20

Comments Dedicated tubing already in well is tied to a weight & cannot be removed ~~that sure~~ if LDPE or HDPE

Abigail Cartwright — **Signature**

11/7/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-96-5C

Project: LTM - Fall 2019 | Date: 11/7/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	6.5
Depth to bottom (ft BTOR)	82.25
Pump Set Depth (ft BTOR)	55
Screen Interval (ft BTOR)	51.0-61.0
Total volume purged (gal)	2.3

Sampling Type

Purging Method: peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 09:45/09:55 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 06M0743 AG
LaMotte 2020we 5083-5014

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
09:55	250	6.5	9.90	6.73	659	3.57	-70.7	5.45	clear
10:00	250	6.5	9.91	6.59	639	0.56	-72.8	4.96	clear
10:05	250	6.5	9.85	6.52	609	0.57	-67.8	5.98	clear
10:10	250	6.5	9.85	6.47	583	0.44	-59.1	3.76	clear
10:15	250	6.5	9.81	6.42	566	0.39	-52.9	3.85	clear
10:20	250	6.5	9.80	6.38	546	0.33	-47.5	4.18	clear
10:25	250	6.5	9.82	6.36	542	0.29	-43.1	3.79	clear
10:30	250	6.5	9.83	6.35	535	0.31	-36.9	3.83	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0 163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	N	N	N	

Sampling Details

Sampling ID: SHM-96-5C_FAL19

Sample Time: 10:30 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments Well gripper might need replacement - duct taped together

Abigail Cartwright — **Signature**

11/7/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-99-31C

Project: LTM - Fall 2019 | Date: 11/14/19
Location: Fort Devens, Massachusetts | Sampler: M. VIDAL

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	4.68
Depth to bottom (ft BTOR)	81.10
Pump Set Depth (ft BTOR)	~77
Screen Interval (ft BTOR)	69.96-79.96
Total volume purged (gal)	~4.5

Sampling Type

Purging Method: LOW-FLOW | Tubing type: TEFLON LINED | Dedicated pump (Y/N): PERISTALTIC
Purge start/stop time: 8:15/8:45 | Tubing diameter: 1/4" | Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS S/N 15L102308

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
8:20	300	4.87	9.49	7.13	248	3.29	189.3	20.7	CLEAR & SUSPENDED PARTICLES
8:25	300	4.88	9.49	7.18	248	2.82	137.4	45.0	
8:30		4.90	9.49	7.10	247	2.25	73.7	31.3	
8:35		4.90	9.50	7.06	246	2.00	40.1	20.9	
8:40		4.88	9.49	6.93	246	1.48	-28.0	16.2	
8:45		4.86	9.45	6.87	248	0.82	-70.8	13.7	
8:50		4.86	9.40	6.70	286	0.80	-73.6	11.1	
8:55		4.86	9.41	6.68	294	0.77	-76.1	9.3	
9:00		4.86	9.43	6.67	299	0.78	-77.5	6.44	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	Y	Y	

Sampling Details

Sampling ID: SHM-99-31C-FAL19
Sample Time: 9:05 | Duplicate (Y/N): N/A | MS/MSD (Y/N): VOCs + METALS
Field Filtered (Y/N): | Dup ID: N/A
Filter Size: 0.45 µm | Dup Time: N/A

Comments

Signature | Date: 11/14/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-99-32X

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/13/19
Sampler: Kristen Esser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	10.4
Depth to bottom (ft BTOR)	85.2
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	74.16 - 84.16
Total volume purged (gal)	3.75

Sampling Type

Purging Method: peristaltic
Tubing type: Teflon lined
Dedicated pump (Y/N): N
Purge start/stop time: 0875/0905
Tubing diameter: 1/4"
Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS/11G 100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0830	300.0	10.5	8.61	6.11	0.249	6.94	162.6	782	clear
0835	300.0	10.5	8.42	6.37	0.248	7.03	139.9	12.0	clear
0840	300.0	10.5	8.30	6.42	0.248	7.16	132.3	12.3	clear
0845	300.0	10.5	8.34	6.47	0.252	6.92	126.0	12.26	clear
0850	300.0	10.5	8.25	6.48	0.255	6.79	124.2	12.24	clear
0855	300.0	10.5	8.26	6.40	0.292	6.14	118.9	12.23	clear
0900	300.0	10.5	8.20	6.31	0.293	6.04	112.3	12.24	clear
0905	300.0	10.5	8.20	6.30	0.291	6.01	110.8	12.20	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-99-32X_N0419
Sample Time: 0905
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45µm
Dup Time: —

Comments

[signature]
Signature

KE RF 11/13/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-99-32X

Project: LTM - Fall 2019 | Date: 11/12/19

Location: Fort Devens, Massachusetts | Sampler: B/A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	10.05
Depth to bottom (ft BTOR)	84.20
Pump Set Depth (ft BTOR)	80
Screen Interval (ft BTOR)	74.16-84.16
Total volume purged (gal)	3.5

Sampling Type

Purging Method: Peri | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0830-0930 | Tubing diameter: 1/4" OD | Air source: NA

Field Instrument (Model/S/N): YSI 556 MPS 15F101567
Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0835	250	10.05	9.57	6.16	352	0.92	138.9	21.4	clear
0840	250	10.05	9.56	6.24	364	0.59	117.6	19.8	clear
0845	250	10.05	9.56	6.25	368	0.42	103.1	17.1	"
0850	250	10.05	9.55	6.27	370	0.33	87.8	14.6	"
0855	250	10.05	9.68	6.38	370	0.26	59.3	12.4	"
0900	250	10.05	9.74	6.40	370	0.27	50.0	9.36	"
0905	250	10.05	9.52	6.40	371	0.24	35.6	8.14	"
0910	250	10.05	9.39	6.40	371	0.22	28.9	8.03	"
0915	250	10.05	9.43	6.45	371	0.19	17.5	7.96	"
0920	250	10.05	9.28	6.44	371	0.17	9.3	7.88	"
0925	250	10.05	9.23	6.44	371	0.16	10.4	7.92	"
0930	250	10.05	9.20	6.43	371	0.16	11.8	7.79	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N				N	

Sampling Details

Sampling ID: SHM-99-32X-FAL19

Sample Time: 0930 | Duplicate (Y/N): Y (PFAS only) | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP-111219

Filter Size: 0.45µm | Dup Time: 0935

Comments: LTM + PFAS (FO)

Signature | Date: 11/12/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-01-36X

Project: LTM - Fall 2019 | Date: 11/4/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact			✓
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	steel
Depth to water (ft BTOR)	7.5
Depth to bottom (ft BTOR)	13.0
Pump Set Depth (ft BTOR)	9.5
Screen Interval (ft BTOR)	6.96 - 11.98
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1142/1150 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG
Hach 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
11:50	250	7.5	12.41	6.43	297	1.36	43.7	2.92	clear
11:55	250	7.5	12.39	6.40	296	1.20	43.9	2.33	clear
12:00	250	7.5	12.30	6.37	297	0.88	43.8	2.57	clear
12:05	250	7.5	12.23	6.36	297	0.42	42.6	3.21	clear
12:10	250	7.5	12.21	6.36	297	0.28	39.0	2.13	clear
12:15	250	7.5	12.19	6.35	297	0.33	38.4	2.04	clear
12:20	250	7.5	12.21	6.35	297	0.32	37.4	1.95	clear
12:25	250	7.5	12.16	6.35	297	0.30	36.8	2.01	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	Y	

Sampling Details

Sampling ID: SHP-01-36X_FAL19

Sample Time: 12:25 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

11/4/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-01-37X

Project: LTM - Fall 2019 | Date: 11/4/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact			✓
Well gripper present	✓		
Bolts present	✓		✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	steel
Depth to water (ft BTOR)	6.2
Depth to bottom (ft BTOR)	11.3
Pump Set Depth (ft BTOR)	7.5
Screen Interval (ft BTOR)	5.12-10.12
Total volume purged (gal)	2.3

Sampling Type

Purging Method: LF | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1024/1035 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743AG

HACH 2100Q 17050C059542

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
10:35	250	6.3	12.96	6.43	315	2.46	5.4	2.75	clear
10:40	250	6.35	13.02	6.36	313	0.91	4.8	3.64	clear
10:45	250	6.4	12.93	6.39	312	0.81	3.3	3.21	clear
10:50	250	6.4	13.08	6.48	310	0.74	-1.8	2.40	clear
10:55	250	6.4	13.27	6.50	309	0.51	-3.0	2.78	clear
11:00	250	6.4	13.21	6.55	311	0.49	-4.5	2.48	clear
11:05	250	6.4	13.10	6.55	312	0.44	-4.5	2.63	clear
11:10	250	6.4	12.98	6.56	313	0.39	-4.3	2.55	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	Y	

Sampling Details

Sampling ID: SHP-01-37X_FAL19

Sample Time: 11:10 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartright — **Signature**

11/4/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-01-38A

Project: LTM - Fall 2019 | Date: 11/4/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact			✓
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	steel
Depth to water (ft BTOR)	6.5
Depth to bottom (ft BTOR)	9.15
Pump Set Depth (ft BTOR)	6
Screen Interval (ft BTOR)	3.59-8.59
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0810/0820 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 00M0743 AG

HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
08:20	250	6.55	11.55	7.14	306	2.32	23.6	7.81	clear
08:25	250	6.55	11.72	6.56	283	1.14	24.0	3.12	clear
08:30	250	6.55	11.70	6.27	268	0.58	18.9	2.75	clear
08:35	250	6.55	12.02	6.08	260	0.68	12.7	4.24	clear
08:40	250	6.60	12.06	6.05	253	0.45	8.6	3.85	clear
08:45	250	6.60	12.10	6.02	251	0.41	4.6	2.51	clear
08:50	250	6.60	12.26	6.01	250	0.40	3.7	2.27	clear
08:55	250	6.60	12.28	6.01	248	0.37	0.8	2.24	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	N	Y	

Sampling Details

Sampling ID: SHP-01-38A_FAL19

Sample Time: 08:55 | Duplicate (Y/N): Y | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: SHL-DUP04_FAL19

Filter Size: 0.45 µm | Dup Time: 09:00

Comments

Abigail Cartwright — **Signature**

11/4/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-99-29X

Project: LTM - Fall 2019 | Date: 11/6/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	23.95
Depth to bottom (ft BTOR)	30.95
Pump Set Depth (ft BTOR)	25
Screen Interval (ft BTOR)	20.88-30.88
Total volume purged (gal)	2.43

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0812/0820 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 10M0743 AG
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
08:20	230	24.0	10.36	7.49	314	3.09	5.4	29.1	visible dirt particles
08:25	230	24.0	10.59	6.52	303	2.85	11.0	23.1	visible dirt particles
08:30	230	24.0	10.30	5.40	260	1.98	13.5	16.7	visible dirt particles
08:35	230	24.0	10.53	5.72	251	1.45	15.7	8.04	clear
08:40	230	24.0	10.48	5.66	250	1.08	15.8	5.22	clear
08:45	230	24.0	10.58	5.62	246	0.77	16.4	4.96	clear
08:50	230	24.0	10.63	5.62	247	0.62	16.2	4.04	clear
08:55	230	24.0	10.58	5.64	244	0.56	13.3	4.38	clear
09:00	230	24.0	10.57	5.64	244	0.51	13.5	4.11	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				Y	Y	N	N	Y	

Sampling Details

Sampling ID: SHP-99-29X_FAL19

Sample Time: 09:00 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright
Signature

11/6/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-1A

Project: LTM - Fall 2019 | Date: 11/8/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	15.95
Depth to bottom (ft BTOR)	26.18
Pump Set Depth (ft BTOR)	20.5
Screen Interval (ft BTOR)	15.59-25.59
Total volume purged (gal)	2.64

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0822/0830 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 11B100186
HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
08:30	250	16.12	11.14	8.06	115	14.56	73.3	26.7	slightly cloudy
08:35	250	16.12	11.07	7.41	97	3.61	72.4	10.3	clear
08:40	250	16.12	10.81	6.49	73	-0.41	45.9	7.02	clear
08:45	250	16.15	11.03	6.24	72	-0.20	45.1	6.49	clear
08:50	250	16.15	11.06	6.09	70	-0.53	36.4	6.64	clear
08:55	250	16.15	11.10	5.98	70	-0.42	36.3	6.51	clear
09:00	250	16.15	11.20	5.84	69	-0.32	35.0	7.43	clear
09:05	250	16.18	11.28	5.73	68	-0.29	35.7	6.71	clear
09:10	250	16.18	11.29	5.70	68	-0.26	36.0	6.84	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Variance Observed (Y/N):				N	Y	Y	Y	Y	

Sampling Details

Sampling ID: SHP-2016-1A-FAL19

Sample Time: 09:10 | Duplicate (Y/N): N | MS/MSD (Y/N): Y

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments: DO probe malfunctioned

Abigail Cartwright
Signature

11/8/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-1B

Project: LTM - Fall 2019 | Date: 11/8/19

Location: Fort Devens, Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	17.25
Depth to bottom (ft BTOR)	86.19 ?
Pump Set Depth (ft BTOR)	82.5
Screen Interval (ft BTOR)	77.56-87.56
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1025/1035 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS 11B100186

HACH 2100Q 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
10:35	250	18.3	10.06	5.49	285	1.95	57.6	30.5	clear
10:40	250	18.3	9.95	5.48	286	0.75	48.9	11.6	clear
10:45	250	18.3	9.85	5.54	292	1.18	39.7	8.47	clear
10:50	250	18.3	10.18	5.56	305	0.70	38.1	7.52	clear
10:55	250	18.3	10.38	5.65	310	0.77	36.9	5.91	clear
11:00	250	18.3	10.24	5.70	318	0.83	37.3	6.88	clear
11:05	250	18.3	10.30	5.73	327	0.86	37.1	6.24	clear
11:10	250	18.3	10.44	5.74	331	0.89	36.3	6.77	clear
			✓	✓	✓	✓	✓	✓	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	Y	Y	Y	Y	

Sampling Details

Sampling ID: SHP-2016-1B-FAL19

Sample Time: 11:10 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: 0.45 µm | Dup Time:

Comments

Abigail Cartwright — **Signature**

11/8/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: ~~SHP-2016-2A~~ PZ SHP-2016-2A

Project:	LTM - Fall 2019	Date:	10/24/2019
Location:	Fort Devens, Massachusetts	Sampler:	Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	~~2"~~ 1"
Material	PVC
Depth to water (ft BTOR)	15.21
Depth to bottom (ft BTOR)	27.45
Pump Set Depth (ft BTOR)	24.70
Screen Interval (ft BTOR)	22.70-27.20
Total volume purged (gal)	2.4

Sampling Type

Purging Method: peri — Tubing type: LDPE — Dedicated pump (Y/N): no

Purge start/stop time: 1245/1343 — Tubing diameter: 1/4" OD — Air source: none

Field Instrument (Model/S/N): YSI 556 MPS #15F101567
HACH 2100Q #17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1248	175	15.35	10.72	7.05	148	14.88	200.4	46.2	clear
1253	175	15.39	10.90	7.63	152	2.17	202.7	16.8	clear
1258	175	15.40	10.83	8.18	~~142.8~~	1.24	191.8	11.6	clear
1303	175	15.40	10.72	8.30	~~140.0~~	1.18	189.4	8.33	clear
1308	175	15.40	10.65	8.56	~~144~~ 134	1.41	177.2	7.53	clear
1313	175	15.46	10.64	8.49	129	1.60	173.7	6.22	clear
1318	175	15.40	10.60	8.44	125	1.85	172.8	6.08	clear
1323	175	15.40	10.51	8.35	121	2.12	166.5	4.72	clear
1328	175	15.40	10.59	8.22	118	2.35	164.7	4.75	clear
1333	175	15.46	10.61	8.18	115	2.51	158.7	4.81	clear
1338	175	15.40	10.70	8.11	117	2.47	159.9	4.62	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: SHP-2016-2A

Sample Time: 1338 — Duplicate (Y/N): no — MS/MSD (Y/N): no

Field Filtered (Y/N): yes — Dup ID: —

Filter Size: 0.45 um — Dup Time: —

Comments

Erick Seiler — **Signature**

10/24/2019 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-2B

Project:	LTM - Fall 2019	Date:	10/24/2019
Location:	Fort Devens, Massachusetts	Sampler:	Seiler

Well Integrity

	Yes	No	N/A
Casing Secure	X		
Concrete Pad intact	X		
PVC casing intact	X		
Well gripper present	X		
Bolts present			X
Locked (stickup wells)	X		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	15.22
Depth to bottom (ft BTOR)	87.98
Pump Set Depth (ft BTOR)	84.72
Screen Interval (ft BTOR)	82.22 - 87.22
Total volume purged (gal)	2.5

Sampling Type

Purging Method: Peri Tubing type: LDPE Dedicated pump (Y/N): no

Purge start/stop time: 1346/1437 Tubing diameter: 1/4" OD Air source: none

Field Instrument (Model/S/N): YSI 556 MPS # 15F101567
HACH 21000 # 17060C059342

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1348	200	15.27	10.26	7.01	267	20.29	74.6	5.48	clear
1353	200	15.28	10.23	6.77	267	0.94	19.1	2.69	clear
1358	200	15.28	10.17	6.72	267	0.42	-0.2	3.00	clear
1403	200	15.28	10.16	6.66	269	0.26	-6.4	2.25	clear
1408	200	15.28	10.20	6.62	335	0.20	-14.7	3.17	clear
1413	200	15.28	10.19	6.56	448	0.19	-20.4	4.32	clear
1418	200	15.28	10.13	6.47	475	0.24	-22.3	3.75	clear
1423	200	15.28	9.91	6.45	486	0.25	-26.1	2.48	clear
1428	200	15.28	9.89	6.50	489	0.22	-31.7	2.98	clear
1433	200	15.28	9.87	6.47	487	0.19	-32.6	3.03	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				no	yes	no	no	yes	

Sampling Details

Sampling ID: SHP-2016-2B

Sample Time: 1433 Duplicate (Y/N): no MS/MSD (Y/N): no

Field Filtered (Y/N): yes Dup ID: –

Filter Size: 0.45 um Dup Time: –

Comments

Brian Seiler
Signature

10/24/2019
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-PZ-16-03A

Project: LTM - Fall 2019 | Date: 10/28/19

Location: Fort Devens Massachusetts | Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	22.0 (22.0)
Depth to bottom (ft BTOR)	28.0
Pump Set Depth (ft BTOR)	~~28.0~~ 24
Screen Interval (ft BTOR)	22.05 - 27.05
Total volume purged (gal)	2.3

Sampling Type

Purging Method: Peri | Tubing type: LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 11:15/11:30 | Tubing diameter: 1/4" OD | Air source:

Field Instrument (Model/S/N): YSI 650 MDS

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
11:35	250	22.65	8.85	7.77	183	0.55	-47.8	3.16	clear
11:40	250	22.65	8.51	6.82	168	0.48	-44.1	2.59	clear
11:45	250	22.65	8.63	6.66	163	0.62	-48.8	1.86	clear
11:50	250	22.65	8.60	6.57	161	0.59	-55.0	3.08	clear
11:55	250	22.65	8.55	6.56	160	0.61	-59.1	4.05	clear
12:00	250	22.65	8.58	6.51	159	0.43	-64.6	2.29	clear
12:05	250	22.65	8.60	6.5	159	0.40	-60.7	2.52	clear
12:10	250	22.65	8.70	6.48	159	0.37	-52.0	2.95	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):									0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID: SHP-2016-3A_FAL19

Sample Time: 12:10 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID:

Filter Size: .45 µm | Dup Time:

Comments

Abigail Cartwright — **Signature**

10/28/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-PZ-16-03B

Project: LTM - Fall 2019 Date: 10/28/19

Location: Fort Devens, Massachusetts Sampler: A. Cartwright

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	12.2
Depth to bottom (ft BTOR)	87.7
Pump Set Depth (ft BTOR)	84.5
Screen Interval (ft BTOR)	82.05-87.05
Total volume purged (gal)	2.12

Sampling Type

Purging Method peri Tubing type LDPE Dedicated pump (Y/N) N

Purge start/stop time 12:50/1:00 Tubing diameter 1/4" OD Air source

Field Instrument (Model/S/N) YSI 650 MDS

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
13:00	230	12.2	9.16	6.31	209	1.54	-57.8	9.66	clear
13:05	230	12.2	9.05	6.40	217	0.76	-73.1	11.8	clear
13:10	230	12.2	9.05	6.44	224	0.34	-77.7	8.69	clear
13:15	230	12.23	9.07	6.48	235	0.26	-82.4	5.87	clear
13:20	230	12.23	9.08	6.51	238	0.25	-84.3	5.10	clear
13:25	230	12.25	9.12	6.52	241	0.24	-84.9	3.24	clear
13:30	230	12.25	9.11	6.53	242	0.21	-85.5	3.21	clear
13:35	230	12.25	9.14	6.54	242	0.21	-85.8	2.85	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: SHP-2016-3B-FAL19

Sample Time 13:35 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N) Y Dup ID:

Filter Size .45 µm Dup Time:

Comments

Abigail Cartwright

Signature

10/28/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-04A

Project: LTM - Fall 2019 Date: 11/5/19

Location: Fort Devens, Massachusetts Sampler: Kristen Baker

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	18.95'
Depth to bottom (ft BTOR)	32.90'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	27.4 - 32.4
Total volume purged (gal)	3.2

Sampling Type

Purging Method: peristaltic Tubing type: HDPE Dedicated pump (Y/N): N

Purge start/stop time: 1120 / Tubing diameter: 3/8" Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS / 11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1125	310.5	19.89	8.14	6.410	0.084	2.160	52.9	14.7	cloudy
1130	310.2	19.85	8.04	6.39	0.083	2.162	49.2	13.25	clear-cloudy
1135	300.5	19.60	8.07	6.42	0.084	2.163	45.4	9.85	clear
1140	300.7	19.60	8.06	6.41	0.084	2.168	45.1	10.06	clear
1145	300.5	19.61	8.07	6.39	0.084	2.167	46.2	9.00	clear
1150	300.2	19.60	8.08	6.37	0.083	2.169	46.8	9.06	clear
1155	300.4	19.65	8.07	6.33	0.084	2.169	49.1	9.11	clear
1200	300.5	19.63	8.08	6.32	0.084	2.173	49.6	9.13	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHP-2016-04A-FAL19

Sample Time: 1200 Duplicate (Y/N): N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID: —

Filter Size: 0.45 µm Dup Time: —

Comments Well labeled as SHP-PZ-16-04A/B.

Signature: [signature] Date: 11/5/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-04B

Project:	LTM - Fall 2019	Date:	11/5/19
Location:	Fort Devens, Massachusetts	Sampler:	Kristen Eisner

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	19.03'
Depth to bottom (ft BTOR)	93.41'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	87.8-92.8
Total volume purged (gal)	4.2

Sampling Type

Purging Method: peristaltic — Tubing type: HDPE — Dedicated pump (Y/N): N

Purge start/stop time: 1245/1315 — Tubing diameter: 3/8" — Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS / 11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1250	350.2	19.05	8.23	6.09	0.226	0.43	5.1	9.65	clear
1255	350.4	19.04	8.25	6.19	0.233	0.37	-9.8	11.19	clear
1300	350.4	19.02	8.28	6.24	0.413	0.33	-30.1	14.48	clear
1305	350.2	19.03	8.30	6.30	0.463	0.34	-41.3	12.41	clear
1310	350.3	19.09	8.32	6.37	0.485	0.32	-54.1	9.93	clear
1315	350.2	19.03	8.32	6.40	0.492	0.32	-58.5	8.88	clear
1320	350.4	19.07	8.33	6.43	0.497	0.32	-52.0	8.57	clear
1325	350.2	19.05	8.34	6.45	0.494	0.31	-59.7	8.12	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHP-2016-04B-FAL19

Sample Time: 1325 — Duplicate (Y/N): ~~Y~~ N — MS/MSD (Y/N): N

Field Filtered (Y/N): N — Dup ID: —

Filter Size: 0.45 µm — Dup Time: —

Comments: Did not take FD

Signature: [signature] — Date: 11/5/19

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHP-2016-05A

Project: LTM - Fall 2019
Location: Fort Devens, Massachusetts
Date: 11/5/19
Sampler: Kristen Esser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	~~17'~~ 16.1'
Depth to bottom (ft BTOR)	37'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	27.13-32.13
Total volume purged (gal)	4.3

Sampling Type
Purging Method: peristaltic
Purge start/stop time: 0815/0900
Tubing type: HDPE
Tubing diameter: 3/8"
Dedicated pump (Y/N): N
Air source: NA
Field Instrument (Model/S/N): YSF650 MDS / 11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0820	360.2	16.40	8.11	5.69	0.403	0.98	128.3	11.56	clear
0825	360.1	16.30	8.05	5.88	0.397	0.65	83.5	29.10	clear
0830	360.2	16.30	8.03	6.00	0.391	0.61	65.0	30.26	clear
0835	360.2	16.29	8.02	6.04	0.389	0.65	59.5	8.30	clear
0840	360.1	16.30	8.03	6.11	0.383	0.54	47.7	7.46	clear
0845	360.1	16.30	8.04	6.14	0.380	0.52	43.4	6.14	clear
0850	360.2	16.31	8.06	6.17	0.383	0.48	37.1	8.08	clear
0855	360.2	16.30	8.05	6.19	0.381	0.47	32.8	8.07	clear
0900	360.2	16.30	8.05	6.21	0.382	0.45	30.1	8.09	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHP-2016-05A_FAL19
Sample Time: 0900
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: —
Filter Size: 0.45 µm
Dup Time: —

Comments Well labeled as SHP-PZ-16-05 A/B

[signature]
Signature

11/5/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-058

Project: LTM - Fall 2019 | Date: 11/5/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Fraser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1"
Material	PVC
Depth to water (ft BTOR)	16.1'
Depth to bottom (ft BTOR)	93.41'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	87.07-92.07
Total volume purged (gal)	3.8

Sampling Type

Purging Method: peristaltic | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0945/1 | Tubing diameter: 3/8" | Air source: NA

Field Instrument (Model/S/N): YSI 650MDS/11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0950	320.5	16.25	8.33	6.16	0.517	0.67	-10.2	8.70	clear
0955	320.3	16.24	8.42	6.25	0.518	0.55	-26.7	9.99	clear
1000	320.4	16.20	8.44	6.34	0.541	0.48	-43.0	9.87	clear-cloudy
1005	320.3	16.22	8.43	6.35	0.563	0.45	-48.1	8.08	clear-cloudy
1010	320.5	16.25	8.49	6.38	0.584	0.42	-55.7	10.27	clear-cloudy
1015	320.4	16.20	8.51	6.42	0.588	0.40	-61.3	10.49	clear-cloudy
1020	320.3	16.25	8.50	6.44	0.589	0.38	-65.9	13.73	clear-cloudy
1025	320.3	16.22	8.51	6.46	0.586	0.36	-68.4	13.86	clear
1030	320.4	16.20	8.51	6.46	0.585	0.34	-69.6	13.25	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHP-2016-058_FA19

Sample Time: 1030 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): N | Dup ID: —

Filter Size: 0.45 µm | Dup Time: —

Comments: level logger present, will labeled as SHP-PZ-16-05A/B

Signature: [signature] | Date: 11/5/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-06A

Project: LTM - Fall 2019 | Date: 11/5/19

Location: Fort Devens, Massachusetts | Sampler: BCA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	80.82
Depth to bottom (ft BTOR)	85.70
Pump Set Depth (ft BTOR)	~~85~~ 83
Screen Interval (ft BTOR)	82.85-87.85
Total volume purged (gal)	1.0

Sampling Type

Purging Method 0.675" microblocelolor | Tubing type Bonded LDPE | Dedicated pump (Y/N) N

Purge start/stop time 0830-1000 | Tubing diameter 1/4" OD | Air source No

Field Instrument (Model/S/N) YSI 556MPS 15F101567

Hach 2100Q 16010C047280

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0910	50	29.85	9.86	6.99	634	1.74	71.2	8.61	clear
0915	50	29.85	9.85	7.00	639	1.58	52.3	7.14	"
0920 ~~0930~~	50	30.01	9.88	7.04	643	1.44	31.5	6.28	"
0925 ~~0935~~	50	30.26	9.76	7.07	644	1.38	1.5	4.08	"
0930	50	30.28	9.94	7.10	645	1.20	-12.9	3.16	"
0935	50	30.50	9.98	7.11	646	1.07	-23.2	2.47	"
0940	50	30.75	10.11	7.17	650	0.91	-37.8	1.96	"
0945	50	30.92	10.03	7.16	655	0.78	-48.7	1.85	"
0950	50	31.26	10.15	7.20	683	0.71	-61.1	1.78	"
0955	50	31.35	10.16	7.20	685	0.70	-65.2	1.74	"
1000	50	31.40	10.16	7.20	685	0.68	-67.1	1.70	"
	5								
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHP-2016-06A-FAL19

Sample Time: 1000 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: –

Filter Size: 0.45um | Dup Time: –

Comments DTW not stabilizing at lowest FR. , full suite + VOCs

Signature | Date 11/5/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-06B

Project: LTM - Fall 2019 | Date: 11/5/19

Location: Fort Devens, Massachusetts | Sampler: BCA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	26.05
Depth to bottom (ft BTOR)	112.10
Pump Set Depth (ft BTOR)	108
Screen Interval (ft BTOR)	103.89-113.89
Total volume purged (gal)	1.0

Sampling Type

Purging Method: 0.675" microbladder | Tubing type: Bonded LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1100-1210 | Tubing diameter: 1/4" OD | Air source: N_2

Field Instrument (Model/S/N): YSI 556MPS 15F101567

Hach 2100Q 1160100047200

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1115	50	26.41	10.47	7.51	553	3.28	-36.3	10.4	Clear
1120	50	26.58	10.91	7.53	570	2.81	-48.2	9.81	"
1125	50	26.75	10.89	7.57	583	2.00	-52.9	9.16	"
1130	50	26.88	10.86	7.58	615	1.74	-56.7	8.43	"
1135	50	26.89	10.84	7.57	679	1.34	-64.1	8.28	"
1140	50	26.89	10.84	7.57	803	1.04	-72.1	8.19	"
1145	50	26.89	10.83	7.57	959	0.79	-81.5	7.10	"
1150	50	26.89	10.84	7.60	1035	0.69	-87.0	6.43	"
1155	50	26.89	10.83	7.60	1079	0.66	-89.7	6.31	"
1200	50	26.89	10.83	7.60	1119	0.59	-92.3	6.28	"
1205	50	26.89	10.83	7.60	1128	0.54	-95.8	6.25	"
1210	50	26.89	10.84	7.60	1131	0.56	-96.2	6.20	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHP-2016-06B-FAL19

Sample Time: 1210 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: -

Filter Size: 0.45µm | Dup Time: -

Comments

Signature | Date: 11/5/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-06C

Project: LTM - Fall 2019 | Date: 11/5/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	1.5"
Material	PVC
Depth to water (ft BTOR)	23.60
Depth to bottom (ft BTOR)	133.58
Pump Set Depth (ft BTOR)	130
Screen Interval (ft BTOR)	124.87-134.87
Total volume purged (gal)	1.0

Sampling Type

Purging Method: 0.675" Peristaltic pump | Tubing type: Bonded LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1255-1350 | Tubing diameter: 1/4" OD | Air source: N_2

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 2100Q 16D100047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1310	50	23.78	10.64	7.97	248	5.07	-39.1	18.6	clear
1315	50	23.85	10.52	7.97	244	3.78	-44.9	17.1	clear
1320	50	23.97	10.48	7.95	243	3.31	-47.8	16.8	clear
1325	50	24.05	10.46	7.93	242	2.59	-51.3	14.6	clear
1330	50	24.15	10.39	7.87	241	1.68	-54.3	12.0	clear
1335	50	24.20	10.44	7.88	240	1.40	-58.6	9.16	clear
1340	50	24.25	10.46	7.85	240	2.17	-60.9	8.10	clear
1345	50	24.30	10.49	7.86	240	2.12	-62.0	8.00	clear
1350	50	24.30	10.51	7.87	240	2.15	-63.8	7.98	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHP-2016-06C-FA19

Sample Time: 1350 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: -

Filter Size: 0.45µm | Dup Time: -

Comments

Signature | Date: 11/5/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-2016-07B

Project: LTM - Fall 2019 | Date: 11/6/19

Location: Fort Devens, Massachusetts | Sampler: B.A

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	34.96
Depth to bottom (ft BTOR)	79.90
Pump Set Depth (ft BTOR)	75
Screen Interval (ft BTOR)	72.35-82.35
Total volume purged (gal)	1.0

Sampling Type

Purging Method: 0.675 mB | Tubing type: Bonded LDPE | Dedicated pump (Y/N): N

Purge start/stop time: 1200-1300 | Tubing diameter: 1/4" OD | Air source: N_2

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1215	40	31.86	13.50	7.11	304	2.32	29.7	85.6	cloudy
1220	40	32.15	13.46	7.20	301	1.75	19.8	72.1	"
1225	40	32.38	13.34	7.16	299	1.56	18.7	59.5	"
1230	40	32.40	13.21	7.11	298	1.40	20.4	45.8	"
1235	40	32.43	13.15	7.14	298	1.30	18.5	40.6	"
1240	40	32.51	12.99	7.08	297	1.14	19.4	32.9	"
1245	40	32.58	12.86	7.08	296	1.06	17.9	28.1	"
1250	40	32.65	12.80	7.11	296	1.04	18.4	27.8	"
1255	40	32.71	12.78	7.10	295	1.01	18.7	27.6	"
1300	40	32.78	12.78	7.10	295	0.98	18.0	27.6	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHP-2016-07B FALL

Sample Time: 1300 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: –

Filter Size: 0.45µm | Dup Time: –

Comments DTW does not stabilize

Signature | Date: 11/6/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHP-99-33B

Project: LTM - Fall 2019 | Date: 11/14/19

Location: Fort Devens, Massachusetts | Sampler: M. VIDAL

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present		✓	
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	1"
Material	PVC/STEEL?
Depth to water (ft BTOR)	12.78
Depth to bottom (ft BTOR)	78.54
Pump Set Depth (ft BTOR)	~75
Screen Interval (ft BTOR)	74.5-79.5
Total volume purged (gal)	~5.0

Sampling Type

Purging Method: Low Flow | Tubing type: HDPE | Dedicated pump (Y/N): PERISTALTIC

Purge start/stop time: 10:30/11:35 | Tubing diameter: 1/4" | Air source: N/A

Field Instrument (Model/S/N): YSI 556MPS S/N 15L102398

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1035	300	20.18	9.55	7.41	465	3.60	-130.3	OUT OF RANGE	GRAY + CLOUDY & DARK
1040	300	20.77	9.49	6.89	549	0.47	-123.8	↓	↓
1045	150	20.20	9.49	6.86	602	0.49	-124.0		
1050	150	19.99	9.49	6.83	656	0.40	-125.1		
1055	150	19.96	9.49	6.81	674	0.31	-125.8	999.5	GRAY + CLOUDY
1100	↓	20.31	9.49	6.79	671	0.29	-126.3	806.1	↓
1105		20.61	9.58	6.79	673	0.30	-127.0	767	
1110		20.88	9.65	6.79	670	0.31	-126.6	608	
1115		20.96	9.59	6.78	666	0.25	-126.2	566.3	LIGH GRAY + CLOUDY
1120		20.99	9.58	6.78	667	0.24	-126.6	411	↓
1125		21.00	9.57	6.78	668	0.23	-126.7	393.2	
1130	↓	21.02	9.55	6.78	669	0.22	-126.5	388	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	Y	Y	

Sampling Details

Sampling ID: SHP-99-33B_FAL19

Sample Time: 1130 | Duplicate (Y/N): N/A | MS/MSD (Y/N): N/A

Field Filtered (Y/N): N/A | Dup ID: N/A

Filter Size: N/A | Dup Time: N/A

Comments

M. Vidal — **Signature**

11/14/19 — **Date**

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: 32M-01-14XBR

Project: LTM - Fall 2019 | Date: 11/15/19

Location: Fort Devens, Massachusetts | Sampler: BrA

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓	✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	21.90
Depth to bottom (ft BTOR)	46.40
Pump Set Depth (ft BTOR)	42
Screen Interval (ft BTOR)	35.81-45.81
Total volume purged (gal)	1.0

Sampling Type

Purging Method: Peri | Tubing type: HDPE | Dedicated pump (Y/N): N

Purge start/stop time: 0855-0940 | Tubing diameter: | Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS 15F101567

Hach 2100Q 16010C047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0905	90	26.50	10.00	6.92	817	2.36	162.4	12.8	clear
0910	90	27.00	9.47	6.71	817	1.70	157.6	12.4	clear
0915	80	27.50	9.20	6.58	812	1.36	151.6	11.9	"
0920	80	28.00	8.86	6.55	814	1.12	150.6	11.4	"
0925	80	28.40	9.10	6.50	811	1.20	148.9	11.0	"
0930	80	28.65	9.30	6.50	809	1.26	146.0	10.8	"
0935	80	29.43	9.31	6.50	808	1.25	147.1	10.7	"
0940	80	29.96	9.28	6.49	806	1.23	145.9	10.5	"
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	—	—	—	→	

Sampling Details

Sampling ID: 32M-01-14XBR_FA19

Sample Time: 0940 | Duplicate (Y/N): N | MS/MSD (Y/N): —

Field Filtered (Y/N): N | Dup ID: —

Filter Size: — | Dup Time: —

Comments PFAS only, DTW constant drawdown @ lowest pump rate

Signature | Date: 11/15/19

KGS

Field Instrument Calibration Log

Date: 10/16/19 **Weather:** Cool, 36°F (AM)

Project/Site Name: Devens LTM - AOC30 **Instrument:** YSI 556MPS

Calibrated By: BrA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1515	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1400	143	15.55	1416	18.63	±10 µS/cm	N
pH (7)	01/21	7.38	7.00	15.79	6.89	17.91	± 0.3 Ph *	
pH (4)	03/20	3.89	4.00	15.66	4.05	18.87	± 0.3 Ph *	
pH (10)	02/20	9.81	10.00	15.75	9.96	18.46	± 0.3 Ph *	
ORP (240 mv)	06/23	239.0	240.0	15.81	237.9	18.50	±10 mv	
Dissolved Oxygen (%)	—	107	100	16.49	95.2	18.87	-	
Dissolved Oxygen (mg/L)	—	10.46	9.80	16.49	9.52	18.87	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	760	760	16.45	760	18.87	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 10/16/19

KGS

Field Instrument Calibration Log

Date: 10/18/19 **Weather:** Cloudy 50°F

Project/Site Name: Devens LTM **Instrument:** YSI 556 MPS

Calibrated By: BVA **Serial Number:** 15F1015167

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1530	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1421	1413	17.97	1410	19.25	±10 µS/cm	N
pH (7)	01/21	7.13	7.00	17.75	7.12	19.16	± 0.3 Ph *	
pH (4)	03/20	4.00	4.00	18.78	4.20	19.20	± 0.3 Ph *	
pH (10)	02/20	9.95	10.00	18.34	10.14	19.11	± 0.3 Ph *	
ORP (240 mv)	06/23	244.6	240.0	18.10	235.6	19.30	±10 mv	
Dissolved Oxygen (%)	—	96.3	~~17.31~~ 100	17.31	95.8	19.41	-	
Dissolved Oxygen (mg/L)	—	9.25	~~17.3~~ 9.40	17.31	9.01	19.41	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	760	760	17.31	760	19.41	-	N

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 10/18/19

KGS

Field Instrument Calibration Log

Date: 10/28/19 **Weather:** Cloudy, 50°F

Project/Site Name: Drumm Farm **Instrument:** YSI 556 MPS

Calibrated By: BA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0530		Cal. Temp. (°C)	PM Post Cal. Check Time 1440	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	03/20	1443	1413	19.17	1420	17.81	±10 µS/cm	N
pH (7)	01/21	7.05	7.00	18.83	7.03	18.04	± 0.3 Ph *	
pH (4)	03/20	3.95	4.00	18.95	3.96	18.01	± 0.3 Ph *	
pH (10)	02/20	9.99	10.01	18.70	9.89	17.65	± 0.3 Ph *	
ORP (240 mv)	06/23	235.9	240.0	19.13	239.6	18.03	±10 mv	
Dissolved Oxygen (%)	–	113.8	99.9	19.43	104.6	19.01	-	
Dissolved Oxygen (mg/L)	–	10.47	9.15	19.43	9.36	19.01	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	760	19.43	760	19.01	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 10/28/19

KGS

Field Instrument Calibration Log

Date: 10/29/19 **Weather:** Overcast, 50°F

Project/Site Name: Devens LTM **Instrument:** YSI 556 MPS

Calibrated By: BrA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1430	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	03/20	1414	1413	18.03	1410	17.81	±10 µS/cm	N
pH (7)	01/21	6.95	7.00	18.48	6.85	17.85	± 0.3 Ph *	
pH (4)	~~03/20~~ 03/21	3.89	4.00	18.28	4.04	17.91	± 0.3 Ph *	
pH (10)	03/20	9.96	10.00	18.40	10.02	18.04	± 0.3 Ph *	
ORP (240 mv)	06/23	247.5	240.0	18.57	238.4	17.76	±10 mv	
Dissolved Oxygen (%)	–	103.3	99.8	18.89	98.1	17.80	-	
Dissolved Oxygen (mg/L)	–	9.61	9.28	18.89	9.17	17.80	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	760	18.89	760	17.80	-	N

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: BrA **Date:** 10/29/19

KGS

Field Instrument Calibration Log

Date: 10/30/19 **Weather:** Rain, 51°F

Project/Site Name: Devens LTM **Instrument:** YSI 556MPS

Calibrated By: B/A **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0550		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1433	1413	18.23	1410	19.29	±10 µS/cm	N
pH (7)	01/21	6.85	7.00	18.33	6.98	19.06	± 0.3 Ph *	
pH (4)	03/21	3.95	4.00	18.03	4.10	19.15	± 0.3 Ph *	
pH (10)	03/20	9.98	10.00	18.21	10.00	18.61	± 0.3 Ph *	
ORP (240 mv)	06/23	242.0	240.0	18.47	239.9	18.70	±10 mv	
Dissolved Oxygen (%)	–	90.2	100	18.49	101.6	18.50	-	
Dissolved Oxygen (mg/L)	–	8.42	9.36	18.49	9.47	18.50	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	760	18.49	760	18.50	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: B/A **Date:** 10/30/19

Field Instrument Calibration Log

Date: 10/31/19 **Weather:** Rain, 50°F

Project/Site Name: Devens LTM SHL **Instrument:** YSI 556 MPS

Calibrated By: Brd **Serial Number:** 15F105567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1215	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1487	1413	18.45	1385	18.56	±10 µS/cm	Y
pH (7)	01/21	7.00	7.00	18.45	6.99	18.76	± 0.3 Ph *	N
pH (4)	03/21	4.06	4.00	18.46	4.03	18.78	± 0.3 Ph *	N
pH (10)	03/20	10.02	10.00	18.58	10.00	18.92	± 0.3 Ph *	N
ORP (240 mv)	06/23	238.3	240.0	18.51	239.1	18.70	±10 mv	N
Dissolved Oxygen (%)	—	124.1	100	18.48	103.8	18.41	-	N
Dissolved Oxygen (mg/L)	—	11.64	9.39	18.48	9.75	18.41	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	760	760	18.48	760	18.41	-	N

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 10/31/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM - AOC50 SHL

Instrument: ~~YSI~~ Hach 2100Q

Calibrated By: B/A

Serial Number: 16010C047202

Date	AM Calibration Pre/Post - Cal 10 NTU	AM Calibration Pre/Post - Cal 20 NTU	AM Calibration Pre/Post - Cal 100 NTU	AM Calibration Pre/Post - Cal 800 NTU	PM Post Calibration Check 10 NTU	PM Post Calibration Check 20 NTU	PM Post Calibration Check 100 NTU	PM Post Calibration Check 800 NTU	Variance Noted
10/14/19	9.94/10	17.5/20	82.5/100	776/800	10.2	19.3/20	97	810	N
10/15/19	9.98/10	20.8/20	98.8/100	799/800	9.93/10	20.1/20	97.5/100	800	N
10/16/19	10.3/10	19.2/20	101/100	807/800	9.91/10	20.6/20	101/100	795/800	N
10/18/19	10.3/10	19.4/20	98.6/100	799/800	9.95/10	20.4/20	102/100	808/800	N
10/28/19	10.1/10	19.8/20	99.1/100	801/800	9.90/10	20.1/20	98/100	796/800	N
10/29/19	10.0/10	20.7/20	103./100	803/800	10.0/10	20.2/20	102.0/100	801/800	N
10/30/19	10.2/10	17.5/20	92.4/100	773/800	10.2/10	19.8/20	98/100	794/800	N
10/31/19	10.3/10	20.1/	104/100	802/800	~~23~~ 10.1/10	20.2/20	98.8/100	800/800	N
					Post Calibration Criteria				
					± 0.5	± 1	± 5	± 40	

Notes: Mark Noted Variences on Field Forms

Signature: [signature]

Date: 10/14 - 10/31

KGS

Field Instrument Calibration Log

Date: 11/1/15 **Weather:** Windy, rainy (AM) 54°F

Project/Site Name: Devons LTM **Instrument:** YSI 556MPS

Calibrated By: BrA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1530	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	03/20	1442	1413	19.65	1409	19.08	±10 µS/cm	N
pH (7)	01/21	7.00	7.00	20.02	7.08	18.73	± 0.3 Ph *	
pH (4)	03/21	3.85	4.00	20.06	4.10	18.72	± 0.3 Ph *	
pH (10)	03/20	9.91	10.00	20.05	9.80	18.56	± 0.3 Ph *	
ORP (240 mv)	06/23	238.8	240.0	20.01	239.7	18.80	±10 mv	
Dissolved Oxygen (%)		95.6	100	19.40	98.6	19.20	-	
Dissolved Oxygen (mg/L)		8.79	9.21	19.40	9.14	19.20	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)		760	760	19.40	760	19.20	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: BrA **Date:** 11/1/15

KGS

Field Instrument Calibration Log

Date: 11/5/19 **Weather:** Overcast (rain PM), 45°F

Project/Site Name: Devens LTM **Instrument:** YSI 556 MPS

Calibrated By: BrA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1430	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1514	1413	17.84	1409	18.26	±10 µS/cm	N
pH (7)	01/21	7.26	7.00	17.67	7.04	18.51	± 0.3 Ph *	
pH (4)	03/21	3.78	4.00	17.85	3.96	18.30	± 0.3 Ph *	
pH (10)	03/20	9.86	10.00	18.01	10.08	18.27	± 0.3 Ph *	
ORP (240 mv)	06/23	233.7	240.0	18.14	239.6	18.04	±10 mv	
Dissolved Oxygen (%)	–	105.7	100	18.84	98.7	18.01	-	
Dissolved Oxygen (mg/L)	–	9.84	9.30	↓	9.26	18.01	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	/	760	760	↓	760	18.01	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** ~~11/8~~ 11/5/19

KGS

Field Instrument Calibration Log

Date: 11/6/15 **Weather:** Sun, 48°F

Project/Site Name: Devens LTM **Instrument:** YSI 556 MPS

Calibrated By: BrA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1500	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1428	1413	17.41	1410	17.30	±10 µS/cm	N
pH (7)	01/21	7.20	7.00	17.68	7.04	17.25	± 0.3 Ph *	
pH (4)	03/21	3.81	4.00	17.53	3.96	18.01	± 0.3 Ph *	
pH (10)	03/20	9.91	10.00	18.10	10.05	17.57	± 0.3 Ph *	
ORP (240 mv)	06/23	236.1	240	17.08	235.1	18.10	±10 mv	
Dissolved Oxygen (%)	—	96.4	100	16.41	103.8	16.90	-	
Dissolved Oxygen (mg/L)	/	9.28	9.33	16.41	9.40	16.90	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	/	760	760	16.41	760	16.90	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: Brett [illegible] **Date:** 11/6/15

KGS

Field Instrument Calibration Log

Date: 11/7/15 **Weather:** Cloudy

Project/Site Name: Devens LTM **Instrument:** YSI 556 MPS

Calibrated By: BW **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1500	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1510	1413	18.11	1405	17.55	±10 µS/cm	N
pH (7)	01/21	6.88	7.00	17.95	7.12	17.68	± 0.3 Ph *	
pH (4)	03/21	3.98	4.00	17.93	4.07	17.50	± 0.3 Ph *	
pH (10)	03/20	9.92	10.00	17.85	9.87	17.51	± 0.3 Ph *	
ORP (240 mv)	06/23	248.6	240.0	17.91	222.0	16.97	±10 mv	
Dissolved Oxygen (%)		99.4	100	18.68	99.7	16.99	-	
Dissolved Oxygen (mg/L)		9.28	9.34	18.68	9.35	16.99	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)		760	760	18.68	760	16.99	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: BW **Date:** 11/7/15

KGS

Field Instrument Calibration Log

Date: 11/8/15 **Weather:** Cloudy

Project/Site Name: Devens LTM **Instrument:** YSI 556 MPS

Calibrated By: BMA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1330	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1436	1413	18.55	1417	18.24	±10 µS/cm	N
pH (7)	01/21	6.96	7.00	17.91	6.90	18.51	± 0.3 Ph *	
pH (4)	03/20	3.68	4.00	19.30	3.89	18.80	± 0.3 Ph *	
pH (10)	02/20	9.96	10.00	19.25	9.96	18.70	± 0.3 Ph *	
ORP (240 mv)	06/23	255.4	240	15.18	239.6	17.92	±10 mv	
Dissolved Oxygen (%)	–	100.8	100	19.93	~~90~~ 113	17.80	-	
Dissolved Oxygen (mg/L)	–	9.18	9.11	19.93	9.28	17.80	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	760		760	17.80	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: BMA **Date:** 11/8/15

KGS

Field Instrument Calibration Log

Date: 11/11/19 **Weather:** Overcast, 50°F

Project/Site Name: Devens LTM **Instrument:** YSI556MPS

Calibrated By: BrA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0615		Cal. Temp. (°C)	PM Post Cal. Check Time 1420	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1439	1413	17.88	1409	17.16	±10 µS/cm	N
pH (7)	01/~~20~~ 21	7.28	7.00	17.78	6.96	17.78	± 0.3 Ph *	
pH (4)	03/20	3.98	4.00	17.80	3.94	17.92	± 0.3 Ph *	
pH (10)	02/20	9.98	10.00	17.81	10.07	17.90	± 0.3 Ph *	
ORP (240 mv)	06/23	242.8	240.0	17.90	236.1	17.81	±10 mv	
Dissolved Oxygen (%)	–	101.6	100	18.40	96.1	16.10	-	
Dissolved Oxygen (mg/L)	–	9.54	9.39		9.45	16.10	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	760		760	16.16	-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: BrA **Date:** 11/11/19

KGS

Field Instrument Calibration Log

Date: 11/12/19 **Weather:** Rain, 34°F

Project/Site Name: Devens LTM **Instrument:** YSI 556 MPS

Calibrated By: BMA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1015	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1454	1413	18.19	1410	16.41	±10 µS/cm	N
pH (7)	01/21	7.01	7.00	18.04	7.08	16.50	± 0.3 Ph *	
pH (4)	03/20	3.91	4.00	18.46	3.96	16.70	± 0.3 Ph *	
pH (10)	03/21	9.96	10.00	18.40	9.89	16.57	± 0.3 Ph *	
ORP (240 mv)	06/23	245.5	240.0	18.41	243.6	16.72	±10 mv	
Dissolved Oxygen (%)	—	110.5	100	18.79	101.7	16.40	-	
Dissolved Oxygen (mg/L)	—	10.29	9.32	↓	9.38	16.40	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	760	760	↓	760	16.40	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 11/12/19

KGS

Field Instrument Calibration Log

Date: 11/13/15 **Weather:** Cold, clear sky, 19 F (2°F wind)

Project/Site Name: Devens LFM **Instrument:** YSI 556 MPS

Calibrated By: BMA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1430	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1455	1413	16.74	1420	16.90	±10 µS/cm	N
pH (7)	01/21	7.07	7.00	16.04	7.00	18.24	± 0.3 Ph *	
pH (4)	03/20	3.97	4.00	16.28	4.08	17.58	± 0.3 Ph *	
pH (10)	03/21	9.50	10.00	16.34	9.88	16.98	± 0.3 Ph *	
ORP (240 mv)	06/23	228.1	240.	16.40	243.8	17.90	±10 mv	
Dissolved Oxygen (%)	—	120	100	17.49	90	15.80	-	
Dissolved Oxygen (mg/L)	—	11.56	9.57	17.49	9.12	15.80	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	—	760	760	17.49	760	15.80	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 11/13/15

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM

Instrument: Hach 2100Q

Calibrated By: B.A

Serial Number: 16010047202

Date	AM Calibration Pre/Post - Cal 10 NTU	AM Calibration Pre/Post - Cal 20 NTU	AM Calibration Pre/Post - Cal 100 NTU	AM Calibration Pre/Post - Cal 800 NTU	PM Post Calibration Check 10 NTU	PM Post Calibration Check 20 NTU	PM Post Calibration Check 100 NTU	PM Post Calibration Check 800 NTU	Variance Noted
11/1/19	10.3/10	19.8/20	97.8/100	800/800	10/10	20.6/20	102/100	800/800	N
11/5/19	10.4/10	20.8/20	100/100	799/800	10.2/10	20.4/20	101/100	800/800	N
11/6/19	10.6/10	19.7/20	101/100	808/800	10.2/10	19.9/20	104/100	800/800	N
11/7/19	10.2/10	19.3/20	96.7/100	798/800	10.1/10	20.1/20	103/100	804/800	N
11/8/19	10.1/10	19.4/20	97.1/100	796/800	10.0/10	20.0/20	101/100	790/800	N
11/11/19	10.1/10	19.6/20	97.6/100	803/800	10.2/10	19.2/20	103/100	799/800	N
11/12/19	10.1/10	20.5/20	96.9/100	800/800	10.1/10	19.8/20	101/100	796/800	N
11/13/19	10.2/10	20.1/20	97.1/100	801/800	10.1/10	19.9/20	104/100	795/800	N
					Post Calibration Criteria				
					± 0.5	± 1	± 5	± 40	

Notes: Mark Noted Variences on Field Forms

Signature: [signature]

Date: 11/1 - 11/13/19

Field Instrument Calibration Log

Date: 11/14/19 **Weather:** AM: Cloudy, 19°F (5°F RF)

Project/Site Name: ~~Best~~ Devon UT **Instrument:** YSI 556 MPS

Calibrated By: B/A **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0630		Cal. Temp. (°C)	PM Post Cal. Check Time 1430	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	03/20	1406	1413	17.40	1419	15.08	±10 µS/cm	N
pH (7)	01/21	7.03	7.00	16.20	7.00	15.25	± 0.3 Ph *	↓
pH (4)	03/20	4.10	4.00	14.53	4.08	15.40	± 0.3 Ph *	
pH (10)	03/21	10.04	10.00	15.64	10.16	16.10	± 0.3 Ph *	
ORP (240 mv)	06/23	257.6	240	15.70	248.1	16.71	±10 mv	
Dissolved Oxygen (%)	–	116.4	100	14.28	103	15.08	-	
Dissolved Oxygen (mg/L)	–	10.41	9.81	↓	9.90	15.08	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	
Barometric Pressure (mmHg)	–	760	760		760	15.08	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: BAD **Date:** 11/14/19

KGS

Field Instrument Calibration Log

Date: 11/15/19 **Weather:** 23°F, Sunny

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 556 MPS

Calibrated By: BrA **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0600		Cal. Temp. (°C)	PM Post Cal. Check Time 1300	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	03/20	1413	1413	15.28	1420	14.28	±10 µS/cm	✓
pH (7)	01/21	6.69	7.00	15.70	7.01	14.51	± 0.3 Ph *	✓
pH (4)	03/21	4.08	~~4.00~~ 4.00	15.50	4.03	14.70	± 0.3 Ph *	✓
pH (10)	03/21	10.40	10.00	16.01	10.04	14.31	± 0.3 Ph *	✓
ORP (240 mv)	06/23	232.8	240	16.50	241.6	14.35	±10 mv	✓
Dissolved Oxygen (%)	–	107	100	16.69	101	13.29	-	✓
Dissolved Oxygen (mg/L)	–	10.39	9.70	16.69	9.72	13.29	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	✓
Barometric Pressure (mmHg)	–	760	760	16.69	760	13.29	-	✓

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: BrA **Date:** 11/15/19

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM

Instrument: Hach 2100Q

Calibrated By: B/A

Serial Number: 16010C047202

Date	AM Calibration				PM Post Calibration Check				Variance Noted
	Pre/Post - Cal 10 NTU	Pre/Post - Cal 20 NTU	Pre/Post - Cal 100 NTU	Pre/Post - Cal 800 NTU	10 NTU	20 NTU	100 NTU	800 NTU	
11/14/19	9.96/10	20.3/20	99.7/100	793/800	10.2/10	20.4/20	103/100	796/800	N
11/15/19	10.4/10	19.7/20	103/100	805/800	10.1/10	20.2/20	101/100	804/800	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria			
± 0.5	± 1	± 5	± 40

Signature: [signature]

Date: 11/14 - 11/15/19

KGS

Field Instrument Calibration Log

Date: 11/14/19 **Weather:** 15 °F

Project/Site Name: FORT DEVENS **Instrument:** YSI 556 MPS

Calibrated By: M. VIDAL **Serial Number:** 15L102308

Parameters	Solution Expiration Date	AM Calibration Time 0700		Cal. Temp. (°C)	PM Post Cal. Check Time 1435	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	2/2020	1.312	1.413	17.46	1418 / 1413	14.43	±10 µS/cm	N
pH (7)	2/2021	7.09	7.00	16.20	7.02 / 7.00	15.33	± 0.3 Ph *	N
pH (4)	3/2021	3.90	4.00	14.53	4.04 / 4.00	14.86	± 0.3 Ph *	N
pH (10)	2/2021	9.96	9.99	15.64	9.68 / 10.03	15.29	± 0.3 Ph *	Y
ORP (240 mv)	1/2020	246.9	240.0	15.70	277 / 238.7	15.41	±10 mv	Y
Dissolved Oxygen (%)	N/A	108.1	100.0	14.25	86.8 / 100.0	14.22	-	Y
Dissolved Oxygen (mg/L)	N/A	11.0	10.23	14.25	8.72 / 10.23	14.22	± 0 5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	760.0	N/A	N/A	14.25			-	

Notes:

* **Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: M. Vidal **Date:** 11/14/19

KGS

Field Instrument Calibration Log

Date: 11/15/19 **Weather:** 25°F

Project/Site Name: FORT DEVENS **Instrument:** YSI 650 MDS

Calibrated By: M. VIDAL **Serial Number:** 00M0743 AG

Parameters	Solution Expiration Date	AM Calibration Time 7:00		Cal. Temp. (°C)	PM Post Cal. Check Time 1145	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm)	3/2020	1368	1,413	13.74	1,417 / 1,413	13.37	±10 µS/cm	N
pH (7)	2/2021	6.96	7.00	14.76	7.04 / 7.02	14.31	± 0.3 Ph *	N
pH (4)	3/2021	3.98	4.00	14.21	4.03 / 3.99	14.35	± 0.3 Ph *	N
pH (10)	2/2021	9.99	10.03	14.71	10.07 / 10.02	14.38	± 0.3 Ph *	N
ORP (240 mv)	5/2020	245.6	239.9	13.99	236.6 / 240.1	14.36	±10 mv	N
Dissolved Oxygen (%)	N/A	101.3	100.0	14.29	134.3 /	13.11	-	Y
Dissolved Oxygen (mg/L)	N/A	10.39	10.05	14.29	14.45 /	13.11	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	N/A	760					-	

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Alan Vidal **Date:** 11/15/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: FORT DENENS

Instrument: HACH 2100Q

Calibrated By: M. VIDAL

Serial Number: 17060C059342

Date	AM Calibration				PM Post Calibration Check				Variance Noted
	Pre/Post - Cal 10 NTU	Pre/Post - Cal 20 NTU	Pre/Post - Cal 100 NTU	Pre/Post - Cal 800 NTU	10 NTU	20 NTU	100 NTU	800 NTU	
11/14/19	9.90/10.0	18.7/20	93.2/100	742/800	10.1/10	22/20	109/100	839/800	Y
11/15/19	9.96/10.0	18.1/20	97.4/100	760/800	10.4/10	20.1/20	102/100	806/800	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria			
± 0.5	± 1	± 5	± 40

Signature: Marlon

Date: 11/15/19

KGS

Field Instrument Calibration Log

Date: 11/4/19 **Weather:** 46-52°F, Clear

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 650 MDS

Calibrated By: Kristen Esser **Serial Number:** ~~11G101194~~ KE 11G100387

Parameters	Solution Expiration Date	AM Calibration Time 0645		Cal. Temp. (°C)	PM Post Cal. Check Time 1450	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm^c)	3/2020	1.342	1.413	15.67	1.407	17.18	±10 µS/cm	N
pH (7)	2/2021	7.48	7.00	16.88	6.81	16.98	± 0.3 Ph *	N
pH (4)	3/2021	3.40	3.90	16.73	4.15	16.98	± 0.3 Ph *	N
pH (10)	2/2021	9.92	10.04	16.55	9.75	17.84	± 0.3 Ph *	N
ORP (240 mv)	5/2020	227.9	240.1	16.35	241.9	16.98	±10 mv	N
Dissolved Oxygen (%)	—	94.8	100.0	16.18	100.4	16.66	-	—
Dissolved Oxygen (mg/L)	—	9.24	9.81	16.18	10.02	16.66	± 0 5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	758.0	758.0	16.18	760.0	16.66	-	—

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 11/4/19

KGS

Field Instrument Calibration Log

Date: 11/5/19 **Weather:** 43-54°F, Cloudy AM, Rain PM

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 650 MDS

Calibrated By: Kristen Esser **Serial Number:** 11G100387

Parameters	Solution Expiration Date	AM Calibration Time 0640		Cal. Temp. (°C)	PM Post Cal. Check Time 1450	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1.455	1.413	17.5	1.407	16.57	±10 µS/cm	N
pH (7)	2/2021	6.86	7.00	17.4	6.94	17.02	± 0.3 Ph *	N
pH (4)	3/2021	4.23	4.03	17.3	4.13	17.06	± 0.3 Ph *	N
pH (10)	2/2021	9.95	10.01	17.3	9.93	17.14	± 0.3 Ph *	N
ORP (240 mv)	5/2020	243.0	240.0	17.3	232.1	17.03	±10 mv	N
Dissolved Oxygen (%)	—	106.0	100.0	18.3	100.0	11.3	-	—
Dissolved Oxygen (mg/L)	—	9.38 ~~106.0~~	9.56 ~~100.0~~	18.3	~~10.91~~ 10.07	11.3	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	760.0	760.0	18.3	760.0	11.3	-	—

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 11/5/19

KGS

Field Instrument Calibration Log

Date: 11/6/15 **Weather:** 46-50°F Clear

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 650 MDS

Calibrated By: Kristen Esser **Serial Number:** 11G100387

Parameters	Solution Expiration Date	AM Calibration Time 0645		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1.379	1.413	16.90	1.534	16.87	±10 µS/cm	N
pH (7)	2/2021	6.78	7.01	16.85	6.98	16.73	± 0.3 Ph *	N
pH (4)	3/2021	4.21	4.03	16.79	4.14	16.89	± 0.3 Ph *	N
pH (10)	2/2021	9.76	10.03	16.87	10.00	16.92	± 0.3 Ph *	N
ORP (240 mv)	5/2020	240.7	240.1	16.79	235.3	16.80	±10 mv	N
Dissolved Oxygen (%)	—	103.0	100.0	17.36	102.6	15.83	-	—
Dissolved Oxygen (mg/L)	—	9.58	9.56	17.36	10.00	15.78	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	760.0	760.0	17.37	760.0	760.0	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 11/6/15

KGS

Field Instrument Calibration Log

Date: 11/7/19

Weather: ~~84~~ 41-54°F, Cloudy Rain PM

Project/Site Name: LTM - Fall 2019

Instrument: YSI 650 MDS

Calibrated By: Kristen Esser

Serial Number: 11G100387

Parameters	Solution Expiration Date	AM Calibration Time 0640		Cal. Temp. (°C)	PM Post Cal. Check Time 1350	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm^c)	3/2020	1.567	1.413	17.35	1.375	16.17	±10 µS/cm	N
pH (7)	2/2021	6.92	7.00	17.28	6.82	16.55	± 0.3 Ph *	N
pH (4)	3/2021	4.32	4.06	17.35	4.25	16.65	± 0.3 Ph *	N
pH (10)	2/2021	9.98	10.04	17.34	9.94	16.62	± 0.3 Ph *	N
ORP (240 mv)	5/2020	232.9	240.1	17.25	246.7	16.57	±10 mv	N
Dissolved Oxygen (%)	—	106.5	100.0	17.64	104.6	12.15	-	—
Dissolved Oxygen (mg/L)	—	9.46	9.56	17.63	9.98	12.15	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	760.0	760.0	17.64	760.0	12.15	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature]

Date: 11/7/19

KGS

Field Instrument Calibration Log

Date: 11/8/19 **Weather:** 32 - 34°F, Clear

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 650 MDS

Calibrated By: Kristen Ecker **Serial Number:** 11G 100387

Parameters	Solution Expiration Date	AM Calibration Time 0645		Cal. Temp. (°C)	PM Post Cal. Check Time 1350	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1.394	1.413	17.83	1.398	17.25	±10 µS/cm	N
pH (7)	2/2021	6.95	7.00	17.69	6.78	17.69	± 0.3 Ph *	N
pH (4)	2/2021	4.33	4.07	17.74	4.21	17.85	± 0.3 Ph *	N
pH (10)	2/2021	10.07	10.00	17.90	10.29	17.59	± 0.3 Ph *	N
ORP (240 mv)	5/2020	230.2	240.1	17.60	232.4	17.74	±10 mv	N
Dissolved Oxygen (%)	—	102.6	100.0	19.33	115.3	8.00	-	—
Dissolved Oxygen (mg/L)	—	9.19	9.56	19.33	13.50	8.00	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	—	760.0	760.0	19.33	760.0	8.00	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 11/8/19

KGS

Field Instrument Calibration Log

Date: 11/11/19 **Weather:** 43-45°F, Cloudy

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 6450 MDS

Calibrated By: Kristen Esser **Serial Number:** 16A100387

Parameters	Solution Expiration Date	AM Calibration Time 0644		Cal. Temp. (°C)	PM Post Cal. Check Time 1430	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1.499	1.413	17.06	1.379	16.33	±10 µS/cm	N
pH (7)	2/2021	6.94	7.00	16.88	6.93	16.58	± 0.3 Ph *	N
pH (4)	3/2021	4.14	4.02	16.68	4.27	16.77	± 0.3 Ph *	N
pH (10)	2/2021	10.16	10.00	16.91	9.75	16.78	± 0.3 Ph *	N
ORP (240 mv)	5/2020	230.0	240.0	16.81	232.6	16.72	±10 mv	N
Dissolved Oxygen (%)	—	110.6	100.0	17.72	107.6	11.16	-	N
Dissolved Oxygen (mg/L)	—	9.57	9.56	17.69	11.69	11.16	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	—	760.0	760.0	17.72	760.0	11.16	-	N

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 11/11/19

KGS

Field Instrument Calibration Log

Date: 11/12/19

Weather: 34-43°F, Cloudy Rain/Snow PM

Project/Site Name: LTM - Fall 2019

Instrument: YSI 650 MDS/~~11G100 387~~

Calibrated By: Kristen Esser

Serial Number: 11G100 387

Parameters	Solution Expiration Date	AM Calibration Time 0640		Cal. Temp. (°C)	PM Post Cal. Check Time 1250	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1.442	1.413	17.61	1.504	16.47	±10 µS/cm	N
pH (7)	2/2021	6.68	7.00	17.55	6.81	16.57	± 0.3 Ph *	N
pH (4)	3/2021	4.18	4.01	17.45	3.99	16.52	± 0.3 Ph *	N
pH (10)	2/2021	9.99	10.00	17.58	10.12	16.61	± 0.3 Ph *	N
ORP (240 mv)	5/2020	234.7	240.1	17.41	238.6	16.01	±10 mv	N
Dissolved Oxygen (%)	—	104.6	99.9	18.18	110.3	6.04	-	—
Dissolved Oxygen (mg/L)	—	9.38	9.56	18.15	9.97	6.04	± 0.5 mg/L < 0 5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	760.0	760.0	18.18	760.0	6.04	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature]

Date: 11/12/19

KGS

Field Instrument Calibration Log

Date: 11/13/12 **Weather:** 20 - 32°F, Clear

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 650 MDS

Calibrated By: Kristen Esner **Serial Number:** 16 100 387

Parameters	Solution Expiration Date	AM Calibration Time 0650		Cal. Temp. (°C)	PM Post Cal. Check Time 1340	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1.454	1.413	16.51	1.517	16.46	±10 µS/cm	N
pH (7)	2/2021	7.02	7.00	16.45	6.98	16.52	± 0.3 Ph *	N
pH (4)	3/2021	4.19	4.04	16.48	4.00	16.50	± 0.3 Ph *	N
pH (10)	2/2021	9.98	10.02	16.53	10.04	16.48	± 0.3 Ph *	N
ORP (240 mv)	5/2020	231.5	240.5	16.33	237.3	16.45	±10 mv	N
Dissolved Oxygen (%)	—	103.0	100.0	17.00	109.9	7.50	-	—
Dissolved Oxygen (mg/L)	—	9.66	9.56	17.00	10.05	7.49	± 0 5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	760.0	760.0	17.00	760.0	7.49	-	—

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 11/13/19

KGS

Turbidity Instrument Calibration Log

Hach 2100Q

Project/Site Name: Dairens LTM Fall 2019

Instrument: ~~YSI 650 MDS~~

Calibrated By: Kristen Esser

Serial Number: 034948

* LaMotte 2020we SN: 19257

	Date	AM Calibration: Pre-Cal 20 NTU	AM Calibration: Post-Cal 100 NTU	AM Calibration: Pre-Cal ~~800~~ 10 NTU	AM Calibration: ~~Post~~ Cal 10 NTU	PM Post Calibration Check: 20 / ~~0 NTU~~ 100 / 800	PM Post Calibration Check: 10 NTU	Variance Noted
	11/4/19	Pre 19.1 | Post 20.0	Pre 102.0 | Post 100.0	Pre 801.0 | Post 800	Pre 10.1 | Post 10.0	21.7 | 101 | 807	10.0	N
*	11/5/19	0 NTU 0.10	0 NTU 0.01	10 NTU 8.13	10 NTU 8.48	0 NTU 0.02	10 NTU 8.28	N
*	11/6/19	0.02	0.01	9.00	9.62	0.01	9.45	N
*	11/7/19	0.02	0.01	8.82	9.52	0.01	9.80	N
*	11/8/19	0.01	0.02	8.87	9.98	0.00	9.82	N
*	11/11/19	0.02	0.01	6.61	9.41	0.01	9.55	N
*	11/12/19	0.22	0.01	8.73	10.06	0.00	9.94	N
*	11/13/19	0.01	0.00	9.59	9.63	0.01	9.14	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature]

Date: 11/13/19

KGS

Field Instrument Calibration Log

Date: 11/14/19

Weather: 23-40°F, Cloudy

Project/Site Name: LTM - Fall 2019

Instrument: YSI 650MDS

Calibrated By: Kristen Esser

Serial Number: 11G100387

Parameters	Solution Expiration Date	AM Calibration Time 0650		Cal. Temp. (°C)	PM Post Cal. Check Time 1410	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1.407	1.413	15.20	1.398	14.13	±10 µS/cm	N
pH (7)	2/2021	6.90	7.00	15.23	6.86	14.48	± 0.3 Ph *	N
pH (4)	3/2021	4.35	4.06	15.22	4.29	14.31	± 0.3 Ph *	N
pH (10)	2/2021	10.16	10.01	15.29	9.91	14.31	± 0.3 Ph *	N
ORP (240 mv)	5/2020	233.1	240.8	15.09	236.2	14.35	±10 mv	N
Dissolved Oxygen (%)	—	103.6	100.0	14.89	100.5	8.24	-	—
Dissolved Oxygen (mg/L)	—	10.08	9.56	14.89	11.81	8.24	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	—	760.0	760.0	14.89	760.0	8.24	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature]

Date: 11/14/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Ft Devens Fall LTM

Instrument: LaMotte 2020we

Calibrated By: Kristen Esner

Serial Number: 19252

Date	AM Calibration				PM Post Calibration Check				Variance Noted
	Pre/~~Post~~ - Cal 0 ~~10~~ NTU	~~Pre/~~Post - Cal 10 ~~20~~ NTU	Pre/~~Post - Cal~~ 10 ~~100~~ NTU	~~Pre~~/Post - Cal 10 ~~800~~ NTU	~~10 NTU~~ 0 NTU	~~20 NTU~~ 10 NTU	~~100 NTU~~	~~800 NTU~~	
11/14/19	0.98	0.02	8.68	9.30	0.02	9.60			N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria			
± 0.5	± 1	± 5	± 40

Signature: [signature]

Date:

Field Instrument Calibration Log

Date: 10/21/2019 **Weather:** partly sunny, dry, 50-65°F

Project/Site Name: LTM - Fall 2019 **Instrument:** 457 556 MPS

Calibrated By: Seiler **Serial Number:** 1F101567

Parameters	Solution Expiration Date	AM Calibration Time 0635		Cal. Temp. (°C)	PM Post Cal. Check Time 1415	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm[c])	3/2020	1434	1413	18.54	1410 → 1413	21.37	±10 µS/cm	no
pH (7)	1/2021	7.02	7.00	18.70	6.84 → 7.00	19.82	± 0.3 Ph *	no
pH (4)	3/2020	4.04	4.00	18.43	4.02 → 4.00	20.17	± 0.3 Ph *	no
pH (10)	2/2020	10.10	10.02	18.48	10.33 → 10.05	20.81	± 0.3 Ph *	yes
ORP (240 mv)	6/2023	231.8	240.0	18.50	242.7 → 240.0	21.72	±10 mv	no
Dissolved Oxygen (%)	-	100.8	100.0	17.89	99.0 → 100.0	21.49	-	-
Dissolved Oxygen (mg/L)	-	9.57	9.51	17.89	8.76 → 8.82	21.49	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	yes
Barometric Pressure (mmHg)	760	-	-	-	760	-	-	-

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: Erick Seiler **Date:** 10/21/2019

KGS

Field Instrument Calibration Log

Date: 10/23/2019 **Weather:** overcast, light rain

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 560 MDS

Calibrated By: Seiler **Serial Number:** 11G100386

Parameters	Solution Expiration Date	AM Calibration Time 0715		Cal. Temp. (°C)	PM Post Cal. Check Time 1250	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	11/2019	1454	1413	18.80	1370 → 1413	19.52	±10 µS/cm	yes
pH (10) ~~pH (7)~~	2/2021	10.28	10.04	18.82	10.07 → 10.00	19.54	± 0.3 Ph *	no
pH (4)	3/2021	4.08	4.00	18.99	4.22 → 4.00	19.18	± 0.3 Ph *	no
pH (7) ~~pH (10)~~	2/2021	6.87	7.00	18.86	6.70 → ~~6.58~~ → 7.00	19.38	± 0.3 Ph *	yes
ORP (240 mv)	11/2019	236.7	240.0	18.86	237.8 → 240.0	19.69	±10 mv	no
Dissolved Oxygen (%)	—	100.3	100.0	17.89	100.3 → 100.0	20.23	-	—
Dissolved Oxygen (mg/L)	—	9.52	9.49	17.89	9.08 → 9.05	20.23	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	no
Barometric Pressure (mmHg)	—	760	—	—	760	—	-	—

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: Eric Seiler **Date:** 10/23/2019

KGS

Field Instrument Calibration Log

Date: 10/24/2019 **Weather:** Clear, sunny, 40-65°F

Project/Site Name: LTM - Fall 2019 **Instrument:** 482 556 MPS

Calibrated By: Seiler **Serial Number:** 15F101567

Parameters	Solution Expiration Date	AM Calibration Time 0635		Cal. Temp. (°C)	PM Post Cal. Check Time 1455	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1409	1413	18.34	1214 → 1413	20.97	±10 µS/cm	yes
pH (7)	1/2021	6.82 ~~6.71~~	7.00	18.21	6.90 ~~6.89~~ → 7.00	19.93	± 0.3 Ph *	no
pH (4)	3/2020	4.09	3.99	18.38	4.17 → 4.00	19.97	± 0.3 Ph *	no
pH (10)	2/2020	9.99 ~~9.92~~	10.00	18.47	9.98 → 10.00	20.09	± 0.3 Ph *	no
ORP (240 mv)	6/2023	243.0	240.0	18.48	236.0 → 240.0	21.98	±10 mv	no
Dissolved Oxygen (%)	–	93.1	100.0	18.01	92.2 → 100.0 ~~760~~	22.32	–	–
Dissolved Oxygen (mg/L)	–	8.81	9.46	18.01	8.01 → 8.67	22.32	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	no
Barometric Pressure (mmHg)	–	760	–	–	760	–	–	–

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Erin Seiler **Date:** 10/24/2019

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM

Instrument: HACH 2100Q

Calibrated By: E. Seiler

Serial Number: 17060C059342

*16010C047202

Date	AM Calibration: Pre/Post - Cal 10 NTU	AM Calibration: Pre/Post - Cal 20 NTU	AM Calibration: Pre/Post - Cal 100 NTU	AM Calibration: Pre/Post - Cal 800 NTU	PM Post Calibration Check: 10 NTU	PM Post Calibration Check: 20 NTU	PM Post Calibration Check: 100 NTU	PM Post Calibration Check: 800 NTU	Variance Noted
10/14/2019	10.3/10	20.4/20	106/100	812/800	10.0/10	20.1/20	103/100	796/800	no
10/15/2019	10.4/10	19.3/20	96.5/100	799/800	9.71/10	20.6/20	96.9/100	790/800	no
10/16/2019	9.87/10	20.4/20	103/100	816/800	10.0/10	19.6/20	102/100	793/800	no
10/17/2019	10.1/10	19.7/20	98.6/100	810/800	10.02/10	19.9/20	97.2/100	779/800	no
10/21/2019	9.06/10	20.2/20	104/100	814/800	10.04/10	19.8/20	95.3/100	779/800	no
10/23/2019	12.3/10	20.6/20	103/100	811/800	10.2/10	20.3/20	103/100	802/800	no
10/24/2019	9.90/10	20.1/20	102/100	804/800	10.02/10	20.2/20	~~140~~ 110/100	791/800	yes
* 10/25/2019	10.0/10	20.5/20	102/100	790/800	10.0/10	20.2/20	96.8/100	810/800	~~no~~ yes
					Post Calibration Criteria				
					± 0.5	± 1	± 5	± 40	

Notes: Mark Noted Variences on Field Forms

Signature: [signature]

Date: 10/25/2019

KGS

Field Instrument Calibration Log

Date: 10/28/19 **Weather:** overcast 49°F

Project/Site Name: Devens LTM **Instrument:** YSI 650 MDS

Calibrated By: A. Cartwright **Serial Number:** 00M0743 AG

Parameters	Solution Expiration Date	AM Calibration Time 10:00		Cal. Temp. (°C)	PM Post Cal. Check Time ~~09~~ 14:45	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1,424	1,413	18.38	~~1,310~~ / 1,413	17.51	±10 µS/cm	N
pH (7)	2/2021	7.59	6.99	17.77	7.01	17.60	± 0.3 Ph *	N
pH (4)	3/2021	3.58	4.00	17.94	4.01	17.93	± 0.3 Ph *	N
pH (10)	2/2021	9.19	~~9.90~~ 10.00	18.24	10.0	17.95	± 0.3 Ph *	N
ORP (240 mv)	5/2020	257.9	240.0	18.24	240.0	17.98	±10 mv	N
Dissolved Oxygen (%)	—	91.9	99.9	17.33	100	17.32	-	
Dissolved Oxygen (mg/L)	—	8.83	9.59	17.33	9.61	17.32	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	—	759.4	17.33	759.6	17.32	-	

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: Abigail Cartwright **Date:** 10/28/19

KGS

Field Instrument Calibration Log

Date: 10/29/19 **Weather:** overcast/misty, 49°

Project/Site Name: Devens LTM **Instrument:** YSI 650 MDS

Calibrated By: A. Cartwright **Serial Number:** 00M0743 AG

Parameters	Solution Expiration Date	AM Calibration Time 07:00		Cal. Temp. (°C)	PM Post Cal. Check Time ~~0~~ 1445	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1,502	1,413	18.40	1,413	17.31	±10 µS/cm	N
pH (7)	2/2021	7.13	7.00	18.40	7.00	17.82	± 0.3 Ph *	N
pH (4)	3/2021	3.94	3.99	18.36	4.00	18.06	± 0.3 Ph *	N
pH (10)	2/2021	9.95	10.01	18.37	10.01	18.07	± 0.3 Ph *	N
ORP (240 mv)	5/2020	237.6	240	18.33	239.9	18.14	±10 mv	N
Dissolved Oxygen (%)	–	–	100.4%	17.48	101.6	[redacted] 17.65	-	–
Dissolved Oxygen (mg/L)	–	–	9.60	17.48	9.73	17.65 [redacted]	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	–	–	763.1	17.48	760.8	17.65 [redacted]	-	–

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Abigail Cartwright **Date:** 10/29/19

KGS

Field Instrument Calibration Log

Date: 10/30/19 **Weather:** Misting, 53°

Project/Site Name: Devens LTM **Instrument:** YSI MDS 650

Calibrated By: A. Cartwright **Serial Number:** 00M0743 AG

Parameters	Solution Expiration Date	AM Calibration Time 0645		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1,584	1,413	18.30	~~[illegible]~~ 793	18.74	±10 µS/cm	Y
pH (7)	2/2021	7.35	7.00	18.29	7.00	18.84	± 0.3 Ph *	N
pH (4)	3/2021	3.56	4.00	18.29	4.00	18.84	± 0.3 Ph *	N
pH (10)	2/2021	9.46	9.91	18.16	9.99	18.82	± 0.3 Ph *	N
ORP (240 mv)	5/2020	238.0	240.0	18.20	238.4	18.90	±10 mv	N
Dissolved Oxygen (%)	–	–	100.8	16.98	100.9	18.69	–	–
Dissolved Oxygen (mg/L)	–	–	9.73	16.98	9.40	18.69	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	–	–	761.8	16.98	760.9	18.69	–	–

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: Abigail Cartwright **Date:** 10/30/19

Field Instrument Calibration Log

Date: 10/31/19 **Weather:** rainy, 60°F

Project/Site Name: Devens LTM **Instrument:** ~~YS~~ YSI 650 MDS

Calibrated By: A. Cartwright **Serial Number:** 00M0743 AG

Parameters	Solution Expiration Date	AM Calibration Time 0640		Cal. Temp. (°C)	PM Post Cal. Check Time 1200	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm[c])	3/2020	2,663	1,413	18.30	1,376	18.00	±10 µS/cm	Y
pH (7)	2/2021	7.30	7.00	18.38	6.95	18.20	± 0.3 Ph *	N
pH (4)	3/2021	3.53	4.00	18.38	3.99	18.28	± 0.3 Ph *	N
pH (10)	2/2021	9.45	9.90	18.31	9.85	18.32	± 0.3 Ph *	N
ORP (240 mv)	5/2020	239.8	240.1	18.32	240.3	18.29	±10 mv	N
Dissolved Oxygen (%)	—	—	100.1	17.93	107.7	18.21	-	—
Dissolved Oxygen (mg/L)	—	—	9.49	17.93	9.99	18.21	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	—	—	754.0	17.93	636.4	18.21	-	—

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Abigail Cartwright **Date:** 10/31/19

KGS

Field Instrument Calibration Log

Date: 11/1/19 **Weather:** windy, 50° F

Project/Site Name: Devens LTM **Instrument:** YSI 650 MDS

Calibrated By: A. Cartwright **Serial Number:** 00 M0743 AG

Parameters	Solution Expiration Date	AM Calibration Time 0645		Cal. Temp. (°C)	PM Post Cal. Check Time 1510	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1,422	1,413	19.03	1,403	17.61	±10 µS/cm	N
pH (7)	2/2021	7.18	7.00	19.15	6.94	18.06	± 0.3 Ph *	N
pH (4)	3/2021	3.83	4.00	19.03	4.12	18.25	± 0.3 Ph *	N
pH (10)	2/2021	9.73	9.96	18.78	10.02	18.33	± 0.3 Ph *	N
ORP (240 mv)	5/2020	274.1	240.2	19.09	240.0	18.34	±10 mv	N
Dissolved Oxygen (%)	–	–	101.3	17.92	104.4	17.66	-	–
Dissolved Oxygen (mg/L)	–	–	9.70	17.92	9.77	17.66	± 0 5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	–	–	740.8	17.92	753.4	17.66	-	–

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: Abigail Cartwright **Date:** 11/1/19

KGS

Field Instrument Calibration Log

Date: 11/4/19 **Weather:** 30° F, sunny

Project/Site Name: Devens LTM **Instrument:** YSI 650 MDS

Calibrated By: A. Cartwright **Serial Number:** 00 M0743 AG

Parameters	Solution Expiration Date	AM Calibration Time 0630		Cal. Temp. (°C)	PM Post Cal. Check Time 1450	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1,427	1,413	18.68	1,385	17.64	±10 µS/cm	Y
pH (7)	2/2021	7.20	7.00	18.57	6.96	18.34	± 0.3 Ph *	N
pH (4)	3/2021	3.68	4.00	18.09	4.20	18.36	± 0.3 Ph *	N
pH (10)	2/2021	9.26	9.88	17.67	10.00	18.29	± 0.3 Ph *	N
ORP (240 mv)	5/2020	238.1	239.8	17.62	239.1	18.29	±10 mv	N
Dissolved Oxygen (%)	–	–	106.0	16.04	~~760.7~~ 112.1	17.51	-	–
Dissolved Oxygen (mg/L)	–	–	10.51	16.04	9.68	17.51	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	–	–	761.8	16.04	760.7	17.51	-	–

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Abigail Cartwright **Date:** 11/4/19

KGS

Field Instrument Calibration Log

Date: 11/5/19 **Weather:** 40-50° F, rainy in afternoon

Project/Site Name: Devens LTM **Instrument:** YSI 650 MDS

Calibrated By: A. Cartwright **Serial Number:** 00M0743 AG

Parameters	Solution Expiration Date	AM Calibration Time 0645		Cal. Temp. (°C)	PM Post Cal. Check Time 1515	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1,394	1,412	18.61	1,259	16.31	±10 µS/cm	Y
pH (7)	2/2021	7.32	7.00	18.53	6.87	17.65	± 0.3 Ph *	N
pH (4)	3/2021	3.48	4.00	18.42	4.12	17.65	± 0.3 Ph *	N
pH (10)	2/2021	4.49	9.91	18.28	10.00	17.68	± 0.3 Ph *	N
ORP (240 mv)	5/2020	238.1	240.1	18.51	241.5	17.92	±10 mv	N
Dissolved Oxygen (%)	–	–	111.3	17.06	99.3	17.06	-	–
Dissolved Oxygen (mg/L)	–	–	10.73	17.06	9.60	17.06	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	–	–	760.3	17.06	755.2	17.06	-	–

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Abigail Cartwright **Date:** 11/5/19

KGS

Field Instrument Calibration Log

Date: 11/6/19 **Weather:** 30 – 40° F, sunny

Project/Site Name: Devens LTM **Instrument:** YSI 650 MDS

Calibrated By: A. Cartwright **Serial Number:** 00M0743 AG

Parameters	Solution Expiration Date	AM Calibration Time 06 40		Cal. Temp. (°C)	PM Post Cal. Check Time 14 10	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1,493	1,413	18.07	1,330	17.38	±10 µS/cm	Y
pH (7)	2/2021	7.27	7.00	17.99	6.93	17.34	± 0.3 Ph *	N
pH (4)	3/2021	3.67	4.00	17.80	4.43	17.59	± 0.3 Ph *	Y
pH (10)	2/2021	9.43	~~9.90~~ 9.97	17.65	9.88	17.40	± 0.3 Ph *	N
ORP (240 mv)	5/2020	239.1	240.0	17.90	239.1	17.78	±10 mv	N
Dissolved Oxygen (%)	–	–	97.2	16.44	96.8	16.74	-	–
Dissolved Oxygen (mg/L)	–	–	9.54	16.44	9.48	16.74	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	–	–	760.5	16.44	760.8	~~76~~ 16.74	-	–

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: Abigail Cartwright **Date:** 11/6/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM

Instrument: HACH 2100Q

Calibrated By: A. Cartwright

Serial Number: 17060C059342

Date	AM Calibration				PM Post Calibration Check				Variance Noted
	Pre/Post - Cal 10 NTU	Pre/Post - Cal 20 NTU	Pre/Post - Cal 100 NTU	Pre/Post - Cal 800 NTU	10 NTU	20 NTU	100 NTU	800 NTU	
10/28/19	10.2/10	19.7/20	89.4/100	815/800	10.0/10	19.9/20	91.2/100	812/800	N
10/29/19	10.3/10	19.9/20	96.8/100	790/800	10.1/10	19.7/20	95.3/100	792/800	N
10/30/19	9.66/10	21.9/20	106/100	815/800	9.27/10	20.7/20	97.9/100	793/800	[redacted] N
10/31/19	10.1/10	18.3/20	101/100	812/800	10.0/10	19.5/20	101/100	792/800	[redacted] N
11/1/19	9.59/10	19.4 [redacted]/20	103 [redacted]/100	793 [redacted]/800	9.68/10	19.0/20	97.4/100	814/800	N
11/4/19	9.69/10	20.3/20	99.7/100	798/800	9.70/10	18.0/20	93.3/100	763/800	Y
11/5/19	9.47/10	23.7/20	110/100	847/800	9.68/10	19.4/20	98.7/100	794/800	N
11/6/19	9.36/10	21.8/20	105/100	816/800	10.2/10	18.0/20	99.1/100	808/800	Y
					Post Calibration Criteria				
					± 0.5	± 1	± 5	± 40	

Notes: Mark Noted Variences on Field Forms

Signature: Abigail Cartwright

Date: 11/6/19

KGS

Field Instrument Calibration Log

Date: 11/7/19 **Weather:** Overcast, 40-50° F

Project/Site Name: Devens LTM **Instrument:** YSI 650 MDS

Calibrated By: A. Cartwright **Serial Number:** 17060C059342

Parameters	Solution Expiration Date	AM Calibration Time 0640		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1,535	1,413	18.41	1,307	16.03	±10 µS/cm	Y
pH (7)	2/2021	6.95	7.00	18.37	6.85	17.32	± 0.3 Ph *	N
pH (4)	3/2021	4.02	4.00	18.29	4.24	17.31	± 0.3 Ph *	N
pH (10)	2/2021	9.48	9.90	18.36	9.70	17.57	± 0.3 Ph *	N
ORP (240 mv)	5/2020	239.3	240.0	18.35	240.9	17.46	±10 mv	N
Dissolved Oxygen (%)	–	–	98.6	17.03	98.4	16.26	-	–
Dissolved Oxygen (mg/L)	–	–	9.56	17.03	9.71	16.26	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	–	–	758.3	17.03	753.5	16.26	-	–

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Abigail Cartwright **Date:** 11/7/19

KGS

Field Instrument Calibration Log

Date: 11/8/19 **Weather:** 30-35° F, windy

Project/Site Name: Devens LTM **Instrument:** YSI 650 MDS

Calibrated By: A. Cartwright **Serial Number:** ~~[illegible]~~ 11B100186

Parameters	Solution Expiration Date	AM Calibration Time 06 30		Cal. Temp. (°C)	PM Post Cal. Check Time 1330	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/2020	1,43 ~~1,494~~	1,413 ~~1,413~~	19.37 ~~19.42~~	1,354	16.46	±10 µS/cm	Y
pH (7)	2/2021	6.95	7.00	19.14	6.72	18.13	± 0.3 Ph *	N
pH (4)	3/2021	4.01	3.98	19.17	4.30	18.19	± 0.3 Ph *	N
pH (10)	2/2021	9.86	10.00	18.88	9.92	18.34	± 0.3 Ph *	N
ORP (240 mv)	5/2020	230.8	240.0	19.62	209.0	18.58	±10 mv	Y
Dissolved Oxygen (%)	–	–	85.1	17.98	1.2	17.08	-	–
Dissolved Oxygen (mg/L)	–	–	8.03	17.98	0.09	17.08	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	Y
Barometric Pressure (mmHg)	–	–	766.5	17.98	763.4	17.08	-	–

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: Abigail Cartwright **Date:** 11/8/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: Dover

Instrument: Lamotte Labcare

Calibrated By: WGA

Serial Number: 5083 5014

	AM Calibration				PM Post Calibration Check		
Date	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	Variance Noted
11/7/19	0.47	0.00	10.27	10.00	0.87	9.56	N

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature]

Date: 11/7/19

Turbidity Instrument Calibration Log

Project/Site Name: Devens LTM

Instrument: HACH 2100Q

Calibrated By: A. Cartwright

Serial Number: 17060C059342

Date	AM Calibration				PM Post Calibration Check				Variance Noted
	Pre/Post - Cal 10 NTU	Pre/Post - Cal 20 NTU	Pre/Post - Cal 100 NTU	Pre/Post - Cal 800 NTU	10 NTU	20 NTU	100 NTU	800 NTU	
11/7/19	used LaMotte 2020we		5083-5014	→ see Kevin's calibration log					–
11/8/19	9.09/10	19.2/20	98.6/100	768/800	10.5/10	22.7/20	107/100	883/800	Y

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria			
± 0.5	± 1	± 5	± 40

Signature: Abigail Cartwright

Date: 11/8/19

KGS

Field Instrument Calibration Log

Date: 11/11/19 **Weather:** 50's

Project/Site Name: Davar **Instrument:** YSI 650XL

Calibrated By: [illegible] **Serial Number:** 11B100186

Parameters	Solution Expiration Date	AM Calibration Time 630		Cal. Temp. (°C)	PM Post Cal. Check Time 1400	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/20	1.327	1.413	17.39°	1.420	18.11°	±10 µS/cm	N
pH (7)	2/21	7.27	7.00	17.24°	7.11	18.23°	± 0.3 Ph *	N
pH (4)	3/21	4.21	4.00	17.30°	4.03	18.19°	± 0.3 Ph *	N
pH (10)	2/21	9.61	10.00	17.29°	10.11	18.22°	± 0.3 Ph *	N
ORP (240 mv)	5/20	259.7	240.0	17.21°	247.7	18.39°	±10 mv	N
Dissolved Oxygen (%)	N/A	91.6%	100.0%	16.88°	118.6%	18.41°	-	N
Dissolved Oxygen (mg/L)	N/A	9.32	10.00	16.90°	9.71	18.10°	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 11/11/19

KGS

Field Instrument Calibration Log

Date: 11/12/19 **Weather:** 30's Rain

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 650 XL

Calibrated By: N/A **Serial Number:** 11B100186

Parameters	Solution Expiration Date	AM Calibration Time 605		Cal. Temp. (°C)	PM Post Cal. Check Time 930	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm[c])	3/20	1.487	1.413	19.45°	1.410	17.01°	±10 µS/cm	N
pH (7)	2/21	6.49	7.00	19.37°	7.03	17.03°	± 0.3 Ph *	N
pH (4)	3/21	4.02	4.00	19.21°	4.01	17.00°	± 0.3 Ph *	N
pH (10)	2/21	9.80	10.00	19.23°	10.10	16.97°	± 0.3 Ph *	N
ORP (240 mv)	5/20	229.7	240.0	19.18°	241.1	16.96°	±10 mv	N
Dissolved Oxygen (%)	N/A	96.1%	100.0%	19.13°	111.1%	16.45°	-	N
Dissolved Oxygen (mg/L)	N/A	11.09	10.00	19.27°	9.90	16.38°	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 11/12/19

KGS

Field Instrument Calibration Log

Date: 11/13/19 **Weather:** 10's

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 650XL

Calibrated By: PLA **Serial Number:** 11B100186

Parameters	Solution Expiration Date	AM Calibration Time 605		Cal. Temp. (°C)	PM Post Cal. Check Time _____	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/20	1.398	1.413	19.25	1.419	5.59	±10 µS/cm	N
pH (7)	2/21	~~7~~ 6.29	7.00	19.48	7.29	5.72°	± 0.3 Ph *	N
pH (4)	3/21	4.11	4.00	19.58	4.01	5.62°	± 0.3 Ph *	N
pH (10)	2/21	10.49	10.00	19.63	10.01	5.70°	± 0.3 Ph *	N
ORP (240 mv)	5/20	227.1	240.0	19.79	243.9	6.41°	±10 mv	N
Dissolved Oxygen (%)	N/A	119.7%	100.0%	20.19	101.6%	4.90°	-	N
Dissolved Oxygen (mg/L)	N/A	11.17	10.00	20.23	9.61	4.83°	± 0 5 mg/L < 0 5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

*** Ph Unit with Ph 7 Buffer**

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 11/13/19

KGS

Field Instrument Calibration Log

Date: 11/14/19 **Weather:** 10's

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 650XL

Calibrated By: VM **Serial Number:** 11B100186

Parameters	Solution Expiration Date	AM Calibration Time 610		Cal. Temp. (°C)	PM Post Cal. Check Time 1445	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm^c)	3/20	1.430	1.413	14.69°	1.409	5.69°	±10 µS/cm	N
pH (7)	2/21	7.39	7.00	14.89°	6.80	5.52°	± 0.3 Ph *	N
pH (4)	3/21	4.27	4.00	14.67°	4.22	6.00°	± 0.3 Ph *	N
pH (10)	2/21	9.49	10.00	14.69°	10.09	5.82°	± 0.3 Ph *	N
ORP (240 mv)	5/20	261.7	240.0	14.27°	247.2	6.87	±10 mv	N
Dissolved Oxygen (%)	N/A	82.6%	100.0%	13.92	103.6%	7.90°	-	N
Dissolved Oxygen (mg/L)	N/A	9.32	10.00	13.80	9.95	7.89°	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 11/14/19

KGS

Field Instrument Calibration Log

Date: 11/15/19 **Weather:** 20's

Project/Site Name: LTM - Fall 2019 **Instrument:** YSI 650+C

Calibrated By: KW **Serial Number:** 11B100186

Parameters	Solution Expiration Date	AM Calibration Time 700		Cal. Temp. (°C)	PM Post Cal. Check Time 1100	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1,413 µS/cm°)	3/20	1.430	1.413	15.21°	1.409	14.21°	±10 µS/cm	N
pH (7)	2/21	7.11	7.00	15.39°	6.92	14.32°	± 0.3 Ph *	N
pH (4)	3/21	4.02	4.00	15.22°	4.11	14.36°	± 0.3 Ph *	N
pH (10)	2/21	9.92	10.00	15.21°	10.03	14.33°	± 0.3 Ph *	N
ORP (240 mv)	5/20	229.1	240.0	15.20°	237.1	14.18°	±10 mv	N
Dissolved Oxygen (%)	N/A	81.6%	100.0%	15.02°	111.3%	14.13°	-	N
Dissolved Oxygen (mg/L)	N/A	9.70	10.00	14.97°	9.82	14.07	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

*** Ph Unit with Ph 7 Buffer** **(Mark Noted Variences on Field Forms)**

Signature: [signature] **Date:** 11/15/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: SHM-10-16 (Redo)

Project: Supplemental - Fall 2019 Shepleys Hill Landfill
Location: Fort Devens, Massachusetts
Date: 11/21/19
Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	
Depth to bottom (ft BTOR)	
Pump Set Depth (ft BTOR)	
Screen Interval (ft BTOR)	
Total volume purged (gal)	

☆ Redo ☆

Sampling Type geotech
Purging Method ~~[illegible]~~
Purge start/stop time 840/920
Tubing type teflon lined poly
Tubing diameter 1/4"
Dedicated pump (Y/N) N
Air source N/A

Field Instrument (Model/S/N) YSI 650XL 11B100186
LaMotte 2020WP 3519-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
840	200	probe failure	9.11	7.56	649	7.97	15.9	2.30	clear
845	↓	↓	8.90	7.49	630	7.80	9.9	1.81	Clear
850			8.89	7.43	607	7.77	8.9	1.78	Clear
855			8.89	7.42	606	7.78	8.7	1.78	Clear
900			8.91	7.43	599	7.74	8.6	1.77	Clear
905			8.92	7.44	598	7.74	8.4	1.77	Clear
910			8.90	7.43	597	7.73	8.3	1.73	Clear
915	↓	↓	8.90	7.43	596	7.70	8.2	1.71	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHM-10-16
Sample Time: 920
Duplicate (Y/N): N
MS/MSD (Y/N): N
Field Filtered (Y/N): Y
Dup ID: N/A
Filter Size: .45
Dup Time: N/A

Comments

[signature]
Signature

11/21/19
Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: ~~SHM-10-15~~ SLM-01-15XBR REDO

Project: Supplemental - Fall 2019 Shepleys Hill Landfill — Date: 11/20/19

Location: Fort Devens, Massachusetts — Sampler: VBL

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		✓
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	
Depth to bottom (ft BTOR)	
Pump Set Depth (ft BTOR)	
Screen Interval (ft BTOR)	
Total volume purged (gal)	

REDO

Sampling Type

Purging Method: geotech — Tubing type: teflon lined — Dedicated pump (Y/N): N

Purge start/stop time: 730/810 — Tubing diameter: 1/4" — Air source: N/A

Field Instrument (Model/S/N): YSI 650XL 11B100186 Cond/Temp 20100112 DO 19F-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
730	100	24.90	11.09	7.04	6420	8.90	193.7	4.01	clear
735		25.41	11.13	7.01	6409	8.77	186.1	4.00	clear
740		25.83	11.41	7.00	6370	8.57	184.2	3.92	clear
745		26.19	11.37	6.97	6369	8.53	182.1	3.93	clear
750		26.50	11.37	6.94	6358	8.50	180.3	3.92	clear
755		26.87	11.29	6.93	6357	8.47	179.8	3.90	clear
800		27.09	11.27	6.95	6350	8.44	179.3	3.87	clear
805		27.40	11.16	6.95	6347	8.42	179.0	3.86	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0 163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SLM-01-15XBR

Sample Time: 810 — Duplicate (Y/N): N — MS/MSD (Y/N): N

Field Filtered (Y/N): N — Dup ID: N

Filter Size: N — Dup Time: N

Comments

Signature — Date: 11/20/19

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Low Flow/ Low Stress Groundwater Sampling Log

KGS

Well Identification: ~~SBM-10-46~~ 32M-01-16XBR REDO

Project: Supplemental - Fall 2019 Shepleys Hill Landfill — Date: 11/20/19

Location: Fort Devens Massachusetts — Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present	✓		
Locked (stickup wells)			✓

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	
Depth to bottom (ft BTOR)	
Pump Set Depth (ft BTOR)	
Screen Interval (ft BTOR)	
Total volume purged (gal)	

REDO

Sampling Type

Purging Method: Peristaltic — Tubing type: teflon lined — Dedicated pump (Y/N): N

Purge start/stop time: 845/925 — Tubing diameter: 1/4" — Air source: N/A

Field Instrument (Model/S/N): YSI 6820 11B100836 Lamotte 2020WQ 3579-3573

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
840									
845	200	24.07	12.21	7.09	932	6.98	167	1.97	Clear
850		24.07	12.69	7.09	989	6.99	165.7	1.97	Clear
855		24.07	13.09	7.11	102	6.93	167.1	1.92	Clear
900		24.07	13.11	7.12	1047	6.90	166.6	1.90	Clear
905		24.07	13.12	7.13	1061	6.90	165.1	1.87	Clear
910		24.07	13.15	7.13	1073	6.87	164.2	1.89	Clear
915		24.07	13.13	7.14	1079	6.85	162.1	1.90	Clear
920		24.07	13.17	7.16	1083	6.83	160.7	1.91	Clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):									

Sampling Details

Sampling ID: 32M-01-16XBR

Sample Time: 925 — Duplicate (Y/N): N — MS/MSD (Y/N): N

Field Filtered (Y/N): N — Dup ID: N

Filter Size: N — Dup Time: N

Comments

Signature — Date: 11/20/19

KGS

Field Instrument Calibration Log

Date: 11/21/19 Weather: 30s

Project/Site Name: SHL Instrument: YSI 650XL

Calibrated By: MA Serial Number: 11B100186

Parameters	Solution Expiration Date	AM Calibration Time 700		Cal. Temp. (°C)	PM Post Cal. Check Time 1200	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	3/20	1.400	1.413	17.18	1.414	18.16°	±10 µS/cm	N
pH (7)	2/21	7.14	7.00	17.15	7.01	18.21°	± 0.3 Ph *	N
pH (4)	3/21	4.09	4.00	17.23	4.09	18.30°	± 0.3 Ph *	N
pH (10)	2/21	9.70	10.00	17.30°	10.03	18.29°	± 0.3 Ph *	N
ORP (240 mv)	5/20	221.6	240.0	17.19	241.1	18.30°	±10 mv	N
Dissolved Oxygen (%)	N/A	132.6%	100.0%	17.00°	92.6%	18.27°	–	N
Dissolved Oxygen (mg/L)	N/A	9.41	10.00	16.82°	9.92	18.00°	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	769	—	760	—	–	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature: Date: 11/21/19

KGS

Field Instrument Calibration Log

Date: 11/20/17 **Weather:** 30's

Project/Site Name: STL **Instrument:** YSI 650XL

Calibrated By: VA **Serial Number:** 11B100186

Parameters	Solution Expiration Date	AM Calibration Time 645		Cal. Temp. (°C)	PM Post Cal. Check Time 945	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	3/20	1.429	1.413	19.01°	1.416	18.21°	±10 µS/cm	N
pH (7)	2/21	7.11	7.00	18.97°	7.03	18.30°	± 0.3 Ph *	N
pH (4)	3/21	4.09	4.00	18.93°	4.00	18.27°	± 0.3 Ph *	N
pH (10)	2/21	10.30	10.00	19.06°	10.03	18.22°	± 0.3 Ph *	N
ORP (240 mv)	3/29	226.2	240.0	18.97°	242.6	18.30°	±10 mv	N
Dissolved Oxygen (%)	N/A	132.1%	100.0%	17.91°	102.1%	18.01°	-	N
Dissolved Oxygen (mg/L)	N/A	9.60	10.00	18.13°	9.97	17.96°	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	760	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature: [signature] **Date:** 11/20/17

KGS

Turbidity Instrument Calibration Log

Project/Site Name: SHL

Instrument: LaMotte 2020WE

Calibrated By: VGA

Serial Number: 3519 - 3513

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
11/20/19	0.00	0.00	10.09	10.00	0.02	10.00	✓
11/21/19	0.03	0.00	10.02	10.00	0.03	10.09	✓

Notes: Mark Noted Variences on Field Forms

Post Calibration Criteria	
-	± 0.5

Signature: [signature]

Date: 11/21/19

Monitoring Well Evaluation Form

KGS

Project Name: Devens FAll'19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1105
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
3-2	NA	39.53	58.95	

Well Construction Details GGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
59.0	267.28	54.0-59.0

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	NA - PVC casing
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: Devens FAU '14 LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 1125
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
20-1	NA	39.90	56.33	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
55.0	277.78	40.0 - 55.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	NA - PVC CAP
Photo Taken?	N

Well Condition

Protective Cover:	G
Well Riser Casing:	G
Well Pad:	G
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: Devens, FALL 19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1130
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
27-1	NA	41.12	66.30	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
63.25	268.09	58.25 - 63.25

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	NA - PVC CAP
Photo Taken?	NO

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form	KGS
Project Name: Devons, FALL 19 LTM	Date: 10/22/19
Location: AOC 5	Time: 1137
Tidally Influenced (yes/no):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
27-2	NA	47.45	69.62	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
68.0	273.07	58.0 - 68.0

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	NA - PVC CAP
Photo Taken?	N

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: Devens, FALL '19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1225
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
CAP-2B	NA	22.80	58.27	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
57.0	248.66	32-57.0

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	NA + PVC CAP
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: Devons FALL LTM'19	**Date:** 10/22/19
Location: AOCS	**Time:** CH-1D 1210 | CH-1S 1215
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID		PID Reading (PPM)	Depth to Water (feet) CH1D	Depth to Water (feet) CH-1S	Total Well Depth (feet) CH-1D	Total Well Depth (feet) CH-1S	Comments
CH-1D	CH-1S	NA	21.80	22.00	97.32	43.0	

Well Construction Details 695

Total Depth (ft) CH1D	Total Depth (ft) CH-1S	Ground Elevation (NVGD88)	Screened Interval CH1D	Screened Interval CH-1S
95.0	41.0	248.46	85.0-95.0	36.0-41.0

Checklist

Well Material and Diameter:	1.5" PVC	1" PVC
Well Casing Reference Point:	Y	Y
Well ID Tag Present?	Y	Y
Well Secured?	Y	Y
Photo Taken?	N	N

Well Condition Shared Casing

Protective Cover:	Good	
Well Riser Casing:	Good	
Well Pad:	Good	
Other (Posts, Tags, Paint, etc.):	NA	
Standing Water Around Well?	no	
Dedicated Equipment Present?	CH 1D Y	CH-1S Y
Sediment in Well:	n	n

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0925
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-1A	—	12.15	27.90	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
28.88	223.79	23.88 – 28.88

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0930
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-1B	—	11.80	77.80	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
78.72	223.53	23.72 - 78.72

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	EPA Transducer
Sediment in Well:	Some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0912
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-2A	—	11.42	28.40	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
28.66	223.38	23.66 - 28.66

Checklist

Well Material and Diameter:	1" pve
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine, minor cracking
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0918
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-2B	—	11.44	83.40	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
83.62	223.37	78.62 - 83.62

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	nA
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	EPA Transducer
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1125
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-3A	—	11.68	27.93	

Well Construction Details

Total Depth (ft)	~~Ground~~ Elevation TOR (NVGD88)	Screened Interval
28.45	222.65	23.45 - 28.45

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2014 LTM	**Date:** 10/22/2014
Location: SHL	**Time:** 1129
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-3B	—	11.60	77.05	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
78.32	222.57	73.32 – 78.32

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	~~no~~ yes
Well Secured?	no → no lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	Some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1140
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-4A	—	15.92	28.00	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
28.30	226.60	23.30 - 28.30

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1144
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-4B	—	15.76	77.00	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
77.88	226.39	72.88-77.88

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	Some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1438
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA - PZ - 2012-SA	—	8.96	27.43	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
28.68	220.01	23.68 - 28.68

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1442
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-5B	—	8.24	85.78	

Well Construction Details

Total Depth (ft)	~~Ground~~ Elevation TOR (NVGD88)	Screened Interval
88.18	219.38	83.18 - 88.18

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0739
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-6A	—	23.68 ~~33.40~~	33.40	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
33.54	234.25	28.54 - 33.54

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall LTM 2019	**Date:** 10/22/2019
Location: SHL	**Time:** 0733
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-6B	—	23.55	82.00 ~~28.00~~	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
83.23	234.08	78.23-83.23

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	EPA Transducer
Sediment in Well:	Some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1513
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-7A	—	23.79	29.40	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
29.74	234.16	24.74 – 29.74

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	on plug
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	NA → flushmount
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1515
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EPA-PZ-2012-7B	—	23.39	64.55	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
64.75	234.03	54.75 - 64.75

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	on plug
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	na → flushmount
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens FALL'19 LT	**Date:** 10/22/19
Location: AOC5	**Time:** 1305
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EW-15	NA	16.38	43.35	

Well Construction Details 6TOR

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
45.0	226.97	35.0-45.0

Checklist

Well Material and Diameter:	1.5"
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	N — Vault
Photo Taken?	N

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Vault — Good
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	Yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1507
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
EW-2S	—	16.30	42.04	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
50.0	227.06	40.0 - 50.0

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no → missing bolts/lock
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	NA → vault
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	some

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LDM 2019	**Date:** 10/22/19
Location: Shipleys	**Time:** 1109
Tidally Influenced (yes/no):	**Field Crew:** CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
N1-P1	NA	12.99	73.00	Shldup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
73.00	229.92	67.14-72.14

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dorms Fall LTM 2019	Date: 10/22/19
Location: Shoplys	Time: 1111
Tidally Influenced (yes/no):	Field Crew: W

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
N1-P2	NA	13.01	48.28	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
48.25	229.93	42.15 - 47.15

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Devons Fall COM 2019	Date: 10/22/19
Location: Shoplys	Time: 1113
Tidally Influenced (yes/no):	Field Crew: CW

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
N1-P3	NA	12.97	21.10	Shielup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
21.10	230.08	14.30-19.30

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, ~~tobly~~ transducer
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dame Fall LTM 2019	Date: 10/22/19
Location: Shipley's	Time: 1129
Tidally Influenced (yes/no):	Field Crew: CW

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
NZ-P1	NA	4.65	41.76	SHdup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
41.76	222.01	36.46-41.46

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	~~Y~~ No
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dunns Fall LTM 2019	Date: 10/22/19
Location: Shorlys	Time: 1132
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
N2-P2	NA	4.99	12.73	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
12.73	222.16	5.61-10.61

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	Yes ✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LTM 2019	Date: 10/22/19
Location: Shrplys	Time: 1042
Tidally Influenced (yes/no):	Field Crew: CW

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
N3-P1	NA	4.15	37.95	stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
37.95	220.83	35.02-37.02

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	No
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LTM 2019	Date: 10/22/19
Location: Shuplys	Time: 1037
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
N3-P2	NA	3.85	12.51	Shiplys

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
12.51	220.84	6.03-11.03

Checklist

Well Material and Diameter:	[redacted], 1", PVC
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Melissa Miller	**Date:** 10/22/19
Location: AOC 5	**Time:** NS-P1 1310 | NS-P2 1315
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID		PID Reading (PPM)	Depth to Water (feet) NS-P1	Depth to Water (feet) NS-P2	Total Well Depth (feet) NS-P1	Total Well Depth (feet) NS-P2	Comments
NS-P1	NS-P2	NA	24.0	24.25	99.75	32.80	

Well Construction Details bgs

Total Depth (ft) NS-P1	Total Depth (ft) NS-P2	Ground Elevation (NVGD88)	Screened Interval NS-P1	Screened Interval NS-P2
97.50	28.0	240.46	95.5-97.5	23.0-28.0

Checklist	NS-P1	NS-P2
Well Material and Diameter:	1" PVC	1" PVC
Well Casing Reference Point:	Y	
Well ID Tag Present?	Y	
Well Secured?	Y	
Photo Taken?	NA	

Well Condition Shared Casing

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	4 posts - Good
Standing Water Around Well?	NO
Dedicated Equipment Present?	NS-P1 No | NS-P2 Y
Sediment in Well:	NO | NO

Monitoring Well Evaluation Form

KGS

Project Name: Devens, FALL '18 LTM	**Date:** 10/22/18
Location: AOC 5	**Time:** 0950
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
NG-P1	NA	36.68	90.78	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
87.5	256.06	85.5 - 87.5

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	4 Guard Posts - Good
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	Yes

Monitoring Well Evaluation Form	KGS
Project Name: Devens, FALL '19 LTM	Date: 10/22/19
Location: AOC5	Time: 0930
Tidally Influenced (yes/no):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
N7-P1	NA	31.15	71.30	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
68.0	253.19	66.0-68.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	N

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	4 Guard Posts - Good
Standing Water Around Well?	no
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form	KGS
Project Name: Devens FALL 19 LTM	Date: 10/22/19
Location: AOC 5	Time: 0935
Tidally Influenced (yes/no):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
N7-P2	NA	31.20	37.32	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
34.0	253.19	29.0 - 34.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	4 good Posts
Standing Water Around Well?	no
Dedicated Equipment Present?	Yes
Sediment in Well:	

Monitoring Well Evaluation Form

KGS

Project Name: Ma' Devens FALL '19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1220
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
MW-1	NA	Dry	11.52	

Well Construction Details BTOC

Total Depth (ft) est.	Ground Elevation (NVGD88)	Screened Interval est
8.58	248.89	6.58 - 8.58

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	N
Dedicated Equipment Present?	Y
Sediment in Well:	No

Monitoring Well Evaluation Form

KGS

Project Name: Devens, FALL 19 LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 1232
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
MW-4-1	NA	Dry	7.20	

Well Construction Details GTOR

Total Depth (ft) est.	Ground Elevation (NVGD88)	Screened Interval est.
5.72	245.39	3.72-5.72

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Devens FALL '19 LTM	Date: 10/22/19
Location: AOC 5	Time: 1240
Tidally Influenced (yes/no):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
MW-7	NA	Dry	12.02	

Well Construction Details 6TOR

Total Depth (ft) est.	Ground Elevation (NVGD88)	Screened Interval est.
8.98	246.09	6.98-8.98

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	N

Well Condition

Protective Cover:	Good
Well Riser Casing:	good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	No
Dedicated Equipment Present?	Yes, Dropped Below Reach
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens, FALL'19 LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 1247
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
MW-9	NA	DRY	12.10	

Well Construction Details TOR

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
9.65 est.	241.05	7.65 - 9.65

Checklist

Well Material and Diameter:	1"
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	Yes, Dropped
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: Devons, Fall '19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1205
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
MW-11A	NA	8.90	9.05	

Well Construction Details "bTOR

Total Depth (ft) est	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval est
6.18	258.57	4.18 - 6.18

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	NO
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	No
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Dewens, FALL 19 LTM	Date: 10/22/19
Location: AOC5	Time: 1155
Tidally Influenced (yes/(no)):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
MW-14	NA	Dry	9.65	

Well Construction Details

Total Depth (ft) EST	~~Ground~~ Riser Elevation (NVGD88)	Screened Interval EST
7.14	256.61	5.14 – 7.14

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	N, Rusted Lock Removed
Photo Taken?	N

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	Yes
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Revens FALL'19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1120
Tidally Influenced (yes/no): no	**Field Crew:** Melissa Mille

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
MW-16	NA	9.55	9.56	

Well Construction Details 6TOC

Total Depth (ft) est.	~~Ground~~ Elevation TOR (NVGD88)	Screened Interval est.
6.70	270.23	4.70–6.70

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	N
Photo Taken?	Y

Well Condition

Protective Cover:	Poor / missing KAP
Well Riser Casing:	Poor
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	N
Dedicated Equipment Present?	N
Sediment in Well:	N

PVC Heaved Above Casing

Monitoring Well Evaluation Form

KGS

Project Name: Dovens FALL 19 LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 1145
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
MW-22	NA	DRY	8.80	

Well Construction Details bGS

Total Depth (ft) est.	Ground Elevation (NVGD88)	Screened Interval est.
6.70	265.53	4.70 - 6.70

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	N
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Y
Sediment in Well:	NO

Monitoring Well Evaluation Form	KGS
Project Name: Drums Fall LTM 2019	Date: 10/22/19
Location: Sheplays	Time: 0942
Tidally Influenced (yes/no):	Field Crew: av

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-01	NA	20.12	35.70	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
35.70	237.55	27.00 - 37.00

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing and transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LDM 2019	Date: 10/22/19
Location: Shoplays	Time: 0939
Tidally Influenced (yes/no):	Field Crew: CW

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-02	NA	20.08	34.45	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
34.45	237.79	28.04-38.04

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LSM 2019	Date: 10/22/19
Location: Shoplays	Time: 0928
Tidally Influenced (yes/no):	Field Crew: aV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-03	NA	19.95	36.60	stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
36.60	236.40	27.55 - 37.55

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing and transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LTM 2019	**Date:** 10/22/19
Location: Shopboys	**Time:** 0926
Tidally Influenced (yes/no):	**Field Crew:** W

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-04	NA	19.90	37.00	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
37.00	238.26	27.15 - 37.15

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing and transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Devons Fall LDM 2019	Date: 10/22/19
Location: Shoplays	Time: 0905
Tidally Influenced (yes/no):	Field Crew: a

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-05	NA	21.09	34.71	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
34.71	238.73	28.65- 38.65

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer and Nbity present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dorms Fall LTM 2019	**Date:** 10/22/19
Location: Shoplays	**Time:** 0901
Tidally Influenced (yes/no):	**Field Crew:** CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-06	NA	23.64	33.85	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
33.85	242.18	28.76-38.76

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing and transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Devons Fall LTM 2019	Date: 10/22/19
Location: Shopleys	Time: 0824
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-07	NA	27.08	33.19	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
33.19	244.59	23.79 - 33.79

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing and transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dams Fall LTM 2019	Date: 10/22/19
Location: Shipbys	Time: 0827
Tidally Influenced (yes/no):	Field Crew: GV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
P7-12-08	NA	26.41	32.34	Shiplys

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
32.34	244.83	21.09-35.09

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing and transducer
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Well Gauging	Date: 10/22/19
Location: Shepleys	Time: 0742
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-09	NA	23.97	33.19	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
33.19	241.93	23.50- 33.50

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dam's LTM 2019 (Fall	**Date:** 10/22/19
Location: Shoplys	**Time:** 0735
Tidally Influenced (yes/no):	**Field Crew:** CV

Field Measurements BTOR

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
PZ-12-10	NA	22.81	32.35	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
32.35	242.78	23.30 - 33.30

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form

KGS

Project Name: Devens FALL'19 LTM	**Date:** 10/22/19
Location: AOCS	**Time:** 11PM
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
Q4-1	NA	32.70	42.32	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
40.0	266.2	30.0 - 40.0

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	NO - PVC CAP
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: DeWens FALL'19 LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 1150
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
Q5-1	NA	28.53	53.43	

Well Construction Details bgs

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
52.0	259.32	47.5 - 52.0

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	NA - PVC CAP
Photo Taken?	N

Well Condition

Protective Cover:	G
Well Riser Casing:	G
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LSM 2019	**Date:** 10/22/19
Location: Shoplys	**Time:** 1137
Tidally Influenced (yes/no):	**Field Crew:** CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSK-7	NA	4.63	11.10	Shfdep

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
11.10	222.01	5.45-10.45

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Burns Fall LTM 2019	Date: 10/22/19
Location: Shoplays	Time: 0813
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSK-15	NA	8.05	14.62	Shallow

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
14.62	225.54	9.85-14.85

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LTM 2019	Date: 10/22/19
Location: Shoplays	Time: 1005
Tidally Influenced (yes/no):	Field Crew: CW

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSK-19	NA	1.35	9.54	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
9.54	218.76	4.98-9.98

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	Yes, transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dams Fall LTM 2019	**Date:** 10/22/19
Location: Shopleys	**Time:** 0818
Tidally Influenced (yes/no):	**Field Crew:** CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSK-25	NA	21.69	26.39	Flush Mount

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
26.39	239.21	20.68-25.68

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	No
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall 2019 LTM	Date: 10/22/19
Location: Shepleys	Time: 0857
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSK-27	NA	22.37	26.11	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
26.11	241.45	21.22-26.22

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dennis Fall LTM 2019	Date: 10/22/19
Location: Shoplays	Time: 0911
Tidally Influenced (yes/no):	Field Crew: W

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSK-28	NA	20.75	25.91	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
25.91	239.24	21.40-26.40

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LTM 2019	Date: 10/22/19
Location: Shopleys	Time: 0921
Tidally Influenced (yes/no):	Field Crew: CW

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSK 32	NA	18.61	25.93	3 stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
25.93	236.91	21.04-26.04

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	No
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LTM 2019	Date: 10/22/19
Location: Shoplays	Time: 1028
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSK-37	NA	3.10	8.78	stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
6.78	220.55	33.91-38.91

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form

KGS

Project Name: Devens FALL LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 1525
Tidally Influenced (yes/no):	**Field Crew:** Melissa Mille

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSK-34	NA	16.06	23.85	

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
24.0	233.55	18.61-23.61

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	N
Well Secured?	Y
Photo Taken?	N

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	Transducer
Standing Water Around Well?	No
Dedicated Equipment Present?	NO
Sediment in Well:	Yes

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LDM 2019	Date: 10/22/19
Location: Shoplys	Time: 1046
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
RSR-35	NA	17.01	25.49	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
25.49	233.64	22.65-26.65

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	Yes, transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form

KGS

Project Name: Owens FALL'19 LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 1025
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-1	NA	7.75	8.13	

Well Construction Details [redacted] GGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
5.51	271.76	2.51 - 5.51

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	4 - Posts
Standing Water Around Well?	NO
Dedicated Equipment Present?	NO
Sediment in Well:	NO

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall 2019 LTM	**Date:** 10/22/19
Location: Shoplays	**Time:** 0750
Tidally Influenced (yes/no):	**Field Crew:** ev

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-3	NA	29.35	33.95	stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
33.95	246.95	25.15-35.15

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Devens Fall 2019 LTM	Date: 10/22/19
Location: Shepley's	Time: 0809
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-4	NA	10.00	14.70	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
14.70	227.48	4.40-14.40

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	No lock (installed one after gauging)
Photo Taken?	No

Well Condition

Protective Cover:	✓
Well Riser Casing:	✓
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	✓
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0938
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-5	—	5.65	13.95	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
13.70	217.60	3.70 - 13.70

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0906
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-8D	—	8.21	69.00	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
72.95	220.78	70.95 - 72.95

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	Cracked
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	some

Monitoring Well Evaluation Form

KGS

Project Name: Devons Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0902
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-8S	—	8.33	56.24	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
56.14	220.97	54.14 - 56.14

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	cracked
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1118
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-9	—	12.18	24.12	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
26.23	221.95	16.23 - 26.23

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	nA
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	some

Monitoring Well Evaluation Form	KGS
Project Name: Drums Fall 2019 LTM	Date: 10/22/19
Location: Shoplays	Time: 0756
Tidally Influenced (yes/no):	Field Crew: av

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-10	NA	30.56	38.62	stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
38.62	248.02	28.40-40.40

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	No lock (installed one after gauging)
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dams Fall LTM 2019	Date: 10/22/19
Location: Shoplys	Time: 0951
Tidally Influenced (yes/no):	Field Crew: av

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-11	NA	18.05	29.81	SHdup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
29.81	236.47	13.52-28.52

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing and transducer present
Sediment in Well:	No

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0853
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL - 13	—	6.59	21.00 ~~12.00~~	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
	220.71	6.73 - 21.73

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	some

Monitoring Well Evaluation Form	KGS
Project Name: Devons Fall 2019 LTM	Date: 10/22/19
Location: Shapleys	Time: 0803
Tidally Influenced (yes/no):	Field Crew: ev

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-19	NA	22.99	32.52	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
32.52	240.50	21.91-31.91

Checklist

Well Material and Diameter:	PVC, 4"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Dams Fall GTM 2019	Date: 10/22/19
Location: Shanlays	Time: 0946
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-20	NA	18.00	49.45	Shallow

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
49.45	238.95	40.23 - 50.23

Checklist

Well Material and Diameter:	PVC, 4"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1055
Tidally Influenced (yes/no):	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL-22	—	8.68	112.95	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
115.6	219.58	105.68 - 115.6

Checklist

Well Material and Diameter:	4" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1234
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHL 23	—	30.21	35.66	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
34.85	241.29	24.85 - 34.85

Checklist

Well Material and Diameter:	4" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	some

Monitoring Well Evaluation Form

Project Name: Devens Fall 2019 LTm	**Date:** 10/22/2019
Location: SHL	**Time:** 1304
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHm-05-41A	—	11.95	40.75	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
43.76	222.48	41.76 – 43.76

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	inscribed TOR
Well ID Tag Present?	no
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good → Flushmount
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2014 LTM	**Date:** 10/22/2014
Location: SHL	**Time:** 1256
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-05-41B	—	40.09	64.05	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
63.83	222.33	61.83 - 63.83

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	no
Well Secured?	no → missing bolts
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good → Flushmount
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2014 LTM	**Date:** 10/22/2014
Location: SHL	**Time:** 1318
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-05-41C	—	12.15	87.71	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
92.66	222.57	97.66 - 92.66

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	not marked
Well ID Tag Present?	no
Well Secured?	no → missing bolts
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good → Flushmount
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1405
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-05-42A	—	8.05	44.19	

Well Construction Details

Total Depth (ft)	~~Ground~~ Elevation TOR (NVGD88)	Screened Interval
45.16	216.81	43.16-45.16

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	no
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	cracked
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1400
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-05-42B	—	7.50	73.71	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
75.15	216.80	73.15 - 75.15

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	no
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	cracked
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	Some

Monitoring Well Evaluation Form

KGS

Project Name: Devons Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1450
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-47A	~	5.56	6.02	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
6.04	217.39	5.04-6.04

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOC
Well ID Tag Present?	yes
Well Secured?	no
Photo Taken?	no

Well Condition

Protective Cover:	pvc only
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name:	**Date:** 10/22/19
Location: ~~SHP~~	**Time:** 1448
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-47B	—	2.43	5.95	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
6.07	215.40	5.07-6.07

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	no
Photo Taken?	no

Well Condition

Protective Cover:	PVC only
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devons Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1457
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-10-06	—	26.00	81.30	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
82.38	232.91	72.38 - 82.38

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	Marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1500
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHm-10-06A	—	35.30	89.23	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
89.58	248.54	79.58 - 89.58

Checklist

Well Material and Diameter:	1.5" PVC
Well Casing Reference Point:	Mark
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Dewens. FALL '19 LTM	Date: 10/22/19
Location: AOC 5	Time: 0900
Tidally Influenced (yes/no):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-10-07	NA	27.08	50.18	

Well Construction Details LGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
50.0	244.98	40.0- 50.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Yes
Well ID Tag Present?	Yes
Well Secured?	Yes
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	Probe, good
Standing Water Around Well?	no
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form	KGS
Project Name: Devens, FALL 19 LTM	Date: 10/22/19
Location: AOC 5	Time: 1015
Tidally Influenced (yes/no):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-10-12	NA	33.75	57.34	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
55.0	252.57	45 - 55

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	N
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA - Just Probe
Standing Water Around Well?	No
Dedicated Equipment Present?	NO
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: Devens, FALL 19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 0945
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements bGS

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-10-11	NA	40.23	62.30	wind sock

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
60.0	261.16	50.0 – 60.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	wind sock
Standing Water Around Well?	no
Dedicated Equipment Present?	Yes
Sediment in Well:	

Monitoring Well Evaluation Form

KGS

Project Name: Devens, FALL '19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1320
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-10-13	NA	25.95	73.30	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
70	24651	60-70

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	N
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	No
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: Devens FALL '19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1327
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-10-14	NA	20.48	82.85	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
80.0	234.80	60-80

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	GOOD
Well Pad:	GOOD
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: Devens FALL'19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1305
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-10-15	NA	24.40	56.70	

Well Construction Details GS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
55.0	241.95	45.0 – 55.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	n
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA Probe
Standing Water Around Well?	Yes
Dedicated Equipment Present?	Yes
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devons Fall 2014 LTM	**Date:** 10/22/2014
Location: SHL	**Time:** 1410
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-10-16	—	8.62	87.48	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
87.51	219.23	77.51-87.51

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Dennis Fall LTM 2019	**Date:** 10/22/19
Location: Sheepleys	**Time:** 0857
Tidally Influenced (yes/no):	**Field Crew:** CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-11-02	NA	22.32	68.59	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
68.59	240.73	41.07 - 51.07

Checklist

Well Material and Diameter:	Steel, 4"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LSM 2019	Date: 10/22/19
Location: Shopbys	Time: 1053
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-11-06	NA	20.11	35.80	Shallow

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
35.80	236.71	27.84-37.84

Checklist

Well Material and Diameter:	PVC, 2"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing and transducer
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Devons Fall LTM 2019	Date: 10/22/19
Location: Shoploys	Time: 0914
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-11-07	NA	22.40	48.01	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
48.01	240.83	43.61-48.61

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	No
Sediment in Well:	No

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1049
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-93-22B	—	8.48	92.70	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
92.55	219.39	82.55 - 92.55

Checklist

Well Material and Diameter:	4" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	nA
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1102
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-93-22C	—	9.85	142.80	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
136.0	220.69	126.07 - 136.0

Checklist

Well Material and Diameter:	4" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0948
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHm-96-5B	—	7.49	88.75	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
91.54	218.92	81.54 – 91.54

Checklist

Well Material and Diameter:	6" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0942
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-96-5C	—	6.97	79.75	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
61.0	218.39	51.0 - 61.0

Checklist

Well Material and Diameter:	6" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Stevens FALL'19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1410
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-99-31A	NA	3.98	15.83	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
14.0	212.82	4-14.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	In well casing
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form

KGS

Project Name: Devens FALL'19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1405
Tidally Influenced (yes/no):	**Field Crew** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-99-31B	NA	4.89	61.50	

Well Construction Details bgs

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
60.0	212.52	50.0-60.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name:	**Date:** 10/22/19
Location: AOC 5	**Time:** 1400
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-99-31C	NA	5.15	78.85	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
78.0	212.64	68.0-78.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	Yes
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Devens FALL'19 LTM	Date: 10/22/19
Location: AOC 5	Time: 0750
Tidally Influenced (yes/no):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHM-99-32X	NA	10.80	84.10	

Well Construction Details bgs

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
82.00	219.12	72 - 82.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	N, needs new Locks
Photo Taken?	NO

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	4 Gaurd Posts, good
Standing Water Around Well?	no.
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form	KGS
Project Name: Dams Fall LSM 2019	Date: 10/22/19
Location: Shoplays	Time: 1117
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-01-036X	NA	6.67	12.80	Shiday

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
12.80	223.95	6.96-11.98

Checklist

Well Material and Diameter:	Steel, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LDM 2019	Date: 10/22/19
Location: Shoplys	Time: 1125
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-01-37X		5.85	10.40	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
10.40	222.79	5.12-10.12

Checklist

Well Material and Diameter:	Steel, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.)	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	Yes, transducer
Sediment in Well	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LTM 2019	Date: 10/24/19
Location: Shoplays	Time: 0956
Tidally Influenced (yes/no):	Field Crew: ev

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-01-38A	NA	3.32	9.07	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
9.07	220.86	3.59-8.59

Checklist

Well Material and Diameter:	Steel, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LTM 2019	Date: 10/22/19
Location: Shoplays	Time: 1001
Tidally Influenced (yes/no):	Field Crew: ev

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-01-38B	NA	3.49	25.53	Shoplays

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
25.53	221.03	20.15-25.15

Checklist

Well Material and Diameter:	Steel, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, tubing present
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Downs Fall LSM 2019	Date: 10/22/19
Location: Shopleys	Time: 1105
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-43	NA	45.05	61.18	Stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
61.18	260.17	52.29-62.29

Checklist

Well Material and Diameter:	1", PVC
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer
Sediment in Well:	No

Monitoring Well Evaluation Form	KGS
Project Name: Davis Fall LTM 2019	Date: 10/22/19
Location: Shoplys	Time: 1059
Tidally Influenced (yes/no):	Field Crew: CV

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-44	NA	42.41	60.70	stickup

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
60.70	258.55	53.99-63.99

Checklist

Well Material and Diameter:	PVC, 1"
Well Casing Reference Point:	✓
Well ID Tag Present?	✓
Well Secured?	✓
Photo Taken?	No

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	Good
Standing Water Around Well?	No
Dedicated Equipment Present?	yes, transducer
Sediment in Well:	No

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0805
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-45A	—	17.73	27.30	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
27.16	228.48	22.16-27.16

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0810
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-45B	–	18.42	75.80	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
77.39	229.11	67.39 – 77.39

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0830
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-46A	—	16.95	27.30	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
26.87	228.18	21.87-26.87

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0822
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-005-46B	—	16.30	75.80	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
76.57	227.60	66.57 - 76.57

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	fine
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	Some

Monitoring Well Evaluation Form	KGS
Project Name: Devens, FALL '19 LTM	Date: 10/22/19
Location: AOC 5	Time: 0815
Tidally Influenced (yes/no):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-48A	NA	3.82	5.42	

Well Construction Details 6GS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
2.0	213.09	1.0 - 2.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Yes
Well ID Tag Present?	Yes
Well Secured?	no
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: DRWMS, FALL'19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 0820
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-48B	NA	2.84	5.25	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
3.0	213.03	2.0-3.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Yes
Well ID Tag Present?	Yes
Well Secured?	NO
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens, FALL '19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 0800
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-49A	NA	5.68	6.02	

Well Construction Details 6GS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
2.0	212.34	1.0 - 2.0

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Yes
Well ID Tag Present?	Yes
Well Secured?	NO
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens, FALL '19 LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 0805
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-05-49B		4.18	5.40	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
3.50	212.39	2.5 - 3.5

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Yes
Well ID Tag Present?	Yes
Well Secured?	no
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form	KGS
Project Name: Jevons, FALL '18 LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 0915
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-95-27X	NA	14.03	42.72	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
40.5	235.31	30.5 40.5

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	Yes
Well ID Tag Present?	Yes
Well Secured?	Yes
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Gravel, good
Other (Posts, Tags, Paint, etc.):	4 Guard posts, good
Standing Water Around Well?	no
Dedicated Equipment Present?	Yes
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens FALL19 LTM	**Date:** 10/22/19
Location: AOC5	**Time:** 1040
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-99-01B	NA	9.85	10.00	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
8.0	271.76	4.0 - 8.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Y
Well Riser Casing:	Y
Well Pad:	Gravel - Good
Other (Posts, Tags, Paint, etc.):	4 Posts
Standing Water Around Well?	N
Dedicated Equipment Present?	Y
Sediment in Well:	N

Monitoring Well Evaluation Form

KGS

Project Name: Devens, Fall '19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1035
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-99-01C	NA	24.54	32.05	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
29.7	272.16	19.7-29.7

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	N
Photo Taken?	NA

Well Condition

Protective Cover:	GOOD
Well Riser Casing:	GOOD
Well Pad:	Gravel - GOOD
Other (Posts, Tags, Paint, etc.):	4 Posts - GOOD
Standing Water Around Well?	N
Dedicated Equipment Present?	Y
Sediment in Well:	NO

Monitoring Well Evaluation Form	KGS
Project Name: Devens, FALL 19 LTM	Date: 10/22/19
Location: AOC 5	Time: 1255
Tidally Influenced (yes/no):	Field Crew: Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-99- 29x	NA	23.95	30.90	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
29.0	241.46	19.0-29.0

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	~~Y~~ N, Had to remove Rusted Lock
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	4 Posts - Good
Standing Water Around Well?	NO
Dedicated Equipment Present?	Yes
Sediment in Well:	NO

Monitoring Well Evaluation Form	KGS
Project Name: Devens FALL '19 LTM	Date: 10/22/19
Location: AOC 5	Time: 1755
Tidally Influenced (yes/no):	Field Crew: Melissa Mille

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-99-34B	NA	13.80	74.20	

Well Construction Details bGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
79.5	222.69	74.5 - 79.5

Checklist

Well Material and Diameter:	1" Steel
Well Casing Reference Point:	Yes
Well ID Tag Present?	Yes
Well Secured?	NO
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens FALL 19 LTM	**Date:** 10/22/19
Location: AOC 5	**Time:** 1005
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-99-35X	NA	36.35	41.60	

Well Construction Details GGS

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
40.2	256.70	30.2 – 40.2

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	Y
Well ID Tag Present?	Y
Well Secured?	Y
Photo Taken?	NA

Well Condition

Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	4 Posts – Good
Standing Water Around Well?	No
Dedicated Equipment Present?	No
Sediment in Well:	Yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens '19 FALL 19	**Date:** 10/22/19
Location: AOC 5	**Time:** 1435 (1A) / 1440 (1B)
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements

Well ID		PID Reading (PPM)	Depth to Water (feet) 1A	Depth to Water (feet) 1B	Total Well Depth (feet) 1A	Total Well Depth (feet) 1B	Comments
SHP-2016 -1A	SHP-2016 - 1B	NA	16.85	17.95	25.82	86.50	

Well Construction Details

Total Depth (ft) 1A	Total Depth (ft) 1B	Ground Elevation (NVGD88) 1A	Ground Elevation (NVGD88) 1B	Screened Interval 1A	Screened Interval 1B
25.59	87.56	224.69	224.69	15.59-25.59	77.56-87.56

Checklist	1A	1B
Well Material and Diameter:	1" PVC	1" PVC
Well Casing Reference Point:	Y	Y
Well ID Tag Present?	Y	Y
Well Secured?	N	N
Photo Taken?	NA	NA

Well Condition	Shared casing
Protective Cover:	Good
Well Riser Casing:	Good
Well Pad:	Good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	NO
Dedicated Equipment Present?	1A: Y / 1B: Y
Sediment in Well:	1A: N / 1B: N

Monitoring Well Evaluation Form	KGS
Project Name: ~~1351~~ Devons Fall 2019 LTM	**Date:** 10/22/~~2019~~ 2019
Location: SHL	**Time:** ~~1331~~ 1355
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-~~16~~ 2016-02A	—	15.41	27.45	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
27.20	225.93	22.20 - 27.20

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2018
Location: SHL	**Time:** 1328
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-~~16~~ 2014-002B	—	16.29	87.98	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
87.22	225.95	82.22 - 87.22

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	Some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1108
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-P7-~~16~~ 2016-03A	—	12.50	27.58	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
27.05	223.18	22.05 - 27.05

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/19
Location: SHL	**Time:** 1113
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-PZ-~~70~~ 2016-03B	—	12.37	87.74	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
87.05	223.18	82.05 - 87.05

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	Some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1334
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-04A	—	24.36	32.83	

Well Construction Details

Total Depth (ft)	Ground Elevation (NVGD88)	Screened Interval
32.40	229.97	27.40 - 32.40

Checklist

Well Material and Diameter:	~~marked~~ 1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1338
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-04B	—	19.10	92.70	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
92.18	229.75	87.18-92.18

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	Some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1345
Tidally Influenced (yes/no): no	**Field Crew:** Seiler - Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-05A	—	16.30	32.84	

Well Construction Details

Total Depth (ft)	~~Ground Elevation~~ TOR (NVGD88)	Screened Interval
32.13	227.01	27.13 - 32.13

Checklist

Well Material and Diameter:	1" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated Tubing
Sediment in Well:	no

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1350
Tidally Influenced (yes/no): no	**Field Crew:** Seiler + Vignola

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-05B	—	16.28	92.71	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
92.07	226.95	87.07 - 92.07

Checklist

Well Material and Diameter:	1" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	Transducer
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SH2	**Time:** 1239
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-06A	—	30.17	85.65	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
87.85	241.90	82.85 – 87.85

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	nA
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1243
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-06B	—	24.05	112.00	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
113.84	241.89	103.84 – 113.84

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	nA
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 1246
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-2016-06C	—	23.75	133.60	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
134.87	241.92	124.87 — 134.87

Checklist

Well Material and Diameter:	2" PVC
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	NA
Other (Posts, Tags, Paint, etc.):	NA
Standing Water Around Well?	no
Dedicated Equipment Present?	dedicated tubing
Sediment in Well:	yes

Monitoring Well Evaluation Form

KGS

Project Name: Devens FALL 19 - LTM	**Date:** 10/22/19
Location: AOCS	**Time:** 07A 1046 | 07B 1052
Tidally Influenced (yes/no):	**Field Crew:** Melissa Miller

Field Measurements Shared Casing

Well ID		PID Reading (PPM)	Depth to Water (feet) 07A	07B	Total Well Depth (feet) 07A	07B	Comments
SHP-2016-07A	SHP-2016-07B	NA	Dry	35.80	31.80	79.90	

Well Construction Details GGS

Total Depth (ft) SHP-2016-07A	SHP-2016-07B	Ground Elevation (NVGD88) 07A	07B	Screened Interval SHP-2016-07A	SHP-2016-07B
32.0	80.0	262.98	262.98	22.0-32.0	70.0 - 80.0

Checklist

	SHP-2016-07A	SHP-2016-07B
Well Material and Diameter:	1" PVC	2" PVC
Well Casing Reference Point:	Y	Y
Well ID Tag Present?	Y	Y
Well Secured?	Y	Y
Photo Taken?	NA	NA

Well Condition Shared Casing

Protective Cover:	Good	
Well Riser Casing:	Good	
Well Pad:	Good	
Other (Posts, Tags, Paint, etc.):	NA	
Standing Water Around Well?	No	
Dedicated Equipment Present?	SHP-2016-07A	SHP-2016-07B Y
Sediment in Well:	NO	

Monitoring Well Evaluation Form	KGS
Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0759
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP - 2017 - 01	—	20.17	78.35	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
~~SHP - 2017 - 01~~ 79.0	229.63	74.0 - 79.0

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	Some

Monitoring Well Evaluation Form

KGS

Project Name: Devens Fall 2019 LTM	**Date:** 10/22/2019
Location: SHL	**Time:** 0746
Tidally Influenced (yes/no): no	**Field Crew:** Seiler

Field Measurements

Well ID	PID Reading (PPM)	Depth to Water (feet)	Total Well Depth (feet)	Comments
SHP-17-02	—	20.80	94.20	

Well Construction Details

Total Depth (ft)	~~Ground~~ TOR Elevation (NVGD88)	Screened Interval
94.5	230.05	89.5-94.5

Checklist

Well Material and Diameter:	2" pvc
Well Casing Reference Point:	marked TOR
Well ID Tag Present?	yes
Well Secured?	yes
Photo Taken?	no

Well Condition

Protective Cover:	good
Well Riser Casing:	good
Well Pad:	good
Other (Posts, Tags, Paint, etc.):	nA
Standing Water Around Well?	no
Dedicated Equipment Present?	no
Sediment in Well:	some

APPENDIX F
ANALYTICAL DATA VALIDATION REPORTS
(on CD)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro

February 1, 2019

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed is the final validation report for the fraction listed below. This SDG was received on January 16, 2019. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #44208:

SDG #	**Fraction**
JC81275	Arsenic

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar
smckellar@lab-data.com
Project Manager/Chemist

223 pages-ADV (no worksheets) Attachment 1

ADR (Stage 2A) **LDC 44208 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	As (6020A)																																			
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC81275	01/16/19	02/06/19	1	0																																		
Total	T/SM			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

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Data Validation Report
Shepley's Hill

SDG: JC81275

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

January 30, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the January 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Arsenic by EPA SW 846 Method 6020A

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, matrix spike and matrix spike duplicate samples (MS/MSD), laboratory control samples (LCS), laboratory blanks, and serial dilutions.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of serial dilutions which were reviewed manually. Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogate spikes were not required by the methods.

V. Matrix Spike

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Laboratory Duplicate Sample

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
11-Jan-2019	EFFLUENT	JC81275-1	N	6020B	6020B	S2AVE
11-Jan-2019	EFFLUENTMS	MP12071-S1	MS	6020B	6020B	S2AVE
11-Jan-2019	EFFLUENTMSD	MP12071-S2	MSD	6020B	6020B	S2AVE

N = Normal Sample MS = Matrix Spike MSD = Matrix Spike Duplicate
S2AVE = EPA Stage 2A Electronic Validation

Attachment 2
Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC81275

Laboratory: ACTD

EDD Filename: JC81275-SEDD_2a_1

eQAPP Name: Sovereign_Shepley'sHillLandfill_180924

No Data Review Qualifiers Applied.

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC81275

(No Outliers)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro
spassafaro@sovcon.com

February 28, 2019

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed is the final validation report for the fraction listed below. This SDG was received on February 25, 2019. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #44444:

SDG #	**Fraction**
JC82631	Arsenic

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar
smckellar@lab-data.com
Project Manager/Chemist

158 pages-ADV (no worksheets) Attachment 1

ADR (Stage 2A) **LDC 44444 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	As (6020A)																																			
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC82631	02/25/19	03/18/19	1	0																																		
Total	T/SM			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

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Data Validation Report
Shepley's Hill

SDG: JC82631

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

February 28, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the February 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Arsenic by EPA SW 846 Method 6020B

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, laboratory control samples (LCS), and laboratory blanks.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013). Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogate spikes were not required by the methods.

V. Matrix Spike

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed.

VI. Laboratory Duplicate Sample

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution was not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
08-Feb-2019	EFFLUENT	JC82631-1	N	6020B	6020B	S2AVE

N = Normal Sample *S2AVE = EPA Level II Validation*

Attachment 2
Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC82631

Laboratory: ACTD

EDD Filename: JC82631-SEDD_2a_1

eQAPP Name: Sovereign_Shepley'sHillLandfill_180924

No Data Review Qualifiers Applied.

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC82631

(No Outliers)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro
spassafaro@sovcon.com

April 9, 2019

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on April 1, 2019. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #44650:

SDG #	**Fraction**
JC84299	Metals, Wet Chemistry

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar
smckellar@lab-data.com
Project Manager/Chemist

567 pages-ADV (no worksheets) Attachment 1

ADR (Stage 2A)

LDC 44650 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)

LDC	SDG#	DATE REC'D	(3) DATE DUE	(4) Metals (6010D/ 6020B)		(3) Metals (6010D/ 6020B)		Cl,SO_4 (300.0 /9056A)		NO_3N (353.2)		NO_3/ NO_2-N (353.2)																									
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC84299	04/01/19	04/15/19	1	0	2	0	1	0	1	0	1	0																								
Total	T/SM			1	0	2	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

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Data Validation Report
Shepley's Hill

SDG: JC84299

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

April 9, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the March 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Metals by EPA SW 846 Method 6010D and 6020B
Nitrate as Nitrogen and Nitrate/Nitrite as Nitrogen by EPA Method 353.2
Chloride and Sulfate by EPA Method 300.0/SW 846 Method 9056A

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, laboratory control samples (LCS), and laboratory blanks.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013). Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicate

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed.

V. Duplicate Sample Analysis

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VI. Serial Dilution

Serial dilution was not performed for this SDG.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Field Duplicate Samples

No field duplicates were identified in this SDG.

IX. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

All compounds reported below the LOQ as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosure I.

X. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results reported as detected below the LOQ, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

Data flags are summarized and are presented as Attachment 2

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
12-Mar-2019	EW-01	JC84299-2	N	3010A	6010D	S2AVE
12-Mar-2019	EW-01	JC84299-2	N	3010A	6020B	S2AVE
12-Mar-2019	EW-04	JC84299-3	N	3010A	6010D	S2AVE
12-Mar-2019	EW-04	JC84299-3	N	3010A	6020B	S2AVE
12-Mar-2019	EFFLUENT	JC84299-1	N	3010A	6010D	S2AVE
12-Mar-2019	EFFLUENT	JC84299-1	N	3010A	6020B	S2AVE
12-Mar-2019	EFFLUENT	JC84299-1	N	Gen Prep	300.0	S2AVE
12-Mar-2019	EFFLUENT	JC84299-1	N	Gen Prep	353.2	S2AVE
12-Mar-2019	EFFLUENT	JC84299-1	N	Gen Prep	353.2_CALC	S2AVE

N = Normal Sample *S2AVE = EPA Level II Validation*

Attachment 2
Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC84299 **Laboratory: ACTD**

EDD Filename: JC84299-SEDD_2a_1 **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method Category: **GENCHEM**

Method: **353.2** ***Matrix:*** **Water**

Sample ID: **EFFLUENT** ***Collected:*** **3/12/2019 1:40:00 PM** ***Analysis Type:*** **Initial/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITROGEN, NITRATE-NITRITE	0.098	J	0.10	LOD	0.10	LOQ	mg/L	J	TR

Method Category: **GENCHEM**

Method: **353.2_CALC** ***Matrix:*** **Water**

Sample ID: **EFFLUENT** ***Collected:*** **3/12/2019 1:40:00 PM** ***Analysis Type:*** **Initial/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITRATE	0.098	J	0.11	LOD	0.11	LOQ	mg/L	J	TR

Method Category: **METALS**

Method: **6010D** ***Matrix:*** **Water**

Sample ID: **EFFLUENT** ***Collected:*** **3/12/2019 1:40:00 PM** ***Analysis Type:*** **Initial/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BARIUM	14.7	J	100	LOD	200	LOQ	ug/l	J	TR

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Data Qualifier Summary

Lab Reporting Batch ID: JC84299 **Laboratory: ACTD**

EDD Filename: JC84299-SEDD_2a_1 **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Reason Code Legend

Reason Code	*Description*
TR	Reporting Limit Trace Value

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC84299

Reporting Limit Outliers

Lab Reporting Batch ID: JC84299 **Laboratory: ACTD**

EDD Filename: JC84299-SEDD_2a_1 **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method: **353.2**
Matrix: **Water**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
EFFLUENT	NITROGEN, NITRATE-NITRITE	J	0.098	0.10	LOQ	mg/L	J (all detects)

Method: **353.2_CALC**
Matrix: **Water**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
EFFLUENT	NITRATE	J	0.098	0.11	LOQ	mg/L	J (all detects)

Method: **6010D**
Matrix: **Water**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
EFFLUENT	BARIUM	J	14.7	200	LOQ	ug/l	J (all detects)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro
spassafaro@sovcon.com

April 26, 2019

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed is the final validation report for the fraction listed below. This SDG was received on April 16, 2019. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #44785:

SDG #	**Fraction**
JC85918	Arsenic

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar
smckellar@lab-data.com
Project Manager/Chemist

210 pages-ADV (no worksheets)

Attachment 1

ADR (Stage 2A)

LDC 44785 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)

LDC	SDG#	DATE REC'D	(3) DATE DUE	As (6020B)																																			
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC85918	04/16/19	05/07/19	1	0																																		
Total	T/SM			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

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Data Validation Report
Shepley's Hill

SDG: JC85918

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

April 26, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the April 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Arsenic by EPA SW 846 Method 6020B

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, laboratory blanks, matrix spike/matrix spike duplicates (MS/MSD), laboratory control samples (LCS), and serial dilutions.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of serial dilutions which were reviewed manually. Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogate spikes were not required by the methods.

V. Matrix Spike

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Laboratory Duplicate Sample

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
05-Apr-2019	EFFLUENT 4-5-19	JC85918-1	N	3010A	6020B	S2AVE
05-Apr-2019	EFFLUENT 4-5-19MS	MP14084-S1	MS	3010A	6020B	S2AVE
05-Apr-2019	EFFLUENT 4-5-19MSD	MP14084-S2	MSD	3010A	6020B	S2AVE

N = Normal Sample MS = Matrix Spike MSD = Matrix Spike Duplicate
S2AVE = EPA Level II Validation

Attachment 2
Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC85918

Laboratory: ACTD

EDD Filename: JC85918-SEDD_2a_1

eQAPP Name: Sovereign_Shepley'sHillLandfill_180924

No Data Review Qualifiers Applied.

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC85918

(No Outliers)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro
spassafaro@sovcon.com

June 24, 2019

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed is the final validation report for the fraction listed below. This SDG was received on June 3, 2019. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #45188:

SDG #	**Fraction**
JC87982	Arsenic

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng

Pei Geng
pgeng@lab-data.com
Project Manager/Senior Chemist

159 pages-ADV (no worksheets)

Attachment 1

ADR (Stage 2A)

LDC 45188 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)

LDC	SDG#	DATE REC'D	(3) DATE DUE	As (6020B)																																			
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC87982	06/03/19	06/24/19	1	0																																		
Total	T/PG			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

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Data Validation Report
Shepley's Hill

SDG: JC87982

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

June 24, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the May 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Arsenic by EPA SW 846 Method 6020B

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, laboratory blanks, and laboratory control samples (LCS).

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013). Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogate spikes were not required by the methods.

V. Matrix Spike

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VI. Laboratory Duplicate Sample

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution was not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
10-May-2019	EFFLUENT	JC87982-1	N	3010A	6020B	S2AVE

N = Normal Sample S2AVE = EPA Level II Validation

Attachment 2
Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC87982

Laboratory: ACTD

EDD Filename: JC87982-SEDD_2a_1_rev

eQAPP Name: Sovereign_Shepley'sHillLandfill_180924

No Data Review Qualifiers Applied.

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC87982

(No Outliers)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro
spassafaro@sovcon.com

August 28, 2019

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on August 20, 2019. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #45771:

SDG #	**Fraction**
JC91275, JC93074	Metals, Wet Chemistry

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng

Pei Geng
pgeng@lab-data.com
Project Manager/Senior Chemist

811 pages-ADV (no worksheets)

Attachment 1

ADR (Stage 2A)

LDC 45771 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)

LDC	SDG#	DATE REC'D	(3) DATE DUE	(3) Metals (6010D)		(2) Metals (6010D)		As (6020B)		Cl,SO_4 (300.0 /9056A)		NO_3N (353.2)		NO_2-N (4500-NO2B)		NO_3/ NO_2-N (353.2)																					
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC91275	08/20/19	09/11/19	1	0	2	0	3	0	1	0	1	0	1	0	1	0																				
B	JC93074	08/20/19	09/11/19	-	-	-	-	1	0	-	-	-	-	-	-	-	-																				
Total	T/PG			1	0	2	0	4	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

L:\Sovereign\Shepleys Hill\45771ST.wpd

Data Validation Report
Shepley's Hill

SDG: JC91275

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

August 28, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the July 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Metals by EPA SW 846 Method 6010D and 6020B
Nitrate as Nitrogen and Nitrate/Nitrite as Nitrogen by EPA Method 353.2
Chloride and Sulfate by EPA Method 300.0

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, matrix spike/matrix spike duplicates (MS/MSD), laboratory control samples (LCS), and laboratory blanks.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013). Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the exception of one MS/MSD pair for iron. The associated sample results were qualified as detected estimated (J) as applicable. The details regarding the qualification of data are provided in Enclosure I.

V. Duplicate Sample Analysis

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VI. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Field Duplicate Samples

No field duplicates were identified in this SDG.

IX. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

All compounds reported below the limit of quantitation (LOQ) as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosure I.

X. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to MS/MSD %R, data were qualified as estimated in two samples.

Due to results reported as detected below the LOQ, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

Data flags are summarized and are presented as Attachment 2.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
08-Jul-2019	EFFLUENT	JC91275-1	N	3010A	6010D	S2AVE
08-Jul-2019	EFFLUENT	JC91275-1	N	3010A	6020B	S2AVE
08-Jul-2019	EFFLUENT	JC91275-1	N	Gen Prep	300.0	S2AVE
08-Jul-2019	EFFLUENT	JC91275-1	N	Gen Prep	353.2	S2AVE
08-Jul-2019	EFFLUENT	JC91275-1	N	Gen Prep	353.2_CALC	S2AVE
08-Jul-2019	EW-01	JC91275-2	N	3010A	6010D	S2AVE
08-Jul-2019	EW-01	JC91275-2	N	3010A	6020B	S2AVE
08-Jul-2019	EW-01MS	MP16437-S1	MS	3010A	6010D	S2AVE
08-Jul-2019	EW-01MSD	MP16437-S2	MSD	3010A	6010D	S2AVE
08-Jul-2019	EW-04	JC91275-3	N	3010A	6010D	S2AVE
08-Jul-2019	EW-04	JC91275-3	N	3010A	6020B	S2AVE

N = Normal Sample MS = Matrix Spike MSD = Matrix Spike Duplicate
S2AVE = EPA Level II Validation

Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC91275 **Laboratory: ACTD**

EDD Filename: JC91275-SEDD_2a_1_rev **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method Category: **METALS**

Method: **6010D** ***Matrix:*** **Water**

Sample ID: **EFFLUENT** ***Collected:*** **7/8/2019 1:03:00 PM** ***Analysis Type:*** **Initial/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BARIUM	14.2	J	100	LOD	200	LOQ	ug/l	J	TR

Sample ID: **EW-01** ***Collected:*** **7/8/2019 1:10:00 PM** ***Analysis Type:*** **Initial/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
IRON	69300		50.0	LOD	100	LOQ	ug/l	J	Q

Sample ID: **EW-04** ***Collected:*** **7/8/2019 1:12:00 PM** ***Analysis Type:*** **Initial/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
IRON	47800		50.0	LOD	100	LOQ	ug/l	J	Q

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Data Qualifier Summary

Lab Reporting Batch ID: JC91275 **Laboratory: ACTD**

EDD Filename: JC91275-SEDD_2a_1_rev **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Reason Code Legend

Reason Code	*Description*
Q	Matrix Spike Upper Estimation
TR	Reporting Limit Trace Value

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC91275

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: JC91275 **Laboratory: ACTD**

EDD Filename: JC91275-SEDD_2a_1_rev **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method: **6010D**
Matrix: Water

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
EW-01MSD (Total) (EFFLUENT EW-01 EW-04)	IRON	-	120.4	80.00-120.00	-	IRON	J (all detects)

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Reporting Limit Outliers

Lab Reporting Batch ID: JC91275 **Laboratory: ACTD**

EDD Filename: JC91275-SEDD_2a_1_rev **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method: **6010D**

Matrix: Water

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
EFFLUENT	BARIUM	J	14.2	200	LOQ	ug/l	J (all detects)

Data Validation Report
Shepley's Hill

SDG: JC93074

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

August 28, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the August 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Arsenic by EPA SW 846 Method 6020B

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, laboratory blanks, and laboratory control samples (LCS).

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013). Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the method. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogate spikes were not required by the method.

V. Matrix Spike

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VI. Laboratory Duplicate Sample

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution was not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
09-Aug-2019	EFFLUENT	JC93074-1	N	3010A	6020B	S2AVE

N = Normal Sample S2AVE = EPA Level II Validation

Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC93074

Laboratory: ACTD

EDD Filename: JC93074-SEDD_2a_1_rev

eQAPP Name: Sovereign_Shepley'sHillLandfill_180924

No Data Review Qualifiers Applied.

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC93074

(No Outliers)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro
spassafaro@sovcon.com

November 13, 2019

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on October 11, 2019. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #46161:

SDG #	Fraction
JC94537/L1940945 JC94613	Volatiles, Semivolatiles, Polychlorinated Biphenyls & Pesticides, Metals, Wet Chemistry, N-Hexane Extractable Material, Methane & Ethane

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Organic Superfund Methods Data Review; January 2017
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng

Pei Geng
pgeng@lab-data.com
Project Manager/Senior Chemist

2,000 pages-ADV (no worksheets)

Attachment 1

ADR (Stage 2A)

LDC #46161 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)

LDC	SDG#	DATE REC'D	(3) DATE DUE	VOA (8260C)		VOA (624.1)		SVOA (625.1)		Pest/ & PCB (608.3)		Fe,Mn (6010D)		Metals (6010D /7470A)		As (6020B)		Methane Ethane (175)		Cl,SO_4 (300.0 /9056A)		NO_3N (353.2)		NO_2-N (4500-NO2B)		NO_3/ NO_2-N (353.2)		HEM (1664A)									
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC94537/L1940945	10/11/19	11/01/19	-	-	1	0	2	0	1	0	-	-	1	0	1	0	-	-	1	0	1	0	1	0	1	0	1	0								
B	JC94613	10/11/19	11/01/19	2	0	-	-	-	-	-	-	2	0	-	-	2	0	2	0	-	-	-	-	-	-	-	-	-	-								
Total	J/PG			2	0	1	0	2	0	1	0	2	0	1	0	3	0	2	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	19

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

L:\Sovereign\Shepleys Hill\46161ST.wpd

Data Validation Report
Shepley's Hill

SDG: JC94537/L19408945

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, CA 92010

November 12, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the September 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017), and the US EPA NFG for Organic Superfund Methods Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method 624.1
Semivolatile Organic Compounds (SVOCs) by EPA Method 625.1
Chlorinated Pesticides and Polychlorinated Biphenyls (PCBs) by EPA Method 608.3
Metals by EPA SW 846 Method 6010D/6020B
Mercury by EPA SW 846 Method 7470A
N-Hexane Extractable Material (HEM) by EPA Method 1664A

Wet Chemistry:
Chloride and Sulfate by EPA Method 300.0/SW 846 Method 9056A
Nitrate as Nitrogen (N) and Nitrate-Nitrite as N by EPA Method 353.2
Nitrite as N by Standard Method 4500NO2 B-11

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I. Validation for VOCs, SVOCs, pesticides, and PCBs were performed manually and DVRs for Stage 2A manual validation are also presented in Enclosure II.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, surrogates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control samples (LCS), and laboratory blanks.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of all QC for VOCs, SVOCs, pesticides, and PCBs, which were validated manually. Quality assurance (QA)/QC criteria specified in the QAPP and NFGs were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not applicable): Data did not warrant qualification since detected results only are affected and the compound was not detected in the associated samples.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt & Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits with the exception of sample EFFLUENT for SVOCs. No data were qualified since the method allows for one base and one acid surrogate %R to be outside the QC limits if the surrogate %R is greater than 10%.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Duplicate Sample Analysis

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution was not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

All compounds reported below the limit of quantitation (LOQ) as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosure I.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

In the instance where sample EFFLUENT was re-extracted outside holding time, data was qualified as not reportable in order to yield only one complete set of data for sample EFFLUENT.

Due to results below the LOQ, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation, all other results are considered valid and usable for all purposes.

Data flags are summarized and are presented as Attachment 2.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
06-Sep-2019	EFFLUENTMS	GP23804-S1	MS	Gen Prep	1664	S2AVE
06-Sep-2019	EFFLUENT	JC94537-1	N	3010A	6010D	S2AVE
06-Sep-2019	EFFLUENT	JC94537-1	N	3010A	6020B	S2AVE
06-Sep-2019	EFFLUENT	JC94537-1	N	7470A	7470A	S2AVE
06-Sep-2019	EFFLUENT	JC94537-1	N	Gen Prep	1664	S2AVE
06-Sep-2019	EFFLUENT	JC94537-1	N	Gen Prep	300.0	S2AVE
06-Sep-2019	EFFLUENT	JC94537-1	N	Gen Prep	353.2	S2AVE
06-Sep-2019	EFFLUENT	JC94537-1	N	Gen Prep	353.2_CALC	S2AVE
06-Sep-2019	EFFLUENTMS	MP17235-S1	MS	7470A	7470A	S2AVE
06-Sep-2019	EFFLUENTMSD	MP17235-S2	MSD	7470A	7470A	S2AVE

N = Normal Sample MS = Matrix Spike MSD = Matrix Spike Duplicate
S2AVE = EPA Level II Validation

Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC94537 **Laboratory: ACTD**

EDD Filename: JC94537-SEDD_2a_1_rev **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method Category: **GENCHEM**

Method: **1664** ***Matrix:*** **Water**

Sample ID: EFFLUENT ***Collected:*** 9/6/2019 9:51:00 AM ***Analysis Type:*** Initial/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PETROLEUM HYDROCARBONS (TPH)	1.0	J	0.86	LOD	5.0	LOQ	mg/L	J	TR

Method Category: **METALS**

Method: **6010D** ***Matrix:*** **Water**

Sample ID: EFFLUENT ***Collected:*** 9/6/2019 9:51:00 AM ***Analysis Type:*** Initial/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BARIUM	15.4	J	100	LOD	200	LOQ	ug/L	J	TR

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Data Qualifier Summary

Lab Reporting Batch ID: JC94537 **Laboratory: ACTD**

EDD Filename: JC94537-SEDD_2a_1_rev **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Reason Code Legend

Reason Code	*Description*
TR	Reporting Limit Trace Value

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC94537

Reporting Limit Outliers

Lab Reporting Batch ID: JC94537 **Laboratory: ACTD**

EDD Filename: JC94537-SEDD_2a_1_rev **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method: **1664**

Matrix: Water

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
EFFLUENT	PETROLEUM HYDROCARBONS (TPH)	J	1.0	5.0	LOQ	mg/L	J (all detects)

Method: **6010D**

Matrix: Water

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
EFFLUENT	BARIUM	J	15.4	200	LOQ	ug/L	J (all detects)

Enclosure II

Stage 2A Manual Validation
Data Validation Reports

LDC Report# 46161A1a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Shepley's Hill

LDC Report Date: November 7, 2019

Parameters: Volatiles

Validation Level: Stage 2A

Laboratory: SGS North America, Inc./ALS Environmental

Sample Delivery Group (SDG): JC94537X/L1940945

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
EFFLUENT	JC94537-1/L1940945-01	Water	09/06/19

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) Method 624.1

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

Instrument performance check data were not reviewed for Stage 2A validation.

III. Initial Calibration and Initial Calibration Verification

Initial calibration data were not reviewed for Stage 2A validation.

IV. Continuing Calibration

Continuing calibration data were not reviewed for Stage 2A validation.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

Internal standards data were not reviewed for Stage 2A validation.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2A validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2A validation.

XIV. System Performance

Raw data were not reviewed for Stage 2A validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

Shepley's Hill
Volatiles - Data Qualification Summary - SDG JC94537X/L1940945

No Sample Data Qualified in this SDG

Shepley's Hill
Volatiles - Laboratory Blank Data Qualification Summary - SDG JC94537X/L1940945

No Sample Data Qualified in this SDG

Shepley's Hill
Volatiles - Field Blank Data Qualification Summary - SDG JC94537X/L1940945

No Sample Data Qualified in this SDG

LDC #: 46161A1a

VALIDATION COMPLETENESS WORKSHEET

Stage 2A

Date: 11/7/19

SDG #: JC94537X/L1940945

Page: 1 of 1

Laboratory: SGS North America, Inc./ALS Environmental

Reviewer: KK

2nd Reviewer:

METHOD: GC/MS Volatiles (EPA Method 624.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A /A	
II.	GC/MS Instrument performance check	N	
III.	Initial calibration/ICV	N/N	
IV.	Continuing calibration	N	
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Sublab	Lab ID	Matrix	Date
1	EFFLUENT	L1940945-01	JC94537-1	Water	09/06/19
2					
3					
4					
5					
6					
7					
8					

Notes:

LDC Report# 46161A2a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Shepley's Hill

LDC Report Date: November 7, 2019

Parameters: Semivolatiles

Validation Level: Stage 2A

Laboratory: SGS North America, Inc./ALS Environmental

Sample Delivery Group (SDG): JC94537X/L1940945

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
EFFLUENT	JC94537-1/L1940945-01	Water	09/06/19
EFFLUENTRE	JC94537-1/L1940945-01RE	Water	09/06/19

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Semivolatile Organic Compounds (SVOCs) by Environmental Protection Agency (EPA) Method 625.1

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

Instrument performance check data were not reviewed for Stage 2A validation.

III. Initial Calibration and Initial Calibration Verification

Initial calibration data were not reviewed for Stage 2A validation.

IV. Continuing Calibration

Continuing calibration data were not reviewed for Stage 2A validation.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. Surrogate recoveries (%R) were not within QC limits for sample EFFLUENT. Using professional judgment, no data were qualified when one base or one acid surrogate %R was outside the QC limits and the %R was greater than or equal to 10%.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

Internal standards data were not reviewed for Stage 2A validation.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2A validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2A validation.

XIV. System Performance

Raw data were not reviewed for Stage 2A validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed not reportable as follows:

Sample	Compound	Reason	Flag	A or P
EFFLUENTRE	All compounds	Extracted outside holding time.	Not reportable	-

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

Shepley's Hill
Semivolatiles - Data Qualification Summary - SDG JC94537X/L1940945

Sample	Compound	Flag	A or P	Reason
EFFLUENTRE	All compounds	Not reportable	-	Overall assessment of data

Shepley's Hill
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG JC94537X/L1940945

No Sample Data Qualified in this SDG

Shepley's Hill
Semivolatiles - Field Blank Data Qualification Summary - SDG JC94537X/L1940945

No Sample Data Qualified in this SDG

LDC #: 46161A2a

VALIDATION COMPLETENESS WORKSHEET

Stage 2A

SDG #: JC94537X/L1940945

Laboratory: SGS North America, Inc./ALS Environmental

Date: 11/7/19

Page: 1 of 1

Reviewer: KK

2nd Reviewer:

METHOD: GC/MS Semivolatiles (EPA Method 625.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	N	
III.	Initial calibration/ICV	N/N	
IV.	Continuing calibration	N	
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	SW	#1, one out, NQ
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Sub lab	Lab ID	Matrix	Date
1	EFFLUENT	L1940945-01	JC94537-1	Water	09/06/19
2	EFFLUENTRE	↓ -01RE	JC94537-1RE	Water	09/06/19
3					
4					
5					
6					
7					
8					

Notes:

LDC #: 46161A2a

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: KK
2nd Reviewer: _____

METHOD: GC/MS SVOA (EPA Method 625.1)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Compound	Finding	Qualifications
		#2	All	outside HT	NR /A

Comments: _____

OVR.2S

LDC Report# 46161A3b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Shepley's Hill

LDC Report Date: November 12, 2019

Parameters: Polychlorinated Biphenyls & Pesticides

Validation Level: Stage 2A

Laboratory: SGS North America, Inc./ALS Environmental

Sample Delivery Group (SDG): JC94537X/L1940945

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
EFFLUENT	JC94537-1/L1940945-01	Water	09/06/19

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015) and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Biphenyls (PCBs) and Chlorinated Pesticides by Environmental Protection Agency (EPA) Method 608.3

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

Initial calibration data were not reviewed for Stage 2A validation.

III. Continuing Calibration

Continuing calibration data were not reviewed for Stage 2A validation.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Stage 2A validation.

XI. Target Compound Identification

Raw data were not reviewed for Stage 2A validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

Shepley's Hill
Polychlorinated Biphenyls - Data Qualification Summary - SDG JC94537X/L1940945

No Sample Data Qualified in this SDG

Shepley's Hill
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG JC94537X/L1940945

No Sample Data Qualified in this SDG

Shepley's Hill
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG JC94537X/L1940945

No Sample Data Qualified in this SDG

LDC #: 46161A3b

VALIDATION COMPLETENESS WORKSHEET

Date: 11/7/19

SDG #: JC94537X/L1940945

Stage 2A

Page: 1 of 1

Laboratory: SGS North America, Inc./ALS Environmental

Reviewer: KK

2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls & Pesticides (EPA Method 608.3)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	Initial calibration/ICV	N/N	
III.	Continuing calibration	N	
IV.	Laboratory Blanks	A	
V.	Field blanks	N	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Compound quantitation/RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Sub lab	Lab ID	Matrix	Date
1	EFFLUENT	L1940945-01	JC94537-1	Water	09/06/19
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

Notes:

Data Validation Report
Shepley's Hill

SDG: JC94613

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, CA 92010

November 12, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the September 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017), and the US EPA NFG for Organic Superfund Methods Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260C
Iron and Manganese by EPA SW 846 Method 6010D
Arsenic by EPA SW 846 Method 6020B
Dissolved Methane and Ethane by EPA Method RSK-175

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, surrogates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD), and laboratory blanks.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013). Quality assurance (QA)/QC criteria specified in the QAPP and NFGs were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not applicable): Data did not warrant qualification since detected results only are affected and the compound was not detected in the associated samples.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt & Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogates were added to all samples as required by the methods. All surrogate recoveries (%R) were within QC limits with the exception of sample EW-1 for toluene-d8. The associated sample results were qualified as non-detected estimated (UJ). The details regarding the qualification of data are provided in Enclosure I.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Duplicate Sample Analysis

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

All compounds reported below the limit of quantitation (LOQ) as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosure I.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to surrogate %R, data were qualified as estimated in one sample.

Due to results below the LOQ, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation, all other results are considered valid and usable for all purposes.

Data flags are summarized and are presented as Attachment 2.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
06-Sep-2019	EW-1	JC94613-1	N		RSK 175	S2AVE
06-Sep-2019	EW-1	JC94613-1	N	3010A	6010D	S2AVE
06-Sep-2019	EW-1	JC94613-1	N	3010A	6020B	S2AVE
06-Sep-2019	EW-1	JC94613-1	N	5030B	8260C	S2AVE
06-Sep-2019	EW-1MS	MP17232A-S3	MS	3010A	6020B	S2AVE
06-Sep-2019	EW-1MSD	MP17232A-S4	MSD	3010A	6020B	S2AVE
06-Sep-2019	EW-1MS	MP17232-S1	MS	3010A	6010D	S2AVE
06-Sep-2019	EW-1MSD	MP17232-S2	MSD	3010A	6010D	S2AVE
06-Sep-2019	EW-4	JC94613-2	N		RSK 175	S2AVE
06-Sep-2019	EW-4	JC94613-2	N	3010A	6010D	S2AVE
06-Sep-2019	EW-4	JC94613-2	N	3010A	6020B	S2AVE
06-Sep-2019	EW-4	JC94613-2	N	5030B	8260C	S2AVE

N = Normal Sample MS = Matrix Spike MSD = Matrix Spike Duplicate
S2AVE = EPA Level II Validation

Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC94613 **Laboratory: ACTD**

EDD Filename: JC94613-SEDD_2a_1 **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method Category: **VOA**

Method: **8260C** ***Matrix:*** **Water**

Sample ID: **EW-1** ***Collected:*** **9/6/2019 11:40:00 AM** ***Analysis Type:*** **Initial/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
CHLOROBENZENE	0.76	J	0.75	LOD	1.0	LOQ	ug/L	J	TR
CIS-1,2-DICHLOROETHENE	0.65	J	0.75	LOD	1.0	LOQ	ug/L	J	TR

Sample ID: **EW-1** ***Collected:*** **9/6/2019 11:40:00 AM** ***Analysis Type:*** **Reanalysis-1/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
CHLOROETHANE	0.75	U	0.75	LOD	1.0	LOQ	ug/L	UJ	S

Sample ID: **EW-4** ***Collected:*** **9/6/2019 11:55:00 AM** ***Analysis Type:*** **Initial/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
CHLOROBENZENE	0.57	J	0.75	LOD	1.0	LOQ	ug/L	J	TR

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Data Qualifier Summary

Lab Reporting Batch ID: JC94613 **Laboratory: ACTD**

EDD Filename: JC94613-SEDD_2a_1 **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Reason Code Legend

Reason Code	*Description*
L	Laboratory Control Spike Upper Estimation
Q	Matrix Spike Upper Estimation
S	Surrogate/Tracer Recovery Lower Estimation
TR	Reporting Limit Trace Value

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC94613

Surrogate Outlier Report

Lab Reporting Batch ID: JC94613 **Laboratory: ACTD**

EDD Filename: JC94613-SEDD_2a_1_rev **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method: **8260C**
Matrix: Water

Sample ID (Analysis Type)	*Surrogate*	*Sample % Recovery*	*% Recovery Limits*	*Affected Compounds*	*Flag*
EW-1 (Reanalysis-1/ TOT)	TOLUENE-D8	87	89.00-112.00	All Target Analytes	J (all detects) UJ (all non-detects)

Reporting Limit Outliers

Lab Reporting Batch ID: JC94613 **Laboratory: ACTD**

EDD Filename: JC94613-SEDD_2a_1_rev **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method: **8260C**

Matrix: Water

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
EW-1	CHLOROBENZENE CIS-1,2-DICHLOROETHENE	J J	0.76 0.65	1.0 1.0	LOQ LOQ	ug/L ug/L	J (all detects)
EW-4	CHLOROBENZENE	J	0.57	1.0	LOQ	ug/L	J (all detects)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro
spassafaro@sovcon.com

November 13, 2019

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed is the final validation report for the fraction listed below. This SDG was received on October 14, 2019. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #46165:

SDG #	**Fraction**
JC96281	Arsenic

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng

Pei Geng
pgeng@lab-data.com
Project Manager/Senior Chemist

174 pages-ADV (no worksheets) Attachment 1

ADR (Stage 2A) **LDC #46165 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	As (6020B)																																			
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC96281	10/14/19	11/04/19	1	0																																		
Total	T/PG			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

L:\Sovereign\Shepleys Hill\46165ST.wpd

Data Validation Report
Shepley's Hill

SDG: JC96281

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

November 12, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the October 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Arsenic by EPA SW 846 Method 6020B

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, laboratory blanks, and laboratory control samples (LCS).

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013). Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the method. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogate spikes were not required by the method.

V. Matrix Spike

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VI. Laboratory Duplicate Sample

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution was not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
04-Oct-2019	EFFLUENT	JC96281-1	N	3010A	6020B	S2AVE

N = Normal Sample *S2AVE = EPA Stage 2A Validation*

Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC96281

Laboratory: ACTD

EDD Filename: JC96281-SEDD_2a_1

eQAPP Name: Sovereign_Shepley'sHillLandfill_180924

No Data Review Qualifiers Applied.

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC96281

(No Outliers)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro
spassafaro@sovcon.com

December 3, 2019

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed is the final validation report for the fraction listed below. This SDG was received on November 26, 2019. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #46165:

SDG #	**Fraction**
JC96281	Arsenic

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng

Pei Geng
pgeng@lab-data.com
Project Manager/Senior Chemist

5 pages-ADV (no worksheets) Attachment 1

ADR (Stage 2A) **LDC #46598 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	As (6020B)																																			
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC98286	11/26/19	12/19/19	1	0																																		
Total	T/PG			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

L:\Sovereign\Shepleys Hill\46598ST.wpd

Data Validation Report
Shepley's Hill

SDG: JC98286

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

December 3, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the November 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Arsenic by EPA SW 846 Method 6020B

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, laboratory blanks, matrix spike/matrix spike duplicates (MS/MSD), and laboratory control samples (LCS).

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013). Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the method. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogate spikes were not required by the method.

V. Matrix Spike

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Laboratory Duplicate Sample

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution was not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
08-Nov-2019	EFFLUENT	JC98286-1	N	3010A	6020B	S2AVE
08-Nov-2019	EFFLUENTMS	MP18386-S1	MS	3010A	6020B	S2AVE
08-Nov-2019	EFFLUENTMSD	MP18386-S2	MSD	3010A	6020B	S2AVE

N = Normal Sample MS = Matrix Spike MSD = Matrix Spike Duplicate
S2AVE = Stage 2A Validation

Attachment 2
Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC98286

Laboratory: ACTD

EDD Filename: JC98286-SEDD_2a_1

eQAPP Name: Sovereign_Shepley'sHillLandfill_180924

No Data Review Qualifiers Applied.

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC98286

(No Outliers)

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Sovereign Consulting Inc.
16 Chestnut Street, Suite 520
Foxborough, MA 02035
ATTN: Mr. Steven Passafaro
spassafaro@sovcon.com

January 9, 2020

SUBJECT: Shepley's Hill, Data Validation

Dear Mr. Passafaro,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on December 23, 2019. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #46887:

SDG #	**Fraction**
JC99810, JC99822	Metals, Wet Chemistry

The data validation was performed under Stage 2A guidelines. The analyses were validated using the following documents, as applicable to each method:

- Quality Assurance Project Plan for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts; March 2015
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng
pgeng@lab-data.com
Project Manager/Senior Chemist

1,128 pages-ADV (no worksheets)

Attachment 1

ADR (Stage 2A)

LDC #46887 (Sovereign Consulting, Inc., Foxborough, MA / Shepley's Hill)

LDC	SDG#	DATE REC'D	(3) DATE DUE	(3-5) Metals (6010D)		Cl,SO_4 (300.0 /9056A)		NO_3-N (353.2 /4500)		NO_3/ NO_2-N (353.2)		NO_2-N (4500)																									
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	JC99810	12/23/19	01/16/20	1	0	1	0	1	0	1	0	1	0																								
B	JC99822	12/23/19	01/16/20	2	0	-	-	-	-	-	-	-	-																								
Total	J/PG			3	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7

Shaded cells indicate Stage 4 validation (all other cells are ADR review). These sample counts do not include MS, MSD, or DUP's.

L:\Sovereign\Shepleys Hill\46887ST.wpd

Data Validation Report
Shepley's Hill

SDG: JC99810

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

January 8, 2020

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the December 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Arsenic by EPA SW 846 Method 6020A
Metals by EPA SW 846 Method 6010C
Nitrate as Nitrogen and Nitrate/Nitrite as Nitrogen by EPA Method 353.2
Chloride and Sulfate by EPA Method 300/SW 846 Method 9056A

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, laboratory control samples (LCS), and laboratory blanks.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of serial dilutions which were reviewed manually. Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogate spikes were not required by the methods.

V. Matrix Spike

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed.

VI. Laboratory Duplicate Sample

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution was not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

All compounds reported below the LOQ as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosure I.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results reported as detected below the LOQ, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

Data flags are summarized and are presented as Attachment 2

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
06-Dec-2019	EFFLUENT	JC99810-1	N	3010A	6010D	S2AVE
06-Dec-2019	EFFLUENT	JC99810-1	N	3010A	6020B	S2AVE
06-Dec-2019	EFFLUENT	JC99810-1	N	Gen Prep	300.0	S2AVE
06-Dec-2019	EFFLUENT	JC99810-1	N	Gen Prep	353.2	S2AVE
06-Dec-2019	EFFLUENT	JC99810-1	N	Gen Prep	353.2_CALC	S2AVE

N = Normal Sample
S2AVE = EPA Level II Validation

Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC99810 **Laboratory: ACTD**

EDD Filename: JC99810-SEDD_2a_1 **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method Category: **METALS**

Method: **6010D** ***Matrix:*** **Water**

Sample ID: **EFFLUENT** ***Collected:*** **12/6/2019 2:45:00 PM** ***Analysis Type:*** **Initial/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BARIUM	14.4	J	100	LOD	200	LOQ	ug/L	J	TR

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Data Qualifier Summary

Lab Reporting Batch ID: JC99810 **Laboratory: ACTD**

EDD Filename: JC99810-SEDD_2a_1 **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Reason Code Legend

Reason Code	*Description*
TR	Reporting Limit Trace Value

* denotes a non-reportable result

Project Name and Number: - USACE Project: Shepley's Hill (SHL), Devens, MA

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC99810

Reporting Limit Outliers

Lab Reporting Batch ID: JC99810 **Laboratory: ACTD**

EDD Filename: JC99810-SEDD_2a_1 **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method: **6010D**

Matrix: **Water**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
EFFLUENT	BARIUM	J	14.4	200	LOQ	ug/L	J (all detects)

Data Validation Report
Shepley's Hill

SDG: JC99822

Prepared for

Sovereign Consulting
16 Chestnut Street, Suite 520
Foxborough, MA 02035

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, California 92010

January 8, 2020

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2A data validation results for samples collected during the December 2019 sampling period. Data validation was performed in accordance with the Quality Assurance Project Plan (QAPP) for Shepley's Hill Landfill Treatment System O&M Services, Devens, Massachusetts (March 2015), and the US Environmental Protection Agency (EPA) National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Arsenic by EPA SW 846 Method 6020A
Iron and Manganese by EPA SW 846 Method 6010C

The sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2A Automated Data Review outliers are presented in Enclosure I.

All sample results were subjected to Stage 2A data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, matrix spike and matrix spike duplicate samples (MS/MSD), laboratory control samples (LCS), laboratory blanks, and serial dilutions.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of serial dilutions which were reviewed manually. Quality assurance (QA)/QC criteria specified in the QAPP and NFG were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

I. Sample Receipt and Technical Holding Time

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program.

III. Field Blank Samples

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogate spikes were not required by the methods.

V. Matrix Spike

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the exception of one MS/MSD pair for arsenic. No data were qualified since the sample concentrations were significantly greater (>4x) than the spike amount. The details are presented in Enclosure I.

VI. Laboratory Duplicate Sample

The laboratory has indicated that there were no laboratory duplicate (DUP) analyses specified for the samples in this SDG, and therefore laboratory duplicate analyses were not performed for this SDG.

VII. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Field Duplicate Samples

No field duplicates were identified in this SDG.

X. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
06-Dec-2019	EW-01	JC99822-1	N	3010A	6010D	S2AVE
06-Dec-2019	EW-01	JC99822-1	N	3010A	6020B	S2AVE
06-Dec-2019	EW-01MS	MP18781A-S1	MS	3010A	6010D	S2AVE
06-Dec-2019	EW-01MSD	MP18781A-S2	MSD	3010A	6010D	S2AVE
06-Dec-2019	EW-01MS	MP18781-S3	MS	3010A	6020B	S2AVE
06-Dec-2019	EW-01MSD	MP18781-S4	MSD	3010A	6020B	S2AVE
06-Dec-2019	EW-04	JC99822-2	N	3010A	6010D	S2AVE
06-Dec-2019	EW-04	JC99822-2	N	3010A	6020B	S2AVE

N = Normal Sample MS = Matrix Spike MSD = Matrix Spike Duplicate
S2AVE = EPA Level II Validation

Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: JC99822

Laboratory: ACTD

EDD Filename: JC99822-SEDD_2a_1

eQAPP Name: Sovereign_Shepley'sHillLandfill_180924

No Data Review Qualifiers Applied.

Enclosure I

Stage 2A ADR Outliers

Quality Control Outlier Reports

JC99822

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: JC99822 **Laboratory: ACTD**

EDD Filename: JC99822-SEDD_2a_1 **eQAPP Name: Sovereign_Shepley'sHillLandfill_180924**

Method: **6020B**
Matrix: **Water**

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
EW-01MS (Total) (EW-01)	ARSENIC	62.5	-	80.00-120.00	-	ARSENIC	No Qual, >4x

Data Validation Report for 6801676301

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Spring 2019
SDG:	6801676301
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	May 27, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C	SW6010C - Dissolved	SW6020A	SW6020A - Dissolved	SW9056A	SW9060A	SW9060A - Dissolved
EPA-PZ-2012-2A_SPR19	680-167630-12	Water	Field Sample/N	X		X		X	X		X
EPA-PZ-2012-2B_SPR19	680-167630-13	Water	Field Sample/N	X		X		X	X		X
EPA-PZ-2012-5A_SPR19	680-167630-10	Water	Field Sample/N	X		X		X	X		X
EPA-PZ-2012-5B_SPR19	680-167630-11	Water	Field Sample/N	X		X		X	X		X
EW-1@ATP Port_SPR19	680-167630-1	Water	Field Sample/N	X		X		X	X		X
EW-4@ATP Port_SPR19	680-167630-2	Water	Field Sample/N	X		X		X	X		X
PZ-12-08_SPR19	680-167630-6	Water	Field Sample/N	X		X		X	X		X
SHL-10_SPR19	680-167630-3	Water	Field Sample/N	X		X		X	X		X
SHL-19_SPR19	680-167630-5	Water	Field Sample/N	X		X		X	X		X
SHL-EB01_SPR19	680-167630-4	Water	Equipment Blank/EB	X	X		X		X	X	
SHM-93-22B_SPR19	680-167630-14	Water	Field Sample/N	X		X		X	X		X
SHP-01-36X_SPR19	680-167630-7	Water	Field Sample/N	X		X		X	X		X
SHP-01-37X_SPR19	680-167630-8	Water	Field Sample/N	X		X		X	X		X
SHP-01-38A_SPR19	680-167630-9	Water	Field Sample/N	X		X		X	X		X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Solutions, LLC, Marlborough, MA; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801676301. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank
- Interference Check Sample A - Negative
- MS RPD
- Calibration Blank - Negative
- MS Recovery
- Equipment Blank
- LCS RPD
- Calibration Blank
- Interference Check Sample A
- Blank - Negative
- Prep Hold Time
- Test Hold Time
- Interference Check Sample AB
- Continuing Calibration Verification
- LCS Recovery

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 5 results (5.10%) out of the 98 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

13 field samples and 1 EB sample for SHL 2019 Spring LTM

Analytical Method	Data Reviewer Comment
A2320B	No additional comments; see Checklist for detail.
SW6010C	Samples were field filtered and analyzed for dissolved Fe and Mn
SW6020A	Samples were field filtered and analyzed for dissolved As
SW9056A	No additional comments; see Checklist for detail.
SW9060A	Samples were field filtered and analyzed for dissolved organic carbon (DOC).

Sherri A Pullar

May 23, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

May 28, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW9056A, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHL-EB01_SPR19 (EB)/ 680-167630-4	Chloride	0.2700	< 0.2	< 0.5	mg/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Equipment Blank for SW9056A

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-10_SPR19	N	Chloride	0.500	0.970	0.970 J	+	mg/l	V

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW9060A, Dissolved, Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 280-455212/4 (LB)/ MB 280-455212/4	Dissolved Organic Carbon	0.1890	< 0.16	< 1	mg/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Blank for SW9060A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-2A_SPR19	N	Dissolved Organic Carbon	1.00	0.640 J	1.00 U		mg/l	L
PZ-12-08_SPR19	N	Dissolved Organic Carbon	1.00	0.920 J	1.00 U		mg/l	L
SHL-10_SPR19	N	Dissolved Organic Carbon	1.00	0.620 J	1.00 U		mg/l	L
SHL-19_SPR19	N	Dissolved Organic Carbon	1.00	0.860 J	1.00 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW9060A, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHL-EB01_SPR19 (EB)/ 680-167630-4	Total Organic Carbon	0.3300	< 0.16	< 1	mg/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Table of All Qualified Results

Test Method: SW9056A Extraction Method: NONE

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-10_SPR19	N	Chloride	0.500	0.970	0.970 J	+	mg/l	V

Test Method: SW9060A Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-2A_SPR19	N	Dissolved Organic Carbon	1.00	0.640 J	1.00 U		mg/l	L
PZ-12-08_SPR19	N	Dissolved Organic Carbon	1.00	0.920 J	1.00 U		mg/l	L
SHL-10_SPR19	N	Dissolved Organic Carbon	1.00	0.620 J	1.00 U		mg/l	L
SHL-19_SPR19	N	Dissolved Organic Carbon	1.00	0.860 J	1.00 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
L	Lab Blank
TR	Trace Level Detect
V	Equipment Blank

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl-4 was an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl-4 was an EB; ND for Fe and Mn
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-5 was prepared for MS/MSD analysis
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl-4 was an EB; As was ND
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-5 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl-4 was an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-5 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl-4 was an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-5 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801678501

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Spring 2019
SDG:	6801678501
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc, Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	May 27, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C	SW6010C - Dissolved	SW6020A	SW6020A - Dissolved	SW9056A	SW9060A	SW9060A - Dissolved
EPA-PZ-2012-1A_SPR19	680-167850-3	Water	Field Sample/N	X		X		X	X		X
EPA-PZ-2012-1B_SPR19	680-167850-4	Water	Field Sample/N	X		X		X	X		X
EPA-PZ-2012-3A_SPR19	680-167850-5	Water	Field Sample/N	X		X		X	X		X
EPA-PZ-2012-3B_SPR19	680-167850-6	Water	Field Sample/N	X		X		X	X		X
EPA-PZ-2012-4A_SPR19	680-167850-1	Water	Field Sample/N	X		X		X	X		X
EPA-PZ-2012-4B_SPR19	680-167850-2	Water	Field Sample/N	X		X		X	X		X
PZ-12-05_SPR19	680-167853-7	Water	Field Sample/N	X		X		X	X		X
PZ-12-06_SPR19	680-167853-6	Water	Field Sample/N	X		X		X	X		X
PZ-12-07_SPR19	680-167853-4	Water	Field Sample/N	X		X		X	X		X
PZ-12-09_SPR19	680-167853-3	Water	Field Sample/N	X		X		X	X		X
PZ-12-10_SPR19	680-167853-2	Water	Field Sample/N	X		X		X	X		X
SHL-4_SPR19	680-167853-8	Water	Field Sample/N	X		X		X	X		X
SHL-DUP03_SPR19	680-167850-7	Water	Field Duplicate/FD	X		X		X	X		X
SHL-DUP06	680-167851-3	Water	Field Duplicate/FD	X		X		X	X		X
SHM-05-41C_SPR19	680-167853-1	Water	Field Sample/N	X		X		X	X		X
SHM-11-02_SPR19	680-167853-5	Water	Field Sample/N	X		X		X	X		X
SHM-13-03_SPR19	680-167851-5	Water	Field Sample/N	X		X		X	X		X
SHM-13-04_SPR19	680-167851-1	Water	Field Sample/N	X		X		X	X		X
SHM-13-06_SPR19	680-167851-2	Water	Field Sample/N	X		X		X	X		X
SHM-13-07_SPR19	680-167851-4	Water	Field Sample/N	X		X		X	X		X

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C	SW6010C - Dissolved	SW6020A	SW6020A - Dissolved	SW9056A	SW9060A	SW9060A - Dissolved
SHM-13-08_SPR19	680-167851-6	Water	Field Sample/N	X		X		X	X		X
SHP-2016-06A_SPR19	680-167852-2	Water	Field Sample/N	X		X		X	X		X
SHP-2016-06B_SPR19	680-167852-3	Water	Field Sample/N	X		X		X	X		X
SHP-2016-06C_SPR19	680-167852-1	Water	Field Sample/N	X		X		X	X		X
SHP-EB01_SPR19	680-167852-4	Water	Equipment Blank/EB	X	X		X			X	

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Solutions, LLC, Marlborough, MA; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801678501. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank
- MS RPD
- Blank - Negative
- Field Duplicate RPD
- MS Recovery
- Equipment Blank
- Calibration Blank
- LCS RPD
- Interference Check Sample A - Negative
- Lab Replicate RPD
- Test Hold Time
- Prep Hold Time
- Interference Check Sample AB
- Continuing Calibration Verification
- LCS Recovery
- Interference Check Sample A
- Calibration Blank - Negative

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 6 results (3.47%) out of the 173 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

24 samples and 1 EB were collected for SHL 2019 Spring LTM

Analytical Method	Data Reviewer Comment
A2320B	No additional comments; see Checklist for detail.
SW6010C	Samples were field filtered and analyzed for dissolved Fe and Mn.
SW6020A	Samples were field filtered and analyzed for dissolved As.
SW9056A	No additional comments; see Checklist for detail.
SW9060A	Samples were field filtered and analyzed for DOC.

Sherri A Pullar

May 24, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

May 28, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method A2320B, Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 280-455784/109 (LB)/ MB 280-455784/109	Alkalinity, Total (as CaCO3)	4.180	< 3.1	< 10	mg/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Blank for A2320B

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHP-EB01_SPR19	EB	Alkalinity, Total (as CaCO3)	10.0	4.00 J	10.0 U		mg/l	B2/L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method A2320B, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 280-455784/107 (CB)/ CCB 280-455784/107	Alkalinity, Total (as CaCO3)	4.050	< 3.1	< 10	mg/l	U/None	B2	
CCB 280-455784/120 (CB)/ CCB 280-455784/120	Alkalinity, Total (as CaCO3)	4.220	< 3.1	< 10	mg/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Calibration Blank for A2320B

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHP-EB01_SPR19	EB	Alkalinity, Total (as CaCO3)	10.0	4.00 J	10.0 U		mg/l	B2/L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method A2320B, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHP-EB01_SPR19 (EB)/ 680-167852-4	Alkalinity, Total (as CaCO3)	4.000	< 3.1	< 10	mg/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-568255/377 (CB)/ CCB 680-568255/377	Iron	20.00	< 17	< 50	ug/l	U/None	B2	
CCB 680-568255/400 (CB)/ CCB 680-568255/400	Iron	24.20	< 17	< 50	ug/l	U/None	B2	
CCB 680-568255/412 (CB)/ CCB 680-568255/412	Iron	22.90	< 17	< 50	ug/l	U/None	B2	
CCB 680-568511/202 (CB)/ CCB 680-568511/202	Manganese	1.350	< 1	< 10	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW9060A, Dissolved, Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 280-455615/35 (LB)/ MB 280-455615/35	Dissolved Organic Carbon	0.2610	< 0.16	< 1	mg/l	U/None	L	
MB 280-455615/4 (LB)/ MB 280-455615/4	Dissolved Organic Carbon	0.1780	< 0.16	< 1	mg/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Blank for SW9060A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
PZ-12-09_SPR19	N	Dissolved Organic Carbon	1.00	0.660 J	1.00 U		mg/l	L
PZ-12-10_SPR19	N	Dissolved Organic Carbon	1.00	0.750 J	1.00 U		mg/l	L
SHL-DUP06	FD	Dissolved Organic Carbon	1.30	1.30	1.30 U		mg/l	L
SHM-13-04_SPR19	N	Dissolved Organic Carbon	1.10	1.10	1.10 U		mg/l	L
SHP-2016-06C_SPR19	N	Dissolved Organic Carbon	1.00	0.730 J	1.00 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW9060A, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHP-EB01_SPR19 (EB)/ 680-167852-4	Total Organic Carbon	0.4400	< 0.16	< 1	mg/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Table of All Qualified Results

Test Method: A2320B Extraction Method: NONE

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHP-EB01_SPR19	EB	Alkalinity, Total (as CaCO3)	10.0	4.00 J	10.0 U		mg/l	B2/L

Test Method: SW9060A Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
PZ-12-09_SPR19	N	Dissolved Organic Carbon	1.00	0.660 J	1.00 U		mg/l	L
PZ-12-10_SPR19	N	Dissolved Organic Carbon	1.00	0.750 J	1.00 U		mg/l	L
SHL-DUP06	FD	Dissolved Organic Carbon	1.30	1.30	1.30 U		mg/l	L
SHM-13-04_SPR19	N	Dissolved Organic Carbon	1.10	1.10	1.10 U		mg/l	L
SHP-2016-06C_SPR19	N	Dissolved Organic Carbon	1.00	0.730 J	1.00 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
B2	CCB
L	Lab Blank
TR	Trace Level Detect
V	Equipment Blank

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl 167852-4 is an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		Spl 167853-3, 167850-3, 167851-6 were prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs 167850-6/-7 and 167851-2/-3; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		see outlier report CCB contamination
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl 167852-4 is an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl 167853-3, 167850-3, 167851-6 were prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs 167850-6/-7 and 167851-2/-3; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl 167852-4 is an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl 167853-3, 167850-3, 167851-6 were prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs 167850-6/-7 and 167851-2/-3; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl 167852-4 is an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls 167853-3, 167850-3, 167853-2 were prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs 167850-6/-7 and 167851-2/-3; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report for CCV contamination.
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl 167852-4 is an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl 167853-3, 167850-3, 167851-6 were prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs 167850-6/-7 and 167851-2/-3; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Spring 2019
Field Duplicates for SDG: 6801678501

Location	Analysis
EPA-PZ-2012-3B	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-3B_SPR19 / SHL-DUP03_SPR19	680-167850-6 / 680-167850-7	Alkalinity, Total (as CaCO3)	180	180	10.0	0.00	30	OK	NA

Location	Analysis
EPA-PZ-2012-3B	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-3B_SPR19 / SHL-DUP03_SPR19	680-167850-6 / 680-167850-7	Iron (FLDFLT)	45000	45000	50.0	0.00	30	OK	NA
EPA-PZ-2012-3B_SPR19 / SHL-DUP03_SPR19	680-167850-6 / 680-167850-7	Manganese (FLDFLT)	5800	5700	10.0	1.74	30	OK	NA

Location	Analysis
EPA-PZ-2012-3B	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-3B_SPR19 / SHL-DUP03_SPR19	680-167850-6 / 680-167850-7	Arsenic (FLDFLT)	2700	3000	3.00	10.5	30	OK	NA

Location	Analysis
EPA-PZ-2012-3B	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-3B_SPR19 / SHL-DUP03_SPR19	680-167850-6 / 680-167850-7	Chloride	28.0	28.0	0.500	0.00	30	OK	NA
EPA-PZ-2012-3B_SPR19 / SHL-DUP03_SPR19	680-167850-6 / 680-167850-7	Sulfate	12.0	11.0	1.00	8.70	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Spring 2019
Field Duplicates for SDG: 6801678501

Location	Analysis
EPA-PZ-2012-3B	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-3B_SPR19 / SHL-DUP03_SPR19	680-167850-6 / 680-167850-7	Dissolved Organic Carbon (FLDFLT)	1.90	1.90	1.00	0.00	30	NA	OK

Location	Analysis
SHM-13-06	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-13-06_SPR19 / SHL-DUP06	680-167851-2 / 680-167851-3	Alkalinity, Total (as CaCO3)	73.0	74.0	10.0	1.36	30	OK	NA

Location	Analysis
SHM-13-06	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-13-06_SPR19 / SHL-DUP06	680-167851-2 / 680-167851-3	Iron (FLDFLT)	18000	17000	50.0	5.71	30	OK	NA
SHM-13-06_SPR19 / SHL-DUP06	680-167851-2 / 680-167851-3	Manganese (FLDFLT)	1100	1000	10.0	9.52	30	OK	NA

Location	Analysis
SHM-13-06	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-13-06_SPR19 / SHL-DUP06	680-167851-2 / 680-167851-3	Arsenic (FLDFLT)	3100	2900	3.00	6.67	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Spring 2019
Field Duplicates for SDG: 6801678501

Location	Analysis
SHM-13-06	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-13-06_SPR19 / SHL-DUP06	680-167851-2 / 680-167851-3	Chloride	70.0	65.0	1.00	7.41	30	OK	NA
SHM-13-06_SPR19 / SHL-DUP06	680-167851-2 / 680-167851-3	Sulfate	6.30	6.30	2.00	0.00	30	NA	OK

Location	Analysis
SHM-13-06	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-13-06_SPR19 / SHL-DUP06	680-167851-2 / 680-167851-3	Dissolved Organic Carbon (FLDFLT)	1.40	ND	1.00	NA	30	NA	1.4

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801679521

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Spring 2019
SDG:	6801679521
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	May 27, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C	SW6010C - Dissolved	SW6020A	SW6020A - Dissolved	SW9056A	SW9060A	SW9060A - Dissolved
EPA-PZ-2012-7A_SPR19	680-167952-14	Water	Field Sample/N	X		X		X	X		X
EPA-PZ-2012-7B_SPR19	680-167952-15	Water	Field Sample/N	X		X		X	X		X
PZ-12-01_SPR19	680-167952-4	Water	Field Sample/N	X		X		X	X		X
PZ-12-02_SPR19	680-167952-5	Water	Field Sample/N	X		X		X	X		X
PZ-12-03_SPR19	680-167952-6	Water	Field Sample/N	X		X		X			X
PZ-12-04_SPR19	680-167952-8	Water	Field Sample/N	X		X		X	X		X
SHL-DUP01	680-167952-7	Water	Field Duplicate/FD	X		X		X	X		X
SHL-EB02_SPR19	680-167952-2	Water	Equipment Blank/EB	X	X		X		X	X	
SHM-05-41B_SPR19	680-167952-18	Water	Field Sample/N	X		X		X	X		X
SHM-07-03_SPR19	680-167952-16	Water	Field Sample/N	X		X		X	X		X
SHM-07-05X_SPR19	680-167952-17	Water	Field Sample/N	X		X		X	X		X
SHM-11-06_SPR19	680-167952-3	Water	Field Sample/N	X		X		X	X		X
SHP-2016-03A_SPR19	680-167952-19	Water	Field Sample/N	X		X		X	X		X
SHP-2016-03B_SPR19	680-167952-20	Water	Field Sample/N	X		X		X	X		X
SHP-2016-07B_SPR19	680-167952-1	Water	Field Sample/N	X		X		X	X		X
SHP-2016-2A_SPR19	680-167952-11	Water	Field Sample/N	X		X		X	X		X
SHP-2016-2B_SPR19	680-167952-12	Water	Field Sample/N	X		X		X	X		X
SHP-2016-4A_SPR19	680-167952-9	Water	Field Sample/N	X		X		X	X		X
SHP-2016-4B_SPR19	680-167952-10	Water	Field Sample/N	X		X		X	X		X
SHP-DUP04	680-167952-13	Water	Field Duplicate/FD	X		X		X	X		X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Solutions, LLC, Marlborough, MA; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801679521. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- MS RPD
- Field Duplicate RPD
- Blank
- Interference Check Sample A - Negative
- Lab Replicate RPD
- Equipment Blank
- Interference Check Sample A
- LCS RPD
- Calibration Blank - Negative
- Calibration Blank
- Prep Hold Time
- Test Hold Time
- Blank - Negative
- MS Recovery
- Interference Check Sample AB
- Continuing Calibration Verification
- LCS Recovery

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 8 results (5.80%) out of the 138 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

19 samples and 1 EB were collected for SHL 2019 Spring LTM

Analytical Method	Data Reviewer Comment
A2320B	No additional comments; see Checklist for detail.
SW6010C	Samples were field filtered and analyzed for dissolved Fe and Mn.
SW6020A	Samples were field filtered and analyzed for dissolved As.
SW9056A	No additional comments; see Checklist for detail.
SW9060A	Samples were field filtered and analyzed for DOC.

Sherri A Pullar

May 24, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

May 28, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-568033/1-A (LB)/ MB 680-568033/1-A	Manganese	2.340	< 1	< 10	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Blank for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-7A_SPR19	N	Manganese	10.0	9.50 J	10.0 U		ug/l	L
SHM-07-03_SPR19	N	Manganese	10.0	9.70 J	10.0 U		ug/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6010C, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-07-05X_SPR19 (MS)/ 680-167952-17	Manganese	85.00	90 - 114	10 - 125	percent	J/UJ	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6020A, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-07-05X_SPR19 (MS)/ 680-167952-17	Arsenic	120.0	84 - 116	10 - 125	percent	J/None	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW9056A, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHL-EB02_SPR19 (EB)/ 680-167952-2	Chloride	0.2800	< 0.2	< 0.5	mg/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW9056A, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-07-03_SPR19 (MS)/ 680-167952-16	Chloride	70.00	90 - 110	10 - 110	percent	J/UJ	M	Spike amount Insignificant
SHM-07-03_SPR19 (SD)/ 680-167952-16	Chloride	70.00	90 - 110	10 - 110	percent	J/UJ	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW9060A, Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 280-456096/4 (LB)/ MB 280-456096/4	Total Organic Carbon	0.2170	< 0.16	< 1	mg/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Blank for SW9060A

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-EB02_SPR19	EB	Total Organic Carbon	1.00	0.320 J	1.00 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW9060A, Dissolved, Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 280-456096/35 (LB)/ MB 280-456096/35	Dissolved Organic Carbon	0.2830	< 0.16	< 1	mg/l	U/None	L	
MB 280-456096/4 (LB)/ MB 280-456096/4	Dissolved Organic Carbon	0.2170	< 0.16	< 1	mg/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Blank for SW9060A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-7A_SPR19	N	Dissolved Organic Carbon	1.00	0.860 J	1.00 U		mg/l	L
EPA-PZ-2012-7B_SPR19	N	Dissolved Organic Carbon	1.30	1.30	1.30 U		mg/l	L
SHP-2016-03A_SPR19	N	Dissolved Organic Carbon	1.10	1.10	1.10 U		mg/l	L
SHP-2016-2A_SPR19	N	Dissolved Organic Carbon	1.00	1.00	1.00 U		mg/l	L
SHP-2016-4A_SPR19	N	Dissolved Organic Carbon	1.00	1.00	1.00 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW9060A, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHL-EB02_SPR19 (EB)/ 680-167952-2	Total Organic Carbon	0.3200	< 0.16	< 1	mg/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-7A_SPR19	N	Manganese	10.0	9.50 J	10.0 U		ug/l	L
SHM-07-03_SPR19	N	Manganese	10.0	9.70 J	10.0 U		ug/l	L

Test Method: SW9060A Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-7A_SPR19	N	Dissolved Organic Carbon	1.00	0.860 J	1.00 U		mg/l	L
EPA-PZ-2012-7B_SPR19	N	Dissolved Organic Carbon	1.30	1.30	1.30 U		mg/l	L
SHP-2016-03A_SPR19	N	Dissolved Organic Carbon	1.10	1.10	1.10 U		mg/l	L
SHP-2016-2A_SPR19	N	Dissolved Organic Carbon	1.00	1.00	1.00 U		mg/l	L
SHP-2016-4A_SPR19	N	Dissolved Organic Carbon	1.00	1.00	1.00 U		mg/l	L

Test Method: SW9060A Extraction Method: NONE

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-EB02_SPR19	EB	Total Organic Carbon	1.00	0.320 J	1.00 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
L	Lab Blank
M	MS Recovery
TR	Trace Level Detect
V	Equipment Blank

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -2 was an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -6/-7 and -12/-13; see FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		see outlier report
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -2 was an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl -17 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			Mn %R was outside QC limits but the sample result was >4x the spiking concentration. No qualifications were required.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -6/-7 and -12/-13; see FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -2 was an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-17 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -6/-7 and -12/-13; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -2 was an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl-16 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			%R for Chloride were outside QC limits, however the sample concentration was >4x than the spike. No qualifications were applied.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -6/-7 and -12/-13; see field duplicate report
Were QAPP specified laboratory LOQs/RLs achieved?		•		Spl 18 required 5X dilution; RL was adjusted.
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -2 was an EB
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-6 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -6/-7 and -12/-13; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Spring 2019
Field Duplicates for SDG: 6801679521

Location	Analysis
PZ-12-03	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
PZ-12-03_SPR19 / SHL-DUP01	680-167952-6 / 680-167952-7	Alkalinity, Total (as CaCO3)	170	170	10.0	0.00	30	OK	NA

Location	Analysis
PZ-12-03	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
PZ-12-03_SPR19 / SHL-DUP01	680-167952-6 / 680-167952-7	Iron (FLDFLT)	39000	38000	50.0	2.60	30	OK	NA
PZ-12-03_SPR19 / SHL-DUP01	680-167952-6 / 680-167952-7	Manganese (FLDFLT)	3900	3800	10.0	2.60	30	OK	NA

Location	Analysis
PZ-12-03	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
PZ-12-03_SPR19 / SHL-DUP01	680-167952-6 / 680-167952-7	Arsenic (FLDFLT)	630	640	3.00	1.57	30	OK	NA

Location	Analysis
PZ-12-03	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
PZ-12-03_SPR19 / SHL-DUP01	680-167952-6 / 680-167952-7	Dissolved Organic Carbon (FLDFLT)	2.00	2.00	1.00	0.00	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Spring 2019
Field Duplicates for SDG: 6801679521

Location	Analysis
SHP-2016-2B	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-2B_SPR19 / SHP-DUP04	680-167952-12 / 680-167952-13	Alkalinity, Total (as CaCO3)	150	150	10.0	0.00	30	OK	NA

Location	Analysis
SHP-2016-2B	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-2B_SPR19 / SHP-DUP04	680-167952-12 / 680-167952-13	Iron (FLDFLT)	43000	41000	50.0	4.76	30	OK	NA
SHP-2016-2B_SPR19 / SHP-DUP04	680-167952-12 / 680-167952-13	Manganese (FLDFLT)	2200	2100	10.0	4.65	30	OK	NA

Location	Analysis
SHP-2016-2B	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-2B_SPR19 / SHP-DUP04	680-167952-12 / 680-167952-13	Arsenic (FLDFLT)	450	410	3.00	9.30	30	OK	NA

Location	Analysis
SHP-2016-2B	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-2B_SPR19 / SHP-DUP04	680-167952-12 / 680-167952-13	Chloride	9.60	9.90	0.500	3.08	30	OK	NA
SHP-2016-2B_SPR19 / SHP-DUP04	680-167952-12 / 680-167952-13	Sulfate	4.30	4.30	1.00	0.00	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Spring 2019
Field Duplicates for SDG: 6801679521

Location	Analysis
SHP-2016-2B	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-2B_SPR19 / SHP-DUP04	680-167952-12 / 680-167952-13	Dissolved Organic Carbon (FLDFLT)	2.20	2.10	1.00	4.65	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801681081

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Spring 2019
SDG:	6801681081
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Arvada, CO
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	June 03, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
EPA-PZ-2012-6A_SPR19	680-168108-1	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-6B_SPR19	680-168108-2	Water	Field Sample/N	X	X	X	X	X
SHL-11_SPR19	680-168108-3	Water	Field Sample/N	X	X	X	X	X
SHL-DUP02_SPR19	680-168108-4	Water	Field Duplicate/FD	X	X	X	X	X
SHL-DUP05_SPR19	680-168108-7	Water	Field Duplicate/FD	X	X	X	X	X
SHP-2016-5A_SPR19	680-168108-5	Water	Field Sample/N	X	X	X	X	X
SHP-2016-5B_SPR19	680-168108-6	Water	Field Sample/N	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Solutions, LLC, Marlborough, MA; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801681081. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Blank
- MS Recovery
- MS RPD
- Interference Check Sample A - Negative
- Interference Check Sample A
- Field Duplicate RPD
- Test Hold Time
- LCS RPD
- Calibration Blank
- Prep Hold Time
- Continuing Calibration Verification
- LCS Recovery
- Interference Check Sample AB
- Calibration Blank - Negative

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 2 results (4.08%) out of the 49 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

Seven samples were collected for SHL spring 2019 LTM

Analytical Method	Data Reviewer Comment
A2320B	No additional comments; see Checklist for detail.
SW6010C	Samples were field filtered and submitted for dissolved iron and manganese analysis.
SW6020A	Samples were field filtered and submitted for dissolved arsenic analysis.
SW9056A	No additional comments; see Checklist for detail.
SW9060A	Samples were field filtered and submitted for DOC analysis.

Sherri A Pullar

May 31, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

June 03, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-569048/220 (CB)/ CCB 680-569048/220	Iron	20.90	< 17	< 50	ug/l	U/None	B2	
CCB 680-569048/232 (CB)/ CCB 680-569048/232	Iron	24.40	< 17	< 50	ug/l	U/None	B2	
CCB 680-569048/244 (CB)/ CCB 680-569048/244	Iron	18.30	< 17	< 50	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Calibration Blank for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-6A_SPR19	N	Iron	110	110	110 U		ug/l	B2

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW9060A, Dissolved, Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 280-456758/47 (LB)/ MB 280-456758/47	Dissolved Organic Carbon	0.2560	< 0.16	< 1	mg/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Blank for SW9060A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-6A_SPR19	N	Dissolved Organic Carbon	1.00	0.890 J	1.00 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-6A_SPR19	N	Iron	110	110	110 U		ug/l	B2

Test Method: SW9060A Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EPA-PZ-2012-6A_SPR19	N	Dissolved Organic Carbon	1.00	0.890 J	1.00 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
B2	CCB
L	Lab Blank
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -3/-4 and -6/-7; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report; CCBs had iron contamination. No qualifications needed; samples results were greater than 5X CCBs.
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl -5 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -3/-4 and -6/-7; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-5 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -3/-4 and -6/-7; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-5 was prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -3/-4 and -6/-7; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			Spl-5 and spl-7 were prepared for MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pairs -3/-4 and -6/-7; see FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Spring 2019
Field Duplicates for SDG: 6801681081

Location	Analysis
SHL-11	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-11_SPR19 / SHL-DUP02_SPR19	680-168108-3 / 680-168108-4	Alkalinity, Total (as CaCO3)	140	140	10.0	0.00	30	OK	NA

Location	Analysis
SHL-11	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-11_SPR19 / SHL-DUP02_SPR19	680-168108-3 / 680-168108-4	Iron (FLDFLT)	58000	60000	50.0	3.39	30	OK	NA
SHL-11_SPR19 / SHL-DUP02_SPR19	680-168108-3 / 680-168108-4	Manganese (FLDFLT)	1700	1700	10.0	0.00	30	OK	NA

Location	Analysis
SHL-11	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-11_SPR19 / SHL-DUP02_SPR19	680-168108-3 / 680-168108-4	Arsenic (FLDFLT)	960	950	3.00	1.05	30	OK	NA

Location	Analysis
SHL-11	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-11_SPR19 / SHL-DUP02_SPR19	680-168108-3 / 680-168108-4	Chloride	65.0	65.0	0.500	0.00	30	OK	NA
SHL-11_SPR19 / SHL-DUP02_SPR19	680-168108-3 / 680-168108-4	Sulfate	4.70	4.30	1.00	8.89	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Spring 2019
Field Duplicates for SDG: 6801681081

Location	Analysis
SHL-11	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-11_SPR19 / SHL-DUP02_SPR19	680-168108-3 / 680-168108-4	Dissolved Organic Carbon (FLDFLT)	2.00	2.10	1.00	4.88	30	NA	OK

Location	Analysis
SHP-2016-5B	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-5B_SPR19 / SHL-DUP05_SPR19	680-168108-6 / 680-168108-7	Alkalinity, Total (as CaCO3)	180	180	10.0	0.00	30	OK	NA

Location	Analysis
SHP-2016-5B	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-5B_SPR19 / SHL-DUP05_SPR19	680-168108-6 / 680-168108-7	Iron (FLDFLT)	64000	64000	50.0	0.00	30	OK	NA
SHP-2016-5B_SPR19 / SHL-DUP05_SPR19	680-168108-6 / 680-168108-7	Manganese (FLDFLT)	5100	5100	10.0	0.00	30	OK	NA

Location	Analysis
SHP-2016-5B	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-5B_SPR19 / SHL-DUP05_SPR19	680-168108-6 / 680-168108-7	Arsenic (FLDFLT)	610	620	3.00	1.63	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Spring 2019
Field Duplicates for SDG: 6801681081

Location	Analysis
SHP-2016-5B	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-5B_SPR19 / SHL-DUP05_SPR19	680-168108-6 / 680-168108-7	Chloride	21.0	20.0	0.500	4.88	30	OK	NA
SHP-2016-5B_SPR19 / SHL-DUP05_SPR19	680-168108-6 / 680-168108-7	Sulfate	0.810	0.820	1.00	1.23	30	NA	OK

Location	Analysis
SHP-2016-5B	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-2016-5B_SPR19 / SHL-DUP05_SPR19	680-168108-6 / 680-168108-7	Dissolved Organic Carbon (FLDFLT)	2.60	2.80	1.00	7.41	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801681091

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Spring 2019
SDG:	6801681091
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	May 28, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
SHM-05-40X_SPR19	680-168109-2	Water	Field Sample/N	X	X	X	X	X
SHM-96-5B_SPR19	680-168109-1	Water	Field Sample/N	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Solutions, LLC, Marlborough, MA; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801681091. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Interference Check Sample A
- Blank - Negative
- Interference Check Sample A - Negative
- Blank
- LCS RPD
- Calibration Blank
- Calibration Blank - Negative
- Prep Hold Time
- Test Hold Time
- Interference Check Sample AB
- Continuing Calibration Verification
- LCS Recovery

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 14 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

2 samples were collected for SHL 2019 Spring LTM

Analytical Method	Data Reviewer Comment
A2320B	No additional comments; see Checklist for detail.
SW6010C	Samples were field filtered and submitted for dissolved Fe and Mn analysis.
SW6020A	Samples were field filtered and submitted for dissolved As analysis.
SW9056A	No additional comments; see Checklist for detail.
SW9060A	Samples were field filtered and submitted for DOC analysis.

Sherri A Pullar

May 24, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

May 28, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method A2320B, Test Hold Time

Hold times are ascertained based on project requirements. Holding times were determined by comparing the chain of custody records with the dates of analysis found in the electronic data deliverable and laboratory summary forms. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-05-40X_SPR19 (N)/ 680-168109-2		14.15	< 14	< 28	days	J/UJ	H1	Test Exceeds UWL
SHM-96-5B_SPR19 (N)/ 680-168109-1		14.20	< 14	< 28	days	J/UJ	H1	Test Exceeds UWL

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-569048/220 (CB)/ CCB 680-569048/220	Iron	20.90	< 17	< 50	ug/l	U/None	B2	
CCB 680-569048/232 (CB)/ CCB 680-569048/232	Iron	24.40	< 17	< 50	ug/l	U/None	B2	
CCB 680-569048/244 (CB)/ CCB 680-569048/244	Iron	18.30	< 17	< 50	ug/l	U/None	B2	
CCB 680-569048/256 (CB)/ CCB 680-569048/256	Iron	23.00	< 17	< 50	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW9060A, Dissolved, Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 280-456758/47 (LB)/ MB 280-456758/47	Dissolved Organic Carbon	0.2560	< 0.16	< 1	mg/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Qualified Results

No results associated with this sample delivery group required qualification.

Table of Results with Modified Qualifiers

Modified Qualifiers for test method A2320B

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
SHM-05-40X_SPR19	N	Alkalinity, Total (as CaCO3)	10.0	74.0	74.0 J	74.0	
SHM-96-5B_SPR19	N	Alkalinity, Total (as CaCO3)	10.0	220	220 J	220	

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Reason Code Definitions

Code	Definition
B2	CCB
H1	Test Hold Time
L	Lab Blank
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			Samples were run within 14 days; HT qualifiers were removed. See outlier report.
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		see outlier report for CCB contamination; results >5X blank concentration no qualifications required.
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801681111

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Spring 2019
SDG:	6801681111
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Solutions, LLC, Marlborough, MA
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	May 28, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
SHL-20_SPR19	680-168111-2	Water	Field Sample/N	X	X	X	X	X
SHP-2016-1A_SPR19	680-168111-3	Water	Field Sample/N	X	X	X	X	X
SHP-2016-1B_SPR19	680-168111-4	Water	Field Sample/N	X	X	X	X	X
SHP-2016-7A_SPR19	680-168111-1	Water	Field Sample/N	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Solutions, LLC, Marlborough, MA; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801681111. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- MS Recovery
- Interference Check Sample A - Negative
- MS RPD
- Blank
- Calibration Blank
- LCS RPD
- Interference Check Sample AB
- Prep Hold Time
- Test Hold Time
- Continuing Calibration Verification
- LCS Recovery
- Calibration Blank - Negative
- Interference Check Sample A
- Blank - Negative

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 3 results (10.71%) out of the 28 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

Four samples were collected for SHL Spring 2019 LTM

Analytical Method	Data Reviewer Comment
A2320B	No additional comments; see Checklist for detail.
SW6010C	Samples were field filtered and submitted for dissolved Fe and Mn analysis.
SW6020A	Samples were field filtered and submitted for dissolved As analysis.
SW9056A	No additional comments; see Checklist for detail.
SW9060A	Samples were field filtered and submitted for DOC.

Sherri A Pullar

May 28, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

May 28, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-569048/220 (CB)/ CCB 680-569048/220	Iron	20.90	< 17	< 50	ug/l	U/None	B2	
CCB 680-569048/232 (CB)/ CCB 680-569048/232	Iron	24.40	< 17	< 50	ug/l	U/None	B2	
CCB 680-569048/244 (CB)/ CCB 680-569048/244	Iron	18.30	< 17	< 50	ug/l	U/None	B2	
CCB 680-569048/256 (CB)/ CCB 680-569048/256	Iron	23.00	< 17	< 50	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Calibration Blank for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHP-2016-1A_SPR19	N	Iron	50.0	19.0 J	50.0 U		ug/l	B2

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW9060A, Dissolved, Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 280-456758/47 (LB)/ MB 280-456758/47	Dissolved Organic Carbon	0.2560	< 0.16	< 1	mg/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Blank for SW9060A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHP-2016-1A_SPR19	N	Dissolved Organic Carbon	1.10	1.10	1.10 U		mg/l	L
SHP-2016-7A_SPR19	N	Dissolved Organic Carbon	1.10	1.10	1.10 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHP-2016-1A_SPR19	N	Iron	50.0	19.0 J	50.0 U		ug/l	B2

Test Method: SW9060A Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHP-2016-1A_SPR19	N	Dissolved Organic Carbon	1.10	1.10	1.10 U		mg/l	L
SHP-2016-7A_SPR19	N	Dissolved Organic Carbon	1.10	1.10	1.10 U		mg/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
B2	CCB
L	Lab Blank
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report for CCB contamination.
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl-1 was prepared for MS/MSD analysis
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			LCS only
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?			•	

Data Validation Report for 6801760261

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Fall 2019
SDG:	6801760261
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Arvada, CO
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	December 09, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
EPA-PZ-2012-2A_FAL19	680-176026-3	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-2B_FAL19	680-176026-4	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-6A_FAL19	680-176026-7	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-6B_FAL19	680-176026-8	Water	Field Sample/N	X	X	X	X	X
SHL-8D_FAL19	680-176026-2	Water	Field Sample/N	X	X	X	X	X
SHL-8S_FAL19	680-176026-1	Water	Field Sample/N	X	X	X	X	X
SHP-2016-2A_FAL19	680-176026-5	Water	Field Sample/N	X	X	X	X	X
SHP-2016-2B_FAL19	680-176026-6	Water	Field Sample/N	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801760261. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 56 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SHL Fall 2019 LTM SDG contains 8 samples.

Analytical Method	Data Reviewer Comment
SW6020A	No additional comments; see Checklist for detail.
SW6010C	No additional comments; see Checklist for detail.
SW9060A	No additional comments; see Checklist for detail.
A2320B	No additional comments; see Checklist for detail.
SW9056A	No additional comments; see Checklist for detail.

Sherri A Pullar

December 08, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

December 09, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl-5 was prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801762191

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Fall 2019
SDG:	6801762191
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Arvada, CO
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
EPA-PZ-2012-3A_FAL19	680-176219-1	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-3B_FAL19	680-176219-2	Water	Field Sample/N	X	X	X	X	X
PZ-12-03_FAL19	680-176219-14	Water	Field Sample/N	X	X	X	X	X
PZ-12-04_FAL19	680-176219-15	Water	Field Sample/N	X	X	X	X	X
PZ-12-05_FAL19	680-176219-16	Water	Field Sample/N	X	X	X	X	X
PZ-12-06_FAL19	680-176219-12	Water	Field Sample/N	X	X	X	X	X
SHL-10_FAL19	680-176219-5	Water	Field Sample/N	X	X	X	X	X
SHL-11_FAL19	680-176219-17	Water	Field Sample/N	X	X	X	X	X
SHL-19_FAL19	680-176219-10	Water	Field Sample/N	X	X	X	X	X
SHL-3_FAL19	680-176219-3	Water	Field Sample/N	X	X	X	X	X
SHL-4_FAL19	680-176219-11	Water	Field Sample/N	X	X	X	X	X
SHL-9_FAL19	680-176219-6	Water	Field Sample/N	X	X	X	X	X
SHL-DUP01_FAL19	680-176219-13	Water	Field Duplicate/FD	X	X	X	X	X
SHL-DUP07_FAL19	680-176219-7	Water	Field Duplicate/FD	X	X	X	X	X
SHM-93-10D_FAL19	680-176219-4	Water	Field Sample/N	X	X	X	X	X
SHP-2016-3A_FAL19	680-176219-8	Water	Field Sample/N	X	X	X	X	X
SHP-2016-3B_FAL19	680-176219-9	Water	Field Sample/N	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801762191. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- Lab Replicate RPD
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 14 results (11.76%) out of the 119 results (sample and field QC samples) reported are qualified based on review and 14 results (11.76%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains the 17 samples (including 2 FD samples) collected during the Fall 2019 sampling event. This is a revised DV report. Sample data for samples EPA-PZ-2012-3A-FAL19 and EPA-PZ-2012-3B-FAL19 were rejected after evaluation in 2019 Annual Report due to inconsistencies with historical data.

Analytical Method	Data Reviewer Comment
SW6020A	Analytical results for samples EPA-PZ-2012-3A-FAL19 and EPA-PZ-2012-3B-FAL19 were rejected due to inconsistencies with historical data.
SW9056A	Analytical results for samples EPA-PZ-2012-3A-FAL19 and EPA-PZ-2012-3B-FAL19 were rejected due to inconsistencies with historical data.
SW6010C	Analytical results for samples EPA-PZ-2012-3A-FAL19 and EPA-PZ-2012-3B-FAL19 were rejected due to inconsistencies with historical data.
SW9060A	Analytical results for samples EPA-PZ-2012-3A-FAL19 and EPA-PZ-2012-3B-FAL19 were rejected due to inconsistencies with historical data.
A2320B	Analytical results for samples EPA-PZ-2012-3A-FAL19 and EPA-PZ-2012-3B-FAL19 were rejected due to inconsistencies with historical data.

Laurie H Ekes

February 06, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-594345/1-A (LB)/ MB 680-594345/1-A	Iron	17.90	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
PZ-12-04_FAL19 (MS)/ 680-176219-15	Iron	-10.00	87 - 115	10 - 125	percent	J/X	M	Spike amount Insignificant
PZ-12-04_FAL19 (SD)/ 680-176219-15	Iron	36.00	87 - 115	10 - 125	percent	J/UJ	M	Spike amount Insignificant
PZ-12-04_FAL19 (MS)/ 680-176219-15	Manganese	55.00	90 - 114	10 - 125	percent	J/UJ	M	Spike amount Insignificant
PZ-12-04_FAL19 (SD)/ 680-176219-15	Manganese	70.00	90 - 114	10 - 125	percent	J/UJ	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6020A, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
PZ-12-04_FAL19 (MS)/ 680-176219-15	Arsenic	57.00	84 - 116	10 - 125	percent	J/UJ	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW9056A, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-93-10D_FAL19 (SD)/ 680-176219-4	Chloride	111.0	90 - 110	10 - 110	percent	J/None	M	
SHM-93-10D_FAL19 (SD)/ 680-176219-4	Sulfate	111.0	90 - 110	10 - 110	percent	J/None	M	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Qualified Results

No results associated with this sample delivery group required qualification.

Table of Results with Modified Qualifiers

Modified Qualifiers for test method A2320B

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
EPA-PZ-2012-3A_FAL19	N	Alkalinity, Total (as CaCO3)	10.0	96.0	96.0	96.0 R	Z7
EPA-PZ-2012-3B_FAL19	N	Alkalinity, Total (as CaCO3)	10.0	180	180	180 R	Z7

Modified Qualifiers for test method SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
EPA-PZ-2012-3A_FAL19	N	Iron	50.0	17000	17000	17000 R	Z7
EPA-PZ-2012-3A_FAL19	N	Manganese	10.0	950	950	950 R	Z7
EPA-PZ-2012-3B_FAL19	N	Iron	50.0	49000	49000	49000 R	Z7
EPA-PZ-2012-3B_FAL19	N	Manganese	10.0	5900	5900	5900 R	Z7

Modified Qualifiers for test method SW6020A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
EPA-PZ-2012-3A_FAL19	N	Arsenic	3.00	16.0	16.0	16.0 R	Z7
EPA-PZ-2012-3B_FAL19	N	Arsenic	3.00	3200	3200	3200 R	Z7

Modified Qualifiers for test method SW9056A

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
EPA-PZ-2012-3A_FAL19	N	Chloride	0.500	34.0	34.0	34.0 R	Z7
EPA-PZ-2012-3A_FAL19	N	Sulfate	1.00	0.940 J	0.940 J	0.940 R	TR/Z7
EPA-PZ-2012-3B_FAL19	N	Chloride	0.500	29.0	29.0	29.0 R	Z7
EPA-PZ-2012-3B_FAL19	N	Sulfate	1.00	15.0	15.0	15.0 R	Z7
SHM-93-10D_FAL19	N	Chloride	0.500	29.0	29.0 J	29.0	
SHM-93-10D_FAL19	N	Sulfate	1.00	17.0	17.0 J	17.0	

Modified Qualifiers for test method SW9060A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
EPA-PZ-2012-3A_FAL19	N	Dissolved Organic Carbon	1.00	9.70	9.70	9.70 R	Z7
EPA-PZ-2012-3B_FAL19	N	Dissolved Organic Carbon	1.00	1.70	1.70	1.70 R	Z7

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Reason Code Definitions

Code	Definition
L	Lab Blank
M	MS Recovery
TR	Trace Level Detect
Z7	Data rejected.

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pairs: -12/-13 and -6/-7. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		See method comment.

Data Validation Report for 6801762191

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report.
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls -15, -4, and -5 were prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?			•	Sample results were >4x the spike concentration; now qualifications were required.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Samples -12/-13 and -6/-7 were FD samples. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?	•			See method comment.

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls -15, -4, and -5 were prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Samples -12/-13 and -6/-7 were FD samples. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?	•			See method comment.

Data Validation Report for 6801762191

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Samples -4, -5, -8, and -17 were prepared and analyzed for MS/MSD
Were MS/MSD recoveries within project acceptance limits?		•		See outlier report.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Samples -12/-13 and -6/-7 were FD samples. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?	•			See method comment.

Data Validation Report for 6801762191

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Samples -4 and -5 were prepared and analyzed for MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Samples -12/-13 and -6/-7 were FD samples. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?	•			See method comment.

Data Validation Report for 6801763091

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Fall 2019
SDG:	6801763091
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Arvada, CO
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	December 09, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
EPA-PZ-2012-4A_FAL19	680-176309-7	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-4B_FAL19	680-176309-6	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-7A_FAL19	680-176309-8	Water	Field Sample/N	X	X	X	X	X
PZ-12-01_FAL19	680-176309-12	Water	Field Sample/N	X	X	X	X	X
PZ-12-02_FAL19	680-176309-13	Water	Field Sample/N	X	X	X	X	X
PZ-12-07_FAL19	680-176309-19	Water	Field Sample/N	X	X	X	X	X
PZ-12-08_FAL19	680-176309-18	Water	Field Sample/N	X	X	X	X	X
PZ-12-09_FAL19	680-176309-17	Water	Field Sample/N	X	X	X	X	X
PZ-12-10_FAL19	680-176309-16	Water	Field Sample/N	X	X	X	X	X
SHL-15_FAL19	680-176309-20	Water	Field Sample/N	X	X	X	X	X
SHL-20_FAL19	680-176309-14	Water	Field Sample/N	X	X	X	X	X
SHL-DUP02_FAL19	680-176309-15	Water	Field Duplicate/FD	X	X	X	X	X
SHL-DUP03_FAL19	680-176309-11	Water	Field Duplicate/FD	X	X	X	X	X
SHL-DUP06_FAL19	680-176309-10	Water	Field Duplicate/FD	X	X	X	X	X
SHL-DUP11_FAL19	680-176309-21	Water	Field Duplicate/FD	X	X	X	X	X
SHM-10-06_FAL19	680-176309-22	Water	Field Sample/N	X	X	X	X	X
SHM-11-06_FAL19	680-176309-9	Water	Field Sample/N	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801763091. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- Lab Replicate RPD
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 119 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SHL Fall 2019 LTM SDG contains 17 samples (including 4 field duplicates (FD)).

Analytical Method	Data Reviewer Comment
SW6020A	No additional comments; see Checklist for detail.
SW6010C	No additional comments; see Checklist for detail.
SW9060A	No additional comments; see Checklist for detail.
SW9056A	No additional comments; see Checklist for detail.
A2320B	No additional comments; see Checklist for detail.

Sherri A Pullar

December 08, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

December 09, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-594345/1-A (LB)/ MB 680-594345/1-A	Iron	17.90	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
L	Lab Blank
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD Spl pairs were -6/-10, -20/-21, -14/-15, and -9/-11. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report.
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD Spl pairs were -6/-10, -20/-21, -14/-15, and -9/-11. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD Spl pairs were -6/-10, -20/-21, -14/-15, and -9/-11. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl -12 was prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD Spl pairs were -6/-10, -20/-21, -14/-15, and -9/-11. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl-15 was prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD Spl pairs were -6/-10, -20/-21, -14/-15, and -9/-11. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801763091

Location	Analysis
EPA-PZ-2012-4B	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-4B_FAL19 / SHL-DUP06_FAL19	680-176309-6 / 680-176309-10	Alkalinity, Total (as CaCO3)	130	130	10.0	0.00	30	OK	NA

Location	Analysis
EPA-PZ-2012-4B	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-4B_FAL19 / SHL-DUP06_FAL19	680-176309-6 / 680-176309-10	Iron (FLDFLT)	62000	74000	50.0	17.6	30	OK	NA
EPA-PZ-2012-4B_FAL19 / SHL-DUP06_FAL19	680-176309-6 / 680-176309-10	Manganese (FLDFLT)	690	740	10.0	6.99	30	OK	NA

Location	Analysis
EPA-PZ-2012-4B	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-4B_FAL19 / SHL-DUP06_FAL19	680-176309-6 / 680-176309-10	Arsenic (FLDFLT)	2100	2000	3.00	4.88	30	OK	NA

Location	Analysis
EPA-PZ-2012-4B	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-4B_FAL19 / SHL-DUP06_FAL19	680-176309-6 / 680-176309-10	Chloride	26.0	26.0	0.500	0.00	30	OK	NA
EPA-PZ-2012-4B_FAL19 / SHL-DUP06_FAL19	680-176309-6 / 680-176309-10	Sulfate	17.0	17.0	1.00	0.00	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801763091

Location	Analysis
EPA-PZ-2012-4B	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
EPA-PZ-2012-4B_FAL19 / SHL-DUP06_FAL19	680-176309-6 / 680-176309-10	Dissolved Organic Carbon (FLDFLT)	2.10	2.00	1.00	4.88	30	NA	OK

Location	Analysis
SHL-15	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-15_FAL19 / SHL-DUP11_FAL19	680-176309-20 / 680-176309-21	Alkalinity, Total (as CaCO3)	100	100	10.0	0.00	30	OK	NA

Location	Analysis
SHL-15	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-15_FAL19 / SHL-DUP11_FAL19	680-176309-20 / 680-176309-21	Iron (FLDFLT)	1500	1700	50.0	12.5	30	OK	NA
SHL-15_FAL19 / SHL-DUP11_FAL19	680-176309-20 / 680-176309-21	Manganese (FLDFLT)	540	530	10.0	1.87	30	OK	NA

Location	Analysis
SHL-15	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-15_FAL19 / SHL-DUP11_FAL19	680-176309-20 / 680-176309-21	Arsenic (FLDFLT)	110	110	3.00	0.00	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801763091

Location	Analysis
SHL-15	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-15_FAL19 / SHL-DUP11_FAL19	680-176309-20 / 680-176309-21	Chloride	7.00	7.30	0.500	4.20	30	OK	NA
SHL-15_FAL19 / SHL-DUP11_FAL19	680-176309-20 / 680-176309-21	Sulfate	29.0	29.0	1.00	0.00	30	OK	NA

Location	Analysis
SHL-15	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-15_FAL19 / SHL-DUP11_FAL19	680-176309-20 / 680-176309-21	Dissolved Organic Carbon (FLDFLT)	2.60	2.60	1.00	0.00	30	NA	OK

Location	Analysis
SHL-20	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-20_FAL19 / SHL-DUP02_FAL19	680-176309-14 / 680-176309-15	Alkalinity, Total (as CaCO3)	99.0	98.0	10.0	1.02	30	OK	NA

Location	Analysis
SHL-20	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-20_FAL19 / SHL-DUP02_FAL19	680-176309-14 / 680-176309-15	Iron (FLDFLT)	45000	46000	50.0	2.20	30	OK	NA
SHL-20_FAL19 / SHL-DUP02_FAL19	680-176309-14 / 680-176309-15	Manganese (FLDFLT)	1900	1900	10.0	0.00	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801763091

Location	Analysis
SHL-20	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-20_FAL19 / SHL-DUP02_FAL19	680-176309-14 / 680-176309-15	Arsenic (FLDFLT)	830	810	3.00	2.44	30	OK	NA

Location	Analysis
SHL-20	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-20_FAL19 / SHL-DUP02_FAL19	680-176309-14 / 680-176309-15	Chloride	62.0	61.0	0.500	1.63	30	OK	NA
SHL-20_FAL19 / SHL-DUP02_FAL19	680-176309-14 / 680-176309-15	Sulfate	29.0	29.0	1.00	0.00	30	OK	NA

Location	Analysis
SHL-20	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHL-20_FAL19 / SHL-DUP02_FAL19	680-176309-14 / 680-176309-15	Dissolved Organic Carbon (FLDFLT)	1.30	1.40	1.00	7.41	30	NA	OK

Location	Analysis
SHM-11-06	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-11-06_FAL19 / SHL-DUP03_FAL19	680-176309-9 / 680-176309-11	Alkalinity, Total (as CaCO3)	190	190	10.0	0.00	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801763091

Location	Analysis
SHM-11-06	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-11-06_FAL19 / SHL-DUP03_FAL19	680-176309-9 / 680-176309-11	Iron (FLDFLT)	69000	68000	50.0	1.46	30	OK	NA
SHM-11-06_FAL19 / SHL-DUP03_FAL19	680-176309-9 / 680-176309-11	Manganese (FLDFLT)	1700	1600	10.0	6.06	30	OK	NA

Location	Analysis
SHM-11-06	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-11-06_FAL19 / SHL-DUP03_FAL19	680-176309-9 / 680-176309-11	Arsenic (FLDFLT)	780	810	3.00	3.77	30	OK	NA

Location	Analysis
SHM-11-06	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-11-06_FAL19 / SHL-DUP03_FAL19	680-176309-9 / 680-176309-11	Chloride	46.0	46.0	0.500	0.00	30	OK	NA
SHM-11-06_FAL19 / SHL-DUP03_FAL19	680-176309-9 / 680-176309-11	Sulfate	8.60	8.10	1.00	5.99	30	OK	NA

Location	Analysis
SHM-11-06	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-11-06_FAL19 / SHL-DUP03_FAL19	680-176309-9 / 680-176309-11	Dissolved Organic Carbon (FLDFLT)	2.10	1.90	1.00	10.0	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801766111

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Fall 2019
SDG:	6801766111
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Arvada, CO
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	December 09, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
EPA-PZ-2012-5A_FAL19	680-176611-17	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-5B_FAL19	680-176611-18	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-7B_FAL19	680-176611-21	Water	Field Sample/N	X	X	X	X	X
EW-1_FAL19	680-176611-23	Water	Field Sample/N	X	X	X	X	X
EW-4_FAL19	680-176611-24	Water	Field Sample/N	X	X	X	X	X
N5-P1_FAL19	680-176611-11	Water	Field Sample/N	X	X	X	X	X
SHL-22_FAL19	680-176611-2	Water	Field Sample/N	X	X	X	X	X
SHL-DUP04_FAL19	680-176611-16	Water	Field Duplicate/FD	X	X	X	X	X
SHL-DUP09_FAL19	680-176611-9	Water	Field Duplicate/FD	X	X	X	X	X
SHL-EB-110519	680-176611-28	Water	Equipment Blank/EB	X	X	X	X	X
SHM-05-42A_FAL19	680-176611-19	Water	Field Sample/N	X	X	X	X	X
SHM-05-42B_FAL19	680-176611-20	Water	Field Sample/N	X	X	X	X	X
SHM-10-07_FAL19	680-176611-12	Water	Field Sample/N	X	X	X	X	X
SHM-10-13_FAL19	680-176611-10	Water	Field Sample/N	X	X	X	X	X
SHM-10-14_FAL19	680-176611-8	Water	Field Sample/N	X	X	X	X	X
SHM-93-22B_FAL19	680-176611-1	Water	Field Sample/N	X	X	X	X	X
SHM-93-22C_FAL19	680-176611-3	Water	Field Sample/N	X	X	X	X	X
SHP-01-36X_FAL19	680-176611-15	Water	Field Sample/N	X	X	X	X	X
SHP-01-37X_FAL19	680-176611-14	Water	Field Sample/N	X	X	X	X	X

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
SHP-01-38A_FAL19	680-176611-13	Water	Field Sample/N	X	X	X	X	X
SHP-2016-04A_FAL19	680-176611-6	Water	Field Sample/N	X	X	X	X	X
SHP-2016-04B_FAL19	680-176611-7	Water	Field Sample/N	X	X	X	X	X
SHP-2016-05A_FAL19	680-176611-4	Water	Field Sample/N	X	X	X	X	X
SHP-2016-05B_FAL19	680-176611-5	Water	Field Sample/N	X	X	X	X	X
SHP-2016-06A_FAL19	680-176611-25	Water	Field Sample/N	X	X	X	X	X
SHP-2016-06B_FAL19	680-176611-26	Water	Field Sample/N	X	X	X	X	X
SHP-2016-06C_FAL19	680-176611-27	Water	Field Sample/N	X	X	X	X	X
SHP-2016-07B_FAL19	680-176611-29	Water	Field Sample/N	X	X	X	X	X
SHP-99-29X_FAL19	680-176611-22	Water	Field Sample/N	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801766111. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Equipment Blank
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- Lab Replicate RPD
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 203 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SHL Fall 2019 LTM SDG contains 26 samples, 2 FD, and 1 EB.

Analytical Method	Data Reviewer Comment
SW6020A	No additional comments; see Checklist for detail.
SW9060A	No additional comments; see Checklist for detail.
A2320B	No additional comments; see Checklist for detail.
SW9056A	No additional comments; see Checklist for detail.
SW6010C	No additional comments; see Checklist for detail.

Sherri A Pullar

December 08, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

December 09, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-595456/1-A (LB)/ MB 680-595456/1-A	Iron	33.50	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-10-14_FAL19 (MS)/ 680-176611-8	Iron	50.00	87 - 115	10 - 125	percent	J/UJ	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6020A, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-10-14_FAL19 (SD)/ 680-176611-8	Arsenic	-20.00	84 - 116	10 - 125	percent	J/X	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW9056A, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHP-2016-06A_FAL19 (MS)/ 680-176611-25	Sulfate	80.00	90 - 110	10 - 110	percent	J/UJ	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
L	Lab Blank
M	MS Recovery
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pairs: -8/-9 and -13/-16. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report.
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -28 was an EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl-8 was prepared and analyzed as MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			Results were >4x the spiked amount; no qualifications were required.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pairs: -8/-9 and -13/-16. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -28 was an EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl-8 was prepared and analyzed as MS/MSD
Were MS/MSD recoveries within project acceptance limits?	•			Results were >4x the spiked amount; no qualifications were required.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pairs: -8/-9 and -13/-16. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -28 was an EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls -7, -24, and -25 were prepared and analyzed for MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			Results were >4x the spiked amount; no qualifications were required.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pairs: -8/-9 and -13/-16. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls -11, -24, and -13 were prepared and analyzed as MS.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pairs: -8/-9 and -13/-16. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801766111

Location	Analysis
SHM-10-14	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-14_FAL19 / SHL-DUP09_FAL19	680-176611-8 / 680-176611-9	Alkalinity, Total (as CaCO3)	200	210	10.0	4.88	30	OK	NA

Location	Analysis
SHM-10-14	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-14_FAL19 / SHL-DUP09_FAL19	680-176611-8 / 680-176611-9	Iron (FLDFLT)	78000	80000	50.0	2.53	30	OK	NA
SHM-10-14_FAL19 / SHL-DUP09_FAL19	680-176611-8 / 680-176611-9	Manganese (FLDFLT)	2400	2400	10.0	0.00	30	OK	NA

Location	Analysis
SHM-10-14	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-14_FAL19 / SHL-DUP09_FAL19	680-176611-8 / 680-176611-9	Arsenic (FLDFLT)	4500	4500	3.00	0.00	30	OK	NA

Location	Analysis
SHM-10-14	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-14_FAL19 / SHL-DUP09_FAL19	680-176611-8 / 680-176611-9	Chloride	4.00	4.00	0.500	0.00	30	OK	NA
SHM-10-14_FAL19 / SHL-DUP09_FAL19	680-176611-8 / 680-176611-9	Sulfate	2.40	2.30	1.00	4.26	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801766111

Location	Analysis
SHM-10-14	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-14_FAL19 / SHL-DUP09_FAL19	680-176611-8 / 680-176611-9	Dissolved Organic Carbon (FLDFLT)	3.40	3.40	1.00	0.00	30	NA	OK

Location	Analysis
SHP-01-38A	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-01-38A_FAL19 / SHL-DUP04_FAL19	680-176611-13 / 680-176611-16	Alkalinity, Total (as CaCO3)	94.0	95.0	10.0	1.06	30	OK	NA

Location	Analysis
SHP-01-38A	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-01-38A_FAL19 / SHL-DUP04_FAL19	680-176611-13 / 680-176611-16	Iron (FLDFLT)	25000	25000	50.0	0.00	30	OK	NA
SHP-01-38A_FAL19 / SHL-DUP04_FAL19	680-176611-13 / 680-176611-16	Manganese (FLDFLT)	2000	2000	10.0	0.00	30	OK	NA

Location	Analysis
SHP-01-38A	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-01-38A_FAL19 / SHL-DUP04_FAL19	680-176611-13 / 680-176611-16	Arsenic (FLDFLT)	130	140	3.00	7.41	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801766111

Location	Analysis
SHP-01-38A	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-01-38A_FAL19 / SHL-DUP04_FAL19	680-176611-13 / 680-176611-16	Chloride	8.50	8.60	0.500	1.17	30	OK	NA
SHP-01-38A_FAL19 / SHL-DUP04_FAL19	680-176611-13 / 680-176611-16	Sulfate	13.0	13.0	1.00	0.00	30	OK	NA

Location	Analysis
SHP-01-38A	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHP-01-38A_FAL19 / SHL-DUP04_FAL19	680-176611-13 / 680-176611-16	Dissolved Organic Carbon (FLDFLT)	1.30	1.40	1.00	7.41	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801766831

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Fall 2019
SDG:	6801766831
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Arvada, CO
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	December 09, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
EPA-PZ-2012-1A_FAL19	680-176683-3	Water	Field Sample/N	X	X	X	X	X
EPA-PZ-2012-1B_FAL19	680-176683-4	Water	Field Sample/N	X	X	X	X	X
SHL-12_FAL19	680-176683-10	Water	Field Sample/N	X	X	X	X	X
SHL-24_FAL19	680-176683-9	Water	Field Sample/N	X	X	X	X	X
SHL-5_FAL19	680-176683-7	Water	Field Sample/N	X	X	X	X	X
SHL-DUP10_FAL19	680-176683-13	Water	Field Duplicate/FD	X	X	X	X	X
SHL-EB-110819	680-176683-17	Water	Equipment Blank/EB	X	X	X	X	X
SHM-05-40X_FAL19	680-176683-12	Water	Field Sample/N	X	X	X	X	X
SHM-05-41A_FAL19	680-176683-19	Water	Field Sample/N	X	X	X	X	X
SHM-05-41B_FAL19	680-176683-20	Water	Field Sample/N	X	X	X	X	X
SHM-05-41C_FAL19	680-176683-18	Water	Field Sample/N	X	X	X	X	X
SHM-07-03_FAL19	680-176683-11	Water	Field Sample/N	X	X	X	X	X
SHM-07-05X_FAL19	680-176683-14	Water	Field Sample/N	X	X	X	X	X
SHM-10-06A_FAL19	680-176683-16	Water	Field Sample/N	X	X	X	X	X
SHM-10-11_FAL19	680-176683-15	Water	Field Sample/N	X	X	X	X	X
SHM-93-24A_FAL19	680-176683-8	Water	Field Sample/N	X	X	X	X	X
SHM-96-5B_FAL19	680-176683-1	Water	Field Sample/N	X	X	X	X	X
SHM-96-5C_FAL19	680-176683-2	Water	Field Sample/N	X	X	X	X	X
SHP-2016-1A_FAL19	680-176683-5	Water	Field Sample/N	X	X	X	X	X

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
SHP-2016-1B_FAL19	680-176683-6	Water	Field Sample/N	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801766831. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Equipment Blank
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- Lab Replicate RPD
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 7 results (5.00%) out of the 140 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SHL Fall 2019 LTM SDG contains 18 samples, 1 field duplicate (FD), and 1 equipment blank (EB).

Analytical Method	Data Reviewer Comment
SW6020A	No additional comments; see Checklist for detail.
SW6010C	No additional comments; see Checklist for detail.
SW9060A	No additional comments; see Checklist for detail.
SW9056A	No additional comments; see Checklist for detail.
A2320B	No additional comments; see Checklist for detail.

Sherri A Pullar

December 08, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

December 09, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-595456/1-A (LB)/ MB 680-595456/1-A	Iron	33.50	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-05-41C_FAL19 (MS)/ 680-176683-18	Manganese	82.50	90 - 114	10 - 125	percent	J/UJ	M	
SHP-2016-1A_FAL19 (SD)/ 680-176683-5	Manganese	84.51	90 - 114	10 - 125	percent	J/UJ	M	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the MS Recovery for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHM-05-41C_FAL19	N	Manganese	10.0	820 J1	820 J	-	ug/l	M
SHP-2016-1A_FAL19	N	Manganese	10.0	4.70 J J1	4.70 J	-	ug/l	M/TR

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW9056A, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-05-41C_FAL19 (MS)/ 680-176683-18	Chloride	72.00	90 - 110	10 - 110	percent	J/UJ	M	Spike amount Insignificant
SHM-05-41C_FAL19 (SD)/ 680-176683-18	Chloride	76.00	90 - 110	10 - 110	percent	J/UJ	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW9060A, Dissolved, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHL-EB-110819 (EB)/ 680-176683-17	Dissolved Organic Carbon	1.200	< 0.35	< 1	mg/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Equipment Blank for SW9060A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHM-05-41A_FAL19	N	Dissolved Organic Carbon	2.30	2.30	2.30 U		mg/l	V
SHM-05-41B_FAL19	N	Dissolved Organic Carbon	2.50	2.50	2.50 U		mg/l	V
SHM-05-41C_FAL19	N	Dissolved Organic Carbon	3.40	3.40	3.40 U		mg/l	V
SHM-10-06A_FAL19	N	Dissolved Organic Carbon	2.60	2.60	2.60 U		mg/l	V
SHM-10-11_FAL19	N	Dissolved Organic Carbon	5.20	5.20	5.20 U		mg/l	V

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHM-05-41C_FAL19	N	Manganese	10.0	820 J1	820 J	-	ug/l	M
SHP-2016-1A_FAL19	N	Manganese	10.0	4.70 J J1	4.70 J	-	ug/l	M/TR

Test Method: SW9060A Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHM-05-41A_FAL19	N	Dissolved Organic Carbon	2.30	2.30	2.30 U		mg/l	V
SHM-05-41B_FAL19	N	Dissolved Organic Carbon	2.50	2.50	2.50 U		mg/l	V
SHM-05-41C_FAL19	N	Dissolved Organic Carbon	3.40	3.40	3.40 U		mg/l	V
SHM-10-06A_FAL19	N	Dissolved Organic Carbon	2.60	2.60	2.60 U		mg/l	V
SHM-10-11_FAL19	N	Dissolved Organic Carbon	5.20	5.20	5.20 U		mg/l	V

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
L	Lab Blank
M	MS Recovery
TR	Trace Level Detect
V	Equipment Blank

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pair: -12/-13. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report.
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -17 was an EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls -5 and -18 were prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?		•		See outlier report.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pair: -12/-13. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -17 was an EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls -5 and -18 were prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pair: -12/-13. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -17 was an EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls -5, -10, and -18 were prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			Sample results were >4x the blank concentration; no qualifications were required.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pair: -12/-13. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?		•		See outlier report.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls -5 and -18 were prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD spl pair: -12/-13. See FD report
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801766831

Location	Analysis
SHM-05-40X	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-05-40X_FAL19 / SHL-DUP10_FAL19	680-176683-12 / 680-176683-13	Alkalinity, Total (as CaCO3)	140	140	10.0	0.00	30	OK	NA

Location	Analysis
SHM-05-40X	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-05-40X_FAL19 / SHL-DUP10_FAL19	680-176683-12 / 680-176683-13	Iron (FLDFLT)	33000	32000	50.0	3.08	30	OK	NA
SHM-05-40X_FAL19 / SHL-DUP10_FAL19	680-176683-12 / 680-176683-13	Manganese (FLDFLT)	820	770	10.0	6.29	30	OK	NA

Location	Analysis
SHM-05-40X	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-05-40X_FAL19 / SHL-DUP10_FAL19	680-176683-12 / 680-176683-13	Arsenic (FLDFLT)	2200	2100	3.00	4.65	30	OK	NA

Location	Analysis
SHM-05-40X	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-05-40X_FAL19 / SHL-DUP10_FAL19	680-176683-12 / 680-176683-13	Chloride	23.0	22.0	0.500	4.44	30	OK	NA
SHM-05-40X_FAL19 / SHL-DUP10_FAL19	680-176683-12 / 680-176683-13	Sulfate	5.40	5.40	1.00	0.00	30	OK	NA

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801766831

Location	Analysis
SHM-05-40X	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-05-40X_FAL19 / SHL-DUP10_FAL19	680-176683-12 / 680-176683-13	Dissolved Organic Carbon (FLDFLT)	2.80	2.80	1.00	0.00	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801769271

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Fall 2019
SDG:	6801769271
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Arvada, CO
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	December 11, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
SHL-23_FAL19	680-176927-28	Water	Field Sample/N	X	X	X	X	X
SHL-7_FAL19	680-176927-7	Water	Field Sample/N	X	X	X	X	X
SHL-DUP08_FAL19	680-176927-21	Water	Field Duplicate/FD	X	X	X	X	X
SHL-EB-111319	680-176927-30	Water	Equipment Blank/EB	X	X	X	X	X
SHM-10-05A_FAL19	680-176927-26	Water	Field Sample/N	X	X	X	X	X
SHM-10-10_FAL19	680-176927-4	Water	Field Sample/N	X	X	X	X	X
SHM-10-16_FAL19	680-176927-20	Water	Field Sample/N	X	X	X	X	X
SHM-11-02_FAL19	680-176927-29	Water	Field Sample/N	X	X	X	X	X
SHM-13-02_FAL19	680-176927-25	Water	Field Sample/N	X	X	X	X	X
SHM-13-03_FAL19	680-176927-24	Water	Field Sample/N	X	X	X	X	X
SHM-13-04_FAL19	680-176927-18	Water	Field Sample/N	X	X	X	X	X
SHM-13-05_FAL19	680-176927-19	Water	Field Sample/N	X	X	X	X	X
SHM-13-06_FAL19	680-176927-17	Water	Field Sample/N	X	X	X	X	X
SHM-13-07_FAL19	680-176927-22	Water	Field Sample/N	X	X	X	X	X
SHM-13-08_FAL19	680-176927-1	Water	Field Sample/N	X	X	X	X	X
SHM-13-14D_FAL19	680-176927-23	Water	Field Sample/N	X	X	X	X	X
SHM-13-14S_FAL19	680-176927-2	Water	Field Sample/N	X	X	X	X	X
SHM-13-15_FAL19	680-176927-3	Water	Field Sample/N	X	X	X	X	X
SHM-93-18B_FAL19	680-176927-6	Water	Field Sample/N	X	X	X	X	X

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
SHM-99-32X_FAL19	680-176927-27	Water	Field Sample/N	X	X	X	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801769271. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Equipment Blank
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- Lab Replicate RPD
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 6 results (4.29%) out of the 140 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SHL Fall 2019 LTM SDG contains 18 spls, 1 field duplicate (FD), and 1 equipment blank (EB).

Analytical Method	Data Reviewer Comment
SW6020A	No additional comments; see Checklist for detail.
SW9060A	No additional comments; see Checklist for detail.
SW6010C	No additional comments; see Checklist for detail.
A2320B	No additional comments; see Checklist for detail.
SW9056A	No additional comments; see Checklist for detail.

Sherri A Pullar

December 10, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

December 11, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-596525/1-A (LB)/ MB 680-596525/1-A	Iron	20.00	< 17	< 50	ug/l	U/None	L	
MB 680-596597/1-A (LB)/ MB 680-596597/1-A	Iron	21.50	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Lab Blank for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-23_FAL19	N	Iron	50.0	19.0 J	50.0 U		ug/l	L
SHM-10-10_FAL19	N	Iron	50.0	38.0 J	50.0 U		ug/l	L
SHM-13-02_FAL19	N	Iron	50.0	18.0 J	50.0 U		ug/l	L
SHM-93-18B_FAL19	N	Iron	50.0	18.0 J	50.0 U		ug/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6010C, Dissolved, LCS Recovery

The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
LCS 680-596525/2-A (BS)/ LCS 680-596525/2-A	Sodium	86.51	87 - 115	10 - 150	percent	J/UJ	C	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHM-13-02_FAL19 (MS)/ 680-176927-25	Manganese	-177.5	90 - 114	10 - 125	percent	J/X	M	Spike amount Insignificant
SHM-13-02_FAL19 (SD)/ 680-176927-25	Manganese	135.0	90 - 114	10 - 125	percent	J/None	M	Spike amount Insignificant

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW9060A, Dissolved, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHL-EB-111319 (EB)/ 680-176927-30	Dissolved Organic Carbon	0.3700	< 0.35	< 1	mg/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Equipment Blank for SW9060A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-23_FAL19	N	Dissolved Organic Carbon	1.00	0.950 J	1.00 U		mg/l	V
SHM-11-02_FAL19	N	Dissolved Organic Carbon	1.60	1.60	1.60 U		mg/l	V

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-23_FAL19	N	Iron	50.0	19.0 J	50.0 U		ug/l	L
SHM-10-10_FAL19	N	Iron	50.0	38.0 J	50.0 U		ug/l	L
SHM-13-02_FAL19	N	Iron	50.0	18.0 J	50.0 U		ug/l	L
SHM-93-18B_FAL19	N	Iron	50.0	18.0 J	50.0 U		ug/l	L

Test Method: SW9060A Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-23_FAL19	N	Dissolved Organic Carbon	1.00	0.950 J	1.00 U		mg/l	V
SHM-11-02_FAL19	N	Dissolved Organic Carbon	1.60	1.60	1.60 U		mg/l	V

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
C	LCS Recovery
L	Lab Blank
M	MS Recovery
TR	Trace Level Detect
V	Equipment Blank

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			Only one COC was included in the lab package.
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -20/-21. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			Only one COC was included in the lab package.
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report.
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl-30 was the EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			Sodium %R was noted in the outlier report as being out; however it rounds to 87% (within the QC limits).
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl-25 was prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			Sample results were >4x the spike amount; no qualifications were required.
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -20/-21. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			Only one COC was included in the lab package.
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl-30 was the EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl-25 was prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -20/-21. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			Only one COC was included in the lab package.
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl-30 was the EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls-25 and -4 were prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -20/-21. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?		•		Chloride required a 5x dilution in spl -18.
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			Only one COC was included in the lab package.
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?		•		See outlier report.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spls-1 and -4 were prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -20/-21. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801769271

Location	Analysis
SHM-10-16	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-16_FAL19 / SHL-DUP08_FAL19	680-176927-20 / 680-176927-21	Alkalinity, Total (as CaCO3)	280	280	10.0	0.00	30	OK	NA

Location	Analysis
SHM-10-16	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-16_FAL19 / SHL-DUP08_FAL19	680-176927-20 / 680-176927-21	Iron (FLDFLT)	37000	38000	50.0	2.67	30	OK	NA
SHM-10-16_FAL19 / SHL-DUP08_FAL19	680-176927-20 / 680-176927-21	Manganese (FLDFLT)	1700	1700	10.0	0.00	30	OK	NA

Location	Analysis
SHM-10-16	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-16_FAL19 / SHL-DUP08_FAL19	680-176927-20 / 680-176927-21	Arsenic (FLDFLT)	1200	1100	3.00	8.70	30	OK	NA

Location	Analysis
SHM-10-16	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-16_FAL19 / SHL-DUP08_FAL19	680-176927-20 / 680-176927-21	Chloride	24.0	24.0	0.500	0.00	30	OK	NA
SHM-10-16_FAL19 / SHL-DUP08_FAL19	680-176927-20 / 680-176927-21	Sulfate	3.70	3.70	1.00	0.00	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801769271

Location	Analysis
SHM-10-16	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-16_FAL19 / SHL-DUP08_FAL19	680-176927-20 / 680-176927-21	Dissolved Organic Carbon (FLDFLT)	1.90	1.90	1.00	0.00	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801769272

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Supplemental Fall 2019
SDG:	6801769272
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved	SW8260B
SHL-10_NOV19	680-176927-8	Water	Field Sample/N	X	X	X
SHL-11_NOV19	680-176927-9	Water	Field Sample/N	X	X	X
SHL-19_NOV19	680-176927-10	Water	Field Sample/N	X	X	X
SHL-20_NOV19	680-176927-11	Water	Field Sample/N	X	X	X
SHL-DUP08_NOV19	680-176927-16	Water	Field Duplicate/FD			X
SHM-10-16_NOV19	680-176927-15	Water	Field Sample/N			X
SHM-93-22C_NOV19	680-176927-12	Water	Field Sample/N	X	X	X
SHM-99-32X_NOV19	680-176927-14	Water	Field Sample/N	X	X	X
TRIPBLANK_NOV19	680-176927-13	Water	Trip Blank/TB			X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801769272. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- LCS RPD
- Prep Hold Time
- Surrogate
- Test Hold Time
- Trip Blank

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 25 results (33.33%) out of the 75 results (sample and field QC samples) reported are qualified based on review and 22 results (29.33%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains the 7 GW samples , 1 FD sample and 1 TB sample for VOCs collected during the SHL supplemental sampling event in the fall of 2019.
This is a revised DV report. Sample data for samples SHL-10 and SHL-20 were rejected after evaluation due to inconsistencies with historical data. It appears that sample were mis-labeled and/or switched either in the field or in the laboratory.

Analytical Method	Data Reviewer Comment
SW6020A	Supplemental samples from select SHL locations were submitted for As by method 6020A. Analytical results for samples SHL-10 and SHL-20 were rejected due to inconsistencies with historical data.
SW8260B	Samples were submitted for select VOCs: 1,2-dichlorobenzene, 1,4-dichlorobenzene and 1,2-dichloroethane. Analytical results for samples SHL-10 and SHL-20 were rejected due to inconsistencies with historical data.
SW6010C	Supplemental samples from select SHL locations were submitted for select metals analysis: Cr, Pb, Mn, Ni, Na, Al and Fe. Analytical results for samples SHL-10 and SHL-20 were rejected due to inconsistencies with historical data.

Laurie H Ekes

February 06, 2020

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-597499/142 (CB)/ CCB 680-597499/142	Nickel	2.370	< 2.1	< 40	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Calibration Blank for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHM-93-22C_NOV19	N	Nickel	40.0	2.20 J	40.0 U		ug/l	B2

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-596525/1-A (LB)/ MB 680-596525/1-A	Iron	20.00	< 17	< 50	ug/l	U/None	L	
MB 680-596597/1-A (LB)/ MB 680-596597/1-A	Iron	21.50	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Lab Blank for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-19_NOV19	N	Iron	50.0	80.0	80.0 J	+	ug/l	L
SHM-93-22C_NOV19	N	Iron	50.0	47.0 J	50.0 U		ug/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6010C, Dissolved, LCS Recovery

The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
LCS 680-596525/2-A (BS)/ LCS 680-596525/2-A	Sodium	86.51	87 - 115	10 - 150	percent	J/UJ	C	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW8260B, LCS RPD

The objective of laboratory control sample/laboratory control sample duplicate (LCS/LCSD) RPD analysis is to demonstrate acceptable method precision by the laboratory at the time of analysis. LCS/LCSD analyses are also performed to generate data that determines the long-term precision of the analytical method on various matrices. Non-homogenous samples can impact the apparent method precision. Summary forms were evaluated and compared to electronic data deliverables. Laboratory control sample/laboratory control sample duplicate RPD results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
LCSD 680-597781/5 (BD)/ LCSD 680-597781/5	1,2-Dichloroethane	21.61	< 20	< 20	rpd	J/None	Z	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-19_NOV19	N	Iron	50.0	80.0	80.0 J	+	ug/l	L
SHM-93-22C_NOV19	N	Nickel	40.0	2.20 J	40.0 U		ug/l	B2
SHM-93-22C_NOV19	N	Iron	50.0	47.0 J	50.0 U		ug/l	L

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Table of Results with Modified Qualifiers

Modified Qualifiers for test method SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
SHL-10_NOV19	N	Aluminum	200	70.0 U	70.0 U	70.0 R	Z7
SHL-10_NOV19	N	Chromium	10.0	4.00 U	4.00 U	4.00 R	Z7
SHL-10_NOV19	N	Iron	50.0	47000	47000	47000 R	Z7
SHL-10_NOV19	N	Lead	10.0	10.0 U	10.0 U	10.0 R	Z7
SHL-10_NOV19	N	Manganese	10.0	1800	1800	1800 R	Z7
SHL-10_NOV19	N	Nickel	40.0	6.40 J	6.40 J	6.40 R	Z7
SHL-10_NOV19	N	Sodium	1000	28000	28000 J	28000 R	Z7
SHL-19_NOV19	N	Sodium	1000	4500	4500 J	4500	
SHL-20_NOV19	N	Aluminum	200	70.0 U	70.0 U	70.0 R	Z7
SHL-20_NOV19	N	Chromium	10.0	4.00 U	4.00 U	4.00 R	Z7
SHL-20_NOV19	N	Iron	50.0	50.0 J	50.0 U	50.0 R	Z7
SHL-20_NOV19	N	Lead	10.0	10.0 U	10.0 U	10.0 R	Z7
SHL-20_NOV19	N	Manganese	10.0	2.10 J	2.10 J	2.10 R	Z7
SHL-20_NOV19	N	Nickel	40.0	3.20 J	3.20 J	3.20 R	Z7
SHL-20_NOV19	N	Sodium	1000	27000	27000 J	27000 R	Z7
SHM-99-32X_NOV19	N	Sodium	1000	29000	29000 J	29000	

Modified Qualifiers for test method SW6020A, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
SHL-10_NOV19	N	Arsenic	3.00	880	880	880 R	Z7
SHL-20_NOV19	N	Arsenic	3.00	1.80 J	1.80 J	1.80 R	Z7

Modified Qualifiers for test method SW8260B

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
SHL-10_NOV19	N	1,2-Dichlorobenzene	1.00	1.00 U	1.00 U	1.00 R	Z7
SHL-10_NOV19	N	1,2-Dichloroethane	1.00	1.00 U M Q	1.00 U	1.00 R	Z7
SHL-10_NOV19	N	1,4-Dichlorobenzene	1.00	1.00 U	1.00 U	1.00 R	Z7
SHL-20_NOV19	N	1,2-Dichlorobenzene	1.00	1.00 U	1.00 U	1.00 R	Z7
SHL-20_NOV19	N	1,2-Dichloroethane	1.00	1.00 U M	1.00 U	1.00 R	Z7
SHL-20_NOV19	N	1,4-Dichlorobenzene	1.00	1.00 U	1.00 U	1.00 R	Z7

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Reason Code Definitions

Code	Definition
B2	CCB
C	LCS Recovery
L	Lab Blank
TR	Trace Level Detect
Z	LCS RPD
Z7	Data rejected.

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Data Validation Report for 6801769272

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report.
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?		•		See outlier report.
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?	•			See method comment.

Data Validation Report for 6801769272

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?	•			See method comment.

Data Validation Report for 6801769272

Review Questions

Method: SW8260B (Volatile Organic Compounds by Capillary GC/MS)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Were the required minimum levels of calibration standards used in the initial calibration?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Were surrogate recoveries within project acceptance limits?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Sample -11 was a TB sample.
Were target analytes reported in the field blank(s) less than MDL?		•		VOCs were ND in the TB sample.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?		•		See outlier report.
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			Sample -15/-16 were FD samples. VOCs were ND in both samples.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were DoD QSM corrective actions followed if deviations were noted?	•			
Were any data rejected during the verification process?	•			See method comment.

Data Validation Report for 6801770322

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Fall 2019
SDG:	6801770322
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Arvada, CO
Data Review Contractor:	KOMAN Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Sherri Pullar, Data Validation Chemist
Second Reviewer:	Laurie Ekes, Senior Scientist
Date Submitted:	December 11, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	A2320B	SW6010C - Dissolved	SW6020A - Dissolved	SW9056A	SW9060A - Dissolved
SHL-DUP05_FAL19	680-177032-7	Water	Field Duplicate/FD	X	X	X	X	X
SHL-EB-111419	680-177032-8	Water	Equipment Blank/EB	X	X	X	X	X
SHM-10-02_FAL19	680-177032-13	Water	Field Sample/N	X	X	X	X	X
SHM-10-03_FAL19	680-177032-14	Water	Field Sample/N	X	X	X	X	X
SHM-10-04_FAL19	680-177032-15	Water	Field Sample/N	X	X	X	X	X
SHM-10-08_FAL19	680-177032-12	Water	Field Sample/N	X	X	X	X	X
SHM-10-12_FAL19	680-177032-6	Water	Field Sample/N	X	X	X	X	X
SHM-10-15_FAL19	680-177032-16	Water	Field Sample/N	X	X	X	X	X
SHM-13-01_FAL19	680-177032-5	Water	Field Sample/N	X	X	X	X	X
SHM-99-31C_FAL19	680-177032-4	Water	Field Sample/N	X			X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Arvada, CO and were reported under sample delivery group (SDG) 6801770322. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Equipment Blank
- Field Duplicate RPD
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 6 results (8.96%) out of the 67 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SHL Fall 2019 LTM SDG contains 8 spls, 1 field duplicate (FD), and 1 equipment blank (EB).

Analytical Method	Data Reviewer Comment
SW6020A	No additional comments; see Checklist for detail.
SW6010C	No additional comments; see Checklist for detail.
SW9056A	No additional comments; see Checklist for detail.
SW9060A	No additional comments; see Checklist for detail.
A2320B	No additional comments; see Checklist for detail.

Sherri A Pullar

December 10, 2019

Reviewed by Sherri Pullar, Data Validation Chemist, KOMAN Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

Laurie Ekes

December 11, 2019

Reviewed by Laurie Ekes, Senior Scientist, KOMAN Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-597291/110 (CB)/ CCB 680-597291/110	Iron	17.50	< 17	< 50	ug/l	U/None	B2	
CCB 680-597291/146 (CB)/ CCB 680-597291/146	Iron	20.10	< 17	< 50	ug/l	U/None	B2	
CCB 680-597291/158 (CB)/ CCB 680-597291/158	Iron	18.90	< 17	< 50	ug/l	U/None	B2	
CCB 680-597291/170 (CB)/ CCB 680-597291/170	Iron	21.20	< 17	< 50	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Calibration Blank for SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-EB-111419	EB	Iron	50.0	20.0 J	50.0 U		ug/l	B2
SHM-10-02_FAL19	N	Iron	50.0	32.0 J	50.0 U		ug/l	B2
SHM-10-03_FAL19	N	Iron	50.0	29.0 J	50.0 U		ug/l	B2
SHM-10-04_FAL19	N	Iron	50.0	36.0 J	50.0 U		ug/l	B2
SHM-10-08_FAL19	N	Iron	61.0	61.0	61.0 U		ug/l	B2
SHM-13-01_FAL19	N	Iron	50.0	27.0 J	50.0 U		ug/l	B2

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Quality Control Outliers for test method SW6010C, Dissolved, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHL-EB-111419 (EB)/ 680-177032-8	Iron	20.00	< 17	< 50	ug/l	U/None	V	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-596602/1-A (LB)/ MB 680-596602/1-A	Iron	23.00	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6020A, Dissolved, Equipment Blank

The purpose of equipment blanks is to determine the existence and magnitude of cross-contamination problems resulting from the process during sampling. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in equipment blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
SHL-EB-111419 (EB)/ 680-177032-8	Arsenic	23.00	< 1.5	< 3	ug/l	U/None	V	Blank is over 3X RL

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Table of All Qualified Results

Test Method: SW6010C Extraction Method: , Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
SHL-EB-111419	EB	Iron	50.0	20.0 J	50.0 U		ug/l	B2
SHM-10-02_FAL19	N	Iron	50.0	32.0 J	50.0 U		ug/l	B2
SHM-10-03_FAL19	N	Iron	50.0	29.0 J	50.0 U		ug/l	B2
SHM-10-04_FAL19	N	Iron	50.0	36.0 J	50.0 U		ug/l	B2
SHM-10-08_FAL19	N	Iron	61.0	61.0	61.0 U		ug/l	B2
SHM-13-01_FAL19	N	Iron	50.0	27.0 J	50.0 U		ug/l	B2

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
B2	CCB
L	Lab Blank
TR	Trace Level Detect
V	Equipment Blank

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: A2320B (Alkalinity by Titrimetric Method)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -6/-7. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report for CCB contamination. No qualifications for Iron MB contamination.
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -8 was an EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -6/-7. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report.
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -8 was an EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -6/-7. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9056A (Anion Chromatography)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?	•			Spl -8 was an EB.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -6/-7. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Review Questions

Method: SW9060A (Total Organic Carbon)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?	•			Spl -8 was prepared and analyzed as MS/MSD.
Were MS/MSD recoveries within project acceptance limits?	•			
Was the MS/MSD RPD within project acceptance limits?	•			
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?	•			FD pair spls -6/-7. See FD report.
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801770322

Location	Analysis
SHM-10-12	A2320B

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-12_FAL19 / SHL-DUP05_FAL19	680-177032-6 / 680-177032-7	Alkalinity, Total (as CaCO3)	170	160	10.0	6.06	30	OK	NA

Location	Analysis
SHM-10-12	SW6010C

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-12_FAL19 / SHL-DUP05_FAL19	680-177032-6 / 680-177032-7	Iron (FLDFLT)	65000	71000	50.0	8.82	30	OK	NA
SHM-10-12_FAL19 / SHL-DUP05_FAL19	680-177032-6 / 680-177032-7	Manganese (FLDFLT)	5400	5800	10.0	7.14	30	OK	NA

Location	Analysis
SHM-10-12	SW6020A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-12_FAL19 / SHL-DUP05_FAL19	680-177032-6 / 680-177032-7	Arsenic (FLDFLT)	3400	3200	3.00	6.06	30	OK	NA

Location	Analysis
SHM-10-12	SW9056A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-12_FAL19 / SHL-DUP05_FAL19	680-177032-6 / 680-177032-7	Chloride	4.10	3.10	0.500	27.8	30	OK	NA
SHM-10-12_FAL19 / SHL-DUP05_FAL19	680-177032-6 / 680-177032-7	Sulfate	2.60	2.20	1.00	16.7	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Field Duplicate Report By SDG
Long Term Monitoring
KOMAN, Long Term Monitoring, SHL Fall 2019
Field Duplicates for SDG: 6801770322

Location	Analysis
SHM-10-12	SW9060A

Field ID - Primary/Field Dup	Lab ID - Primary/Field Dup	Analyte	Primary Result	FD Result	RL	RPD	RPD Criteria	RPD Check	RL Check
SHM-10-12_FAL19 / SHL-DUP05_FAL19	680-177032-6 / 680-177032-7	Dissolved Organic Carbon (FLDFLT)	2.90	2.90	1.00	0.00	30	NA	OK

FD = Field Duplicate
RL = Reporting Limit
RPD = Relative Percent Difference

RL Check = If either the primary sample or field duplicate result is less than 5 times the RL then the criteria used to determine if the field duplicate is outside QC limits is +/- RL for Water and +/- 2 times RL for Soil"

Data Validation Report for 6801770323

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Supplemental Fall 2019
SDG:	6801770323
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	December 16, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved	SW8260B
EW-01_FAL19R	680-177032-9	Water	Field Sample/N	X	X	X
EW-04_FAL19R	680-177032-10	Water	Field Sample/N	X	X	X
SHM-99-31C_FAL19R	680-177032-4	Water	Field Sample/N	X	X	X
TRIPBLANK2_111519	680-177032-11	Water	Trip Blank/TB			X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801770323. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- LCS RPD
- MS Recovery
- MS RPD
- Prep Hold Time
- Surrogate
- Test Hold Time
- Trip Blank

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 10 results (27.78%) out of the 36 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains 3 GW samples and 1 TB sample.

Analytical Method	Data Reviewer Comment
SW6010C	Supplemental samples from select SHL locations were submitted for select metals analysis: Cr, Pb, Mn, Ni, Na, Al and Fe.
SW6020A	No additional comments; see Checklist for detail.
SW8260B	Samples were submitted for select VOCs: 1,2-dichlorobenzene, 1,4-dichlorobenzene and 1,2-dichloroethane

December 12, 2019

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

December 16, 2019

Reviewed by Sherri Pullar, Senior Scientist, Koman Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

Quality Control Outliers for test method SW6010C, Dissolved, Calibration Blank

The purpose of calibration blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in calibration blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
CCB 680-597291/110 (CB)/ CCB 680-597291/110	Iron	17.50	< 17	< 50	ug/l	U/None	B2	
CCB 680-597291/146 (CB)/ CCB 680-597291/146	Iron	20.10	< 17	< 50	ug/l	U/None	B2	
CCB 680-597291/158 (CB)/ CCB 680-597291/158	Iron	18.90	< 17	< 50	ug/l	U/None	B2	
CCB 680-597291/170 (CB)/ CCB 680-597291/170	Iron	21.20	< 17	< 50	ug/l	U/None	B2	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, Lab Blank

The purpose of laboratory blanks is to determine the existence and magnitude of cross-contamination problems resulting from laboratory activities. Reported results were evaluated to determine compliance with the required acceptance criteria. Summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and contaminants found in laboratory blanks are listed below along with any associated qualified results.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
MB 680-596602/1-A (LB)/ MB 680-596602/1-A	Iron	23.00	< 17	< 50	ug/l	U/None	L	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, MS Recovery

Data for matrix spikes/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. These data alone cannot be used to evaluate the precision and accuracy of individual samples. However, when exercising professional judgment, MS/MSD data can be used in conjunction with other available QC information. Reported results were evaluated to determine compliance with the required acceptance criteria, and summary forms were evaluated and compared to electronic data deliverables. Findings of this review, and any associated qualified results, are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
EW-01_FAL19R (SD)/ 680-177032-9	Iron	-26.00	87 - 115	10 - 125	percent	J/X	M	Spike amount Insignificant
EW-01_FAL19R (MS)/ 680-177032-9	Iron	4.000	87 - 115	10 - 125	percent	J/X	M	Spike amount Insignificant
EW-01_FAL19R (SD)/ 680-177032-9	Manganese	47.50	90 - 114	10 - 125	percent	J/UJ	M	Spike amount Insignificant
EW-01_FAL19R (MS)/ 680-177032-9	Manganese	60.00	90 - 114	10 - 125	percent	J/UJ	M	Spike amount Insignificant
EW-01_FAL19R (SD)/ 680-177032-9	Sodium	80.00	87 - 115	10 - 125	percent	J/UJ	M	
SHM-99-31C_FAL19R (MS)/ 680-177032-4	Manganese	47.50	90 - 114	10 - 125	percent	J/UJ	M	Spike amount Insignificant
SHM-99-31C_FAL19R (SD)/ 680-177032-4	Manganese	62.50	90 - 114	10 - 125	percent	J/UJ	M	Spike amount Insignificant
SHM-99-31C_FAL19R (MS)/ 680-177032-4	Sodium	76.00	87 - 115	10 - 125	percent	J/UJ	M	Spike amount Insignificant
SHM-99-31C_FAL19R (SD)/ 680-177032-4	Sodium	82.00	87 - 115	10 - 125	percent	J/UJ	M	Spike amount Insignificant
SHM-99-31C_FAL19R (MS)/ 680-177032-4	Iron	84.00	87 - 115	10 - 125	percent	J/UJ	M	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW6010C, Dissolved, MS RPD

The objective of matrix spikes/matrix spike duplicates (MS/MSD) RPD analysis is to demonstrate acceptable method precision by the laboratory at the time of analysis. MS/MSD analyses are also performed to generate data that determines the long-term precision of the analytical method on various matrices. Non-homogenous samples can impact the apparent method precision. Summary forms were evaluated and compared to electronic data deliverables. Matrix spikes/matrix spike duplicates results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
EW-01_FAL19R (SD)/ 680-177032-9	Nickel	2.927	< 0	< 0		J/UJ	D	
SHM-99-31C_FAL19R (SD)/ 680-177032-4	Nickel	0.9852	< 0	< 0		J/UJ	D	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

No results associated with this QC element required qualification.

Quality Control Outliers for test method SW8260B, Surrogate

Method performance for individual samples is demonstrated through spiking activities. All samples are spiked with surrogate compounds prior to sample preparation. The sample itself may produce effects due to such factors as interferences and high concentrations of analytes. Summary forms were evaluated and compared to electronic data deliverables. Surrogate results that were outside of the acceptance criteria are listed below.

Sample ID/ Lab Sample ID	Analyte	Result	Warning Limits	Control Limits	Units	Qualifier	Reason Code	Comment
EW-01_FAL19R (N)/ 680-177032-9	Toluene-d8	115.7	89 - 112	10 - 112	percent	J/None	I	
EW-04_FAL19R (N)/ 680-177032-10	1,2-Dichloroethane-d4	77.34	81 - 118	10 - 118	percent	J/UJ	I	
SHM-99-31C_FAL19R (N)/ 680-177032-4	Toluene-d8	87.07	89 - 112	10 - 112	percent	J/UJ	I	
TRIPBLANK2_111519 (TB)/ 680-177032-11	1,2-Dichloroethane-d4	79.71	81 - 118	10 - 118	percent	J/UJ	I	

Where two qualifiers are listed, such as 'J/UJ', the first applies to positive results, and the second to non-detect results.
Upper and Lower Warning and Control Limits are abbreviated UWL, LWL, UCL, and LCL in the Comment field.

Qualified Results associated with the Surrogate for SW8260B

FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EW-01_FAL19R	N	1,4-Dichlorobenzene	1.00	0.710 J	0.710 J	+	ug/l	I/TR
EW-04_FAL19R	N	1,2-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I
EW-04_FAL19R	N	1,2-Dichloroethane	1.00	1.00 U M	1.00 UJ		ug/l	I
EW-04_FAL19R	N	1,4-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I
SHM-99-31C_FAL19R	N	1,2-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I
SHM-99-31C_FAL19R	N	1,2-Dichloroethane	1.00	1.00 U	1.00 UJ		ug/l	I
SHM-99-31C_FAL19R	N	1,4-Dichlorobenzene	1.00	1.00 U M	1.00 UJ		ug/l	I
TRIPBLANK2_111519	TB	1,2-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I
TRIPBLANK2_111519	TB	1,2-Dichloroethane	1.00	1.00 U M	1.00 UJ		ug/l	I
TRIPBLANK2_111519	TB	1,4-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.

Table of All Qualified Results

Test Method: SW8260B	**Extraction Method: SW5030B**							
FieldSample ID	Type	Analyte	LOQ	Lab Result	Qualified Result	Bias	Units	Reason
EW-01_FAL19R	N	1,4-Dichlorobenzene	1.00	0.710 J	0.710 J	+	ug/l	I/TR
EW-04_FAL19R	N	1,2-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I
EW-04_FAL19R	N	1,2-Dichloroethane	1.00	1.00 U M	1.00 UJ		ug/l	I
EW-04_FAL19R	N	1,4-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I
SHM-99-31C_FAL19R	N	1,2-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I
SHM-99-31C_FAL19R	N	1,2-Dichloroethane	1.00	1.00 U	1.00 UJ		ug/l	I
SHM-99-31C_FAL19R	N	1,4-Dichlorobenzene	1.00	1.00 U M	1.00 UJ		ug/l	I
TRIPBLANK2_111519	TB	1,2-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I
TRIPBLANK2_111519	TB	1,2-Dichloroethane	1.00	1.00 U M	1.00 UJ		ug/l	I
TRIPBLANK2_111519	TB	1,4-Dichlorobenzene	1.00	1.00 U	1.00 UJ		ug/l	I

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Table of Results with Modified Qualifiers

Modified Qualifiers for test method SW6010C, Dissolved

FieldSample ID	Type	Analyte	LOQ	Lab Result	ADR Result	Modified Result	Reason
EW-01_FAL19R	N	Nickel	40.0	7.30 J	7.30 J	7.30 J	TR
EW-01_FAL19R	N	Sodium	1000	13000 J1	13000 J	13000	
SHM-99-31C_FAL19R	N	Iron	50.0	11000 J1	11000 J	11000	
SHM-99-31C_FAL19R	N	Nickel	40.0	6.30 J	6.30 J	6.30 J	TR

Analytes not found in project samples are reported as not detected at the limit of detection (LOD).
In instances where no LOD is provided, results are reported down to the LOQ.
Trace values are not included in the qualified results table unless additional reason codes are associated.

Reason Code Definitions

Code	Definition
B2	CCB
D	MS RPD
I	Surrogate recovery outside project limits.
L	Lab Blank
M	MS Recovery
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		See outlier report.
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?	•			The laboratory selected samples -4 and -9 to spike and analyze as MS/MSD samples.
Were MS/MSD recoveries within project acceptance limits?		•		See outlier report. The native sample results from both samples for Na, Fe, and/or Mn were greater than 4 times the spike levels. MS/MSD %Rs were outside control limits due to the high levels of target analytes. Qualifiers were not needed.
Was the MS/MSD RPD within project acceptance limits?			•	RPDs could not be calculated due to high levels of target analytes.
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801770323

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801770323

Review Questions

Method: SW8260B (Volatile Organic Compounds by Capillary GC/MS)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Were the required minimum levels of calibration standards used in the initial calibration?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Were surrogate recoveries within project acceptance limits?		•		See outlier report.
Was a method blank prepared and analyzed with each batch?	•			
Were field blanks (EBs or FBs) submitted with these samples?	•			Sample -11 was a TB sample.
Were target analytes reported in the field blank(s) less than MDL?		•		VOC were ND in the TB sample.
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?	•			
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were DoD QSM corrective actions followed if deviations were noted?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801773551

Facility:	Long Term Monitoring
Event:	KOMAN, Long Term Monitoring, SHL Supplemental Fall 2019
SDG:	6801773551
Guidance Document:	Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018
Prime Contractor:	KOMAN Government Services, LLC
Project Manager:	Jim Ropp
Contract Laboratory(ies):	TestAmerica Laboratories, Inc., Savannah, GA
Data Review Contractor:	Koman Government Solutions, LLC
Data Review Level:	2B
Primary Data Reviewer:	Laurie Ekes, Senior Project Chemist
Second Reviewer:	Sherri Pullar, Senior Scientist
Date Submitted:	December 16, 2019

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	SW6010C - Dissolved	SW6020A - Dissolved
SHM-10-16_NOV19R	680-177355-1	Water	Field Sample/N	X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at 2B data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the Quality Assurance Project Plan, Long Term Monitoring Program, Former Fort Devens, 2018 and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by KOMAN Government Services, LLC; analyses were performed by TestAmerica Laboratories, Inc., Savannah, GA and were reported under sample delivery group (SDG) 6801773551. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Blank - Negative
- Calibration Blank
- Calibration Blank - Negative
- Continuing Calibration Verification
- Interference Check Sample A
- Interference Check Sample A - Negative
- Interference Check Sample AB
- Lab Blank
- LCS Recovery
- Prep Hold Time
- Test Hold Time

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 8 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency. Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

This SDG contains one SHL GW sample.

Analytical Method	Data Reviewer Comment
SW6010C	Supplemental samples from select SHL locations were submitted for select metals analysis: Cr, Pb, Mn, Ni, Na, Al and Fe.
SW6020A	No additional comments; see Checklist for detail.

December 13, 2019

Reviewed by Laurie Ekes, Senior Project Chemist, Koman Government Solutions, LLC

As the First Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of a minimum of 10% of the reported sample results and method quality control data between the two deliverables.

December 16, 2019

Reviewed by Sherri Pullar, Senior Scientist, Koman Government Solutions, LLC

As the Second Reviewer, I certify that I have performed a quality assurance review of the report generated by the First Reviewer.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
J	Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.
B	Blank contamination: The analyte was found in an associated blank above one half the RL, as well as in the sample.
UB	The analyte was also detected in an associated laboratory or field blank at a concentration comparable to the concentration in the sample. The reported result has been requalified as not detected.

X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.

Data Validation Report for 6801773551

Review Questions

Method: SW6010C (Trace Metals by Inductively Coupled Plasma/Atomic Emission Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were target analytes reported in the field blank(s) less than MDL?			•	
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

Data Validation Report for 6801773551

Review Questions

Method: SW6020A (Trace Metals by Inductively Coupled Plasma/Mass Spectrometry)				
Review Questions	Yes	No	NA	Comment
Did Chain-of-Custody information agree with laboratory report and EDD for requested field samples and tests?	•			
Were samples preserved properly and received in good condition?	•			
Were holding times met?	•			
Were all requested target analytes reported?	•			
Was the Calibration within acceptance criteria?	•			
Was either analysis of an ICV performed after each ICAL or a second source standard prior to sample analysis?	•			
Were all reported analytes for the ICV within the required criteria?	•			
Were CCVs run at the required frequency and within acceptance criteria?	•			
Was a method blank prepared and analyzed with each batch?	•			
Were target analytes in the method blank less than MDL?		•		
Were field blanks (EBs or FBs) submitted with these samples?		•		
Was an LCS/LCSD pair prepared and analyzed with each batch?	•			
Were LCS/LCSD recoveries within project acceptance limits?	•			
Was the LCS/LCSD RPD within project acceptance limits?			•	
Was a MS/MSD pair prepared with each batch?		•		
Were MS/MSD recoveries within project acceptance limits?			•	
Was the MS/MSD RPD within project acceptance limits?			•	
If a field duplicate was analyzed, were the RPDs within QAPP acceptance limits?			•	
Were QAPP specified laboratory LOQs/RLs achieved?	•			
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?	•			
Were any data rejected during the verification process?		•		

APPENDIX G

2019 SUPPLEMENTAL SAMPLING EVENT FOR THE 2020 FIVE-YEAR REVIEW

Appendix G
Former Fort Devens
KOMAN, Long Term Monitoring, SHL Supplemental Fall 2019
AOC 5, Shepley's Hill Landfill

Locations: Field Sample ID: Sample Date:		EW-01 EW-01_FAL19R 11/15/2019	EW-04 EW-04_FAL19R 11/15/2019	SHL-10 SHL-10_NOV19 11/13/2019	SHL-11 SHL-11_NOV19 11/11/2019	SHL-19 SHL-19_NOV19 11/11/2019	SHL-20 SHL-20_NOV19 11/11/2019	SHM-10-16 SHM-10-16_NOV19R 11/21/2019	SHM-93-22C SHM-93-22C_NOV19 11/11/2019	SHM-99-31C SHM-99-31C_FAL19R 11/14/2019	SHM-99-32X SHM-99-32X_NOV19 11/13/2019
Metals (UG/L)	Cleanup Levels *										
Aluminum	6,870	70.0 U	70.0 U	70.0 U	70.0 U	70.0 U	70.0 U	**36.0 J**	70.0 U	**110 J**	70.0 U
Arsenic	10	**1,700**	**3,200**	**880**	**910**	**3.00**	**1.80 J**	**1,100**	**4.20**	**140**	**55.0**
Chromium	100	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U
Iron	9,100	**66,000**	**40,000**	**47,000**	**52,000**	**80.0 J**	50.0 U	**33,000**	50.0 U	**11,000**	**7,100**
Lead	15	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	**9.00 J**	10.0 U
Manganese	291	**2,200**	**2,400**	**1,800**	**1,800**	**2.80 J**	**2.10 J**	**1,800**	**2.60 J**	**4,700**	**4,600**
Nickel	100	**7.30 J**	**6.20 J**	**6.40 J**	**4.30 J**	5.00 U	**3.20 J**	**41.0**	40.0 U	**6.30 J**	5.00 U
Sodium	20,000	**13,000**	**6,500**	**28,000**	**29,000**	**4,500**	**27,000**	**28,000**	**14,000**	**28,000**	**29,000**
VOC (UG/L)											
1,2-Dichlorobenzene	600	1.00 U	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U
1,2-Dichloroethane	5	1.00 U	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 U
1,4-Dichlorobenzene	5	**0.710 J**	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U	**0.870 J**	1.00 U	1.00 UJ	1.00 U
Field Parameters											
Temperature (°C)		--	--	10	10.12	10.11	10.57	8.9	8.61	9.43	8.2
Ph		--	--	5.5	6.31	6.3	5.99	7.43	6.95	6.67	6.3
Specific Conductivity (us/cm)		--	--	32	511	214	343	5.96	274	299	291
Dissolved Oxygen (mg/L)		--	--	6.2	0.42	5.6	2.6	7.7	4.12	0.78	6.01
ORP (mv)		--	--	210.1	-24.9	84.2	66.6	8.2	102.9	-77.5	110.8
Turbidity (NTU)		--	--	3.46	14.96	11.96	13.91	1.71	14.08	6.44	12.2

Notes:

* = Cleanup Levels from SHL ROD (1995)

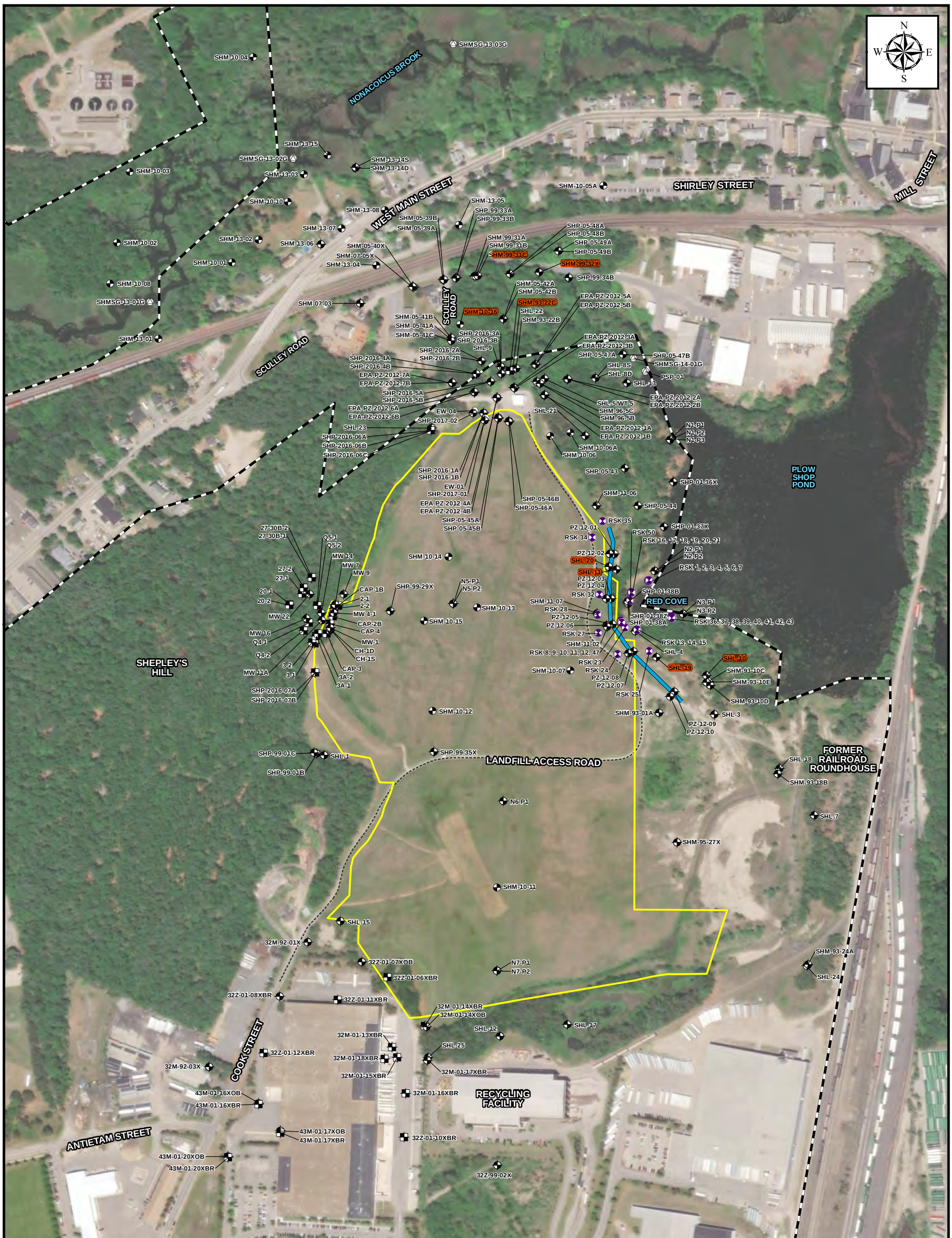
Result greater than cleanup level.

Rejected analytical results

Detects are displayed in **bold font**

J: The analyte was positively identified, but the associated numerical value is estimated.
U: The analyte was not detected above the reported sample quantitation limit.
UJ: The analyte was not detected above the reported sample quantitation limit.

UG/L = microgram per liter



Legend

- Overburden Monitoring Well/Piezometer
- Groundwater Profiling Location/Monitoring Well
- Monitoring Well
- Bedrock Monitoring Well
- Bedrock Study Core
- Extraction Well
- Stream Gauge
- Barrier Wall
- Landfill Access Road
- Shepley's Hill Landfill Boundary
- Former Fort Devens Boundary
- Supplemental VOC and Metals for 5YR

References: LTMMP Update (Sovereign, 2015)

Aerial Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Supplemental VOC and Metals Shepley's Hill Landfill

2019 Annual Report
Shepley's Hill Landfill

Former Fort Devens Army Installation
Devens, Massachusetts

KOMAN Government Solutions, LLC
293 Boston Post Road West, Suite 100, Marlborough, MA 01752

0 200 400
Feet

Date: 1/27/2020

Figure 1

File: AR2018_SHL_F1-2_SITEPLAN.mxd

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-10 (Resample VOCs) (Supplemental)

Project:	LTM - Fall 2019	Date:	11/13/19
Location:	Fort Devens Massachusetts	Sampler:	BM

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	34.705
Depth to bottom (ft BTOR)	38.65
Pump Set Depth (ft BTOR)	35.8
Screen Interval (ft BTOR)	25.40-30.40
Total volume purged (gal)	3.0

Sampling Type

Purging Method: 1.75" Bladder

Tubing type: Bonded TLPE

Dedicated pump (Y/N): N

Purge start/stop time: 0950-1035

Tubing diameter: 1/4" OD

Air source: N_2

Field Instrument (Model/S/N): YSI 556MPS 15F101567

Hach 2100Q 160PC047202

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1000	300	31.20	9.88	5.69	46	6.35	196.4	9.84	clear
1005	300	31.20	10.01	5.53	34	6.40	205.4	3.96	clear
1010	300	31.20	9.91	5.48	33	6.33	212.2	3.80	clear
1015	300	31.20	9.79	5.45	33	6.42	213.7	3.71	clear
1020	300	31.20	9.85	5.40	32	6.32	213.3	3.58	clear
1025	300	31.20	9.90	5.47	32	6.27	211.6	3.50	clear
1030	300	31.20	9.96	5.46	32	6.25	207.6	3.51	clear
1035	300	31.20	10.00	5.50	32	6.20	210.1	3.46	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume =
Post Cal. Check Varience Observed (Y/N):				N					0.163 gal/ft or 616 ml/ft

Sampling Details

Sampling ID:	SHL-10-FAL19				
Sample Time:	1035	Duplicate (Y/N):	N	MS/MSD (Y/N):	N
Field Filtered (Y/N)	N	Dup ID:	–		
Filter Size:	–	Dup Time:	–		

Comments VOCs only (supplemental) - previously sampled on LTM Fall '19
T°C changes potentially due to weather

Brett

Signature

11/13/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC
Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-11 (Supplemental)

Project: LTM - Fall 2019 | Date: 11/11/19
Location: Fort Devens Massachusetts | Sampler: Kristen Fisher

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	19.05'
Depth to bottom (ft BTOR)	30.81'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	12.00'- 27.00 K (13.52 - 28.52 LK)
Total volume purged (gal)	3.1

Sampling Type

Purging Method: peristaltic | Tubing type: Teflon lined | Dedicated pump (Y/N): N
Purge start/stop time: 1110 | Tubing diameter: 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS/11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1115	260.5	19.07	10.11	6.00	0.505	1.25	76.3	16.01	clear
1120	260.7	19.10	10.11	5.97	0.508	0.95	64.3	15.53	clear
1125	260.6	19.08	10.10	6.09	0.511	0.65	32.6	15.63	clear
1130	260.5	19.07	10.10	6.14	0.511	0.59	20.6	15.60	clear
1135	260.5	19.10	10.11	6.23	0.511	0.50	-8.1	11.30	clear
1140	260.5	19.08	10.10	6.26	0.512	0.45	-15.6	15.05	clear
1145	260.6	19.10	10.10	6.28	0.512	0.44	-20.3	15.27	clear
1150	260.6	19.10	10.12	6.31	0.511	0.42	-24.9	14.96	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHL-11_NOV19
Sample Time: 1150 | Duplicate (Y/N): N | MS/MSD (Y/N): N
Field Filtered (Y/N): Y | Dup ID:
Filter Size: 0.45µm | Dup Time: —

Comments

Signature | Date: 11/11/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL - 19 (Supplemental)

Project: LTM - Fall 2019 | Date: 11/11/19

Location: Fort Devens, Massachusetts | Sampler: Kristen Esler

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	23.1075'
Depth to bottom (ft BTOR)	33.70'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	10.00' - 20.00'
Total volume purged (gal)	4.1

Sampling Type

Purging Method: peristaltic | Tubing type: Teflon lined | Dedicated pump (Y/N): N

Purge start/stop time: ~~0950~~ 0945 / 1025 | Tubing diameter: ~~1/4"~~ 1/4" | Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS / 11A100587

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm^c)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0950	310.5	23.70	10.35	6.93	0.183	4.01	80.0	12.1	clear
0955	310.4	23.71	10.38	6.78	0.185	4.09	84.5	11.9	clear
1000	310.5	23.70	10.36	6.50	0.194	4.74	83.9	11.7	clear
1005	310.6	23.70	10.27	6.37	0.203	5.41	83.8	11.7	clear
1010	310.5	23.72	10.23	6.34	0.205	5.63	84.2	11.8	clear
1015	310.4	23.71	10.18	6.32	0.208	5.87	84.1	11.3	clear
1020	310.5	23.70	10.10	6.30	0.213	5.59	84.7	11.14	clear
1025	310.3	23.70	10.11	6.30	0.214	5.60	84.2	11.96	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHL-19 - NOV 19

Sample Time: 1025 | Duplicate (Y/N): N | MS/MSD (Y/N): N

Field Filtered (Y/N): Y | Dup ID: —

Filter Size: 0.45 µm | Dup Time: —

Comments: VOC + filtered metals sample

Signature: [signature] | Date: 11/11/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHL-20 (Supplemental)

Project: LTM - Fall 2019 Date: 11/11/19

Location: Fort Devens, Massachusetts Sampler: Kristen Flesser

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	18.25'
Depth to bottom (ft BTOR)	~~39-49~~ 52.5'
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	39-49
Total volume purged (gal)	3.5

Sampling Type

Purging Method: peristaltic

Purge start/stop time: 1240/

Tubing type: Teflon lined - VOCs HDPE - PFAS

Tubing diameter: 1/4"

Dedicated pump (Y/N): N

Air source: NA

Field Instrument (Model/S/N): YSI 6820 MDS/11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm[c])	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
1245	320.5	18.30	10.93	6.20	0.344	3.77	76.8	14.92	clear
1250	275.0	18.32	10.83	6.04	0.344	3.13	71.5	14.24	clear
1255	275.2	18.30	10.79	6.04	0.344	2.77	67.9	14.35	clear
1300	275.1	18.30	10.78	6.04	0.344	2.73	67.1	14.23	clear
1305	275.3	18.31	10.72	6.02	0.345	2.69	66.3	14.06	clear
1310	275.2	18.30	10.69	6.01	0.343	2.61	66.1	13.45	clear
1315	275.2	18.30	10.62	5.99	0.343	2.60	66.3	13.94	clear
1320	275.3	18.30	10.57	5.99	0.343	2.60	66.6	13.91	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: SHL-20-NOV19

Sample Time: 1320

Duplicate (Y/N): N

MS/MSD (Y/N): N

Field Filtered (Y/N): Y

Dup ID: —

Filter Size: 0.45 µm

Dup Time: —

Comments

Signature

11/11/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-10-16 (Redo)

Project: Supplemental - Fall 2019 Shepleys Hill Landfill — Date: 11/21/19

Location: Fort Devens, Massachusetts — Sampler: [illegible]

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact	✓		
PVC casing intact	✓		
Well gripper present	✓		✓
Bolts present	✓		✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	
Depth to bottom (ft BTOR)	
Pump Set Depth (ft BTOR)	
Screen Interval (ft BTOR)	
Total volume purged (gal)	

☆ Redo ☆

Sampling Type geotech

Purging Method ~~[illegible]~~ — Tubing type teflon lined poly — Dedicated pump (Y/N) N

Purge start/stop time 840/920 — Tubing diameter 1/4" — Air source N/A

Field Instrument (Model/S/N) YSI 650XL 11B100186

LaMotte 7020WP 3519-3513

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
840	200	probe failed	9.11	7.56	649	7.97	15.9	2.30	clear
845	↓	↓	8.90	7.49	630	7.80	9.9	1.81	clear
850	↓	↓	8.89	7.43	607	7.77	8.9	1.78	clear
855	↓	↓	8.89	7.42	606	7.78	8.7	1.75	clear
900	↓	↓	8.91	7.43	599	7.74	8.6	1.77	clear
905	↓	↓	8.92	7.44	598	7.74	8.4	1.71	clear
910	↓	↓	8.90	7.43	597	7.73	8.3	1.73	clear
915	↓	↓	8.90	7.43	596	7.70	8.2	1.71	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	N	N	N	

Sampling Details

Sampling ID: SHM-10-16

Sample Time: 920 — Duplicate (Y/N): N — MS/MSD (Y/N) N

Field Filtered (Y/N): Y — Dup ID N/A

Filter Size: .45 — Dup Time N/A

Comments

Signature

11/21/19

Date

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-93-22C (Supplemental)

Project:	LTM - Fall 2019	Date:	11/11/19
Location:	Fort Devens, Massachusetts	Sampler:	Kristen Ebner

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	4"
Material	PVC
Depth to water (ft BTOR)	9.75
Depth to bottom (ft BTOR)	143.0
Pump Set Depth (ft BTOR)	NA
Screen Interval (ft BTOR)	124.30 — 134.30
Total volume purged (gal)	3.0

Sampling Type

Purging Method: peristaltic — Tubing type: Teflon lined — Dedicated pump (Y/N): N

Purge start/stop time: 0800/ — Tubing diameter: 1/4" — Air source: NA

Field Instrument (Model/S/N): YSI 650 MDS / 11G100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0805	320.0	10.30	8.68	5.82	0.282	4.84	161.8	15.17	clear
0810	300.6	11.21	8.63	6.11	0.273	3.87	142.5	15.20	clear
0815	200.7	11.45	8.65	6.46	0.275	3.86	127.5	13.79	clear
0820	200.8	11.75	8.64	6.52	0.276	3.87	124.3	14.13	clear
0825	200.5	12.10	8.67	6.76	0.275	3.95	114.3	14.74	clear
0830	200.7	12.24	8.66	6.85	0.275	3.99	110.9	14.01	clear
0835	200.5	12.34	8.63	6.94	0.274	4.05	107.2	14.10	clear
0840	200.6	12.40	8.61	6.95	0.274	4.12	102.9	14.08	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	N	N	

Sampling Details

Sampling ID: SHM-93-22C_NOV19

Sample Time: 0840 — Duplicate (Y/N): N — MS/MSD (Y/N): N

Field Filtered (Y/N): Y — Dup ID: —

Filter Size: 0.45µm — Dup Time: —

Comments: VOC & filtered metals sample

Signature: [signature] — Date: 11/11/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-99-31C (Supplemental)

Project: LTM - Fall 2019 | Date: 11/14/19

Location: Fort Devens, Massachusetts | Sampler: M. VIDAL

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)	✓		

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	4.68
Depth to bottom (ft BTOR)	81.10
Pump Set Depth (ft BTOR)	~77
Screen Interval (ft BTOR)	69.96-79.96
Total volume purged (gal)	~4.5

Sampling Type

Purging Method: Low-Flow | Tubing type: TEFLON LINED | Dedicated pump (Y/N): PERISTALTIC

Purge start/stop time: 8:15/8:15 | Tubing diameter: 1/4" | Air source: N/A

Field Instrument (Model/S/N): YSI 556 MPS S/N 15L102308

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
8:20	300	4.87	9.49	7.13	248	3.29	189.3	20.7	CLEAR & SUSPENDED PARTICLES
8:25	300	4.88	9.49	7.18	248	2.82	137.4	45.0	
8:30		4.90	9.49	7.10	247	2.25	73.7	31.3	
8:35		4.90	9.50	7.06	246	2.00	40.1	20.9	
8:40		4.88	9.49	6.93	246	1.48	-28.0	16.2	
8:45		4.86	9.45	6.87	248	0.82	-70.8	13.7	
8:50		4.86	9.40	6.70	286	0.80	-73.6	11.1	
8:55		4.86	9.41	6.68	294	0.77	-76.1	9.3	
9:00		4.86	9.43	6.67	299	0.78	-77.5	6.44	
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N	N	Y	Y	Y	

Sampling Details

Sampling ID: SHM-99-31C-FAL19

Sample Time: 9:05 | Duplicate (Y/N): N/A | MS/MSD (Y/N): VOCs + METALS

Field Filtered (Y/N): | Dup ID: N/A

Filter Size: 0.45 µm | Dup Time: N/A

Comments

Signature | Date: 11/14/19

KOMAN GOVERNMENT SOLUTIONS LLC

Low Flow/ Low Stress Groundwater Sampling Log

Well Identification: SHM-99-32X (Supplemental)

Project: LTM - Fall 2019 Date: 11/13/19

Location: Fort Devens, Massachusetts Sampler: Kristen Frazer

Well Integrity

	Yes	No	N/A
Casing Secure	✓		
Concrete Pad intact			✓
PVC casing intact	✓		
Well gripper present	✓		
Bolts present			✓
Locked (stickup wells)		✓	

Well Information

Diameter	2"
Material	PVC
Depth to water (ft BTOR)	10.4
Depth to bottom (ft BTOR)	85.0
Pump Set Depth (ft BTOR)	N/A
Screen Interval (ft BTOR)	74.16 - 84.16
Total volume purged (gal)	3.75

Sampling Type

Purging Method Peristaltic Tubing type Teflon lined Dedicated pump (Y/N) N

Purge start/stop time 0825/0905 Tubing diameter 1/4" Air source N/A

Field Instrument (Model/S/N) YSI 650 MDS / 11G 100387

Stabilization Parameters

Time (hhmm)	Flow Rate (ml/min)	Depth to Water (ft)	Temp (°C)	pH (STD)	SPC (µS/cm°)	DO (mg/L)	ORP (mv)	Turbidity (NTU)	Color/Clarity
0830	300.0	10.5	8.61	6.11	0.249	6.94	162.6	7.82	clear
0835	300.0	10.5	8.48	6.37	0.248	7.03	139.9	12.0	clear
0840	300.0	10.5	8.30	6.47	0.248	7.16	132.3	12.3	clear
0845	300.0	10.5	8.34	6.47	0.252	6.92	126.0	12.210	clear
0850	300.0	10.5	8.25	6.48	0.255	6.79	124.2	12.24	clear
0855	300.0	10.5	8.26	6.40	0.292	6.14	118.9	12.23	clear
0900	300.0	10.5	8.20	6.31	0.293	6.04	112.3	12.24	clear
0905	300.0	10.5	8.20	6.30	0.291	6.01	110.8	12.20	clear
Acceptance Criteria:		<0.3ft	±3%	±0.1	±3%	±10%	± 10mv	10%	2" Screen Volume = 0.163 gal/ft or 616 ml/ft
Post Cal. Check Varience Observed (Y/N):				N					

Sampling Details

Sampling ID: SHM-99-32X-NOV19

Sample Time: 0905 Duplicate (Y/N) N MS/MSD (Y/N): N

Field Filtered (Y/N): Y Dup ID —

Filter Size: 0.45µm Dup Time —

Comments

Signature

EF 11/13/19

Date

KGS

Field Instrument Calibration Log

Date: 11/21/19 Weather: 30's

Project/Site Name: SHL Instrument: YSI 650XL

Calibrated By: MA Serial Number: 11B100186

Parameters	Solution Expiration Date	AM Calibration Time 7:00		Cal. Temp. (°C)	PM Post Cal. Check Time 1200	Post Cal. Check Temp (°C)	Post Cal. Check Criteria	Varience Noted (Y/N)
Specific Conductivity (1.413 µS/cm°)	3/20	1.400	1.413	17.18	1.414	18.16°	±10 µS/cm	N
pH (7)	2/21	7.14	7.00	17.15	7.01	18.21°	± 0.3 Ph *	N
pH (4)	3/21	4.09	4.00	17.23	4.09	18.30°	± 0.3 Ph *	N
pH (10)	2/21	9.70	10.00	17.30	10.03	18.29°	± 0.3 Ph *	N
ORP (240 mv)	5/20	221.6	240.0	17.19	241.1	18.30°	±10 mv	N
Dissolved Oxygen (%)	N/A	132.6%	100.0%	17.00°	92.6%	18.27°	-	N
Dissolved Oxygen (mg/L)	N/A	9.41	10.00	16.82°	9.92	18.00°	± 0.5 mg/L < 0.5 mg/L for 0 mg/L solution, no negative value	N
Barometric Pressure (mmHg)	N/A	—	769	—	760	—	-	N

Notes:

* Ph Unit with Ph 7 Buffer

(Mark Noted Variences on Field Forms)

Signature: [signature] Date: 11/21/19

KGS

Turbidity Instrument Calibration Log

Project/Site Name: SHL

Instrument: LaMotte 2020WE

Calibrated By: VGA

Serial Number: 3519 - 3513

Date	AM Calibration				PM Post Calibration Check		Variance Noted
	Pre-Cal 0 NTU	Post-Cal 0 NTU	Pre-Cal 10 NTU	Post-Cal 10 NTU	0 NTU	10 NTU	
11/20/19	0.00	0.00	10.09	10.00	0.02	10.00	✓
11/21/19	0.03	0.00	10.02	10.00	0.03	10.09	✓

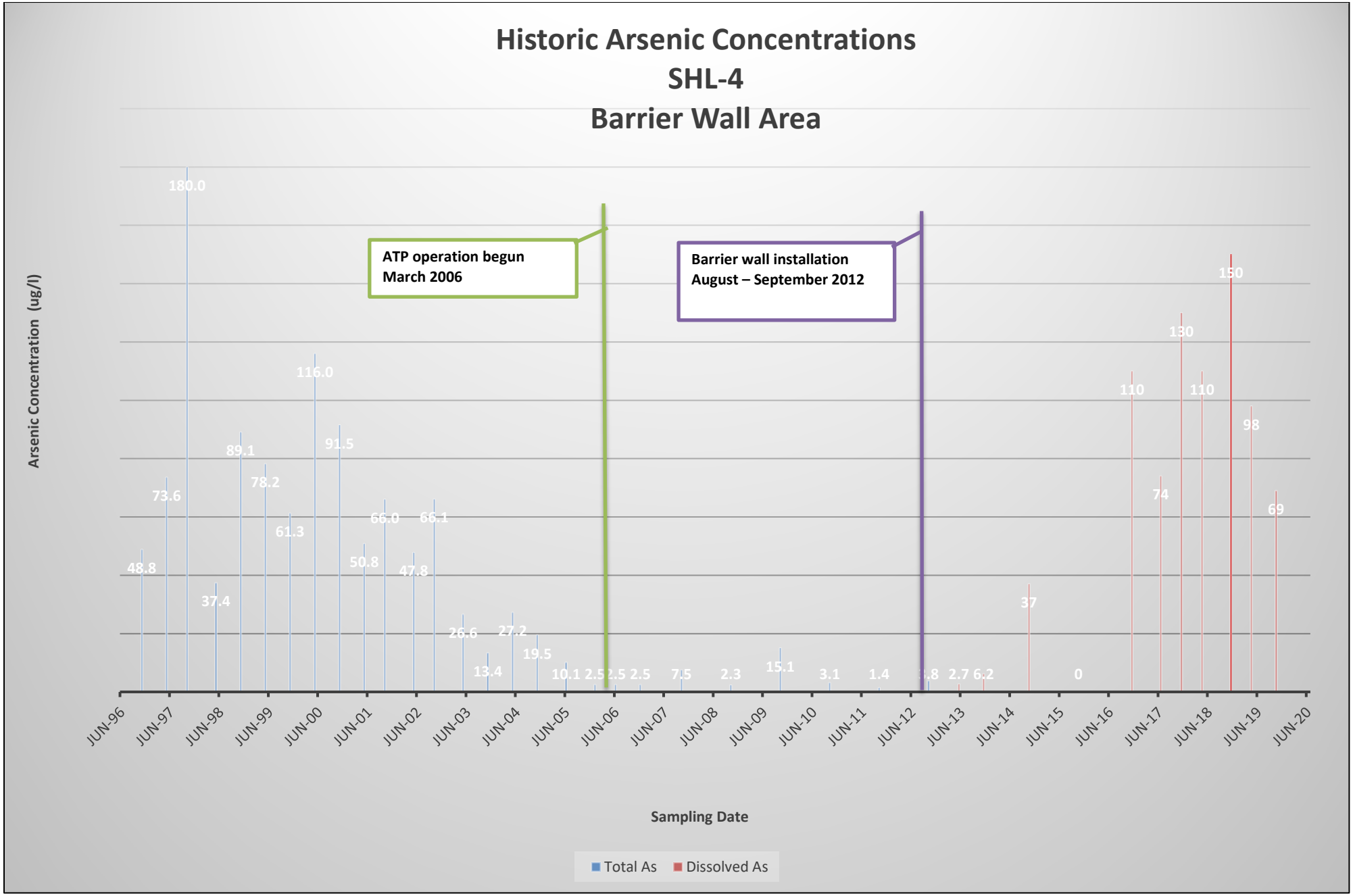
Notes: Mark Noted Variences on Field Forms

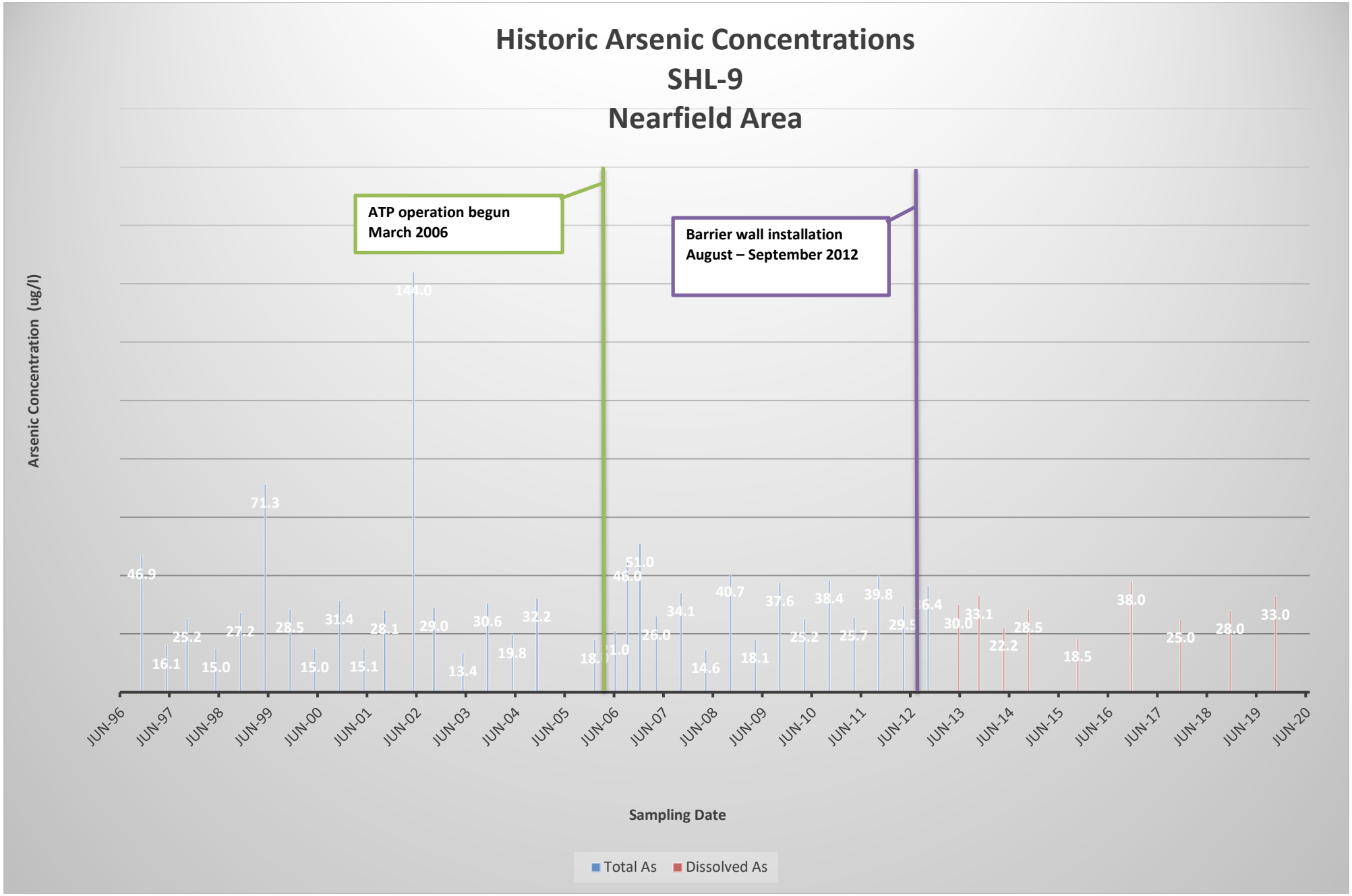
Post Calibration Criteria	
-	± 0.5

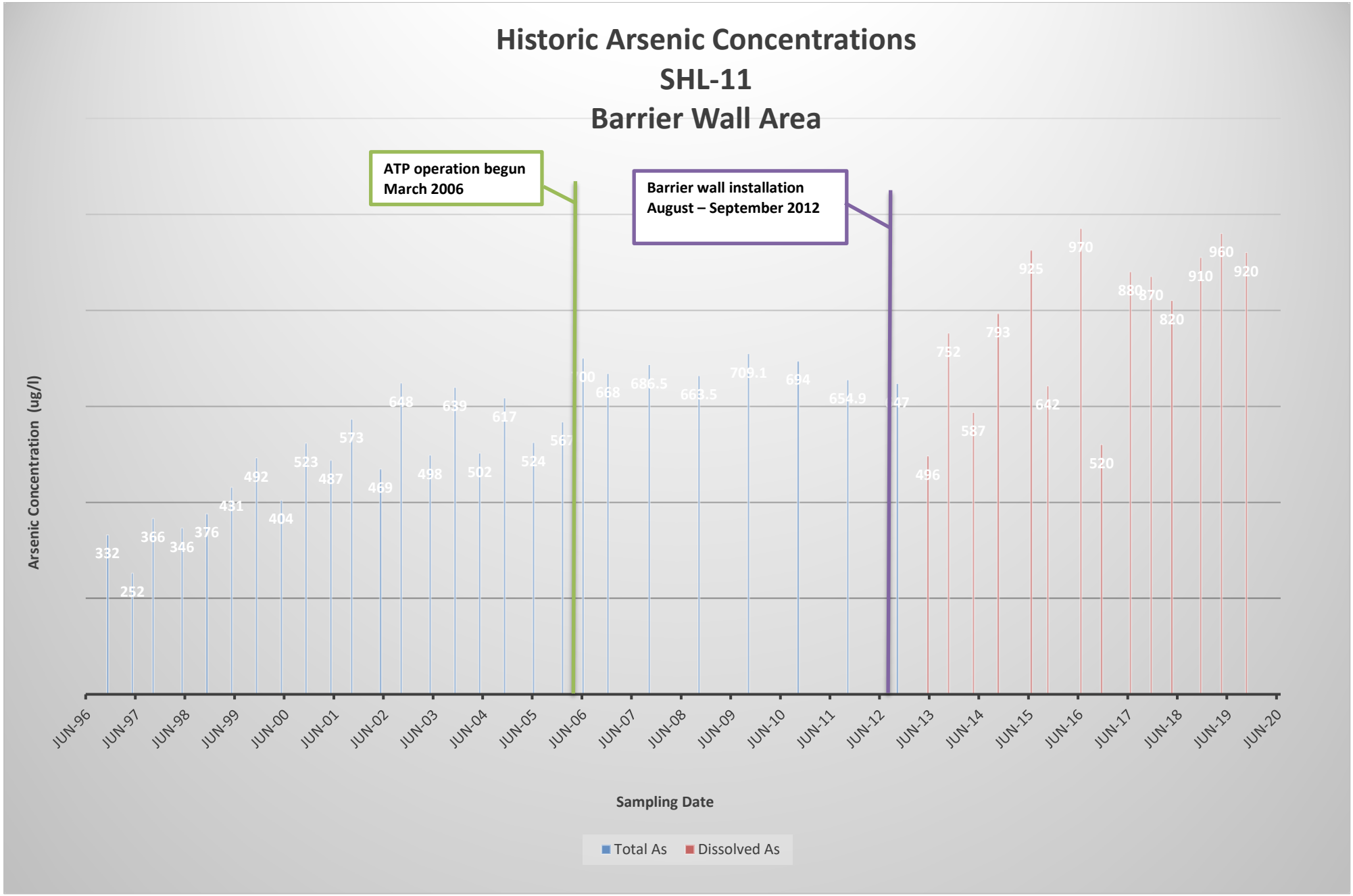
Signature: [signature]

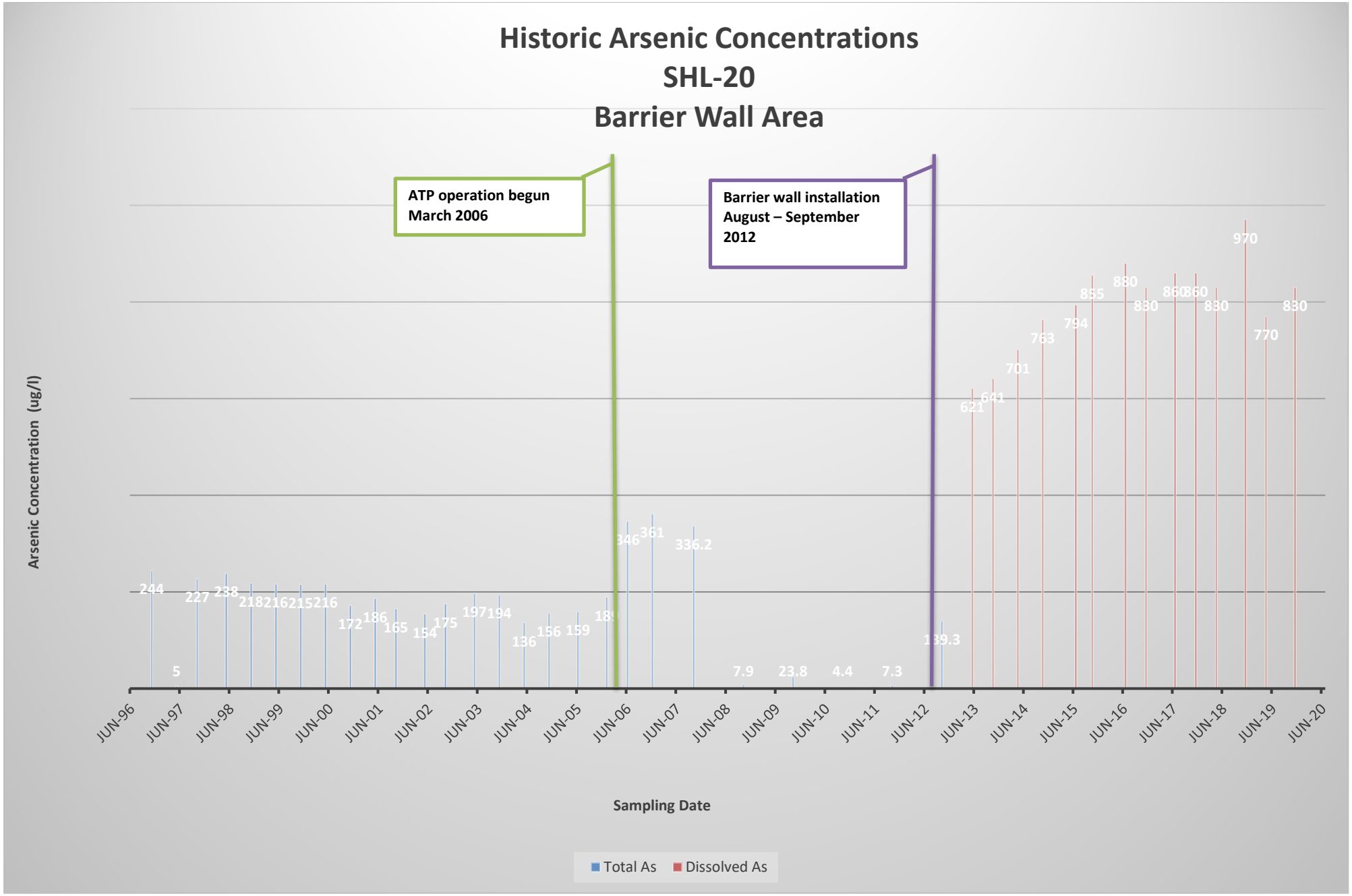
Date: 11/21/19

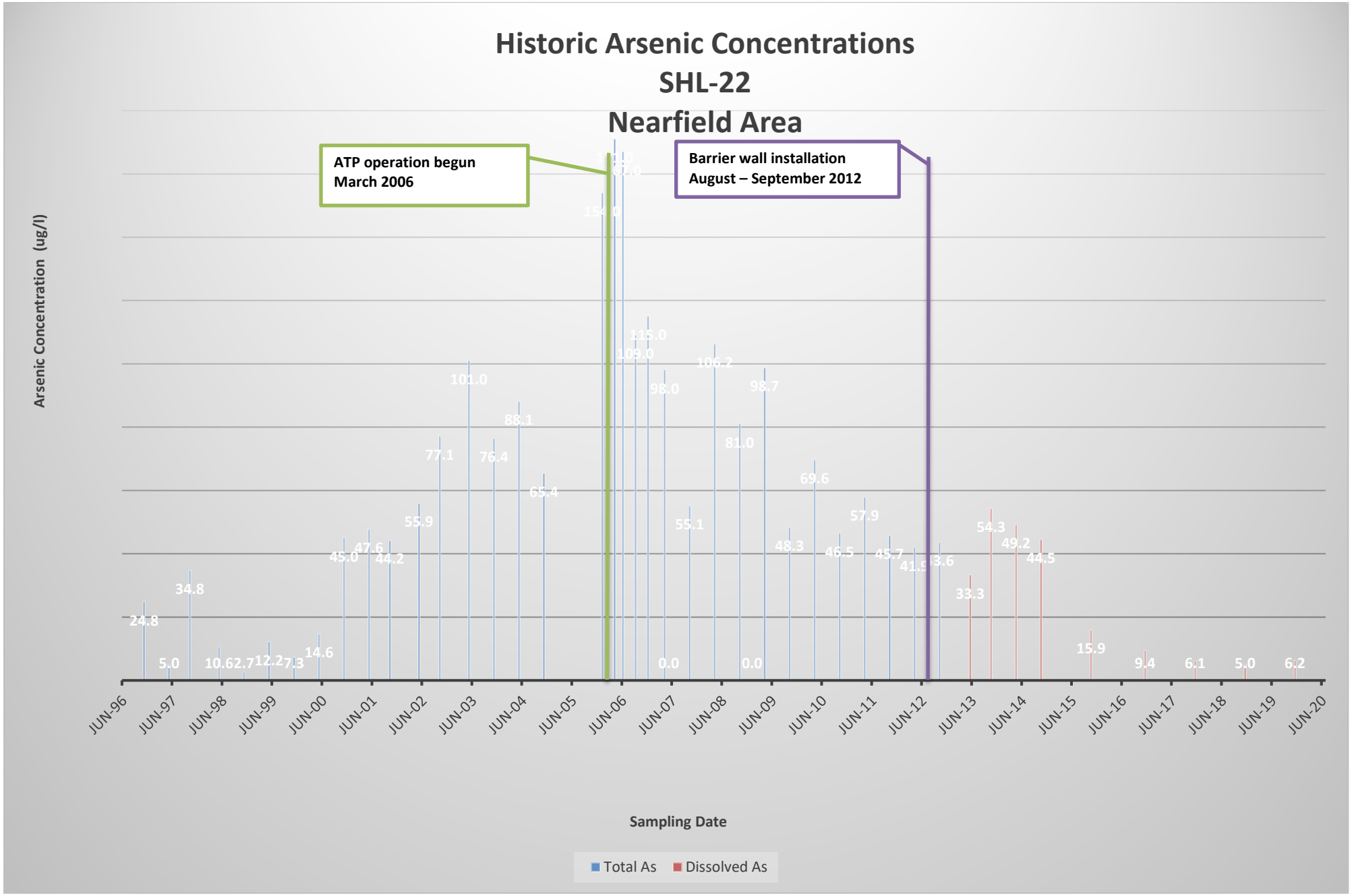
APPENDIX H
ARSENIC CONCENTRATION TREND GRAPHS

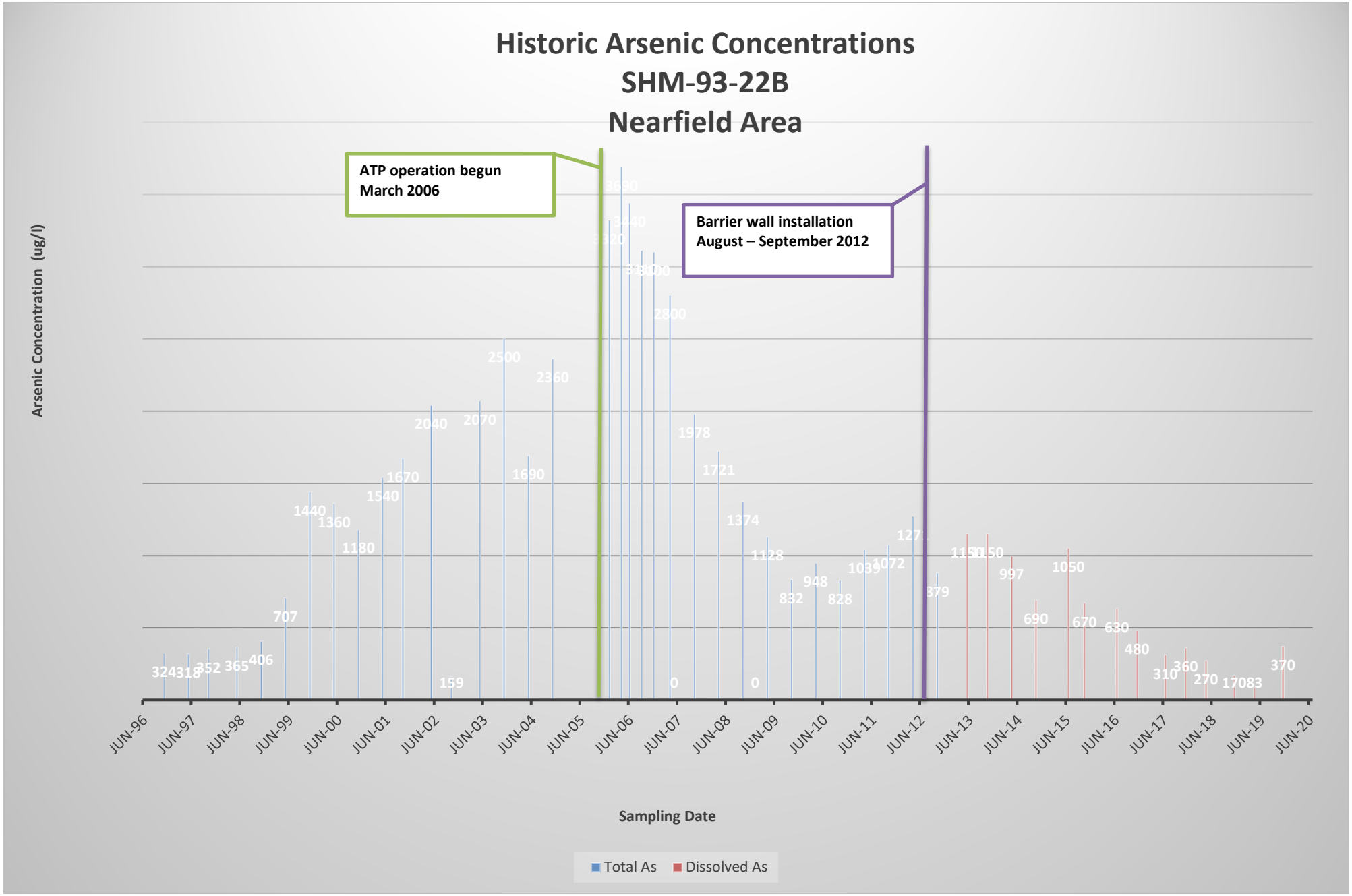

Historic Arsenic Concentrations
SHL-4
Barrier Wall Area
Arsenic Concentration (ug/l)
ATP operation begun
March 2006
Barrier wall installation
August – September 2012
48.8
73.6
180.0
37.4
89.1
78.2
61.3
116.0
91.5
50.8
66.0
47.8
66.1
26.6
13.4
27.2
19.5
10.1
2.5
2.5
2.5
7.5
2.3
15.1
3.1
1.4
2.7
6.2
37
0
110
74
130
110
150
98
69
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
Sampling Date
Total As
Dissolved As

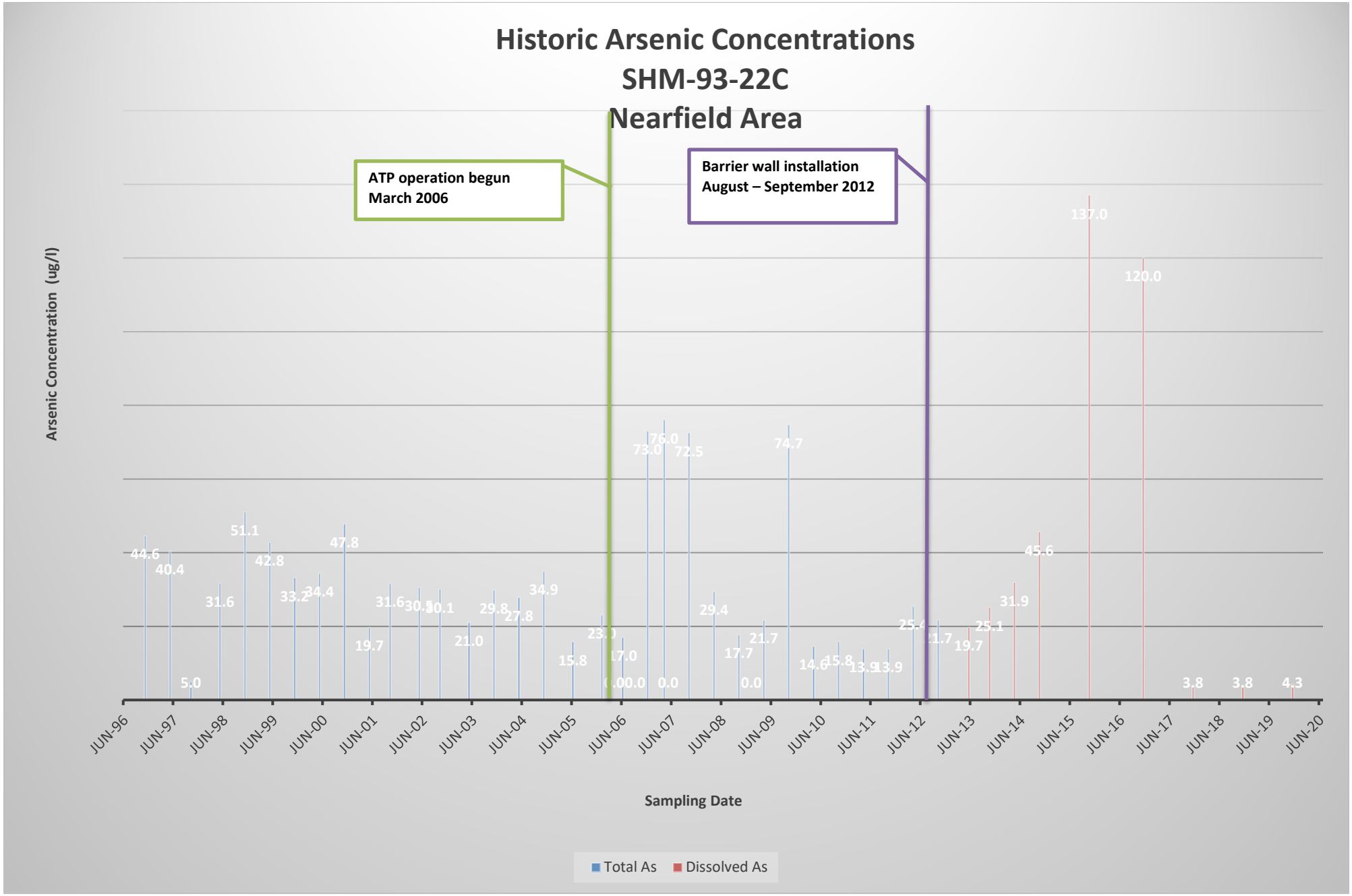

Historic Arsenic Concentrations
SHL-9
Nearfield Area
ATP operation begun
March 2006
Barrier wall installation
August – September 2012
Arsenic Concentration (ug/l)
Sampling Date
Total As
Dissolved As
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
46.9
16.1
25.2
15.0
27.2
71.3
28.5
15.0
31.4
15.1
28.1
144.0
29.0
13.4
30.6
19.8
32.2
51.0
46.0
26.0
34.1
14.6
40.7
18.1
37.6
25.2
38.4
25.7
39.8
30.0
33.1
22.2
28.5
18.5
38.0
25.0
28.0
33.0

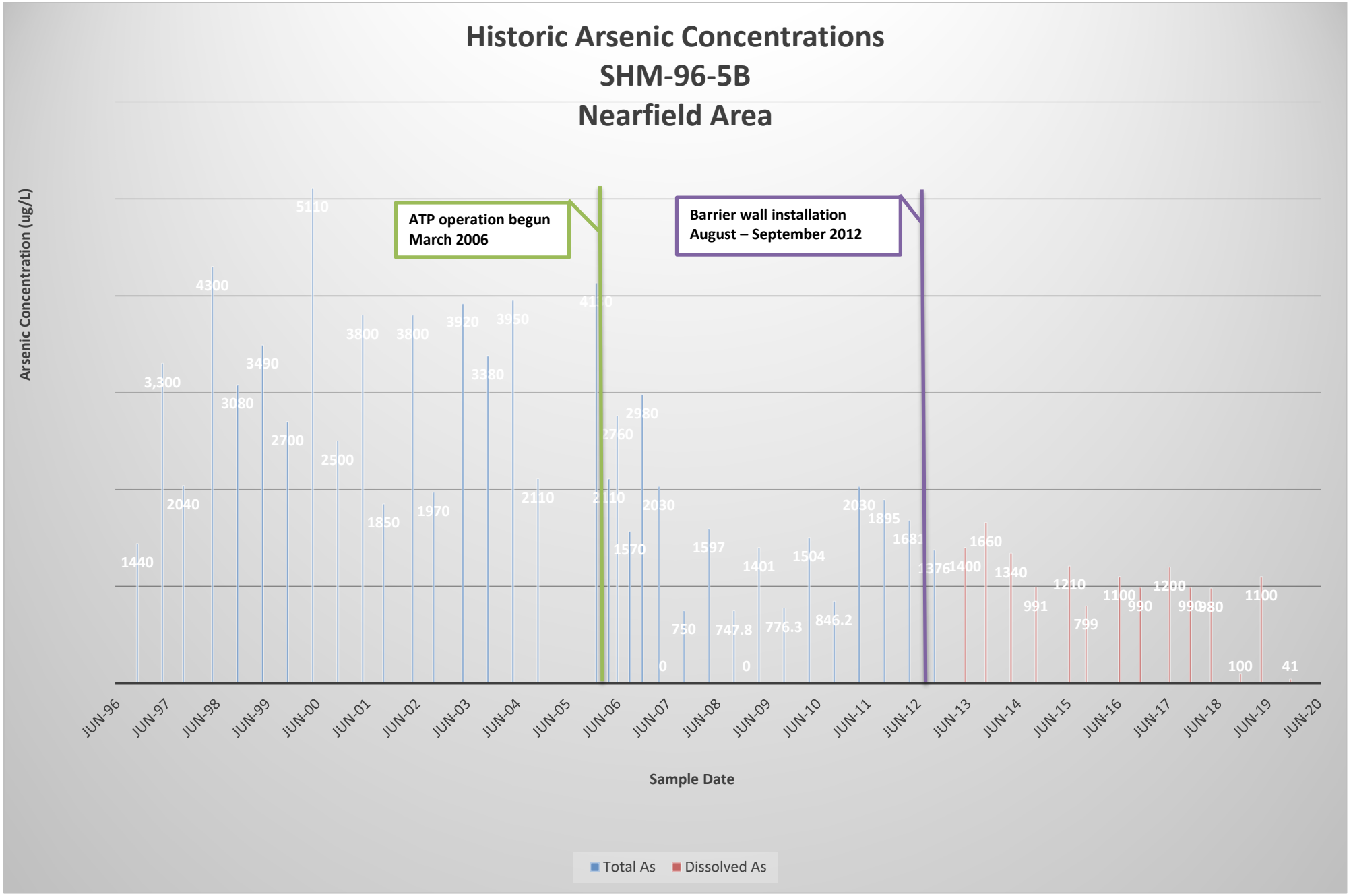

Historic Arsenic Concentrations
SHL-11
Barrier Wall Area
ATP operation begun
March 2006
Barrier wall installation
August – September 2012
Arsenic Concentration (ug/l)
332
252
366
346
376
431
492
404
523
487
573
469
648
498
639
502
617
524
567
668
686.5
663.5
709.1
684
654.9
496
752
587
793
925
642
970
520
880
870
820
910
960
920
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
Sampling Date
Total As
Dissolved As


Historic Arsenic Concentrations
SHL-20
Barrier Wall Area
ATP operation begun March 2006
Barrier wall installation August – September 2012
Arsenic Concentration (ug/l)
Sampling Date
Total As
Dissolved As
244
5
227
238
218
216
215
216
172
186
165
154
175
197
194
136
156
159
346
361
336.2
7.9
23.8
4.4
7.3
139.3
621
641
701
763
794
855
880
830
860
860
830
970
770
830
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20

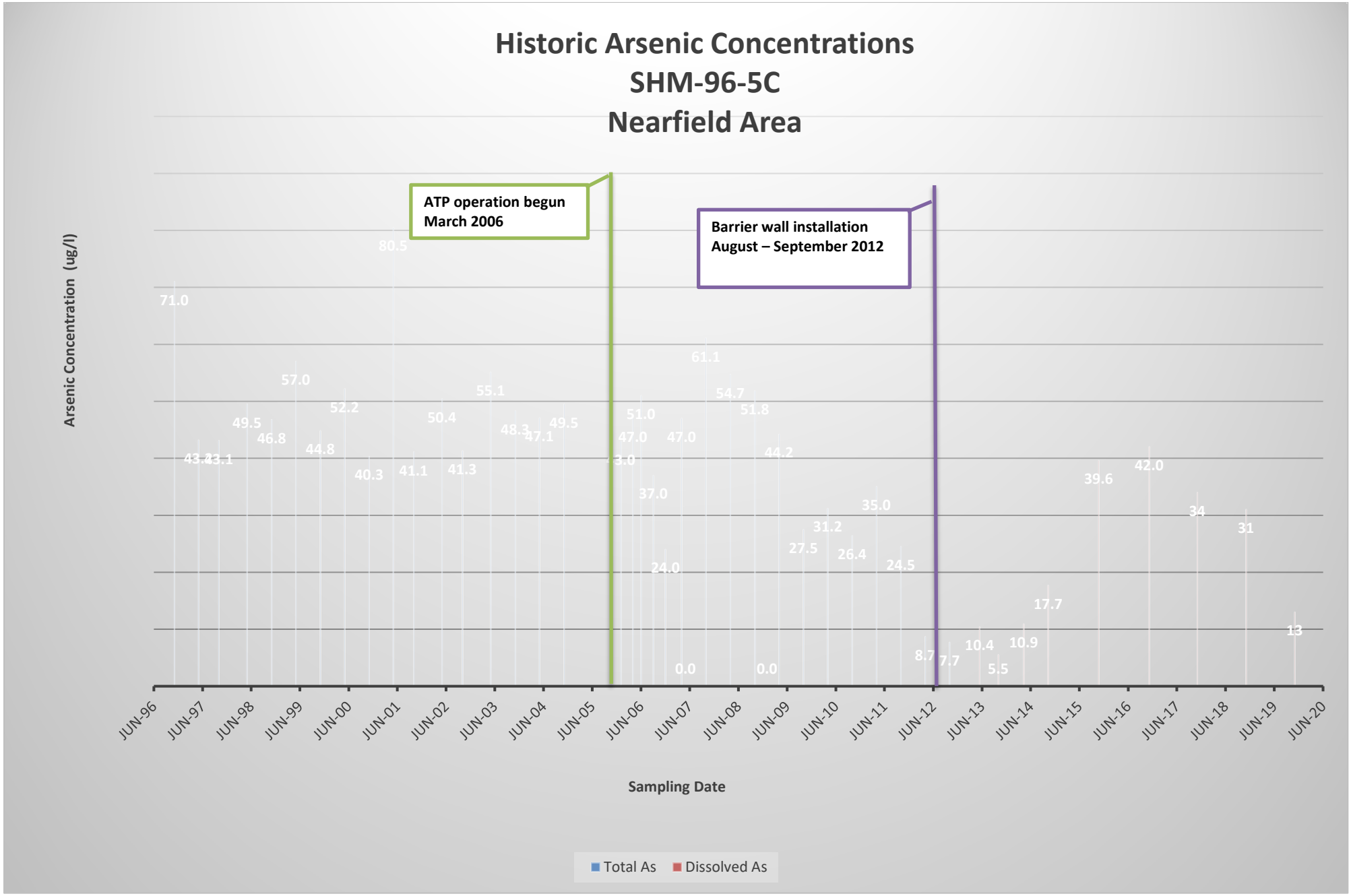

Historic Arsenic Concentrations
SHL-22
Nearfield Area
ATP operation begun
March 2006
Barrier wall installation
August – September 2012
Arsenic Concentration (ug/l)
Sampling Date
Total As
Dissolved As
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
24.8
5.0
34.8
10.6
2.7
12.2
7.3
14.6
45.0
47.6
44.2
55.9
77.1
101.0
76.4
88.1
65.4
115.0
109.0
98.0
0.0
55.1
106.2
81.0
0.0
98.7
48.3
69.6
46.5
57.9
45.7
41.9
3.6
33.3
54.3
49.2
44.5
15.9
9.4
6.1
5.0
6.2

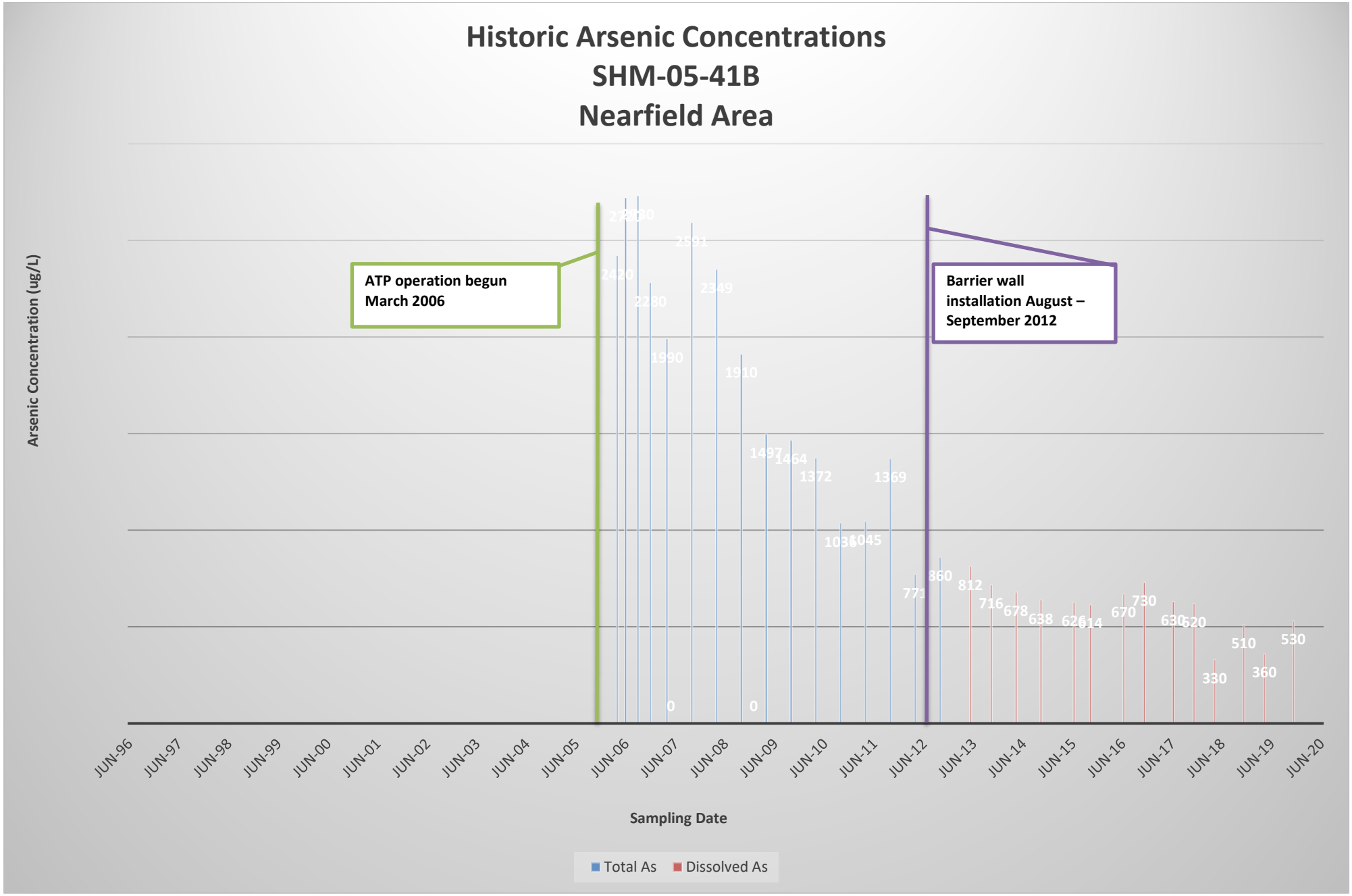

Historic Arsenic Concentrations
SHM-93-22B
Nearfield Area
ATP operation begun
March 2006
Barrier wall installation
August – September 2012
Arsenic Concentration (ug/l)
Sampling Date
Total As
Dissolved As
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
324
318
352
365
406
707
1440
1360
1180
1540
1670
2040
159
2070
2500
1690
2360
2800
0
1978
1721
1374
0
1128
832
948
828
1039
1072
1270
379
1150
1150
997
690
1050
670
630
480
310
360
270
170
83
370

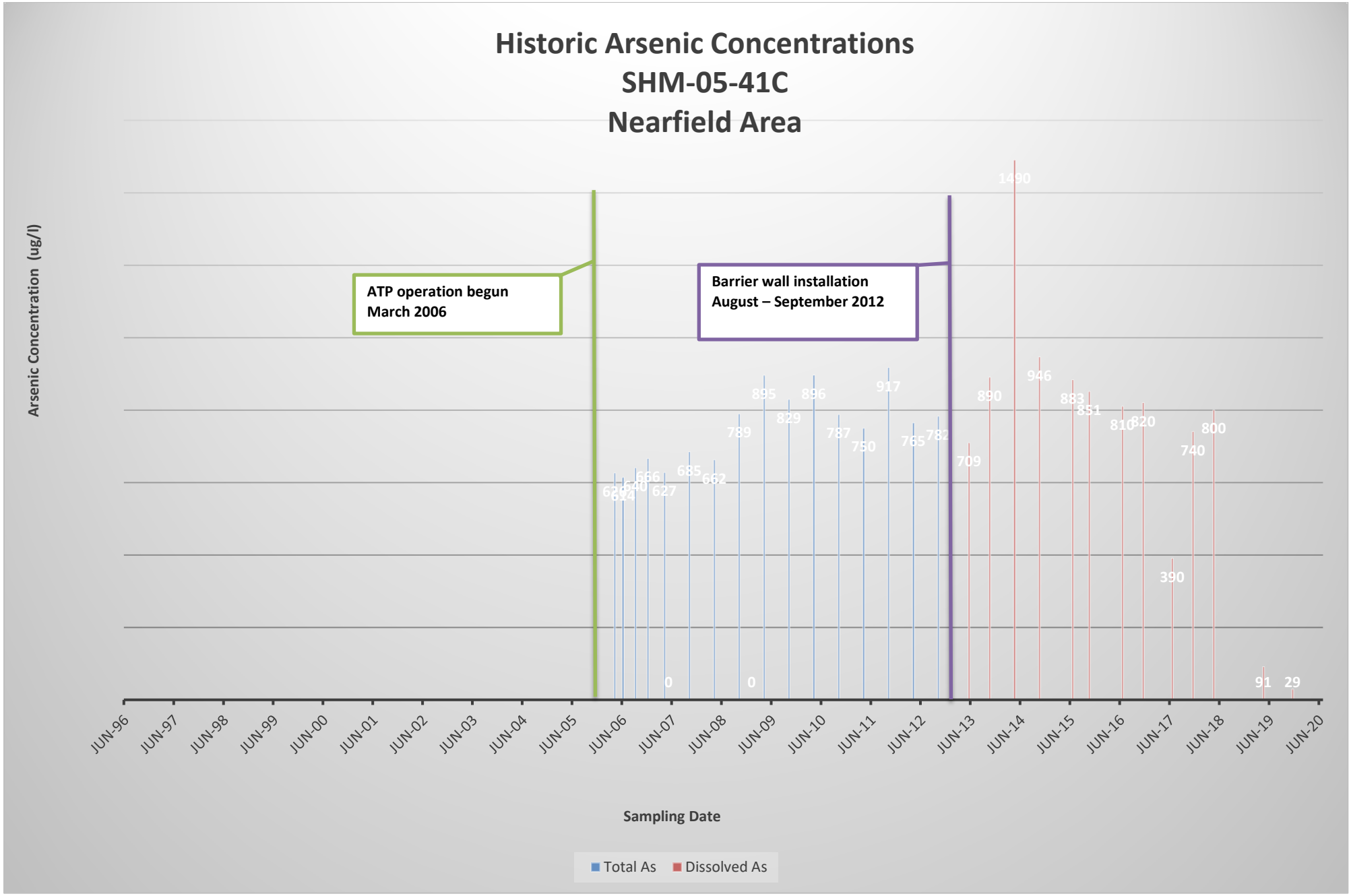

Historic Arsenic Concentrations
SHM-93-22C
Nearfield Area
ATP operation begun
March 2006
Barrier wall installation
August – September 2012
Arsenic Concentration (ug/l)
Sampling Date
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
44.6
40.4
5.0
31.6
51.1
42.8
33.2
34.4
47.8
19.7
31.6
30.5
30.1
21.0
29.8
27.8
34.9
15.8
23.0
17.0
0.0
0.0
73.0
76.0
72.5
29.4
17.7
0.0
21.7
74.7
14.6
15.8
13.9
13.9
25.4
21.7
19.7
25.1
31.9
45.6
137.0
120.0
3.8
3.8
4.3
Total As
Dissolved As



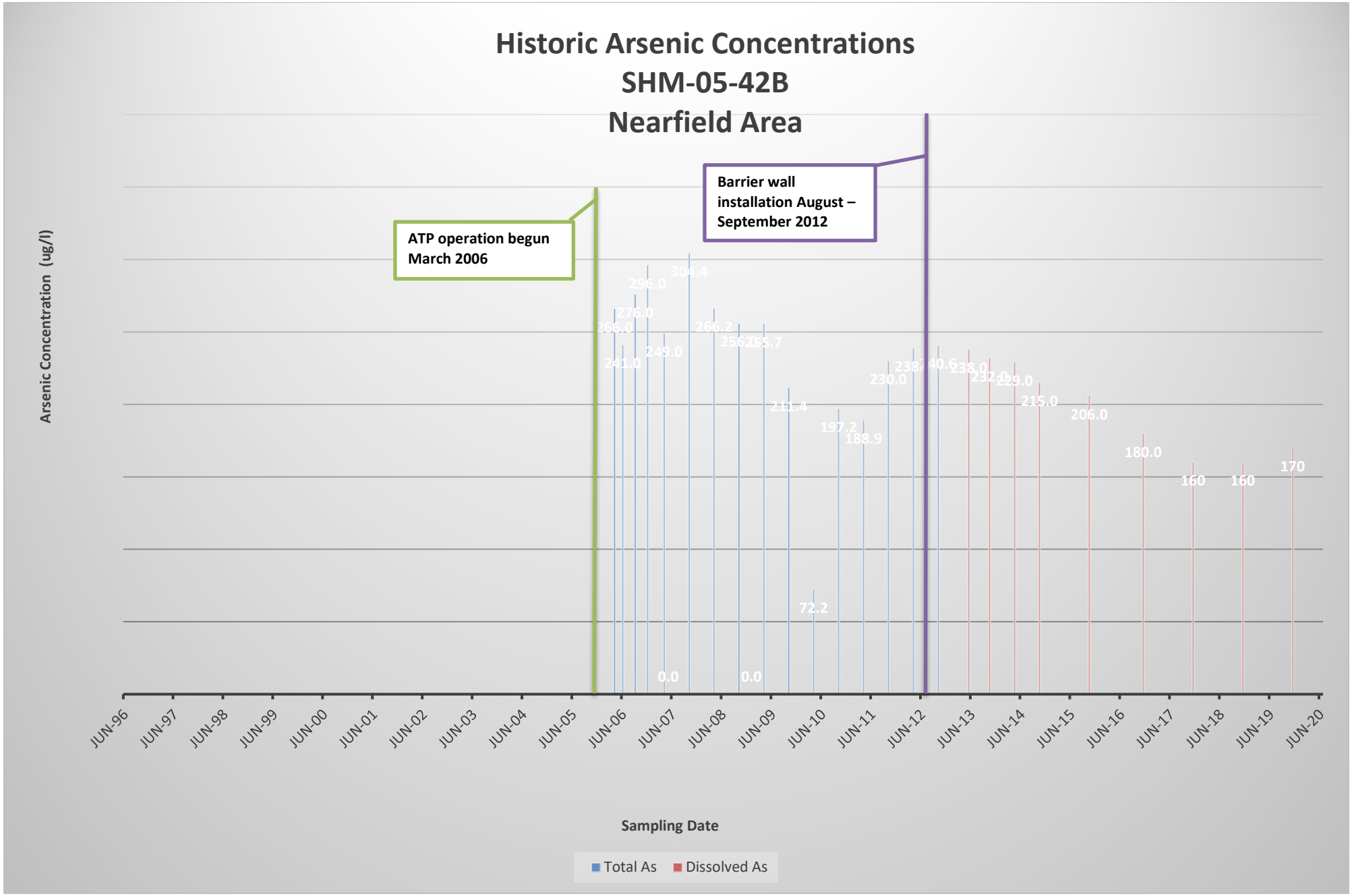
Total As
Dissolved As

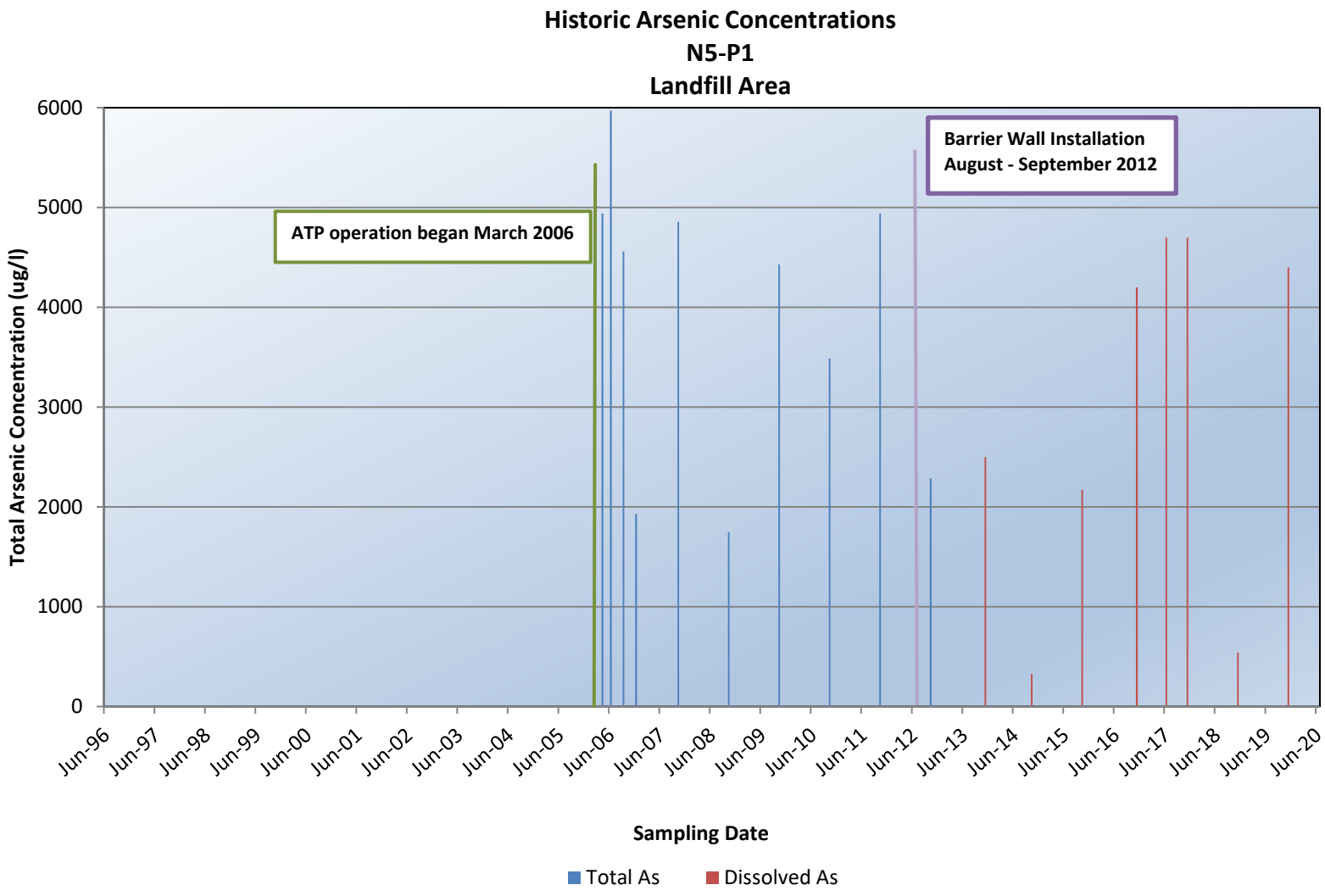

Historic Arsenic Concentrations
SHM-96-5C
Nearfield Area
ATP operation begun
March 2006
Barrier wall installation
August – September 2012
Arsenic Concentration (ug/l)
Sampling Date
Total As
Dissolved As
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
71.0
43.8
43.1
49.5
46.8
57.0
44.8
52.2
40.3
80.5
41.1
50.4
41.3
55.1
48.3
47.1
49.5
51.0
47.0
47.0
37.0
24.0
0.0
61.1
54.7
51.8
44.2
0.0
27.5
31.2
26.4
35.0
24.5
8.7
7.7
10.4
5.5
10.9
17.7
39.6
42.0
34
31
13

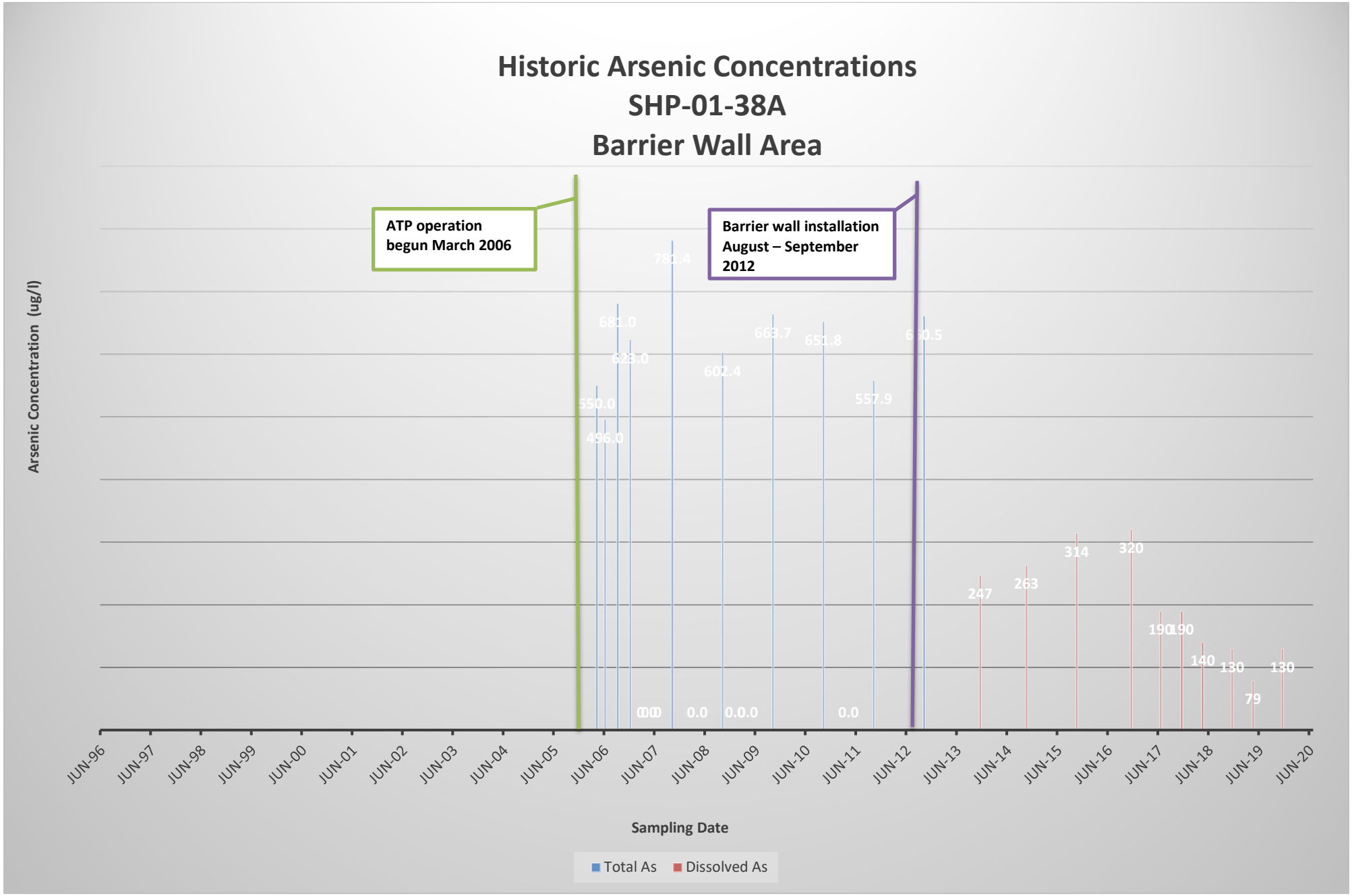

Historic Arsenic Concentrations
SHM-05-41B
Nearfield Area
Arsenic Concentration (ug/L)
ATP operation begun March 2006
Barrier wall installation August – September 2012
2420
2280
1990
2591
2349
1910
0
0
1497
1464
1372
1369
1045
771
860
812
716
678
638
670
730
630
620
330
510
360
530
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
Sampling Date
Total As
Dissolved As



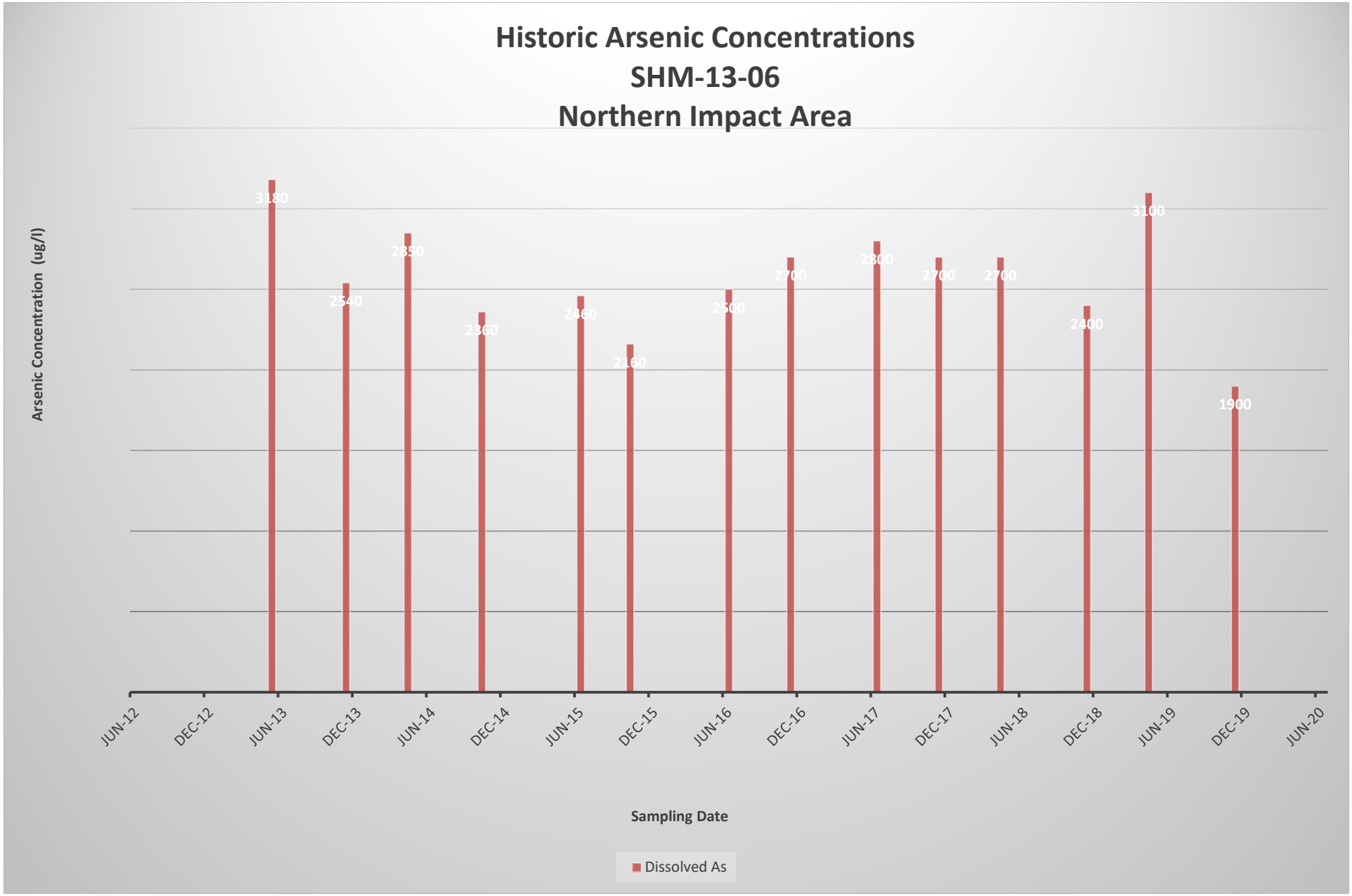
Historic Arsenic Concentrations
SHM-05-41C
Nearfield Area
Arsenic Concentration (ug/l)
ATP operation begun
March 2006
Barrier wall installation
August – September 2012
1490
946
883
851
810
820
800
740
390
91
29
890
917
895
896
829
789
787
750
765
782
709
685
662
666
640
627
614
0
0
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
Sampling Date
Total As
Dissolved As

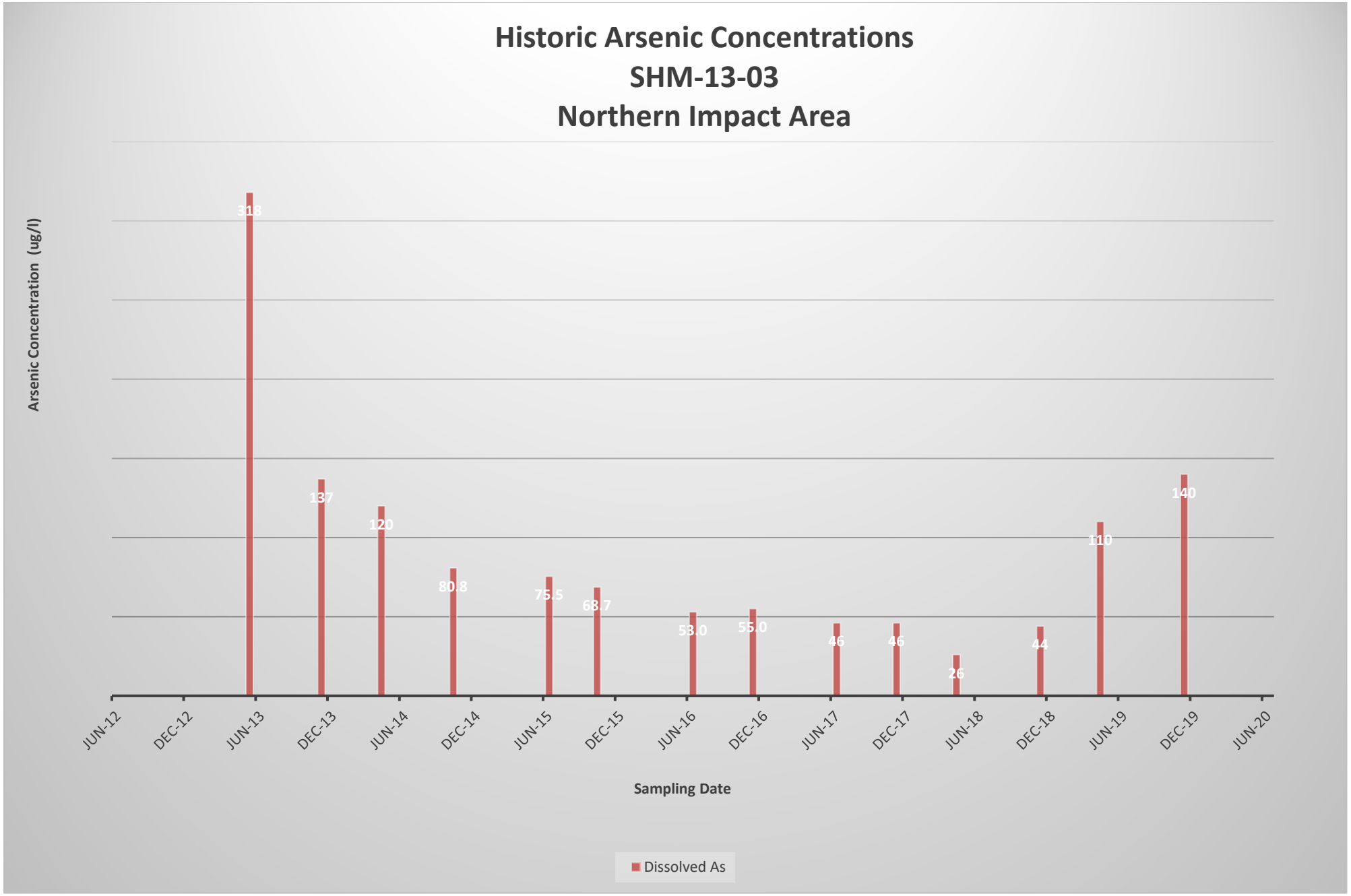

Historic Arsenic Concentrations
SHM-05-42B
Nearfield Area
ATP operation begun March 2006
Barrier wall installation August – September 2012
Arsenic Concentration (ug/l)
Sampling Date
Total As
Dissolved As
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
266.0
276.0
296.0
304.4
241.0
249.0
265.2
256.2
255.7
0.0
0.0
211.4
72.2
197.2
188.9
230.0
238.0
240.6
233.0
232.0
229.0
215.0
206.0
180.0
160
160
170

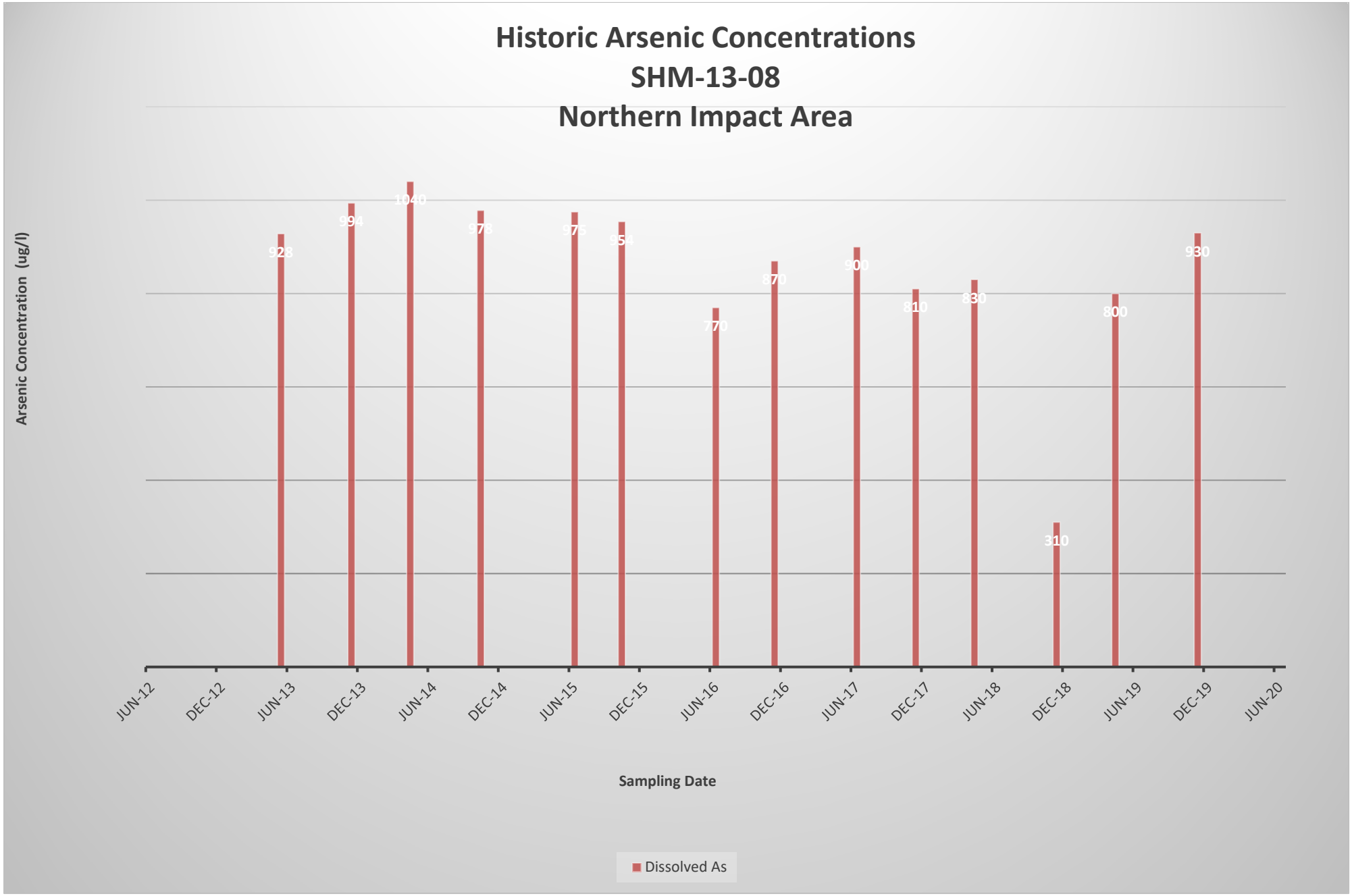

Historic Arsenic Concentrations
N5-P1
Landfill Area
Barrier Wall Installation
August - September 2012
ATP operation began March 2006
Total Arsenic Concentration (ug/l)
6000
5000
4000
3000
2000
1000
0
Jun-96
Jun-97
Jun-98
Jun-99
Jun-00
Jun-01
Jun-02
Jun-03
Jun-04
Jun-05
Jun-06
Jun-07
Jun-08
Jun-09
Jun-10
Jun-11
Jun-12
Jun-13
Jun-14
Jun-15
Jun-16
Jun-17
Jun-18
Jun-19
Jun-20
Sampling Date
Total As
Dissolved As

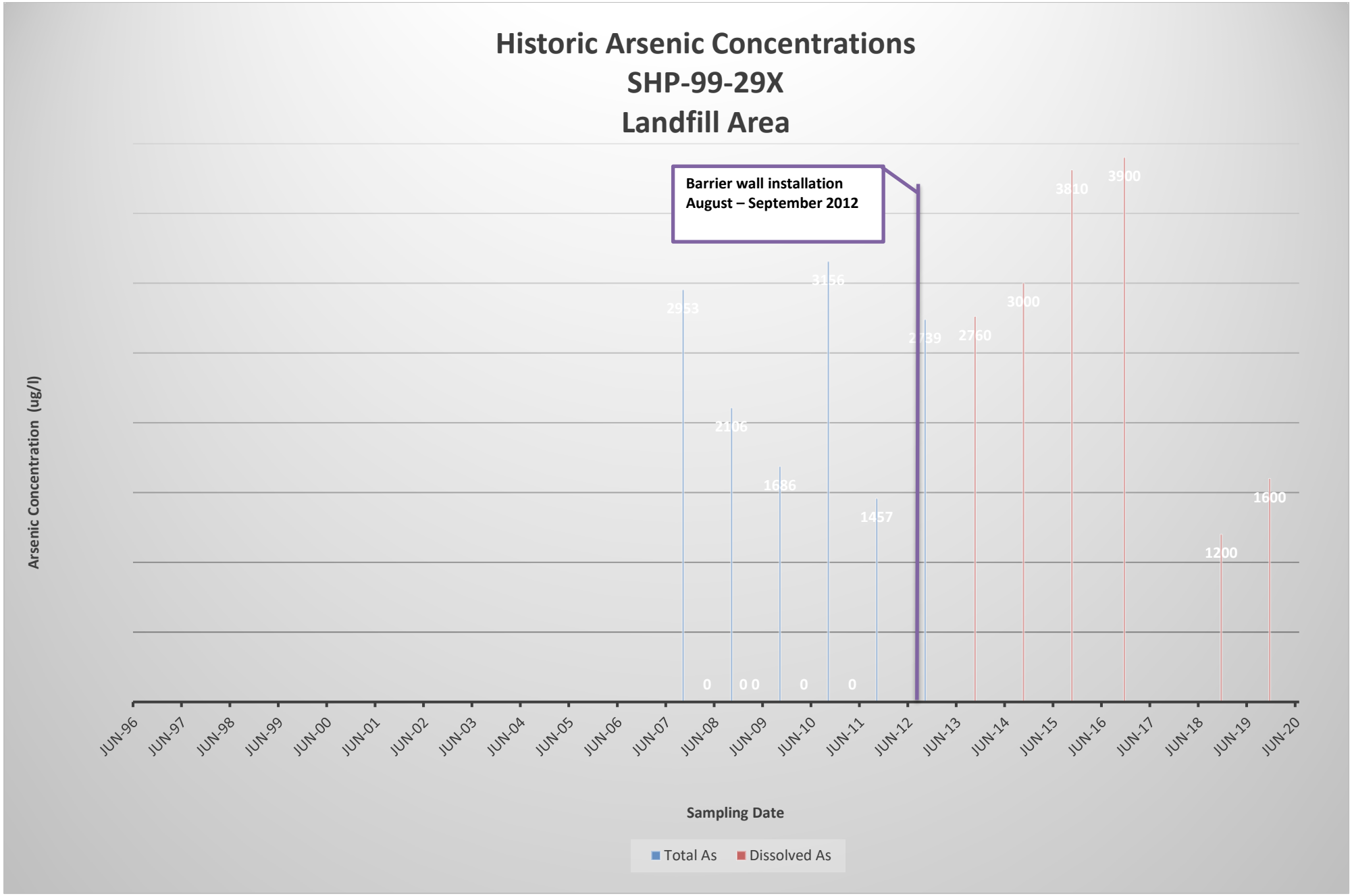


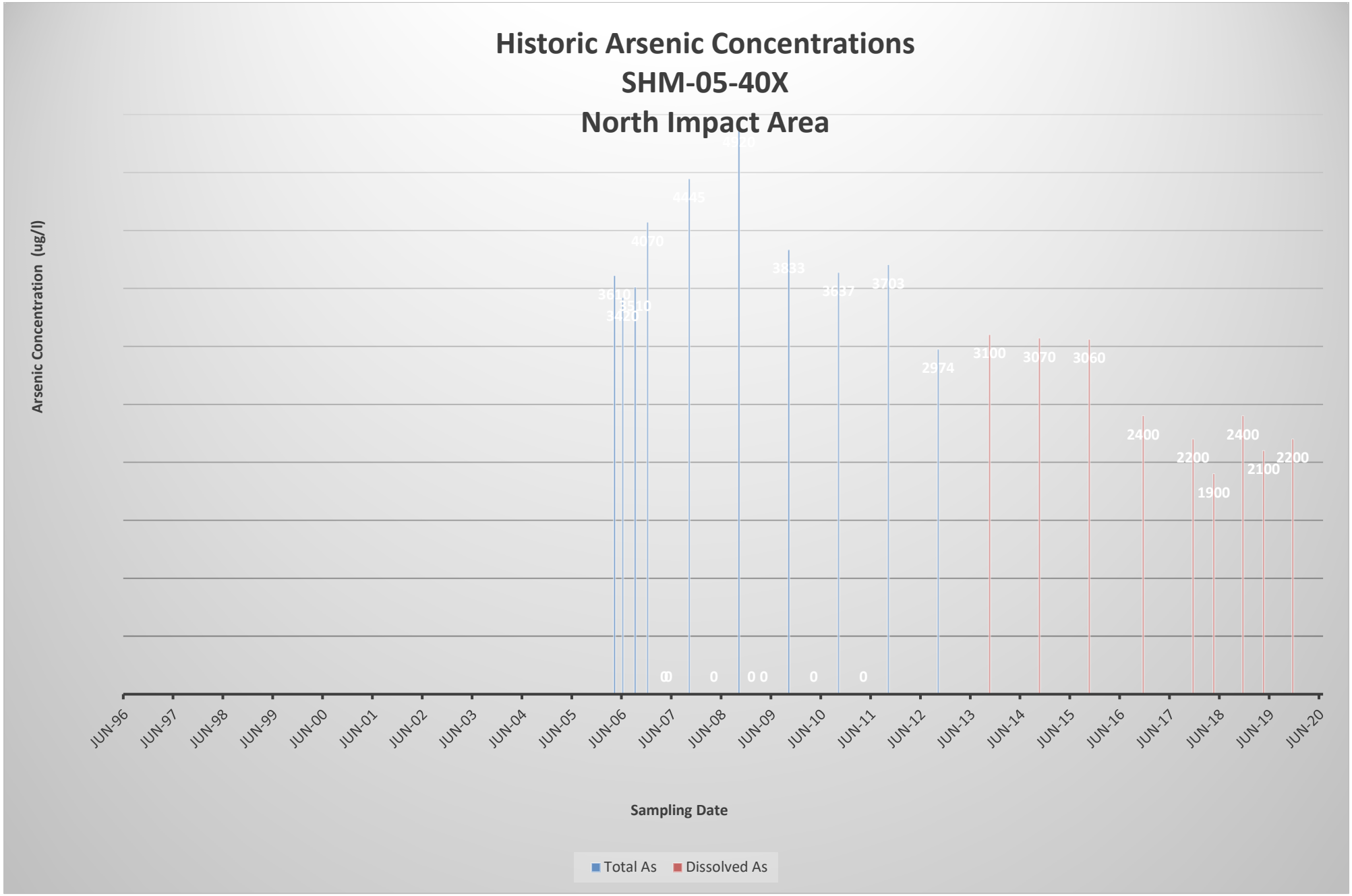
Historic Arsenic Concentrations
SHP-01-38A
Barrier Wall Area
ATP operation begun March 2006
Barrier wall installation August – September 2012
Arsenic Concentration (ug/l)
781.4
681.0
623.0
550.0
496.0
0.0
0.0
0.0
0.0
0.0
663.7
651.8
602.4
557.9
0.0
247
263
314
320
190
190
140
130
79
130
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
Sampling Date
Total As
Dissolved As

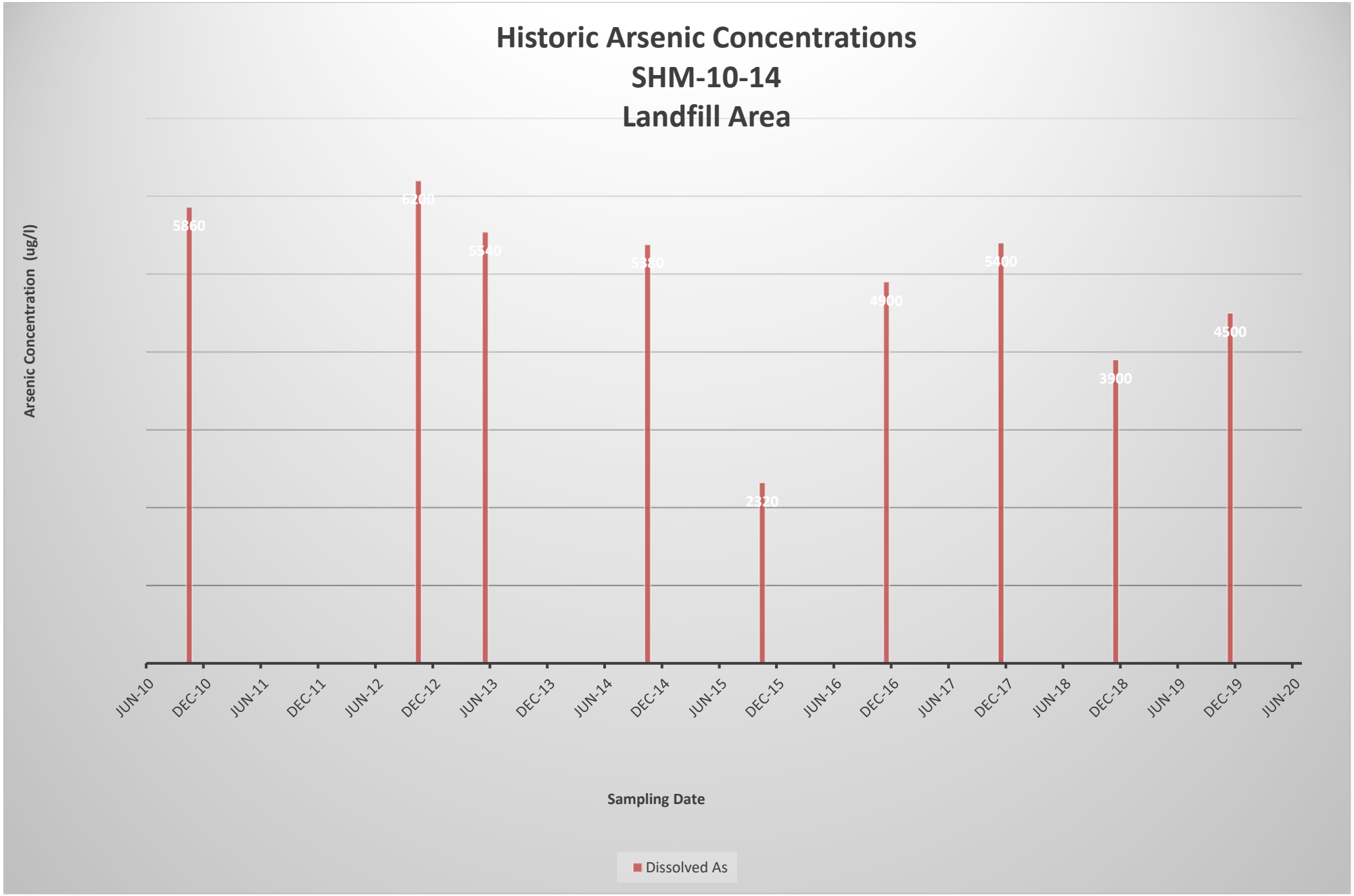

Historic Arsenic Concentrations
SHM-13-06
Northern Impact Area
Arsenic Concentration (ug/l)
3180
2540
2850
2360
2460
2160
2500
2700
2800
2700
2700
2400
3100
1900
JUN-12
DEC-12
JUN-13
DEC-13
JUN-14
DEC-14
JUN-15
DEC-15
JUN-16
DEC-16
JUN-17
DEC-17
JUN-18
DEC-18
JUN-19
DEC-19
JUN-20
Sampling Date
Dissolved As


Historic Arsenic Concentrations
SHM-13-03
Northern Impact Area
Arsenic Concentration (ug/l)
318
137
120
80.8
75.5
68.7
53.0
55.0
46
46
26
44
110
140
JUN-12
DEC-12
JUN-13
DEC-13
JUN-14
DEC-14
JUN-15
DEC-15
JUN-16
DEC-16
JUN-17
DEC-17
JUN-18
DEC-18
JUN-19
DEC-19
JUN-20
Sampling Date
Dissolved As


Historic Arsenic Concentrations
SHM-13-08
Northern Impact Area
Arsenic Concentration (ug/l)
928
994
1040
976
975
954
770
870
900
810
830
310
800
930
JUN-12
DEC-12
JUN-13
DEC-13
JUN-14
DEC-14
JUN-15
DEC-15
JUN-16
DEC-16
JUN-17
DEC-17
JUN-18
DEC-18
JUN-19
DEC-19
JUN-20
Sampling Date
Dissolved As


Historic Arsenic Concentrations
SHP-99-29X
Landfill Area
Barrier wall installation
August – September 2012
Arsenic Concentration (ug/l)
2953
2106
1636
3156
1457
2739
2760
3000
3810
3900
1200
1600
0
0 0
0
0
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
Sampling Date
Total As
Dissolved As


Historic Arsenic Concentrations
SHM-05-40X
North Impact Area
Arsenic Concentration (ug/l)
3610
3420
3510
4070
4445
4950
3833
3637
3703
2974
3100
3070
3060
2400
2200
1900
2400
2100
2200
0
0
0
0
0
0
JUN-96
JUN-97
JUN-98
JUN-99
JUN-00
JUN-01
JUN-02
JUN-03
JUN-04
JUN-05
JUN-06
JUN-07
JUN-08
JUN-09
JUN-10
JUN-11
JUN-12
JUN-13
JUN-14
JUN-15
JUN-16
JUN-17
JUN-18
JUN-19
JUN-20
Sampling Date
Total As
Dissolved As


Historic Arsenic Concentrations
SHM-10-14
Landfill Area
Arsenic Concentration (ug/l)
5360
6200
5540
5380
2320
4900
5400
3900
4500
JUN-10
DEC-10
JUN-11
DEC-11
JUN-12
DEC-12
JUN-13
DEC-13
JUN-14
DEC-14
JUN-15
DEC-15
JUN-16
DEC-16
JUN-17
DEC-17
JUN-18
DEC-18
JUN-19
DEC-19
JUN-20
Sampling Date
Dissolved As

APPENDIX I

HISTORICAL GROUNDWATER MONITORING WELL AND GAS VENT ANALYTICAL RESULTS

Appendix I
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	IPC (T)	N-5, P-1 (T)	N-5, P-1 (D)	N-5, P-2 (T)	N-5, P-2 (D)	PSP-01 (T)	PSP-01 (D)	SHL-3 (T)	SHL-3 (D)	SHL-4 (T)	SHL-4 (D)	SHL-5 (T)	SHL-5 (D)	SHL-7 (D)	SHL-8S (T)	SHL-8S (D)	SHL-8D (T)	SHL-8D (D)	SHL-9 (T)	SHL-9 (D)	SHL-10 (T)	SHL-10 (D)	SHL-11 (T)	SHL-11 (D)
Sample Month-Year	**Units**																								
Aug-91	µg/L								35		260		23							37		67		320	
Dec-91	µg/L								120		140		38							67		120		320	
Mar-93	µg/L								6.5		2.54		11.4							42.4		280		340	
Jun-93	µg/L																								
Nov-96	µg/L								NS		48.8		12							46.9		3.4 B		332	
May-97	µg/L								10 U		73.6 J		10 U							16.1 J		10 U		252 J	
Oct-97	µg/L								10 U		180		10 U							25.2		209		366	
May-98	µg/L								5 U		37.4		5 U							15		5 U		346	
Nov-98	µg/L								5.4 U		89.1		11.5							27.2		5.4 U		376	
May-99	µg/L								2.7 B		78.2		5.0 B							71.3		2.7 B		431	
Nov-99	µg/L		5800		30.1				1.9 U		61.3		6.5							28.5		1.9 U		492	
May-00	µg/L								2.5 U		116		2.5 U							15		2.5 U		404	
Nov-00	µg/L								17.4		91.5		13.8							31.4		4.2 U		523	
May-01	µg/L								4.1 U		50.8		13.8							15.1		4.1 U		487	
Oct-01	µg/L								1.5 U		66		14.8							28.1		1.5 U		573	
Nov-01	µg/L		5800		43											5 U		5 U							
May-02	µg/L								2.8 B		47.8 B		11.9 B							144		4.0 B		469	
Oct-02	µg/L								3.2 U		66.1		3.2 U							29		3.2 U		648	
May-03	µg/L								4.7 U		26.6		7.3							13.4		4.7 U		498	
Nov-03	µg/L								4.1 U		13.4		4.7 B							30.6		4.1 U		639	
May-04	µg/L								2.6 U		27.2		7.4 B							19.8		2.6 U		502	
Nov-04	µg/L								5.8 U		19.5		6.8 B							32.2		5.8 U		617	
Jun-05	µg/L								4.5 U		10.1		7.0 B									4.5 U		524	
Jan-06	µg/L										5 U		5 U							18		5 U		567	
Apr-06	µg/L		4940		22		5 U									5 U		5 U		21					
Jun-06	µg/L		5970		46		6		5 U		5 U		6			5 U		5 U		21		5 U		700	
Sep-06	µg/L		4560		22		10									5 U		5 U		46					
Dec-06	µg/L		1930		30		5 U		5 U		5 U		8			5 U		5 U		51		5 U		668	
Apr-07	µg/L															3 U		3 U		26					
May-07	µg/L												6.2												
Oct-07	µg/L		4856		28.1						7.5		16.2			22.6		11.8		34.1		0.59 J		686.5	
Apr-08	µg/L												4.1			0.5 U		0.5 U		14.6					
Oct-08	µg/L		1748		26.8						2.3		4.9			1 UJ		1 UJ		40.7		1 UJ		663.5	
Jan-09	µg/L	188.9																							
Apr-09	µg/L												3.6			0.5 U		0.5 U		18.1					
Oct-09	µg/L		4429		30.5						15.1		12.3			0.5 U		0.5 U		37.6				709.1	
Apr-10	µg/L												3.4			0.6		0.6		25.2					
Jul-10	µg/L																								
Aug-10	µg/L																								
Sep-10	µg/L																								
Oct-10	µg/L		3488		24.5						3.1		4.8			0.5 U		0.5 U		38.4		0.9		694	
Apr-11	µg/L												1			0.5 U		0.5 U		25.7					
Oct-11	µg/L		4942		27.4						1.4		5.5			0.5 U		0.5 U		39.8				654.9	
Apr-12	µg/L												3.7			0.6		0.5 U		29.5					
Oct-12	µg/L		2286		26.1						3.8		4.5			0.5 U		0.5 U		36.4		0.7		647	
May-13	µg/L											2.6		3.7			0.93 U		0.72 U		30.0		1.2		496
Oct-13	µg/L			2500		21.2								15.1			2.0 U		2.0 U		33.1		1.2		752
Nov-13	µg/L											6.2									22.2				
Feb-14	µg/L																								
Apr-14	µg/L													2.0 U			2.0 U		2.0 U						587
Oct-14	µg/L			327								37		13.3			2.0 U		2.0 U		28.5		2.0 U		793
Jun-15	µg/L																								925
Oct-15	µg/L			2170		25.7		2.1 J		4.0 U		37.4		12.6			4.0 U		4.0 U		18.5		4.0 U		642
Jun-16	µg/L																								970
Nov-16	µg/L			4200								110		3.0 U			3.0 U		3.0 U		38		3.0 U		520
Jun-17	µg/L			4700								74											3.0 U		880
Nov-17	µg/L			4700						3.0 U		130		3.7	3.0		3.0 U		3.0 U		25		3.0 U		870
May-18	µg/L											110											3.0 U		820
Nov-18	µg/L			540						3.0 U		150		2.8J	3.0 U		3.0 U		3.0 U		28		3.0 U		910
May-19	ug/L											98											3.0 U		960
Oct-19	ug/L									3.0 U		69					3.0 U		3.0 U		33		3.0 U		920
Nov-19	ug/L			4400											3.0 U										

Notes:

µg/l = microgram per liter
U = non detect
UJ = estimated non detect
J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Appendix I
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHL-12 (D)	SHL-13 (T)	SHL-13 (D)	SHL-15 (T)	SHL-15 (D)	SHL-18 (D)	SHL-19 (T)	SHL-19 (D)	SHL-20 (T)	SHL-20 (D)	SHL-21 (T)	SHL-21 (D)	SHL-22 (T)	SHL-22 (D)	SHL-23 (T)	SHL-23 (D)	SHL-24(D)	SHM-93-10C (T)	SHM-93-10D (T)	SHM-93-10D (D)	SHM-93-18B (D)	SHM-93-22B (T)	SHM-93-22B (D)	SHM-93-22C (T)
Sample Month-Year	**Units**																								
Aug-91	µg/L							340		98				27											
Dec-91	µg/L							710		89				25											
Mar-93	µg/L							390		330				32.9					21.3						68.9
Jun-93	µg/L																		18.1						49.8
Nov-96	µg/L							138		244				24.8					12.4				324		44.6
May-97	µg/L							10 U		10 U				10 U					10 U				318 J		40.4
Oct-97	µg/L							298		227				34.8					10.5				352		10 U
May-98	µg/L							77.5		238				10.6					7.5				365		31.6
Nov-98	µg/L							145		218				5.4 U					10.2				406		51.1
May-99	µg/L							156		216				12.2 B					10.8 B				707		42.8
Nov-99	µg/L				215			176		215				7.3					8.7				1440		33.2
May-00	µg/L							41.4		216				14.6					5.9 J				1360		34.4
Nov-00	µg/L							154		172				45					8.8				1180		47.8
May-01	µg/L							129		186				47.6					6.9				1540		19.7
Oct-01	µg/L							183		165				44.2					10.1				1670		31.6
Nov-01	µg/L		5 U									5 U				5 U									
May-02	µg/L							66.9		154				55.9 B					11.0 B				2040		30.5 B
Oct-02	µg/L							164		175				77.1					7.1				159		30.1
May-03	µg/L							36.1		197				101					9.8				2070		21
Nov-03	µg/L							83.6		194				76.4					5.2 U				2500		29.8
May-04	µg/L							75		136				88.1					7.2 B				1690		27.8
Nov-04	µg/L							121		156				65.4					10.6 B				2360		34.9
Jun-05	µg/L							26.3		159									8.1 B						15.8
Jan-06	µg/L							156		189				154					11				3320		23
Apr-06	µg/L		5 U		18							5 U		171		5 U				14			3690		
Jun-06	µg/L		5 U		16			1790		346				167		5 U			12				3440		17
Sep-06	µg/L		5 U		44							5 U		109		5 U				14			3110		
Dec-06	µg/L		5 U		93			142		361		5 U		115		5 U			10	12			3100		73
Apr-07	µg/L											3 U		98		3 U							2800		76
May-07	µg/L																								
Oct-07	µg/L		1.6		42			885.1		336.2		0.81 J		55.1		0.73 J			9.8	10.3			1978		72.5
Apr-08	µg/L											1.1		106.2		0.19 J							1721		29.4
Oct-08	µg/L		3.3		75			173.6	28	7.9		1 U		81		1 UJ			10.1	23.4			1374		17.7
Jan-09	µg/L																								
Apr-09	µg/L											1.2		98.7		0.5 U							1128		21.7
Oct-09	µg/L		0.5 U		26.7			136.9	38.8	23.8				48.3									832.3		74.7
Apr-10	µg/L													69.6									947.5		14.6
Jul-10	µg/L																								
Aug-10	µg/L																								
Sep-10	µg/L																								
Oct-10	µg/L		0.5 U		25			234.8	56.1	4.4		0.9		46.5		0.5 U			8.7				827.6		15.8
Apr-11	µg/L													57.9									1039		13.9
Oct-11	µg/L		2.8		70.4			62.9		7.3				45.7									1072		13.9
Apr-12	µg/L													41.9									1271		25.4
Oct-12	µg/L		1.0		24.2			138.3		139.3		1.1		43.6		0.5 U			8.1				879		21.7
May-13	µg/L								3.8		621				33.3									1150	
Oct-13	µg/L			2.0 U		34.9			33.6		641				54.3									1150	
Nov-13	µg/L																								
Feb-14	µg/L																								
Apr-14	µg/L										701				49.2									997	
Oct-14	µg/L								3.1		763				44.5									690	
Jun-15	µg/L	2.0 J				31.6					794						2.0 U	4.9						1050	
Oct-15	µg/L			2.9 J					3.1 J		855		4.0 U		15.9		4.0 U	6.5			11.6			670	
Jun-16	µg/L										880													630	
Nov-16	µg/L	1.6 J				19			3.0 U		830				9.4		3.0 U	5.5						480	
Jun-17	µg/L								1.6 J		860													310	
Nov-17	µg/L	2.4 J				200			3.0 U		860				6.1		3.0 U	4.8			3.0 U	3.0 U		360	
May-18	µg/L								3.0 U		830													270	
Nov-18	µg/L	1.90 J				44			20 J		970				5		3.0 U	3.4			3.0 U	3.0 U		170	
May-19	ug/L								3.0 U		770													83	
Oct-19	ug/L								4.4												3.0 U				
Nov-19	ug/L	7.4				110					830				6.2		3.0 U	4.2				3.0 U		370	

Notes:

µg/l = microgram per liter
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J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Appendix I
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-93-22C (D)	SHM-93-24A (D)	SHM-96-5B (T)	SHM-96-5B (D)	SHM-96-5C (T)	SHM-96-5C (D)	SHP-99-29X (T)	SHP-99-29X (D)	SHM-99-31A (T)	SHM-99-31A (D)	SHM-99-31B (T)	SHM-99-31B (D)	SHM-99-31C (T)	SHM-99-31C (D)	SHM-99-32X (T)	SHM-99-32X (D)	SHP-01-36X (T)	SHP-01-36X (D)	SHP-01-37X (T)	SHP-01-37X (D)	SHP-01-38A (T)	SHP-01-38A (D)	SHP-01-38B (D)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L			**1440**		**71**																		
May-97	µg/L			**3,300 J**		**43.2**																		
Oct-97	µg/L			**2040**		**43.1**																		
May-98	µg/L			**4300**		**49.5**																		
Nov-98	µg/L			**3080**		**46.8**																		
May-99	µg/L			**3490**		**57**																		
Nov-99	µg/L			**2700**		**44.8**		**4380**																
May-00	µg/L			**5110**		**52.2**																		
Nov-00	µg/L			**2500**		**40.3**																		
May-01	µg/L			**3800**		**80.5**																		
Oct-01	µg/L			**1850**		**41.1**																		
Nov-01	µg/L							**3800**																
May-02	µg/L			**3800**		**50.4 B**																		
Oct-02	µg/L			**1970**		**41.3**																		
May-03	µg/L			**3920**		**55.1**																		
Nov-03	µg/L			**3380**		**48.3**																		
May-04	µg/L			**3950**		**47.1**																		
Nov-04	µg/L			**2110**		**49.5**																		
Jun-05	µg/L																							
Jan-06	µg/L			**4130**		**43**																		
Apr-06	µg/L			**2110**		**47**				**9**		**56**		**270**		**168**		**24**		**41**		**550**		
Jun-06	µg/L			**2760**		**51**				**12**		**53**		**273**		**186**		**22**		**49**		**496**		
Sep-06	µg/L			**1570**		**37**				**23**		**74**		**305**		**202**		**30**		**46**		**681**		
Dec-06	µg/L			**2980**		**24**				**16**		**72**		**301**		**176**		**19**		**46**		**623**		
Apr-07	µg/L			**2030**		**47**																		
May-07	µg/L																							
Oct-07	µg/L			**750**		**61.1**		**2953**		**22.7**		**85.5**		**292.1**		**206.2**		**16.7**		**26.6**		**781.4**		
Apr-08	µg/L			**1597**		**54.7**																		
Oct-08	µg/L			**747.8**		**51.8**		**2106**		**16.2**		**79.5**		**260.3**		**203.9**		**27.9**		**38.1**		**602.4**		
Jan-09	µg/L																							
Apr-09	µg/L			**1401**		**44.2**																		
Oct-09	µg/L			**776.3**		**27.5**		**1686**		**20.4**		**56.7**		**223.5**		**196.8**		**18.7**		**35.1**		**663.7**		
Apr-10	µg/L			**1504 J**		**31.2**																		
Jul-10	µg/L																							
Aug-10	µg/L												**28.8**											
Sep-10	µg/L																							
Oct-10	µg/L			**846.2**		**26.4**		**3156**		**17.4**		**39.2**		**239.4**		**173.4**		**14.2**		**22.5**		**651.8**		
Apr-11	µg/L			**2030**		**35**																		
Oct-11	µg/L			**1895**		**24.5**		**1457**		**18.4**		**59.3**		**244**		**172.8**		**30.8**		**20.2**		**557.9**		
Apr-12	µg/L			**1681**		8.7																		
Oct-12	µg/L			**1376**		7.7		**2739**		**17.7**		**60.1**		**206.4**		**130.6**		**17.8**		**10.2**		**660.5**		
May-13	µg/L	**19.7**			**1400**		**10.4**																	**900**
Oct-13	µg/L	**25.1**			**1660**		5.5		**2760**		**14.6**		**61.6**		**205**		**107**							
Nov-13	µg/L																		4.8		4.7		**247**	
Feb-14	µg/L																							
Apr-14	µg/L	31.9			**1340**		**10.9**																	
Oct-14	µg/L	45.6			**991**		**17.7**		**3000**						**180**		**93.5**		**10.8**		8.5		**263**	
Jun-15	µg/L				**1210**																			
Oct-15	µg/L	**137**			**799**		**39.6**		**3810**		**18.7**		**58.7**		**194**				9.0		**14**		**314**	**903**
Jun-16	µg/L				**1100**																			
Nov-16	µg/L	**120**			**990**		**42**		**3900**						**200**		**59**		4.5		**11**		**320**	
Jun-17	µg/L				**1200**														4.3		6.5		**190**	
Nov-17	µg/L	3.8	2.2 J		**990**		**34**		**2100**						**200**		**60**		**17**		**13**		**190**	
May-18	µg/L				**980**														**11**		9.9		**140**	
Nov-18	µg/L	3.8	3.0 U		**100**		**31**		**1200**						**160**		6.3		7.8		**17**		**130**	
May-19	ug/L				**1100**														6.3		**15**		**79**	
Oct-19	ug/L																							
Nov-19	ug/L	4.3	3.0 U		**41**		**13**		**1600**								**47**		**11**		**13**		**130**	

Notes:

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J = estimated result

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Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
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Appendix I
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-05-39A (T)	SHM-05-39A (D)	SHM-05-39B (T)	SHM-05-39B (D)	SHM-05-40X (T)	SHM-05-40X (D)	SHM-05-41A (T)	SHM-05-41A (D)	SHM-05-41B (T)	SHM-05-41B (D)	SHM-05-41C (T)	SHM-05-41C (D)	SHM-05-42A (T)	SHM-05-42A (D)	SHM-05-42B (T)	SHM-05-42B (D)	SHM-07-03 (D)	SHM-07-05 (T)	SHM-07-05 (D)	SHM-10-01 (T)	SHM-10-01 (D)	SHM-10-02 (T)	SHM-10-02 (D)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L																							
May-97	µg/L																							
Oct-97	µg/L																							
May-98	µg/L																							
Nov-98	µg/L																							
May-99	µg/L																							
Nov-99	µg/L																							
May-00	µg/L																							
Nov-00	µg/L																							
May-01	µg/L																							
Oct-01	µg/L																							
Nov-01	µg/L																							
May-02	µg/L																							
Oct-02	µg/L																							
May-03	µg/L																							
Nov-03	µg/L																							
May-04	µg/L																							
Nov-04	µg/L																							
Jun-05	µg/L																							
Jan-06	µg/L																							
Apr-06	µg/L	**289**		**590**		**3610**		**54**		**2420**		**626**		5 U		**266**								
Jun-06	µg/L	**288**		**634**		**3420**		**52**		**2720**		**614**		5 U		**241**								
Sep-06	µg/L	**270**		**415**		**3510**		**41**		**2730**		**640**		5 U		**276**								
Dec-06	µg/L	**248**		**412**		**4070**		**36**		**2280**		**666**		5 U		**296**								
Apr-07	µg/L							**30**		**1990**		**627**		3 U		**249**								
May-07	µg/L																							
Oct-07	µg/L	**241.5**		**309.4**		**4445**		**24.9**		**2591**		**684.5**		1.01 J		**304.4**		<0.5	**14.7**					
Apr-08	µg/L							**26.9**		**2349**		**662.2**		2.5		**266.2**								
Oct-08	µg/L	**275.6**		**241.2**		**4920**		**18.7**		**1910**		**789.3**		1 U		**256**								
Jan-09	µg/L																							
Apr-09	µg/L							**22.1**		**1497**		**895.3**		2		**255.7**								
Oct-09	µg/L	**259.5**		**338.8**		**3833**		**16.3**		**1464**		**828.7**		1 U		**211.4**								
Apr-10	µg/L							**26.9**		**1372**		**896**		2.5		**72.2**								
Jul-10	µg/L																				1.16 J	0.68 J	0.74	0.43 J
Aug-10	µg/L						**3180**											0.29 J				3.51 J		
Sep-10	µg/L																				8.15	7.87	1.11	1.07
Oct-10	µg/L	**246.3**		**162**		**3637**		**66.7**		**1036**		**787**		1.2		**197.2**								
Apr-11	µg/L							**20.9**		**1045**		**749.8**		1.1		**188.9**								
Oct-11	µg/L	**227.1**		**308.1**		**3703**		**18.4**		**1369**		**917**		0.8		**230**								
Apr-12	µg/L							**15.5**		**770.8**		**764.8**		2.3		**238.7**								
Oct-12	µg/L	**76.3**		**364.4**		**2974**		**10.3**		**859.5**		**782.2**		0.7		**240.6**						1.4		1.1
May-13	µg/L								**12.3**		**812**		**709**		0.89 U		**238**	1.0				1.3		1.5
Oct-13	µg/L		**146**		**113**		**3100**		**12.5**		**716**		**890**		2.0 U		**232**							
Nov-13	µg/L																							
Feb-14	µg/L																							
Apr-14	µg/L								9.7		**678**		**1490**		2.0 U		**229**							
Oct-14	µg/L						**3070**		**14.2**		**638**		**946**		2.0 U		**215**							
Jun-15	µg/L										**626**		**883**					2.0 U		4.8		2.0 U		3.2 J
Oct-15	µg/L		4.0 U		**293**		**3060**		**15**		**614**		**851**		4.0 U		**206**							
Jun-16	µg/L										**670**		**810**					3.2		**11**				
Nov-16	µg/L						**2400**		**19**		**730**		**820**		3.0 U		**180**							
Jun-17	µg/L						**R**				**630**		**390**					3.0 U		**54**				
Nov-17	µg/L						**2200**		**18**		**620**		**740**		3.0 U		**160**	3.0 U		**890**				3.0 U
May-18	µg/L						**1900**				**330**		**800**					3.1		**430**				
Nov-18	µg/L						**2400**		**16**		**510**				3.0 U		**160**	3.0 U		**100**				3.0 U
May-19	ug/L						**2100**				**360**		**91**					3.0 U		**950**				
Oct-19	ug/L																							
Nov-19	ug/L						**2200**		**31**		**530**		**29**		3.0 U		**170**	3.0 U		**500**				3.0 U

Notes:
µg/l = microgram per liter
U = non detect
UJ = estimated non detect
J = estimated result

Appendix I
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-10-03 (T)	SHM-10-03 (D)	SHM-10-04 (T)	SHM-10-04 (D)	SHM-10-05A (T)	SHM-10-05A (D)	SHM-10-06 (T)	SHM-10-06 (D)	SHM-10-06A (T)	SHM-10-06A (D)	SHM-10-07 (T)	SHM-10-07 (D)	SHM-10-08 (T)	SHM-10-08 (D)	SHM-10-10 (T)	SHM-10-10 (D)	SHM-10-11 (T)	SHM-10-11 (D)	SHM-10-12 (T)	SHM-10-12 (D)	SHM-10-13 (T)	SHM-10-13 (D)	SHM-10-14 (T)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L																							
May-97	µg/L																							
Oct-97	µg/L																							
May-98	µg/L																							
Nov-98	µg/L																							
May-99	µg/L																							
Nov-99	µg/L																							
May-00	µg/L																							
Nov-00	µg/L																							
May-01	µg/L																							
Oct-01	µg/L																							
Nov-01	µg/L																							
May-02	µg/L																							
Oct-02	µg/L																							
May-03	µg/L																							
Nov-03	µg/L																							
May-04	µg/L																							
Nov-04	µg/L																							
Jun-05	µg/L																							
Jan-06	µg/L																							
Apr-06	µg/L																							
Jun-06	µg/L																							
Sep-06	µg/L																							
Dec-06	µg/L																							
Apr-07	µg/L																							
May-07	µg/L																							
Oct-07	µg/L																							
Apr-08	µg/L																							
Oct-08	µg/L																							
Jan-09	µg/L																							
Apr-09	µg/L																							
Oct-09	µg/L																							
Apr-10	µg/L																							
Jul-10	µg/L	2.36	0.78 J	1.62	0.64	4.7	4.6	**2210 J**	**1680 J**	**64.8**	**61**	**816 J**	**818 J**	2.72	0.73 J	2.0 J	1.25 J							
Aug-10	µg/L																3.62 J	**356**	**342 J**	**2880**	**3560**			
Sep-10	µg/L	1.47 J	0.51 J	1.0 J	0.79 J	5.68	5.21	**2580**	**2710**	**102**	**94.2**	**979**	**918**	1.4	1.55	2.57 J	2.4 J					**619 J**	**575**	**4280**
Oct-10	µg/L																	**470**	**463**	**2980**	**3120**	**700**	**672**	**5990 J**
Apr-11	µg/L																							
Oct-11	µg/L																							
Apr-12	µg/L																							
Oct-12	µg/L		1.0 U		1.0 U		3.0		**2300**		**72**		**1100**		1.9		1.0		**440**		**4100**		**670**	
May-13	µg/L		1.5		1.0		3.1		**1980**		**72.8**		**1210**		1.9		1.7		**460**		**3580**		**565**	
Oct-13	µg/L																							
Nov-13	µg/L										**22.9**						2.0 J		**432**		**3570**			
Feb-14	µg/L																							
Apr-14	µg/L																							
Oct-14	µg/L								**1900**		**95.6**		**861**				2.6 J				**3510**		**532**	
Jun-15	µg/L		4.2		2.0 U		3.0 J								3.6 J									
Oct-15	µg/L								**2150**		4.0 U		**926**				2.9 J		**503**		**3850**		4.5	
Jun-16	µg/L																							
Nov-16	µg/L								**1700**		**76**		**750**				3.5		**520**		**2900**		**530**	
Jun-17	µg/L																							
Nov-17	µg/L		3.0 U		3.0 U		2.1 J		**1600**		**74**		**970**		3.0 U		3.0 U		**540**		**3300**		**450**	
May-18	µg/L																							
Nov-18	µg/L		3.0 U		3.0 U		3.0 U		**1200**		**64**		**900**		2.0 J		3.0 U		**620**		**3300**		**570**	
May-19	ug/L																							
Oct-19	ug/L																							
Nov-19	ug/L		8.5		3.0 U		2.0 J		**1300**		**63**		**1000**		3.0 U		3.0 U		**560**		**3400**		**460**	

Notes:

µg/l = microgram per liter
U = non detect
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J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Appendix I
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-10-14 (D)	SHM-10-15 (T)	SHM-10-15 (D)	SHM-10-16 (T)	SHM-10-16 (D)	SHM-11-02 (D)	SHM-11-06 (D)	PZ-12-01 (D)	PZ-12-02 (D)	PZ-12-03 (D)	PZ-12-04 (D)	PZ-12-05 (D)	PZ-12-06 (D)	PZ-12-07 (D)	PZ-12-08 (D)	PZ-12-09 (D)	PZ-12-10 (D)	SHM-13-01 (D)	SHM-13-02 (D)	SHM-13-03 (D)	SHM-13-04 (D)	SHM-13-05 (D)	SHM-13-06 (D)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L																							
May-97	µg/L																							
Oct-97	µg/L																							
May-98	µg/L																							
Nov-98	µg/L																							
May-99	µg/L																							
Nov-99	µg/L																							
May-00	µg/L																							
Nov-00	µg/L																							
May-01	µg/L																							
Oct-01	µg/L																							
Nov-01	µg/L																							
May-02	µg/L																							
Oct-02	µg/L																							
May-03	µg/L																							
Nov-03	µg/L																							
May-04	µg/L																							
Nov-04	µg/L																							
Jun-05	µg/L																							
Jan-06	µg/L																							
Apr-06	µg/L																							
Jun-06	µg/L																							
Sep-06	µg/L																							
Dec-06	µg/L																							
Apr-07	µg/L																							
May-07	µg/L																							
Oct-07	µg/L																							
Apr-08	µg/L																							
Oct-08	µg/L																							
Jan-09	µg/L																							
Apr-09	µg/L																							
Oct-09	µg/L																							
Apr-10	µg/L																							
Jul-10	µg/L																							
Aug-10	µg/L																							
Sep-10	µg/L	**4100**	**7930**	**8110**	**487**	**495**																		
Oct-10	µg/L	**5860**	**6090**	**6230**	**1180**	**1090**																		
Apr-11	µg/L																							
Oct-11	µg/L																							
Apr-12	µg/L																							
Oct-12	µg/L	**6200 J**		**7000**		**1600**	7.1	**920**																
May-13	µg/L	**5540**		**1090**		**1350**		**1020**	**441**	**627**	**659**	**610**	**741**	**224**	**484**	1.9	1.1	0.69 J		2.5	**318**	**2060**	8.9	**3180 J**
Oct-13	µg/L																							
Nov-13	µg/L			**5740**		**1530**	3.2 J	**1000**											2.2 J	2.7 J	**137**		6.8	**2540**
Feb-14	µg/L																							
Apr-14	µg/L						2.0 U														**120**	**61.1**		**2850**
Oct-14	µg/L	**5380**		**5870 J**			2.0 U	**825**												2.6 J	**80.8**	**693**	**11**	**2360**
Jun-15	µg/L						2.0 U														**75.5**	**620**		**2460**
Oct-15	µg/L	**2320**		**5450**		**1760**	4.0 U	**821**											2.1 J	2.6	**68.7**	**212**	**12.3**	**2160**
Jun-16	µg/L					**1900**	3.0														**53**	**20**		**2500**
Nov-16	µg/L	**4900**		**5100**		**1600**	3.0 U	**900**												1.8 J	**55**	**140**	**11**	**2700**
Jun-17	µg/L					**1800**	3.0 U	**730**	**680**	**500**	**600**	**640**	**260**	**41 J**	**110**	3.1	3.0 U	3.0 U			**46**	**350**		**2800**
Nov-17	µg/L	**5400**		**6400**		**1200**	2.5 J	**780**	**420**	**660**	**620**	**68**	**260**	**49**	3.8	2.3 J	3.0 U	3.0 U	1.5 J	3.0 U	**46**	**160**	8.4	**2700**
May-18	µg/L						2.0 J	**600**	**700**	**400**	**610**	**690**	**190**	**25**	**72**	1.5 J	3.0 U	3.0 U			**26**	**340**		**2700**
Nov-18	µg/L	**3900**		**5800**		**1100**	8.7	**750**	**570**	**300**	**560**	**630**	**140**	**48**	**58**	3.0 U	3.0 U	3.0 U	1.5 J	3.0 U	**44**	**190 J**	**12**	**2400**
May-19	ug/L						**37.0**	**680**	**470**	**190**	**630**	**670**	**220**	**31**	**100**	**160**	3.0 U	3.0 U			**110**	**430**		**3100**
Oct-19	ug/L										**790**	**730**	**210**	**40**		**17**	3.1	3.0 U						
Nov-19	ug/L	**4500**		**5600**		**1200**		**780**	**560**	**270**					**94**				1.90 J	3.0 U	**140**	**600**	**16**	**1900**

Notes:

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Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
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Appendix I
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHM-13-07 (D)	SHM-13-08 (D)	SHM-13-14S (D)	SHM-13-14D (D)	SHM-13-15 (D)	EPA-PZ-2012-1A (D)	EPA-PZ-2012-1B (D)	EPA-PZ-2012-2A (D)	EPA-PZ-2012-2B (D)	EPA-PZ-2012-3A (D)	EPA-PZ-2012-3B (D)	EPA-PZ-2012-4A (D)	EPA-PZ-2012-4B (D)	EPA-PZ-2012-5A (D)	EPA-PZ-2012-5B (D)	EPA-PZ-2012-6A (D)	EPA-PZ-2012-6B (D)	EPA-PZ-2012-7A (D)	EPA-PZ-2012-7B (D)	SHP-2016-1A (D)	SHP-2016-1B (D)	SHP-2016-2A (D)	SHP-2016-2B (D)
Sample Month-Year	**Units**																							
Aug-91	µg/L																							
Dec-91	µg/L																							
Mar-93	µg/L																							
Jun-93	µg/L																							
Nov-96	µg/L																							
May-97	µg/L																							
Oct-97	µg/L																							
May-98	µg/L																							
Nov-98	µg/L																							
May-99	µg/L																							
Nov-99	µg/L																							
May-00	µg/L																							
Nov-00	µg/L																							
May-01	µg/L																							
Oct-01	µg/L																							
Nov-01	µg/L																							
May-02	µg/L																							
Oct-02	µg/L																							
May-03	µg/L																							
Nov-03	µg/L																							
May-04	µg/L																							
Nov-04	µg/L																							
Jun-05	µg/L																							
Jan-06	µg/L																							
Apr-06	µg/L																							
Jun-06	µg/L																							
Sep-06	µg/L																							
Dec-06	µg/L																							
Apr-07	µg/L																							
May-07	µg/L																							
Oct-07	µg/L																							
Apr-08	µg/L																							
Oct-08	µg/L																							
Jan-09	µg/L																							
Apr-09	µg/L																							
Oct-09	µg/L																							
Apr-10	µg/L																							
Jul-10	µg/L																							
Aug-10	µg/L																							
Sep-10	µg/L																							
Oct-10	µg/L																							
Apr-11	µg/L																							
Oct-11	µg/L																							
Apr-12	µg/L																							
Oct-12	µg/L																							
May-13	µg/L		**928**																					
Oct-13	µg/L																							
Nov-13	µg/L	**1340**	**994**																					
Feb-14	µg/L			2.0 U	7.9	3.8 J																		
Apr-14	µg/L	**1280**	**1040**																					
Oct-14	µg/L	**962**	**978**	2.0 U	9.6	8.1	2.0 U	**160**	2.0 U	2.0 U	**21.2**	**3830**	4.8	**2680**	2.0 U	3.2 J	2.0 U	**515**	2.0 U	**1250**				
Jun-15	µg/L	**946**	**975**																					
Oct-15	µg/L	**531**	**954**				4.0 U	**288**	4.0 U	4.0 U	**16.4**	**4070**	5.6	**3520**	4.0 U	3.7	4.0 U	**386**	4.0 U	**1330**				
Jun-16	µg/L	**320**	**770**							.														
Nov-16	µg/L	**140**	**870**	4.0	9.1	5.5	3.0 U	**260**	3.0 U	3.0 U	**23**	**3600**	5.1	**2200**	3.0 U	2.4 J	1.6 J	**370**	3.0 U	**1000**				
Jun-17	µg/L	230	**900**				3.0 U	**240**	3.0 U	3.3	**19**	**4000**	2.9 J	**2300**	3.0 U	1.6 J	3.0 U	**430**	3.0 U	**1500**	3.0 U	**120**	**58**	**350**
Nov-17	µg/L	**620**	**810**	3.0 U	**11**	5.7	3.0 U	**200**	3.0 U	3.0 U	**12**	**3400**	3.4	**2300**	3.0 U	3.0 U	3.0 U	**350**	3.0 U	**1200**	3.0 U	**170**	**51**	**550**
May-18	µg/L	**470**	**830**				3.0 U	**170**	3.0 U	3.0 U	**13**	**2900**	2.5 J	**1900**	1.5 J	3.0 U	3.0 U	**96**	3.0 U	**1300**	3.0 U	**130**	**32**	**420**
Nov-18	µg/L	**490**	**310**	3.0 U	6.1	1.6 J	3.0 U	**170**	1.9 J	3.0 U	**15**	**3000**	3.5	**2000**	1.5 J	**12**	3.0 U	**300**	3.0 U	**1100**	3.0 U	**130**	**17**	**430**
May-19	ug/L	**470**	**800**				3.0 U	**160**	3.0 U	3.0 U	**15**	**2700**	2.5 J	**2000**	1.5 J	2.7 J	1.6 J	**350**	3.0 U	**1500**	3.0 U	**120**	**16**	**450**
Oct-19	ug/L								3.0 U	3.0 U	**16**	**3200**	4.5	**2100**			3.0 U	**370**	2.30 J				**11**	**560**
Nov-19	ug/L	**750**	**930**	1.90 J	**12**	5.1	3.0 U	**220**							2.20 J	**14**				**1300**	3.0 U	**180**		

Notes:

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J = estimated result

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Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
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Appendix I
Summary of Historical Arsenic Results in Groundwater
Shepley's Hill Landfill - Devens Massachusetts

Well ID	Total or Dissolved	SHP-2016-3A (D)	SHP-2016-3B (D)	SHP-2016-4A (D)	SHP-2016-4B (D)	SHP-2016-5A (D)	SHP-2016-5B (D)	SHP-2016-6A (D)	SHP-2016-6B (D)	SHP-2016-6C (D)	SHP-2016-7A (D)	SHP-2016-7B (D)	EW-1² (D)	EW-4² (D)
Sample Month-Year	**Units**													
Aug-91	µg/L													
Dec-91	µg/L													
Mar-93	µg/L													
Jun-93	µg/L													
Nov-96	µg/L													
May-97	µg/L													
Oct-97	µg/L													
May-98	µg/L													
Nov-98	µg/L													
May-99	µg/L													
Nov-99	µg/L													
May-00	µg/L													
Nov-00	µg/L													
May-01	µg/L													
Oct-01	µg/L													
Nov-01	µg/L													
May-02	µg/L													
Oct-02	µg/L													
May-03	µg/L													
Nov-03	µg/L													
May-04	µg/L													
Nov-04	µg/L													
Jun-05	µg/L													
Jan-06	µg/L													
Apr-06	µg/L													
Jun-06	µg/L													
Sep-06	µg/L													
Dec-06	µg/L													
Apr-07	µg/L													
May-07	µg/L													
Oct-07	µg/L													
Apr-08	µg/L													
Oct-08	µg/L													
Jan-09	µg/L													
Apr-09	µg/L													
Oct-09	µg/L													
Apr-10	µg/L													
Jul-10	µg/L													
Aug-10	µg/L													
Sep-10	µg/L													
Oct-10	µg/L													
Apr-11	µg/L													
Oct-11	µg/L													
Apr-12	µg/L													
Oct-12	µg/L													
May-13	µg/L													
Oct-13	µg/L													
Nov-13	µg/L													
Feb-14	µg/L													
Apr-14	µg/L													
Oct-14	µg/L													
Jun-15	µg/L													
Oct-15	µg/L													
Jun-16	µg/L												**1500**	**2400**
Nov-16	µg/L													
Jun-17	µg/L	4.8	**240**	**10**	**1100**	2.3 J	**620**	**520**	**830**	**320**	**81**	7.9	**1900**	**3500**
Nov-17	µg/L	7.0	**270**	4.6	**1800**	2.2 J	**700**	**600**	**1300**	**280**	**12**	**11**	**1800**	**3500**
May-18	µg/L	3.2	**240**	3.8	**1300**	2.5 J	**620**	**280**	**1300**	**210**	**84**	**200**	**1500**	**3300**
Nov-18	µg/L	4.5	**240**	1.5 J	**1400**	2.8 J	**520**	**480**	**1300**	**300**	**200**	**150**	**1900**	**4000**
May-19	ug/L	4.0	**230**	3.0 U	**1400**	3.9	**610**	**2800**	**1300**	**250**	**19**	**80**	**1500**	**2900**
Oct-19	ug/L	**260**	4.1											
Nov-19	ug/L			3.0 U	**1500**	3.2	**720**	**860**	**1200**	**270**		**35**	**1600**	**3200**

Notes:

µg/l = microgram per liter
U = non detect
UJ = estimated non detect
J = estimated result

D = detected in lab blank
Shaded and bolded values exceed the MCL Standards for Arsenic of 10 ug/l
R = arsenic concentration of 25 J ug/L is rejected and not useable. The sample was collected underwater due to Sculley Road flooding conditions; therefore, the arsenic concentration is not representative of the arsenic levels at this location.
² = extraction well sample collected at ATP port

Appendix J
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Former Fort Devens, Devens, MA

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
GV-1	10/26/2012	12:54	0.2	8.6	0	16	0	9.5	0.8	4	167	0.5	8.0	0	23	0	10.8	1.1	29.87
	11/12/2013	8:46	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.2	0.0	29.98
	10/17/2014	14:49	0.0	21.0	0.0	0.0	0.0	0.0	0.0	4	167	0.0	18.4	0.0	3.0	4.0	1.9	0.1	29.32
	10/20/2015	9:21	0.0	20.8	0.0	0.0	0.0	0.1	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.0	0.0	29.90
	10/18/2016	17:48	0.1	8.8	0.0	21	0.0	9.4	1.1	4	167	0.1	6.1	0.0	24	0.0	11.8	1.2	29.55
	10/18/2017	15:05	0.0	19.6	0.0	0.0	0.0	1.0	0.0	4	167	0.0	11.4	0.0	12.0	0.0	6.9	0.3	29.98
	10/18/2018	14:28	0.0	21.3	0.0	0.0	0.0	0.4	0.0	4	167	0.0	21.1	0.0	0.0	0.0	0.5	0.0	30.03
	10/16/2019	14:07	0.0	9.1	0.0	64.0	0.0	8.4	1.3	4	167	0.0	5.6	0.0	66.0	0.0	11.0	3.3	29.71
GV-2	10/26/2012	13:05	0.4	9.9	0	87	0	9.6	4.3	4	167	0.6	4.0	0	>100	0	15.4	9.3	29.87
	11/12/2013	8:56	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:40	0.0	20.8	1.0	0.0	0.0	0.1	0.0	4	167	0.0	15.2	0.0	68.0	4.0	5.1	3.5	29.32
	10/20/2015	10:50	0.1	19.4	0.0	27.0	0.0	1.2	0.8	4	167	0.1	16.4	0.0	83.0	1.0	4.2	2.5	29.89
	10/18/2016	17:43	0.1	8.7	0.0	99	0.0	10.3	4.9	4	167	0.0	3.9	0.0	100	0.0	14.8	7.2	29.55
	10/18/2017	14:58	0.0	20.5	0.0	5.0	0.0	0.5	0.1	4	167	0.0	11.3	0.0	69.0	0.0	6.7	2.7	29.99
	10/18/2018	14:23	0.0	21.6	0.0	0.0	0.0	0.0	0.0	4	167	0.0	21.6	0.0	0.0	0.0	0.1	0.0	30.03
	10/16/2019	14:15	0.0	11.5	0.0	74.0	0.0	7.5	3.0	4	167	0.0	2.6	0.0	99.0	0.0	13.7	7.7	29.71
GV-3	10/26/2012	13:22	0.0	20.9	0	0	0	0.0	0.0	4	167	0.0	20.9	0	0	0	0.0	0.0	29.87
	11/12/2013	9:09	0.1	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:25	0.0	20.7	0.0	0.0	0.0	0.0	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.0	0.0	29.32
	10/20/2015	8:50	0.0	20.5	0.0	0.0	0.0	0.0	0.0	4	167	0.0	20.5	0.0	0.0	0.0	0.1	0.1	29.88
	10/18/2016	17:31	0.0	18.3	0.0	13	0.0	1.8	0.6	4	167	0.0	19.9	0.0	0	0.0	0.0	0.0	29.55
	10/18/2017	14:39	0.0	20.9	0.0	0.0	0.0	0.1	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.1	0.0	29.98
	10/18/2018	14:12	0.0	21.3	0.0	0.0	0.0	0.0	0.0	4	167	0.0	21.4	0.0	0.0	0.0	0.0	0.0	30.03
	10/16/2019	13:40	0.0	21.1	0.0	3.0	0.0	0.0	0.1	4	167	0.0	20.9	0.0	0.0	0.0	0.0	0.1	29.71
GV-4	10/26/2012	13:15	0.6	7.4	0	72	0	10.4	3.4	4	167	0.5	11.3	0	39	0	6.8	1.9	29.87
	11/12/2013	9:18	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:33	0.0	18.0	0.0	21.0	5.0	2.5	1.0	4	167	0.2	1.8	0.0	100.0	0.0	14.3	8.1	29.32
	10/20/2015	9:00	0.1	10.0	0.0	71.0	0.0	8.7	2.1	4	167	0.2	10.1	0.0	100.0	0.0	10.1	3.1	29.88
	10/18/2016	17:37	0.2	8.7	0.0	80	0.0	11.0	4.0	4	167	0.2	5.2	0.0	100	0.0	14.0	5.3	29.55
	10/18/2017	14:48	0.0	13.3	0.0	61.0	0.0	4.8	2.1	4	167	0.0	15.2	0.0	30.0	0.0	4.1	1.0	29.97
	10/18/2018	14:18	0.0	21.5	0.0	0.0	0.0	0.0	0.0	4	167	0.0	21.5	0.0	0.0	0.0	0.0	0.0	30.03
	10/16/2019	13:58	0.0	5.5	0.0	91.0	0.0	11.7	5.1	4	167	0.0	9.3	0.0	63.0	0.0	8.5	2.7	29.71
GV-5	10/26/2012	13:55	1.5	13.4	0	1	0	5.2	0.0	4	167	0.2	14.0	0	0	0	4.8	0.0	29.87
	11/12/2013	9:48	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:02	0.0	6.9	0.0	0.0	5.0	6.7	0.0	4	167	0.0	5.9	0.0	0.0	5.0	7.9	0.0	29.32
	10/20/2015	9:12	0.1	19.7	0.0	4.0	0.0	0.6	0.1	4	167	0.0	20.5	0.0	0.0	0.0	0.4	0.0	29.88
	10/18/2016	17:01	0.0	14.2	0.0	0	0.0	5.0	0.0	4	167	0.0	12.4	0.0	0	0.0	6.3	0.0	29.55
	10/18/2017	13:47	0.0	18.0	0.0	0.0	0.0	1.3	0.0	4	167	0.0	18.1	0.0	0.0	0.0	1.9	0.0	29.98
	10/18/2018	12:58	0.0	21.7	0.0	0.0	0.0	0.1	0.0	4	167	0.0	21.8	0.0	1.0	0.0	0.1	0.1	30.02
	10/16/2019	14:43	0.0	12.2	0.0	6.0	0.0	6.4	6.2	4	167	0.0	12.6	0.0	0.0	0.0	6.2	0.2	29.71
GV-6	10/26/2012	13:31	0.4	5.8	0	>100	0	12.8	7.5	4	167	0.7	5.7	0	85	0	11.4	4.2	29.87
	11/12/2013	9:29	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:14	70.1	2.6	0.0	>100	3.0	14.3	8.0	4	167	0.1	0.5	0.0	>100	0.0	17.5	9.4	29.32
	10/20/2015	13:16	0.0	3.3	0.0	100.0	0.0	13.7	7.6	4	167	0.0	1.7	0.0	100.0	0.0	14.8	7.8	29.88
	10/18/2016	17:29	0.0	6.5	0.0	100	0.0	14.1	6.0	4	167	0.1	6.9	0.0	100	0.0	14.0	5.7	29.55
	10/18/2017	14:31	0.0	14.8	0.0	46.0	0.0	4.0	1.0	4	167	0.0	14.3	0.0	49.0	0.0	43.0	1.8	29.97
	10/18/2018	14:06	0.0	21.1	0.0	0.0	0.0	0.1	0.0	4	167	0.0	21.1	0.0	0.0	0.0	0.1	0.0	30.03
	10/16/2019	13:38	1.0	1.6	0.0	97.0	0.0	14.4	6.5	4	167	0.0	1.6	0.0	51.0	0.0	14.7	5.4	29.71
GV-7	10/26/2012	14:15	0.5	1.1	0	>100	2	12.1	6.6	4	167	0.4	1.2	0	63	0	11.1	3.2	29.87
	11/12/2013	9:57	0.0	20.7	0	0	0	0.1	0.0	4	167	0.0	20.5	0	0	0	0.1	0.0	29.98
	10/17/2014	13:47	0.0	2.9	0.0	>100	0.0	11.4	7.6	4	167	0.0	0.6	0.0	>100	0.0	13.8	8.2	29.32
	10/20/2015	11:30	0.0	5.4	0.0	100.0	0.0	11.6	8.2	4	167	0.0	1.1	0.0	100.0	1.0	14.1	7.9	29.89
	10/18/2016	17:10	0.0	11.8	0.0	100	0.0	7.7	5.6	4	167	0.0	2.5	0.0	100	0.0	16.8	11.0	29.55
	10/18/2017	13:37	0.0	18.2	0.0	10.0	0.0	0.9	0.3	4	167	0.0	18.6	0.0	5.0	0.0	0.8	0.0	29.98
	10/18/2018	12:47	0.0	21.6	1.0	1.0	0.0	0.0	0.1	4	167	0.0	21.6	1.0	0.0	0.0	0.0	0.0	30.02
	10/16/2019	14:27	0.0	0.3	0.0	99.0	0.0	15.2	13.3	4	167	0.0	0.1	0.0	99.0	0.0	15.1	12.1	29.71

Appendix J
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Former Fort Devens, Devens, MA

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
GV-8	10/26/2012	14:05	0.7	10.1	0	1	0	7.0	0.1	4	167	0.1	9.1	0	0	1	7.4	0.0	29.87
	11/12/2013	10:04	0.0	20.3	0	0	0	0.1	0.0	4	167	0.0	20.2	0	0	0	0.1	0.0	29.98
	10/17/2014	13:54	0.0	6.7	0.0	15.0	6.0	6.6	0.8	4	167	0.0	5.8	0.0	9.0	6.0	7.7	0.4	29.32
	10/20/2015	11:39	0.0	12.7	0.0	45.0	0.0	6.2	1.4	4	167	0.0	10.6	0.0	27.0	0.0	7.3	0.8	29.89
	10/18/2016	16:53	0.0	13.6	0.0	9	0.0	5.2	0.4	4	167	0.0	8.1	0.0	2	0.0	9.6	0.1	29.55
	10/18/2017	13:56	0.0	17.7	0.0	9.0	0.0	1.8	0.1	4	167	0.0	17.8	0.0	0.0	0.0	1.9	0.0	29.95
	10/18/2018	12:52	0.0	21.7	1.0	0.0	0.0	0.1	0.0	4	167	0.0	21.5	0.0	0.0	0.0	0.1	0.0	30.02
	10/16/2019	14:26	0.0	8.2	0.0	49.0	0.0	9.0	2.5	4	167	0.0	5.8	0.0	5.0	0.0	11.1	0.3	29.71
GV-9	10/26/2012	13:40	0.6	3.0	0	99	0	11.7	4.9	4	167	1.2	3.2	0	>100	0	18.1	22.0	29.87
	11/12/2013	9:39	0.0	20.9	0	0	0	0.1	0.0	4	167	0.0	20.9	0	0	0	0.1	0.0	29.98
	10/17/2014	14:10	0.2	1.0	0.0	>100	0.0	16.8	9.1	4	167	0.2	0.3	0.0	0.0	0.0	18.7	17.0	29.32
	10/20/2015	13:24	0.2	7.1	0.0	100.0	0.0	11.2	5.9	4	167	0.4	0.7	0.0	100.0	0.0	19.1	17.8	29.88
	10/18/2016	17:17	0.0	5.5	0.0	100	0.0	15.7	7.6	4	167	0.0	4.9	0.0	100	0.0	17.1	13.7	29.55
	10/18/2017	14:23	0.0	14.9	0.0	49.0	0.0	3.3	1.5	4	167	0.0	10.1	0.0	100.0	0.0	9.1	10.3	29.98
	10/18/2018	14:00	0.0	20.7	0.0	3.0	0.0	0.3	0.2	4	167	0.0	20.1	0.0	11.0	0.0	0.7	0.5	30.03
	10/16/2019	13:27	0.0	0.0	0.0	40.0	0.0	16.0	8.8	4	167	0.0	0.1	0.0	99.0	0.0	17.0	13.1	29.71
GV-10	10/26/2012	14:22	0.3	2.8	0	50	2	10.5	2.6	4	167	0.2	4.0	0	30	2	9.5	1.5	29.87
	11/12/2013	10:22	0.0	20.7	0	0	0	0.2	0.0	4	167	0.0	20.6	0	0	0	0.1	0.0	29.98
	10/17/2014	13:30	0.0	1.9	0.0	55.0	0.0	11.6	2.7	4	167	0.0	1.3	0.0	54.0	0.0	12.1	2.7	29.32
	10/20/2015	13:03	0.0	4.2	0.0	100.0	0.0	11.6	4.2	4	167	0.0	2.0	0.0	100.0	0.0	12.4	4.3	29.89
	10/18/2016	16:40	0.0	6.1	0.0	100	0.0	14.4	8.4	4	167	0.0	2.2	0.0	100	0.0	16.3	7.8	29.55
	10/18/2017	14:17	0.0	18.6	0.0	0.0	0.0	0.9	0.0	4	167	0.0	17.6	0.0	0.0	0.0	1.3	0.0	29.98
	10/18/2018	12:41	0.0	21.6	1.0	0.0	0.0	0.0	0.0	4	167	0.0	21.6	1.0	0.0	0.0	0.0	0.0	30.02
	10/16/2019	13:17	0.0	1.1	0.0	51.0	0.0	14.1	3.0	4	167	0.0	2.0	0.0	45.0	0.0	13.6	2.4	29.71
GV-11	10/26/2012	14:30	0.2	11.8	0	9	0	5.2	0.5	4	167	0.1	11.3	0	16	0	5.1	0.8	29.87
	11/12/2013	10:14	0.0	20.6	0	0	0	0.1	0.0	4	167	0.0	20.6	0	0	0	0.2	0.0	29.98
	10/17/2014	13:37	0.0	13.3	0.0	5.0	4.0	4.9	0.2	4	167	0.0	6.9	0.0	2.0	6.0	5.0	1.0	29.32
	10/20/2015	12:54	0.0	14.1	0.0	0.0	0.0	4.5	1.1	4	167	0.0	13.7	0.0	22.0	1.0	4.8	0.6	29.89
	10/18/2016	16:46	0.1	13.8	0.0	23	0.0	4.9	1.1	4	167	0.0	12.2	0.0	15	0.0	5.6	0.7	29.55
	10/18/2017	14:12	0.0	19.5	0.0	3.0	0.0	0.7	0.0	4	167	0.0	18.0	0.0	5.0	0.0	1.5	0.0	29.98
	10/18/2018	12:35	0.0	21.3	0.0	0.0	0.0	0.0	0.0	4	167	0.0	21.4	0.0	0.0	0.0	0.1	0.0	30.02
	10/16/2019	13:09	0.0	10.9	0.0	99.0	0.0	6.8	2.5	4	167	0.0	5.9	0.0	99.0	0.0	6.5	9.0	29.71
GV-12	10/26/2012	14:40	0.1	0.9	0	>100	0	9.3	6.1	4	167	0.2	1.0	0	>100	1	10.1	6.5	29.87
	11/12/2013	11:00	0.0	20.4	0	0	0	0.2	0.0	4	167	0.0	20.6	0	0	0	0.2	0.0	29.98
	10/17/2014	12:55	0.0	12.6	1.0	14.0	2.0	5.3	0.7	4	167	0.0	4.9	0.0	24.0	5.0	7.4	1.2	29.32
	10/20/2015	13:35	0.1	7.5	0.0	100.0	0.0	10.2	8.3	4	167	0.0	0.8	0.0	100.0	0.0	14.6	11.8	29.88
	10/18/2016	16:16	0.0	3.1	0.0	100	0.0	14.7	9.5	4	167	0.0	1.5	0.0	100	0.0	15.7	9.7	29.55
	10/18/2017	13:11	0.0	20.5	0.0	0.0	0.0	0.2	0.0	4	167	0.0	20.3	0.0	0.0	10.0	0.4	0.0	29.99
	10/18/2018	12:28	0.0	21.2	1.0	0.0	0.0	0.0	0.0	4	167	0.0	21.3	1.0	0.0	0.0	0.0	0.0	30.02
	10/16/2019	13:00	0.0	3.3	0.0	95.0	0.0	10.7	7.0	4	167	0.0	0.0	0.0	99.0	0.0	12.4	8.8	29.71
GV-13	10/26/2012	15:51	1.5	19.4	0	77	0	2.0	3.8	4	167	0.5	18.1	0	>100	0	3.7	5.2	29.77
	11/12/2013	11:11	0.1	20.6	0	0	0	0.4	0.0	4	167	0.0	20.5	0	6	0	0.4	0.0	29.98
	10/17/2014	10:01	0.0	20.9	0.0	0.0	0.0	0.1	0.0	4	167	0.0	20.7	0.0	0.0	0.0	0.2	0.0	29.40
	10/20/2015	13:45	0.1	20.1	0.0	15.0	0.0	0.7	0.4	4	167	0.1	19.3	0.0	32.0	0.0	1.2	0.8	29.88
	10/18/2016	8:44	0.0	19.6	0.0	0	0.0	0.3	0.0	4	167	0.0	19.7	0.0	0	0.0	0.1	0.0	29.73
	10/18/2017	9:40	0.0	20.9	0.0	0.0	0.0	0.4	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.4	0.0	30.02
	10/18/2018	9:04	0.0	20.9	0.0	0.0	0.0	0.1	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.1	0.0	30.06
	10/16/2019	11:44	0.0	12.4	0.0	47.0	0.0	5.0	3.4	4	167	0.0	16.2	0.0	30.0	0.0	2.5	2.1	29.85
GV-14	10/26/2012	15:37	0.6	20.9	0	>100	0	15.7	29.5	4	167	0.5	3.0	0	>100	0	19.7	34.9	29.87
	11/12/2013	12:30	0.2	11.2	0	>100	0	6.3	7.9	4	167	0.3	8.1	0	>100	0	8.3	10.3	29.91
	10/17/2014	10:12	0.0	20.1	0.0	29.0	30.0	1.6	1.7	4	167	0.2	17.1	0.0	100.0	0.0	4.4	6.1	29.40
	10/20/2015	14:00	0.1	20.4	0.0	15.0	0.0	0.6	0.3	4	167	0.0	13.9	0.0	100.0	0.0	7.0	11.9	29.88
	10/18/2016	10:00	0.0	19.3	0.0	7	0.0	0.7	0.3	4	167	0.0	19.7	0.0	2	0.0	0.3	0.1	29.72
	10/18/2017	10:20	0.0	20.5	0.0	0.0	0.0	0.6	0.0	4	167	0.0	20.9	0.0	0.0	0.0	0.3	0.0	30.02
	10/18/2018	12:21	0.0	21.3	1.0	0.0	0.0	0.0	0.0	4	167	0.0	21.3	1.0	0.0	0.0	0.0	0.0	30.02
	10/16/2019	11:55	0.0	20.6	0.0	99.0	0.0	0.2	0.2	4	167	0.0	3.7	0.0	99.0	0.0	15.1	29.3	29.85

Appendix J
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Former Fort Devens, Devens, MA

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
GV-15	10/26/2012	15:27	1.0	1.5	0	>100	4	22.5	24.3	4	375	0.4	1.5	0	>100	1	22.6	23.9	29.87
	11/12/2013	14:39	0.3	6.4	0	75	0	10.5	7.9	4	375	0.2	4.8	0	>100	0	11.4	8.6	29.91
	10/17/2014	10:56	0.0	15.2	1.0	25.0	5.0	5.0	1.3	4	375	0.0	20.7	0.0	0.0	0.0	0.1	0.0	29.33
	10/20/2015	16:15	0.1	20.6	0.0	23.0	0.0	0.7	0.6	4	375	0.1	3.1	0.0	100.0	0.0	21.2	24.9	29.88
	10/18/2016	16:05	0.0	2.7	0.0	100	0.0	23.3	22.3	4	375	0.0	2.8	0.0	100	0.0	22.9	21.2	29.55
	10/18/2017	13:02	0.0	16.9	0.0	35.0	0.0	2.4	1.1	4	375	0.0	16.0	0.0	42.0	0.0	3.2	1.4	29.98
	10/18/2018	12:11	0.0	21.5	0.0	0.0	0.0	0.0	0.1	4	375	0.0	21.4	0.0	0.0	0.0	0.0	0.0	30.10
	10/16/2019	12:10	0.0	1.8	0.0	99.0	0.0	21.9	23.5	4	375	0.0	0.0	0.0	99.0	0.0	21.0	26.5	29.85
GV-16	10/26/2012	14:50	0.3	1.2	0	>100	2	20.3	14.1	4	375	0.4	2.2	0	>100	2	20.3	13.7	29.87
	11/12/2013	10:45	0.0	20.8	0	0	0	0.3	0.0	4	375	0.0	20.0	0	0	0	0.3	0.0	29.98
	10/17/2014	13:04	0.0	1.2	0.0	100.0	0.0	19.5	15.8	4	375	0.1	0.7	0.0	100.0	0.0	20.2	17.0	29.32
	10/20/2015	15:55	0.1	20.1	0.0	27.0	0.0	23.7	17.3	4	375	0.2	6.1	0.0	100.0	0.0	16.7	11.0	29.88
	10/18/2016	16:22	0.0	1.7	0.0	100	0.0	25.5	19.9	4	375	0.0	1.9	0.0	100	0.0	25.5	19.9	29.55
	10/18/2017	13:19	0.0	17.2	0.0	14.0	0.0	2.4	0.4	4	375	0.0	16.8	0.0	12.0	0.0	2.7	0.3	29.90
	10/18/2018	12:00	0.0	21.6	0.0	0.0	0.0	0.0	0.0	4	375	0.0	21.7	0.0	0.0	0.0	0.0	0.0	30.10
	10/16/2019	12:48	0.0	0.0	0.0	99.0	22.1	0.0	20.2	4	375	0.0	0.0	0.0	99.0	0.0	22.4	19.2	29.71
GV-17	10/26/2012	15:02	0.0	3.3	0	>100	2	22.7	20.7	4	375	0.3	2.7	0	>100	2	22.9	20.9	29.87
	11/12/2013	10:30	0.0	20.5	0	0	0	0.3	0.0	4	375	0.0	20.0	0	0	0	0.3	0.0	29.98
	10/17/2014	13:16	0.0	0.2	97.0	100.0	0.0	24.6	27.5	4	375	0.1	0.0	0.0	100.0	0.0	25.0	28.4	29.32
	10/20/2015	16:08	0.2	2.2	0.0	100.0	0.0	23.2	21.5	4	375	0.1	1.1	0.0	100.0	0.0	24.3	22.8	29.88
	10/18/2016	16:30	0.0	1.7	0.0	100	0.0	27.5	26.0	4	375	0.0	3.6	0.0	100	0.0	25.1	24.3	29.55
	10/18/2017	13:27	0.0	16.1	0.0	20.0	0.0	2.4	0.4	4	375	0.0	15.8	0.0	21.0	0.0	3.2	0.6	29.94
	10/18/2018	11:51	0.0	21.2	0.0	0.0	0.0	0.1	0.0	4	375	0.0	21.4	0.0	0.0	0.0	0.1	0.0	30.10
	10/16/2019	12:36	0.0	2.6	0.0	99.0	0.0	23.4	25.6	4	375	0.0	0.0	0.0	99.0	0.0	23.4	26.1	29.71
GV-18	10/26/2012	15:15	0.5	5.3	0	>100	4	25.8	34.6	4	375	0.4	0.8	0	>100	3	26.3	35.5	29.87
	11/12/2013	14:23	0.2	5.9	0	>100	0	15.5	16.2	4	375	0.2	3.2	0	>100	0	17.9	18.9	29.91
	10/17/2014	11:12	0.0	20.8	0.0	0.0	0.0	0.1	0.0	4	375	0.0	20.7	0.0	0.0	0.0	0.1	0.0	29.33
	10/20/2015	16:25	0.1	5.6	0.0	100.0	0.0	21.2	29.1	4	375	0.2	8.8	0.0	100.0	0.0	17.1	24.1	29.88
	10/18/2016	15:55	0.0	4.8	0.0	100	0.0	22.9	25.2	4	375	0.0	2.6	0.0	100	0.0	26.4	29.3	29.55
	10/18/2017	12:55	0.0	20.2	0.0	7.0	0.0	0.5	0.1	4	375	0.0	20.3	0.0	0.0	0.0	0.5	0.1	29.98
	10/18/2018	11:40	0.0	20.9	0.0	0.0	0.0	0.2	0.0	4	375	0.0	21.2	0.0	0.0	0.0	0.1	0.0	30.10
	10/16/2019	12:21	0.0	0.7	0.0	99.0	0.0	21.3	23.4	4	375	0.0	1.0	0.0	99.0	0.0	21.2	23.4	29.71
LGP-01-01X	10/26/2012	7:55	0.0	20.9	0	0	0	0.7	0.0	2	83	0.0	20.3	0	0	0	0.7	0.0	29.88
	11/12/2013	7:36	0.0	20.8	0	0	0	0.4	0.0	2	83	0.0	20.9	0	0	0	0.5	0.0	29.98
	10/17/2014	15:00	0.0	20.4	0.0	0.0	0.0	0.6	0.0	2	83	0.0	20.6	0.0	0.0	0.0	0.6	0.0	29.32
	10/20/2015	9:45	0.0	20.6	0.0	0.0	0.0	0.7	0.0	2	83	0.0	20.5	0.0	0.0	0.0	0.7	0.0	29.90
	10/18/2016	17:56	0.0	18.9	0.0	0	0.0	1.4	0.0	2	83	0.0	19.3	0.0	0	0.0	0.9	0.0	29.55
	10/18/2017	8:55	0.0	20.3	0.0	0.0	0.0	0.8	0.0	2	83	0.0	20.4	0.0	0.0	0.0	0.9	0.0	30.00
	10/18/2018	14:48	0.0	20.9	0.0	0.0	0.0	1.0	0.0	2	83	0.0	20.9	0.0	0.0	0.0	1.0	0.0	30.03
	10/16/2019	15:37	0.0	21.0	0.0	0.0	0.0	0.5	0.1	2	83	0.0	21.1	0.0	0.0	0.0	0.5	0.1	29.64
LGP-09-01XA	10/26/2012	8:00	0.0	20.3	0	0	0	0.8	0.0	2	157	0.0	20.4	0	0	0	0.8	0.0	29.89
	11/12/2013	7:42	0.0	20.9	0	0	0	0.7	0.0	2	157	0.0	20.9	0	0	0	0.7	0.0	29.98
	10/17/2014	15:03	0.4	20.6	0.0	0.0	0.0	0.6	0.0	2	157	0.0	20.7	0.0	0.0	0.0	0.6	0.0	29.32
	10/20/2015	9:33	0.0	20.8	0.0	0.0	0.0	0.8	0.0	2	157	0.0	20.3	0.0	0.0	0.0	0.9	0.0	29.90
	10/18/2016	18:01	0.0	19.7	0.0	0	0.0	0.5	0.0	2	157	0.0	19.6	0.0	0	0.0	0.6	0.0	29.55
	10/18/2017	9:00	0.0	20.2	0.0	0.0	0.0	0.8	0.0	2	157	0.0	20.2	0.0	0.0	0.0	1.0	0.0	30.00
	10/18/2018	14:43	0.0	20.6	0.0	0.0	0.0	1.2	0.0	2	157	0.0	20.6	0.0	0.0	0.0	1.2	0.0	30.03
	10/16/2019	15:48	0.0	21.0	0.0	0.0	0.0	0.5	0.1	2	157	0.0	21.2	0.0	0.0	0.0	0.6	0.1	29.64
LGP-09-01XB	10/26/2012	8:06	0.1	20.9	0	0	0	0.9	0.0	2	259	0.0	20.9	0	0	0	0.9	0.0	29.89
	11/12/2013	7:50	0.2	20.9	0	0	0	0.2	0.0	2	259	0.0	20.9	0	0	0	1.0	0.0	29.98
	10/17/2014	15:02	0.7	20.5	0.0	0.0	0.0	0.6	0.0	2	157	0.0	20.6	0.0	0.0	0.0	0.6	0.0	29.32
	10/20/2015	9:40	0.0	20.2	0.0	0.0	0.0	0.9	0.0	2	157	0.0	20.2	0.0	0.0	0.0	0.9	0.0	29.90
	10/18/2016	18:05	0.0	19.5	0.0	0	0.0	0.7	0.0	2	157	0.0	19.5	0.0	0	0.0	0.7	0.0	29.55
	10/18/2017	9:05	1.0	20.1	0.0	0.0	0.0	1.0	0.0	2	157	0.0	20.1	0.0	0.0	0.0	1.0	0.0	30.00
	10/18/2018	14:38	0.0	20.8	0.0	1.0	0.0	0.9	0.1	2	157	0.0	20.6	0.0	0.0	0.0	1.0	0.0	30.03
	10/16/2019	15:43	0.0	20.8	0.0	0.0	0.0	0.7	0.1	2	157	0.0	20.9	0.0	0.0	0.0	0.8	0.1	29.64

Appendix J
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Former Fort Devens, Devens, MA

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
LGP-01-02X	10/26/2012	8:26	0.0	19.8	0	0	0	1.4	0.0	2	83	0.0	20.2	0	0	0	1.5	0.0	29.89
	11/12/2013	8:02	0.0	20.9	0	0	0	0.9	0.0	2	83	0.0	20.8	0	0	0	0.9	0.0	29.98
	10/17/2014	15:18	0.0	20.2	0.0	0.0	0.0	0.8	0.0	2	83	0.0	20.2	0.0	0.0	0.0	0.9	0.0	29.32
	10/20/2015	9:58	0.0	20.3	0.0	0.0	0.0	1.1	0.0	2	83	0.0	20.2	0.0	0.0	0.0	1.3	0.0	29.90
	10/18/2016	18:09	0.0	19.4	0.0	0	0.0	1.0	0.0	2	83	0.0	19.3	0.0	0	0.0	1.2	0.0	29.55
	10/18/2017	9:18	0.0	19.9	0.0	0.0	0.0	1.3	0.0	2	83	0.0	20.0	0.0	0.0	0.0	1.2	0.0	30.01
	10/18/2018	15:01	0.0	18.7	0.0	0.0	0.0	3.2	0.0	2	83	0.0	18.8	1.0	0.0	0.0	3.2	0.0	30.03
	10/16/2019	15:28	0.0	20.8	0.0	0.0	0.0	0.9	0.1	2	83	0.0	20.8	0.0	0.0	0.0	0.9	0.1	29.64
LGP-09-02X	10/26/2012	8:20	0.1	19.6	0	0	0	1.7	0.0	2	204	0.0	19.7	0	0	0	1.7	0.0	29.89
	11/12/2013	8:07	0.2	20.9	0	0	0	1.1	0.0	2	204	0.1	20.6	0	0	0	1.3	0.0	29.98
	10/17/2014	15:20	0.0	20.2	0.0	0.0	0.0	1.0	0.0	2	204	0.0	20.3	1.0	0.0	0.0	1.1	0.0	29.32
	10/20/2015	9:52	0.0	20.1	0.0	0.0	0.0	1.4	0.0	2	204	0.0	20.0	0.0	0.0	0.0	0.3	0.0	29.90
	10/18/2016	18:12	0.0	19.4	0.0	0	0.0	1.0	0.0	2	204	0.0	19.5	0.0	0	0.0	0.9	0.0	29.55
	10/18/2017	9:13	0.0	19.8	0.0	0.0	0.0	1.1	0.0	2	204	0.0	19.9	0.0	0.0	0.0	1.2	0.0	30.00
	10/18/2018	14:56	0.0	18.9	1.0	0.0	0.0	3.2	0.0	2	204	0.0	18.5	2.0	0.0	0.0	3.5	0.0	30.03
	10/16/2019	15:26	0.0	20.7	0.0	0.0	0.0	1.1	0.1	2	204	0.0	20.9	0.0	0.0	0.0	1.2	0.2	29.64
LGP-01-03X	10/26/2012	8:47	0.0	20.2	0	0	0	1.1	0.0	2	83	0.0	20.2	0	0	0	1.1	0.0	29.91
	11/12/2013	8:15	0.0	20.8	0	0	0	0.9	0.0	2	83	0.0	20.7	0	0	0	0.9	0.0	29.98
	10/17/2014	15:29	0.0	20.2	0.0	0.0	0.0	0.8	0.0	2	83	0.0	20.2	0.0	0.0	0.0	0.8	0.0	29.32
	10/20/2015	10:10	0.0	20.3	0.0	0.0	0.0	1.1	0.0	2	83	0.0	20.3	0.0	0.0	0.0	1.1	0.0	29.90
	10/18/2016	18:15	0.0	19.6	0.0	0	0.0	0.7	0.0	2	83	0.0	19.6	0.0	0	0.0	0.7	0.0	29.55
	10/18/2017	8:40	0.0	20.2	0.0	0.0	0.0	1.0	0.0	2	83	0.0	20.1	0.0	0.0	0.0	1.2	0.0	30.00
	10/18/2018	15:07	0.0	19.9	1.0	0.0	0.0	1.8	0.0	2	83	0.0	20.0	0.0	0.0	0.0	1.6	0.0	30.03
	10/16/2019	15:22	0.0	20.8	0.0	0.0	0.0	0.8	0.1	2	83	0.0	20.9	0.0	0.0	0.0	0.8	0.1	29.64
LGP-09-03X	10/26/2012	8:40	0.4	19.8	0	0	0	1.4	0.0	2	167	0.0	19.9	0	0	0	1.5	0.0	29.91
	11/12/2013	8:20	0.1	20.7	0	0	0	1.2	0.0	2	167	0.0	20.6	0	0	0	1.3	0.0	29.98
	10/17/2014	15:31	0.5	20.1	0.0	0.0	0.0	1.0	0.0	2	167	0.0	20.8	0.0	0.0	0.0	0.3	0.0	29.32
	10/20/2015	10:19	0.0	20.1	0.0	0.0	0.0	1.2	0.0	2	167	0.0	20.2	0.0	0.0	0.0	1.3	0.0	29.90
	10/18/2016	18:19	0.0	19.4	0.0	0	0.0	0.9	0.0	2	167	0.0	19.4	0.0	0	0.0	1.0	0.0	29.55
	10/18/2017	8:46	0.0	19.8	0.0	0.0	0.0	1.5	0.0	2	167	0.0	19.8	0.0	0.0	0.0	1.6	0.0	30.00
	10/18/2018	15:12	0.0	19.8	0.0	0.0	0.0	1.9	0.0	2	167	0.0	19.6	0.0	0.0	0.0	2.0	0.0	30.03
	10/16/2019	15:16	0.0	20.8	0.0	0.0	0.0	1.0	0.1	2	167	0.0	20.7	0.0	0.0	0.0	1.0	0.1	29.64
LGP-01-04X	10/26/2012	8:54	0.0	20.5	0	0	0	0.8	0.0	2	83	0.0	20.9	0	0	0	0.8	0.0	29.91
	11/12/2013	8:27	0.0	20.9	0	0	0	0.5	0.0	2	83	0.0	20.9	0	0	0	0.5	0.0	29.98
	10/17/2014	15:38	0.0	20.5	0.0	0.0	0.0	0.5	0.0	2	83	0.0	20.5	0.0	0.0	0.0	0.5	0.0	29.32
	10/20/2015	11:11	0.0	20.1	0.0	0.0	0.0	0.7	0.0	2	83	0.0	20.2	0.0	0.0	0.0	0.8	0.0	29.89
	10/18/2016	18:23	0.0	19.7	0.0	0	0.0	0.5	0.0	2	83	0.0	19.6	0.0	0	0.0	0.7	0.0	29.55
	10/18/2017	8:20	0.0	20.4	0.0	0.0	0.0	0.8	0.1	2	83	0.0	20.3	0.0	0.0	0.0	1.0	0.1	30.00
	10/18/2018	15:20	0.0	20.4	0.0	0.0	0.0	1.6	0.0	2	83	0.0	20.4	0.0	0.0	0.0	1.6	0.0	30.03
	10/16/2019	15:05	0.0	20.9	0.0	0.0	0.0	0.5	0.1	2	83	0.0	20.9	0.0	0.0	0.0	0.5	0.2	29.65
LGP-09-04X	10/26/2012	9:00	0.0	20.4	0	0	0	0.8	0.0	2	120	0.0	20.4	0	0	0	0.9	0.0	29.91
	11/12/2013	8:33	0.1	20.9	0	0	0	0.6	0.0	2	120	0.0	20.8	0	0	0	0.7	0.0	29.98
	10/17/2014	15:40	0.1	20.6	0.0	0.0	0.0	0.5	0.0	2	120	0.0	20.5	0.0	0.0	0.0	0.5	0.0	29.32
	10/20/2015	11:18	0.0	20.8	0.0	0.0	0.0	0.8	0.0	2	120	0.0	20.3	0.0	0.0	0.0	0.9	0.0	29.89
	10/18/2016	18:27	0.0	19.7	0.0	0	0.0	0.6	0.0	2	120	0.0	19.6	0.0	0	0.0	0.7	0.0	29.55
	10/18/2017	8:27	0.0	20.5	0.0	0.0	0.0	0.6	0.0	2	120	0.0	20.3	0.0	0.0	0.0	1.0	0.0	30.00
	10/18/2018	15:24	0.0	19.9	0.0	0.0	0.0	1.8	0.0	2	120	0.0	19.7	0.0	0.0	0.0	1.9	0.0	30.03
	10/16/2019	15:11	0.0	21.0	0.0	0.0	0.0	0.2	0.1	2	120	0.0	21.0	0.0	0.0	0.0	0.6	0.1	29.65
LGP-05-05X	10/26/2012	9:10	0.3	14.4	0	3	0	7.1	0.2	2	93	0.0	12.4	0	0	0	9.7	0.0	29.91
	11/12/2013	14:10	0.2	17.1	0	13	0	7.6	0.4	2	93	0.1	18.1	0	2	0	5.6	0.0	29.91
	10/17/2014	11:43	0.0	2.5	1.0	100.0	0.0	17.1	12.2	2	93	0.2	0.0	1.0	100.0	0.0	29.7	30.1	29.33
	10/20/2015	15:35	0.2	14.4	0.0	6.0	0.0	6.0	0.0	2	93	0.3	1.1	0.0	44.0	0.0	18.9	1.5	29.88
	10/18/2016	15:41	0.0	8.0	0.0	100	0.0	16.7	9.7	2	93	0.0	2.6	0.0	100	0.0	27.6	16.7	29.65
	10/18/2017	11:55	0.0	15.2	0.0	40.0	0.0	8.1	1.5	2	93	0.0	14.3	0.0	0.0	0.0	6.9	0.0	30.00
	10/18/2018	11:27	0.0	14.9	1.0	66.0	0.0	8.7	3.3	2	93	0.0	19.5	1.0	6.0	0.0	2.6	0.3	30.10
	10/16/2019	8:33	0.0	11.7	0.0	12.0	0.0	11.7	0.8	2	93	0.0	9.9	0.0	0.0	0.0	0.1	0.2	29.95

Appendix J
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Former Fort Devens, Devens, MA

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
LGP-09-05X	10/26/2012	9:18	2.5	10.6	0	30	0	14.4	1.5	2	167	0.2	9.3	0	0	0	13.0	0.0	29.91
	11/12/2013	14:15	0.8	10.4	0	42	0	14.2	2.4	2	167	0.1	11.4	0	0	0	13.0	0.0	29.91
	10/17/2014	11:45	0.3	1.7	1.0	100.0	0.0	20.2	16.0	2	167	0.3	0.0	1.0	100.0	0.0	30.1	33.5	29.33
	10/20/2015	15:40	0.6	9.3	0.0	65.0	0.0	13.1	1.7	2	167	0.3	0.5	0.0	100.0	0.0	24.7	9.1	29.88
	10/18/2016	15:36	0.0	6.1	0.0	100	0.0	20.5	13.2	2	167	0.0	1.6	0.0	100	0.0	30.1	21.9	29.65
	10/18/2017	11:48	0.0	10.6	0.0	100.0	0.0	13.8	4.6	2	167	0.0	12.8	0.0	0.0	0.0	9.4	0.0	30.00
	10/18/2018	11:32	1.0	18.0	1.0	34.0	0.0	5.1	1.7	2	167	0.0	19.3	1.0	3.0	0.0	2.8	0.2	30.10
	10/16/2019	8:43	0.55	22.0	0.0	53.0	0.0	0.2	0.2	2	167	0.0	3.0	0.0	31.0	0.0	0.2	0.2	29.95
LGP-05-06X	10/26/2012	9:37	0.0	17.5	0	0	0	0.0	0.0	2	93	0.0	15.9	0	0	0	4.9	0.0	29.91
	11/12/2013	14:01	0.1	18.7	0	2	0	2.6	0.0	2	93	0.1	19.7	0	2	0	2.7	0.0	29.91
	10/17/2014	11:34	0.0	17.2	0.0	0.0	0.0	3.0	0.0	2	93	0.0	16.5	0.0	0.0	5.0	3.6	0.0	29.33
	10/20/2015	15:23	0.0	17.0	0.0	0.0	0.0	3.7	0.0	2	93	0.0	17.3	0.0	0.0	0.0	3.5	0.0	29.88
	10/18/2016	15:29	0.0	16.8	0.0	0	0.0	3.0	0.0	2	93	0.0	16.3	0.0	0	0.0	3.5	0.0	29.65
	10/18/2017	11:36	0.0	17.6	0.0	0.0	0.0	2.7	0.0	2	93	0.0	17.6	0.0	0.0	0.0	3.5	0.0	30.00
	10/18/2018	11:20	0.0	14.2	2.0	0.0	0.0	5.3	0.0	2	93	0.0	14.6	2.0	0.0	0.0	5.2	0.0	30.10
	10/16/2019	9:00	0.0	18.3	0.0	0.0	0.0	2.3	0.2	2	93	0.0	18.8	0.0	0.0	0.0	2.5	0.2	29.93
LGP-09-06X	10/26/2012	9:28	0.2	10.2	0	0	0	8.6	0.0	2	120	0.0	10.9	0	0	0	8.4	0.0	29.91
	11/12/2013	14:06	0.1	15.5	0	1	0	5.8	0.0	2	120	0.1	15.7	0	1	0	5.8	0.0	29.91
	10/17/2014	11:32	0.5	6.9	7.0	0.0	5.0	6.2	0.0	2	120	0.0	6.6	1.0	0.0	5.0	6.5	0.0	29.32
	10/20/2015	15:30	0.2	14.1	0.0	0.0	0.0	5.6	0.0	2	120	0.0	14.1	0.0	0.0	0.0	5.8	0.0	29.88
	10/18/2016	15:23	0.0	14.4	0.0	0	0.0	5.0	0.0	2	120	0.0	13.7	0.0	0	0.0	5.5	0.0	29.65
	10/18/2017	11:41	0.0	14.4	0.0	0.0	0.0	6.1	0.0	2	120	0.0	14.5	0.0	0.0	0.0	6.1	0.0	30.01
	10/18/2018	11:15	0.0	9.5	0.0	0.0	0.0	10.1	0.0	2	120	0.0	11.6	1.0	0.0	0.0	8.5	0.0	30.10
	10/16/2019	8:52	0.0	16.2	0.0	0.0	0.0	0.2	0.2	2	120	0.0	16.1	0.0	0.0	0.0	5.0	0.2	29.93
LGP-05-07X	10/26/2012	9:45	0.1	15.4	0	0	0	7.7	0.0	2	65	0.0	13.2	0	0	0	6.8	0.0	29.91
	11/12/2013	13:55	0.1	19.8	0	1	0	2.0	0.0	2	65	0.0	19.6	0	0	0	2.7	0.0	29.91
	10/17/2014	11:25	0.1	1.1	0.0	100.0	0.0	20.6	10.4	2	65	0.2	0.0	0.0	100.0	0.0	21.9	8.4	29.33
	10/20/2015	15:17	0.1	10.8	0.0	0.0	0.0	7.3	0.0	2	65	0.0	8.1	0.0	0.0	0.0	12.7	0.0	29.88
	10/18/2016	15:15	0.1	10.7	0.0	4	0.0	10.4	0.2	2	65	0.0	9.4	0.0	0	0.0	11.9	0.0	29.65
	10/18/2017	11:27	0.0	17.9	0.0	0.0	0.0	3.9	0.0	2	65	0.0	18.4	0.0	0.0	0.0	3.8	0.0	30.01
	10/18/2018	11:08	0.0	12.5	1.0	7.0	0.0	10.5	0.4	2	65	0.0	16.3	0.0	0.0	0.0	6.7	0.0	30.10
	10/16/2019	9:09	0.0	18.2	0.0	0.0	0.0	3.7	0.2	2	65	0.0	15.4	0.0	0.0	0.0	6.0	0.2	NR
LGP-05-08X	10/26/2012	9:55	0.8	9.8	0	0	0	4.4	0.0	2	93	0.0	7.7	0	0	0	13.5	0.0	29.91
	11/12/2013	13:42	0.1	17.7	0	0	0	5.2	0.0	2	93	0.0	14.1	0	0	0	8.6	0.0	29.91
	10/17/2014	11:38	0.3	3.8	20.0	17.0	1.0	13.2	0.9	2	93	0.2	0.0	0.0	69.0	4.0	19.8	3.4	29.33
	10/20/2015	15:05	0.0	16.9	0.0	0.0	0.0	7.2	0.0	2	93	0.0	4.7	0.0	0.0	0.0	14.8	0.0	29.88
	10/18/2016	15:10	0.0	9.7	0.0	2	0.0	10.4	0.1	2	93	0.0	1.8	0.0	8	0.0	10.1	0.4	29.65
	10/18/2017	11:18	0.0	12.4	0.0	0.0	0.0	0.4	0.0	2	93	0.0	10.7	0.0	0.0	0.0	10.3	0.0	30.01
	10/18/2018	10:50	0.0	20.9	1.0	0.0	0.0	0.4	0.0	2	93	0.0	17.6	1.0	0.0	0.0	2.5	0.0	30.10
	10/16/2019	9:25	0.0	15.7	0.0	0.0	0.0	6.6	0.2	2	93	0.0	7.0	0.0	0.0	0.0	14.5	0.2	29.93
LGP-09-08X	10/26/2012	10:05	0.8	5.6	0	0	1	3.8	0.0	2	185	0.1	2.2	0	4	0	18.6	0.2	29.91
	11/12/2013	13:48	0.2	7.7	0	7	0	14.6	0.2	2	185	0.1	1.8	0	3	0	18.7	0.0	29.91
	10/17/2014	10:40	0.4	1.0	0.0	21.0	5.0	17.2	1.1	2	185	0.3	0.0	0.0	90.0	4.0	20.3	4.4	29.40
	10/20/2015	15:10	0.1	10.5	0.0	5.0	0.0	13.9	0.0	2	185	0.1	0.7	0.0	9.0	0.0	20.3	0.3	29.88
	10/18/2016	15:05	0.1	8.4	0.0	13	0.0	12.0	0.6	2	185	0.2	4.4	0.0	27	0.0	19.3	1.3	29.65
	10/18/2017	11:09	0.0	7.3	0.0	11.0	0.0	15.0	0.5	2	185	0.0	7.8	0.0	0.0	0.0	14.4	0.0	30.01
	10/18/2018	10:56	0.0	8.4	2.0	4.0	0.0	15.7	0.2	2	185	0.0	7.8	2.0	0.0	0.0	16.1	0.0	30.10
	10/16/2019	9:18	0.0	5.9	0.0	0.0	0.0	16.5	0.2	2	185	0.0	2.8	0.0	5.0	0.0	19.3	0.3	NR
LGP-05-09X	10/26/2012	10:15	0.1	13.8	0	0	0	7.2	0.0	2	93	0.0	13.2	0	0	0	7.9	0.0	29.91
	11/12/2013	13:27	0.0	16.9	0	0	0	6.0	0.0	2	93	0.0	18.1	0	0	0	5.4	0.0	29.91
	10/17/2014	8:46	0.0	5.8	0.0	0.0	0.0	9.0	0.0	2	93	0.0	0.5	0.0	0.0	0.0	16.7	0.0	29.40
	10/20/2015	14:55	0.0	16.0	0.0	0.0	0.0	5.1	0.0	2	93	0.0	14.0	0.0	0.0	0.0	6.6	0.0	29.88
	10/18/2016	14:58	0.0	10.6	0.0	0	0.0	9.0	0.0	2	93	0.0	8.3	0.0	0	0.0	11.4	0.0	29.65
	10/18/2017	10:56	0.0	14.3	0.0	0.0	0.0	7.2	0.0	2	93	0.0	14.0	0.0	0.0	0.0	7.5	0.0	30.01
	10/18/2018	10:32	0.0	8.7	1.0	4.0	0.0	13.7	0.2	2	93	0.0	9.9	1.0	0.0	0.0	12.9	0.0	30.10
	10/16/2019	9:53	0.0	14.4	0.0	0.0	0.0	15.2	0.2	2	93	0.0	20.9	0.0	0.0	0.0	7.4	0.2	29.86

Appendix J
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Former Fort Devens, Devens, MA

			Initial Readings									Post Purge Readings							
ID	Date	Time	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Purge Rate (lpm)	Purge Time (sec)	VOC (ppm)	O_2 (%)	H_2S (ppm)	LEL (%)	CO (ppm)	CO_2 (%)	CH_4 (%)	Bar. Pres.("Hg)
LGP-09-09X	10/26/2012	10:25	0.4	17.5	0	0	0	1.0	0.0	2	185	0.1	7.3	0	4	0	13.1	0.0	29.91
	11/12/2013	13:32	0.2	11.9	0	0	0	10.2	0.0	2	185	0.0	5.2	0	0	0	15.0	0.0	29.91
	10/17/2014	8:49	0.0	20.7	0.0	0.0	0.0	0.1	0.0	2	185	0.0	0.2	0.0	28.0	6.0	18.5	1.4	29.40
	10/20/2015	15:00	0.1	11.3	0.0	0.0	0.0	9.7	0.0	2	185	0.0	3.7	0.0	0.0	6.0	16.7	0.0	29.88
	10/18/2016	14:48	0.1	5.9	0.0	5	0.0	13.5	0.2	2	185	0.0	1.8	0.0	2	0.0	18.2	0.1	29.65
	10/18/2017	11:00	0.0	10.5	0.0	5.0	0.0	0.1	0.0	2	185	0.0	10.5	0.0	0.0	0.0	11.1	0.0	30.01
	10/18/2018	10:26	1.0	6.7	1.0	32.0	0.0	15.1	1.6	2	185	0.0	7.1	1.0	2.0	0.0	15.2	0.1	30.10
	10/16/2019	9:37	0.0	10.1	0.0	0.0	0.0	10.9	0.2	2	185	0.0	5.4	0.0	0.0	0.0	15.3	0.2	29.93
LGP-05-10X	10/26/2012	10:51	0.1	14.6	0	0	0	4.6	0.0	2	93	0.1	10.1	0	0	0	10.5	0.0	29.89
	11/12/2013	13:15	0.0	20.2	0	0	0	1.9	0.0	2	93	0.0	19.0	0	0	0	4.1	0.0	29.91
	10/17/2014	9:07	0.0	2.3	0.0	10.0	0.0	16.4	8.0	2	93	0.0	0.0	0.0	100.0	0.0	21.4	14.0	29.40
	10/20/2015	14:40	0.0	14.8	0.0	0.0	0.0	5.3	0.0	2	93	0.0	6.7	0.0	0.0	0.0	10.2	0.0	29.88
	10/18/2016	14:38	0.3	8.3	0.0	46	0.0	11.7	2.3	2	93	0.0	1.6	0.0	100	0.0	20.1	5.2	29.65
	10/18/2017	10:47	0.0	16.9	0.0	0.0	0.0	3.2	0.0	2	93	0.0	15.4	0.0	0.0	0.0	6.1	0.0	30.02
	10/18/2018	10:05	0.0	19.3	1.0	7.0	0.0	2.8	0.4	2	93	0.0	20.0	1.0	0.0	0.0	2.3	0.0	30.10
	10/16/2019	10:06	0.0	15.4	0.0	0.0	0.0	5.2	0.2	2	93	0.0	8.3	0.0	0.0	0.0	11.9	0.2	29.86
LGP-09-10X	10/26/2012	11:00	0.1	17.2	0	0	0	9.5	0.0	2	148	0.1	7.0	0	0	0	14.4	0.0	29.89
	11/12/2013	13:20	0.1	15.0	0	0	0	8.3	0.0	2	148	0.0	14.3	0	0	0	8.9	0.0	29.91
	10/17/2014	9:09	0.0	1.2	0.0	100.0	0.0	19.8	14.0	2	148	0.1	0.0	0.0	100.0	0.0	23.1	20.5	29.40
	10/20/2015	14:45	0.1	10.4	0.0	0.0	0.0	9.7	0.0	2	148	0.0	2.9	0.0	5.0	0.0	16.5	0.0	29.88
	10/18/2016	14:32	0.0	6.1	0.0	100	0.0	15.9	6.2	2	148	0.0	1.4	0.0	100	0.0	22.0	10.1	29.65
	10/18/2017	10:42	0.0	18.6	0.0	0.0	0.0	2.2	0.0	2	148	0.0	12.0	0.0	0.0	0.0	9.8	0.0	30.02
	10/18/2018	10:11	0.0	20.8	1.0	0.0	0.0	1.6	0.0	2	148	1.0	12.1	1.0	0.0	0.0	11.8	0.0	30.10
	10/16/2019	10:15	0.0	2.5	0.0	5.0	0.0	14.1	0.3	2	148	0.0	2.7	0.0	7.0	0.0	17.7	0.5	29.86
LGP-05-11X	10/26/2012	10:35	0.2	15.9	0	0	0	12.6	0.0	2	83	0.0	9.8	0	0	0	10.8	0.0	29.91
	11/12/2013	13:02	0.1	19.2	0	0	0	2.8	0.0	2	83	0.1	16.1	0	0	0	6.5	0.0	29.91
	10/17/2014	9:20	0.1	3.1	0.0	44.0	5.0	13.2	2.2	2	83	0.0	0.0	0.0	100.0	0.0	19.8	8.7	29.40
	10/20/2015	14:25	0.1	15.5	0.0	0.0	0.0	5.5	0.0	2	83	0.0	8.5	0.0	0.0	0.0	11.6	0.0	29.88
	10/18/2016	14:22	0.2	7.8	0.0	24	0.0	11.7	1.2	2	83	0.1	2.7	0.0	54	0.0	17.8	2.7	29.65
	10/18/2017	10:09	0.0	12.9	0.0	4.0	0.0	9.1	0.1	2	83	0.0	10.4	0.0	0.0	0.0	12.0	0.0	30.02
	10/18/2018	9:58	1.0	11.1	1.0	5.0	0.0	13.0	0.3	2	83	1.0	14.2	1.0	25.0	0.0	11.1	1.3	30.06
	10/16/2019	10:36	0.0	14.8	0.0	0.0	0.0	5.6	0.2	2	83	0.0	8.5	0.0	0.0	0.0	10.9	0.2	29.86
LGP-09-11X	10/26/2012	10:41	1.0	1.5	0	54	0	10.5	0.8	2	139	0.2	0.8	0	3	0	18.8	0.1	29.91
	11/12/2013	13:10	0.4	12.2	0	0	0	9.1	0.0	2	139	0.1	14.0	0	0	0	8.7	0.0	29.91
	10/17/2014	9:22	0.0	16.1	0.0	26.0	5.0	12.6	1.9	2	139	0.2	20.5	0.0	1.0	3.0	0.9	0.2	29.40
	10/20/2015	14:30	0.3	7.7	0.0	20.0	0.0	14.1	0.5	2	139	0.1	2.9	0.0	2.0	3.0	17.2	0.0	29.88
	10/18/2016	14:10	0.1	3.8	0.0	61	0.0	16.3	3.0	2	139	0.1	2.7	0.0	100	0.0	18.4	5.8	29.65
	10/18/2017	10:17	0.0	8.9	0.0	18.0	0.0	15.2	1.0	2	139	0.0	6.5	0.0	0.0	0.0	15.8	0.0	30.02
	10/18/2018	9:51	0.0	8.1	0.0	85.0	0.0	14.1	4.3	2	139	0.0	2.9	1.0	24.0	0.0	18.7	1.2	30.06
	10/16/2019	10:30	0.0	6.8	0.0	0.0	0.0	11.9	0.2	2	139	0.0	4.6	0.0	0.0	0.0	15.0	0.2	29.86
LGP-05-13X	10/26/2012	11:21	0.0	18.0	0	0	0	5.4	0.0	2	56	0.0	13.3	0	0	0	6.8	0.0	29.88
	11/12/2013	12:43	0.1	19.5	0	0	0	1.6	0.0	2	56	0.0	19.8	0	0	0	2.4	0.0	29.91
	10/17/2014	9:35	0.0	1.3	0.0	56.0	4.0	14.3	2.0	2	56	0.1	0.0	0.0	100.0	0.0	15.3	6.7	29.40
	10/20/2015	14:20	0.1	14.8	0.0	0.0	0.0	4.4	0.0	2	56	0.1	9.5	0.0	0.0	0.0	8.2	0.0	29.88
	10/18/2016	9:40	0.0	14.8	0.0	0	0.0	5.0	0.0	2	56	0.0	13.3	0.0	0	0.0	6.6	0.0	29.72
	10/18/2017	10:00	0.0	18.0	0.0	0.0	0.0	3.2	0.0	2	56	0.0	16.9	0.0	0.0	0.0	4.3	0.0	30.03
	10/18/2018	9:39	0.0	18.6	0.0	2.0	0.0	3.1	0.1	2	56	0.0	18.5	1.0	0.0	0.0	3.8	0.0	30.06
	10/16/2019	11:16	0.0	17.0	0.0	0.0	0.0	3.8	0.2	2	56	0.0	12.5	0.0	0.0	0.0	6.6	0.2	29.85
LGP-05-14X	10/26/2012	11:30	0.0	6.1	0	0	0	13.3	0.0	2	93	0.0	8.5	0	0	0	13.4	0.0	29.88
	11/12/2013	12:53	0.1	15.2	0	0	0	7.2	0.0	2	93	0.0	14.2	0	0	0	8.7	0.0	29.91
	10/17/2014	9:44	0.0	5.6	0.0	100.0	5.0	8.8	0.6	2	93	0.0	0.0	0.0	37.0	5.0	15.5	1.9	29.40
	10/20/2015	14:10	0.2	15.7	0.0	13.0	0.0	4.7	0.4	2	93	0.1	9.9	0.0	6.0	5.0	9.6	0.1	29.88
	10/18/2016	9:05	0.0	9.4	0.0	0	0.0	10.2	0.0	2	93	0.0	8.9	0.0	0	0.0	10.8	0.0	29.73
	10/18/2017	9:52	0.0	11.8	0.0	0.0	0.0	9.7	0.0	2	93	0.0	11.5	0.0	0.0	0.0	11.1	0.0	29.95
	10/18/2018	9:31	0.0	1.0	1.0	31.0	0.0	11.0	1.6	2	93	0.0	0.2	0.0	39.0	0.0	11.9	1.9	30.06
	10/16/2019	11:22	0.0	12.4	0.0	0.0	0.0	7.7	0.2	2	93	0.0	12.5	0.0	0.0	0.0	7.5	0.2	29.85

Appendix J
Historical Results: 2012-Present
Shepley Hill Landfill Gas Monitoring
Former Fort Devens, Devens, MA

			Initial Readings									Post Purge Readings							
ID	**Date**	**Time**	**VOC (ppm)**	**O_2 (%)**	**H_2S (ppm)**	**LEL (%)**	**CO (ppm)**	**CO_2 (%)**	**CH_4 (%)**	**Purge Rate (lpm)**	**Purge Time (sec)**	**VOC (ppm)**	**O_2 (%)**	**H_2S (ppm)**	**LEL (%)**	**CO (ppm)**	**CO_2 (%)**	**CH_4 (%)**	**Bar. Pres.("Hg)**
LGP-09-15X	10/26/2012	11:39	0.1	15.9	0	0	0	6.6	0.0	2	111	0.0	13.7	0	0	0	7.0	0.0	29.88
	11/12/2013	11:25	0.0	16.4	0	0	0	5.8	0.0	2	111	0.0	16.4	0	0	0	5.9	0.0	29.98
	10/17/2014	9:53	0.0	16.7	1.0	0.0	60.0	5.1	0.0	2	111	0.0	16.4	0.0	0.0	0.0	5.6	0.0	29.40
	10/20/2015	13:50	0.1	16.3	0.0	0.0	0.0	4.6	0.0	2	111	0.0	15.3	0.0	0.0	0.0	6.1	0.0	29.88
	10/18/2016	8:29	0.0	15.6	0.0	0	0.0	4.8	0.0	2	111	0.0	14.8	0.0	0	0.0	5.8	0.0	29.73
	10/18/2017	9:34	0.0	18.0	0.0	0.0	0.0	4.1	0.0	2	111	0.0	16.6	0.0	0.0	0.0	6.0	0.0	30.01
	10/18/2018	9:15	0.0	11.7	1.0	0.0	0.0	9.3	0.0	2	111	0.0	10.6	1.0	0.0	0.0	10.5	0.0	30.06
	10/16/2019	11:33	0.0	17.0	0.0	0.0	0.0	4.2	0.2	2	111	0.0	16.0	0.0	0.0	0.0	5.7	0.2	29.85

Notes:

VOC = Volatile Organic Compounds
O_2 = Oxygen
LEL = Lower Explosive Limit
CO = Carbon Monoxide
CO_2 = Carbon Dioxide
CH_4 = Methane

H_2S = Hydrogen Sulfide
"Hg = inches of Mercury
lpm = Liters per minute
sec = Seconds
ppm = Parts per million
% = Percentage

APPENDIX J
ProUCL OUTPUTS

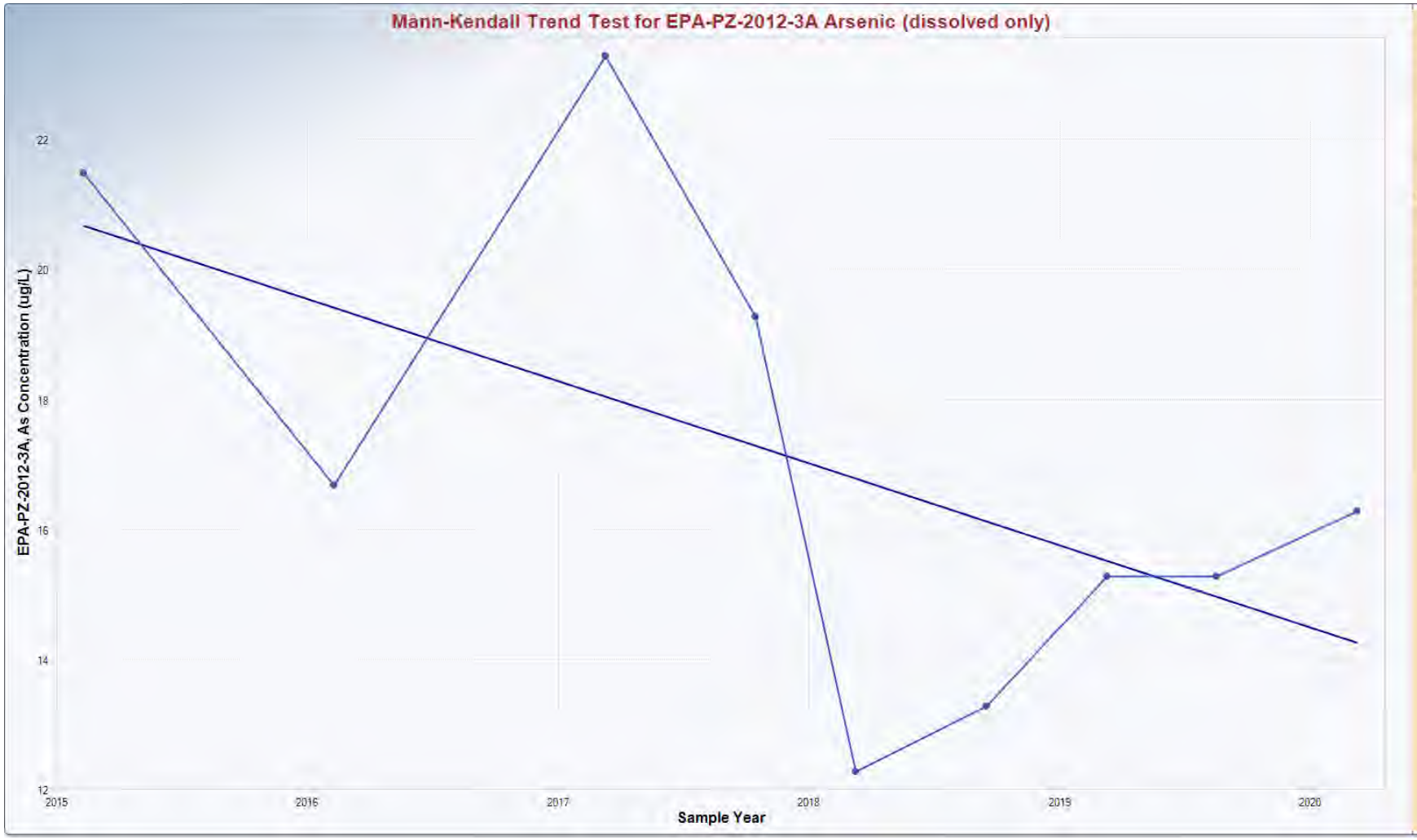
Mann-Kendall Trend Analysis

n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.4868
Standardized Value of S	-1.1595
M-K Test Value (S)	-12
Tabulated p-value	0.1300
Approximate p-value	0.1231

OLS Regression Line (Blue)

OLS Regression Slope	-8.4853
OLS Regression Intercept	17,328.3610

Insufficient statistical evidence of a significant trend at the specified level of significance.



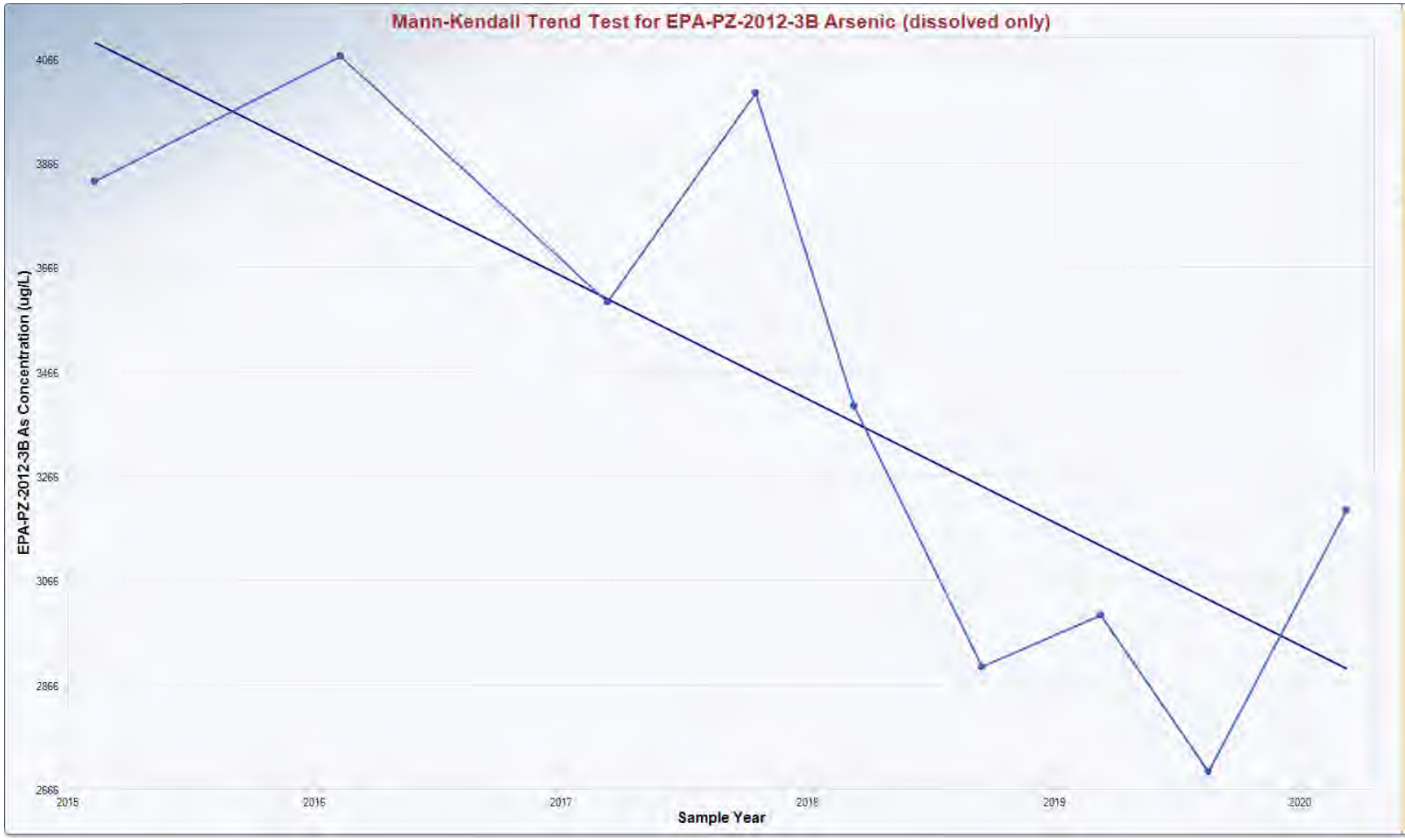
Mann-Kendall Trend Analysis

n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.5394
Standardized Value of S	-1.0483
M-K Test Value (S)	-11
Tabulated p-value	0.1790
Approximate p-value	0.1473

OLS Regression Line (Blue)

OLS Regression Slope	-1.2652
OLS Regression Intercept	2,569.4689

Insufficient statistical evidence of a significant trend at the specified level of significance.



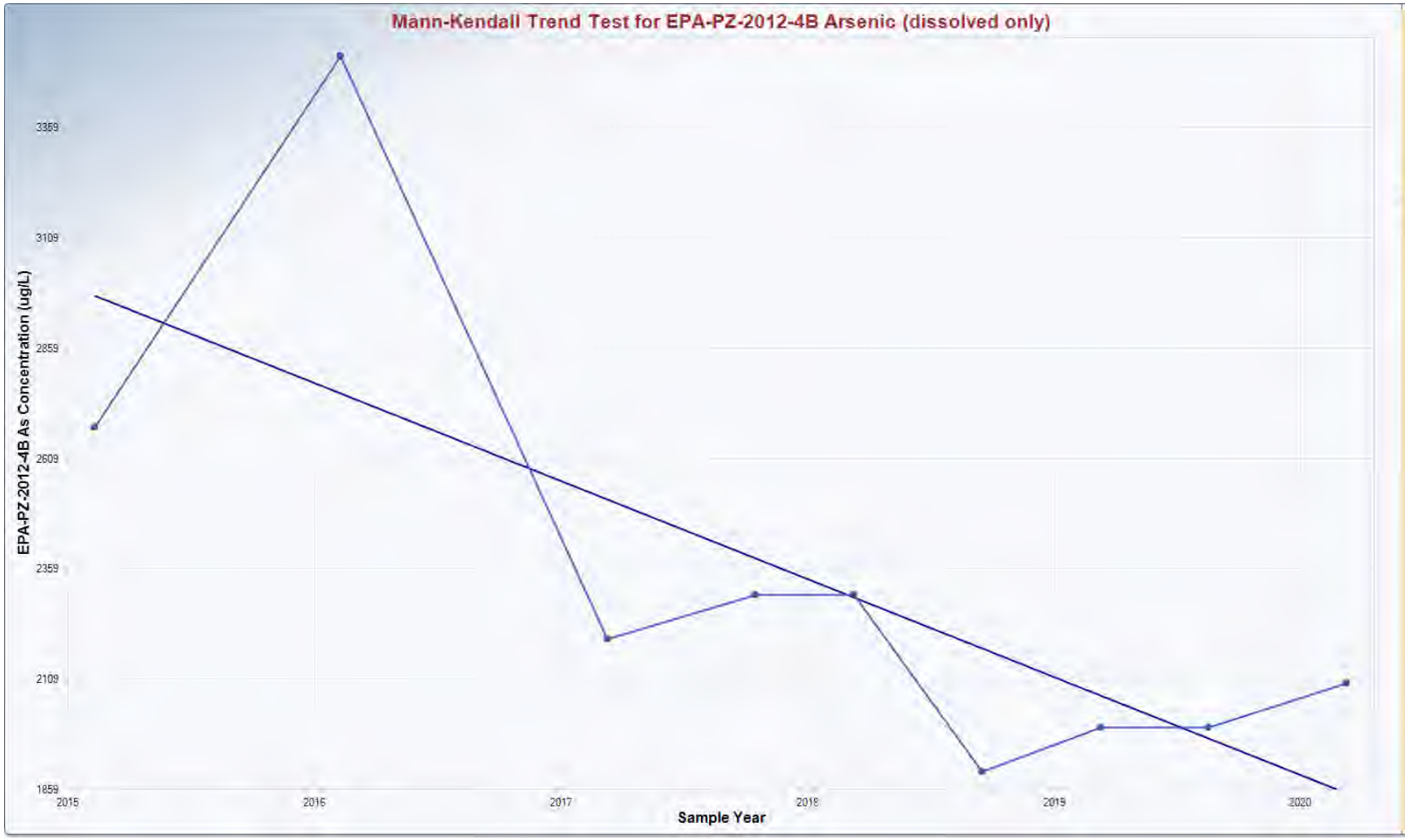
Mann-Kendall Trend Analysis

n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.5917
Standardized Value of S	-2.1894
M-K Test Value (S)	-22
Tabulated p-value	0.0120
Approximate p-value	0.0143

OLS Regression Line (Blue)

OLS Regression Slope	-236.3897
OLS Regression Intercept	480,375.1618

Statistically significant evidence of a decreasing trend at the specified level of significance.



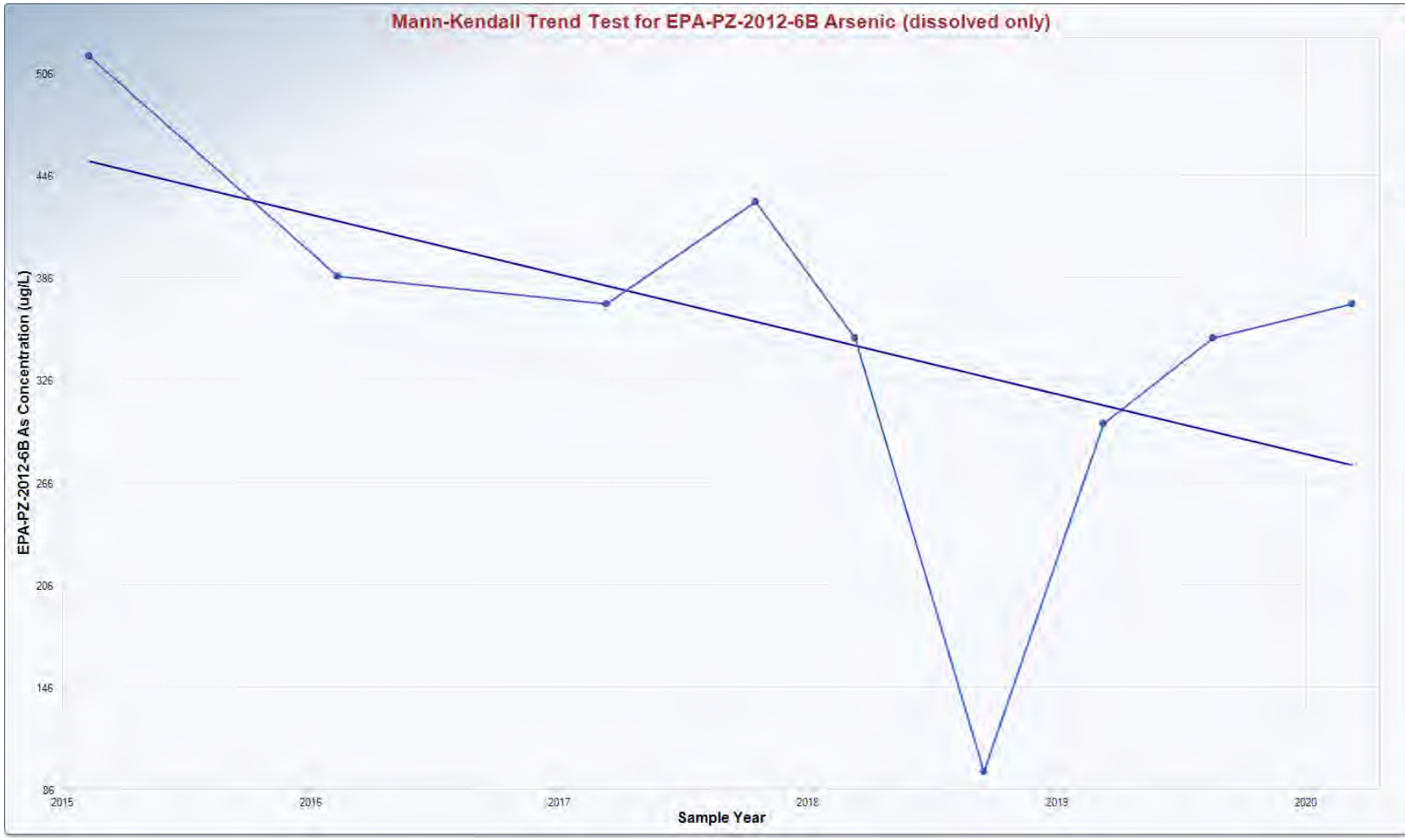
Mann-Kendall Trend Analysis

n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.4868
Standardized Value of S	-1.7920
M-K Test Value (S)	-18
Tabulated p-value	0.0380
Approximate p-value	0.0366

OLS Regression Line (Blue)

OLS Regression Slope	-222.1581
OLS Regression Intercept	450,582.2637

Statistically significant evidence of a decreasing trend at the specified level of significance.



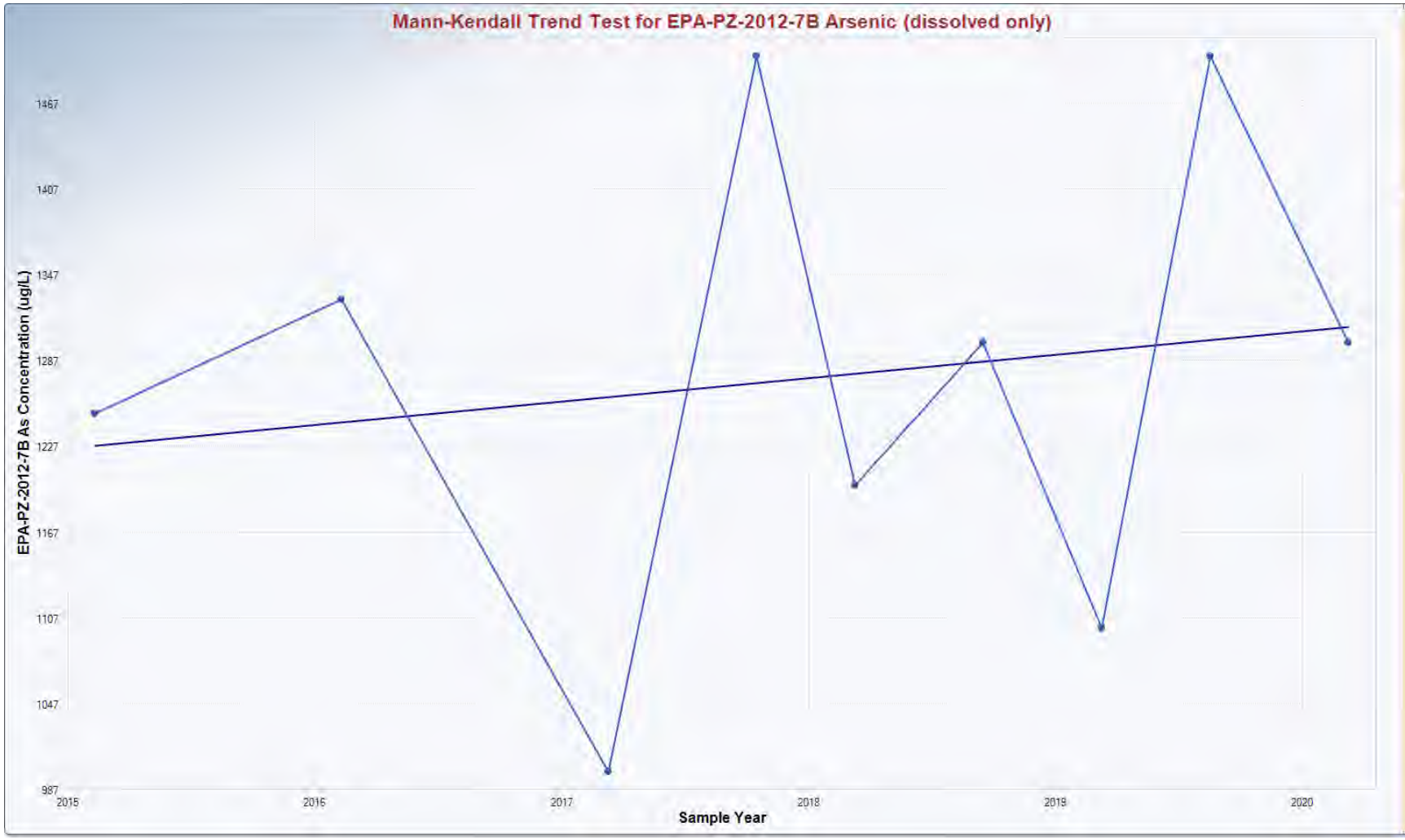
Mann-Kendall Trend Analysis

n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.4868
Standardized Value of S	-1.5811
M-K Test Value (S)	-16
Tabulated p-value	0.0600
Approximate p-value	0.0569

OLS Regression Line (Blue)

OLS Regression Slope	-35.1364
OLS Regression Intercept	71,246.6922

Insufficient statistical evidence of a significant trend at the specified level of significance.



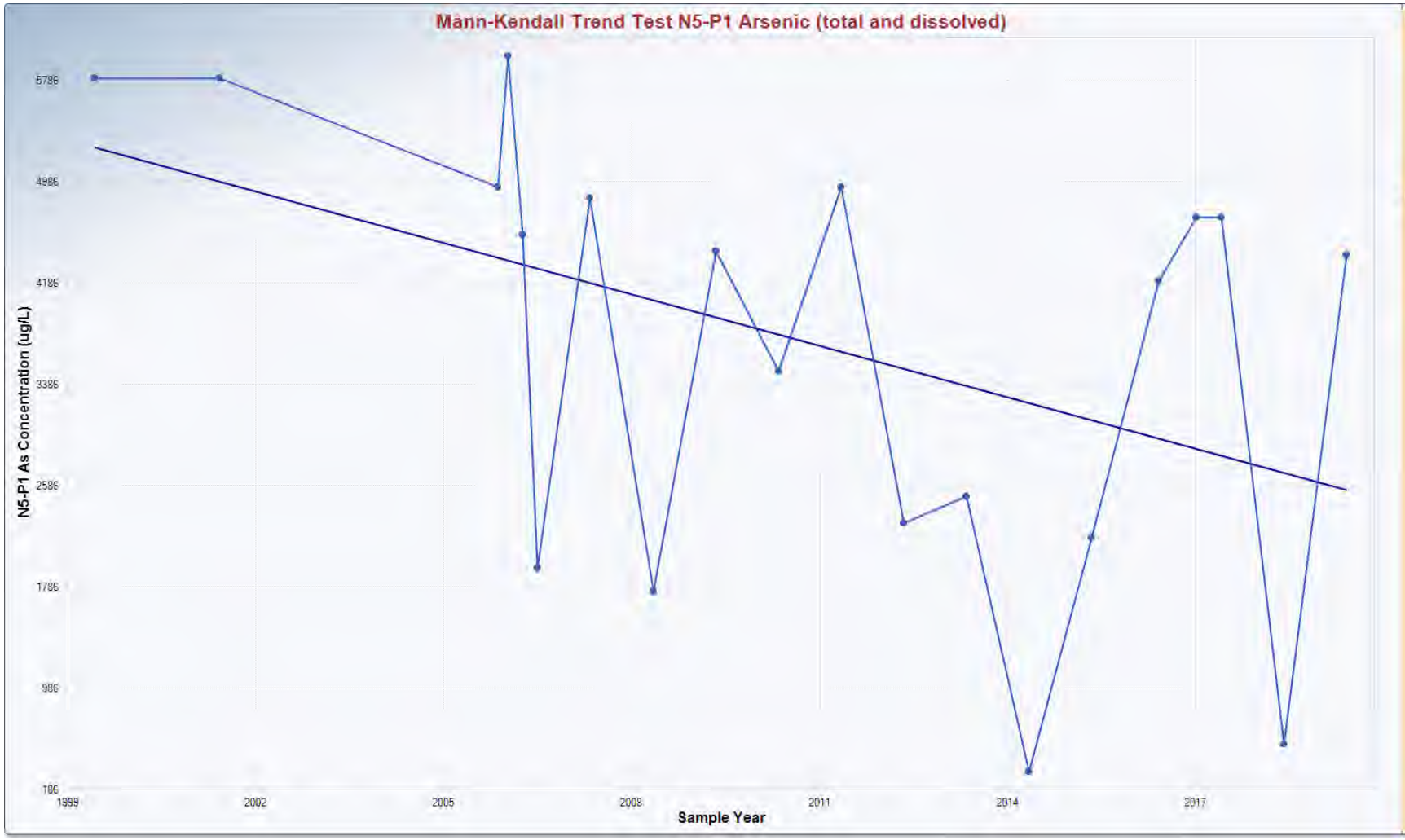
Mann-Kendall Trend Analysis

n	9
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	9.4868
Standardized Value of S	0.3162
M-K Test Value (S)	4
Tabulated p-value	0.3810
Approximate p-value	0.3759

OLS Regression Line (Blue)

OLS Regression Slope	16.3618
OLS Regression Intercept	-31,737.6749

Insufficient statistical evidence of a significant trend at the specified level of significance.



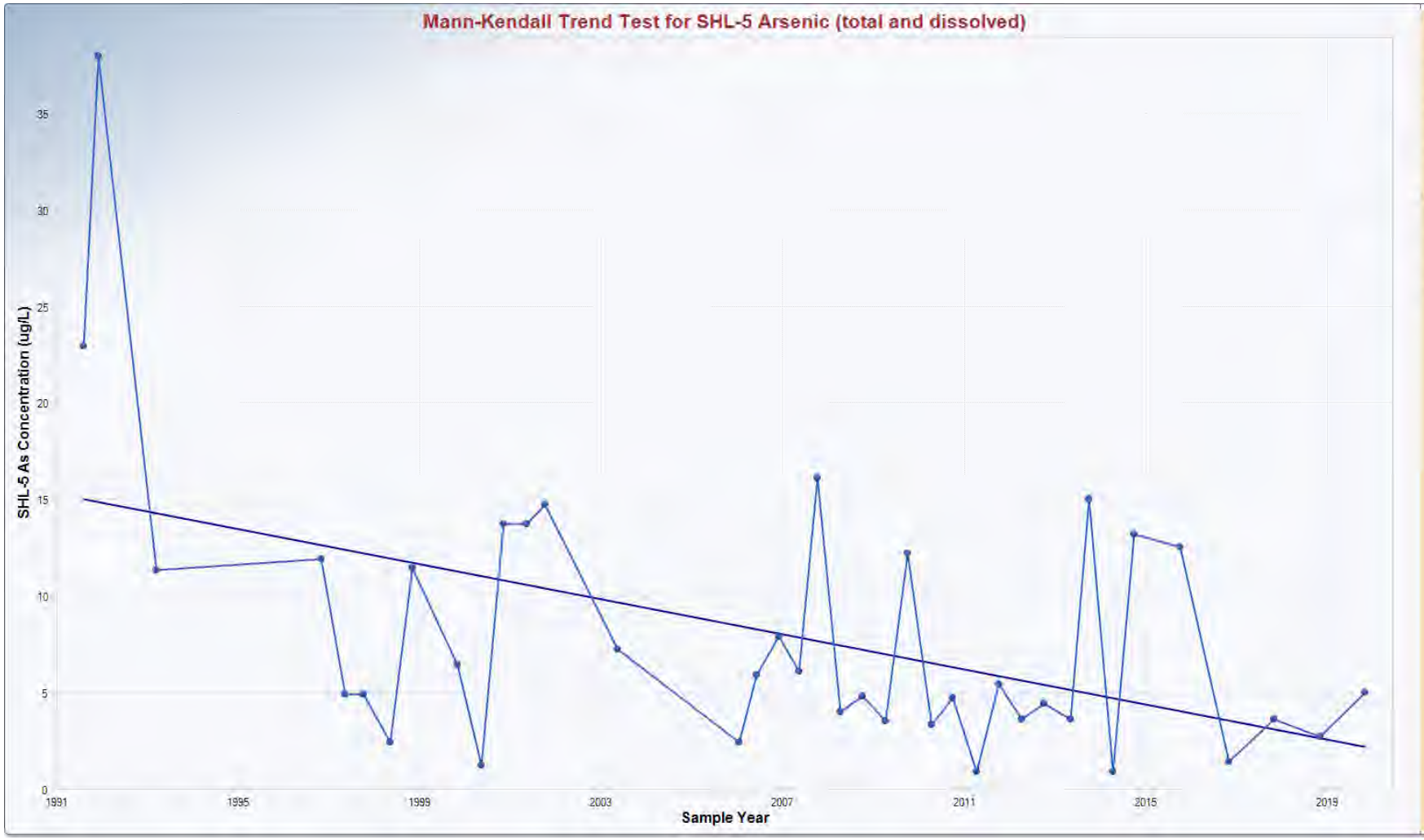
Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	30.7896
Standardized Value of S	-2.1111
M-K Test Value (S)	-65
Tabulated p-value	0.0170
Approximate p-value	0.0174

OLS Regression Line (Blue)

OLS Regression Slope	-135.2037
OLS Regression Intercept	275,645.7127

Statistically significant evidence of a decreasing trend at the specified level of significance.



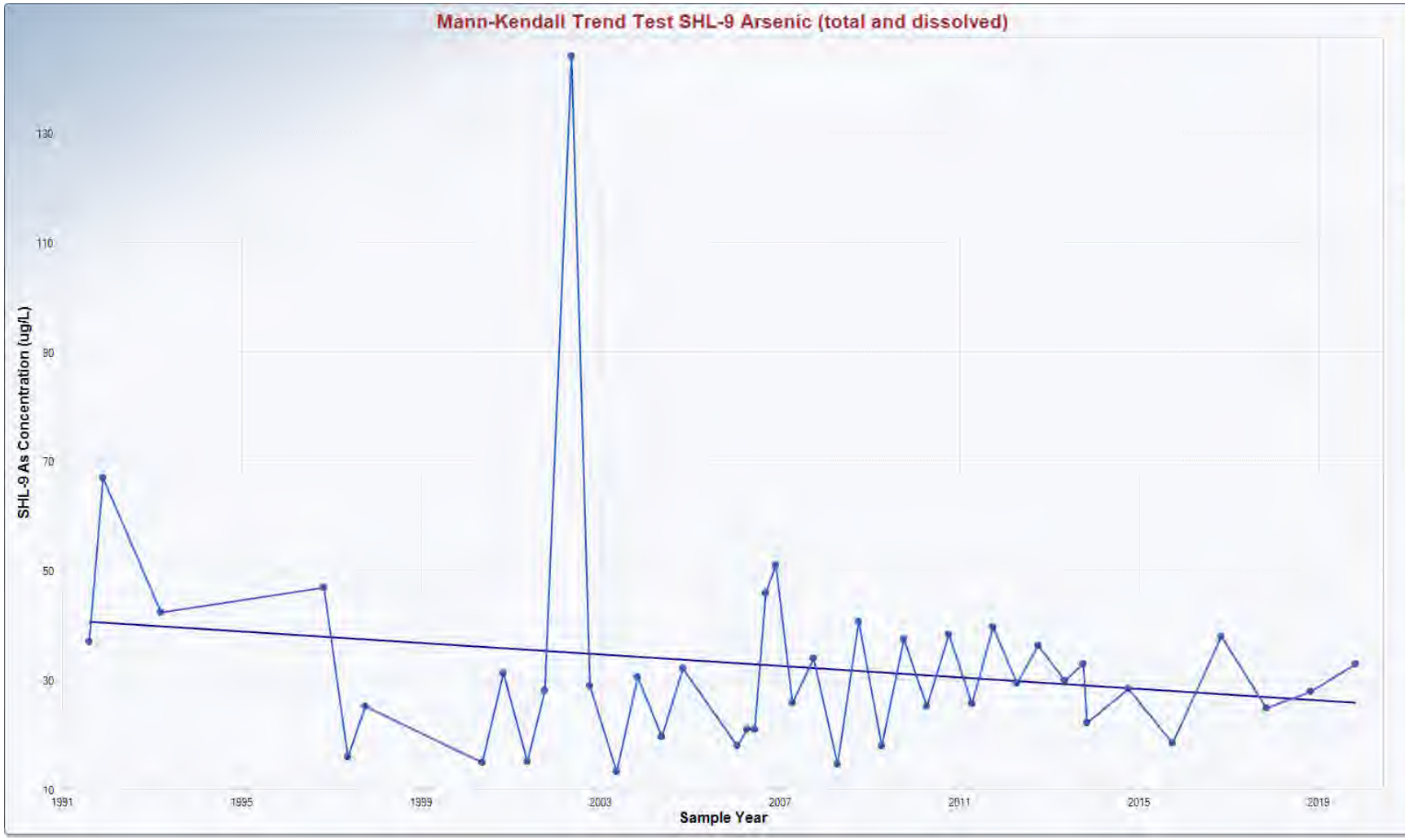
Mann-Kendall Trend Analysis

n	38
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	79.4942
Standardized Value of S	-2.3524
M-K Test Value (S)	-188
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0093

OLS Regression Line (Blue)

OLS Regression Slope	-0.4528
OLS Regression Intercept	916.7945

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	42
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	92.2623
Standardized Value of S	-0.0867
M-K Test Value (S)	-9
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.4655

OLS Regression Line (Blue)

OLS Regression Slope	-0.5266
OLS Regression Intercept	1,089.5408

Insufficient statistical evidence of a significant trend at the specified level of significance.

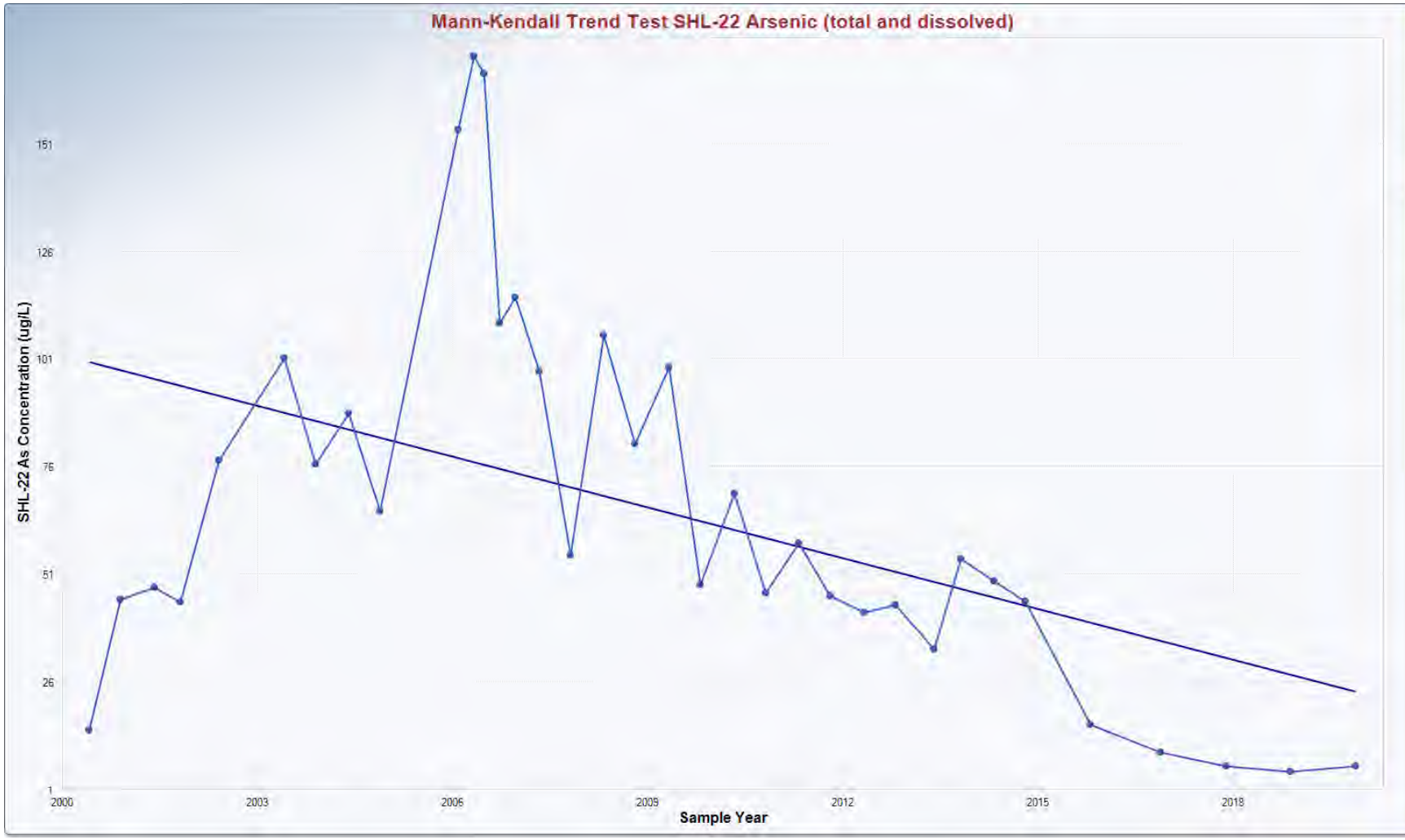
Mann-Kendall Trend Analysis

n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2556
Standardized Value of S	0.2474
M-K Test Value (S)	7
Tabulated p-value	0.4200
Approximate p-value	0.4023

OLS Regression Line (Blue)

OLS Regression Slope	-1.1702
OLS Regression Intercept	2,417.5758

Insufficient statistical evidence of a significant trend at the specified level of significance.



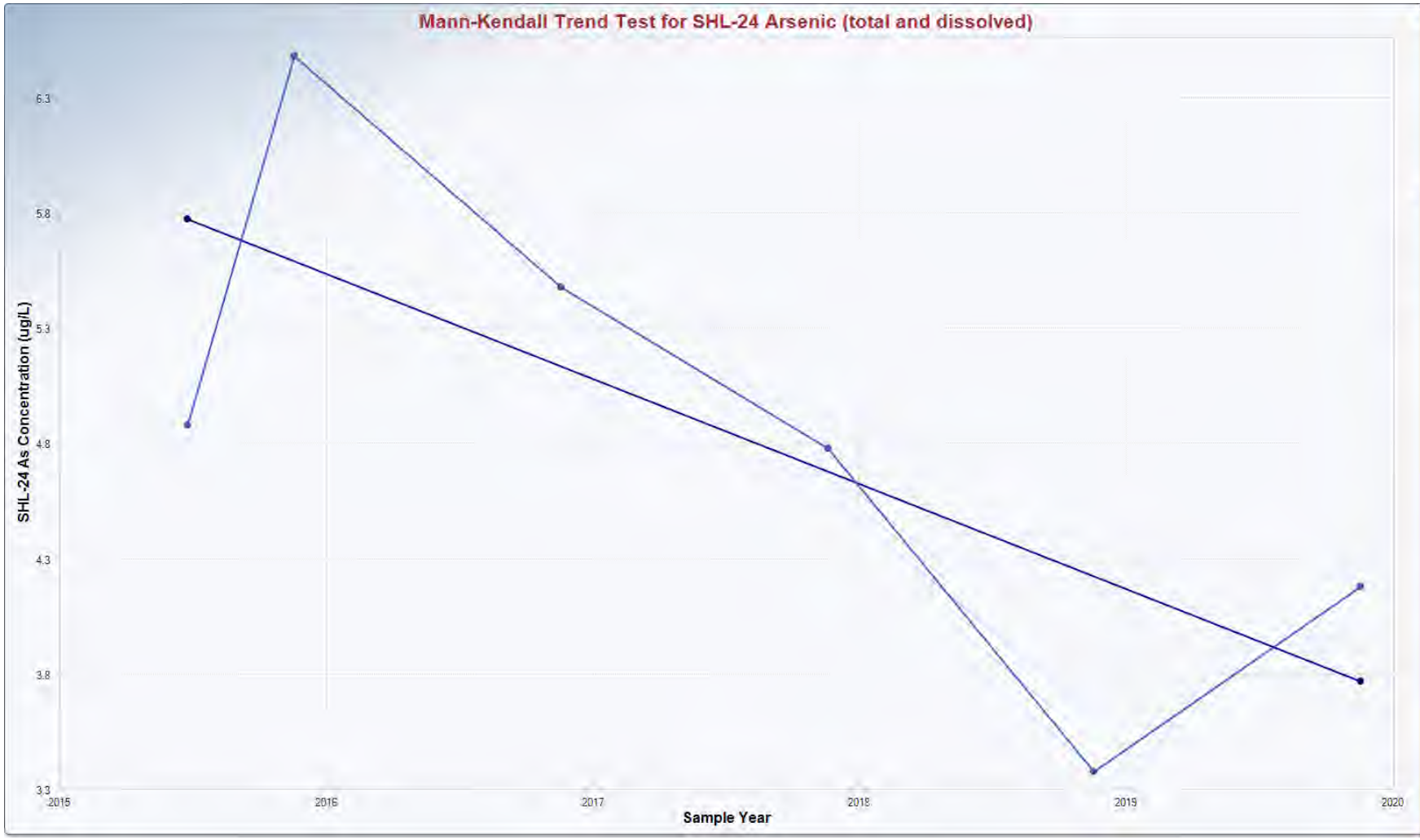
Mann-Kendall Trend Analysis

n	35
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	70.4154
Standardized Value of S	-3.5220
M-K Test Value (S)	-249
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0002

OLS Regression Line (Blue)

OLS Regression Slope	-3.9281
OLS Regression Intercept	7,957.9466

Statistically significant evidence of a decreasing trend at the specified level of significance.



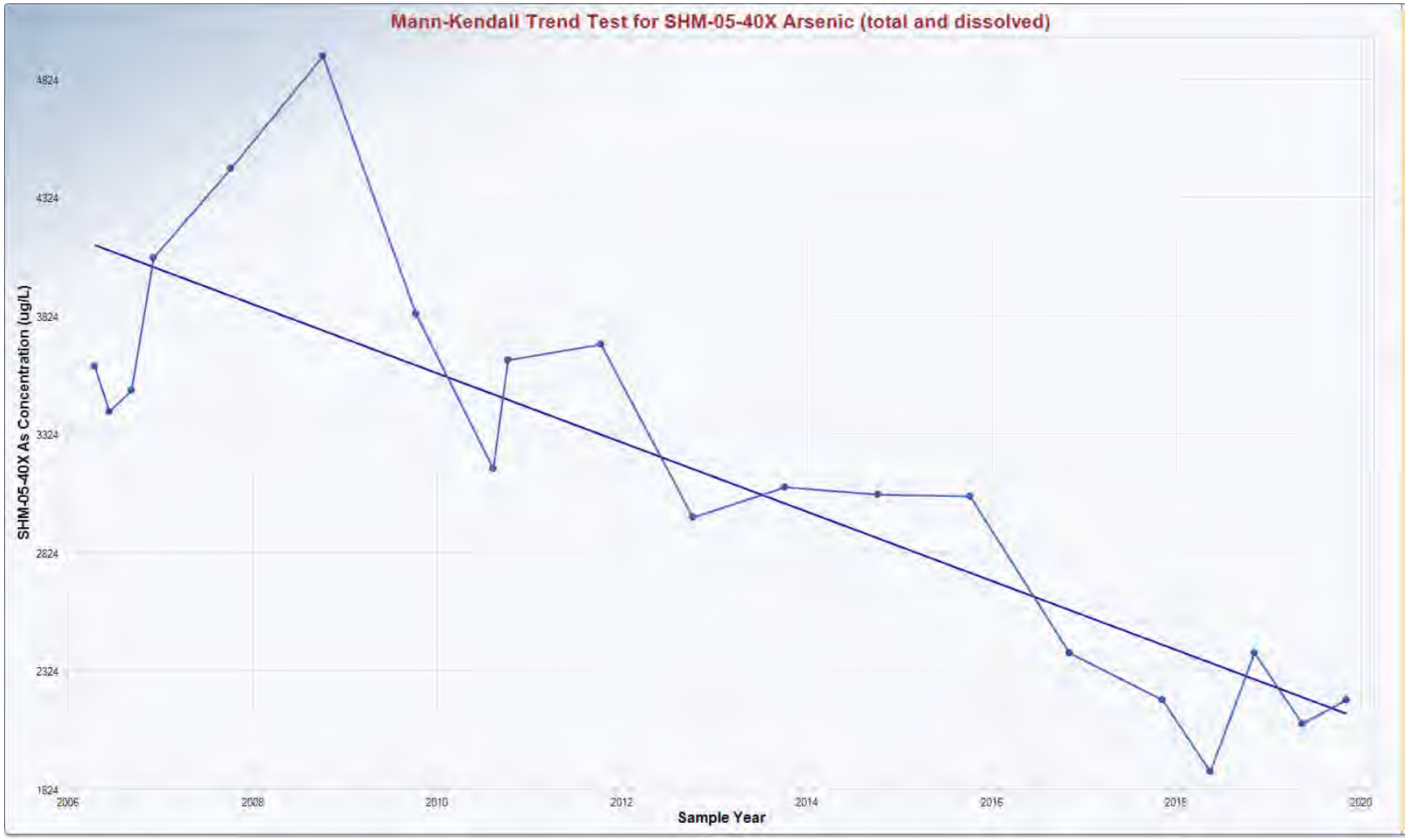
Mann-Kendall Trend Analysis

n	6
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	5.3229
Standardized Value of S	-1.5029
M-K Test Value (S)	-9
Tabulated p-value	0.0680
Approximate p-value	0.0664

OLS Regression Line (Blue)

OLS Regression Slope	-0.4554
OLS Regression Intercept	923.6546

Insufficient statistical evidence of a significant trend at the specified level of significance.



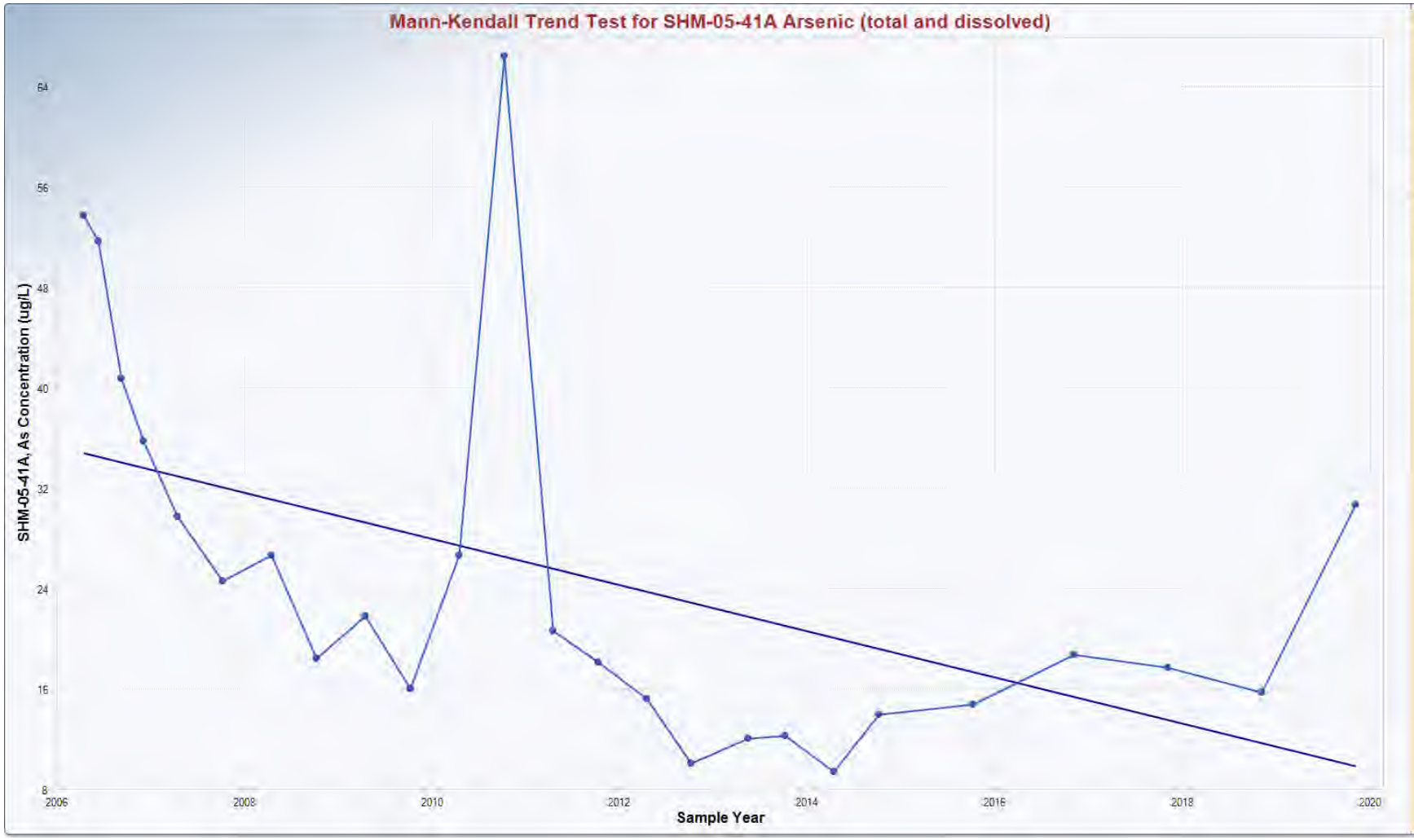
Mann-Kendall Trend Analysis

n	20
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	30.7896
Standardized Value of S	-3.9299
M-K Test Value (S)	-122
Tabulated p-value	0.0000
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-146.1032
OLS Regression Intercept	297,253.1224

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	25
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	42.8058
Standardized Value of S	-3.4108
M-K Test Value (S)	-147
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0003

OLS Regression Line (Blue)

OLS Regression Slope	-1.8424
OLS Regression Intercept	3,731.4724

Statistically significant evidence of a decreasing trend at the specified level of significance.

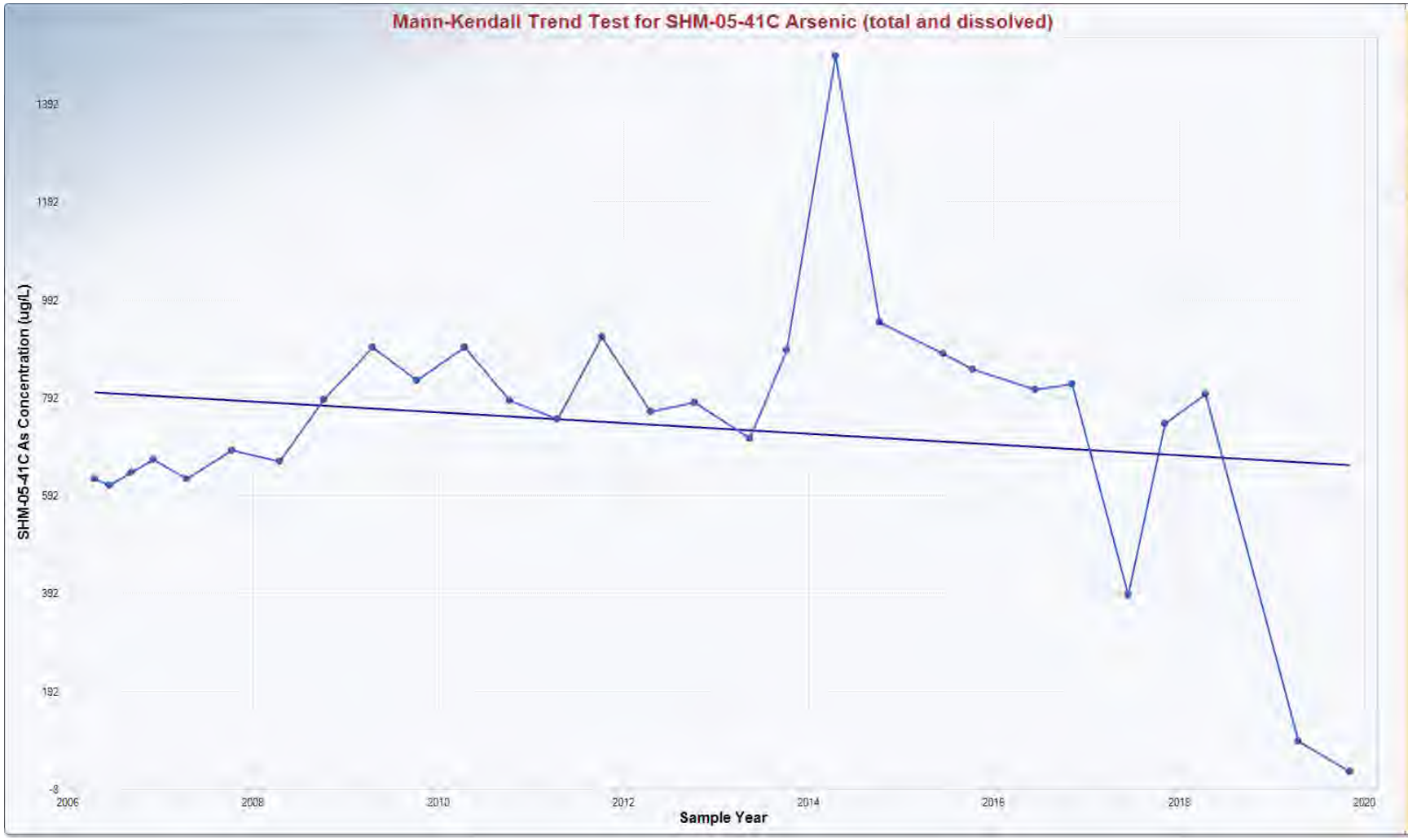
Mann-Kendall Trend Analysis

n	30
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	56.0506
Standardized Value of S	-6.6725
M-K Test Value (S)	-375
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-163.8463
OLS Regression Intercept	330,996.9938

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	29
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	53.3104
Standardized Value of S	0.9567
M-K Test Value (S)	52
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.1694

OLS Regression Line (Blue)

OLS Regression Slope	-10.9872
OLS Regression Intercept	22,608.0595

Insufficient statistical evidence of a significant trend at the specified level of significance.

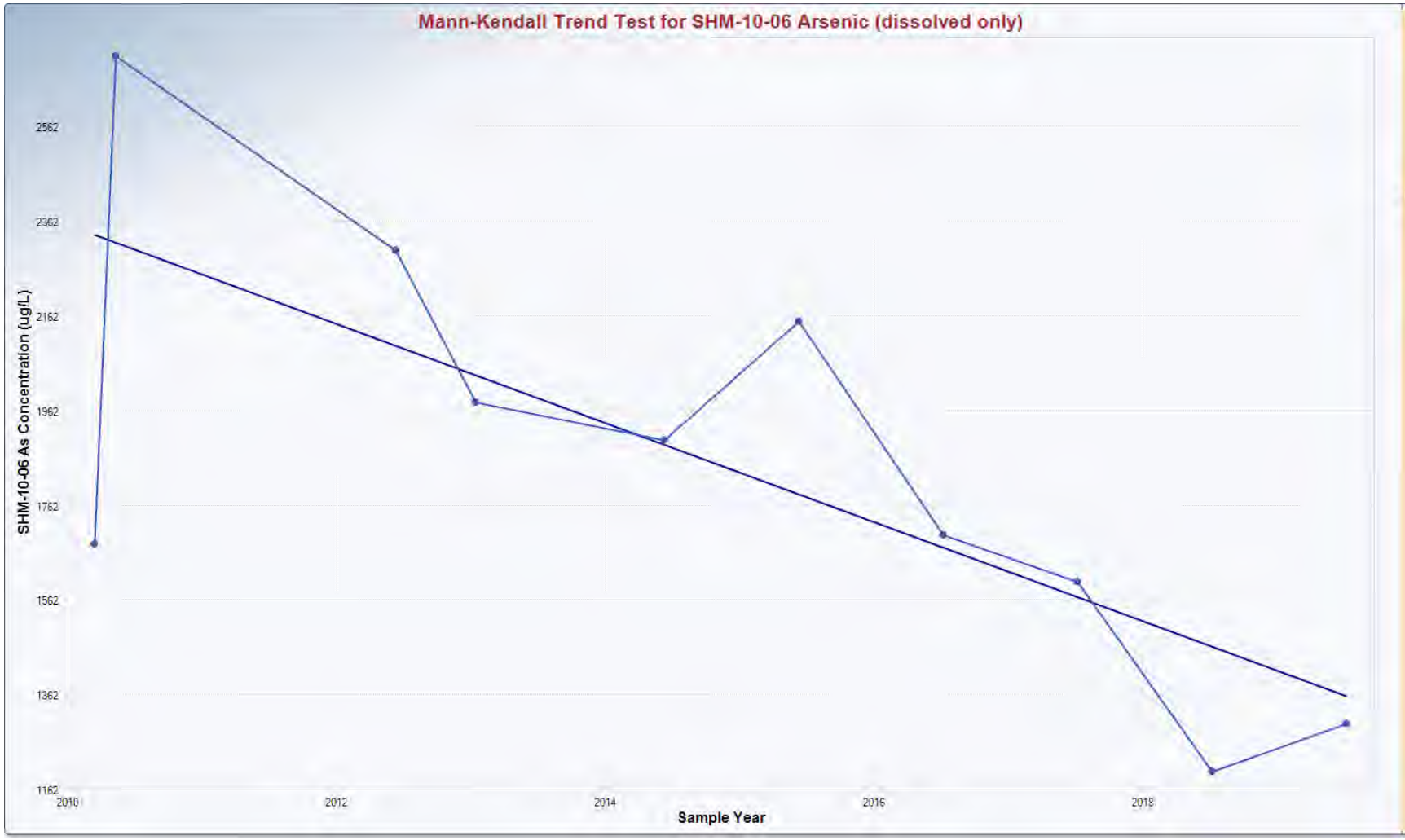
Mann-Kendall Trend Analysis

n	25
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	42.8058
Standardized Value of S	-4.0649
M-K Test Value (S)	-175
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-7.3893
OLS Regression Intercept	15,088.2339

Statistically significant evidence of a decreasing trend at the specified level of significance.



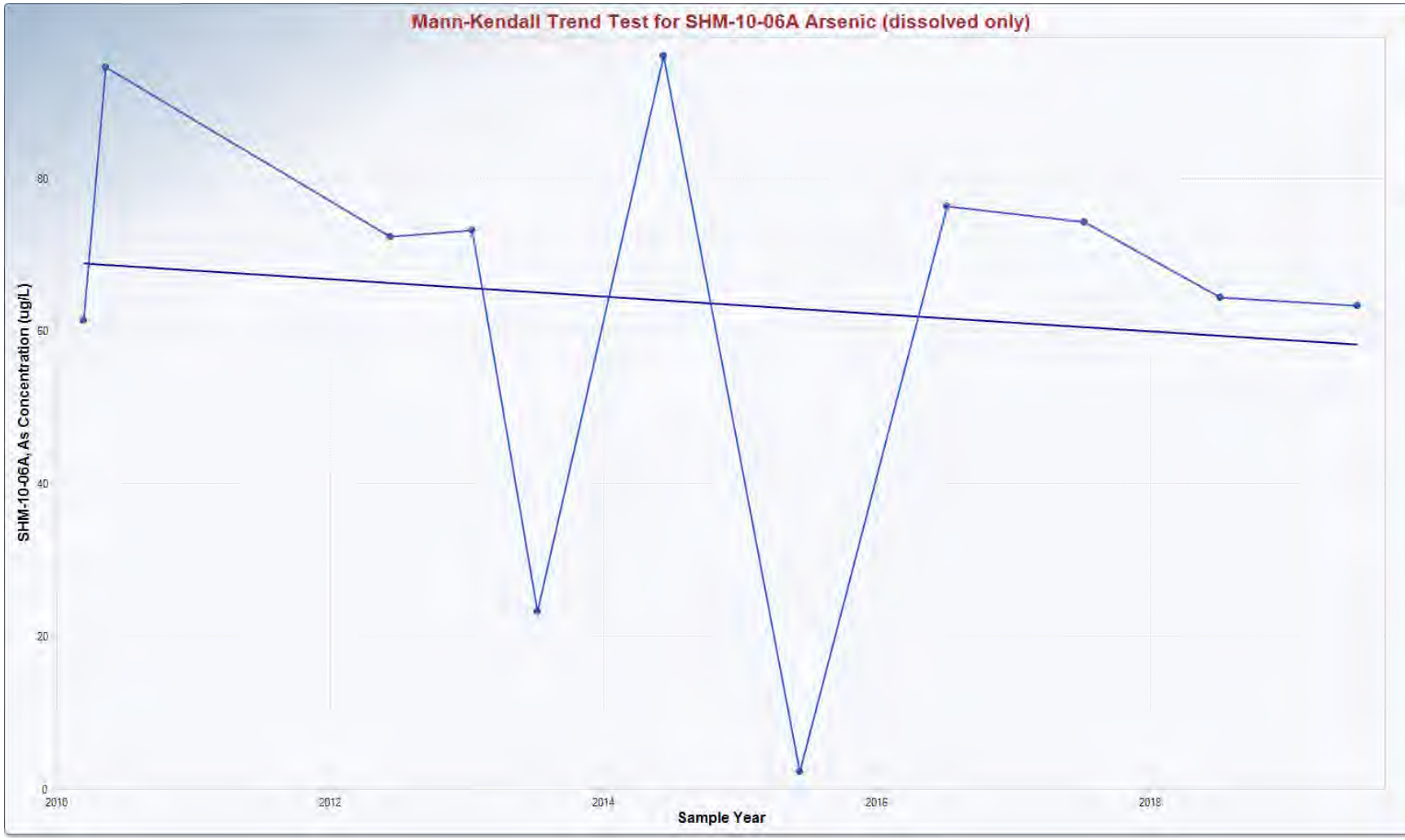
Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1803
Standardized Value of S	-2.3255
M-K Test Value (S)	-27
Tabulated p-value	0.0080
Approximate p-value	0.0100

OLS Regression Line (Blue)

OLS Regression Slope	-104.6590
OLS Regression Intercept	212,756.5632

Statistically significant evidence of a decreasing trend at the specified level of significance.



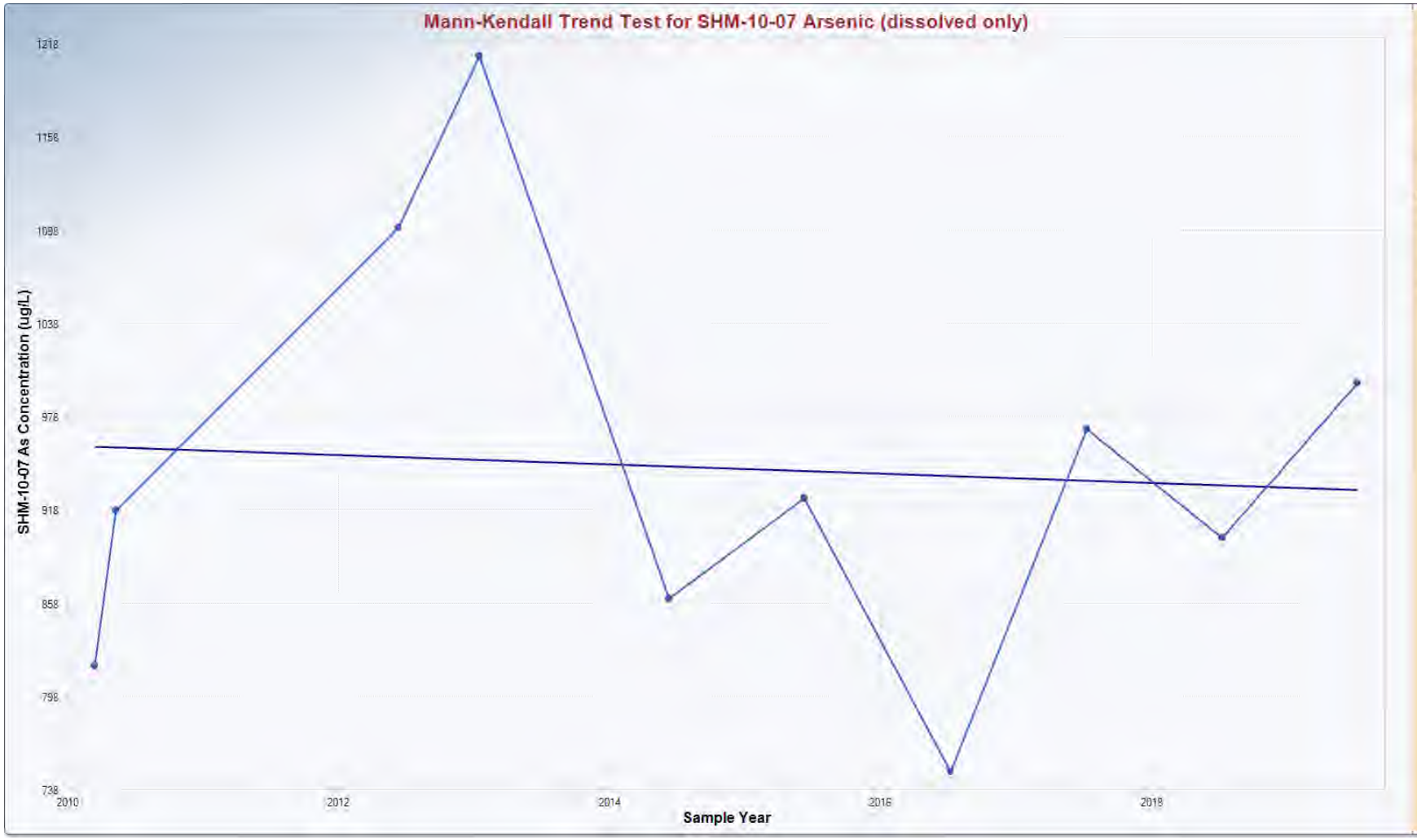
Mann-Kendall Trend Analysis

n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8452
Standardized Value of S	-0.3114
M-K Test Value (S)	-5
Tabulated p-value	0.3810
Approximate p-value	0.3777

OLS Regression Line (Blue)

OLS Regression Slope	-1.1295
OLS Regression Intercept	2,339.4160

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1803
Standardized Value of S	0.3578
M-K Test Value (S)	5
Tabulated p-value	0.3640
Approximate p-value	0.3603

OLS Regression Line (Blue)

OLS Regression Slope	-2.9542
OLS Regression Intercept	6,898.5139

Insufficient statistical evidence of a significant trend at the specified level of significance.

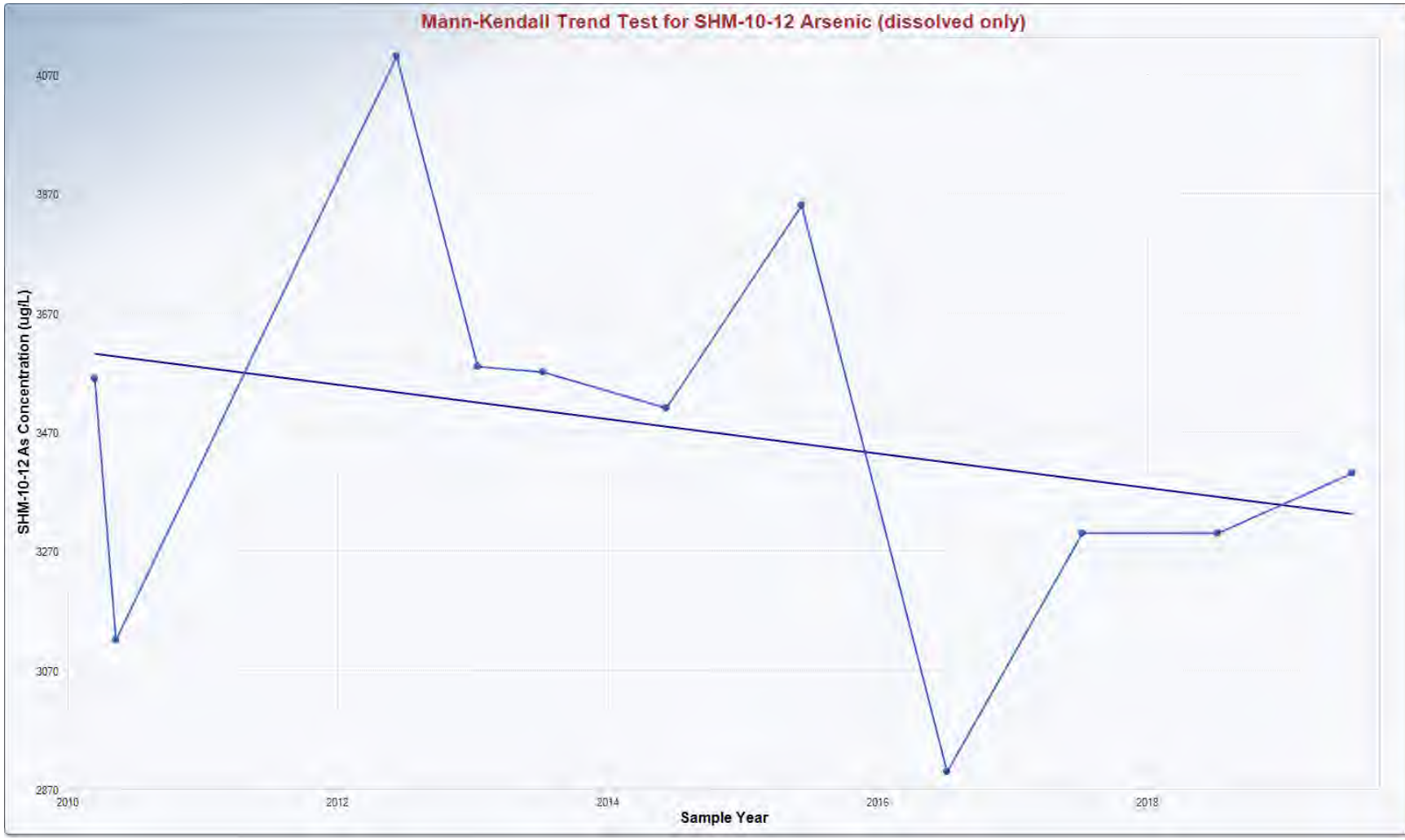
Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1803
Standardized Value of S	2.8622
M-K Test Value (S)	33
Tabulated p-value	0.0010
Approximate p-value	0.0021

OLS Regression Line (Blue)

OLS Regression Slope	20.9619
OLS Regression Intercept	-41,751.6538

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8062
Standardized Value of S	-1.0151
M-K Test Value (S)	-14
Tabulated p-value	0.1410
Approximate p-value	0.1550

OLS Regression Line (Blue)

OLS Regression Slope	-28.9962
OLS Regression Intercept	61,900.3588

Insufficient statistical evidence of a significant trend at the specified level of significance.

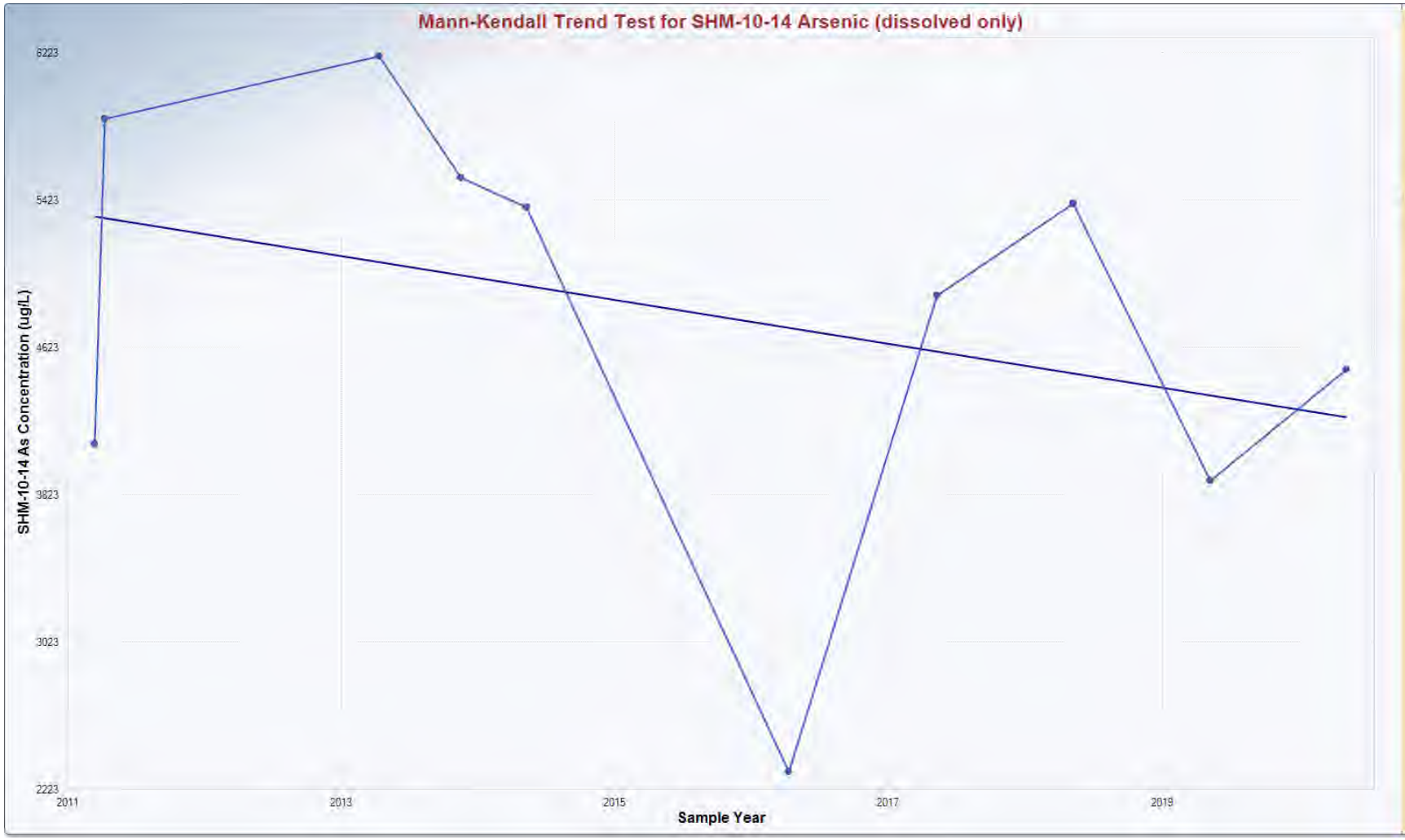
Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1803
Standardized Value of S	-1.9677
M-K Test Value (S)	-23
Tabulated p-value	0.0230
Approximate p-value	0.0245

OLS Regression Line (Blue)

OLS Regression Slope	-20.5231
OLS Regression Intercept	41,858.7725

Statistically significant evidence of a decreasing trend at the specified level of significance.



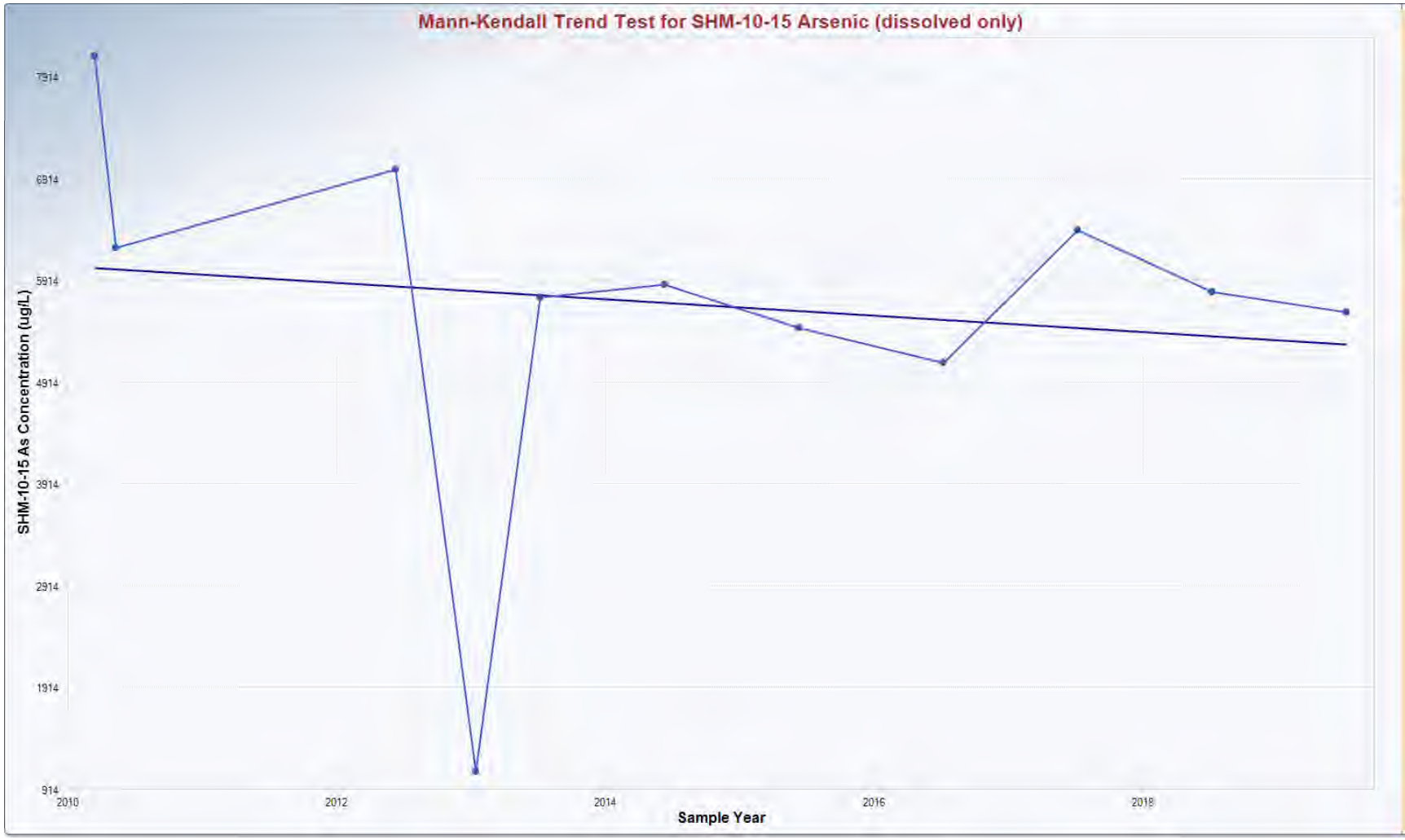
Mann-Kendall Trend Analysis

n	10
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	11.1803
Standardized Value of S	-1.2522
M-K Test Value (S)	-15
Tabulated p-value	0.1080
Approximate p-value	0.1052

OLS Regression Line (Blue)

OLS Regression Slope	-118.9455
OLS Regression Intercept	244,496.1096

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	11
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	12.8452
Standardized Value of S	-1.2456
M-K Test Value (S)	-17
Tabulated p-value	0.1090
Approximate p-value	0.1065

OLS Regression Line (Blue)

OLS Regression Slope	-80.8836
OLS Regression Intercept	168,655.7507

Insufficient statistical evidence of a significant trend at the specified level of significance.

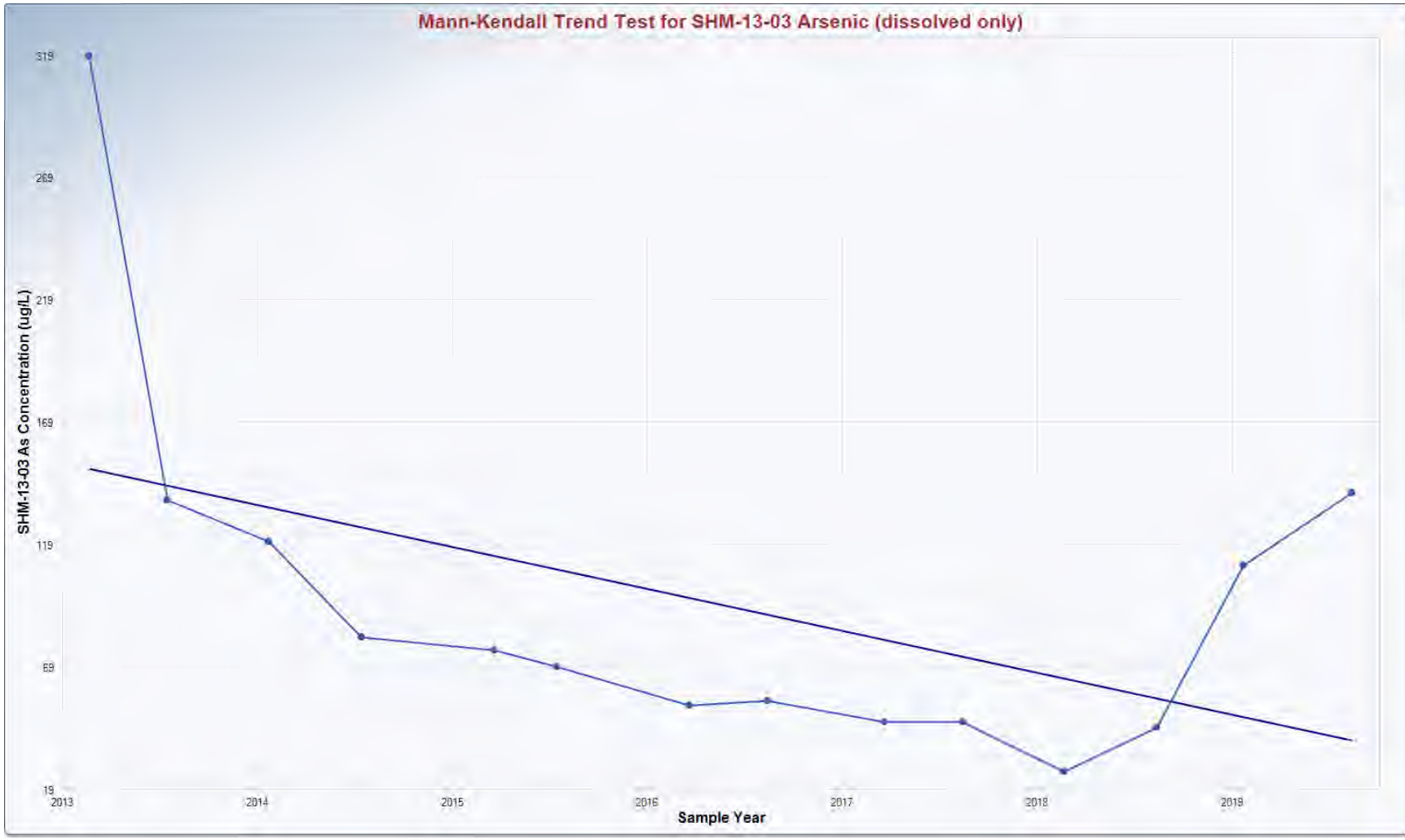
Mann-Kendall Trend Analysis

n	12
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	14.5144
Standardized Value of S	0.6201
M-K Test Value (S)	10
Tabulated p-value	0.2730
Approximate p-value	0.2676

OLS Regression Line (Blue)

OLS Regression Slope	43.8657
OLS Regression Intercept	-87,020.9529

Insufficient statistical evidence of a significant trend at the specified level of significance.



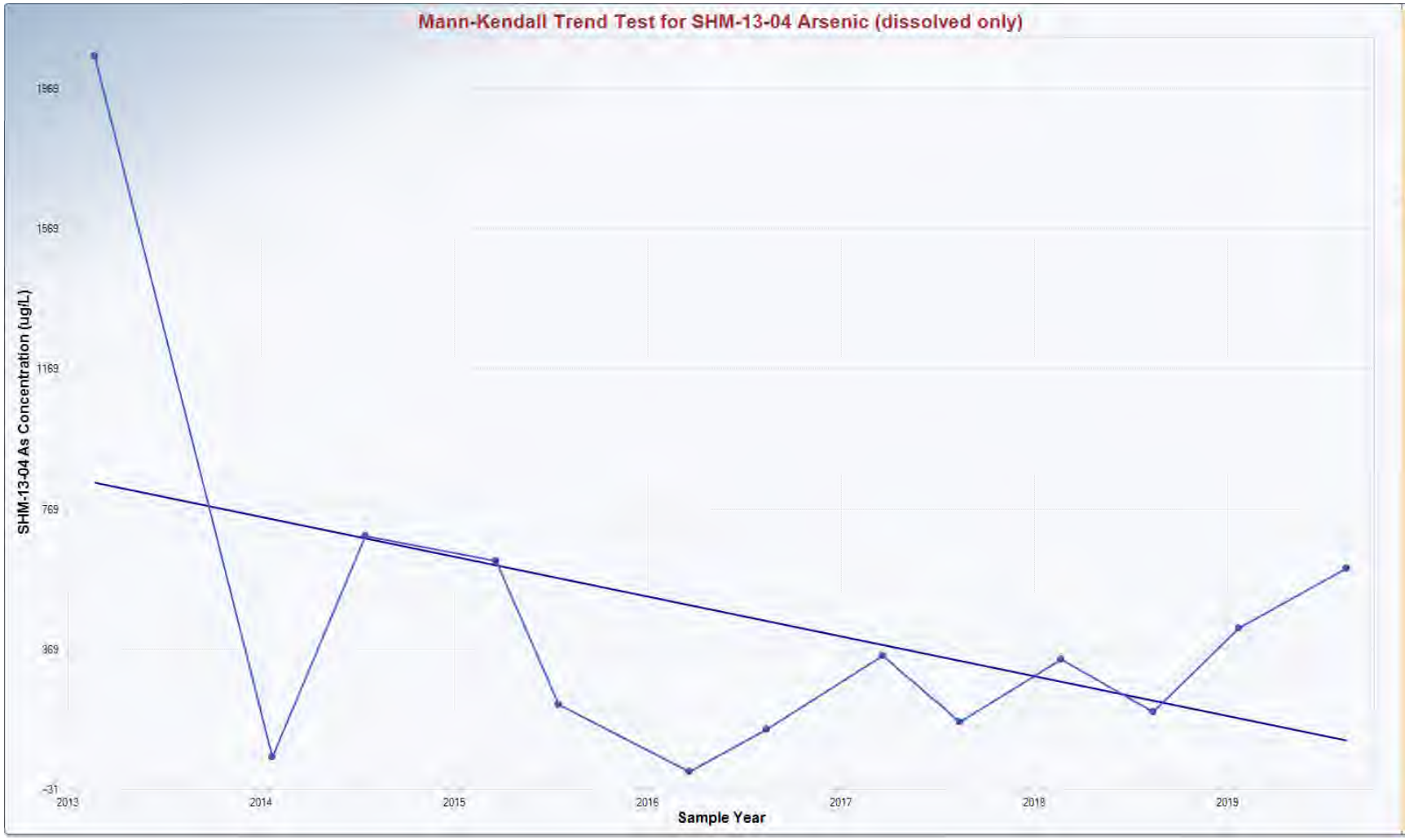
Mann-Kendall Trend Analysis

n	14
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	18.2392
Standardized Value of S	-2.3576
M-K Test Value (S)	-44
Tabulated p-value	0.0070
Approximate p-value	0.0092

OLS Regression Line (Blue)

OLS Regression Slope	-17.1046
OLS Regression Intercept	34,588.0035

Statistically significant evidence of a decreasing trend at the specified level of significance.



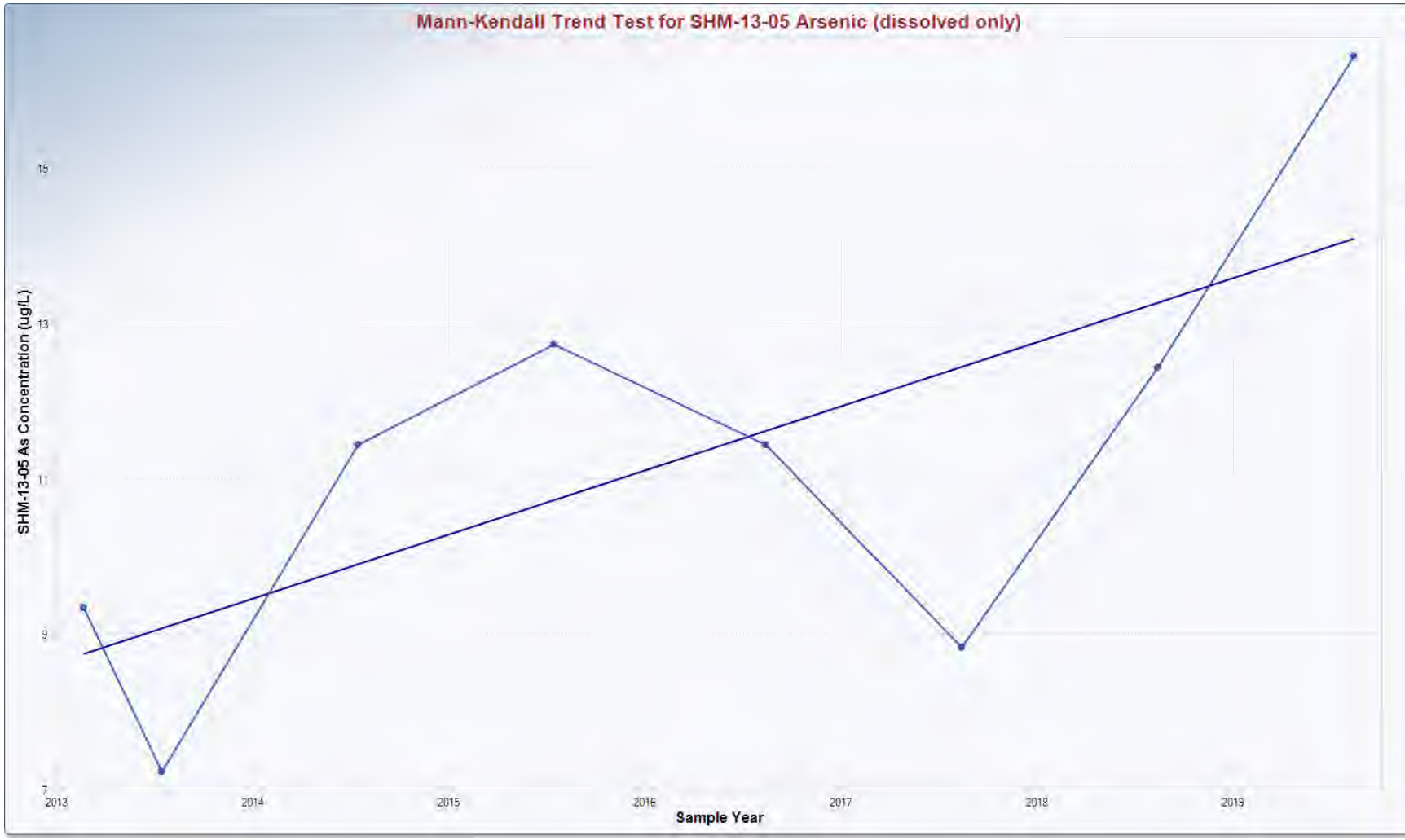
Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3911
Standardized Value of S	-0.0610
M-K Test Value (S)	-2
Tabulated p-value	0.4760
Approximate p-value	0.4757

OLS Regression Line (Blue)

OLS Regression Slope	-113.6674
OLS Regression Intercept	229,701.6081

Insufficient statistical evidence of a significant trend at the specified level of significance.



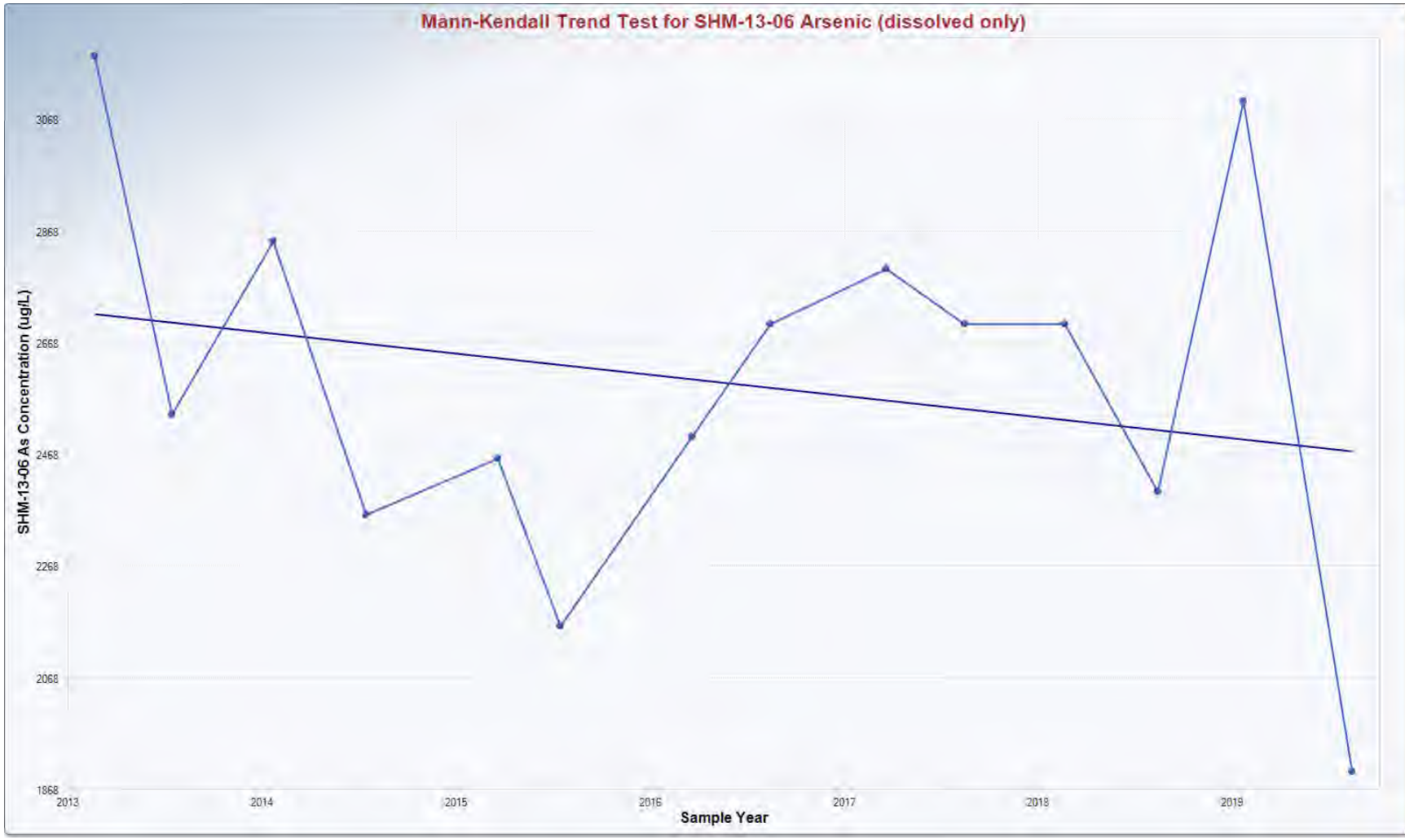
Mann-Kendall Trend Analysis

n	8
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	8.0208
Standardized Value of S	1.4961
M-K Test Value (S)	13
Tabulated p-value	0.0890
Approximate p-value	0.0673

OLS Regression Line (Blue)

OLS Regression Slope	0.8256
OLS Regression Intercept	-1,653.9804

Insufficient statistical evidence of a significant trend at the specified level of significance.



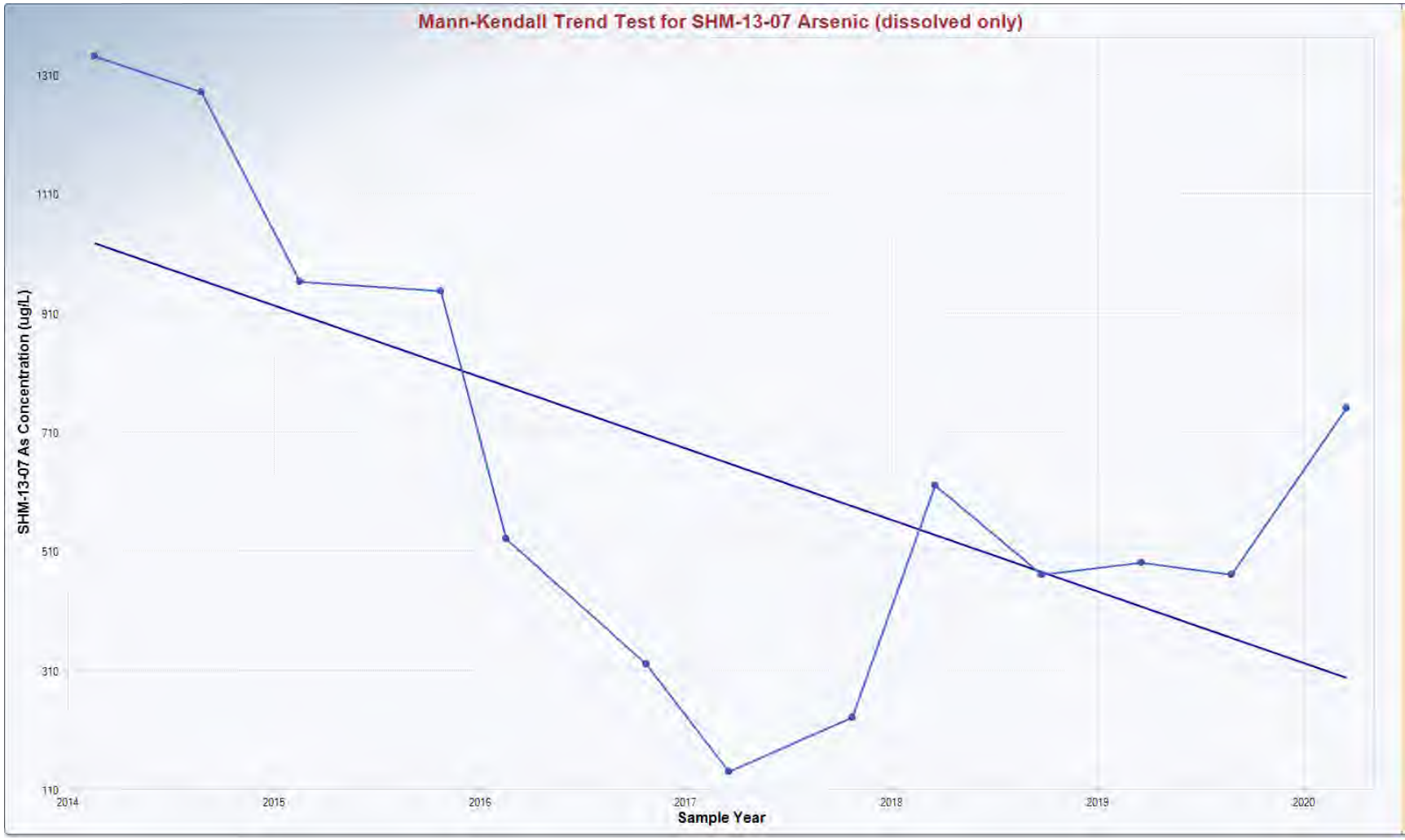
Mann-Kendall Trend Analysis

n	14
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	18.1659
Standardized Value of S	-0.4954
M-K Test Value (S)	-10
Tabulated p-value	0.2950
Approximate p-value	0.3101

OLS Regression Line (Blue)

OLS Regression Slope	-37.9772
OLS Regression Intercept	79,182.3339

Insufficient statistical evidence of a significant trend at the specified level of significance.



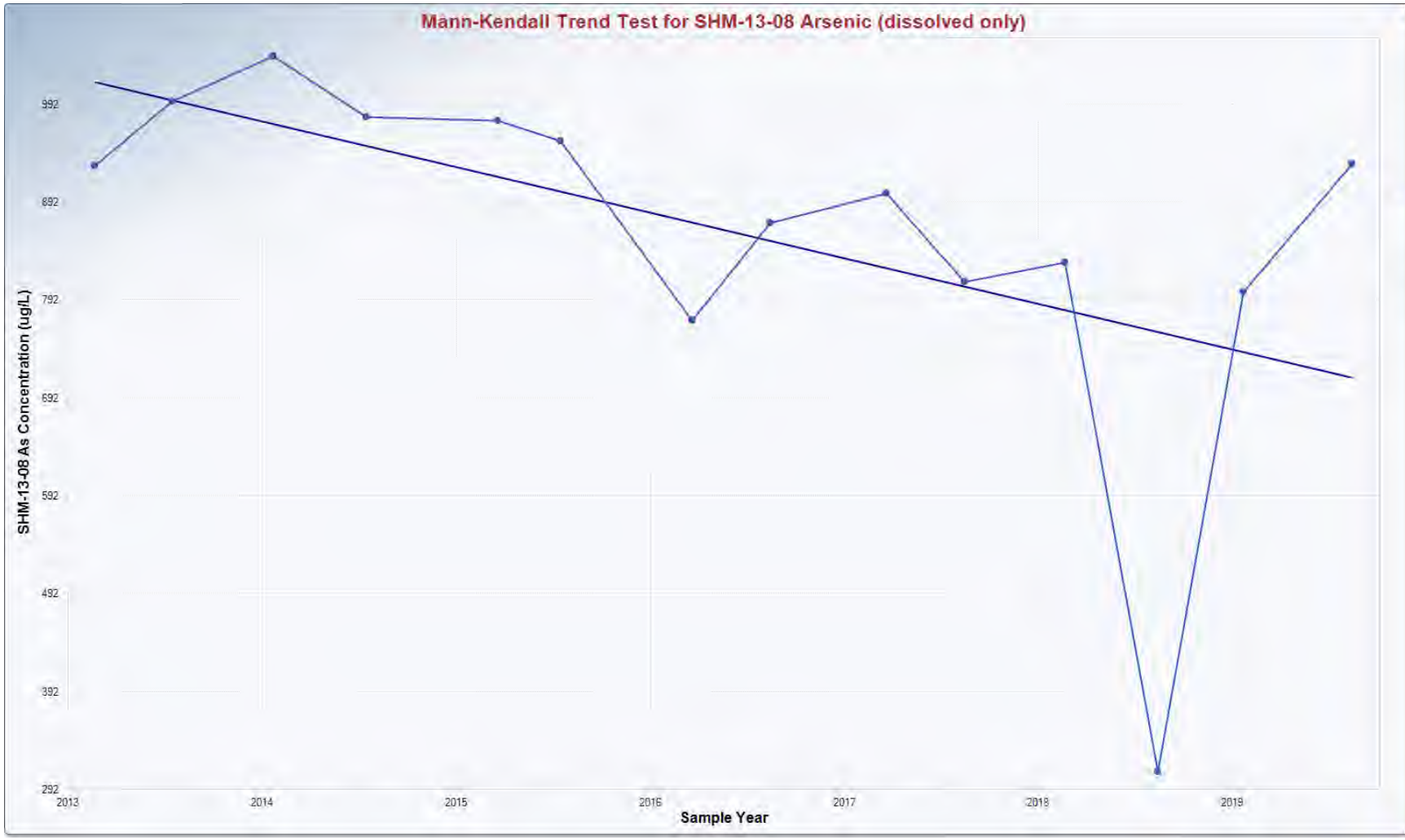
Mann-Kendall Trend Analysis

n	13
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	16.3605
Standardized Value of S	-1.8337
M-K Test Value (S)	-31
Tabulated p-value	0.0380
Approximate p-value	0.0334

OLS Regression Line (Blue)

OLS Regression Slope	-120.0461
OLS Regression Intercept	242,775.8590

Statistically significant evidence of a decreasing trend at the specified level of significance.



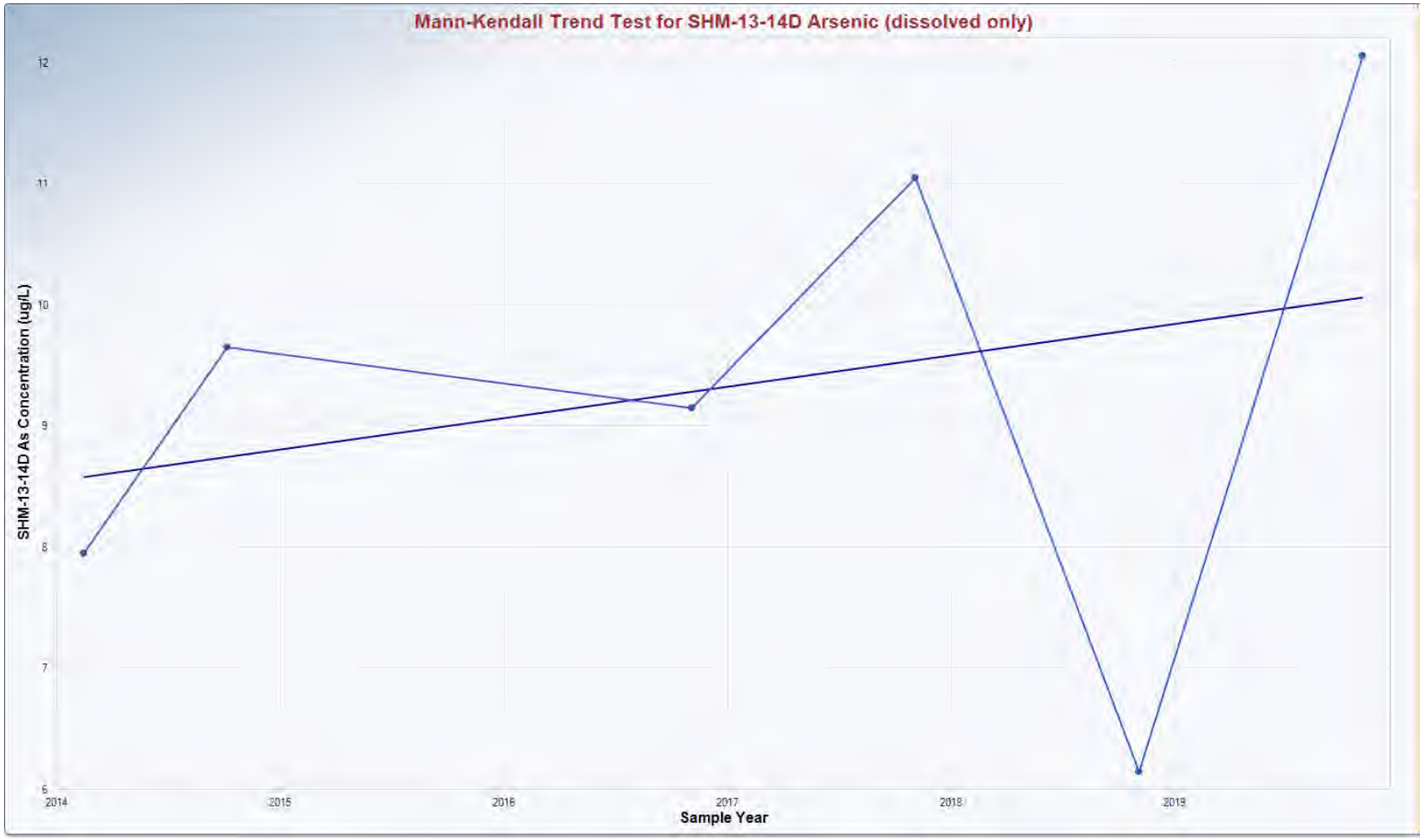
Mann-Kendall Trend Analysis

n	14
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	18.2665
Standardized Value of S	-2.5183
M-K Test Value (S)	-47
Tabulated p-value	0.0050
Approximate p-value	0.0059

OLS Regression Line (Blue)

OLS Regression Slope	-46.5687
OLS Regression Intercept	94,776.2229

Statistically significant evidence of a decreasing trend at the specified level of significance.



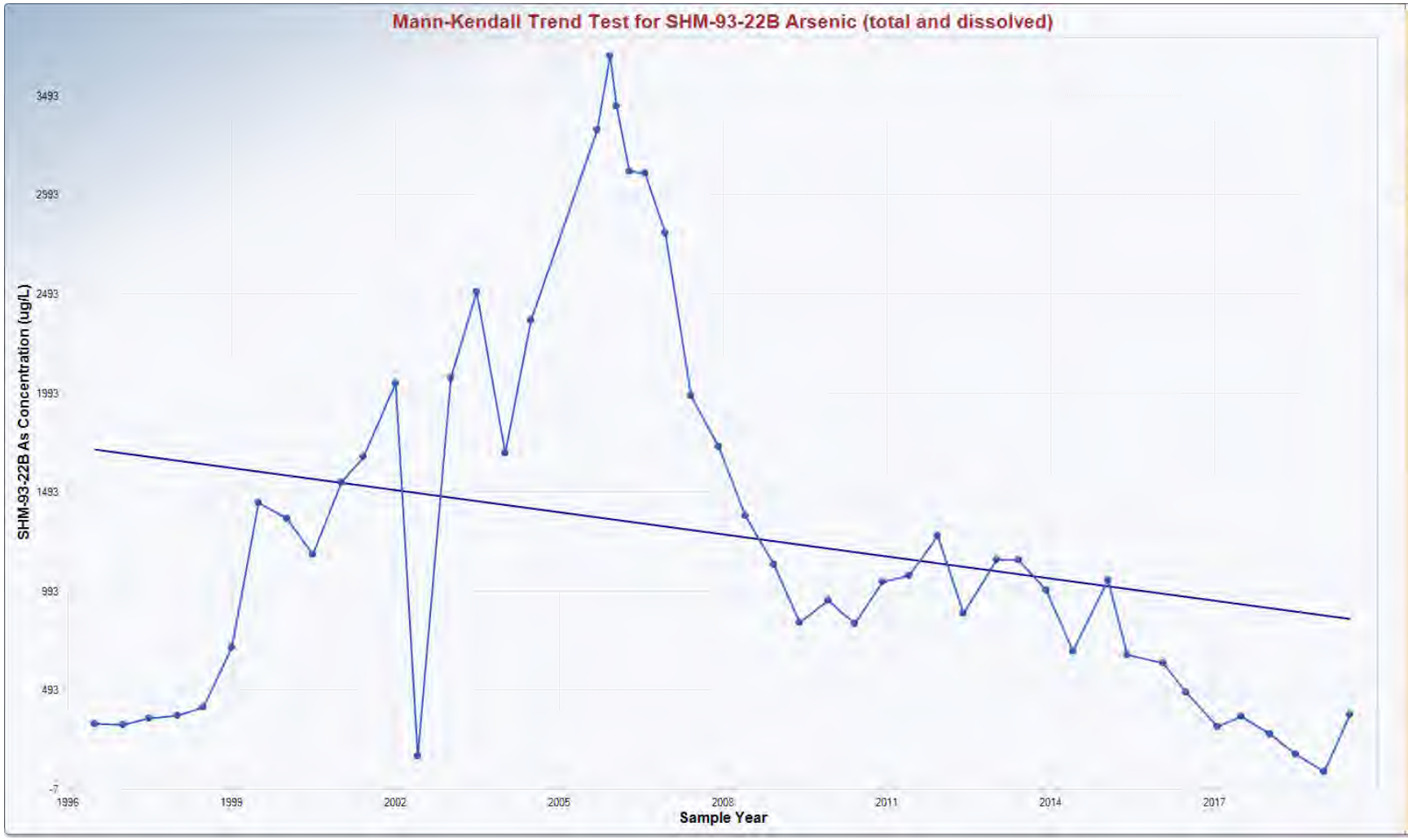
Mann-Kendall Trend Analysis

n	6
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	5.3229
Standardized Value of S	0.7515
M-K Test Value (S)	5
Tabulated p-value	0.2350
Approximate p-value	0.2262

OLS Regression Line (Blue)

OLS Regression Slope	0.2591
OLS Regression Intercept	-513.4124

Insufficient statistical evidence of a significant trend at the specified level of significance.



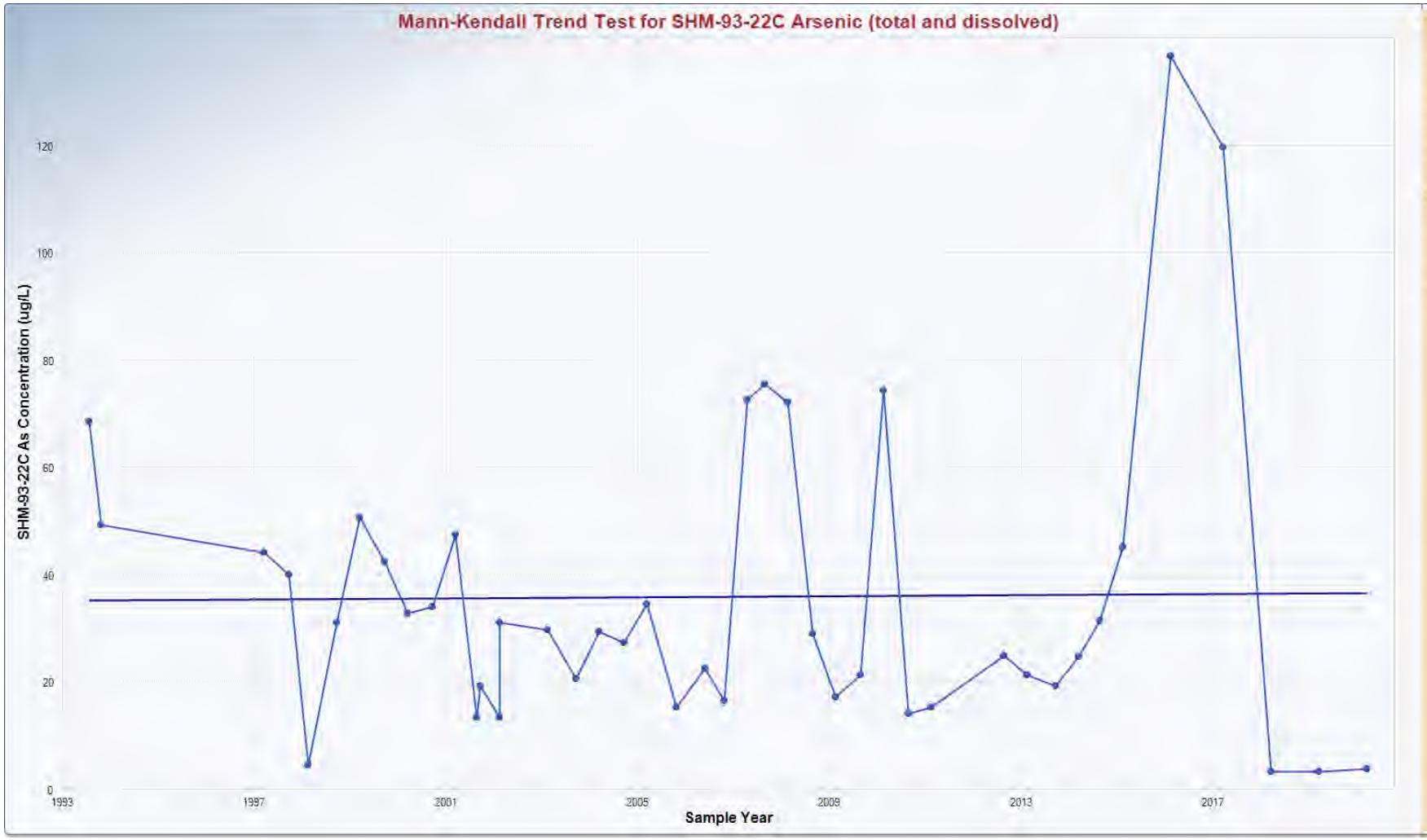
Mann-Kendall Trend Analysis

n	48
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	112.5063
Standardized Value of S	-2.4887
M-K Test Value (S)	-281
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0064

OLS Regression Line (Blue)

OLS Regression Slope	-37.1595
OLS Regression Intercept	75,908.3682

Statistically significant evidence of a decreasing trend at the specified level of significance.



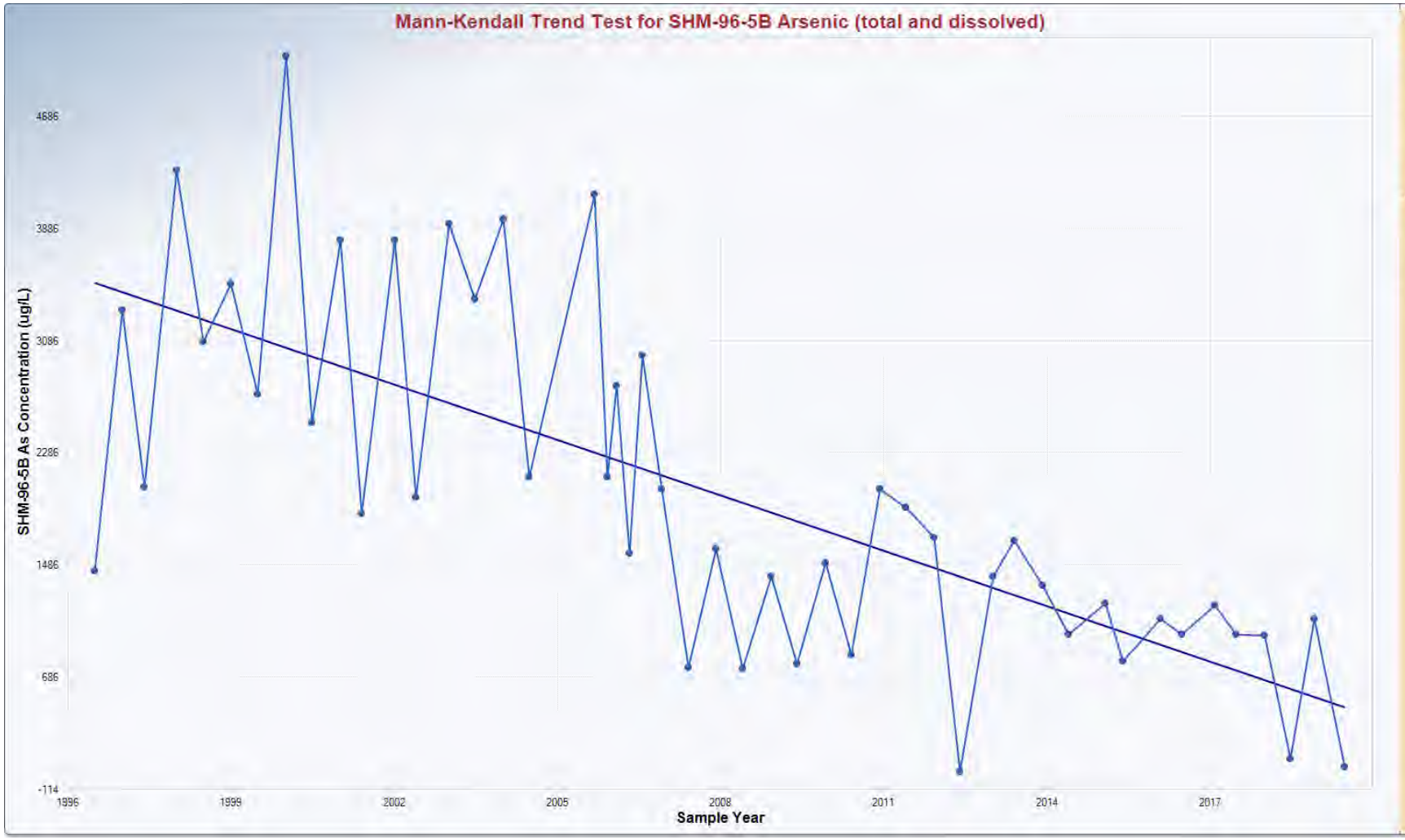
Mann-Kendall Trend Analysis

n	43
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	95.5214
Standardized Value of S	-1.5913
M-K Test Value (S)	-153
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0558

OLS Regression Line (Blue)

OLS Regression Slope	0.0525
OLS Regression Intercept	-68.9975

Insufficient statistical evidence of a significant trend at the specified level of significance.



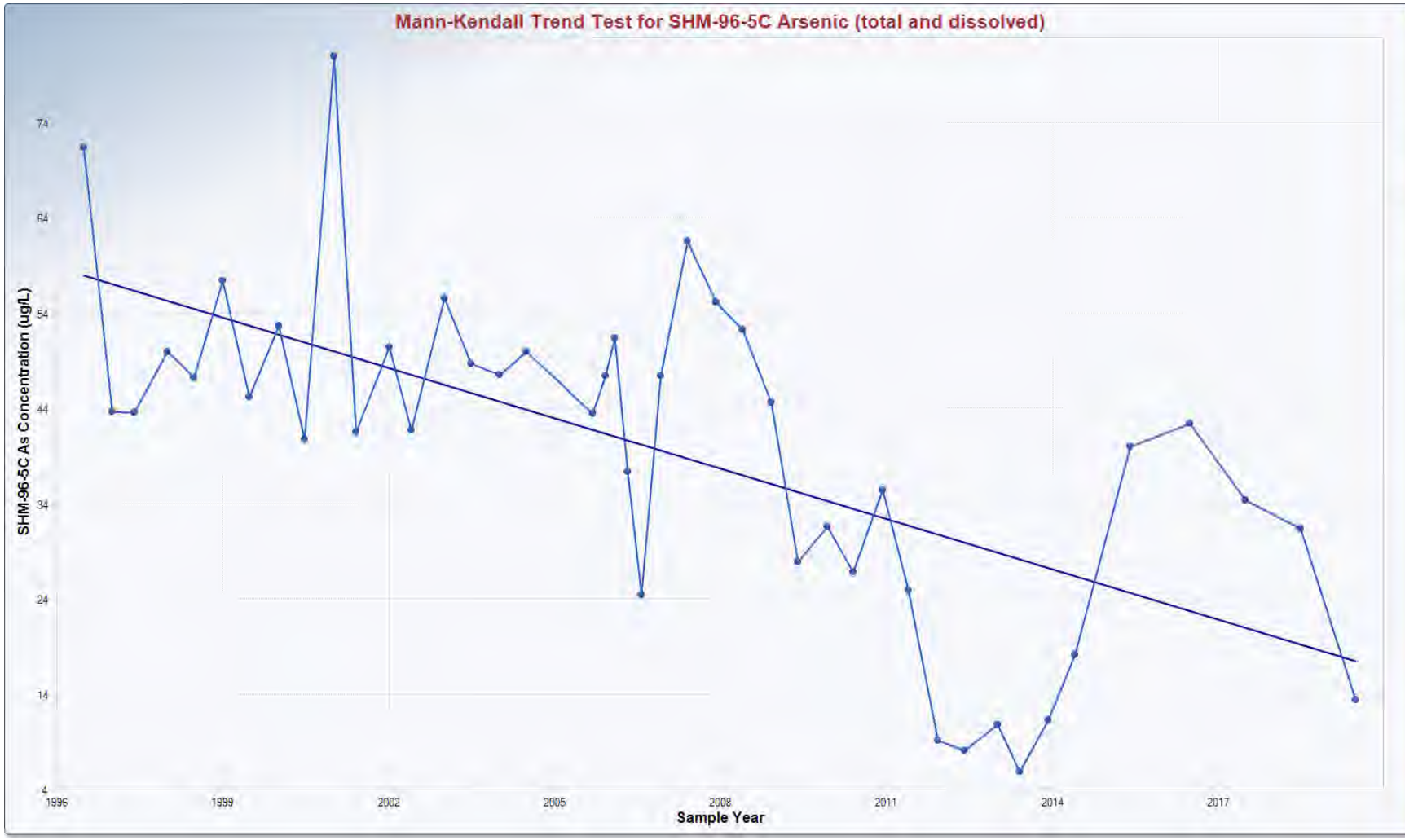
Mann-Kendall Trend Analysis

n	48
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	112.4885
Standardized Value of S	-5.6006
M-K Test Value (S)	-631
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-131.6487
OLS Regression Intercept	266,385.8567

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	43
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	95.5423
Standardized Value of S	-4.3122
M-K Test Value (S)	-413
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-1.7605
OLS Regression Intercept	3,573.1140

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Analysis

n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2556
Standardized Value of S	-3.9579
M-K Test Value (S)	-97
Tabulated p-value	0.0000
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-8.0468
OLS Regression Intercept	16,415.5939

Statistically significant evidence of a decreasing trend at the specified level of significance.

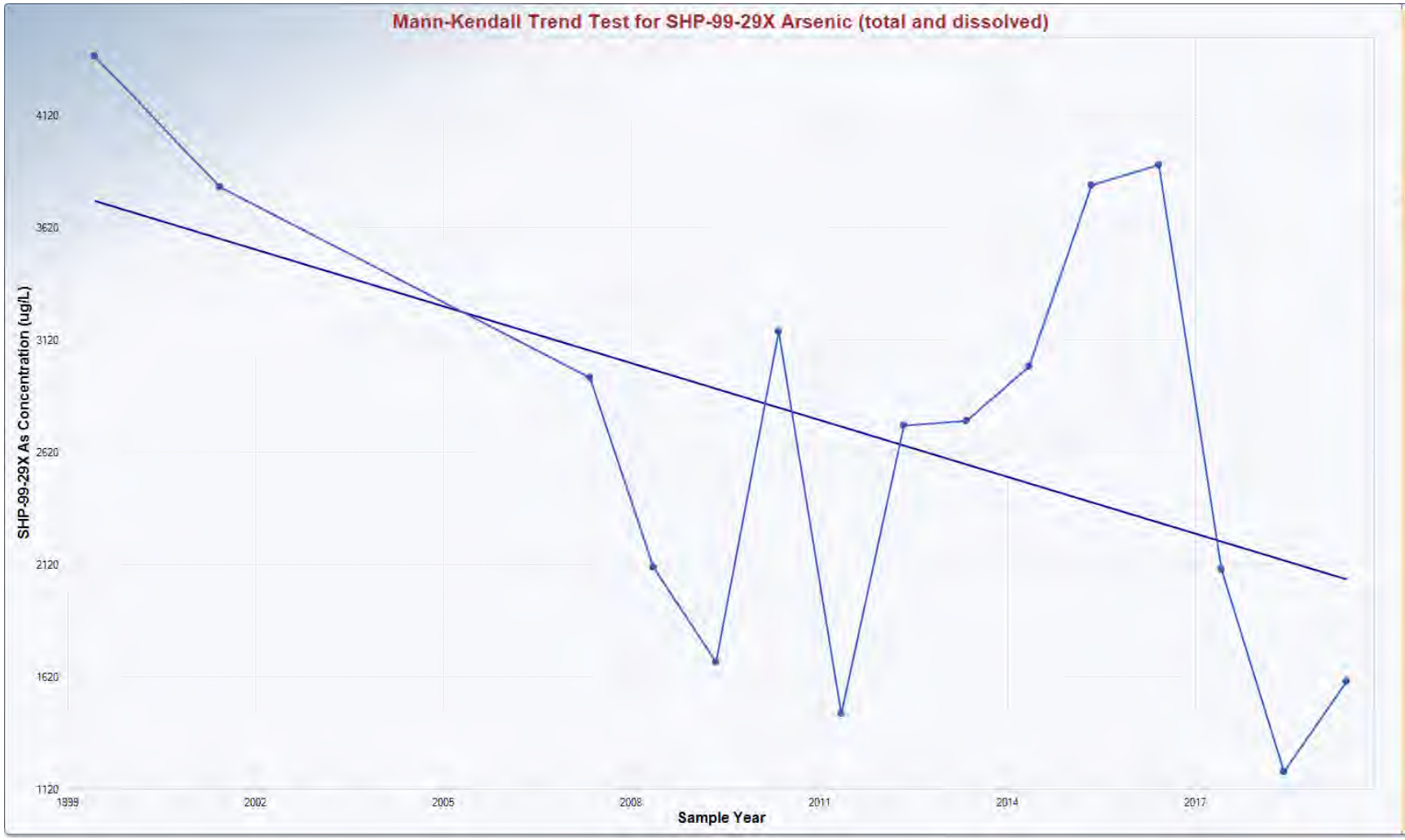
Mann-Kendall Trend Analysis

n	16
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	22.2111
Standardized Value of S	-3.6468
M-K Test Value (S)	-82
Tabulated p-value	0.0000
Approximate p-value	0.0001

OLS Regression Line (Blue)

OLS Regression Slope	-13.0360
OLS Regression Intercept	26,363.8214

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	15
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	20.2073
Standardized Value of S	-1.2867
M-K Test Value (S)	-27
Tabulated p-value	0.1010
Approximate p-value	0.0991

OLS Regression Line (Blue)

OLS Regression Slope	-84.2177
OLS Regression Intercept	172,164.1035

Insufficient statistical evidence of a significant trend at the specified level of significance.

APPENDIX K
RESPONSE TO COMMENTS

February 18, 2021

U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2571
Attn: Ms. Penelope Reddy

RE: Army Responses to Comments
Draft 2019 Annual Operations, Maintenance, and Monitoring Report
Shepley's Hill Landfill, Former Fort Devens Army Installation, Devens, MA
Contract No. W912WJ-18-C-0011

Dear Ms. Reddy,

On behalf of the Army, KOMAN Government Solutions, LLC (KGS)/Trinity is pleased to provide the Army's responses to stakeholder comments on the draft *2019 Annual Operations, Maintenance, and Monitoring Report* for the Shepley's Hill Landfill site at the Former Fort Devens Army Installation, Devens, MA. The Annual Report summarizes the work completed in 2019 for the operation and maintenance (O&M), long-term monitoring (LTM), and remedial action programs at the subject site. The Annual Report is being considered as a primary document under the Fort Devens Federal Facility Agreement (FFA).

The draft 2019 Annual Report was issued on May 18, 2020, with regulatory agency comments due by July 3, 2020. Comments were received from the Massachusetts Department of Environmental Protection (MassDEP) and the People of Ayer Concerned about the Environment (PACE) on June 22, 2020. On July 14, 2020, the Army checked with EPA on the status of their review and was told the document was in review. EPA provided comments on Appendix G of the Annual Report on August 4, 2020. On November 19, 2020, the Army checked with EPA on the status of the remainder of their review. EPA provided their remaining comments on December 8, 2020. The enclosed document provides Army responses to these MassDEP, PACE, and EPA comments.

Per the FFA, the draft final 2019 Annual Report will be issued within 45 days (April 5, 2021).

Please contact me at (508) 219-6771 or jropp@komangs.com if you have any questions or require additional information.

Sincerely,
KOMAN Government Solutions, LLC

James Ropp, P.E.
Project Manager

encl: Army Responses to EPA, MassDEP, and PACE Comments (electronic)

cc: Robert Simeone, BRAC Devens

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Julie Corenzwit, PACE
Richard Doherty, Engineering and Consulting Resources, Inc.
Denise Tripp, Geosyntec
Steve Passafaro, Sovereign
Heather Levesque, Seres
Andy Vitolins, Arcadis
Brian Therriault, Arcadis
KGS File

U.S. ARMY RESPONSES TO U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) COMMENTS ON THE DRAFT 2019 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT, SHEPLEY'S HILL LANDFILL, DEVENS, MASSACHUSETTS

The following U.S. Army responses pertain to the U.S. Environmental Protection Agency (EPA) comments provided by email dated December 7, 2020 on the Barrier Wall Analysis presented in the Draft Devens Five Year Review and the Barrier Wall Analysis provided in Appendix G of the draft 2019 Annual Long-Term Monitoring and Maintenance Report for the Shepley's Hill Landfill (SHL), dated May 2020.

Appendix G comments were received from EPA as part of the December 7, 2020 email; however, an earlier and similar version of the comments on the annual report was received on August 4, 2020. The December 7, 2020 EPA comments supersede the August 4, 2020 EPA comments.

General Comment

The following EPA comments were submitted on the draft 2020 Devens Five-Year Review (FYR) Report but given their relevance to ongoing SHL monitoring activities, are being reiterated below in hopes of addressing/resolving them in the next iteration of the SHL LTMMP to be prepared/issued in 2021 (see EPA's September 29, 2020, Additional Work Letter).

Comment 1- The ability of the existing SHL ATP to achieve arsenic concentrations in the NIA that are compliant with the current arsenic MCL (10 ug/L) is unlikely. To resolve long-standing disagreements regarding remedy performance and attainment of ROD-specified RAOs and cleanup goals, EPA issued the February 2016, SHL Scope of Work (SOW) in February 2016 in either the current ROD cleanup level (50 ug/L) or a potential alternative dictated by lowering the arsenic MCL to 10 ug/L. However, the statement open-ended and lacking technical analysis and justification. Likewise, such a statement is premature given that the analysis to establish a relevant background concentration for arsenic in groundwater in the overburden aquifer has not yet been conducted for the hydrogeologic setting in which the SHL and NIA are located. A key aspect of the ATP remedy is that it was designed for containment of the groundwater plume emanating from the toe of the landfill. It was not designed to directly address arsenic contamination resulting from prior plume migration in the aquifer downgradient from the extraction wells. Likewise, the maximum extraction rate is limited by the capacity of the above-ground treatment facility, which limits the potential for natural attenuation processes to be affective for the entire NIA impacted by historical landfill plume migration given the relatively long time frame required for attenuation of dissolved arsenic in an orphaned plume naturally flushed by unimpacted groundwater with relatively low oxygen concentrations. However, the area of plume impact in the NIA would expand to a larger extent if operation of the ATP system was discontinued.

As such, it is recommended that the current statement in this section be revised.

Current version:
"However, the arsenic concentration levels above the cleanup level in many monitoring wells are indicative of complex interplay between the geochemical and hydrogeological processes that are controlling the concentrations of dissolved arsenic downgradient of the landfill. These arsenic data indicate that a significant decrease in dissolved arsenic concentrations off-site and in the NIA may not be achievable through continued operation of the ATP."

Recommended revised version:
"However, continued observation of arsenic concentrations above the cleanup level (50 ug/L in ROD; 10 ug/L proposed alternative) suggest that sole reliance on the ATP as currently designed may not present a final solution to address past plume migration beyond the landfill boundary. Adequacy and long-term performance of the ATP will be addressed through technical analysis to be conducted under SOW Phase 1 (Demonstrate Plume Capture) and Phase 2 Task 2 (Designation of Arsenic Background) in order to better define adequacy of the current remedy. Determination of background concentration for arsenic in the hydrogeologic setting for SHL will provide a critical piece of information to support reliable assessment of the performance of the ATP as currently configured."

> ***Response:*** *Please note the final FYR was submitted on September 28, 2020. The comments provided herein will be addressed in the 2019 annual report and the next iteration of the SHL LTMMP to be prepared in 2021.*
>
> *In response to the recommended text revision, the text in the annual report and the next iteration of the SHL LTMMP will be revised to, "However, continued observation of arsenic concentrations above the cleanup level (50 ug/L in ROD; 10 ug/L proposed alternative) is indicative of complex interplay between the geochemical and hydrogeological processes that are controlling the dissolved arsenic concentrations downgradient of the landfill. These arsenic data indicate that a significant decrease in dissolved arsenic concentrations off-site and in the NIA may not be achievable through continued operation of the groundwater extraction system. As described in the 1995 SHL ROD, the intent of the groundwater extraction system and the ATP (installed as a contingency remedy to address groundwater contamination still present after landfill capping) is to capture dissolved arsenic and low-ORP groundwater flowing northward from the beneath the landfill cap and thereby reducing or controlling exposure to arsenic and reducing arsenic levels in the downgradient NIA to achieve MCLs. Groundwater that may be bypassing the capture zone outside the footprint of the landfill was not intended to be addressed by this contingency remedy. The current approved SHL groundwater model provides a useful tool, in addition to potentiometric contour maps developed from measured water levels, to evaluate capture of arsenic impacted groundwater from the landfill and flow to the east of the current extraction wells. The results of model flow path analyses indicate that under the current pumping conditions, the zone of capture extends beyond the full width of the landfill, but 3PE analyses indicate that the capture along the eastern edge may be overestimated. However, in the area east of the landfill where capture effectiveness is less certain, arsenic concentrations are substantially lower than*

concentrations within the landfill footprint. If bypass is occurring, then the mass of arsenic that could be bypassing east of the system is a small portion of the overall total arsenic mass that would otherwise be migrating from beneath the landfill cap (Geosyntec, 2020).

The effectiveness of the groundwater extraction system for capturing groundwater migrating from the SHL is being addressed through technical analysis to be conducted under SOW Phase 1 (Demonstrate Plume Capture) and Phase 2 Task 2 (Designation of Arsenic Background). Determination of background concentration for arsenic in the hydrogeologic setting for SHL will provide a critical piece of information to support reliable assessment of the existing remedy."

Specific Comments

Comment 1- Section 2.5.2: Barrier Wall Performance Monitoring, pp. 2-12 to 2-14
The evaluation of barrier wall performance is weak and appears to suffer from data quality issues regarding the groundwater elevations measured on October 22, 2019, and as well as poor quality interpretations of the supporting information. The following comments and recommendations for strengthening the evaluations are offered for consideration.

Response: *Sufficient data will be collected to perform the barrier wall evaluation and assess impacts to Plow Shop Pond/Red Cove in future annual reports. We know from the comprehensive "EPA ORD Study of Arsenic Flux from Groundwater to Surface Water" that the arsenic flux is decreasing from the landfill to Red Cove (Ford, 2018) which is evidence the barrier wall is effective. The barrier wall assessment discussed in Appendix G will be removed from the 2019 annual report and Section 5.2.2 will be revised to summarize the suspected erroneous water level measurements from the fall 2019 synoptic event used in the redacted 3PE analysis shown in Appendix G. Also, there is insufficient seasonal water level data available to determine the performance of the barrier wall.*

The Army plans to update the LTMMP to include the methodology to be used and the data to be collected to evaluate arsenic flux to the pond/cove and the efficacy of the barrier wall. These data will include surface water and sediment samples from Plow Shop Pond at select locations and collection of water levels and determining groundwater flow direction and rate in the vicinity of the barrier wall. Please note that a sampling plan for Plow Shop Pond will be prepared separately and the outcome (sampling plan and frequency) will then be incorporated into the LTMMP.

The draft 2019 annual report, Appendix G included an evaluation of the barrier wall hydraulic performance using hydraulic head analysis, pre-and post- barrier wall groundwater contours and 3PE vector analysis which supported performance of the barrier wall and is lines of evidence; however, this will be removed from the next version of the 2019 annual report . As indicated previously in the 2017 annual report, Section 5.2.2 discusses the performance of the barrier wall for diverting groundwater from the landfill area away from Red Cove.

The Army will remove the barrier wall performance evaluation from the 2019 annual report and will update Section 5.2.2. The Army will include an evaluation of the barrier wall performance in future annual reports based on the groundwater data collected after 2020; but will revise the LTMMP to include data collection from beneath and within Plow Shop Pond to facilitate a more complete evaluation of the flux of arsenic (and iron) to the pond. These data will be used for evaluation of the performance of the barrier wall for mitigating arsenic flux to the pond in future reports. The update of the 2018 LTMMP will address hydraulic and geochemical data gap deficiencies identified in 2019 for the barrier wall evaluation.

Comment 1a - Hydraulic Head Analysis, p. 2-13
The hydraulic head analysis presented in this document has little value in its current form. It merely demonstrates there is a decrease in hydraulic head from west to east across the wall. However, there was already a decrease in hydraulic head from west to east in this area prior to installation of the wall. One way that this line of evidence could possibly be strengthened is by comparing pre-wall and post-wall hydraulic heads for spring and fall monitoring events at the locations of the PZ-12-01 through PZ-12-10 paired piezometers. Since these piezometers were not in place prior to wall installation, this may be accomplished by interpolating pre-wall hydraulic heads from well constrained potentiometric surface maps. Given the sparsity of wells installed by the Army in this area, it appears that potentiometric surfaces incorporating data from the ORD wells would be needed to produce a defensible analysis.

Response: *The Army plans to update the 2018 LTMMP to address hydraulic and geochemical data gap deficiencies identified in 2019 for the barrier wall evaluation. The current barrier wall text referenced in the 2019 annual report in Section 5.2.2 will be revised to include only hydraulic performance of the wall and a summary of the suspected erroneous water level measurements from the fall 2019 synoptic event. Appendix G will be removed.*

Comment 1b - Pre- and Post-Barrier Wall Groundwater Contours, p. 2-13
The comparison of groundwater flow directions interpreted from the potentiometric surface maps provided for 2011/2012 and 2019 as Figures 1 and 2 of Appendix G, Attachment 1 is of very limited value since the monitoring network used for the 2011/2012 maps was much more limited than the network used to produce the October 22, 2019, map, particularly beneath the landfill. The interpretation of the difference in flow directions from these maps appears to be largely a function of the different network configurations. In addition, close examination of the hydraulic head data contoured in the 2011 and 2012 maps indicates these data do not fully support the estimated contours as depicted on the maps. In order to produce a useful line of evidence from this type of analysis, better constrained maps for both fall and spring monitoring events would be required. It is noted that this analysis did not include a recent spring potentiometric surface map. The current set of wells used to monitor hydraulic head during spring events is insufficient for this purpose. It is recommended that revision of the long-term monitoring plan to include additional hydraulic head monitoring locations for spring events be considered.

Response: *The Army plans to update the 2018 LTMMP to address hydraulic and geochemical data gap deficiencies identified in 2019 for the barrier wall evaluation. The current barrier wall text referenced in the 2019 annual report in Section 5.2.2 will be revised to reflect EPA comments and Appendix G will be removed. Army will include an evaluation of the barrier wall performance in future annual reports based on the groundwater data collected after 2020 that reflects the recommendations provided by EPA.*

Comment 1c - 3PE Vector Analysis, pp. 2-13 to 2-14

A comparison of groundwater flow vectors on opposite sides of the wall is one of the strongest lines of evidence used to demonstrate the hydraulic impact of a barrier wall such as this one. It is a stronger indicator of bulk groundwater flow direction near the wall than comparison of hydraulic head in well pairs and interpretation of poorly constrained potentiometric surfaces. However, the analysis presented in this document appears to suffer from data quality issues and a lack of thoughtful interpretation.

The report correctly notes that some of the groundwater flow vectors calculated from groundwater elevations measured on October 22, 2019, appear to be anomalous as depicted in Figure G-1. In addition, several of the calculated flow vectors for the area west of the wall appear to have a more easterly direction than previously observed. Careful examination of the groundwater elevations used to calculate the vectors in this map indicates that water level measurements at several wells are likely erroneous. For example, hydraulic head calculated for piezometer PZ-12-03 on October 22, 2019, appears to be approximately a foot lower than expected in relation to groundwater elevations calculated for nearby wells PZ-12-01 and PZ-12-05 based on historical data measured by both the Army and EPA ORD from 2016 through 2019.. Use of the erroneous groundwater elevation for well PZ-12-03 results in the anomalous western flow vectors calculated for triangles 16 and 18 in Table G-2 and Figure G-1. Other wells which appear to have anomalous or questionable groundwater elevation measurements include PZ-12-02 and PZ-12-08.

There also appear to be errors in the presentation of the vectors in Figure G-1. The vectors calculated by 3PE originate at the centroid of each triangle which is not as depicted in the figure. It is also not clear that the vector magnitudes (i.e., the length of the arrows in Figure G-1) are presented using the same scaling factor as stated in the document since the document also states that the scaling factors suggested by 3PE were used. It should be noted that 3PE treats calculations for each triangle independently and the scaling factors it suggests for different triangles may be different. A single scaling factor should be specified for all triangles depicted in Figure G-1.

The interpretation of these calculated vectors is also deeply flawed. If the majority of the flow vectors on the west side of the wall actually had the east to northeast orientations in Table G-2 and Figure G-1, this might indicate the potential for significant flow across the wall rather than the interpretation of flow diversion away from Red Cove that is stated in this document. In addition, the document attempts to interpret the erroneous vectors calculated for triangles 16 and 18 as artifacts of an abnormally low pond level which is stated to be 215.34 ft NAVD88. This

pond level and, therefore, this interpretation are not supported by the pond elevation data measured at staff gauge PSP-01 on October 22, 2019, as depicted in Figure 3 of Appendix G, Attachment 1 (217.62 ft NAVD88). Therefore, even the premise for the anomalous vectors appears to be in error.

Finally, it is noted that vector maps for spring events were not provided. The current long-term monitoring network for spring events does not include monitoring hydraulic head in all the wells needed for this analysis. Accurate water level measurements obtained during both spring and fall events are necessary to make use of this powerful line of evidence. It is recommended that more care be exercised during water level measurements, particularly those to be used for vector analysis, and that additional locations for hydraulic head monitoring be incorporated into spring events. It is also recommended that additional vector analyses, representing several spring and fall datasets, be developed to strengthen this line of evidence rather than relying on a single dataset.

> ***Response:*** *The Army plans to update the 2018 LTMMP to address hydraulic and geochemical data gap deficiencies identified in 2019 for the barrier wall evaluation. The current barrier wall text referenced in the 2019 annual report in Section 5.2.2 will be revised to reflect EPA comments and Appendix G will be removed. Army will include an evaluation of the barrier wall performance in future annual reports based on the groundwater data collected after 2020 that reflects the recommendations provided by EPA.*

Comment 1d - Arsenic Flux, p. 2-14

Estimates of arsenic flux across the wall are calculated using the groundwater flow model and a simple analytical calculation using the Darcy equation and measured hydraulic heads. In each case, potential water flow across a uniform wall with a hydraulic conductivity of 1x10-7 cm/s was calculated. Although these estimates are informative with respect to the potential impact of a perfect wall, they do not necessarily represent actual conditions.

> ***Response:*** *Army will remove the barrier wall performance evaluation in Appendix G from the 2019 AR. Army will include an evaluation of arsenic flux to Red Cove in the barrier wall performance assessment in future annual reports and revisions to the LTMMP will include data collection from beneath and within Plow Shop Pond to facilitate evaluation of the arsenic flux (and iron) to the pond. These data will be used for evaluation of the performance of the barrier wall for mitigating arsenic flux to the pond in future reports.*

Comment 2 - Section 2.5.2: Geochemical Trends Analysis, pp. 2-14 to 2-15

The analysis of geochemical trends is presented in the absence of integration with changes in the direction and magnitude of groundwater movement following installation of the hydraulic barrier wall, and, thus, provide limited utility in helping understand actual conditions within the aquifer. While oxidation-reduction potential (ORP) is a factor that influences observed dissolved arsenic concentrations, there is clear, documented professional opinion (outside of EPA) that reliance on

the response of a platinum electrode as an indicator of groundwater plume behavior is tenuous, at best (U.S. EPA, 2002). Low (negative) redox potential recorded by a platinum electrode indicates conditions that may support elevated arsenic concentrations, but these measurements do not indicate the causal factor for elevated concentrations of arsenic. There are several likely scenarios where elevated concentrations of arsenic in combination with low values of ORP might be observed: 1) plume developed from landfill impact in which oxygen concentrations are low due to lack of precipitation infiltration, 2) zones in which plume migration has been intercepted, but mixing with oxygenated sources of groundwater (or infiltration) are insignificant, and 3) zones of natural, oxygen-deficient groundwater for which natural sources of arsenic are the primary source. While the current speculation about the "heterogeneous distribution of arsenic in the subsurface and variation in groundwater geochemistry" sounds elegant (pg. 2-15, second bullet), it is the equivalent of throwing one's hands up in the air and giving up. Ultimately, interpretation of chemistry trends in the absence of certainty about groundwater hydrology is likely to lead to unsupportable observations. Like the groundwater extraction system, the barrier wall adjacent to Red Cove is a containment (or diversion) system specifically designed to minimize or eliminate continued direct discharge of contaminated groundwater from underneath the landfill into surface water in Red Cove.

As indicated by prior review comments, the current analysis is insufficient to understand groundwater hydrology adjacent to Red Cove, much less influence on arsenic flux discharging into the cove. A basic analysis of statistically significant trends for several key monitoring locations during the period 2013-2019 results in the observations shown in Table 1. This summary emphasizes the critical importance of evaluating the statistical significance of trends derived solely from qualitative visual observations. Likewise, this summary emphasizes that ORP is not a reliable causal indicator for the presence or absence of elevated arsenic concentrations.
The soil-bentonite barrier wall was installed within an existing groundwater plume. Groundwater west of the barrier wall should be deflected from transport to the cove, while groundwater between the barrier wall and cove is an orphaned plume cut off from continued flux of contaminated groundwater originating from the landfill. The hydraulic conditions east of the barrier wall have changed drastically. Groundwater near the water table is likely to start to

Table 1. Summary of Mann-Kendall trend analysis for arsenic and ORP at monitoring locations west and east of the soil-bentonite hydraulic barrier wall for the period 2013-2019. Statistical analyses were performed using ProUCL Version 5.1.002 for significance level $p < 0.05$ (U.S. EPA, 2015).

Location ID	Designation	Arsenic Trend	ORP Trend
SHM-10-07	Landfill Plume	Insignificant	Insignificant
SHL-20	MW West of Barrier Wall	Significant, Increasing	Insignificant
SHP-01-38A	MW East of Barrier Wall	Significant, Decreasing	Insignificant
SHL-4	MW East of Barrier Wall	Insignificant	Insignificant

U.S. EPA. Workshop on Monitoring Oxidation-Reduction Processes for Ground-Water Restoration. U.S. Environmental Protection Agency, Washington, D.C., EPA/600/R-02/002, 2002.

U.S. EPA. ProUCL Version 5.1.002 User Guide, Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations, Washington, D.C, EPA/600/R-07/041, 2015.

recover in part from infiltration of precipitation from land surface. In contrast, deeper depths within the aquifer east of the barrier wall will likely respond much slower, since the gradient for groundwater flow is diminished and there is not a ready source of oxygenated groundwater. Reliable assessment of hydraulic gradients supporting groundwater discharge to Red Cove indicates a reduction in arsenic flux to the cove. However, this line of evidence should be supported with direct observations of reduced impact to porewater and sediments within the cove.

> ***Response:*** *The Army plans to update the 2018 LTMMP to address hydraulic and geochemical data gap deficiencies identified in 2019 for the barrier wall evaluation. The current barrier wall text referenced in the 2019 annual report in Section 5.2.2 will be revised to reflect EPA comments and Appendix G will be removed. Army will include an evaluation of the barrier wall performance in future annual reports based on the groundwater data collected after 2020 that reflects the recommendations provided by EPA.*
>
> *Also, the update to the LTMMP will include the methodology and the data to be collected to evaluate arsenic flux to the pond and the efficacy of the barrier wall. These data will include surface water and sediment samples from Plow Shop Pond at select locations and water levels from monitoring wells in the vicinity of the barrier wall. A separate sampling plan for assessment of Arsenic flux to Plow Shop Pond will be prepared and the outcome (sample locations and frequency) will then be incorporated into the LTMMP.*

Appendix G Comments

General Comment

Comment 1 - Appendix G, 2019 Barrier Wall Analysis
The evaluation of barrier wall performance is weak and appears to suffer from data quality issues regarding the groundwater elevations measured on October 22, 2019, and as well as poor quality interpretations of the supporting information. The following comments and recommendations are offered to strengthen current and future assessments.

> ***Response:*** *The current barrier wall text referenced in the 2019 annual report in Section 5.2.2 will be revised to reflect EPA comments and Appendix G will be removed. Army will include an evaluation of the barrier wall performance in future annual reports based on the groundwater data collected after 2020 that reflects the recommendations provided by EPA.*

Specific Comments

Comment 1 - Geochemical Trends
The analysis of geochemical trends is presented in the absence of integration with changes in the direction and magnitude of groundwater movement following installation of the hydraulic barrier wall, and, thus, provide limited utility in helping understand actual conditions within the aquifer.

While oxidation-reduction potential (ORP) is a factor that influences observed dissolved arsenic concentrations, there is clear, documented professional opinion (outside of EPA) that reliance on the response of a platinum electrode as an indicator of groundwater plume behavior is tenuous, at best (U.S. EPA, 2002). Low (negative) redox potential recorded by a platinum electrode indicates conditions that may support elevated arsenic concentrations, but these measurements do not indicate the causal factor for elevated concentrations of arsenic. There are several likely scenarios where elevated concentrations of arsenic in combination with low values of ORP might be observed: 1) plume developed from landfill impact in which oxygen concentrations are low due to lack of rain infiltration, 2) zones in which plume migration has been intercepted, but mixing with oxygenated sources of groundwater (or infiltration) are insignificant, and 3) zones of natural, oxygen-deficient groundwater for which natural sources of arsenic are the primary source. While the current speculation about the "heterogeneous distribution of arsenic in the subsurface and variation in groundwater geochemistry" sounds elegant (Section 3, second bullet), it lacks a detailed technical analysis. Ultimately, interpretation of chemistry trends in the absence of certainty about groundwater hydrology is likely to lead to unsupportable observations. Like the groundwater extraction system, the barrier wall adjacent to Red Cove is a containment (or diversion) system specifically designed to minimize or eliminate continued direct discharge of contaminated groundwater from underneath the landfill into surface water in Red Cove.

As discussed in prior comments, the current analysis is insufficient to understand groundwater hydrology adjacent to Red Cove, much less influence on arsenic flux discharging into the cove. A basic analysis of statistically significant trends for several key monitoring locations during the period 2013-2019 results in the observations provided in the following summary.

Monitoring Location	**Location Designation**	**ProUCL arsenic trend**	**ProUCL ORP trend**
SHM-10-01	Landfill Plume	Insignificant	Insignificant
SHL-20	West of Barrier Wall	Significant (Increasing)	Insignificant
SHP-01-38A	East of Barrier Wall	Significant (Decreasing)	Insignificant
SHL-4	East of Barrier Wall	Insignificant	Insignificant

This summary emphasizes the critical importance of evaluating the statistical significance of apparent trends based solely on qualitative visual observations. Likewise, this summary emphasizes that ORP is not a reliable causal indicator for the presence or absence of elevated arsenic concentrations. The soil-bentonite barrier wall was installed within an existing groundwater plume. Groundwater west of the barrier wall should be deflected from transport to the cove, while groundwater between the barrier wall and cove is an orphaned plume cut off from continued flux of contaminated groundwater originating from the landfill. The hydraulic conditions east of the barrier wall have changed drastically. Groundwater near the water table is likely to start to recover in part from infiltration of precipitation from land surface. In contrast, deeper depths within the aquifer east of the barrier wall will likely respond much slower, since the gradient for groundwater flow is diminished and there is not a ready source of oxygenated groundwater. Reliable assessment of hydraulic gradients supporting groundwater discharge to Red Cove indicates a reduction in arsenic flux to the cove. However, as stated in the concluding sentence of Appendix G (page 4 of 5), this line of evidence should (and will) be supported with direct observations of reduced impact to surface water and sediments within the cove. It is also

recommended that these measurements be supported by analysis of samples of sediment pore water.

Response: *See response to Comment 2.*

Comment 2 - Hydraulic Head Analysis - The hydraulic head analysis presented in this document has little value in its current form. It merely demonstrates there is a decrease in hydraulic head from west to east across the wall. However, there was already a decrease in hydraulic head from west to east in this area prior to installation of the wall. One way that this line of evidence could possibly be strengthened is by comparing pre-wall and post-wall hydraulic heads for spring and fall monitoring events at the locations of the PZ-12-01 through PZ-12-10 paired piezometers. Since these piezometers were not in place prior to wall installation, this may be accomplished by interpolating pre-wall hydraulic heads from well constrained potentiometric surface maps. Given the sparsity of wells installed by the Army in this area, it appears that potentiometric surfaces incorporating data from the ORD wells would be needed to produce a defensible analysis.

Response: *See response to Comment 1a.*

Comment 3 - Pre- and Post-Barrier Wall Groundwater Contours - The comparison of groundwater flow directions interpreted from the potentiometric surface maps provided for 2011/2012 and 2019 as Figures 1 and 2 of Appendix G, Attachment 1 is of very limited value since the monitoring network used for the 2011/2012 maps was much more limited than the network used to produce the October 22, 2019, map, particularly beneath the landfill. The interpretation of the difference in flow directions from these maps appears to be largely a function of the different network configurations. In addition, close examination of the hydraulic head data contoured in the 2011 and 2012 maps indicates these data do not fully support the estimated contours as depicted on the maps. In order to produce a useful line of evidence from this type of analysis, better constrained maps for both fall and spring monitoring events would be required. It is noted that this analysis did not include a recent spring potentiometric surface map. The current set of wells used to monitor hydraulic head during spring events is insufficient for this purpose. It is recommended that revision of the long-term monitoring plan to include additional hydraulic head monitoring locations for spring events be considered.

Response: *See response to Comment 1b.*

Comment 4 - 3PE Vector Analysis - A comparison of groundwater flow vectors on opposite sides of the wall is one of the strongest lines of evidence used to demonstrate the hydraulic impact of a barrier wall such as this one. It is a stronger indicator of bulk groundwater flow direction near the wall than comparison of hydraulic head in well pairs and interpretation of poorly constrained potentiometric surfaces. However, the analysis presented in this document appears to suffer from data quality issues and a lack of thoughtful interpretation.

The report correctly notes that some of the groundwater flow vectors calculated from groundwater elevations measured on October 22, 2019, appear to be anomalous as depicted in

Figure G-1. In addition, several of the calculated flow vectors for the area west of the wall appear to have a more easterly direction than previously observed. Careful examination of the groundwater elevations used to calculate the vectors in this map indicates that water level measurements at several wells are likely erroneous. For example, hydraulic head calculated for piezometer PZ-12-03 on October 22, 2019, appears to be approximately a foot lower than expected in relation to groundwater elevations calculated for nearby wells PZ-12-01 and PZ-12-05 based on historical data measured by both the Army and EPA ORD from 2016 through 2019. Use of the erroneous groundwater elevation for well PZ-12-03 results in the anomalous western flow vectors calculated for triangles 16 and 18 in Table G-2 and Figure G-1. Other wells which appear to have anomalous or questionable groundwater elevation measurements include PZ-12-02 and PZ-12-08. It is recommended that the standard operating procedure used to measure water levels in wells be reviewed and quality assurance/quality control measures be enhanced, as needed, to reduce the frequency of erroneous water level measurements.

There also appear to be errors in the presentation of the vectors in Figure G-1. The vectors calculated by 3PE originate at the centroid of each triangle which is not as depicted in the figure. It is also not clear that the vector magnitudes (i.e., the length of the arrows in Figure G-1) are presented using the same scaling factor as stated in the document since the document also states that the scaling factors suggested by 3PE were used. It should be noted that 3PE treats calculations for each triangle independently and the scaling factors it suggests for different triangles may be different. A single scaling factor should be specified for all triangles depicted in Figure G-1.

The interpretation of these calculated vectors is also flawed. If the majority of the flow vectors on the west side of the wall actually had the east to northeast orientations in Table G-2 and Figure G-1, this might indicate the potential for significant flow across the wall rather than the interpretation of flow diversion away from Red Cove that is stated in this document. In addition, the document attempts to interpret the erroneous vectors calculated for triangles 16 and 18 as artifacts of an abnormally low pond level which is stated to be 215.34 ft NAVD88. This pond level and, therefore, this interpretation are not supported by the pond elevation data measured at staff gauge PSP-01 on October 22, 2019, as depicted in Figure 3 of Appendix G, Attachment 1 (217.62 ft NAVD88). Therefore, even the premise for the anomalous vectors appears to be in error.

ORD personnel were at the site on October 24, 2019, and measured water levels in the wells required for this analysis. The vector map produced using these data is provided in the attached Figure 1 and generally indicates a more north to northeast flow direction on the west side of the wall indicating diversion of bulk groundwater flow away from Red Cove. This is similar to the pattern seen in previous analyses. East of the wall, surface water elevation in Red Cove was approximately equal to or slightly higher than groundwater elevations adjacent to the cove resulting in little to no groundwater discharge to the cove at the time of the measurements. Figure 2 depicts and labels the wells used in this analysis.

Finally, it is noted that vector maps for spring events were not provided. The current long-term monitoring network for spring events does not include monitoring hydraulic head in all the wells

needed for this analysis. Accurate water level measurements obtained during both spring and fall events are necessary to make use of this powerful line of evidence. It is recommended that more care be exercised during water level measurements, particularly those to be used for vector analysis, and that additional locations for hydraulic head monitoring be incorporated into spring events. It is also recommended that additional vector analyses, representing several spring and fall datasets, be developed to strengthen this line of evidence rather than relying on a single dataset.

Response: *See response to Comment 1c.*

Comment 5 - Arsenic Flux - Estimates of arsenic flux across the wall are calculated using the groundwater flow model and a simple analytical calculation using the Darcy equation and measured hydraulic heads. In each case, potential water flow across a uniform wall with a hydraulic conductivity of 1x10-7 cm/s was calculated. Although these estimates are informative with respect to the potential impact of a perfect wall, they do not necessarily represent actual conditions. [Source: U.S. EPA. Workshop on Monitoring Oxidation-Reduction Processes for Ground-Water Restoration. U.S. Environmental Protection Agency, Washington, D.C., EPA/600/R-02/002, 2002.]

Response: *See response to Comment 1d.*

Comment 6 – [Figures below were received from ORD on 8/4/20 using water levels collected by ORD on 10/24/19. Figures provided are to be used as supplemental information and as a reference.]

Response: *The 3PE analysis will be removed from Appendix G in the 2019 annual report due to suspected erroneous water level measurements collected in fall 2019. Additional water level readings will need to be obtained in future spring synoptic events to perform a comparable 3PE analysis to Figure 2 within the same year for spring and fall. Recommendations for additional hydraulic data collection in the spring and fall will be presented in an updated LTMMP revision.*

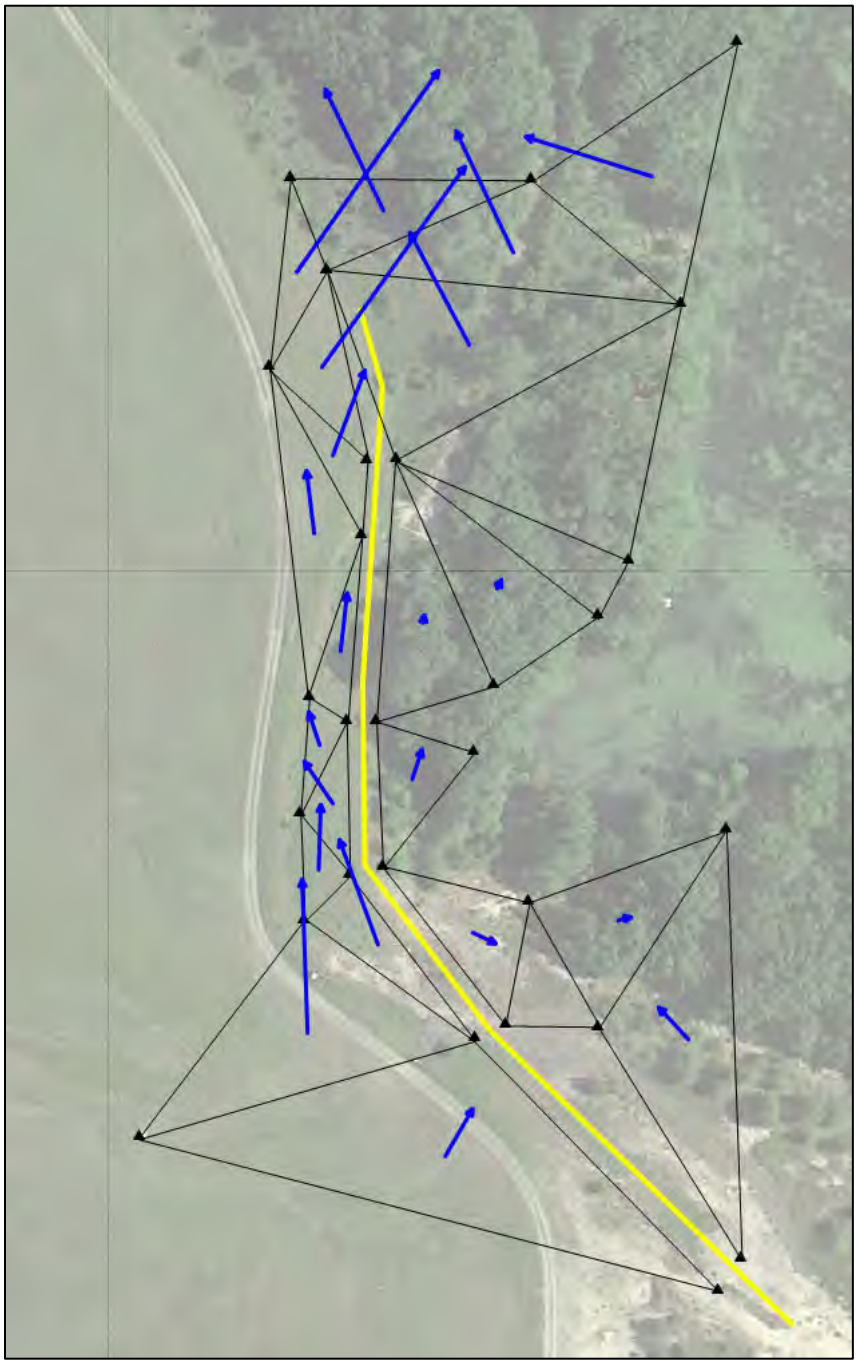


Figure 1. Scaled groundwater flow vectors calculated using the 3PE spreadsheet application and groundwater elevation measurements obtained by ORD on October 24, 2019. The approximate location of the slurry wall is depicted in yellow. Vectors were not calculated for three triangles where the difference in measured hydraulic head was insignificant.

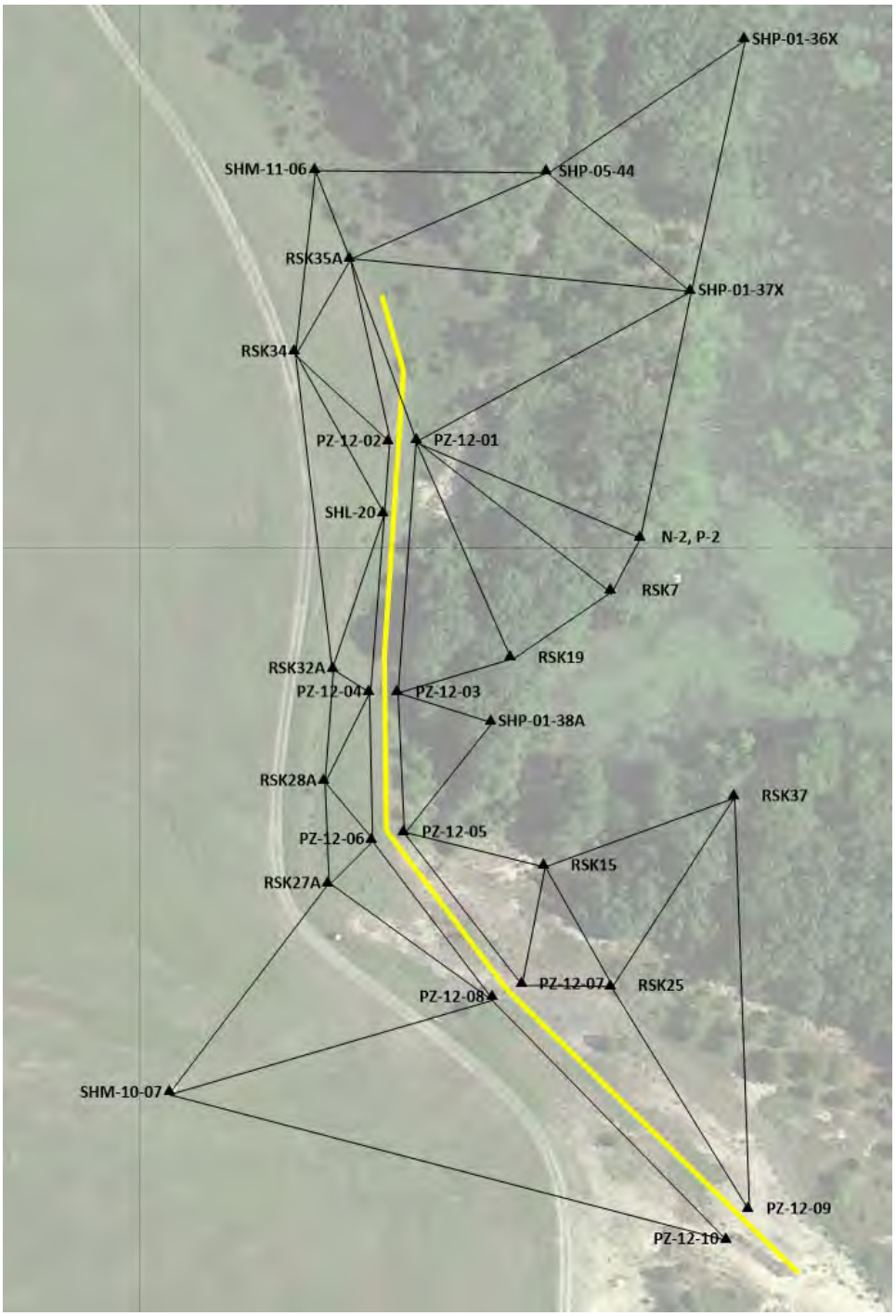


Figure 2. Wells used in three-point estimation of groundwater flow vectors west and east of the slurry wall near Red Cove on October 24, 2019. The approximate location of the slurry wall is depicted in yellow.

U.S. ARMY RESPONSES TO MASSACHUSETTS DEPARMENT OF ENVIRONMENTAL PROTECTION (MASSDEP) COMMENTS ON THE DRAFT 2019 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT, SHEPLEY'S HILL LANDFILL, DEVENS, MASSACHUSETTS

The following U.S. Army responses pertain to the MassDEP comments dated June 22, 2020 on the draft 2019 Annual Long-Term Monitoring and Maintenance Report for the Shepley's Hill Landfill, dated May 2020.

Specific Comments

Comment 1 - Section 5.2.2

Appendix G is insufficient to assess the performance of the barrier wall because it was based on estimates of the arsenic flux across the wall instead of estimates of the arsenic flux to Plow Shop Pond. While the wall may perform "as designed" to impede groundwater flow, the assessment in Appendix G does not demonstrate the arsenic flux to Plow Shop Pond has been reduced sufficiently to prevent a significant rebound of arsenic concentrations in surface water and sediment in the pond. In particular, the assessment does not account for the possibility that arsenic could migrate to the pond in groundwater that flows around or under the barrier wall. Detailed comments are provided below.

> ***Response:*** *The assessment of arsenic flux across the wall in the draft annual report is consistent with responses provided by the Army to DEP's second set of comments for the 2018 annual report that indicated we would provide an estimate of flux across the wall for the 2019 report. However, due to insufficient data from the spring monitoring event and suspected erroneous measurements during the fall 2019 monitoring event, the barrier wall assessment discussed in Appendix G will be removed from the 2019 annual report and Section 5.2.2 will be revised to include only hydraulic performance of the wall and a summary of the erroneous water level measurements from the fall 2019 synoptic event.*
>
> *With regard to arsenic flux to Red Cove, we know from the comprehensive "EPA ORD Study of Arsenic Flux from Groundwater to Surface Water" that the arsenic flux from the landfill to Red Cove (Ford, 2018) is decreasing which is evidence the barrier wall is effective. To supplement ORD findings, the Army plans to update the LTMMP to include the methodology to be used and the data to be collected to evaluate arsenic flux to the pond and the efficacy of the barrier wall. These data will include surface water and sediment samples from Plow Shop Pond at select locations and water levels from monitoring wells in the vicinity of the barrier wall. A separate sampling plan for assessment of Arsenic flux to Plow Shop Pond will be prepared and the outcome (sample locations and frequency) will then be incorporated into the LTMMP.*

Comment 2 - Section 5.4.2

The trend analysis presented here obscures trends relevant to an evaluation of extraction system performance by including trends from many wells not expected to be affected by the extraction

system. In particular, most of the wells showing insufficient evidence of a significant trend were not screened within the historic limits of the arsenic plume targeted by the extraction system or were not under the influence of the extraction system for a significant portion of their monitoring periods. Most of the wells showing decreasing trends were screened within the historic limits of the plume, indicating that groundwater extraction has achieved significant reductions.

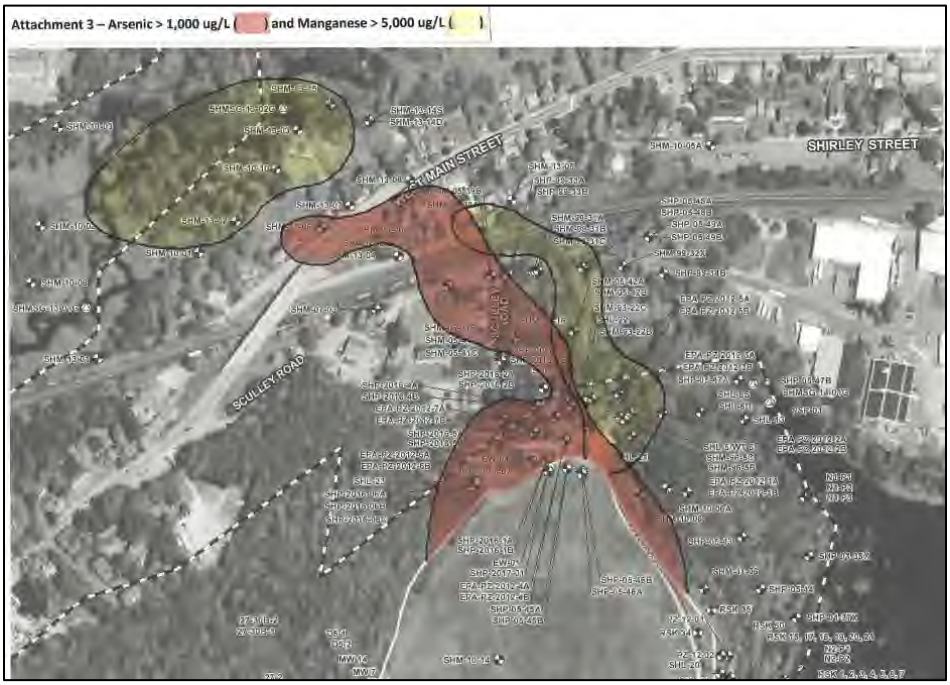
> ***Response:*** *The wells selected for arsenic trend analysis are based on the 2018 LTMMP Update (KGS, 2018). Wells in the NIA are part of the historic arsenic plume and trend analysis was performed on these well locations per the LTMMP.*

Comment 3 - Section 6.1.4

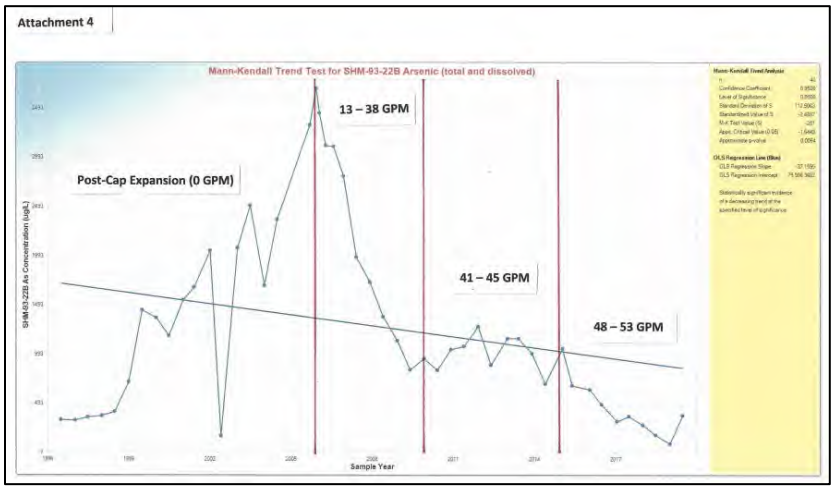
As noted here, concentrations of arsenic in groundwater downgradient of the landfill continue to exceed the associated cleanup goal. Conditions appear to be similar to those reported since 2016, indicating that arsenic concentrations have stabilized at unacceptable levels since the average annual extraction rate first exceeded 50 gpm. While the relationship between arsenic concentrations, ORP measurements, and dissolved oxygen measurements at individual well locations is dynamic and complex (as described in Section 5.4.4), the relationship between the arsenic concentrations and the landfill is relatively straightforward: the distribution of arsenic reflects a typical pattern of redox zonation that is associated with migrating landfill leachate. High arsenic (and iron) concentrations exist in the core of the leachate plume, where iron-arsenic-reducing conditions dominate (**Attachment 1**).

Manganese concentrations are highest in an adjacent outboard zone, where less intense manganese-reducing conditions dominate (**Attachment 2**).

Attachment 3 combines arsenic data (area where concentrations exceed 1,000 ug/L) and manganese data (area where concentrations exceed 5,000 ug/L) to show the spatial relationship between these two redox zones. The apparent absence of a manganese redox zone west of the plume core appears to be attributable to the bedrock ledge that blocks groundwater flow in that area.

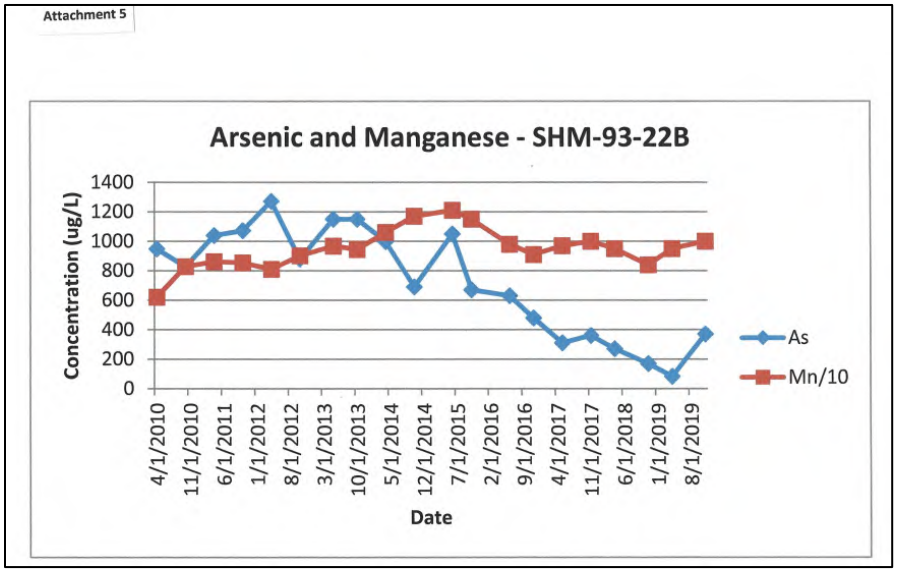


Monitoring data acquired since the landfill cap was installed show that the extraction system affects the distribution of arsenic by shifting the positions of the arsenic and manganese redox zones, drawing the boundaries from the east toward the extraction wells in proportion to the amount of water extracted. The data from monitoring well SHM-93-22B provide a clear example (**Attachment 4**).



Between 1996 and 2006, when the extraction system was activated, arsenic concentrations increased to greater than 3,500 ug/L as reducing conditions in the landfill intensified due to capping. This trend was abruptly reversed when the extraction system was activated in 2006. As extraction rates increased between 2006 and 2010, arsenic concentrations decreased further because the boundary of the arsenic redox zone was drawn closer to the well from the east.

Between 2010 and 2015, arsenic concentrations stabilized around 1,000 ug/L as extraction rates stabilized /around 40 gpm. During 2016, extraction rates increased to around 50 gpm, reducing arsenic concentrations further as the edge of the arsenic plume approached the well (83 ug/L in April 2019). Manganese data collected from the well are consistent with this interpretation. As arsenic concentrations declined between 2010 and 2019 due to eastward migration of the arsenic-reducing zone, manganese concentrations increased from approximately 6,000 ug/L to 10,000 ug/L as the manganese-reducing zone intercepted the well (**Attachment 5**).



With this understanding of landfill redox zones and the influence of groundwater extraction on the redox zones at SHL, the persistence of the arsenic plume is easily explained: the extraction system is capturing a substantial portion of the leachate emerging from the landfill, but capture is not sufficient to prevent migration of leachate from the northeast comer of the landfill. Concentrations of arsenic have stabilized since 2016 because the volume of leachate by-passing the extraction wells stabilized when the extraction rate stabilized at approximately 50 gallons per minute (gpm). The continued migration of leachate from the northeast comer of the landfill sustains the arsenic plume that extends to Nonacoicus Brook. These results indicate that effective corrective remedial action options could include increasing extraction rates in the existing extraction wells or modifying the existing system (e.g., installing additional extraction wells to the east of the existing extraction wells) to extend the capture zone to the east. Alternatively, remedial technologies that could control the reducing conditions that mobilize arsenic could be considered.

> ***Response:*** *The Army will consider manganese and iron analysis and implications when preparing subsequent annual reports as well as during preparation of the memos addressing the USEPA SOW Phase 1 and 2 data collection and analysis.*
>
> *As noted in the Army's response to EPA General Comment #1, the ability of the existing SHL ATP to achieve arsenic concentrations in the NIA that are compliant with the*

current arsenic MCL (10 ug/L) is unlikely. The continued observation of arsenic concentrations above the cleanup level is indicative of the complex interplay between the geochemical and hydrogeological processes that are controlling the dissolved arsenic downgradient of the landfill. These arsenic data indicate that a significant decrease in dissolved arsenic concentrations off-site and in the NIA may not be achievable through continued operation of the groundwater extraction system. As described in the 1995 SHL ROD, the intent of the groundwater extraction system and the ATP (installed as a contingency remedy to address groundwater contamination still present after landfill capping) is to capture dissolved arsenic and low-ORP groundwater flowing northward from the beneath the landfill cap and thereby reducing or controlling exposure to arsenic and reducing arsenic levels in the NIA to achieve MCLs. Groundwater that may be bypassing the capture zone outside the footprint of the landfill was not intended to be addressed by this contingency remedy. The current approved SHL groundwater model provides a useful tool, in addition to potentiometric contour maps developed from measured water levels, to evaluate capture of arsenic impacted groundwater from the landfill and flow to the east of the current extraction wells. The results of model flow path analyses indicate that under the current pumping conditions, the zone of capture extends beyond the full width of the landfill, but 3PE analyses indicate that the capture along the eastern edge may be overestimated. However, in the area east of the landfill where capture effectiveness is less certain, arsenic concentrations are substantially lower than concentrations within the landfill footprint. If bypass is occurring, then the mass of arsenic that could be bypassing east of the system is a small portion of the overall total arsenic mass that would otherwise be migrating from beneath the landfill cap (Geosyntec, 2020).

The Army will prepare separate Technical Memoranda to further evaluate the capture zone of the two extraction wells and to validate the approved groundwater flow model per Tasks 1(g) and 4(e) of EPA's February 2016 Scope of Work for SHL. The Phase 1 results from EPA's Scope of Work are intended to be used to determine whether the capture zone of the groundwater extraction system requires modification to either capture the full landfill footprint or arsenic levels to the east of the system.

Comment 4 - Appendix F
Appendix F should include a data validation report for SDG 680-168109, and the second copy of the data validation report for SDG 680-176219 should be deleted.

Response: *Data validation report for SDG 680-168109 will be added to Appendix F and the duplicate data validation report SDG 680-176219 will be deleted.*

Comment 5 - Appendix G

Comment 5a - Section 2: The barrier assessment did not meet the stated objective ("...to determine if the barrier wall is reducing the arsenic flux to Red Cove.") because it was based on estimates of the arsenic flux across the wall instead of estimates of the arsenic flux to the pond.

The assumption that these are equivalent does not account for the possibility that arsenic could migrate from the landfill to the pond in groundwater that flows around or beneath the barrier wall.

> ***Response:*** *See the response to Specific Comment #1. The barrier wall assessment in Appendix G will be removed from the 2019 annual report and presented in future reports after updating barrier wall hydraulic and geochemical monitoring locations in the LTMMP.*

Comment 5b - Section 2: A well-calibrated groundwater model can be useful for predicting future conditions; however, models should not be used to estimate current conditions where current conditions can be measured directly by acquiring field data. The order of magnitude difference between the model estimates the estimates derived from field data indicates the model may not be reliable.

> ***Response:*** *A well calibrated model can be useful to validate measured conditions and, if accurate, be useful in a predictive mode. As an example, if heads and gradients can be replicated, then the model can simulate the expansion of a capture zone if pumping rates were to increase. With respect to the barrier wall, measured water level data and aquifer parameters can be used to approximate the volume of water discharging to the cove and therefore the flux of arsenic to the cove. But, in the absence of measurement data approximate to and within the cove, a well-calibrated model can be used instead to estimate the flux to the cove. In future annual reports, the Army will use the approved groundwater model to estimate arsenic flux to the cove/pond using the available data if the groundwater model can be demonstrated to suitably predict the measured head data near the barrier wall. In addition, Army will revise the 2018 LTMMP to collect data at/near the pond to improve future estimates of the arsenic flux to Red Cove.*

Comment 5c: Surface water and sediment samples should be collected from Red Cove to determine if arsenic concentrations have rebounded in these media since the sediment removal action was completed. In particular, surface water and sediment samples should be collected from the slightly discolored area (iron flocculent) shown in **Attachment 6**.

> ***Response:*** *As discussed in the response to Comment #5, the Army plans to collect surface water and sediment samples from Red Cove. A work plan is being developed to assess arsenic concentrations in Red Cove and east of the barrier wall. Objectives and approach for sampling these areas can be reviewed upon submittal of the workplan and updated LTMMP . The work plan will consider sample locations in the slightly discolored area shown in DEP's Attachment 6.*

U.S. ARMY RESPONSES TO PEOPLE OF AYER CONCERNED ABOUT THE ENVIRONMENT (PACE) COMMENTS ON THE DRAFT 2019 ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING REPORT, SHEPLEY'S HILL LANDFILL, DEVENS, MASSACHUSETTS

The following U.S. Army responses pertain to PACE comments dated January 15, 2020 and June 22, 2020 on Appendix G (SHL Barrier Wall Evaluation) of the draft 2019 Annual Long-Term Monitoring and Maintenance Report for the Shepley's Hill Landfill, dated May 2020.

General Comment

Comment 1 - On behalf of People of Ayer Concerned about the Environment (PACE), Engineering & Consulting Resources, Inc. (ECR) prepared this letter to provide comment on the forthcoming evaluation of the barrier wall at Shepley's Hill Landfill. It is our understanding that Army will conduct an evaluation of the effectiveness of the barrier wall as part of the next Five-Year Review. However, as stated in the Army's Response to Comments in Appendix L of the 2018 Shepley Hill Landfill Draft Final Annual Report, the Army proposes to conduct the evaluation using data from the revised groundwater flow model rather than field data. ECR and PACE agree with and support MassDEP's recommendation that the evaluation should rely on field data, including but not limited to water levels and arsenic concentrations on each side of the barrier wall. While it is acknowledged that EPA previously performed an extensive evaluation that concluded that the barrier wall was effective, ECR and PACE believe it is important to have new field data to show that the wall remains effective, and that arsenic concentrations and flux to Red Cove continue to decrease.

> ***Response:*** *The Army is planning to collect sufficient field data to evaluate performance of the barrier wall evaluation and assess arsenic flux to Plow Shop Pond/Red Cove in future annual reports. There is insufficient seasonal water level data and arsenic sample results available to determine the performance of the barrier wall and arsenic flux to the pond. The future assessment will supplement the findings from the comprehensive "EPA ORD Study of Arsenic Flux from Groundwater to Surface Water" which demonstrated that arsenic flux to Red Cove is decreasing since the barrier wall was installed in 2012 (Ford, 2018). The barrier wall assessment discussed in Appendix G will be removed from the 2019 annual report and Section 5.2.2 will be revised to include only hydraulic performance of the wall and a summary of the suspected erroneous water level measurements from the fall 2019 synoptic event.*
>
> *To supplement ORD's 2018 findings which indicated that the arsenic flux to Red Cove is decreasing (evidence that the barrier wall is effective), the Army plans to update the LTMMP to include the methodology to be used and the data to be collected to further evaluate arsenic flux to the pond and the efficacy of the barrier wall. These new data will include surface water and sediment samples from Plow Shop Pond at selected locations and water levels from monitoring wells in the vicinity of the barrier wall. A separate sampling plan for assessment of Arsenic flux to Plow Shop Pond will be prepared and the outcome (sample locations and frequency) will then be incorporated into the LTMMP.*

Comment 2 - On behalf of PACE, I (*Laurie Nehring*) appreciate this comment letter from David Chaffin, and am very concerned about the Slurry Wall and what appear to be continued impacts of high levels of arsenic entering Plow Shop Pond at the Red Cove. For the record, I want to state that there is a group of Ayer citizens who are investigating the potential to put a canoe launch location at Nonacoicus Brook. As you know, this Plow Shop Pond is the source for Nonacoicus Brook.

I respectfully request that we have a RAB (probably remotely) to further discuss what is happening at SHL and at Moore Army Airfield, with PFAS.

> ***Response:*** *As noted in response to Comment 1, the barrier wall evaluation will be revised after data gaps are sufficiently addressed in a revised LTMMP. Also, a work plan will be developed in 2021 for the sampling of surface water and sediment in Red Cove. Both these actions will improve the understanding of impacts of arsenic concentration and groundwater flow from SHL to Red Cove. A study of arsenic flux to Red Cove was performed by the EPA Office of Research and Development and conclusions indicated reduced groundwater flow and arsenic flux from the landfill to Red Cove since the barrier wall was installed (Ford, 2018).*
>
> *The status of SHL and Moore Army Airfield can be discussed at future RAB meetings where the public can directly inquire on the status of these sites. The next RAB meeting is scheduled for February 25, 2021.*