



**REPORT**

**QUARTERLY MONITORING REPORT  
FIRST QUARTER 2023  
RESERVE SILICA RECLAMATION SITE**

*Ecology Facility Site No. 2041/Cleanup Site No 4728  
28131 Ravensdale-Black Diamond Road  
Ravensdale, Washington 98051*

Submitted to:

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## 1.0 INTRODUCTION

This report, prepared by WSP USA Inc. (WSP) for Holcim (US) Inc., presents the results of surface water and groundwater monitoring conducted at the Reserve Silica Reclamation Site (Site) during the first quarter of 2023. The Site is located at 28131 Ravensdale-Black Diamond Road in Ravensdale, Washington. Figure 1 shows the Site location.

A Model Toxics Control Act (MTCA) Remedial Investigation/Feasibility Study (RI/FS) is being conducted at the Site under Agreed Order (AO) No. DE 16052. An RI Work Plan (Work Plan), supporting Sampling and Analysis Plan (SAP), and Quality Assurance Project Plan (QAPP) (Golder 2021) describe the RI monitoring requirements and sampling procedures. Quarterly groundwater monitoring at the Site is currently being conducted in accordance with the Work Plan and supporting documents. Historical groundwater and surface water monitoring activities at the Site were conducted under the requirements of Post-Closure Care and Maintenance Permits issued by Public Health – Seattle and King County (Public Health). The first quarter monitoring event was conducted in March 2023.

## 2.0 BACKGROUND

### 2.1 Site Background

The following is a brief description of the historical mining and reclamation activities that occurred at the Site and includes a discussion of the quarterly monitoring program.

#### 2.1.1 Lower Disposal Area Background

The Lower Disposal Area (LDA) is a former open pit sand mine that was reclaimed by placing cement kiln dust (CKD) and other material into the mine excavation from June 1979 to October 1982. The LDA was filled with approximately 175,000 tons of CKD. Records indicate that a cap consisting of clay and up to 7 feet of overburden material from sand mining operations was placed over the CKD.

Historically, high pH seepage surfaced along the slope west of the LDA. The outbreaks are primarily located along the northern half of the western boundary of the LDA and records as early as 1987 indicate a leachate collection system was implemented for the LDA seepage. The leachate drained through low-lying, marshy areas and commingled with stormwater before flowing to the three Infiltration Ponds (the Infiltration Ponds as shown in Figure 2) near the Ravensdale-Black Diamond Road (ARCADIS 2004). In 2013 a new seepage collection ditch was installed to intercept and collect the seepage (see Section 2.2.3 of this report), which then flowed inside a pipe to the Infiltration Ponds. In 2018, a water treatment system was constructed, and the high pH water captured by the collection ditch is currently piped to the on-site treatment area for pH neutralization and dissolved metals removal. The treated water discharges from the treatment system to the Infiltration Ponds.

#### 2.1.2 Dale Strip Pit Background

The Dale Strip Pit (DSP) was created to mine the Dale No. 4 coal seam from the surface starting in 1946. Prior to 1946, the coal seam was worked from an underground mine. The underground mining chutes were driven upward to the surface to provide ventilation and allow the transportation of timbers into the mine. Construction of the mine allowed groundwater to drain by gravity to the mine portal (Portal). The Portal has since collapsed, and now a pipe in the collapsed Portal allows water to continuously drain from the mine under an Ecology Sand and Gravel General Permit (Ecology 2005) with monitoring as described below. The Portal is located north of the LDA on the east side of the main haul road.

The DSP was approximately 1,800 feet long (north to south), averaged 140 feet wide (east to west), and averaged 40 feet deep. It was filled in the 1970s and 1980s with approximately 250,000 cubic yards of material including CKD, borrow, and other materials pursuant to a permit from Public Health. It is estimated that about one-third of the DSP was filled with CKD (ARCADIS 2004).

## **2.2 Mitigation Activities**

### **2.2.1 LDA Cover Upgrade**

During September and October 2007, the existing soil cover on the LDA was regraded to provide positive drainage at all locations, reduce overly-steep slope areas, and place a minimum 2-foot-thick clean soil cover over the entire area, including locations where CKD was exposed at the surface. The construction activities are described in the Construction Summary Report (Golder 2008a).

### **2.2.2 LDA Seep Collection System Test Trenches**

During September and October 2008, test trenches for collecting high pH seepage were constructed (Golder 2008b). The purpose of this test system was to evaluate the feasibility of using a more extensive trench system to collect high pH seepage that would otherwise discharge at the ground surface adjacent to the LDA. Details of the test trench construction are presented in the Construction Summary Report (Golder 2009a).

Between October 2008 and September 2009, Golder monitored seepage flow rates from each of the two test trenches and the pipeline discharge once per month, on average. A summary of activities and results of this monitoring program is presented in the flow monitoring report (Golder 2009b).

### **2.2.3 LDA Seep Collection Ditch and Seepage Treatment System**

In February 2013, a surface water collection ditch and concrete catch basin were constructed on the bench below the main access road on the west side of the LDA. This system was installed to capture leachate seeps emerging from the bank along the east side of the bench (west of the main access road) and direct them into the existing pipeline that carries flow from the test trenches to the Infiltration Ponds. In April 2015, the 4-inch-diameter pipeline from the catch basin to the Infiltration Ponds, approximately 1,000 feet in length, was replaced with a 12-inch-diameter pipeline to alleviate plugging issues.

In December 2017, the seepage collection trench was further extended approximately 100 feet to the north to collect additional seepage that was not previously captured. Seepage water was then redirected into a seepage treatment system, which completed construction and started initial operations on September 28, 2018. The treatment system uses carbon dioxide (CO<sub>2</sub>) sparging to neutralize pH levels and arsenic and lead adsorption using an iron-based adsorption media.

During the initial year of operation, the system operated intermittently, with system shut-downs occurring as various upgrades and modifications were completed to increase the long-term operational efficiency of the treatment system. The system began continuous operating in June 2019, with only minor shutdowns occurring to complete routine maintenance.

### **2.2.4 LDA Interceptor Trench**

In September 2013, a gravel-filled interceptor trench that included a perforated drainpipe and vertical downgradient liner was installed south of the LDA to intercept clean groundwater moving in a northerly direction prior to encountering the CDK in the LDA.

## 2.2.5 DSP Cover Upgrade

Cover upgrade activities began at the DSP in November 2010 and were completed in July 2011. Cover upgrade activities included stripping surficial vegetation and topsoil, regrading the existing surface to establish positive drainage, placing low permeability soil to provide a minimum 2-foot-thick layer at all locations, filling the existing ditch along the northeast side of the DSP, replacing topsoil, and revegetating the cover surface.

## 3.0 MONITORING PROGRAM

The purpose of the quarterly monitoring activities is to assess the groundwater and surface water conditions with respect to potential impact from the CKD placed in the LDA and the DSP. Prior to the start of the RI, quarterly monitoring and reporting activities were conducted under requirements of Post-Closure Care and Maintenance Permits issued by Public Health. The current RI groundwater and surface water requirements are detailed within the Work Plan (Golder 2021).

### 3.1 LDA Sampling Locations

The LDA groundwater and surface water sampling locations are shown in Figure 2. Monitoring well construction details are provided in Table 1. Shallow/alluvial monitoring wells were installed near the LDA in July 2005 and are monitored to assess the shallow/alluvial groundwater conditions with respect to potential impact from the CKD. Four of the wells (MW-1A, MW-2A, MW-5A, and MW-6A) are located around the Infiltration Ponds. MW-3A is located west of the high pH seepage area. MW-4A, a background well, is located south of, and upgradient with respect to groundwater flow and surface water drainage, the high pH seepage area. P-14 was installed in November 2020 in the center of the LDA and is screened within CKD and other fill material disposed in the LDA. Groundwater samples collected from P-14 provide data on chemical composition of water in an area where saturated CKD is present. The monitoring well naming convention of assigning either the prefix MW (for monitoring well) or P (for piezometer) differentiates wells that are historically associated with or will likely be associated with the closed landfill permit required monitoring (prefix MW- or MWB- for bedrock wells), from groundwater wells that were installed for site investigation purposes (P- wells). MW and P groundwater wells are constructed similarly, and groundwater sampling of these wells follows the procedures approved in the Work Plan, thus, data collected from MW or P wells are equivalent in representativeness.

As part of the RI, during September 2021, the following groundwater monitoring wells were also installed to evaluate groundwater quality in and downgradient of the LDA:

- MW-7A and MW-8A were installed west and southwest of the Infiltration Ponds to evaluate groundwater gradients and groundwater quality.
- MW-9A and MW-10A are located west of the high pH seepage area and the South Pond, near the western property boundary to evaluate groundwater gradients and groundwater quality.
- P-15 was installed in the LDA and, similar to P-14, is also screened within CKD and other fill material disposed in the LDA. Groundwater samples collected from P-15 provide data on chemical composition of water just before the groundwater flows across the Lower Haul Road to daylight as seeps west of the LDA.
- P-16 was installed just west (downgradient) of the high pH seepage area and east (upgradient) of the South Pond.
- P-17 was installed per Ecology's request during their Site visit in September 2021 and is located southwest of the LDA.

The LDA surface water sampling locations evaluate the high pH seepage that occurs west of the LDA:

- The Still Well is a 2-inch-diameter flush-mount well located within the high pH seepage zone west of the LDA.
- The South Pond is a closed depression located west of the high pH seepage area.
- The Weir is located north of the access road to MW-3A immediately below the discharge point from the wetlands. If no flow is observed at the Weir, the constructed wetlands upstream are the alternative sampling location.
- The Infiltration Ponds are located at the north end of the Site near Ravensdale-Black Diamond Road and receive treated water from the on-site seepage treatment system. The surface sample is collected from the southwest area of the Infiltration Ponds.

In 2006, bedrock monitoring wells were installed along the west side of the main access road, west of the LDA. The bedrock wells were installed to assess groundwater conditions in the bedrock immediately downgradient of the LDA. MWB-1LDA is located near the northern tip of the LDA, MWB-2LDA is located near the center of the LDA, and MWB-3 LDA is located near the southern end of the LDA. In accordance with the Work Plan, field parameters are monitored in the LDA bedrock monitoring wells semi-annually, and the wells are sampled annually. The first quarter monitoring event did not include sampling or measurement of field parameters in the LDA bedrock wells.

## 3.2 DSP Sampling Locations

The DSP groundwater monitoring locations are shown in Figure 2. The DSP bedrock groundwater monitoring program includes four wells in the DSP area (MWB-1SDSP, MWB-1DDSP, MWB-5DSP, and MWB-6DSP), which evaluate groundwater quality beneath, upgradient, and downgradient of the DSP. Field parameters of groundwater discharging from the Portal are monitored semi-annually, and the Portal is sampled annually. The Portal was originally constructed to drain water from the Dale Strip Coal mine. In accordance with the Work Plan, field parameters are monitored in the DSP bedrock monitoring wells semi-annually, and the wells are sampled annually. There are two additional monitoring wells (MWB-2DSP and MWB-4SDSP) near the DSP area that are monitored semi-annually for water levels and field parameters only.

## 3.3 LDA Interceptor Trench

The purpose of the Interceptor Trench is to intercept clean shallow groundwater and direct the water away from the LDA before the water enters the LDA. Monitoring is performed at the Interceptor Trench outfall for flow, pH, turbidity, and total dissolved solids. The purpose of the monitoring is to ensure that the trench is not collecting impacted groundwater.

## 4.0 SAMPLING ACTIVITIES

The following section summarizes the activities associated with the current monitoring event.

### 4.1 Procedures

#### 4.1.1 Water Level and Field Parameter Measurements

Depth to water measurements were collected from all monitoring wells at the Site on March 13, 2023. Table 1 presents depth to water measurements and elevations. Groundwater elevation contour maps are provided in Figures 3A-C.

Field parameters for groundwater and surface water were measured as part of the sampling activities described in the following sections. These measurements were performed with the following equipment:

- YSI ProDSS multimeter with pH, ORP (oxidation-reduction potential), conductivity, dissolved oxygen, and temperature probes
- Hach 2100Q Turbidimeter

#### 4.1.2 Laboratory Analysis

Laboratory analyses were performed on samples collected from the various locations described in the following sections. Although the analytic parameters varied between the types of samples, the following elements are common to all the sampling and analysis activities:

- The collected samples were transported to the laboratory within appropriate sample hold times following chain-of-custody protocols.
- The testing was performed by Analytical Resources, Inc. (ARI) of Tukwila, Washington.
- All samples were tested for the following parameters using the methods indicated:

Antimony	EPA Method 200.8
Arsenic	EPA Method 200.8
Lead	EPA Method 200.8
Potassium	EPA Method 6010D
Vanadium	EPA Method 200.8
Total Dissolved Solids (TDS)	SM 2540 C

- Interceptor Trench samples are tested for the following parameters using the method indicated:

pH	Field Measurement
TDS	SM 2540 C
Turbidity	Field Measurement

- Summaries of historical analytic data for the various sampling locations are presented in Appendix A. The data validation report and the laboratory analytical data packages are provided in Appendix C. Sampling Integrity Data Sheets (SIDS) are provided in Appendix D.

#### 4.1.3 LDA Groundwater Sampling

During the period of March 13 to 17, 2023, WSP sampled groundwater from shallow/alluvial groundwater monitoring wells outside of the LDA (MW-1A, MW-2A, MW-3A, MW-4A, MW-5A, MW-6A, MW-7A, MW-8A, MW-9A, MW-10, P-16, P-17), and from two well installed within the LDA (P-14 and P-15).

The following methods and procedures were used to collect groundwater samples:

- Depth to groundwater was measured in the wells prior to purging and sampling.
- Using a dedicated bladder pump or dedicated tubing connected to a peristaltic pump (if groundwater elevation allowed), water from wells MW-1A, MW-2A, MW-3A, MW-4A, MW-5A, MW-6A, MW-7A, MW-8A, MW-9A,

MW-10, P-16, P-17, P-14, and P-15 was purged at a rate between approximately 100 and 500 milliliters (mL) per minute.

- Field parameters of pH, conductivity, temperature, DO, ORP, and turbidity were measured and recorded during purging at approximately five-minute intervals until parameters were stable.
- Once the field parameters stabilized, the purging phase of the process was concluded. Groundwater samples were then collected directly from the dedicated sample tubing.
- For quality control purposes, a duplicate sample was collected from MW-2A (labeled as MW-45A).
- Laboratory-provided containers were used to collect the samples. For each groundwater sample, one 500-mL bottles preserved with nitric acid and one 1-Liter (L) unpreserved bottle were collected. The samples were then labeled and placed in a cooler with ice.
- The pH of the water in some of the wells within the LDA (P-14 and P-15) is occasionally greater than 10. Sampling protocol requires that the preserved samples for dissolved metals analysis have a pH of less than 2 upon receipt at the laboratory. To meet this requirement, the pH of the LDA surface water samples collected for metals analysis was checked at the time of sample collection using pH test paper strips. If the pH was higher than 2, additional nitric acid (provided by the laboratory) was added until the pH of the sample was less than 2.

All groundwater and quality control samples were analyzed for the parameters listed in Section 4.1.2. Field parameters and analytical data are presented in Table 2.

#### **4.1.4 LDA Surface Water Sampling**

On March 13, 2023, WSP monitored surface water from the Infiltration Ponds. On March 15, 2023, WSP monitored surface water from the Still Well, Weir, and South Pond sampling locations. The following methods and procedures were used to collect surface water samples:

- Field parameters of pH, conductivity, temperature, DO, ORP, and turbidity were measured and recorded. These parameters were measured and recorded at each of the surface water locations at the time of sample collection.
- Grab surface water samples were collected using dedicated sample tubing connected to a peristaltic pump.
- For quality control purposes, a duplicate sample was collected from the Infiltration Ponds (labeled as MW-35A).
- Laboratory-provided containers were used to collect the surface water samples. For each surface water sample, one 500-mL bottles preserved with nitric acid and one unpreserved 1-L bottle were collected. The samples were labeled and placed in a cooler with ice.
- The pH of some LDA surface water sampling locations is occasionally greater than 10. Sampling protocol requires that the preserved samples for dissolved metals analysis have a pH of less than 2 upon receipt at the laboratory. To meet this requirement, the pH of the LDA surface water samples collected for metals analysis was checked at the time of sample collection using pH test paper strips. If the pH was higher than 2, additional nitric acid (provided by the laboratory) was added until the pH of the sample was less than 2.

All surface water and quality control samples were analyzed for the parameters listed in Section 4.1.2. Field parameters and analytical data are presented in Table 2.

#### 4.1.5 DSP Groundwater Sampling

On March 15 and 16, 2023, WSP sampled groundwater from the DSP groundwater monitoring wells (MWB 1SDSP, MWB-1DDSP, MWB-5DSP, and MWB-6DSP) and the Portal. The following methods and procedures were used in collecting the groundwater samples:

- Depth to groundwater was measured in the wells prior to purging and sampling.
- Using the dedicated discharge tubing connected to the dedicated bladder pump, water from wells MWB-1DDSP, MWB-1SDSP, MWB-5DSP, and MWB-6DSP was purged at a rate between approximately 100 and 500 mL per minute.
- Field parameters of pH, conductivity, temperature, DO, ORP, and turbidity were measured and recorded during purging at approximately five-minute intervals until parameters were stable.
- Once the field parameters stabilized, the purging phase of the process was concluded. Groundwater samples were then collected directly from the dedicated sample tubing.
- Grab water samples were collected from the Portal using dedicated sample tubing connected to a peristaltic pump. The water quality parameters were measured and recorded at the Portal at the time of sample collection.
- For quality control purposes, a duplicate sample was collected from MWB-6DSP (labeled as MW-55A).
- Laboratory-provided containers were used to collect the samples. For each groundwater sample, two 500-mL bottles preserved with nitric acid and one 1-L unpreserved bottle were collected. The samples were labeled and placed in a cooler with ice.

All groundwater and quality control samples were analyzed for the parameters listed in Section 4.1.2. Field parameters and analytical data are presented in Table 2.

In addition, water levels and field parameters were measured in DSP monitoring wells 2DSP and 4SDSP.

#### 4.1.6 LDA Interceptor Trench Sampling

On March 16, 2023, WSP sampled groundwater from the Interceptor Trench outfall. The following methods and procedures were used to collect the sample:

- Field pH, turbidity, and the flow rate at the Interceptor Trench outfall were measured and recorded.
- Grab water samples were collected from the Interceptor Trench by placing the sample bottles under the flow of water.
- Laboratory-provided containers were used to collect the sample for TDS lab analysis. One 1-L unpreserved bottle was collected. The sample was then labeled and placed in a cooler with ice.

The Interceptor Trench sample was analyzed for the parameters listed in Section 4.1.2. Field parameters and analytical data are presented in Table 2.



## 5.0 RESULTS

Analytical results from the March 2023 monitoring round are presented in Table 2. Table 3 presents the current and historical summary of the Interceptor Trench monitoring data. Historical summary tables of analytical results at each sampling location are provided in Appendix A and concentrations trend graphs for key parameters are provided in Appendix B. All analytical data were subject to a data validation review. Data validation was conducted in accordance with the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA 2020), the SAP, and the QAPP (Golder 2021). Data reporting qualifiers are included with the analytical results in Appendix A. The data validation review found that all the data were considered valid and usable. The data validation and raw analytical data packages provided by the laboratory are provided in Appendix C. Data collected during this sampling round will be combined with all RI data to complete the evaluations and requirements of the RI/FS.

## 6.0 OPERATIONS AND MAINTENANCE OF THE LEACHATE TREATMENT SYSTEM

The leachate treatment system began operating in September 2018. The system operated intermittently from December 2018 to May 2019 as the system upgrades were completed during that time, which included various upgrades and modifications to improve the system's long-term operating efficiency. The system began continuous operations in June 2019, with minor shutdowns occurring to complete routine maintenance and continued minor modifications to improve long-term operating efficiency.

The treatment system includes a 4,200-gallon mixing tank (steel rectangular box-shaped tank) that receives the influent water coming from the seepage collection ditch and piping. Water from the tank constantly flows through the carbon dioxide (CO<sub>2</sub>) sparge unit, which continuously monitors the water pH and activates CO<sub>2</sub> sparging when the water pH exceeds 8.5. CO<sub>2</sub> sparging continues until the pH reduces to 8. The sparged water is pumped back into the mixing tank to maintain the neutralized water within the tank. The influent flow, pumping from the tank and through the CO<sub>2</sub> sparge unit, and discharge from the sparge unit back into the tank are all specifically located in different areas of the mixing tank to provide constant circulation effectively providing pH neutralization throughout the tank. The mixing tank contains a float switch-activated discharge pump that activates when the water reaches a set height within the tank and turns the pump off when the water is lowered to the desired height. Neutralized water pumped from the tank is discharged through filters and an iron-based adsorption media to remove arsenic, prior to discharge of the water to the Infiltration Ponds.

The continuous pH monitoring system is connected to telemetry that sends pH readings and alerts to WSP engineer's cell phones if readings outside of the set ranges occur allowing for response and troubleshooting. Routine inspections of the treatment system are conducted approximately once every two weeks. The inspections include routine maintenance activities such as cleaning scale off pump parts, hoses, and probes to sustain continued operations of the treatment system. The treatment system has been effective in reducing the pH of the seepage water to below 8 standard units and reducing metals concentrations before discharge to the Infiltration Ponds. Typical maintenance downtime of less than 1 day occasionally occurs. Optimization of the metals adsorption system continues, as calcium carbonate clogging of the adsorption system frequently arises. Table 4 provides the 2023 first quarter laboratory analytical data for samples collected: before the pH treatment tank (influent), pre-iron-based adsorption media, and post-iron-based adsorption media. The laboratory analytical report is provided in Appendix C.



The treatment system has been effective in reducing the impacts to groundwater in the immediate vicinity of the Infiltration Ponds that were historically observed in groundwater monitoring wells MW-5A and MW-6A. Additional modifications and improvements are anticipated to occur to the treatment system during the MTCA cleanup process to improve system performance, efficiency, and achieve Site-specific cleanup standards that are protective of human health and the environment.

## **7.0 LIMITATIONS**

WSP prepared this report for the exclusive use of Holcim (US) Inc. and their authorized agents. It may also be submitted to regulatory agencies.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood. This report was prepared, in part, based on previous investigations and data collected by others. WSP USA Inc. is not responsible for any data that were inaccurately reported by others and reproduced here.

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## Tables

**Table 1: First Quarter 2023 Water Level Measurements**

Sample Area	Sample Location ID	Date Measured	Well Data				Water Levels		
			Total Well Depth (feet bgs)	Screened Interval (feet bgs)	Bentonite Seal (feet bgs)	Casing Diameter (inches)	TOC Elevation (feet NAVD88)	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)
LDA - Shallow/Alluvial Groundwater	MW-1A	3/13/2023	44	28-43	2-26	2	613.44	29.36	584.08
	MW-2A	3/13/2023	40	25-40	2-23	2	607.21	23.24	583.97
	MW-3A	3/13/2023	20	4-20	2-4	2	689.11	5.02	684.09
	MW-4A	3/13/2023	20	5-20	2-4	2	705.45	3.39	702.06
	MW-5A	3/13/2023	40	25-40	2-23	2	611.23	27.15	584.08
	MW-6A	3/13/2023	39	24-39	2-22	2	608.95	24.91	584.04
	MW-7A	3/13/2023	20	10-20	2-7	2	592.69	8.90	583.79
	MW-8A	3/13/2023	26	16-26	2-13	2	601.49	17.86	583.63
	MW-9A	3/13/2023	13	8-13	2-5	2	697.29	2.39	694.90
	MW-10A	3/13/2023	29	9-29	2-6	2	698.02	5.64	692.38
Within LDA - Groundwater	P-16	3/13/2023	10	5-10	1-3	2	702.87	2.49	700.38
	P-17	3/13/2023	13	8-13	2-5	2	720.32	5.05	715.27
Within LDA - Groundwater	P-14	3/13/2023	52	40-50	3-38	2	773.32	30.30	743.02
	P-15	3/13/2023	34	24-34	2-20	2	756.55	21.53	735.02
LDA - Bedrock Groundwater	MWB-1LDA	3/13/2023	135	115-135	2-105	2	704.68	22.00	682.68
	MWB-2LDA	3/13/2023	125	110-125	2-103	2	741.66	35.09	706.57
	MWB-3LDA	3/13/2023	145	125-145	2-115	2	744.19	1.11	743.08
DSP - Bedrock Groundwater	MWB-1SDSP	3/13/2023	160	150-160	138-148	2	936.29	34.48	901.81
	MWB-1DDSP	3/13/2023	265	255-265	243-253	2	935.37	48.34	887.03
	MWB-2DSP	3/13/2023	258	238-258	-	2	934.82	192.63	742.19
	MWB-4SDSP	3/13/2023	43	32-42.8	-	2	932.41	17.46	914.95
	MWB-5DSP	3/13/2023	83	73-83	2-61	2	935.05	18.62	916.43
	MWB-6DSP	3/13/2023	195	120-195	2-108	2	-	15.98	-

- Not measured or not available  
 feet bgs Feet below ground surface  
 feet bmp Feet below measuring point  
 feet NAVD88 Feet in NAVD88 datum  
 TOC Top of casing

**Table 2: First Quarter 2023 Field Parameters and Analytical Data**

Sample Area	Sample Location ID	Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)					
			TOC Elevation (feet NAVD88)	Depth to Water (feet btoc)*	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	Antimony, Total	Arsenic, Total	Potassium, Total	Lead, Total	Vanadium, Total	
Preliminary Cleanup Level <sup>a</sup>			-	-	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	-	2.1	140
LDA - Shallow/Alluvial Groundwater	MW-1A	3/13/2023	613.44	29.36	584.08	8	584.2	9.22	90.2	0.29	6.85	298	0.86	1.27	14000	0.053 J	0.935	
	MW-2A	3/14/2023	607.21	23.24	583.97	8.6	664.2	7.67	174.1	0.97	7.08	368	1.65	1.49	28800	0.1 U	1.03	
	MW-2A Duplicate (MW-45A)	3/14/2023	-	-	-	-	-	-	-	-	-	346	1.67	1.51	30100	0.1 U	1.01	
	MW-3A	3/15/2023	689.11	5.02	684.09	6.1	669	1.38	203.9	0.95	7.34	393	5.15	2.42	91100	0.147	1.19	
	MW-4A	3/16/2023	705.45	3.39	702.06	7.9	468.9	4.44	111.7	2.92	6.3	264	0.2 U	0.159 J	616	0.1 U	1.13	
	MW-5A	3/13/2023	611.23	27.15	584.08	8.1	1,685	5.49	172.5	1.43	7.47	1090	5.83	3.39	318000	0.068 J	1.64	
	MW-6A	3/14/2023	608.95	24.91	584.04	6.8	2,029	8.44	212.6	0.76	7.71	1190	6.7	1.87	387000	0.1 U	0.801	
	MW-7A	3/17/2023	592.69	8.90	583.79	5.3	755	2.7	205.3	0.85	7.16	412	1.51	1.45	55300	0.1 U	0.774	
	MW-8A	3/17/2023	601.49	17.86	583.63	9.2	1216	4.6	214.5	0.8	7.19	714	4.71	7.2	218000	0.1 U	4.22	
	MW-9A	3/16/2023	697.29	2.39	694.90	6.6	556.2	5.25	120.9	1.6	6.85	337	0.119 J	0.508	1660	0.1 U	0.812	
	MW-10A	3/15/2023	698.02	5.64	692.38	8.4	179	8.78	145.7	2.07	6.85	108	0.2 U	0.541	892	0.1 U	0.727	
	P-16	3/15/2023	702.87	2.49	700.38	7.1	4,819	0.04	-332.2	52.2	12	2520	9.34	166	829000	11.1	317	
	P-17	3/16/2023	720.32	5.05	715.27	7.6	630	0.22	-42.4	7.01	6.5	293	0.816	3.46	7590	0.1 U	1.54	
Within LDA - Groundwater	P-14	3/14/2023	773.32	30.30	743.02	12.4	24,035	0.08	-187.5	0.31	13.12	6280	134	232	2390000	2.22	20.5	
	P-15	3/14/2023	756.55	21.53	735.02	11.5	14,124	0.15	70.5	0.41	12.98	3360	2.47	5.82	945000	93.8	0.288 J	
LDA - Bedrock Groundwater <sup>b</sup>	MWB-1LDA	3/15/2023	704.68	22.00	682.68	10.30	372.20	0.17	-86.50	0.13	7.66	221	0.2 U	8.35	864	0.1 U	0.2 U	
	MWB-2LDA	3/14/2023	741.66	35.09	706.57	10.80	350.40	3.17	50.50	0.20	7.37	199	0.2 U	5.25	894	0.1 U	0.088 J	
	MWB-3LDA	3/14/2023	744.19	1.11	743.08	11.00	254.90	0.80	-29.80	0.29	7.51	146	0.2 U	7.37	786	0.1 U	0.4 U	



**Table 2: First Quarter 2023 Field Parameters and Analytical Data**

Sample Area	Sample Location ID	Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)					
			TOC Elevation (feet NAVD88)	Depth to Water (feet btoc)*	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Antimony, Total	Arsenic, Total	Potassium, Total	Lead, Total	Vanadium, Total
Preliminary Cleanup Level <sup>a</sup>			-	-	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	-	2.1	140
LDA- Surface Water	South Pond	3/15/2023	-	-	-	8.9	1467	10.36	-7.6	6.57	9.33	913	2.75	8.5	347000	4.84	12.3	
	Still Well	3/15/2023	-	-	-	7.5	7393	3.03	77	42	12.72	2070	10.1	39.1	478000	6.26	3.06	
	Weir	3/15/2023	-	-	-	5.1	758.2	6.46	202.5	9.22	7.49	437	5.92	3.49	96000	0.197	0.825	
	Infiltration Ponds	3/13/2023	-	-	-	7.20	1831.00	11.21	177.80	31.80	8.29	1050	8.27	16.3	401000	5.8	4	
	Infiltration Ponds Duplicate (MW-35A)	3/13/2023	-	-	-	-	-	-	-	-	-	1080	8.77	17	413000	6.44	4.36	
DSP - Bedrock Groundwater <sup>b</sup>	MWB-1SDSP	3/16/2023	936.29	34.48	901.81	11.50	1633.00	0.21	-28.90	0.42	6.88	1200	0.2 U	16.5	5580	0.1 U	0.4 U	
	MWB-1DDSP	3/16/2023	935.37	48.34	887.03	11.70	1110.00	0.29	-89.50	0.38	7.19	783	0.2 U	5.45	3870	0.1 U	0.4 U	
	MWB-2DSP	3/15/2023	934.82	192.63	742.19	11.40	591.70	2.44	41.80	5.56	7.53	-	-	-	-	-	-	
	MWB-4SDSP	3/15/2023	932.41	17.46	914.95	12.30	668.00	8.07	57.40	2.67	7.85	-	-	-	-	-	-	
	MWB-5DSP	3/16/2023	935.05	18.62	916.43	11.70	846.00	0.21	-19.70	0.41	7.03	497	0.2 U	4.56	2570	0.1 U	0.4 U	
	MWB-6DSP <sup>c</sup>	3/15/2023	-	15.98	-	10.9	444.1	1.06	16.4	1.17	7.11	251	0.2 U	1.05	1110	0.1 U	0.445	
	MWB-6DSP Duplicate (MW-55A)	3/15/2023	-	-	-	-	-	-	-	-	-	246	0.2 U	1.04	1140	0.1 U	0.44	
	Portal	3/16/2023	-	-	-	10.8	667.5	6.16	76.1	8.99	6.86	383	0.2 U	5.08	27100	0.1 U	0.172 J	

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

- Not measured or not collected.

\* Depth to water (DTW) measurements for all shallow/alluvial wells collected on the same day; date noted is sampling date.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

b LDA and DSP bedrock wells are monitored semi-annually

c MWB-6DSP was found damaged in July 2022. The well was repaired by late December 2022 and has yet to be resurveyed.

J Data validation code; estimated value.

J+ Data validation code; estimated value with high bias

J- Data validation code; estimated value with low bias.

U Data validation code; not detected at the Reporting Limit (RL).

DRY Location is dry. Unable to collect field parameters or samples.

TOC Top of casing inside PVC well

°C Degrees Celsius

feet bmp Feet below measuring point

feet NAVD88 Feet in NAVD88 datum

ug/L Micrograms per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

µmhos/cm Micromhos per centimeter



**Table 3: Interceptor Trench Discharge Monitoring**

Date Sampled	Time Sampled	Flow (gpm)	Field pH (standard units)	Turbidity (NTU)	Total Dissolved Solids (mg/L)
19-Oct-13	8:45	0.3	7.47	-	-
19-Nov-13	9:25	0.7	7.52	-	-
23-Dec-13	15:25	1.2	7.27	-	-
20-Jan-14	11:15	0.8	7.58	1	277
-	-	-	-	-	-
31-Mar-14	11:12	1	7.22	1.6	257
22-Apr-14	16:05	3.6	6.85	474	214
27-May-14	15:30	0.8	7.12	21.9	294
27-Jun-14	11:10	0.3	7.13	13.3	136
31-Jul-14	19:45	0.2	6.95	4.1	305
28-Aug-14	14:00	0.1	7.2	1.8	294
29-Sep-14	13:39	0.1	7.87	1.4	340
29-Oct-14	11:45	0.3	7.03	1.1	319
24-Nov-14	11:50	0.8	7.09	0.7	229
22-Dec-14	8:00	0.4	7.08	0.4	253
30-Jan-15 <sup>1</sup>	10:10	1.1	7.09	0.7	270
4-May-15	9:30	0.31	7.54	2.05	290
4-Aug-15	12:20	0.06	7.61	1.51	268
3-Nov-15	13:15	0.8	7.38	36.9	320
8-Feb-16	10:40	1.9	7.23	9.29	279
2-May-16	16:00	0.5	7.77	22.5	431
22-Aug-16	11:00	0.08	7.78	3.34	302
1-Nov-16	11:40	2.4	8.16	96.3	345
2-Feb-17	9:25	4.5	7.61	0.85	514
30-May-17	15:45	4.5	7.33	4.04	324
18-Aug-17	8:50	0.1	7.57	34	300
10-Nov-17	11:20	1.1	6.81	12.9	365
28-Feb-18	10:16	2.22	7.02	37.9	381
2-May-18	11:45	1.18	7.46	2.89	339
22-Aug-18	10:00	0.13	7.32	19.3	287

**Table 3: Interceptor Trench Discharge Monitoring**

Date Sampled	Time Sampled	Flow (gpm)	Field pH (standard units)	Turbidity (NTU)	Total Dissolved Solids (mg/L)
7-Nov-18	14:40	0.33	7.24	3.05	342
13-Mar-19	11:31	1.43	7.61	19.4	313
9-May-19	10:30	0.88	7.77	8.9	394
26-Aug-19	18:15	0.42	7.25	26.4	361
14-Nov-19	13:30	0.42	7.05	34.5	447
13-Feb-20	12:35	1.58	6.95	1.76	306
13-Aug-20	12:00	0.21	7.32	20.8	339
10-Dec-20	12:22	3.8	7.7	228	691
4-Mar-21	12:20	3.5	7.23	116	584
10-Jun-21	13:10	0.2	7.02	6.31	360
15-Oct-21	13:55	0.2	7.08	31	382
7-Jan-22	11:58	9.2	7.43	6.23	288
17-Mar-22	15:25	3.5	11.75^	3.24	368
22-Jun-22	14:05	2.2	6.94	6.21	415
23-Sep-22	14:46	0.11	7.54	4.77	330
14-Dec-22	9:20	0.79	7.19	2.27	279
13-Mar-23	9:25	2.25	6.9	1.07	232

- Not measured or not available  
 ^ pH values error, due to faulty pH probe.  
 gpm Gallons per minute  
 NTU Nephelometric Turbidity Unit  
 mg/L Milligrams per liter



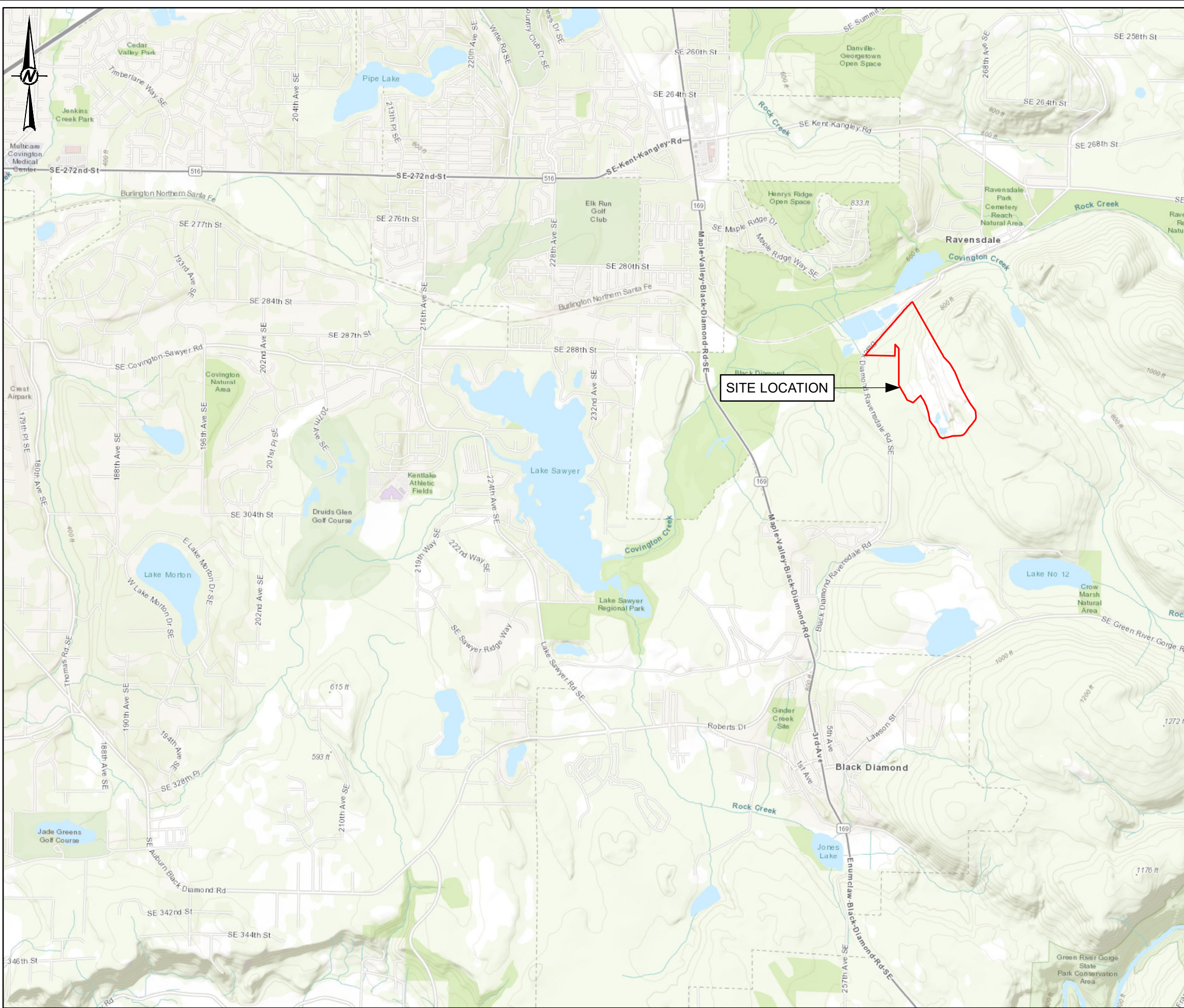
**Table 4: First Quarter 2023 Treatment System Metals Monitoring**

Sample Location	Sample ID	Date Sampled	Total Antimony (ug/L)	Dissolved Antimony (ug/L)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)	Total Lead (ug/L)	Dissolved Lead (ug/L)	Total Vanadium (ug/L)	Dissolved Vanadium (ug/L)
pH Tank Influent	Tank-Influent	17-Mar-23	13.9	14.2	30.8	22.3	107	75.2	3.50	3.30
pH Tank Effluent/Filter Media Influent	Sand-Effluent	17-Mar-23	13.7	13.9	28.1	26.9	41.3	0.282	3.24	3.08
Filter Media Effluent	As-Effluent	17-Mar-23	13.5	12.5	21.0	9.86	30.5	0.0760	3.45	0.754

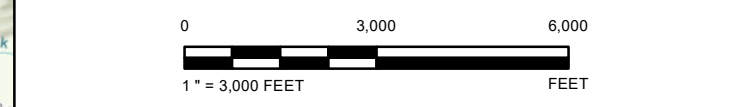
- Not measured or not available  
ug/L Micrograms per liter

## Figures





**LEGEND**  
 [Red Outline] Property Boundary



**REFERENCE(S)**  
 1. ASPECT CONSULTING (PROPERTY BOUNDARY)  
 2. ESRI (WASHINGTON STATE COUNTY BOUNDARY)  
 3. COORDINATE SYSTEM: NAD 1983 STATEPLANE WASHINGTON NORTH FIPS 4601 FEET  
 4. MAP SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI KOREA, ESRI (THAILAND), NGCC, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY  
 SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT  
**HOLCIM**

PROJECT  
**RI WORK PLAN 2020  
 RAVENSDALE, WA**

TITLE  
**SITE LOCATION MAP**

	CONSULTANT	YYYY-MM-DD	2021-02-10
		DESIGNED	TL
		PREPARED	TL
		REVIEWED	JX
		APPROVED	GZ

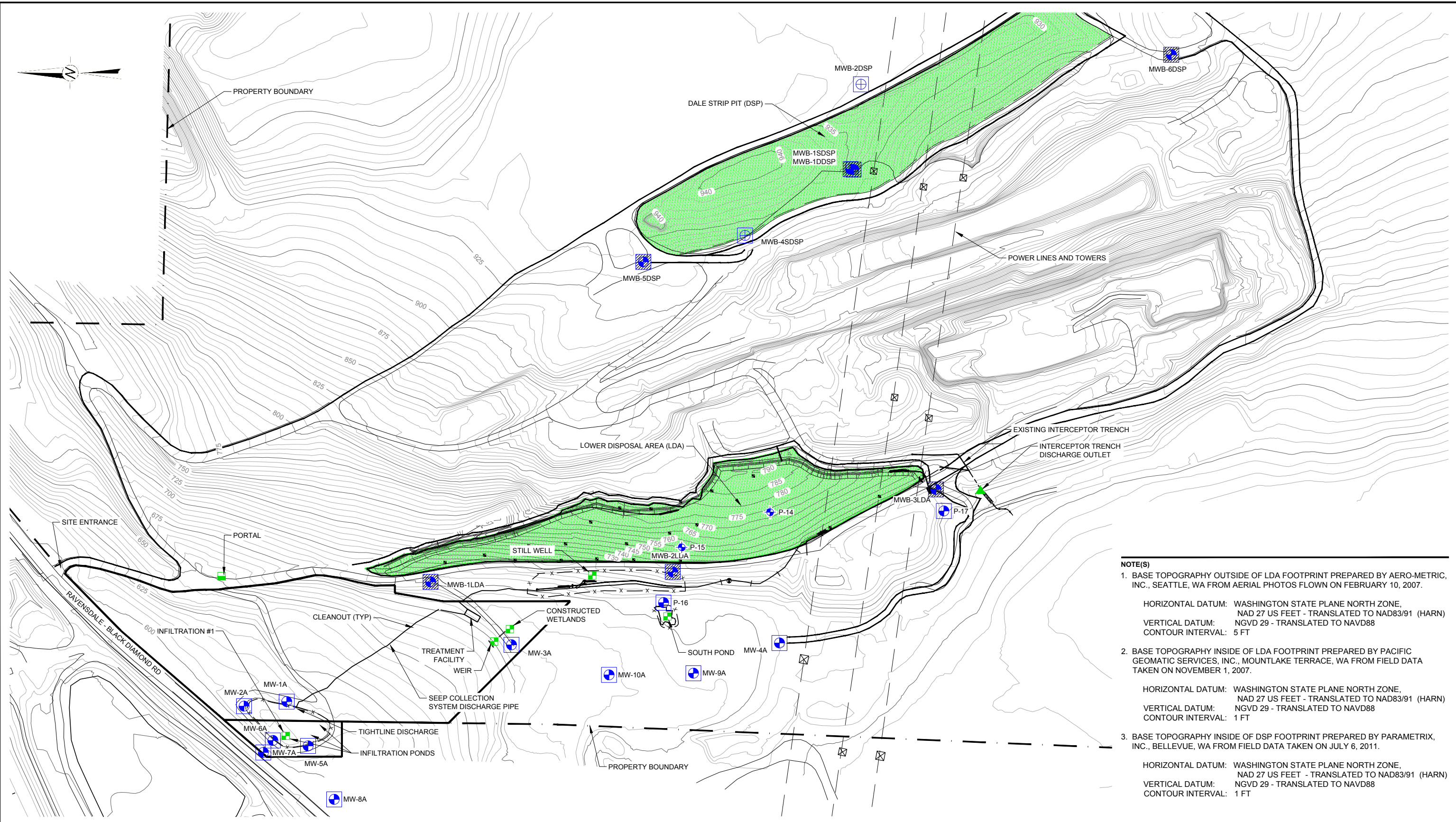
PROJECT NO.	PHASE	REV.	FIGURE
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANS I



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**NOTE(S)**

- BASE TOPOGRAPHY OUTSIDE OF LDA FOOTPRINT PREPARED BY AERO-METRIC, INC., SEATTLE, WA FROM AERIAL PHOTOS FLOWN ON FEBRUARY 10, 2007.  
 HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD 27 US FEET - TRANSLATED TO NAD83/91 (HARN)  
 VERTICAL DATUM: NGVD 29 - TRANSLATED TO NAVD88  
 CONTOUR INTERVAL: 5 FT
- BASE TOPOGRAPHY INSIDE OF LDA FOOTPRINT PREPARED BY PACIFIC GEOMATIC SERVICES, INC., MOUNTLAKE TERRACE, WA FROM FIELD DATA TAKEN ON NOVEMBER 1, 2007.  
 HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD 27 US FEET - TRANSLATED TO NAD83/91 (HARN)  
 VERTICAL DATUM: NGVD 29 - TRANSLATED TO NAVD88  
 CONTOUR INTERVAL: 1 FT
- BASE TOPOGRAPHY INSIDE OF DSP FOOTPRINT PREPARED BY PARAMETRIX, INC., BELLEVUE, WA FROM FIELD DATA TAKEN ON JULY 6, 2011.  
 HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD 27 US FEET - TRANSLATED TO NAD83/91 (HARN)  
 VERTICAL DATUM: NGVD 29 - TRANSLATED TO NAVD88  
 CONTOUR INTERVAL: 1 FT

	COVER AREA		LDA SURFACE WATER SAMPLING LOCATION
	MW-1A ALLUVIAL MONITORING WELL		DSP BEDROCK SAMPLING LOCATION (PORTAL)
	MWB-1DDSP BEDROCK MONITORING WELL		INTERCEPTOR TRENCH SAMPLING LOCATION
	MWB-2DSP BEDROCK MONITORING WELL (NOTE 4)	- x - x -	FENCE LINE
	DISPOSAL AREA MONITORING WELL		



CLIENT  
**HOLCIM**

CONSULTANT		YYYY-MM-DD	2022-01-20
		DESIGNED	JX
		PREPARED	REDMOND
		REVIEWED	JX
		APPROVED	GZ

PROJECT  
**RI WORK PLAN 2020  
RAVENSDALE, WA**

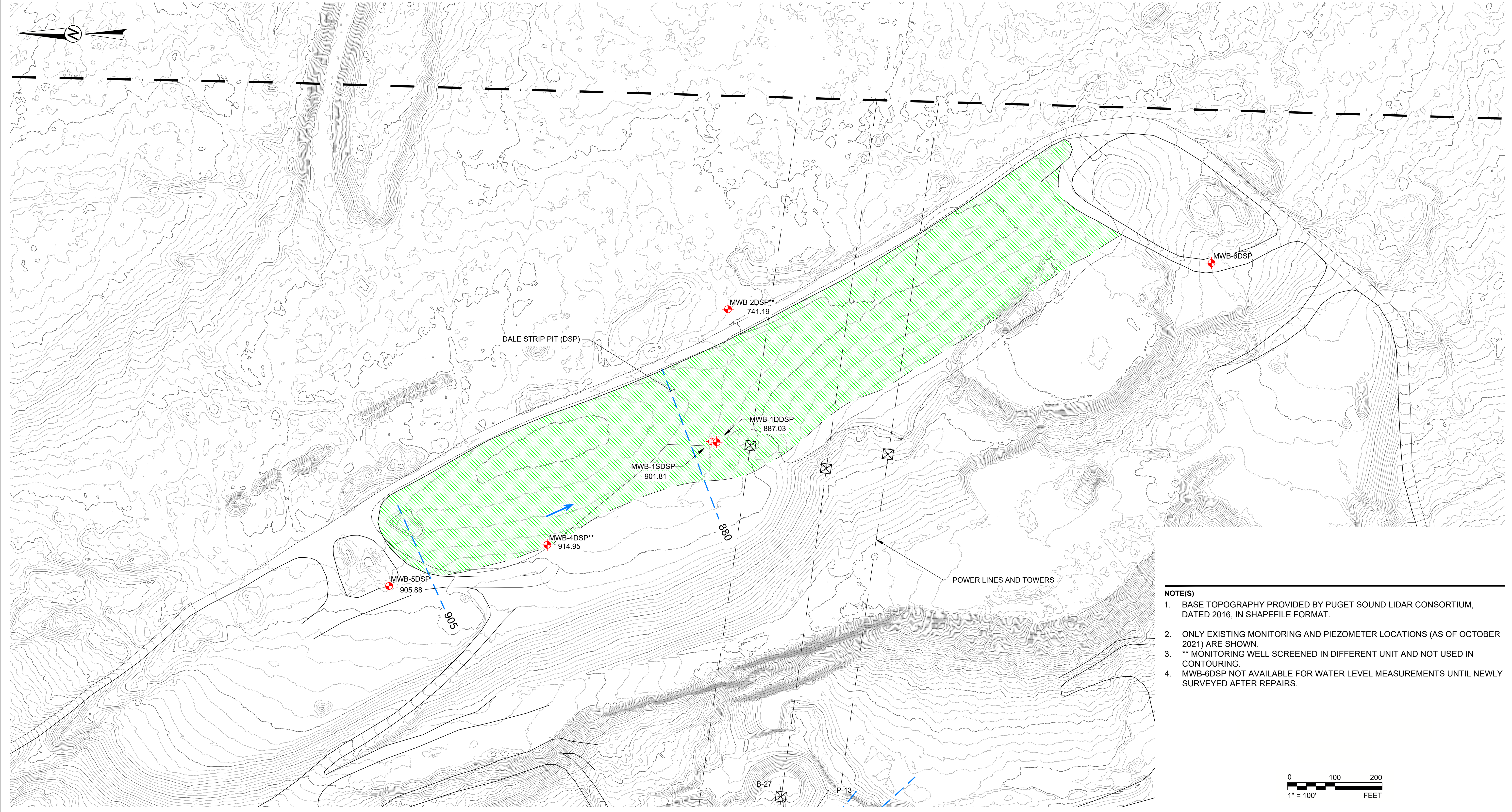
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**SITE PLAN**

PROJECT NO.	PHASE	REV.	FIGURE
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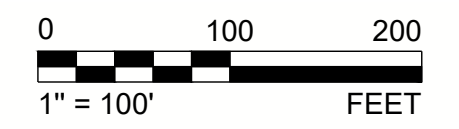
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- NOTE(S)**
1. BASE TOPOGRAPHY PROVIDED BY PUGET SOUND LIDAR CONSORTIUM, DATED 2016, IN SHAPEFILE FORMAT.
  2. ONLY EXISTING MONITORING AND PIEZOMETER LOCATIONS (AS OF OCTOBER 2021) ARE SHOWN.
  3. \*\* MONITORING WELL SCREENED IN DIFFERENT UNIT AND NOT USED IN CONTOURING.
  4. MWB-6DSP NOT AVAILABLE FOR WATER LEVEL MEASUREMENTS UNTIL NEWLY SURVEYED AFTER REPAIRS.



LEGEND	
	COVER AREA
	P-1 GOLDER PIEZOMETER
	MW-1A ALLUVIAL MONITORING WELL
	LDA SURFACE WATER SAMPLING LOCATION
	MWB-1DDSP BEDROCK MONITORING WELL
	DSP BEDROCK SAMPLING LOCATION (PORTAL)
	P-14 LDA MONITORING WELL
	INTERCEPTOR TRENCH SAMPLING LOCATION
	AMW-1 PLANT SITE MONITORING WELLS
	FENCE LINE

CLIENT  
**HOLCIM**

CONSULTANT



YYYY-MM-DD	2023-04-28
DESIGNED	AP
PREPARED	REDMOND
REVIEWED	AP
APPROVED	GZ

PROJECT  
**MARCH 13, 2023 GROUNDWATER ELEVATIONS  
RAVENSDALE, WA**

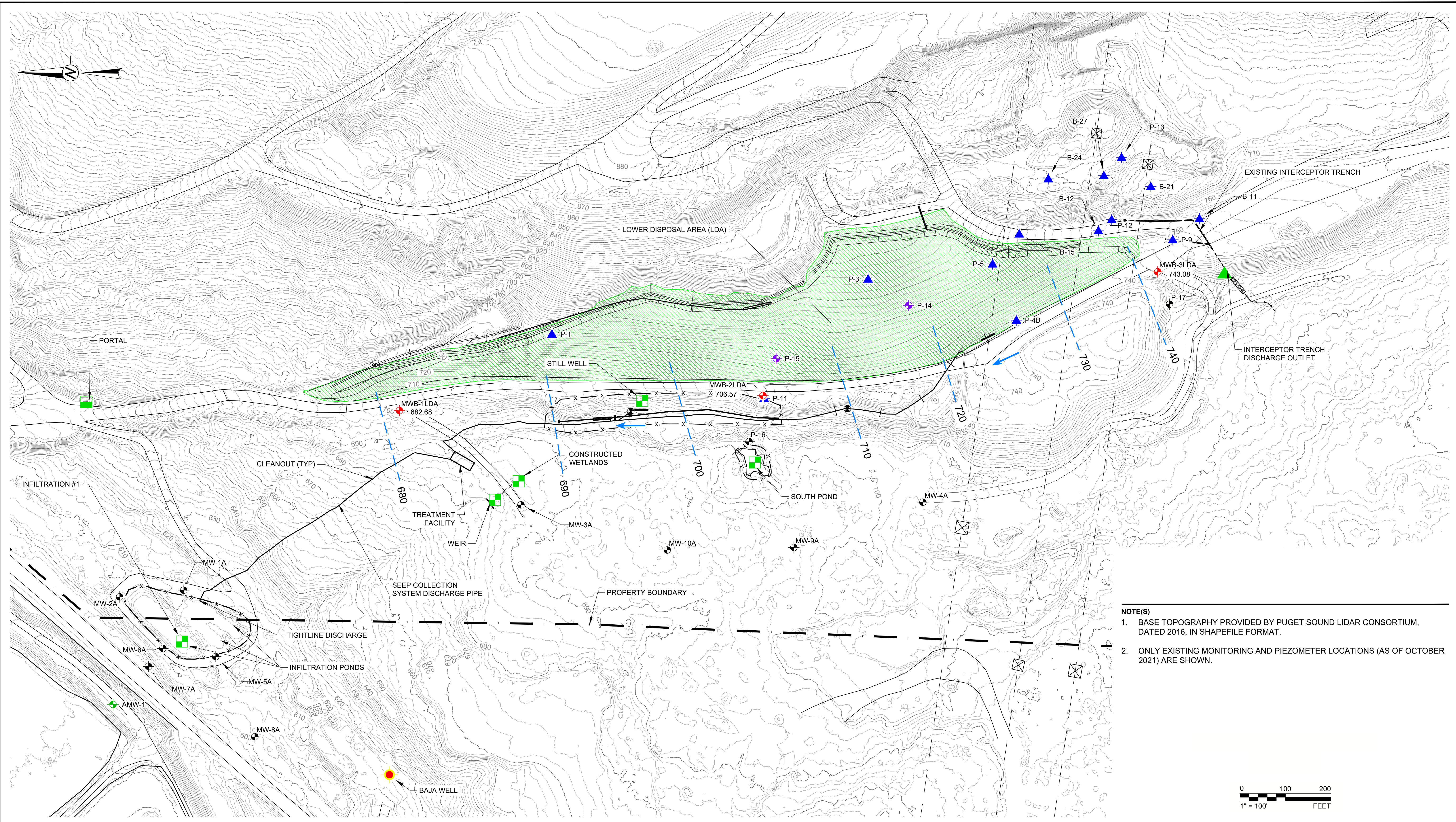
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**DSP BEDROCK GROUNDWATER ELEVATIONS**

PROJECT NO. 152030402	PHASE 004	REV. B	FIGURE <b>3A</b>
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1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANS/D



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**NOTE(S)**  
 1. BASE TOPOGRAPHY PROVIDED BY PUGET SOUND LIDAR CONSORTIUM, DATED 2016, IN SHAPEFILE FORMAT.  
 2. ONLY EXISTING MONITORING AND PIEZOMETER LOCATIONS (AS OF OCTOBER 2021) ARE SHOWN.

	COVER AREA		P-1	GOLDER PIEZOMETER		PRIVATE WELL
	MW-1A			LDA SURFACE WATER SAMPLING LOCATION		
	MWB-1DDSP			DSP BEDROCK SAMPLING LOCATION (PORTAL)		
	P-14			INTERCEPTOR TRENCH SAMPLING LOCATION		
	AMW-1			FENCE LINE		

CLIENT  
HOLCIM

CONSULTANT	YYYY-MM-DD	2023-04-28
	DESIGNED	AP
	PREPARED	REDMOND
	REVIEWED	AP
	APPROVED	GZ

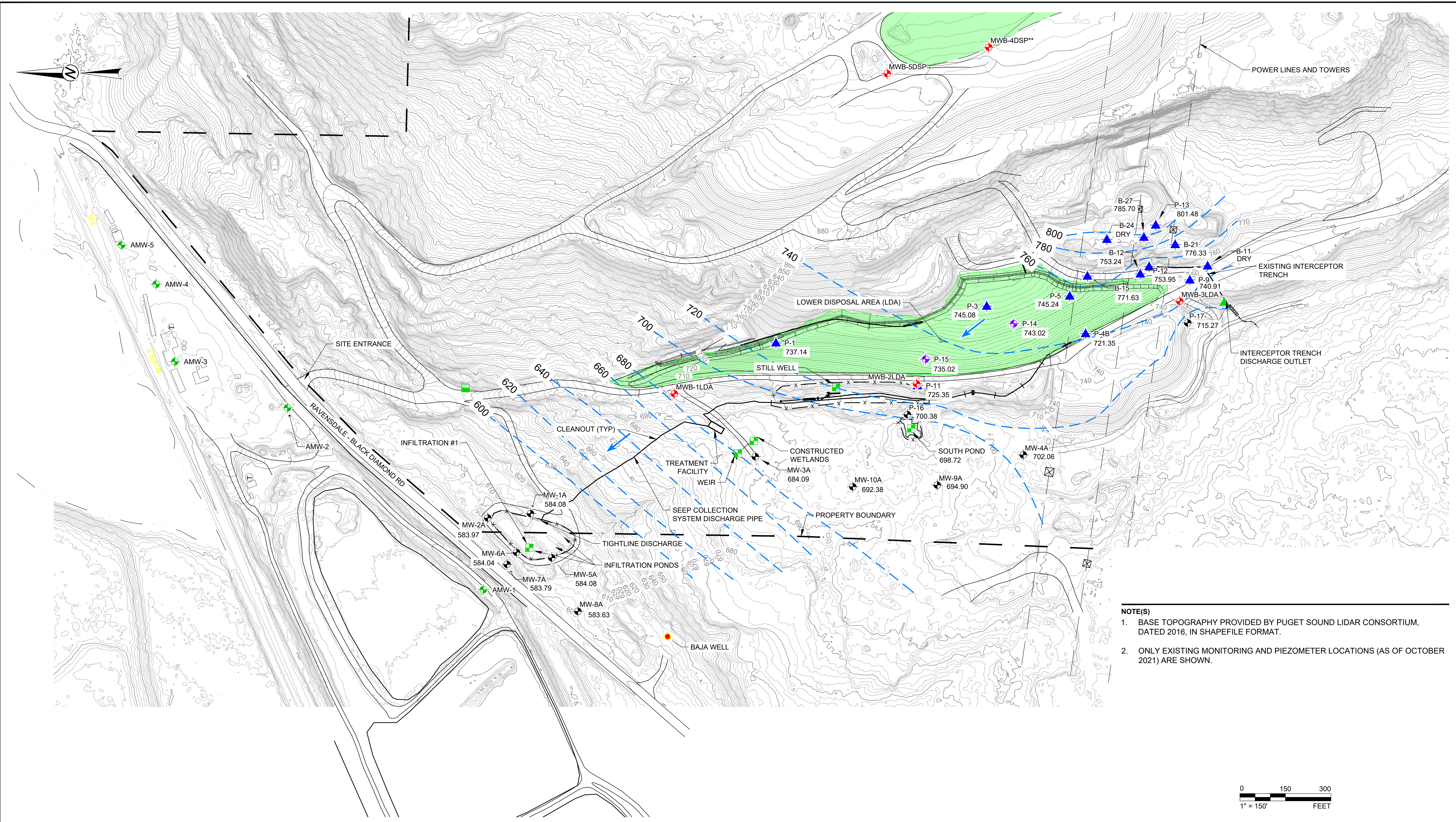
PROJECT  
MARCH 13, 2023 GROUNDWATER ELEVATIONS  
RAVENSDALE, WA

TITLE <b>LDA BEDROCK GROUNDWATER ELEVATIONS</b>	
PROJECT NO. 152030402	PHASE 004
REV. A	FIGURE 3B

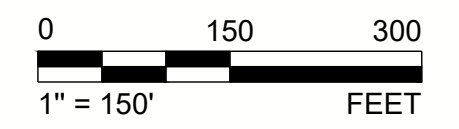
1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D



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- NOTE(S)**
1. BASE TOPOGRAPHY PROVIDED BY PUGET SOUND LIDAR CONSORTIUM, DATED 2016, IN SHAPEFILE FORMAT.
  2. ONLY EXISTING MONITORING AND PIEZOMETER LOCATIONS (AS OF OCTOBER 2021) ARE SHOWN.



LEGEND	
	COVER AREA
	P-1
	MW-1A
	MWB-1DDSP
	P-14
	AMW-1
	GOLDER PIEZOMETER
	LDA SURFACE WATER SAMPLING LOCATION
	DSP BEDROCK SAMPLING LOCATION (PORTAL)
	INTERCEPTOR TRENCH SAMPLING LOCATION
	FENCE LINE
	PRIVATE WELL

CLIENT  
**HOLCIM**

CONSULTANT



YYYY-MM-DD	2023-04-28
DESIGNED	AP
PREPARED	REDMOND
REVIEWED	AP
APPROVED	GZ

PROJECT  
**MARCH 13, 2023 GROUNDWATER ELEVATIONS  
RAVENSDALE, WA**

TITLE  
**ALLUVIAL - SHALLOW GROUNDWATER ELEVATIONS**

PROJECT NO.	PHASE	REV.	FIGURE
152030402	004	B	3C

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANS/D



**APPENDIX A**

**Summary Data Tables for Individual  
Wells and Monitoring Locations**



**APPENDIX A-1**

# Summary of Lower Disposal Area – Surface Water Sampling Results

Table A-1A Still Well  
Table A-1B Infiltration Ponds  
Table A-1C Weir  
Table A-1D South Pond

**Table A-1a: Summary of Lower Disposal Area - Surface Water Sampling Results - Still Well**  
Ravensdale Site, Ravensdale, Washington

Date Sampled	Field Parameters						Gen-Chem Total Dissolved Solids (mg/L)	Metals (ug/L)						
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Antimony	Arsenic	Iron	Lead	Manganese	Potassium	Vanadium
Preliminary Screening Level <sup>c</sup>	-	-	-	-	-	6.5-8.5	-	5.6	8	-	2.1	-	-	140
1-Feb-05	8.1	10658	-	-	6.59	12.87	2860	-	49.9	100 U	5.52	10 U	-	-
9-Mar-05	13.23	7393	-	-	7.42	12.51	2860	-	115	228	14.7	10 U	-	-
5-Apr-05	9.5	11310	-	-	10.9	12.44	2900	-	55.6	100 U	11.6	20 U	-	-
10-May-05	13.99	11871	-	-	3.6	12.53	2810	-	55.4	100 U	12.5	20 U	-	-
7-Jun-05	13.83	10888	-	-	22.6	12.54	2490	-	5 U	100 U	5 U	20 U	-	-
15-Jul-05 <sup>a</sup>	18.21	11331	-	-	14.8	12.5	3800	-	2.72	150 U	6.07	10 U	-	-
15-Jul-05 <sup>b</sup>	-	-	-	-	-	-	2540	-	39.8	100 U	7.57	20 U	-	-
9-Aug-05 <sup>a</sup>	21.45	12087	-	-	17.9	11.78	3500	-	120	288	10.9	10.1	-	-
9-Aug-05 <sup>b</sup>	-	-	-	-	-	-	2820	-	91.5	100 U	9.53	20 U	-	-
14-Sept-05 <sup>a</sup>	17.38	9507	-	-	14	12.36	3600	-	118	750 U	11.2	50 U	-	-
14-Sept-05 <sup>b</sup>	-	-	-	-	-	-	2830	-	115	363	14.4	-	-	-
5-Oct-05	13.31	11481	-	-	62.7	12.47	3020	-	85.2	100 U	11.9	20 U	-	-
9-Nov-05	9.58	14417	-	-	11	12.34	3400	-	74	150 U	10 U	10 U	-	-
9-Dec-05	6.18	7138	-	-	12.5	12.82	2800	-	14.5	150 U	1.07	10 U	-	-
19-Jan-06	8.66	8265	1.74	-	11.8	13.06	1900 J	-	15.2 J	150 U	1 U	10 U	-	-
16-Feb-06	8.13	9019	2.81	195.6	6.16	12.27	3200 J	-	13.4 J	150 U	1.89	10 U	-	-
15-Mar-06	7.98	9033	0.79	114.8	8.93	12.6	3300 J	-	2.36	150 U	2.5 J	10 U	-	-
7-Apr-06	9.98	10450	0.57	34.8	6.08	12.51	3400	-	15.2	150 U	2.83	10 U	-	-
16-May-06	12.79	11060	0.14	45.4	9.28	12.4	3500	-	4.04	150 U	1.59	10 U	-	-
23-Jun-06	13.29	11680	0.44	-	14.6	12.9	3600	-	52.6	150 U	16.5	10 U	-	-
20-Jul-06	16.2	12240	0.14	-217.8	10.4	12.47	4300	-	19.3	150 U	3.57	10 U	-	-
22-Aug-06	17.14	10920	1.22	-146	13.3	12.66	3800	-	144	150 U	9.14 J	10 U	-	-
26-Sep-06	15.72	9599	0.42	-263.3	61.4	12.59	3800	-	123	171	4.63	15.4	-	-
26-Oct-06	10.99	9955	0.88	-207.5	82.3	12.93	3600	-	161	1500 U	19.5	10 U	-	-
15-Nov-06	10.58	12040	1.82	149.2	188	12.87	3400	-	30.6 J	150 U	4.5	10 U	-	-
20-Dec-06	8.85	10990	0.71	-152	32.8	13.02	2600 J	-	52.6	150 U	13	10 U	-	-
24-Jan-07	8.29	10440	0.97	-139.8	13.7	13.05	2500 J	-	58.6	150 U	13.1	10 U	-	-
12-Feb-07	8.88	10590	0.86	-125.8	56.4	13.06	3400	-	61.3	150 U	14	10 U	-	-
27-Mar-07	9.45	9163	1.25	-42.4	18.4	11.53	2900 J	-	44.1	150 U	1.81	10 U	-	-
18-Apr-07	8.9	8155	2.63	2.3	37.2	12.77	3300 J	-	29.3	150 U	1.98	10 U	-	-
31-May-07	20.12	11050	5.3	-153.9	9.31	11.59	2800 J	-	48.5	150 U	15.1 J	10 U	-	-
20-Jun-07	18.28	12000	5.41	-122.5	16.1	12.04	4300 J	-	26.8	150 U	2.33	10 U	-	-
31-Jul-07	16.53	12200	1.7	-151.6	24.8	12.48	6000	-	87.6	150 U	1.03	10 U	-	-
29-Aug-07	17	9570	1.12	-183.1	268	12.78	4600 J	-	106	150 U	9.46	10 U	-	-
27-Sep-07	14.49	8263	52.4	-183	211	12.42	2800	-	125	150 U	15.4	10 U	-	-
26-Oct-07	9.49	6144	4.88	-147.2	92.4	12.85	3300 J	-	124	260	24.9	10.1	-	-
30-Nov-07	5.53	7703	2.13	-122.6	127	12.67	2200	-	174	184	14.1	10 U	-	-
12-Dec-07	5.24	11609	3.43	-144.8	116	12.6	4100	-	110	150 U	11.3	10 U	-	-
24-Jan-08	3.73	9649	13.81	-138	-	10.74	2500	-	101	1530	9.74	81.5	-	-
28-Feb-08	-	-	-	-	51.2	-	2900	-	58.5	150 U	12.6	10 U	-	-
25-Mar-08	7.06	8623	5.52	-11.2	17.4	11.26	3400	-	74.3	150 U	10.4	10 U	-	-
29-Apr-08	9.74	11332	4.29	-1.3	27.7	12.82	3000 J	-	76.6	150 U	13.3	10 U	-	-
20-May-08	14.53	11955	1.74	-35.8	72.7	12.82	3400	-	87.3	150 U	15.1	10 U	-	-
18-Jun-08	12.77	10267	3.34	-27	34	12.86	3200 J	-	63.2	150 U	16.9	10 U	-	-
26-Aug-08	15.86	7703	1.06	-72.8	38.3	12.67	2600 J	-	430	1220	35	49.7	759000	-
20-Nov-08	9.59	8762	0.91	-65.6	74.1	13.32	3500	-	70	150 U	16.8	10 U	848000	-
12-Feb-09	3.25	554	14.29	-	108	13.03	550	-	47.2	150 U	13.7	10 U	551000	-
19-May-09	11.53	276	8.8	26	43.4	9.83	2500 J	-	37.8	150 U	15	10 U	689000	-
22-Sep-09	12.47	9760	1.5	159.1	625	12.47	3000	-	160	200	37	10 J	990000	-
15-Dec-09	5.2	11650	1.9	237	26.3	12.85	3000	-	86	67 J	21	4.7 J	900000 J	-
22-Mar-10	9.7	1035	-	182	19.4	12.58	3000	-	73	200 U	17	20 U	870000	-
17-Jun-10	11.7	9610	0.08	-	6.59	12.48	2700	-	66	95 J	15	2 J	780000	-
21-Sep-10	15	6710	1.26	152.6	140	12.29	2400	-	300	1100 J+	39	30 J+	570000	-
8-Dec-10	8.3	10110	1	-	5.44	12.63	2600	-	64	200 U	10	20 U	860000	-
30-Mar-11	8.6	4810	0.46	136.3	13.7	14.31	2500 J	-	65	200 U	9.6	20 U	720000	-
21-Jun-11	16.6	10420	1.63	111.9	3.4	12.36	5200	-	60	200 U	9.1	1.7 J	770000	-
28-Sep-11	14.8	5270	2.34	70	66.7	12.17	2200	-	220	360	11	7.2 J	1000000	-
15-Dec-11	6	7330	2.47	104.2	18.3	13.09	2800	-	83	200 U	2.9	20 U	880000	-
21-Mar-12	5.5	11040	3.15	294.2	12	12.39	2600	-	67	200 U	4.7	20 U	760000	-
19-Jun-12	5.5	11040	3.15	294.2	12	12.39	2600	-	58	200 U	6.7	20 U	690000	-
20-Sep-12	16.1	9560	3.27	76	10.7	12.35	2900	-	84	200 U	3	20 U	830000	-
19-Dec-12	4.1	1320	10.11	303.1	5.86	9.69	700	-	75	690	4.3	71	250000	-
26-Feb-13	7.3	9950	1.77	161.8	25.5	12.66	2000	-	70	500 U	0.29 J	20 U	720000	-
23-May-13	11.5	8040	2.23	266.8	22.7	12.47	2500	-	57	500 U	3.4	20 U	690000	-
22-Aug-13	17.4	8810	2.42	10.8	38.5	12.79	2590	-	57.8	100 U	1.5	2	863000	-
19-Nov-13	9	7090	2.47	79	62.8	12.54	2720	-	52.5	100 U	4.2	2 U	909000	-
1-Apr-14	10.3	6080	0.55	128.2	37.1	6.08	1890	-	54.6	100 U	1.1	1.3 U	687000	-
22-May-14	13.6	7360	1.22	34.4	-	11.75	2330	-	60.9	100 U	2	2 U	689000	-
13-Aug-14	18.26	7844	0.33	1.2	7.3	12.53	2770	-	70	100 U	2.1	2 U	849000	-
12-Nov-14	9	585	3.17	-47.8	17.5	12.93	2450	-	83.2	100 U	3.9	2 U	837000	-
12-Feb-15	10.7	7540	2.68	-18.6	9.64	12.71	2150	-	51.6	100 U	0.3	2 U	690000	-
4-May-15	12.9	9140	2.73	110.4	26.8	13.02	2520	-	54.6	100 U	0.22 J	2 U	734000	-
5-Aug-15	19.5	8060	2.58	-29.8	61.1	12.62	2980	-	63.9	250 U	1.7	4.7 J	898000	-
3-Nov-15	11.1	5150	0.37	38.6	171	8.93	1840	-	109	270	21.7	13	747000	-
9-Feb-16	9.7	7390	0.78	80.8	7.79	13.07	2170	-	53.6	100 U	1.2	6	601000	-
3-May-16	14.7	7530	1.4	358.1	2.65	12.98	2480	-	54.2	100 U	1.7 J	2	711000	-
22-Aug-16	20.5	7.91	2.1	-	59	12.95	2780	-	91.3	250 U	5.87	2.3 J	831000	-



**Table A-1a: Summary of Lower Disposal Area - Surface Water Sampling Results - Still Well  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters						Gen-Chem Total Dissolved Solids (mg/L)	Metals (ug/L)						
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Antimony	Arsenic	Iron	Lead	Manganese	Potassium	Vanadium
Preliminary Screening Level <sup>c</sup>	-	-	-	-	-	6.5-8.5	-	5.6	8	-	2.1	-	-	140
1-Nov-16	12.3	2884	2.66	-72.1	19.1	13.17	2620	-	46.2	100 U	9.64	2 U	841000	-
31-Jan-17	7.4	8510	2.37	-167	7.35	13.17	2050	-	52.5	26 J	1.19	1.6 J	582000	-
31-May-17	14.6	7500	2.44	-	4.17	12.89	1900	-	45.4	11 J	0.68 J+	0.7 J	615000	-
17-Aug-17	18.3	8460	3.35	-84	15.9	12.79	2680	-	56.8	3 J	2.14	1.3 J	750000	-
9-Nov-17	8.2	7215	3.48	90.9	18.2	12.65	2360	-	62.1	100 U	3.52	2.5	822000	-
27-Feb-18	6.6	5312	3.75	2.3	2.49	12.11	1970	-	50.2	100 U	7.53	2.5	521000	-
2-May-18	11.1	8260	1.7	-	13	12.92	2360	-	43.4	133	21.7 J+	8.8	552000	-
21-Aug-18	20.22	6260	4.71	-42.1	5.84	12.58	2100	-	52.2	100 U	0.138	2 U	629000	-
7-Nov-18	9.7	995	6.72	126.8	20.6	9.15	1880	-	644	1350	80.2	49.1	502000 J+	-
11-Mar-19	10.6	1354	5.93	-18.7	7.19	10.31	1710	-	52.8	9.1 J	21.2	1.3 J	501000	-
9-May-19	13.8	6973	6.4	18.1	16.7	12.36	1980	-	41.6	7.9 J	13.4	0.8 J	521000	-
26-Aug-19	17.8	6405	3.91	Note 1	5.15	12.56	2570	-	42.5	100 U	15.4	1 J	722000	-
14-Nov-19	9.7	6065	0.41	-53.3	12	12.67	1750	-	167	121 J	23.9	6.5	563000	-
13-Feb-20	7.6	4936	0.37	-139	2.56	12.66	1630	-	48.6	13.6 J	6.08	3.1	490000	-
13-Aug-20	15	6817	2.55	-42.8	2.02	12.39	2620	-	41.9	6.3 J	0.86	0.9 J	659000	-
10-Dec-20	8.8	4534	0.55	-26.2	5.87	12.79	1670	-	82.7	241	11.1	10.8	510000	-
4-Mar-21	7.7	4728	0.05	-42	0.85	11.94	1470	-	61.8	100 U	1.49	8 U	512000	-
9-Jun-21	13.4	5213	0.89	-148.4	4.06	12.56	1600	-	91.7	-	5.72	-	471000	-
13-Oct-21	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	-	DRY	DRY
7-Jan-22	8.8	4103	2.53	55.4	3.04	12.88	1900	8.39	50.3	-	4.26	-	486000	3.34
17-Mar-22	9	4955	7.42	153.1	1.88	13.71	2070	8.23	51.7	-	5.88	-	517000	3.02
21-Jun-22	15.4	5090	2.53	156.3	3.4	11.96	2180	9.34	51.6	-	3.08	-	465000	3.7
14-Sep-22	16.6	6728	6	68	44.5	12.33	2480	7.82	52.3	-	6.96	-	669000	3.47
13-Dec-22	7.7	1419	7.42	-92.9	9.97	11.6	967	71	125	-	9.95	-	309000	11.1
15-Mar-23	7.5	7393	3.03	77	42	12.72	2070	10.1	39.1	-	6.26	-	478000	3.06

Notes:

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not analyzed or not available
- Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.
- a North Creek Analytical, Inc.
- b Severn Trent Laboratories
- c Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022
- U Data validation code; not detected at the Reporting Limit (RL)
- J Data validation code; estimated value
- J+ Data validation code; estimated value with positive bias
- °C Degrees Celsius
- Note 1 ORP measurements not available due to faulty sensor.
- µmhos/cm Micromhos per centimeter
- feet bmp Feet below measuring point
- feet NAVD88 Feet NAVD88 Datum
- mg/L
- mV
- NTU



**Table A-1b: Summary of Lower Disposal Area - Surface Water Sampling Results - Infiltration Ponds #1 Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters						Gen-Chem Total Dissolved Solids (mg/L)	Metals (ug/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>c</sup>	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
1-Feb-05	8.17	1315	-	-	8.13	9.95	874	-	84.9	4.99	-	-
9-Mar-05	14.04	1183	-	-	23.00	9.59	960	-	96.2	3.92	-	-
5-Apr-05	11.00	1115	-	-	43.70	9.80	800	-	62.3	3.21	-	-
10-May-05	14.91	1275	-	-	564.00	9.83	844	-	76.5	5 U	-	-
7-Jun-05	15.11	1140	-	-	239.00	9.61	804	-	84.3	5 U	-	-
15-Jul-05 <sup>a</sup>	23.56	1276	-	-	94.40	9.30	1100	-	92.5	4.14	-	-
15-Jul-05 <sup>b</sup>	-	-	-	-	-	-	874	-	99.9	3.82	-	-
9-Aug-05 <sup>a</sup>	19.05	1744	-	-	57.20	9.44	1000	-	123	5.1	-	-
9-Aug-05 <sup>b</sup>	-	-	-	-	-	-	1030	-	140	6.12	-	-
14-Sept-05 <sup>a</sup>	13.59	1154	-	-	99.80	8.97	790	-	110	3.54	-	-
14-Sept-05 <sup>b</sup>	-	-	-	-	-	-	806	-	118	5.18	-	-
5-Oct-05	14.82	970	-	-	82.70	8.98	736	-	89.3	2.83	-	-
9-Nov-05	8.43	1285	-	-	135.00	8.83	970	-	46	10 U	-	-
9-Dec-05	2.12	1361	-	-	14.20	9.71	980	-	64.6	3.11	-	-
19-Jan-06	6.66	728	7.96	-	64.70	10.13	470 J	-	40.7	2.29	-	-
16-Feb-06	2.63	624	9.75	30.3	25.20	8.54	530 J	-	13.3	1 U	-	-
15-Mar-06	7.16	639	11.61	236.8	23.10	9.22	530 J	-	22.5	1 U	-	-
7-Apr-06	11.91	1013	10.81	27.8	18.80	9.98	780	-	63.8	3.24	-	-
16-May-06	15.58	1160	7.58	50.6	16.50	9.57	950	-	77.9	2.49	-	-
23-Jun-06	18.63	1261	7.41	-	126.00	9.85	920	-	70.7	3.65	-	-
20-Jul-06	20.65	932	5.36	-35.1	279.00	8.94	980	-	108	3.48	-	-
22-Aug-06	15.65	860	7.64	86.5	218.00	9.22	760	-	116	3.84	-	-
26-Sep-06	21.86	903	8.98	-72.8	263.00	8.89	820	-	75.8	3.06	-	-
26-Oct-06	11.04	702	9.97	90.4	221.00	8.56	760	-	68.3	1.66	-	-
15-Nov-06	7.73	715	9.21	149.2	33.60	9.07	500	-	20.8	2.29	-	-
20-Dec-06	4.98	1082	9.05	86.3	9.29	9.78	680	-	51.3	2.67	-	-
24-Jan-07	2.12	1058	10.71	130.4	20.50	9.97	640 J	-	66.1	7.58	-	-
12-Feb-07	10.10	1218	12.40	-61.8	103.00	9.98	860	-	90.1	4.49	-	-
27-Mar-07	7.94	772	9.67	13.3	25.50	8.27	540 J	-	49.8	2.74	-	-
18-Apr-07	7.52	2418	9.23	84.4	58.10	11.73	1400	-	79.2	10.5	-	-
31-May-07	15.45	1879	6.47	-92.2	3.15	9.79	1300	-	165	8.11	-	-
20-Jun-07	24.18	1925	10.88	-52.1	251.00	10.24	1300 J	-	144	5.34	-	-
31-Jul-07	19.05	1418	5.97	-36.1	128.00	9.81	1200	-	140	7.23	-	-
29-Aug-07	18.00	1193	5.60	-35.4	158.00	9.29	1300 J	-	164	7.01	-	-
27-Sep-07	14.97	987	5.44	45.9	186.00	8.99	970	-	196	5.49	-	-
26-Oct-07	2.66	504	6.02	63.1	282.00	8.64	770 J	-	42.9	2.25	-	-
30-Nov-07	1.86	955	9.77	190.1	163.00	10.02	570	-	48.9	1.62	-	-
12-Dec-07	4.22	790	11.11	126.8	56.00	9.40	520	-	34.3	1.67	-	-
24-Jan-08	2.12	875	19.35	142.0	-	8.68	640	-	42.8	1.66	-	-
28-Feb-08	-	-	-	-	25.60	-	510	-	41.3	2.66	-	-
25-Mar-08	5.27	937	14.46	91.0	86.80	9.60	630	-	50.2	2.15	-	-
29-Apr-08	9.02	1079	10.56	190.8	61.30	9.87	670 J	-	66	2.87	-	-
20-May-08	15.42	1191	7.58	160.0	91.40	9.75	820	-	85.9	4.85	-	-
18-Jun-08	12.94	1124	9.62	167.3	76.90	9.65	810 J	-	77.6	3.67	-	-
26-Aug-08	15.95	880	3.75	53.5	490.00	8.00	650 J	-	76.9	1.64	144000	-
20-Nov-08	6.91	897	7.02	183.5	376.00	10.22	960	-	87.2	4.21	313000	-
12-Feb-09	1.29	-	13.72	-	10.20	10.52	800	-	118	5.84	271000	-
19-May-09	11.90	862	6.52	71.9	133.00	9.59	840 J	-	91.3	3.99	238000	-
18-Nov-09	5.70	852	6.61	185.9	68.00	9.88	490	-	40	4.4	160000	-
15-Dec-09	2.30	1162	8.22	460.1	63.30	9.97	640	-	71	7.2	220000	-
24-Mar-10	13.00	1299	5.83	408.2	13.00	10.48	1000	-	140	8.5	340000	-
17-Jun-10	12.00	947	4.45	332.1	33.60	10.56	540	-	62	6.2	220000	-
22-Sep-10	15.60	1736	3.14	342.5	33.00	9.84	1300	-	130	21	360000	-
8-Dec-10	5.40	1382	7.73	371.1	12.10	10.75	870	-	100	12	300000	-
29-Mar-11	9.60	627	5.16	577.6	19.80	11.05	760 J	-	78	3.1	270000	-
21-Jun-11	21.00	1778	5.46	239.1	11.60	10.44	1700 J	-	78	11	340000	-
27-Sep-11	14.80	1382	3.98	239.8	33.40	9.58	1600	-	120	13	670000	-
14-Dec-11	3.10	1046	5.60	281.7	15.70	9.93	1100	-	87	14	330000	-
20-Mar-12	6.10	986	11.04	271.1	11.70	10.32	500	-	71	3.3	180000	-
19-Jun-12	14.80	862	7.83	352.2	38.80	9.57	500	-	64	3.7	180000	-
20-Sep-12	12.40	1961	1.81	419.0	10.30	9.43	4600 J	-	130	2.1	440000	-
19-Dec-12	4.10	1320	10.11	303.1	5.86	9.69	700	-	75	4.3	250000	-
25-Feb-13	7.10	1963	9.30	234.7	26.60	11.30	1000	-	90	6	370000	-
22-May-13	10.50	4380	7.72	411.7	202.00	12.56	1400	-	25	11	530000	-
21-Aug-13	20.10	12850	1.24	-2.3	18.20	12.18	3430	-	106	47.5	1180000	-
20-Nov-13	5.70	1198	8.03	131.9	22.20	10.23	704	-	41.3	6.2	260000	-
1-Apr-14	9.80	1708	9.77	136.4	8.79	12.26	832	-	24.1	3	317000	-
23-May-14	12.63	6574	8.63	120.8	-	12.61	2120	-	4.8	35.4	811000	-
13-Aug-14	18.99	3273	6.29	77.7	89.00	12.34	1660	-	71.4	6.3 J	548000	-
11-Nov-14	8.80	578	3.55	179.2	62.50	12.73	2000	-	56.7	20.4	739000	-
11-Feb-15	9.70	487	9.97	66.2	42.00	9.40	337	-	9.1	0.9	87700	-
4-May-15	14.30	4210	5.60	281.2	7.67	12.53	1670	-	35.3	7.4	589000	-
5-Aug-15	19.90	4890	5.14	18.8	89.80	11.79	3080	-	85.4	18.1	1150000	-
3-Nov-15	9.20	760	6.39	129.9	34.60	9.78	707	-	23.5	5.3	235000	-
9-Feb-16	10.20	-	10.29	100.3	8.01	12.78	1330	-	5.3	24.8	530000	-
2-May-16 <sup>d</sup>	-	-	-	-	-	-	2490	-	24	37 J	996000	-
23-Aug-16	19.30	4250	3.95	386.5	46.30	11.76	2970	-	105	14.3	989000	-



**Table A-1b: Summary of Lower Disposal Area - Surface Water Sampling Results - Infiltration Ponds #1 Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters						Gen-Chem Total Dissolved Solids (mg/L)	Metals (ug/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>c</sup>	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
1-Nov-16	11.70	229	9.26	185.2	48.90	10.33	508	-	12.6	0.792	164000	-
1-Feb-17	2.40	8890	10.78	26.1	3.17	13.36	2220	-	10.1	46.8	854000	-
30-May-17	14.70	6800	56.90	17.7	1.38	12.73	1720	-	1.75	31.6 J+	759000	-
17-Aug-17	18.10	5410	3.88	-19.5	14.90	11.93	3080	-	62.6	32.8	1150000	-
10-Nov-17	7.90	2016	7.72	64.4	30.70	12.00	1520	-	63	32.2	578000	-
27-Feb-18	5.70	5062	8.76	42.0	3.74	12.28	1620	-	15	54.6	678000	-
1-May-18	12.30	6620	5.25	-	1.94	12.73	2070	-	2.42	30.1 J+	745000	-
21-Aug-18	23.85	5058	2.95	106.0	5.62	11.64	3090	-	77.3	28.8	1200000	-
6-Nov-18	11.70	1078	3.50	-5.4	46.90	8.48	1180	-	6.03	5.44	359000 J+	-
13-Mar-19	3.90	331	8.08	183.7	29.10	10.72	455	-	11.9	2.21	185000	-
8-May-19	17.20	6113	6.38	6.4	6.17	12.39	2040	-	7.7	26.8	830000	-
26-Aug-19	24.22	4177	2.47	Note 1	7.21	9.12	2840	-	17.2 J	5.27 J	1020000	-
13-Nov-19	8.70	2523	1.61	-201.7	33.00	8.67	1930	-	32.5	4.44	726000	-
12-Feb-20	7.80	971	7.99	150.3	16.00	7.92	836	-	14.3	3.96	243000	-
12-Aug-20	18.30	3655	4.33	123.5	5.74	8.98	2570	-	20.8	2.59	988000	-
9-Dec-20	8.30	740	7.80	202.0	18.40	8.21	632	-	14.9	5.11	207000	-
3-Mar-21	8.30	1446	7.87	217.0	15.50	8.56	1310	-	35.3	6.11	509000	-
9-Jun-21	15.10	2963	4.88	174.9	4.37	8.79	2400	-	23.7	1.51	923000	-
13-Oct-21	9.30	2563	4.73	34.2	39.30	8.84	2610 J-	16.1	19.7	6.12	831000	3.11
5-Jan-22	1.20	510	9.85	236.4	14.00	8.01	679	6.32	12.1	6.31	226000	3.36
16-Mar-22	11.10	786	10.41	172.1	12.8	7.45	733	7.59	10.6	4.77	236000	1.82
23-Jun-22	14.90	1982	2.58	156.8	5.3	8.34	1650	8.5	10.2	3.44	549000	0.97
28-Sep-22	16.20	3251.00	7.06	-49.10	3.18	8.75	2730 J	24	5.88	1.11	1040000	0.516
5-Jan-23	8.80	1047.00	8.40	191.00	8.47	8.16	1560	18.8	26.7	2.49	567000	4.45
13-Mar-23	7.20	1831.00	11.21	177.80	31.80	8.29	1050	8.27	16.3	5.8	401000	4

Notes:

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not analyzed or not available
- Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.
- a North Creek Analytical, Inc.
- b Severn Trent Laboratories
- c Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022
- d Field parameters for Infiltration Ponds #1 were inadvertently not collected during May 2016 sampling
- U Data validation code; not detected at the Reporting Limit (RL)
- J Data validation code; estimated value
- J+ Data validation code; estimated value with positive bias
- °C Degrees Celsius
- Note 1 ORP measurements not available due to faulty sensor.
- µmhos/cm Micromhos per centimeter mg/L
- feet bmp Feet below measuring point mV
- feet NAVD88 Feet NAVD88 Datum NTU



**Table A-1c: Summary of Lower Disposal Area - Surface Water Sampling Results - Weir  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters							Gen-Chem Total Dissolved Solids (mg/L)	Metals (ug/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	pH (standard units)	Weir Flow Rate (gpm)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	6.5-8.5	-	-	5.6	8	2.1	-	140
1-Feb-05	8.47	2205	-	-	6.24	10.23	-	1440	-	149	10.7	-	-
9-Mar-05	11.38	2054	-	-	7.80	10.15	2.64	1630	-	200	11.9	-	-
5-Apr-05	7.7	2169	-	-	7.99	10.42	10.00	1420	-	129	8.61	-	-
10-May-05	14.1	1912	-	-	562.00	9.87	25.00	1210	-	105	7.63	-	-
7-Jun-05	15.74	2588	-	-	11.60	10.03	6.82	1570	-	138	10.1	-	-
15-Jul-05 <sup>a</sup>	20.38	3184	-	-	8.91	10.36	0.94	3200	-	192	9.98	-	-
15-Jul-05 <sup>b</sup>	-	-	-	-	-	-	-	1990	-	189	10.8	-	-
9-Aug-05 <sup>a</sup>	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	-	-
9-Aug-05 <sup>b</sup>	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	-	-
14-Sept-05 <sup>a</sup>	15.60	3792	-	-	14.50	9.92	0.07	2800	-	208	57.8	-	-
14-Sept-05 <sup>b</sup>	-	-	-	-	-	-	-	2730	-	223	73.3	-	-
5-Oct-05	12.96	3237	-	-	4.99	9.89	0.32	2150	-	170	12.5	-	-
9-Nov-05	8.40	2545	-	-	13.80	9.64	7.50	1900	-	78.2	10 U	-	-
9-Dec-05	3.34	1377	-	-	8.03	10.43	5.00	1700	-	130	6.12	-	-
19-Jan-06	7.37	1424	7.92	-	12.20	10.61	7.50	1000 J	-	89.5	4.81	-	-
16-Feb-06	3.74	1680	12.19	*	14.60	10.78	7.50	1400 J	-	105	5.46	-	-
15-Mar-06	7.21	1634	12.61	194.4	7.44	10.63	5.28	1300 J	-	128	6.38	-	-
7-Apr-06	14.33	2055	8.54	55.3	9.21	10.84	3.17	1500	-	143	6.63	-	-
16-May-06	21.65	2474	6.09	11.6	9.37	10.69	0.83	2000	-	157	8.19	-	-
23-Jun-06	24.58	2820	6.66	-	15.40	11.64	0.63	1400	-	154	13.1	-	-
20-Jul-06	21.17	3291	8.56	-85.5	68.30	10.75	DRY*	2300	-	131	9.41	-	-
22-Aug-06	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	-	-
26-Sep-06	16.38	2997	3.00	-57.1	31.60	9.92	DRY*	2900	-	103	16.8	-	-
26-Oct-06	11.00	2650	5.35	59.6	25.80	9.65	0.63	2300	-	132	26.3	-	-
15-Nov-06	8.51	1708	8.16	-35.7	34.70	10.15	17.14	1200	-	67.4	8.07	-	-
20-Dec-06	5.07	1927	8.84	14.8	7.94	10.67	10.91	1200	-	99.7	4.78	-	-
24-Jan-07	2.30	1846	10.72	5.9	11.70	10.37	9.00	1100 J	-	126	16.1	-	-
12-Feb-07	9.26	1777	11.75	-91.3	26.70	10.56	6.00	1100	-	139	7.12	-	-
27-Mar-07	8.71	1219	9.18	-12.6	13.80	8.70	24.00	840 J	-	88.5	4.86	-	-
18-Apr-07	7.39	4563	8.65	41.0	16.80	12.12	9.00	2000	-	97.5	32.5	-	-
31-May-07	-	3916	6.33	-149.5	10.70	10.96	1.36	2100	-	275	22.9	-	-
20-Jun-07	22.59	3336	8.50	-20.4	42.50	10.46	0.29	2400 J	-	255	27.4	-	-
31-Jul-07	18.94	3915	7.85	-69.2	41.30	10.92	0.06	3300	-	236	12.6	-	-
29-Aug-07	21.52	2406	5.75	-5.3	24.10	9.72	DRY*	2300 J	-	129	8.45	-	-
27-Sep-07	13.88	2009	5.75	15.5	28.30	9.56	0.06	1600	-	207	4.37	-	-
26-Oct-07	7.68	1662	9.06	80.5	13.00	9.92	2.04	1800 J	-	132	7.53	-	-
30-Nov-07	4.34	2446	9.63	26.7	11.70	9.86	2.63	1600	-	135	8.27	-	-
12-Dec-07	5.88	2056	10.34	39.3	10.30	10.18	2.63	1500	-	105	5.73	-	-
24-Jan-08	3.05	1601	15.03	42.3	-	9.40	2.63	1000	-	87.4	4.06	-	-
28-Feb-08	-	-	-	-	9.22	-	4.13	1200	-	118	8.92	-	-
25-Mar-08	6.80	1622	12.37	95.1	16.40	9.98	5.25	1100	-	110	3.86	-	-
29-Apr-08	7.53	1997	9.10	137.4	11.90	10.29	7.50	1100 J	-	124	7.05	-	-
20-May-08	16.35	2504	9.03	77.4	32.90	10.92	7.50	1700	-	146	14.7	-	-
18-Jun-08	11.82	2925	8.32	68.3	25.70	11.14	1.69	1800 J	-	208	8.48	-	-
26-Aug-08	17.69	3376	7.98	62.8	41.10	10.43	0.84	2200 J	-	287	13.2	647000	-
20-Nov-08	8.10	1447	9.65	112.0	43.70	11.00	11.25	1400	-	121	16.2	485000	-
12-Feb-09	2.99	1214	14.46	-	14.60	10.93	4.06	1200	-	219	11.8	434000	-
19-May-09	13.05	1962	7.92	32.6	36.70	10.23	7.50	1800 J	-	210	13.7	521000	-
24-Sep-09	16.30	2792	1.59	263.8	13.70	8.82	DRY*	2400	-	130	53	730000	-
15-Dec-09	2.80	1702	7.47	343.0	-	10.18	6.67	1200	-	170	22	330000	-
24-Mar-10	13.80	2629	2.09	270.7	263.00	11.46	6.03	1800	-	180	20	600000	-
17-Jun-10	12.00	1876	0.01	-	157.00	10.76	14.15	1200	-	27	3.9	410000	-
20-Sep-10	11.40	3100	6.34	198.6	12.20	10.63	2.38	2800	-	250	40	580000	-
7-Dec-10	6.60	2455	4.03	154.0	11.00	11.61	16.69	1600	-	240	26	510000	-
30-Mar-11	8.10	848	0.22	136.1	31.50	13.08	58.61	940 J	-	91	9.9	330000	-
22-Jun-11	14.40	2286	5.68	164.2	13.20	11.28	5.68	2600 J	-	120	25	490000	-
27-Sep-11	16.20	1911	4.62	253.4	39.10	10.07	13.40	2100	-	170	45	880000	-
15-Dec-11	4.10	1439	7.40	139.4	10.60	10.33	6.65	1400	-	180	21	500000	-
20-Mar-12	5.20	1687	8.50	27.5	9.60	11.17	60.00	410	-	130	7.4	290000	-
18-Jun-12	14.70	2336	0.11	326.9	15.60	11.25	60.00	410	-	130	9.8	430000	-
20-Sep-12	15.30	2972	7.81	106.0	12.10	9.55	0.10	1400 J	-	130	2.2	450000	-
18-Dec-12	4.80	1908	9.34	-14.2	7.41	10.28	18.50	870	-	120	8.1	390000	-
26-Feb-13	5.80	6470	11.27	161.6	22.00	12.46	9.90	1800	-	99	62	710000	-
23-May-13	10.50	1625	9.14	291.8	14.40	9.93	4.84	980	-	94	21	310000	-
21-Aug-13	15.70	7260	7.69	51.6	9.00	10.71	0.32	2780	-	342	18.3	954000	-
19-Nov-13	8.10	2032	10.00	87.4	9.95	11.19	25.40	1270	-	70.8	16.9	487000	-
1-Apr-14	13.70	3420	9.11	129.4	59.00	12.57	20.77	1300	-	37.3	12	572000	-
23-May-14	12.83	986	11.63	105.7	-	9.36	-	822	-	47	13.9	274000	-
13-Aug-14	18.38	2000	5.52	63.6	8.93	8.02	2.00	1250	-	13.4	0.6	326000	-
11-Nov-14	6.70	259	9.77	164.8	4.27	8.09	1.50	955	-	19	0.2	315000	-
12-Feb-15	10.00	669	11.13	142.9	2.75	8.62	40.00	1490	-	14.9	1.8	155000	-
4-May-15	13.70	1293	8.69	181.7	155.00	9.38	0.09	1100	-	43.3	11.3	292000	-
5-Aug-15	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
3-Nov-15	9.70	1296	7.66	165.6	13.70	8.03	1.98	1200	-	11.4	0.8	355000	-
9-Feb-16	9.10	838	8.79	181.4	2.17	7.87	0.69	529	-	7.8	0.5 J+	145000	-
2-May-16	23.40	1126	6.16	128.1	7.59	7.63	DRY*	688	-	7.6	0.06 J-	162000	-
23-Aug-16	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
1-Nov-16	11.70	332	7.12	97.5	7.71	7.76	7.24	703	-	9.18	0.3	207000	-



**Table A-1c: Summary of Lower Disposal Area - Surface Water Sampling Results - Weir  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters							Gen-Chem Total Dissolved Solids (mg/L)	Metals (ug/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	pH (standard units)	Weir Flow Rate (gpm)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	6.5-8.5	-	-	5.6	8	2.1	-	140
1-Feb-17	2.30	925	11.55	39.1	2.04	7.71	0.30	567	-	4.9	0.09 J	135000	-
30-May-17	13.30	817	57.50	8.3	22.20	7.40	0.30	516	-	13.1	0.08 J+	94300	-
17-Aug-17	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
9-Nov-17	7.00	851	7.57	88.0	67.30	8.43	-	865	-	36.6	10.7	236000	-
27-Feb-18	5.50	498	10.68	106.0	5.39	8.60	-	503	-	9.7	1.23	127000	-
1-May-18	12.80	894	8.87	-	2.39	7.97	-	656	-	7.81	0.1 UJ	195000	-
21-Aug-18	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
7-Nov-18	8.50	1079	7.37	166.6	5.48	7.94	-	1030	-	15.7	0.089 J	322000 J+	-
11-Mar-19	5.00	525	9.79	146.3	1.28	7.76	-	541	-	4.21	0.1 U	133000	-
9-May-19	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
26-Aug-19	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
14-Nov-19	7.40	842	4.10	214.3	19.00	7.74	DRY*	783	-	11.3	0.076 J	242000	-
12-Feb-20	7.20	401	8.41	-38.3	2.47	7.53	3.96	348	-	4.81	0.1 U	86900	-
13-Aug-20	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
10-Dec-20	7.20	581	6.72	185.0	0.96	7.80	8	560	-	5.13	0.1 U	126000	-
4-Mar-21	4.90	427	7.11	146.0	2.50	7.86	3	424	-	3.7	0.114	80600	-
10-Jun-21	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
13-Oct-21	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
6-Jan-22	4.90	269	10.81	211.8	15.90	7.63	300	228	5.52	4.33	0.698	50500	1
17-Mar-22	7.00	410	9.46	157.2	0.91	7.43	8	394	5.37	3.5	0.055 J	86000	1
21-Jun-22	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
12-Sep-22	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
13-Dec-22	5.60	712	6.9	12.5	1.29	7.83	-	535	10.5	3.27	0.113 J+	111000	1.01
15-Mar-23	5.10	758.2	6.46	202.5	9.22	7.49	0.1	437	5.92	3.49	0.197	96000	0.825

Notes:

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- \* Sample collected from constructed wetland (alternative sampling location) upstream of weir
- Not analyzed or not available
- Dry Weir dry; unable to collect field parameters or samples
- Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.
- a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022
- U Data validation code; not detected at the Reporting Limit (RL)
- J Data validation code; estimated value
- J+ Data validation code; estimated value with positive bias
- °C Degrees Celsius
- µmhos/cm Micromhos per centimeter
- feet bmp Feet below measuring point
- feet NAVD88 Feet NAVD88 Datum
- gpm Gallons per minute
- mg/L Milligrams per liter
- mV Millivolts
- NTU Nephelometric Turbidity Unit

**Table A-1d: Summary of Lower Disposal Area - Surface Water Sampling Results - South Pond Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters						Gen-Chem Total Dissolved Solids (mg/L)	Metals (ug/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>c</sup>	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
1-Feb-05	7.13	9580	-	-	4.19	13.02	4080	-	174	24.3	-	-
9-Mar-05	14.28	9979	-	-	6.79	12.52	4640	-	240	42.1	-	-
5-Apr-05	9.90	10820	-	-	43.50	11.99	3830	-	133	9.85	-	-
10-May-05	15.10	6091	-	-	45.60	12.14	3270	-	92.9	25.5	-	-
7-Jun-05	14.49	8257	-	-	24.20	12.19	3780	-	132	24.7	-	-
15-Jul-05 <sup>a</sup>	18.34	6937	-	-	6.89	11.69	5000	-	281	31.8	-	-
15-Jul-05 <sup>b</sup>	-	-	-	-	-	-	4260	-	237	34.2	-	-
9-Aug-05 <sup>a</sup>	23.53	7654	-	-	17.1	10.26	6600	-	322	44.5	-	-
9-Aug-05 <sup>b</sup>	-	-	-	-	-	-	5580	-	340	37.1	-	-
14-Sept-05 <sup>a</sup>	18.55	6730	-	-	10.00	10.51	5100	-	235	19.3	-	-
14-Sept-05 <sup>b</sup>	-	-	-	-	-	-	4750	-	268	34.2	-	-
5-Oct-05	12.14	4323	-	-	17.60	9.80	3090	-	130	26.5	-	-
9-Nov-05	6.78	3784	-	-	11.80	11.12	2600	-	121	21.7	-	-
9-Dec-05	3.22	8745	-	-	12.90	12.85	3900	-	175	14.1	-	-
19-Jan-06	7.73	5215	5.43	-	13.30	12.52	2000 J	-	20.3	3.24	-	-
16-Feb-06	3.96	9342	8.97	231.2	9.08	12.30	4100 J	-	43	25.6	-	-
15-Mar-06	8.72	12910	9.59	222.1	7.64	12.60	5100 J	-	38.6	41.8	-	-
7-Apr-06	14.26	15220	6.90	18.9	3.65	12.92	5700	-	48.5	65.6	-	-
16-May-06	19.75	10880	2.61	33.8	15.40	12.46	5100	-	130	92.1	-	-
23-Jun-06	22.76	7586	2.98	-	14.10	12.65	5100	-	130	57.9	-	-
20-Jul-06	24.33	7457	0.73	-148.4	16.70	11.33	6400	-	272	51.3	-	-
22-Aug-06	15.03	7481	3.75	61.0	14.10	10.40	6100	-	318	33.2	-	-
26-Sep-06	17.30	8409	1.31	-312.4	15.10	12.38	5500	-	230	45.7	-	-
26-Oct-06	10.95	6075	4.10	-265.6	13.30	12.18	4600	-	243	41.5	-	-
15-Nov-06	8.07	5022	7.71	-152.7	21.50	12.24	2600	-	76.2	3.68	-	-
20-Dec-06	6.32	9148	5.73	-139.6	12.20	12.85	2900 J	-	46.1	1.28	-	-
24-Jan-07	2.15	12690	9.24	-98.4	9.74	13.10	3000 J	-	19.2	26.8	-	-
12-Feb-07	9.35	14110	8.43	-86.7	32.50	13.13	4700	-	96.2	83.5	-	-
27-Mar-07	9.16	10560	8.41	-46.2	7.42	11.31	2900 J	-	5.98	14.5	-	-
18-Apr-07	8.27	14570	8.32	10.8	10.30	12.79	5200	-	19.8	22.1	-	-
31-May-07	23.66	13410	6.42	-95.0	31.20	11.77	5100	-	78.4	50.4	-	-
20-Jun-07	26.35	10050	5.53	-195.7	27.90	12.29	5300 J	-	112	38.2	-	-
31-Jul-07	21.39	6666	4.76	-106.4	72.00	10.86	6300	-	208	68.8	-	-
29-Aug-07	22.61	6950	1.57	-193.4	61.80	12.05	6300 J	-	149	30.6	-	-
27-Sep-07	11.45	5059	2.66	-180.4	78.40	11.43	4800	-	190	17.4	-	-
26-Oct-07	6.98	4147	1.44	-204.7	39.50	12.48	3900 J	-	168	25.5	-	-
30-Nov-07	2.86	5030	8.50	-74.9	12.40	12.20	2600	-	121	14.3	-	-
12-Dec-07	4.45	3564	2.03	-141.8	20.70	10.93	2700	-	79.3	9.87	-	-
24-Jan-08	1.13	4859	4.10	-186.8	-	11.19	2200	-	86.1	6.79	-	-
28-Feb-08	-	-	-	-	18.10	-	2800	-	183	73.4	-	-
25-Mar-08	7.37	5413	7.88	-58.2	122.00	12.29	2900	-	182	13	-	-
29-Apr-08	8.43	3685	9.04	59.3	19.20	11.63	2400 J	-	152	16	-	-
20-May-08	18.03	3554	6.69	58.0	156.00	11.01	2100	-	137	38.3	-	-
18-Jun-08	13.01	5680	6.46	57.5	71.80	11.14	4000 J	-	279	34.4	-	-
26-Aug-08	18.02	2800	5.72	16.9	49.80	10.08	2500 J	-	91.7	18.6	557000	-
20-Nov-08	7.46	2011	9.04	38.3	23.60	10.49	2300	-	72.9	9.2	566000	-
12-Feb-09	1.63	1870	11.74	-	46.10	10.83	2300	-	129	17.2	738000	-
19-May-09	12.73	1895	5.37	-16.4	168.00	9.82	1700 J	-	78.9	11.3	515000	-
23-Sep-09	21.50	4190	0.09	175.1	14.40	9.70	4100	-	120	99	1300000	-
14-Dec-09	+	+	+	+	+	+	+	-	+	+	+	-
22-Mar-10	13.10	2480	-	342.0	15.60	10.05	1700	-	76	34	520000	-
17-Jun-10	13.40	2429	5.14	-	26.10	10.77	2100	-	120	89	630000	-
21-Sep-10	16.30	2733	1.10	216.8	21.50	9.81	2200	-	25	27	510000	-
8-Dec-10	6.00	1994	2.70	-	18.70	10.05	1400	-	53	18	490000	-
30-Mar-11	9.10	509	0.37	179.2	13.80	12.04	730 J	-	36	14	260000	-
21-Jun-11	21.60	2092	1.90	192.2	13.60	10.07	2800 J	-	62	29	380000	-
27-Sep-11	14.60	1516	9.34	220.4	32.50	9.34	1800	-	78	36	780000	-
15-Dec-11	3.00	1449	1.90	94.6	13.80	10.75	2100	-	140	74	630000	-
21-Mar-12	2.60	1088	8.10	285.7	13.10	9.95	780	-	30	7.2	240000	-
19-Jun-12	17.10	1747	5.54	345.3	10.80	9.93	780	-	70	29	400000	-
20-Sep-12	-	-	-	-	-	-	-	-	-	-	-	-
19-Dec-12	4.00	1771	6.37	104.0	6.12	10.71	1300	-	47	18	440000	-
26-Feb-13	6.90	3720	5.40	196.7	10.60	11.86	1100	-	140	39	690000	-
23-May-13	11.50	2335	5.21	323.5	44.10	12.48	1800	-	130	50	530000	-
22-Aug-13	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
19-Nov-13	8.20	1256	4.12	79.3	18.20	9.89	1260	-	39.8	20.4	487000	-
1-Apr-14	15.30	2053	4.42	130.9	772.00	11.27	1800	-	113	42.2	649000	-
23-May-14	14.15	2187	5.50	77.3	-	10.19	1860	-	112	23.6	623000	-
13-Aug-14	20.29	1298	5.35	40.1	24.80	9.63	949	-	44.9	22.8	306000	-
12-Nov-14	1.30	315	4.55	-0.5	22.10	10.45	2440	-	122	34.2	804000	-
12-Feb-15	11.10	1267	4.01	-8.2	23.90	10.20	905	-	27.2	9.6	320000	-
4-May-15	15.60	3200	4.35	240.5	9.21	10.42	2280	-	154	30.8	774000	-
5-Aug-15	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
3-Nov-15	8.30	1143	2.01	88.1	35.40	9.22	1050	-	28	28.2	364000	-
9-Feb-16	7.30	1672	3.45	95.9	7.79	10.45	1170	-	51 J+	34	410000	-
3-May-16	14.20	3150	3.61	335.2	63.80	10.35	2260	-	148	97.9 J-	777000	-
24-Aug-16	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-





**Table A-1d: Summary of Lower Disposal Area - Surface Water Sampling Results - South Pond Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters						Gen-Chem Total Dissolved Solids (mg/L)	Metals (ug/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>c</sup>	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
1-Nov-16	12.10	401	5.56	-65.9	15.00	9.43	742	-	21.9	14.1	356000	-
1-Feb-17	2.10	2064	4.82	5.0	17.80	10.27	1330	-	57.6	139	455000	-
31-May-17	14.50	2594	5.36	-	22.70	9.93	1920	-	105	51.5 J+	664000	-
17-Aug-17	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
9-Nov-17	6.50	1049	6.38	92.3	14.40	10.13	1260	-	58.8	53.4 J+	441000	-
27-Feb-18	6.50	1379	4.05	-71.0	6.11	10.94	865	-	61.7	47.7 J-	429000	-
2-May-18	11.60	2547	-	-	25.30	10.36	1860	-	85.9	26.7 J+	611000	-
22-Aug-18	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
7-Nov-18	9.70	995	6.72	126.8	20.60	9.15	1040	-	76	65.5	333000 J+	-
11-Mar-19	10.60	1354	5.93	-18.7	7.19	10.31	1270	-	49.3	41.7	458000	-
9-May-19	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
26-Aug-19	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
14-Nov-19	8.70	1180	5.98	30.9	7.38	9.03	1120	-	67.2	76.4	418000	-
13-Feb-20	4.30	1032	2.51	-126.9	6.10	10.46	927	-	28.1	13	348000	-
13-Aug-20	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
10-Dec-20	5.60	1000	2.52	66.8	6.02	9.66	952	-	12	6.63	318000	-
4-Mar-21	8.10	1271	1.98	38.0	8.02	10.35	4820	-	50.6	35.7	435000	-
10-Jun-21	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	-
13-Oct-21	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
6-Jan-22	4.50	305	10.57	-30.2	4.07	9.42	300	2.29	4.42	2.29	77100	4.27
17-Mar-22	8.80	997	8.53	-66.4	4.54	11.32	912	4.85	22.60	16.70	358000	37.80
21-Jun-22	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
12-Sep-22	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
13-Dec-22	4.1	1319	8.1	-51.9	15.8	9.45	1170	17.5	40.5	33.1	384000	79.3
15-Mar-23	8.9	1467	10.36	-7.6	6.57	9.33	913	2.75	8.5	4.84	347000	12.3

Notes:

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not analyzed or not available
- Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.
- + South Pond frozen; unable to collect field parameters or samples
- Dry South Pond dry; unable to collect field parameters or samples
- a North Creek Analytical, Inc.
- b Severn Trent Laboratories
- c Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022
- U Data validation code; not detected at the Reporting Limit (RL)
- J Data validation code; estimated value
- J+ Data validation code; estimated value with positive bias
- °C Degrees Celsius
- µmhos/cm Micromhos per centimeter
- feet bmp Feet below measuring point
- feet NAVD88 Feet NAVD88 Datum
- mg/L
- mV
- NTU

**APPENDIX A-2**

**Summary of Lower Disposal Area –  
Shallow/Alluvial Groundwater  
Sampling Results**

Table A-2A Well MW-1A  
Table A-2B Well MW-2A  
Table A-2C Well MW-3A  
Table A-2D Well MW-4A  
Table A-2E Well MW-5A  
Table A-2F Well MW-6A  
Table A-2G Well MW-7A  
Table A-2H Well MW-8A  
Table A-2I Well MW-9A  
Table A-2J Well MW-10A  
Table A-2K Well P-16  
Table A-2L Well P-17

**Table A-2a: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-1A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
15-Jul-05	35.43	578.01	15.17	883	-	-	358	7.03	664	-	8.47	2 U	-	-	
9-Nov-05	31.83	581.61	10.77	1037	-	-	22.2	6.89	680	-	3.45	1 U	-	-	
15-Feb-06	23.91	589.53	9.14	623	1.53	497.4	6.76	7.26	470 J	-	3.25	1 U	-	-	
17-May-06	31.91	581.53	11.32	1029	1.33	121.6	10.3	7.18	600	-	5.18	1 U	-	-	
23-Aug-06	35.35	578.09	19.21	481	5.97	60.4	6.3	6.67	340	-	1.7	1 U	-	-	
14-Nov-06	20.00	593.44	10.35	635	4.55	95.1	22.2	7.23	550	-	3.07	1 U	-	-	
14-Feb-07	29.29	584.15	11.13	435	3.88	85.6	32.1	6.76	260	-	2	1 U	-	-	
30-May-07	32.90	580.54	10.30	545	6.63	145.7	6.93	6.81	320	-	2.48	1 U	-	-	
27-Aug-07	35.68	577.76	10.49	428	7.13	76.7	8.65	6.95	260 J	-	1.87	1 U	-	-	
29-Nov-07	32.75	580.69	10.10	625	7.14	144.3	12.2	6.96	340 J	-	2.32	1 U	-	-	
27-Feb-08	27.83	585.61	-	-	-	-	19.6	-	320	-	2.58	1 U	-	-	
20-May-08	31.86	581.58	10.22	471	6.38	177.0	109	6.48	290 J	-	2.24	1 U	-	-	
27-Aug-08	36.04	577.40	9.84	427	7.40	118.4	63.6	7.08	260	-	2.05	1 U	23000	-	
26-Sep-08	Test Trench Drain Line Installed														
16-Oct-08	35.65	577.79	9.51	443	9.78	113.9	38	7.38	260 J	-	1.79	1 U	22900	-	
20-Nov-08	25.62	587.82	9.49	563	6.11	231.0	5.48	7.18	430	-	3.68	1 U	106000	-	
30-Dec-08	23.14	590.30	9.84	402	8.40	106.9	8.92	7.25	280 J	-	2.47	1 U	43900	-	
15-Jan-09	20.66	592.78	8.40	336	9.65	229.6	1.07	6.88	290	-	2.25	1 U	35700	-	
12-Feb-09	30.00	583.44	9.05	372	8.46	-	16.7	7.34	320	-	1.93	1 U	27000	-	
12-Mar-09	31.30	582.14	9.13	409	8.60	174.9	15.8	7.03	340	-	1.66	1 U	20600	-	
16-Apr-09	23.88	589.56	8.17	343	10.24	131.8	13.5	6.78	310	-	1.77	1 U	24600	-	
19-May-09	30.50	582.94	8.99	392	8.69	82.6	23.7	7.75	340 J	-	1.56	1 U	19600	-	
23-Jun-09	34.00	579.44	9.21	480	9.56	79.0	22.9	7.89	430	-	2 U	2 U	20000	-	
25-Aug-09	36.95	576.49	13.10	373	6.47	311.9	4.98	6.76	270 J+	-	0.64 J	2 U	17000	-	
23-Sep-09	37.12	576.32	11.30	336	6.90	368.3	21.3	6.73	240	-	2 U	0.18 J	14000	-	
15-Dec-09	28.30	585.14	9.20	643	5.30	567.0	18	6.72	330	-	2 U	2 U	26000	-	
24-Mar-10	30.03	583.41	9.80	562	5.72	545.9	5.04	6.74	370	-	1.9 J	2 U	19000	-	
16-Jun-10	23.55	589.89	9.20	506	5.93	405.4	16.1	6.53	40 U	-	3.6	2 U	20000	-	
21-Sep-10	35.89	577.55	10.40	593	4.82	288.5	117	6.96	370	-	2.6	0.23 J	19000	-	
7-Dec-10	27.39	586.05	10.00	504	1.45	198.4	139	7.15	330	-	2.3	2 U	14000	-	
29-Mar-11	29.76	583.68	8.10	247	2.47	169.0	6.81	7.14	300	-	2.4	2 U	15000	-	
21-Jun-11	30.45	582.99	9.30	606	4.58	332.9	3.56	7.17	400 J	-	5 U	2 U	16000	-	
27-Sep-11	36.65	576.79	9.90	366	7.27	356.2	2.18	6.85	310	-	5 U	2 U	17000	-	
14-Dec-11	31.53	581.91	9.20	407	1.97	234.7	20.4	7.09	370	-	5 U	2 U	16000	-	
20-Mar-12	21.60	591.84	7.70	561	7.06	385.4	4.8	7.18	280	-	2.3	0.4 U	16000	-	
19-Jun-12	21.60	591.84	10.00	575	7.04	378.2	5.6	7.31	330	-	2.5	0.4 U	16000	-	
19-Sep-12	36.42	577.02	11.30	561	8.76	286.0	2.49	7.02	310	-	2.4	0.4 U	17000	-	
19-Dec-12	23.43	590.01	9.30	671	6.67	348.2	0.74	7.26	20 U	-	1.7	0.4 U	17000	-	
25-Feb-13	29.32	584.12	8.00	572	9.51	337.0	26	7.28	300	-	2.5	0.4 U	16000	-	
22-May-13	31.23	582.21	9.00	518	8.59	397.7	4.68	7.40	310	-	1.8	0.4 U	15000	-	
21-Aug-13	37.02	576.42	10.20	534	9.27	152.7	1.46	7.11	227	-	1.2	0.1 U	14100	-	
20-Nov-13	29.69	583.75	9.50	852	7.62	243.5	39.5	6.75	419	-	1.6	0.1 U	19900	-	
1-Apr-14	23.29	590.15	8.90	347	7.60	248.1	2.54	7.30	247	-	2	0.1 U	16500	-	
21-May-14	28.31	585.13	9.50	349	4.02	178.6	-	7.12	280	-	1.8	0.1 U	15100	-	
13-Aug-14	36.52	576.92	12.10	441	9.22	51.9	6.2	7.10	283	-	1.4	0.1 U	15200	-	
13-Nov-14	31.63	581.81	11.50	438	8.80	173.0	14.7	7.10	352	-	1.6	0.1 U	17100	-	
11-Feb-15	23.02	590.42	9.40	498	3.89	98.1	10.5	7.72	319	-	9.1	0.3	42900	-	
4-May-15	31.93	581.51	9.80	578	7.35	416.9	1.05	7.26	413	-	1.7	0.1 U	16000	-	
6-Aug-15	37.65	575.79	10.70	447	0.17	71.6	49	7.21	343	-	3.9	0.1 U	10300	-	
4-Nov-15	32.89	580.55	9.50	657	8.56	240.5	5.7	6.92	554	-	2.3	0.1 U	49300	-	
10-Feb-16	25.39	588.05	9.80	322	7.36	204.8	3.21	7.31	202	-	2	0.1 U	22200	-	
2-May-16	32.32	581.12	10.80	579	5.95	250.2	4.7	7.02	350	-	1.8	0.04 J-	17800	-	
23-Aug-16	37.66	575.78	11.00	488	1.34	459.9	259	7.08	413	-	3.88	0.07 J	14600	-	
2-Nov-16	31.30	582.14	9.70	280	3.94	225.0	6.13	7.18	531	-	2.13	0.12	37700	-	
1-Feb-17	29.01	584.43	8.60	510	5.26	187.7	0.97	7.04	270	-	1.47	0.1 U	19000	-	
30-May-17	28.47	584.97	9.50	483	6.89	4.7	4.85	6.96	290	-	2.09	0.1 U	15700	-	
17-Aug-17	36.30	577.14	10.50	536	3.79	82.5	6.44	6.96	283	-	1.55	0.1 U	15500	-	
9-Nov-17	32.20	581.24	9.20	460	5.89	75.1	2.7	7.01	380	-	1.63	0.1 U	16300	-	
27-Feb-18	25.18	588.26	8.90	215	7.35	121.6	6.04	6.31	186	-	1.72	0.1 U	15500	-	
1-May-18	26.98	586.46	9.50	391	7.82	-	3.06	6.94	214	-	1.65	0.1 UJ	14100	-	
21-Aug-18	37.29	576.15	10.02	266	7.37	75.6	129	6.84	215	-	1.51	0.1 U	13300	-	
6-Nov-18	34.18	579.26	9.60	340	9.13	215.4	1	6.93	327	-	1.67	0.1 U	16600	-	
11-Mar-19	27.75	585.69	8.90	323	5.65	185.3	4.29	6.94	269	-	1.36	0.1 U	14400	-	
8-May-19	30.05	583.39	9.80	448	7.77	97.6	1.11	6.87	320	-	1.25	0.1 U	15100	-	
26-Aug-19	37.02	576.42	9.83	329	1.16	Note 1	7.97	7.11	258	-	0.904	0.1 U	10700	-	
13-Nov-19	35.13	578.31	9.20	376	5.50	144.0	8.26	6.87	320	-	1.23	0.1 U	15800	-	
12-Feb-20	20.38	593.06	9.00	381	2.58	191.6	1.33	7.15	268	-	1.25	0.1 U	26600	-	
12-Aug-20	36.61	576.83	9.50	285	5.01	198.7	0.8	6.96	214	-	1.14	0.1 U	14100	-	

**Table A-2a: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-1A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Antimony	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
9-Dec-20	32.05	581.39	9.10	425	7.17	211.0	1.57	6.86	347	-	1.11	0.1 U	17100	-
3-Mar-21	27.01	586.43	8.60	383	5.71	248.0	0.6	6.83	299	-	1.16	0.1 U	17400	-
9-Jun-21	35.32	578.12	9.20	422	8.47	151.0	2.22	6.68	310	-	1.39	0.1 U	16300	-
12-Oct-21	33.84	579.60	9.30	329	9.07	160.8	1.55	6.34	236 J-	0.846	1.13	0.1 U	12500	0.801
5-Jan-22	25.20	588.24	9.20	344	7.96	170.2	0.67	6.54	255	1.06	1.02	0.1 U	18100	0.782
16-Mar-22	23.67	589.77	9.30	386	7.79	155.0	0.96	5.60	350	1.58	1.33	0.1 U	36800	0.887
23-Jun-22	27.91	585.53	9.80	356	7.21	152.8	2.55	6.93	281	1.08	1.04	0.1 U	16500	0.86
23-Sep-22	37.05	576.39	13.2	312.5	6.93	128.4	2.84	6.91	222	0.83	1.2	0.137	14100	0.786
13-Dec-22	32.35	581.09	9.4	394.6	8.79	99.3	0.31	6.77	234	0.955	1.13	0.1 U	14500	0.791
13-Mar-23	29.36	584.08	8	584.2	9.22	90.2	0.29	6.85	298	0.86	1.27	0.053 J	14000	0.935

Notes:

Top of casing elevation (feet NAVD88): 613.44

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available
- Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.
- a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022
- U Data validation code; not detected at the Reporting Limit (RL)
- J Data validation code; estimated value
- J+ Data validation code; estimated value with positive bias
- °C Degrees Celsius
- Note 1 ORP measurements not available due to faulty sensor.
- µmhos/cm Micromhos per centimeter mg/L Milligrams per liter
- feet bmp Feet below measuring point mV Millivolts
- feet NAVD88 Feet NAVD88 Datum NTU Nephelometric Turbidity Unit

**Table A-2b: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-2A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
15-Jul-05	29.18	578.03	13.78	853	-	-	28.3	7.7	606	-	2 U	2 U	-	-	
9-Nov-05	25.64	581.57	10.95	860	-	-	3.82	7.43	550	-	1.31	1 U	-	-	
15-Feb-06	17.64	589.57	7.81	709	0.82	467.7	3.96	7.86	520 J	-	1.06	1 U	-	-	
17-May-06	25.76	581.45	9.67	810	2.17	246.1	3.01	7.06	490	-	1.13	1 U	-	-	
23-Aug-06	29.13	578.08	12.86	759	2.6	12	9.82	7.4	570	-	1.54	1 U	-	-	
14-Nov-06	13.74	593.47	10.44	649	3.72	63.6	9.78	7.72	460	-	1.36	1 U	-	-	
14-Feb-07	22.09	585.12	10.77	648	1.69	11.5	52.4	7.51	380	-	1.07	1 U	-	-	
30-May-07	26.72	580.49	11.46	732	2.05	72.2	12.8	7.44	480	-	1.17	1 U	-	-	
27-Aug-07	29.45	577.76	10.8	829	7.41	62.8	117	7.58	590 J	-	1.09	1 U	-	-	
29-Nov-07	26.57	580.64	10.74	899	2	81.1	392	6.05	490	-	1.03	1 U	-	-	
27-Feb-08	21.45	585.76	-	-	-	-	446	-	400	-	1.09	1 U	-	-	
20-May-08	25.73	581.48	9.48	706	3.07	110.2	419	7.26	420 J	-	1.21	1 U	-	-	
27-Aug-08	29.84	577.37	9.87	824	4.74	91.5	571	7.43	550 J	-	1.3	1 U	65100	-	
26-Sep-08	<i>Test Trench Drain Line Installed</i>														
16-Oct-08	29.13	578.08	9.76	820	4.56	53.6	227	7.33	520 J	-	1.3	1 U	76300	-	
20-Nov-08	19.48	587.73	9.31	462	5.24	240.1	6.16	7.35	360	-	1.76	1 U	67000	-	
30-Dec-08	16.93	590.28	9.85	480	6.18	66.8	56.1	7.35	390 J	-	1.55	1 U	61500	-	
15-Jan-09	14.46	592.75	7.71	402	7.47	177.8	1.61	7.61	360	-	1.57	1 U	58500	-	
12-Feb-09	23.84	583.37	9.63	-	8.72	-	74.9	7.54	390	-	1.3	1 U	48100	-	
12-Mar-09	25.15	582.06	9.11	454	7.22	163.7	573	7.19	400	-	1.17	1 U	43100	-	
16-Apr-09	17.72	589.49	8.4	417	8.27	126.4	128	7.26	400	-	1.4	1 U	48800	-	
19-May-09	24.38	582.83	8.8	448	6.88	72	178	7.95	410 J	-	1.1	1 U	44000	-	
23-Jun-09	27.85	579.36	8.95	507	7.76	61.9	256	8.07	490	-	2 U	2 U	39000	-	
25-Aug-09	30.68	576.53	10.5	707	6.94*	307.4	4.38	7.17	530 J+	-	2 U	0.18 J	49000	-	
23-Sep-09	30.84	576.37	11.2	661	5.41	374.7	15	7.28	500	-	2 U	2 U	51000	-	
15-Dec-09	22.10	585.11	9.5	720	5.1	579	39	6.92	380	-	2 U	2 U	42000	-	
24-Mar-10	23.82	583.39	10	602	4.1	535.3	43.3	6.93	370	-	1.7 J	2 U	39000	-	
17-Jun-10	17.45	589.76	9.3	547	4.06	-	157	6.57	350	-	3.9	2 U	39000	-	
22-Sep-10	29.66	577.55	10.2	722	5.77	360.2	7.2	7.22	450	-	3.3	2 U	55000	-	
8-Dec-10	22.10	585.11	9.9	566	6.69	-	64.6	7.09	350	-	2 U	2 U	35000	-	
29-Mar-11	19.94	587.27	8.4	251.3	6.95	620	28	7.13	250 J	-	1.4 J	2 U	30000	-	
21-Jun-11	24.25	582.96	9.9	628	5.23	344.3	37	7.29	410 J	-	5 U	2 U	28000	-	
28-Sep-11	30.41	576.8	9.5	57.5	6.54	481.7	13.8	7.24	500	-	5 U	2 U	54000	-	
14-Dec-11	25.35	581.86	9.3	441	3.86	346.5	386	7.26	440	-	5 U	2 U	29000	-	
20-Mar-12	15.45	591.76	7.7	580	1.53	382	32.3	7.4	280	-	2.2	0.4 U	26000	-	
19-Jun-12	23.88	583.33	9	590	1.85	388.1	55.7	7.74	320	-	2.5	0.4 U	23000	-	
19-Sep-12	30.18	577.03	11.1	695	7.03	297	9.31	7.41	420	-	2.7	0.4 U	42000	-	
19-Dec-12	17.24	589.97	9.4	704	6.33	317	55.2	7.4	310	-	1.7	0.4 U	25000	-	
25-Feb-13	23.12	584.09	9.1	585	6.04	339	110	7.46	370	-	2.5	0.4 U	24000	-	
22-May-13	25.05	582.16	8.6	537	8.41	391.5	12.3	7.51	310	-	1.9	0.4 U	22000	-	
21-Aug-13	30.75	576.46	10.6	684	8.42	150.2	5.85	7.74	419	-	1.5	0.2	27700	-	
20-Nov-13	23.51	583.7	9.6	513	6.19	230.4	32.1	6.81	364	-	1.3	0.1 U	27500	-	
1-Apr-14	17.11	590.1	8.5	386	7.32	243.1	14.6	7.46	294	-	1.4	0.1 U	31700	-	
21-May-14	22.07	585.14	9.1	365	6.02	212.7	-	6.93	273	-	1.3	0.1 U	24700	-	
12-Aug-14	31.32	575.89	13.16	552	6.56	76.7	6.8	7.36	394	-	1.5	0.1 U	25300	-	
13-Nov-14	25.48	581.73	12.3	459.5	7.22	189.8	7.2	7.19	367	-	1.4	0.1 U	25500	-	
11-Feb-15	16.83	590.38	9.3	447	6.76	134.4	36.6	7.52	286	-	1.7	0.1 U	30400	-	
4-May-15	25.78	581.43	10.2	619	6.27	407.1	7.7	7.36	382	-	1.4	0.1 U	25200	-	
6-Aug-15	31.87	575.34	11.3	500	9.18	207.1	28.1	7.23	394	-	1.5	0.1 U	22000	-	
4-Nov-15	26.74	580.47	9.9	481	8.76	222.6	16.8	6.88	381	-	1.1	0.1 U	21800	-	
10-Feb-16	19.19	588.02	9	376	7.35	206	40.2	7.68	261	-	3.6	0.1 U	37100	-	
2-May-16	26.14	581.07	11.3	552	3.19	194.5	87.8	7.35	344	-	2.1	0.01 J-	31200	-	
23-Aug-16	31.64	575.57	10.5	545	7.62	486.5	10.8	7.18	412	-	1.54	0.1 U	32600	-	
2-Nov-16	25.12	582.09	10.2	220	4.01	238.9	245	7.19	431	-	1.4	0.1 U	30600	-	
1-Feb-17	22.84	584.37	9.1	580	5.06	186.3	13.6	7.35	317	-	3.17	0.1 U	51100	-	
30-May-17	22.31	584.9	9.4	520	7.01	4.99	40.2	7.18	322	-	1.78	0.1 U	34100	-	
17-Aug-17	30.08	577.13	10.6	626	5.63	134.2	32.3	7.21	370	-	1.28	0.1 U	28900	-	
9-Nov-17	26.04	581.17	9.8	479.5	5.79	74.4	68.8	7	391	-	1.39	0.1 U	25400	-	
27-Feb-18	19.03	588.18	8.8	293.1	7.43	185.2	15.1	6.9	254	-	3.98	0.1 U	41900	-	
1-May-18	20.84	586.37	9.1	531	7.46	-	25	7.35	316	-	3	0.1 UJ	40600	-	
21-Aug-18	31.09	576.12	10.39	437	7.33	115.2	19.1	7.04	358	-	1.48	0.1 U	26900	-	
6-Nov-18	28.00	579.21	9.7	420.1	8.17	210.3	6.74	6.97	418	-	1.3	0.1 U	23400	-	
11-Mar-19	21.61	585.6	9	351.2	9.2	187.1	20.6	7.11	312	-	1.57	0.1 U	32700	-	
8-May-19	23.88	583.33	9.8	443.1	8.05	109.6	7.79	7.06	316	-	1.66	0.1 U	32900	-	
26-Aug-19	30.90	576.31	10.91	495	8.65	Note 1	12.7	6.91	394	-	1.28	0.1 U	21100	-	
13-Nov-19	28.91	578.3	9.8	506	7.81	180.4	14.4	6.87	429	-	1.34	0.1 U	22900	-	
12-Feb-20	14.21	593	8.1	319.3	9.95	189.3	14.6	7.27	277	-	1.95	0.1 U	56300	-	
12-Aug-20	30.41	576.8	9.5	463.3	6.6	185.5	72.9	7.03	359	-	1.2	0.1 U	22400	-	
9-Dec-20	25.91	581.3	9.4	533	6.44	213	9.96	6.97	400	-	1.38	0.49 J	26800	-	
3-Mar-21	20.83	586.38	8.9	330	5.24	216.5	12.4	7.18	268	-	1.8	0.219	61100	-	

**Table A-2b: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-2A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	-	5.6	8	2.1	-	140
9-Jun-21	29.14	578.07	9.1	459.8	8.65	193.6	1.34	6.88	360 J	-	1.25	0.058 J	21800	-	
12-Oct-21	27.75	579.46	10.4	595	9.33	188.2	0.56	6.53	439 J-	1.19	1.1	0.1 U	21900	1.07	
6-Jan-22	19.05	588.16	10.2	466.3	4.66	197.7	2.69	7.14	368	3.24	1.89	0.1 U	80700	1.19	
16-Mar-22	17.54	589.67	8.4	304.1	9.88	154.6	6.43	6	291	3.26	1.85	0.218	60900	1.15	
23-Jun-22	21.76	585.45	9.5	442.6	6.06	158.8	1.49	7.10	369	1.94	1.5	0.1 U	37500	1.15	
23-Sep-22	30.87	576.34	11.2	471.5	8.5	190.3	2.04	6.82	351	0.923	1.17	0.13	23300	1.18	
13-Dec-22	26.24	580.97	9.9	557	8.35	117.4	4.38	6.81	319	1.17	1.28 J	0.218 J+	21800	1.59	
14-Mar-23	23.24	583.97	8.6	664.2	7.67	174.1	0.97	7.08	368	1.65	1.49	0.1 U	28800	1.03	

Notes:

Top of casing elevation (feet NAVD88): 607.21

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

\* Dissolved Oxygen meter working incorrectly at the time of sample collection

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit



**Table A-2c: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-3A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
15-Jul-05	6.09	683.02	13.8	1124	-	-	30.3	6.96	922	-	2.41	2 U	-	-	
10-Nov-05	5.50	683.61	10.8	1518	-	-	2.32	6.88	960	-	10.5	1 U	-	-	
15-Feb-06	5.31	683.80	9.52	1357	0.46	217.4	58.2	6.33	930 J	-	6.66	1 U	-	-	
16-May-06	6.25	682.86	10.4	1296	0.96	91	11.4	6.91	910	-	10.1	1 U	-	-	
22-Aug-06	8.85	680.26	12.84	1362	1.28	-64.8	56	6.97	900	-	12.1	1 U	-	-	
13-Nov-06	5.03	684.08	11.24	1392	2.12	-74.4	234	6.89	910	-	5.73	1 U	-	-	
16-Feb-07	5.55	683.56	8.99	1155	0.75	-71.3	12.3	6.96	770	-	3.74	1 U	-	-	
30-May-07	6.72	682.39	11.86	1297	0.75	-25.2	12.5	7.04	790	-	5.2	1 U	-	-	
27-Aug-07	8.38	680.73	12.65	1483	0.71	-96.3	15.3	6.73	1100 J	-	8.74	1 U	-	-	
28-Nov-07	5.66	683.45	10.47	1363	1.05	-72.9	26.9	7.31	730	-	4.24	1 U	-	-	
27-Feb-08	5.57	683.54	-	-	-	-	121	-	860	-	9.76	1 U	-	-	
19-May-08	5.94	683.17	9.39	1346	0.66	-52.6	20	6.93	820 J	-	6.64	1 U	-	-	
26-Aug-08	6.44	682.67	12.15	1495	0.85	-53.6	5.85	6.88	820	-	3.42	1 U	30300	-	
18-Nov-08	5.50	683.61	10.5	975	1.87	-67.4	225	6.93	880 J	-	7.48	1 U	62500	-	
11-Feb-09	5.62	683.49	7.67	877	0.98	-	68	7.28	810	-	5.2	1 U	50600	-	
19-May-09	5.60	683.51	8.52	847	0.91	-63.4	52	8.21	750 J	-	2.51	1 U	49500	-	
22-Sep-09	8.36	680.75	15.7	1149	0.1	132.1	75.1	7.05	910	-	6.6	2 U	53000	-	
17-Dec-09	4.59	684.52	8.9	1300	0.4	194	401	7.08	710	-	2 U	2 U	62000	-	
24-Mar-10	5.40	683.71	11.2	1010	0.12	-	226	6.76	800	-	3.8	2 U	46000	-	
16-Jun-10	5.27	683.84	10.1	1123	0.2	188	6.19	8.43	570	-	13	2 U	49000	-	
21-Sep-10	6.01	683.10	12.7	1314	0.19	177.7	2.97	6.91	1,000	-	6.2	0.19 J	160000	-	
7-Dec-10	5.23	683.88	9.7	1183	0.23	182.7	25.3	6.86	840	-	3.2	2 U	82000	-	
30-Mar-11	5.04	684.07	8.3	498	0.28	174	4.93	7.89	700	-	3.6	2 U	36000	-	
22-Jun-11	6.77	682.34	9.7	895	0.43	172.2	9.18	7.01	700 J	-	5 U	2 U	34000	-	
28-Sep-11	7.83	681.28	12.6	99	0.18	141.8	6.07	6.83	840	-	8.8	2 U	83000	-	
15-Dec-11	5.40	683.71	9	785	0.6	179.8	24.4	6.98	760	-	4.5 J	2 U	73000	-	
20-Mar-12	4.96	684.15	7.1	1092	0.16	22.6	12.1	7.11	470	-	5.2	2 U	73000	-	
19-Jun-12	6.76	682.35	10.3	1077	0.11	198.6	11.3	7.07	660	-	12	0.4 U	78000	-	
20-Sep-12	8.67	680.44	12.3	1235	0.15	111	1.96	6.99	710	-	11	0.05 J	100000	-	
18-Dec-12	4.98	684.13	8.7	1450	0.3	-40.6	18.7	7.25	740	-	4.8	0.4 U	150000	-	
26-Feb-13	5.25	683.86	7.8	1211	0.15	186.6	27.8	7.21	740	-	4.7	0.4 U	98000	-	
23-May-13	6.56	682.55	9.9	1000	0.18	242.3	16.9	7.21	460	-	14	2.8	150000	-	
21-Aug-13	9.01	680.10	12.1	917	0.12	-14.2	1.24	7.27	772	-	7.6	0.05 J	94000	-	
19-Nov-13	6.09	683.02	9.9	697	0.07	61.8	2.93	6.77	852	-	12.3	0.2	169000	-	
1-Apr-14	5.75	683.36	9	722	0.1	131.3	4.47	7.07	624	-	10.5	0.06 J	104000	-	
22-May-14	5.80	683.31	9.8	580	1.08	185.3	-	6.85	494	-	5.2	0.1	66500	-	
13-Aug-14	8.54	680.57	11.48	915	2.85	-67.6	8.16	7.09	740	-	6.9	0.1 U	116000	-	
12-Nov-14	5.97	683.14	11.1	313.7	2.79	-85.1	15.3	6.87	744	-	6.9	0.1 U	89100	-	
12-Feb-15	5.50	683.61	9.8	980	0.52	-54.5	1.28	7.04	696	-	4.2	0.1 U	73200	-	
4-May-15	5.80	683.31	10.8	994	0.17	143.4	15.4	7.12	701	-	9.3	0.1 U	100000	-	
5-Aug-15	10.12	678.99	12.6	881	0.13	-90.4	0.89	7.07	724	-	7.3	0.1 U	70300	-	
3-Nov-15	5.30	683.81	12	865	1.23	105.5	5.06	6.97	1020	-	1.7	0.2	195000	-	
9-Feb-16	5.14	683.97	9.1	954	0.55	154.6	4.82	7.03	625	-	3.4	0.1 U	92700	-	
2-May-16	4.74	684.37	11.3	844	0.19	96.8	2.21	7.16	621	-	10.5	0.04 J-	105000	-	
23-Aug-16	9.04	680.07	13.2	946	0.03	156.2	3.48	6.97	924	-	8.19	0.09 J	148000	-	
1-Nov-16	6.18	682.93	11.9	349	0.15	18.5	2.43	7.11	744	-	2.63	0.1 U	180000	-	
1-Feb-17	5.91	683.20	7.5	1114	0.17	-67.4	6.05	7.08	694	-	6.4	0.1 U	100000	-	
30-May-17	7.40	681.71	10.4	753	2.2	8.59	3.28	7.12	465	-	9.52	0.1 U	89300	-	
17-Aug-17	9.71	679.40	12.4	1101	0.25	-60.2	3.39	7.01	737	-	8.47	0.1 U	72000	-	
9-Nov-17	6.06	683.05	9.6	833	0.64	75.3	2.01	7.08	748	-	1.84	0.1 U	191000	-	
27-Feb-18	5.16	683.95	7.6	791	0.21	-75.4	9.52	6.64	506	-	2.97	0.1 U	92000	-	
1-May-18	5.41	683.70	10	847	0.93	-	5.82	7.36	547	-	3.81	0.1 UJ	120000	-	
21-Aug-18	10.81	678.30	14.54	909	2.96	-17.2	1.67	6.92	722	-	6.48	0.1 U	101000	-	
7-Nov-18	5.85	683.26	11.2	931	0.66	179	0.87	6.97	828	-	2.03	0.073 J	202000 J+	-	
11-Mar-19	5.26	683.85	6.1	477.5	1.25	53.7	2.39	7.34	486	-	1.44	0.1 U	125000	-	
9-May-19	5.44	683.67	10.2	678	3.72	-9.4	1.85	7.04	574	-	3.02	0.083 J	143000	-	
26-Aug-19	9.30	679.81	13.96	1041	0.6	Note 1	0.02	6.83	843	-	6.15	0.1 U	142000	-	
13-Nov-19	5.58	683.53	9.4	803	0.31	12.8	0.02	6.97	724	-	2.2	0.077 J	174000	-	
12-Feb-20	5.10	684.01	7.8	349.3	0.37	-62.4	1.4	7.25	287	-	1.86	0.1 U	74200	-	
13-Aug-20	9.33	679.78	11.8	884	0.64	-81.6	4.28	6.76	683	-	10.9	0.1 U	119000	-	
10-Dec-20	5.08	684.03	8.5	688	3.06	210	0.9	7.29	566	-	2.36	0.159	128000	-	

**Table A-2c: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-3A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Antimony	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
4-Mar-21	5.26	683.85	7	364	0.59	47	1.54	7.42	319	-	1.52	0.134	74200	-
9-Jun-21	6.24	682.87	11.4	706	0.96	-50.2	4.12	7.03	540	-	6.48	0.204	124000	-
12-Oct-21	5.34	683.77	12.3	1611	2.92	133.4	5.25	6.63	1070 J-	15.6	3.31	0.4	93200	2.14
6-Jan-22	5.10	684.01	7.5	269.6	2.33	189.1	1.84	7.38	242	8.89	2.04	0.265	53400	2.61
17-Mar-22	4.97	684.14	7.5	269.6	2.33	189.1	1.84	7.38	252	3.39	1.98	0.169	53200	0.88
21-Jun-22	5.21	683.9	11.2	439.4	0.19	181.3	0.66	7.03	368	0.966	3.66	0.075 J	75400	0.39
13-Sep-22	11.25	677.86	15.3	910	4.92	85.7	9.15	6.49	689	0.973	5.42	0.137	91100	0.507
12-Dec-22	5.32	683.79	7.7	817	4.09	205.2	1.29	7.15	475	9.5	1.72	0.115 J+	99800	1.26
15-Mar-23	5.02	684.09	6.1	669.2	1.38	203.9	0.95	7.34	393	5.15	2.42	0.147	91100	1.19

Notes:

Top of casing elevation (feet NAVD88): 689.11

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit





**Table A-2d: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-4A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem. Total Dissolved Solids (mg/L)	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
13-Feb-20	3.70	701.75	7.9	283.7	2.98	102.2	0.91	6.18	283	-	0.176 J	0.1 U	859	-
13-Aug-20	7.73	697.72	13.5	334.3	0.62	58.3	0.51	6.19	238	-	0.711	0.1 U	921	-
10-Dec-20	3.45	702.00	9.8	364	6.11	169	1.56	6.51	297	-	0.296	0.1 U	1260	-
4-Mar-21	3.72	701.73	8.3	304	2.83	137	0.49	6.47	255	-	0.192 J	0.1 U	876	-
10-Jun-21	5.32	700.13	11.9	338.7	1.23	108.5	0.73	6.09	220	-	0.228	0.1 U	787	-
15-Oct-21	7.69	697.76	12.6	341.3	6.91	133.9	20.5	6.37	363 J-	0.18 J	0.99	0.151	1480	4.09
7-Jan-22	3.40	702.05	8.7	248.4	4.37	211.1	3.08	6.29	270	0.2 U	0.383	0.1 U	774 J	1.73
18-Mar-22	3.52	701.93	9.1	340.6	3.26	123.8	1.85	6.63	320	0.2 U	0.279	0.1 U	1140	1.53
22-Jun-22	3.83	701.62	10.1	327.8	1.36	114.5	0.46	6.36	263	0.2 U	0.201	0.1 U	666	1.16
14-Sep-22	8.9	696.55	13.4	389.4	2.46	87.6	2.53	6.02	330	0.2 U	0.385	0.1 U	1080	1.19
14-Dec-22	3.88	701.57	9.1	278	7.03	135.4	0.44	6.35	224	0.2 U	0.188 J	0.1 U	583	1.42
16-Mar-23	3.39	702.06	7.9	468.9	4.44	111.7	2.92	6.3	264	0.2 U	0.159 J	0.1 U	616	1.13

Notes:

Top of casing elevation (feet NAVD88): 705.45

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-2e: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-5A Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
15-Jul-05	33.33	577.90	12.02	956	-	-	496	7.34	600	-	2.01	2 U	-	-	
10-Nov-05	29.62	581.61	11.24	1212	-	-	27.6	7.32	800	-	8.4	1 U	-	-	
15-Feb-06	21.70	589.53	6.45	665	2.59	280.3	11.1	7.86	520 J	-	22.3	1 U	-	-	
17-May-06	29.80	581.43	7.74	831	0.88	101.9	8.67	7.79	580	-	11	1 U	-	-	
23-Aug-06	33.25	577.98	15.19	737	1.76	33.5	19.6	7.32	660	-	2.53	1 U	-	-	
14-Nov-06	17.79	593.44	10.86	699	4.5	76.3	38.7	7.55	490	-	3.15	1 U	-	-	
16-Feb-07	27.08	584.15	8.08	630	6.07	2.3	57.6	8.26	500	-	14.4	1 U	-	-	
30-May-07	30.75	580.48	9.6	894	2.59	13.3	13.4	7.76	540	-	8.43	1 U	-	-	
29-Aug-07	33.60	577.63	9.56	684	7.64	67	-	7.1	670 J	-	1.97	1 U	-	-	
29-Nov-07	30.60	580.63	11	1075	3.53	151.5	23.5	8.37	560	-	5.17	1 U	-	-	
27-Feb-08	25.68	585.55	-	-	-	-	29.9	-	400	-	10.7	1 U	-	-	
20-May-08	29.73	581.50	7.93	768	4.27	180.7	77.8	7.39	480 J	-	5.67	1 U	-	-	
27-Aug-08	33.97	577.26	10.17	862	4.07	81.2	-	7.43	540 J	-	1.17	1 U	87500	-	
26-Sep-08	Test Trench Drain Line Installed														
16-Oct-08	33.55	577.68	8.89	845	5.39	86.3	852	7.53	440 J	-	1.03	1 U	90700	-	
20-Nov-08	23.48	587.75	9.34	577	5.27	234.3	9.48	7.5	470	-	6.24	2 U	138000	-	
30-Dec-08	20.88	590.35	8.39	510	8.89	99	44.8	8.02	430 J	-	14.2	1.11	138000	-	
15-Jan-09	18.50	592.73	4.97	347	8.9	154.8	17.2	8.47	380	-	24.4	1 U	104000	-	
12-Feb-09	27.90	583.33	8.47	-	10.21	-	22	7.6	420 J	-	6.11	1 U	99000	-	
12-Mar-09	29.19	582.04	7.47	521	6.15	171.7	26.8	7.39	480	-	8.97	1 U	124000	-	
16-Apr-09	21.70	589.53	6.99	456	7.6	151.6	72.7	8.66	470	-	28.2	1.01	126000	-	
19-May-09	28.37	582.86	8.08	509	6.38	64.4	31.3	8.07	450 J	-	9.19	1 U	105000	-	
23-Jun-09	31.95	579.28	8.84	551	5.97	69.1	74.3	8.28	500	-	4.3	2 U	71000	-	
25-Aug-09	35.08	576.15	-	-	-	-	-	-	-	-	-	-	-	-	
24-Sep-09	35.29	575.94	11.7	714	2.28	371.9	258	7.26	550 J	-	0.76 J	0.17 J	88000	-	
15-Dec-09	26.11	585.12	8.6	928	2.89	544	89	7.14	450	-	1.1 J	2 U	110000	-	
24-Mar-10	27.86	583.37	8.3	697	3.52	505.1	18.1	7.47	450	-	23	0.46 J	110000	-	
16-Jun-10	21.35	589.88	10.7	783	2.07	379	41.4	7.73	340	-	53	0.0021	150000	-	
22-Sep-10	33.88	577.35	10.4	938	4.3	467.1	7.93	7.1	620	-	5	2 U	100000	-	
7-Dec-10	25.22	586.01	10.2	781	3.86	353.7	11.1	7.39	500	-	12	0.53 J	130000	-	
29-Mar-11	23.59	587.64	7	354	3.47	708	22.22	9.52	440 J	-	63	1.4 J	140000	-	
21-Jun-11	28.33	582.90	11.6	1000	2.22	285.3	10.6	9.06	1100 J	-	43	1.2 J	180000	-	
27-Sep-11	34.70	576.53	12.7	641	1.46	307.2	12.8	7.3	680	-	5 U	0.23 J	100000	-	
14-Dec-11	29.46	581.77	9.5	691	1.95	757.1	9.69	7.35	690	-	6.9	0.18 J	180000	-	
20-Mar-12	19.50	591.73	6.2	841	3.98	320.2	8.52	8.25	350	-	26	1 J	140000	-	
19-Jun-12	27.91	583.32	10.2	800	3.22	365.9	2.76	7.66	510	-	8.7	0.4 U	120000	-	
20-Sep-12	34.53	576.70	11	859	0.73	387	46.8	7.64	530	-	2.6	0.4 U	100000	-	
19-Dec-12	21.26	589.97	8.9	983	1.73	279	778	7.71	530	-	11	0.62	180000	-	
25-Feb-13	27.19	584.04	7.5	682	7.61	330.5	4.36	7.85	380	-	13	0.15 J	74000	-	
22-May-13	29.09	582.14	8.8	828	3.88	411.4	8.11	8.29	350	-	25	0.53	100000	-	
21-Aug-13	35.15	576.08	17.1	1248	3.41	114.2	144	7.78	1060	-	1.5	0.05 J	95000	-	
20-Nov-13	27.45	583.78	10	1032	4.13	196.5	31.7	7.18	699	-	14.5	1.4	202000	-	
1-Apr-14	21.08	590.15	8.4	567	3.04	168.2	15.7	10.24	413	-	62.7	1.5	150000	-	
21-May-14	26.11	585.12	10.3	670	0.49	198.4	-	7.45	565	-	95	1.6	166000	-	
12-Aug-14	34.56	576.67	14.07	812	3.64	87.7	1519	7.51	560	-	3	0.1 U	107000	-	
13-Nov-14	29.48	581.75	12.9	1135	3.5	241.7	10.46	7.69	956	-	20.8	0.1	295000	-	
11-Feb-15	20.81	590.42	7.7	619	6.17	81.4	18	9.63	430	-	39.2	1.3	126000	-	
4-May-15	29.80	581.43	10.5	924	2.54	361.3	8.7	9.74	623	-	42.3	0.5	192000	-	
6-Aug-15	36.08	575.15	12.8	781	2.4	129.6	261	7.24	DRY	-	DRY	DRY	DRY	-	
4-Nov-15	30.80	580.43	10.7	1234	4.98	205.6	11.8	7.13	1130	-	6.6	0.3	318000	-	
10-Feb-16	23.56	587.67	6.4	602	1.62	197.7	11.9	10.19	451	-	132	1.4	148000	-	
2-May-16	30.19	581.04	11.5	1008	0.8	110.6	9.76	10.14	751	-	171	2.7 J-	232000	-	
23-Aug-16	35.79	575.44	13.1	729	2	436.2	51.4	7.2	1010	-	4.01	0.1 U	137000	-	
2-Nov-16	29.06	582.17	10.9	570	4.98	103.1	32.1	7.55	1180	-	11.2	0.56	372000	-	
1-Feb-17	26.86	584.37	8.1	992	2.21	99.7	7.19	9.73	632	-	109	0.971	194000	-	
30-May-17	26.86	584.37	10.5	814	6.12	5.83	5.74	9.73	487	-	42.5	0.36 J+	168000	-	
17-Aug-17	34.23	577.00	11.7	1054	5.43	125.1	5.68	7.65	731	-	6.52	0.1 U	156000	-	
10-Nov-17	29.96	581.27	10	1077	4.65	85.2	10.5	7.18	953	-	5.82	0.338	308000	-	
27-Feb-18	23.02	588.21	7.7	584	1.91	120.4	12.6	9.96	530	-	86.3	0.642	174000	-	
1-May-18	24.85	586.38	9.1	1082	2.16	-	11.8	10.34	682	-	113	0.775 J+	196000	-	
21-Aug-18	35.17	576.06	14.83	1095	4.02	131	123	7.4	936	-	3.65	0.1 U	214000	-	
6-Nov-18	32.00	579.23	10.3	1192	5.93	198.1	2.35	7.49	1200	-	4.87	0.077 J	163000 J+	-	
13-Mar-19	25.12	586.11	7.4	695	2.19	189.7	15.8	9.48	632	-	44.1	0.633	200000	-	
8-May-19	27.89	583.34	10.7	844	4.95	60.5	5.19	9.3	697	-	41.9	0.677	182000	-	
26-Aug-19	35.02	576.21	11.89	1111	1.52	Note 1	22.9	7.26	995	-	2.46	0.1 U	177000	-	
13-Nov-19	33.00	578.23	9.8	932	5.27	66.1	0.02	7.18	776	-	3.89	0.1 U	211000	-	
12-Feb-20	18.23	593.00	7	533	7.58	140.4	10.6	8.32	463	-	6.31	0.145	183000	-	
12-Aug-20	34.50	576.73	11.2	1381	4	125	2.75	7.52	1250	-	5.37	0.1 U	333000	-	
9-Dec-20	29.90	581.33	9.8	1105	4.51	222	8.32	7.29	897	-	3.12	0.295	263000	-	
3-Mar-21	24.81	586.42	9.2	899	3.04	225	3.09	7.6	792	-	3.74	0.132	247000	-	

**Table A-2e: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-5A Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Antimony	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
9-Jun-21	33.20	578.03	9.3	875	5.23	184	1.26	7.27	700	-	2.62	0.063 J	205000	-
13-Oct-21	31.70	579.53	9.5	1934	5.97	194	9.56	7.22	DRY	DRY	DRY	DRY	DRY	DRY
5-Jan-22	23.00	588.23	9.2	972	4.7	271.1	1.4	7.18	829	6.42	3.38	0.085 J	252000	1.8
16-Mar-22	21.48	589.75	7.8	724	7.0	187	2.65	6.6	711	6.01	4.02	0.11	223000	1.52
23-Jun-22	25.74	585.49	9.6	969	3.5	173.1	1.13	7.38	881	5.49	3.29	0.093 J	251000	1.82
23-Sep-22	35	576.23	11.5	1640	3.45	223.6	1.35	7.42	1720	4.57	3.21	0.156 J	455000	1.58
13-Dec-22	30.22	581.01	10.4	928	7.08	109.2	2.27	7.04	634	3.54	1.89	0.105 J+	173000	1.25
13-Mar-23	27.15	584.08	8.1	1685	5.49	172.5	1.43	7.47	1090	5.83	3.39	0.068 J	318000	1.64

Notes:

Top of casing elevation (feet NAVD88): 611.23

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available
- Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.
- Dry Well went dry during sampling. Unable to collect sample.
- a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022
- U Data validation code; not detected at the Reporting Limit (RL)
- J Data validation code; estimated value
- J+ Data validation code; estimated value with positive bias
- °C Degrees Celsius
- Note 1 ORP measurements not available due to faulty sensor.
- µmhos/cm Micromhos per centimeter
- feet bmp Feet below measuring point
- feet NAVD88 Feet NAVD88 Datum
- mg/L Milligrams per liter
- mV Millivolts
- NTU Nephelometric Turbidity Unit



**Table A-2f: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-6A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (umhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Antimony	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
15-Jul-05	30.89	578.06	15.26	735	-	-	303	7.6	612	-	2 U	2 U	-	-
10-Nov-05	27.25	581.70	11.79	700	-	-	13.7	7.51	460	-	2.16	1 U	-	-
15-Feb-06	19.42	589.53	6.17	759	2	162.9	9.42	8.27	550 J	-	7.54	1 U	-	-
17-May-06	27.55	581.40	11.99	835	1.31	248.3	4.16	7.46	550	-	11	1 U	-	-
23-Aug-06	30.99	577.96	15.92	862	1.6	-26.4	15.5	7.4	810	-	1.34	1 U	-	-
14-Nov-06	15.30	593.65	10.56	712	4.59	84.1	14.5	7.32	500	-	1.71	1 U	-	-
16-Feb-07	24.22	584.73	8.49	581	3.64	38.6	139	7.21	420	-	1.6	1 U	-	-
30-May-07	28.50	580.45	13.93	1092	2.72	180.7	210	7.4	740	-	16.2	1 U	-	-
29-Aug-07	31.34	577.61	10.15	701	4.48	84.8	662	7.8	620 J	-	1.41	1 U	-	-
29-Nov-07	28.32	580.63	11.3	731	6.23	154	-	6.26	420	-	1.78	1 U	-	-
27-Feb-08	23.42	585.53	-	-	-	-	-	-	410	-	1.47	1 U	-	-
20-May-08	27.49	581.46	8.14	791	3.93	176.5	-	7.64	540 J	-	8.18	1 U	-	-
27-Aug-08	31.72	577.23	9.33	776	4.83	142	-	7.32	660 J	-	1.86	1 U	109000	-
26-Sep-08	<i>Test Trench Drain Line Installed</i>													
16-Oct-08	31.29	577.66	9.17	923	4.6	115.4	-	7.13	590 J	-	1.85	1 U	106000	-
20-Nov-08	21.18	587.77	9.7	578	5.22	249.4	11.7	7.4	460	-	4.42	2 U	110000	-
30-Dec-08	18.64	590.31	8.45	448	9.27	137.9	75.8	7.89	370 J	-	11.9	1.14	106000	-
15-Jan-09	16.23	592.72	6.84	344	9.25	181.9	2.77	7.47	320	-	4.88	1 U	72900	-
12-Feb-09	25.64	583.31	7.89	-	10.82	-	71.7	7.7	420	-	11	1 U	103000	-
12-Mar-09	26.92	582.03	7.27	524	8.31	166.7	116	7.76	500	-	23.5	1 U	125000	-
16-Apr-09	19.46	589.49	7.33	406	7.57	182.8	91.8	8.33	430	-	24.1	1.09	101000	-
19-May-09	26.10	582.85	9.07	554	6.39	65.6	161	8.32	550 J	-	13.4	1 U	115000	-
23-Jun-09	29.67	579.28	9.51	522	6.05	71.4	-	8.17	540	-	3.1	2 U	74000	-
25-Aug-09	32.72	576.23	14.8	795	3.25	282.7	22	7.28	630 J	-	0.75 J	2 U	100000	-
24-Sep-09	32.93	576.02	10.6	745	4.02	361.3	29.8	7.27	560 J	-	0.28 J	2 U	100000	-
15-Dec-09	23.87	585.08	9.5	815	4.2	556	20	7.15	450	-	2 U	2 U	120000	-
24-Mar-10	25.61	583.34	8.5	704	4.93	205.6	20.5	8.53	490	-	47	0.9 J	140000	-
16-Jun-10	19.11	589.84	10.4	553	4.79	399.8	13.4	7.22	310	-	16	2 U	90000	-
22-Sep-10	31.61	577.34	11.3	1019	3.89	413.8	20.3	7.1	770	-	6.2	0.24 J	130000	-
8-Dec-10	23.10	585.85	87.9	751	6.24	437.1	9.55	8.77	520	-	43	1.3 J	130000	-
29-Mar-11	21.32	587.63	7.1	303	4.76	809.4	13.4	9.35	350 J	-	43	0.55 J	110000	-
21-Jun-11	26.04	582.91	11.2	840	3.24	300.2	8.5	8.4	790	-	18	0.58 J	110000	-
28-Sep-11	32.43	576.52	10.9	66.6	3.92	415.6	8.32	7.3	590	-	5 U	0.19 J	110000	-
14-Dec-11	27.19	581.76	9	605	1.56	329.9	21.9	7.89	570	-	11	0.79 J	150000	-
20-Mar-12	17.23	591.72	6.7	639	5.03	362.5	59.9	7.79	200	-	17	2 U	79000	-
19-Jun-12	25.63	583.32	9.6	681	5.24	373.2	5.94	7.43	430	-	7.4	0.4 U	76000	-
19-Sep-12	32.12	576.83	11.7	786	3.49	290	7.36	7.38	460	-	5.7	0.4 U	81000	-
19-Dec-12	19.00	589.95	8.9	977	4.55	308	26.9	7.98	440	-	20	1.3	150000	-
25-Feb-13	24.93	584.02	7.1	766	7.59	306.9	6.18	8.2	450	-	34	0.73	120000	-
22-May-13	26.84	582.11	9.1	705	3.94	412.9	5.97	9.33	430	-	43	0.52	140000	-
21-Aug-13	32.84	576.11	11.2	879	4.54	110.2	8.28	8.28	548	-	9.5	0.1 U	106000	-
20-Nov-13	25.21	583.74	11.1	1264	4.69	201.4	30.8	7.55	640	-	24.9	1.9	163000	-
1-Apr-14	18.81	590.14	8.4	448	3.5	194.9	14.7	8.87	342	-	14.8	0.3	78400	-
21-May-14	23.84	585.11	10.6	122	1.32	199.3	-	8.46	352	-	18	0.2	80400	-
13-Aug-14	32.25	576.70	12.46	796	5.77	54	8.01	8.68	628	-	16.1	0.1 U	165000	-
13-Nov-14	27.21	581.74	13.3	837	4.02	234.3	11.4	8.63	711	-	44.1	0.4	203000	-
11-Feb-15	18.54	590.41	8.4	609	1.75	16	87.4	9.71	435	-	36.2	1	117000	-
4-May-15	27.52	581.43	9.9	974	3.27	356.5	12.3	10.14	654	-	41.6	0.5	199000	-
6-Aug-15	33.98	574.97	11.7	822	1.77	113.7	4.02	8.83	670	-	19.1	0.1 U	210000	-
4-Nov-15	28.51	580.44	11.7	1207	4.85	206.3	21.2	7.48	1090	-	7.7	1	370000	-
10-Feb-16	20.96	587.99	6.9	712	2.3	145.8	20.1	10.82	575	-	121	1.1	173000	-
2-May-16	28.91	580.04	10.6	1856	0.19	111.2	15.6	11.53	1010	-	199	2.5 J	347000	-
23-Aug-16	33.58	575.37	11.4	1241	0.43	462	8.89	9.51	1150	-	38.9	0.341	349000	-
2-Nov-16	26.92	582.03	11.6	409	5.05	14.4	40.6	9.15	911	-	25.6	1.49	297000	-
1-Feb-17	24.61	584.34	6.2	1757	2.34	72.1	11.7	11.97	880	-	141	0.336	283000	-
30-May-17	24.56	584.39	10.8	1026	2.45	5.69	16.9	10.5	629	-	72.8	0.52 J+	210000	-
17-Aug-17	32.04	576.91	13.1	1019	3.94	87.3	42.7	9.36	726	-	20.3	0.15	219000	-
10-Nov-17	27.72	581.23	11.6	1090	4.17	109.6	38.2	9.12	931	-	24.3	2.77	356000	-
27-Feb-18	20.78	588.17	7	823	3.99	59.3	12	11.29	635	-	99.3	0.561	203000	-
1-May-18	22.58	586.37	8.9	1442	3.52	-	17.7	11.49	817	-	119	0.831 J+	250000	-
21-Aug-18	33.09	575.86	13.18	1153	1.01	139.8	9.68	10.06	989	-	53.6	0.345	334000	-
6-Nov-18	29.74	579.21	11.1	1719	3.85	218.4	6.49	8.13	1860	-	3.04	0.367	701000 J+	-
13-Mar-19	22.90	586.05	5.8	748	5.04	145.7	32	10.55	737	-	39.1	0.455	246000	-
8-May-19	25.63	583.32	9.1	936	5.95	75.9	7.6	10.38	747	-	54.7	1.27	246000	-
26-Aug-19	32.90	576.05	11.18	1622	0.88	Note 1	6.57	8.97	1510	-	18.8	0.507	478000	-
13-Nov-19	30.92	578.03	10.2	1320	1.45	172.7	5.1	8.33	1140	-	6.31	0.1 U	422000	-
12-Feb-20	15.95	593.00	7.7	437.7	1.4	150.6	19.7	8.13	379	-	2.12	0.1 U	122000	-
12-Aug-20	32.30	576.65	11	2360	2.25	162.9	13.4	8.16	2060	-	6.28	0.088 J	709000	-
9-Dec-20	27.60	581.35	10.8	1750	1.95	209	22	8.22	1500	-	3.14	0.984	539000	-
3-Mar-21	22.58	586.37	7.1	760	1.74	208	5.6	8.04	722	-	3.09	0.307	243000	-



**Table A-2f: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-6A Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Antimony	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
9-Jun-21	31.07	577.88	9.8	2077	4.83	197.3	1.81	8.08	1900	-	5.03	0.094 J	707000	-
13-Oct-21	29.39	579.56	11.2	2509	4.77	188.6	13.1	7.64	DRY	DRY	DRY	DRY	DRY	DRY
6-Jan-22	20.72	588.23	7.3	1136	8.21	229.4	2.04	7.98	1040	7.89	2.41	0.115	333000	0.912
16-Mar-22	19.23	589.72	7.3	828	7.3	176.4	3.63	7.57	808	7.90	2.85	0.155	255000	0.935
23-Jun-22	23.49	585.46	11.2	916	3.74	163.1	0.76	7.66	836	7.00	2.09	0.073 J	265000	0.977
23-Sep-22	32.92	576.03	14.8	2281	3.73	199.3	2.05	8.05	2150	7.64	4.97	0.2 U	646000	2.52
13-Dec-22	27.98	580.97	12.4	1915	6.1	80.4	3.77	7.98	1350	12.4	5.64	0.865 J+	495000	1.26
14-Mar-23	24.91	584.04	6.8	2029	8.44	212.6	0.76	7.71	1190	6.7	1.87	0.1 U	387000	0.801

Notes:

Top of casing elevation (feet NAVD88): 608.95

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

mg/L Milligrams per liter

feet bmp Feet below measuring point

mV Millivolts

feet NAVD88 Feet NAVD88 Datum

NTU Nephelometric Turbidity Unit

**Table A-2g: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-7A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
13-Oct-21	13.61	579.08	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	
10-Jan-22	4.73	587.96	7.00	467	5.45	197.0	2.99	7.34	419	3.89	2.07	0.1 U	98000	1.04	
21-Mar-22	3.21	589.48	7.3	691	6.38	66.2	1.52	7.46	632	6.23	2.88	0.071 J	179000	1.34	
22-Jun-22	7.45	585.24	12	541	1.88	107.5	0.47	7.21	387	2.91	1.78	0.1 U	65500	1.19	
14-Sep-22	16.9	575.79	13.6	548	4.46	141	0.5	6.31	444	1.63	1.49	0.1 U	54000	1.16	
14-Dec-22	12	580.69	8	514	5.35	170.1	0.41	7.07	335	1.64	1.18	0.1 U	42700	0.798	
17-Mar-23	8.90	583.79	5.3	755	2.7	205.3	0.85	7.16	412	1.51	1.45	0.1 U	55300	0.774	

Notes:

Top of casing elevation (feet NAVD88): 592.69

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

<sup>a</sup> Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-2h: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-8A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
13-Oct-21	23.91	577.58	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	
6-Jan-22	13.55	587.94	9.5	670	3.99	239.1	4.50	7.05	595	5.21	6.64	0.1 U	169000	3.87	
21-Mar-22	12.11	589.38	8.0	587	7.13	45	3.32	7.71	536	4.76	7.48	0.1 U	163000	3.84	
22-Jun-22	16.4	585.09	9.4	773	2.99	96	0.94	7.22	699	5.17	8.13	0.1 U	197000	4.73	
12-Sep-22	26	575.49	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	
13-Dec-22	21.16	580.33	10.4	1011	6.13	122.1	1.22	7.07	721	4.53	5.37	0.1 U	205000	3.61	
17-Mar-23	17.86	583.63	9.2	1216	4.6	214.5	0.8	7.19	714	4.71	7.2	0.1 U	218000	4.22	

Notes:

Top of casing elevation (feet NAVD88): 601.49

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit



**Table A-2i: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-9A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Antimony	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
15-Oct-21	4.38	692.91	12.20	956	1.45	-93.2	2.70	7.11	981 J-	0.659	4.79	0.139	16000	1.2
7-Jan-22	2.45	694.84	8.50	381	4.86	189.9	1.43	6.95	404	0.181 J	1.02	0.056 J	2910	1.03
18-Mar-22	2.38	694.91	8.50	423	5.19	138.3	1.17	7.16	403	0.154 J	0.788	0.1 U	2470	0.776
22-Jun-22	2.38	694.91	10.5	485.8	4.42	72.8	0.85	6.89	399	0.244	0.656	0.052 J	2130	0.916
14-Sep-22	8.7	688.59	13.5	509	3.84	130.2	1.09	6.44	441	0.154 J	1.05	0.1 U	2780	1.13
14-Dec-22	2.5	694.79	8	413.5	7.42	135.6	0.53	6.91	328	0.132 J	0.599	0.1 U	1630	0.867
16-Mar-23	2.39	694.9	6.6	556.2	5.25	120.9	1.6	6.85	337	0.119 J	0.508	0.1 U	1660	0.812

Notes:

Top of casing elevation (feet NAVD88): 697.29

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-2j: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well MW-10A  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
15-Oct-21	19.04	678.98	10.7	390	4.24	-115.0	27.80	7.93	383 J-	0.705	4.04	0.383	9700	2.87	
6-Jan-22	5.55	692.47	9.3	168	7.06	94.6	6.90	7.50	141	0.151 J	1.13	0.109	2660	1.03	
17-Mar-22	5.39	692.63	9.4	151	7.12	95.1	6.21	6.50	139	0.2 U	0.91	0.061 J	1880	0.807	
21-Jun-22	5.89	692.13	11.5	114.9	7.92	191.1	4.48	6.80	116	0.2 U	0.764	0.081 J	1150	1.02	
13-Sep-22	14.24	683.78	12	221.3	6.64	189.1	3.74	6.78	195	0.201	1.54	0.082 J	2350	1.56	
13-Dec-22	14.93	683.09	9.8	395.9	4.71	179.4	5.19	7.34	200	0.173 J	1.3	0.1 U	2060	1.1	
15-Mar-23	5.64	692.38	8.4	179.4	8.78	145.7	2.07	6.85	108	0.2 U	0.541	0.1 U	892	0.727	

Notes:

Top of casing elevation (feet NAVD88): 698.02

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

µmhos/cm Micromhos per centimeter mg/L Milligrams per liter

feet bmp Feet below measuring point mV Millivolts

feet NAVD88 Feet NAVD88 Datum NTU Nephelometric Turbidity Unit

**Table A-2k: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well P-16  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
15-Oct-21	2.41	700.46	12.30	2622	0.71	-261.2	56.2	12.11	2640 J-	9.16	232	41.1	826000	445	
6-Jan-22	2.35	700.52	8.10	2804	1.06	-409.7	1.1	12.75	2420	9.63	109	14.6	809000	292	
17-Mar-22	2.73	700.14	8.4	2600	1.16	-421.2	23.5	13.71	2570	8.14	124	10.5	771000	255	
22-Jun-22	2.71	700.16	11.6	2757	0.04	-105.8	27.4	12.19	2200	9.62	124	17.1	713000	285	
13-Sep-22	4.33	698.54	14.9	2609	1.26	-427.3	31.8	11.63	2160	5.92	103	42.7	756000	431	
13-Dec-22	2.86	700.01	8.2	4004	3.49	-393.6	21	11.01	2390	6.52	55.2	12	820000	213	
15-Mar-23	2.49	700.38	7.1	4819	0.04	-332.2	52.2	12	2520	9.34	166	11.1	829000	317	

Notes:

Top of casing elevation (feet NAVD88): 702.87

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-2I: Summary of Lower Disposal Area - Shallow/Alluvial Groundwater Sampling Results - Well P-17  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
15-Oct-21	4.89	715.43	14.00	464	0.98	-97.5	38.1	6.49	444 J-	1 U	16.4	13.1	9700	105	
7-Jan-22	3.65	716.67	6.90	389	1.13	-60.4	4.1	6.46	388	1.26	2.81	0.1 U	8030	1.8	
18-Mar-22	4.12	716.2	8.4	404.4	1.46	23.7	5.41	7.33	362	1.38	1.34	0.1 U	13300	1.08	
22-Jun-22	6.87	713.45	11.7	586	0.26	-57.6	2.87	6.44	398	0.68	6.73	0.2 U	3560	2.99	
14-Sep-22	13.31	707.01	14.3	706	1.91	-63.2	2.12	6.1	489	1 U	7.67	0.5 U	3570	2.99	
14-Dec-22	5.47	714.85	9.7	469.3	3.17	-85.9	3.75	6.51	377	1	2.69	0.1 U	7820	1.6	
16-Mar-23	5.05	715.27	7.6	630	0.22	-42.4	7.01	6.5	293	0.816	3.46	0.1 U	7590	1.54	

Notes:

Top of casing elevation (feet NAVD88): 720.32

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**APPENDIX A-3**

**Summary of Lower Disposal Area –  
Bedrock Groundwater Sampling  
Results**

Table A-3A Well MWB-1LDA  
Table A-3B Well MWB-2LDA  
Table A-3C Well MWB-3LDA

**Table A-3a: Summary of Lower Disposal Area - Bedrock Groundwater Sampling Results  
- Well MWB-1LDA Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
19-Dec-06	26.51	678.17	10.96	546	0.43	-115.4	1.05	7.70	310	151	1 U	-
14-Feb-07	26.08	678.60	10.62	397	1.02	-90.8	3.07	7.53	240	160	1 U	-
31-May-07	25.96	678.72	10.83	386	0.36	-172.8	4.20	8.20	220	122	1 U	-
27-Aug-07	25.66	679.02	10.97	372	0.76	-128.2	1.08	7.51	240	89.9	1 U	-
28-Nov-07	26.81	677.87	10.56	371	0.42	-121.2	1.29	8.03	220	88.3	1 U	-
27-Feb-08	25.80	678.88	10.62	371	2.01	-	1.07	-	230	80.9	1 U	3000 U
20-May-08	25.62	679.06	10.61	391	0.36	-53.0	1.11	7.28	230	64.3	1 U	-
27-Aug-08	26.14	678.54	10.58	394	0.50	-63.9	1.02	7.35	230 J	64	1 U	3000 U
19-Nov-08	25.16	679.52	10.33	269	0.45	-88.6	0.48	7.51	230	59.6	1 U	3000 U
11-Feb-09	25.08	679.60	10.04	268	0.48	-	0.97	7.89	230	56	1 U	3000 U
18-May-09	24.83	679.85	10.10	271	0.42	-50.5	1.81	8.05	230 J	46.6	1 U	3000 U
24-Sep-09	26.32	678.36	11.80	323	0.24	202.0	3.59	7.57	260	27	2 U	1100 J
17-Dec-09	25.06	679.62	10.10	370	0.94	179.0	4.16	7.77	<40	34	2 U	1200 J
23-Mar-10	24.83	679.85	10.90	344	0.21	397.4	3.17	7.57	240	25	2 U	1300 J
15-Jun-10	24.38	680.30	10.50	355	0.08	195.5	0.42	7.66	150	27	2 U	1100 J
20-Sep-10	25.74	678.94	10.50	354	0.06	192.9	0.20	7.65	200	22	2 U	1100 J
6-Dec-10	24.59	680.09	10.00	347	0.09	99.3	0.17	7.86	230	22	2 U	1000 J
28-Mar-11	24.01	680.67	10.00	173	0.16	90.6	0.88	7.58	200	22	2 U	1000 J
20-Jun-11	24.11	680.57	10.30	330	0.07	121.5	0.17	7.65	250	22	2 U	900 J
26-Sep-11	25.39	679.29	10.40	2906	0.06	123.6	0.43	7.65	280	15	2 U	1100 J
14-Dec-11	24.61	680.07	9.90	245	0.10	193.8	1.76	7.57	230	21	2 U	1200 J
21-Mar-12	23.70	680.98	10.10	392	0.07	392.0	0.22	7.47	240	23	2 U	1100 J
18-Jun-12	23.90	680.78	10.50	383	0.02	342.8	0.30	7.67	230	20	0.4 U	3300 U
19-Sep-12	25.38	679.30	10.30	402	0.01	151.0	0.44	7.63	220	19	0.4 U	1000 J
18-Dec-12	23.59	681.09	10.10	492	0.00	-45.7	0.16	7.70	92	17	0.4 U	1200 J
25-Feb-13	23.73	680.95	9.90	377	0.00	177.1	0.37	7.53	270 J	19	0.4 U	1000 J
22-May-13	23.85	680.83	9.90	398	0.00	430.4	0.44	7.73	290	17	0.4 U	3300 U
21-Aug-13	25.34	679.34	10.40	467	0.01	-31.7	0.55	7.68	238	16.8	0.08 J	1060
19-Nov-13	24.25	680.43	10.10	361	0.00	70.3	0.32	7.30	232	15.7	0.1 U	1040
31-Mar-14	22.36	682.32	10.70	286	0.01	107.4	0.21	7.79	211	13.8	0.1 U	1020
21-May-14	23.29	681.39	8.54	271	1.35	54.3	-	7.14	198	13.1	0.1 U	1000
12-Aug-14	24.87	679.81	14.79	335	0.41	-16.0	2.02	7.05	216	11.9	0.1 U	1010
11-Nov-14	24.96	679.72	10.10	262	0.79	11.1	1.51	7.49	221	13.6	0.1 U	1090
10-Feb-15	23.23	681.45	10.40	319	0.25	-114.0	0.36	7.70	240	13.3	0.1 U	960
4-May-15	23.62	681.06	10.20	370	0.05	175.1	0.16	7.70	224	11.7	0.1 U	960
4-Aug-15	25.30	679.38	11.00	279	0.06	-30.5	0.72	7.72	234	14.4	0.1 U	990
4-Nov-15	25.35	679.33	10.60	263	0.00	51.2	0.46	7.46	233	11	0.1 U	1150
8-Feb-16	23.03	681.65	10.20	319	0.03	206.5	0.20	7.77	210	12.1	0.1 U	1050
2-May-16	23.49	681.19	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
22-Aug-16	25.00	679.68	11.10	323	0.02	-55.2	1.10	7.64	Monitored Annually <sup>1</sup>			
1-Nov-16	24.29	680.39	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
31-Jan-17	23.06	681.62	10.20	391	0.05	169.3	0.13	7.66	223	11.9	0.1 U	1030
30-May-17	22.45	682.23	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
16-Aug-17	24.27	680.41	10.70	385	0.15	123.4	0.40	7.64	Monitored Annually <sup>1</sup>			
9-Nov-17	35.09	680.27	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
28-Feb-18	22.04	682.64	10.10	276	0.20	-96.4	0.25	7.44	221	10.8	0.1 U	951
1-May-18	22.11	682.57	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
22-Aug-18	24.42	680.26	11.37	277	5.25	-59.6	0.18	7.61	Monitored Annually <sup>1</sup>			
6-Nov-18	24.57	680.11	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
11-Mar-19	22.61	682.07	10.10	248	0.60	-70.8	0.68	7.60	224	8.74	0.1 U	1070
8-May-19	22.68	682.00	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
27-Aug-19	24.54	680.14	11.45	282	0.58	Note 1	0.04	7.30	Monitored Annually <sup>1</sup>			
13-Nov-19	24.15	680.53	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
13-Feb-20	22.04	682.64	10.10	280	0.34	-133.4	0.57	7.51	207	8.82	0.1 U	1050
13-Aug-20	23.92	680.76	11.00	284	0.60	-113.5	0.44	7.55	Monitored Annually <sup>1</sup>			
9-Dec-20	23.35	681.33	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
5-Mar-21	22.01	682.67	10.20	266	0.04	-50.0	0.42	7.64	214	10.5	0.1 U	1120



**Table A-3a: Summary of Lower Disposal Area - Bedrock Groundwater Sampling Results  
- Well MWB-1LDA Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
10-Jun-21	23.17	681.51	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
13-Oct-21	24.41	680.27	10.90	327.2	0.91	-76.1	0.33	7.48	Monitored Annually <sup>1</sup>			
5-Jan-22	22.00	682.68	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
17-Mar-22	21.89	682.79	10.7	259.6	1.24	-60.4	0.22	6.52	220	8.2	0.1 U	925
21-Jun-22	21.58	683.1	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
12-Sep-22	23.51	681.17	11.3	263.3	2.86	-7.4	0.37	6.76	Monitored Annually <sup>1</sup>			
12-Dec-22	23.51	681.17	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
15-Mar-23	22.00	682.68	10.3	372.2	0.17	-86.5	0.13	7.66	221	8.35	0.1 U	864

Note:

Top of casing elevation (feet NAVD88): 704.68

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021.

Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

- Not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit



**Table A-3b: Summary of Lower Disposal Area - Bedrock Groundwater Sampling Results  
- Well MWB-2LDA Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
19-Dec-06	36.82	704.84	12.15	394	0.57	114.6	1.84	7.58	230	8.49	1 U	-
14-Feb-07	36.30	705.36	11.69	339	1.40	-85.7	2.72	7.39	200	6.09	1 U	-
31-May-07	36.93	704.73	12.13	346	0.20	-223.7	3.04	8.28	210	6.95	1 U	-
27-Aug-07	37.99	703.67	12.18	336	0.49	-169.7	0.84	7.54	210	7.49	1 U	-
28-Nov-07	37.89	703.77	11.82	338	0.28	-146.6	1.32	7.93	250	6.91	1 U	-
27-Feb-08	37.24	704.42	11.87	340	0.23	-	0.87	7.41	210	7.46	1 U	3000 U
20-May-08	37.31	704.35	11.91	359	0.23	-86.6	0.67	7.27	200	6.31	1 U	-
27-Aug-08	38.37	703.29	11.84	362	0.35	-77.6	0.70	7.21	210 J	6.36	1 U	3000 U
19-Nov-08	37.50	704.16	11.53	254	0.44	-105.9	2.08	7.45	200	5.86	1 U	3000 U
11-Feb-09	37.10	704.56	11.25	254	0.48	-	0.63	7.91	220	5.61	1 U	3000 U
18-May-09	37.00	704.66	11.42	258	0.42	-71.9	1.11	8.00	210 J	5.17	1 U	3000 U
25-Sep-09	38.88	702.78	13.10	297	0.14	140.7	3.09	7.54	230	6.5	2 U	1200 J
17-Dec-09	37.19	704.47	10.80	341	0.51	129.0	4.85	7.71	74	4.3	2 U	1100 J
23-Mar-10	36.60	705.06	12.60	323	0.27	355.0	5.28	7.54	110	7.6	2 U	1200 J
15-Jun-10	36.25	705.41	11.40	326	0.08	171.1	-	7.62	98	8.8	2 U	1100 J
20-Sep-10	37.85	703.81	11.60	324	0.08	144.0	0.16	7.61	160	6.5	2 U	1200 J
6-Dec-10	36.60	705.06	11.00	319	0.21	78.3	0.20	7.81	210	2.9	2 U	900 J
29-Mar-11	35.98	705.68	11.20	156	0.15	215.0	0.75	7.48	200	5.6	2 U	1500 J
21-Jun-11	36.34	705.32	11.80	352	0.06	101.5	0.24	7.59	220	5 U	2 U	1000 J
27-Sep-11	38.14	703.52	11.50	2484	0.06	114.4	0.45	7.60	220	5 U	2 U	1000 J
14-Dec-11	36.91	704.75	11.00	228	0.05	127.2	4.04	7.54	190	6.7	2 U	1200 J
21-Mar-12	35.68	705.98	11.00	359	0.05	93.9	0.30	7.43	210	6.9	2 U	1100 J
18-Jun-12	36.06	705.60	11.70	350	0.02	211.9	0.23	7.62	220	6.2	0.4 U	3300 U
19-Sep-12	38.07	703.59	11.60	367	0.00	102.0	0.34	7.59	200	6.5	0.4 U	1000 J
18-Dec-12	34.88	706.78	10.90	463	0.00	-97.8	0.17	7.81	68	6	0.4 U	1200 J
25-Feb-13	35.70	705.96	10.90	347	0.09	112.6	0.27	7.56	190	6.6	0.4 U	1100 J
22-May-13	36.24	705.42	11.00	412	0.00	412.5	0.43	7.71	190	6	0.4 U	3300 U
20-Aug-13	38.13	703.53	12.20	406	0.02	-41.5	0.64	7.48	211	5.5	0.1 U	1030
19-Nov-13	36.56	705.10	11.10	344	0.01	43.6	0.32	7.35	206	5.2	0.1 U	1090
31-Mar-14	35.36	706.30	11.50	285	0.00	93.1	0.31	7.71	207	5.1	0.1 U	1100
22-May-14	35.80	705.86	10.05	260	0.24	17.5	-	7.22	186	5	0.1 U	1000
13-Aug-14	37.50	704.16	13.10	294	0.57	-37.5	3.28	7.19	190	5.4	0.1 U	1110
11-Nov-14	37.06	704.60	10.10	241	0.68	-39.7	2.10	7.48	206	5.4	0.1 U	1090
10-Feb-15	35.70	705.96	11.40	295	0.11	-123.2	2.11	7.69	206	5.1	0.1 U	1020
4-May-15	36.34	705.32	11.70	336	0.05	340.2	0.72	7.73	204	4.8	0.1 U	1040
4-Aug-15	38.42	703.24	12.70	263	0.04	-81.8	0.77	7.72	204	5.8	0.1 U	1040
4-Nov-15	37.81	703.85	11.60	244	0.04	26.9	2.13	7.45	201	4.7	0.1 U	1070
8-Feb-16	35.68	705.98	11.60	307	0.00	208.4	0.74	7.68	186	5.5	0.1 U	1110
2-May-16	36.03	705.63	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
22-Aug-16	37.92	703.74	12.20	306	0.02	-137.6	1.58	7.67	Monitored Annually <sup>1</sup>			
1-Nov-16	37.07	704.59	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
31-Jan-17	36.00	705.66	10.90	348	0.10	120.5	0.86	7.67	195	5.66	0.1 U	1110
30-May-17	35.44	706.22	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
16-Aug-17	37.69	703.97	12.30	356	0.14	-77.2	3.27	7.67	Monitored Annually <sup>1</sup>			
9-Nov-17	37.11	704.55	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
28-Feb-18	34.95	706.71	10.90	261	0.21	-115.5	0.80	7.48	205	5.69	0.1 U	992
1-May-18	35.11	706.55	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
22-Aug-18	37.90	703.76	12.31	262	1.64	-80.3	0.92	7.56	Monitored Annually <sup>1</sup>			
6-Nov-18	37.66	704.00	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
12-Mar-19	35.68	705.98	10.70	239	0.58	-75.1	0.59	7.48	188	5.5	0.1 U	1080
8-May-19	35.86	705.80	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
27-Aug-19	37.85	703.81	12.30	265	0.43	Note 1	0.02	7.46	Monitored Annually <sup>1</sup>			
13-Nov-19	37.22	704.44	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
13-Feb-20	35.10	706.56	10.80	261	0.39	-135.9	0.96	7.50	185	5.45	0.1 U	1150
13-Aug-20	37.21	704.45	11.60	266	0.54	-118.2	1.35	7.50	Monitored Annually <sup>1</sup>			
9-Dec-20	36.55	705.11	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
5-Mar-21	35.02	706.64	11.10	255	0.04	-80.0	2.29	7.65	176	5.52	0.1 U	1090

**Table A-3b: Summary of Lower Disposal Area - Bedrock Groundwater Sampling Results  
- Well MWB-2LDA Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
10-Jun-21	36.29	705.37	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
13-Oct-21	37.76	703.90	11.70	308	3.66	-44.7	0.32	7.43	Monitored Annually <sup>1</sup>			
5-Jan-22	35.31	706.35	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
17-Mar-22	34.52	707.14	11.6	244.3	2.84	-60.6	3.21	6.56	201	5.53	0.071 J	1060
21-Jun-22	34.7	706.96	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
23-Sep-22	37	704.66	12.1	243.1	3.88	-17.8	0.54	7.47	Monitored Annually <sup>1</sup>			
12-Dec-22	36.41	705.25	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
14-Mar-23	35.09	706.57	10.8	350.4	3.17	50.5	0.2	7.37	199	5.25	0.1 U	894

Note:

Top of casing elevation (feet NAVD88): 741.66  
 Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

- Not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-3c: Summary of Lower Disposal Area - Bedrock Groundwater Sampling Results  
- Well MWB-3LDA Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
19-Dec-06	7.08	737.11	11.37	670	0.42	-171.2	1.20	9.23	500	25.7	1 U	-
23-Jan-07	5.62	738.57	13.07	383	0.51	-275.0	1.53	8.63	270	18.4	1 U	-
14-Feb-07	5.81	738.38	12.57	328	1.09	-158.2	115.00	7.86	310	15.1	1 U	-
29-Mar-07	4.78	739.41	12.44	458	0.57	-140.8	4.25	7.78	260 J	37.9	1 U	-
17-Apr-07	4.86	739.33	12.79	389	0.27	-102.4	1.22	7.46	240	23	1 U	-
31-May-07	6.39	737.80	12.98	394	0.29	-223.8	3.32	8.14	240	21.2	1 U	-
20-Jun-07	6.86	737.33	13.41	412	6.10	-128.5	1.35	8.02	230 J	23.8	1 U	-
31-Jul-07	7.96	736.23	13.47	417	0.77	-174.1	0.92	7.64	250	18.9	1 U	-
27-Aug-07	8.50	735.69	12.84	395	0.46	-132.4	1.97	7.43	250	17.6	1 U	-
27-Sep-07	9.58	734.61	12.68	294	0.51	-133.8	0.53	7.87	250	19.3	1 U	-
26-Oct-07	9.65	734.54	12.49	288	0.84	-111.9	9.83	7.60	240 J	11	1 U	-
28-Nov-07	10.23	733.96	11.95	362	0.64	-86.1	1.58	7.87	200	17.8	1 U	-
12-Dec-07	9.66	734.53	11.83	334	0.26	-93.2	0.63	7.63	280 J	17.4	1 U	-
24-Jan-08	8.20	735.99	11.09	335	0.44	-108.3	-	7.46	220	19.2	1 U	-
26-Feb-08	7.61	736.58	12.26	337	0.48	-	2.40	7.45	210	22	1 U	3000 U
25-Mar-08	7.22	736.97	11.94	337	1.01	-48.6	2.80	7.51	210	17.8	1 U	-
29-Apr-08	6.75	737.44	12.53	332	0.77	-50.3	1.95	7.41	200 J	18.2	1 U	-
19-May-08	7.17	737.02	12.37	336	0.57	-57.2	2.19	7.34	200 J	18.7	1 U	-
18-Jun-08	7.26	736.93	12.11	323	0.48	-64.1	0.83	7.13	190 J	19.5	1 U	-
26-Aug-08	8.78	735.41	12.31	329	1.16	-36.5	2.89	7.30	200 J	17.7	1 U	3000 U
19-Nov-08	9.03	735.16	11.91	243	0.52	-93.1	1.69	7.40	190	18.2	1 U	3000 U
11-Feb-09	7.07	737.12	11.74	227	0.65	-	1.03	7.76	180	17.7	1 U	3000 U
18-May-09	6.50	737.69	12.11	225	0.67	-63.9	1.51	7.83	190 J	12.9	1 U	3000 U
25-Sep-09	10.47	733.72	13.50	260.1	0.36	215.3	4.14	7.61	220	17	0.94 J	12000
17-Dec-09	8.39	735.80	11.50	301.0	0.44	110.0	3.10	7.71	270	23	2 U	1300 J
23-Mar-10	6.46	737.73	12.20	294.8	0.43	332.5	3.52	7.57	150 J	27	2 U	1300 J
16-Jun-10	5.34	738.85	11.10	281.7	0.05	117.0	-	7.71	160	27	2 U	1300 J
21-Sep-10	7.72	736.47	11.80	276.3	0.06	169.5	0.36	7.54	140	23	2 U	1300 J
7-Dec-10	6.48	737.71	11.00	263.0	0.15	77.2	0.38	7.58	180	20	2 U	1200 J
28-Mar-11	4.42	739.77	10.80	134.0	0.44	75.6	1.06	7.46	160 J	21	2 U	1700 J
20-Jun-11	4.76	739.43	12.10	252.7	0.07	68.4	0.13	7.48	200 J	16	2 U	1000 J
27-Sep-11	7.86	736.33	11.90	2064.0	0.04	102.6	0.37	7.48	170	18	2 U	1100 J
14-Dec-11	7.17	737.02	11.00	188.2	0.03	140.8	1.87	7.50	770	22	2 U	1300 J
21-Mar-12	4.68	739.51	10.70	297.8	0.07	130.6	0.41	7.39	170	21	2 U	1100 J
18-Jun-12	4.75	739.44	11.60	289.0	0.16	271.3	0.55	7.54	150 J+	19	0.4 U	3300 U
19-Sep-12	7.65	736.54	12.60	299.9	0.10	121.0	0.42	7.50	160	18	0.4 U	1100 J
18-Dec-12	5.58	738.61	10.90	384.0	0.03	15.6	1.39	7.50	200	19	0.4 U	1300 J
25-Feb-13	4.80	739.39	10.60	284.2	0.03	140.4	0.30	7.53	150	22	0.4 U	1200 J
22-May-13	4.81	739.38	11.00	294.9	0.14	387.7	0.52	7.61	160	18	0.4 U	3300 U
20-Aug-13	7.63	736.56	12.60	383.0	0.81	-8.4	0.80	7.26	164	16.7	0.1 U	1060
19-Nov-13	7.11	737.08	11.30	218.1	0.14	54.3	0.73	7.20	169	16.6	0.1 U	1130
1-Apr-14	4.08	740.11	10.70	222.6	0.15	158.5	1.12	7.50	168	13.3	0.1 U	1070
22-May-14	4.21	739.98	9.98	206.0	1.59	27.1	-	7.17	158	11.2	0.1 U	1000
13-Aug-14	6.95	737.24	13.50	237.0	1.14	9.8	4.70	6.92	154	10.5	0.1 U	990
12-Nov-14	6.04	738.15	8.40	185.1	0.28	-10.1	3.42	7.36	162	16.1	0.1 U	1050
11-Feb-15	4.62	739.57	11.50	205.1	1.20	68.1	1.32	7.41	169	9	0.1 U	1100
4-May-15	4.93	739.26	12.20	262.0	1.64	190.2	0.84	7.43	168	10.9	0.1 U	1010
4-Aug-15	7.44	736.75	13.20	211.3	1.62	81.9	2.02	7.39	173	6.8	0.1 U	1020
5-Nov-15	8.14	736.05	12.50	186.0	1.49	166.9	1.87	7.10	162	3.5	0.1 U	1040
8-Feb-16	3.20	740.99	11.70	240.5	2.13	196.9	0.88	7.23	150	11.2	0.1 U	980
2-May-16	3.77	740.42	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
22-Aug-16	6.81	737.38	13.10	238.0	2.40	168.5	2.39	7.41	Monitored Annually <sup>1</sup>			
1-Nov-16	6.59	737.60	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
31-Jan-17	4.02	740.17	11.30	265.8	2.79	218.2	1.39	7.34	154	3.23	0.1 U	953
30-May-17	2.32	741.87	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
16-Aug-17	5.48	738.71	13.20	258.4	3.54	92.2	2.50	7.41	Monitored Annually <sup>1</sup>			
9-Nov-17	6.00	738.19	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
28-Feb-18	1.13	743.06	10.80	186.9	4.11	142.0	1.83	7.18	159	2.53	0.1 U	848
1-May-18	1.60	742.59	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
22-Aug-18	5.93	738.26	13.55	194	7.63	16.9	0.77	7.11	Monitored Annually <sup>1</sup>			
6-Nov-18	6.78	737.41	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
12-Mar-19	2.32	741.87	10.50	166	4.32	167.7	1.34	7.14	149	1.87	0.1 U	953
8-May-19	2.57	741.62	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
27-Aug-19	5.76	738.43	13.62	192	3.94	Note 1	0.02	7.09	Monitored Annually <sup>1</sup>			
13-Nov-19	6.00	738.19	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			



**Table A-3c: Summary of Lower Disposal Area - Bedrock Groundwater Sampling Results  
- Well MWB-3LDA Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
13-Feb-20	1.69	742.50	10.70	180	3.20	88.5	1.21	7.11	140	1.69	0.1 U	915
13-Aug-20	4.59	739.60	13.60	188.7	4.26	50.3	1.60	7.19	Monitored Annually <sup>1</sup>			
9-Dec-20	4.22	739.97	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
5-Mar-21	1.06	743.13	10.90	172.0	3.43	132	0.69	7.26	136	1.84	0.1 U	877
10-Jun-21	3.46	740.73	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
13-Oct-21	6.17	738.02	12.90	215.1	4.10	148.3	0.96	7.05	Monitored Annually <sup>1</sup>			
5-Jan-22	0.80	743.39	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
17-Mar-22	0.2	743.99	11.4	166.1	5.44	58.3	0.79	7.54	151	1.58	0.1 U	1200
21-Jun-22	0.54	743.65	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
23-Sep-22	4	740.19	13.8	178.6	5.66	172	5.55	6.63	Monitored Annually <sup>1</sup>			
12-Dec-22	4.48	739.71	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>			
14-Mar-23	1.11	743.08	11	254.9	0.8	-29.8	0.29	7.51	146	7.37	0.1 U	786

Note:

Top of casing elevation (feet NAVD88): 744.19

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

- Not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**APPENDIX A-4**

**Summary of Dale Strip Pit –  
Bedrock Groundwater Sampling  
Results**

Table A-4A Well MWB-1SDSP  
Table A-4B Well MWB-1DDSP  
Table A-4C Well MWB-5DSP  
Table A-4D Well MWB-6DSP  
Table A-4E Portal  
Table A-4F Well MWB-2DSP  
Table A-4G Well MWB-4SDSP



**Table A-4a: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-1SDSP Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)			
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-	
2-Dec-02	69.87	866.42	9.5	1690	-	-	-	7.29	910	46.6	2.68	-	
3-Mar-03	36.83	899.46	11.5	1260	-	-	24.10	7.15	860	9.73	-	-	
3-May-03	34.88	901.41	12.8	1520	-	-	38.00	7.09	950	-	-	-	
3-Aug-03	52.02	884.27	19.19	1460	-	-	11.40	7.01	990	-	-	-	
1-Nov-03	53.61	882.68	11.60	915	-	-	8.97	7.19	1010	8.58	0.695	-	
1-Feb-04	32.75	903.54	11.52	1033	-	-	7.36	6.78	1060	-	-	-	
1-May-04	42.50	893.79	14.87	1126	-	-	7.53	7.23	1020	-	-	-	
1-Aug-04	49.26	887.03	13.72	1234	-	-	8.07	6.98	981	-	-	-	
1-Nov-04	42.81	893.48	11.88	1429	-	-	9.06	6.92	1060	10	1 U	-	
1-Feb-05	33.62	902.67	13.06	1615	-	-	7.11	7.01	1020	-	-	-	
1-May-05	34.88	901.41	12.91	1459	-	-	6.54	6.85	1000	-	-	-	
1-Aug-05	43.80	892.49	10.40	1472	-	-	10.40	6.80	1090	-	-	-	
1-Nov-05	52.80	883.49	10.40	1458	-	-	6.02	6.64	1100	10.3	1 U	-	
1-Feb-06	42.70	893.59	10.40	1343	1.10	48.3	11.10	7.08	1100 J	-	-	-	
1-May-06	37.81	898.48	11.52	1686	1.64	49.2	10.50	6.83	1100	-	-	-	
1-Aug-06	46.11	890.18	14.10	1357	2.33	43.0	10.70	7.11	1100	-	-	-	
1-Nov-06	46.47	889.82	-	-	-	-	-	-	-	-	-	-	
28-Dec-06	33.20	903.09	-	-	-	-	-	-	-	-	-	-	
7-Feb-07	34.50	901.79	-	-	-	-	-	-	-	-	-	-	
7-May-07	36.48	899.81	15.19	1484	0.52	-83.4	6.78	7.60	1100	-	-	-	
7-Aug-07	47.57	888.72	11.21	1488	8.80	107.4	9.53	6.51	1200	-	-	-	
27-Nov-07	51.25	885.04	13.60	1483	1.82	-129.5	434.00	7.11	1000 J	5.72	1 U	-	
8-Feb-08	35.12	901.17	14.71	1489	3.11	-	10.20	6.97	1100	-	-	-	
8-May-08	37.60	898.69	14.50	1594	3.99	112.5	4.71	6.90	1200 J	-	-	-	
8-Aug-08	46.98	889.31	13.27	1617	2.49	105.3	5.32	6.96	1200 J	7.82	1 U	5570	
1-Nov-08	43.35	892.94	11.17	1096	7.29	127.1	47.30	7.70	1100	9.8	1 U	5610	
11-Feb-09	37.00	899.29	10.28	1112	4.15	-	7.68	7.25	1100	7.52	1 U	5560	
9-May-09	36.53	899.76	13.87	1209	2.93	89.0	5.45	7.41	990 J	7.57	1 U	5580	
24-Sep-09	53.61	882.68	12.10	1328	1.98	331.0	3.26	6.92	1200	7.9	2 U	5700	
14-Dec-09	33.72	902.57	10.20	1519	0.55	393.0	2.82	6.99	1100	3.4	2 U	5700	
22-Mar-10	35.11	901.18	10.90	1463	-	508.0	3.95	6.94	1200	10	2 U	5600	
15-Jun-10	33.26	903.03	11.00	1485	0.20	210.3	1.50	7.02	1100	11	2 U	5900	
20-Sep-10	45.81	890.48	11.30	1484	0.06	159.7	0.91	6.98	1100	9.1	0.48 J	6000	
6-Dec-10	36.20	900.09	10.70	1494	0.08	35.4	0.24	7.21	1200	6.8	0.48 J	5200	
28-Mar-11	35.07	901.22	10.70	749	0.08	136.8	0.16	6.88	1100	6.8	2 U	5500	
20-Jun-11	38.53	897.76	11.40	1439	0.08	-19.2	0.21	6.99	1400	4.6 J	2 U	5500	
26-Sep-11	50.43	885.86	11.20	1249	0.07	38.5	0.41	7.01	1200	4.5 J	2 U	5700	
13-Dec-11	51.30	884.99	10.40	1308	0.06	50.3	2.03	7.07	530	7.6	2 U	6100	
22-Mar-12	43.75	892.54	10.60	1695	0.08	125.1	0.28	6.99	1200	12	2 U	5700	
18-Jun-12	44.86	891.43	Monitored Semiannually <sup>1</sup>										
18-Sep-12	55.74	880.55	12.90	1506	0.05	99.5	0.36	7.08	1300	10	0.4 U	5800	
18-Dec-12	41.94	894.35	Monitored Semiannually <sup>1</sup>										
21-Feb-13	37.86	898.43	10.40	1730	0.02	131.5	0.41	7.27	1200	13	0.4 U	6300	
22-May-13	39.34	896.95	Monitored Semiannually <sup>1</sup>										
20-Aug-13	49.40	886.89	11.90	1707	0.05	-37.6	0.69	7.00	1240	10.2	0.1 U	6000	
19-Nov-13	44.94	891.35	Monitored Semiannually <sup>1</sup>										
31-Mar-14	33.31	902.98	11.20	1256	0.01	103.5	0.27	7.00	1200	13.1	0.1 U	6580	
21-May-14	33.37	902.92	Monitored Semiannually <sup>1</sup>										
15-Aug-14	45.31	890.98	13.43	1467	0.71	-1.1	2.32	6.79	1150	13.4	0.1 U	6100	
14-Nov-14	44.83	891.46	Monitored Semiannually <sup>1</sup>										
10-Feb-15	35.97	900.32	11.00	1423	0.04	-109.4	2.16	7.00	1200	13	0.1 U	6260	
4-May-15	38.67	897.62	Monitored Semiannually <sup>1</sup>										
4-Aug-15	49.21	887.08	12.50	1253	0.04	-100.7	0.26	7.07	1230	13.9	0.1 U	6070	
5-Nov-15	56.85	879.44	11.20	1159	0.02	57.4	0.91	6.75	1190	14.9	0.1 U	6990	
8-Feb-16	33.02	903.27	11.60	1429	0.00	167.6	0.10	7.05	1190	19.4	0.1 U	6730	
2-May-16	37.48	898.81	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
22-Aug-16	49.78	886.51	12.10	1232	0.06	-143.8	0.77	7.00	Monitored Annually <sup>2</sup>				
1-Nov-16	47.49	888.80	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
31-Jan-17	35.57	900.72	11.10	1620	0.05	-241.6	0.24	6.99	1260	21.8	0.1 U	6690	
30-May-17	34.70	901.59	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
16-Aug-17	44.32	891.97	11.90	1621	0.12	-144.5	0.47	6.97	Monitored Annually <sup>2</sup>				
9-Nov-17	44.71	891.58	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
28-Feb-18	32.04	904.25	10.70	1278	0.16	-58.5	0.11	6.82	1244	22.4	0.1 U	6530	
1-May-18	33.99	902.30	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
22-Aug-18	47.95	888.34	11.97	1246	1.17	4.10	0.17	6.88	Monitored Annually <sup>2</sup>				





**Table A-4a: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-1SDSP Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
6-Nov-18	52.94	883.35	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
12-Mar-19	33.09	903.20	10.40	1157	0.55	-23.0	0.62	6.81	1200	20.7	0.1 U	951
8-May-19	34.37	901.92	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
27-Aug-19	47.88	888.41	12.51	1314	0.15	Note 1	0.39	6.80	Monitored Annually <sup>2</sup>			
13-Nov-19	47.03	889.26	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
14-Feb-20	31.08	905.21	10.60	1249	0.38	-82.2	0.10	6.61	1230	18.3	0.1 U	6360
13-Aug-20	43.99	892.30	11.70	1176	0.56	-67.7	0.18	6.78	Monitored Annually <sup>2</sup>			
9-Dec-20	39.67	896.62	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
5-Mar-21	34.96	901.33	11.00	1257	0.26	-38	0.24	6.95	1200	19.5	0.1 U	6150
10-Jun-21	42.65	893.64	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
18-Oct-21	55.97	880.32	11.7	858	0.86	-92.3	0.48	6.84	Monitored Annually <sup>2</sup>			
5-Jan-22	33.64	902.65	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
18-Mar-22	38.2	898.09	11.5	1096	1.17	-40.8	0.31	7.18	1260	16.6	0.1 U	6400
21-Jun-22	35.46	900.83	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
13-Sep-22	44.37	891.92	11.8	1122	2.97	6.4	4.73	6.42	Monitored Annually <sup>2</sup>			
12-Dec-22	42.96	893.33	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
16-Mar-23	34.48	901.81	11.5	1633	0.21	-28.9	0.42	6.88	1200	16.5	0.1 U	5580

Notes:

Top of casing elevation (feet NAVD88): 936.29

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated May 16, 2012

2 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-4b: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-1DDSP  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem. Total Dissolved Solids (mg/L)	Metals (ug/L)			
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Arsenic	Lead	Potassium	
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-	
2-Dec-02	87.28	848.09	11.1	557	-	-	-	7.72	540	32.7	0.5 U	-	
3-Mar-03	48.63	886.74	12.0	623	-	-	24.00	7.48	370	7.08	-	-	
3-May-03	47.12	888.25	12.1	548	-	-	264.00	7.54	440	-	-	-	
3-Aug-03	64.60	870.77	23.23	675	-	-	195.00	7.36	450	-	-	-	
1-Nov-03	66.14	869.23	11.0	400	-	-	15.50	8.10	437	6.03	0.5 U	-	
1-Feb-04	46.55	888.82	10.68	455	-	-	8.70	7.15	440	-	-	-	
1-May-04	55.82	879.55	13.61	508	-	-	12.40	7.58	429	-	-	-	
1-Aug-04	61.89	873.48	13.15	585	-	-	15.70	7.47	399	-	-	-	
1-Nov-04	56.83	878.54	10.94	655	-	-	9.40	7.22	477	3.08	1 U	-	
1-Feb-05	47.31	888.06	12.80	778	-	-	8.39	7.35	451	-	-	-	
1-May-05	48.60	886.77	12.86	743	-	-	4.22	7.25	432	-	-	-	
1-Aug-05	56.80	878.57	14.17	746	-	-	3.10	6.99	518	-	-	-	
1-Nov-05	66.85	868.52	10.20	702	-	-	5.36	7.11	470	3.6	1 U	-	
1-Feb-06	47.88	887.49	10.11	648	0.71	109.4	2.72	7.53	450 J	-	-	-	
1-May-06	52.23	883.14	12.22	686	1.82	43.7	3.68	7.43	450	-	-	-	
1-Aug-06	59.41	875.96	12.28	665	1.06	-74.0	14.20	7.36	480	-	-	-	
1-Nov-06	61.84	873.53	-	-	-	-	-	-	-	-	-	-	
28-Dec-06	48.26	887.11	-	-	-	-	-	-	-	-	-	-	
7-Feb-07	49.64	885.73	-	-	-	-	-	-	-	-	-	-	
7-May-07	53.24	882.13	12.44	722	0.74	-150.8	6.06	7.94	470	-	-	-	
7-Aug-07	60.45	874.92	13.76	712	0.79	-50.0	4.53	7.28	500	-	-	-	
27-Nov-07	63.40	871.97	14.41	711	0.45	-194.4	7.07	7.34	470 J	2.89	1 U	-	
8-Feb-08	49.23	886.14	14.07	737	0.62	-	6.28	7.46	500	-	-	-	
8-May-08	51.31	884.06	13.52	793	0.55	27.9	4.42	7.40	520 J	-	-	-	
8-Aug-08	59.69	875.68	13.73	812	0.67	-24.7	9.33	7.37	560 J	2.26	1 U	3000 U	
1-Nov-08	57.38	877.99	14.75	619	0.89	-42.5	4.40	7.45	480	2.22	1 U	3000 U	
10-Feb-09	50.92	884.45	6.50	618	10.51	-	655.00	7.69 J	530	2.19	1 U	3010	
9-May-09	51.25	884.12	13.95	637	2.21	39.3	5.87	7.74	540 J	2.42	1 U	3000 U	
25-Sep-09	65.46	869.91	13.20	678	2.25	331.8	2.29	7.15	570	1.8 J	2 U	3300	
17-Dec-09	49.40	885.97	10.60	794	0.99	224.0	3.97	7.58	440	0.7 J	2 U	3200 J	
22-Mar-10	49.18	886.19	10.40	762	-	245.0	0.74	7.39	580	4.5	2 U	3200 J	
15-Jun-10	46.88	888.49	12.10	762	0.05	142.1	0.47	7.50	420	5.5	2 U	3300	
20-Sep-10	58.97	876.40	11.40	765	0.07	89.6	0.47	7.47	520	4.7	0.27 J	3400	
6-Dec-10	50.66	884.71	10.20	763	0.19	58.9	0.32	7.72	550	1.3 J	2 U	3200 J	
28-Mar-11	48.89	886.48	10.50	376	0.55	165.0	0.73	7.53	470	3.7	2 U	3000 J	
20-Jun-11	52.13	883.24	13.40	718	0.45	-65.1	0.75	7.53	600 J	5 U	2 U	3500	
26-Sep-11	63.02	872.35	11.80	633	1.73	-6.0	1.72	7.61	560	5 U	2 U	3500	
13-Dec-11	63.88	871.49	8.60	678	0.69	-24.7	1.95	7.56	530	5.7	2 U	4100	
22-Mar-12	56.96	878.41	5.60	877	1.89	-26.6	0.84	7.69	540	3.4	0.4 U	3000 J	
18-Jun-12	58.01	877.36	Monitored Semiannually <sup>1</sup>										
18-Sep-12	67.78	867.59	26.30	838	3.62	12.4	1.27	7.70	540	3.1	0.4 U	3100 J	
18-Dec-12	56.10	879.27	Monitored Semiannually <sup>1</sup>										
21-Feb-13	51.62	883.75	4.30	895	7.54	31.3	0.83	8.04	510	3.6	0.4 U	3600	
22-May-13	53.14	882.23	Monitored Semiannually <sup>1</sup>										
20-Aug-13	62.35	873.02	12.30	526	0.08	-60.4	2.91	7.47	585	3.2	0.1 U	3200	
19-Nov-13	58.70	876.67	Monitored Semiannually <sup>1</sup>										
31-Mar-14	46.60	888.77	11.10	622	0.04	48.4	0.45	7.52	561	1.8	0.1 U	3340	
21-May-14	46.96	888.41	Monitored Semiannually <sup>1</sup>										
15-Aug-14	58.62	876.75	12.48	732	0.90	-62.4	2.04	7.16	564	2	0.2	3140	
14-Nov-14	59.59	875.78	Monitored Semiannually <sup>1</sup>										
10-Feb-15	49.61	885.76	10.90	717	0.03	-114.4	1.82	7.48	551	2.9	0.1 U	3270	
4-May-15	52.25	883.12	Monitored Semiannually <sup>1</sup>										
4-Aug-15	61.71	873.66	12.00	618	0.04	-115.0	0.35	7.56	552	3	0.1 U	3360	
5-Nov-15	68.72	866.65	11.10	625	0.05	27.5	1.26	7.21	603	1.6	0.1 U	3590	
8-Feb-16	46.93	888.44	11.40	794	0.00	155.1	0.17	7.57	599	2.1	0.1 U	3800	
2-May-16	50.77	884.60	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
22-Aug-16	62.11	873.26	11.60	770	0.04	-251.0	0.86	7.50	Monitored Annually <sup>2</sup>				
1-Nov-16	61.71	873.66	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
31-Jan-17	49.02	886.35	10.60	916	0.13	-310.4	0.35	7.47	676	1.87	0.1 U	3410	
30-May-17	48.11	887.26	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
16-Aug-17	57.17	878.20	11.80	898	0.12	-210.9	0.22	7.42	Monitored Annually <sup>2</sup>				
9-Nov-17	58.71	876.66	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
28-Feb-18	45.21	890.16	10.20	758	0.19	-166.6	0.20	7.26	694	2.87	0.1 U	3340	
1-May-18	47.40	887.97	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
22-Aug-18	60.25	875.12	11.58	705	2.22	-153.0	0.14	7.37	Monitored Annually <sup>2</sup>				



**Table A-4b: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-1DDSP Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
6-Nov-18	65.30	870.07	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
12-Mar-19	46.35	889.02	9.80	707	0.58	-119.9	0.16	7.24	668	4.96	0.1 U	4210
8-May-19	47.20	888.17	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
27-Aug-19	59.87	875.50	11.95	762	0.39	Note 1	0.02	7.20	Monitored Annually <sup>2</sup>			
13-Nov-19	60.20	875.17	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
14-Feb-20	44.28	891.09	10.30	760	0.30	-169.3	1.09	7.11	717	4.56	0.1 U	4070
13-Aug-20	57.57	877.80	11.10	739	0.91	-145.8	0.31	7.17	Monitored Annually <sup>2</sup>			
9-Dec-20	54.25	881.12	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
5-Mar-21	48.74	886.63	10.70	724	0.27	-222	0.61	7.36	592	4.06	0.1 U	3880
10-Jun-21	59.90	875.47	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
18-Oct-21	67.32	868.05	11.60	561	0.83	-149	0.33	7.23	Monitored Annually <sup>2</sup>			
5-Jan-22	47.77	887.60	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
18-Mar-22	48.37	887	11.3	741	1.2	-93.4	0.39	7.52	781	4.64	0.1 U	4240
21-Jun-22	49.68	885.69	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
13-Sep-22	57.47	877.9	11.9	778	2.5	-91	0.45	6.84	Monitored Annually <sup>2</sup>			
12-Dec-22	57.68	877.69	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
16-Mar-23	48.34	887.03	11.7	1110	0.29	-89.5	0.38	7.19	783	5.45	0.1 U	3870

Notes:

Top of casing elevation (feet NAVD88): 935.37

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated May 16, 2012

2 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-4c: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-5DSP  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)			
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	Arsenic	Lead	Potassium	
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-	
18-Dec-06	20.56	914.49	11.30	1054	0.59	-10.5	6.76	7.01	630	4.46	1 U	-	
7-Jan-07	18.48	916.57	12.53	700	0.61	-70.6	33.50	7.11	540	5.19	1 U	-	
7-Feb-07	21.53	913.52	11.59	557	0.57	-59.1	33.50	6.88	530	5.19	1 U	-	
7-Mar-07	15.34	919.71	11.71	817	0.45	-2.4	91.20	6.52	550 J	4.91	1 U	-	
7-Apr-07	17.97	917.08	11.96	909	0.25	0.2	121.00	6.91	560	4.75	1 U	-	
1-May-07	26.92	908.13	12.55	880	4.20	-14.3	63.70	7.13	540	4.9	1 U	-	
7-Jun-07	29.94	905.11	13.12	1016	3.20	-5.6	3.58	7.52	600 J	4.37	1 U	-	
7-Jul-07	35.27	899.78	13.00	910	1.74	-27.4	9.97	7.24	550	4.91	1 U	-	
7-Aug-07	39.55	895.50	12.40	1065	0.92	-14.6	4.62	6.99	590	4.46	1 U	-	
7-Sep-07	44.69	890.36	12.36	696	0.68	-33.3	3.22	7.29	590	4.92	1 U	-	
26-Oct-07	38.90	896.15	11.46	667	0.56	-18.3	22.60	6.98	620 J	4.43	1 U	-	
27-Nov-07	38.79	896.26	11.71	914	0.56	-46.7	3.32	6.91	560 J	4.9	1 U	-	
12-Dec-07	35.33	899.72	12.61	909	0.53	-27.3	4.28	6.87	820	4.09	1 U	-	
24-Jan-08	28.97	906.08	10.72	872	0.78	-49.1	-	7.14	550	4.72	1 U	-	
8-Feb-08	26.00	909.05	11.25	888	0.44	-	4.18	6.85	550	4.5	1 U	-	
8-Mar-08	26.03	909.02	10.94	915	0.59	-95.6	3.19	6.89	550	5.21	1 U	-	
8-Apr-08	25.03	910.02	11.27	931	0.61	-20.1	3.44	6.89	550 J	4.88	1 U	-	
8-May-08	27.33	907.72	11.68	949	0.68	-6.7	5.37	6.62	580 J	5.34	1 U	-	
8-Jun-08	28.38	906.67	11.40	948	0.75	-50.4	1.59	6.68	580 J	4.45	1 U	-	
8-Aug-08	39.80	895.25	11.80	970	0.68	-78.6	1.72	6.84	610 J	4.64	1 U	3000 U	
1-Nov-08	33.96	901.09	11.20	682	0.63	-115.4	0.95	6.82	540	4.8	1 U	3000 U	
10-Feb-09	25.56	909.49	10.54	671	0.71	-71.7	0.98	7.05	610	4.73	1 U	3000 U	
9-May-09	25.79	909.26	11.23	682	0.55	-5.8	0.86	7.68	560 J	3.4	1 U	3000 U	
22-Sep-09	46.68	888.37	18.70	737	0.64	214.5	0.99	6.91	580 J	3.9	2 U	2700 J	
14-Dec-09	30.45	904.60	9.80	901	0.18	200.0	0.70	6.96	450	1.7 J	2 U	2500 J	
23-Mar-10	19.92	915.13	11.30	773	0.25	148.0	4.40	6.86	510	5.6	2 U	2600 J	
15-Jun-10	16.74	918.31	11.00	838	0.10	202.3	2.89	7.01	860 J	8.2	2 U	2800 J	
20-Sep-10	33.31	901.74	11.20	852	0.09	174.7	0.60	6.97	540	6.2	2 U	2700 J	
6-Dec-10	19.81	915.24	10.80	838	0.10	30.5	0.47	7.17	530	3.8	2 U	2300 J	
28-Mar-11	17.16	917.89	10.80	403	0.15	48.4	1.13	6.89	500 J	2.3	2 U	2300 J	
20-Jun-11	18.95	916.10	11.10	775	0.05	-29.1	0.37	7.01	610 J	5 U	2 U	2400 J	
26-Sep-11	33.71	901.34	11.20	690	0.03	-8.7	0.54	7	560	4.1 J	2 U	2800 J	
13-Dec-11	24.48	910.57	10.50	730	0.05	93.6	1.92	7.07	520	6.1	2 U	2800 J	
21-Mar-12	15.54	919.51	10.70	883	0.06	106.9	0.34	6.9	500	6.5	2 U	2400 J	
19-Jun-12	17.01	918.04	Monitored Semiannually <sup>1</sup>										
19-Sep-12	29.82	905.23	11.90	877	0.00	122.0	0.47	7.08	490	6.9	0.4 U	2600 J	
18-Dec-12	17.39	917.66	Monitored Semiannually <sup>1</sup>										
21-Feb-13	18.84	916.21	10.60	875	0.05	103.3	0.40	7.32	510	5.9	0.4 U	2600 J	
22-May-13	20.25	914.80	Monitored Semiannually <sup>1</sup>										
20-Aug-13	30.15	904.90	12.10	530	0.06	-50.3	0.75	6.98	510	5.6	0.1 U	2500	
19-Nov-13	22.73	912.32	Monitored Semiannually <sup>1</sup>										
31-Mar-14	15.50	919.55	11.30	574	0.06	95.7	0.53	7.15	447	5.6	0.1 U	2720	
21-May-14	14.83	920.22	Monitored Semiannually <sup>1</sup>										
15-Aug-14	25.16	909.89	14.49	741	0.48	-24.0	2.92	6.87	477	5.9	0.1 U	2550	
14-Nov-14	22.25	912.80	Monitored Semiannually <sup>1</sup>										
10-Feb-15	15.98	919.07	11.40	693	0.04	-117.5	0.80	7.13	503	5.9	0.1 U	2560	
4-May-15	20.05	915.00	Monitored Semiannually <sup>1</sup>										
4-Aug-15	31.90	903.15	11.90	620	0.16	-71.1	0.47	7.13	517	6.4	0.1 U	2670	
5-Nov-15	32.00	903.05	11.40	605	0.00	37.5	1.16	6.84	511	5.3	0.1 U	3060	
8-Feb-16	17.13	917.92	11.80	720	0.00	160.4	0.08	7.34	480	6	0.1 U	3020	
2-May-16	23.31	911.74	Monitored Semiannually <sup>2</sup>								Monitored Annually <sup>2</sup>		
22-Aug-16	34.07	900.98	12.50	571	0.00	-	0.66	7.11	Monitored Annually <sup>2</sup>				
1-Nov-16	26.04	909.01	Monitored Semiannually <sup>2</sup>								Monitored Annually <sup>2</sup>		
31-Jan-17	19.36	915.69	12.20	808	0.07	-219.2	0.30	7.21	509	6.76	0.1 U	2840	
30-May-17	17.31	917.74	Monitored Semiannually <sup>2</sup>								Monitored Annually <sup>2</sup>		
16-Aug-17	28.13	906.92	12.40	826	0.12	-71.9	0.66	7.10	Monitored Annually <sup>2</sup>				
9-Nov-17	27.17	907.88	Monitored Semiannually <sup>2</sup>								Monitored Annually <sup>2</sup>		
28-Feb-18	16.55	918.50	10.90	657	0.15	-97.6	0.35	7.02	528	5.39	0.1 U	2550	
1-May-18	17.69	917.36	Monitored Semiannually <sup>2</sup>								Monitored Annually <sup>2</sup>		
22-Aug-18	32.63	902.42	12.46	655	0.81	-46.4	0.26	7.01	Monitored Annually <sup>2</sup>				
6-Nov-18	32.44	902.61	Monitored Semiannually <sup>2</sup>								Monitored Annually <sup>2</sup>		
12-Mar-19	18.84	916.21	10.90	597	0.56	-28.1	0.86	6.96	512	4.51	0.1 U	2890	
8-May-19	19.75	915.30	Monitored Semiannually <sup>2</sup>								Monitored Annually <sup>2</sup>		
27-Aug-19	33.26	901.79	13.08	688	0.26	Note 1	0.02	6.89	Monitored Annually <sup>2</sup>				





**Table A-4c: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-5DSP  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)			
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	Arsenic	Lead	Potassium	
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-	
13-Nov-19	33.03	902.02	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
14-Feb-20	16.70	918.35	10.90	626	0.34	-99.8	0.33	6.88	524	4.31	0.1 U	2650	
13-Aug-20	27.37	907.68	11.80	619	0.55	-70.6	0.40	6.89	Monitored Annually <sup>2</sup>				
9-Dec-20	24.68	910.37	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
5-Mar-21	16.91	918.14	11.30	641	0.19	-77.0	0.45	7.09	473	4.84	0.1 U	2450	
10-Jun-21	24.68	910.37	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
18-Oct-21	29.11	905.94	11.9	440.1	0.87	-86.2	0.35	6.96	Monitored Annually <sup>2</sup>				
5-Jan-22	16.88	918.17	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
21-Mar-22	17.14	917.91	11.3	601	1.28	-42.9	0.82	6.26	513	4.79	0.1 U	2560	
21-Jun-22	17.25	917.8	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
13-Sep-22	27.19	907.86	12.3	606	2.54	-3.7	1.49	6.74	Monitored Annually <sup>2</sup>				
12-Dec-22	24.31	910.74	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
16-Mar-23	18.62	916.43	11.7	846	0.21	-19.7	0.41	7.03	497	4.56	0.1 U	2570	

Notes:

Top of casing elevation (feet NAVD88): 935.05

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated May 16, 2012

2 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-4d: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-6DSP  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)			
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	Arsenic	Lead	Potassium	
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-	
18-Dec-06	8.13	897.82	9.93	525	0.54	-54.5	0.61	7.78	300	5.37	1 U	-	
7-Feb-07	9.40	896.55	11.79	479	1.19	-30.0	7.40	7.41	330	6.01	1 U	-	
7-May-07	10.73	895.22	12.26	729	2.83	-103.6	16.40	7.63	480	10.1	1 U	-	
7-Aug-07	15.14	890.81	11.42	882	0.75	-11.5	1.82	7.10	470	3.25	1 U	-	
27-Nov-07	16.16	889.79	10.98	748	0.37	-47.9	0.83	6.99	440 J	2.82	1 U	-	
8-Feb-08	9.66	896.29	11.01	645	0.31	-	0.90	7.05	380	2.68	1 U	-	
8-May-08	10.34	895.61	11.27	665	0.64	13.4	1.52	6.93	380 J	2.40	1 U	-	
8-Aug-08	14.17	891.78	11.23	683	0.72	-8.2	2.49	7.05	390 J	2.18	1 U	3000 U	
1-Nov-08	12.98	892.97	10.61	488	0.60	-45.6	1.35	6.80	380	2.04	1 U	3000 U	
10-Feb-09	9.64	896.31	10.32	398	0.52	-57.0	1.20	7.31	350	2.00	1 U	3000 U	
9-May-09	9.91	896.04	10.50	405	0.73	-4.0	1.26	7.77	320 J	1.69	1 U	3000 U	
23-Sep-09	17.16	888.79	12.50	541	0.25	216.2	5.38	7.14	400 J	0.91 J	2 U	1300 J	
14-Dec-09	12.73	893.22	9.10	580	0.47	231.0	2.70	7.23	270	2 U	2 U	1300 J	
22-Mar-10	9.62	896.33	10.90	504	-	321.7	3.50	7.22	320	2.00	2 U	1200 J	
15-Jun-10	8.30	897.65	11.00	495	0.11	205.1	1.41	7.29	320	4.20	2 U	1300 J	
20-Sep-10	14.90	891.05	10.90	560	0.10	187.2	0.28	7.29	270	3.00	2 U	1400 J	
6-Dec-10	10.47	895.48	10.50	515	0.12	87.8	0.14	7.47	300	2 U	2 U	1100 J	
28-Mar-11	8.71	897.24	10.30	241	0.19	58.9	1.86	7.19	300	2 U	2 U	1100 J	
20-Jun-11	9.87	896.08	10.80	477	0.06	141.2	0.20	7.27	340	5 U	2 U	1100 J	
26-Sep-11	14.82	891.13	10.80	467	0.05	114.8	0.92	7.26	380	5 U	2 U	1500 J	
13-Dec-11	13.02	892.93	10.20	491	0.06	131.3	1.69	7.29	340	5 U	2 U	1600 J	
21-Mar-12	8.13	897.82	10.20	550	0.09	160.0	0.07	7.14	310	2.50	0.4 U	1200 J	
18-Jun-12	-	-	Monitored Semiannually <sup>1</sup>										
18-Sep-12	14.76	891.19	12.50	587	0.00	122.0	0.35	7.31	370	2.80	0.4 U	1300 J	
18-Dec-12	8.16	897.79	Monitored Semiannually <sup>1</sup>										
21-Feb-13	8.45	897.50	10.10	594	0.02	152.7	0.28	7.49	300	1.90	0.4 U	1300 J	
22-May-13	9.36	896.59	Monitored Semiannually <sup>1</sup>										
20-Aug-13	13.28	892.67	11.70	478	0.01	-43.8	0.54	7.22	349 J	1.60	0.1 U	1300	
19-Nov-13	9.71	896.24	Monitored Semiannually <sup>1</sup>										
31-Mar-14	8.42	897.53	10.70	455	0.06	166.1	0.27	7.35	315	1.40	0.1 U	1290	
21-May-14	5.99	899.96	Monitored Semiannually <sup>1</sup>										
14-Aug-14	12.03	893.92	13.45	512	0.56	-21.4	1.99	6.95	317	1.70	0.1 U	1270	
14-Nov-14	10.68	895.27	Monitored Semiannually <sup>1</sup>										
10-Feb-15	7.39	898.56	10.90	482	0.03	-86.2	0.59	7.32	337	1.40	0.1 U	1230	
4-May-15	9.17	896.78	Monitored Semiannually <sup>1</sup>										
4-Aug-15	13.64	892.31	12.40	449	0.18	-81.7	0.27	7.33	385	1.70	0.1 U	1280	
5-Nov-15	13.98	891.97	11.50	435	2.23	85.2	1.09	7.04	354	1.30	0.1 U	1470	
8-Feb-16	6.74	899.21	11.50	495	0.03	187.2	0.25	7.39	297	1.40	0.1 U	1350	
2-May-16	8.64	897.31	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
22-Aug-16	13.27	892.68	12.20	559	0.03	-52.7	0.80	7.28	Monitored Annually <sup>2</sup>				
1-Nov-16	11.36	894.59	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
31-Jan-17	7.91	898.04	10.90	539	0.08	124.4	0.18	7.31	321	1.48	0.1 U	1300	
30-May-17	2.65	903.30	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
16-Aug-17	12.08	893.87	12.10	573	0.12	-46.9	1.39	7.26	Monitored Annually <sup>2</sup>				
9-Nov-17	11.70	894.25	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
28-Feb-18	6.50	899.45	11.00	423	0.19	-61.0	0.18	7.12	138	1.56	0.1 U	1200	
1-May-18	6.80	899.15	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
22-Aug-18	13.47	892.48	11.61	441	7.44	26.6	0.21	7.11	Monitored Annually <sup>2</sup>				
6-Nov-18	13.96	891.99	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
12-Mar-19	7.30	898.65	10.30	363	0.56	-25.1	0.27	7.16	294	1.47	0.1 U	1340	
8-May-19	7.77	898.18	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
27-Aug-19	13.16	892.79	12.19	454	0.45	Note 1	0.02	7.05	Monitored Annually <sup>2</sup>				
13-Nov-19	26.35	894.30	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
13-Feb-20	20.79	899.86	10.60	387	0.39	-76.5	1.05	7.13	313	1.40	0.1 U	1330	
13-Aug-20	25.94	894.71	11.70	403	0.65	-64.3	0.60	7.07	Monitored Annually <sup>2</sup>				
9-Dec-20	24.06	896.59	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>				
4-Mar-21	21.56	899.09	10.80	363	0.16	-9.0	1.29	7.30	280	1.10	0.1 U	1240	



**Table A-4d: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-6DSP  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
10-Jun-21	24.55	896.10	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
18-Oct-21	28.08	892.57	11.6	273.8	0.96	-73.8	1.38	7.15	Monitored Annually <sup>2</sup>			
5-Jan-22	21.36	899.29	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
21-Mar-22	20.7	899.95	10.9	348.2	1.41	102.1	1.4	6.42	297	1.06	0.1 U	1090
21-Jun-22	21.51	899.14	Monitored Semiannually <sup>2</sup>						Monitored Annually <sup>2</sup>			
13-Sep-22	Well Damaged - Unable to Sample <sup>3</sup>											
12-Dec-22	Well Damaged - Unable to Sample <sup>3</sup>											
15-Mar-23	15.98	- <sup>3</sup>	10.9	444.1	1.06	16.4	1.17	7.11	251	1.05	0.1 U	1110

Notes:

Top of casing elevation (feet NAVD88) prior to raising casing: 905.95  
 Top of casing elevation (feet NAVD88) after raising casing (post-Q3 2019): 920.65

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated May 16, 2012

2 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

3 MWB-6DSP was found damaged in July 2022. The well was repaired by late December 2022 and has yet to be resurveyed.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-4e: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Portal Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet msl)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
1-Mar-02	-	-	-	653	-	-	-	7.29	586	-	-	-
1-Jun-02	-	-	12	920	-	-	-	7.20	583	-	-	-
1-Sep-02	-	-	11	920	-	-	-	7.10	651	-	-	-
2-Dec-02	-	-	9.1	900	-	-	-	7.03	570	4.44	0.5 U	-
3-Mar-03	-	-	10.1	873	-	-	-	7.09	530	-	-	-
3-May-03	-	-	11.2	981	-	-	10.00	6.94	590	-	-	-
3-Aug-03	-	-	12.78	1030	-	-	13.00	7.17	630	-	-	-
1-Nov-03	-	-	10.2	569	-	-	4.65	7.53	592	3.33	0.5 U	-
1-Feb-04	-	-	9.31	568	-	-	5.41	6.85	560	-	-	-
1-May-04	-	-	10.93	952	-	-	5.98	7.12	615	-	-	-
1-Aug-04	-	-	12.10	835	-	-	6.29	7.11	601	-	-	-
1-Nov-04	-	-	10.20	941	-	-	6.58	6.94	656	3.41	1 U	-
1-Feb-05	-	-	10.52	889	-	-	8.72	7.41	541	-	-	-
1-May-05	-	-	13.08	953	-	-	8.15	7.31	548	-	-	-
1-Aug-05	-	-	11.08	988	-	-	7.40	7.23	644	-	-	-
1-Nov-05	-	-	9.53	958	-	-	8.58	7.61	640	3.15	1 U	-
1-Feb-06	-	-	9.23	669	7.88	*	7.93	6.78	450 J	-	-	-
1-May-06	-	-	11.49	947	7.60	38.5	10.40	7.01	570	-	-	-
1-Aug-06	-	-	10.52	835	8.82	-39.8	14.10	7.26	640	-	-	-
1-Nov-06	-	-	9.41	740	9.57	-32.2	12.50	7.23	510	2.45	1 U	-
7-Feb-07	-	-	9.90	815	10.99	-6.2	27.80	7.74	510	-	-	-
7-May-07	-	-	18.39	810	11.05	-6.2	11.80	7.61	510	-	-	-
7-Aug-07	-	-	10.42	870	8.72	-44.9	25.20	7.42	560	-	-	-
30-Nov-07	-	-	9.41	783	9.56	-18.7	48.30	-	520	3.17	1 U	-
8-Feb-08	-	-	10.02	708	10.04	-	50.00	7.20	420	-	-	-
8-May-08	-	-	10.83	815	12.13	0.1	7.28	7.29	480 J	-	-	-
8-Aug-08	-	-	10.63	906	11.05	-5.6	11.00	7.05	560 J	3.69	1 U	41600
1-Nov-08	-	-	9.79	553	10.70	-21.1	16.90	7.40	460	3.2	1 U	35500
11-Feb-09	-	-	9.16	488	6.99	-	15.40	7.52	430	2.97	1 U	34200
9-May-09	-	-	9.64	522	10.56	13.4	9.77	7.39	440 J	2.01	1 U	32400
23-Sep-09	-	-	10.70	745	8.95	271.7	14.70	6.88	570	2 U	2 U	40000
15-Dec-09	-	-	8.60	713	5.20	279.0	12.50	6.67	350	2 U	2 U	30000
24-Mar-10	-	-	9.90	681	6.14	370.7	-	6.57	470	4.2	2 U	39000
17-Jun-10	-	-	10.00	623	9.58	-	26.30	7.50	380	5.9	2 U	28000
22-Sep-10	-	-	10.00	783	9.02	225.9	17.40	7.00	510	5.2	2 U	42000
7-Dec-10	-	-	9.90	662	9.15	186.0	13.60	6.95	450	2 U	2 U	32000
29-Mar-11	-	-	9.90	292	5.90	370.8	4.44	6.73	360 J	4.1	2 U	25000
20-Jun-11	-	-	10.50	591	6.42	219.1	4.44	7.01	420	5 U	2 U	26000
26-Sep-11	-	-	10.70	623	5.76	240.5	11.90	6.83	520	5 U	2 U	39000
15-Dec-11	-	-	8.80	472	4.92	310.4	7.32	6.78	430	4.7 J	2 U	32000
21-Mar-12	-	-	8.90	611	5.24	313.3	9.16	6.49	330	4.8	0.4 U	20000
18-Jun-12	Monitored Semiannually <sup>1</sup>											
18-Sep-12	-	-	14.20	652	9.70	148.0	20.80	7.48	450	5	0.4 U	29000
18-Dec-12	Monitored Semiannually <sup>1</sup>											
25-Feb-13	-	-	9.20	648	10.10	209.6	4.12	7.58	300	5	0.4 U	25000
25-Feb-13	Monitored Semiannually <sup>1</sup>											
21-Feb-13	-	-	9.20	648	10.10	209.6	4.12	7.58	300	5	0.4 U	25000
22-May-13	Monitored Semiannually <sup>1</sup>											
20-Aug-13	-	-	10.80	635	9.31	170.1	8.46	7.11	458	3.9	0.1 U	32300
19-Nov-13	Monitored Semiannually <sup>1</sup>											
31-Mar-14	-	-	10.60	448	9.29	213.5	87.20	7.30	321	3.7	0.18 J	21100
21-May-14	Monitored Semiannually <sup>1</sup>											
15-Aug-14	-	-	10.01	595	10.01	-35.2	6.43	6.99	427	3.5	0.1 U	31500
14-Nov-14	Monitored Semiannually <sup>1</sup>											
10-Feb-15	-	-	10.60	515	9.88	183.5	6.84	7.26	363	2.8	0.07 J	27200
4-May-15	Monitored Semiannually <sup>1</sup>											
4-Aug-15	-	-	10.90	554	9.98	95.8	8.68	7.48	438	2.6	0.1 U	34700
5-Nov-15	-	-	10.30	503	10.24	177.6	13.40	7.46	449	2.8	0.1 U	31800
8-Feb-16	-	-	9.30	541	11.30	215.0	5.12	7.30	293	3.2	0.1 U	23100



**Table A-4e: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Portal Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet msl)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-	
-	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
24-Aug-16	-	-	13.40	585	9.32	410.0	8.50	7.23	Monitored Annually <sup>2</sup>				
1-Nov-16	-	-	10.90	242	9.13	51.4	7.57	7.41	Monitored Annually <sup>2</sup>				
31-Jan-17	-	-	8.90	663	10.87	-57.4	6.23	7.50	3390	3.97	0.1 U	29200	
-	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
17-Aug-17	-	-	11.40	712	9.67	-12.4	9.87	7.30	Monitored Annually <sup>2</sup>				
9-Nov-17	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
27-Feb-18	-	-	9.50	427	9.94	-46.4	16.70	7.72	354	4.11	0.1 U	20400	
1-May-18	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
21-Aug-18	-	-	13.13	582	12.46	-23.0	23.10	7.24	Monitored Annually <sup>2</sup>				
6-Nov-18	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
12-Mar-19	-	-	8.00	406	11.35	-2.8	10.70	7.97	388	1.56	0.1 U	24700	
8-May-19	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
27-Aug-19	-	-	10.55	576	11.80	Note 1	154.00	6.78	Monitored Annually <sup>2</sup>				
13-Nov-19	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
13-Feb-20	-	-	9.20	382	9.19	-1.3	13.40	6.93	259	3.65	0.1 U	16700	
13-Aug-20	-	-	10.10	569	10.01	-27.0	12.20	7.12	Monitored Annually <sup>2</sup>				
9-Dec-20	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
4-Mar-21	-	-	9.30	416	5.80	33.0	17.1	6.89	364	4.14	0.1 U	20000	
10-Jun-21	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
18-Oct-21	-	-	10.9	386.7	5.11	-28.4	86.1	6.45	Monitored Annually <sup>2</sup>				
5-Jan-22	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
16-Mar-22	-	-	12	402.9	6.78	70.7	19.8	5.81	348	5.32	0.1 U	18800	
21-Jun-22	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
14-Sep-22	-	-	12	521	7.29	39.1	93.8	6.7	Monitored Annually <sup>2</sup>				
14-Dec-22	Monitored Semiannually <sup>2</sup>									Monitored Annually <sup>2</sup>			
16-Mar-23	-	-	10.8	667.5	6.16	76.1	8.99	6.86	383	5.08	0.1 U	27100	

Notes:

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

\* Measurement invalid and not shown

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated May 16, 2012

2 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-4f: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-2DSP  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem. Total Dissolved Solids (mg/L)	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
1-Mar-02	-	-	-	542	-	-	-	7.22	467	-	-	-
1-Jun-02	197.34	735.48	12.00	750	-	-	-	7.10	459	-	-	-
1-Sep-02	199.29	733.53	14.00	660	-	-	-	6.90	499	-	-	-
2-Dec-02	200.09	732.73	10.80	675	-	-	-	6.89	440	1 U	0.5 U	-
3-Mar-03	190.21	742.61	11.90	763	-	-	-	6.98	450	-	-	-
3-May-03	191.78	741.04	12.30	730	-	-	233.00	6.98	550	-	-	-
3-Aug-03	199.82	733.00	16.50	848	-	-	17.00	6.92	520	-	-	-
1-Nov-03	199.97	732.85	11.60	559	-	-	9.20	7.04	522	0.98	0.5 U	-
1-Feb-04	188.78	744.04	11.96	608	-	-	4.86	6.68	560	-	-	-
1-May-04	198.45	734.37	13.69	614	-	-	6.17	6.80	478	-	-	-
1-Aug-04	199.17	733.65	14.38	731	-	-	5.48	6.71	460	-	-	-
1-Nov-04	197.92	734.90	11.62	785	-	-	12.30	6.75	512	1 U	1 U	-
1-Feb-05	186.36	746.46	11.64	806	-	-	1.47	6.94	487	-	-	-
1-May-05	-	-	12.87	790	-	-	15.80	6.89	338	-	-	-
1-Aug-05	196.10	736.72	15.01	603	-	-	45.70	6.44	388	-	-	-
1-Nov-05	196.78	736.04	9.91	549	-	-	13.30	6.66	350	1 U	1 U	-
1-Feb-06	193.93	738.89	8.10	641	2.11	269.2	35.70	6.82	400 J	-	-	-
1-May-06	197.90	734.92	10.88	798	1.67	27.3	5.38	6.50	380	-	-	-
1-Aug-06	198.80	734.02	11.44	534	2.52	205.7	8.74	6.67	360	-	-	-
1-Nov-06	187.36	745.46	10.77	680	2.12	-19.9	18.90	7.06	430	1 U	1 U	-
28-Dec-06	192.37	740.45	-	-	-	-	-	-	-	-	-	-
7-Feb-07	197.46	735.36	10.24	621	0.64	-16.7	27.80	6.89	420	-	-	-
7-May-07	198.49	734.33	-	-	-	-	-	-	-	-	-	-
1-Aug-07	198.45	734.37	-	-	-	-	-	-	-	-	-	-
27-Nov-07	196.48	736.34	-	-	-	-	-	-	-	-	-	-
8-Feb-08	191.30	741.52	-	-	-	-	-	-	-	-	-	-
8-May-08	193.95	738.87	-	-	-	-	-	-	-	-	-	-
27-Sep-11	197.32	735.50	-	-	-	-	-	-	-	-	-	-
13-Dec-11	192.15	740.67	9.6	421	2.10	313.0	16.10	7.49	-	-	-	-
22-Mar-12	183.35	751.47	8.9	546	12.83	166.3	0.56	7.47	-	-	-	-
18-Jun-12	192.54	742.28	-	-	-	-	-	-	-	-	-	-
18-Sep-12	199.51	735.31	16.2	508	2.21	120.0	1.27	7.58	-	-	-	-
18-Dec-12	184.52	750.30	-	-	-	-	-	-	-	-	-	-
21-Feb-13	190.65	744.17	7.6	678	5.33	342.6	6.61	8.02	-	-	-	-
22-May-13	198.05	736.77	-	-	-	-	-	-	-	-	-	-
20-Aug-13	200.47	734.35	13.0	488	3.26	90.2	8.47	7.42	-	-	-	-
19-Nov-13	196.59	738.23	-	-	-	-	-	-	-	-	-	-
31-Mar-14	186.78	748.04	11.4	421	7.28	195.1	1.70	7.47	-	-	-	-
21-May-14	192.27	742.55	-	-	-	-	-	-	-	-	-	-
15-Aug-14	199.97	734.85	18.9	492	0.97	1.4	52.50	7.01	-	-	-	-
14-Nov-14	196.60	738.22	-	-	-	-	-	-	-	-	-	-
10-Feb-15	183.97	750.85	10.2	450	7.65	121.4	1.02	7.34	-	-	-	-
4-May-15	194.19	740.63	-	-	-	-	-	-	-	-	-	-
4-Aug-15	198.35	736.47	13.6	432	3.07	18.6	0.27	7.47	-	-	-	-
3-Nov-15	198.25	736.57	10.3	405	2.57	106.2	7.07	7.35	-	-	-	-
8-Feb-16	188.43	746.39	12.5	536	2.77	189.8	0.25	7.78	-	-	-	-
2-May-16	195.72	739.10	Monitored Semiannually <sup>1</sup>						-	-	-	-
22-Aug-16	197.89	736.93	14.0	418	1.27	-123.1	4.36	7.32	-	-	-	-
1-Nov-16	195.49	739.33	Monitored Semiannually <sup>1</sup>						-	-	-	-
31-Jan-17	186.94	747.88	9.2	506	5.26	-45.4	0.38	7.45	-	-	-	-
30-May-17	190.62	744.20	Monitored Semiannually <sup>1</sup>						-	-	-	-
16-Aug-17	197.55	737.27	13.3	540	2.31	37.3	3.42	7.37	-	-	-	-
9-Nov-17	197.11	737.71	Monitored Semiannually <sup>1</sup>						-	-	-	-
28-Feb-18	185.96	748.86	10.1	390	5.95	204.7	1.62	7.15	-	-	-	-
1-May-18	184.95	749.87	Monitored Semiannually <sup>1</sup>						-	-	-	-
22-Aug-18	197.40	737.42	13.7	412	3.10	85.5	1.66	7.27	-	-	-	-
6-Nov-18	197.94	736.88	Monitored Semiannually <sup>1</sup>						-	-	-	-
12-Mar-19	182.84	751.98	8.7	332	6.25	148.4	1.93	7.28	-	-	-	-
8-May-19	185.36	749.46	Monitored Semiannually <sup>1</sup>						-	-	-	-
27-Aug-19	196.56	738.26	11.92	411	8.82	Note 1	0.02	7.28	-	-	-	-
13-Nov-19	196.74	738.08	Monitored Semiannually <sup>1</sup>						-	-	-	-
13-Feb-20	177.10	757.72	9.3	453	3.03	91.0	2.31	7.56	-	-	-	-
13-Aug-20	200.97	733.85	12.2	422	3.04	35.0	0.96	7.42	-	-	-	-
9-Dec-20	197.86	736.96	Monitored Semiannually <sup>1</sup>						-	-	-	-



**Table A-4f: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-2DSP  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
5-Mar-21	197.42	737.40	10.0	398	3.79	112.0	1.17	7.37	-	-	-	-
10-Jun-21	199.94	734.88	Monitored Semiannually <sup>1</sup>						-	-	-	-
18-Oct-21	200.24	734.58	12.6	307.7	6.06	161.4	12.3	7.35	-	-	-	-
5-Jan-22	192.66	742.16	Monitored Semiannually <sup>1</sup>						-	-	-	-
21-Mar-22	193.68	741.14	9.6	369	7.04	125.6	5.95	6.63	-	-	-	-
21-Jun-22	191.33	743.49	Monitored Semiannually <sup>1</sup>						-	-	-	-
13-Sep-22	200.03	734.79	12.6	404.7	8.66	252.7	10.5	6.91	-	-	-	-
12-Dec-22	197.99	736.83	Monitored Semiannually <sup>1</sup>						-	-	-	-
15-Mar-23	192.63	742.19	11.4	591.7	2.44	41.8	5.56	7.53	-	-	-	-

Notes:

Top of casing elevation (feet NAVD88) prior to raising casing: 932.82  
 Top of casing elevation (feet NAVD88) after raising casing (December 14, 2011): 934.82

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit



**Table A-4g: Summary of Dale Strip Pit - Bedrock Groundwater Sampling Results - Well MWB-4SDSP Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Arsenic	Lead
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	8	2.1	-
26-Sep-11	25.77	906.64	11.40	553	0.86	197.2	-	7.21	-	-	-	-
13-Dec-11	24.94	907.47	9.70	625	1.73	658.0	22.70	7.68	-	-	-	-
22-Mar-12	23.80	908.61	9.60	785	3.71	242.6	8.14	7.30	-	-	-	-
19-Jun-12	24.09	908.32	-	-	-	-	-	-	-	-	-	-
18-Sep-12	25.68	906.73	16.50	664	2.37	150.0	19.20	7.34	-	-	-	-
18-Dec-12	23.02	909.39	-	-	-	-	-	-	-	-	-	-
21-Feb-13	23.50	908.91	10.00	840	6.55	352.4	3.42	7.42	-	-	-	-
22-May-13	23.84	908.57	-	-	-	-	-	-	-	-	-	-
20-Aug-13	25.08	907.33	13.50	539	2.91	45.1	1.87	7.22	-	-	-	-
19-Nov-13	22.76	909.65	-	-	-	-	-	-	-	-	-	-
31-Mar-14	21.39	911.02	12.20	511	6.31	197.3	1.38	7.58	-	-	-	-
21-May-14	19.82	912.59	-	-	-	-	-	-	-	-	-	-
15-Aug-14	24.00	908.41	12.81	647	0.82	7.5	5.42	6.62	-	-	-	-
14-Nov-14	22.28	910.13	-	-	-	-	-	-	-	-	-	-
10-Feb-15	21.10	911.31	12.30	636	2.56	-71.9	1.11	7.11	-	-	-	-
4-May-15	22.65	909.76	-	-	-	-	-	-	-	-	-	-
5-Aug-15	24.65	907.76	13.50	563	3.21	116.4	55.20	7.42	-	-	-	-
3-Nov-15	23.87	908.54	12.20	493	4.65	114.4	5.78	7.52	-	-	-	-
8-Feb-16	19.39	913.02	15.80	670	3.92	163.5	5.06	7.59	-	-	-	-
2-May-16	20.99	911.42	Monitored Semiannually <sup>1</sup>						-	-	-	-
22-Aug-16	24.42	907.99	17.60	527	5.01	106.0	1.39	7.44	-	-	-	-
1-Nov-16	21.31	911.10	Monitored Semiannually <sup>1</sup>						-	-	-	-
31-Jan-17	21.11	911.30	12.10	680	2.75	-146.1	1.48	7.35	-	-	-	-
30-May-17	18.49	913.92	Monitored Semiannually <sup>1</sup>						-	-	-	-
17-Aug-17	22.58	909.83	12.60	673	5.22	177.8	1.97	7.15	-	-	-	-
9-Nov-17	20.72	911.69	Monitored Semiannually <sup>1</sup>						-	-	-	-
28-Feb-18	17.09	915.32	11.10	509	8.34	29.0	0.72	7.37	-	-	-	-
1-May-18	17.76	914.65	Monitored Semiannually <sup>1</sup>						-	-	-	-
22-Aug-18	Could not be safely accessed due to wasp nests.								-	-	-	-
6-Nov-18	21.70	910.71	Monitored Semiannually <sup>1</sup>						-	-	-	-
12-Mar-19	18.30	914.11	10.10	215	9.65	18.9	0.39	7.86	-	-	-	-
8-May-19	19.09	913.32	Monitored Semiannually <sup>1</sup>						-	-	-	-
27-Aug-19	22.85	909.56	14.79	562	8.59	Note 1	3.60	7.80	-	-	-	-
13-Nov-19	21.95	910.46	Monitored Semiannually <sup>1</sup>						-	-	-	-
13-Feb-20	16.60	915.81	10.80	458	8.74	68.0	1.98	7.83	-	-	-	-
13-Aug-20	21.96	910.45	12.60	503	8.74	-39.8	1.89	7.83	-	-	-	-
9-Dec-20	20.58	911.83	Monitored Semiannually <sup>1</sup>						-	-	-	-
5-Mar-21	17.69	914.72	11.30	497	6.84	90.0	1.46	7.91	-	-	-	-
10-Jun-21	21.47	910.94	Monitored Semiannually <sup>1</sup>						-	-	-	-
18-Oct-21	23.22	909.19	13.5	368.9	8.47	130.8	1.36	7.63	-	-	-	-
5-Jan-22	17.66	914.75	Monitored Semiannually <sup>1</sup>						-	-	-	-
21-Mar-22	16.7	915.71	10.7	456.3	9.94	115.5	2.79	7.05	-	-	-	-
21-Jun-22	17.95	914.46	Monitored Semiannually <sup>1</sup>						-	-	-	-
13-Sep-22	21.6	910.81	15.3	531	7.87	90.3	1.45	7.53	-	-	-	-
12-Dec-22	19.02	913.39	Monitored Semiannually <sup>1</sup>						-	-	-	-
15-Mar-23	17.46	914.95	12.3	668	8.07	57.4	2.67	7.85	-	-	-	-

Notes:

Top of casing elevation (feet NAVD88) prior to DSP Cover Upgrade: 939.42  
 Top of casing elevation (feet NAVD88) after DSP Cover Upgrade (completed July 2011): 932.41  
 Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

1 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated April 7, 2016, extended October 10, 2019. Field parameters collected semi-annually, analytical samples collected annually. Sampling schedule follows the Golder 2021 RI Work Plan starting in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

°C Degrees Celsius

Note 1 ORP measurements not available due to faulty sensor.

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit





**APPENDIX A-5**

**Summary of Lower Disposal Area –  
Disposal Area Groundwater  
Sampling Results**

Table A-5A Well P-14  
Table A-5B Well P-15

**Table A-5a: Summary of Lower Disposal Area - Disposal Area Groundwater Sampling Results - Well P-14  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters								Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)		Total Dissolved Solids (mg/L)	Antimony	Arsenic	Lead	Potassium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140
11-Dec-20	32.53	740.79	11.6	18697	0.12	-61.2	17.9	13.30	6560	-	263	19.6	2540000	-
3-Mar-21	29.44	743.88	12.0	12836	0.05	-87.0	1.54	13.09	4060	-	84.1	9.64	1490000	-
10-Jun-21	33.57	739.75	12.9	18706	0.67	-175.2	1.88	13.06	6400	-	242	3.44	2460000	-
13-Oct-21	33.57	739.75	12.7	23225	0.77	-139.7	0.75	13.18	7240 J-	131	292	2.47	2560000	24.2
7-Jan-22	27.73	745.59	11.9	9778	0.96	-112.9	1.86	13.30	4850	51.8	76.3	9.19	1480000	6.77
21-Mar-22	27.5	745.82	12.5	11725	1.27	-25.3	2.18	14.52	4110	46.1	74.8	41.3	1430000	6.68
23-Jun-22	28.65	744.67	13.5	18219	0.05	-88.6	2.04	12.93	6160	130	238	6.56	2250000	21.9
14-Sep-22	34.22	739.1	13.2	17395	1.72	-127.9	1.7	13.21	6510	130	235	6.3	2570000	20.5
14-Dec-22	32.59	740.73	12.1	19267	3.3	-448.9	0.88	13.06	6730	130	255	11.1	2710000	23
14-Mar-23	30.30	743.02	12.4	24035	0.08	-187.5	0.31	13.12	6280	134	232	2.22	2390000	20.5

Notes:

Top of casing elevation (feet NAVD88): 773.32

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

<sup>a</sup> Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

**Table A-5b: Summary of Lower Disposal Area - Disposal Area Groundwater Sampling Results - Well P-15  
Ravensdale Site, Ravensdale, Washington**

Date Sampled	Field Parameters									Gen. Chem.	Metals (ug/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)		Antimony	Arsenic	Lead	Potassium	Vanadium
Preliminary Screening Level <sup>a</sup>	-	-	-	-	-	-	-	6.5-8.5	-	5.6	8	2.1	-	140	
15-Oct-21	30.03	726.52	13.00	15815	1.72	-147.5	5.08	13.17	7180 J-	2 U	6.57	94	2390000	3.65	
7-Jan-22	15.32	741.23	10.20	7227	1.03	-116.3	1.84	13.28	3420	5.17	6.34	101	884000	0.515 J	
17-Mar-22	14.44	742.11	11.8	9351	1.11	-70	1.88	14.60	3060	3.08	5.63	109	970000	0.406	
22-Jun-22	18.39	738.16	13	10563	0.14	-71	2.19	12.95	3300	2.22	5.37	100	924000	1.14	
14-Sep-22	28.82	727.73	13.8	14297	6.41	-17.7	4.71	12.99	5340	4 U	3.68 J	269	1790000	0.624	
14-Dec-22	21.29	735.26	11	10770	2.85	-322.9	2.33	13.05	3460	1.72	5.07	173	1070000	1.19	
14-Mar-23	21.53	735.02	11.5	14124	0.15	70.5	0.41	12.98	3360	2.47	5.82	93.8	945000	0.288 J	

Notes:

Top of casing elevation (feet NAVD88): 756.55

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward. Iron and manganese are not included in the COPCs at the Site and are not analyzed beginning in Q2 2021. Antimony and Vanadium were included as COPCs for surface water locations and shallow/alluvial groundwater monitoring wells at the Site beginning in Q3 2021.

- Not measured or not available

Orange shaded values indicate parameter results above the Preliminary Screening Level (PSL), except for pH, which could be above or below the PSL.

a Preliminary Cleanup Level (PCUL) provided by Ecology 30 Sept 2022

U Data validation code; not detected at the Reporting Limit (RL)

J Data validation code; estimated value

J+ Data validation code; estimated value with positive bias

°C Degrees Celsius

µmhos/cm Micromhos per centimeter

feet bmp Feet below measuring point

feet NAVD88 Feet NAVD88 Datum

mg/L Milligrams per liter

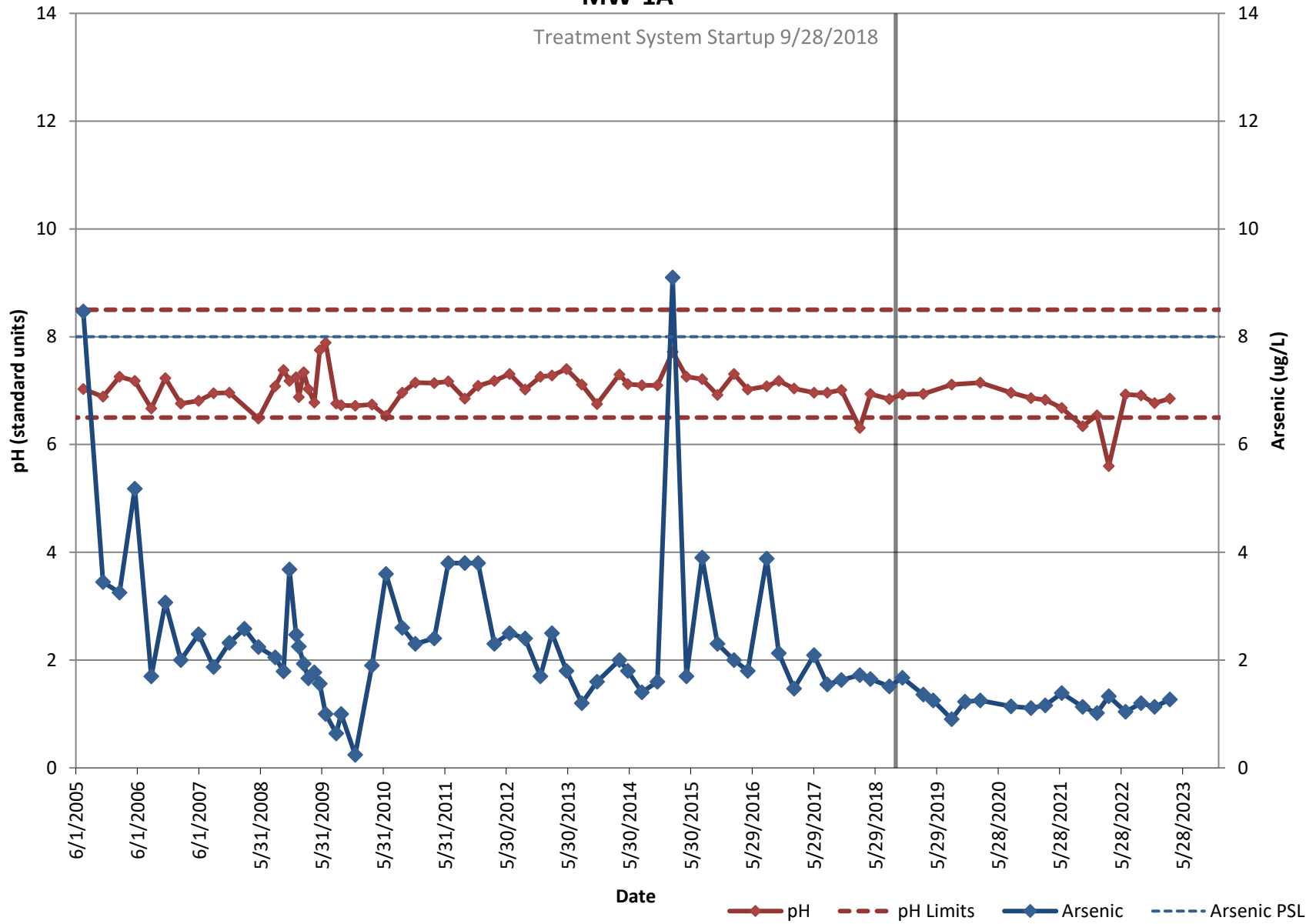
mV Millivolts

NTU Nephelometric Turbidity Unit

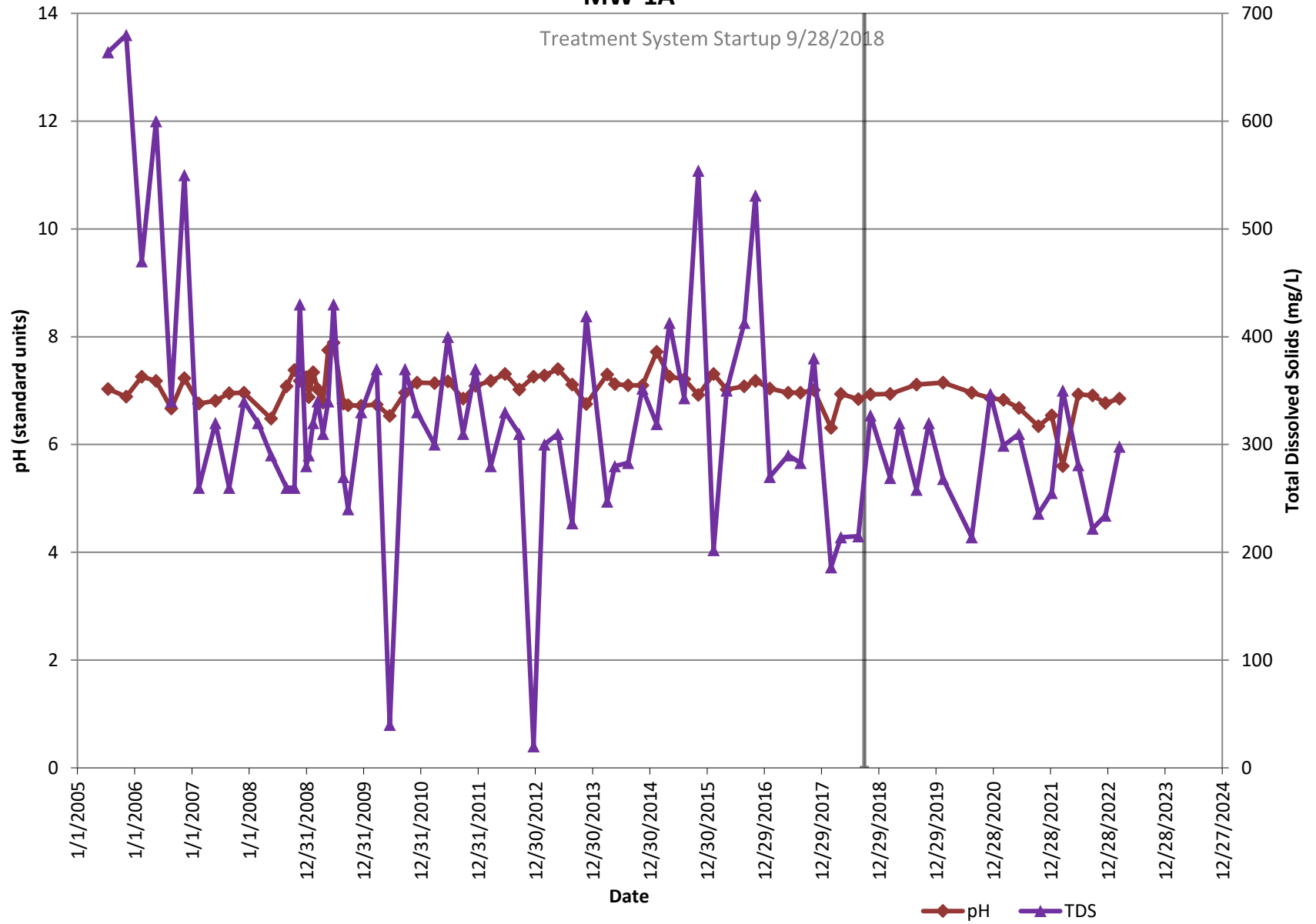
**APPENDIX B**

**LDA Shallow/Alluvial Monitoring  
Wells Data Graphs**

# LDA Shallow/Alluvial Monitoring Wells MW-1A



# LDA Shallow/Alluvial Monitoring Wells MW-1A

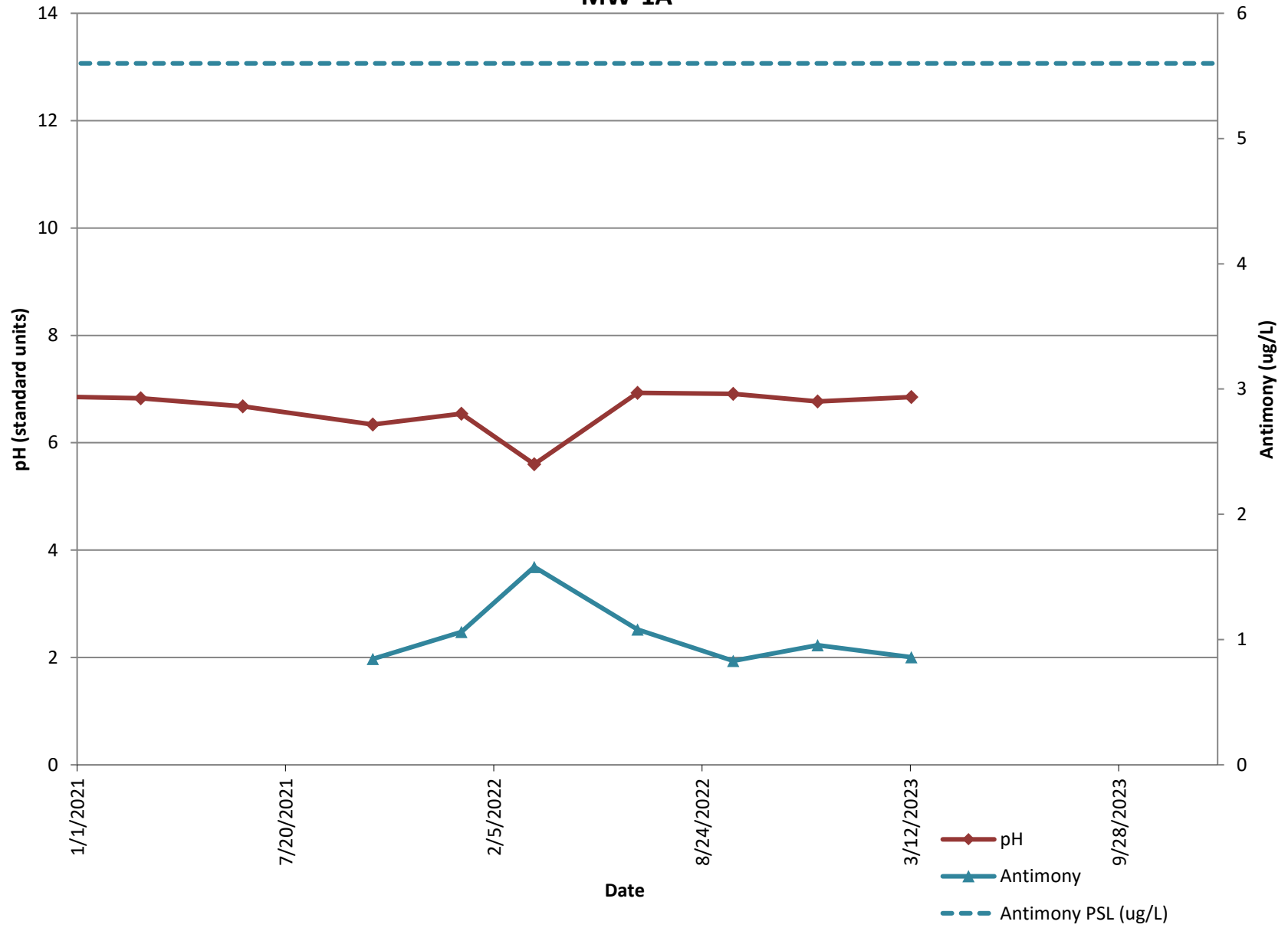




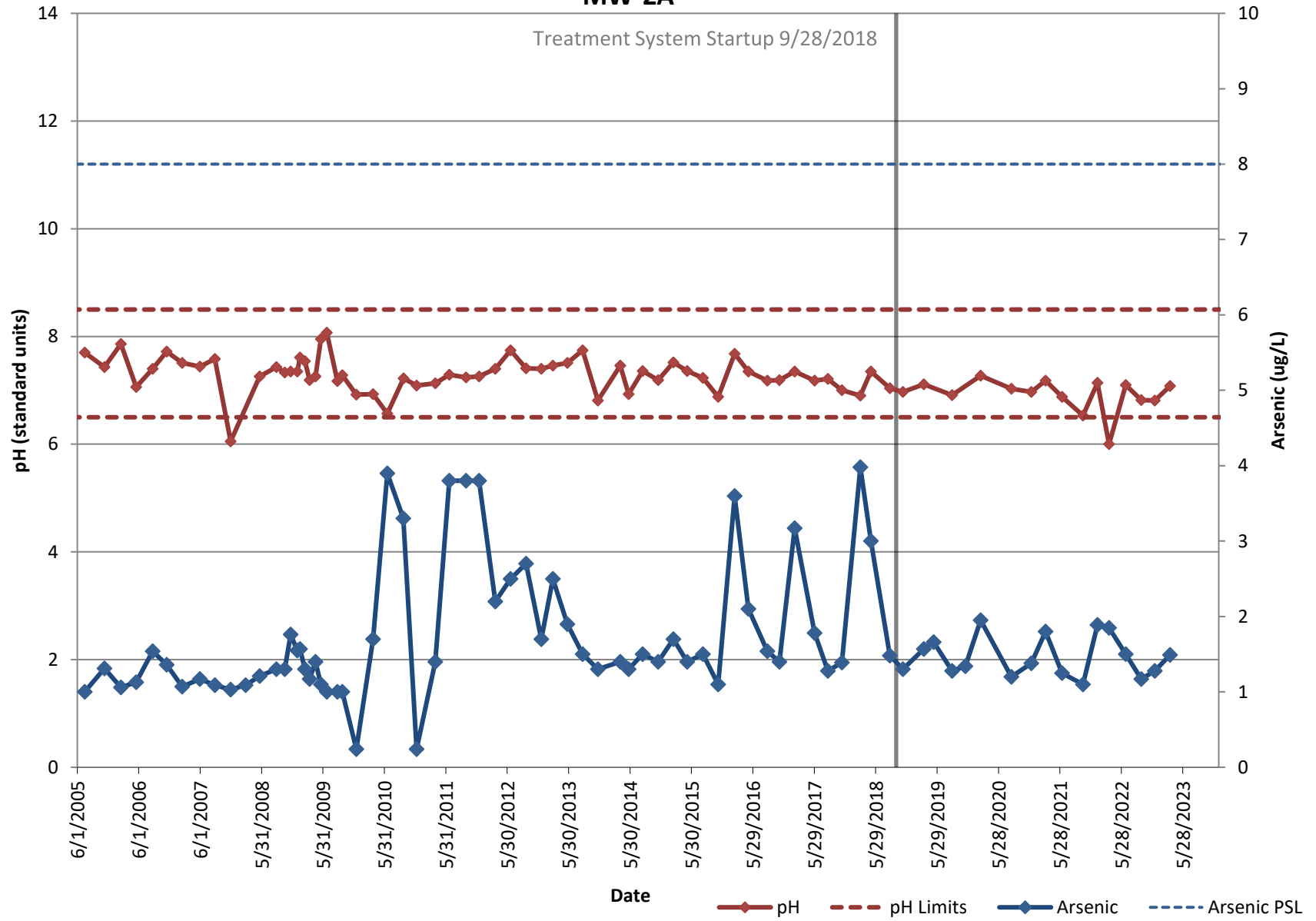
# LDA Shallow/Alluvial Monitoring Wells MW-1A



# LDA Shallow/Alluvial Monitoring Wells MW-1A

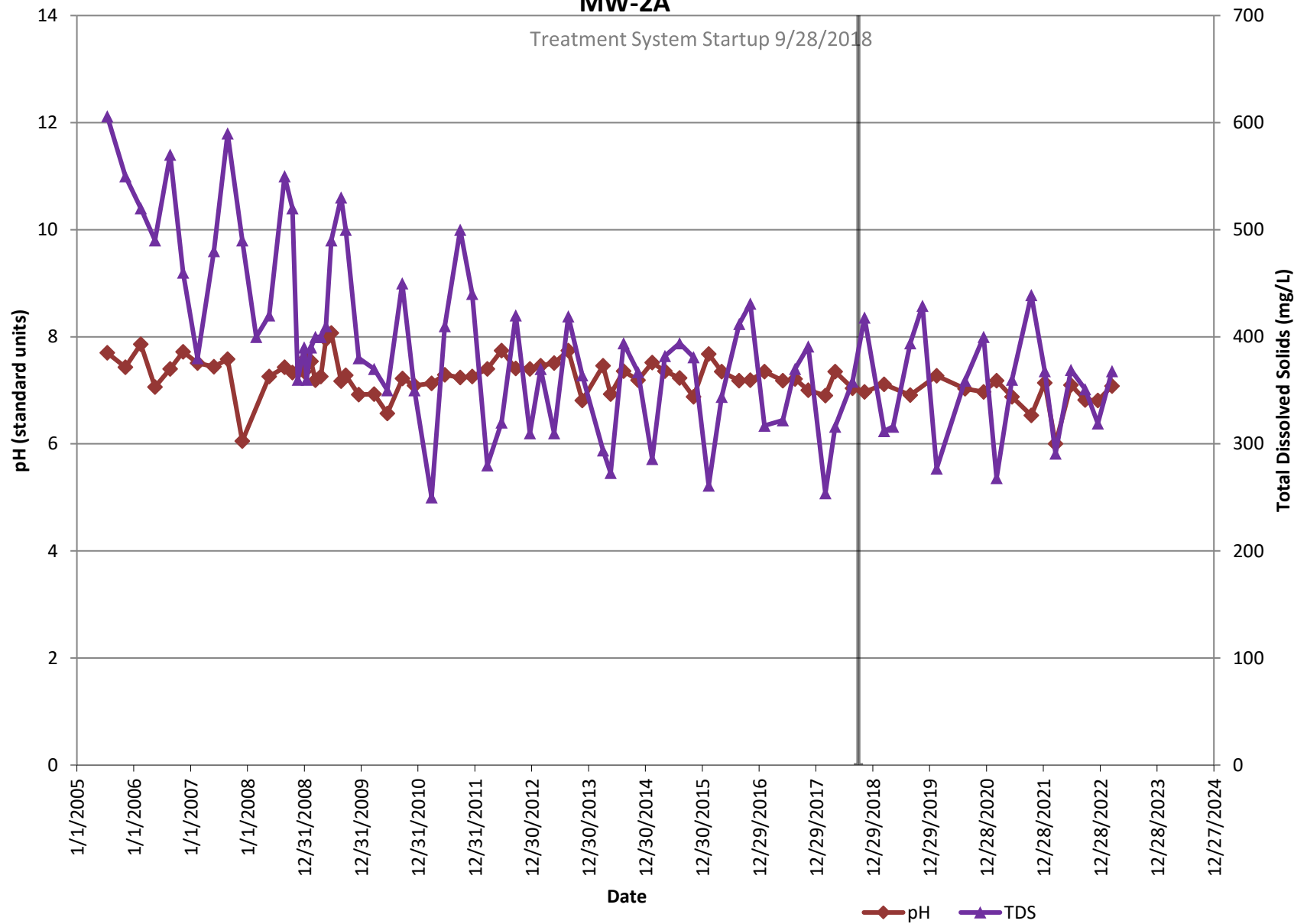


## LDA Shallow/Alluvial Monitoring Wells MW-2A

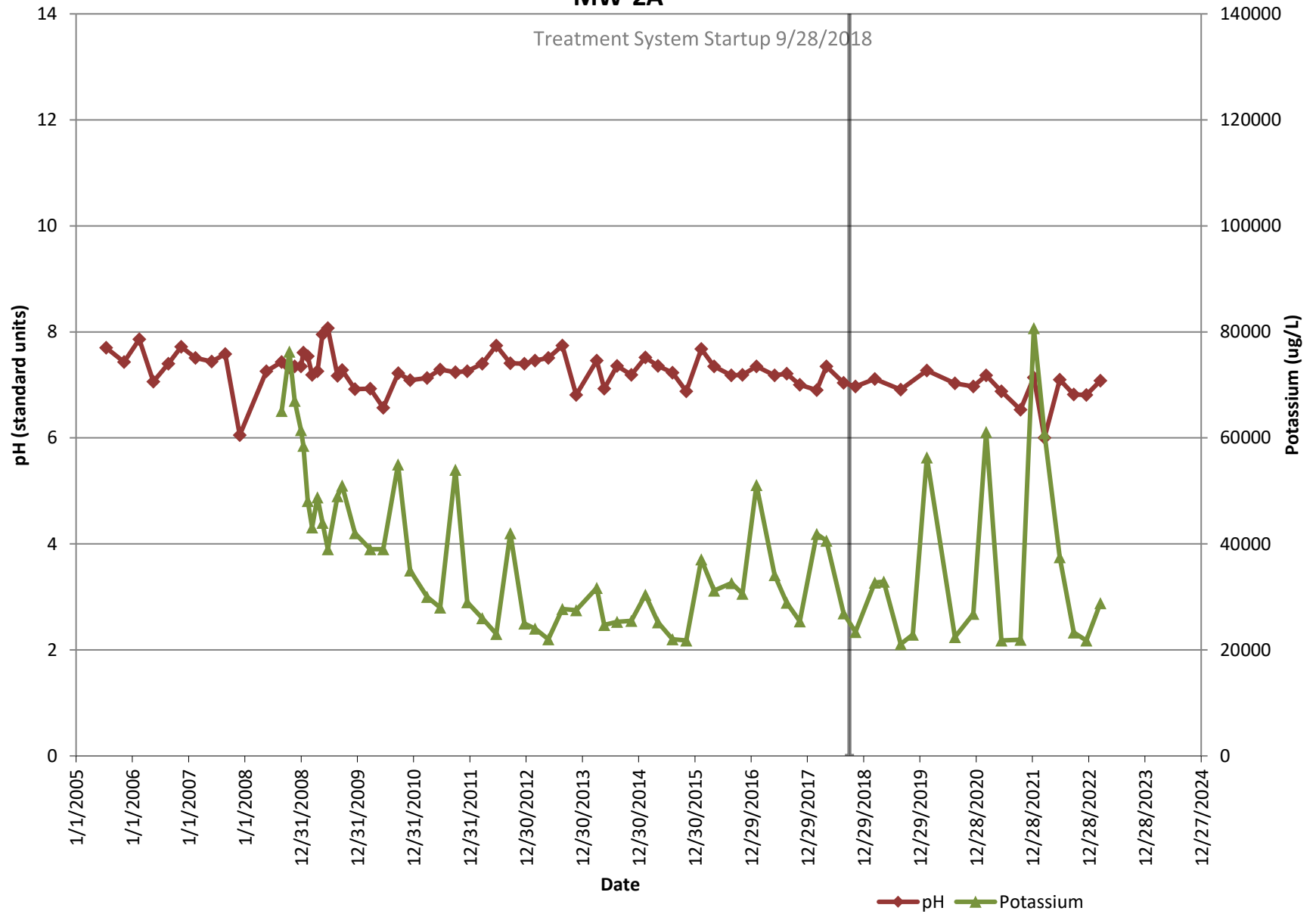


# LDA Shallow/Alluvial Monitoring Wells

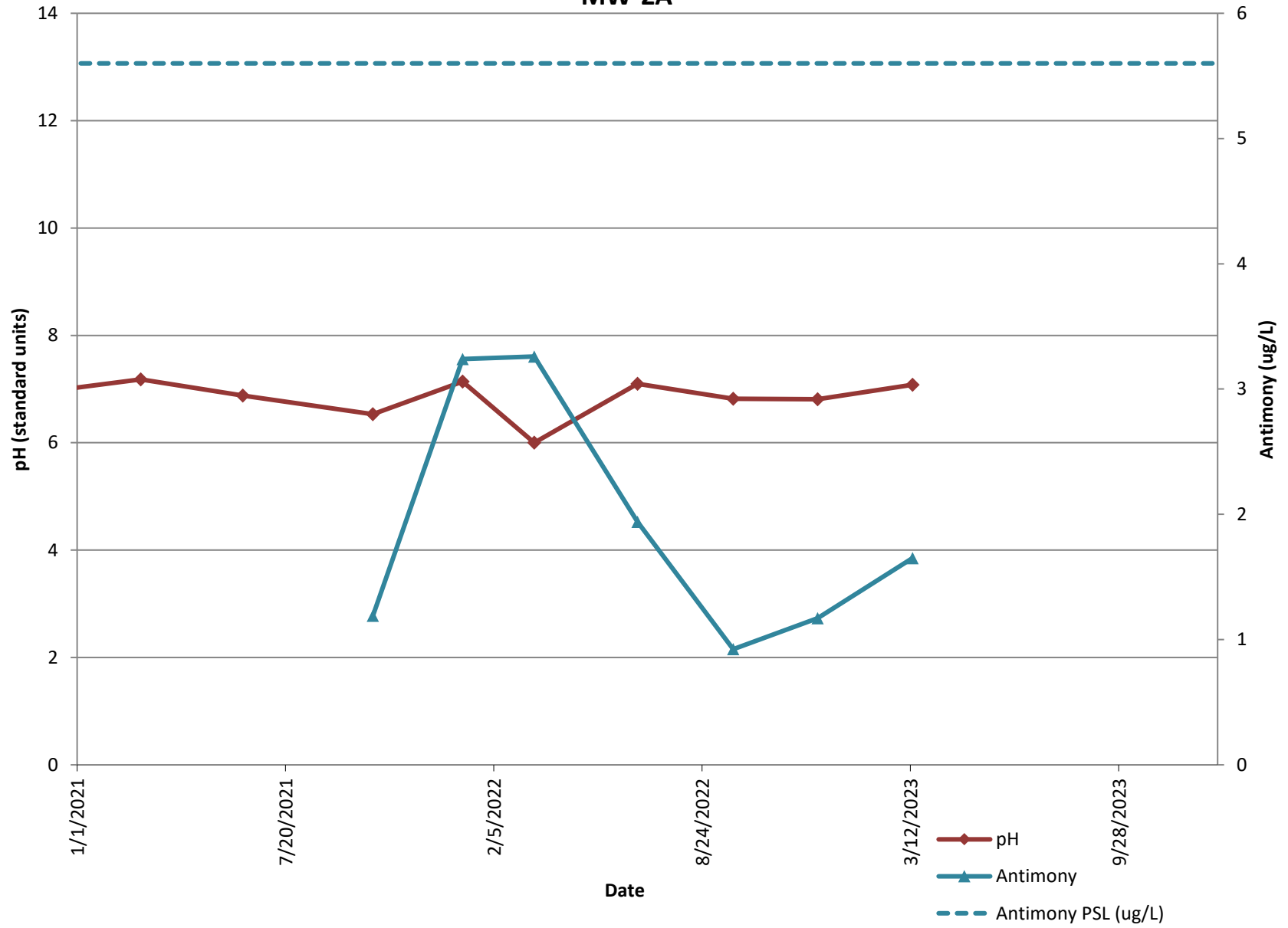
## MW-2A



# LDA Shallow/Alluvial Monitoring Wells MW-2A

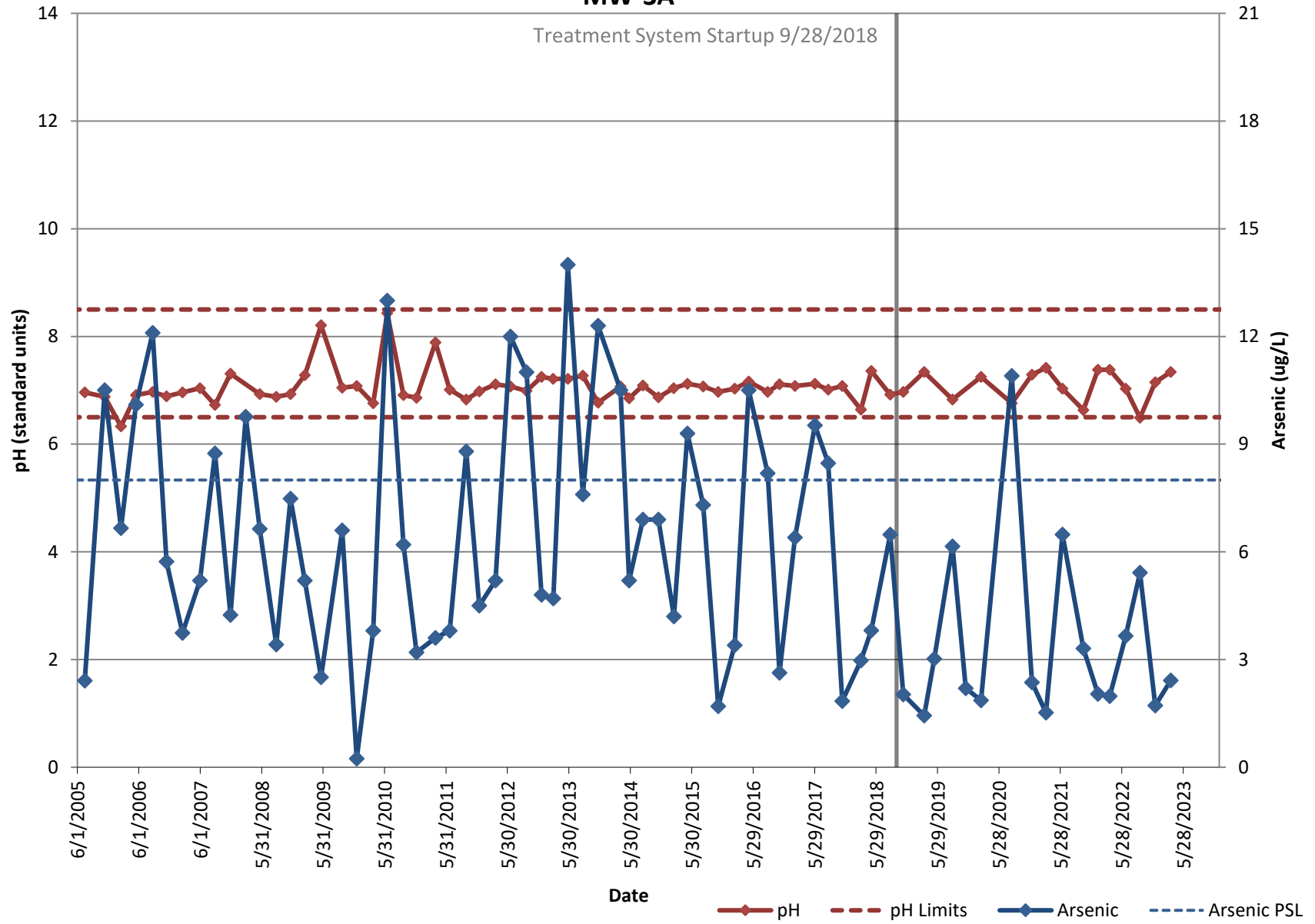


# LDA Shallow/Alluvial Monitoring Wells MW-2A



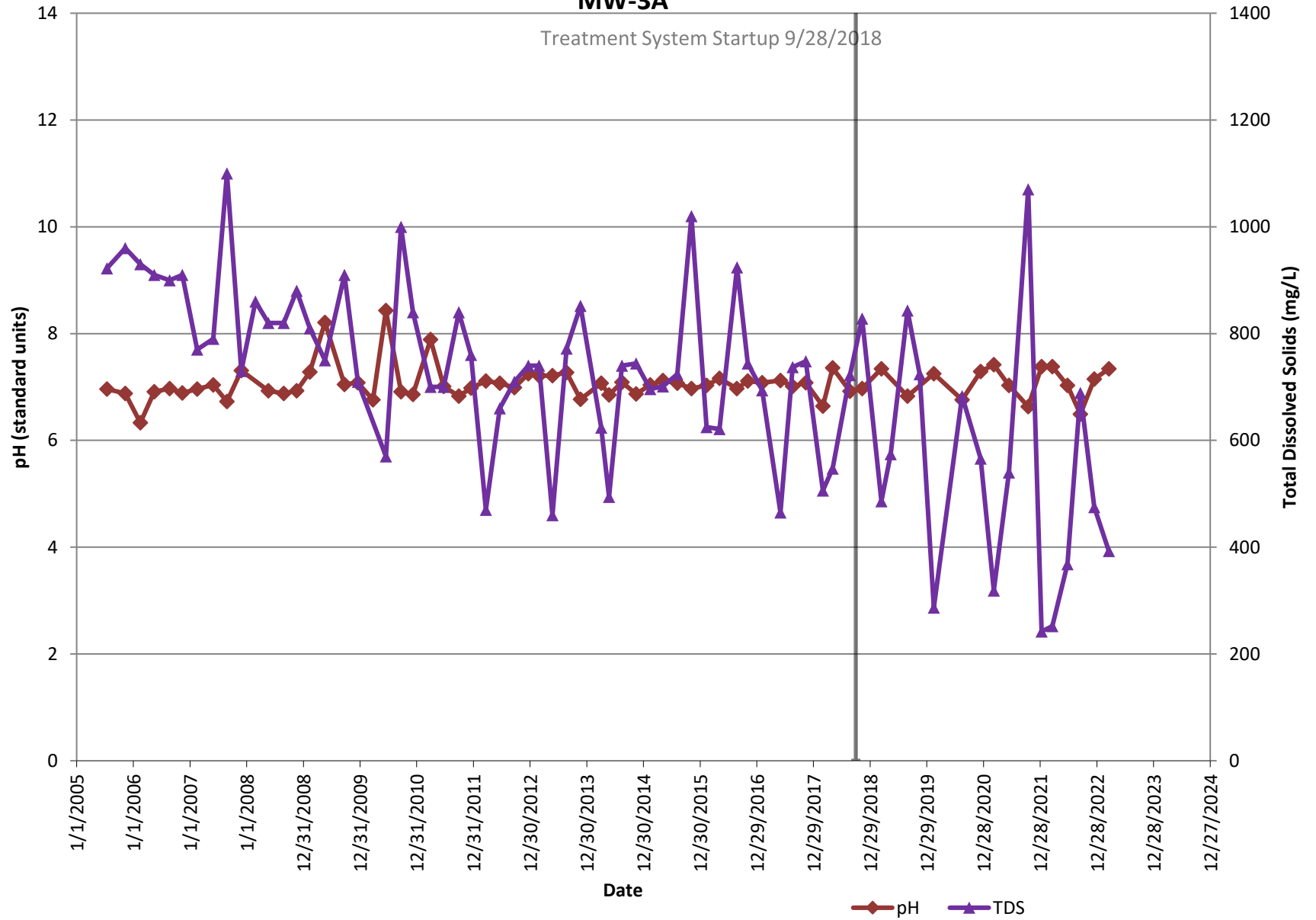


# LDA Shallow/Alluvial Monitoring Wells MW-3A

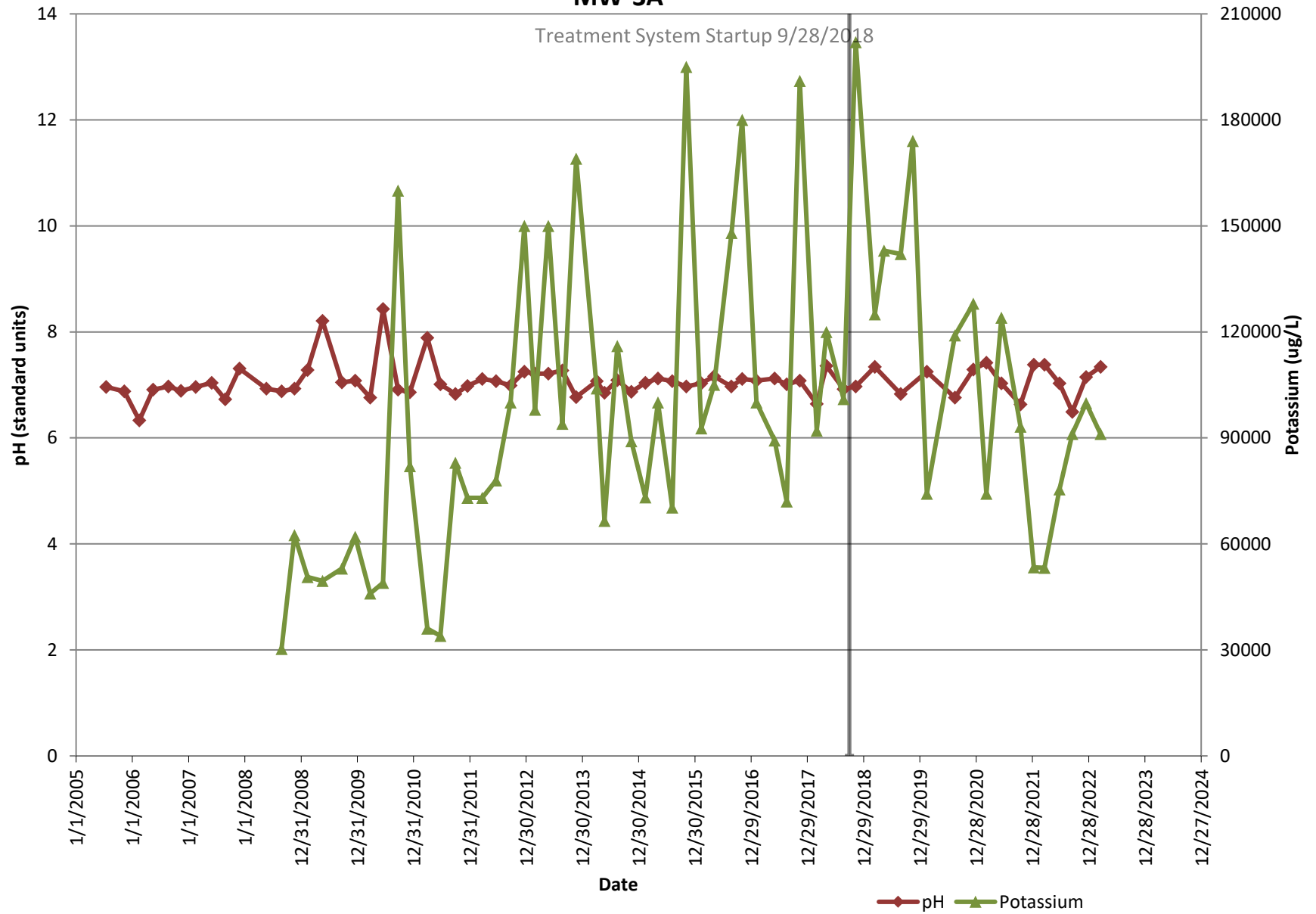


# LDA Shallow/Alluvial Monitoring Wells

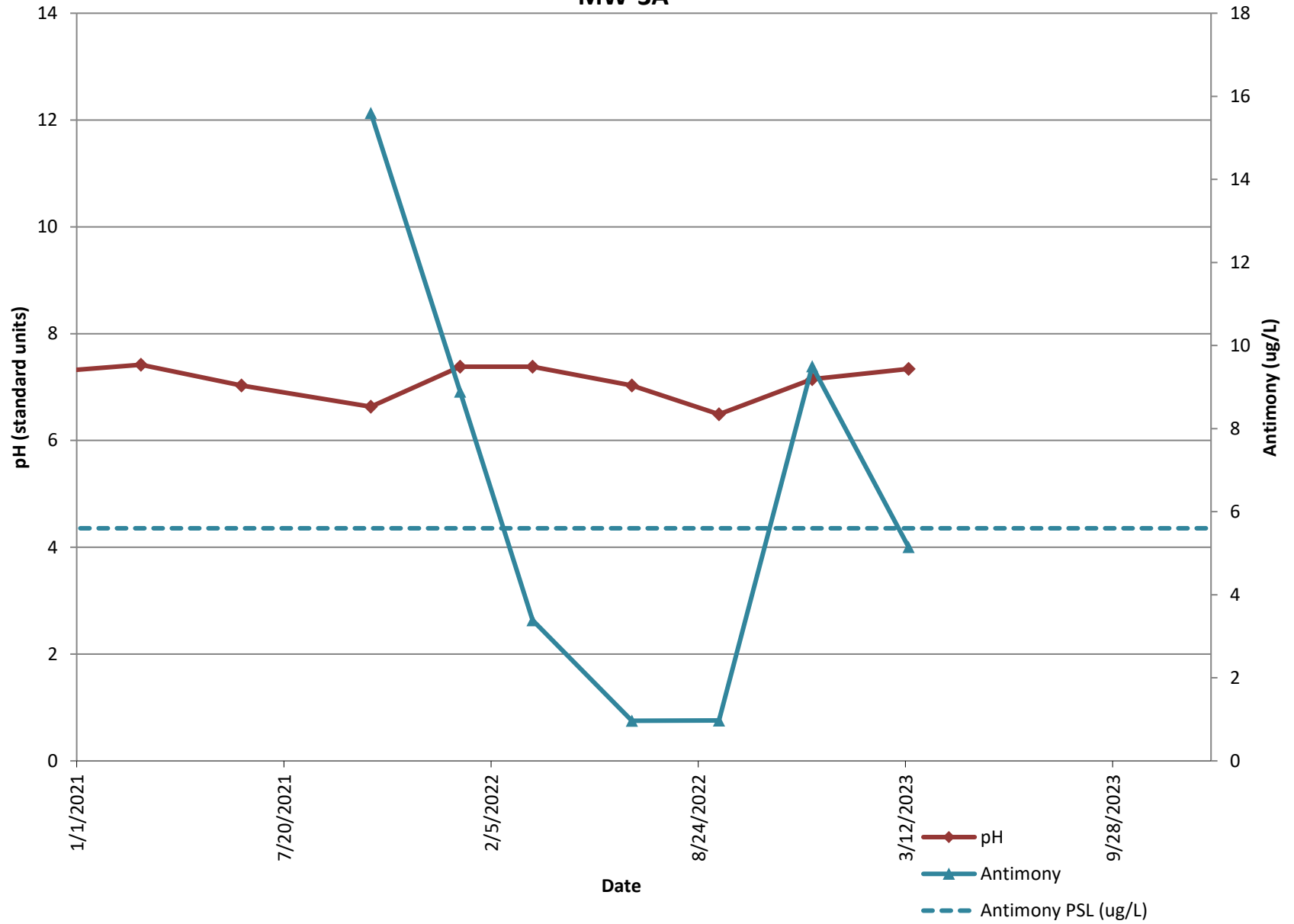
## MW-3A



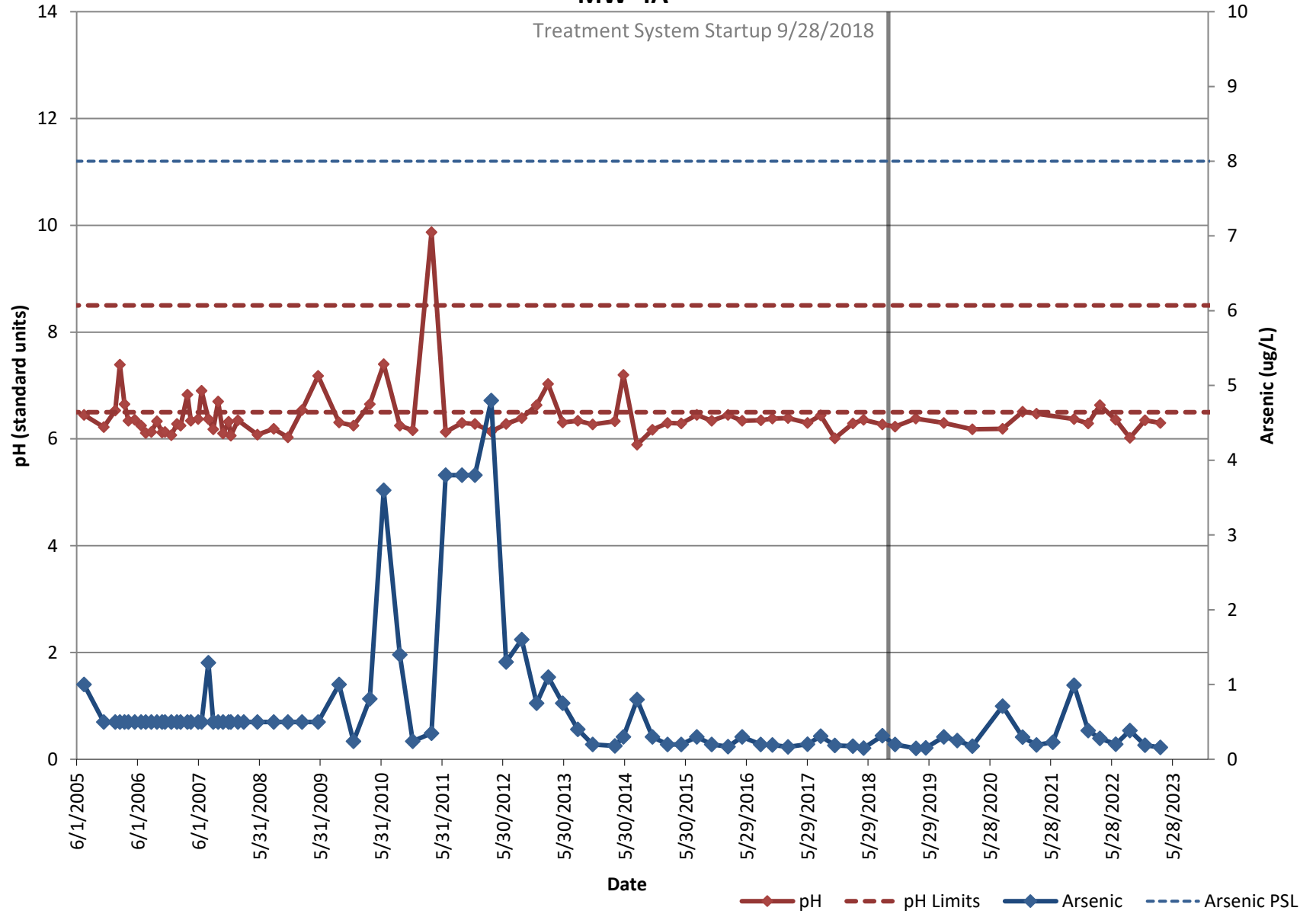
# LDA Shallow/Alluvial Monitoring Wells MW-3A



# LDA Shallow/Alluvial Monitoring Wells MW-3A

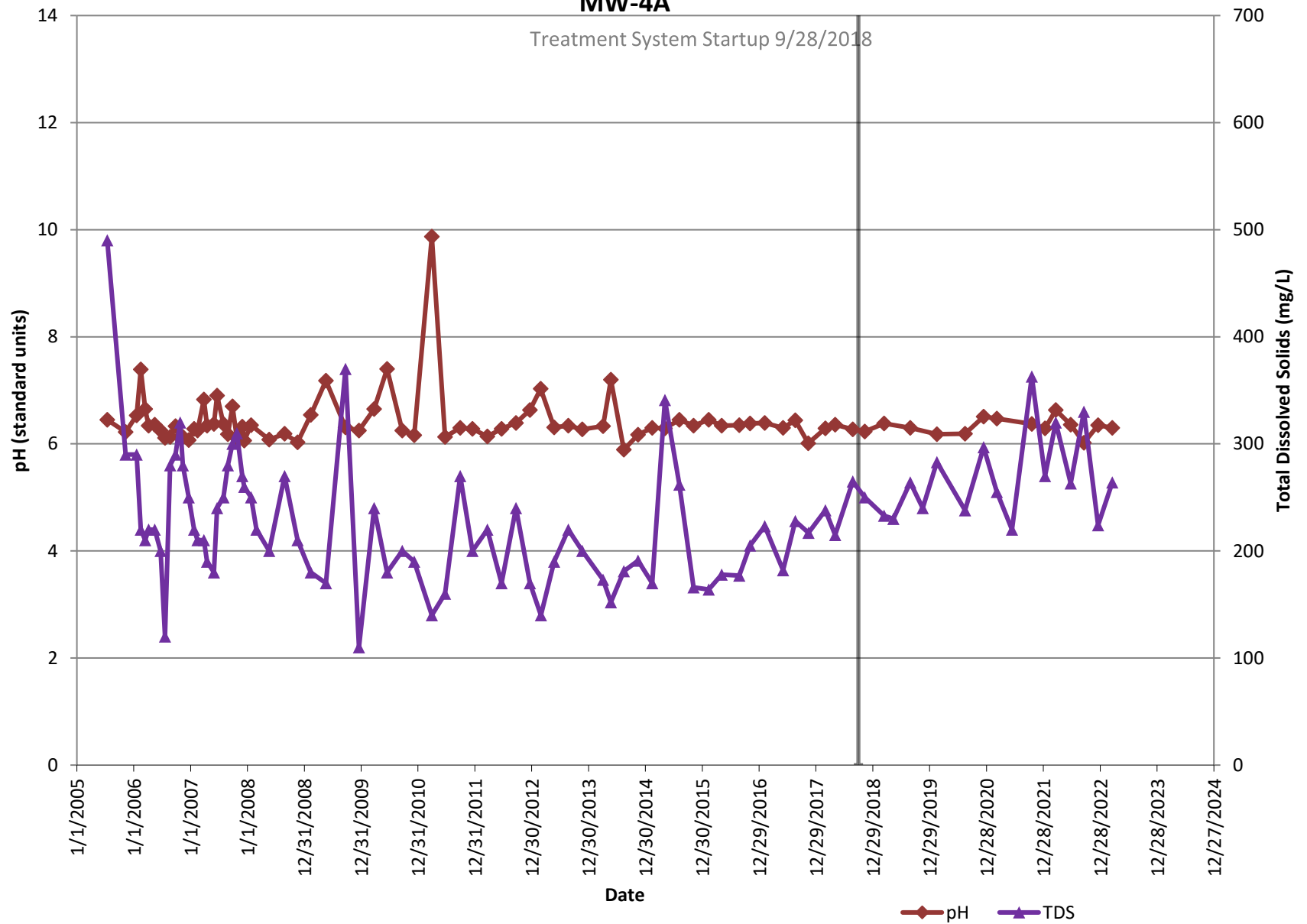


# LDA Shallow/Alluvial Monitoring Wells MW-4A



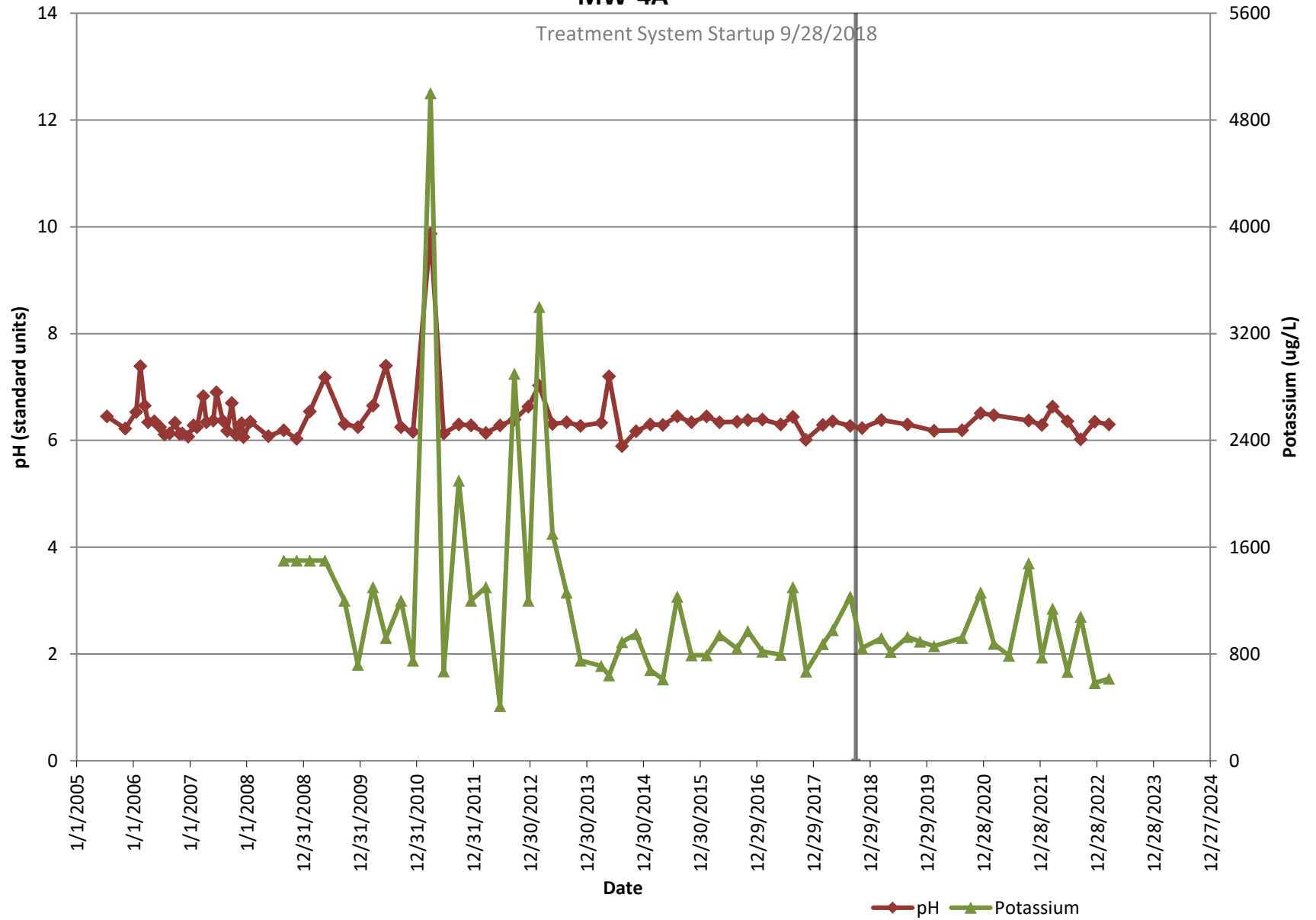
# LDA Shallow/Alluvial Monitoring Wells

## MW-4A

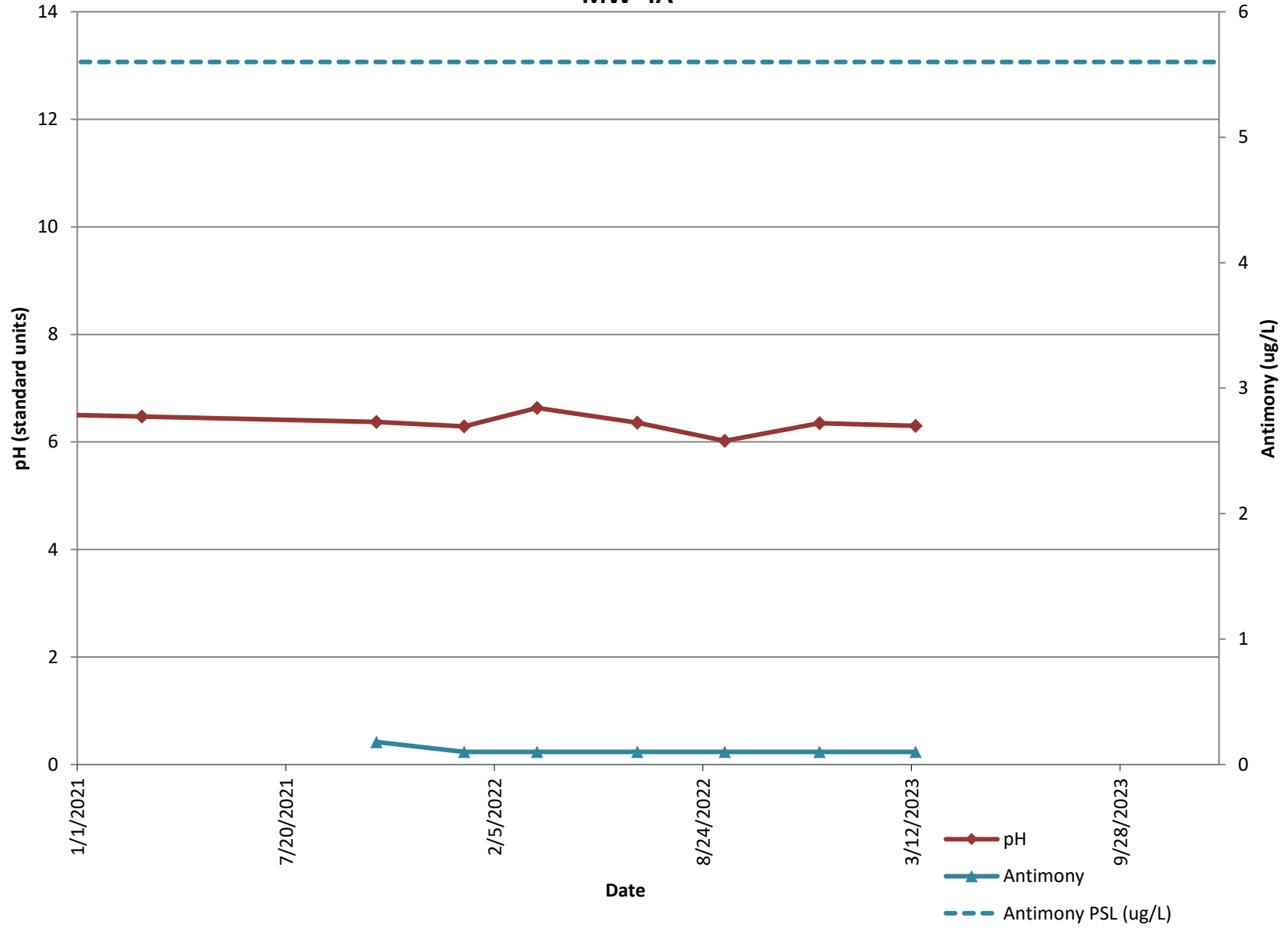




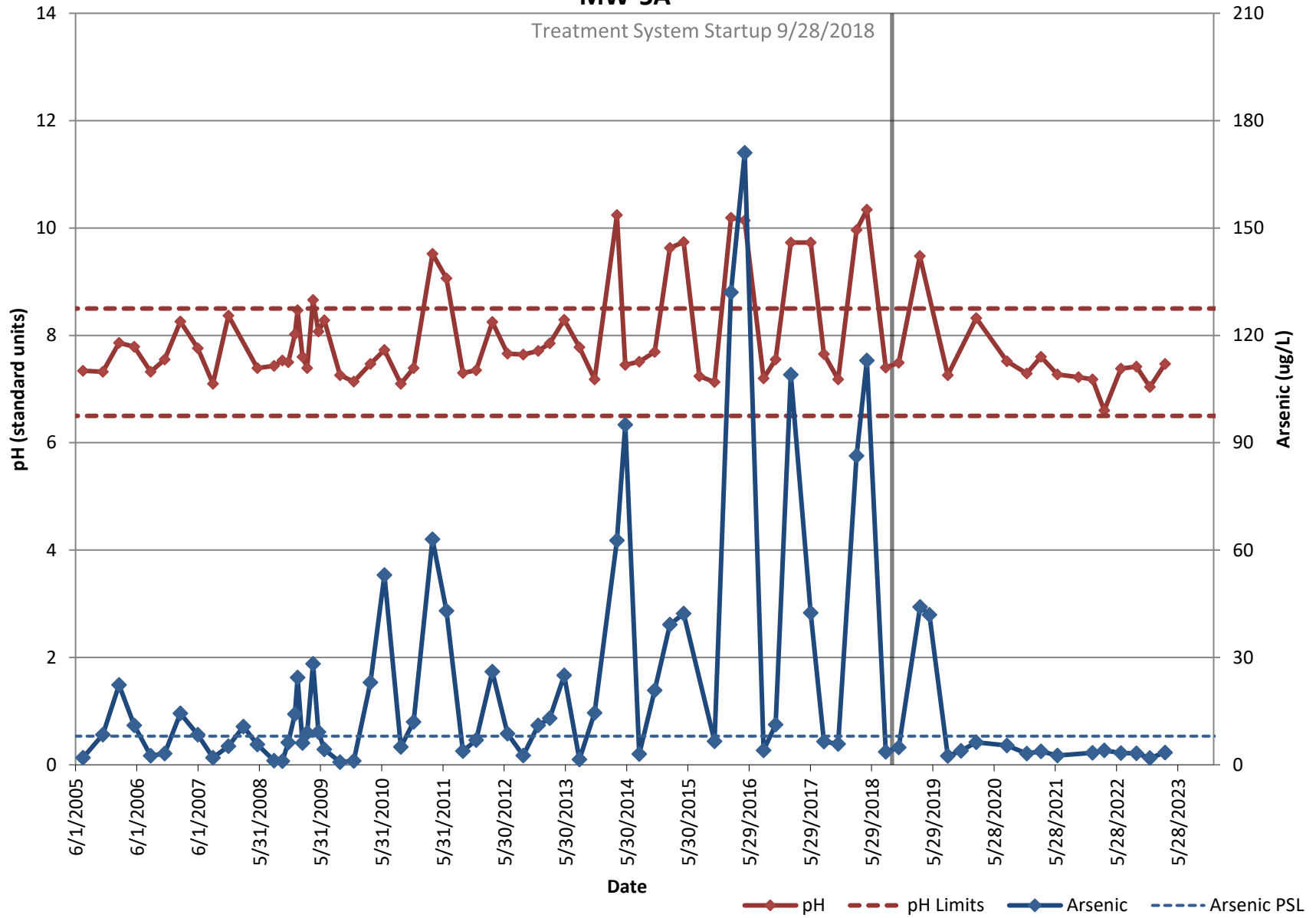
# LDA Shallow/Alluvial Monitoring Wells MW-4A



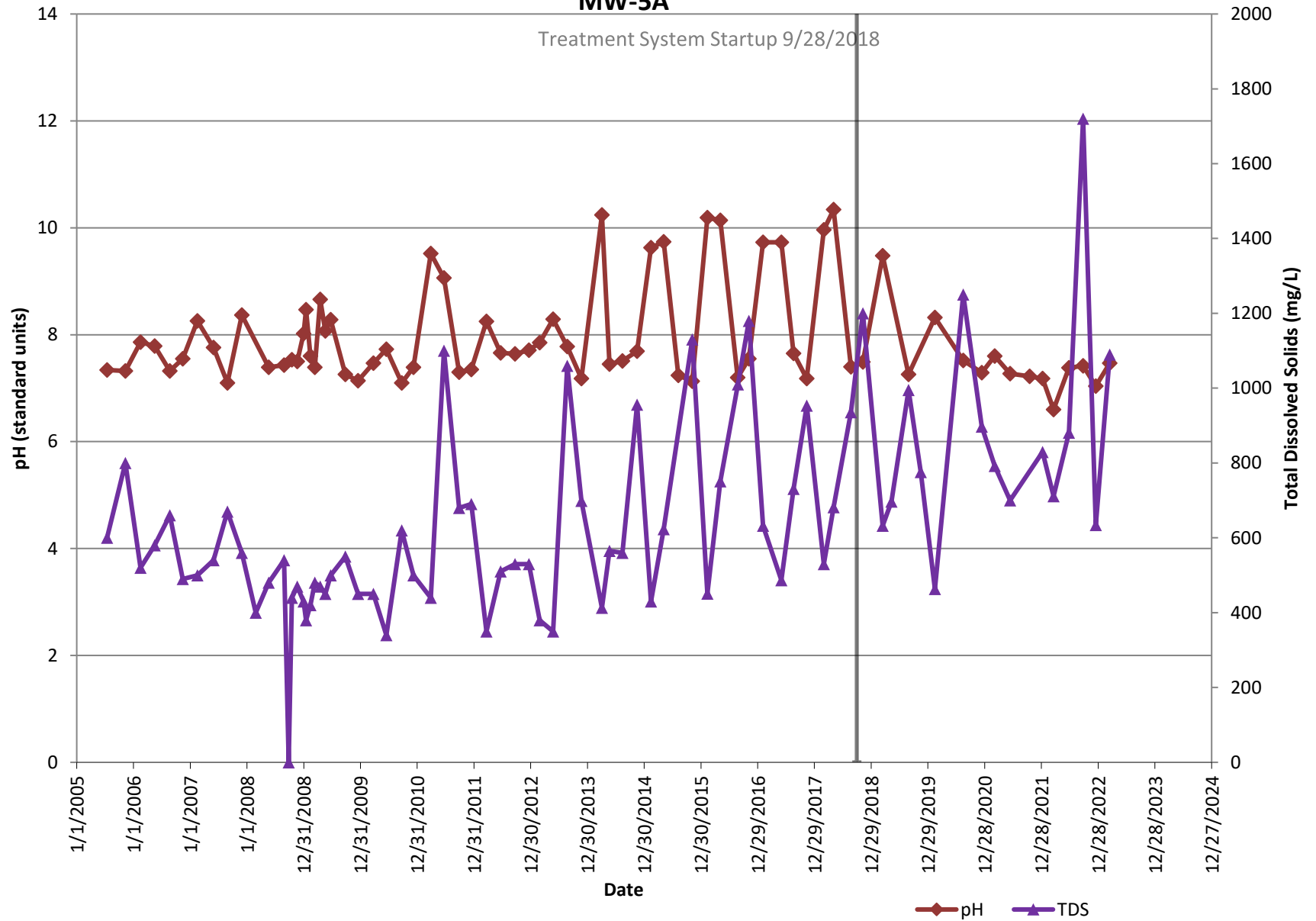
# LDA Shallow/Alluvial Monitoring Wells MW-4A



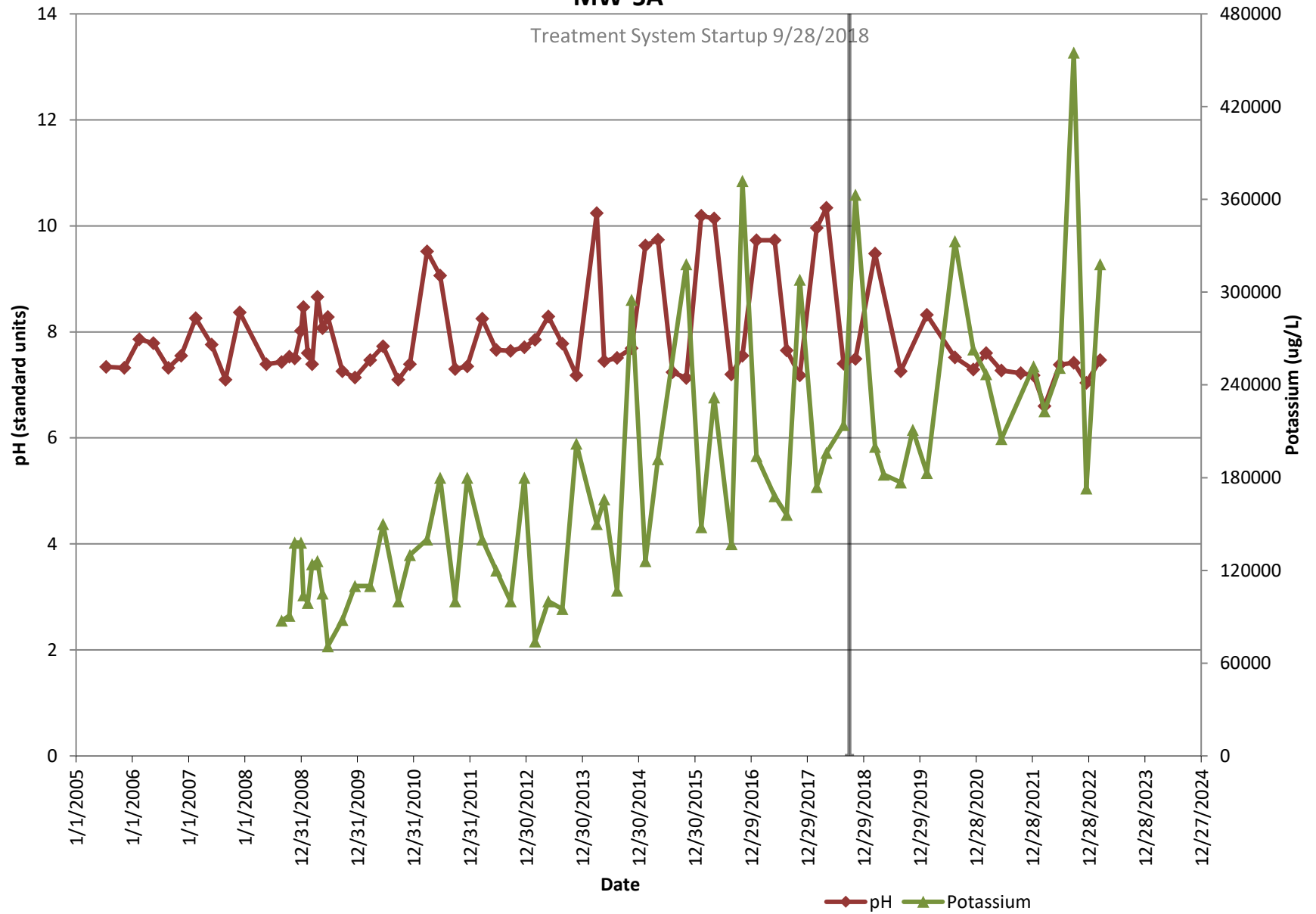
## LDA Shallow/Alluvial Monitoring Wells MW-5A



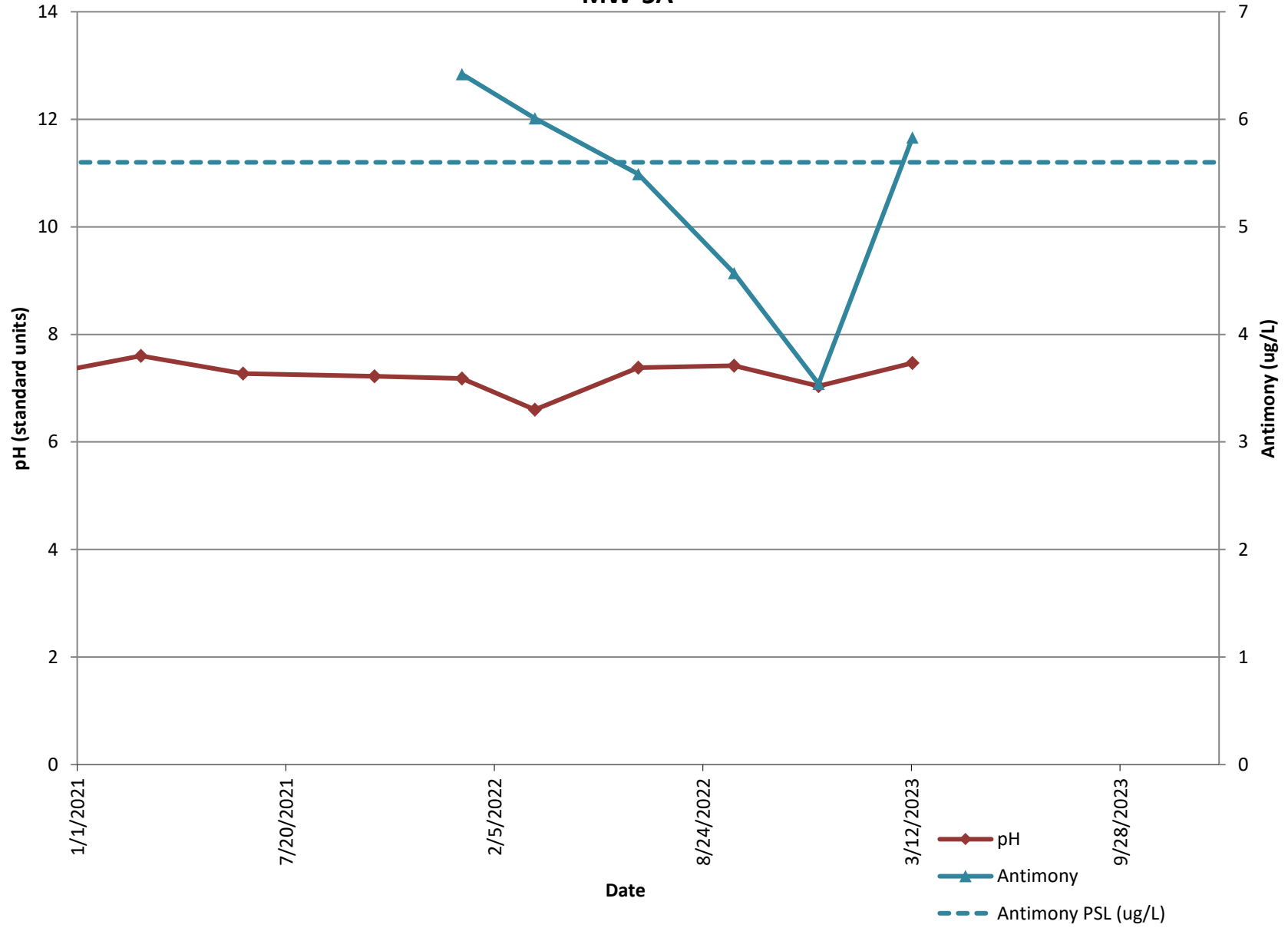
# LDA Shallow/Alluvial Monitoring Wells MW-5A



# LDA Shallow/Alluvial Monitoring Wells MW-5A

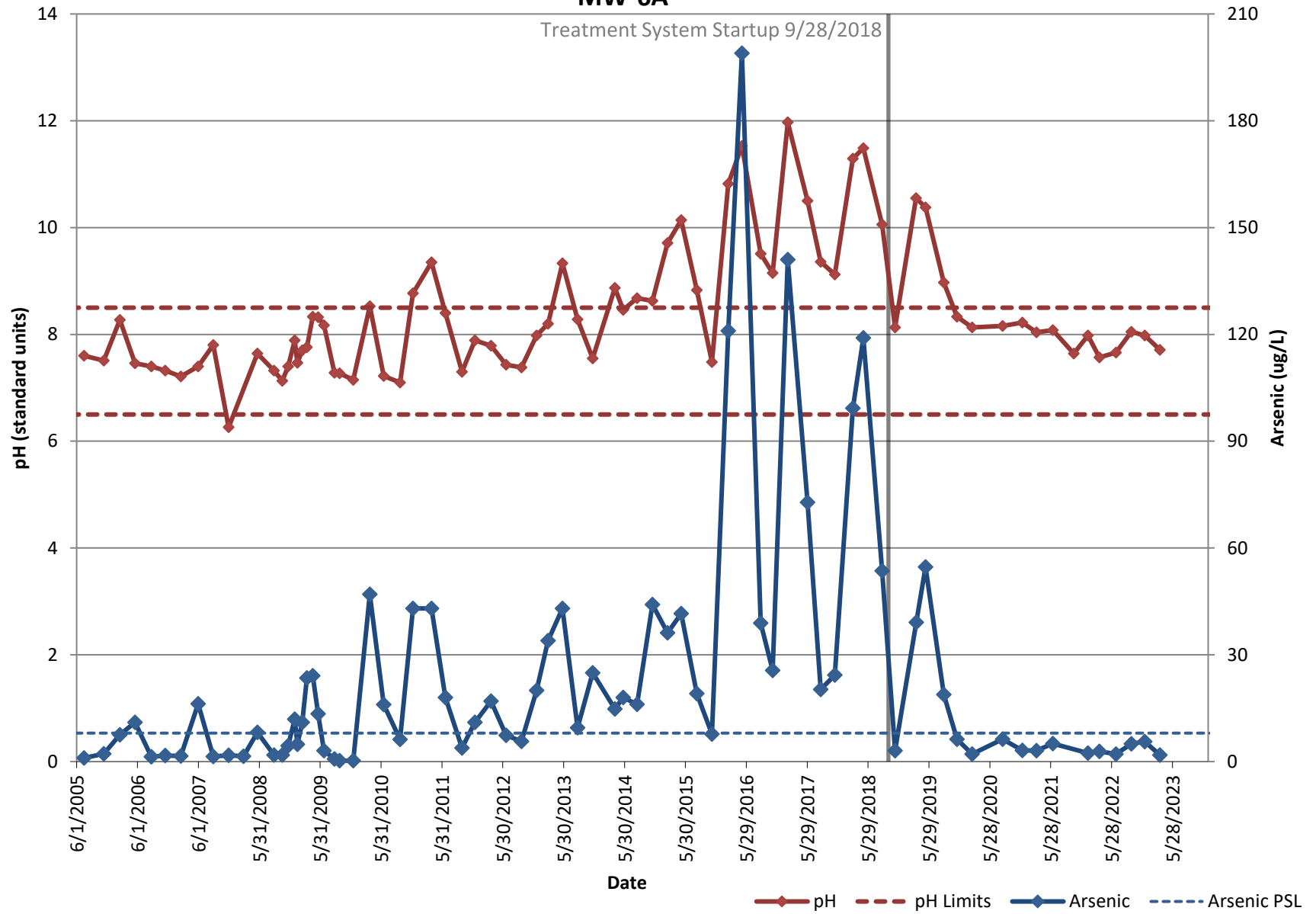


# LDA Shallow/Alluvial Monitoring Wells MW-5A

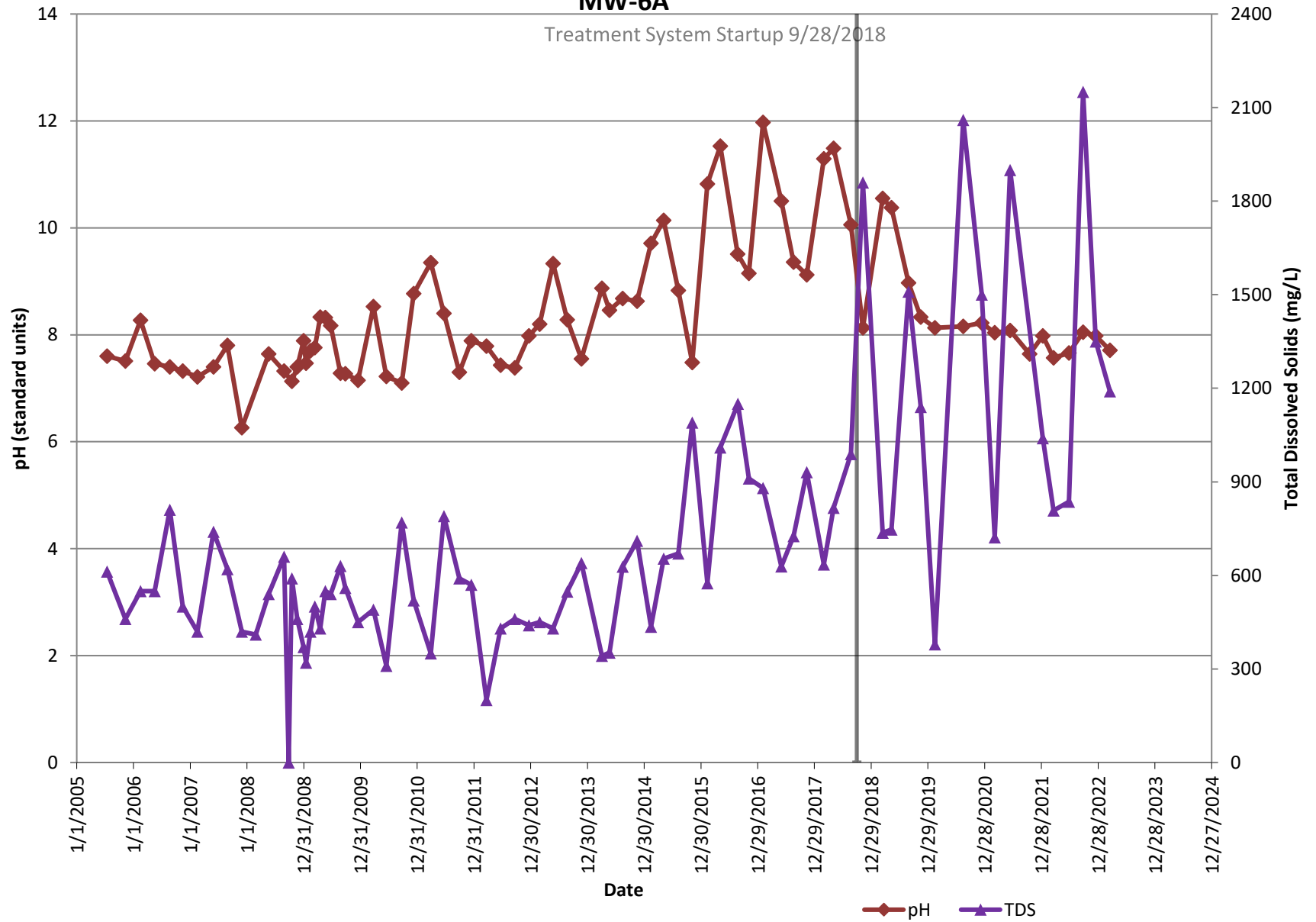




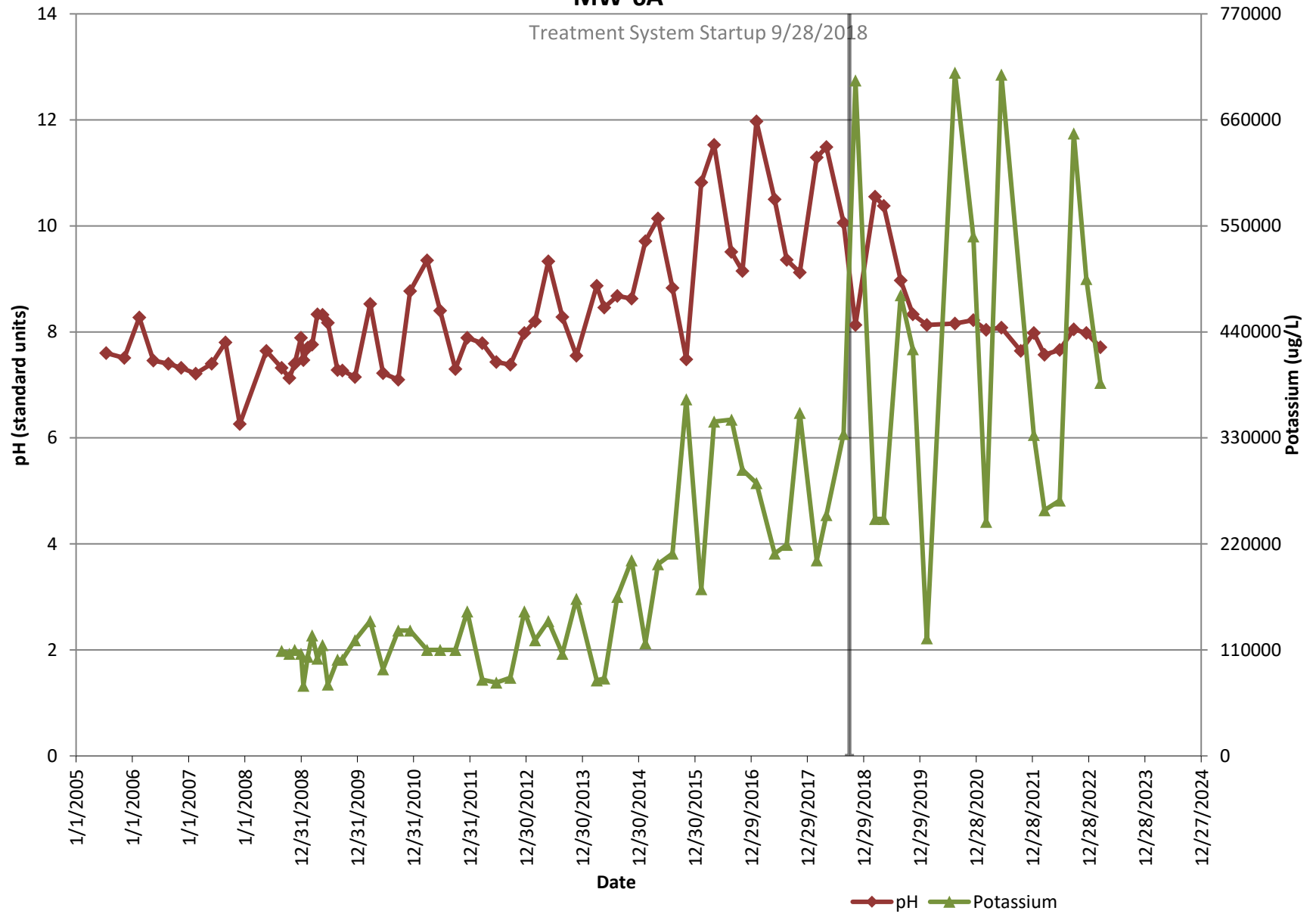
## LDA Shallow/Alluvial Monitoring Wells MW-6A



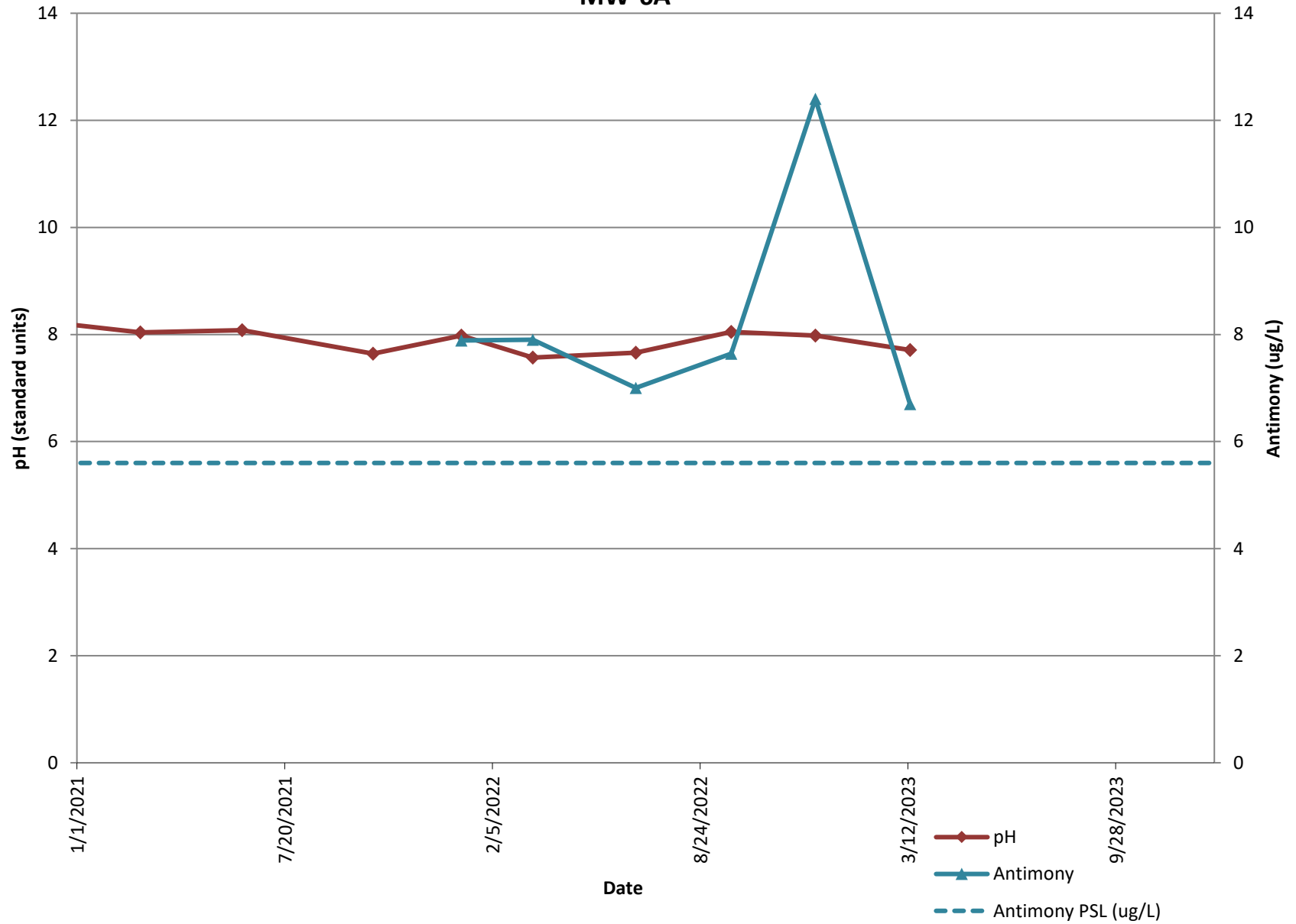
## LDA Shallow/Alluvial Monitoring Wells MW-6A



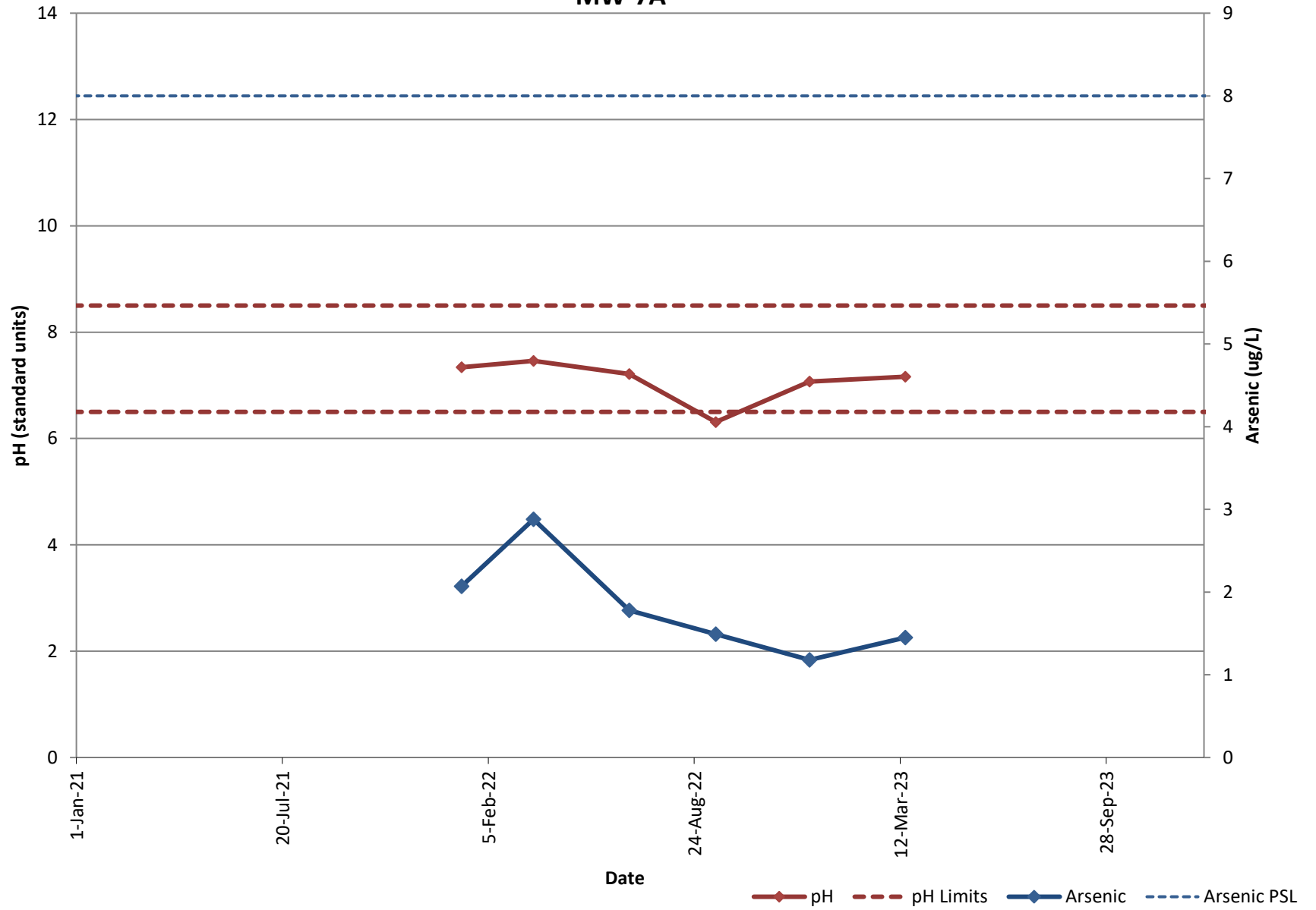
# LDA Shallow/Alluvial Monitoring Wells MW-6A



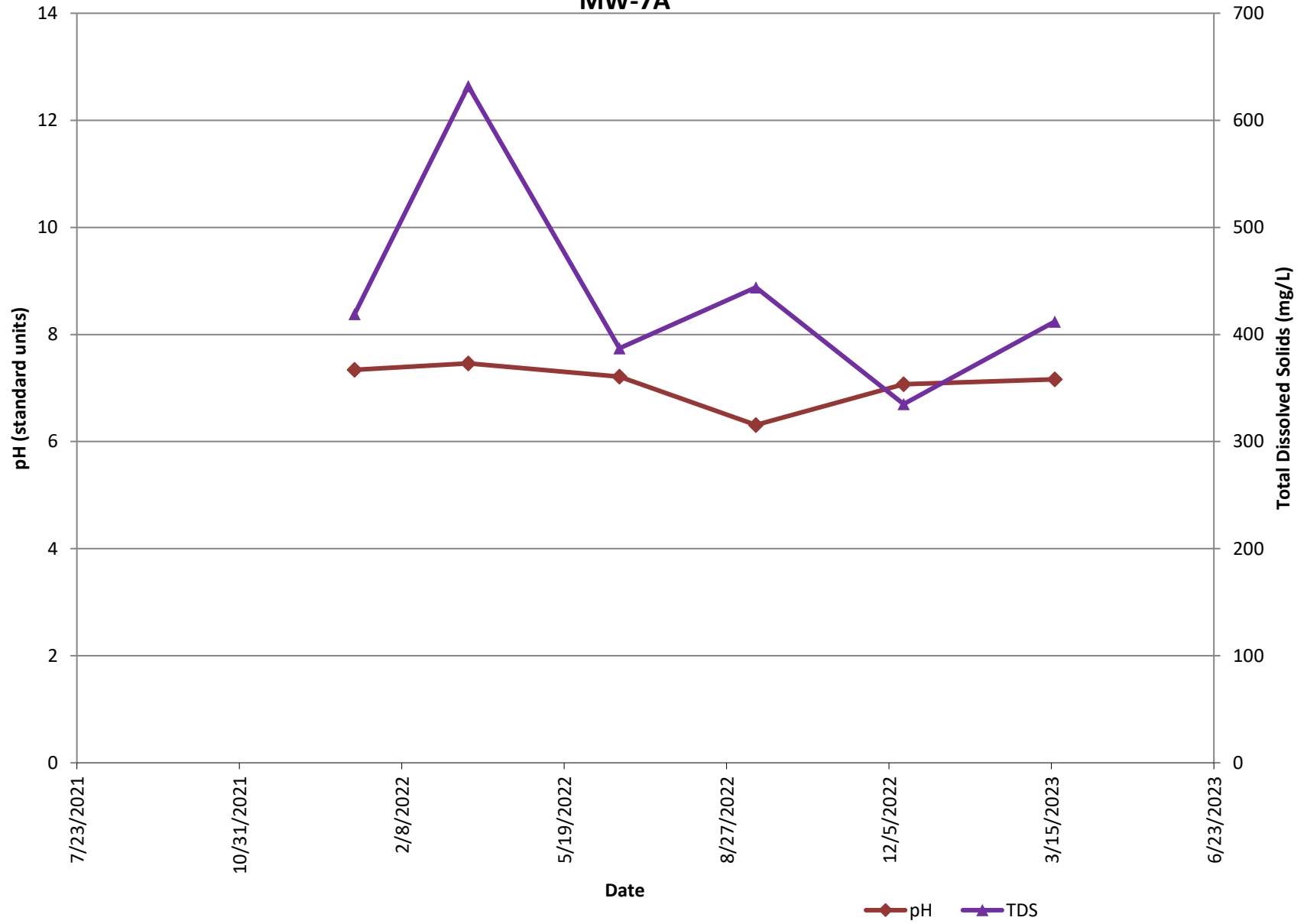
# LDA Shallow/Alluvial Monitoring Wells MW-6A



# LDA Shallow/Alluvial Monitoring Wells MW-7A

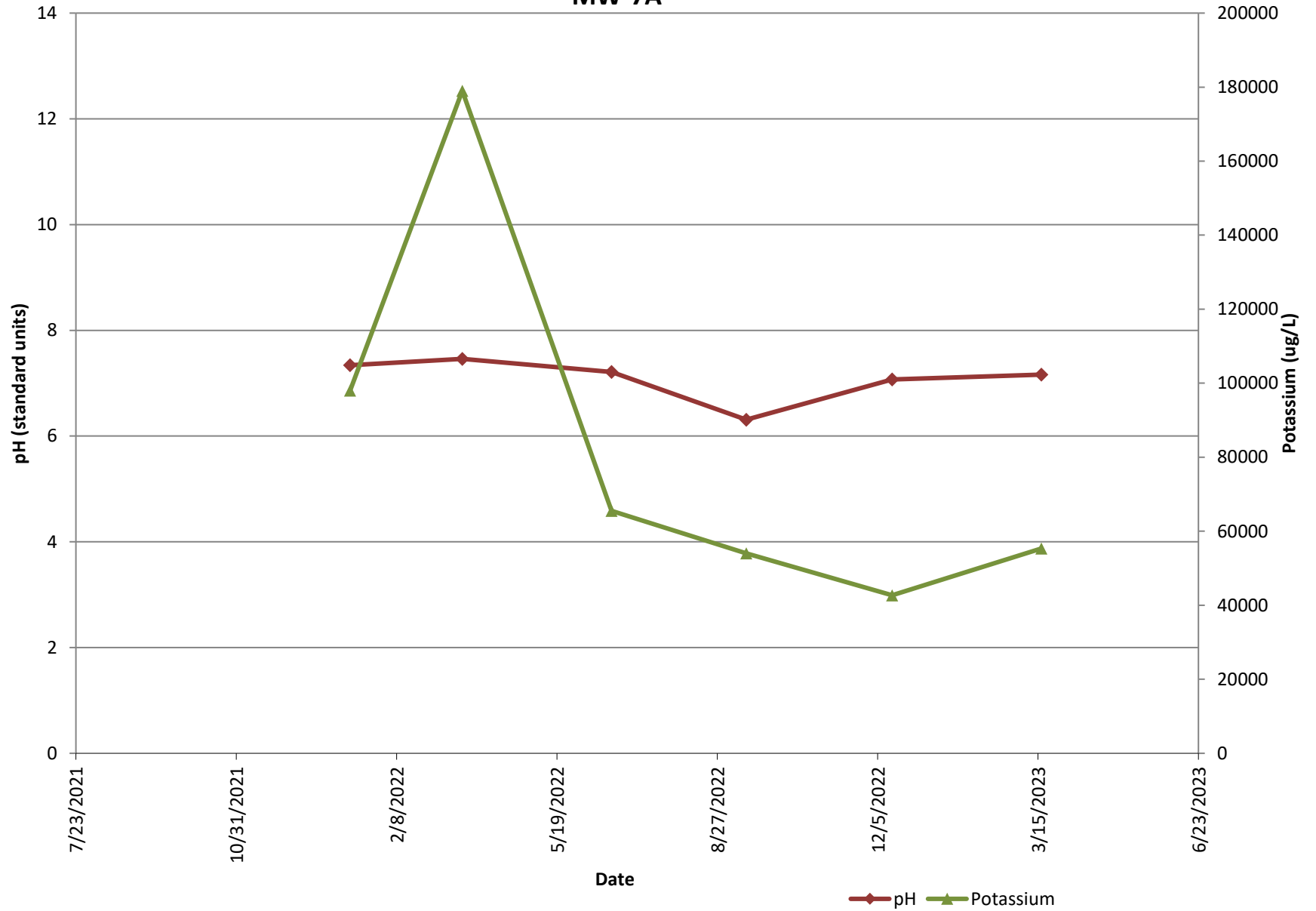


# LDA Shallow/Alluvial Monitoring Wells MW-7A

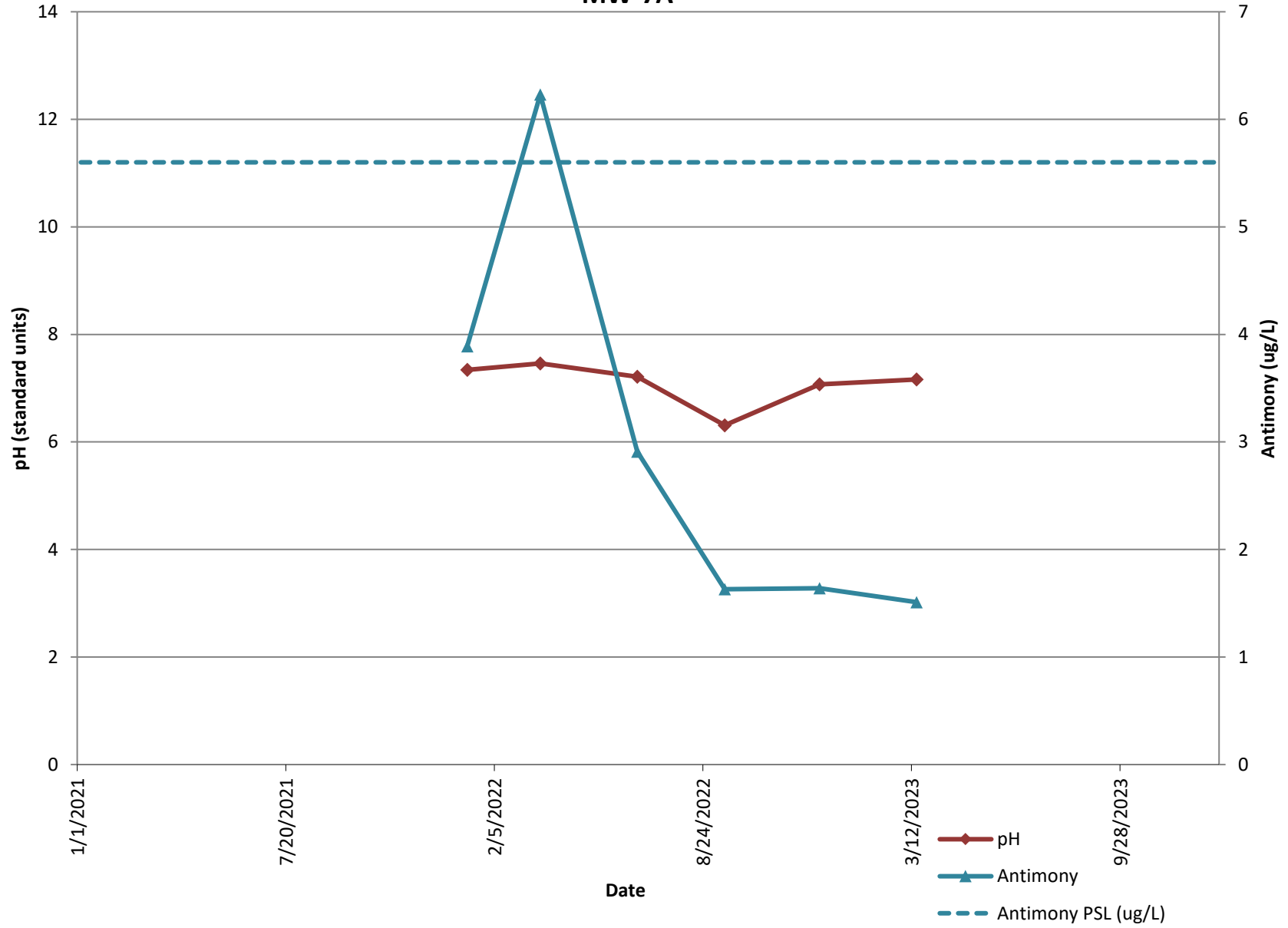




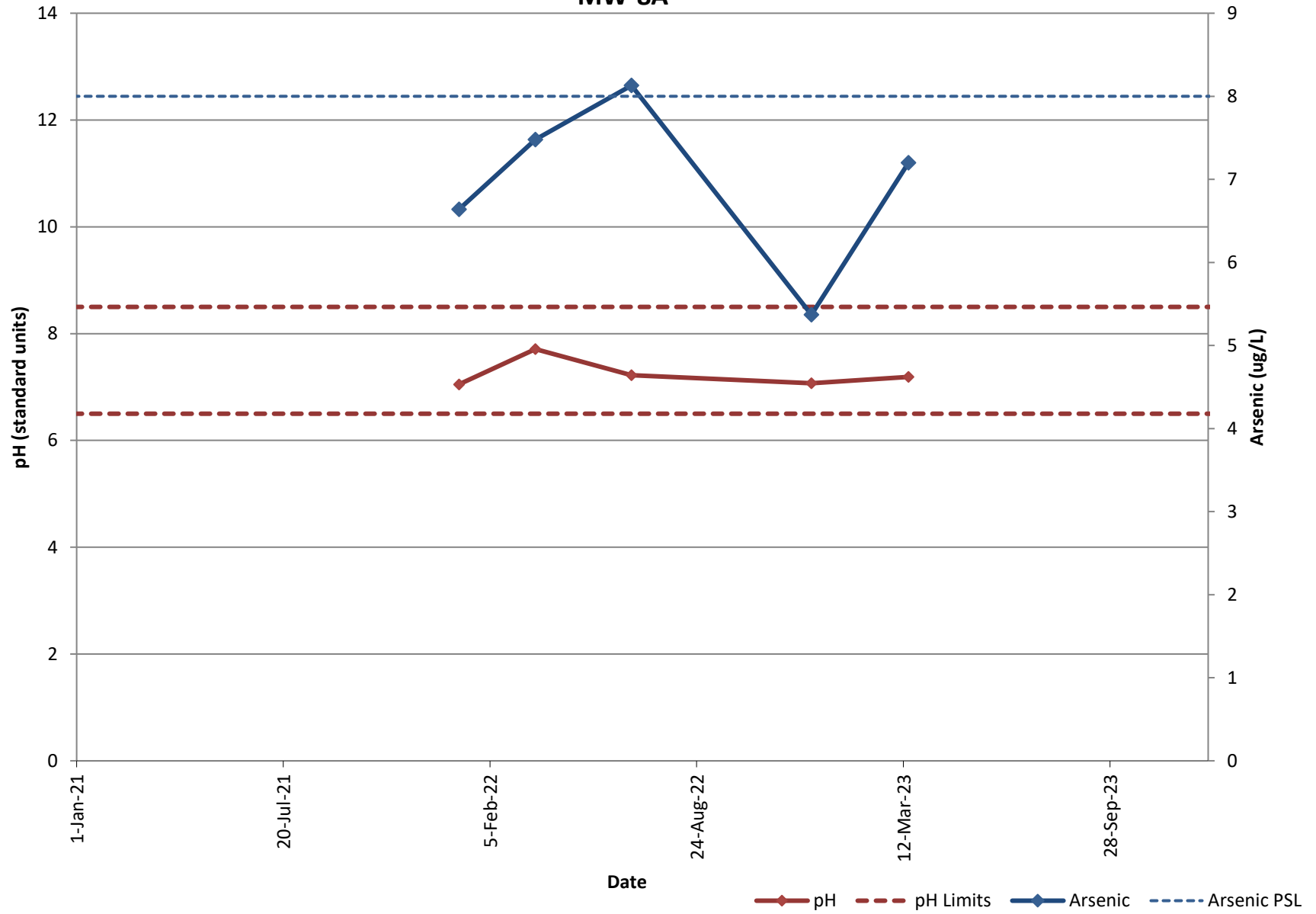
### LDA Shallow/Alluvial Monitoring Wells MW-7A



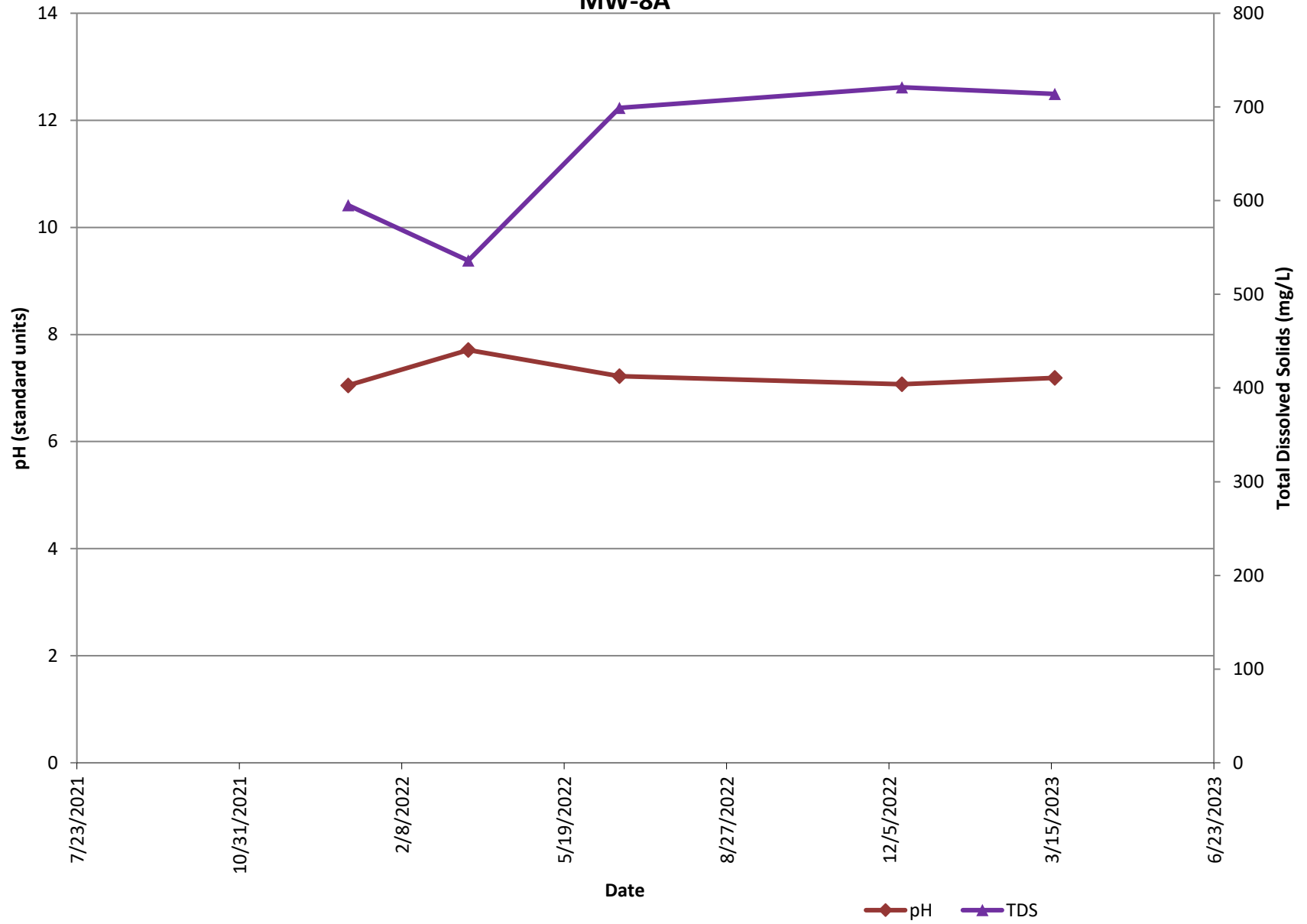
# LDA Shallow/Alluvial Monitoring Wells MW-7A



# LDA Shallow/Alluvial Monitoring Wells MW-8A

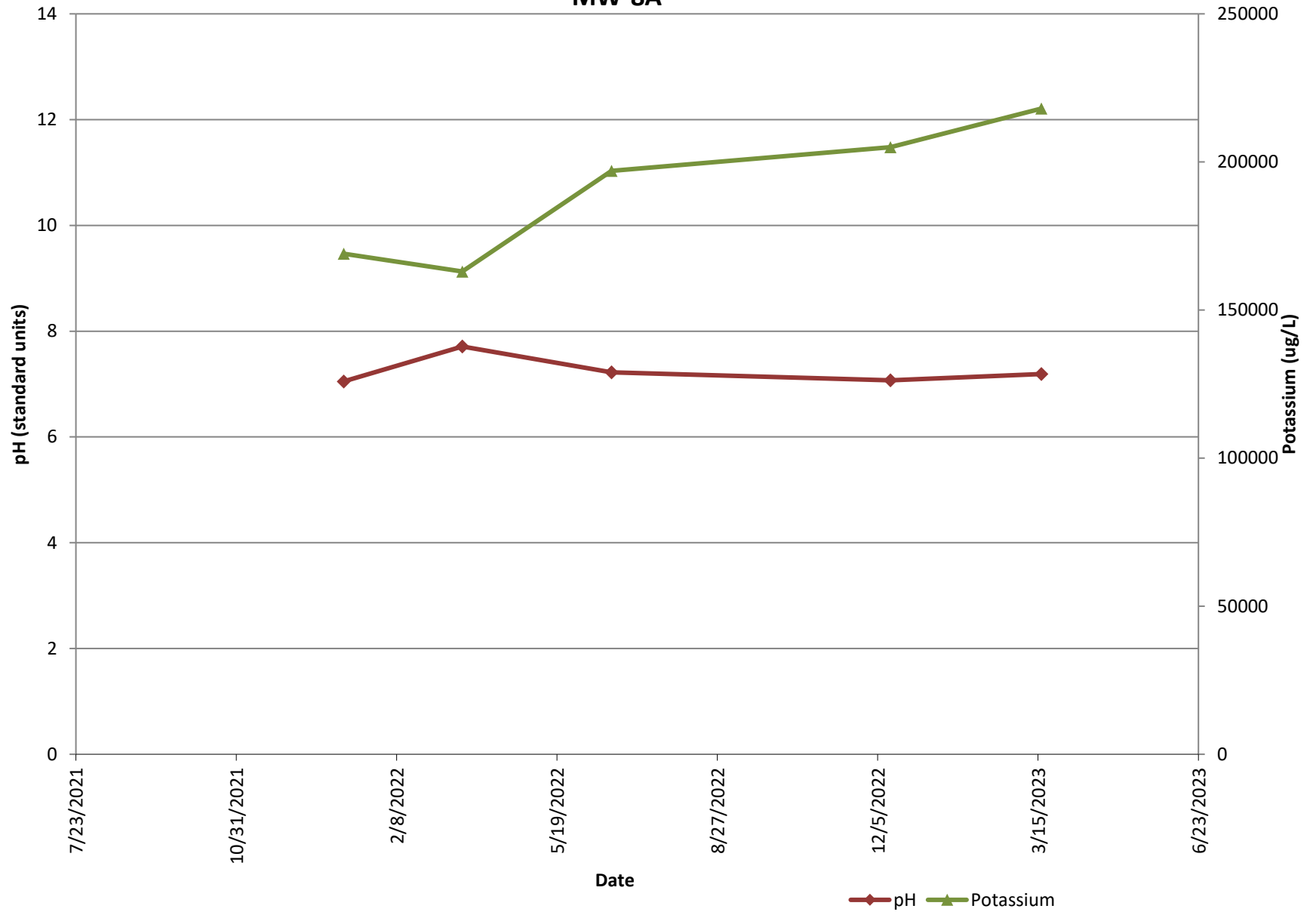


# LDA Shallow/Alluvial Monitoring Wells MW-8A

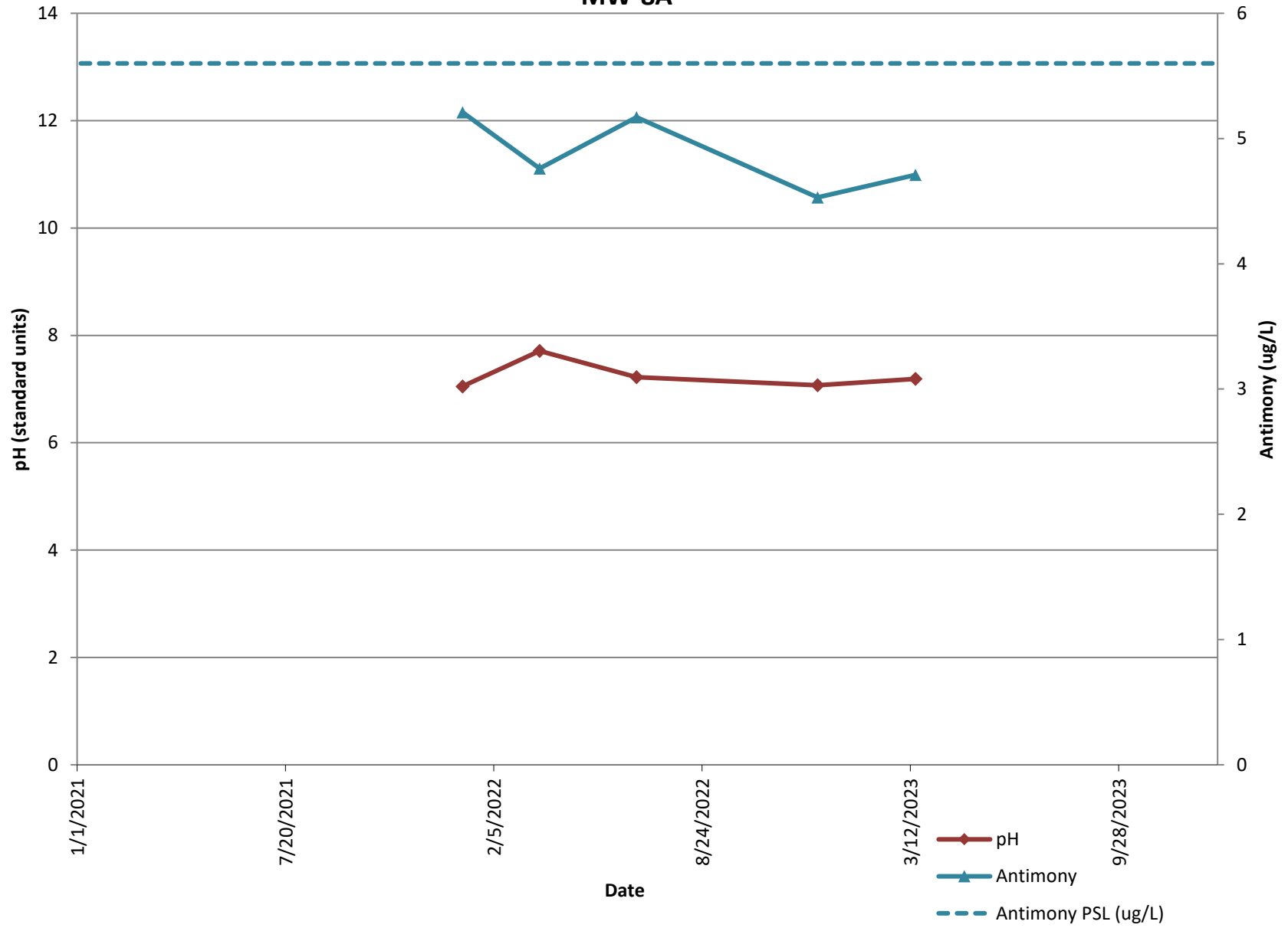




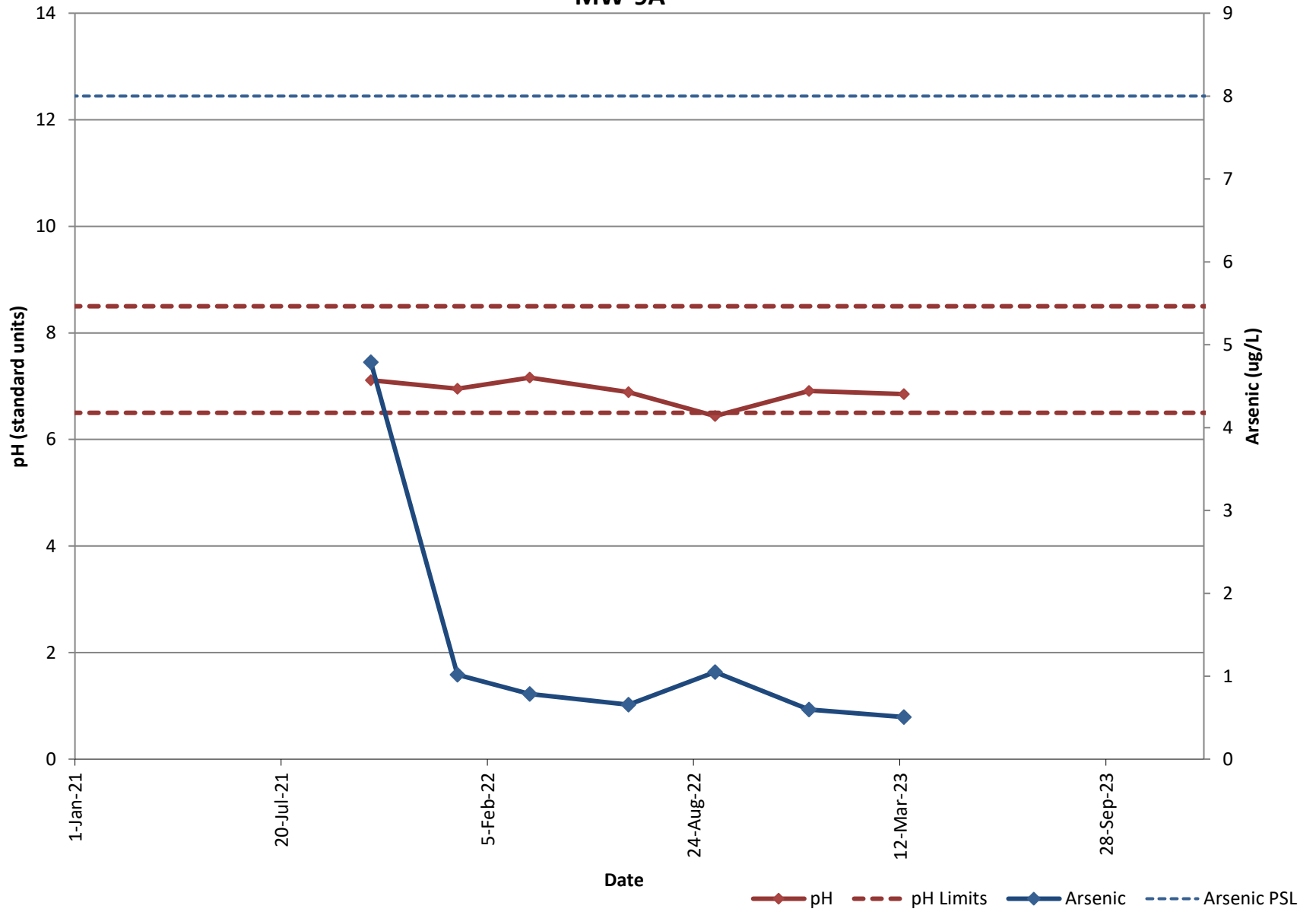
# LDA Shallow/Alluvial Monitoring Wells MW-8A



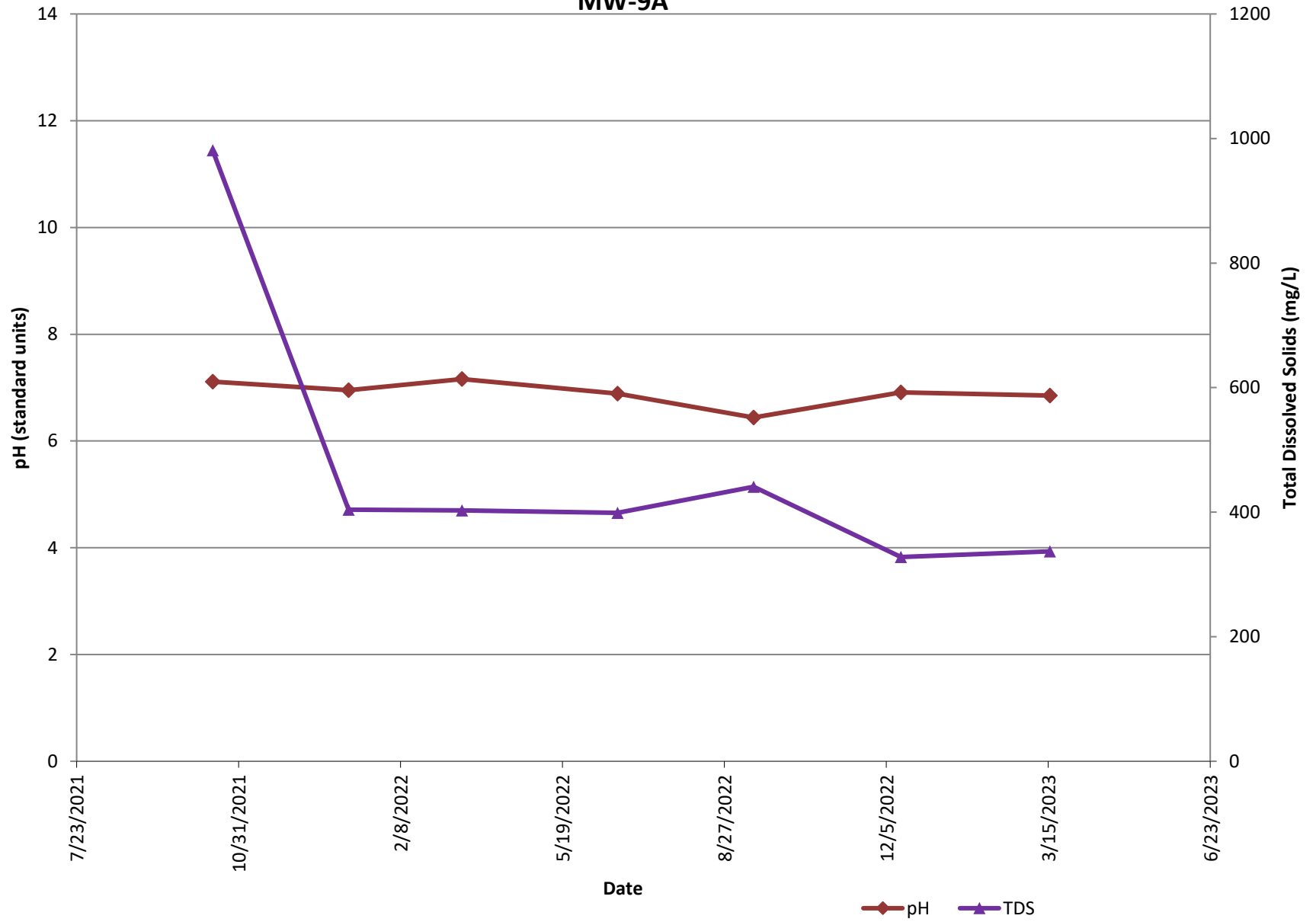
# LDA Shallow/Alluvial Monitoring Wells MW-8A



# LDA Shallow/Alluvial Monitoring Wells MW-9A

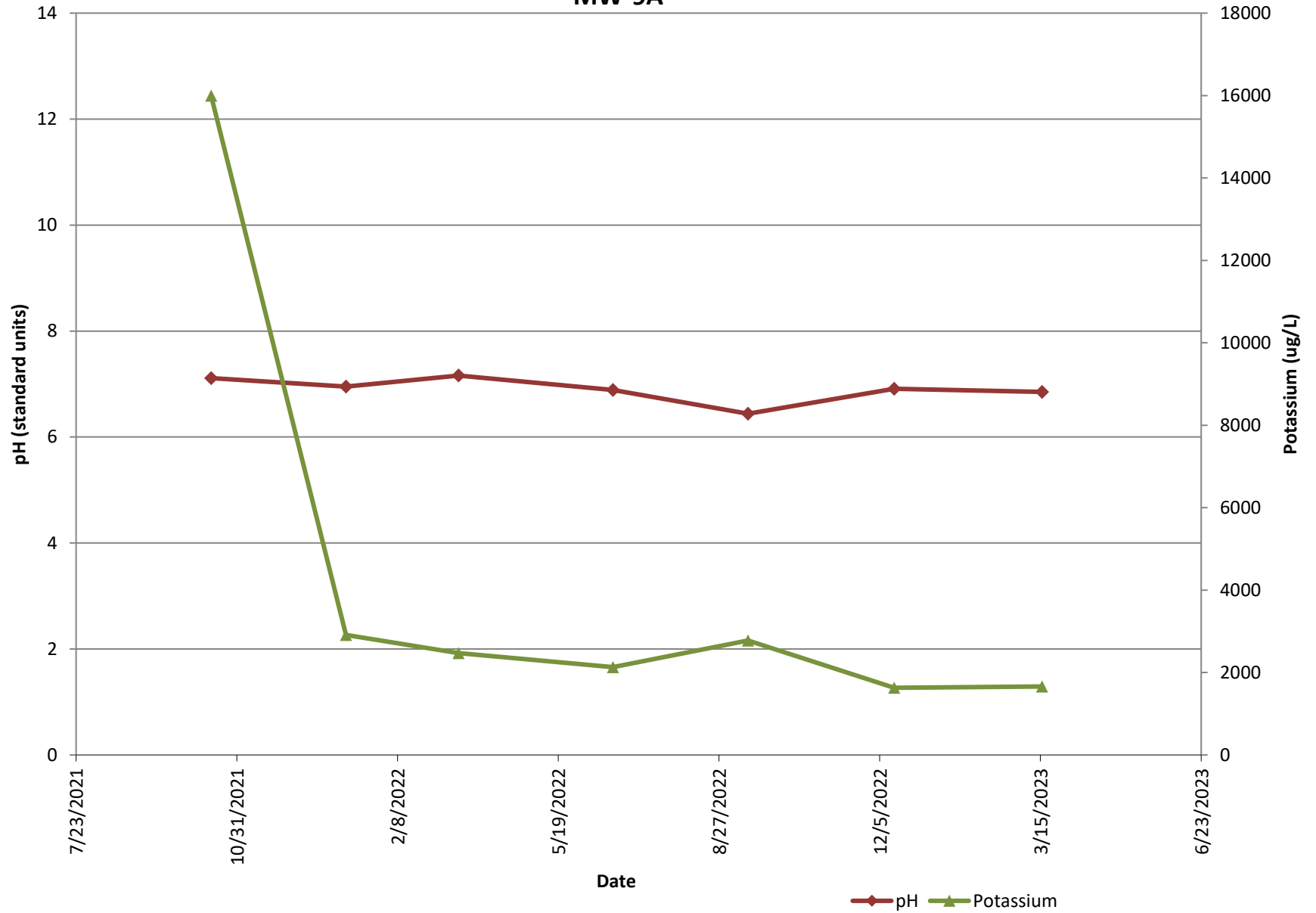


# LDA Shallow/Alluvial Monitoring Wells MW-9A

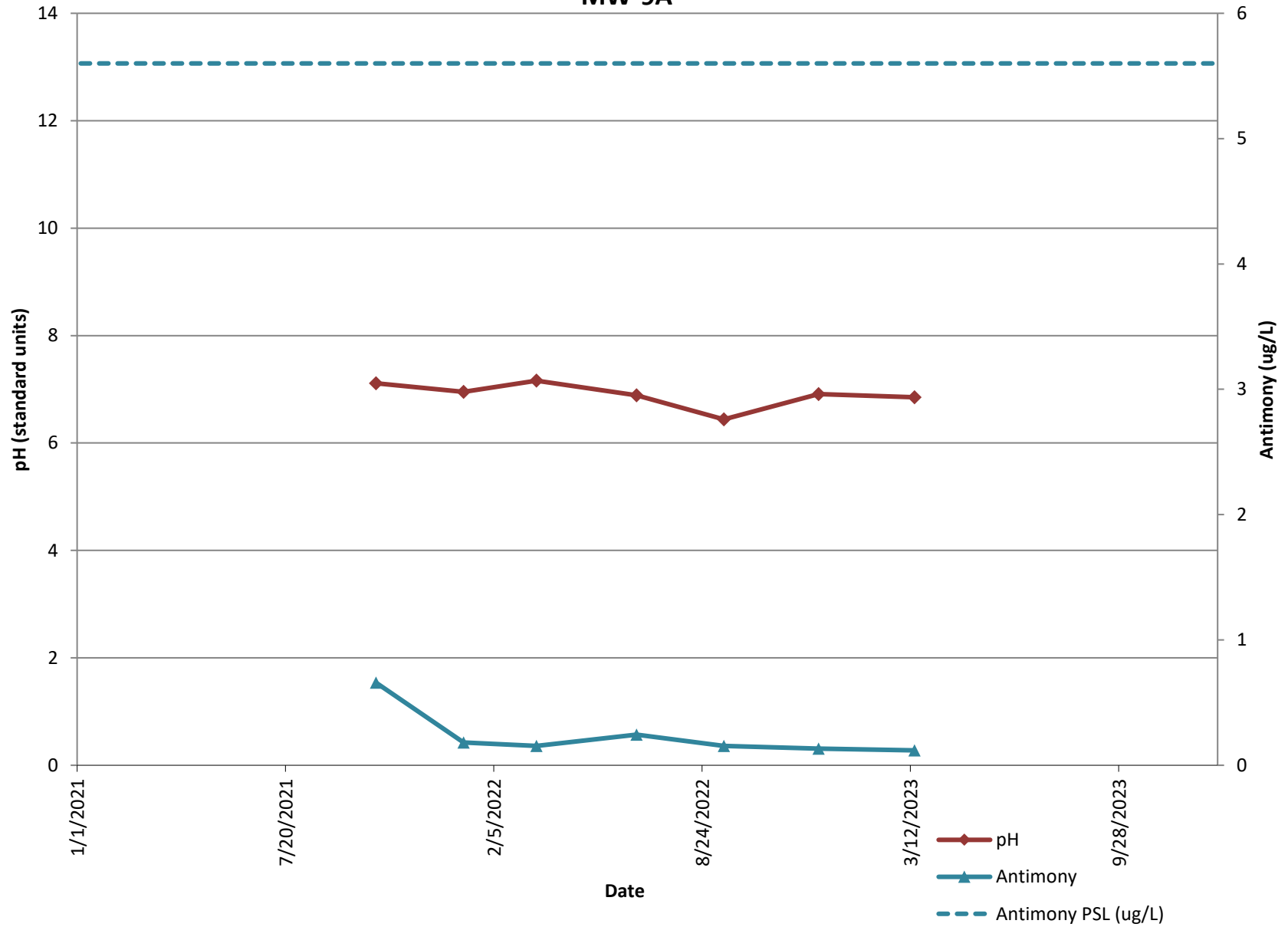




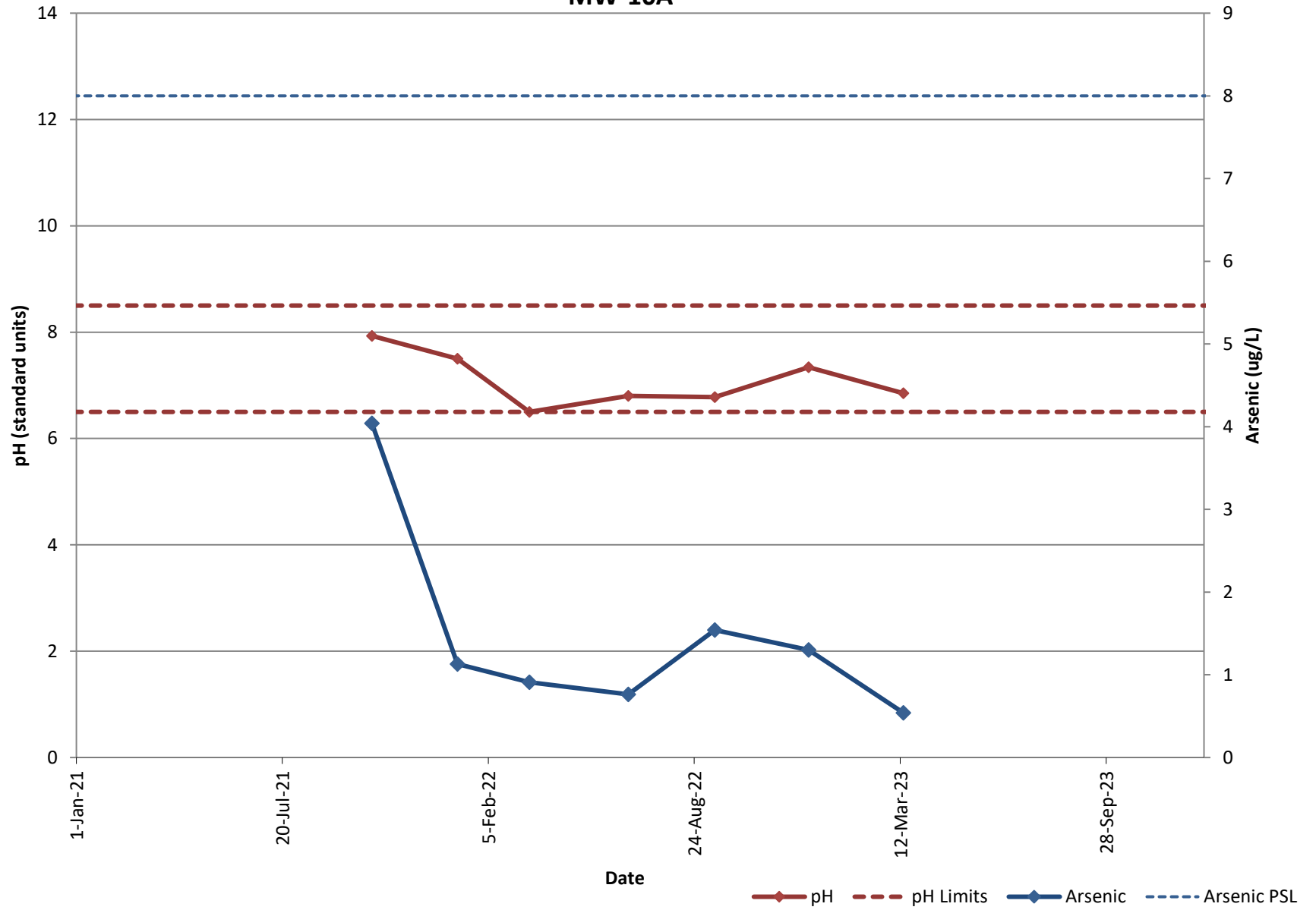
### LDA Shallow/Alluvial Monitoring Wells MW-9A



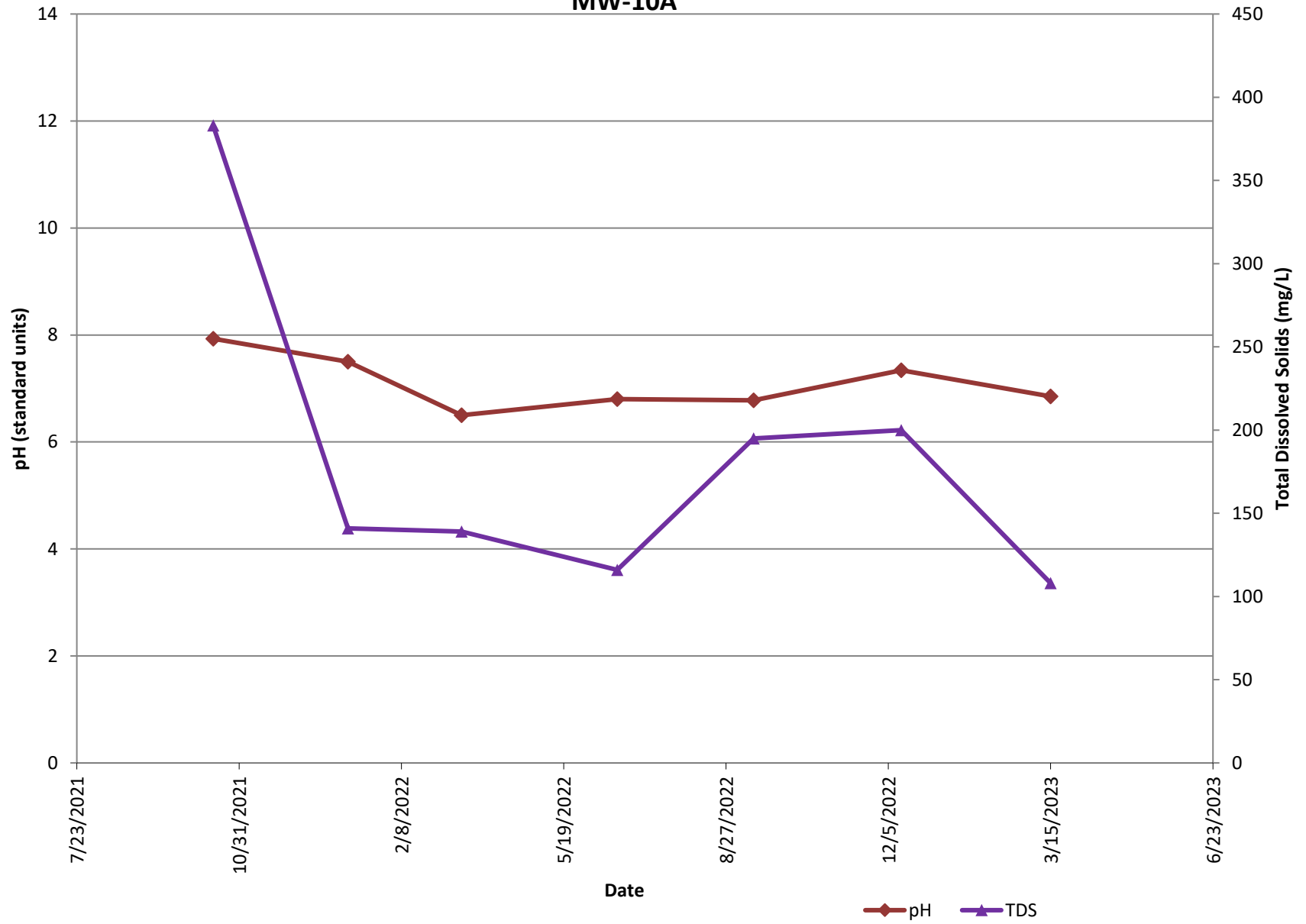
# LDA Shallow/Alluvial Monitoring Wells MW-9A



# LDA Shallow/Alluvial Monitoring Wells MW-10A

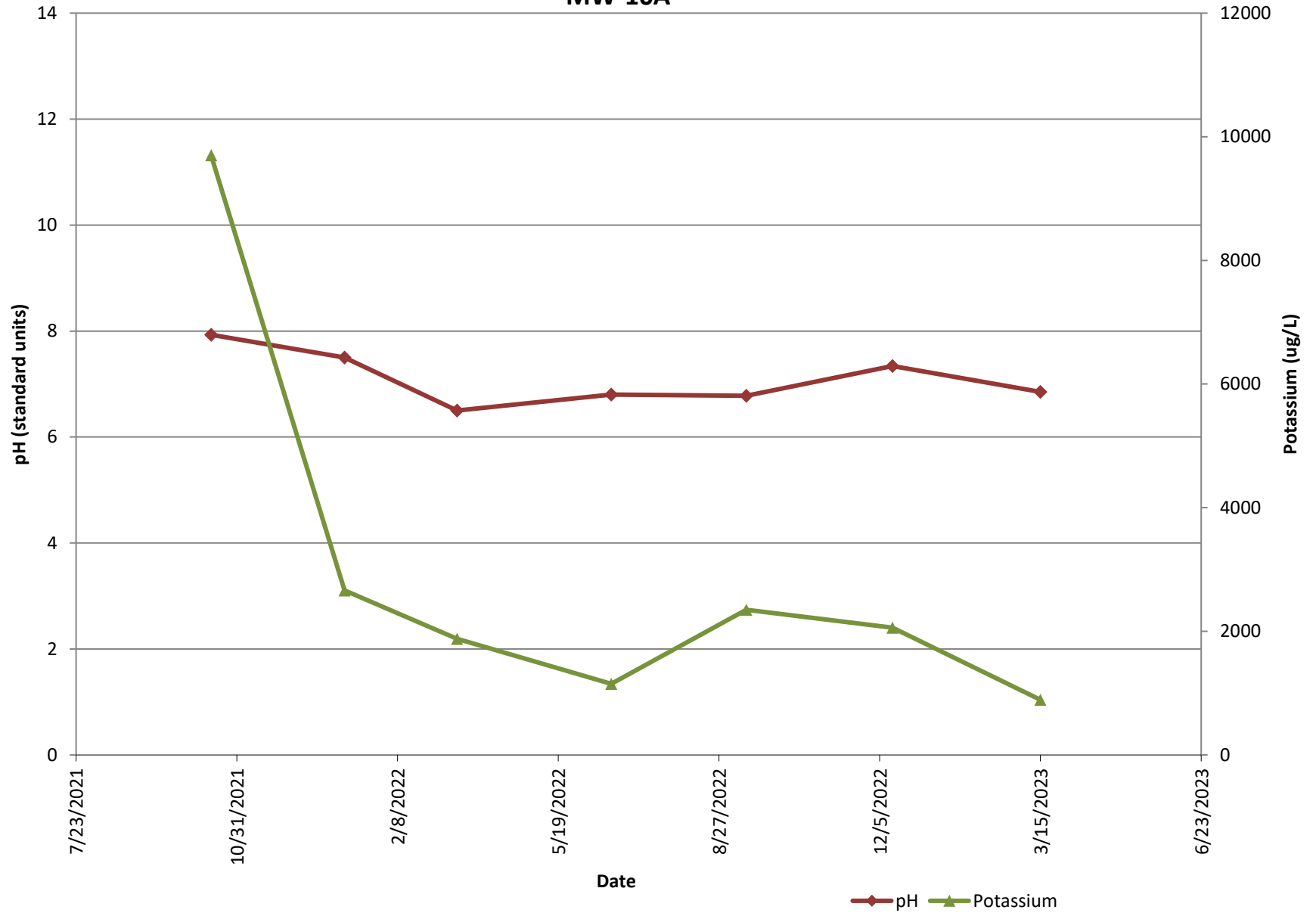


# LDA Shallow/Alluvial Monitoring Wells MW-10A

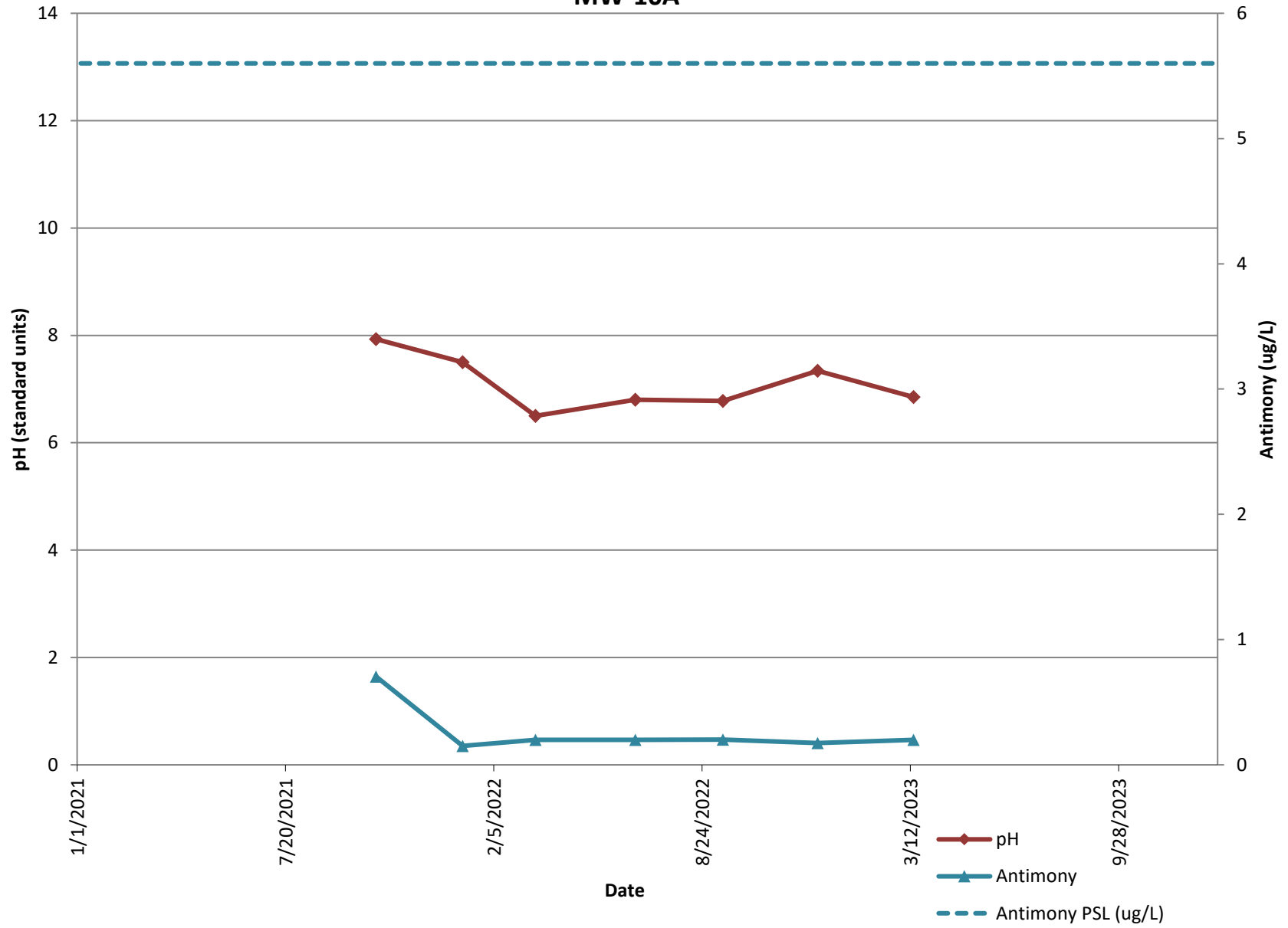




### LDA Shallow/Alluvial Monitoring Wells MW-10A



# LDA Shallow/Alluvial Monitoring Wells MW-10A



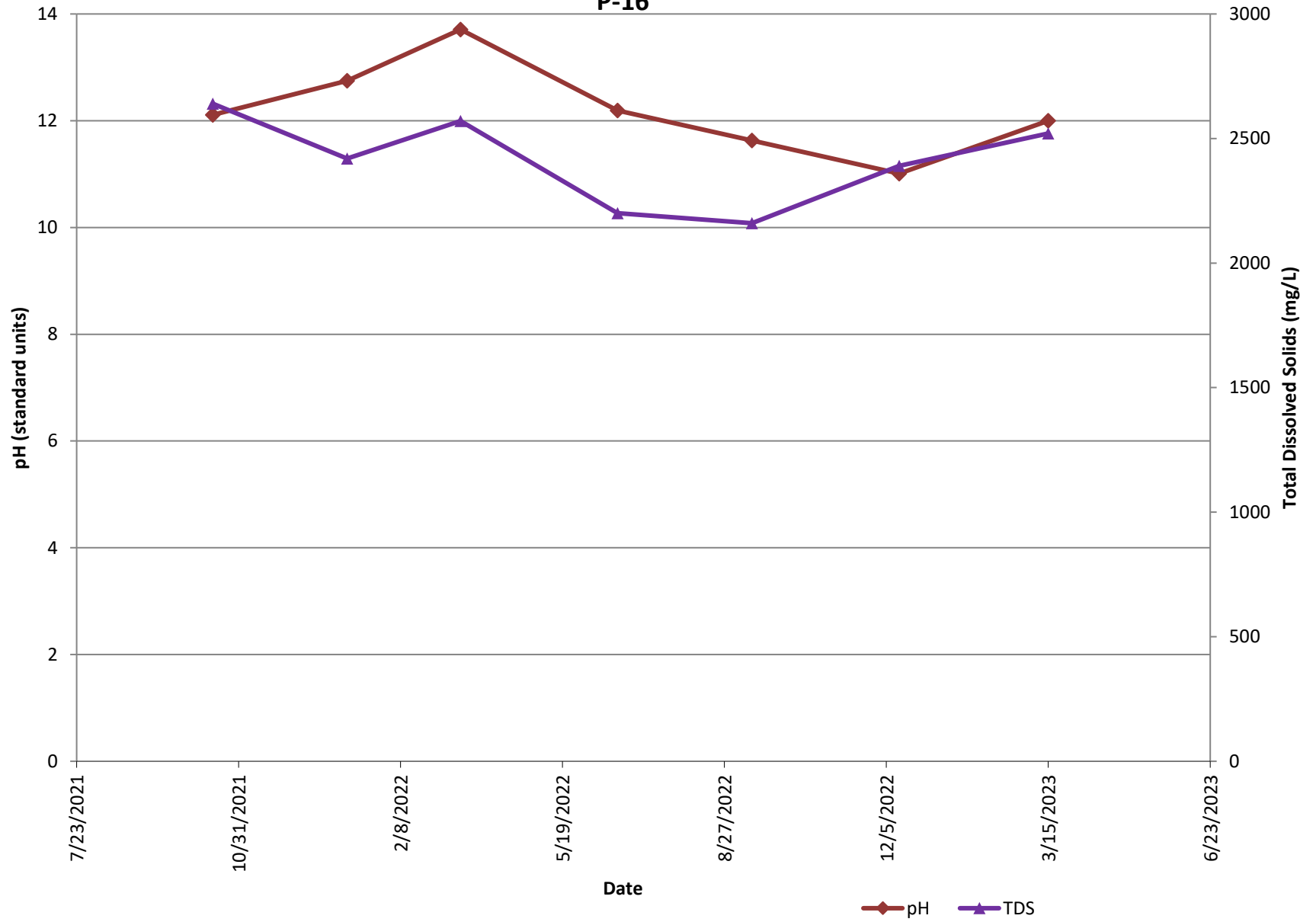
### LDA Shallow/Alluvial Monitoring Wells

### P-16

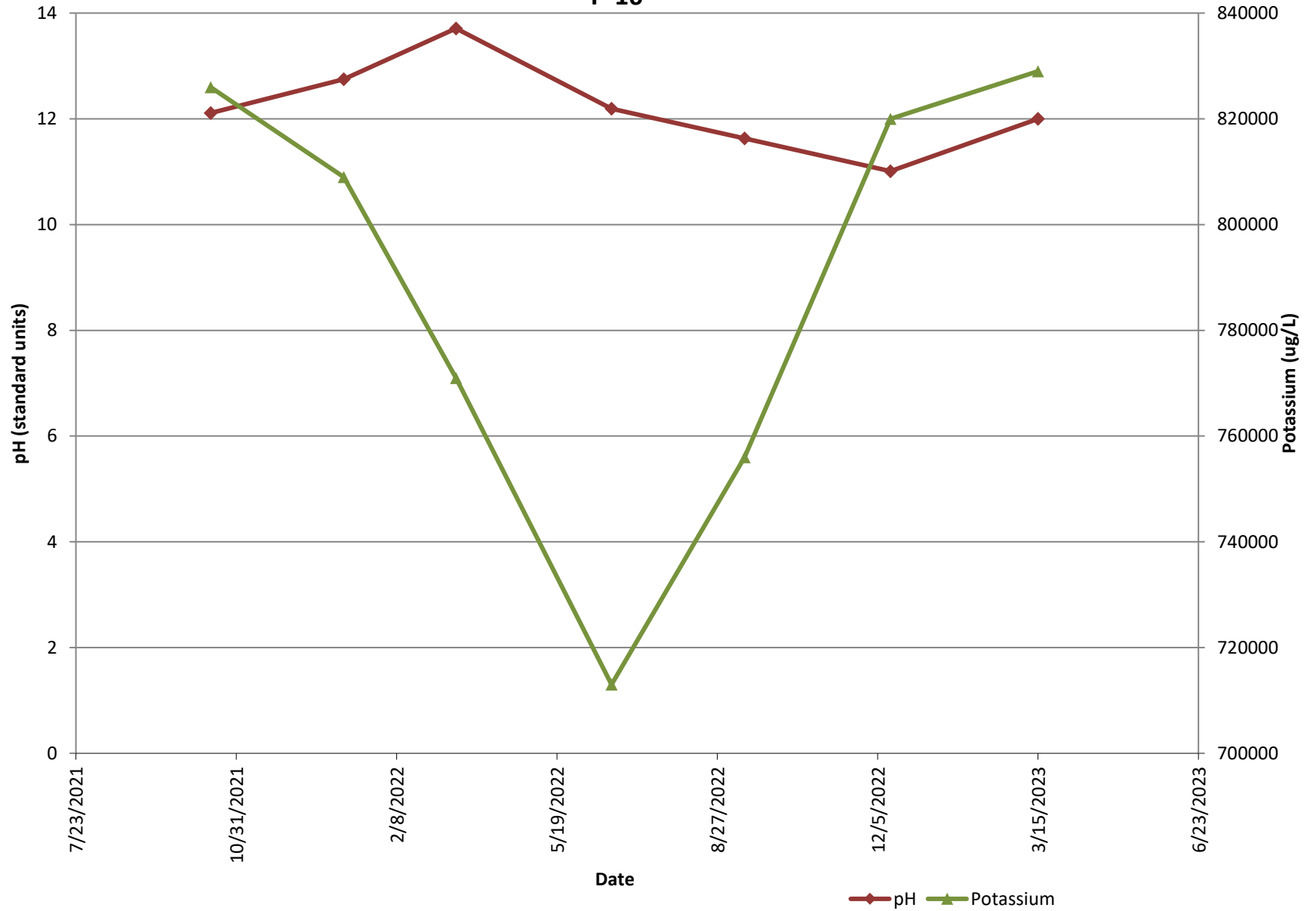


# LDA Shallow/Alluvial Monitoring Wells

## P-16

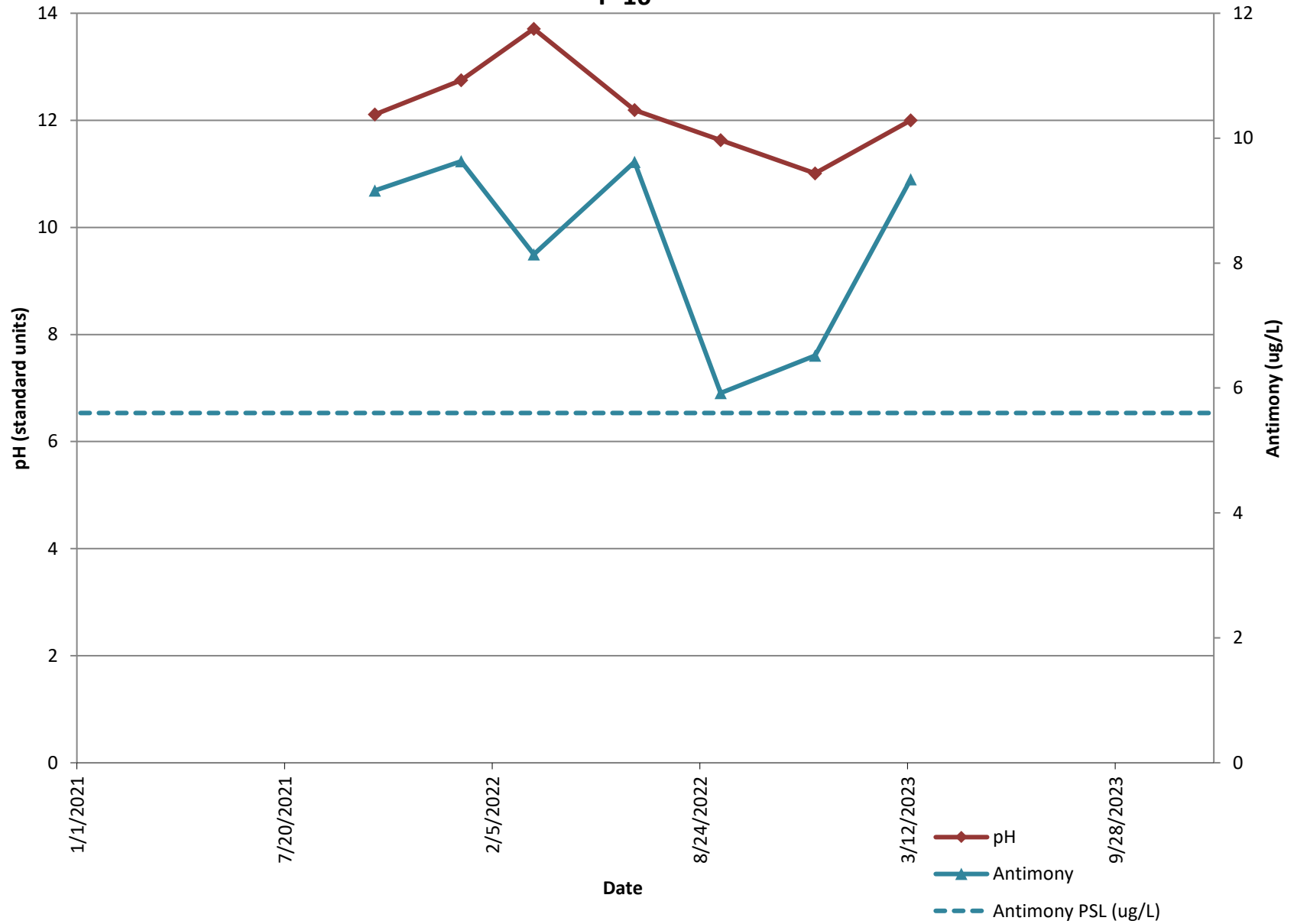


### LDA Shallow/Alluvial Monitoring Wells P-16

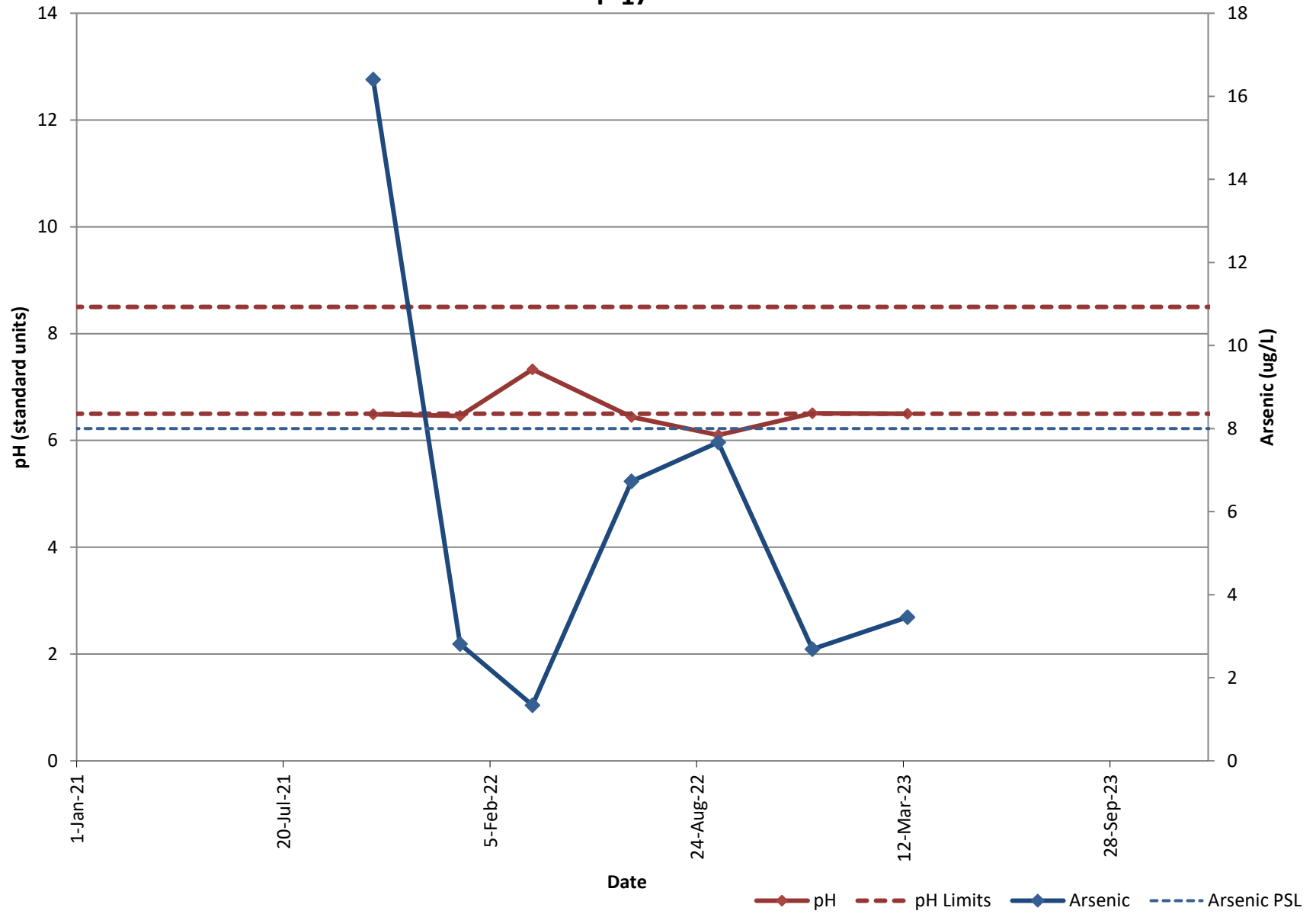




# LDA Shallow/Alluvial Monitoring Wells P-16

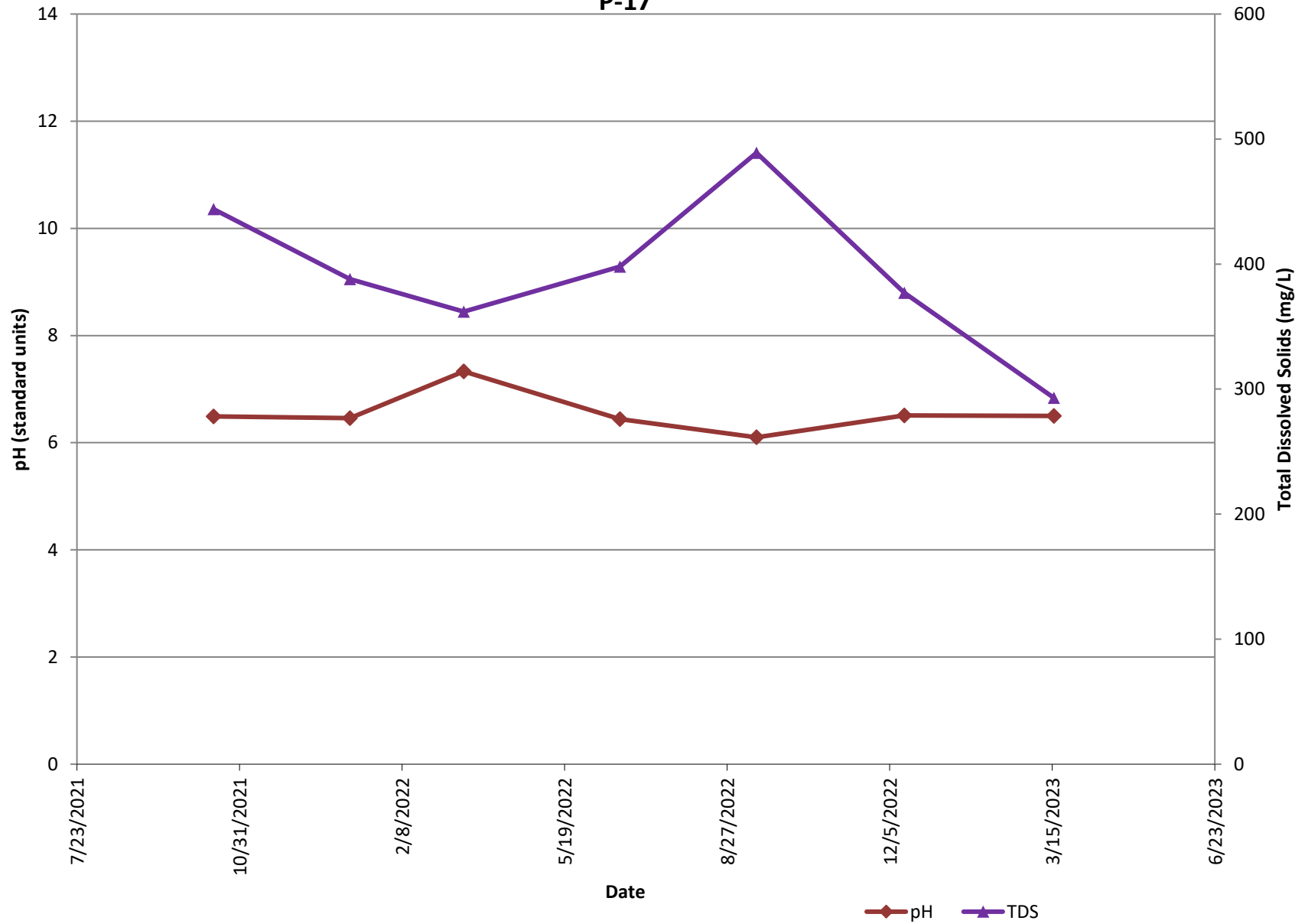


# LDA Shallow/Alluvial Monitoring Wells P-17

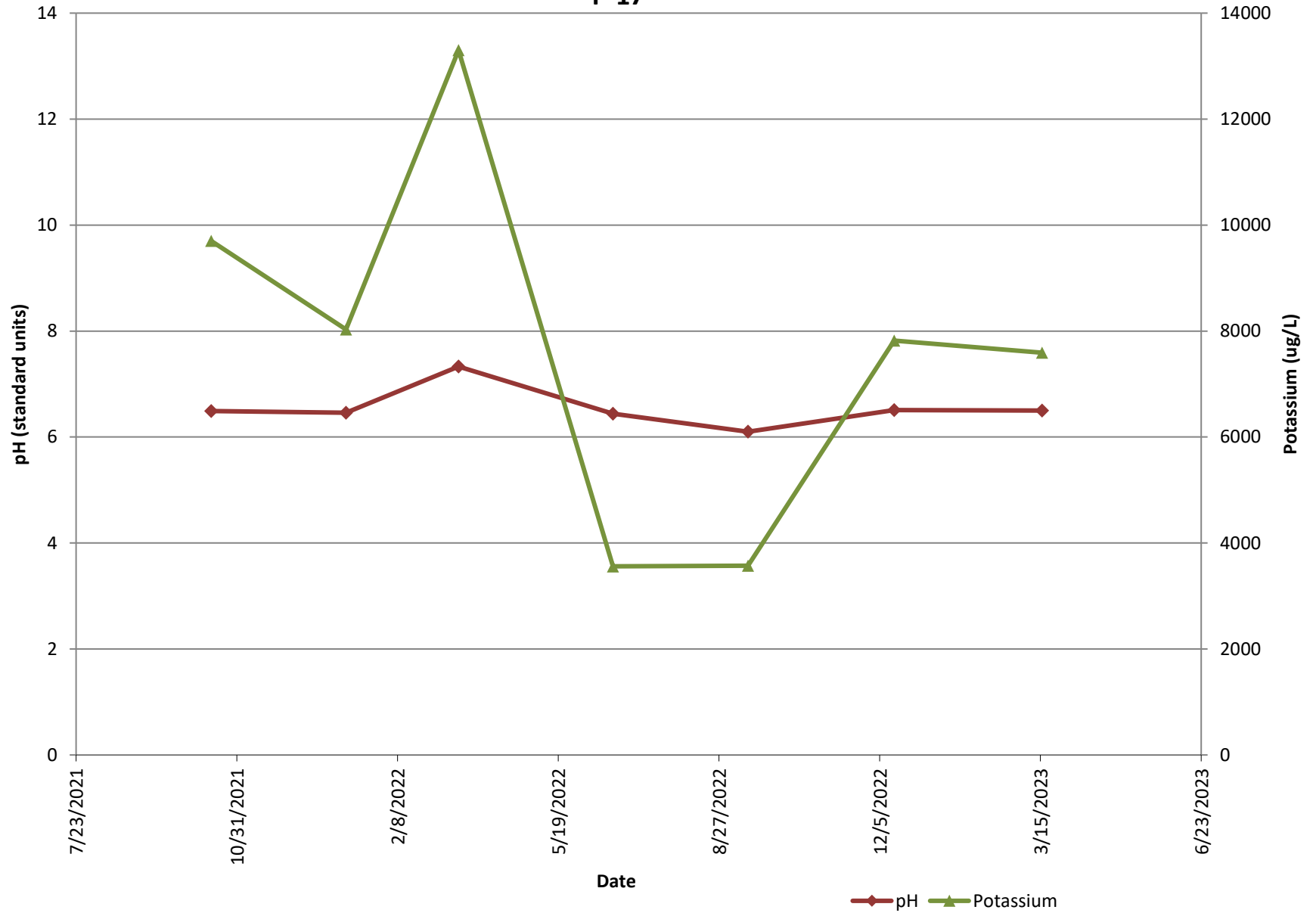


# LDA Shallow/Alluvial Monitoring Wells

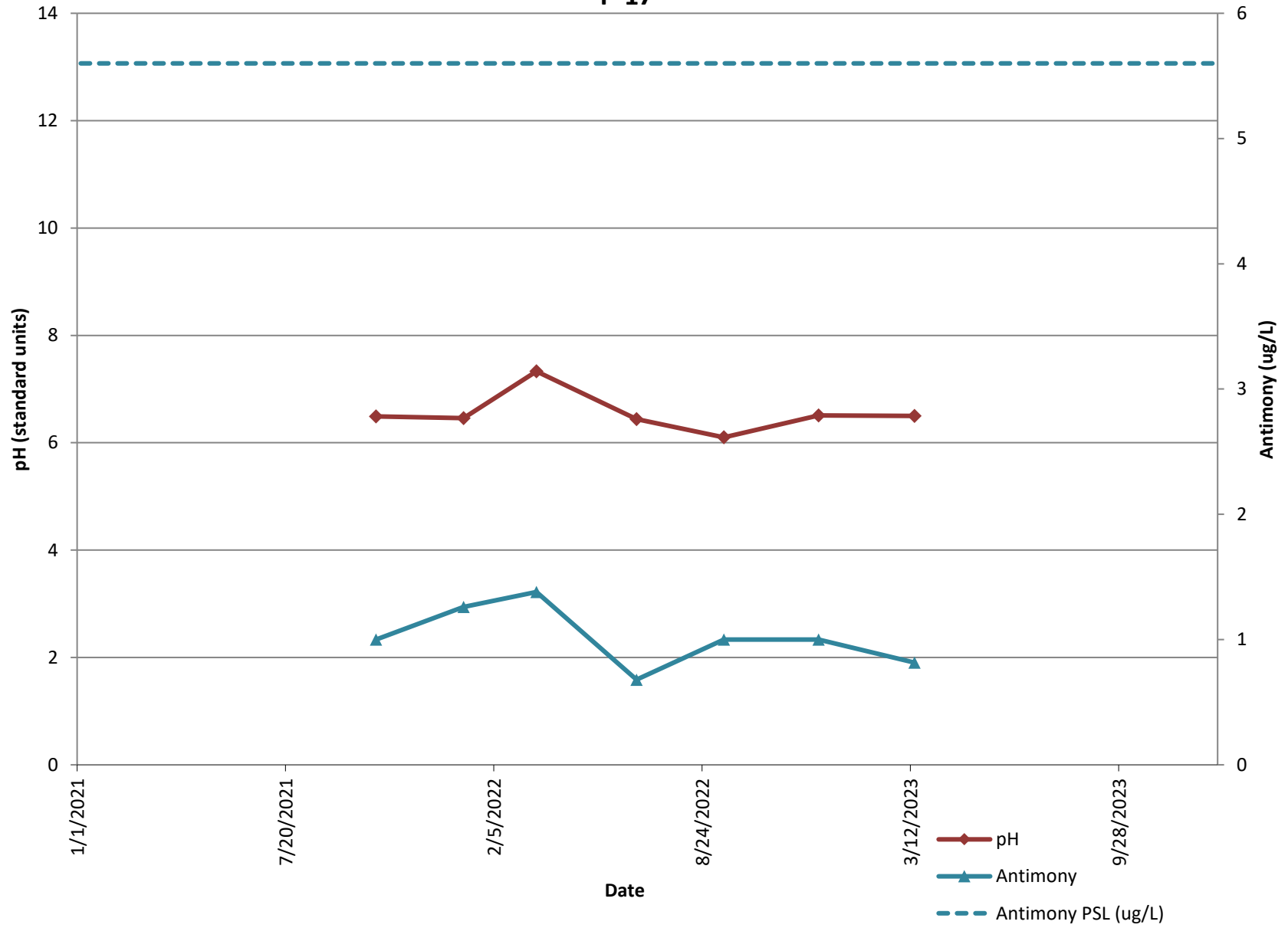
## P-17



# LDA Shallow/Alluvial Monitoring Wells P-17



# LDA Shallow/Alluvial Monitoring Wells P-17





**APPENDIX C**

# Data Validation Report and Laboratory Analytical Results

**DATA VALIDATION CHECKLIST**

<b>Project Name:</b>	Ravensdale Project
<b>Project Number:</b>	GL152030402.001/01.LBR
<b>Sample Identification(s):</b>	MW-5A_0323, MW-1A_0323, MW-6A_0323, MW-2A_0323, MW-45A_0323, P-15_0323, MWB-2LDA_0323, MWB-3LDA_0323, P-14_0323, MW-99-1_0323, MW-3A_0323, MW-10A_0323, P-16_0323, MWB-1LDA_0323, MWB-6DSP_0323, MW-55A_0323, MWB-2DSP_0323, MWB-4DSP_0323, P-17_0323, MW-4A_0323, MW-9A_0323, MWB-1DDSP_0323, MWB-1SDSP_0323, MWB-5DSP_0323, Portal_0323, MW-8A_0323, MW-7A_0323, MW-99-2_0323, Infiltration Pond_0323, MW-35A_0323, Weir_0323, South Pond_0323, Still Well_0323, Interceptor Trench_0323
<b>Sample Date(s):</b>	3/13/23, 3/14/23, 3/15/23, 3/16/23, and 3/17/23
<b>Sample Team:</b>	Sean Johnson, Golder Associates
<b>Sample Matrix:</b>	Aqueous
<b>Analyzing Laboratory:</b>	Analytical Resources, Inc. – Tukwila, WA
<b>Analyses:</b>	TDS (SM2540C); Total Metals: K, Pb, Sb, V (SW6010D, E200.8); As (E200.8 UCT-KED)
<b>Laboratory Report No.:</b>	23C0439

**FIELD DATA PACKAGE DOCUMENTATION**

Field Sampling Logs:	Reported		Performance Acceptable		Not Required
	NO	YES	NO	YES	
1. Sampling dates noted		X		X	
2. Sampling team indicated		X		X	
3. Sampling identification traceable to location collected		X		X	
4. Sample location		X		X	
5. Collection technique (bailer, pump, etc.)		X		X	
6. Sample container type		X		X	
7. Preservation methods		X		X	
8. Chain-of-custody form completed		X		X	
9. Required analytical methods requested		X		X	
10. Field sample logs completed properly and signed		X		X	
11. Number and type of field QC samples collected		X		X	
12. Field equipment calibration		X		X	
13. Field equipment decontamination		X		X	

QC – quality control

**COMMENTS:**

Performance was acceptable, with no exceptions.

## ANALYTICAL DATA PACKAGE DOCUMENTATION

### GENERAL INFORMATION

	Reported		Performance Acceptable		Not Required
	NO	YES	NO	YES	
1. Sample results		X		X	
2. Parameters analyzed		X		X	
3. Method of analysis		X		X	
4. Reporting limits of analysis		X		X	
5. Sample collection date		X		X	
6. Laboratory sample received date		X		X	
7. Sample preparation/extraction date		X		X	
8. Sample analysis date		X		X	
9. Copy of chain-of-custody form signed by lab sample custodian		X		X	
10. Narrative summary of QA or sample problems provided		X	X		

QA – quality assurance

### COMMENTS:

Performance was acceptable, with the following notes:

- Some cooler temperatures were below 0 degrees Celsius (-1.5, -0.8, and -1.0) The lab did not note any ice formation in sample containers upon arrival. No further action is required other than to note.
- The following sample volumes for total dissolved solids were not 200ml: MW-5A\_0323, MW-1A\_0323, MW-6A\_0323, MW-2A\_0323, MW-45A\_0323, P-15\_0323, P-14\_0323, MW-3A\_0323, P-16\_0323, MWB-2DSP\_0323, MWB-4DSP\_0323, P-17\_0323, MW-4A\_0323, MW-9A\_0323, MWB-1DDSP\_0323, MWB-1SDSP\_0323, MWB-5DSP\_0323, Portal\_0323, MW-8A\_0323, MW-7A\_0323, Infiltration Pond\_0323, MW-35A\_0323, Weir\_0323, South Pond\_0323, Still Well\_0323, and Interceptor Trench\_0323. No further action is required other than to note.

### INORGANIC ANALYSES

Metals (EPA 6010/200.8) (E200.8 UCT-KED)	Reported		Performance Acceptable		Not Required
	NO	YES	NO	YES	
1. Holding times		X		X	
2. Reporting limits		X		X	
3. Blanks					
a. Method blanks		X		X	
b. Equipment /Rinsate blanks		X		X	
4. Laboratory control sample (LCS) %R		X		X	
5. Matrix spike (MS) %R		X		X	
6. LCS duplicate (LCSD) %R	X				
7. MS duplicate (MSD) %R		X	X		
8. MS / MSD RPD		X		X	
9. LCS / LCSD RPD	X				
10. Laboratory Duplicate RPD		X		X	
11. Field duplicate comparison		X		X	

%R – percent recovery

RPD – relative percent difference

**COMMENTS:**

Performance was acceptable, with the following exceptions and/or notes:

- Certain MS/MSD recoveries exceeded QC limits. Using professional judgement, when the original concentration is more than 4x times the spike, no qualifications are required.

Sample ID	Method	Analyte	MS/MSD Recovery (%)	RPD (%)	QC limits	Units
MW-5A_0323	6010D	Potassium	96.3/211	3.43	75-125/20	mg/L
Weir_0323	6010D	Potassium	116/131	1.36	75-125/20	mg/L

- There were project specific lab duplicates (MW-5A\_0323, MW-2A\_0323, MW-99-1\_0323, and Weir\_0323). Recovery and RPDs were within QC limits and no qualifications were required.
- Field duplicates are as followed: MW-35A-0323 is a duplicate to Infiltration Ponds-0323 and MW-45A-0323 is a field duplicate to MW-2A-0323. All were within RPD limits, and no qualifications were required.
- The field blanks are as followed: MW-99-1\_0323 and MW-99-2\_0323. All results were non-detect and no qualifications were required.

**GENERAL WET CHEMISTRY**

TDS (SM 2540C)	Reported		Performance Acceptable		Not Required
	NO	YES	NO	YES	
1. Holding times		X		X	
2. Reporting limits		X		X	
3. Blanks					
a. Method blanks		X		X	
b. Equipment rinsate blanks		X		X	
4. Laboratory control sample (LCS) %R		X		X	
5. Matrix spike (MS) %R		X	X		
6. LCS duplicate (LCSD) %R	X				
7. MS duplicate (MSD) %R		X		X	
8. MS/MSD RPD		X		X	
9. LCS/LCSD RPD	X				
10. Laboratory Duplicate RPD		X		X	
11. Field duplicate comparison		X		X	

%R – percent recovery

RPD – relative percent difference

**COMMENTS:**

- There was a project specific lab duplicate (Weir\_0323). Recovery and RPDs were within QC limits and no qualifications were required.

- Field duplicates are as followed: MW-35A-0323 is a duplicate to Infiltration Ponds-0323 and MW-45A-0323 is a field duplicate to MW-2A-0323. All were within RPD limits, and no qualifications were required.
- The field blanks are as followed: MW-99-1\_0323 and MW-99-2\_0323. All results were non-detect and no qualifications were required.

## DATA VALIDATION CHECKLIST

### SUMMARY AND DATA QUALIFIER CODES

<b>Project Name:</b>	Ravensdale Project
<b>Project Number:</b>	GL152030402.001/01.LBR
<b>Sample Identification(s):</b>	MW-5A_0323, MW-1A_0323, MW-6A_0323, MW-2A_0323, MW-45A_0323, P-15_0323, MWB-2LDA_0323, MWB-3LDA_0323, P-14_0323, MW-99-1_0323, MW-3A_0323, MW-10A_0323, P-16_0323, MWB-1LDA_0323, MWB-6DSP_0323, MW-55A_0323, MWB-2DSP_0323, MWB-4DSP_0323, P-17_0323, MW-4A_0323, MW-9A_0323, MWB-1DDSP_0323, MWB-1SDSP_0323, MWB-5DSP_0323, Portal_0323, MW-8A_0323, MW-7A_0323, MW-99-2_0323, Infiltration Pond_0323, MW-35A_0323, Weir_0323, South Pond_0323, Still Well_0323, Interceptor Trench_0323
<b>Sample Date(s):</b>	3/13/23, 3/14/23, 3/15/23, 3/16/23, and 3/17/23
<b>Sample Team:</b>	Sean Johnson, Golder Associates
<b>Sample Matrix:</b>	Aqueous
<b>Analyzing Laboratory:</b>	Analytical Resources, Inc. – Tukwila, WA
<b>Analyses:</b>	TDS (SM2540C); Total Metals: K, Pb, Sb, V (SW6010D, E200.8); As (E200.8 UCT-KED)
<b>Laboratory Report No.:</b>	23C0439

<b>VALIDATION PERFORMED BY:</b>	Julia Campbell, WSP
<b>DATE:</b>	May 1, 2023
<b>PEER REVIEW PERFORMED BY:</b>	<b>Michael Shadle, WSP</b>
<b>DATE:</b>	May 3, 2023



Client_Sample_ID	Analyte	Infiltration Ponds		MW-35A Duplicate		RPD	Unit	Qualifier	RL	MDL
		Result	Result	Result	Result					
Infiltration Pond_0323	Antimony	8.27	8.77	6%	ug/L			0.4	0.202	
Infiltration Pond_0323	Arsenic	16.3	17	4%	ug/L			0.4	0.0746	
Infiltration Pond_0323	Potassium	401	413	3%	mg/L			1	0.214	
Infiltration Pond_0323	Lead	5.8	6.44	10%	ug/L			0.2	0.103	
Infiltration Pond_0323	Vanadium	4	4.36	9%	ug/L			0.4	0.111	
Infiltration Pond_0323	Total Dissolved Solids	1050	1080	3%	mg/L			50	13	

Client_Sample_ID	Analyte	MW-2A		MW-45A Duplicate		RPD	Unit	Qualifier	RL	MDL
		Result	Result	Result	Result					
MW-2A-0323	Antimony	1.65	1.67	1%	ug/L			0.2	0.101	
MW-2A-0323	Arsenic	1.49	1.51	1%	ug/L			0.2	0.0373	
MW-2A-0323	Potassium	28.8	30.1	4%	mg/L			0.5	0.107	
MW-2A-0323	Lead	0.1	0.1	0%	ug/L			0.1	0.0513	
MW-2A-0323	Vanadium	1.03	1.01	2%	ug/L			0.2	0.0556	
MW-2A-0323	Total Dissolved Solids	368	346	6%	mg/L			10	10	



**Analytical Resources, LLC**  
**Analytical Chemists and Consultants**  
**Tukwila, WA**

24 April 2023

Gary Zimmerman  
 Golder Associates  
 18300 NE Union Hill Road Suite 200  
 Redmond, WA 98052-3333

RE: Ravensdale (152030402.001)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

<u>Associated Work Order(s)</u>	<u>Associated SDG ID(s)</u>
23C0439	N/A

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I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Kelly Bottem, Client Services Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number: <b>23C0439</b>	Turn-around Requested: Standard	Date: <b>3/17/23</b>
ARI Client Company: WSP	Phone: (425) 883-0777	Page: <b>1</b> of <b>4</b>
Client Contact: Gary Zimmerman		No. of Coolers: <b>4</b> Cooler Temps: <b>0.7, -1.5, -0.8, -0.6</b>

Client Project Name: Ravensdale 2023 Q1 Sampling	Analysis Requested						Notes/Comments
Client Project #: 152030402.004	Samplers: Sean Johnson	Total Metals: As, Pb, Sb, V, K	TDS				

Sample ID	Date	Time	Matrix	No. Containers	Total Metals: As, Pb, Sb, V, K	TDS							
MW-5A_0323	3/13/23	15:20	GW	2	X	X							
MW-1A_0323	3/13/23	16:30	GW	2	X	X							
MW-6A_0323	3/14/23	9:55	GW	2	X	X							
MW-2A_0323	3/14/23	10:40	GW	2	X	X							
MW-45A_0323	3/14/23	10:45	GW	2	X	X							
P-15_0323	3/14/23	12:45	GW	2	X	X							
MWB-2LDA_0323	3/14/23	12:00	GW	2	X	X							
MWB-3LDA_0323	3/14/23	14:35	GW	2	X	X							
P-14_0323	3/14/23	15:45	GW	2	X	X							
MW-99-1_0323	3/15/23	9:10	DI	2	X	X							

Comments/Special Instructions  Analyze in accordance with MSA between Golder/WSP and ARI.  Ecology EIM EDD.	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <b>SEAN JOHNSON</b>	Printed Name: <b>Philip Bates</b>	Printed Name:	Printed Name:
	Company: <b>WSP</b>	Company: <b>AR</b>	Company:	Company:
	Date & Time: <b>3/17/23 15:10</b>	Date & Time: <b>3/17/23 15:10</b>	Date & Time:	Date & Time:

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number: <b>23C0439</b>	Turn-around Requested: Standard	Date: <b>3/17/23</b>
ARI Client Company: WSP	Phone: (425) 883-0777	Page: <b>2</b> of <b>4</b>
Client Contact: Gary Zimmerman		No. of Coolers: <b>4</b> Cooler Temps: <b>0.7, -1.4, -0.8, -0.6</b>

Client Project Name: Ravensdale 2023 Q1 Sampling					Analysis Requested							Notes/Comments	
Client Project #: 152030402.004		Samplers: Sean Johnson			Total Metals: As, Pb, Sb, V, K	TDS							
Sample ID	Date	Time	Matrix	No. Containers									
MW-3A_0323	3/15/23	9:35	GW	2	X	X							
MW-10A_0323	3/15/23	10:45	GW	2	X	X							
P-16_0323	3/15/23	12:00	GW	2	X	X							
MWB-1LDA_0323	3/15/23	13:50	GW	2	X	X							
MWB-6DSP_0323	3/15/23	15:15	GW	2	X	X							
MW-55A_0323	3/15/23	15:20	GW	2	X	X							
MWB-2DSP_0323	3/15/23	15:45	GW	2	X	X							
MWB-4DSP_0323	3/15/23	16:20	GW	2	X	X							
P-17_0323	3/16/23	9:10	GW	2	X	X							
MW-4A_0323	3/16/23	10:20	GW	2	X	X							

Comments/Special Instructions  Analyze in accordance with MSA between Golder/WSP and ARI.  Ecology EIM EDD.	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <b>SEAN JOHNSON</b>	Printed Name: <b>Philip Bates</b>	Printed Name:	Printed Name:
	Company: <b>WSP</b>	Company: <b>AR</b>	Company:	Company:
	Date & Time: <b>3/17/23 15:10</b>	Date & Time: <b>3/17/23 15:10</b>	Date & Time:	Date & Time:

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# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number: <b>23C0439</b>	Turn-around Requested: Standard	Date: <b>3/17/23</b>
ARI Client Company: WSP	Phone: (425) 883-0777	Page: <b>3</b> of <b>4</b>
Client Contact: Gary Zimmerman		No. of Coolers: <b>4</b> Cooler Temps: <b>0.7, -1.5, 0.8, -0.6</b>

Client Project Name: Ravensdale 2023 Q1 Sampling	Analysis Requested		Notes/Comments
Client Project #: 152030402.004	Samplers: Sean Johnson		

Sample ID	Date	Time	Matrix	No. Containers	Total Metals: As, Pb, Sb, V, K	TDS										
MW-9A_0323	3/16/23	11:00	GW	2	X	X										
MWB-1DDSP_0323	3/16/23	12:30	GW	2	X	X										
MWB-1SDSP_0323	3/16/23	13:15	GW	2	X	X										
MWB-5DSP_0323	3/16/23	14:10	GW	2	X	X										
PORTAL_0323	3/16/23	14:35	GW	2	X	X										
MW-8A_0323	3/17/23	9:35	GW	2	X	X										
MW-7A_0323	3/17/23	10:15	GW	2	X	X										
MW-99-2_0323	3/17/23	11:00	DI	2	X	X										

Comments/Special Instructions  Analyze in accordance with MSA between Golder/WSP and ARI.  Ecology EIM EDD.	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <b>SEAN JOHNSON</b>	Printed Name: <b>Phillip Barcos</b>	Printed Name:	Printed Name:
	Company: <b>WSP</b>	Company: <b>AR</b>	Company:	Company:
	Date & Time: <b>3/17/23 15:10</b>	Date & Time: <b>3/17/23 15:10</b>	Date & Time:	Date & Time:

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# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number: <b>23CO434</b>	Turn-around Requested: Standard	Date: <b>3/17/23</b>
ARI Client Company: WSP	Phone: (425) 883-0777	Page: <b>4</b> of <b>4</b>
Client Contact: Gary Zimmerman		No. of Coolers: <b>4</b>
Client Project Name: Ravensdale 2023 Q1 Sampling		Cooler Temps: <b>0.7, -1.5, -0.8, -0.6</b>

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested							Notes/Comments	
					Total Metals: As, Pb, Sb, V, K	TDS							
INFILTRATION POND_0323	3/13/23	14:05	SW	2	X	X							
MW-35A_0323	3/13/23	14:10	SW	2	X	X							
WEIR_0323	3/15/23	9:45	SW	<b>6</b>	X	X							MS/MSD
SOUTH POND_0323	3/15/23	12:15	SW	2	X	X							
STILL WELL_0323	3/15/23	12:40	SW	2	X	X							
INTERCEPTOR TRENCH_0323	3/16/23	9:25	SW	1		X							

Comments/Special Instructions  Analyze in accordance with MSA between Golder/WSP and ARI.  Ecology EIM EDD.	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <b>SEAN JOHNSON</b>	Printed Name: <b>Phillip BATES</b>	Printed Name:	Printed Name:
	Company: <b>WSP</b>	Company: <b>AR</b>	Company:	Company:
	Date & Time: <b>3/17/23 15:10</b>	Date & Time: <b>3/17/23 15:10</b>	Date & Time:	Date & Time:

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Golder Associates  
18300 NE Union Hill Road Suite 200  
Redmond WA, 98052-3333

Project: Ravensdale  
Project Number: 152030402.001  
Project Manager: Gary Zimmerman

**Reported:**  
24-Apr-2023 10:55

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-5A_0323	23C0439-01	Water	13-Mar-2023 15:20	17-Mar-2023 15:10
MW-1A_0323	23C0439-02	Water	13-Mar-2023 16:30	17-Mar-2023 15:10
MW-6A_0323	23C0439-03	Water	14-Mar-2023 09:55	17-Mar-2023 15:10
MW-2A_0323	23C0439-04	Water	14-Mar-2023 10:40	17-Mar-2023 15:10
MW-45A_0323	23C0439-05	Water	14-Mar-2023 10:45	17-Mar-2023 15:10
P-15_0323	23C0439-06	Water	14-Mar-2023 12:45	17-Mar-2023 15:10
MWB-2LDA_0323	23C0439-07	Water	14-Mar-2023 12:00	17-Mar-2023 15:10
MWB-3LDA_0323	23C0439-08	Water	14-Mar-2023 14:35	17-Mar-2023 15:10
P-14_0323	23C0439-09	Water	14-Mar-2023 15:45	17-Mar-2023 15:10
MW-99-1_0323	23C0439-10	Water	15-Mar-2023 09:10	17-Mar-2023 15:10
MW-3A_0323	23C0439-11	Water	15-Mar-2023 09:35	17-Mar-2023 15:10
MW-10A_0323	23C0439-12	Water	15-Mar-2023 10:45	17-Mar-2023 15:10
P-16_0323	23C0439-13	Water	15-Mar-2023 12:00	17-Mar-2023 15:10
MWB-1LDA_0323	23C0439-14	Water	15-Mar-2023 13:50	17-Mar-2023 15:10
MWB-6DSP_0323	23C0439-15	Water	15-Mar-2023 15:15	17-Mar-2023 15:10
MW-55A_0323	23C0439-16	Water	15-Mar-2023 15:20	17-Mar-2023 15:10
MWB-2DSP_0323	23C0439-17	Water	15-Mar-2023 15:45	17-Mar-2023 15:10
MWB-4DSP_0323	23C0439-18	Water	15-Mar-2023 16:20	17-Mar-2023 15:10
P-17_0323	23C0439-19	Water	16-Mar-2023 09:10	17-Mar-2023 15:10
MW-4A_0323	23C0439-20	Water	16-Mar-2023 10:20	17-Mar-2023 15:10
MW-9A_0323	23C0439-21	Water	16-Mar-2023 11:00	17-Mar-2023 15:10
MWB-1DDSP_0323	23C0439-22	Water	16-Mar-2023 12:30	17-Mar-2023 15:10
MWB-1SDSP_0323	23C0439-23	Water	16-Mar-2023 13:15	17-Mar-2023 15:10
MWB-5DSP_0323	23C0439-24	Water	16-Mar-2023 14:10	17-Mar-2023 15:10
Portal_0323	23C0439-25	Water	16-Mar-2023 14:35	17-Mar-2023 15:10
MW-8A_0323	23C0439-26	Water	17-Mar-2023 09:35	17-Mar-2023 15:10
MW-7A_0323	23C0439-27	Water	17-Mar-2023 10:15	17-Mar-2023 15:10
MW-99-2_0323	23C0439-28	Water	17-Mar-2023 11:00	17-Mar-2023 15:10
Infiltration Pond_0323	23C0439-29	Water	13-Mar-2023 14:05	17-Mar-2023 15:10
MW-35A_0323	23C0439-30	Water	13-Mar-2023 14:10	17-Mar-2023 15:10
Weir_0323	23C0439-31	Water	15-Mar-2023 09:45	17-Mar-2023 15:10
South Pond_0323	23C0439-32	Water	15-Mar-2023 12:15	17-Mar-2023 15:10
Still Well_0323	23C0439-33	Water	15-Mar-2023 12:40	17-Mar-2023 15:10
Interceptor Trench_0323	23C0439-34	Water	16-Mar-2023 09:25	17-Mar-2023 15:10



Golder Associates

18300 NE Union Hill Road Suite 200

Redmond WA, 98052-3333

Project: Ravensdale

Project Number: 152030402.001

Project Manager: Gary Zimmerman

Reported:

24-Apr-2023 10:55

## Work Order Case Narrative

### **Total Metals - EPA Method 200.8 and 6010D**

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

### **Wet Chemistry**

The sample(s) were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The duplicate (DUP) relative percent difference (RPD) were within advisory control limits.



WORK ORDER

23C0439

Samples will be discarded 90 days after submission of a final report unless other instructions are received

Client: Golder Associates

Project Manager: Kelly Bottem

Project: Ravensdale

Project Number: 152030402.001

Preservation Confirmation

Container ID	Container Type	pH
23C0439-01 A	HDPE NM, 1000 mL	
23C0439-01 B	HDPE NM, 500 mL, 1:1 HNO3	LZ Pass CP)
23C0439-02 A	HDPE NM, 1000 mL	
23C0439-02 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-03 A	HDPE NM, 1000 mL	
23C0439-03 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-04 A	HDPE NM, 1000 mL	
23C0439-04 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-05 A	HDPE NM, 1000 mL	
23C0439-05 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-06 A	HDPE NM, 1000 mL	
23C0439-06 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-07 A	HDPE NM, 1000 mL	
23C0439-07 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-08 A	HDPE NM, 1000 mL	
23C0439-08 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-09 A	HDPE NM, 1000 mL	
23C0439-09 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-10 A	HDPE NM, 1000 mL	
23C0439-10 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-11 A	HDPE NM, 1000 mL	
23C0439-11 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-12 A	HDPE NM, 1000 mL	
23C0439-12 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-13 A	HDPE NM, 1000 mL	
23C0439-13 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-14 A	HDPE NM, 1000 mL	
23C0439-14 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-15 A	HDPE NM, 1000 mL	
23C0439-15 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-16 A	HDPE NM, 1000 mL	
23C0439-16 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P
23C0439-17 A	HDPE NM, 1000 mL	
23C0439-17 B	HDPE NM, 500 mL, 1:1 HNO3	LZ P





WORK ORDER

23C0439

Samples will be discarded 90 days after submission of a final report unless other instructions are received

<b>Client:</b> Golder Associates	<b>Project Manager:</b> Kelly Bottem
<b>Project:</b> Ravensdale	<b>Project Number:</b> 152030402.001

23C0439-18 A	HDPE NM, 1000 mL	
23C0439-18 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-19 A	HDPE NM, 1000 mL	
23C0439-19 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-20 A	HDPE NM, 1000 mL	
23C0439-20 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-21 A	HDPE NM, 1000 mL	
23C0439-21 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-22 A	HDPE NM, 1000 mL	
23C0439-22 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-23 A	HDPE NM, 1000 mL	
23C0439-23 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-24 A	HDPE NM, 1000 mL	
23C0439-24 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-25 A	HDPE NM, 1000 mL	
23C0439-25 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-26 A	HDPE NM, 1000 mL	
23C0439-26 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-27 A	HDPE NM, 1000 mL	
23C0439-27 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-28 A	HDPE NM, 1000 mL	
23C0439-28 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-29 A	HDPE NM, 1000 mL	
23C0439-29 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-30 A	HDPE NM, 1000 mL	
23C0439-30 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-31 A	HDPE NM, 1000 mL	
23C0439-31 B	HDPE NM, 1000 mL	
23C0439-31 C	HDPE NM, 1000 mL	
23C0439-31 D	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-31 E	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-31 F	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-32 A	HDPE NM, 1000 mL	
23C0439-32 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P
23C0439-33 A	HDPE NM, 1000 mL	
23C0439-33 B	HDPE NM, 500 mL, 1:1 HNO3	ZZ P





**WORK ORDER**

23C0439

Samples will be discarded 90 days after submission of a final report unless other instructions are received

**Client: Golder Associates**

**Project Manager: Kelly Bottem**

**Project: Ravensdale**

**Project Number: 152030402.001**

23C0439-34 A

HDPE NM, 1000 mL

PIB

Preservation Confirmed By

3/17/23

Date



# Cooler Receipt Form

ARI Client: Goldet / WSP

Project Name: Ravensdale 2023 Q1

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 230439

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 15:10 0.7 -1.5 -0.9 -0.6

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 7009708

Cooler Accepted by: PIB Date: 3/17/23 Time: 15:10

**Complete custody forms and attach all shipping documents**

**Log-In Phase:**

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI... NA

Were the sample(s) split by ARI? NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: PIB Date: 3/17/23 Time: 16:33 Labels checked by: PIB

**\*\* Notify Project Manager of discrepancies or concerns \*\***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

**Additional Notes, Discrepancies, & Resolutions:**

By: \_\_\_\_\_ Date: \_\_\_\_\_



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-5A\_0323**  
**23C0439-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/13/2023 15:20  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 05:32

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-01 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Antimony	7440-36-0	1	0.101	0.200	5.83	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0680	ug/L	J
Vanadium	7440-62-2	1	0.0556	0.200	1.64	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-5A\_0323**  
**23C0439-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/13/2023 15:20  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 05:32

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-01 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	3.39	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-5A\_0323**  
**23C0439-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/13/2023 15:20  
Instrument: ICP3 Analyst: SKD Analyzed: 04/03/2023 18:22

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-01 B 02  
Preparation Batch: BLD0011 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	318	mg/L	





Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-5A\_0323**  
**23C0439-01 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/13/2023 15:20  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-01  
Preparation Batch: BLC0492 Sample Size: 75 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	1090	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-1A\_0323**  
**23C0439-02 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/13/2023 16:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 05:37

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-02 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	0.860	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0530	ug/L	J
Vanadium	7440-62-2	1	0.0556	0.200	0.935	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-1A\_0323**  
**23C0439-02 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/13/2023 16:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 05:37

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-02 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.27	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-1A\_0323**  
**23C0439-02 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/13/2023 16:30  
Instrument: ICP3 Analyst: SKD Analyzed: 04/03/2023 18:44

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-02 B 02  
Preparation Batch: BLD0011 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	14.0	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-1A\_0323**  
**23C0439-02 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/13/2023 16:30  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-02  
Preparation Batch: BLC0492 Sample Size: 100 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	298	mg/L	





Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-6A\_0323**  
**23C0439-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/14/2023 09:55  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 05:42

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-03 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	6.70	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	0.801	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-6A\_0323**  
**23C0439-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/14/2023 09:55  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 05:42

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-03 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	1.87	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-6A\_0323**  
**23C0439-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/14/2023 09:55  
Instrument: ICP3 Analyst: SKD Analyzed: 04/04/2023 16:27

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-03 B 02  
Preparation Batch: BLD0011 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	2	0.214	1.00	387	mg/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-6A\_0323**  
**23C0439-03 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/14/2023 09:55  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-03  
Preparation Batch: BLC0492 Sample Size: 75 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	1190	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-2A\_0323**  
**23C0439-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/14/2023 10:40  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 05:47

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-04 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	1.65	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.03	ug/L	





Golder Associates  
18300 NE Union Hill Road Suite 200  
Redmond WA, 98052-3333

Project: Ravensdale  
Project Number: 152030402.001  
Project Manager: Gary Zimmerman

**Reported:**  
24-Apr-2023 10:55

**MW-2A\_0323**  
**23C0439-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED

Sampled: 03/14/2023 10:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 03/31/2023 05:47

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M  
Preparation Batch: BLC0819  
Prepared: 03/30/2023

Sample Size: 25 mL  
Final Volume: 25 mL

Extract ID: 23C0439-04 B 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.49	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-2A\_0323**  
**23C0439-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/14/2023 10:40  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 09:56

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-04 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	28.8	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-2A\_0323**  
**23C0439-04 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/14/2023 10:40  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-04  
Preparation Batch: BLC0492 Sample Size: 100 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	368	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-45A\_0323**  
**23C0439-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/14/2023 10:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:29

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-05 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	1.67	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.01	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-45A\_0323**  
**23C0439-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/14/2023 10:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:29

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-05 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	1.51	ug/L	





Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-45A\_0323**  
**23C0439-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/14/2023 10:45  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:08

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-05 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	30.1	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-45A\_0323**  
**23C0439-05 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/14/2023 10:45  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-05  
Preparation Batch: BLC0492 Sample Size: 100 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	346	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**P-15\_0323**  
**23C0439-06 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/14/2023 12:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 04/01/2023 16:28

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-06 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	5	0.505	1.00	2.47	ug/L	D
Lead	7439-92-1	1	0.0513	0.100	93.8	ug/L	
Vanadium	7440-62-2	2	0.111	0.400	0.288	ug/L	J, D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**P-15\_0323**  
**23C0439-06 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/14/2023 12:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 04/01/2023 16:28

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-06 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	5	0.187	1.00	5.82	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**P-15\_0323**  
**23C0439-06 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/14/2023 12:45  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 12:40

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-06 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	5	0.534	2.50	945	mg/L	D





Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**P-15\_0323**  
**23C0439-06 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/14/2023 12:45  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-06  
Preparation Batch: BLC0492 Sample Size: 5 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	200	200	3360	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MWB-2LDA\_0323**  
**23C0439-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/14/2023 12:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:39

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-07 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	0.0880	ug/L	J



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**MWB-2LDA\_0323**  
**23C0439-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/14/2023 12:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:39

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-07 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	5.25	ug/L	



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**MWB-2LDA\_0323**  
**23C0439-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/14/2023 12:00  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:14

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-07 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	0.894	mg/L	



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**MWB-2LDA\_0323**  
**23C0439-07 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/14/2023 12:00  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-07  
Preparation Batch: BLC0492 Sample Size: 200 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	199	mg/L	





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**MWB-3LDA\_0323**  
**23C0439-08 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/14/2023 14:35  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:44

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-08 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	ND	ug/L	U



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**MWB-3LDA\_0323**  
**23C0439-08 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/14/2023 14:35  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:44

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-08 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	7.37	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MWB-3LDA\_0323**  
**23C0439-08 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/14/2023 14:35  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:17

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-08 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	0.786	mg/L	



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**MWB-3LDA\_0323**  
**23C0439-08 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/14/2023 14:35  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-08  
Preparation Batch: BLC0492 Sample Size: 200 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	146	mg/L	



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**P-14\_0323**  
**23C0439-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/14/2023 15:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 04/01/2023 02:28

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-09 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	10	1.01	2.00	134	ug/L	D
Lead	7439-92-1	10	0.513	1.00	2.22	ug/L	D
Vanadium	7440-62-2	10	0.556	2.00	20.5	ug/L	D



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**P-14\_0323**  
**23C0439-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/14/2023 15:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 04/01/2023 02:28

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-09 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	10	0.373	2.00	232	ug/L	D





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**P-14\_0323**  
**23C0439-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/14/2023 15:45  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 12:35

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-09 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	10	1.07	5.00	2390	mg/L	D



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**P-14\_0323**  
**23C0439-09 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/14/2023 15:45  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-09  
Preparation Batch: BLC0492 Sample Size: 5 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	200	200	6280	mg/L	



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**MW-99-1\_0323**  
**23C0439-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 09:10  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 05:51

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-10 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	ND	ug/L	U



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-99-1\_0323**  
**23C0439-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 09:10  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 05:51

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-10 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	ND	ug/L	U



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**MW-99-1\_0323**  
**23C0439-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 09:10  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:23

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-10 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	ND	mg/L	U



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**MW-99-1\_0323**  
**23C0439-10 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 09:10  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-10  
Preparation Batch: BLC0492 Sample Size: 200 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	ND	mg/L	U





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**MW-3A\_0323**  
**23C0439-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 09:35  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:54

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-11 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	5.15	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.147	ug/L	
Vanadium	7440-62-2	1	0.0556	0.200	1.19	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-3A\_0323**  
**23C0439-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 09:35  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:54

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-11 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	2.42	ug/L	



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**MW-3A\_0323**  
**23C0439-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 09:35  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:26

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-11 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	91.1	mg/L	



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**MW-3A\_0323**  
**23C0439-11 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 09:35  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-11  
Preparation Batch: BLC0492 Sample Size: 100 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	393	mg/L	



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**MW-10A\_0323**  
**23C0439-12 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 10:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:58

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-12 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	0.727	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-10A\_0323**  
**23C0439-12 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 10:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 06:58

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-12 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.541	ug/L	





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**MW-10A\_0323**  
**23C0439-12 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 10:45  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:42

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-12 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	0.892	mg/L	



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**MW-10A\_0323**  
**23C0439-12 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 10:45  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-12  
Preparation Batch: BLC0492 Sample Size: 200 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	108	mg/L	



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**P-16\_0323**  
**23C0439-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 12:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:32

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-13 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	20	2.02	4.00	9.34	ug/L	D
Lead	7439-92-1	20	1.03	2.00	11.1	ug/L	D
Vanadium	7440-62-2	20	1.11	4.00	317	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**P-16\_0323**  
**23C0439-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 12:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:32

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-13 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	20	0.746	4.00	166	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**P-16\_0323**  
**23C0439-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 12:00  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 12:37

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-13 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	5	0.534	2.50	829	mg/L	D



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**P-16\_0323**  
**23C0439-13 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 12:00  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-13  
Preparation Batch: BLC0492 Sample Size: 20 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	50	50	2520	mg/L	





Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MWB-1LDA\_0323**  
**23C0439-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 13:50  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:03

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-14 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	ND	ug/L	U



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**MWB-1LDA\_0323**  
**23C0439-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 13:50  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:03

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-14 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	8.35	ug/L	



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**MWB-1LDA\_0323**  
**23C0439-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 13:50  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:45

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-14 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	0.864	mg/L	



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**MWB-1LDA\_0323**  
**23C0439-14 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 13:50  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-14  
Preparation Batch: BLC0492 Sample Size: 200 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	221	mg/L	



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**MWB-6DSP\_0323**  
**23C0439-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 15:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:10

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-15 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	0.445	ug/L	



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**MWB-6DSP\_0323**  
**23C0439-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 15:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:10

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-15 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	1.05	ug/L	





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**MWB-6DSP\_0323**  
**23C0439-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 15:15  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:48

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-15 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	1.11	mg/L	



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**MWB-6DSP\_0323**  
**23C0439-15 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 15:15  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-15  
Preparation Batch: BLC0492 Sample Size: 200 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	251	mg/L	



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**MW-55A\_0323**  
**23C0439-16 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 15:20  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:36

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-16 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	0.440	ug/L	



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**MW-55A\_0323**  
**23C0439-16 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 15:20  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:36

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-16 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.04	ug/L	



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**MW-55A\_0323**  
**23C0439-16 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 15:20  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:51

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-16 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	1.14	mg/L	



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**MW-55A\_0323**  
**23C0439-16 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 15:20  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-16  
Preparation Batch: BLC0561 Sample Size: 200 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	246	mg/L	





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**MWB-2DSP\_0323**  
**23C0439-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 15:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:41

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-17 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	0.505	ug/L	
Lead	7439-92-1	1	0.0513	0.100	1.15	ug/L	
Vanadium	7440-62-2	1	0.0556	0.200	0.557	ug/L	



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**MWB-2DSP\_0323**  
**23C0439-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 15:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:41

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-17 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.04	ug/L	



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**MWB-2DSP\_0323**  
**23C0439-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 15:45  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:54

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-17 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	2.32	mg/L	



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**MWB-2DSP\_0323**  
**23C0439-17 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 15:45  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-17  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	302	mg/L	



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**MWB-4DSP\_0323**  
**23C0439-18 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 16:20  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:46

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-18 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	0.364	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0970	ug/L	J
Vanadium	7440-62-2	1	0.0556	0.200	0.351	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MWB-4DSP\_0323**  
**23C0439-18 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 16:20  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:46

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-18 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	3.19	ug/L	





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**MWB-4DSP\_0323**  
**23C0439-18 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 16:20  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 11:57

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-18 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	2.76	mg/L	



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**MWB-4DSP\_0323**  
**23C0439-18 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 16:20  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-18  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	381	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**P-17\_0323**  
**23C0439-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/16/2023 09:10  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:51

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-19 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	0.816	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.54	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**P-17\_0323**  
**23C0439-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/16/2023 09:10  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:51

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-19 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	3.46	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**P-17\_0323**  
**23C0439-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/16/2023 09:10  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 12:00

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-19 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	7.59	mg/L	



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**P-17\_0323**  
**23C0439-19 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/16/2023 09:10  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-19  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	293	mg/L	



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**MW-4A\_0323**  
**23C0439-20 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/16/2023 10:20  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:56

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-20 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.13	ug/L	





Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-4A\_0323**  
**23C0439-20 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/16/2023 10:20  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 07:56

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-20 B 01  
Preparation Batch: BLC0819 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.159	ug/L	J



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**MW-4A\_0323**  
**23C0439-20 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/16/2023 10:20  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 12:03

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-20 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	0.616	mg/L	



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**MW-4A\_0323**  
**23C0439-20 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/16/2023 10:20  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-20  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	264	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-9A\_0323**  
**23C0439-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/16/2023 11:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:00

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-21 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	0.119	ug/L	J
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	0.812	ug/L	



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**MW-9A\_0323**  
**23C0439-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/16/2023 11:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:00

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-21 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.508	ug/L	



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**MW-9A\_0323**  
**23C0439-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/16/2023 11:00  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 12:06

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-21 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	1.66	mg/L	



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**MW-9A\_0323**  
**23C0439-21 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/16/2023 11:00  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-21  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	337	mg/L	





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**MWB-1DDSP\_0323**  
**23C0439-22 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/16/2023 12:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:06

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-22 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	ND	ug/L	U



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**MWB-IDDSP\_0323**  
**23C0439-22 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/16/2023 12:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:06

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-22 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	5.45	ug/L	



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**MWB-1DDSP\_0323**  
**23C0439-22 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/16/2023 12:30  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 12:09

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-22 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	3.87	mg/L	



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**MWB-1DDSP\_0323**  
**23C0439-22 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/16/2023 12:30  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-22  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	783	mg/L	



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**MWB-1SDSP\_0323**  
**23C0439-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/16/2023 13:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:12

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-23 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	ND	ug/L	U



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**MWB-1SDSP\_0323**  
**23C0439-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/16/2023 13:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:12

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-23 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	16.5	ug/L	



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**MWB-1SDSP\_0323**  
**23C0439-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/16/2023 13:15  
Instrument: ICP3 Analyst: DOE Analyzed: 04/06/2023 13:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-23 B 02  
Preparation Batch: BLD0047 Sample Size: 25 mL  
Prepared: 04/03/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	5.58	mg/L	





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**MWB-1SDSP\_0323**  
**23C0439-23 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/16/2023 13:15  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-23  
Preparation Batch: BLC0561 Sample Size: 75 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	1200	mg/L	



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**MWB-5DSP\_0323**  
**23C0439-24 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/16/2023 14:10  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:34

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-24 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	ND	ug/L	U



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**MWB-5DSP\_0323**  
**23C0439-24 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/16/2023 14:10  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:34

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-24 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	4.56	ug/L	



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**MWB-5DSP\_0323**  
**23C0439-24 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/16/2023 14:10  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 10:19

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-24 B 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	2.57	mg/L	



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**MWB-5DSP\_0323**  
**23C0439-24 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/16/2023 14:10  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-24  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	497	mg/L	



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**Portal\_0323**  
**23C0439-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/16/2023 14:35  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:39

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-25 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	0.172	ug/L	J, D



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**Portal\_0323**  
**23C0439-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/16/2023 14:35  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:39

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-25 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	5.08	ug/L	





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**Portal\_0323**  
**23C0439-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/16/2023 14:35  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 10:22

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-25 B 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	27.1	mg/L	



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**Portal\_0323**  
**23C0439-25 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/16/2023 14:35  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-25  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	383	mg/L	



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**MW-8A\_0323**  
**23C0439-26 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/17/2023 09:35  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:43

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-26 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	4.71	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	4.22	ug/L	



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**MW-8A\_0323**  
**23C0439-26 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/17/2023 09:35  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:43

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-26 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	7.20	ug/L	



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**MW-8A\_0323**  
**23C0439-26 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/17/2023 09:35  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 10:25

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-26 B 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	218	mg/L	



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**MW-8A\_0323**  
**23C0439-26 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/17/2023 09:35  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-26  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	714	mg/L	



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**MW-7A\_0323**  
**23C0439-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/17/2023 10:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:48

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-27 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	1.51	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	0.774	ug/L	





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**MW-7A\_0323**  
**23C0439-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/17/2023 10:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:48

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-27 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.45	ug/L	



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**MW-7A\_0323**  
**23C0439-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/17/2023 10:15  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 10:28

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-27 B 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	55.3	mg/L	



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**MW-7A\_0323**  
**23C0439-27 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/17/2023 10:15  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-27  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	412	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-99-2\_0323**  
**23C0439-28 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/17/2023 11:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:53

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-28 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	ND	ug/L	U



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**MW-99-2\_0323**  
**23C0439-28 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/17/2023 11:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:53

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-28 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	ND	ug/L	U



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**MW-99-2\_0323**  
**23C0439-28 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/17/2023 11:00  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 10:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-28 B 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	ND	mg/L	U



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**MW-99-2\_0323**  
**23C0439-28 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/17/2023 11:00  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-28  
Preparation Batch: BLC0561 Sample Size: 200 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	ND	mg/L	U





Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Infiltration Pond\_0323**  
**23C0439-29 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/13/2023 14:05  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:58

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-29 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	2	0.202	0.400	8.27	ug/L	D
Lead	7439-92-1	2	0.103	0.200	5.80	ug/L	D
Vanadium	7440-62-2	2	0.111	0.400	4.00	ug/L	D



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**Infiltration Pond\_0323**  
**23C0439-29 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/13/2023 14:05  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 08:58

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-29 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	2	0.0746	0.400	16.3	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Infiltration Pond\_0323**  
**23C0439-29 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/13/2023 14:05  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 11:11

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-29 B 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	2	0.214	1.00	401	mg/L	D



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**Infiltration Pond\_0323**  
**23C0439-29 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/13/2023 14:05  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-29  
Preparation Batch: BLC0492 Sample Size: 75 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	1050	mg/L	



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18300 NE Union Hill Road Suite 200  
Redmond WA, 98052-3333

Project: Ravensdale  
Project Number: 152030402.001  
Project Manager: Gary Zimmerman

**Reported:**  
24-Apr-2023 10:55

**MW-35A\_0323**  
**23C0439-30 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8

Sampled: 03/13/2023 14:10

Instrument: ICPMS2 Analyst: MCB

Analyzed: 03/31/2023 09:02

**Analysis by: Analytical Resources, LLC**

Sample Preparation:

Preparation Method: REN - EPA 3010A M

Extract ID: 23C0439-30 B 01

Preparation Batch: BLC0818

Sample Size: 25 mL

Prepared: 03/30/2023

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	2	0.202	0.400	8.77	ug/L	D
Lead	7439-92-1	2	0.103	0.200	6.44	ug/L	D
Vanadium	7440-62-2	2	0.111	0.400	4.36	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**MW-35A\_0323**  
**23C0439-30 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/13/2023 14:10  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 09:02

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-30 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	2	0.0746	0.400	17.0	ug/L	D



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**MW-35A\_0323**  
**23C0439-30 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/13/2023 14:10  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 11:13

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-30 B 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	2	0.214	1.00	413	mg/L	D





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**MW-35A\_0323**  
**23C0439-30 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/13/2023 14:10  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-30  
Preparation Batch: BLC0492 Sample Size: 100 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	1080	mg/L	



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**Weir\_0323**  
**23C0439-31 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 09:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 04:32

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-31 D 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	5.92	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.197	ug/L	
Vanadium	7440-62-2	1	0.0556	0.200	0.825	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Weir\_0323**  
**23C0439-31 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 09:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 04:32

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-31 D 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	3.49	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Weir\_0323**  
**23C0439-31 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 09:45  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 09:23

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-31 D 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	96.0	mg/L	



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**Weir\_0323**  
**23C0439-31 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 09:45  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-31  
Preparation Batch: BLC0492 Sample Size: 100 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	437	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**South Pond\_0323**  
**23C0439-32 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 12:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 09:08

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-32 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	2	0.202	0.400	2.75	ug/L	D
Lead	7439-92-1	2	0.103	0.200	4.84	ug/L	D
Vanadium	7440-62-2	2	0.111	0.400	12.3	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**South Pond\_0323**  
**23C0439-32 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 12:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 09:08

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-32 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	2	0.0746	0.400	8.50	ug/L	D





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**South Pond\_0323**  
**23C0439-32 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 12:15  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 10:40

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-32 B 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	1	0.107	0.500	347	mg/L	



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**South Pond\_0323**  
**23C0439-32 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 12:15  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-32  
Preparation Batch: BLC0492 Sample Size: 75 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	913	mg/L	



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**Still Well\_0323**  
**23C0439-33 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 03/15/2023 12:40  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 09:14

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-33 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Antimony	7440-36-0	1	0.101	0.200	10.1	ug/L	
Lead	7439-92-1	1	0.0513	0.100	6.26	ug/L	
Vanadium	7440-62-2	1	0.0556	0.200	3.06	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Still Well\_0323**  
**23C0439-33 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 03/15/2023 12:40  
Instrument: ICPMS2 Analyst: MCB Analyzed: 03/31/2023 09:14

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: REN - EPA 3010A M Extract ID: 23C0439-33 B 01  
Preparation Batch: BLC0818 Sample Size: 25 mL  
Prepared: 03/30/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	39.1	ug/L	



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**Still Well\_0323**  
**23C0439-33 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 03/15/2023 12:40  
Instrument: ICP3 Analyst: DOE Analyzed: 04/07/2023 11:16

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 23C0439-33 B 02  
Preparation Batch: BLD0115 Sample Size: 25 mL  
Prepared: 04/05/2023 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Potassium	7440-09-7	2	0.214	1.00	478	mg/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Still Well\_0323**  
**23C0439-33 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/15/2023 12:40  
Instrument: BAL2 Analyst: CDE Analyzed: 03/18/2023 19:01

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-33  
Preparation Batch: BLC0492 Sample Size: 10 mL  
Prepared: 03/18/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	100	100	2070	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Interceptor Trench\_0323**  
**23C0439-34 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 03/16/2023 09:25  
Instrument: BAL2 Analyst: UW Analyzed: 03/21/2023 16:31

**Analysis by: Analytical Resources, LLC**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 23C0439-34  
Preparation Batch: BLC0561 Sample Size: 100 mL  
Prepared: 03/21/2023 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	232	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Analysis by: Analytical Resources, LLC**

**Metals and Metallic Compounds - Quality Control**

**Batch BLC0818 - EPA 200.8**

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes		
<b>Blank (BLC0818-BLK1)</b>		Prepared: 30-Mar-2023 Analyzed: 30-Mar-2023 21:42												
Antimony	121	ND	0.101	0.200	ug/L							U		
Lead	208	ND	0.0513	0.100	ug/L							U		
Vanadium	51a	ND	0.0556	0.200	ug/L							U		
Arsenic	75a	ND	0.0373	0.200	ug/L							U		
<b>LCS (BLC0818-BS1)</b>		Prepared: 30-Mar-2023 Analyzed: 30-Mar-2023 21:47												
Antimony	121	25.5	0.101	0.200	ug/L	25.0		102	80-120					
Lead	208	26.0	0.0513	0.100	ug/L	25.0		104	80-120					
Vanadium	51a	25.2	0.0556	0.200	ug/L	25.0		101	80-120					
Arsenic	75a	25.0	0.0373	0.200	ug/L	25.0		100	80-120					
<b>Duplicate (BLC0818-DUP1)</b>		<b>Source: 23C0439-31</b>		Prepared: 30-Mar-2023 Analyzed: 31-Mar-2023 05:56										
Antimony	121	5.87	0.101	0.200	ug/L		5.92			0.90	20			
Lead	208	0.189	0.0513	0.100	ug/L		0.197			4.15	20			
Vanadium	51a	0.833	0.0556	0.200	ug/L		0.825			0.97	20			
Arsenic	75a	3.43	0.0373	0.200	ug/L		3.49			1.68	20			
<b>Matrix Spike (BLC0818-MS1)</b>		<b>Source: 23C0439-31</b>		Prepared: 30-Mar-2023 Analyzed: 31-Mar-2023 06:01										
Antimony	121	32.3	0.101	0.200	ug/L	25.0	5.92	105	75-125					
Lead	208	25.6	0.0513	0.100	ug/L	25.0	0.197	102	75-125					
Vanadium	51a	25.1	0.0556	0.200	ug/L	25.0	0.825	97.0	75-125					
Arsenic	75a	29.8	0.0373	0.200	ug/L	25.0	3.49	105	75-125					
Recovery limits for target analytes in MS/MSD QC samples are advisory only.														
<b>Matrix Spike Dup (BLC0818-MSD1)</b>		<b>Source: 23C0439-31</b>		Prepared: 30-Mar-2023 Analyzed: 31-Mar-2023 04:48										
Antimony	121	32.1	0.101	0.200	ug/L	25.0	5.92	105	75-125	0.58	20			
Lead	208	25.9	0.0513	0.100	ug/L	25.0	0.197	103	75-125	1.15	20			
Vanadium	51a	24.5	0.0556	0.200	ug/L	25.0	0.825	94.7	75-125	2.29	20			
Arsenic	75a	29.5	0.0373	0.200	ug/L	25.0	3.49	104	75-125	1.02	20			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.





Golder Associates  
18300 NE Union Hill Road Suite 200  
Redmond WA, 98052-3333

Project: Ravensdale  
Project Number: 152030402.001  
Project Manager: Gary Zimmerman

**Reported:**  
24-Apr-2023 10:55

**Analysis by: Analytical Resources, LLC**

**Metals and Metallic Compounds - Quality Control**

**Batch BLC0819 - EPA 200.8**

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes		
<b>Blank (BLC0819-BLK1)</b>		Prepared: 30-Mar-2023 Analyzed: 30-Mar-2023 22:43												
Antimony	121	ND	0.101	0.200	ug/L							U		
Lead	208	ND	0.0513	0.100	ug/L							U		
Vanadium	51a	ND	0.0556	0.200	ug/L							U		
Arsenic	75a	ND	0.0373	0.200	ug/L							U		
<b>LCS (BLC0819-BS1)</b>		Prepared: 30-Mar-2023 Analyzed: 30-Mar-2023 22:47												
Antimony	121	26.2	0.101	0.200	ug/L	25.0		105	80-120					
Lead	208	27.0	0.0513	0.100	ug/L	25.0		108	80-120					
Vanadium	51a	25.5	0.0556	0.200	ug/L	25.0		102	80-120					
Arsenic	75a	26.5	0.0373	0.200	ug/L	25.0		106	80-120					
<b>Duplicate (BLC0819-DUP1)</b>		<b>Source: 23C0439-10</b>		Prepared: 30-Mar-2023 Analyzed: 31-Mar-2023 04:37										
Antimony	121	ND	0.101	0.200	ug/L		ND					U		
Lead	208	ND	0.0513	0.100	ug/L		ND					U		
Vanadium	51a	ND	0.0556	0.200	ug/L		ND					U		
Arsenic	75a	ND	0.0373	0.200	ug/L		ND					U		
<b>Matrix Spike (BLC0819-MS1)</b>		<b>Source: 23C0439-10</b>		Prepared: 30-Mar-2023 Analyzed: 31-Mar-2023 04:42										
Antimony	121	25.5	0.101	0.200	ug/L	25.0	ND	102	75-125					
Lead	208	27.7	0.0513	0.100	ug/L	25.0	ND	111	75-125					
Vanadium	51a	24.8	0.0556	0.200	ug/L	25.0	ND	99.2	75-125					
Arsenic	75a	24.6	0.0373	0.200	ug/L	25.0	ND	98.4	75-125					
Recovery limits for target analytes in MS/MSD QC samples are advisory only.														
<b>Matrix Spike Dup (BLC0819-MSD1)</b>		<b>Source: 23C0439-10</b>		Prepared: 30-Mar-2023 Analyzed: 31-Mar-2023 06:07										
Antimony	121	25.3	0.101	0.200	ug/L	25.0	ND	101	75-125	0.76	20			
Lead	208	27.2	0.0513	0.100	ug/L	25.0	ND	109	75-125	1.80	20			
Vanadium	51a	25.5	0.0556	0.200	ug/L	25.0	ND	102	75-125	2.80	20			
Arsenic	75a	24.6	0.0373	0.200	ug/L	25.0	ND	98.5	75-125	0.17	20			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.														



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Analysis by: Analytical Resources, LLC**

**Metals and Metallic Compounds - Quality Control**

**Batch BLD0011 - EPA 6010D**

Instrument: ICP3 Analyst: SKD

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BLD0011-BLK1)</b>						Prepared: 03-Apr-2023 Analyzed: 03-Apr-2023 18:05					
Potassium	ND	0.107	0.500	mg/L							U
<b>LCS (BLD0011-BS1)</b>						Prepared: 03-Apr-2023 Analyzed: 03-Apr-2023 18:08					
Potassium	10.3	0.107	0.500	mg/L	10.0		103	80-120			
<b>Duplicate (BLD0011-DUP1)</b>						Source: 23C0439-01 Prepared: 03-Apr-2023 Analyzed: 03-Apr-2023 18:25					
Potassium	320	0.107	0.500	mg/L		318			0.75	20	
<b>Matrix Spike (BLD0011-MS1)</b>						Source: 23C0439-01 Prepared: 03-Apr-2023 Analyzed: 03-Apr-2023 18:28					
Potassium	328	0.107	0.500	mg/L	10.0	318	96.3	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
<b>Matrix Spike Dup (BLD0011-MSD1)</b>						Source: 23C0439-01 Prepared: 03-Apr-2023 Analyzed: 03-Apr-2023 18:31					
Potassium	339	0.107	0.500	mg/L	10.0	318	211	75-125	3.43	20	HC
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Analysis by: Analytical Resources, LLC**

**Metals and Metallic Compounds - Quality Control**

**Batch BLD0047 - EPA 6010D**

Instrument: ICP3 Analyst: DOE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BLD0047-BLK1)</b>						Prepared: 03-Apr-2023 Analyzed: 06-Apr-2023 09:08					
Potassium	ND	0.107	0.500	mg/L							U
<b>LCS (BLD0047-BS1)</b>						Prepared: 03-Apr-2023 Analyzed: 06-Apr-2023 09:13					
Potassium	10.5	0.107	0.500	mg/L	10.0	28.8	105	80-120			
<b>Duplicate (BLD0047-DUP1)</b>						Source: 23C0439-04 Prepared: 03-Apr-2023 Analyzed: 06-Apr-2023 09:59					
Potassium	28.7	0.107	0.500	mg/L		28.8			0.61	20	
<b>Matrix Spike (BLD0047-MS1)</b>						Source: 23C0439-04 Prepared: 03-Apr-2023 Analyzed: 06-Apr-2023 10:02					
Potassium	40.4	0.107	0.500	mg/L	10.0	28.8	116	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
<b>Matrix Spike Dup (BLD0047-MSD1)</b>						Source: 23C0439-04 Prepared: 03-Apr-2023 Analyzed: 06-Apr-2023 10:05					
Potassium	40.0	0.107	0.500	mg/L	10.0	28.8	111	75-125	1.02	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Analysis by: Analytical Resources, LLC**

**Metals and Metallic Compounds - Quality Control**

**Batch BLD0115 - EPA 6010D**

Instrument: ICP3 Analyst: DOE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BLD0115-BLK1)</b>						Prepared: 05-Apr-2023 Analyzed: 07-Apr-2023 09:06					
Potassium	ND	0.107	0.500	mg/L							U
<b>LCS (BLD0115-BS1)</b>						Prepared: 05-Apr-2023 Analyzed: 07-Apr-2023 09:09					
Potassium	10.7	0.107	0.500	mg/L	10.0		107	80-120			
<b>Duplicate (BLD0115-DUP1)</b>						Source: 23C0439-31 Prepared: 05-Apr-2023 Analyzed: 07-Apr-2023 09:26					
Potassium	95.9	0.107	0.500	mg/L		96.0			0.03	20	
<b>Matrix Spike (BLD0115-MS1)</b>						Source: 23C0439-31 Prepared: 05-Apr-2023 Analyzed: 07-Apr-2023 09:29					
Potassium	108	0.107	0.500	mg/L	10.0	96.0	116	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
<b>Matrix Spike Dup (BLD0115-MSD1)</b>						Source: 23C0439-31 Prepared: 05-Apr-2023 Analyzed: 07-Apr-2023 09:32					
Potassium	109	0.107	0.500	mg/L	10.0	96.0	131	75-125	1.36	20	HC
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Analysis by: Analytical Resources, LLC**

**Wet Chemistry - Quality Control**

**Batch BLC0492 - SM 2540 C-97**

Instrument: BAL2 Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BLC0492-BLK1)</b>						Prepared: 18-Mar-2023 Analyzed: 18-Mar-2023 19:01					
Dissolved Solids	ND	5	5	mg/L							U
<b>LCS (BLC0492-BS1)</b>						Prepared: 18-Mar-2023 Analyzed: 18-Mar-2023 19:01					
Dissolved Solids	487	10	10	mg/L	500		97.4	90-110			
<b>Duplicate (BLC0492-DUP1)</b>						Source: 23C0439-31 Prepared: 18-Mar-2023 Analyzed: 18-Mar-2023 19:01					
Dissolved Solids	445	10	10	mg/L		437			1.81	20	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030402.001 Project Manager: Gary Zimmerman	<b>Reported:</b> 24-Apr-2023 10:55
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**Analysis by: Analytical Resources, LLC**

**Wet Chemistry - Quality Control**

**Batch BLC0561 - SM 2540 C-97**

Instrument: BAL2 Analyst: UW

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BLC0561-BLK1)</b>						Prepared: 21-Mar-2023 Analyzed: 21-Mar-2023 16:31					
Dissolved Solids	ND	5	5	mg/L							U
<b>LCS (BLC0561-BS1)</b>						Prepared: 21-Mar-2023 Analyzed: 21-Mar-2023 16:31					
Dissolved Solids	480	10	10	mg/L	500		96.0	90-110			



Golder Associates  
18300 NE Union Hill Road Suite 200  
Redmond WA, 98052-3333

Project: Ravensdale  
Project Number: 152030402.001  
Project Manager: Gary Zimmerman

**Reported:**  
24-Apr-2023 10:55

**Certified Analyses included in this Report**

Analyte	Certifications
<b><i>EPA 200.8 in Water</i></b>	
Lead-208	NELAP,WADOE,WA-DW,DoD-ELAP
Lead-208	NELAP,WADOE,WA-DW,DoD-ELAP
Lead-208	NELAP,WADOE,WA-DW,DoD-ELAP
Lead-208	NELAP,WADOE,WA-DW,DoD-ELAP
Antimony-121	NELAP,WADOE,WA-DW,DoD-ELAP
Antimony-121	NELAP,WADOE,WA-DW,DoD-ELAP
Antimony-121	NELAP,WADOE,WA-DW,DoD-ELAP
Antimony-121	NELAP,WADOE,WA-DW,DoD-ELAP
Vanadium-51a	NELAP,DoD-ELAP,WADOE
Vanadium-51a	NELAP,DoD-ELAP,WADOE
Vanadium-51a	NELAP,DoD-ELAP,WADOE
Vanadium-51a	NELAP,DoD-ELAP,WADOE
<b><i>EPA 200.8 UCT-KED in Water</i></b>	
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
<b><i>EPA 6010D in Water</i></b>	
Potassium	WADOE,NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
<b><i>SM 2540 C-97 in Water</i></b>	
Dissolved Solids	DoD-ELAP,WADOE,WA-DW,NELAP
Dissolved Solids	DoD-ELAP,WADOE,WA-DW,NELAP
Dissolved Solids	DoD-ELAP,WADOE,WA-DW,NELAP
Dissolved Solids	DoD-ELAP,WADOE,WA-DW,NELAP



Golder Associates

18300 NE Union Hill Road Suite 200

Redmond WA, 98052-3333

Project: Ravensdale

Project Number: 152030402.001

Project Manager: Gary Zimmerman

**Reported:**

24-Apr-2023 10:55

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2025
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program, PJLA Testing	66169	02/28/2025
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2023
WADOE	WA Dept of Ecology	C558	06/30/2023
WA-DW	Ecology - Drinking Water	C558	06/30/2023





Golder Associates  
18300 NE Union Hill Road Suite 200  
Redmond WA, 98052-3333

Project: Ravensdale  
Project Number: 152030402.001  
Project Manager: Gary Zimmerman

**Reported:**  
24-Apr-2023 10:55

### Notes and Definitions

- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- J Estimated concentration value detected below the reporting limit.
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.

**APPENDIX D**

## Sample Integrity Data Sheets

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MW-99-2 - 0323

Sampling Location QA/QC Blank

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler \_\_\_\_\_

Date March 17, 2023 Time 11:00

Media Other Station MW-7A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at ft BTOC (); Well total depth at \_\_\_\_\_

Screen Interval: \_\_\_\_\_

Pump Intake: \_\_\_\_\_

Sample Description Equipment blank collected by pouring lab provided DI water over a clean water level tape.

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3



# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MW-99-1 - 0323

Sampling Location QA/QC Blank

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler \_\_\_\_\_

Date March 15, 2023 Time 09:10

Media Other Station MW-3A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at ft BTOC (); Well total depth at \_\_\_\_\_

Screen Interval: \_\_\_\_\_

Pump Intake: \_\_\_\_\_

Sample Description Equipment blank collected by pouring lab provided DI water over a clean water level tape.

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

## SAMPLE INTEGRITY DATA SHEET

Well ID MW-99-1

Date 03/15/2023

Time Begin Purge 09:10

Time Collect Sample 09:10

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
	09:10						

Comments:

Flow Rate: \_\_\_\_\_ mL/min

Equipment blank collected by pouring lab provided DI water over a clean water level tape.

Sampler 

Date March 15, 2023

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MWB-5DSP - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (dedicated)

Date March 16, 2023 Time 14:10

Media Groundwater Station MWB-5DSP

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 18.71 ft BTOC (March 16, 2023 1:39 PM); Well total depth at 265' BGS

Screen Interval: 255'- 265' BGS

Pump Intake: ~ 260' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3





# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MW-7A - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 17, 2023 Time 10:15

Media Groundwater Station MW-7A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 8.29 ft BTOC (March 17, 2023 9:45 AM); Well total depth at 20' BGS

Screen Interval: 10' - 20' BGS

Pump Intake: ~ 17' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3



# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MW-8A - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 17, 2023 Time 09:35

Media Groundwater Station MW-8A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 17.25 ft BTOC (March 17, 2023 9:08 AM); Well total depth at 26' BGS

Screen Interval: 16' - 26' BGS

Pump Intake: ~ 22' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

**SAMPLE INTEGRITY DATA SHEET**

Well ID           MW-8A          

Date          03/17/2023         

Time Begin Purge          09:09         

Time Collect Sample          09:35         

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
17.25	09:15	7.09	1,238	9	4.56	214.7	1.49
17.25	09:20	7.13	1,236	9	4.44	214.8	1.1
17.25	09:25	7.2	1,227	9.1	4.56	214.2	1.04
17.25	09:30	7.19	1,220	9.2	4.59	214.5	0.76
17.25	09:35	7.19	1,216	9.2	4.6	214.5	0.8

Comments:  
  
Flow Rate:          300          mL/min

Sampler 

Date          March 17, 2023         

Supervisor                                  

Date

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID Portal - 0323

Sampling Location Surface Water Monitoring Point

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 16, 2023 Time 14:35

Media Surface Water Station Portal

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 0 ft BTOC (March 16, 2023 2:31 PM); Well total depth at N/A

Screen Interval: N/A

Pump Intake: N/A

Sample Description No odor, no sheen

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

# SAMPLE INTEGRITY DATA SHEET

Well ID          Portal         

Date 03/16/2023

Time Begin Purge 14:35

Time Collect Sample 14:35

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
0	14:35	6.86	667.5	10.8	6.16	76.1	8.99

Comments:

Flow Rate: N/A mL/min

Sampler 

Date March 16, 2023

Supervisor         

Date

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MWB-1SDSP - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (non-dedicated)

Date March 16, 2023 Time 13:15

Media Groundwater Station MWB-1SDSP

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 34.6 ft BTOC (March 16, 2023 12:44 PM); Well total depth at 160' BGS

Screen Interval: 73'- 83' BGS

Pump Intake: ~ 80' BGS

Sample Description No sheen, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3





# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MWB-1DDSP - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (dedicated)

Date March 16, 2023 Time 12:30

Media Groundwater Station MWB-1DDSP

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 48.51 ft BTOC (March 16, 2023 11:27 AM); Well total depth at 265' BGS

Screen Interval: 255'- 265' BGS

Pump Intake: ~ 260' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

## SAMPLE INTEGRITY DATA SHEET

Well ID           MWB-1DDSP          

Date           03/16/2023          

Time Begin Purge           11:30          

Time Collect Sample           12:30          

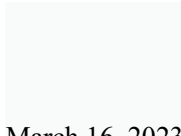
Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
51.83	11:35	7.21	1,044	11.1	1.11	24.2	1.54
55.11	11:40	7.24	1,096	11.1	0.22	12.8	3.13
58.58	11:45	7.16	1,098	11	0.12	-9	1.55
61.21	11:50	7.05	1,100	11.2	0.15	-36.9	1.43
61.98	11:55	7.31	1,102	11.4	0.17	-51.4	0.81
62.84	12:00	7.27	1,105	11.5	0.17	-66.3	0.49
63.66	12:05	7.24	1,108	11.6	0.18	-78.1	1.74
64.45	12:10	7.09	1,107	11.7	0.2	-86.2	1.21
65.11	12:15	7.13	1,109	11.7	0.22	-92	1.28
65.95	12:20	7.12	1,107	11.8	0.24	-91.8	0.38
66.61	12:25	7.34	1,111	11.7	0.3	-90.8	4.47
57.25	12:30	7.19	1,110	11.7	0.29	-89.5	0.38

Comments:

Flow Rate:           200           mL/min

**SAMPLE INTEGRITY DATA SHEET**

**Sampler**  \_\_\_\_\_

**Date**  \_\_\_\_\_  
March 16, 2023

**Supervisor** \_\_\_\_\_

**Date** \_\_\_\_\_

## SAMPLE INTEGRITY DATA SHEET

**Plant/Site** Ravensdale **Project No.** 152030402

**Site Location** Ravensdale, WA

**Sample ID** MW-9A - 0323

**Sampling Location** Monitoring Well

**Technical Procedure Reference(s)** Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

**Type of Sampler** Peristaltic Pump

**Date** March 16, 2023 **Time** 11:00

**Media** Groundwater **Station** MW-9A

**Sample Type:** grab time composite space composite

**Sample Acquisition Measurements** (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 2.47 ft BTOC (March 16, 2023 10:33 AM); Well total depth at 13' BGS

Screen Interval: 8' - 13' BGS

Pump Intake: ~ 10' BGS

**Sample Description** Clear, no odor

**Field Measurements on Sample** (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

# SAMPLE INTEGRITY DATA SHEET

Well ID     MW-9A    

Date     03/16/2023    

Time Begin Purge     10:34    

Time Collect Sample     11:00    

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
5.22	10:40	6.88	561.7	6.3	6.12	123.6	1.45
6.4	10:45	6.85	559.3	6.3	5.48	121.9	0.94
7.31	10:50	6.82	557.4	6.4	5.43	121.3	1.77
8.1	10:55	6.85	556.2	6.6	5.25	120.9	1.60

Comments:

Flow Rate:     250     mL/min

Sampler  \_\_\_\_\_

Date     March 16, 2023    

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MW-4A - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 16, 2023 Time 10:20

Media Groundwater Station MW-4A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 3.57 ft BTOC (March 16, 2023 9:35 AM); Well total depth at 20' BGS

Screen Interval: 5' - 20' BGS

Pump Intake: ~ 12' BGS

Sample Description \_\_\_\_\_

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-500 mL	Dissolved Metals	HDPE	HNO3
1-1000 mL	Total Dissolved Solids	HDPE	N/A

### SAMPLE INTEGRITY DATA SHEET

Well ID     MW-4A    

Date   03/16/2023  

Time Begin Purge   09:37  

Time Collect Sample   10:20  

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
3.9	09:40	6.51	540.8	7.6	7.3	90.5	6.66
4.06	09:45	6.36	557	7.7	3.52	89.7	1.58
4.12	09:50	6.37	561.4	7.7	2.2	92.7	1.99
4.16	09:55	6.36	536.3	7.7	2.42	93.3	2.30
4.2	10:00	6.33	503	7.7	3.92	98.1	1.75
4.22	10:05	6.32	492.5	7.6	4.18	101.8	1.19
4.24	10:10	6.27	477.9	7.7	4.19	105.7	1.33
4.25	10:15	6.3	471.1	7.9	4.26	108.8	1.37
4.25	10:20	6.3	468.9	7.9	4.44	111.7	2.92

Comments:

Flow Rate:   350   mL/min

Sampler  \_\_\_\_\_

Date   March 16, 2023  

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID Interceptor Trench - 0323

Sampling Location Surface Water Monitoring Point

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Grab

Date March 16, 2023 Time 09:25

Media Surface Water Station Interceptor Trench

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 0 ft BTOC (March 16, 2023 9:23 AM); Well total depth at N/A

Screen Interval: N/A

Pump Intake: N/A

Sample Description \_\_\_\_\_

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A



## SAMPLE INTEGRITY DATA SHEET

Well ID           Interceptor Trench          

Date   03/16/2023  

Time Begin Purge   09:25  

Time Collect Sample   09:25  

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
	09:25	6.9	467.6	7.8	10.7	78.1	1.07

Comments:

Flow Rate:   8500   mL/min

Sampler  \_\_\_\_\_

Date   March 16, 2023  

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID P-17 - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 16, 2023 Time 09:10

Media Groundwater Station P-17

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 5.18 ft BTOC (March 16, 2023 8:20 AM); Well total depth at 13' BGS

Screen Interval: 8'- 13' BGS

Pump Intake: ~ 10' BGS

Sample Description \_\_\_\_\_

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

### SAMPLE INTEGRITY DATA SHEET

Well ID          P-17   

Date         03/16/2023  

Time Begin Purge         08:23  

Time Collect Sample         09:10  

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
6.09	08:30	6.64	482.9	6.2	1.68	164.2	181
6.22	08:35	6.74	482.9	6.5	1.42	133.7	72
6.28	08:40	6.63	519.9	6.8	0.19	78.1	43.2
6.32	08:45	6.57	572.1	7.2	1.37	36.4	17.2
6.35	08:50	6.51	593.1	7.3	0.47	-7.3	11.1
6.37	08:55	6.58	608.9	7.4	0.33	-35.7	10.4
6.38	09:00	6.5	619.3	7.5	0.23	-39.0	8.27
6.4	09:05	6.49	626.3	7.5	0.2	-41.6	7.1
6.4	09:10	6.5	630	7.6	0.22	-42.4	7.01

Comments:

Flow Rate:         300                 mL/min

Sampler         *[Signature]*  

Date         March 16, 2023  

Supervisor   

Date

## SAMPLE INTEGRITY DATA SHEET

**Plant/Site** Ravensdale **Project No.** 152030402

**Site Location** Ravensdale, WA

**Sample ID** MWB-4DSP - 0323

**Sampling Location** Monitoring Well

**Technical Procedure Reference(s)** Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

**Type of Sampler** Grab

**Date** March 15, 2023 **Time** 16:20

**Media** Groundwater **Station** MWB-4DSP

**Sample Type:** **grab** time composite space composite

**Sample Acquisition Measurements** (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 17.4 ft BTOC (March 15, 2023 4:15 PM); Well total depth at 42.8' BGS

Screen Interval: 25'- 36' BGS

Pump Intake: N/A

**Sample Description** Clear, no odor

**Field Measurements on Sample** (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3



# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MWB-2DSP - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Grab

Date March 15, 2023 Time 15:45

Media Groundwater Station MWB-2DSP

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 192.14 ft BTOC (March 15, 2023 3:42 PM); Well total depth at 258' BGS

Screen Interval: 236'- 256' BGS

Pump Intake: N/A

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

### SAMPLE INTEGRITY DATA SHEET

Well ID MWB-2DSP

Date 03/15/2023

Time Begin Purge 15:45

Time Collect Sample 15:45

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
192.14	15:45	7.53	591.7	11.4	2.44	41.8	5.56

Comments:

Flow Rate: \_\_\_\_\_ mL/min

Sampler 

Date March 15, 2023

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MWB-6DSP / MW-55A - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (dedicated)

Date March 15, 2023 Time 15:15

Media Groundwater Station MWB-6DSP / MW-55A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 19.05 ft BTOC (March 15, 2023 2:46 PM); Well total depth at 195' BGS

Screen Interval: 120'- 195' BGS

Pump Intake: ~ 170' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3





## SAMPLE INTEGRITY DATA SHEET

**Plant/Site** Ravensdale **Project No.** 152030402

**Site Location** Ravensdale, WA

**Sample ID** MWB-1LDA - 0323

**Sampling Location** Monitoring Well

**Technical Procedure Reference(s)** Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

**Type of Sampler** Bladder Pump (dedicated)

**Date** March 15, 2023 **Time** 13:50

**Media** Groundwater **Station** MWB-1LDA

**Sample Type:** **grab** time composite space composite

**Sample Acquisition Measurements** (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 22.09 ft BTOC (March 15, 2023 1:13 PM); Well total depth at 135' BGS

Screen Interval: 115'- 135' BGS

Pump Intake: ~ 125' BGS

**Sample Description** Clear, no odor

**Field Measurements on Sample** (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

## SAMPLE INTEGRITY DATA SHEET

Well ID           MWB-1LDA          

Date           03/15/2023          


Time Begin Purge           13:16          

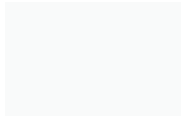
Time Collect Sample           13:50          

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
22.88	13:20	8.21	380.8	10.4	1.28	-4.5	4.55
23.27	13:25	7.91	379.1	10.3	0.23	-18.8	0.56
23.63	13:30	7.8	378.4	10.3	0.17	-34.9	0.28
23.92	13:35	7.73	377.6	10.3	0.15	-53.2	0.28
24.15	13:40	7.69	376.9	10.3	0.15	-68.7	0.17
24.45	13:45	7.64	372.1	10.3	0.15	-82.8	0.2
24.6	13:50	7.66	372.2	10.3	0.17	-86.5	0.13

Comments:

Flow Rate:           400           mL/min

Sampler  \_\_\_\_\_

Date            March 15, 2023          

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

## SAMPLE INTEGRITY DATA SHEET

**Plant/Site** Ravensdale **Project No.** 152030402

**Site Location** Ravensdale, WA

**Sample ID** Still Well - 0323

**Sampling Location** Surface Water Monitoring Point

**Technical Procedure Reference(s)** Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

**Type of Sampler** Peristaltic Pump

**Date** March 15, 2023 **Time** 12:37

**Media** Surface Water **Station** Still Well

**Sample Type:** grab time composite space composite

**Sample Acquisition Measurements** (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 0 ft BTOC (March 15, 2023 12:40 PM); Well total depth at N/A

Screen Interval: N/A

Pump Intake: N/A

**Sample Description** \_\_\_\_\_

**Field Measurements on Sample** (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3



# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID South Pond - 0323

Sampling Location Surface Water Monitoring Point

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 15, 2023 Time 12:15

Media Surface Water Station South Pond

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 0.33 ft BTOC (March 15, 2023 12:15 PM); Well total depth at N/A

Screen Interval: N/A

Pump Intake: N/A

Sample Description Clear-brown, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

# SAMPLE INTEGRITY DATA SHEET

Well ID South Pond

Date 03/15/2023

Time Begin Purge 12:15

Time Collect Sample 12:15

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
0.33	12:15	9.33	1,467	8.9	10.36	-7.6	6.57

Comments:

Flow Rate: \_\_\_\_\_ mL/min

Sampler 

Date March 15, 2023

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID P-16 - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 15, 2023 Time 00:00

Media Groundwater Station P-16

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 2.75 ft BTOC (March 15, 2023 10:59 AM); Well total depth at 10' BGS

Screen Interval: 5'- 10' BGS

Pump Intake: ~ 8' BGS

Sample Description Reddish brown, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3



## SAMPLE INTEGRITY DATA SHEET

Well ID       P-16      

Date       03/15/2023      

Time Begin Purge       11:00      

Time Collect Sample       00:00      

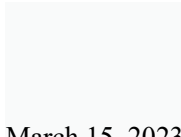
Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
4.5	11:05	9.73	3,095	7.4	0.13	128.1	38
4.99	11:10	9.74	3,124	7.3	0.04	95.4	52.8
5.37	11:15	9.78	3,150	7.3	0.06	41.7	84.0
5.56	11:20	9.92	3,181	7.3	0.04	-28.7	157
5.67	11:25	10.74	3,391	7.3	0.04	-142.1	150
5.74	11:30	11.93	3,694	7.2	0.04	-220.8	120
5.71	11:35	12.24	4,002	7.2	0.03	-263.8	88.6
5.71	11:40	12.45	4,420	7.2	0.04	-290	60.5
5.74	11:45	12.48	4,571	7.1	0.05	-303.6	51.3
5.8	11:50	12.53	4,677	7.1	0.04	-316.5	54.1
5.82	11:55	12.51	4,780	7	0.04	-324.6	51.1
5.83	00:00	12	4,819	7.1	0.04	-332.2	52.2

Comments:

Flow Rate:       350       mL/min

**SAMPLE INTEGRITY DATA SHEET**

**Sampler**  \_\_\_\_\_

**Date**  \_\_\_\_\_  
March 15, 2023

**Supervisor** \_\_\_\_\_

**Date** \_\_\_\_\_

## SAMPLE INTEGRITY DATA SHEET

**Plant/Site** Ravensdale **Project No.** 152030402

**Site Location** Ravensdale, WA

**Sample ID** MW-10A - 0323

**Sampling Location** Monitoring Well

**Technical Procedure Reference(s)** Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

**Type of Sampler** Peristaltic Pump

**Date** March 15, 2023 **Time** 10:45

**Media** Groundwater **Station** MW-10A

**Sample Type:** grab time composite space composite

**Sample Acquisition Measurements** (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 5.51 ft BTOC (March 15, 2023 10:12 AM); Well total depth at 29' BGS

Screen Interval: 9' - 29' BGS

Pump Intake: ~ 25' BGS

**Sample Description** Clear, no odor

**Field Measurements on Sample** (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

# SAMPLE INTEGRITY DATA SHEET

Well ID     MW-10A    

Date     03/15/2023    

Time Begin Purge     10:13    


Time Collect Sample     10:45    

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
8.39	10:20	7.09	181.7	8.3	9.65	154.4	3.98
9.71	10:25	7.01	181	8.4	9.28	151.6	1.82
10.85	10:30	6.97	181.2	8.4	9.1	150.1	2.15
11.94	10:35	6.91	180.9	8.4	8.94	148.3	2
12.29	10:40	6.89	180.4	8.4	8.91	146.9	2.24
12.53	10:45	6.85	179.4	8.4	8.78	145.7	2.07

Comments:

Flow Rate:     300     mL/min

Sampler  \_\_\_\_\_

Date      March 15, 2023    

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID Weir or Constructed Wetlands - 0323

Sampling Location Surface Water Monitoring Point

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 15, 2023 Time 09:45

Media Surface Water Station Weir or Constructed Wetlands

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at ft BTOC (March 15, 2023 9:44 AM); Well total depth at N/A

Screen Interval: N/A

Pump Intake: N/A

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
3-1000 mL	Total Dissolved Solids	HDPE	N/A
3-500 mL	Total Metals	HDPE	HNO3

# SAMPLE INTEGRITY DATA SHEET

Well ID \_\_\_\_\_ Weir or Constructed Wetlands \_\_\_\_\_

Date 03/15/2023

Time Begin Purge 09:45

Time Collect Sample 09:45

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
	09:45	7.49	758.2	5.1	6.46	202.5	9.22

Comments:

Flow Rate: 500 mL/min

Sampler 

Date March 15, 2023

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MW-3A - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 15, 2023 Time 09:35

Media Groundwater Station MW-3A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 5.11 ft BTOC (March 15, 2023 8:53 AM); Well total depth at 20' BGS

Screen Interval: 4' - 20' BGS

Pump Intake: ~ 12' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3





# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID P-14 - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (dedicated)

Date March 14, 2023 Time 15:45

Media Groundwater Station P-14

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 29.94 ft BTOC (March 14, 2023 3:05 PM); Well total depth at 50' BGS

Screen Interval: 40'- 50' BGS

Pump Intake: ~ 45' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

### SAMPLE INTEGRITY DATA SHEET

Well ID       P-14      

Date       03/14/2023      

Time Begin Purge       15:06      

Time Collect Sample       15:45      

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
30.18	15:10	12.87	23,518	12.3	1.25	51.9	4.96
30.12	15:15	13.06	23,750	12.2	0.24	1.2	1.53
30.19	15:20	13.16	23,999	12.3	0.15	-72.9	0.67
30.11	15:25	13.21	24,092	12.3	0.11	-127.1	0.57
30.17	15:30	13.14	24,084	12.3	0.1	-161.3	0.55
30.2	15:35	13.18	24,070	12.3	0.1	-175.9	0.33
30.13	15:40	13.13	24,050	12.3	0.08	-182.4	0.47
30.15	15:45	13.12	24,035	12.4	0.08	-187.5	0.31

Comments:

Flow Rate:       300       mL/min

Sampler 

Date       March 14, 2023      

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MWB-3LDA - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (dedicated)

Date March 14, 2023 Time 14:35

Media Groundwater Station MWB-3LDA

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 1.16 ft BTOC (March 14, 2023 1:08 PM); Well total depth at 145' BGS

Screen Interval: 125'- 145' BGS

Pump Intake: ~ 135' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

## SAMPLE INTEGRITY DATA SHEET

Well ID           MWB-3LDA          

Date           03/14/2023          

Time Begin Purge           13:10          

Time Collect Sample           14:35          


Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
3.51	13:15	8.32	260.4	10.8	3.97	81.4	2.38
5.92	13:20	7.82	253.7	10.8	3.66	58.0	0.59
7.47	13:25	7.64	261.4	10.8	4.02	46.7	0.48
8.23	13:30	7.55	263.9	10.5	4.22	41.6	0.31
8.42	13:35	7.44	256	10.5	3.66	37.7	0.25
8.77	13:40	7.36	254.7	10.6	3.29	35.0	0.27
8.83	13:45	7.58	251.9	10.7	3.16	35.1	0.43
8.98	13:50	7.54	255.4	10.7	2.96	33.7	0.29
8.95	13:55	7.54	252.8	10.8	2.61	33.1	0.41
8.88	14:00	7.54	251.8	10.8	2.14	32.3	0.62
8.88	14:05	7.55	238.9	10.9	1.52	32.1	0.67
8.76	14:10	7.55	245.6	11	1.43	31.4	0.92
8.79	14:15	7.52	249.8	11	1.13	16.6	
8.79	14:20	7.59	253.5	11	0.96	-1.0	0.82
8.62	14:25	7.55	255.1	11	0.86	-15.5	0.32
8.65	14:30	7.51	254.9	11	0.8	-29.8	0.29

# SAMPLE INTEGRITY DATA SHEET

Comments:

Flow Rate: 350 mL/min

Sampler 

Date  March 14, 2023

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID P-15 - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 14, 2023 Time 12:45

Media Groundwater Station P-15

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 20.38 ft BTOC (March 14, 2023 12:12 PM); Well total depth at 34' BGS

Screen Interval: 24'- 34' BGS

Pump Intake: ~ 30' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

## SAMPLE INTEGRITY DATA SHEET

Well ID     P-15    

Date     03/14/2023    

Time Begin Purge     12:14    


Time Collect Sample     12:45    

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
20.89	12:20	12.83	13,923	11.5	0.25	140.6	1.24
20.91	12:25	12.39	14,097	11.4	0.31	130.2	1.99
20.98	12:30	12.9	14,103	11.5	0.26	117.8	0.97
21	12:35	12.97	14,121	11.5	0.19	103.4	0.84
21.03	12:40	12.97	14,135	11.5	0.16	87.7	0.57
21.03	12:45	12.98	14,124	11.5	0.15	70.5	0.41

Comments:

Flow Rate:     300     mL/min

Sampler  \_\_\_\_\_

Date  \_\_\_\_\_  
 March 14, 2023

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MWB-2LDA - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (dedicated)

Date March 14, 2023 Time 00:00

Media Groundwater Station MWB-2LDA

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 35.11 ft BTOC (March 14, 2023 11:06 AM); Well total depth at 125' BGS

Screen Interval: 110'- 125' BGS

Pump Intake: ~ 120' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3



### SAMPLE INTEGRITY DATA SHEET

 Well ID MWB-2LDA

 Date 03/14/2023

 Time Begin Purge 11:07

 Time Collect Sample 00:00

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
33.04	11:15	7.35	351.9	11	1.61	133.2	2.70
33.96	11:20	7.37	352.1	11	0.85	126.2	1.04
33.9	11:25	7.45	351.7	10.9	1.35	115.7	0.46
32.5	11:30	7.29	351.6	10.9	2.01	106.5	0.42
33.9	11:35	7.27	351.6	10.9	2.31	99.0	0.26
34.25	11:40	7.57	351.2	10.8	2.57	93.8	0.24
34.25	11:45	7.34	350.9	10.8	3.03	75.2	0.25
34.25	11:50	7.32	350.6	10.8	3.03	60.6	0.3
34.25	11:55	7.4	350.1	10.8	3.04	52.5	0.27
34.25	00:00	7.37	350.4	10.8	3.17	50.5	0.2

Comments:

 Flow Rate: 350 mL/min

 Sampler 

 Date March 14, 2023

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MW-2A / MW-45A - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (dedicated)

Date March 14, 2023 Time 10:40

Media Groundwater Station MW-2A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 22.79 ft BTOC (March 14, 2023 10:12 AM); Well total depth at 40' BGS

Screen Interval: 24'- 40' BGS

Pump Intake: ~ 30' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
2-1000 mL	Total Dissolved Solids	HDPE	N/A
2-500 mL	Total Metals	HDPE	HNO3

## SAMPLE INTEGRITY DATA SHEET

Well ID          MW-2A / MW-45A

Date          03/14/2023

Time Begin Purge          10:15

Time Collect Sample          10:40

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
22.82	10:20	7.33	666.6	8.3	7.61	180.8	4.47
22.82	10:25	7.21	663.7	8.5	7.51	178.8	2.33
22.83	10:30	7.14	663.9	8.5	7.52	177	1.24
22.82	10:35	7.11	664.2	8.6	7.55	175.3	0.94
22.82	10:40	7.08	664.2	8.6	7.67	174.1	0.97

Comments:

Flow Rate:          500          mL/min

Duplicate MW-45A\_0323 at 10:45

Sampler          

Date                    March 14, 2023

Supervisor         

Date

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MW-6A - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (dedicated)

Date March 14, 2023 Time 09:55

Media Groundwater Station MW-6A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 24.54 ft BTOC (March 14, 2023 9:20 AM); Well total depth at 39' BGS

Screen Interval: 24'- 39' BGS

Pump Intake: ~ 36' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

### SAMPLE INTEGRITY DATA SHEET

Well ID       MW-6A      

Date       03/14/2023      

Time Begin Purge       09:24      

Time Collect Sample       09:55      

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
24.56	09:30	7.84	2,365	6.9	7.53	213.1	1.72
24.54	09:35	7.95	2,386	6.8	7.49	214.2	0.75
24.56	09:40	7.95	2,375	6.8	7.56	214.4	1.21
24.56	09:45	7.83	2,236	6.7	8.01	213.8	1.22
24.55	09:50	7.75	2,096	6.7	8.41	213.0	0.95
24.55	09:55	7.71	2,029	6.8	8.44	212.6	0.76

Comments:

Flow Rate:       375       mL/min

Sampler 

Date       March 14, 2023      

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

## SAMPLE INTEGRITY DATA SHEET

**Plant/Site** Ravensdale **Project No.** 152030402

**Site Location** Ravensdale, WA

**Sample ID** MW-1A - 0323

**Sampling Location** Monitoring Well

**Technical Procedure Reference(s)** Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

**Type of Sampler** Bladder Pump (dedicated)

**Date** March 13, 2023 **Time** 16:30

**Media** Groundwater **Station** MW-1A

**Sample Type:** grab time composite space composite

**Sample Acquisition Measurements** (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 29.3 ft BTOC (March 13, 2023 3:47 PM); Well total depth at 44' BGS

Screen Interval: 28' - 43' BGS

Pump Intake: ~ 39' BGS

**Sample Description** Clear, no odor

**Field Measurements on Sample** (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3

## SAMPLE INTEGRITY DATA SHEET

Well ID     MW-1A    

Date     03/13/2023    

Time Begin Purge     15:50    

Time Collect Sample     16:30    

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
29.28	15:55	6.97	620.1	8.2	7.45	84.8	0.47
29.28	16:00	6.9	587.8	8.1	9.34	83.9	.75
29.28	16:05	6.88	585.6	8.1	9.51	84.6	.67
29.28	16:10	6.87	585	8.1	9.62	85.7	.50
29.28	16:15	6.86	584.5	8.1	9.69	87.2	.34
29.28	16:20	6.86	584.6	8	9.63	88.2	.33
29.28	16:25	6.86	584.6	8	9.63	89.3	.26
29.28	16:30	6.85	584.2	8	9.22	90.2	0.29

Comments:

Flow Rate:     450     mL/min

Sampler     

Date     March 13, 2023    

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID MW-5A - 0323

Sampling Location Monitoring Well

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Bladder Pump (dedicated)

Date March 13, 2023 Time 15:20

Media Groundwater Station MW-5A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at 27.15 ft BTOC (March 13, 2023 2:25 PM); Well total depth at 40' BGS

Screen Interval: 25'- 40' BGS

Pump Intake: ~ 38' BGS

Sample Description Clear, no odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
1-1000 mL	Total Dissolved Solids	HDPE	N/A
1-500 mL	Total Metals	HDPE	HNO3



## SAMPLE INTEGRITY DATA SHEET

Well ID     MW-5A    

Date     03/13/2023    

Time Begin Purge     14:30    

Time Collect Sample     15:20    

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
27.14	14:35	7.52	2,012	8.3	3.3	179.5	3.3
27.15	14:40	7.51	2,070	8.4	1.2	179.2	2.57
27.15	14:45	7.49	2,105	8.4	0.93	178.5	3.68
27.15	14:50	7.49	2,092	8.3	1.08	177.9	2.90
27.15	14:55	7.45	1,983	8.3	2.07	176.5	3.18
27.15	15:00	7.43	1,858	8.2	3.36	175.2	2.16
27.15	15:05	7.43	1,781	8.2	4.52	174.5	3.16
27.15	15:10	7.44	1,737	8.2	4.93	173.7	2.38
27.15	15:15	7.46	1,710	8.1	5.35	173.2	2.27
27.15	15:20	7.47	1,685	8.1	5.49	172.5	1.43

Comments:

Flow Rate:     300     mL/min

Sampler 

Date     March 13, 2023    

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

# SAMPLE INTEGRITY DATA SHEET

Plant/Site Ravensdale Project No. 152030402

Site Location Ravensdale, WA

Sample ID Infiltration Ponds / MW-35A - 0323

Sampling Location Surface Water Monitoring Point

Technical Procedure Reference(s) Golder, Sampling and Analysis Plan; Quality Assurance Project Plan 2020

Type of Sampler Peristaltic Pump

Date March 13, 2023 Time 14:05

Media Surface Water Station Infiltration Ponds / MW-35A

Sample Type: **grab** time composite space composite

Sample Acquisition Measurements (depth, volume of static well water and purged water, etc.)

SWL: Depth to water at ft BTOC (); Well total depth at N/A

Screen Interval: N/A

Pump Intake: N/A

Sample Description Clear, mild odor

Field Measurements on Sample (pH, conductivity, etc.) SEE FIELD PARAMETERS SHEET

Aliquot Amount	Analysis	Container	Preservation
2-1000 mL	Total Dissolved Solids	HDPE	N/A
2-500 mL	Total Metals	HDPE	HNO3

# SAMPLE INTEGRITY DATA SHEET

Well ID Infiltration Ponds / MW-35A

Date 03/13/2023

Time Begin Purge 14:00

Time Collect Sample 14:05

Water Level (ft bmp)	Time	pH	Cond. (uS/cm)	Temp (°C)	DO (mg/L)	ORP (rel mV)	Turbidity (NTU)
	14:00	8.29	1,831	7.2	11.21	177.8	31.8

Comments:

Flow Rate: \_\_\_\_\_ mL/min

Sampler 

Date March 13, 2023

Supervisor \_\_\_\_\_

Date \_\_\_\_\_

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