



**REPORT**

**QUARTERLY MONITORING REPORT  
SECOND QUARTER 2021  
RESERVE SILICA RECLAMATION SITE**

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

Submitted to:

**Mr. Alan Noell and Mr. Tim O'Connor, Washington State Department of Ecology**

Northwest Regional Office  
15700 Dayton Ave. N.  
Shoreline WA 98133

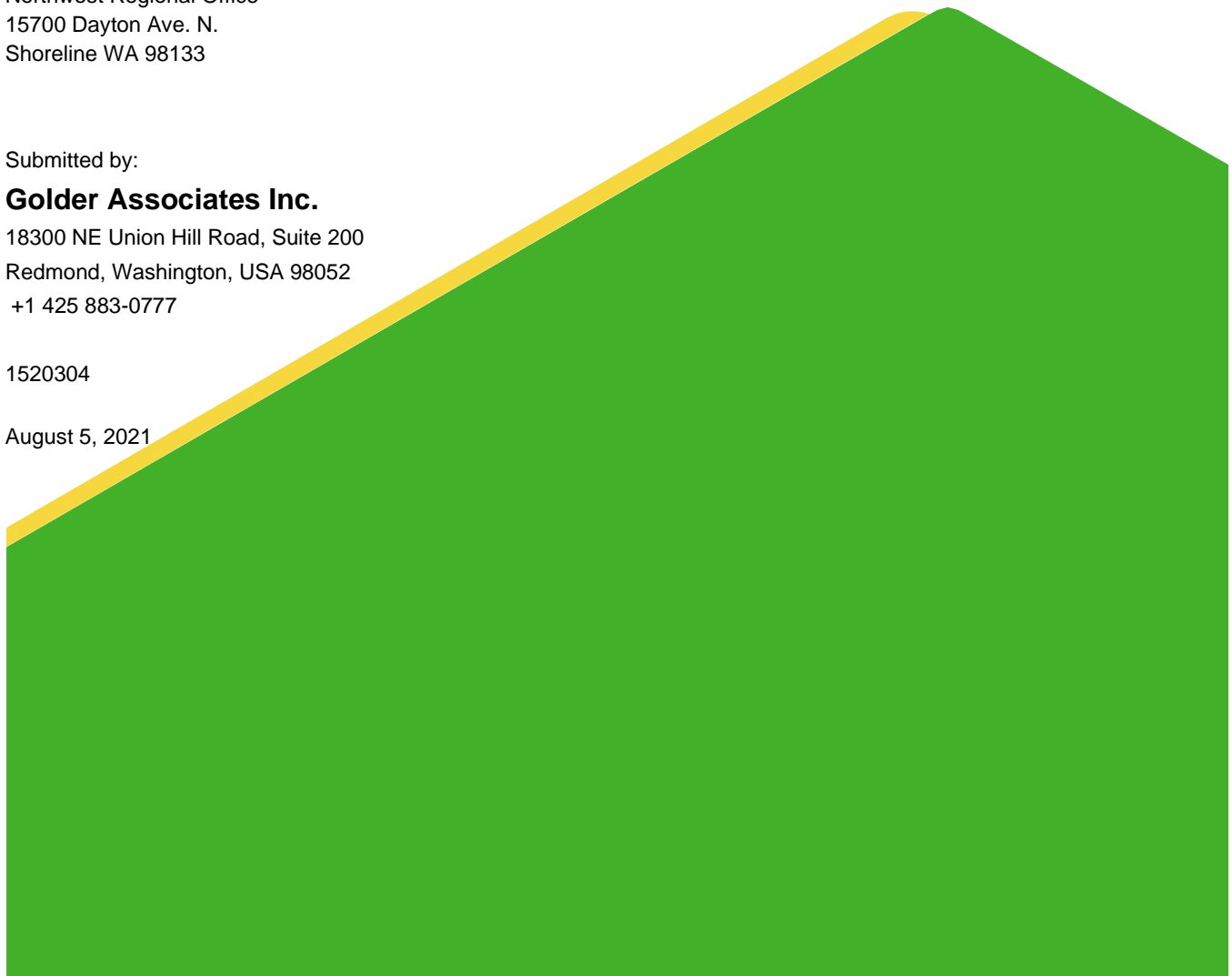
Submitted by:

**Golder Associates Inc.**

18300 NE Union Hill Road, Suite 200  
Redmond, Washington, USA 98052  
+1 425 883-0777

1520304

August 5, 2021



## Distribution List

Alan L. Noell, Tim O'Connor, Ecology, 2 Hard copies + 2 CDs

Darshan Dhillon, Public Health, 1 Hard copy + 1 CD

Electronic Only:

Chris Martin

Fred White

Yolanda Pon

Randy Sandin

Keith Dearborn

Marisa Floyd

Matt Wells

Douglas Steding

Travis Bennett

Greg Jacoby

Mark Coldiron

Carla Brock

Dave Cook

# Table of Contents

<b>1.0 INTRODUCTION</b>	<b>1</b>
1.1 Site Description	1
1.2 Purpose and Scope	1
<b>2.0 BACKGROUND</b>	<b>2</b>
2.1 Site Background	2
2.1.1 LDA Background	2
2.1.2 DSP Background	3
2.2 Mitigation Activities	3
2.2.1 LDA Cover Upgrade	3
2.2.2 LDA Seep Collection System Test Trenches	3
2.2.3 LDA Seep Collection Ditch and Seepage Treatment System	3
2.2.4 LDA Interceptor Trench	4
2.2.5 DSP Cover Upgrade	4
2.3 Monitoring Locations	4
2.3.1 LDA	4
2.3.2 DSP	5
2.3.3 LDA Interceptor Trench	5
2.4 Groundwater and Surface Water Monitoring Schedule	5
2.4.1 LDA Groundwater Sampling	5
2.4.2 LDA Surface Water Sampling	6
2.4.3 DSP Groundwater Sampling	6
2.4.4 LDA Interceptor Trench Sampling	6
<b>3.0 OPERATIONS AND MAINTENANCE OF THE LEACHATE TREATMENT SYSTEM</b>	<b>6</b>
<b>4.0 SAMPLING ACTIVITIES</b>	<b>7</b>
4.1 Common Elements	7
4.1.1 Field Parameter Measurements	7

4.1.2 Laboratory Analysis ..... 7

4.2 Sampling Procedures ..... 8

4.2.1 LDA Groundwater Sampling ..... 8

4.2.2 LDA Surface Water Sampling ..... 9

4.2.3 LDA Interceptor Trench Sampling..... 9

**5.0 RESULTS..... 10**

5.1 Preliminary Standards ..... 10

5.2 Method Detection Limits and Reporting Limits ..... 10

5.3 Data Validation ..... 10

5.4 Measurement Results ..... 10

**6.0 LIMITATIONS..... 12**

**7.0 REFERENCES ..... 13**

**TABLES**

- Table 1: Second Quarter 2021 Water Level Measurements
- Table 2: Second Quarter 2021 Field Parameters and Analytical Data
- Table 3: Preliminary Standards
- Table 4: Interceptor Trench Discharge Monitoring
- Table 5: Second Quarter 2021 Treatment System Metals Monitoring

**FIGURES**

- Figure 1: Site Location Map
- Figure 2: Site Plan

## **APPENDICES**

### **APPENDIX A**

Summary Data Tables for Individual Wells and Monitoring Locations

#### **APPENDIX A-1**

Summary of Lower Disposal Area – Surface Water Sampling Results

#### **Appendix A-2**

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

#### **APPENDIX A-3**

Summary of Lower Disposal Area – Bedrock Groundwater Sampling Results

#### **APPENDIX A-4**

Summary of Dale Strip Pit – Bedrock Groundwater Sampling Results

#### **APPENDIX A-5**

Summary of Lower Disposal Area – Disposal Area Groundwater Sampling Results

### **APPENDIX B**

Data Graphs

#### **APPENDIX B-1**

LDA Shallow/Alluvial Monitoring Wells Data Graphs

### **APPENDIX C**

Data Validation Report

#### **Appendix D**

Laboratory Analytical Results

## 1.0 INTRODUCTION

This report, prepared by Golder Associates Inc. (Golder) for Holcim (US) Inc., presents the results of surface water and groundwater monitoring conducted at the Reserve Silica Reclamation Site (Site) during the second quarter of 2021. The quarterly monitoring was completed during June 2021.

### 1.1 Site Description

The Site is located at 28131 Ravensdale-Black Diamond Road in Ravensdale, Washington. Figure 1 shows the Site location. Cement kiln dust (CKD) was placed in two former mine pits at the Site: the Lower Disposal Area (LDA) and the Dale Strip Pit (DSP). These permitted landfill areas have been capped and are in the post-closure inspection, maintenance, and monitoring phase. The LDA encompasses about 7 acres and is in the northwestern portion of the Site. The DSP, an area of about 6 acres, is in the southeastern portion of the Site. The LDA and DSP are shown in Figure 2.

Historically, sand and coal mining operations occurred on the Site. The Site is currently owned and operated by the Reserve Silica Corporation and is in the reclamation phase. The Site's historical background and previous environmental investigations are discussed further in Section 2.0.

### 1.2 Purpose and Scope

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. Previously, quarterly monitoring and reporting activities were conducted under requirements of Post-Closure Care and Maintenance Permits issued by Public Health – Seattle and King County (Public Health). The Site entered Agreed Order (AO) No. DE 16052 in December 2019, which requires that the Site complete a Remedial Investigation/Feasibility Study (RI/FS) under the Model Toxics Control Act (MTCA) and complete any necessary interim remedial actions as agreed upon by the Washington State Department of Ecology (Ecology). A draft RI Work Plan (draft Work Plan) was prepared by Golder and submitted to Ecology in June 2020 under the requirements of the AO. The draft Work Plan and supporting Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) describe the monitoring conducted in association with the RI.

The groundwater and surface water monitoring plan and procedures presented in the draft Work Plan, SAP, and QAPP are designed to fulfill the monitoring requirements of the 2020 Post-Closure Care and Maintenance Permit (PR0015708).

The groundwater and surface water monitoring scope of work includes the following:

- Quarterly collection of groundwater samples from six on-site shallow/alluvial groundwater monitoring wells (MW-1A, MW-2A, MW-3A, MW-4A, MW-5A, and MW-6A) as part of the LDA monitoring program.
- Annual collection of groundwater samples from three on-site bedrock groundwater monitoring wells (MWB-1LDA, MWB-2LDA, and MWB-3LDA) as part of the LDA monitoring program.
- Annual collection of groundwater samples from four on-site bedrock groundwater-monitoring wells (MWB-1SDSP, MWB-1DDSP, MWB-5DSP, MWB-6DSP) as part of the DSP monitoring program.
- Semi-annual measurement of water levels and field parameters in monitoring wells MWB-2DSP and MWB-4SDSP as part of the DSP monitoring program.

- Quarterly collection of surface water samples from the Infiltration Ponds, Weir (or the constructed wetlands located upstream if the Weir is dry), South Pond, and Still Well as part of the LDA surface water sampling program.
- Annual collection of water samples from the culvert that discharges from the former mine Portal (the Portal) as part of the DSP sampling program.
- Measurement of field parameters in water purged from the groundwater monitoring wells and in water sampled directly from the surface water areas. Field parameters include groundwater level readings (in wells only), pH, conductivity, temperature, dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity.
- Analysis of the groundwater, surface water, and quality control samples for some combination of total arsenic, lead, iron, manganese, potassium, and total dissolved solids (TDS). Dissolved metals had historically been analyzed at the Site but Ecology in their comments on the draft Work Plan requested the analyses to be changed to total metals.
- Analysis of duplicate samples for quality control.
- Quarterly Interceptor Trench monitoring for instantaneous flow volume and sampling for pH, TDS, and turbidity.

In November 2020, monitoring well P-14 was installed near the center of the LDA in accordance with the draft Work Plan. Monitoring well P-14 installation, completion, and development details are included in the *2020 Remedial Investigation Activities Technical Memorandum* (Golder 2021) submitted to Ecology on January 29, 2021. Sampling of monitoring well P-14 is included in the quarterly monitoring. P-14 sampling started during the fourth quarter 2020 event, and included:

- Measurement of field parameters during purging of the groundwater monitoring wells. Field parameters include groundwater level readings, pH, conductivity, temperature, DO, ORP, and turbidity.
- Analysis of the groundwater for total arsenic, lead, iron, potassium, and TDS.

In support of the RI, the initial sampling of P-14 also included analyses for a full list of chemicals of potential concern (COPCs): antimony, arsenic, beryllium, chromium, lead, mercury, nickel, selenium, silver, thallium, vanadium, and 2,3,7,8-substituted dioxins & furans. The results from the full COPC list were presented to Ecology in the *2020 Remedial Investigation Activities Technical Memorandum* (Golder 2021).

Figure 2 shows the location of the monitoring wells and surface water collection points. Table 1 presents construction details and water levels for each monitoring well.

## 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 LDA Background

The LDA is a former open pit sand mine that was reclaimed by placing 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 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 DSP Background

The 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 – Seattle and King County. 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 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 cement kiln dust 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.

## 2.3 Monitoring Locations

### 2.3.1 LDA

The LDA groundwater and surface water sampling locations are shown in Figure 2. 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 upstream with respect to groundwater flow and surface water drainage, the high pH seepage area.

Bedrock monitoring wells were installed along the west side of the main access road, west of the LDA. The wells were installed in December 2006 to assess bedrock groundwater conditions in the vicinity 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.

P-14 was installed in the center of the LDA during November 2020 as part of the draft Work Plan 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 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 south west area of the infiltration ponds.

### 2.3.2 DSP

The DSP groundwater monitoring locations are shown in Figure 2. The DSP bedrock groundwater monitoring program was required by Public Health – Seattle and King County and Ecology as a condition of the CKD exemption as a dangerous waste on December 13, 1984 (Public Health 1984). 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. Groundwater discharging from the Portal is also monitored. The Portal was originally constructed to drain water from the Dale Strip Coal mine. There are two additional monitoring wells (MWB-2DSP and MWB-4SDSP) located in the DSP area that are being monitored for water levels and field parameters.

### 2.3.3 LDA Interceptor Trench

The purpose of the Interceptor Trench is to intercept clean 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.

## 2.4 Groundwater and Surface Water Monitoring Schedule

Various levels of groundwater and surface water monitoring have been conducted at the Site since 2002. ARCADIS performed monthly and quarterly monitoring activities through the second quarter of 2009. Golder assumed responsibility for monitoring activities in August 2009 and conducted groundwater and surface water monitoring until April 2014. GeoEngineers performed groundwater and surface monitoring from May to December 2014. Golder resumed the groundwater and surface monitoring in February 2015.

### 2.4.1 LDA Groundwater Sampling

Groundwater monitoring of the shallow/alluvial monitoring wells generally occurred on a quarterly schedule from July 2005 to September 2008. After the seep collection test trenches were installed, groundwater monitoring frequency for the four wells around the infiltration ponds was increased to monthly through September 2009. At the end of the formal test trench monitoring program in October 2009, the sampling frequency for these four wells returned to quarterly.

Groundwater monitoring of the bedrock monitoring wells generally occurred on a quarterly schedule since December 2006. A letter was submitted to Public Health dated April 9, 2015 requesting a variance to the LDA bedrock groundwater monitoring frequency. In a letter to Golder dated April 7, 2016, Public Health granted a variance for three years to reduce the monitoring frequency of the Ravensdale LDA bedrock wells to annually (Public Health 2016). Public Health subsequently granted an additional 2-year extension to the variance in a letter dated October 10, 2019 (Public Health 2019), extending the variance until October 2021. After the initiation of the finalized RI Work Plan, no additional variances will be required, and future monitoring shall be completed in accordance with the RI Work Plan.

## 2.4.2 LDA Surface Water Sampling

Surface water monitoring of the Infiltration Ponds, Weir (or the constructed wetlands located upstream if the Weir was dry), South Pond, and Still Well generally occurred on a monthly schedule from February 2005 to June 2008 and then was reduced to the current quarterly schedule.

## 2.4.3 DSP Groundwater Sampling

Groundwater monitoring of wells MWB-1SDSP and MWB-1DDSP generally occurred on a quarterly schedule starting in December 2002. Monitoring of well MWB-5DSP generally occurred on a monthly schedule from December 2006 to June 2008 and then monitoring was reduced to quarterly. Groundwater monitoring of well MWB-6DSP generally occurred on a quarterly schedule starting in December 2006. Groundwater levels and field parameters are being measured in wells MWB-2DSP and MWB-4SDSP on a quarterly schedule. Surface water monitoring of the Portal discharge generally occurred on a quarterly schedule starting in March 2002.

In a letter to Golder dated May 16, 2012, Public Health granted a variance for three years to reduce the monitoring frequency of the Ravensdale DSP wells and Portal to semi-annually (Public Health 2012). During this variance period, groundwater monitoring of the DSP wells occurred during the first and third quarters each year. During the second and fourth quarters, only water levels were measured in these wells. This variance expired in May 2015. A letter was submitted to the Public Health dated April 9, 2015, requesting a variance to the groundwater monitoring frequency. Pending approval, sampling of the DSP and Portal was reverted to quarterly, starting with the August 2015 sampling quarter. In a letter to Golder dated April 7, 2016, Public Health granted a variance for three years to reduce the monitoring frequency of the DSP wells and Portal to annually (Public Health 2016). Public Health subsequently granted an additional 2-year extension to the variance in a letter dated October 10, 2019 (Public Health 2019), extending the variance until October 2021. After the initiation of the finalized RI Work Plan, no additional variances will be required, and future monitoring shall be completed in accordance with the RI Work Plan.

## 2.4.4 LDA Interceptor Trench Sampling

The Interceptor Trench was monitored monthly from October 2013 to December 2014 and data showed that the water being collected and discharged is not impacted. A reduction in monitoring frequency to quarterly was approved by King County Public Health in an email to Joel Bolduc of Holcim dated January 2, 2015 (Public Health 2015). The Interceptor Trench is being monitored for pH, turbidity, and TDS.

## 3.0 OPERATIONS AND MAINTENANCE OF THE LEACHATE TREATMENT SYSTEM

The leachate treatment system first 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 8.3. CO<sub>2</sub> sparging continues until the pH reduces to 7.5. The sparged water is pumped back into the mixing tank to maintain the neutralized the 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 a 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 Golder engineer's cell phones if readings outside of the set ranges occurs allowing for response and trouble shooting. 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 down time 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 5 provides the 2021 second quarter laboratory analytical data pre- and post- iron-based adsorption media showing the reduction in lead and arsenic concentrations. The data validation report is provided in Appendix C, and the laboratory analytical report is provided in Appendix D.

The treatment system has been effective in reducing the impacts to groundwater in the immediate vicinity of the infiltrations 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.

## 4.0 SAMPLING ACTIVITIES

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

### 4.1 Common Elements

#### 4.1.1 Field Parameter Measurements

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 2100P 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 and by Am Test Inc (AmTest). of Kirkland, Washington.

- All samples were tested for the following parameters using the methods indicated:

Arsenic	EPA Method 200.8
Lead	EPA Method 200.8
Potassium	EPA Method 6010C
Iron	EPA Method 6010C
Manganese	EPA Method 6010C
Total Dissolved Solids (TDS)	EPA Method 160.1

- Samples were collected for both total metals and dissolved metals analyses, with dissolved metals samples field filtered with a 0.45 µm in-line filter. Samples historically were analyzed for dissolved metals at the Site until December 2020. Ecology requested in their review of the Draft RI/FS Work Plan that metals analyses be conducted as total metals. Groundwater samples are collected in the field for both dissolved metals and for total metals analyses. The dissolved metals samples are held at the laboratory so that they can be analyzed if the total metals results indicated significant differences from historical dissolved metals results. The total metal results were within the range of historical dissolved metals results, as such, dissolved metals analyses were not deemed necessary for this sampling event. Only total metals analyses were completed.
- Interceptor Trench samples were tested for the following parameters using the method indicated:

pH	Field Measurement
TDS	EPA Method 160.1
Turbidity	Field Measurement

- Summaries of historical analytic data for the various sampling locations are presented in Appendix A. The data validation report is provided in Appendix C, and the laboratory analytical data packages are provided in Appendix D.

## 4.2 Sampling Procedures

### 4.2.1 LDA Groundwater Sampling

On June 9 and 10, 2021, Golder sampled groundwater from the LDA shallow/alluvial groundwater monitoring wells (MW-1A, MW-2A, MW-3A, MW-4A, MW-5A, and MW-6A) and the LDA disposal area (P-14). 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. Table 1 presents depth to water measurements and elevations.
- 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, and P-14 was purged at a rate between approximately 150 and 400 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, two 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.

All groundwater and quality control samples were analyzed for the parameters listed in Section 4.1.2. Analytical results are discussed in Section 5.0, and the field parameters and analytical data are presented in Table 2.

#### 4.2.2 LDA Surface Water Sampling

On June 9 and 10, 2021, Golder sampled surface water from the Still Well, Weir, South Pond, and the Infiltration Ponds sampling locations. The following methods and procedures were used in collecting the 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, two 500-mL bottles preserved with nitric acid and one unpreserved 1-L bottle were collected. The samples were then labeled and placed in a cooler with ice.
- The pH of the LDA surface water samples is typically high (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. In order to meet this requirement, the pH of the LDA surface water samples collected for metals analysis were checked at the time of sample collection using pH test paper strips. If the pH was higher than 2, 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. Analytical results are discussed in Section 5.0, and the field parameters and analytical data are presented in Table 2.

#### 4.2.3 LDA Interceptor Trench Sampling

On June 10, 2021, Golder sampled groundwater from the Interceptor Trench. The following methods and procedures were used to collect the groundwater 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. pH and turbidity were measured and recorded at the Interceptor Trench at the time of sample collection.
- 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. Analytical results are discussed in Section 5.0, and the field parameters and analytical data are presented in Table 2.



## 5.0 RESULTS

### 5.1 Preliminary Standards

Preliminary standards have been established from the Washington State Administrative Code (WAC) 173-200 and 246-290-310(3)(a) for some of the field parameters and analytes measured as part of the monitoring program. These standards are presented in Table 3.

### 5.2 Method Detection Limits and Reporting Limits

The Method Detection Limit (MDL) is the minimum concentration of an analyte that the laboratory can detect using the specified analytical method and equipment. The Reporting Limit (RL) is the lowest concentration that the laboratory can report with certainty after adjustments have been made for sample dilution, sample weight, and other factors.

Where the laboratory analytical results indicate non-detection (ND), the concentration of an analyte is below the MDL. On the trend graphs presented in Appendix B, non-detections for sampling events prior to the December 2009 fourth quarter monitoring were plotted as fifty percent of the RL value. Beginning with the December 2009 fourth quarter monitoring event, non-detections are plotted as the MDL value, which is more representative of actual laboratory results. Method Detection Limits are not available for all the historical data; therefore, non-detect data prior to December 2009 remains plotted as fifty percent of the RL value. For TDS results, non-detect data are plotted at the RL.

### 5.3 Data Validation

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 2017), the SAP, and the QAPP. Data reporting qualifiers are included with the analytical results in Appendix A. Copies of the data validation checklist are included in Appendix C. The raw analytical data packages provided by the laboratory are provided in Appendix D. The data validation review found that all the data were considered valid and usable.

### 5.4 Measurement Results

A summary of the groundwater field parameters and analytical results for the June 2021 second quarter monitoring are included in Table 2. Interceptor Trench results are provided in Table 4. Trend graphs of pH, TDS, and arsenic and potassium concentrations measured in each monitoring well are presented in Appendix B. Total metals concentrations did not appear to be substantially different from dissolved metals concentrations reported at the Site historically.

Results observed during this monitoring round were generally consistent with previous sampling rounds. pH levels and arsenic concentrations detected in the infiltration ponds and the two groundwater monitoring wells (MW-5A and MW-6A) located immediately downgradient of the infiltration ponds have attenuated in response to the operation of the treatment system and have remained at levels significantly lower than prior to the activation of the treatment system. Concentrations of arsenic in the infiltration ponds have remained steady since fourth quarter 2019.

The June 2021 concentrations of arsenic in MW-5A and MW-6A (0.003 mg/L and 0.005 mg/L respectively) are approximately one order of magnitude lower than average concentrations measured during 2019 (0.02 mg/L and 0.03 mg/L respectively), and similar to those measured during 2020 (0.005 mg/L and 0.004 mg/L respectively).

Concentrations of lead measured in samples from the infiltration ponds, MW-5A, and MW-6A have also steadily decreased from levels routinely measured during 2019 and earlier. Concentrations of lead detected in all samples were below the preliminary standard. The noted decreases in pH levels and reported concentrations of arsenic and lead in the infiltration ponds and in groundwater immediately downgradient of the infiltration ponds indicate the mitigating effects produced by the treatment system.



## 6.0 LIMITATIONS

Golder has 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. Golder Associates Inc. is not responsible for any data that were inaccurately reported by others and reproduced here.

[https://golderassociates.sharepoint.com/sites/11287g/groundwater monitoring/golder reports/2021 year/2021 q2/final/1520304-r-rev0-ravensdale 2021 q2 monitoring-080521.docx](https://golderassociates.sharepoint.com/sites/11287g/groundwater%20monitoring/golder%20reports/2021%20year/2021%20q2/final/1520304-r-rev0-ravensdale%202021%20q2%20monitoring-080521.docx)

## 7.0 REFERENCES

- ARCADIS (U.S.) Inc. (ARCADIS). 2004. Lower Disposal Area and Dale Strip Pit Conceptual Design Plan, Reserve Silica Property, 28131 Black Diamond-Ravensdale Road, Ravensdale, Washington. April 28.
- ARCADIS. 2006. Sampling and Analysis and Quality Assurance Project Plan, Reserve Silica Site, Ravensdale, Washington. March 2.
- ARCADIS. 2009. Quarterly Monitoring Report, Second Quarter 2009, Reserve Silica Site, Ravensdale, Washington. September 16.
- Golder Associates Inc. (Golder). 2008a. Construction Summary Report, Lower Disposal Area Cover Upgrade, Reserve Silica Site, Reserve Silica Site, Ravensdale, Washington, July 25.
- Golder. 2008b. Draft Workplan for Seep Collection Test Trenches, Lower Disposal Area, Reserve Silica Site, Ravensdale, Washington. August 4.
- Golder. 2009a. Construction Summary Report, Seep Collection System Test Trenches, Reserve Silica Site, Ravensdale, Washington. March 6.
- Golder. 2009b. Flow Monitoring Seep Collection System Test Trenches, Reserve Silica Site, Lower Disposal Area, Ravensdale, Washington. December.
- Golder. 2019. Quarterly Monitoring Report Second Quarter 2019, Ravensdale Site, Ravensdale, Washington. July 2.
- Golder. 2021. 2020 Remedial Investigation Activities, Reserve Silica Site, Ravensdale, Washington. January 29.
- Public Health – Seattle and King County (Public Health). 1984. Letter from Mr. Greg Bishop to Mr. Victor Hoffman of Industrial Mineral Products, Re: Status of Solid Waste Disposal Site Permit Application at Ravensdale Silica Sand Mine. December 13.
- Public Health. 2012. Letter from Mr. Bill Lasby to Mr. Frank Shuri of Golder, Re: Request for Public Health Variance, Reserve Silica Corporation, Service Request SR1221672. May 16.
- Public Health. 2015. Email from Ms. Yolanda Pon to Mr. Joel Bolduc of Holcim, Re: Request to Reduce Interceptor Trench Monitoring. January 2.
- Public Health. 2016. Letter from Mr. Darshan Dhillon to Ms. Sarah Morgan and Mr. Gary Zimmerman of Golder, Re: Request for Public Health Variance, Reserve Silica Corporation, Service Request SR1380540. April 7.
- Public Health. 2019. Letter from Mr. Darshan Dhillon to Ms. Sarah Morgan and Mr. Gary Zimmerman of Golder, Re: Request for Public Health Variance, Reserve Silica Corporation, Service Request SR1380540. October 10.
- Washington Administrative Code. 1990. Water Quality Standards for Ground Waters of the State of Washington, Chapter WAC 173-200. December 1.
- Washington Administrative Code. 2010. Maximum Contaminant Levels (MCLs) and Maximum Residual Disinfectant Levels (MRDLs). Chapter WAC 246-290-310(3)(a). Effective January 4, 2010.
- Washington State Department of Ecology. 2005. Sand and Gravel General Permit. Limit for Discharge to Ground Water. January 5.

Washington State Department of Ecology. 2006. (Approval) Work Plan, Bedrock Monitor Well Installation, Sampling and Analysis Plan, and Quality Assurance Project Plan, Reserve Silica Site, Ravensdale, Washington. August 3.

USEPA (EPA). 2017. National Functional Guidelines for Inorganic Superfund Data Review. USEPA Contract Laboratory Program. OSWER 9355.0-131, EPA 540-R-013-001. January.

Tables

**Table 1: Second Quarter 2021 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	6/10/2021	44	28-43	2-26	2	609.83	35.32	574.51
	MW-2A	6/10/2021	40	25-40	2-23	2	603.61	29.14	574.47
	MW-3A	6/10/2021	20	4-20	2-4	2	685.51	6.24	679.27
	MW-4A	6/10/2021	20	5-20	2-4	2	701.85	5.32	696.53
	MW-5A	6/10/2021	40	25-40	2-23	2	607.61	33.20	574.41
	MW-6A	6/10/2021	39	24-39	2-22	2	605.35	31.07	574.28
Within LDA - Groundwater	P-14	6/10/2021	52	40-50	3-38	2	773.32	33.57	739.75
LDA - Bedrock Groundwater	MWB-1LDA	6/10/2021	135	115-135	2-105	2	701.08	23.17	677.91
	MWB-2LDA	6/10/2021	125	110-125	2-103	2	738.06	36.29	701.77
	MWB-3LDA	6/10/2021	145	125-145	2-115	2	740.59	3.46	737.13
DSP - Bedrock Groundwater	MWB-1SDSP	6/10/2021	160	150-160	138-148	2	932.69	42.65	890.04
	MWB-1DDSP	6/10/2021	265	255-265	243-253	2	931.77	59.9	871.87
	MWB-2DSP	6/10/2021	258	238-258	-	2	931.22	199.94	731.28
	MWB-4SDSP	6/10/2021	43	32-42.8	-	2	928.81	21.47	907.34
	MWB-5DSP	6/10/2021	83	73-83	2-61	2	931.45	24.68	906.77
	MWB-6DSP	6/10/2021	195	120-195	2-108	2	920.65	24.55	896.10

- 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: Second Quarter 2021 Field Parameters and Analytical Data**

Sample Area	Sample Location ID	Date Sampled	Field Parameters									Gen. Chem.	Total Metals (mg/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)	Arsenic	Lead	Potassium
LDA - Shallow/Alluvial Groundwater	MW-1A	6/9/2021	609.83	35.32	574.51	9.2	421.5	8.47	151	2.22	6.68	310	0.00139	0.0001 U	16.3
	MW-2A	6/9/2021	603.61	29.14	574.47	9.1	459.8	8.65	193.6	1.34	6.88	360 J	0.00125	0.000058 J	21.8
	MW-2A Duplicate (MW-45A)	6/9/2021	-	-	-	-	-	-	-	-	-	940 J	0.00121	0.000055 J	21.2
	MW-3A	6/9/2021	685.51	6.24	679.27	11.4	706	0.96	-50.2	4.12	7.03	540	0.00648	0.000204	124
	MW-4A	6/10/2021	701.85	5.32	696.53	11.9	338.7	1.23	108.5	0.73	6.09	220	0.000228	0.0001 U	0.787
	MW-5A	6/9/2021	607.61	33.20	574.41	9.3	875	5.23	184	1.26	7.27	<b>700</b>	0.00262	0.000063 J	205
	MW-6A	6/9/2021	605.35	31.07	574.28	9.8	2,077	4.83	197.3	1.81	8.08	<b>1900</b>	0.00503	0.000094 J	707
Within LDA - Groundwater	P-14	6/10/2021	773.32	33.57	739.75	12.9	18,706	0.67	-175.2	1.88	13.06	<b>6400</b>	0.242	0.00344	2460
LDA - Bedrock Groundwater <sup>3</sup>	MWB-1LDA	6/10/2021	701.08	23.17	677.91	-	-	-	-	-	-	-	-	-	-
	MWB-2LDA	6/10/2021	738.06	36.29	701.77	-	-	-	-	-	-	-	-	-	-
	MWB-3LDA	6/10/2021	740.59	3.46	737.13	-	-	-	-	-	-	-	-	-	-
LDA- Surface Water	South Pond	6/10/2021	-	-	-	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
	Still Well	6/9/2021	-	-	-	13.4	5,213	0.89	-148.4	4.06	12.56	<b>1600</b>	0.0917	0.00572	471
	Weir	6/10/2021	-	-	-	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
	Infiltration Ponds	6/9/2021	-	-	-	15.1	2,963	4.88	174.9	4.37	8.79	<b>2400</b>	0.0237	0.00151	923
	Infiltration Ponds Duplicate (MW-35A)	6/9/2021	-	-	-	-	-	-	-	-	-	<b>2400</b>	0.0251	0.00181	941

**Table 2: Second Quarter 2021 Field Parameters and Analytical Data**

Sample Area	Sample Location ID	Date Sampled	Field Parameters									Gen. Chem.	Total Metals (mg/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)	Arsenic	Lead	Potassium		
DSP - Bedrock Groundwater <sup>3</sup>	MWB-1SDSP	6/10/2021	932.69	42.65	890.04	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-1DDSP	6/10/2021	931.77	59.9	871.87	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-2DSP	6/10/2021	931.22	199.94	731.28	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-4SDSP	6/10/2021	928.81	21.47	907.34	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-5DSP	6/10/2021	931.45	24.68	906.77	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-6DSP	6/10/2021	920.65	24.55	896.10	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-6DSP Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Portal	6/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Preliminary Standard <sup>a</sup>			-	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.05	-	-	

**bold** Bold values indicate parameter results above the Preliminary Standard.  
 - Not measured or not available.  
 \* Depth to water (DTW) measurements for all shallow/alluvial wells collected on the same day; date noted is sampling date.  
 < Analyte not detected above the reporting limit shown.  
 a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest.  
 b Site background arsenic value to be determined (TBD).  
 J Data validation code; estimated value.  
 J+ Data validation code; estimated value with positive bias  
 U Data validation code; not detected at the Reporting Limit (RL).  
 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.  
 3 Reduction in monitoring frequency approved by Public Health – Seattle and King County in a letter to Golder Associates Inc. dated October 10, 2019.  
 4 ORP measurements not available due to faulty sensor.  
 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  
 mg/L Milligrams per liter  
 mV Millivolts  
 NTU Nephelometric Turbidity Unit  
 µmhos/cm Micromhos per centimeter

**Table 3: Preliminary Standards**

Parameter	Preliminary Standard	Reference
Conductivity	700 µmhos/cm	WAC 246-290-310(3)(a)
pH	6.5 – 8.5	WAC 173-200; WSDOE Permit 2005
Turbidity	None	None
Total Dissolved Solids	500 mg/L	WAC 173-200
Dissolved Iron	0.3 mg/L	WAC 173-200
Dissolved Lead	0.05 mg/L	WAC 173-200
Dissolved Manganese	0.05 mg/L	WAC 173-200
Dissolved Arsenic	TBD	TBD
Dissolved Potassium	None	None

µmhos/cm                      Micromhos per centimeter  
 mg/L                              Milligrams per liter  
 WAC                                Washington State Administrative Code  
 WSDOE                            Washington State Department of Ecology  
 TBD                                 Site background arsenic value to be determined



**Table 4: 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	1.0	277
-	-	-	-	-	-
31-Mar-14	11:12	1.0	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	7.20	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	0.3	7.54	2.1	290
4-Aug-15	12:20	0.1	7.61	1.5	268
3-Nov-15	13:15	0.8	7.38	36.9	320
8-Feb-16	10:40	1.9	7.23	9.3	279
2-May-16	16:00	0.5	7.77	22.5	431
22-Aug-16	11:00	0.1	7.78	3.3	302
1-Nov-16	11:40	2.4	8.16	96.3	345
2-Feb-17	9:25	4.5	7.61	0.9	514
30-May-17	15:45	4.5	7.33	4.0	324
18-Aug-17	8:50	0.1	7.57	34.0	300
10-Nov-17	11:20	1.1	6.81	12.9	365

**Table 4: Interceptor Trench Discharge Monitoring**

Date Sampled	Time Sampled	Flow (gpm)	Field pH (standard units)	Turbidity (NTU)	Total Dissolved Solids (mg/L)
28-Feb-18	10:16	2.2	7.02	37.9	381
2-May-18	11:45	1.2	7.46	2.9	339
22-Aug-18	10:00	0.1	7.32	19.3	287
7-Nov-18	14:40	0.3	7.24	3.1	342
13-Mar-19	11:31	1.4	7.61	19.4	313
9-May-19	10:30	0.9	7.77	8.9	394
26-Aug-19	18:15	0.4	7.25	26.4	361
14-Nov-19	13:30	0.4	7.05	34.5	447
13-Feb-20	12:35	1.6	6.95	1.8	306
13-Aug-20	12:00	0.2	7.32	20.8	339
10-Dec-20	12:22	3.8	7.70	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

- Not measured or not available  
 gpm Gallons per minute  
 NTU Nephelometric Turbidity Unit  
 mg/L Milligrams per liter  
 1 Reduction in monitoring frequency to quarterly approved by Public Health

**Table 5: Second Quarter 2021 Treatment System Metals Monitoring**

Sample Location	Sample ID	Date Sampled	Total Arsenic (mg/L)	Dissolved Arsenic (mg/L)	Total Lead (mg/L)	Dissolved Lead (mg/L)
Influent	Tank-Effluent	22-Jun-21	0.0242	0.0243	0.0184	0.0048
Effluent	As2-Effluent	22-Jun-21	0.0027	0.0045	0.0771	0.0009

- Not measured or not available  
mg/L Milligrams per liter

In the second quarter of 2021, a "bottom up" method of processing treatment system influent was implemented, in an attempt to reduce frequent clogging of treatment media. The increase in total lead concentrations of the treatment system effluent was likely caused by an increase in turbidity of the sample. The dissolved lead effluent concentration indicate a decrease of over 80% compared to the influent concentration.

## Figures

**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						General Chemistry		Metals (mg/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (ReI mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	pH measured in lab (standard units)	Arsenic	Iron	Lead	Manganese	Potassium
1-Feb-05	8.10	10658	-	-	6.59	12.87	2860	12.58	0.04990	<0.100	0.00552	<0.0100	-
9-Mar-05	13.23	7393	-	-	7.42	12.51	2860	12.53	0.11500	0.228	0.01470	<0.0100	-
5-Apr-05	9.50	11310	-	-	10.90	12.44	2900	12.32	0.05560	<0.100	0.01160	<0.0200	-
10-May-05	13.99	11871	-	-	3.60	12.53	2810	12.57	0.05540	<0.100	0.01250	<0.0200	-
7-Jun-05	13.83	10888	-	-	22.60	12.54	2490	12.51	<0.00500	<0.100	<0.00500	<0.0200	-
15-Jul-05 <sup>a</sup>	18.21	11331	-	-	14.80	12.50	3800	12.6	0.00272	<0.150	0.00607	<0.0100	-
15-Jul-05 <sup>b</sup>	-	-	-	-	-	-	2540	12.61	0.03980	<0.100	0.00757	<0.0200	-
9-Aug-05 <sup>a</sup>	21.45	12087	-	-	17.90	11.78	3500	12.6	0.12000	0.288	0.01090	0.0101	-
9-Aug-05 <sup>b</sup>	-	-	-	-	-	-	2820	12.46	0.09150	<0.100	0.00953	<0.0200	-
14-Sept-05 <sup>a</sup>	17.38	9507	-	-	14.00	12.36	3600	12.5	0.11800	<0.750	0.01120	<0.0500	-
14-Sept-05 <sup>b</sup>	-	-	-	-	-	-	2830	12.61	0.11500	0.363	0.01440	-	-
5-Oct-05	13.31	11481	-	-	62.70	12.47	3020	12.6	0.08520	<0.100	0.01190	<0.0200	-
9-Nov-05	9.58	14417	-	-	11.00	12.34	3400	12.6	0.07400	<0.150	<0.01000	<0.0100	-
9-Dec-05	6.18	7138	-	-	12.50	12.82	2800	12.6	0.01450	<0.150	0.00107	<0.0100	-
19-Jan-06	8.66	8265	1.74	-	11.80	13.06	1900 J	12.6 J	0.01520 J	<0.150	<0.00100	<0.0100	-
16-Feb-06	8.13	9019	2.81	195.6	6.16	12.27	3200 J	12.6	0.01340 J	<0.150	0.00189	<0.0100	-
15-Mar-06	7.98	9033	0.79	114.8	8.93	12.60	3300 J	12.6	0.00236	<0.150	0.00250 J	<0.0100	-
7-Apr-06	9.98	10450	0.57	34.8	6.08	12.51	3400	12.6	0.01520	<0.150	0.00283	<0.0100	-
16-May-06	12.79	11060	0.14	45.4	9.28	12.40	3500	12.6	0.00404	<0.150	0.00159	<0.0100	-
23-Jun-06	13.29	11680	0.44	-	14.60	12.90	3600	12.6	0.05260	<0.150	0.01650	<0.0100	-
20-Jul-06	16.20	12240	0.14	-217.8	10.40	12.47	4300	12.7	0.01930	<0.150	0.00357	<0.0100	-
22-Aug-06	17.14	10920	1.22	-146.0	13.30	12.66	3800	12.7	0.14400	<0.150	0.00914 J	<0.0100	-
26-Sep-06	15.72	9599	0.42	-263.3	61.40	12.59	3800	12.5	0.12300	0.171	0.00463	0.0154	-
26-Oct-06	10.99	9955	0.88	-207.5	82.30	12.93	3600	12.6	0.16100	<1.500	0.01950	<0.1000	-
15-Nov-06	10.58	12040	1.82	149.2	188.00	12.87	3400	12.5	0.03060 J	<0.150	0.00450	<0.0100	-
20-Dec-06	8.85	10990	0.71	-152.0	32.80	13.02	2600 J	12.8	0.05260	<0.150	0.01300	<0.0100	-
24-Jan-07	8.29	10440	0.97	-139.8	13.70	13.05	2500 J	12.4	0.05860	<0.150	0.01310	<0.0100	-
12-Feb-07	8.88	10590	0.86	-125.8	56.40	13.06	3400	12.5	0.06130	<0.150	0.01400	<0.0100	-
27-Mar-07	9.45	9163	1.25	-42.4	18.40	11.53	2900 J	12.5 J	0.04410	<0.150	0.00181	<0.0100	-
18-Apr-07	8.90	8155	2.63	2.3	37.20	12.77	3300 J	12.4	0.02930	<0.150	0.00198	<0.0100	-
31-May-07	20.12	11050	5.30	-153.9	9.31	11.59	2800 J	12.5	0.04850	<0.150	0.01510 J	<0.0100	-
20-Jun-07	18.28	12000	5.41	-122.5	16.10	12.04	4300 J	12.4 J	0.02680	<0.150	0.00233	<0.0100	-
31-Jul-07	16.53	12200	1.70	-151.6	24.80	12.48	6000	12.6 J	0.08760	<0.150	0.00103	<0.0100	-
29-Aug-07	17.00	9570	1.12	-183.1	268.00	12.78	4600 J	12.6 J	0.10600	<0.150	0.00946	<0.0100	-
27-Sep-07	14.49	8263	52.40	-183.0	211.00	12.42	2800	12.5 J	0.12500	<0.150	0.01540	<0.0100	-
26-Oct-07	9.49	6144	4.88	-147.2	92.40	12.85	3300 J	12.3 J	0.12400	0.260	0.02490	0.0101	-
30-Nov-07	5.53	7703	2.13	-122.6	127.00	12.67	2200	12.4 J	0.17400	0.184	0.01410	<0.0100	-
12-Dec-07	5.24	11609	3.43	-144.8	116.00	12.60	4100	12.4 J	0.11000	<0.150	0.01130	<0.0100	-
24-Jan-08	3.73	9649	13.81	-138.0	-	10.74	2500	11.8 J	0.10100	1.530	0.00974	0.0815	-
28-Feb-08	-	-	-	-	51.20	-	2900	12.4 J	0.05850	<0.150	0.01260	<0.0100	-
25-Mar-08	7.06	8623	5.52	-11.2	17.40	11.26	3400	12.5 J	0.07430	<0.150	0.01040	<0.0100	-
29-Apr-08	9.74	11332	4.29	-1.3	27.70	12.82	3000 J	12.5 J	0.07660	<0.150	0.01330	<0.0100	-
20-May-08	14.53	11955	1.74	-35.8	72.70	12.82	3400	12.5 J	0.08730	<0.150	0.01510	<0.0100	-
18-Jun-08	12.77	10267	3.34	-27.0	34.00	12.86	3200 J	12.4 J	0.06320	<0.150	0.01690	<0.0100	-
26-Aug-08	15.86	7703	1.06	-72.8	38.30	12.67	2600 J	12.2 J	0.43000	1.220	0.03500	0.0497	759
20-Nov-08	9.59	8762	0.91	-65.6	74.10	13.32	3500	12.4 J	0.07000	<0.150	0.01680	<0.0100	848
12-Feb-09	3.25	554	14.29	-	108.00	13.03	550	11.8 J	0.04720	<0.150	0.01370	<0.0100	551
19-May-09	11.53	276	8.80	26.0	43.40	9.83	2500 J	12.4 J	0.03780	<0.150	0.01500	<0.0100	689
22-Sep-09	12.47	9760	1.50	159.1	625.00	12.47	3000	-	0.16000	0.200	0.03700	0.0100 J	990
15-Dec-09	5.20	11650	1.90	237.0	26.30	12.85	3000	-	0.08600	0.067 J	0.02100	0.0047 J	900 J
22-Mar-10	9.70	1035	-	182.0	19.40	12.58	3000	-	0.07300	<0.200	0.01700	<0.0200	870
17-Jun-10	11.70	9610	0.08	-	6.59	12.48	2700	-	0.06600	0.095 J	0.01500	0.0020 J	780
21-Sep-10	15.00	6710	1.26	152.6	140.00	12.29	2400	-	0.30000	1.100 J+	0.03900	0.0300 J+	570
8-Dec-10	8.30	10110	1.00	-	5.44	12.63	2600	-	0.06400	<0.200	0.01000	<0.0200	860
30-Mar-11	8.60	4810	0.46	136.3	13.70	14.31	2500 J	-	0.06500	<0.200	0.00960	<0.0200	720
21-Jun-11	16.60	10420	1.63	111.9	3.40	12.36	5200	-	0.06000	<0.200	0.00910	0.0017 J	770
28-Sep-11	14.80	5270	2.34	70.0	66.70	12.17	2200	-	0.22000	0.360	0.01100	0.0072 J	1000

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

Date Sampled	Field Parameters						General Chemistry		Metals (mg/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rei mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	pH measured in lab (standard units)	Arsenic	Iron	Lead	Manganese	Potassium
15-Dec-11	6.00	7330	2.47	104.2	18.30	13.09	2800	-	0.08300	<0.200	0.00290	<0.0200	880
21-Mar-12	5.50	11040	3.15	294.2	12.00	12.39	2600	-	0.06700	<0.200	0.00470	<0.0200	760
19-Jun-12	5.50	11040	3.15	294.2	12.00	12.39	2600	-	0.05800	<0.200	0.00670	<0.0200	690
20-Sep-12	16.10	9560	3.27	76.0	10.70	12.35	2900	-	0.08400	<0.200	0.00300	<0.0200	830
19-Dec-12	4.10	1320	10.11	303.1	5.86	9.69	700	-	0.07500	0.690	0.00430	0.0710	250
26-Feb-13	7.30	9950	1.77	161.8	25.50	12.66	2000	-	0.07000	<0.500	0.00029 J	<0.0200	720
23-May-13	11.50	8040	2.23	266.8	22.70	12.47	2500	-	0.05700	<0.500	0.00340	<0.0200	690
22-Aug-13	17.40	8810	2.42	10.8	38.50	12.79	2590	-	0.05780	<0.100	0.00150	0.0020	863
19-Nov-13	9.00	7090	2.47	79.0	62.80	12.54	2720	-	0.05250	<0.100	0.00420	<0.0200	909
1-Apr-14	10.30	6080	0.55	128.2	37.10	6.08	1890	-	0.05460	<0.100	0.00110	<0.0013	687
22-May-14	13.60	7360	1.22	34.4	-	11.75	2330	-	0.06090	<0.100	0.00200	<0.0020	689
13-Aug-14	18.26	7844	0.33	1.2	7.30	12.53	2770	-	0.07000	<0.100	0.00210	<0.0020	849
12-Nov-14	9.00	585	3.17	-47.8	17.50	12.93	2450	-	0.08320	<0.100	0.00390	<0.0020	837
12-Feb-15	10.70	7540	2.68	-18.6	9.64	12.71	2150	-	0.05160	<0.100	0.00030	<0.0020	690
4-May-15	12.90	9140	2.73	110.4	26.80	13.02	2520	-	0.05460	<0.100	0.00022 J	<0.0020	734
5-Aug-15	19.50	8060	2.58	-29.8	61.10	12.62	2980	-	0.06390	<0.250	0.00170	0.0047 J	898
3-Nov-15	11.10	5150	0.37	38.6	171.00	8.93	1840	-	0.10900	0.270	0.02170	0.0130	747
9-Feb-16	9.70	7390	0.78	80.8	7.79	13.07	2170	-	0.05360	<0.100	0.00120	0.0060	601
3-May-16	14.70	7530	1.40	358.1	2.65	12.98	2480	-	0.0542	<0.100	0.00170 J-	0.0020	711
22-Aug-16	20.50	8	2.10	-	59.00	12.95	2780	-	0.09130	<0.250	0.00587	0.0023 J	831
1-Nov-16	12.30	2884	2.66	-72.1	19.10	13.17	2620	-	0.04620	<0.100	0.00964	<0.0020	841
31-Jan-17	7.40	8510	2.37	-167.0	7.35	13.17	2050	-	0.05250	0.026 J	0.00119	0.0016 J	582
31-May-17	14.60	7500	2.44	-	4.17	12.89	1900	-	0.04540	0.011 J	0.00068 J+	0.0007 J	615
17-Aug-17	18.30	8460	3.35	-84.0	15.90	12.79	2680	-	0.05680	0.003 J	0.00214	0.0013 J	750
9-Nov-17	8.20	7215	3.48	90.9	18.20	12.65	2360	-	0.0621	<0.1	0.00352	0.0025	822
27-Feb-18	6.60	5312	3.75	2.3	2.49	12.11	1970	-	0.0502	<0.1	0.00753	0.0025	521
2-May-18	11.10	8260	1.70	-	13.00	12.92	2360	-	0.0434	0.133	0.02170 J+	0.0088	552
21-Aug-18	20.22	6260	4.71	-42.1	5.84	12.58	2100	-	0.0522	0.10 U	0.000138	<0.002	629
7-Nov-18	9.70	995	6.72	126.8	20.60	9.15	1880	-	0.644	1.35	0.0802	0.0491	502 J+
11-Mar-19	10.60	1354	5.93	-18.7	7.19	10.31	1710	-	0.0528	0.0091 J	0.0212	0.0013 J	501
9-May-19	13.80	6973	6.40	18.1	16.70	12.36	1980	-	0.0416	0.0079 J	0.0134	0.0008 J	521
26-Aug-19	17.80	6405	3.91	Note 1	5.15	12.56	2570	-	0.0425	<0.1	0.0154	0.001 J	722
14-Nov-19	9.70	6065	0.41	-53.3	12.00	12.67	1750	-	0.167	0.121 J	0.0239	0.0065	563
13-Feb-20	7.60	4936	0.37	-139.0	2.56	12.66	1630	-	0.0486	0.0136 J	0.00608	0.0031	490
13-Aug-20	15.00	6817	2.55	-42.8	2.02	12.39	2620	-	0.0419	0.0063 J	0.00086	0.0009 J	659
10-Dec-20	8.80	4534	0.55	-26.2	5.87	12.79	1670	-	0.0827	0.241	0.0111	0.0108	510
4-Mar-21	7.70	4728	0.05	-42.0	0.85	11.94	1470	-	0.0618	0.1 U	0.00149	0.008 U	512
9-Jun-21	13.40	5213	0.89	-148.4	4.06	12.56	1600	-	0.0917	-	0.00572	-	471
Preliminary Standard <sup>c</sup>	-	700	-	-	-	6.5-8.5	500	6.5-8.5	TBD <sup>d</sup>	0.3	0.05	0.05	-

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.

- Not analyzed or not available
- < Analyte not detected above the reporting limit shown
- a North Creek Analytical, Inc.
- b Severn Trent Laboratories
- c Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest
- d Site background arsenic value to be determined (TBD)
- 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 msl Feet above mean sea level
- mg/L Milligrams per liter
- mV Millivolts
- NTU Nephelometric Turbidity Unit



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

Date Sampled	Field Parameters						General Chemistry		Metals (mg/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	pH measured in lab (standard units)	Arsenic	Iron	Lead	Manganese	Potassium
1-Feb-05	8.17	1315	-	-	8.13	9.95	874	9.75	0.08490	0.234	0.00499	0.0249	-
9-Mar-05	14.04	1183	-	-	23.00	9.59	960	9.46	0.09620	0.470	0.00392	0.0321	-
5-Apr-05	11.00	1115	-	-	43.70	9.80	800	9.49	0.06230	0.574	0.00321	<0.0200	-
10-May-05	14.91	1275	-	-	564.00	9.83	844	9.79	0.07650	0.790	<0.00500	0.0462	-
7-Jun-05	15.11	1140	-	-	239.00	9.61	804	9.53	0.08430	0.722	<0.00500	0.0327	-
15-Jul-05 <sup>a</sup>	23.56	1276	-	-	94.40	9.30	1100	9.54	0.09250	<0.300	0.00414	0.0534	-
15-Jul-05 <sup>b</sup>	-	-	-	-	-	-	874	9.45	0.09990	0.533	0.00382	<0.0200	-
9-Aug-05 <sup>a</sup>	19.05	1744	-	-	57.20	9.44	1000	9.22	0.12300	0.792	0.00510	0.0499	-
9-Aug-05 <sup>b</sup>	-	-	-	-	-	-	1030	9.05	0.14000	0.339	0.00612	0.0308	-
14-Sept-05 <sup>a</sup>	13.59	1154	-	-	99.80	8.97	790	9.04	0.11000	<0.750	0.00354	<0.0500	-
14-Sept-05 <sup>b</sup>	-	-	-	-	-	-	806	9.03	0.11800	0.877	0.00518	-	-
5-Oct-05	14.82	970	-	-	82.70	8.98	736	8.73	0.08930	0.329	0.00283	0.0263	-
9-Nov-05	8.43	1285	-	-	135.00	8.83	970	9.28	0.04600	0.194	<0.01000	0.0295	-
9-Dec-05	2.12	1361	-	-	14.20	9.71	980	9.54	0.06460	0.179	0.00311	0.0399	-
19-Jan-06	6.66	728	7.96	-	64.70	10.13	470 J	9.77	0.04070	0.181	0.00229	0.0402	-
16-Feb-06	2.63	624	9.75	30.3	25.20	8.54	530 J	8.99	0.01330	<0.150	<0.00100	0.1190	-
15-Mar-06	7.16	639	11.61	236.8	23.10	9.22	530 J	9.19	0.02250	0.167	<0.00100	0.0791	-
7-Apr-06	11.91	1013	10.81	27.8	18.80	9.98	780	9.72	0.06380	0.344	0.00324	0.0483	-
16-May-06	15.58	1160	7.58	50.6	16.50	9.57	950	9.65	0.07790	0.462	0.00249	0.0505	-
23-Jun-06	18.63	1261	7.41	-	126.00	9.85	920	9.35	0.07070	0.228	0.00365	0.0366	-
20-Jul-06	20.65	932	5.36	-35.1	279.00	8.94	980	8.79	0.10800	0.287	0.00348	0.0285	-
22-Aug-06	15.65	860	7.64	86.5	218.00	9.22	760	9.15	0.11600	0.734	0.00384	0.0237	-
26-Sep-06	21.86	903	8.98	-72.8	263.00	8.89	820	8.76	0.07580	0.616	0.00306	0.0558	-
26-Oct-06	11.04	702	9.97	90.4	221.00	8.56	760	8.59	0.06830	<1.500	0.00166	<0.1000	-
15-Nov-06	7.73	715	9.21	149.2	33.60	9.07	500	9.25	0.02080	0.174	0.00229	0.0367	-
20-Dec-06	4.98	1082	9.05	86.3	9.29	9.78	680	9.83	0.05130	0.269	0.00267	0.0549	-
24-Jan-07	2.12	1058	10.71	130.4	20.50	9.97	640 J	9.97	0.06610	<0.150	0.00758	0.0403	-
12-Feb-07	10.10	1218	12.40	-61.8	103.00	9.98	860	9.97	0.09010	0.642	0.00449	0.0451	-
27-Mar-07	7.94	772	9.67	13.3	25.50	8.27	540 J	9.96 J	0.04980	<0.150	0.00274	0.0336	-
18-Apr-07	7.52	2418	9.23	84.4	58.10	11.73	1400	11.4 J	0.07920	0.212	0.01050	0.0296	-
31-May-07	15.45	1879	6.47	-92.2	3.15	9.79	1300	10 J	0.16500	<0.750	0.00811	0.1340	-
20-Jun-07	24.18	1925	10.88	-52.1	251.00	10.24	1300 J	10.1 J	0.14400	<0.150	0.00534	<0.0100	-
31-Jul-07	19.05	1418	5.97	-36.1	128.00	9.81	1200	9.4 J	0.14000	1.070	0.00723	0.0433	-
29-Aug-07	18.00	1193	5.60	-35.4	158.00	9.29	1300 J	9.48 J	0.16400	0.427 J	0.00701	0.0277 J	-
27-Sep-07	14.97	987	5.44	45.9	186.00	8.99	970	9.15 J	0.19600	0.438	0.00549	0.0326	-
26-Oct-07	2.66	504	6.02	63.1	282.00	8.64	770 J	8.17 J	0.04290	0.422	0.00225	0.0602	-
30-Nov-07	1.86	955	9.77	190.1	163.00	10.02	570	8.9 J	0.04890	0.205	0.00162	0.0271	-
12-Dec-07	4.22	790	11.11	126.8	56.00	9.40	520	9.05 J	0.03430	0.179	0.00167	0.0175	-
24-Jan-08	2.12	875	19.35	142.0	-	8.68	640	9.24 J	0.04280	0.162	0.00166	0.0155	-
28-Feb-08	-	-	-	-	25.60	-	510	9.18 J	0.04130	<0.150	0.00266	0.0159	-
25-Mar-08	5.27	937	14.46	91.0	86.80	9.60	630	9.55 J	0.05020	0.180	0.00215	0.0213	-
29-Apr-08	9.02	1079	10.56	190.8	61.30	9.87	670 J	9.76 J	0.06600	0.27 J	0.00287	0.0286	-
20-May-08	15.42	1191	7.58	160.0	91.40	9.75	820	9.7 J	0.08590	0.334	0.00485	0.0432	-
18-Jun-08	12.94	1124	9.62	167.3	76.90	9.65	810 J	9.55 J	0.07760	0.486	0.00367	0.0222	-
26-Aug-08	15.95	880	3.75	53.5	490.00	8.00	650 J	7.81 J	0.07690	0.334	0.00164	0.0713	144
20-Nov-08	6.91	897	7.02	183.5	376.00	10.22	960	10.1 J	0.08720	0.196	0.00421	0.0584 J	313
12-Feb-09	1.29	-	13.72	-	10.20	10.52	800	10.1 J	0.11800	0.177	0.00584	0.0561	271
19-May-09	11.90	862	6.52	71.9	133.00	9.59	840 J	9.9 J	0.09130	0.350	0.00399	0.0366	238
18-Nov-09	5.70	852	6.61	185.9	68.00	9.88	490	-	0.04000	0.700	0.00440	0.0350	160
15-Dec-09	2.30	1162	8.22	460.1	63.30	9.97	640	-	0.07100	0.850	0.00720	0.0500	220
24-Mar-10	13.00	1299	5.83	408.2	13.00	10.48	1,000	-	0.14000	0.720	0.00850	0.0370	340
17-Jun-10	12.00	947	4.45	332.1	33.60	10.56	540	-	0.06200	0.660	0.00620	0.0630	220
22-Sep-10	15.60	1736	3.14	342.5	33.00	9.84	1300	-	0.13000	2.900	0.02100	0.1700 J+	360
8-Dec-10	5.40	1382	7.73	371.1	12.10	10.75	870	-	0.10000	0.490	0.01200	0.0370	300
29-Mar-11	9.60	627	5.16	577.6	19.80	11.05	760 J	-	0.07800	0.200 J+	0.00310	0.0210	270
21-Jun-11	21.00	1778	5.46	239.1	11.60	10.44	1700 J	-	0.07800	0.810	0.01100	0.0650	340
27-Sep-11	14.80	1382	3.98	239.8	33.40	9.58	1600	-	0.12000	1.600	0.01300	0.0820	670

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

Date Sampled	Field Parameters						General Chemistry		Metals (mg/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	pH measured in lab (standard units)	Arsenic	Iron	Lead	Manganese	Potassium
14-Dec-11	3.10	1046	5.60	281.7	15.70	9.93	1100	-	0.08700	1.100	0.01400	0.0630	330
20-Mar-12	6.10	986	11.04	271.1	11.70	10.32	500	-	0.07100	0.470	0.00330	0.0590	180
19-Jun-12	14.80	862	7.83	352.2	38.80	9.57	500	-	0.06400	0.560 J+	0.00370	0.0540	180
20-Sep-12	12.40	1961	1.81	419.0	10.30	9.43	4600 J	-	0.13000	0.480	0.00210	0.0470	440
19-Dec-12	4.10	1320	10.11	303.1	5.86	9.69	700	-	0.07500	0.690	0.00430	0.0710	250
25-Feb-13	7.10	1963	9.30	234.7	26.60	11.30	1000	-	0.09000	0.100 J	0.00600	0.0230	370
22-May-13	10.50	4380	7.72	411.7	202.00	12.56	1400	-	0.02500	<0.500	0.01100	0.0064 J	530
21-Aug-13	20.10	12850	1.24	-2.3	18.20	12.18	3430	-	0.10600	0.270	0.04750	0.0210	1180
20-Nov-13	5.70	1198	8.03	131.9	22.20	10.23	704	-	0.04130	0.210	0.00620	0.0400	260
1-Apr-14	9.80	1708	9.77	136.4	8.79	12.26	832	-	0.02410	0.049 J	0.00300	0.0050 J+	317
23-May-14	12.63	6574	8.63	120.8	-	12.61	2120	-	0.00480	<0.100	0.03540	<0.0020	811
13-Aug-14	18.99	3273	6.29	77.7	89.00	12.34	1660	-	0.07140	<0.100	0.00630 J	0.0070	548
11-Nov-14	8.80	578	3.55	179.2	62.50	12.73	2000	-	0.05670	<0.100	0.02040	<0.0020	739
11-Feb-15	9.70	487	9.97	66.2	42.00	9.40	337	-	0.00910	0.120	0.00090	0.0120	87.7
4-May-15	14.30	4210	5.60	281.2	7.67	12.53	1670	-	0.03530	0.039 J	0.00740	0.0014 J	589
5-Aug-15	19.90	4890	5.14	18.8	89.80	11.79	3080	-	0.08540	0.390	0.01810	0.0120	1150
3-Nov-15	9.20	760	6.39	129.9	34.60	9.78	707	-	0.02350	0.270	0.00530	0.0150	235
9-Feb-16	10.20	-	10.29	100.3	8.01	12.78	1330	-	0.00530	<0.1000	0.02480	0.0030	530
2-May-16 <sup>e</sup>	-	-	-	-	-	-	2490	-	0.02400	0.0754 J	0.0370 J-	0.0041 J	996
23-Aug-16	19.30	4250	3.95	386.5	46.30	11.76	2970	-	0.10500	0.404	0.01430	0.0113	989
1-Nov-16	11.70	229	9.26	185.2	48.90	10.33	508	-	0.01260	0.155	0.00079	0.0067	164
1-Feb-17	2.40	8890	10.78	26.1	3.17	13.36	2220	-	0.01010	<0.250	0.04680	<0.0050	854
30-May-17	14.70	6800	56.90	17.7	1.38	12.73	1720	-	0.00175	0.030 J	0.03160 J+	0.0009 J	759
17-Aug-17	18.10	5410	3.88	-19.5	14.90	11.93	3080	-	0.06260	0.122 J	0.03280	0.0111	1150
10-Nov-17	7.90	2016	7.72	64.4	30.70	12.00	1520	-	0.063	0.156	0.0322	0.0141	578
27-Feb-18	5.70	5062	8.76	42.0	3.74	12.28	1620	-	0.015	<0.1	0.0546	<0.002	678
1-May-18	12.30	6620	5.25	-	1.94	12.73	2070	-	0.00242	0.0117 J	0.03010 J+	0.0010 J	745
21-Aug-18	23.85	5058	2.95	106.0	5.62	11.64	3090	-	0.0773	0.25 U	0.0288	0.0094	1200
6-Nov-18	11.70	1078	3.50	-5.4	46.90	8.48	1180	-	0.00603	<0.5	0.00544	0.0298	359 J+
13-Mar-19	3.90	331	8.08	183.7	29.10	10.72	455	-	0.0119	0.131	0.00221	0.0053	185
8-May-19	17.20	6113	6.38	6.4	6.17	12.39	2040	-	0.0077	0.0246 J	0.0268	0.0018 J	830
26-Aug-19	24.22	4177	2.47	Note 1	7.21	9.12	2840	-	0.0172 J	0.405 J	0.00527 J	0.0172 J	1020
13-Nov-19	8.70	2523	1.61	-201.7	33.00	8.67	1930	-	0.0325	0.211	0.00444	0.024	726
12-Feb-20	7.80	971	7.99	150.3	16.00	7.92	836	-	0.0143	0.0234 J	0.00396	0.0279	243
12-Aug-20	18.30	3655	4.33	123.5	5.74	8.98	2570	-	0.0208	0.124 J	0.00259	0.0048 J	988
9-Dec-20	8.30	740	7.80	202.0	18.40	8.21	632	-	0.0149	0.686	0.00511	0.0172	207
3-Mar-21	8.30	1446	7.87	217.0	15.50	8.56	1310	-	0.0353	0.118	0.00611	0.0079 J	509
9-Jun-21	15.10	2963	4.88	174.9	4.37	8.79	2400	-	0.0237	-	0.00151	-	923
Preliminary Standard <sup>c</sup>	-	700	-	-	-	6.5-8.5	500	6.5-8.5	TBD <sup>d</sup>	0.3	0.05	0.05	-

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.

- Not analyzed or not available
- < Analyte not detected above the reporting limit shown
- a North Creek Analytical, Inc.
- b Severn Trent Laboratories
- c Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest
- d Site background arsenic value to be determined (TBD)
- e 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
- feet bmp Feet below measuring point
- feet msl Feet above mean sea level
- mg/L Milligrams per liter
- mV Millivolts
- NTU Nephelometric Turbidity Unit

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

Date Sampled	Field Parameters							General Chemistry		Metals (mg/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	pH (standard units)	Weir Flow Rate (gpm)	Total Dissolved Solids (mg/L)	pH measured in lab (standard units)	Arsenic	Iron	Lead	Manganese	Potassium
1-Feb-05	8.47	2205	-	-	6.24	10.23	-	1440	10.37	0.14900	0.323	0.01070	0.0569	-
9-Mar-05	11.38	2054	-	-	7.80	10.15	2.64	1630	10.11	0.20000	0.526	0.01190	0.0938	-
5-Apr-05	7.7	2169	-	-	7.99	10.42	10.00	1420	10.18	0.12900	1.150	0.00861	0.0540	-
10-May-05	14.1	1912	-	-	562.00	9.87	25.00	1210	9.85	0.10500	1.460	0.00763	0.0818	-
7-Jun-05	15.74	2588	-	-	11.60	10.03	6.82	1570	10.18	0.13800	1.470	0.01010	0.1170	-
15-Jul-05 <sup>a</sup>	20.38	3184	-	-	8.91	10.36	0.94	3200	10.3	0.19200	0.367	0.00998	0.2060	-
15-Jul-05 <sup>b</sup>	-	-	-	-	-	-	-	1990	10.44	0.18900	1.460	0.01080	0.1640	-
9-Aug-05 <sup>a</sup>	-	-	-	-	-	-	Dry	-	-	-	-	-	-	-
9-Aug-05 <sup>b</sup>	-	-	-	-	-	-	Dry	-	-	-	-	-	-	-
14-Sept-05 <sup>a</sup>	15.60	3792	-	-	14.50	9.92	0.07	2800	10	0.20800	1.250	0.05780	0.1000	-
14-Sept-05 <sup>b</sup>	-	-	-	-	-	-	-	2730	10.16	0.22300	1.070	0.07330	-	-
5-Oct-05	12.96	3237	-	-	4.99	9.89	0.32	2150	9.97	0.17000	1.430	0.01250	0.2250	-
9-Nov-05	8.40	2545	-	-	13.80	9.64	7.50	1900	9.88	0.07820	0.167	<0.01000	0.0835	-
9-Dec-05	3.34	1377	-	-	8.03	10.43	5.00	1700	10.4	0.13000	0.189	0.00612	0.0857	-
19-Jan-06	7.37	1424	7.92	-	12.20	10.61	7.50	1000 J	10.4	0.08950	0.449	0.00481	0.1040	-
16-Feb-06	3.74	1680	12.19	*	14.60	10.78	7.50	1400 J	10.8	0.10500	0.343	0.00546	0.0817	-
15-Mar-06	7.21	1634	12.61	194.4	7.44	10.63	5.28	1300 J	10.7	0.12800	0.204	0.00638	0.0750	-
7-Apr-06	14.33	2055	8.54	55.3	9.21	10.84	3.17	1500	10.4	0.14300	0.552	0.00663	0.1140	-
16-May-06	21.65	2474	6.09	11.6	9.37	10.69	0.83	2000	10.6	0.15700	0.921	0.00819	0.2000	-
23-Jun-06	24.58	2820	6.66	-	15.40	11.64	0.63	1400	10.6	0.15400	0.210	0.01310	0.1090	-
20-Jul-06	21.17	3291	8.56	-85.5	68.30	10.75	Dry*	2300	10.8	0.13100	0.454	0.00941	0.0406	-
22-Aug-06	-	-	-	-	-	-	Dry	-	-	-	-	-	-	-
26-Sep-06	16.38	2997	3.00	-57.1	31.60	9.92	Dry*	2900	9.94	0.10300	1.070	0.01680	0.1010	-
26-Oct-06	11.00	2650	5.35	59.6	25.80	9.65	0.63	2300	9.45	0.13200	2.220	0.02630	<0.100	-
15-Nov-06	8.51	1708	8.16	-35.7	34.70	10.15	17.14	1200	10.1	0.06740	0.518	0.00807	0.0794	-
20-Dec-06	5.07	1927	8.84	14.8	7.94	10.67	10.91	1200	10.5	0.09970	0.384	0.00478	0.0844	-
24-Jan-07	2.30	1846	10.72	5.9	11.70	10.37	9.00	1100 J	10.6	0.12600	0.359	0.01610	0.0729	-
12-Feb-07	9.26	1777	11.75	-91.3	26.70	10.56	6.00	1100	10.3	0.13900	0.283	0.00712	0.0808	-
27-Mar-07	8.71	1219	9.18	-12.6	13.80	8.70	24.00	840 J	10.2 J	0.08850	0.289	0.00486	0.0821	-
18-Apr-07	7.39	4563	8.65	41.0	16.80	12.12	9.00	2000	11.9 J	0.09750	0.830	0.03250	0.0408	-
31-May-07	-	3916	6.33	-149.5	10.70	10.96	1.36	2100	11.5 J	0.27500	<0.750	0.02290	0.1560	-
20-Jun-07	22.59	3336	8.50	-20.4	42.50	10.46	0.29	2400 J	10.4 J	0.25500	<0.150	0.02740	0.0309	-
31-Jul-07	18.94	3915	7.85	-69.2	41.30	10.92	0.06	3300	10.8 J	0.23600	1.100	0.01260	0.0846	-
29-Aug-07	21.52	2406	5.75	-5.3	24.10	9.72	Dry*	2300 J	9.53 J	0.12900	0.627	0.00845	0.1940	-
27-Sep-07	13.88	2009	5.75	15.5	28.30	9.56	0.06	1600	9.51 J	0.20700	1.150	0.00437	0.4170	-
26-Oct-07	7.68	1662	9.06	80.5	13.00	9.92	2.04	1800 J	9.74 J	0.13200	0.591	0.00753	0.1960	-
30-Nov-07	4.34	2446	9.63	26.7	11.70	9.86	2.63	1600	9.74 J	0.13500	0.432	0.00827	0.1000	-
12-Dec-07	5.88	2056	10.34	39.3	10.30	10.18	2.63	1500	9.85 J	0.10500	0.324	0.00573	0.0784	-
24-Jan-08	3.05	1601	15.03	42.3	-	9.40	2.63	1000	9.73 J	0.08740	0.451	0.00406	0.1500	-
28-Feb-08	-	-	-	-	9.22	-	4.13	1200	10.1 J	0.11800	0.260	0.00892	0.0714	-
25-Mar-08	6.80	1622	12.37	95.1	16.40	9.98	5.25	1100	9.98 J	0.11000	0.307	0.00386	0.0683	-
29-Apr-08	7.53	1997	9.10	137.4	11.90	10.29	7.50	1100 J	10.4 J	0.12400	0.328	0.00705	0.0789	-
20-May-08	16.35	2504	9.03	77.4	32.90	10.92	7.50	1700	10.8 J	0.14600	0.558	0.01470	0.1580	-
18-Jun-08	11.82	2925	8.32	68.3	25.70	11.14	1.69	1800 J	10.9 J	0.20800	0.351	0.00848	0.1540	-
26-Aug-08	17.69	3376	7.98	62.8	41.10	10.43	0.84	2200 J	10.3 J	0.28700	0.391	0.01320	0.4630	647
20-Nov-08	8.10	1447	9.65	112.0	43.70	11.00	11.25	1400	10.6 J	0.12100	0.386	0.01620	0.0888	485
12-Feb-09	2.99	1214	14.46	-	14.60	10.93	4.06	1200	10.6 J	0.21900	0.410	0.01180	0.0986	434
19-May-09	13.05	1962	7.92	32.6	36.70	10.23	7.50	1800 J	10.8 J	0.21000	0.620	0.01370	0.1430	521
24-Sep-09	16.30	2792	1.59	263.8	13.70	8.82	Dry*	2400	-	0.13000	8.600	0.05300	0.6400	730
15-Dec-09	2.80	1702	7.47	343.0	-	10.18	6.67	1200	-	0.17000	2.300	0.02200	0.1200	330
24-Mar-10	13.80	2629	2.09	270.7	263.00	11.46	6.03	1800	-	0.18000	0.660	0.02000	0.0360	600
17-Jun-10	12.00	1876	0.01	-	157.00	10.76	14.15	1200	-	0.02700	1.600	0.00390	0.1700	410
20-Sep-10	11.40	3100	6.34	198.6	12.20	10.63	2.38	2800	-	0.25000	4.800	0.04000	0.4600	580
7-Dec-10	6.60	2455	4.03	154.0	11.00	11.61	16.69	1600	-	0.24000	1.300	0.02600	0.0710	510
30-Mar-11	8.10	848	0.22	136.1	31.50	13.08	58.61	940 J	-	0.09100	0.720 J+	0.00990	0.0500	330
22-Jun-11	14.40	2286	5.68	164.2	13.20	11.28	5.68	2600 J	-	0.12000	1.200	0.02500	0.1000	490

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

Date Sampled	Field Parameters							General Chemistry		Metals (mg/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)	pH (standard units)	Weir Flow Rate (gpm)	Total Dissolved Solids (mg/L)	pH measured in lab (standard units)	Arsenic	Iron	Lead	Manganese	Potassium
27-Sep-11	16.20	1911	4.62	253.4	39.10	10.07	13.40	2100	-	0.17000	4.900	0.04500	0.4400	880
15-Dec-11	4.10	1439	7.40	139.4	10.60	10.33	6.65	1400	-	0.18000	2.000	0.02100	0.1100	500
20-Mar-12	5.20	1687	8.50	27.5	9.60	11.17	60.00	410	-	0.13000	0.970	0.00740	0.1700	290
18-Jun-12	14.70	2336	0.11	326.9	15.60	11.25	60.00	410	-	0.13000	1.000 J+	0.00980	0.0540	430
20-Sep-12	15.30	2972	7.81	106.0	12.10	9.55	0.10	1400 J	-	0.13000	0.460	0.00220	0.0480	450
18-Dec-12	4.80	1908	9.34	-14.2	7.41	10.28	18.50	870	-	0.12000	1.100	0.00810	0.3000	390
26-Feb-13	5.80	6470	11.27	161.6	22.00	12.46	9.90	1800	-	0.09900	<0.500	0.06200	0.0200	710
23-May-13	10.50	1625	9.14	291.8	14.40	9.93	4.84	980	-	0.09400	2.100	0.02100	0.1500	310
21-Aug-13	15.70	7260	7.69	51.6	9.00	10.71	0.32	2780	-	0.34200	0.770	0.01830	0.1610	954
19-Nov-13	8.10	2032	10.00	87.4	9.95	11.19	25.40	1270	-	0.07080	0.350	0.01690	0.0800	487
1-Apr-14	13.70	3420	9.11	129.4	59.00	12.57	20.77	1300	-	0.03730	0.120	0.01200	0.0160	572
23-May-14	12.83	986	11.63	105.7	-	9.36	-	822	-	0.04700	0.550	0.01390	0.1950	274
13-Aug-14	18.38	2000	5.52	63.6	8.93	8.02	2.00	1250	-	0.01340	0.050	0.00060	0.4140	326
11-Nov-14	6.70	259	9.77	164.8	4.27	8.09	1.50	955	-	0.01900	0.080	0.00020	0.0780	315
12-Feb-15	10.00	669	11.13	142.9	2.75	8.62	40.00	1490	-	0.01490	0.310	0.00180	0.2020	155
4-May-15	13.70	1293	8.69	181.7	155.00	9.38	0.09	1100	-	0.04330	0.660	0.01130	0.1700	292
5-Aug-15	Dry	Dry	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	-	0.01140	0.120	0.00080	0.1690	355
9-Feb-16	9.10	838	8.79	181.4	2.17	7.87	0.69	529	-	0.00780	0.110	0.00050 J+	0.0630	145
2-May-16	23.40	1126	6.16	128.1	7.59	7.63	Dry*	688	-	0.00760	0.023 J	0.00006 J-	0.3240	162
23-Aug-16	Dry	Dry	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	-	0.00918	0.097	0.00030	0.0223	207
1-Feb-17	2.30	925	11.55	39.1	2.04	7.71	0.30	567	-	0.00490	<0.050	0.00009 J	0.0397	135
30-May-17	13.30	817	57.50	8.3	22.20	7.40	0.30	516	-	0.01310	0.526	0.00008 J+	3.4700	94
17-Aug-17	Dry	Dry	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	-	0.0366	1.33	0.0107	0.284	236
27-Feb-18	5.50	498	10.68	106.0	5.39	8.60	-	503	-	0.00970	0.174	0.00123	0.0488	127
1-May-18	12.80	894	8.87	-	2.39	7.97	-	656	-	0.00781	0.0212 J	<0.00010 J	0.0762	195
21-Aug-18	Dry	Dry	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	-	0.01570	<0.05	0.000089 J	0.0244	322 J+
11-Mar-19	5.00	525	9.79	146.3	1.28	7.76	-	541	-	0.00421	0.0035 J	<0.0001	0.0050	133
9-May-19	Dry	Dry	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	Dry	Dry
14-Nov-19	7.40	842	4.10	214.3	19.00	7.74	Dry*	783	-	0.01130	0.0146 J	0.000076 J	0.1560	242
12-Feb-20	7.20	401	8.41	-38.3	2.47	7.53	3.96	348	-	0.00481	0.0201 J	0.0001 U	0.0106	87
13-Aug-20	Dry	Dry	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	-	0.00513	0.029 J	0.0001 U	0.0089	126
4-Mar-21	4.90	427	7.11	146.0	2.50	7.86	3	424	-	0.00370	0.0386 J	0.00011	0.0156	81
10-Jun-21	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	DRY	DRY
Preliminary Standard <sup>c</sup>	-	700	-	-	-	6.5-8.5	-	500	6.5-8.5	TBD <sup>d</sup>	0.3	0.05	0.05	-

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.

- \* 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
- < Analyte not detected above the reporting limit shown
- a North Creek Analytical, Inc.
- b Severn Trent Laboratories
- c Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest
- d Site background arsenic value to be determined (TBD)
- 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 msl Feet above mean sea level
- 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						General Chemistry		Metals (mg/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	pH measured in lab (standard units)	Arsenic	Iron	Lead	Manganese	Potassium
1-Feb-05	7.13	9580	-	-	4.19	13.02	4080	12.61	0.17400	1.140	0.02430	0.0694	-
9-Mar-05	14.28	9979	-	-	6.79	12.52	4640	12.57	0.24000	0.988	0.04210	0.0853	-
5-Apr-05	9.90	10820	-	-	43.50	11.99	3830	12.31	0.13300	2.520	0.00985	0.1280	-
10-May-05	15.10	6091	-	-	45.60	12.14	3270	12.4	0.09290	0.866	0.02550	0.0339	-
7-Jun-05	14.49	8257	-	-	24.20	12.19	3780	12.32	0.13200	1.540	0.02470	0.0526	-
15-Jul-05 <sup>a</sup>	18.34	6937	-	-	6.89	11.69	5000	11.6	0.28100	1.260	0.03180	0.0922	-
15-Jul-05 <sup>b</sup>	-	-	-	-	-	-	4260	11.8	0.23700	0.286	0.03420	<0.0200	-
9-Aug-05 <sup>a</sup>	23.53	7654	-	-	17.1	10.26	6600	10.3	0.32200	8.360	0.04450	0.1480	-
9-Aug-05 <sup>b</sup>	-	-	-	-	-	-	5580	10.35	0.34000	0.648	0.03710	0.0828	-
14-Sept-05 <sup>a</sup>	18.55	6730	-	-	10.00	10.51	5100	11.1	0.23500	1.860	0.01930	0.1550	-
14-Sept-05 <sup>b</sup>	-	-	-	-	-	-	4750	11.78	0.26800	2.270	0.03420	-	-
5-Oct-05	12.14	4323	-	-	17.60	9.80	3090	10.15	0.13000	0.947	0.02650	0.0638	-
9-Nov-05	6.78	3784	-	-	11.80	11.12	2600	11.5	0.12100	0.504	0.02170	0.0802	-
9-Dec-05	3.22	8745	-	-	12.90	12.85	3900	12.3	0.17500	5.720	0.01410	0.1490	-
19-Jan-06	7.73	5215	5.43	-	13.30	12.52	2000 J	12.3 J	0.02030	0.556	0.00324	0.0355	-
16-Feb-06	3.96	9342	8.97	231.2	9.08	12.30	4100 J	12.6	0.04300	1.480	0.02560	0.0548	-
15-Mar-06	8.72	12910	9.59	222.1	7.64	12.60	5100 J	12.7	0.03860	<0.150	0.04180	<0.0100	-
7-Apr-06	14.26	15220	6.90	18.9	3.65	12.92	5700	12.7	0.04850	0.382	0.06560	0.0119	-
16-May-06	19.75	10880	2.61	33.8	15.40	12.46	5100	12.6	0.13000	3.200	0.09210	0.0916	-
23-Jun-06	22.76	7586	2.98	-	14.10	12.65	5100	11.9	0.13000	0.606	0.05790	0.0618	-
20-Jul-06	24.33	7457	0.73	-148.4	16.70	11.33	6400	11.5	0.27200	1.180	0.05130	0.0418	-
22-Aug-06	15.03	7481	3.75	61.0	14.10	10.40	6100	10.3	0.31800	0.824	0.03320	0.0390	-
26-Sep-06	17.30	8409	1.31	-312.4	15.10	12.38	5500	12.2	0.23000	0.966	0.04570	0.0490	-
26-Oct-06	10.95	6075	4.10	-265.6	13.30	12.18	4600	11.7	0.24300	3.980	0.04150	<0.2000	-
15-Nov-06	8.07	5022	7.71	-152.7	21.50	12.24	2600	11.9	0.07620	0.217	0.00368	0.1110	-
20-Dec-06	6.32	9148	5.73	-139.6	12.20	12.85	2900 J	12.6	0.04610	1.630	0.00128	0.0820	-
24-Jan-07	2.15	12690	9.24	-98.4	9.74	13.10	3000 J	12.4	0.01920	<0.150	0.02680	<0.0100	-
12-Feb-07	9.35	14110	8.43	-86.7	32.50	13.13	4700	12.6	0.09620	<0.150	0.08350	0.0233	-
27-Mar-07	9.16	10560	8.41	-46.2	7.42	11.31	2900 J	12.5 J	0.00598	<0.150	0.01450	<0.0100	-
18-Apr-07	8.27	14570	8.32	10.8	10.30	12.79	5200	12.5 J	0.01980	<0.300	0.02210	<0.0200	-
31-May-07	23.66	13410	6.42	-95.0	31.20	11.77	5100	12.5 J	0.07840	<1.500	0.05040	<0.100	-
20-Jun-07	26.35	10050	5.53	-195.7	27.90	12.29	5300 J	12.4 J	0.11200	0.315	0.03820	0.0207	-
31-Jul-07	21.39	6666	4.76	-106.4	72.00	10.86	6300	10.9 J	0.20800	2.540	0.06880	0.1160	-
29-Aug-07	22.61	6950	1.57	-193.4	61.80	12.05	6300 J	11.7 J	0.14900	0.835	0.03060	0.0710	-
27-Sep-07	11.45	5059	2.66	-180.4	78.40	11.43	4800	11.3 J	0.19000	1.430	0.01740	0.1140	-

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

Date Sampled	Field Parameters						General Chemistry		Metals (mg/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	pH measured in lab (standard units)	Arsenic	Iron	Lead	Manganese	Potassium
26-Oct-07	6.98	4147	1.44	-204.7	39.50	12.48	3900 J	11.8 J	0.16800	1.510	0.02550	0.0861	-
30-Nov-07	2.86	5030	8.50	-74.9	12.40	12.20	2600	11.7 J	0.12100	0.885	0.01430	0.1120	-
12-Dec-07	4.45	3564	2.03	-141.8	20.70	10.93	2700	11 J	0.07930	1.130	0.00987	0.1640	-
24-Jan-08	1.13	4859	4.10	-186.8	-	11.19	2200	12.4 J	0.08610	<0.150	0.00679	<0.0100	-
28-Feb-08	-	-	-	-	18.10	-	2800	11.2 J	0.18300	0.499	0.07340	0.0279	-
25-Mar-08	7.37	5413	7.88	-58.2	122.00	12.29	2900	11.7 J	0.18200	0.548	0.01300	0.0583	-
29-Apr-08	8.43	3685	9.04	59.3	19.20	11.63	2400 J	11.2 J	0.15200	0.708	0.01600	0.0520	-
20-May-08	18.03	3554	6.69	58.0	156.00	11.01	2100	10.8 J	0.13700	0.406	0.03830	0.0688	-
18-Jun-08	13.01	5680	6.46	57.5	71.80	11.14	4000 J	11 J	0.27900	0.381	0.03440	0.0423	-
26-Aug-08	18.02	2800	5.72	16.9	49.80	10.08	2500 J	9.9 J	0.09170	0.404	0.01860	0.0532	557
20-Nov-08	7.46	2011	9.04	38.3	23.60	10.49	2300	10.1 J	0.07290	1.980	0.00920	0.1710	566
12-Feb-09	1.63	1870	11.74	-	46.10	10.83	2300	10.6 J	0.12900	0.982	0.01720	0.1130	738
19-May-09	12.73	1895	5.37	-16.4	168.00	9.82	1700 J	9.94 J	0.07890	1.320	0.01130	0.0736	515
23-Sep-09	21.50	4190	0.09	175.1	14.40	9.70	4100	-	0.12000	4.500	0.09900	0.0890	1300
14-Dec-09	+	+	+	+	+	+	+	+	+	+	+	+	+
22-Mar-10	13.10	2480	-	342.0	15.60	10.05	1700	-	0.07600	5.700	0.03400	0.1400	520
17-Jun-10	13.40	2429	5.14	-	26.10	10.77	2100	-	0.12000	7.700	0.08900	0.1100	630
21-Sep-10	16.30	2733	1.10	216.8	21.50	9.81	2200	-	0.02500	4.400 J	0.02700	0.2400	510
8-Dec-10	6.00	1994	2.70	-	18.70	10.05	1400	-	0.05300	6.000	0.01800	0.2100	490
30-Mar-11	9.10	509	0.37	179.2	13.80	12.04	730 J	-	0.03600	3.000	0.01400	0.0760	260
21-Jun-11	21.60	2092	1.90	192.2	13.60	10.07	2800 J	-	0.06200	4.300	0.02900	0.0890	380
27-Sep-11	14.60	1516	9.34	220.4	32.50	9.34	1800	-	0.07800	2.800	0.03600	0.0580	780
15-Dec-11	3.00	1449	1.90	94.6	13.80	10.75	2100	-	0.14000	6.200	0.07400	0.0810	630
21-Mar-12	2.60	1088	8.10	285.7	13.10	9.95	780	-	0.03000	2.800	0.00720	0.0580	240
19-Jun-12	17.10	1747	5.54	345.3	10.80	9.93	780	-	0.07000	4.200	0.02900	0.0620	400
20-Sep-12	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Dec-12	4.00	1771	6.37	104.0	6.12	10.71	1300	-	0.04700	4.000	0.01800	0.0960	440
26-Feb-13	6.90	3720	5.40	196.7	10.60	11.86	1100	-	0.14000	4.000	0.03900	0.1000	690
23-May-13	11.50	2335	5.21	323.5	44.10	12.48	1800	-	0.13000	3.100	0.05000	0.0510	530
22-Aug-13	Dry	Dry	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	-	0.03980	0.650	0.02040	0.0590	487
1-Apr-14	15.30	2053	4.42	130.9	772.00	11.27	1800	-	0.11300	1.270	0.04220	0.0520	649
23-May-14	14.15	2187	5.50	77.3	-	10.19	1860	-	0.11200	1.180	0.02360	0.0840	623
13-Aug-14	20.29	1298	5.35	40.1	24.80	9.63	949	-	0.04490	0.560	0.02280	0.0480	306
12-Nov-14	1.30	315	4.55	-0.5	22.10	10.45	2440	-	0.12200	1.160	0.03420	0.0480	804

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

Date Sampled	Field Parameters						General Chemistry		Metals (mg/L)				
	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (Rel mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	pH measured in lab (standard units)	Arsenic	Iron	Lead	Manganese	Potassium
12-Feb-15	11.10	1267	4.01	-8.2	23.90	10.20	905	-	0.02720	2.500	0.00960	0.0440	320
4-May-15	15.60	3200	4.35	240.5	9.21	10.42	2280	-	0.15400	1.320	0.03080	0.0580	774
5-Aug-15	Dry	Dry	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	-	0.02800	0.660	0.02820	0.0430	364
9-Feb-16	7.30	1672	3.45	95.9	7.79	10.45	1170	-	0.05100 J+	0.880	0.03400	0.0540	410
3-May-16	14.20	3150	3.61	335.2	63.80	10.35	2260	-	0.14800	1.430	0.09790 J-	0.0600	777
24-Aug-16	Dry	Dry	Dry	Dry	Dry	Dry	Dry	-	Dry	Dry	Dry	Dry	Dry
1-Nov-16	12.10	401	5.56	-65.9	15.00	9.43	742	-	0.02190	0.423	0.01410	0.0213	356
1-Feb-17	2.10	2064	4.82	5.0	17.80	10.27	1330	-	0.05760	0.963	0.13900	0.0693	455
31-May-17	14.50	2594	5.36	-	22.70	9.93	1920	-	0.10500	0.888	0.05150 J+	0.0472	664
17-Aug-17	Dry	Dry	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	-	0.0588	1.46	0.0534 J+	0.0661	441
27-Feb-18	6.50	1379	4.05	-71.0	6.11	10.94	865	-	0.06170	0.752	0.0477 J-	0.0267	429
2-May-18	11.60	2547	-	-	25.30	10.36	1860	-	0.08590	0.886	0.02670 J+	0.0436	611
22-Aug-18	Dry	Dry	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	-	0.07600	0.950	0.06550	0.0450	333 J+
11-Mar-19	10.60	1354	5.93	-18.7	7.19	10.31	1270	-	0.04930	0.708	0.04170	0.0833	458
9-May-19	Dry	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	Dry
14-Nov-19	8.70	1180	5.98	30.9	7.38	9.03	1120	-	0.0672	0.787	0.0764	0.0599	418
13-Feb-20	4.30	1032	2.51	-126.9	6.10	10.46	927	-	0.0281	0.466	0.0130	0.0680	348
13-Aug-20	Dry	Dry	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	-	0.0120	0.993	0.0066	0.0382	318
4-Mar-21	8.10	1271	1.98	38.0	8.02	10.35	4820	-	0.0506	4.370	0.0357	0.0864	435
10-Jun-21	DRY	DRY	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY	DRY	DRY	DRY
Preliminary Standard <sup>c</sup>	-	700	-	-	-	6.5-8.5	500	6.5-8.5	TBD <sup>d</sup>	0.3	0.05	0.05	-

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.

- Not analyzed or not available
- < Analyte not detected above the reporting limit shown
- + 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 standard is the standard listed or the site-specific (natural) background concentration, whichever is highest
- d Site background arsenic value to be determined (TBD)
- 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 msl Feet above mean sea level
- mg/L Milligrams per liter
- mV Millivolts
- NTU Nephelometric Turbidity Unit

**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-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 (mg/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	Iron	Lead	Manganese
15-Jul-05	35.43	574.40	15.17	883	-	-	358.00	7.03	664	0.00847	<0.100	<0.00200	0.6020	-
9-Nov-05	31.83	578.00	10.77	1037	-	-	22.20	6.89	680	0.00345	<0.150	<0.00100	0.0286	-
15-Feb-06	23.91	585.92	9.14	623	1.53	497.4	6.76	7.26	470 J	0.00325	<0.150	<0.00100	<0.0100	-
17-May-06	31.91	577.92	11.32	1029	1.33	121.6	10.30	7.18	600	0.00518	<0.150	<0.00100	0.3160	-
23-Aug-06	35.35	574.48	19.21	481	5.97	60.4	6.30	6.67	340	0.00170	<0.150	<0.00100	0.0234	-
14-Nov-06	20.00	589.83	10.35	635	4.55	95.1	22.20	7.23	550	0.00307	<0.150	<0.00100	0.0131	-
14-Feb-07	29.29	580.54	11.13	435	3.88	85.6	32.10	6.76	260	0.00200	<0.150	<0.00100	0.0116	-
30-May-07	32.90	576.93	10.30	545	6.63	145.7	6.93	6.81	320	0.00248	<0.150	<0.00100	<0.0100	-
27-Aug-07	35.68	574.15	10.49	428	7.13	76.7	8.65	6.95	260 J	0.00187	<0.150	<0.00100	0.0189	-
29-Nov-07	32.75	577.08	10.10	625	7.14	144.3	12.20	6.96	340 J	0.00232	<0.150	<0.00100	<0.0100	-
27-Feb-08	27.83	582.00	-	-	-	-	19.60	-	320	0.00258	<0.150	<0.00100	<0.0100	-
20-May-08	31.86	577.97	10.22	471	6.38	177.0	109.00	6.48	290 J	0.00224	<0.150	<0.00100	0.0253	-
27-Aug-08	36.04	573.79	9.84	427	7.40	118.4	63.60	7.08	260	0.00205	<0.150	<0.00100	0.0173	23.0
26-Sep-08	<i>Test Trench Drain Line Installed</i>													
16-Oct-08	35.65	574.18	9.51	443	9.78	113.9	38.00	7.38	260 J	0.00179	<0.150	<0.00100	0.0136	22.9
20-Nov-08	25.62	584.21	9.49	563	6.11	231.0	5.48	7.18	430	0.00368	<0.150	<0.00100	<0.0100	106.0
30-Dec-08	23.14	586.69	9.84	402	8.40	106.9	8.92	7.25	280 J	0.00247	<0.150	<0.00100	0.0130	43.9
15-Jan-09	20.66	589.17	8.40	336	9.65	229.6	1.07	6.88	290	0.00225	<0.150	<0.00100	<0.0100	35.7
12-Feb-09	30.00	579.83	9.05	372	8.46	-	16.70	7.34	320	0.00193	<0.150	<0.00100	0.0165	27.0
12-Mar-09	31.30	578.53	9.13	409	8.60	174.9	15.80	7.03	340	0.00166	<0.150	<0.00100	<0.0100	20.6
16-Apr-09	23.88	585.95	8.17	343	10.24	131.8	13.50	6.78	310	0.00177	<0.150	<0.00100	<0.0100	24.6
19-May-09	30.50	579.33	8.99	392	8.69	82.6	23.70	7.75	340 J	0.00156	<0.150	<0.00100	<0.0100	19.6
23-Jun-09	34.00	575.83	9.21	480	9.56	79.0	22.90	7.89	430	<0.00200	<0.200	<0.00200	<0.0200	20.0
25-Aug-09	36.95	572.88	13.10	373	6.47	311.9	4.98	6.76	270 J+	0.00064 J	<0.200	<0.00200	0.0042 J	17.0
23-Sep-09	37.12	572.71	11.30	336	6.90	368.3	21.30	6.73	240	<0.00200	0.054 J	0.00018 J	0.0120 J	14.0
15-Dec-09	28.30	581.53	9.20	643	5.30	567.0	18.00	6.72	330	<0.00200	0.033 J	<0.00200	0.0065 J	26.0
24-Mar-10	30.03	579.80	9.80	562	5.72	545.9	5.04	6.74	370	0.00190 J	<0.200	<0.00200	<0.0200 U	19.0
16-Jun-10	23.55	586.28	9.20	506	5.93	405.4	16.10	6.53	<40	0.00360	0.110 J	<0.00200	0.0110 J	20.0
21-Sep-10	35.89	573.94	10.40	593	4.82	288.5	117.00	6.96	370	0.00260	<0.200	0.00023 J	0.0350 J+	19.0
7-Dec-10	27.39	582.44	10.00	504	1.45	198.4	139.00	7.15	330	0.00230	0.650	<0.00200	0.1700	14.0
29-Mar-11	29.76	580.07	8.10	247	2.47	169.0	6.81	7.14	300	0.00240	0.290 J+	<0.00200	0.0540	15.0
21-Jun-11	30.45	579.38	9.30	606	4.58	332.9	3.56	7.17	400 J	<0.00500	<0.200	<0.00200	0.0100 J	16.0
27-Sep-11	36.65	573.18	9.90	366	7.27	356.2	2.18	6.85	310	<0.00500	<0.200	<0.00200	0.0060 J	17.0
14-Dec-11	31.53	578.30	9.20	407	1.97	234.7	20.40	7.09	370	<0.00500	0.330	<0.00200	0.0860	16.0
20-Mar-12	21.60	588.23	7.70	561	7.06	385.4	4.80	7.18	280	0.00230	<0.200	<0.00040	0.0029 J	16.0

**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 (mg/L)				
	Depth to Water (feet btpc)	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	Iron	Lead	Manganese
19-Jun-12	21.60	588.23	10.00	575	7.04	378.2	5.60	7.31	330	0.00250	<0.200	<0.00040	0.0068 J	16.0
19-Sep-12	36.42	573.41	11.30	561	8.76	286.0	2.49	7.02	310	0.00240	<0.200	<0.00040	<0.0200	17.0
19-Dec-12	23.43	586.40	9.30	671	6.67	348.2	0.74	7.26	<20	0.00170	<0.200	<0.00040	<0.0200	17.0
25-Feb-13	29.32	580.51	8.00	572	9.51	337.0	26.00	7.28	300	0.00250	<0.500	<0.00040	<0.0200	16.0
22-May-13	31.23	578.60	9.00	518	8.59	397.7	4.68	7.40	310	0.00180	<0.500	<0.00040	<0.0200	15.0
21-Aug-13	37.02	572.81	10.20	534	9.27	152.7	1.46	7.11	227	0.00120	<0.050	<0.00010	0.0030	14.1
20-Nov-13	29.69	580.14	9.50	852	7.62	243.5	39.50	6.75	419	0.00160	<0.050	<0.00010	0.0020	19.9
1-Apr-14	23.29	586.54	8.90	347	7.60	248.1	2.54	7.30	247	0.00200	<0.050	<0.00010	<0.0007	16.5
21-May-14	28.31	581.52	9.50	349	4.02	178.6	-	7.12	280	0.00180	<0.050	<0.00010	0.0150	15.1
13-Aug-14	36.52	573.31	12.10	441	9.22	51.9	6.20	7.10	283	0.00140	<0.050	<0.00010	0.0030	15.2
13-Nov-14	31.63	578.20	11.50	438	8.80	173.0	14.70	7.10	352	0.00160	<0.050	<0.00010	0.0020	17.1
11-Feb-15	23.02	586.81	9.40	498	3.89	98.1	10.50	7.72	319	0.00910	0.180	0.00030	0.0040	42.9
4-May-15	31.93	577.90	9.80	578	7.35	416.9	1.05	7.26	413	0.00170	0.008 J	<0.00010	0.0100	16.0
6-Aug-15	37.65	572.18	10.70	447	0.17	71.6	49.00	7.21	343	0.00390	0.110	<0.00010	0.2140	10.3
4-Nov-15	32.89	576.94	9.50	657	8.56	240.5	5.70	6.92	554	0.00230	0.013 J	<0.00010	<0.0010	49.3
10-Feb-16	25.39	584.44	9.80	322	7.36	204.8	3.21	7.31	202	0.00200	0.0076 J	<0.00010	0.0070	22.2
2-May-16	32.32	577.51	10.80	579	5.95	250.2	4.70	7.02	350	0.00180	<0.050	0.00004 J	0.0040	17.8
23-Aug-16	37.66	572.17	11.00	488	1.34	459.9	259.00	7.08	413	0.00388	0.130	0.00007 J	0.6220	14.6
2-Nov-16	31.30	578.53	9.70	280	3.94	225.0	6.13	7.18	531	0.00213	<0.050	0.00012	0.0020	37.7
1-Feb-17	29.01	580.82	8.60	510	5.26	187.7	0.97	7.04	270	0.00147	<0.050	<0.00010	0.0035	19.0
30-May-17	28.47	581.36	9.50	483	6.89	4.7	4.85	6.96	290	0.00209	0.005 J	<0.00010	0.0034	15.7
17-Aug-17	36.30	573.53	10.50	536	3.79	82.5	6.44	6.96	283	0.00155	0.061	<0.00010	0.0524	15.5
9-Nov-17	32.20	577.63	9.20	460	5.89	75.1	2.70	7.01	380	0.00163	<0.05	<0.0001	0.0019	16.3
27-Feb-18	25.18	584.65	8.90	215	7.35	121.6	6.04	6.31	186	0.00172	<0.05	<0.0001	0.0084	15.5
1-May-18	26.98	582.85	9.50	391	7.82	-	3.06	6.94	214	0.00165	0.0042 J	<0.00010 J	<0.0003	14.1
21-Aug-18	37.29	572.54	10.02	266	7.37	75.6	129.00	6.84	215	0.00151	0.148	<0.0001	0.0150	13.3
6-Nov-18	34.18	575.65	9.60	340	9.13	215.4	1.00	6.93	327	0.00167	<0.05	<0.0001	<0.001	16.6
11-Mar-19	27.75	582.08	8.90	323	5.65	185.3	4.29	6.94	269	0.00136	<0.05	<0.0001	0.0111	14.4
8-May-19	30.05	579.78	9.80	448	7.77	97.6	1.11	6.87	320	0.00125	0.0068 J	<0.0001	0.0005 J	15.1
26-Aug-19	37.02	572.81	9.83	329	1.16	Note 1	7.97	7.11	258	0.00090	0.0039 J	<0.0001	0.0317	10.7
13-Nov-19	35.13	574.70	9.20	376	5.50	144.0	8.26	6.87	320	0.00123	0.0133 J	<0.0001	0.0055	15.8
12-Feb-20	20.38	589.45	9.00	381	2.58	191.6	1.33	7.15	268	0.00125	0.0083 J	0.0001 U	0.0228	26.6
12-Aug-20	36.61	573.22	9.50	285	5.01	198.7	0.80	6.96	214	0.00114	0.0034 J	0.0001 U	0.0009 J	14.1
9-Dec-20	32.05	577.78	9.10	425	7.17	211.0	1.57	6.86	347	0.00111	0.0185 J	0.0001 U	0.004 U	17.1
3-Mar-21	27.01	582.82	8.60	383	5.71	248.0	0.60	6.83	299	0.00116	0.05 U	0.0001 U	0.004 U	17.4
9-Jun-21	35.32	574.51	9.20	422	8.47	151.0	2.22	6.68	310	0.00139	-	0.0001 U	-	16.3
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-

Notes:

Top of casing elevation (feet msl): 609.83

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.

- Not measured or not available
- < Analyte not detected above the reporting limit shown
- \* Depth to water (DTW) measurements for all shallow/alluvial wells collected on the same day; date noted is sampling date
- a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest
- b Site background arsenic value to be determined (TBD)
- 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 msl Feet above mean sea level
- mg/L Milligrams per liter
- mV Millivolts
- 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 (mg/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	Iron	Lead	Manganese
15-Jul-05	29.18	574.43	13.78	853	-	-	28.30	7.70	606	<0.00200	<0.100	<0.00200	0.2090	-
9-Nov-05	25.64	577.97	10.95	860	-	-	3.82	7.43	550	0.00131	<0.150	<0.00100	0.4490	-
15-Feb-06	17.64	585.97	7.81	709	0.82	467.7	3.96	7.86	520 J	0.00106	<0.150	<0.00100	0.1340	-
17-May-06	25.76	577.85	9.67	810	2.17	246.1	3.01	7.06	490	0.00113	<0.150	<0.00100	0.0596	-
23-Aug-06	29.13	574.48	12.86	759	2.60	12.0	9.82	7.40	570	0.00154	<0.150	<0.00100	0.2300	-
14-Nov-06	13.74	589.87	10.44	649	3.72	63.6	9.78	7.72	460	0.00136	<0.150	<0.00100	0.0553	-
14-Feb-07	22.09	581.52	10.77	648	1.69	11.5	52.40	7.51	380	0.00107	<0.150	<0.00100	0.1650	-
30-May-07	26.72	576.89	11.46	732	2.05	72.2	12.80	7.44	480	0.00117	<0.150	<0.00100	0.1870	-
27-Aug-07	29.45	574.16	10.80	829	7.41	62.8	117.00	7.58	590 J	0.00109	<0.150	<0.00100	0.1160	-
29-Nov-07	26.57	577.04	10.74	899	2.00	81.1	392.00	6.05	490	0.00103	<0.150	<0.00100	0.1260	-
27-Feb-08	21.45	582.16	-	-	-	-	446.00	-	400	0.00109	<0.150	<0.00100	0.1230	-
20-May-08	25.73	577.88	9.48	706	3.07	110.2	419.00	7.26	420 J	0.00121	<0.150	<0.00100	0.0835	-
27-Aug-08	29.84	573.77	9.87	824	4.74	91.5	571.00	7.43	550 J	0.00130	<0.150	<0.00100	0.0929	65.1
26-Sep-08	<i>Test Trench Drain Line Installed</i>													
16-Oct-08	29.13	574.48	9.76	820	4.56	53.6	227.00	7.33	520 J	0.00130	<0.150	<0.00100	0.0496	76.3
20-Nov-08	19.48	584.13	9.31	462	5.24	240.1	6.16	7.35	360	0.00176	<0.150	<0.00100	0.0149	67.0
30-Dec-08	16.93	586.68	9.85	480	6.18	66.8	56.10	7.35	390 J	0.00155	<0.150	<0.00100	0.0157	61.5
15-Jan-09	14.46	589.15	7.71	402	7.47	177.8	1.61	7.61	360	0.00157	<0.150	<0.00100	<0.0100	58.5
12-Feb-09	23.84	579.77	9.63	-	8.72	-	74.90	7.54	390	0.00130	<0.150	<0.00100	0.0371 J	48.1
12-Mar-09	25.15	578.46	9.11	454	7.22	163.7	573.00	7.19	400	0.00117	<0.150	<0.00100	0.0135	43.1
16-Apr-09	17.72	585.89	8.40	417	8.27	126.4	128.00	7.26	400	0.00140	<0.150	<0.00100	0.0107	48.8
19-May-09	24.38	579.23	8.80	448	6.88	72.0	178.00	7.95	410 J	0.00110	<0.150	<0.00100	<0.0100	44.0
23-Jun-09	27.85	575.76	8.95	507	7.76	61.9	256.00	8.07	490	<0.00200	<0.200	<0.00200	<0.0200	39.0
25-Aug-09	30.68	572.93	10.50	707	6.94**	307.4	4.38	7.17	530 J+	<0.00200	0.091 J	0.00018 J	0.0300	49.0
23-Sep-09	30.84	572.77	11.20	661	5.41	374.7	15.00	7.28	500	<0.00200	<0.200	<0.00200	0.0041 J	51.0
15-Dec-09	22.10	581.51	9.50	720	5.10	579.0	39.00	6.92	380	<0.00200	<0.200	<0.00200	<0.0200	42.0
24-Mar-10	23.82	579.79	10.00	602	4.10	535.3	43.30	6.93	370	0.00170 J	0.062 J	<0.00200	<0.0200 U	39.0
17-Jun-10	17.45	586.16	9.30	547	4.06	-	157.00	6.57	350	0.00390	0.063 J	<0.00200	0.0030 J	39.0
22-Sep-10	29.66	573.95	10.20	722	5.77	360.2	7.20	7.22	450	0.00330	<0.200	<0.00200	<0.0200	55.0
8-Dec-10	22.10	581.51	9.90	566	6.69	-	64.60	7.09	350	<0.00200	<0.200	<0.00200	0.0018 J	35.0
29-Mar-11	19.94	583.67	8.40	251	6.95	620.0	28.00	7.13	250 J	0.00140 J	<0.200	<0.00200	0.0030 J	30.0
21-Jun-11	24.25	579.36	9.90	628	5.23	344.3	37.00	7.29	410 J	<0.00500	<0.200	<0.00200	0.0056 J	28.0
28-Sep-11	30.41	573.20	9.50	58	6.54	481.7	13.80	7.24	500	<0.00500	<0.200	<0.00200	<0.0200	54.0
14-Dec-11	25.35	578.26	9.30	441	3.86	346.5	386.00	7.26	440	<0.00500	<0.200	<0.00200	0.0037 J	29.0
20-Mar-12	15.45	588.16	7.70	580	1.53	382.0	32.30	7.40	280	0.00220	0.200	<0.00040	<0.0200	26.0

**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. Total Dissolved Solids (mg/L)	Metals (mg/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)		Arsenic	Iron	Lead	Manganese	Potassium
19-Jun-12	23.88	579.73	9.00	590	1.85	388.1	55.70	7.74	320	0.00250	<0.200	<0.00040	<0.0200	23.0
19-Sep-12	30.18	573.43	11.10	695	7.03	297.0	9.31	7.41	420	0.00270	<0.200	<0.00040	<0.0200	42.0
19-Dec-12	17.24	586.37	9.40	704	6.33	317.0	55.20	7.40	310	0.00170	<0.200	<0.00040	<0.0200	25.0
25-Feb-13	23.12	580.49	9.10	585	6.04	339.0	110.00	7.46	370	0.00250	<0.500	<0.00040	<0.0200	24.0
22-May-13	25.05	578.56	8.60	537	8.41	391.5	12.30	7.51	310	0.00190	<0.500	<0.00040	<0.0200	22.0
21-Aug-13	30.75	572.86	10.60	684	8.42	150.2	5.85	7.74	419	0.00150	<0.050	0.00020	0.0020	27.7
20-Nov-13	23.51	580.10	9.60	513	6.19	230.4	32.10	6.81	364	0.00130	<0.050	<0.00010	0.0010	27.5
1-Apr-14	17.11	586.50	8.50	386	7.32	243.1	14.60	7.46	294	0.00140	0.009 J	<0.00010	<0.0005	31.7
21-May-14	22.07	581.54	9.10	365	6.02	212.7	-	6.93	273	0.00130	<0.050	<0.00010	<0.0010	24.7
12-Aug-14	31.32	572.29	13.16	552	6.56	76.7	6.80	7.36	394	0.00150	<0.050	<0.00010	<0.0010	25.3
13-Nov-14	25.48	578.13	12.30	460	7.22	189.8	7.20	7.19	367	0.00140	<0.050	<0.00010	0.0010	25.5
11-Feb-15	16.83	586.78	9.30	447	6.76	134.4	36.60	7.52	286	0.00170	0.026 J	<0.00010	0.0007 J	30.4
4-May-15	25.78	577.83	10.20	619	6.27	407.1	7.70	7.36	382	0.00140	<0.050	<0.00010	0.0004 J	25.2
6-Aug-15	31.87	571.74	11.30	500	9.18	207.1	28.10	7.23	394	0.00150	<0.050	<0.00010	0.0030	22.0
4-Nov-15	26.74	576.87	9.90	481	8.76	222.6	16.80	6.88	381	0.00110	<0.050	<0.00010	0.0190	21.8
10-Feb-16	19.19	584.42	9.00	376	7.35	206.0	40.20	7.68	261	0.00360	0.0140 J	<0.00010	0.0040	37.1
2-May-16	26.14	577.47	11.30	552	3.19	194.5	87.80	7.35	344	0.00210	0.0045 J	0.00001 J	0.0020	31.2
23-Aug-16	31.64	571.97	10.50	545	7.62	486.5	10.80	7.18	412	0.00154	<0.050	<0.00010	0.0011	32.6
2-Nov-16	25.12	578.49	10.20	220	4.01	238.9	245.00	7.19	431	0.00140	<0.050	<0.00010	0.0015	30.6
1-Feb-17	22.84	580.77	9.10	580	5.06	186.3	13.60	7.35	317	0.00317	0.010 J	<0.00010	<0.0010	51.1
30-May-17	22.31	581.30	9.40	520	7.01	5.0	40.20	7.18	322	0.00178	0.010 J	<0.00010	<0.0010	34.1
17-Aug-17	30.08	573.53	10.60	626	5.63	134.2	32.30	7.21	370	0.00128	0.014 J	<0.00010	0.0009 J	28.9
9-Nov-17	26.04	577.57	9.80	480	5.79	74.4	68.80	7.00	391	0.00139	<0.05	<0.0001	0.0005 J	25.4
27-Feb-18	19.03	584.58	8.80	293	7.43	185.2	15.10	6.90	254	0.00398	<0.05	<0.0001	<0.001	41.9
1-May-18	20.84	582.77	9.10	531	7.46	-	25.00	7.35	316	0.00300	0.0216 J	<0.00010 J	0.0018	40.6
21-Aug-18	31.09	572.52	10.39	437	7.33	115.2	19.10	7.04	358	0.00148	0.05 U	<0.0001	0.0011	26.9
6-Nov-18	28.00	575.61	9.70	420	8.17	210.3	6.74	6.97	418	0.00130	<0.05	<0.0001	<0.001	23.4
11-Mar-19	21.61	582.00	9.00	351	9.20	187.1	20.60	7.11	312	0.00157	0.0057 J	<0.0001	0.0012	32.7
8-May-19	23.88	579.73	9.80	443	8.05	109.6	7.79	7.06	316	0.00166	0.005 J	<0.0001	0.0005 J	32.9
26-Aug-19	30.90	572.71	10.91	495	8.65	Note 1	12.70	6.91	394	0.00128	<0.05	<0.0001	0.0004 J	21.1
13-Nov-19	28.91	574.70	9.80	506	7.81	180.4	14.40	6.87	429	0.00134	0.0031 J	<0.0001	<0.001	22.9
12-Feb-20	14.21	589.40	8.10	319	9.95	189.3	14.60	7.27	277	0.00195	0.0093 J	0.0001 U	0.001 U	56.3
12-Aug-20	30.41	573.20	9.50	463	6.60	185.5	72.90	7.03	359	0.00120	0.0151 J	0.0001 U	0.0013	22.4
9-Dec-20	25.91	577.70	9.40	533	6.44	213.0	9.96	6.97	400	0.00138	0.255 J	0.00049 J	0.0149	26.8
3-Mar-21	20.83	582.78	8.90	330	5.24	216.5	12.40	7.18	268	0.00180	0.340	0.00022	0.0126	61.1
9-Jun-21	29.14	574.47	9.10	460	8.65	193.6	1.34	6.88	360 J	0.00125	-	0.000058 J	-	21.8
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-

Notes:

Top of casing elevation (feet msl): 603.61

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.

- Not measured or not available

< Analyte not detected above the reporting limit shown

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

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

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level

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 (mg/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	Iron	Lead	Manganese
15-Jul-05	6.09	679.42	13.80	1124	-	-	30.30	6.96	922	0.00241	<0.100	<0.00200	0.6280	-
10-Nov-05	5.50	680.01	10.80	1518	-	-	2.32	6.88	960	0.01050	4.800	<0.00100	3.6000	-
15-Feb-06	5.31	680.20	9.52	1357	0.46	217.4	58.20	6.33	930 J	0.00666	4.290	<0.00100	2.8500	-
16-May-06	6.25	679.26	10.40	1296	0.96	91.0	11.40	6.91	910	0.01010	6.560	<0.00100	3.3800	-
22-Aug-06	8.85	676.66	12.84	1362	1.28	-64.8	56.00	6.97	900	0.01210	7.060	<0.00100	2.8500	-
13-Nov-06	5.03	680.48	11.24	1392	2.12	-74.4	234.00	6.89	910	0.00573	4.750	<0.00100	2.6900	-
16-Feb-07	5.55	679.96	8.99	1155	0.75	-71.3	12.30	6.96	770	0.00374	3.770 J	<0.00100	2.6100 J	-
30-May-07	6.72	678.79	11.86	1297	0.75	-25.2	12.50	7.04	790	0.00520	5.840	<0.00100	2.2200	-
27-Aug-07	8.38	677.13	12.65	1483	0.71	-96.3	15.30	6.73	1100 J	0.00874	9.160	<0.00100	2.3200	-
28-Nov-07	5.66	679.85	10.47	1363	1.05	-72.9	26.90	7.31	730	0.00424	5.460	<0.00100	2.2700	-
27-Feb-08	5.57	679.94	-	-	-	-	121.00	-	860	0.00976	5.990	<0.00100	2.4900	-
19-May-08	5.94	679.57	9.39	1346	0.66	-52.6	20.00	6.93	820 J	0.00664	8.740	<0.00100	2.3300	-
26-Aug-08	6.44	679.07	12.15	1495	0.85	-53.6	5.85	6.88	820	0.00342	2.610	<0.00100	1.5300	30.3
18-Nov-08	5.50	680.01	10.50	975	1.87	-67.4	225.00	6.93	880 J	0.00748	10.100	<0.00100	2.2900	62.5
11-Feb-09	5.62	679.89	7.67	877	0.98	-	68.00	7.28	810	0.00520	5.710	<0.00100	2.2700	50.6
19-May-09	5.60	679.91	8.52	847	0.91	-63.4	52.00	8.21	750 J	0.00251	<0.150	<0.00100	2.2000	49.5
22-Sep-09	8.36	677.15	15.70	1149	0.10	132.1	75.10	7.05	910	0.00660	5.200	<0.00200	1.8000	53.0
17-Dec-09	4.59	680.92	8.90	1300	0.40	194.0	401.00	7.08	710	<0.00200	0.740	<0.00200	2.2000	62.0
24-Mar-10	5.40	680.11	11.20	1010	0.12	-	226.00	6.76	800	0.00380	4.400	<0.00200	2.1000	46.0
16-Jun-10	5.27	680.24	10.10	1123	0.20	188.0	6.19	8.43	570	0.01300	6.400	<0.00200	1.9000	49.0
21-Sep-10	6.01	679.50	12.70	1314	0.19	177.7	2.97	6.91	1,000	0.00620	2.800	0.00019 J	1.3000	160.0
7-Dec-10	5.23	680.28	9.70	1183	0.23	182.7	25.30	6.86	840	0.00320	4.100	<0.00200	1.9000	82.0
30-Mar-11	5.04	680.47	8.30	498	0.28	174.0	4.93	7.89	700	0.00360	3.700	<0.00200	1.4000	36.0
22-Jun-11	6.77	678.74	9.70	895	0.43	172.2	9.18	7.01	700 J	<0.00500	5.100	<0.00200	1.5000	34.0
28-Sep-11	7.83	677.68	12.60	99	0.18	141.8	6.07	6.83	840	0.00880	7.700	<0.00200	2.7000	83.0
15-Dec-11	5.40	680.11	9.00	785	0.60	179.8	24.40	6.98	760	0.00450 J	2.400	<0.0020	1.9000	73.0
20-Mar-12	4.96	680.55	7.10	1092	0.16	22.6	12.10	7.11	470	0.00520	2.300	<0.0020	1.6000	73.0
19-Jun-12	6.76	678.75	10.30	1077	0.11	198.6	11.30	7.07	660	0.01200	8.500	<0.0004	1.8000	78.0
20-Sep-12	8.67	676.84	12.30	1235	0.15	111.0	1.96	6.99	710	0.01100	7.500	0.00005 J	2.1000	100.0
18-Dec-12	4.98	680.53	8.70	1450	0.30	-40.6	18.70	7.25	740	0.00480	1.800	<0.00040	1.6000	150.0
26-Feb-13	5.25	680.26	7.80	1211	0.15	186.6	27.80	7.21	740	0.00470	3.100	<0.00040	2.0000	98.0
23-May-13	6.56	678.95	9.90	1000	0.18	242.3	16.90	7.21	460	0.01400	5.100	0.00280	0.9100	150.0
21-Aug-13	9.01	676.50	12.10	917	0.12	-14.2	1.24	7.27	772	0.00760	5.210	0.00005 J	1.8100	94.0
19-Nov-13	6.09	679.42	9.90	697	0.07	61.8	2.93	6.77	852	0.01230	9.660	0.00020	1.5300	169.0
1-Apr-14	5.75	679.76	9.00	722	0.10	131.3	4.47	7.07	624	0.01050	11.100	0.00006 J	1.7600	104.0
22-May-14	5.80	679.71	9.80	580	1.08	185.3	-	6.85	494	0.00520	4.170	0.00010	1.4300	66.5
13-Aug-14	8.54	676.97	11.48	915	2.85	-67.6	8.16	7.09	740	0.00690	5.140	<0.00010	1.5100	116.0
12-Nov-14	5.97	679.54	11.10	314	2.79	-85.1	15.30	6.87	744	0.00690	3.400	<0.00010	2.0000	89.1
12-Feb-15	5.50	680.01	9.80	980	0.52	-54.5	1.28	7.04	696	0.00420	3.570	<0.00010	2.1900	73.2
4-May-15	5.80	679.71	10.80	994	0.17	143.4	15.40	7.12	701	0.00930	7.970	<0.00010	1.8800	100.0
5-Aug-15	10.12	675.39	12.60	881	0.13	-90.4	0.89	7.07	724	0.00730	5.000	<0.00010	2.0000	70.3
3-Nov-15	5.30	680.21	12.00	865	1.23	105.5	5.06	6.97	1020	0.00170	0.180	0.00020	0.6750	195.0
9-Feb-16	5.14	680.37	9.10	954	0.55	154.6	4.82	7.03	625	0.00340	3.000	<0.00010	1.8700	92.7
2-May-16	4.74	680.77	11.30	844	0.19	96.8	2.21	7.16	621	0.01050	7.310	0.00004 J-	1.7200	105.0
23-Aug-16	9.04	676.47	13.20	946	0.03	156.2	3.48	6.97	924	0.00819	6.780	0.00009 J	1.7000	148.0
1-Nov-16	6.18	679.33	11.90	349	0.15	18.5	2.43	7.11	744	0.00263	0.730	<0.00010	0.8630	180.0
1-Feb-17	5.91	679.60	7.50	1114	0.17	-67.4	6.05	7.08	694	0.00640	4.810	<0.00010	1.9200	100.0
30-May-17	7.40	678.11	10.40	753	2.20	8.6	3.28	7.12	465	0.00952	5.240	<0.00010	1.3800	89.3
17-Aug-17	9.71	675.80	12.40	1101	0.25	-60.2	3.39	7.01	737	0.00847	5.730	<0.00010	2.1700	72.0
9-Nov-17	6.06	679.45	9.60	833	0.64	75.3	2.01	7.08	748	0.00184	<0.05	<0.0001	0.5540	191.0

**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 (mg/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	Iron	Lead	Manganese
27-Feb-18	5.16	680.35	7.60	791	0.21	-75.4	9.52	6.64	506	0.00297	1.410	<0.0001	1.3800	92.0
1-May-18	5.41	680.10	10.00	847	0.93	-	5.82	7.36	547	0.00381	0.961	<0.00010 J	0.8960	120.0
21-Aug-18	10.81	674.70	14.54	909	2.96	-17.2	1.67	6.92	722	0.00648	2.610	<0.0001	2.0700	101.0
7-Nov-18	5.85	679.66	11.20	931	0.66	179.0	0.87	6.97	828	0.00203	<0.05	0.000073 J	0.2780	202 J+
11-Mar-19	5.26	680.25	6.10	478	1.25	53.7	2.39	7.34	486	0.00144	0.051	<0.0001	0.3490	125.0
9-May-19	5.44	680.07	10.20	678	3.72	-9.4	1.85	7.04	574	0.00302	0.274	0.000083 J	0.5940	143.0
26-Aug-19	9.30	676.21	13.96	1041	0.60	Note 1	0.02	6.83	843	0.00615	2.160	<0.0001	2.3600	142.0
13-Nov-19	5.58	679.93	9.40	803	0.31	12.8	0.02	6.97	724	0.00220	0.132	0.000077 J	0.4760	174.0
12-Feb-20	5.10	680.41	7.80	349	0.37	-62.4	1.40	7.25	287	0.00186	0.257	0.0001 U	0.4760	74.2
13-Aug-20	9.33	676.18	11.80	884	0.64	-81.6	4.28	6.76	683	0.01090	3.290	0.0001 U	2.1600	119.0
10-Dec-20	5.08	680.43	8.50	688	3.06	210.0	0.90	7.29	566	0.00236	0.070	0.00016	0.2920	128.0
4-Mar-21	5.26	680.25	7.00	364	0.59	47.0	1.54	7.42	319	0.00152	0.121	0.00013	0.3710	74.2
9-Jun-21	6.24	679.27	11.40	706	0.96	-50.2	4.12	7.03	540	0.00648	-	0.000204	-	124.0
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-

Notes:

Top of casing elevation (feet msl): 685.51

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.

- Not measured or not available

< Analyte not detected above the reporting limit shown

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

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level

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.	Metals (mg/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	Iron	Lead	Manganese
15-Jul-05	4.60	697.25	12.43	629	-	-	6.07	6.45	490	<0.00200	<0.100	<0.00200	0.4260	-
10-Nov-05	3.70	698.15	11.98	441	-	-	7.40	6.22	290	<0.00100	<0.150	<0.00100	0.0991	-
19-Jan-06	3.56	698.29	8.29	319	0.42	-	1.46	6.53	290 J	<0.00100	<0.150	<0.00100	0.0908	-
15-Feb-06	3.82	698.03	8.32	326	0.62	99.7	3.50	7.39	220 J	<0.00100	<0.150	<0.00100	0.0341	-
15-Mar-06	3.79	698.06	7.58	254	0.87	201.9	0.82	6.65	210 J	<0.00100	<0.150	<0.00100	0.0650	-
7-Apr-06	3.87	697.98	9.36	295	0.55	157.4	0.24	6.34	220	<0.00100	<0.150	<0.00100	0.0724	-
16-May-06	4.92	696.93	10.80	321	0.45	142.1	0.99	6.36	220	<0.00100	<0.150	<0.00100	0.0376	-
23-Jun-06	4.41	697.44	12.62	316	0.57	-	2.05	6.25	200	<0.00100	<0.150	<0.00264	0.0638	-
20-Jul-06	6.90	694.95	13.43	347	0.23	-20.9	0.32	6.11	120	<0.00100	<0.150	<0.00100	0.1040	-
22-Aug-06	8.46	693.39	13.68	406	0.90	153.5	2.20	6.13	280	<0.00100	<0.150	<0.00100	0.1510	-
26-Sep-06	6.50	695.35	14.59	417	2.47	-35.2	2.42	6.33	290	<0.00100	<0.150	<0.00100	0.0835	-
26-Oct-06	5.98	695.87	12.82	434	3.30	124.1	0.82	6.12	320	<0.00100	<0.150	<0.00100	0.2160	-
13-Nov-06	3.02	698.83	11.70	386	5.06	187.8	2.47	6.13	280	<0.00100	<0.150	<0.00100	0.0442	-
20-Dec-06	3.60	698.25	9.64	379	4.30	150.5	1.03	6.07	250	<0.00100	<0.150	<0.00100	0.0568	-
23-Jan-07	3.68	698.17	8.37	239	3.96	58.9	0.66	6.28	220	<0.00100	<0.150	<0.00100	0.1800	-
14-Feb-07	3.74	698.11	8.18	325	2.85	110.8	0.53	6.25	210	<0.00100	<0.150	<0.00100	0.0398	-
27-Mar-07	3.32	698.53	8.27	289	2.07	61.5	0.88	6.83	210 J	<0.00100	<0.150	<0.00100	0.2290	-
17-Apr-07	3.89	697.96	9.59	306	1.80	102.3	2.31	6.34	190	<0.00100	<0.150	<0.00100	0.2220	-
30-May-07	4.70	697.15	11.27	285	1.78	101.7	1.37	6.37	180	<0.00100	<0.150	<0.00100	0.0246	-
20-Jun-07	4.69	697.16	12.37	350	1.67	9.3	1.25	6.90	240 J	<0.00100	<0.150	<0.00100	0.0321	-
31-Jul-07	6.38	695.47	14.57	402	1.15	5.5	0.60	6.37	250	0.00129	<0.150	<0.00100	0.0307	-
29-Aug-07	7.44	694.41	13.78	353	1.11	128.3	1.87	6.18	280 J	<0.00100	<0.150	<0.00100	0.0490	-
27-Sep-07	8.25	693.60	13.60	375	0.96	142.6	0.70	6.70	300	<0.00100	<0.150	<0.00100	0.1170	-
26-Oct-07	4.09	697.76	12.16	343	2.27	75.9	3.93	6.10	310 J	<0.00100	<0.150	<0.00100	0.0117	-
29-Nov-07	3.93	697.92	10.13	428	3.17	197.3	1.63	6.32	270	<0.00100	<0.150	<0.00100	0.0164	-
12-Dec-07	5.82	696.03	9.51	384	3.37	185.0	0.80	6.06	260	<0.00100	<0.150	<0.00100	0.0392	-
24-Jan-08	3.86	697.99	7.74	354	3.09	109.0	-	6.35	250	<0.00100	<0.150	<0.00100	0.0376	-
28-Feb-08	4.04	697.81	-	-	-	-	1.06	-	220	<0.00100	<0.150	<0.00100	0.0275	-
19-May-08	4.35	697.50	9.79	329	1.38	209.2	1.20	6.08	200 J	<0.00100	<0.150	<0.00100	0.0191	-
26-Aug-08	7.83	694.02	12.66	431	1.38	210.5	0.28	6.19	270	<0.00100	<0.150	<0.00100	0.0493	<3.0
18-Nov-08	3.64	698.21	10.43	235	3.95	217.5	0.66	6.03	210	<0.00100	<0.150	<0.00100	0.0208	<3.0
11-Feb-09	4.09	697.76	7.24	188	2.13	-	0.12	6.54	180	<0.00100	<0.150	<0.00100	0.0180	<3.0
19-May-09	3.79	698.06	8.19	173	1.28	111.9	1.78	7.18	170 J	<0.00100	<0.150	<0.00100	0.0163	<3.0
22-Sep-09	9.70	692.15	16.50	440	0.82	383.3	12.50	6.31	370 J	<0.00200	<0.200	<0.00200	0.0700	1.2 J
17-Dec-09	3.47	698.38	9.20	311	4.37	470.0	16.00	6.25	110	<0.00200	<0.200	<0.00200	0.0200 J	0.7 J
24-Mar-10	3.87	697.98	9.40	410	0.34	204.8	30.70	6.65	240	0.00081 J	<0.200	<0.00200	0.1700	1.3 J
16-Jun-10	3.77	698.08	10.30	298	0.99	397.8	1.11	7.40	180	0.00360	0.049 J	<0.00200	0.0320	0.9 J
21-Sep-10	5.82	696.03	13.70	350	1.01	302.5	1.04	6.25	200	0.00140 J	<0.200	0.0002 J	<0.0200	1.2 J
7-Dec-10	3.83	698.02	9.60	283	0.72	405.6	0.42	6.16	190	<0.00200	<0.200	<0.00200	0.0090 J	0.8 J
30-Mar-11	3.91	697.94	8.20	133	0.51	248.2	0.29	9.87	140 J	0.00035 J	<0.200	<0.00200	0.0091 J	5.0
22-Jun-11	3.99	697.86	11.00	219	0.16	222.5	0.22	6.13	160	<0.00500	0.180 J	<0.00200	0.1900	0.7 J
28-Sep-11	8.54	693.31	14.30	35	0.26	333.9	2.45	6.30	270	<0.00500	0.110 J	<0.00200	0.1300	2.1 J
15-Dec-11	4.12	697.73	9.40	217	1.15	414.3	2.74	6.28	200	<0.00500	<0.200	<0.00200	0.0170 J	1.2 J
21-Mar-12	3.35	698.50	8.40	346	0.42	438.4	0.48	6.14	220	0.00480	<0.200	<0.00040	0.0280	1.3 J
19-Jun-12	3.78	698.07	11.30	290	0.09	314.0	0.46	6.28	170 J+	0.00130	<0.200	<0.00040	0.0710	<3.3
20-Sep-12	8.53	693.32	14.40	419	0.26	309.0	1.07	6.39	240	0.00160	0.085 J	<0.00040	0.1300	2.9 J
18-Dec-12	3.49	698.36	9.10	491	2.56	264.4	1.38	6.63	170	<0.00100	<0.200	<0.00040	0.0480	1.2 J
26-Feb-13	3.91	697.94	8.40	324	2.59	404.2	1.01	7.03	140	0.00110	<0.500	<0.00040	0.0079 J	3.4
23-May-13	3.76	698.09	10.60	338	1.15	465.9	0.57	6.31	190	<0.00100	<0.500	<0.00040	0.0060 J	<3.3
22-Aug-13	8.28	693.57	13.10	284	0.33	32.2	0.89	6.34	220	0.00040	<0.050	<0.00010	0.0320	1.3
19-Nov-13	3.33	698.52	10.30	323	1.70	109.2	0.64	6.27	200	0.00020	<0.050	<0.00010	0.0070	0.8
1-Apr-14	3.69	698.16	8.20	244	0.45	180.7	0.28	6.33	173	0.00018 J	<0.050	<0.00010	0.0050 J+	0.7
22-May-14	4.52	697.33	10.80	195	0.65	75.0	-	7.20	152	0.00030	<0.050	0.00010	0.0240	0.6
13-Aug-14	7.56	694.29	12.62	269	0.44	37.7	1.12	5.89	181	0.00080	0.200	<0.00010	0.0930	0.9
12-Nov-14	3.73	698.12	11.70	231	1.29	108.2	1.32	6.17	191	0.00030	<0.050	<0.00010	0.0450	1.0
11-Feb-15	3.50	698.35	9.20	270	0.53	-34.2	0.73	6.30	170	0.00020	0.021 J	<0.00010	0.0160	0.7
4-May-15	4.69	697.16	10.90	250	0.28	378.1	0.57	6.29	341	0.00020	0.012 J	<0.00010	0.0790	0.6
5-Aug-15	9.44	692.41	13.90	316	0.72	-38.1	1.16	6.45	262	0.00030	<0.050	<0.00010	0.0150	1.2
3-Nov-15	4.21	697.64	11.80	192	8.59	205.6	5.39	6.34	166	0.00020 J	<0.050	<0.00010	0.0008 J	0.8



**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.	Metals (mg/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	Iron	Lead	Manganese
9-Feb-16	3.82	698.03	9.20	292	4.61	230.7	0.49	6.45	164	0.00017 J	<0.050	<0.00010	0.0050	0.8
3-May-16	4.61	697.24	10.90	310	2.39	253.0	1.01	6.34	178	0.00030	<0.050	0.00001 J-	0.0020	0.9
24-Aug-16	8.76	693.09	13.20	287	1.24	490.4	1.01	6.35	177	0.00020 J	<0.050	<0.00010	0.0093	0.8
1-Nov-16	3.34	698.51	12.20	100	3.69	177.2	0.40	6.38	205	0.00019 J	<0.050	<0.00010	0.0062	1.0
2-Feb-17	3.94	697.91	7.80	363	3.11	190.0	0.10	6.39	223	0.00017 J	<0.050	<0.00010	0.0080	0.8
31-May-17	4.68	697.17	10.30	300	4.50	-	2.48	6.30	182	0.00020	<0.050	<0.00010	0.0145	0.8
18-Aug-17	8.61	693.24	12.70	393	0.51	120.2	0.87	6.44	228	0.00031	0.096	<0.00010	0.0516	1.3
10-Nov-17	3.58	698.27	11.00	264	3.88	56.5	0.76	6.01	217	0.000186 J	<0.05	<0.0001	0.0054	0.7
27-Feb-18	3.76	698.09	8.30	302	3.19	221.1	0.55	6.29	238	0.000176 J	<0.05	<0.0001	0.0045	0.9
2-May-18	4.02	697.83	10.00	343	3.02	-	0.59	6.36	215	0.00015 J	0.0026 J	<0.00010 J	0.0045	1.0
22-Aug-18	9.35	692.50	12.17	330	1.99	142.0	2.31	6.27	265	0.00032	0.05 U	<0.0001	0.0310	1.2
7-Nov-18	5.25	696.60	11.70	317	5.45	124.4	0.76	6.23	250	0.000199 J	<0.05	<0.0001	0.0007 J	0.8
11-Mar-19	3.96	697.89	7.60	226	3.96	220.8	0.70	6.38	233	0.000146 J	<0.05	<0.0001	0.0034	0.9
9-May-19	4.70	697.15	12.50	283	3.60	82.3	1.56	6.14	230	0.000154 J	0.007 J	<0.0001	0.0041	0.8
26-Aug-19	8.20	693.65	13.13	374	0.86	Note 1	0.02	6.30	264	0.00030	0.0324 J	<0.0001	0.0547	0.9
14-Nov-19	4.35	697.50	10.80	309	3.19	109.5	0.02	6.15	240	0.00025	0.082	<0.0001	0.0723	0.9
13-Feb-20	3.70	698.15	7.90	284	2.98	102.2	0.91	6.18	283	0.000176 J	0.067	0.0001 U	0.0723	0.9
13-Aug-20	7.73	694.12	13.50	334	0.62	58.3	0.51	6.19	238	0.00071	0.248	0.0001 U	0.1710	0.9
10-Dec-20	3.45	698.40	9.80	364	6.11	169.0	1.56	6.51	297	0.00030	0.159	0.0001 U	0.0511	1.3
4-Mar-21	3.72	698.13	8.30	304	2.83	137.0	0.49	6.47	255	0.000192 J	0.055	0.0001 U	0.0274	0.9
10-Jun-21	5.32	696.53	11.90	339	1.23	108.5	0.73	6.09	220	0.00023	-	0.0001 U	-	0.8
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-

Notes:

Top of casing elevation (feet msl): 701.85

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.

- Not measured or not available
- < Analyte not detected above the reporting limit shown
- \* Depth to water (DTW) measurements for all shallow/alluvial wells collected on the same day; date noted is sampling date
- a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest
- b Site background arsenic value to be determined (TBD)
- 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 msl Feet above mean sea level
- 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 (mg/L)				
	Depth to Water (feet btoe)	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	Iron	Lead	Manganese
15-Jul-05	33.33	574.28	12.02	956	-	-	496.00	7.34	600	0.00201	<0.100	<0.00200	1.1300	-
10-Nov-05	29.62	577.99	11.24	1,212	-	-	27.60	7.32	800	0.00840	<0.150	<0.00100	0.0183	-
15-Feb-06	21.70	585.91	6.45	665	2.59	280.3	11.10	7.86	520 J	0.02230	0.256	<0.00100	0.0169	-
17-May-06	29.80	577.81	7.74	831	0.88	101.9	8.67	7.79	580	0.01100	<0.150	<0.00100	0.0207	-
23-Aug-06	33.25	574.36	15.19	737	1.76	33.5	19.60	7.32	660	0.00253	<0.150	<0.00100	0.5820	-
14-Nov-06	17.79	589.82	10.86	699	4.50	76.3	38.70	7.55	490	0.00315	<0.150	<0.00100	0.0134	-
16-Feb-07	27.08	580.53	8.08	630	6.07	2.3	57.60	8.26	500	0.01440	<0.150 UJ	<0.00100	0.016 J	-
30-May-07	30.75	576.86	9.60	894	2.59	13.3	13.40	7.76	540	0.00843	<0.150	<0.00100	<0.0100	-
29-Aug-07	33.60	574.01	9.56	684	7.64	67.0	-	7.10	670 J	0.00197	<0.150	<0.00100	0.4540	-
29-Nov-07	30.60	577.01	11.00	1075	3.53	151.5	23.50	8.37	560	0.00517	<0.150	<0.00100	<0.0100	-
27-Feb-08	25.68	581.93	-	-	-	-	29.90	-	400	0.01070	<0.150	<0.00100	<0.0100	-
20-May-08	29.73	577.88	7.93	768	4.27	180.7	77.80	7.39	480 J	0.00567	<0.150	<0.00100	0.0124	-
27-Aug-08	33.97	573.64	10.17	862	4.07	81.2	-	7.43	540 J	0.00117	<0.150	<0.00100	0.0644	87.5
26-Sep-08	<i>Test Trench Drain Line Installed</i>													
16-Oct-08	33.55	574.06	8.89	845	5.39	86.3	852.00	7.53	440 J	0.00103	<0.150	<0.00100	0.0578	90.7
20-Nov-08	23.48	584.13	9.34	577	5.27	234.3	9.48	7.50	470	0.00624	<0.150	<0.00200	0.0121	138
30-Dec-08	20.88	586.73	8.39	510	8.89	99.0	44.80	8.02	430 J	0.01420	0.202	0.00111	0.0251	138
15-Jan-09	18.50	589.11	4.97	347	8.90	154.8	17.20	8.47	380	0.02440	0.172	<0.00100	0.0238 J	104
12-Feb-09	27.90	579.71	8.47	-	10.21	-	22.00	7.60	420 J	0.00611	<0.150	<0.00100	<0.0100	99
12-Mar-09	29.19	578.42	7.47	521	6.15	171.7	26.80	7.39	480	0.00897	<0.150	<0.00100	<0.0100	124
16-Apr-09	21.70	585.91	6.99	456	7.60	151.6	72.70	8.66	470	0.02820	0.162	0.00101	0.0135	126
19-May-09	28.37	579.24	8.08	509	6.38	64.4	31.30	8.07	450 J	0.00919	<0.150	<0.00100	<0.0100	105
23-Jun-09	31.95	575.66	8.84	551	5.97	69.1	74.30	8.28	500	0.00430	<0.200	<0.00200	<0.0200	71
25-Aug-09	35.08	572.53	-	-	-	-	-	-	-	-	-	-	-	-
24-Sep-09	35.29	572.32	11.70	714	2.28	371.9	258.00	7.26	550 J	0.00076 J	0.180 J	0.00017 J	0.1200	88
15-Dec-09	26.11	581.50	8.60	928	2.89	544.0	89.00	7.14	450	0.00110 J	<0.200	<0.00200	0.0024 J	110
24-Mar-10	27.86	579.75	8.30	697	3.52	505.1	18.10	7.47	450	0.02300	0.160 J	0.00046 J	0.0280	110
16-Jun-10	21.35	586.26	10.70	783	2.07	379.0	41.40	7.73	340	0.05300	0.760	0.00210	0.0300	150
22-Sep-10	33.88	573.73	10.40	938	4.30	467.1	7.93	7.10	620	0.00500	<0.200	<0.00200	0.0770 J+	100
7-Dec-10	25.22	582.39	10.20	781	3.86	353.7	11.10	7.39	500	0.01200	0.094 J	0.00053 J	0.011 J	130
29-Mar-11	23.59	584.02	7.00	354	3.47	708.0	22.22	9.52	440 J	0.06300	0.650 J+	0.00140 J	0.0250	140
21-Jun-11	28.33	579.28	11.60	1000	2.22	285.3	10.60	9.06	1100 J	0.04300	0.420	0.00120 J	0.0230	180
27-Sep-11	34.70	572.91	12.70	641	1.46	307.2	12.80	7.30	680	<0.00500	0.063 J	0.00023 J	0.2800	100
14-Dec-11	29.46	578.15	9.50	691	1.95	757.1	9.69	7.35	690	0.00690	<0.200	0.00018 J	0.0019 J	180
20-Mar-12	19.50	588.11	6.20	841	3.98	320.2	8.52	8.25	350	0.02600	0.470	0.00100 J	0.0300	140

**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 (mg/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	Iron	Lead	Manganese
19-Jun-12	27.91	579.70	10.20	800	3.22	365.9	2.76	7.66	510	0.00870	<0.200	<0.00040	0.0290	120
20-Sep-12	34.53	573.08	11.00	859	0.73	387.0	46.80	7.64	530	0.00260	<0.200	<0.00040	0.6300	100
19-Dec-12	21.26	586.35	8.90	983	1.73	279.0	778.00	7.71	530	0.01100	0.110 J	0.00062	0.0670	180
25-Feb-13	27.19	580.42	7.50	682	7.61	330.5	4.36	7.85	380	0.01300	<0.500	0.00015 J	0.0110 J	74
22-May-13	29.09	578.52	8.80	828	3.88	411.4	8.11	8.29	350	0.02500	0.085 J	0.00053	0.0220	100
21-Aug-13	35.15	572.46	17.10	1248	3.41	114.2	144.00	7.78	1060	0.00150	0.060	0.00005 J	0.4870	95
20-Nov-13	27.45	580.16	10.00	1032	4.13	196.5	31.70	7.18	699	0.01450	0.100	0.00140	0.0080	202
1-Apr-14	21.08	586.53	8.40	567	3.04	168.2	15.70	10.24	413	0.06270	0.210	0.00150	0.0140	150
21-May-14	26.11	581.50	10.30	670	0.49	198.4	-	7.45	565	0.09500	0.200	0.00160	0.0480	166
12-Aug-14	34.56	573.05	14.07	812	3.64	87.7	1519.00	7.51	560	0.00300	0.070	<0.00010	0.1370	107
13-Nov-14	29.48	578.13	12.90	1135	3.50	241.7	10.46	7.69	956	0.02080	<0.050	0.00010	0.0020	295
11-Feb-15	20.81	586.80	7.70	619	6.17	81.4	18.00	9.63	430	0.03920	0.380	0.00130	0.0110	126
4-May-15	29.80	577.81	10.50	924	2.54	361.3	8.70	9.74	623	0.04230	0.110	0.00050	0.0130	192
6-Aug-15	36.08	571.53	12.80	781	2.40	129.6	261.00	7.24	Dry	Dry	Dry	Dry	Dry	Dry
4-Nov-15	30.80	576.81	10.70	1234	4.98	205.6	11.80	7.13	1130	0.00660	0.048 J	0.00030	0.0020	318
10-Feb-16	23.56	584.05	6.40	602	1.62	197.7	11.90	10.19	451	0.13200	0.190	0.00140	0.0190	148
2-May-16	30.19	577.42	11.50	1008	0.80	110.6	9.76	10.14	751	0.17100	0.250	0.00270 J	0.0480	232
23-Aug-16	35.79	571.82	13.10	729	2.00	436.2	51.40	7.20	1010	0.00401	<0.050	<0.00010	0.1820	137
2-Nov-16	29.06	578.55	10.90	570	4.98	103.1	32.10	7.55	1180	0.01120	0.185	0.00056	0.0050	372
1-Feb-17	26.86	580.75	8.10	992	2.21	99.7	7.19	9.73	632	0.10900	0.089	0.00097	0.0179	194
30-May-17	26.86	580.75	10.50	814	6.12	5.8	5.74	9.73	487	0.04250	0.084	0.00036 J+	0.0044	168
17-Aug-17	34.23	573.38	11.70	1054	5.43	125.1	5.68	7.65	731	0.00652	0.029 J	<0.00010	0.0604	156
10-Nov-17	29.96	577.65	10.00	1077	4.65	85.2	10.50	7.18	953	0.00582	0.069	0.00034	0.0042	308
27-Feb-18	23.02	584.59	7.70	584	1.91	120.4	12.60	9.96	530	0.08630	0.143	0.00064	0.0068	174
1-May-18	24.85	582.76	9.10	1082	2.16	-	11.80	10.34	682	0.11300	0.214	0.000775 J+	0.0222	196
21-Aug-18	35.17	572.44	14.83	1095	4.02	131.0	123.00	7.40	936	0.00365	0.05 U	<0.0001	0.8700	214
6-Nov-18	32.00	575.61	10.30	1192	5.93	198.1	2.35	7.49	1200	0.00487	<0.05	0.000077 J	<0.001	363 J+
13-Mar-19	25.12	582.49	7.40	695	2.19	189.7	15.80	9.48	632	0.04410	0.091	0.00063	0.0076	200
8-May-19	27.89	579.72	10.70	844	4.95	60.5	5.19	9.30	697	0.04190	0.0953 J	0.00068	0.0140	182
26-Aug-19	35.02	572.59	11.89	1111	1.52	Note 1	22.90	7.26	995	0.00246	0.0152 J	<0.0001	0.9700	177
13-Nov-19	33.00	574.61	9.80	932	5.27	66.1	0.02	7.18	776	0.00389	0.0049 J	<0.0001	0.0006 J	211
12-Feb-20	18.23	589.38	7.00	533	7.58	140.4	10.60	8.32	463	0.00631	0.0436 J	0.00015	0.0015	183
12-Aug-20	34.50	573.11	11.20	1381	4.00	125.0	2.75	7.52	1250	0.00537	0.012 J	0.0001 U	0.0839	333
9-Dec-20	29.90	577.71	9.80	1105	4.51	222.0	8.32	7.29	897	0.00312	0.196	0.00030	0.0064	263
3-Mar-21	24.81	582.80	9.20	899	3.04	225.0	3.09	7.60	792	0.00374	0.100	0.00013	0.0052	247
9-Jun-21	33.20	574.41	9.30	875	5.23	184.0	1.26	7.27	700	0.00262	-	0.000063 J	-	205
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-

Notes:

Top of casing elevation (feet msl): 607.61

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.

- Not measured or not available

< Analyte not detected above the reporting limit shown

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

Dry Well went dry during sampling. Unable to collect sample.

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level 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 (mg/L)				
	Depth to Water (feet btoc)	Groundwater Elevation (feet msI)	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	Iron	Lead	Manganese
15-Jul-05	30.89	574.46	15.26	735	-	-	303.00	7.60	612	<0.00200	<0.100	<0.00200	0.3490	-
10-Nov-05	27.25	578.10	11.79	700	-	-	13.70	7.51	460	0.00216	<0.150	<0.00100	0.4510	-
15-Feb-06	19.42	585.93	6.17	759	2.00	162.9	9.42	8.27	550 J	0.00754	<0.150	<0.00100	0.6160	-
17-May-06	27.55	577.80	11.99	835	1.31	248.3	4.16	7.46	550	0.01100	<0.150	<0.00100	0.1060	-
23-Aug-06	30.99	574.36	15.92	862	1.60	-26.4	15.50	7.40	810	0.00134	<0.150	<0.00100	0.6820	-
14-Nov-06	15.30	590.05	10.56	712	4.59	84.1	14.50	7.32	500	0.00171	<0.150	<0.00100	0.0163	-
16-Feb-07	24.22	581.13	8.49	581	3.64	38.6	139.00	7.21	420	0.00160	<0.150 UJ	<0.00100	0.1710 J	-
30-May-07	28.50	576.85	13.93	1092	2.72	180.7	210.00	7.40	740	0.01620	<0.150	<0.00100	0.1570	-
29-Aug-07	31.34	574.01	10.15	701	4.48	84.8	662.00	7.80	620 J	0.00141	<0.150	<0.00100	0.3520	-
29-Nov-07	28.32	577.03	11.30	731	6.23	154.0	-	6.26	420	0.00178	<0.150	<0.00100	0.1760	-
27-Feb-08	23.42	581.93	-	-	-	-	-	-	410	0.00147	<0.150	<0.00100	0.0220	-
20-May-08	27.49	577.86	8.14	791	3.93	176.5	-	7.64	540 J	0.00818	0.170	<0.00100	0.0410	-
27-Aug-08	31.72	573.63	9.33	776	4.83	142.0	-	7.32	660 J	0.00186	<0.150	<0.00100	0.2660	109
26-Sep-08	Test Trench Drain Line Installed													
16-Oct-08	31.29	574.06	9.17	923	4.60	115.4	-	7.13	590 J	0.00185	<0.150	<0.00100	0.0910	106
20-Nov-08	21.18	584.17	9.70	578	5.22	249.4	11.70	7.40	460	0.00442	<0.150	<0.00200	0.0202	110
30-Dec-08	18.64	586.71	8.45	448	9.27	137.9	75.80	7.89	370 J	0.01190	0.209	0.00114	0.0267	106
15-Jan-09	16.23	589.12	6.84	344	9.25	181.9	2.77	7.47	320	0.00488	<0.150	<0.00100	<0.0100	73
12-Feb-09	25.64	579.71	7.89	-	10.82	-	71.70	7.70	420	0.01100	0.177	<0.00100	<0.0100	103
12-Mar-09	26.92	578.43	7.27	524	8.31	166.7	116.00	7.76	500	0.02350	0.244	<0.00100	0.0167	125
16-Apr-09	19.46	585.89	7.33	406	7.57	182.8	91.80	8.33	430	0.02410	0.154	0.00109	0.0244	101
19-May-09	26.10	579.25	9.07	554	6.39	65.6	161.00	8.32	550 J	0.01340	<0.150	<0.00100	<0.0100	115
23-Jun-09	29.67	575.68	9.51	522	6.05	71.4	-	8.17	540	0.00310	<0.200	<0.00200	0.0630	74
25-Aug-09	32.72	572.63	14.80	795	3.25	282.7	22.00	7.28	630 J	0.00075 J	<0.200	<0.00200	0.0330	100
24-Sep-09	32.93	572.42	10.60	745	4.02	361.3	29.80	7.27	560 J	0.00028 J	<0.200	<0.00200	0.0068 J	100
15-Dec-09	23.87	581.48	9.50	815	4.20	556.0	20.00	7.15	450	<0.00200	<0.200	<0.00200	0.0030 J	120
24-Mar-10	25.61	579.74	8.50	704	4.93	205.6	20.50	8.53	490	0.04700	0.370	0.00090 J	<0.0200 U	140
16-Jun-10	19.11	586.24	10.40	553	4.79	399.8	13.40	7.22	310	0.01600	0.100 J	<0.00200	0.0036 J	90
22-Sep-10	31.61	573.74	11.30	1019	3.89	413.8	20.30	7.10	770	0.00620	<0.200	0.00024 J	<0.0200	130
8-Dec-10	23.10	582.25	87.90	751	6.24	437.1	9.55	8.77	520	0.04300	0.220	0.00130 J	0.0100 J	130
29-Mar-11	21.32	584.03	7.10	303	4.76	809.4	13.40	9.35	350 J	0.04300	0.400 J+	0.00055 J	0.0110 J	110
21-Jun-11	26.04	579.31	11.20	840	3.24	300.2	8.50	8.40	790	0.01800	0.160 J	0.00058 J	0.0092 J	110
28-Sep-11	32.43	572.92	10.90	67	3.92	415.6	8.32	7.30	590	<0.00500	0.040 J	0.00019 J	0.0025 J	110
14-Dec-11	27.19	578.16	9.00	605	1.56	329.9	21.90	7.89	570	0.01100	0.280	0.00079 J	0.0085 J	150
20-Mar-12	17.23	588.12	6.70	639	5.03	362.5	59.90	7.79	200	0.01700	0.091 J	<0.00200	<0.0200	79

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

Date Sampled <sup>*</sup>	Field Parameters								Gen. Chem.	Metals (mg/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	Iron	Lead	Manganese
19-Jun-12	25.63	579.72	9.60	681	5.24	373.2	5.94	7.43	430	0.00740	<0.200	<0.00040	<0.0200	76
19-Sep-12	32.12	573.23	11.70	786	3.49	290.0	7.36	7.38	460	0.00570	<0.200	<0.00040	<0.0200	81
19-Dec-12	19.00	586.35	8.90	977	4.55	308.0	26.90	7.98	440	0.02000	0.490	0.00130	0.0120 J	150
25-Feb-13	24.93	580.42	7.10	766	7.59	306.9	6.18	8.20	450	0.03400	0.190 J	0.00073	0.0120 J	120
22-May-13	26.84	578.51	9.10	705	3.94	412.9	5.97	9.33	430	0.04300	0.150 J	0.00052	0.0054 J	140
21-Aug-13	32.84	572.51	11.20	879	4.54	110.2	8.28	8.28	548	0.00950	<0.050	<0.00010	0.0040	106
20-Nov-13	25.21	580.14	11.10	1264	4.69	201.4	30.80	7.55	640	0.02490	0.140	0.00190	0.0130	163
1-Apr-14	18.81	586.54	8.40	448	3.50	194.9	14.70	8.87	342	0.01480	0.060	0.00030	0.0040 J+	78
21-May-14	23.84	581.51	10.60	122	1.32	199.3	-	8.46	352	0.01800	<0.050	0.00020	0.0330	80
13-Aug-14	32.25	573.10	12.46	796	5.77	54.0	8.01	8.68	628	0.01610	<0.050	<0.00010	0.0040	165
13-Nov-14	27.21	578.14	13.30	837	4.02	234.3	11.40	8.63	711	0.04410	0.090	0.00040	0.0030	203
11-Feb-15	18.54	586.81	8.40	609	1.75	16.0	87.40	9.71	435	0.03620	0.420	0.00100	0.0120	117
4-May-15	27.52	577.83	9.90	974	3.27	356.5	12.30	10.14	654	0.04160	0.100	0.00050	0.0070	199
6-Aug-15	33.98	571.37	11.70	822	1.77	113.7	4.02	8.83	670	0.01910	<0.050	<0.00010	0.0020	210
4-Nov-15	28.51	576.84	11.70	1207	4.85	206.3	21.20	7.48	1090	0.00770	0.100	0.00100	0.0060	370
10-Feb-16	20.96	584.39	6.90	712	2.30	145.8	20.10	10.82	575	0.12100	0.190	0.00110	0.0290	173
2-May-16	28.91	576.44	10.60	1856	0.19	111.2	15.60	11.53	1010	0.19900	0.220	0.00250 J-	0.0250	347
23-Aug-16	33.58	571.77	11.40	1241	0.43	462.0	8.89	9.51	1150	0.03890	0.084	0.00034	0.0049	349
2-Nov-16	26.92	578.43	11.60	409	5.05	14.4	40.60	9.15	911	0.02560	0.448	0.00149	0.0133	297
1-Feb-17	24.61	580.74	6.20	1757	2.34	72.1	11.70	11.97	880	0.14100	0.037 J	0.00034	0.0026	283
30-May-17	24.56	580.79	10.80	1026	2.45	5.7	16.90	10.50	629	0.07280	0.081	0.00052 J+	0.0064	210
17-Aug-17	32.04	573.31	13.10	1019	3.94	87.3	42.70	9.36	726	0.02030	0.048 J	0.00015	0.0083	219
10-Nov-17	27.72	577.63	11.60	1090	4.17	109.6	38.20	9.12	931	0.02430	0.251	0.00277	0.0161	356
27-Feb-18	20.78	584.57	7.00	823	3.99	59.3	12.00	11.29	635	0.09930	0.077	0.00056	0.0045	203
1-May-18	22.58	582.77	8.90	1442	3.52	-	17.70	11.49	817	0.11900	0.182	0.000831 J+	0.0085	250
21-Aug-18	33.09	572.26	13.18	1153	1.01	139.8	9.68	10.06	989	0.05360	0.10 U	0.00035	0.0102	334
6-Nov-18	29.74	575.61	11.10	1719	3.85	218.4	6.49	8.13	1860	0.00304	<0.1	0.00037	0.0007 J	701 J+
13-Mar-19	22.90	582.45	5.80	748	5.04	145.7	32.00	10.55	737	0.03910	0.0479 J	0.00046	0.0045	246
8-May-19	25.63	579.72	9.10	936	5.95	75.9	7.60	10.38	747	0.05470	0.142	0.00127	0.0071	246
26-Aug-19	32.90	572.45	11.18	1622	0.88	Note 1	6.57	8.97	1510	0.01880	0.0895 J	0.00051	0.0169	478
13-Nov-19	30.92	574.43	10.20	1320	1.45	172.7	5.10	8.33	1140	0.00631	0.0099 J	<0.0001	0.0027	422
12-Feb-20	15.95	589.40	7.70	438	1.40	150.6	19.70	8.13	379	0.00212	0.0144 J	0.0001 U	0.0023	122
12-Aug-20	32.30	573.05	11.00	2360	2.25	162.9	13.40	8.16	2060	0.00628	0.0089 J	0.000088 J	0.0061	709
9-Dec-20	27.60	577.75	10.80	1750	1.95	209.0	22.00	8.22	1500	0.00314	0.592	0.00098	0.0216	539
3-Mar-21	22.58	582.77	7.10	760	1.74	208.0	5.60	8.04	722	0.00309	0.182	0.00031	0.0174	243
9-Jun-21	31.07	574.28	9.80	2077	4.83	197.3	1.81	8.08	1900	0.00503	-	0.000094 J	-	707
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-

Notes:

Top of casing elevation (feet msl): 605.35

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.

- Not measured or not available

< Analyte not detected above the reporting limit shown

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

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level

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 (mg/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	Iron	Lead	Manganese
19-Dec-06	26.51	674.57	10.96	546	0.43	-115.4	1.05	7.70	310	0.15100	<0.150	<0.00100	0.0377	-
14-Feb-07	26.08	675.00	10.62	397	1.02	-90.8	3.07	7.53	240	0.16000	0.208	<0.00100	0.0463	-
31-May-07	25.96	675.12	10.83	386	0.36	-172.8	4.20	8.20	220	0.12200	0.183	<0.00100	0.0442	-
27-Aug-07	25.66	675.42	10.97	372	0.76	-128.2	1.08	7.51	240	0.08990	0.166	<0.00100	0.0466	-
28-Nov-07	26.81	674.27	10.56	371	0.42	-121.2	1.29	8.03	220	0.08830	<0.150	<0.00100	0.0547	-
27-Feb-08	25.80	675.28	10.62	371	2.01	-	1.07	-	230	0.08090	0.159	<0.00100	0.0553	<3.0
20-May-08	25.62	675.46	10.61	391	0.36	-53.0	1.11	7.28	230	0.06430	0.162	<0.00100	0.0521	-
27-Aug-08	26.14	674.94	10.58	394	0.50	-63.9	1.02	7.35	230 J	0.06400	0.170	<0.00100	0.0482	<3.0
19-Nov-08	25.16	675.92	10.33	269	0.45	-88.6	0.48	7.51	230	0.05960	0.166	<0.00100	0.0536	<3.0
11-Feb-09	25.08	676.00	10.04	268	0.48	-	0.97	7.89	230	0.05600	0.182	<0.00100	0.0519	<3.0
18-May-09	24.83	676.25	10.10	271	0.42	-50.5	1.81	8.05	230 J	0.04660	<0.150	<0.00100	0.0500	<3.0
24-Sep-09	26.32	674.76	11.80	323	0.24	202.0	3.59	7.57	260	0.02700	0.080 J	<0.00200	0.0650	1.1 J
17-Dec-09	25.06	676.02	10.10	370	0.94	179.0	4.16	7.77	<40	0.03400	0.052 J	<0.00200	0.0700	1.2 J
23-Mar-10	24.83	676.25	10.90	344	0.21	397.4	3.17	7.57	240	0.02500	0.058 J	<0.00200	0.0660	1.3 J
15-Jun-10	24.38	676.70	10.50	355	0.08	195.5	0.42	7.66	150	0.02700	0.083 J	<0.00200	0.0590	1.1 J
20-Sep-10	25.74	675.34	10.50	354	0.06	192.9	0.20	7.65	200	0.02200	<0.200	<0.00200	0.0660 J+	1.1 J
6-Dec-10	24.59	676.49	10.00	347	0.09	99.3	0.17	7.86	230	0.02200	<0.200	<0.00200	0.0510	1.0 J
28-Mar-11	24.01	677.07	10.00	173	0.16	90.6	0.88	7.58	200	0.02200	<0.200	<0.00200	0.0500	1.0 J
20-Jun-11	24.11	676.97	10.30	330	0.07	121.5	0.17	7.65	250	0.02200	0.110 J	<0.00200	0.0510	0.9 J
26-Sep-11	25.39	675.69	10.40	2906	0.06	123.6	0.43	7.65	280	0.01500	0.130 J	<0.00200	0.0560	1.1 J
14-Dec-11	24.61	676.47	9.90	245	0.10	193.8	1.76	7.57	230	0.02100	0.110 J	<0.00200	0.0540	1.2 J
21-Mar-12	23.70	677.38	10.10	392	0.07	392.0	0.22	7.47	240	0.02300	0.110 J	<0.00200	0.0480	1.1 J
18-Jun-12	23.90	677.18	10.50	383	0.02	342.8	0.30	7.67	230	0.02000	<0.200	<0.00040	0.0510	<3.3
19-Sep-12	25.38	675.70	10.30	402	0.01	151.0	0.44	7.63	220	0.01900	0.110 J	<0.00040	0.0550	1.0 J
18-Dec-12	23.59	677.49	10.10	492	0.00	-45.7	0.16	7.70	92	0.01700	0.120 J	<0.00040	0.0490	1.2 J
25-Feb-13	23.73	677.35	9.90	377	0.00	177.1	0.37	7.53	270 J	0.01900	0.140 J	<0.00040	0.0450	1.0 J
22-May-13	23.85	677.23	9.90	398	0.00	430.4	0.44	7.73	290	0.01700	0.130 J	<0.00040	0.0460	<3.3
21-Aug-13	25.34	675.74	10.40	467	0.01	-31.7	0.55	7.68	238	0.01680	0.140	0.00008 J	0.0480	1.1
19-Nov-13	24.25	676.83	10.10	361	0.00	70.3	0.32	7.30	232	0.01570	0.160	<0.00010	0.0500	1.0
31-Mar-14	22.36	678.72	10.70	286	0.01	107.4	0.21	7.79	211	0.01380	0.160	<0.00010	0.0490	1.0
21-May-14	23.29	677.79	8.54	271	1.35	54.3	-	7.14	198	0.01310	0.160	<0.00010	0.0460	1.0
12-Aug-14	24.87	676.21	14.79	335	0.41	-16.0	2.02	7.05	216	0.01190	0.140	<0.00010	0.0450	1.0
11-Nov-14	24.96	676.12	10.10	262	0.79	11.1	1.51	7.49	221	0.01360	0.160	<0.00010	0.0450	1.1
10-Feb-15	23.23	677.85	10.40	319	0.25	-114.0	0.36	7.70	240	0.01330	0.160	<0.00010	0.0450	1.0
4-May-15	23.62	677.46	10.20	370	0.05	175.1	0.16	7.70	224	0.01170	0.180	<0.00010	0.0480	1.0
4-Aug-15	25.30	675.78	11.00	279	0.06	-30.5	0.72	7.72	234	0.01440	0.180	<0.00010	0.0460	1.0
4-Nov-15	25.35	675.73	10.60	263	0.00	51.2	0.46	7.46	233	0.01100	0.170	<0.00010	0.0450	1.2
8-Feb-16	23.03	678.05	10.20	319	0.03	206.5	0.20	7.77	210	0.01210	0.190	<0.00010	0.0480	1.1
2-May-16	23.49	677.59		Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>				
22-Aug-16	25.00	676.08	11.10	323	0.02	-55.2	1.10	7.64		Monitored Annually <sup>1</sup>				
1-Nov-16	24.29	676.79		Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>				
31-Jan-17	23.06	678.02	10.20	391	0.05	169.3	0.13	7.66	223	0.01190	0.177	<0.00010	0.0418	1.0
30-May-17	22.45	678.63		Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>				
16-Aug-17	24.27	676.81	10.70	385	0.15	123.4	0.40	7.64		Monitored Annually <sup>1</sup>				
9-Nov-17	23.17	677.91		Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>				

**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 (mg/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	Iron	Lead	Manganese
28-Feb-18	22.04	679.04	10.10	276	0.20	-96.4	0.25	7.44	221	0.01080	0.192	<0.00010	0.0412	1.0
1-May-18	22.11	678.97	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
22-Aug-18	24.42	676.66	11.37	277	5.25	-59.6	0.18	7.61	Monitored Annually <sup>1</sup>					
6-Nov-18	24.57	676.51	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
11-Mar-19	22.61	678.47	10.10	248	0.60	-70.8	0.68	7.60	224	0.00874	0.224	<0.0001	0.0475	1.07
8-May-19	22.68	678.40	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
27-Aug-19	24.54	676.54	11.45	282	0.58	Note 1	0.04	7.30	Monitored Annually <sup>1</sup>					
13-Nov-19	24.15	676.93	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
13-Feb-20	22.04	679.04	10.10	280	0.34	-133.4	0.57	7.51	207	0.00882	0.231	0.0001 U	0.0428	1.05
13-Aug-20	23.92	677.16	11.00	284	0.60	-113.5	0.44	7.55	Monitored Annually <sup>1</sup>					
9-Dec-20	23.35	677.73	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
5-Mar-21	22.01	679.07	10.20	266	0.04	-50.0	0.42	7.64	214	0.0105	0.21	0.0001 U	0.0407	1.12
10-Jun-21	23.17	677.91	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-

Note:

Top of casing elevation (feet msl): 701.08

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.

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.

- Not available

< Analyte not detected above the reporting limit shown

\* Depth to water (DTW) measurements for all bedrock LDA wells collected on the same day; date noted is sampling date

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level

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 (mg/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	Iron	Lead	Manganese
19-Dec-06	36.82	701.24	12.15	394	0.57	114.6	1.84	7.58	230	0.00849	<0.150	<0.00100	0.0242	-
14-Feb-07	36.30	701.76	11.69	339	1.40	-85.7	2.72	7.39	200	0.00609	0.232	<0.00100	0.0266	-
31-May-07	36.93	701.13	12.13	346	0.20	-223.7	3.04	8.28	210	0.00695	0.255	<0.00100	0.0297	-
27-Aug-07	37.99	700.07	12.18	336	0.49	-169.7	0.84	7.54	210	0.00749	0.262	<0.00100	0.0313	-
28-Nov-07	37.89	700.17	11.82	338	0.28	-146.6	1.32	7.93	250	0.00691	0.259	<0.00100	0.0320	-
27-Feb-08	37.24	700.82	11.87	340	0.23	-	0.87	7.41	210	0.00746	0.254	<0.00100	0.0309	<3.0
20-May-08	37.31	700.75	11.91	359	0.23	-86.6	0.67	7.27	200	0.00631	0.315	<0.00100	0.0267	-
27-Aug-08	38.37	699.69	11.84	362	0.35	-77.6	0.70	7.21	210 J	0.00636	0.279	<0.00100	0.0231	<3.0
19-Nov-08	37.50	700.56	11.53	254	0.44	-105.9	2.08	7.45	200	0.00586	0.279	<0.00100	0.0231	<3.0
11-Feb-09	37.10	700.96	11.25	254	0.48	-	0.63	7.91	220	0.00561	0.290	<0.00100	0.0238	<3.0
18-May-09	37.00	701.06	11.42	258	0.42	-71.9	1.11	8.00	210 J	0.00517	<0.150	<0.00100	0.0208	<3.0
25-Sep-09	38.88	699.18	13.10	297	0.14	140.7	3.09	7.54	230	0.00650	0.250	<0.00200	0.0290	1.2 J
17-Dec-09	37.19	700.87	10.80	341	0.51	129.0	4.85	7.71	74	0.00430	0.250	<0.00200	0.0290	1.1 J
23-Mar-10	36.60	701.46	12.60	323	0.27	355.0	5.28	7.54	110	0.00760	0.220	<0.00200	0.0290	1.2 J
15-Jun-10	36.25	701.81	11.40	326	0.08	171.1	-	7.62	98	0.00880	0.310	<0.00200	0.0230	1.1 J
20-Sep-10	37.85	700.21	11.60	324	0.08	144.0	0.16	7.61	160	0.00650	0.310 J+	<0.00200	0.0280 J+	1.2 J
6-Dec-10	36.60	701.46	11.00	319	0.21	78.3	0.20	7.81	210	0.00290	0.180 J	<0.00200	0.0200	0.9 J
29-Mar-11	35.98	702.08	11.20	156	0.15	215.0	0.75	7.48	200	0.00560	0.320 J+	<0.00200	0.0200	1.5 J
21-Jun-11	36.34	701.72	11.80	352	0.06	101.5	0.24	7.59	220	<0.00500	0.270	<0.00200	0.0280	1.0 J
27-Sep-11	38.14	699.92	11.50	2484	0.06	114.4	0.45	7.60	220	<0.00500	0.290	<0.00200	0.0220	1.0 J
14-Dec-11	36.91	701.15	11.00	228	0.05	127.2	4.04	7.54	190	0.00670	0.280	<0.00200	0.0210	1.2 J
21-Mar-12	35.68	702.38	11.00	359	0.05	93.9	0.30	7.43	210	0.00690	0.270	<0.00200	0.0170 J	1.1 J
18-Jun-12	36.06	702.00	11.70	350	0.02	211.9	0.23	7.62	220	0.00620	0.350 J+	<0.00040	0.0170 J	<3.3
19-Sep-12	38.07	699.99	11.60	367	0.00	102.0	0.34	7.59	200	0.00650	0.290	<0.00040	0.0220	1.0 J
18-Dec-12	34.88	703.18	10.90	463	0.00	-97.8	0.17	7.81	68	0.00600	0.280	<0.00040	0.0170 J	1.2 J
25-Feb-13	35.70	702.36	10.90	347	0.09	112.6	0.27	7.56	190	0.00660	0.270 J	<0.00040	0.0180 J	1.1 J
22-May-13	36.24	701.82	11.00	412	0.00	412.5	0.43	7.71	190	0.00600	0.280 J	<0.00040	0.0170 J	<3.3
20-Aug-13	38.13	699.93	12.20	406	0.02	-41.5	0.64	7.48	211	0.00550	0.290	<0.00010	0.0220	1.0
19-Nov-13	36.56	701.50	11.10	344	0.01	43.6	0.32	7.35	206	0.00520	0.310	<0.00010	0.0190	1.1
31-Mar-14	35.36	702.70	11.50	285	0.00	93.1	0.31	7.71	207	0.00510	0.320	<0.00010	0.0200	1.1
22-May-14	35.80	702.26	10.05	260	0.24	17.5	-	7.22	186	0.00500	0.310	<0.00010	0.0190	1.0
13-Aug-14	37.50	700.56	13.10	294	0.57	-37.5	3.28	7.19	190	0.00540	0.400	0.00210 J	0.0280	1.1
11-Nov-14	37.06	701.00	10.10	241	0.68	-39.7	2.10	7.48	206	0.00540	0.320	<0.00010	0.0180	1.1
10-Feb-15	35.70	702.36	11.40	295	0.11	-123.2	2.11	7.69	206	0.00510	0.310	<0.00010	0.0190	1.0
4-May-15	36.34	701.72	11.70	336	0.05	340.2	0.72	7.73	204	0.00480	0.310	<0.00010	0.0200	1.0
4-Aug-15	38.42	699.64	12.70	263	0.04	-81.8	0.77	7.72	204	0.00580	0.330	<0.00010	0.0200	1.0
4-Nov-15	37.81	700.25	11.60	244	0.04	26.9	2.13	7.45	201	0.00470	0.320	<0.00010	0.0180	1.1
8-Feb-16	35.68	702.38	11.60	307	0.00	208.4	0.74	7.68	186	0.00550	0.330	<0.00010	0.0220	1.1
2-May-16	36.03	702.03		Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>				
22-Aug-16	37.92	700.14	12.20	306	0.02	-137.6	1.58	7.67					Monitored Annually <sup>1</sup>	
1-Nov-16	37.07	700.99		Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>				
31-Jan-17	36.00	702.06	10.90	348	0.10	120.5	0.86	7.67	195	0.00566	0.306	<0.00010	0.0168	1.1
30-May-17	35.44	702.62		Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>				
16-Aug-17	37.69	700.37	12.30	356	0.14	-77.2	3.27	7.67					Monitored Annually <sup>1</sup>	
9-Nov-17	37.11	700.95		Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>				



**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 (mg/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	Iron	Lead	Manganese
28-Feb-18	34.95	703.11	10.90	261	0.21	-115.5	0.80	7.48	205	0.00569	0.310	<0.00010	0.0173	1.0
1-May-18	35.11	702.95	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
22-Aug-18	37.90	700.16	12.31	262	1.64	-80.3	0.92	7.56	Monitored Annually <sup>1</sup>					
6-Nov-18	37.66	700.40	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
12-Mar-19	35.68	702.38	10.70	239	0.58	-75.1	0.59	7.48	188	0.0055	0.352	<0.0001	0.0182	1.08
8-May-19	35.86	702.20	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
27-Aug-19	37.85	700.21	12.30	265	0.43	Note 1	0.02	7.46	Monitored Annually <sup>1</sup>					
13-Nov-19	37.22	700.84	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
13-Feb-20	35.10	702.96	10.80	261	0.39	-135.9	0.96	7.50	185	0.00545	0.349	0.0001 U	0.018	1.15
13-Aug-20	37.21	700.85	11.60	266	0.54	-118.2	1.35	7.50	Monitored Annually <sup>1</sup>					
9-Dec-20	36.55	701.51	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
5-Mar-21	35.02	703.04	11.10	255	0.04	-80.0	2.29	7.65	176	0.00552	0.321	0.0001 U	0.0166	1.09
10-Jun-21	36.29	701.77	Monitored Semi-Annually <sup>1</sup>						Monitored Annually <sup>1</sup>					
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-

Note:

Top of casing elevation (feet msl): 738.06

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.

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.

- Not available

< Analyte not detected above the reporting limit shown

\* Depth to water (DTW) measurements for all bedrock LDA wells collected on the same day; date noted is sampling date

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level 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 (mg/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	Iron	Lead	Manganese	Potassium
19-Dec-06	7.08	733.51	11.37	670	0.42	-171.2	1.20	9.23	500	0.02570	0.173	<0.00100	0.0476	-	
23-Jan-07	5.62	734.97	13.07	383	0.51	-275.0	1.53	8.63	270	0.01840	0.450	<0.00100	0.0787	-	
14-Feb-07	5.81	734.78	12.57	328	1.09	-158.2	115.00	7.86	310	0.01510	<0.150	<0.00100	0.0718	-	
29-Mar-07	4.78	735.81	12.44	458	0.57	-140.8	4.25	7.78	260 J	0.03790	0.261	<0.00100	0.0601	-	
17-Apr-07	4.86	735.73	12.79	389	0.27	-102.4	1.22	7.46	240	0.02300	0.451	<0.00100	0.0900	-	
31-May-07	6.39	734.20	12.98	394	0.29	-223.8	3.32	8.14	240	0.02120	0.443	<0.00100	0.0998	-	
20-Jun-07	6.86	733.73	13.41	412	6.10	-128.5	1.35	8.02	230 J	0.02380	0.274	<0.00100	0.0898	-	
31-Jul-07	7.96	732.63	13.47	417	0.77	-174.1	0.92	7.64	250	0.01890	0.609	<0.00100	0.1190	-	
27-Aug-07	8.50	732.09	12.84	395	0.46	-132.4	1.97	7.43	250	0.01760	0.315	<0.00100	0.1040	-	
27-Sep-07	9.58	731.01	12.68	294	0.51	-133.8	0.53	7.87	250	0.01930	0.451	<0.00100	0.1170	-	
26-Oct-07	9.65	730.94	12.49	288	0.84	-111.9	9.83	7.60	240 J	0.01100	0.949	<0.00100	0.1970	-	
28-Nov-07	10.23	730.36	11.95	362	0.64	-86.1	1.58	7.87	200	0.01780	0.315	<0.00100	0.0819	-	
12-Dec-07	9.66	730.93	11.83	334	0.26	-93.2	0.63	7.63	280 J	0.01740	0.458	<0.00100	0.0953	-	
24-Jan-08	8.20	732.39	11.09	335	0.44	-108.3	-	7.46	220	0.01920	0.456	<0.00100	0.0861	-	
26-Feb-08	7.61	732.98	12.26	337	0.48	-	2.40	7.45	210	0.02200	0.448	<0.00100	0.0916	<3.0	
25-Mar-08	7.22	733.37	11.94	337	1.01	-48.6	2.80	7.51	210	0.01780	0.296	<0.00100	0.0789	-	
29-Apr-08	6.75	733.84	12.53	332	0.77	-50.3	1.95	7.41	200 J	0.01820	0.449	<0.00100	0.0826	-	
19-May-08	7.17	733.42	12.37	336	0.57	-57.2	2.19	7.34	200 J	0.01870	0.373	<0.00100	0.0758	-	
18-Jun-08	7.26	733.33	12.11	323	0.48	-64.1	0.83	7.13	190 J	0.01950	0.461	<0.00100	0.0896	-	
26-Aug-08	8.78	731.81	12.31	329	1.16	-36.5	2.89	7.30	200 J	0.01770	0.298	<0.00100	0.0532	<3.0	
19-Nov-08	9.03	731.56	11.91	243	0.52	-93.1	1.69	7.40	190	0.01820	0.394	<0.00100	0.0690	<3.0	
11-Feb-09	7.07	733.52	11.74	227	0.65	-	1.03	7.76	180	0.01770	0.582	<0.00100	0.1020	<3.0	
18-May-09	6.50	734.09	12.11	225	0.67	-63.9	1.51	7.83	190 J	0.01290	<0.150	<0.00100	0.0886	<3.0	
25-Sep-09	10.47	730.12	13.50	260.1	0.36	215.3	4.14	7.61	220	0.01700	0.260	0.00094 J	0.0440	12.0	
17-Dec-09	8.39	732.20	11.50	301.0	0.44	110.0	3.10	7.71	270	0.02300	0.610	<0.00200	0.0970	1.3 J	
23-Mar-10	6.46	734.13	12.20	294.8	0.43	332.5	3.52	7.57	150 J	0.02700	0.380	<0.00200	0.0760	1.3 J	
16-Jun-10	5.34	735.25	11.10	281.7	0.05	117.0	-	7.71	160	0.02700	0.490	<0.00200	0.0760	1.3 J	
21-Sep-10	7.72	732.87	11.80	276.3	0.06	169.5	0.36	7.54	140	0.02300	0.600 J+	<0.00200	0.0910 J+	1.3 J	
7-Dec-10	6.48	734.11	11.00	263.0	0.15	77.2	0.38	7.58	180	0.02000	0.360	<0.00200	0.0680	1.2 J	
28-Mar-11	4.42	736.17	10.80	134.0	0.44	75.6	1.06	7.46	160 J	0.02100	0.610 J+	<0.00200	0.0720	1.7 J	
20-Jun-11	4.76	735.83	12.10	252.7	0.07	68.4	0.13	7.48	200 J	0.01600	0.650	<0.00200	0.08900	1.0 J	
27-Sep-11	7.86	732.73	11.90	2064.0	0.04	102.6	0.37	7.48	170	0.01800	0.620	<0.00200	0.08300	1.1 J	
14-Dec-11	7.17	733.42	11.00	188.2	0.03	140.8	1.87	7.50	770	0.02200	0.310	<0.00200	0.05600	1.3 J	
21-Mar-12	4.68	735.91	10.70	297.8	0.07	130.6	0.41	7.39	170	0.02100	0.360	<0.00200	0.04600	1.1 J	
18-Jun-12	4.75	735.84	11.60	289.0	0.16	271.3	0.55	7.54	150 J+	0.01900	0.440 J+	<0.00040	0.05300	<3.3	
19-Sep-12	7.65	732.94	12.60	299.9	0.10	121.0	0.42	7.50	160	0.01800	0.370	<0.00040	0.05500	1.1 J	
18-Dec-12	5.58	735.01	10.90	384.0	0.03	15.6	1.39	7.50	200	0.01900	0.150 J	<0.00040	0.04100	1.3 J	
25-Feb-13	4.80	735.79	10.60	284.2	0.03	140.4	0.30	7.53	150	0.02200	0.390 J	<0.00040	0.05400	1.2 J	
22-May-13	4.81	735.78	11.00	294.9	0.14	387.7	0.52	7.61	160	0.01800	0.420 J	<0.00040	0.05800	<3.3	
20-Aug-13	7.63	732.96	12.60	383.0	0.81	-8.4	0.80	7.26	164	0.01670	0.350	<0.00010	0.05200	1.1	
19-Nov-13	7.11	733.48	11.30	218.1	0.14	54.3	0.73	7.20	169	0.01660	0.290	<0.00010	0.05200	1.1	
1-Apr-14	4.08	736.51	10.70	222.6	0.15	158.5	1.12	7.50	168	0.01330	0.480	<0.00010	0.07300	1.1	
22-May-14	4.21	736.38	9.98	206.0	1.59	27.1	-	7.17	158	0.01120	0.150	<0.00010	0.06500	1.0	
13-Aug-14	6.95	733.64	13.50	237.0	1.14	9.8	4.70	6.92	154	0.01050	0.160	<0.00010	0.07900	1.0	
12-Nov-14	6.04	734.55	8.40	185.1	0.28	-10.1	3.42	7.36	162	0.01610	0.440	<0.00010	0.09300	1.1	
11-Feb-15	4.62	735.97	11.50	205.1	1.20	68.1	1.32	7.41	169	0.00900	<0.050	<0.00010	0.07900	1.1	
4-May-15	4.93	735.66	12.20	262.0	1.64	190.2	0.84	7.43	168	0.01090	0.640	<0.00010	0.12400	1.0	
4-Aug-15	7.44	733.15	13.20	211.3	1.62	81.9	2.02	7.39	173	0.00680	0.043 J	<0.00010	0.05100	1.0	
5-Nov-15	8.14	732.45	12.50	186.0	1.49	166.9	1.87	7.10	162	0.00350	0.017 J	<0.00010	0.08600	1.0	
8-Feb-16	3.20	737.39	11.70	240.5	2.13	196.9	0.88	7.23	150	0.01120	1.060	<0.00010	0.13300	1.0	
2-May-16	3.77	736.82	Monitored Semi-Annually <sup>1</sup>								Monitored Annually <sup>1</sup>				
22-Aug-16	6.81	733.78	13.10	238.0	2.40	168.5	2.39	7.41	Monitored Annually <sup>1</sup>						
1-Nov-16	6.59	734.00	Monitored Semi-Annually <sup>1</sup>								Monitored Annually <sup>1</sup>				
31-Jan-17	4.02	736.57	11.30	265.8	2.79	218.2	1.39	7.34	154	0.00323	0.008 J	<0.00010	0.02720	1.0	
30-May-17	2.32	738.27	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 (mg/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	Iron	Lead	Manganese	Potassium
16-Aug-17	5.48	735.11	13.20	258.4	3.54	92.2	2.50	7.41		Monitored Annually <sup>1</sup>					
9-Nov-17	6.00	734.59	Monitored Semi-Annually <sup>1</sup>								Monitored Annually <sup>1</sup>				
28-Feb-18	1.13	739.46	10.80	186.9	4.11	142.0	1.83	7.18	159	0.00253	0.02 J	<0.00010	0.01230	0.8	
1-May-18	1.60	738.99	Monitored Semi-Annually <sup>1</sup>								Monitored Annually <sup>1</sup>				
22-Aug-18	5.93	734.66	13.55	194	7.63	16.9	0.77	7.11	Monitored Annually <sup>1</sup>						
6-Nov-18	6.78	733.81	Monitored Semi-Annually <sup>1</sup>								Monitored Annually <sup>1</sup>				
12-Mar-19	2.32	738.27	10.50	166	4.32	167.7	1.34	7.14	149	0.00187	0.0023 J	<0.0001	<0.001	0.953	
8-May-19	2.57	738.02	Monitored Semi-Annually <sup>1</sup>								Monitored Annually <sup>1</sup>				
27-Aug-19	5.76	734.83	13.62	192	3.94	Note 1	0.02	7.09	Monitored Annually <sup>1</sup>						
13-Nov-19	6.00	734.59	Monitored Semi-Annually <sup>1</sup>								Monitored Annually <sup>1</sup>				
13-Feb-20	1.69	738.90	10.70	180	3.20	88.5	1.21	7.11	140	0.00169	0.05 U	0.0001 U	0.0062	0.915	
13-Aug-20	4.59	736.00	13.60	188.7	4.26	50.3	1.60	7.19	Monitored Annually <sup>1</sup>						
9-Dec-20	4.22	736.37	Monitored Semi-Annually <sup>1</sup>								Monitored Annually <sup>1</sup>				
5-Mar-21	1.06	739.53	10.90	172.0	3.43	132	0.69	7.26	136	0.00184	0.107	0.0001 U	0.00750	0.9	
10-Jun-21	3.46	737.13	Monitored Semi-Annually <sup>1</sup>								Monitored Annually <sup>1</sup>				
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-	

Note:

Top of casing elevation (feet msl): 740.59

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.

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.

- Not available

< Analyte not detected above the reporting limit shown

\* Depth to water (DTW) measurements for all bedrock LDA wells collected on the same day; date noted is sampling date

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level

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 (mg/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
2-Dec-02	69.87	862.82	9.5	1690	-	-	-	7.29	910	0.04660	0.00268	-
3-Mar-03	36.83	895.86	11.5	1260	-	-	24.10	7.15	860	0.00973	-	-
3-May-03	34.88	897.81	12.8	1520	-	-	38.00	7.09	950	-	-	-
3-Aug-03	52.02	880.67	19.19	1460	-	-	11.40	7.01	990	-	-	-
1-Nov-03	53.61	879.08	11.60	915	-	-	8.97	7.19	1010	0.00858	0.00070	-
1-Feb-04	32.75	899.94	11.52	1033	-	-	7.36	6.78	1060	-	-	-
1-May-04	42.50	890.19	14.87	1126	-	-	7.53	7.23	1020	-	-	-
1-Aug-04	49.26	883.43	13.72	1234	-	-	8.07	6.98	981	-	-	-
1-Nov-04	42.81	889.88	11.88	1429	-	-	9.06	6.92	1060	0.01000	<0.00100	-
1-Feb-05	33.62	899.07	13.06	1615	-	-	7.11	7.01	1020	-	-	-
1-May-05	34.88	897.81	12.91	1459	-	-	6.54	6.85	1000	-	-	-
1-Aug-05	43.80	888.89	10.40	1472	-	-	10.40	6.80	1090	-	-	-
1-Nov-05	52.80	879.89	10.40	1458	-	-	6.02	6.64	1100	0.01030	<0.00100	-
1-Feb-06	42.70	889.99	10.40	1343	1.10	48.3	11.10	7.08	1100 J	-	-	-
1-May-06	37.81	894.88	11.52	1686	1.64	49.2	10.50	6.83	1100	-	-	-
1-Aug-06	46.11	886.58	14.10	1357	2.33	43.0	10.70	7.11	1100	-	-	-
1-Nov-06	46.47	886.22	-	-	-	-	-	-	-	-	-	-
28-Dec-06	33.20	899.49	-	-	-	-	-	-	-	-	-	-
7-Feb-07	34.50	898.19	-	-	-	-	-	-	-	-	-	-
7-May-07	36.48	896.21	15.19	1484	0.52	-83.4	6.78	7.60	1100	-	-	-
7-Aug-07	47.57	885.12	11.21	1488	8.80	107.4	9.53	6.51	1200	-	-	-
27-Nov-07	51.25	881.44	13.60	1483	1.82	-129.5	434.00	7.11	1000 J	0.00572	<0.00100	-
8-Feb-08	35.12	897.57	14.71	1489	3.11	-	10.20	6.97	1100	-	-	-
8-May-08	37.60	895.09	14.50	1594	3.99	112.5	4.71	6.90	1200 J	-	-	-
8-Aug-08	46.98	885.71	13.27	1617	2.49	105.3	5.32	6.96	1200 J	0.00782	<0.00100	5.6
1-Nov-08	43.35	889.34	11.17	1096	7.29	127.1	47.30	7.70	1100	0.00980	<0.00100	5.6
11-Feb-09	37.00	895.69	10.28	1112	4.15	-	7.68	7.25	1100	0.00752	<0.00100	5.6
9-May-09	36.53	896.16	13.87	1209	2.93	89.0	5.45	7.41	990 J	0.00757	<0.00100	5.6
24-Sep-09	53.61	879.08	12.10	1328	1.98	331.0	3.26	6.92	1200	0.00790	<0.00200	5.7
14-Dec-09	33.72	898.97	10.20	1519	0.55	393.0	2.82	6.99	1100	0.00340	<0.00200	5.7
22-Mar-10	35.11	897.58	10.90	1463	-	508.0	3.95	6.94	1200	0.01000	<0.00200	5.6
15-Jun-10	33.26	899.43	11.00	1485	0.20	210.3	1.50	7.02	1100	0.01100	<0.00200	5.9
20-Sep-10	45.81	886.88	11.30	1484	0.06	159.7	0.91	6.98	1100	0.00910	0.00048 J	6.0
6-Dec-10	36.20	896.49	10.70	1494	0.08	35.4	0.24	7.21	1200	0.00680	0.00034 J	5.2
28-Mar-11	35.07	897.62	10.70	749	0.08	136.8	0.16	6.88	1100	0.00680	<0.00200	5.5
20-Jun-11	38.53	894.16	11.40	1439	0.08	-19.2	0.21	6.99	1400	0.00460 J	<0.00200	5.5
26-Sep-11	50.43	882.26	11.20	1249	0.07	38.5	0.41	7.01	1200	0.00450 J	<0.00200	5.7
13-Dec-11	51.30	881.39	10.40	1308	0.06	50.3	2.03	7.07	530	0.00760	<0.00200	6.1
22-Mar-12	43.75	888.94	10.60	1695	0.08	125.1	0.28	6.99	1200	0.01200	<0.00200	5.7
18-Jun-12	44.86	887.83										
18-Sep-12	55.74	876.95	12.90	1506	0.05	99.5	0.36	7.08	1300	0.01000	<0.00040	5.8
18-Dec-12	41.94	890.75										
21-Feb-13	37.86	894.83	10.40	1730	0.02	131.5	0.41	7.27	1200	0.01300	<0.00040	6.3
22-May-13	39.34	893.35										
20-Aug-13	49.40	883.29	11.90	1707	0.05	-37.6	0.69	7.00	1240	0.01020	<0.00010	6.0
19-Nov-13	44.94	887.75										
31-Mar-14	33.31	899.38	11.20	1256	0.01	103.5	0.27	7.00	1200	0.01310	<0.00010	6.6
21-May-14	33.37	899.32										
15-Aug-14	45.31	887.38	13.43	1467	0.71	-1.1	2.32	6.79	1150	0.01340	<0.00010	6.1
14-Nov-14	44.83	887.86										
10-Feb-15	35.97	896.72	11.00	1423	0.04	-109.4	2.16	7.00	1200	0.01300	<0.00010	6.3



**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 (mg/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
2-Dec-02	87.28	844.49	11.1	557	-	-	-	7.72	540	0.03270	<0.00050	-
3-Mar-03	48.63	883.14	12.0	623	-	-	24.00	7.48	370	0.00708	-	-
3-May-03	47.12	884.65	12.1	548	-	-	264.00	7.54	440	-	-	-
3-Aug-03	64.60	867.17	23.23	675	-	-	195.00	7.36	450	-	-	-
1-Nov-03	66.14	865.63	11.0	400	-	-	15.50	8.10	437	0.00603	<0.00050	-
1-Feb-04	46.55	885.22	10.68	455	-	-	8.70	7.15	440	-	-	-
1-May-04	55.82	875.95	13.61	508	-	-	12.40	7.58	429	-	-	-
1-Aug-04	61.89	869.88	13.15	585	-	-	15.70	7.47	399	-	-	-
1-Nov-04	56.83	874.94	10.94	655	-	-	9.40	7.22	477	0.00308	<0.00100	-
1-Feb-05	47.31	884.46	12.80	778	-	-	8.39	7.35	451	-	-	-
1-May-05	48.60	883.17	12.86	743	-	-	4.22	7.25	432	-	-	-
1-Aug-05	56.80	874.97	14.17	746	-	-	3.10	6.99	518	-	-	-
1-Nov-05	66.85	864.92	10.20	702	-	-	5.36	7.11	470	0.00360	<0.00100	-
1-Feb-06	47.88	883.89	10.11	648	0.71	109.4	2.72	7.53	450 J	-	-	-
1-May-06	52.23	879.54	12.22	686	1.82	43.7	3.68	7.43	450	-	-	-
1-Aug-06	59.41	872.36	12.28	665	1.06	-74.0	14.20	7.36	480	-	-	-
1-Nov-06	61.84	869.93	-	-	-	-	-	-	-	-	-	-
28-Dec-06	48.26	883.51	-	-	-	-	-	-	-	-	-	-
7-Feb-07	49.64	882.13	-	-	-	-	-	-	-	-	-	-
7-May-07	53.24	878.53	12.44	722	0.74	-150.8	6.06	7.94	470	-	-	-
7-Aug-07	60.45	871.32	13.76	712	0.79	-50.0	4.53	7.28	500	-	-	-
27-Nov-07	63.40	868.37	14.41	711	0.45	-194.4	7.07	7.34	470 J	0.00289	<0.00100	-
8-Feb-08	49.23	882.54	14.07	737	0.62	-	6.28	7.46	500	-	-	-
8-May-08	51.31	880.46	13.52	793	0.55	27.9	4.42	7.40	520 J	-	-	-
8-Aug-08	59.69	872.08	13.73	812	0.67	-24.7	9.33	7.37	560 J	0.00226	<0.00100	<3.0
1-Nov-08	57.38	874.39	14.75	619	0.89	-42.5	4.40	7.45	480	0.00222	<0.00100	<3.0
10-Feb-09	50.92	880.85	6.50	618	10.51	-	655.00	7.69 J	530	0.00219	<0.00100	3.0
9-May-09	51.25	880.52	13.95	637	2.21	39.3	5.87	7.74	540 J	0.00242	<0.00100	<3.0
25-Sep-09	65.46	866.31	13.20	678	2.25	331.8	2.29	7.15	570	0.00180 J	<0.00200	3.3
17-Dec-09	49.40	882.37	10.60	794	0.99	224.0	3.97	7.58	440	0.00070 J	<0.00200	3.2 J
22-Mar-10	49.18	882.59	10.40	762	-	245.0	0.74	7.39	580	0.00450	<0.00200	3.2 J
15-Jun-10	46.88	884.89	12.10	762	0.05	142.1	0.47	7.50	420	0.00550	<0.00200	3.3
20-Sep-10	58.97	872.80	11.40	765	0.07	89.6	0.47	7.47	520	0.00470	0.00027 J	3.4
6-Dec-10	50.66	881.11	10.20	763	0.19	58.9	0.32	7.72	550	0.00130 J	<0.00200	3.2 J
28-Mar-11	48.89	882.88	10.50	376	0.55	165.0	0.73	7.53	470	0.00370	<0.00200	3.0 J
20-Jun-11	52.13	879.64	13.40	718	0.45	-65.1	0.75	7.53	600 J	<0.00500	<0.00200	3.5
26-Sep-11	63.02	868.75	11.80	633	1.73	-6.0	1.72	7.61	560	<0.00500	<0.00200	3.5
13-Dec-11	63.88	867.89	8.60	678	0.69	-24.7	1.95	7.56	530	0.00570	<0.00200	4.1
22-Mar-12	56.96	874.81	5.60	877	1.89	-26.6	0.84	7.69	540	0.00340	<0.00040	3.0 J
18-Jun-12	58.01	873.76										
18-Sep-12	67.78	863.99	26.30	838	3.62	12.4	1.27	7.70	540	0.00310	<0.00040	3.1 J
18-Dec-12	56.10	875.67										
21-Feb-13	51.62	880.15	4.30	895	7.54	31.3	0.83	8.04	510	0.00360	<0.00040	3.6
22-May-13	53.14	878.63										
20-Aug-13	62.35	869.42	12.30	526	0.08	-60.4	2.91	7.47	585	0.00320	<0.00010	3.2
19-Nov-13	58.70	873.07										
31-Mar-14	46.60	885.17	11.10	622	0.04	48.4	0.45	7.52	561	0.00180	<0.00010	3.3
21-May-14	46.96	884.81										
15-Aug-14	58.62	873.15	12.48	732	0.90	-62.4	2.04	7.16	564	0.00200	0.00020	3.1
14-Nov-14	59.59	872.18										
10-Feb-15	49.61	882.16	10.90	717	0.03	-114.4	1.82	7.48	551	0.00290	<0.00010	3.3

**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 (mg/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
4-May-15	52.25	879.52	Monitored Semiannually <sup>1</sup>									
4-Aug-15	61.71	870.06	12.00	618	0.04	-115.0	0.35	7.56	552	0.00300	<0.00010	3.4
5-Nov-15	68.72	863.05	11.10	625	0.05	27.5	1.26	7.21	603	0.00160	<0.00010	3.6
8-Feb-16	46.93	884.84	11.40	794	0.00	155.1	0.17	7.57	599	0.00210	<0.00010	3.8
2-May-16	50.77	881.00	Monitored Semiannually <sup>2</sup>									
22-Aug-16	62.11	869.66	11.60	770	0.04	-251.0	0.86	7.50	Monitored Annually <sup>2</sup>			
1-Nov-16	61.71	870.06	Monitored Semiannually <sup>2</sup>									
31-Jan-17	49.02	882.75	10.60	916	0.13	-310.4	0.35	7.47	676	0.00187	<0.00010	3.4
30-May-17	48.11	883.66	Monitored Semiannually <sup>2</sup>									
16-Aug-17	57.17	874.60	11.80	898	0.12	-210.9	0.22	7.42	Monitored Annually <sup>2</sup>			
9-Nov-17	58.71	873.06	Monitored Semiannually <sup>2</sup>									
28-Feb-18	45.21	886.56	10.20	758	0.19	-166.6	0.20	7.26	694	0.00287	<0.00010	3.34
1-May-18	47.40	884.37	Monitored Semiannually <sup>2</sup>									
22-Aug-18	60.25	871.52	11.58	705	2.22	-153.0	0.14	7.37	Monitored Annually <sup>2</sup>			
6-Nov-18	65.30	866.47	Monitored Semiannually <sup>2</sup>									
12-Mar-19	46.35	885.42	9.80	707	0.58	-119.9	0.16	7.24	668	0.00496	<0.0001	4.21
8-May-19	47.20	884.57	Monitored Semiannually <sup>2</sup>									
27-Aug-19	59.87	871.90	11.95	762	0.39	Note 1	0.02	7.20	Monitored Annually <sup>2</sup>			
13-Nov-19	60.20	871.57	Monitored Semiannually <sup>2</sup>									
14-Feb-20	44.28	887.49	10.30	760	0.30	-169.3	1.09	7.11	717	0.0046	0.0001 U	4.07
13-Aug-20	57.57	874.20	11.10	739	0.91	-145.8	0.31	7.17	Monitored Annually <sup>2</sup>			
9-Dec-20	54.25	877.52	Monitored Semiannually <sup>2</sup>									
5-Mar-21	48.74	883.03	10.70	724	0.27	-222	0.61	7.36	592	0.00406	0.0001 U	3.9
10-Jun-21	59.90	871.87	Monitored Semiannually <sup>2</sup>									
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.05	-

Notes:

Top of casing elevation (feet msl): 931.77

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.

- Not measured or not available
- < Analyte not detected above the reporting limit 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.
- a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest
- b Site background arsenic value to be determined (TBD)
- 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 msl Feet above mean sea level
- 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 (mg/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
18-Dec-06	20.56	910.89	11.30	1054	0.59	-10.5	6.76	7.01	630	0.00446	<0.00100	-
7-Jan-07	18.48	912.97	12.53	700	0.61	-70.6	33.50	7.11	540	0.00519	<0.00100	-
7-Feb-07	21.53	909.92	11.59	557	0.57	-59.1	33.50	6.88	530	0.00519	<0.00100	-
7-Mar-07	15.34	916.11	11.71	817	0.45	-2.4	91.20	6.52	550 J	0.00491	<0.00100	-
7-Apr-07	17.97	913.48	11.96	909	0.25	0.2	121.00	6.91	560	0.00475	<0.00100	-
1-May-07	26.92	904.53	12.55	880	4.20	-14.3	63.70	7.13	540	0.00490	<0.00100	-
7-Jun-07	29.94	901.51	13.12	1016	3.20	-5.6	3.58	7.52	600 J	0.00437	<0.00100	-
7-Jul-07	35.27	896.18	13.00	910	1.74	-27.4	9.97	7.24	550	0.00491	<0.00100	-
7-Aug-07	39.55	891.90	12.40	1065	0.92	-14.6	4.62	6.99	590	0.00446	<0.00100	-
7-Sep-07	44.69	886.76	12.36	696	0.68	-33.3	3.22	7.29	590	0.00492	<0.00100	-
26-Oct-07	38.90	892.55	11.46	667	0.56	-18.3	22.60	6.98	620 J	0.00443	<0.00100	-
27-Nov-07	38.79	892.66	11.71	914	0.56	-46.7	3.32	6.91	560 J	0.00490	<0.00100	-
12-Dec-07	35.33	896.12	12.61	909	0.53	-27.3	4.28	6.87	820	0.00409	<0.00100	-
24-Jan-08	28.97	902.48	10.72	872	0.78	-49.1	-	7.14	550	0.00472	<0.00100	-
8-Feb-08	26.00	905.45	11.25	888	0.44	-	4.18	6.85	550	0.00450	<0.00100	-
8-Mar-08	26.03	905.42	10.94	915	0.59	-95.6	3.19	6.89	550	0.00521	<0.00100	-
8-Apr-08	25.03	906.42	11.27	931	0.61	-20.1	3.44	6.89	550 J	0.00488	<0.00100	-
8-May-08	27.33	904.12	11.68	949	0.68	-6.7	5.37	6.62	580 J	0.00534	<0.00100	-
8-Jun-08	28.38	903.07	11.40	948	0.75	-50.4	1.59	6.68	580 J	0.00445	<0.00100	-
8-Aug-08	39.80	891.65	11.80	970	0.68	-78.6	1.72	6.84	610 J	0.00464	<0.00100	<3.0
1-Nov-08	33.96	897.49	11.20	682	0.63	-115.4	0.95	6.82	540	0.00480	<0.00100	<3.0
10-Feb-09	25.56	905.89	10.54	671	0.71	-71.7	0.98	7.05	610	0.00473	<0.00100	<3.0
9-May-09	25.79	905.66	11.23	682	0.55	-5.8	0.86	7.68	560 J	0.00340	<0.00100	<3.0
22-Sep-09	46.68	884.77	18.70	737	0.64	214.5	0.99	6.91	580 J	0.00390	<0.00200	2.7 J
14-Dec-09	30.45	901.00	9.80	901	0.18	200.0	0.70	6.96	450	0.00170 J	<0.00200	2.5 J
23-Mar-10	19.92	911.53	11.30	773	0.25	148.0	4.40	6.86	510	0.00560	<0.00200	2.6 J
15-Jun-10	16.74	914.71	11.00	838	0.10	202.3	2.89	7.01	860 J	0.00820	<0.00200	2.8 J
20-Sep-10	33.31	898.14	11.20	852	0.09	174.7	0.60	6.97	540	0.00620	<0.00200	2.7 J
6-Dec-10	19.81	911.64	10.80	838	0.10	30.5	0.47	7.17	530	0.00380	<0.00200	2.3 J
28-Mar-11	17.16	914.29	10.80	403	0.15	48.4	1.13	6.89	500 J	0.00230	<0.00200	2.3 J
20-Jun-11	18.95	912.50	11.10	775	0.05	-29.1	0.37	7.01	610 J	<0.00500	<0.00200	2.4 J
26-Sep-11	33.71	897.74	11.20	690	0.03	-8.7	0.54	7.00	560	0.00410 J	<0.00200	2.8 J
13-Dec-11	24.48	906.97	10.50	730	0.05	93.6	1.92	7.07	520	0.00610	<0.00200	2.8 J
21-Mar-12	15.54	915.91	10.70	883	0.06	106.9	0.34	6.90	500	0.00650	<0.00200	2.4 J
19-Jun-12	17.01	914.44										Monitored Semiannually <sup>1</sup>
19-Sep-12	29.82	901.63	11.90	877	0.00	122.0	0.47	7.08	490	0.00690	<0.00040	2.6 J
18-Dec-12	17.39	914.06										Monitored Semiannually <sup>1</sup>
21-Feb-13	18.84	912.61	10.60	875	0.05	103.3	0.40	7.32	510	0.00590	<0.00040	2.6 J
22-May-13	20.25	911.20										Monitored Semiannually <sup>1</sup>
20-Aug-13	30.15	901.30	12.10	530	0.06	-50.3	0.75	6.98	510	0.00560	<0.00010	2.5
19-Nov-13	22.73	908.72										Monitored Semiannually <sup>1</sup>
31-Mar-14	15.50	915.95	11.30	574	0.06	95.7	0.53	7.15	447	0.00560	<0.00010	2.7
21-May-14	14.83	916.62										Monitored Semiannually <sup>1</sup>
15-Aug-14	25.16	906.29	14.49	741	0.48	-24.0	2.92	6.87	477	0.00590	<0.00010	2.6
14-Nov-14	22.25	909.20										Monitored Semiannually <sup>1</sup>
10-Feb-15	15.98	915.47	11.40	693	0.04	-117.5	0.80	7.13	503	0.00590	<0.00010	2.6
4-May-15	20.05	911.40										Monitored Semiannually <sup>1</sup>
4-Aug-15	31.90	899.55	11.90	620	0.16	-71.1	0.47	7.13	517	0.00640	<0.00010	2.7
5-Nov-15	32.00	899.45	11.40	605	0.00	37.5	1.16	6.84	511	0.00530	<0.00010	3.1
8-Feb-16	17.13	914.32	11.80	720	0.00	160.4	0.08	7.34	480	0.00600	<0.00010	3.0

**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 (mg/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
2-May-16	23.31	908.14	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
22-Aug-16	34.07	897.38	12.50	571	0.00	-	0.66	7.11	Monitored Annually <sup>2</sup>			
1-Nov-16	26.04	905.41	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
31-Jan-17	19.36	912.09	12.20	808	0.07	-219.2	0.30	7.21	509	0.00676	<0.00010	2.8
30-May-17	17.31	914.14	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
16-Aug-17	28.13	903.32	12.40	826	0.12	-71.9	0.66	7.10	Monitored Annually <sup>2</sup>			
9-Nov-17	27.17	904.28	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
28-Feb-18	16.55	914.90	10.90	657	0.15	-97.6	0.35	7.02	528	0.00539	<0.00010	2.6
1-May-18	17.69	913.76	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
22-Aug-18	32.63	898.82	12.46	655	0.81	-46.4	0.26	7.01	Monitored Annually <sup>2</sup>			
6-Nov-18	32.44	899.01	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
12-Mar-19	18.84	912.61	10.90	597	0.56	-28.1	0.86	6.96	512	0.00451	<0.0001	2.89
8-May-19	19.75	911.70	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
27-Aug-19	33.26	911.70	13.08	688	0.26	Note 1	0.02	6.89	Monitored Annually <sup>2</sup>			
13-Nov-19	33.03	898.42	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
14-Feb-20	16.70	914.75	10.90	626	0.34	-99.8	0.33	6.88	524	0.00431	0.0001 U	2.65
13-Aug-20	27.37	904.08	11.80	619	0.55	-70.6	0.40	6.89	Monitored Annually <sup>2</sup>			
9-Dec-20	24.68	906.77	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
5-Mar-21	16.91	914.54	11.30	641	0.19	-77.0	0.45	7.09	473	0.00484	0.0001 U	2.45
10-Jun-21	24.68	906.77	Monitored Semiannually <sup>2</sup>							Monitored Annually <sup>2</sup>		
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.05	-

Notes:

Top of casing elevation (feet msl): 931.45

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.

- Not measured or not available

< Analyte not detected above the reporting limit 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.

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level 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 (mg/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
18-Dec-06	8.13	894.22	9.93	525	0.54	-54.5	0.61	7.78	300	0.00537	<0.00100	-
7-Feb-07	9.40	892.95	11.79	479	1.19	-30.0	7.40	7.41	330	0.00601	<0.00100	-
7-May-07	10.73	891.62	12.26	729	2.83	-103.6	16.40	7.63	480	0.01010	<0.00100	-
7-Aug-07	15.14	887.21	11.42	882	0.75	-11.5	1.82	7.10	470	0.00325	<0.00100	-
27-Nov-07	16.16	886.19	10.98	748	0.37	-47.9	0.83	6.99	440 J	0.00282	<0.00100	-
8-Feb-08	9.66	892.69	11.01	645	0.31	-	0.90	7.05	380	0.00268	<0.00100	-
8-May-08	10.34	892.01	11.27	665	0.64	13.4	1.52	6.93	380 J	0.00240	<0.00100	-
8-Aug-08	14.17	888.18	11.23	683	0.72	-8.2	2.49	7.05	390 J	0.00218	<0.00100	<3.0
1-Nov-08	12.98	889.37	10.61	488	0.60	-45.6	1.35	6.80	380	0.00204	<0.00100	<3.0
10-Feb-09	9.64	892.71	10.32	398	0.52	-57.0	1.20	7.31	350	0.00200	<0.00100	<3.0
9-May-09	9.91	892.44	10.50	405	0.73	-4.0	1.26	7.77	320 J	0.00169	<0.00100	<3.0
23-Sep-09	17.16	885.19	12.50	541	0.25	216.2	5.38	7.14	400 J	0.00091 J	<0.00200	1.3 J
14-Dec-09	12.73	889.62	9.10	580	0.47	231.0	2.70	7.23	270	<0.00200	<0.00200	1.3 J
22-Mar-10	9.62	892.73	10.90	504	-	321.7	3.50	7.22	320	0.00200	<0.00200	1.2 J
15-Jun-10	8.30	894.05	11.00	495	0.11	205.1	1.41	7.29	320	0.00420	<0.00200	1.3 J
20-Sep-10	14.90	887.45	10.90	560	0.10	187.2	0.28	7.29	270	0.00300	<0.00200	1.4 J
6-Dec-10	10.47	891.88	10.50	515	0.12	87.8	0.14	7.47	300	<0.00200	<0.00200	1.1 J
28-Mar-11	8.71	893.64	10.30	241	0.19	58.9	1.86	7.19	300	<0.00200	<0.00200	1.1 J
20-Jun-11	9.87	892.48	10.80	477	0.06	141.2	0.20	7.27	340	<0.00500	<0.00200	1.1 J
26-Sep-11	14.82	887.53	10.80	467	0.05	114.8	0.92	7.26	380	<0.00500	<0.00200	1.5 J
13-Dec-11	13.02	889.33	10.20	491	0.06	131.3	1.69	7.29	340	<0.00500	<0.00200	1.6 J
21-Mar-12	8.13	894.22	10.20	550	0.09	160.0	0.07	7.14	310	0.00250	<0.00040	1.2 J
18-Jun-12	-	-	-	-	-	-	-	-	-	-	-	-
18-Sep-12	14.76	887.59	12.50	587	0.00	122.0	0.35	7.31	370	0.00280	<0.00040	1.3 J
18-Dec-12	8.16	894.19	-	-	-	-	-	-	-	-	-	-
21-Feb-13	8.45	893.90	10.10	594	0.02	152.7	0.28	7.49	300	0.00190	<0.00040	1.3 J
22-May-13	9.36	892.99	-	-	-	-	-	-	-	-	-	-
20-Aug-13	13.28	889.07	11.70	478	0.01	-43.8	0.54	7.22	349 J	0.00160	<0.00010	1.3
19-Nov-13	9.71	892.64	-	-	-	-	-	-	-	-	-	-
31-Mar-14	8.42	893.93	10.70	455	0.06	166.1	0.27	7.35	315	0.00140	<0.00010	1.3
21-May-14	5.99	896.36	-	-	-	-	-	-	-	-	-	-
14-Aug-14	12.03	890.32	13.45	512	0.56	-21.4	1.99	6.95	317	0.00170	<0.00010	1.3
14-Nov-14	10.68	891.67	-	-	-	-	-	-	-	-	-	-

**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 (mg/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
10-Feb-15	7.39	894.96	10.90	482	0.03	-86.2	0.59	7.32	337	0.00140	<0.00010	1.2
4-May-15	9.17	893.18	Monitored Semiannually <sup>1</sup>									
4-Aug-15	13.64	888.71	12.40	449	0.18	-81.7	0.27	7.33	385	0.00170	<0.00010	1.3
5-Nov-15	13.98	888.37	11.50	435	2.23	85.2	1.09	7.04	354	0.00130	<0.00010	1.5
8-Feb-16	6.74	895.61	11.50	495	0.03	187.2	0.25	7.39	297	0.00140	<0.00010	1.4
2-May-16	8.64	893.71	Monitored Semiannually <sup>2</sup>									
22-Aug-16	13.27	889.08	12.20	559	0.03	-52.7	0.80	7.28	Monitored Annually <sup>2</sup>			
1-Nov-16	11.36	890.99	Monitored Semiannually <sup>2</sup>									
31-Jan-17	7.91	894.44	10.90	539	0.08	124.4	0.18	7.31	321	0.00148	<0.00010	1.3
30-May-17	2.65	899.70	Monitored Semiannually <sup>2</sup>									
16-Aug-17	12.08	890.27	12.10	573	0.12	-46.9	1.39	7.26	Monitored Annually <sup>2</sup>			
9-Nov-17	11.70	890.65	Monitored Semiannually <sup>2</sup>									
28-Feb-18	6.50	895.85	11.00	423	0.19	-61.0	0.18	7.12	138	0.00156	<0.00010	1.2
1-May-18	6.80	895.55	Monitored Semiannually <sup>2</sup>									
22-Aug-18	13.47	888.88	11.61	441	7.44	26.6	0.21	7.11	Monitored Annually <sup>2</sup>			
6-Nov-18	13.96	888.39	Monitored Semiannually <sup>2</sup>									
12-Mar-19	7.30	895.05	10.30	363	0.56	-25.1	0.27	7.16	294	0.00147	<0.0001	1.34
8-May-19	7.77	894.58	Monitored Semiannually <sup>2</sup>									
27-Aug-19	13.16	889.19	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>									
13-Feb-20	20.79	899.86	10.60	387	0.39	-76.5	1.05	7.13	313	0.00140	0.0001 U	1.33
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>									
4-Mar-21	21.56	899.09	10.80	363	0.16	-9.0	1.29	7.30	280	0.00110	0.0001 U	1.24
10-Jun-21	24.55	896.10	Monitored Semiannually <sup>2</sup>									
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.05	-

Notes:

- Top of casing elevation (feet msl) prior to raising casing: 902.35
- Top of casing elevation (feet msl) after raising casing (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.
- Not measured or not available
- < Analyte not detected above the reporting limit 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.
- a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest
- b Site background arsenic value to be determined (TBD)
- 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 msl Feet above mean sea level 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 (mg/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
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	0.00444	<0.00050	-
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	0.00333	<0.00050	-
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	0.00341	<0.00100	-
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	0.00315	<0.00100	-
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	0.00245	<0.00100	-
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	0.00317	<0.00100	-
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	0.00369	<0.00100	41.6
1-Nov-08	-	-	9.79	553	10.70	-21.1	16.90	7.40	460	0.00320	<0.00100	35.5
11-Feb-09	-	-	9.16	488	6.99	-	15.40	7.52	430	0.00297	<0.00100	34.2
9-May-09	-	-	9.64	522	10.56	13.4	9.77	7.39	440 J	0.00201	<0.00100	32.4
23-Sep-09	-	-	10.70	745	8.95	271.7	14.70	6.88	570	<0.00200	<0.00200	40.0
15-Dec-09	-	-	8.60	713	5.20	279.0	12.50	6.67	350	<0.00200	<0.00200	30.0
24-Mar-10	-	-	9.90	681	6.14	370.7	-	6.57	470	0.00420	<0.00200	39.0
17-Jun-10	-	-	10.00	623	9.58	-	26.30	7.50	380	0.00590	<0.00200	28.0
22-Sep-10	-	-	10.00	783	9.02	225.9	17.40	7.00	510	0.00520	<0.00200	42.0
7-Dec-10	-	-	9.90	662	9.15	186.0	13.60	6.95	450	<0.00200	<0.00200	32.0
29-Mar-11	-	-	9.90	292	5.90	370.8	4.44	6.73	360 J	0.00410	<0.00200	25.0
20-Jun-11	-	-	10.50	591	6.42	219.1	4.44	7.01	420	<0.00500	<0.00200	26.0
26-Sep-11	-	-	10.70	623	5.76	240.5	11.90	6.83	520	<0.00500	<0.00200	39.0
15-Dec-11	-	-	8.80	472	4.92	310.4	7.32	6.78	430	0.00470 J	<0.00200	32.0
21-Mar-12	-	-	8.90	611	5.24	313.3	9.16	6.49	330	0.00480	<0.00040	20.0
18-Jun-12	Monitored Semiannually <sup>1</sup>											
18-Sep-12	-	-	14.20	652	9.70	148.0	20.80	7.48	450	0.00500	<0.00040	29.0
18-Dec-12	Monitored Semiannually <sup>1</sup>											
25-Feb-13	-	-	9.20	648	10.10	209.6	4.12	7.58	300	0.00500	<0.00040	25.0
25-Feb-13	Monitored Semiannually <sup>1</sup>											
21-Feb-13	-	-	9.20	648	10.10	209.6	4.12	7.58	300	0.00500	<0.00040	25.0
22-May-13	Monitored Semiannually <sup>1</sup>											
20-Aug-13	-	-	10.80	635	9.31	170.1	8.46	7.11	458	0.00390	<0.00010	32.3
19-Nov-13	Monitored Semiannually <sup>1</sup>											
31-Mar-14	-	-	10.60	448	9.29	213.5	87.20	7.30	321	0.00370	0.00018 J	21.1

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

Date Sampled	Field Parameters								Gen. Chem.	Metals (mg/L)		
	Depth to Water (feet btoc)	Groundwater Elevation (feet msl)	Temperature (°C)	Conductivity (µmhos/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (Rei mV)	Turbidity (NTU)	pH (standard units)	Total Dissolved Solids (mg/L)	Arsenic	Lead	Potassium
21-May-14	Monitored Semiannually <sup>1</sup>											
15-Aug-14	-	-	10.01	595	10.01	-35.2	6.43	6.99	427	0.00350	<0.00010	31.5
14-Nov-14	Monitored Semiannually <sup>1</sup>											
10-Feb-15	-	-	10.60	515	9.88	183.5	6.84	7.26	363	0.00280	0.00007 J	27.2
4-May-15	Monitored Semiannually <sup>1</sup>											
4-Aug-15	-	-	10.90	554	9.98	95.8	8.68	7.48	438	0.00260	<0.00010	34.7
5-Nov-15	-	-	10.30	503	10.24	177.6	13.40	7.46	449	0.00280	<0.00010	31.8
8-Feb-16	-	-	9.30	541	11.30	215.0	5.12	7.30	293	0.00320	<0.00010	23.1
-	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	0.00397	<0.00010	29.2
-	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	0.00411	<0.00010	20.4
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	0.00156	<0.0001	24.7
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	0.00365	0.0001 U	16.7
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	0.00414	0.0001 U	20.0
10-Jun-21	Monitored Semiannually <sup>2</sup>								Monitored Annually <sup>2</sup>			
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.05	-

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.

- Not measured or not available
- < Analyte not detected above the reporting limit shown
- \* 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.
- a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest
- b Site background arsenic value to be determined (TBD)
- 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 msl Feet above mean sea level
- 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.	Metals (mg/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
1-Mar-02	-	-	-	542	-	-	-	7.22	467	-	-	-	
1-Jun-02	197.34	731.88	12.00	750	-	-	-	7.10	459	-	-	-	
1-Sep-02	199.29	729.93	14.00	660	-	-	-	6.90	499	-	-	-	
2-Dec-02	200.09	729.13	10.80	675	-	-	-	6.89	440	<0.00100	<0.00050	-	
3-Mar-03	190.21	739.01	11.90	763	-	-	-	6.98	450	-	-	-	
3-May-03	191.78	737.44	12.30	730	-	-	233.00	6.98	550	-	-	-	
3-Aug-03	199.82	729.40	16.50	848	-	-	17.00	6.92	520	-	-	-	
1-Nov-03	199.97	729.25	11.60	559	-	-	9.20	7.04	522	0.00098	<0.00050	-	
1-Feb-04	188.78	740.44	11.96	608	-	-	4.86	6.68	560	-	-	-	
1-May-04	198.45	730.77	13.69	614	-	-	6.17	6.80	478	-	-	-	
1-Aug-04	199.17	730.05	14.38	731	-	-	5.48	6.71	460	-	-	-	
1-Nov-04	197.92	731.30	11.62	785	-	-	12.30	6.75	512	<0.00100	<0.00100	-	
1-Feb-05	186.36	742.86	11.64	806	-	-	1.47	6.94	487	-	-	-	
1-May-05	-	-	12.87	790	-	-	15.80	6.89	338	-	-	-	
1-Aug-05	196.10	733.12	15.01	603	-	-	45.70	6.44	388	-	-	-	
1-Nov-05	196.78	732.44	9.91	549	-	-	13.30	6.66	350	<0.00100	<0.00100	-	
1-Feb-06	193.93	735.29	8.10	641	2.11	269.2	35.70	6.82	400 J	-	-	-	
1-May-06	197.90	731.32	10.88	798	1.67	27.3	5.38	6.50	380	-	-	-	
1-Aug-06	198.80	730.42	11.44	534	2.52	205.7	8.74	6.67	360	-	-	-	
1-Nov-06	187.36	741.86	10.77	680	2.12	-19.9	18.90	7.06	430	<0.00100	<0.00100	-	
28-Dec-06	192.37	736.85	-	-	-	-	-	-	-	-	-	-	
7-Feb-07	197.46	731.76	10.24	621	0.64	-16.7	27.80	6.89	420	-	-	-	
7-May-07	198.49	730.73	-	-	-	-	-	-	-	-	-	-	
1-Aug-07	198.45	730.77	-	-	-	-	-	-	-	-	-	-	
27-Nov-07	196.48	732.74	-	-	-	-	-	-	-	-	-	-	
8-Feb-08	191.30	737.92	-	-	-	-	-	-	-	-	-	-	
8-May-08	193.95	735.27	-	-	-	-	-	-	-	-	-	-	
27-Sep-11	197.32	731.90	-	-	-	-	-	-	-	-	-	-	
13-Dec-11	192.15	737.07	9.6	421	2.10	313.0	16.10	7.49	-	-	-	-	
22-Mar-12	183.35	747.87	8.9	546	12.83	166.3	0.56	7.47	-	-	-	-	
18-Jun-12	192.54	738.68	-	-	-	-	-	-	-	-	-	-	
18-Sep-12	199.51	731.71	16.2	508	2.21	120.0	1.27	7.58	-	-	-	-	
18-Dec-12	184.52	746.70	-	-	-	-	-	-	-	-	-	-	
21-Feb-13	190.65	740.57	7.6	678	5.33	342.6	6.61	8.02	-	-	-	-	
22-May-13	198.05	733.17	-	-	-	-	-	-	-	-	-	-	
20-Aug-13	200.47	730.75	13.0	488	3.26	90.2	8.47	7.42	-	-	-	-	
19-Nov-13	196.59	734.63	-	-	-	-	-	-	-	-	-	-	
31-Mar-14	186.78	744.44	11.4	421	7.28	195.1	1.70	7.47	-	-	-	-	
21-May-14	192.27	738.95	-	-	-	-	-	-	-	-	-	-	
15-Aug-14	199.97	731.25	18.9	492	0.97	1.4	52.50	7.01	-	-	-	-	
14-Nov-14	196.60	734.62	-	-	-	-	-	-	-	-	-	-	
10-Feb-15	183.97	747.25	10.2	450	7.65	121.4	1.02	7.34	-	-	-	-	
4-May-15	194.19	737.03	-	-	-	-	-	-	-	-	-	-	
4-Aug-15	198.35	732.87	13.6	432	3.07	18.6	0.27	7.47	-	-	-	-	
3-Nov-15	198.25	732.97	10.3	405	2.57	106.2	7.07	7.35	-	-	-	-	
8-Feb-16	188.43	742.79	12.5	536	2.77	189.8	0.25	7.78	-	-	-	-	
2-May-16	195.72	735.50	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
22-Aug-16	197.89	733.33	14.0	418	1.27	-123.1	4.36	7.32	-	-	-	-	
1-Nov-16	195.49	735.73	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
31-Jan-17	186.94	744.28	9.2	506	5.26	-45.4	0.38	7.45	-	-	-	-	
30-May-17	190.62	740.60	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 (mg/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
16-Aug-17	197.55	733.67	13.3	540	2.31	37.3	3.42	7.37	-	-	-	-
9-Nov-17	197.11	734.11	Monitored Semiannually <sup>1</sup>									
28-Feb-18	185.96	745.26	10.1	390	5.95	204.7	1.62	7.15	-	-	-	-
1-May-18	184.95	746.27	Monitored Semiannually <sup>1</sup>									
22-Aug-18	197.40	733.82	13.7	412	3.10	85.5	1.66	7.27	-	-	-	-
6-Nov-18	197.94	733.28	Monitored Semiannually <sup>1</sup>									
12-Mar-19	182.84	748.38	8.7	332	6.25	148.4	1.93	7.28	-	-	-	-
8-May-19	185.36	745.86	Monitored Semiannually <sup>1</sup>									
27-Aug-19	196.56	734.66	11.92	411	8.82	Note 1	0.02	7.28	-	-	-	-
13-Nov-19	196.74	734.48	Monitored Semiannually <sup>1</sup>									
13-Feb-20	177.10	754.12	9.3	453	3.03	91.0	2.31	7.56	-	-	-	-
13-Aug-20	200.97	730.25	12.2	422	3.04	35.0	0.96	7.42	-	-	-	-
9-Dec-20	197.86	733.36	Monitored Semiannually <sup>1</sup>									
5-Mar-21	197.42	733.80	10.0	398	3.79	112.0	1.17	7.37	-	-	-	-
10-Jun-21	199.94	731.28	Monitored Semiannually <sup>1</sup>									
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.05	-

Notes:

Top of casing elevation (feet msl) prior to raising casing: 929.22

Top of casing elevation (feet msl) after raising casing (December 14, 2011): 931.22

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.

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.

- Not measured or not available

< Analyte not detected above the reporting limit shown

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level

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 (mg/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	
26-Sep-11	25.77	903.04	11.40	553	0.86	197.2	-	7.21	-	-	-	-	
13-Dec-11	24.94	903.87	9.70	625	1.73	658.0	22.70	7.68	-	-	-	-	
22-Mar-12	23.80	905.01	9.60	785	3.71	242.6	8.14	7.30	-	-	-	-	
19-Jun-12	24.09	904.72	-	-	-	-	-	-	-	-	-	-	
18-Sep-12	25.68	903.13	16.50	664	2.37	150.0	19.20	7.34	-	-	-	-	
18-Dec-12	23.02	905.79	-	-	-	-	-	-	-	-	-	-	
21-Feb-13	23.50	905.31	10.00	840	6.55	352.4	3.42	7.42	-	-	-	-	
22-May-13	23.84	904.97	-	-	-	-	-	-	-	-	-	-	
20-Aug-13	25.08	903.73	13.50	539	2.91	45.1	1.87	7.22	-	-	-	-	
19-Nov-13	22.76	906.05	-	-	-	-	-	-	-	-	-	-	
31-Mar-14	21.39	907.42	12.20	511	6.31	197.3	1.38	7.58	-	-	-	-	
21-May-14	19.82	908.99	-	-	-	-	-	-	-	-	-	-	
15-Aug-14	24.00	904.81	12.81	647	0.82	7.5	5.42	6.62	-	-	-	-	
14-Nov-14	22.28	906.53	-	-	-	-	-	-	-	-	-	-	
10-Feb-15	21.10	907.71	12.30	636	2.56	-71.9	1.11	7.11	-	-	-	-	
4-May-15	22.65	906.16	-	-	-	-	-	-	-	-	-	-	
5-Aug-15	24.65	904.16	13.50	563	3.21	116.4	55.20	7.42	-	-	-	-	
3-Nov-15	23.87	904.94	12.20	493	4.65	114.4	5.78	7.52	-	-	-	-	
8-Feb-16	19.39	909.42	15.80	670	3.92	163.5	5.06	7.59	-	-	-	-	
2-May-16	20.99	907.82	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
22-Aug-16	24.42	904.39	17.60	527	5.01	106.0	1.39	7.44	-	-	-	-	
1-Nov-16	21.31	907.50	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
31-Jan-17	21.11	907.70	12.10	680	2.75	-146.1	1.48	7.35	-	-	-	-	
30-May-17	18.49	910.32	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
17-Aug-17	22.58	906.23	12.60	673	5.22	177.8	1.97	7.15	-	-	-	-	
9-Nov-17	20.72	908.09	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
28-Feb-18	17.09	911.72	11.10	509	8.34	29.0	0.72	7.37	-	-	-	-	
1-May-18	17.76	911.05	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
22-Aug-18	Could not be safely accessed due to wasp nests.												
6-Nov-18	21.70	907.11	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
12-Mar-19	18.30	910.51	10.10	215	9.65	18.9	0.39	7.86	-	-	-	-	
8-May-19	19.09	909.72	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
27-Aug-19	22.85	905.96	14.79	562	8.59	Note 1	3.60	7.80	-	-	-	-	
13-Nov-19	21.95	906.86	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
13-Feb-20	16.60	912.21	10.80	458	8.74	68.0	1.98	7.83	-	-	-	-	
13-Aug-20	21.96	906.85	12.60	503	8.74	-39.8	1.89	7.83	-	-	-	-	
9-Dec-20	20.58	908.23	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
5-Mar-21	17.69	911.12	11.30	497	6.84	90.0	1.46	7.91	-	-	-	-	
10-Jun-21	21.47	907.34	Monitored Semiannually <sup>1</sup>						-	-	-	-	-
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.05	-	

Notes:

Top of casing elevation (feet msl) prior to DSP Cover Upgrade: 935.82  
 Top of casing elevation (feet msl) after DSP Cover Upgrade (completed July 2011): 928.81  
 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.

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.

- Not measured or not available

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

°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 msl Feet above mean sea level

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-5 Well P-14

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

Date Sampled*	Field Parameters								Gen. Chem.	Metals (mg/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	Iron	Lead	Manganese
11-Dec-20	32.53	740.79	11.6	18697	0.12	-61.2	17.9	13.30	6560	0.26300	0.293 J	0.01960	0.04 U	2540
3-Mar-21	29.44	743.88	12.0	12836	0.05	-87.0	1.54	13.09	4060	0.08410	0.25 U	0.00964	0.0106 J	1490
10-Jun-21	33.57	739.75	12.9	18706	0.67	-175.2	1.88	13.06	6400	0.24200	-	0.00344	-	2460
Preliminary Standard <sup>a</sup>	-	-	-	700	-	-	-	6.5-8.5	500	TBD <sup>b</sup>	0.3	0.05	0.05	-

Notes:

Top of casing elevation (feet msl): 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.

- Not measured or not available

< Analyte not detected above the reporting limit shown

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

a Preliminary standard is the standard listed or the site-specific (natural) background concentration, whichever is highest

b Site background arsenic value to be determined (TBD)

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 msl Feet above mean sea level

mg/L Milligrams per liter

mV Millivolts

NTU Nephelometric Turbidity Unit

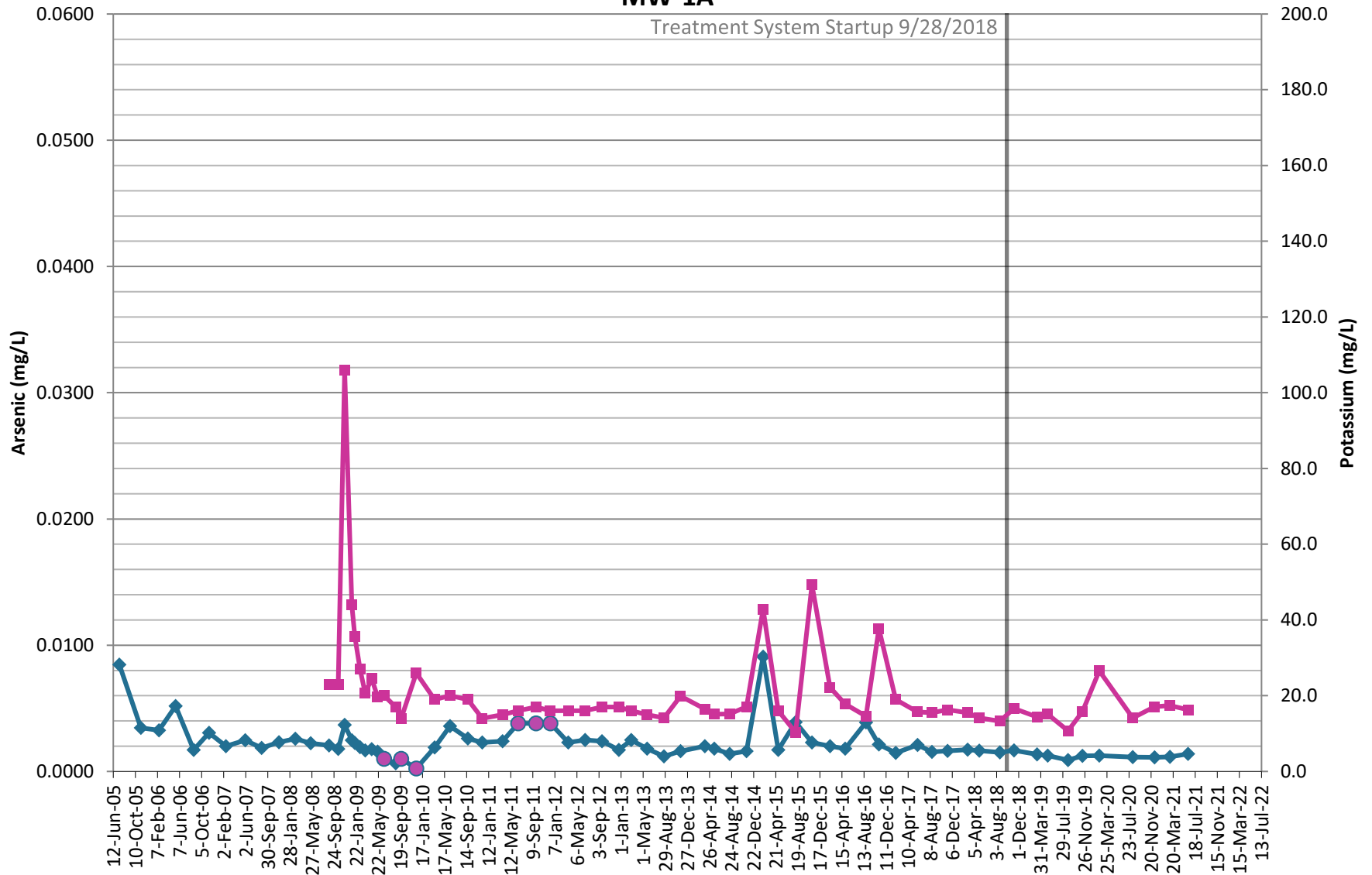
**APPENDIX B**

## Data Graphs

**APPENDIX B-1**

## LDA Shallow/Alluvial Monitoring Wells Data Graphs

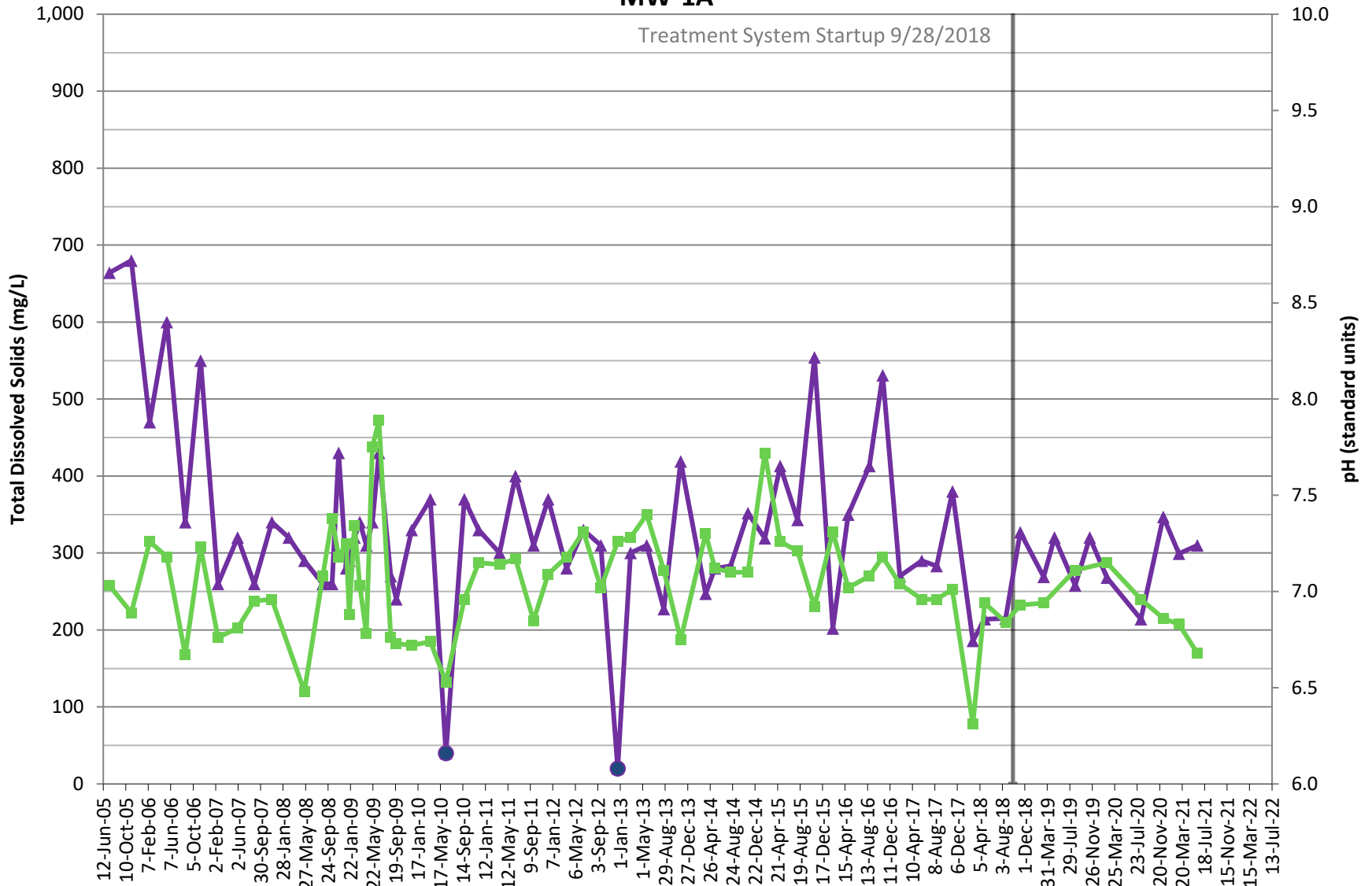
## LDA Shallow/Alluvial Monitoring Wells MW-1A



Non-detections plotted at MDL beginning in December, 2009;  
prior non-detections plotted at 50% of the RL

◆ Arsenic    
 ● Arsenic Non-Detections    
 ■ Potassium

# LDA Shallow/Alluvial Monitoring Wells MW-1A

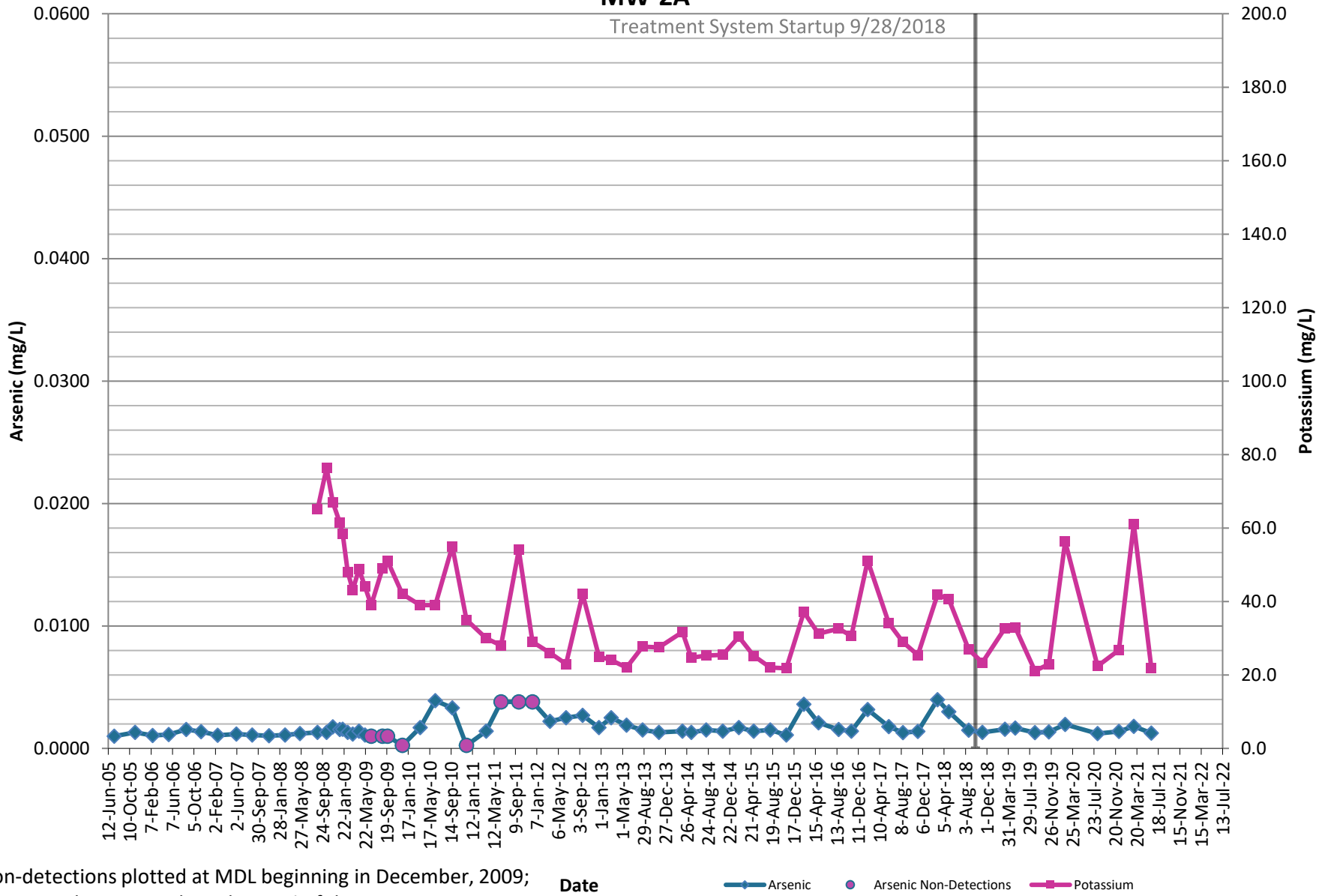


Non-detections plotted at RL beginning in December, 2009;  
no prior non-detections.

Date

—▲— TDS    
 ● TDS Non-Detections    
 —■— pH

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



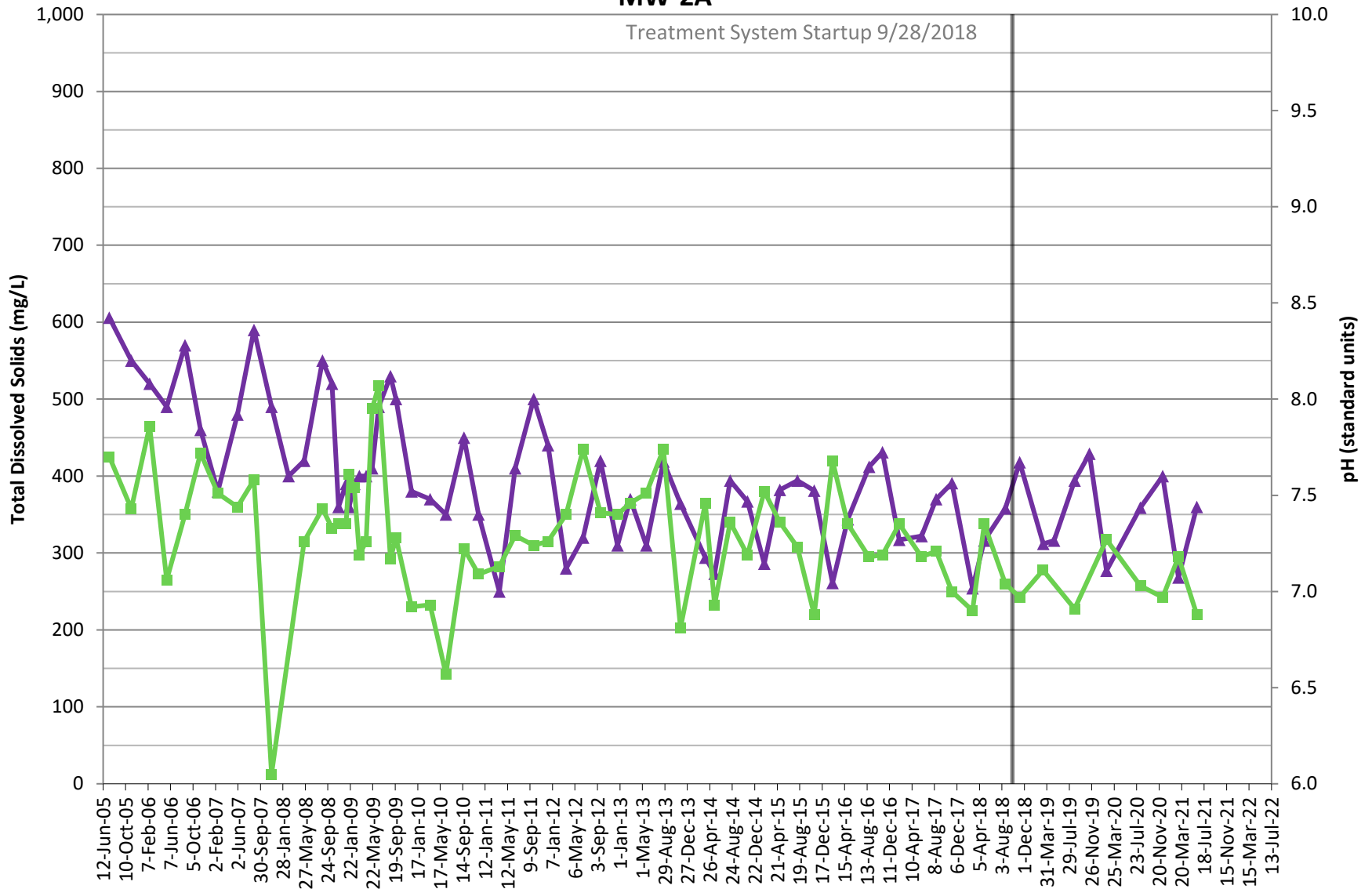
Non-detections plotted at MDL beginning in December, 2009;  
prior non-detections plotted at 50% of the RL

Date

◆ Arsenic    
 ● Arsenic Non-Detections    
 ■ Potassium



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

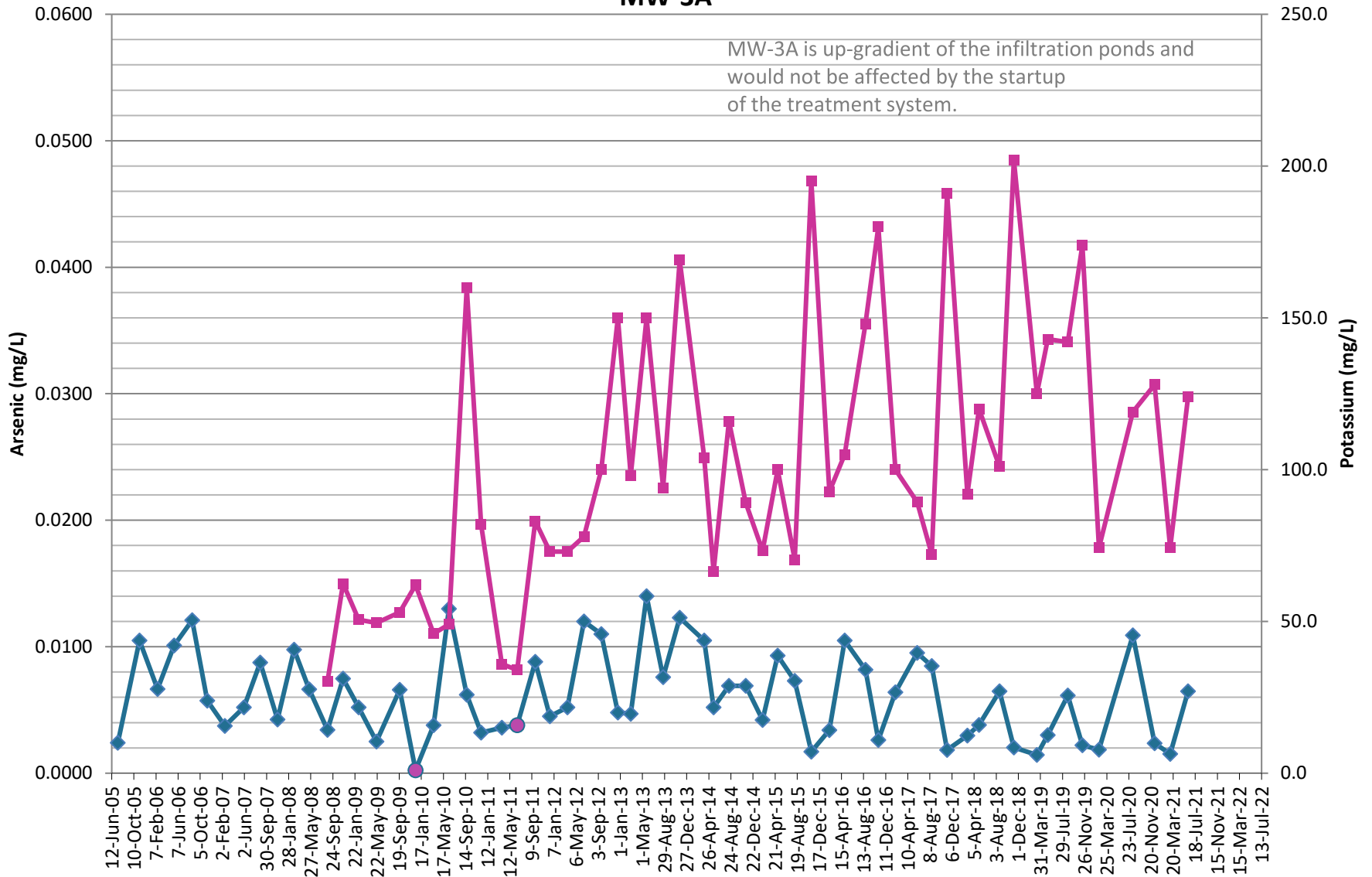


Non-detections plotted at RL beginning in December, 2009;  
no prior non-detections.

Date

—▲— TDS      —■— pH

## LDA Shallow/Alluvial Monitoring Wells MW-3A

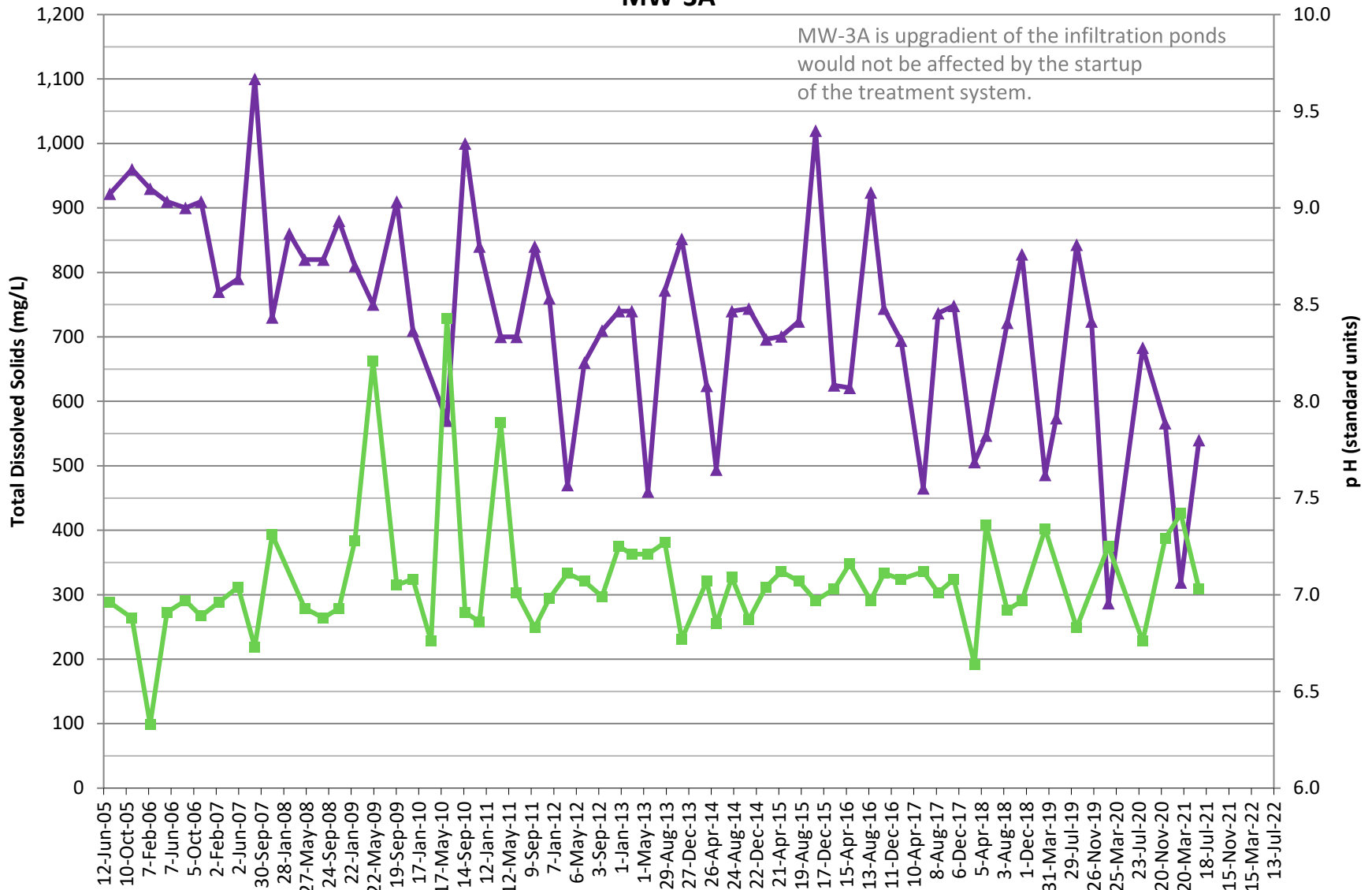


Non-detections plotted at MDL beginning in December, 2009;  
prior non-detections plotted at 50% of the RL

Date

◆ Arsenic    
 ● Arsenic Non-Detections    
 ■ Potassium

## LDA Shallow/Alluvial Monitoring Wells MW-3A



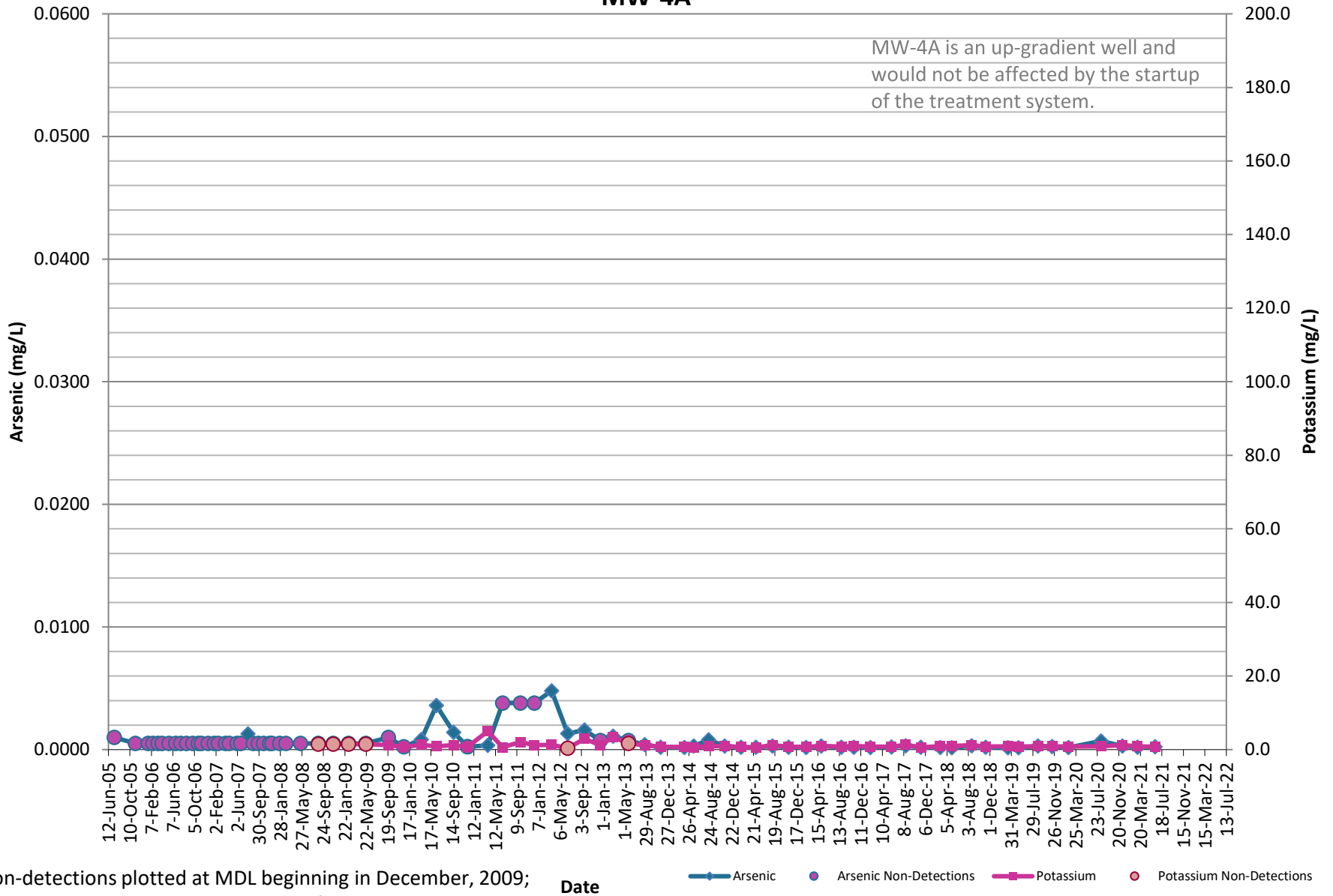
Non-detections plotted at RL beginning in December, 2009;  
no prior non-detections.

Date

▲ TDS

■ pH

## LDA Shallow/Alluvial Monitoring Wells MW-4A

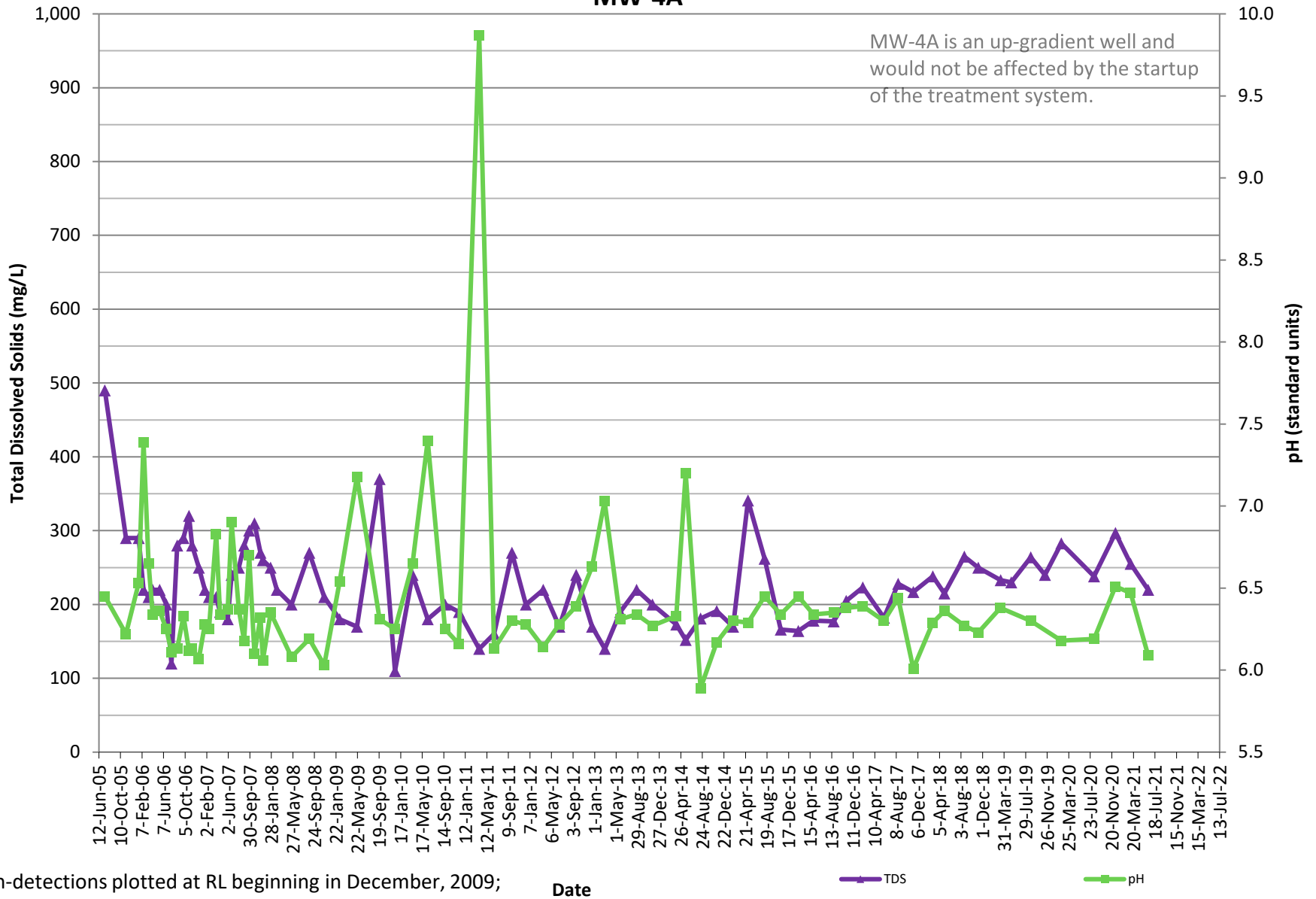


Non-detections plotted at MDL beginning in December, 2009;  
prior non-detections plotted at 50% of the RL

Date

◆ Arsenic   
 ● Arsenic Non-Detections   
 ■ Potassium   
 ● Potassium Non-Detections

## LDA Shallow/Alluvial Monitoring Wells MW-4A



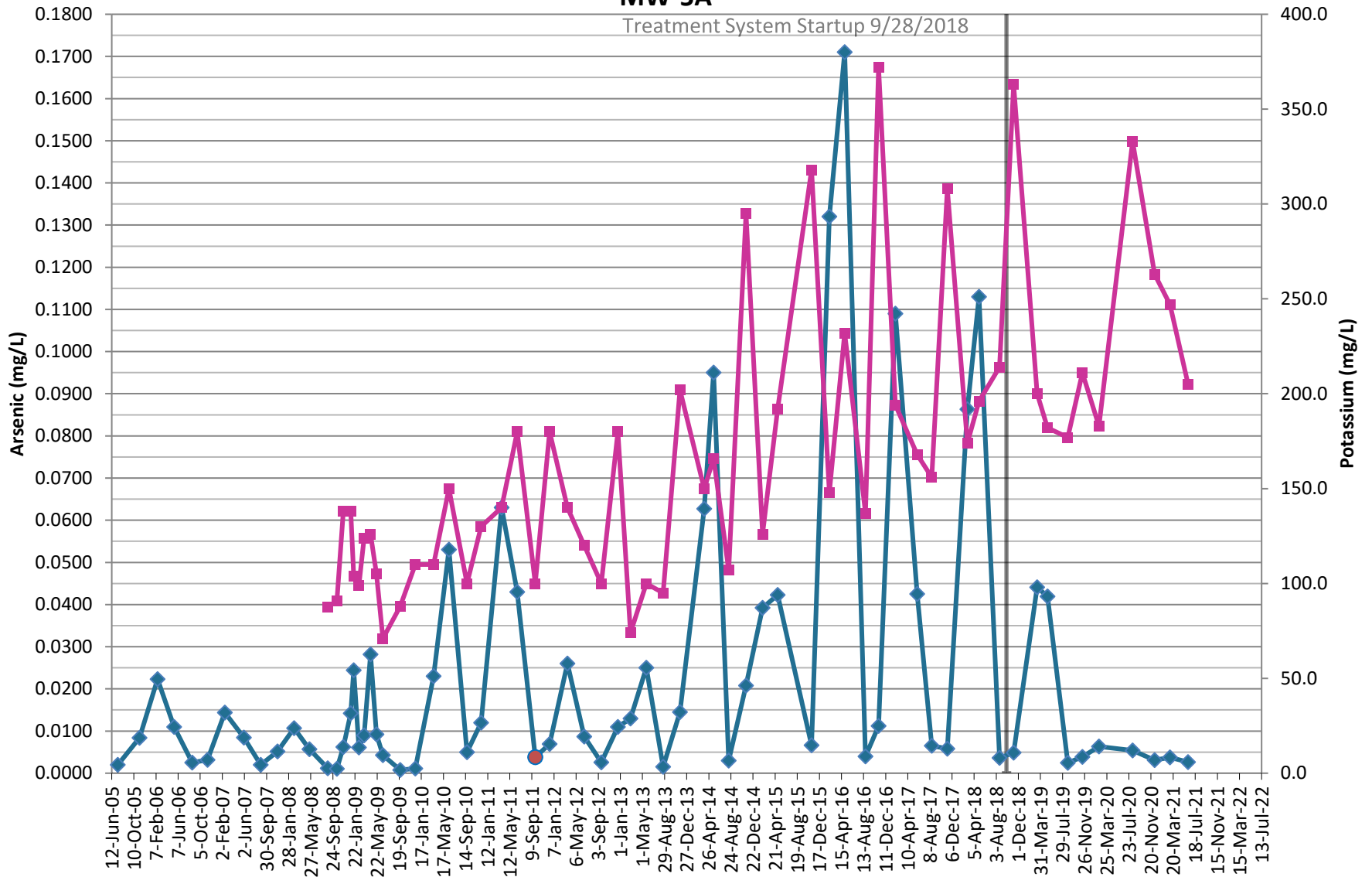
Non-detections plotted at RL beginning in December, 2009;  
no prior non-detections.

Date

—▲— TDS

—■— pH

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



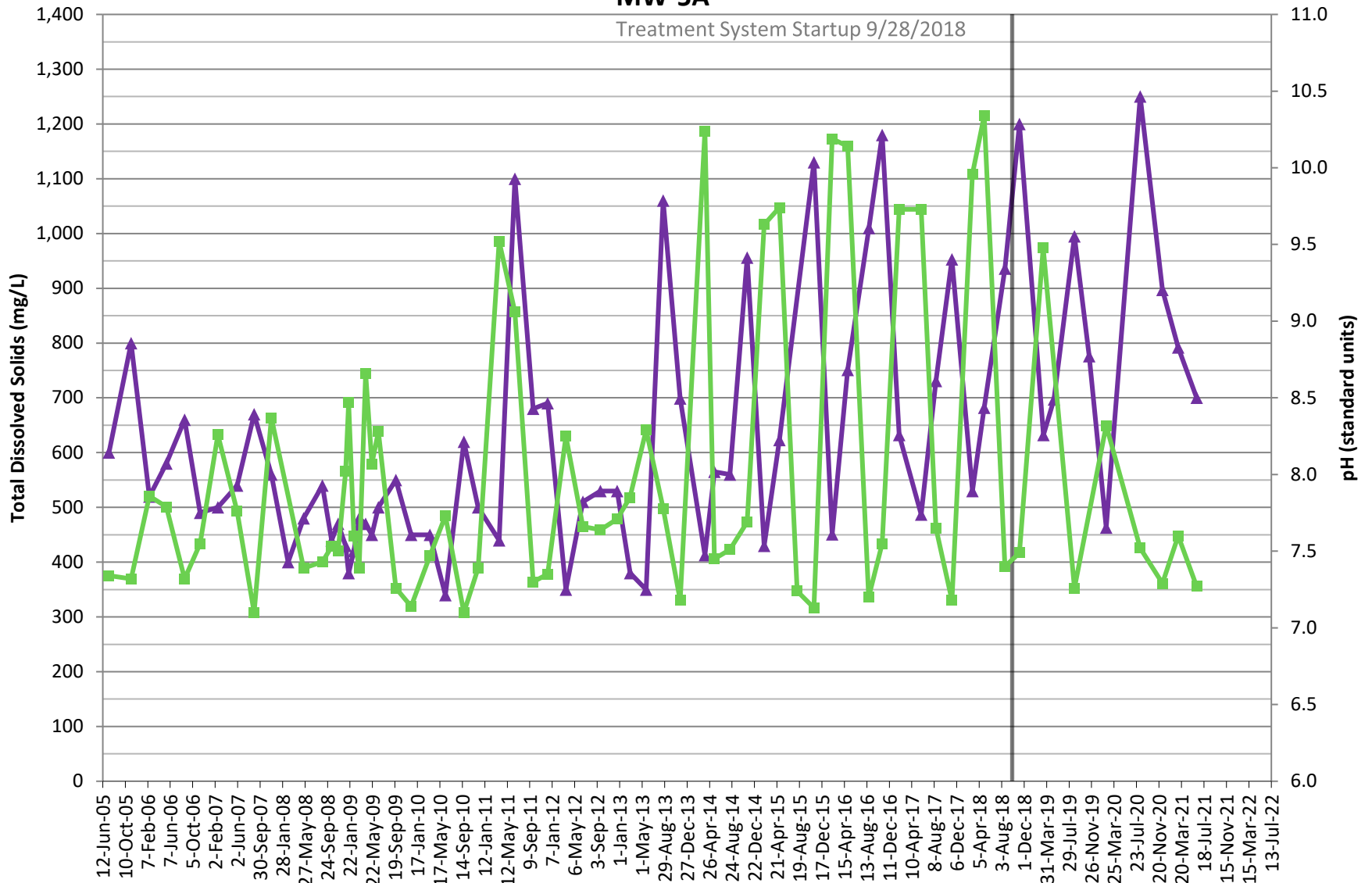
Non-detections plotted at MDL beginning in December, 2009;  
prior non-detections plotted at 50% of the RL

Date

◆ Arsenic    
 ● Arsenic Non-Detections    
 ■ Potassium

# LDA Shallow/Alluvial Monitoring Wells MW-5A

Treatment System Startup 9/28/2018



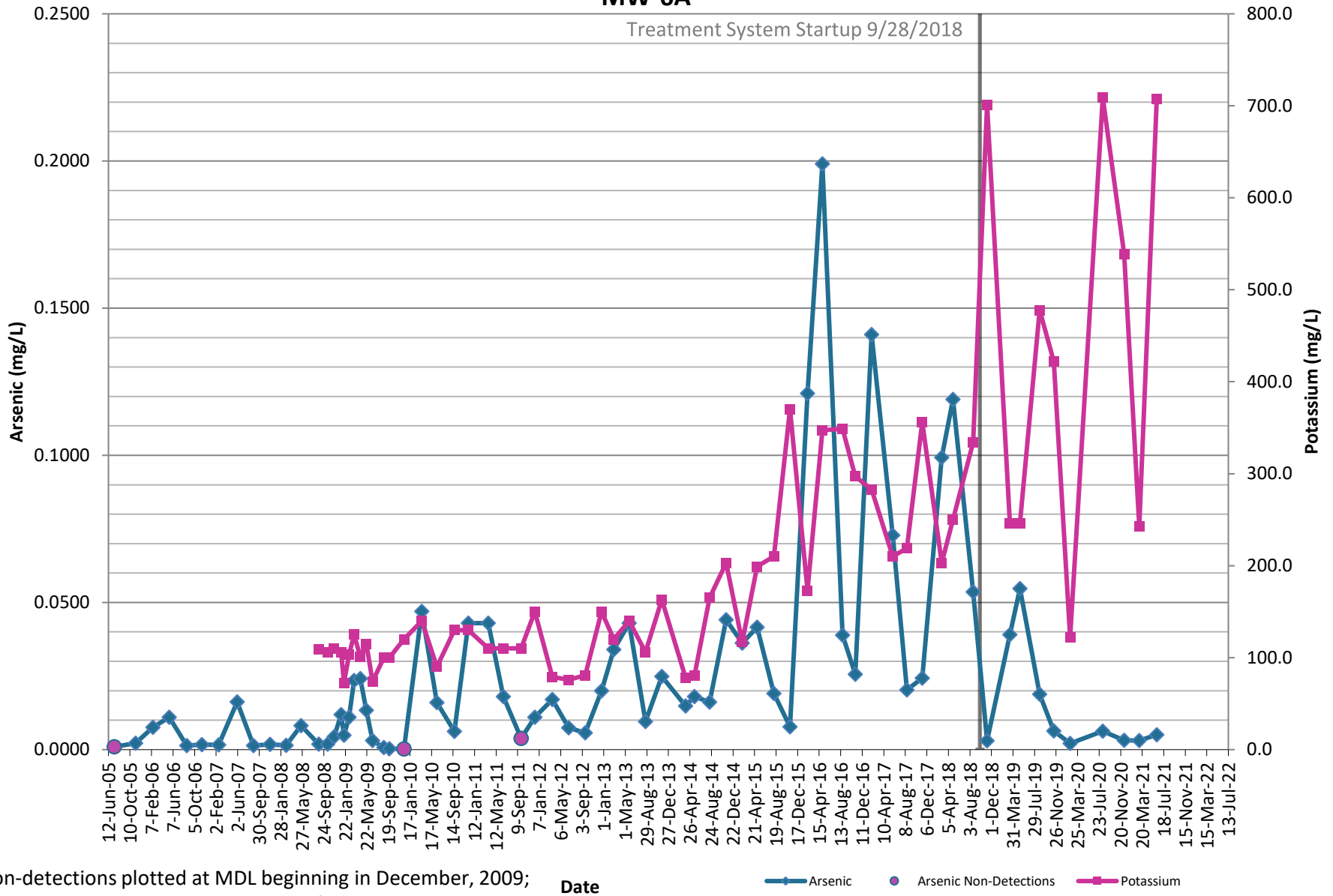
Non-detections plotted at RL beginning in December, 2009;  
no prior non-detections.

Date

TDS

pH

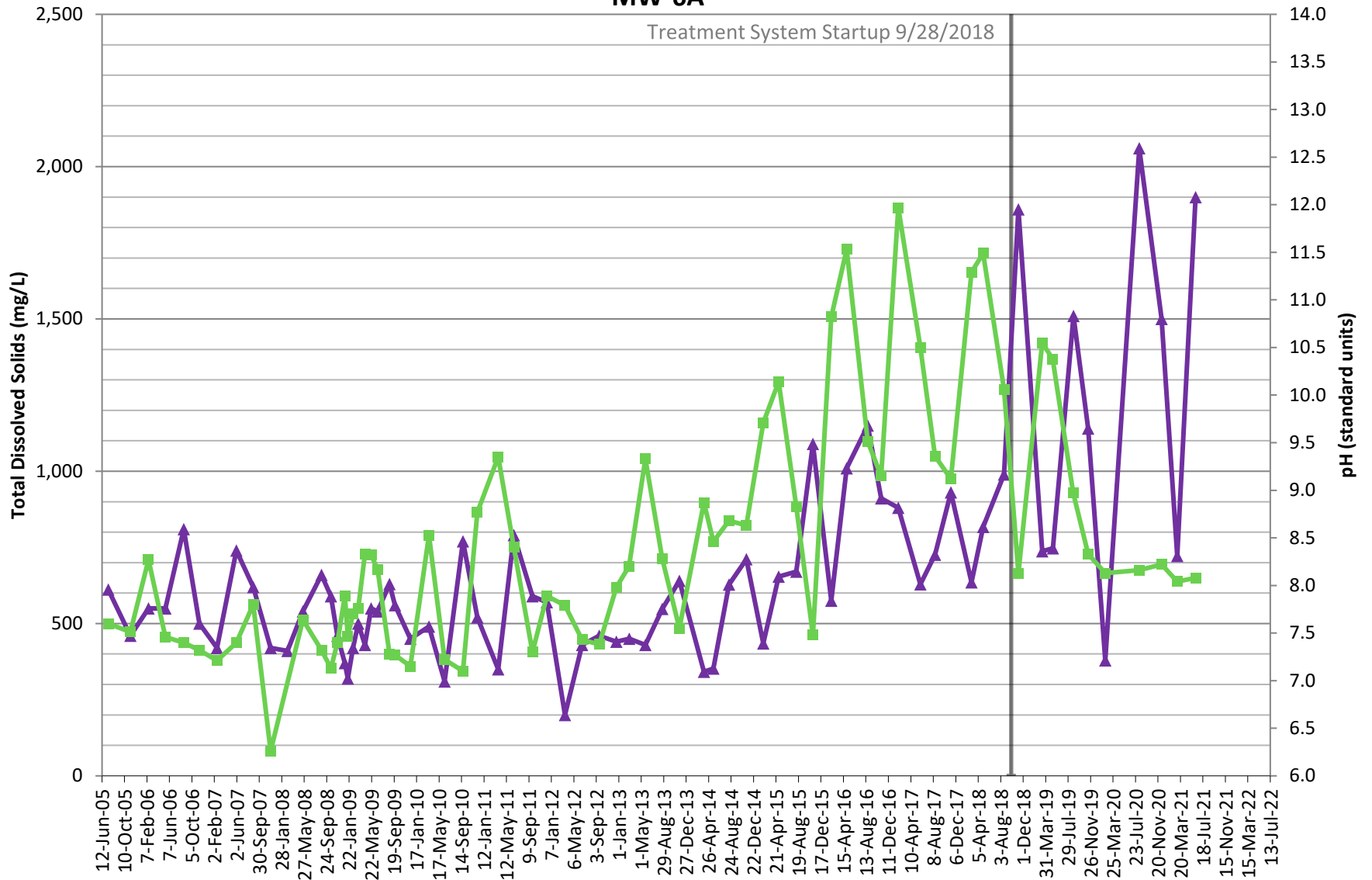
## LDA Shallow/Alluvial Monitoring Wells MW-6A



Non-detections plotted at MDL beginning in December, 2009;  
prior non-detections plotted at 50% of the RL



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



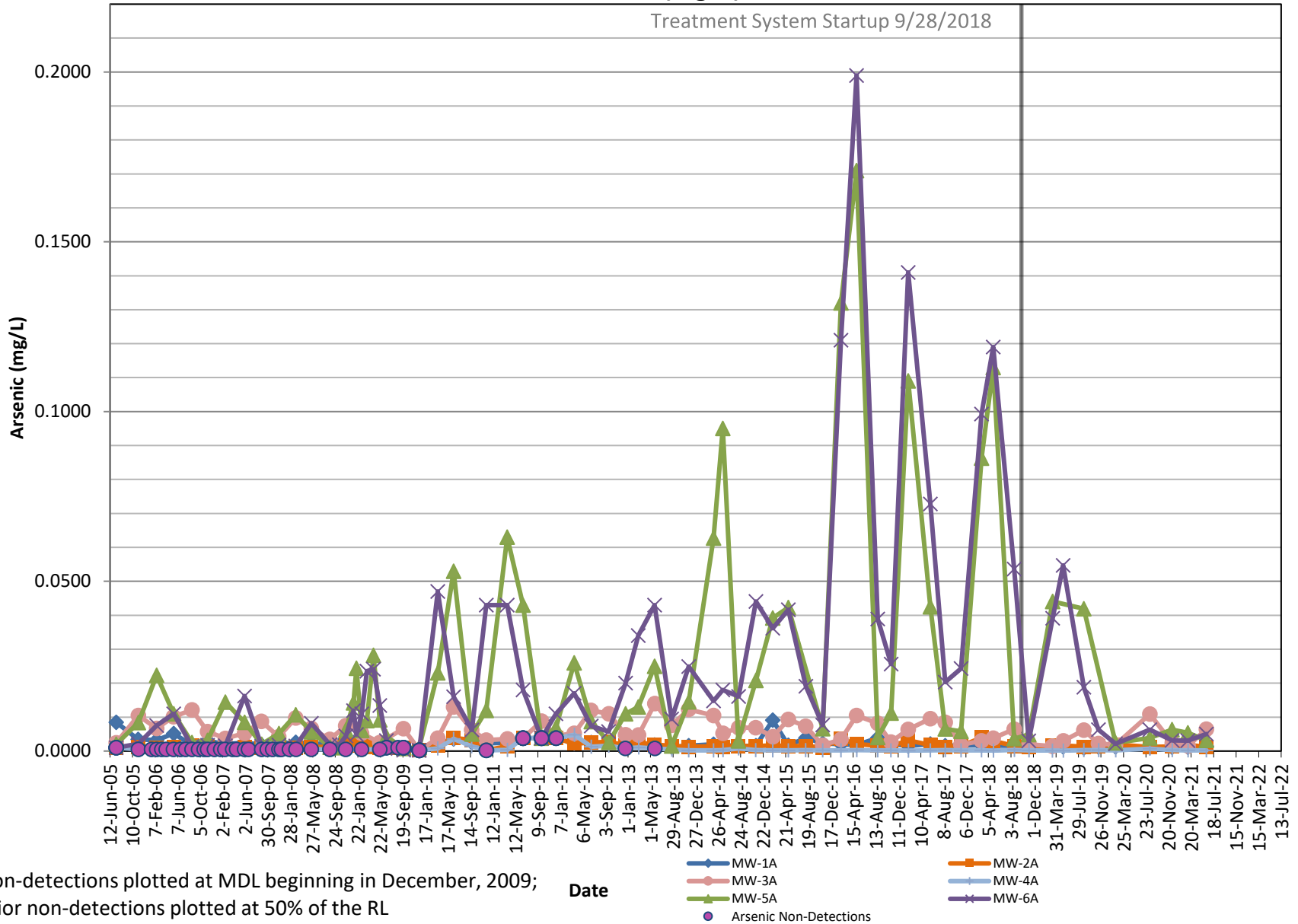
Non-detections plotted at RL beginning in December, 2009;  
no prior non-detections.

Date

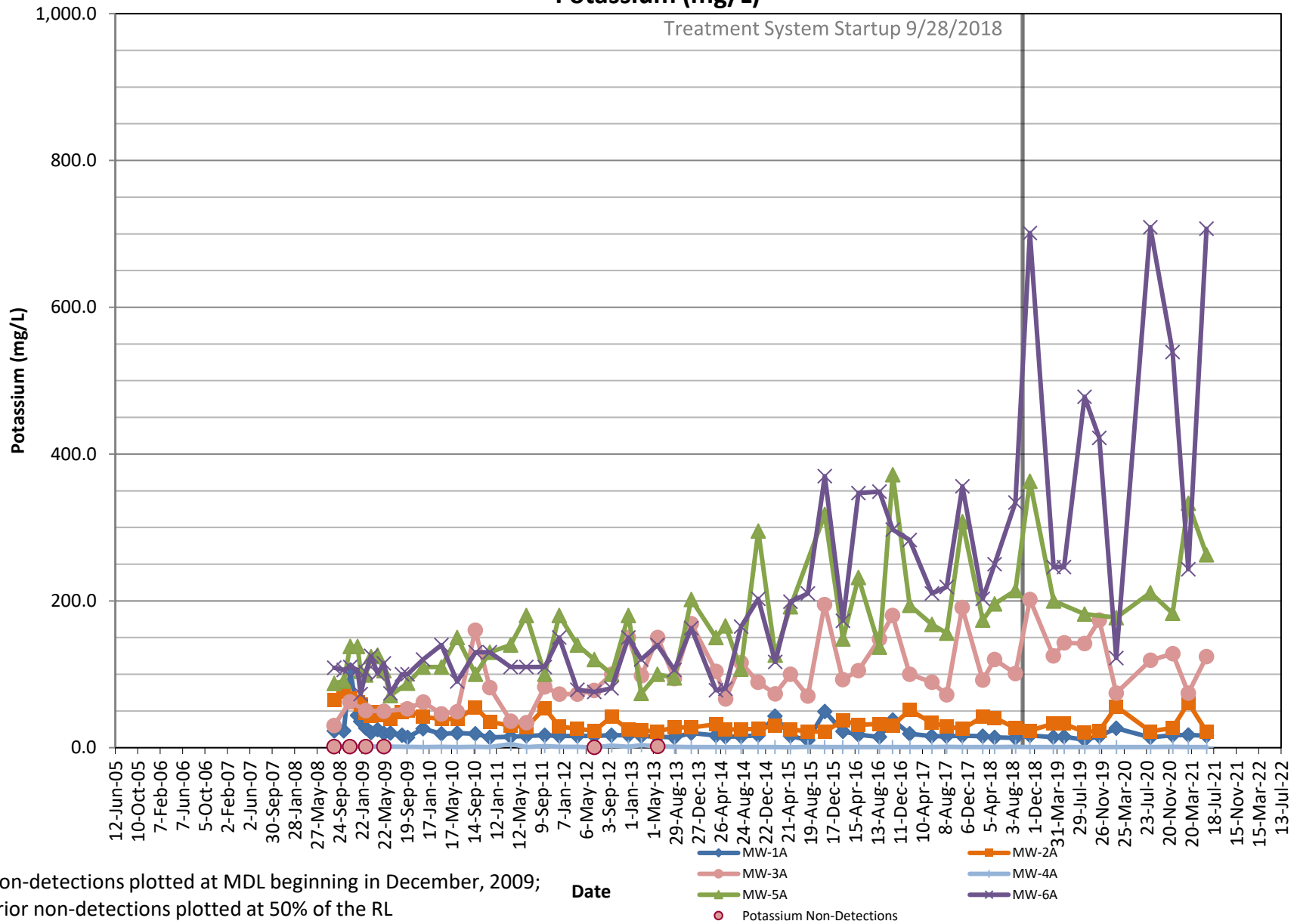
—▲— TDS

—■— pH

## LDA Shallow/Alluvial Monitoring Wells Arsenic (mg/L)

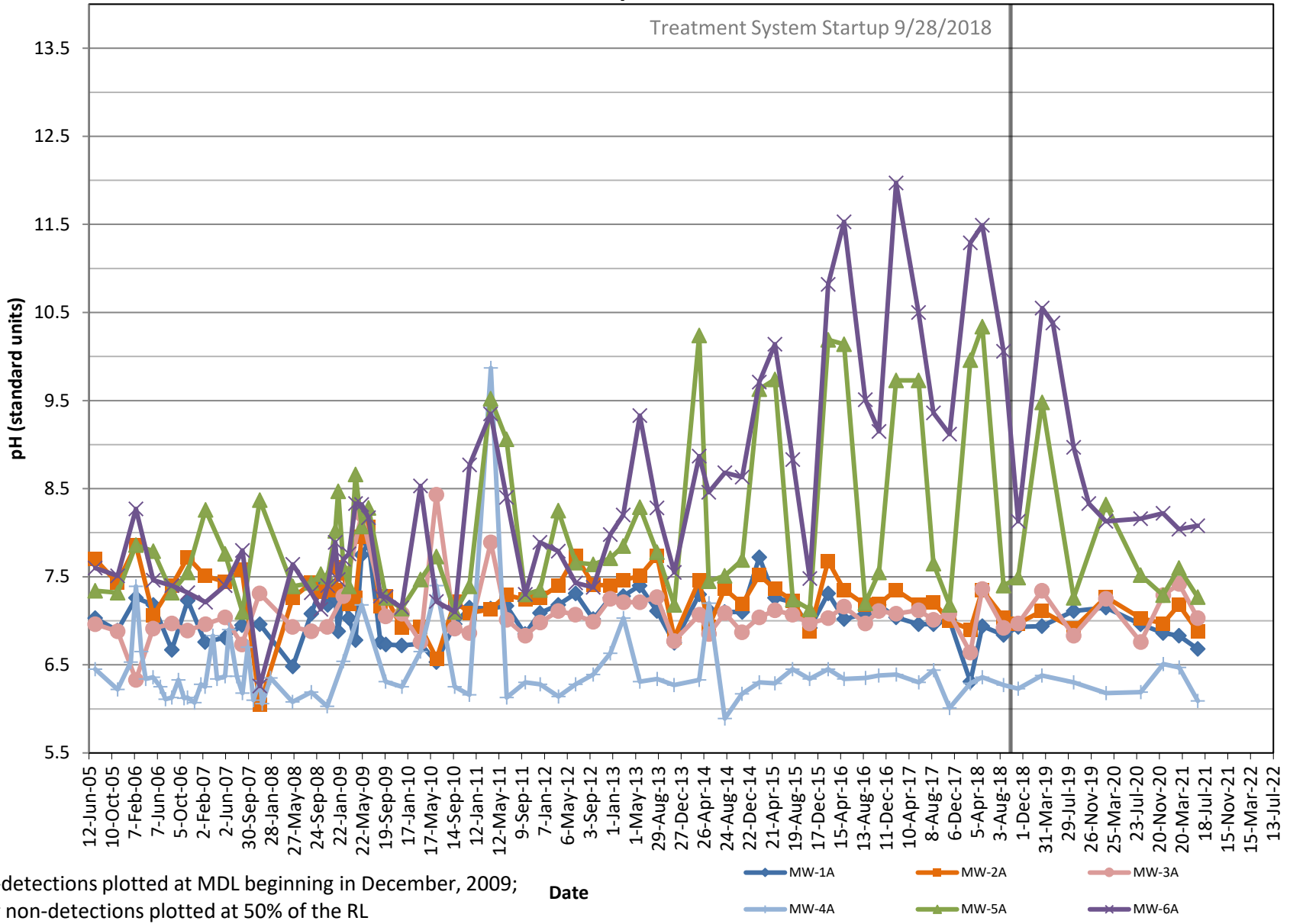


## LDA Shallow/Alluvial Monitoring Wells Potassium (mg/L)

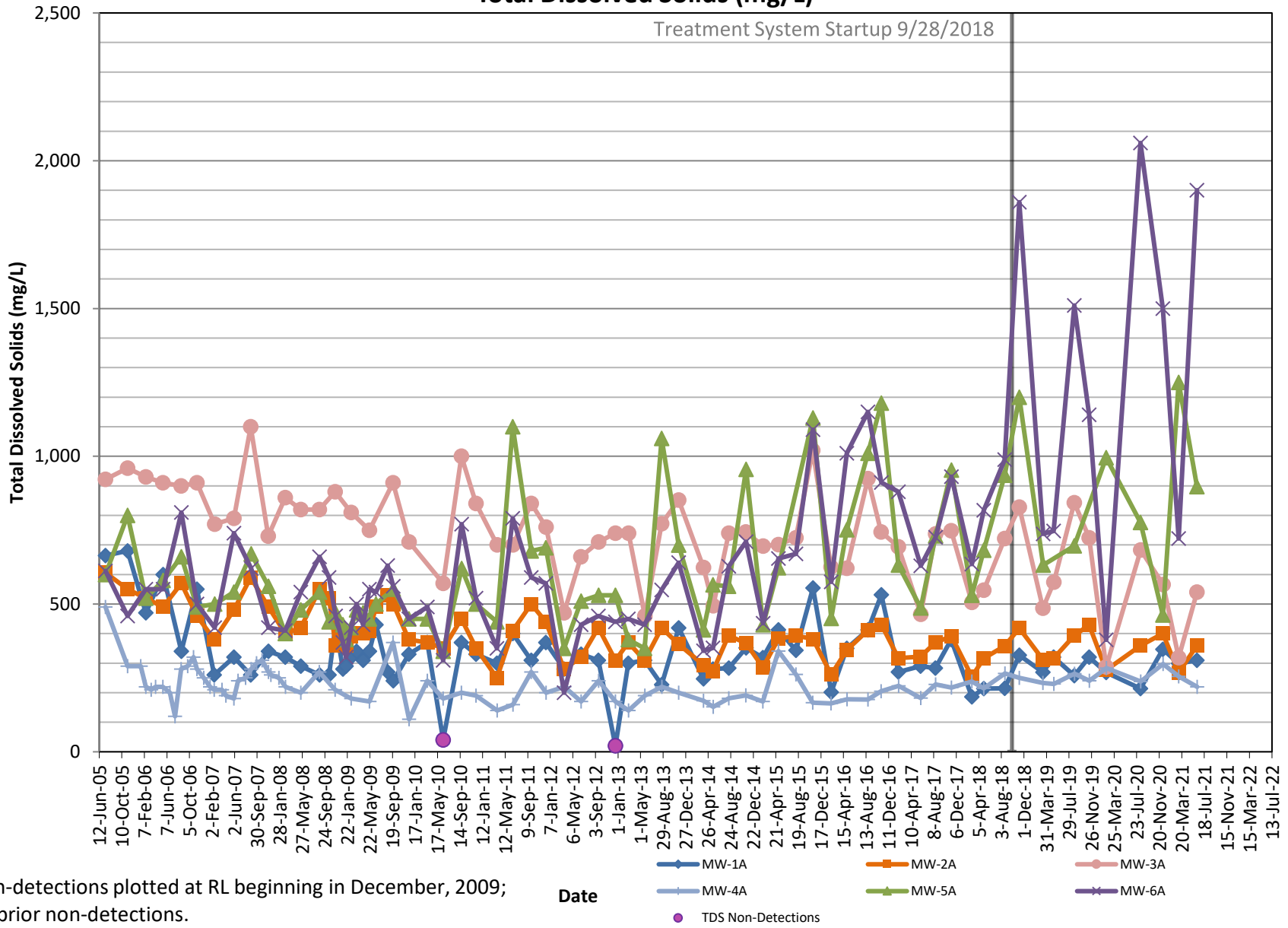


# LDA Shallow/Alluvial Monitoring Wells

## pH



## LDA Shallow/Alluvial Monitoring Wells Total Dissolved Solids (mg/L)



Non-detections plotted at RL beginning in December, 2009;  
no prior non-detections.

**APPENDIX C**

# Data Validation Report

**DATA VALIDATION CHECKLIST**

<b>Project Name:</b>	Ravensdale Project
<b>Project Number:</b>	152030402
<b>Sample Identification(s):</b>	Infiltration Ponds-0621, Still Well-0621, Interceptor Trench-0621, MW-35A-0621, MW-1A-0621, MW-2A-0621, MW-3A-0621, MW-4A-0621, MW-5A-0621, MW-6A-0621, P-14-0621, MW-45A-0621, MW-99-1-0621 Tank-Influent, Tank-Effluent, As2-Effluent
<b>Sample Date(s):</b>	6/9, 6/10/2021
<b>Sample Team:</b>	Joseph Xi & Turner Doggett, Golder Associates
<b>Sample Matrix:</b>	Aqueous
<b>Analyzing Laboratory:</b>	Analytical Resources, Inc. – Tukwila, WA AmTest, Inc. – Kirkland, WA
<b>Analyses:</b>	TDS (SM 2540 C), Total Metals (EPA 6010D, 200.8): As, Pb, K, Dissolved Metals (EPA 6010D, 200.8): As, Pb
<b>Laboratory Report No.:</b>	21F0209, 21F0346

**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:

- The reporting limits (RLs) and method detection limits (MDLs) of Analytical Resources Inc. and AmTest Inc. were reviewed to ensure data quality objectives were met. The following table is a comparison of the laboratory RLs and MDLs as compared to the preliminary standards for the site. All RLs and MDLs were less than the preliminary standards.

Parameter	Preliminary Standards		Analytical Resources Inc.		
	Method	(mg/L)	Method	RL (mg/L)	MDL (mg/L)
<b>Total Dissolved Solids (TDS)</b>	EPA 160.1	500	SM 2540 C	5	5
<b>Potassium</b>	EPA 6010B	NA	EPA 6010D	0.5	0.107
<b>Arsenic</b>	EPA 6020	TBD	EPA 200.8	0.0002	0.0000373
<b>Lead</b>	EPA 6020	0.05	EPA 200.8	0.0001	0.0000513



**INORGANIC ANALYSES**

Metals (EPA 6010/200.8)	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				X
7. MS duplicate (MSD) %R		X		X	
8. MS / MSD RPD		X		X	
9. LCS / LCSD RPD	X				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:

- The Equipment Blank (MW-99-1-0321) had a low detection of potassium (0.541 J mg/L). Validation guidelines do not require qualification of equipment blank data. Following historic project practice, no formal qualifications are applied, but it is advisory that low detections of potassium in the primary samples may be biased high.
- The laboratory did not provide LCSD results. LCSD results are not required per method requirements if a laboratory duplicate is analyzed. Sufficient precision and accuracy data was provided by the lab with LCS and laboratory duplicate analyses.
- Field duplicates were collected at Infiltration Ponds (field duplicate ID is MW-35A) and at MW-2A (field duplicate ID is MW-45A. All precision is acceptable.

**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				X
7. MS duplicate (MSD) %R	X				X
8. MS/MSD RPD	X				X
9. LCS/LCSD RPD	X				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:

- The Equipment Blank (MW-99-1-0321) had a low detection of TDS (5 mg/L; RL for TDS is 5 mg/L). Validation guidelines do not require qualification of equipment blank data. All sample results were > 5 times the EB detection, and no qualification is required.
- The laboratory did not provide LCSD results. LCSD results are not required per method requirements if a laboratory duplicate is analyzed. Sufficient precision and accuracy data was provided by the lab with LCS and laboratory duplicate analyses.
- Field duplicates were collected at Infiltration Ponds (field duplicate ID is MW-35A) and at MW-2A (field duplicate ID is MW-45A). TDS for MW-2A and its duplicate MW-45A had an RPD above 20% (RPD 89%), and both the sample and duplicate were >5x RL. However, the field duplicate for the Infiltration Ponds and its duplicate MW-35A had an RPD less than 20%. The laboratory also ran 2 lab duplicates using samples from the site and the RPDs were less than 20%. Using professional judgement, MW-2A and its duplicate MW-45A were qualified with a “J” qualifier. No other qualification is required. All other precision is acceptable.

**DATA VALIDATION CHECKLIST  
SUMMARY AND DATA QUALIFIER CODES**

<b>Project Name:</b>	Ravensdale Project
<b>Project Number:</b>	152030402
<b>Sample Identification(s):</b>	Infiltration Ponds-0621, Still Well-0621, Interceptor Trench-0621, MW-35A-0621, MW-1A-0621, MW-2A-0621, MW-3A-0621, MW-4A-0621, MW-5A-0621, MW-6A-0621, P-14-0621, MW-45A-0621, MW-99-1-0621 Tank-Influent, Tank-Effluent, As2-Effluent
<b>Sample Date(s):</b>	6/9, 6/10/2021
<b>Sample Team:</b>	Joseph Xi & Turner Doggett, Golder Associates
<b>Sample Matrix:</b>	Aqueous
<b>Analyzing Laboratory:</b>	Analytical Resources, Inc. – Tukwila, WA
<b>Analyses:</b>	TDS (SM 2540 C), Total Metals (EPA 6010D, 200.8): As, Pb, K, Dissolved Metals (EPA 6010D, 200.8): As, Pb
<b>Laboratory Report No.:</b>	21F0209, 21F0346

Sample ID	Analyte(s)	Old Result	Old Qualifier	New Result	New Qualifier	Reason(s)
All samples	All analytes	-	-	-	-	Remove any lab applied "D" qualifiers
MW-2A	TDS	360	-	360	J	Field RPD above 20% and sample concentration >5x RL
MW-45A	TDS	940	-	940	J	Field RPD above 20% and sample concentration >5x RL

<b>VALIDATION PERFORMED BY:</b>	Denise Carscadden, Golder Associates
<b>DATE:</b>	July 26, 2021

**MW-45A**  
**Duplicate**

Client_Sample_ID	Analyte	Result	Result	RPD	Unit	Qualifier	RL	MDL
MW-2A	Arsenic	1.25	1.21	3%	ug/L		0.2	0.022
MW-2A	Lead	0.058	0.055	5%	ug/L	J	0.1	0.068
MW-2A	Potassium	21.8	21.2	3%	mg/L		0.5	0.107
MW-2A	Dissolved Solids	360	940	89%	mg/L		10	10

**Infiltration**  
**Ponds**

**MW-35A**  
**Duplicate**

Client_Sample_ID	Analyte	Result	Result	RPD	Unit	Qualifier	RL	MDL
Infiltration Ponds	Arsenic	23.7	25.1	6%	ug/L		0.2	0.022
Infiltration Ponds	Lead	1.51	1.81	18%	ug/L		0.1	0.068
Infiltration Ponds	Potassium	923	941	2%	mg/L		1	0.214
Infiltration Ponds	Dissolved Solids	2400	2400	0%	mg/L		20	20

**APPENDIX D**

## Laboratory Analytical Results



30 June 2021

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

RE: Ravensdale

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>
21F0209	N/A

-----

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 enclose 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, Inc.

*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>21F0209</b>	Turn-around Requested: <b>Standard</b>	Date: <b>6/11/21</b>
ARI Client Company: <b>Golder</b>	Phone: <b>425-883-0777</b>	Page: <b>1</b> of <b>2</b>
Client Contact: <b>Joseph Xi</b>	No. of Coolers: <b>2</b>	Cooler Temps: <b>0.9 0.6</b>

Client Project Name: <b>Ravensdale 2021 Q2 Sampling</b>					Analysis Requested							Notes/Comments	
Client Project #: <b>152030402.004</b>		Samplers: <b>J. Xi, T. Doggett</b>			Total Metals (1)	Dissolved Metals (1)	TDS						Analyze in accordance with MSA between Golder and ARI Ecology EIM EDD
Sample ID	Date	Time	Matrix	No. Containers									
INFILTRATION PONDS - 0621	6/9/21	1205	GW	3	✓	✓	✓						HOLD DISSOLVED
MW-35A- 0621	6/9/21	1210	GW	3	✓	✓	✓						HOLD DISSOLVED
MW-99-1 -0621	6/9/21	1005	GW	2	✓		✓						
STILL WELL - 0621	6/9/21	1515	GW	3	✓	✓	✓						HOLD DISSOLVED
INTERCEPTOR TRENCH - 0621	6/10/21	1310	GW	1			✓						
MW-1A- 0621	6/9/21	0920	GW	3	✓	✓	✓						HOLD DISSOLVED
MW-2A- 0621	6/9/21	1015	GW	3	✓	✓	✓						HOLD DISSOLVED
MW-45A- 0621	6/9/21	1025	GW	3	✓	✓	✓						HOLD DISSOLVED
MW-3A- 0621	6/9/21	1320	GW	3	✓	✓	✓						HOLD DISSOLVED
MW-4A- 0621	6/10/21	1225	GW	7	✓	✓	✓						HOLD DISSOLVED. Extra vol for MS/MSD (Total metals and TDS only)
Comments/Special Instructions List 1: As, Pb, and K  Extra vol collected at MW-4A-0621 for MS/MSD (total metals and TDS)	Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)			Received by: (Signature)					
	Printed Name: <b>Turner Doggett</b>		Printed Name: <b>Jacob Healtz</b>		Printed Name:			Printed Name:					
	Company: <b>Golder</b>		Company: <b>ARI</b>		Company:			Company:					
	Date & Time: <b>6/11/2021 1020</b>		Date & Time: <b>06/11/2021 1020</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

ARI Assigned Number: <b>21F0209</b>	Turn-around Requested: <b>Standard</b>	Date: <b>6/11/21</b>
ARI Client Company: <b>Golder</b>	Phone: <b>425-883-0777</b>	Page: <b>2</b> of <b>2</b>
Client Contact: <b>Joseph Xi</b>	No. of Coolers: <b>2</b>	Cooler Temps: <b>0.9 0.6</b>



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

Client Project Name: <b>Ravensdale 2021 Q2 Sampling</b>					Analysis Requested							Notes/Comments	
Client Project #: <b>152030402.004</b>		Samplers: <b>J. Xi, T. Doggett</b>			Total Metals (1)	Dissolved Metals (1)	TDS						Analyze in accordance with MSA between Golder and ARI Ecology EIM EDD
Sample ID	Date	Time	Matrix	No. Containers									
MW-5A- 0621	6/9/21	1210	GW	3	✓	✓	✓						HOLD DISSOLVED
MW-6A- 0621	6/9/21	1110	GW	3	✓	✓	✓						HOLD DISSOLVED
P-14- 0621	6/10/21	1005	GW	5	✓	✓	✓						HOLD DISSOLVED
Comments/Special Instructions List 1: As, Pb, and K				Relinquished by: (Signature) <i>Tom Jan</i>	Received by: (Signature) <i>Jacob Walter</i>			Relinquished by: (Signature)			Received by: (Signature)		
				Printed Name: <i>Turner Doggett</i>	Printed Name: <i>Jacob Walter</i>			Printed Name:			Printed Name:		
				Company: <i>Golder</i>	Company: <i>ARI</i>			Company:			Company:		
				Date & Time: <i>6/11/2021 1020</i>	Date & Time: <i>6/11/2021 1020</i>			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.





Am Test Inc.  
13600 NE 126TH PL  
Suite C  
Kirkland, WA 98034  
(425) 885-1664

Professional  
Analytical  
Services

Jun 18 2021  
Analytical Resources Inc.  
4611 S 134th Pl  
Suite 100  
Tukwila, WA 98168  
Attention: KELLY BOTTEM

Dear KELLY BOTTEM:

Enclosed please find the analytical data for your project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
21F0209-01 A	Water	21-A008127	CONV
21F0209-03 A	Water	21-A008128	CONV
21F0209-05 A	Water	21-A008129	CONV
21F0209-07 A	Water	21-A008130	CONV
21F0209-09 A	Water	21-A008131	CONV
21F0209-10 A	Water	21-A008132	CONV
21F0209-12 A	Water	21-A008133	CONV
21F0209-14 A	Water	21-A008134	CONV
21F0209-16 A	Water	21-A008135	CONV
21F0209-18 A,B,C	Water	21-A008136	CONV
21F0209-20 A	Water	21-A008137	CONV
21F0209-22 A	Water	21-A008138	CONV
21F0209-24 A	Water	21-A008139	CONV

Your samples were received on Tuesday, June 15, 2021. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

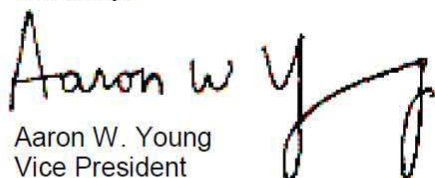
The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

  
Aaron W. Young  
Vice President

PO Number: 21F0209

BACT = Bacteriological  
CONV = Conventionals

MET = Metals  
ORG = Organics

NUT=Nutrients  
DEM=Demand

MIN=Minerals 1

**Am Test Inc.**  
13600 NE 126TH PL  
Suite C  
Kirkland, WA 98034  
(425) 885-1664  
www.amtestlab.com



*Professional  
Analytical  
Services*

### ANALYSIS REPORT

Analytical Resources Inc.  
4611 S 134th PI  
Tukwila, WA 98168  
Attention: KELLY BOTTEM  
PO Number: 21F0209  
All results reported on an as received basis.

Date Received: 06/15/21  
Date Reported: 6/18/21

---

**AMTEST Identification Number** 21-A008127  
**Client Identification** 21F0209-01 A  
**Sampling Date** 06/09/21, 12:05

#### Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	2400	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number** 21-A008128  
**Client Identification** 21F0209-03 A  
**Sampling Date** 06/09/21, 12:10

#### Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	2400	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number** 21-A008129  
**Client Identification** 21F0209-05 A  
**Sampling Date** 06/09/21, 10:05

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	5.0	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number** 21-A008130  
**Client Identification** 21F0209-07 A  
**Sampling Date** 06/09/21, 15:15

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	1600	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number** 21-A008131  
**Client Identification** 21F0209-09 A  
**Sampling Date** 06/10/21, 13:10

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	360	mg/l		1	SM 2540C	MD	06/15/21

**AMTEST Identification Number** 21-A008132  
**Client Identification** 21F0209-10 A  
**Sampling Date** 06/09/21, 09:20

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	310	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number** 21-A008133  
**Client Identification** 21F0209-12 A  
**Sampling Date** 06/09/21, 10:15

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	360	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number** 21-A008134  
**Client Identification** 21F0209-14 A  
**Sampling Date** 06/09/21, 10:25

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	940	mg/l		1	SM 2540C	MD	06/15/21



**AMTEST Identification Number** 21-A008135  
**Client Identification** 21F0209-16 A  
**Sampling Date** 06/09/21, 13:20

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	540	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number** 21-A008136  
**Client Identification** 21F0209-18 A,B,C  
**Sampling Date** 06/10/21, 12:25

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	220	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number** 21-A008137  
**Client Identification** 21F0209-20 A  
**Sampling Date** 06/09/21, 12:10

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	700	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number**      21-A008138  
**Client Identification**                21F0209-22 A  
**Sampling Date**                         06/09/21, 11:10

**Conventionals**

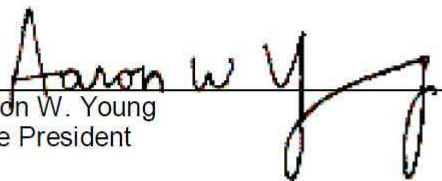
PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	1900	mg/l		1	SM 2540C	MD	06/15/21

---

**AMTEST Identification Number**      21-A008139  
**Client Identification**                21F0209-24 A  
**Sampling Date**                         06/09/21, 10:05

**Conventionals**

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Total Dissolved Solids	6400	mg/l		1	SM 2540C	MD	06/15/21

  
\_\_\_\_\_  
Aaron W. Young  
Vice President



**SUBCONTRACT ORDER**  
**To: AmTest Laboratories**  
**ARI Work Order: 21F0209**

**SENDING LABORATORY:**

Analytical Resources, Inc.  
4611 S. 134th Place, Suite 100  
Tukwila, WA 98168  
Phone: (206) 695-6200  
Fax: (206) 695-6201  
Project Manager: Kelly Bottem  
E-Mail: kelly.bottem@arilabs.com

**RECEIVING LABORATORY:**

AmTest Laboratories  
13600 NE 126th Pl Suite C  
Kirkland, WA 98034  
Phone :425-885-1664  
Fax: -

**PLEASE SEND DATA TO** subdata@arilabs.com

Analysis	Due	Expires	Sub Laboratory ID	Comments
<b>Sample ID: 21F0209-01</b> <b>Sampled: 06/09/21 12:05 Matrix: Water</b>				
Solids, Total Dissolved SM 2540 C-97	06/25/21	06/16/21 12:05		
Containers Supplied:	<b>8127</b>			
<div style="border: 1px solid black; padding: 2px;">           21F0209-01 A            HDPE NM, 1000 mL         </div>				
<b>Sample ID: 21F0209-03</b> <b>Sampled: 06/09/21 12:10 Matrix: Water</b>				
Solids, Total Dissolved SM 2540 C-97	06/25/21	06/16/21 12:10		
Containers Supplied:	<b>28</b>			
<div style="border: 1px solid black; padding: 2px;">           21F0209-03 A            HDPE NM, 1000 mL         </div>				
<b>Sample ID: 21F0209-05</b> <b>Sampled: 06/09/21 10:05 Matrix: Water</b>				
Solids, Total Dissolved SM 2540 C-97	06/25/21	06/16/21 10:05		
Containers Supplied:	<b>29</b>			
<div style="border: 1px solid black; padding: 2px;">           21F0209-05 A            HDPE NM, 1000 mL         </div>				
<b>Sample ID: 21F0209-07</b> <b>Sampled: 06/09/21 15:15 Matrix: Water</b>				
Solids, Total Dissolved SM 2540 C-97	06/25/21	06/16/21 15:15		
Containers Supplied:	<b>30</b>			
<div style="border: 1px solid black; padding: 2px;">           21F0209-07 A            HDPE NM, 1000 mL         </div>				

*Smg/L reporting limit  
See email from Kelly B.*

Released By *[Signature]* Date 6/15/21<sup>1048</sup> Received By *[Signature]* Date 6/15/21 @ 1048

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date T=6.7



**SUBCONTRACT ORDER**  
To: AmTest Laboratories  
ARI Work Order: 21F0209

Analysis	Due	Expires	Sub Laboratory ID	Comments
<b>Sample ID: 21F0209-09</b> <b>Sampled: 06/10/21 13:10 Matrix: Water</b> Solids, Total Dissolved SM 2540 C-97 <i>Containers Supplied:</i> 21F0209-09 A HDPE NM, 1000 mL	06/25/21	06/17/21 13:10		
<b>8131</b>				
<b>Sample ID: 21F0209-10</b> <b>Sampled: 06/09/21 09:20 Matrix: Water</b> Solids, Total Dissolved SM 2540 C-97 <i>Containers Supplied:</i> 21F0209-10 A HDPE NM, 1000 mL	06/25/21	06/16/21 09:20		
<b>32</b>				
<b>Sample ID: 21F0209-12</b> <b>Sampled: 06/09/21 10:15 Matrix: Water</b> Solids, Total Dissolved SM 2540 C-97 <i>Containers Supplied:</i> 21F0209-12 A HDPE NM, 1000 mL	06/25/21	06/16/21 10:15		
<b>33</b>				
<b>Sample ID: 21F0209-14</b> <b>Sampled: 06/09/21 10:25 Matrix: Water</b> Solids, Total Dissolved SM 2540 C-97 <i>Containers Supplied:</i> 21F0209-14 A HDPE NM, 1000 mL	06/25/21	06/16/21 10:25		
<b>34</b>				
<b>Sample ID: 21F0209-16</b> <b>Sampled: 06/09/21 13:20 Matrix: Water</b> Solids, Total Dissolved SM 2540 C-97 <i>Containers Supplied:</i> 21F0209-16 A HDPE NM, 1000 mL	06/25/21	06/16/21 13:20		
<b>35</b>				
<b>Sample ID: 21F0209-18</b> <b>Sampled: 06/10/21 12:25 Matrix: Water</b> Solids, Total Dissolved SM 2540 C-97 <i>Containers Supplied:</i> 21F0209-18 A HDPE NM, 1000 mL	06/25/21	06/17/21 12:25		MS/MSD for TDS and T. Metals only

21F0209-18 A HDPE NM, 1000 mL	21F0209-18 B HDPE NM, 1000 mL	21F0209-18 C HDPE NM, 1000 mL	<b>36</b>
----------------------------------	----------------------------------	----------------------------------	-----------

Released By: *[Signature]* Date: 6/15/21  
 Received By: *[Signature]* Date: 6/15/21 1048  
 T=6.7





SUBCONTRACT ORDER  
To: AmTest Laboratories  
ARI Work Order:21F0209

Analysis	Due	Expires	Sub Laboratory ID	Comments
<b>Sample ID: 21F0209-20</b>				
<b>Sampled: 06/09/21 12:10 Matrix: Water</b>				
Solids, Total Dissolved SM 2540 C-97	06/25/21	06/16/21 12:10		
<i>Containers Supplied:</i>				
21F0209-20 A HDPE NM, 1000 mL	8137			
<b>Sample ID: 21F0209-22</b>				
<b>Sampled: 06/09/21 11:10 Matrix: Water</b>				
Solids, Total Dissolved SM 2540 C-97	06/25/21	06/16/21 11:10		
<i>Containers Supplied:</i>				
21F0209-22 A HDPE NM, 1000 mL	38			
<b>Sample ID: 21F0209-24</b>				
<b>Sampled: 06/09/21 10:05 Matrix: Water</b>				
Solids, Total Dissolved SM 2540 C-97	06/25/21	06/16/21 10:05		
<i>Containers Supplied:</i>				
21F0209-24 A HDPE NM, 1000 mL	39			

Released By: [Signature] Date: 6/15/21 1048  
 Received By: [Signature] Date: 6/15/21 1048  
 T=6.7



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

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

**Reported:**  
30-Jun-2021 14:26

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
INFILTRATION PONDS-0621	21F0209-01	Water	09-Jun-2021 12:05	11-Jun-2021 10:20
MW-35-0621	21F0209-03	Water	09-Jun-2021 12:10	11-Jun-2021 10:20
MW-99-1-0621	21F0209-05	Water	09-Jun-2021 10:05	11-Jun-2021 10:20
STILL WELL-0621	21F0209-07	Water	09-Jun-2021 15:15	11-Jun-2021 10:20
INTERCEPTOR TRENCH-0621	21F0209-09	Water	10-Jun-2021 13:10	11-Jun-2021 10:20
MW-1A-0621	21F0209-10	Water	09-Jun-2021 09:20	11-Jun-2021 10:20
MW-2A-0621	21F0209-12	Water	09-Jun-2021 10:15	11-Jun-2021 10:20
MW-45A-0621	21F0209-14	Water	09-Jun-2021 10:25	11-Jun-2021 10:20
MW-3A-0621	21F0209-16	Water	09-Jun-2021 13:20	11-Jun-2021 10:20
MW-4A-0621	21F0209-18	Water	10-Jun-2021 12:25	11-Jun-2021 10:20
MW-5A-0621	21F0209-20	Water	09-Jun-2021 12:10	11-Jun-2021 10:20
MW-6A-0621	21F0209-22	Water	09-Jun-2021 11:10	11-Jun-2021 10:20
P-14-0621	21F0209-24	Water	09-Jun-2021 10:05	11-Jun-2021 10:20



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

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

Reported:  
30-Jun-2021 14:26

## 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 (TDS)

TDS were subcontracted to Amtest due to capacity at ARI.



WORK ORDER

21F0209

Client: Golder Associates

Project Manager: Kelly Bottem

Project: Ravensdale

Project Number: Ravensdale

Preservation Confirmation

Container ID	Container Type	pH	
21F0209-01 A	HDPE NM, 1000 mL		
21F0209-01 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass (P)
21F0209-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-03 A	HDPE NM, 1000 mL		
21F0209-03 B	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-04 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-05 A	HDPE NM, 1000 mL		
21F0209-05 B	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-07 A	HDPE NM, 1000 mL		
21F0209-07 B	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-08 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-09 A	HDPE NM, 1000 mL		
21F0209-10 A	HDPE NM, 1000 mL		
21F0209-10 B	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-11 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-12 A	HDPE NM, 1000 mL		
21F0209-12 B	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-13 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-14 A	HDPE NM, 1000 mL		
21F0209-14 B	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-15 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-16 A	HDPE NM, 1000 mL		
21F0209-16 B	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-17 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-18 A	HDPE NM, 1000 mL		
21F0209-18 B	HDPE NM, 1000 mL		
21F0209-18 C	HDPE NM, 1000 mL		
21F0209-18 D	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-18 E	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-18 F	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-19 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-20 A	HDPE NM, 1000 mL		
21F0209-20 B	HDPE NM, 500 mL, 1:1 HNO3	<2	P
21F0209-21 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-22 A	HDPE NM, 1000 mL		



WORK ORDER

21F0209

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

21F0209-22 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass(P)
21F0209-23 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	P
21F0209-24 A	HDPE NM, 1000 mL		
21F0209-24 B	HDPE NM, 500 mL, 1:1 HNO3	<2	P

JB  
Preservation Confirmed By

06/12/2021  
Date





# Cooler Receipt Form

ARI Client: Golder

Project Name: Ravensdale 2021 Q2

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

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

Assigned ARI Job No: 21F0209

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 1000 0.9 0.6  
 If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO 3006

Cooler Accepted by: JS Date: 06/11/2021 Time: 1000

**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..... 1040 NA  
 Were the sample(s) split by ARI? NA YES Date/Time: 06/11/2021 Equipment: pan Split by: JS

Samples Logged by: JS Date: 06/11/2021 Time: 1205 Labels checked by: JS

**\*\* 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: Ravensdale  
Project Manager: Gary Zimmerman

**Reported:**  
30-Jun-2021 14:26

**INFILTRATION PONDS-0621**  
**21F0209-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Sampled: 06/09/2021 12:05
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/24/2021 19:08
Sample Preparation:	Extract ID: 21F0209-01 B 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	1.51	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**INFILTRATION PONDS-0621**  
**21F0209-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 06/09/2021 12:05
Instrument: ICP2 Analyst: MVP	Preparation Batch: BJF0574	Final Volume: 25 mL	Analyzed: 06/23/2021 17:35
Sample Preparation:	Prepared: 06/22/2021		Extract ID: 21F0209-01 B 02

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	5	0.534	2.50	923	mg/L	D





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

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

Reported:  
30-Jun-2021 14:26

**INFILTRATION PONDS-0621**  
**21F0209-01 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97

Sampled: 06/09/2021 12:05

Instrument: ALAB Analyst:

Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: B150621  
Prepared: 06/15/2021

Extract ID: 21F0209-01

Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	2400.0	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**INFILTRATION PONDS-0621**  
**21F0209-01RE1 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 12:05
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/24/2021 20:17
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21F0209-01RE1 B 01
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	2	0.0746	0.400	23.7	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**MW-35-0621**  
**21F0209-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/09/2021 12:10
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0601	Analyzed: 06/24/2021 20:32
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-03 B 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	5	0.257	0.500	1.81	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**MW-35-0621**  
**21F0209-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 12:10
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/24/2021 20:32
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21F0209-03 B 01
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	5	0.187	1.00	25.1	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-35-0621**  
**21F0209-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 06/09/2021 12:10
Instrument: ICP2 Analyst: MVP	Preparation Batch: BJF0574	Final Volume: 25 mL	Analyzed: 06/23/2021 17:38
Sample Preparation:	Prepared: 06/22/2021		Extract ID: 21F0209-03 B 02

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	5	0.534	2.50	941	mg/L	D



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

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

**Reported:**  
30-Jun-2021 14:26

**MW-35-0621**  
**21F0209-03 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97

Sampled: 06/09/2021 12:10

Instrument: ALAB Analyst:

Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: B150621  
Prepared: 06/15/2021

Extract ID: 21F0209-03

Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	2400.0	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**MW-99-1-0621**  
**21F0209-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Sampled: 06/09/2021 10:05
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 15:40
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21F0209-05 B 01
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**MW-99-1-0621**  
**21F0209-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 10:05
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 15:40
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21F0209-05 B 01
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

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





Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**MW-99-1-0621**  
**21F0209-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 06/09/2021 10:05
Instrument: ICP2 Analyst: MVP	Preparation Batch: BJF0574	Final Volume: 25 mL	Analyzed: 06/23/2021 17:41
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-05 B 02	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	5	0.534	2.50	0.541	mg/L	J, D



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

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

**Reported:**  
30-Jun-2021 14:26

**MW-99-1-0621**  
**21F0209-05 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97

Sampled: 06/09/2021 10:05

Instrument: ALAB Analyst:

Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: B150621  
Prepared: 06/15/2021

Extract ID: 21F0209-05

Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	5.00	mg/L	



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

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

**Reported:**  
30-Jun-2021 14:26

**STILL WELL-0621**  
**21F0209-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/09/2021 15:15
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0601	Analyzed: 06/24/2021 19:39
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-07 B 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	2	0.103	0.200	5.72	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**STILL WELL-0621**  
**21F0209-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 15:15
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/24/2021 19:39
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21F0209-07 B 01
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	2	0.0746	0.400	91.7	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**STILL WELL-0621**  
**21F0209-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 06/09/2021 15:15
Instrument: ICP2 Analyst: MVP	Preparation Batch: BJF0574	Final Volume: 25 mL	Analyzed: 06/23/2021 17:45
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-07 B 02	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	5	0.534	2.50	471	mg/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**STILL WELL-0621**  
**21F0209-07 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 06/09/2021 15:15  
Instrument: ALAB Analyst: Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 21F0209-07  
Preparation Batch: B150621  
Prepared: 06/15/2021 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	1600.0	mg/L	



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

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

Reported:  
30-Jun-2021 14:26

**INTERCEPTOR TRENCH-0621**  
**21F0209-09 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97

Sampled: 06/10/2021 13:10

Instrument: ALAB Analyst:

Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: B150621  
Prepared: 06/15/2021

Extract ID: 21F0209-09

Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	360.0	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-1A-0621**  
**21F0209-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/09/2021 09:20
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0601	Analyzed: 06/25/2021 15:46
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-10 B 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U





Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-1A-0621**  
**21F0209-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 09:20
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 15:46
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21F0209-10 B 01
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	1.39	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-1A-0621**  
**21F0209-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 06/09/2021 09:20
Instrument: ICP2 Analyst: MVP	Preparation Batch: BJF0574	Final Volume: 25 mL	Analyzed: 06/23/2021 17:50
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-10 B 02	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	5	0.534	2.50	16.3	mg/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**MW-1A-0621**  
**21F0209-10 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97  
Instrument: ALAB Analyst:  
Sampled: 06/09/2021 09:20  
Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: B150621  
Prepared: 06/15/2021  
Final Volume:  
Extract ID: 21F0209-10

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	310.0	mg/L	



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

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

**Reported:**  
30-Jun-2021 14:26

**MW-2A-0621**  
**21F0209-12 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 Sampled: 06/09/2021 10:15  
Instrument: ICPMS1 Analyst: MCB Analyzed: 06/25/2021 15:52  
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Extract ID: 21F0209-12 B 01  
Preparation Batch: BJF0601 Sample Size: 25 mL  
Prepared: 06/22/2021 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	0.0580	ug/L	J



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-2A-0621**  
**21F0209-12 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 10:15
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 15:52
Sample Preparation:	Extract ID: 21F0209-12 B 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	1.25	ug/L	



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

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

**Reported:**  
30-Jun-2021 14:26

**MW-2A-0621**  
**21F0209-12 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 06/09/2021 10:15  
Instrument: ICP2 Analyst: MVP Analyzed: 06/23/2021 18:54

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 21F0209-12 B 02  
Preparation Batch: BJF0574 Sample Size: 25 mL  
Prepared: 06/22/2021 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	5	0.534	2.50	21.8	mg/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**MW-2A-0621**  
**21F0209-12 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97  
Instrument: ALAB Analyst: Sampled: 06/09/2021 10:15  
Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 21F0209-12  
Preparation Batch: B150621  
Prepared: 06/15/2021 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	360.0	mg/L	



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

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

**Reported:**  
30-Jun-2021 14:26

**MW-45A-0621**  
**21F0209-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Sampled: 06/09/2021 10:25
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 15:58
Sample Preparation:	Extract ID: 21F0209-14 B 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	0.0550	ug/L	J





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

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

**Reported:**  
30-Jun-2021 14:26

**MW-45A-0621**  
**21F0209-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 10:25
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 15:58
Sample Preparation:	Extract ID: 21F0209-14 B 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	1.21	ug/L	



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

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

**Reported:**  
30-Jun-2021 14:26

**MW-45A-0621**  
**21F0209-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 06/09/2021 10:25  
Instrument: ICP2 Analyst: MVP Analyzed: 06/23/2021 18:36

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 21F0209-14 B 02  
Preparation Batch: BJF0574 Sample Size: 25 mL  
Prepared: 06/22/2021 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	5	0.534	2.50	21.2	mg/L	D



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

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

Reported:  
30-Jun-2021 14:26

**MW-45A-0621**  
**21F0209-14 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97

Sampled: 06/09/2021 10:25

Instrument: ALAB Analyst:

Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: B150621  
Prepared: 06/15/2021

Extract ID: 21F0209-14

Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	940.0	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-3A-0621**  
**21F0209-16 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/09/2021 13:20
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0601	Analyzed: 06/25/2021 17:22
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-16 B 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	0.204	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-3A-0621**  
**21F0209-16 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 13:20
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 17:22
Sample Preparation:	Extract ID: 21F0209-16 B 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	6.48	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-3A-0621**  
**21F0209-16 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 06/09/2021 13:20
Instrument: ICP2 Analyst: MVP	Preparation Batch: BJF0574	Final Volume: 25 mL	Analyzed: 06/23/2021 18:50
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-16 B 02	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	5	0.534	2.50	124	mg/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**MW-3A-0621**  
**21F0209-16 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97  
Instrument: ALAB Analyst: Sampled: 06/09/2021 13:20  
Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 21F0209-16  
Preparation Batch: B150621  
Prepared: 06/15/2021 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	540.0	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-4A-0621**  
**21F0209-18 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Sampled: 06/10/2021 12:25
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 16:03
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21F0209-18 F 01
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U





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

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

**Reported:**  
30-Jun-2021 14:26

**MW-4A-0621**  
**21F0209-18 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/10/2021 12:25
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 16:03
Sample Preparation:	Extract ID: 21F0209-18 F 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	0.228	ug/L	



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

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

**Reported:**  
30-Jun-2021 14:26

**MW-4A-0621**  
**21F0209-18 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D	Preparation Method: TWC EPA 3010A	Sampled: 06/10/2021 12:25
Instrument: ICP2 Analyst: MVP	Preparation Batch: BJF0574	Analyzed: 06/23/2021 18:13
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-18 F 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	1	0.107	0.500	0.787	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-4A-0621**  
**21F0209-18 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 06/10/2021 12:25  
Instrument: ALAB Analyst: Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 21F0209-18  
Preparation Batch: B150621  
Prepared: 06/15/2021 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	220.0	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-5A-0621**  
**21F0209-20 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Instrument: ICPMS1	Analyst: MCB	Sampled: 06/09/2021 12:10
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Preparation Batch: BJF0601	Analyzed: 06/25/2021 17:28
	Prepared: 06/22/2021	Sample Size: 25 mL	Extract ID: 21F0209-20 B 01
		Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	0.0630	ug/L	J



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

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

**Reported:**  
30-Jun-2021 14:26

**MW-5A-0621**  
**21F0209-20 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 12:10
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 17:28
Sample Preparation:	Extract ID: 21F0209-20 B 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	2.62	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-5A-0621**  
**21F0209-20 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 06/09/2021 12:10
Instrument: ICP2 Analyst: MVP	Preparation Batch: BJF0574	Final Volume: 25 mL	Analyzed: 06/23/2021 16:48
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-20 B 02	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	1	0.107	0.500	205	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-5A-0621**  
**21F0209-20 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 06/09/2021 12:10  
Instrument: ALAB Analyst: Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 21F0209-20  
Preparation Batch: B150621  
Prepared: 06/15/2021 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	700.0	mg/L	



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

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

**Reported:**  
30-Jun-2021 14:26

**MW-6A-0621**  
**21F0209-22 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Sampled: 06/09/2021 11:10
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 17:34
Sample Preparation:	Extract ID: 21F0209-22 B 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	0.0940	ug/L	J





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

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

**Reported:**  
30-Jun-2021 14:26

**MW-6A-0621**  
**21F0209-22 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 11:10
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/25/2021 17:34
Sample Preparation:	Extract ID: 21F0209-22 B 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0601	Sample Size: 25 mL
Prepared: 06/22/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	5.03	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-6A-0621**  
**21F0209-22 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 06/09/2021 11:10
Instrument: ICP2 Analyst: MVP	Preparation Batch: BJF0574	Final Volume: 25 mL	Analyzed: 06/23/2021 18:25
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-22 B 02	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	2	0.214	1.00	707	mg/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**MW-6A-0621**  
**21F0209-22 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 06/09/2021 11:10  
Instrument: ALAB Analyst: Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 21F0209-22  
Preparation Batch: B150621  
Prepared: 06/15/2021 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	1900.0	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**P-14-0621**  
**21F0209-24 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/09/2021 10:05
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0601	Analyzed: 06/24/2021 19:47
Sample Preparation:	Prepared: 06/22/2021	Extract ID: 21F0209-24 B 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	2	0.103	0.200	3.44	ug/L	D



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

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

Reported:  
30-Jun-2021 14:26

**P-14-0621**  
**21F0209-24 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010D Sampled: 06/09/2021 10:05  
Instrument: ICP2 Analyst: MVP Analyzed: 06/23/2021 18:28

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 21F0209-24 B 02  
Preparation Batch: BJF0574 Sample Size: 25 mL  
Prepared: 06/22/2021 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Potassium	7440-09-7	10	1.07	5.00	2460	mg/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 30-Jun-2021 14:26
---	--	---------------------------------------

**P-14-0621**  
**21F0209-24 (Water)**

**Wet Chemistry**

Method: SM 2540 C-97 Sampled: 06/09/2021 10:05  
Instrument: ALAB Analyst: Analyzed: 06/15/2021 00:00

**Analysis by: AmTest Laboratories**

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 21F0209-24  
Preparation Batch: B150621  
Prepared: 06/15/2021 Final Volume:

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	6400.0	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**P-14-0621**  
**21F0209-24RE1 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/09/2021 10:05
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/24/2021 20:24
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BJF0601
	Prepared: 06/22/2021
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 21F0209-24RE1 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	10	0.373	2.00	242	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 30-Jun-2021 14:26
---	--	--------------------------------

**Metals and Metallic Compounds - Quality Control**

**Batch BJF0574 - TWC EPA 3010A**

Instrument: ICP2 Analyst: MVP

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Blank (BJF0574-BLK1)</b>						Prepared: 22-Jun-2021 Analyzed: 23-Jun-2021 18:02					
Potassium	ND	0.107	0.500	mg/L							U
<b>LCS (BJF0574-BS1)</b>						Prepared: 22-Jun-2021 Analyzed: 23-Jun-2021 18:05					
Potassium	10.9	0.107	0.500	mg/L	10.0		109	80-120			
<b>Duplicate (BJF0574-DUP1)</b>						Source: 21F0209-18 Prepared: 22-Jun-2021 Analyzed: 23-Jun-2021 18:10					
Potassium	0.781	0.107	0.500	mg/L		0.787			0.80	20	
<b>Matrix Spike (BJF0574-MS1)</b>						Source: 21F0209-18 Prepared: 22-Jun-2021 Analyzed: 23-Jun-2021 18:16					
Potassium	11.6	0.107	0.500	mg/L	10.0	0.787	108	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
<b>Matrix Spike Dup (BJF0574-MSD1)</b>						Source: 21F0209-18 Prepared: 22-Jun-2021 Analyzed: 23-Jun-2021 18:20					
Potassium	11.6	0.107	0.500	mg/L	10.0	0.787	108	75-125	0.02	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: Ravensdale  
Project Manager: Gary Zimmerman

Reported:  
30-Jun-2021 14:26

**Metals and Metallic Compounds - Quality Control**

**Batch BJF0601 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS1 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 (BJF0601-BLK1)</b>						Prepared: 22-Jun-2021 Analyzed: 23-Jun-2021 17:10						
Lead	208	ND	0.0513	0.100	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
<b>LCS (BJF0601-BS1)</b>						Prepared: 22-Jun-2021 Analyzed: 23-Jun-2021 17:15						
Lead	208	25.4	0.0513	0.100	ug/L	25.0		101	80-120			
Arsenic	75a	25.0	0.0373	0.200	ug/L	25.0		100	80-120			
<b>Duplicate (BJF0601-DUP1)</b>						Source: 21F0209-18 Prepared: 22-Jun-2021 Analyzed: 25-Jun-2021 16:09						
Lead	208	ND	0.0513	0.100	ug/L		ND					U
Arsenic	75a	0.214	0.0373	0.200	ug/L		0.228			6.33	20	
<b>Matrix Spike (BJF0601-MS1)</b>						Source: 21F0209-18 Prepared: 22-Jun-2021 Analyzed: 25-Jun-2021 16:15						
Lead	208	24.7	0.0513	0.100	ug/L	25.0	ND	98.8	75-125			
Arsenic	75a	25.5	0.0373	0.200	ug/L	25.0	0.228	101	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.												
<b>Matrix Spike Dup (BJF0601-MSD1)</b>						Source: 21F0209-18 Prepared: 22-Jun-2021 Analyzed: 25-Jun-2021 16:22						
Lead	208	25.0	0.0513	0.100	ug/L	25.0	ND	99.9	75-125	1.15	20	
Arsenic	75a	25.5	0.0373	0.200	ug/L	25.0	0.228	101	75-125	0.26	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: Ravensdale  
Project Manager: Gary Zimmerman

Reported:  
30-Jun-2021 14:26

**Certified Analyses included in this Report**

Analyte	Certifications
<b>EPA 200.8 in Water</b>	
Lead-208	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WA-DW,DoD-ELAP
<b>EPA 200.8 UCT-KED in Water</b>	
Arsenic-75a	NELAP,WADOE,DoD-ELAP
Arsenic-75a	NELAP,WA-DW,DoD-ELAP
<b>EPA 6010D in Water</b>	
Potassium	WADOE,NELAP,DoD-ELAP
Potassium	NELAP,DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022



Golder Associates

18300 NE Union Hill Road Suite 200

Redmond WA, 98052-3333

Project: Ravensdale

Project Number: Ravensdale

Project Manager: Gary Zimmerman

Reported:

30-Jun-2021 14:26

### Notes and Definitions

- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- 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).
- Y1 Raised reporting limit due to interference
- 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.



13 July 2021

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

RE: Ravensdale

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.

Associated Work Order(s)  
21F0346

Associated SDG ID(s)  
N/A

-----

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 enclose 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, Inc.

*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.*







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

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

**Reported:**  
13-Jul-2021 13:18

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Tank-Influent	21F0346-01	Water	22-Jun-2021 11:05	22-Jun-2021 13:44
Tank-Effluent	21F0346-02	Water	22-Jun-2021 11:10	22-Jun-2021 13:44
Tank-Effluent	21F0346-03	Water	22-Jun-2021 11:10	22-Jun-2021 13:44
Asz-Effluent	21F0346-04	Water	22-Jun-2021 11:15	22-Jun-2021 13:44
Asz-Effluent	21F0346-05	Water	22-Jun-2021 11:15	22-Jun-2021 13:44



Golder Associates

18300 NE Union Hill Road Suite 200

Redmond WA, 98052-3333

Project: Ravensdale

Project Number: Ravensdale

Project Manager: Gary Zimmerman

Reported:

13-Jul-2021 13:18

## Work Order Case Narrative

### Total and Dissolved Metals - EPA Method 200.8

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.



WORK ORDER

21F0346

Client: Golder Associates	Project Manager: Kelly Bottem
Project: Ravensdale	Project Number: Ravensdale

Preservation Confirmation

Container ID	Container Type	pH	
21F0346-01 A	HDPE NM, 500 mL, 1:1 HNO3	7.2	Pass
21F0346-02 A	HDPE NM, 500 mL, 1:1 HNO3	7.2	Pass
21F0346-03 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	7.2	Pass
21F0346-04 A	HDPE NM, 500 mL, 1:1 HNO3	7.2	Pass
21F0346-05 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	7.2	Pass

DL

06/22/21

Preservation Confirmed By \_\_\_\_\_

Date \_\_\_\_\_





# Cooler Receipt Form

ARI Client: Goldier

Project Name: Ravensdale

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

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

Assigned ARI Job No: 21F0346

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 1314 LO

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO 2585

Cooler Accepted by: DL Date: 06/22/21 Time: 1344

**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 (DL)

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: DL Date: 06/22/21 Time: 1536 Labels checked by: \_\_\_\_\_

**\*\* 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:**

Brought in extra containers not listed on the COC & w/ no labels, PM to see if billing is necessary.

By: DL Date: 06/22/21



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 13-Jul-2021 13:18
---	--	---------------------------------------

**Tank-Influent**  
**21F0346-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/22/2021 11:05
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0657	Analyzed: 06/28/2021 19:23
Sample Preparation:	Prepared: 06/25/2021	Extract ID: 21F0346-01 A 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	84.8	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 13-Jul-2021 13:18
---	--	--------------------------------

**Tank-Influent**  
**21F0346-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/22/2021 11:05
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/30/2021 00:08
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21F0346-01 A 01
Preparation Batch: BJF0657	Sample Size: 25 mL
Prepared: 06/25/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	5	0.187	1.00	22.8	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 13-Jul-2021 13:18
---	--	---------------------------------------

**Tank-Effluent**  
**21F0346-02 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/22/2021 11:10
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0657	Analyzed: 06/28/2021 19:28
Sample Preparation:	Prepared: 06/25/2021	Extract ID: 21F0346-02 A 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	18.4	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 13-Jul-2021 13:18
---	--	--------------------------------

**Tank-Effluent**  
**21F0346-02 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED	Sampled: 06/22/2021 11:10
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/30/2021 00:14
Sample Preparation:	Extract ID: 21F0346-02 A 01
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BJF0657	Sample Size: 25 mL
Prepared: 06/25/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	5	0.187	1.00	24.2	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 13-Jul-2021 13:18
---	--	---------------------------------------

**Tank-Effluent**  
**21F0346-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/22/2021 11:10
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0755	Analyzed: 06/30/2021 00:21
Sample Preparation:	Prepared: 06/28/2021	Extract ID: 21F0346-03 A 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead, Dissolved	7439-92-1	5	0.340	0.500	4.81	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 13-Jul-2021 13:18
---	--	---------------------------------------

**Tank-Effluent**  
**21F0346-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED	Sampled: 06/22/2021 11:10
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/30/2021 00:21
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BJF0755
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 21F0346-03 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	5	0.110	1.00	24.3	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 13-Jul-2021 13:18
---	--	---------------------------------------

**Asz-Effluent**  
**21F0346-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/22/2021 11:15
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0657	Analyzed: 06/28/2021 19:17
Sample Preparation:	Prepared: 06/25/2021	Extract ID: 21F0346-04 A 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	2	0.103	0.200	77.1	ug/L	D





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

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

**Reported:**  
13-Jul-2021 13:18

**Asz-Effluent**  
**21F0346-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 200.8 UCT-KED Sampled: 06/22/2021 11:15  
Instrument: ICPMS1 Analyst: MCB Analyzed: 06/28/2021 19:17  
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Extract ID: 21F0346-04 A 01  
Preparation Batch: BJF0657 Sample Size: 25 mL  
Prepared: 06/25/2021 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	2	0.0746	0.400	2.73	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 13-Jul-2021 13:18
---	--	---------------------------------------

**Asz-Effluent**  
**21F0346-05 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 06/22/2021 11:15
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BJF0755	Analyzed: 06/30/2021 00:30
Sample Preparation:	Prepared: 06/28/2021	Extract ID: 21F0346-05 A 01
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead, Dissolved	7439-92-1	5	0.340	0.500	0.900	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	<b>Reported:</b> 13-Jul-2021 13:18
---	--	---------------------------------------

**Asz-Effluent**  
**21F0346-05 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED	Sampled: 06/22/2021 11:15
Instrument: ICPMS1 Analyst: MCB	Analyzed: 06/30/2021 00:30
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
	Preparation Batch: BJF0755
	Prepared: 06/28/2021
	Sample Size: 25 mL
	Final Volume: 25 mL
	Extract ID: 21F0346-05 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	5	0.110	1.00	4.49	ug/L	D



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

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

Reported:  
13-Jul-2021 13:18

**Metals and Metallic Compounds - Quality Control**

**Batch BJF0657 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS1 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 (BJF0657-BLK1)</b>						Prepared: 25-Jun-2021 Analyzed: 25-Jun-2021 18:08						
Lead	208	ND	0.0513	0.100	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
<b>LCS (BJF0657-BS1)</b>						Prepared: 25-Jun-2021 Analyzed: 25-Jun-2021 18:12						
Lead	208	27.1	0.0513	0.100	ug/L	25.0		108	80-120			
Arsenic	75a	25.7	0.0373	0.200	ug/L	25.0		103	80-120			



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

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

Reported:  
13-Jul-2021 13:18

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BJF0755 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS1 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 (BJF0755-BLK1)</b>						Prepared: 28-Jun-2021 Analyzed: 29-Jun-2021 19:51						
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
<b>LCS (BJF0755-BS1)</b>						Prepared: 28-Jun-2021 Analyzed: 29-Jun-2021 19:56						
Lead, Dissolved	208	27.9	0.0513	0.100	ug/L	25.0		112	80-120			
Arsenic, Dissolved	75a	25.3	0.0373	0.200	ug/L	25.0		101	80-120			



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

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

Reported:  
13-Jul-2021 13:18

**Certified Analyses included in this Report**

Analyte	Certifications
<b>EPA 200.8 in Water</b>	
Lead-208	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WA-DW,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WA-DW,DoD-ELAP
<b>EPA 200.8 UCT-KED in Water</b>	
Arsenic-75a	NELAP,WADOE,DoD-ELAP
Arsenic-75a	NELAP,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP
Arsenic-75a	NELAP,WA-DW,DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022



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

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

**Reported:**  
13-Jul-2021 13:18

### Notes and Definitions

- \* Flagged value is not within established control limits.
- D The reported value is from a dilution
- 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.



**[golder.com](http://golder.com)**