



REPORT

**QUARTERLY MONITORING REPORT
FOURTH QUARTER 2020
RESERVE SILICA RECLAMATION SITE**

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

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Table of Contents

1.0	INTRODUCTION	1
1.1	Site Description	1
1.2	Purpose and Scope.....	1
2.0	BACKGROUND	2
2.1	Site Background.....	2
2.1.1	LDA Background.....	3
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	4
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
3.0	OPERATIONS AND MAINTENANCE OF THE LEACHATE TREATMENT SYSTEM	6
4.0	SAMPLING ACTIVITIES	7
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 8

4.2.3 DSP Groundwater Sampling 9

4.2.4 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..... 11

7.0 REFERENCES..... 12

TABLES

- Table 1: Fourth Quarter 2020 Water Level Measurements
- Table 2: Fourth Quarter 2020 Field Parameters and Analytical Data
- Table 3: Preliminary Standards
- Table 4: Interceptor Trench Discharge Monitoring
- Table 5: Fourth Quarter 2020 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 and 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 fourth quarter of 2020. The quarterly monitoring was completed during December 2020.

1.1 Site Description

The Site is located at 28131 Ravensdale-Black Diamond Road in Ravensdale, Washington. Figure 1 shows the Site location. For the purposes of this monitoring report, the Site is comprised of two distinct areas: the Lower Disposal Area (LDA) and the Dale Strip Pit (DSP). 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 buried cement kiln dust (CKD). 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 was included in the fourth quarter event as described in the draft Work Plan, which included:

- Measurement of field parameters in water purged from 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, this 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). P-14 will continue to be sampled on a quarterly basis and analyzed for total arsenic, lead, iron, potassium, and TDS as described in the Work Plan.

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. 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 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 tightline 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 tightline 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 (CO₂) 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 drain pipe 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-3LDA 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.

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.

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. System upgrades occurred from December 2018 to May 2019 and included various upgrades and modifications to improve 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 CO₂ sparge unit, which continuously monitors the water pH and activates CO₂ sparging when the water pH exceeds 8.3. CO₂ 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 CO₂ 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. Table 5 provides the 2020 fourth quarter laboratory analytical data pre- and post- iron-based adsorption media showing the reduction in lead and arsenic concentrations. The validated laboratory analytical report is provided in Appendix C.

The treatment system has been effective in reducing the impacts to groundwater in the immediate vicinity of the 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 meet 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.
- All samples were tested for the following parameters using the methods indicated:

Arsenic (total)	EPA Method 200.8
Lead (total)	EPA Method 200.8
Potassium (total)	EPA Method 6010C

Iron (total)	EPA Method 6010C
Manganese (total)	EPA Method 6010C
Total Dissolved Solids (TDS)	EPA Method 160.1

- 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. Validated analytical laboratory data packages are provided electronically on the flash drive in Appendix C.

4.2 Sampling Procedures

4.2.1 LDA Groundwater Sampling

On December 9, 10, and 11, 2020, 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 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 dedicated tubing connected to a portable, stainless steel bladder pump or 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 200 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.

In addition, water levels and field parameters were measured in LDA monitoring wells MW-1LDA, MW-2LDA, and MW-3LDA on December 9, 2020.

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 December 9 and 10, 2020, 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. Samples collected for dissolved metals were field-filtered through a 0.45 µm in-line filter.
- 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 DSP Groundwater Sampling

On December 9, 2020, Golder measured water levels in the DSP groundwater monitoring wells (MWB-1SDSP, MWB-1DDSP, MWB-2DSP, MWB-4DSP, MWB-5DSP, and MWB-6DSP). The PVC casing of MWB-6DSP was modified by Reserve Silica between August and November 2019 to accommodate inert waste placement in the area of the well. The MWB-6DSP casing elevation was resurveyed in January 2021. Table 1 presents depth to water measurements and elevations.

4.2.4 LDA Interceptor Trench Sampling

On December 10, 2020, 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, along with the raw analytical data packages provided by the laboratory. 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 December 2020 fourth 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 continue to attenuate in response to operation of the treatment system. Concentrations of arsenic in the infiltration ponds have remained steady to slightly decreasing since fourth quarter 2019. Concentrations of arsenic in MW-5A and MW-6A during 2020 averaged 0.005 and 0.004 mg/L, respectively. Concentrations of arsenic in MW-5A and MW-6A during 2019 averaged 0.02 and 0.03 mg/L, respectively. The 2020 concentrations of arsenic in MW-5A and MW-6A are approximately one order of magnitude lower than average concentrations measured during 2019.

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.

P-14 was installed in December 2020 and monitors the groundwater in an area with saturated CKD present within the LDA disposal area. The arsenic and lead concentrations in P-14 were the highest present across all samples, at 0.263 mg/L and 0.0196 mg/L, respectively.

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/2020 year/2020 4q/draft/1520304-r-reva-ravensdale 2020 q4 monitoring-021021.docx](https://golderassociates.sharepoint.com/sites/11287g/groundwater%20monitoring/golder%20reports/2020%20year/2020%204q/draft/1520304-r-reva-ravensdale%202020%20q4%20monitoring-021021.docx)

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Tables

Table 1: Fourth Quarter 2020 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 msl)	Depth to Water (feet btoc)	Groundwater Elevation (feet msl)
LDA - Shallow/Alluvial Groundwater	MW-1A	12/9/2020	44	28-43	2-26	2	609.83	32.05	577.78
	MW-2A	12/9/2020	40	25-40	2-23	2	603.61	25.91	577.70
	MW-3A	12/9/2020	20	4-20	2-4	2	685.51	5.08	680.43
	MW-4A	12/9/2020	20	5-20	2-4	2	701.85	3.45	698.40
	MW-5A	12/9/2020	40	25-40	2-23	2	607.61	29.90	577.71
	MW-6A	12/9/2020	39	24-39	2-22	2	605.35	27.60	577.75
Within LDA - Groundwater	P-14	12/9/2020	50	40-50	2-38	2	773.32	32.53	740.79
LDA - Bedrock Groundwater	MWB-1LDA	12/9/2020	135	115-135	-	2	701.08	23.35	677.73
	MWB-2LDA	12/9/2020	125	110-125	-	2	738.06	36.55	701.51
	MWB-3LDA	12/9/2020	145	125-145	-	2	740.59	4.22	736.37
DSP - Bedrock Groundwater	MWB-1SDSP	12/9/2020	165	150-160	138-148	2	932.69	39.67	893.02
	MWB-1DDSP	12/9/2020	270	255-265	243-253	2	931.77	54.25	877.52
	MWB-2DSP	12/9/2020	256	236-256	-	2	931.22	197.86	733.36
	MWB-4SDSP	12/9/2020	36	25-36	-	2	928.81	20.58	908.23
	MWB-5DSP	12/9/2020	83	73-83	-	2	931.45	24.68	906.77
	MWB-6DSP	12/9/2020	195	120-195	-	2	920.65	24.06	896.59

- Not measured or not available
 feet bgs Feet below ground surface
 feet bmp Feet below measuring point
 feet msl Feet above mean sea level
 TOC Top of casing inside PVC well

Table 2: Fourth Quarter 2020 Field Parameters and Analytical Data

Sample Area	Sample Location ID	Date Sampled	Field Parameters									Gen. Chem.	Total Metals (mg/L)				
			TOC Elevation (feet msl)	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
LDA - Shallow/Alluvial Groundwater	MW-1A	12/9/2020	609.83	32.05	577.78	9.1	425	7.17	211	1.57	6.86	347	0.00111	0.0185 J	0.0001 U	0.004 U	17.1
	MW-2A	12/9/2020	603.61	25.91	577.70	9.4	533	6.44	213	9.96	6.97	400	0.00138	0.255 J	0.00049 J	0.0149	26.8
	MW-2A Duplicate (MW-45A)	12/9/2020	-	-	-	-	-	-	-	-	-	392	0.00138	0.154 J	0.000142 J	0.013	26.5
	MW-3A	12/10/2020	685.51	5.08	680.43	8.5	688	3.06	210	0.90	7.29	566	0.00236	0.0698	0.000159	0.292	128
	MW-4A	12/10/2020	701.85	3.45	698.40	9.8	364	6.11	169	1.56	6.51	297	0.000296	0.159	0.0001 U	0.0511	1.26
	MW-5A	12/9/2020	607.61	29.90	577.71	9.8	1105	4.51	222	8.32	7.29	897	0.00312	0.196	0.000295	0.0064	263
	MW-6A	12/9/2020	605.35	27.60	577.75	10.8	1750	1.95	209	22.0	8.22	1500	0.00314	0.592	0.000984	0.0216	539
Within LDA - Groundwater	P-14	12/11/2020	773.32	32.53	740.79	11.6	18697	0.12	-61.2	17.9	13.30	6560	0.263	0.293 J	0.0196	0.04 U	2540
LDA - Bedrock Groundwater ³	MWB-1LDA	12/9/2020	701.08	23.35	677.73	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-1LDA Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-2LDA	12/9/2020	738.06	36.55	701.51	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-3LDA	12/9/2020	740.59	4.22	736.37	-	-	-	-	-	-	-	-	-	-	-	-
LDA- Surface Water	South Pond	12/10/2020	-	-	-	5.6	1000	2.52	66.8	6.02	9.66	952	0.012	0.993	0.00663	0.0382	318
	Still Well	12/10/2020	-	-	-	8.8	4534	0.55	-26.2	5.87	12.79	1670	0.0827	0.241	0.0111	0.0108	510
	Weir	12/10/2020	-	-	-	7.2	581	6.72	185	0.96	7.80	560	0.00513	0.029 J	0.0001 U	0.0089	126
	Infiltration Ponds	12/9/2020	-	-	-	8.3	740	7.80	202	18.4	8.21	632	0.0149	0.686	0.00511	0.0172	207
	Infiltration Ponds Duplicate (MW-35A)	12/9/2020	-	-	-	-	-	-	-	-	-	643	0.0151	0.721	0.00521	0.0177	207

Table 2: Fourth Quarter 2020 Field Parameters and Analytical Data

Sample Area	Sample Location ID	Date Sampled	Field Parameters									Gen. Chem.	Total Metals (mg/L)					
			TOC Elevation (feet msl)	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	
DSP - Bedrock Groundwater ³	MWB-1SDSP	12/9/2020	932.69	39.67	893.02	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-1DDSP	12/9/2020	931.77	54.25	877.52	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-2DSP	12/9/2020	931.22	197.86	733.36	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-4SDSP	12/9/2020	928.81	20.58	908.23	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-5DSP	12/9/2020	931.45	24.68	906.77	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-6DSP	12/9/2020	920.65	24.06	896.59	-	-	-	-	-	-	-	-	-	-	-	-	-
	MWB-6DSP Duplicate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Portal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Preliminary Standard ^a			-	-	-	-	700	-	-	-	-	6.5-8.5	500	TBD ^b	0.3	0.05	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 msl Feet above mean sea level
 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 ¹	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

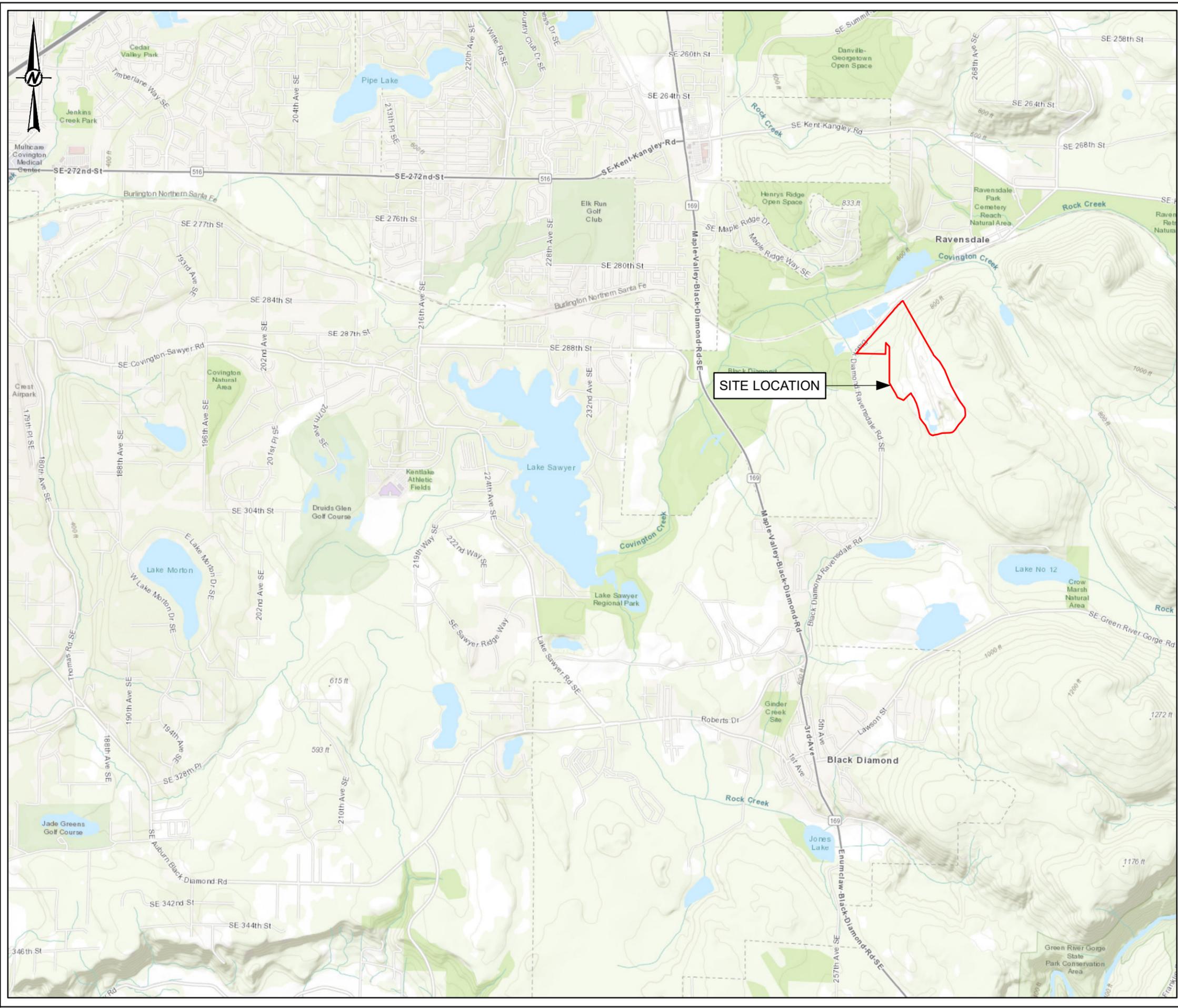
- Not measured or not available
 gpm Gallons per minute
 NTU Nephelometric Turbidity Unit
 mg/L Milligrams per liter
 1 Reduction in monitoring frequency to quarterly approved by Public Health

Table 5: Fourth Quarter 2020 Treatment System Metals Monitoring

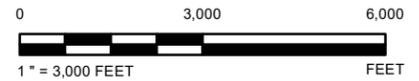
Sample Location	Sample ID	Date Sampled	Arsenic (mg/L)	Lead (mg/L)
Influent	Tank-Effluent	15-Dec-20	0.0404	0.0517
Effluent	As2-Effluent	15-Dec-20	0.0035	0.0260

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

Figures



LEGEND
 Property Boundary



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

CLIENT
HOLCIM

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

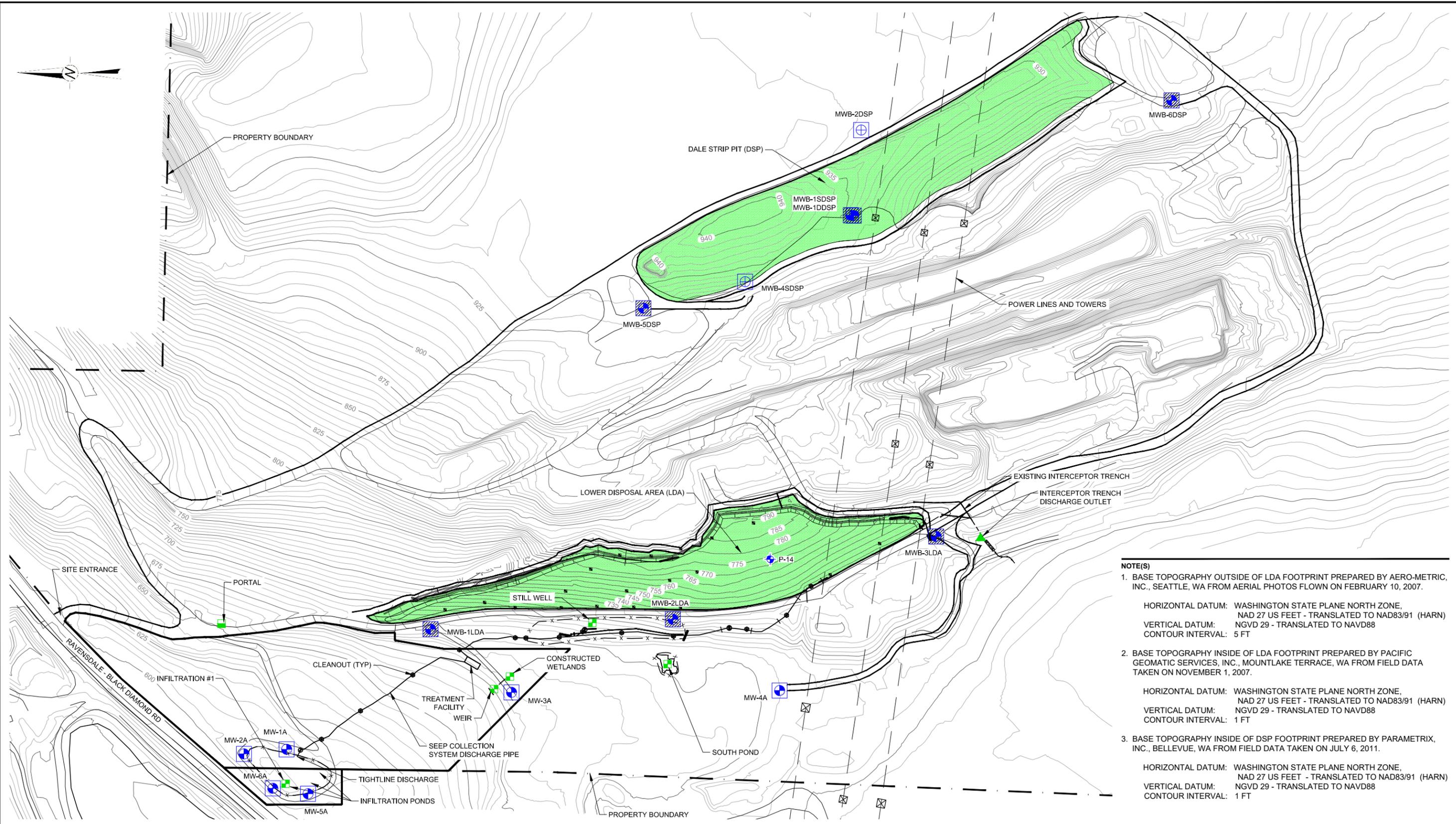
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SITE LOCATION MAP

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

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

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NOTE(S)

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

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



CLIENT
HOLCIM

CONSULTANT



YYYY-MM-DD	2021-02-12
DESIGNED	JX
PREPARED	REDMOND
REVIEWED	JX
APPROVED	GZ

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

TITLE
SITE PLAN

PROJECT NO.	PHASE	REV.	FIGURE
152030420	004	A	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A3S-D

APPENDIX A

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

APPENDIX A-1

Summary of Lower Disposal Area – Surface Water Sampling Results

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

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

Date Sampled	Field Parameters						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 ^a	18.21	11331	-	-	14.80	12.50	3800	12.6	0.00272	<0.150	0.00607	<0.0100	-
15-Jul-05 ^b	-	-	-	-	-	-	2540	12.61	0.03980	<0.100	0.00757	<0.0200	-
9-Aug-05 ^a	21.45	12087	-	-	17.90	11.78	3500	12.6	0.12000	0.288	0.01090	0.0101	-
9-Aug-05 ^b	-	-	-	-	-	-	2820	12.46	0.09150	<0.100	0.00953	<0.0200	-
14-Sept-05 ^a	17.38	9507	-	-	14.00	12.36	3600	12.5	0.11800	<0.750	0.01120	<0.0500	-
14-Sept-05 ^b	-	-	-	-	-	-	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	0.01110	0.0108	510
Preliminary Standard ^c	-	700	-	-	-	6.5-8.5	500	6.5-8.5	TBD ^d	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.

- 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 ^a	23.56	1276	-	-	94.40	9.30	1100	9.54	0.09250	<0.300	0.00414	0.0534	-
15-Jul-05 ^b	-	-	-	-	-	-	874	9.45	0.09990	0.533	0.00382	<0.0200	-
9-Aug-05 ^a	19.05	1744	-	-	57.20	9.44	1000	9.22	0.12300	0.792	0.00510	0.0499	-
9-Aug-05 ^b	-	-	-	-	-	-	1030	9.05	0.14000	0.339	0.00612	0.0308	-
14-Sept-05 ^a	13.59	1154	-	-	99.80	8.97	790	9.04	0.11000	<0.750	0.00354	<0.0500	-
14-Sept-05 ^b	-	-	-	-	-	-	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 ^e	-	-	-	-	-	-	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
Preliminary Standard ^c	-	700	-	-	-	6.5-8.5	500	6.5-8.5	TBD ^d	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.

- 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
- J 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 ^a	20.38	3184	-	-	8.91	10.36	0.94	3200	10.3	0.19200	0.367	0.00998	0.2060	-
15-Jul-05 ^b	-	-	-	-	-	-	-	1990	10.44	0.18900	1.460	0.01080	0.1640	-
9-Aug-05 ^a	-	-	-	-	-	-	Dry	-	-	-	-	-	-	-
9-Aug-05 ^b	-	-	-	-	-	-	Dry	-	-	-	-	-	-	-
14-Sept-05 ^a	15.60	3792	-	-	14.50	9.92	0.07	2800	10	0.20800	1.250	0.05780	0.1000	-
14-Sept-05 ^b	-	-	-	-	-	-	-	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	-	560	-	0.00513	0.029 J	0.0001 U	0.0089	126
Preliminary Standard ^c	-	700	-	-	-	6.5-8.5	-	500	6.5-8.5	TBD ^d	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.

- * 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 ^a	18.34	6937	-	-	6.89	11.69	5000	11.6	0.28100	1.260	0.03180	0.0922	-
15-Jul-05 ^b	-	-	-	-	-	-	4260	11.8	0.23700	0.286	0.03420	<0.0200	-
9-Aug-05 ^a	23.53	7654	-	-	17.1	10.26	6600	10.3	0.32200	8.360	0.04450	0.1480	-
9-Aug-05 ^b	-	-	-	-	-	-	5580	10.35	0.34000	0.648	0.03710	0.0828	-
14-Sept-05 ^a	18.55	6730	-	-	10.00	10.51	5100	11.1	0.23500	1.860	0.01930	0.1550	-
14-Sept-05 ^b	-	-	-	-	-	-	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	-	0.01200	0.993	0.00663	0.0382	318
Preliminary Standard ^c	-	700	-	-	-	6.5-8.5	500	6.5-8.5	TBD ^d	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.

- 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	Test Trench Drain Line Installed													
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 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	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
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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	Test Trench Drain Line Installed													
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.	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	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
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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	138.0
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	138.0
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	104.0
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	99.0
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	124.0
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	126.0
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	105.0
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	71.0
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	88.0
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	110.0
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	110.0
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	150.0
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+	100.0
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	130.0
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	140.0
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	180.0
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	100.0
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	180.0
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	140.0

**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 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	27.91	579.70	10.20	800	3.22	365.9	2.76	7.66	510	0.00870	<0.200	<0.00040	0.0290	120.0
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	100.0
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	180.0
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	74.0
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	100.0
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	95.0
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	202.0
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	150.0
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	166.0
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	107.0
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	295.0
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	126.0
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	192.0
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	318.0
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	148.0
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	232.0
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	137.0
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	372.0
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	194.0
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	168.0
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	156.0
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	308.0
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	174.0
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	196.0
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	214.0
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	200.0
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	182.0
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	177.0
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	211.0
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	183.0
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	333.0
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	263.0
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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
- 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-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 msf)	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	109.0
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	106.0
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	110.0
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	106.0
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	72.9
12-Feb-09	25.64	579.71	7.89	-	10.82	-	71.70	7.70	420	0.01100	0.177	<0.00100	<0.0100	103.0
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	125.0
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	101.0
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	115.0
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	74.0
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	100.0
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	100.0
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	120.0
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	140.0
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	90.0
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	130.0
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	130.0
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	110.0
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	110.0
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	110.0
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	150.0
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	79.0

**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 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	76.0
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	81.0
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	150.0
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	120.0
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	140.0
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	106.0
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	163.0
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+	78.4
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	80.4
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	165.0
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	203.0
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	117.0
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	199.0
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	210.0
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	370.0
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	173.0
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	347.0
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	349.0
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	297.0
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	283.0
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	210.0
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	219.0
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	356.0
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	203.0
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	250.0
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	334.0
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	246.0
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	246.0
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	478.0
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	422.0
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	122.0
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	709.0
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	539.0
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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												
22-Aug-16	25.00	676.08	11.10	323	0.02	-55.2	1.10	7.64						
1-Nov-16	24.29	676.79												
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												
16-Aug-17	24.27	676.81	10.70	385	0.15	123.4	0.40	7.64						
9-Nov-17	23.35	677.73												

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 ¹						Monitored Annually ¹					
22-Aug-18	24.42	676.66	11.37	277	5.25	-59.6	0.18	7.61	Monitored Annually ¹					
6-Nov-18	24.57	676.51	Monitored Semi-Annually ¹						Monitored Annually ¹					
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 ¹						Monitored Annually ¹					
27-Aug-19	24.54	676.54	11.45	282	0.58	Note 1	0.04	7.30	Monitored Annually ¹					
13-Nov-19	24.15	676.93	Monitored Semi-Annually ¹						Monitored Annually ¹					
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 ¹					
9-Dec-20	23.35	677.73	Monitored Semi-Annually ¹						Monitored Annually ¹					
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

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-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 ¹						Monitored Annually ¹				
22-Aug-16	37.92	700.14	12.20	306	0.02	-137.6	1.58	7.67					Monitored Annually ¹	
1-Nov-16	37.07	700.99		Monitored Semi-Annually ¹						Monitored Annually ¹				
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 ¹						Monitored Annually ¹				
16-Aug-17	37.69	700.37	12.30	356	0.14	-77.2	3.27	7.67					Monitored Annually ¹	
9-Nov-17	37.11	700.95		Monitored Semi-Annually ¹						Monitored Annually ¹				

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 ¹						Monitored Annually ¹					
22-Aug-18	37.90	700.16	12.31	262	1.64	-80.3	0.92	7.56	Monitored Annually ¹					
6-Nov-18	37.66	700.40	Monitored Semi-Annually ¹						Monitored Annually ¹					
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 ¹						Monitored Annually ¹					
27-Aug-19	37.85	700.21	12.30	265	0.43	Note 1	0.02	7.46	Monitored Annually ¹					
13-Nov-19	37.22	700.84	Monitored Semi-Annually ¹						Monitored Annually ¹					
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 ¹					
9-Dec-20	36.55	701.51	Monitored Semi-Annually ¹						Monitored Annually ¹					
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

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-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 msf)	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 ¹								Monitored Annually ¹				
22-Aug-16	6.81	733.78	13.10	238.0	2.40	168.5	2.39	7.41	Monitored Annually ¹						
1-Nov-16	6.59	734.00	Monitored Semi-Annually ¹								Monitored Annually ¹				
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 ¹								Monitored Annually ¹				

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 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	Potassium
16-Aug-17	5.48	735.11	13.20	258.4	3.54	92.2	2.50	7.41		Monitored Annually ¹					
9-Nov-17	6.00	734.59	Monitored Semi-Annually ¹								Monitored Annually ¹				
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 ¹								Monitored Annually ¹				
22-Aug-18	5.93	734.66	13.55	194	7.63	16.9	0.77	7.11	Monitored Annually ¹						
6-Nov-18	6.78	733.81	Monitored Semi-Annually ¹								Monitored Annually ¹				
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 ¹								Monitored Annually ¹				
27-Aug-19	5.76	734.83	13.62	192	3.94	Note 1	0.02	7.09	Monitored Annually ¹						
13-Nov-19	6.00	734.59	Monitored Semi-Annually ¹								Monitored Annually ¹				
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 ¹						
9-Dec-20	4.22	736.37	Monitored Semi-Annually ¹								Monitored Annually ¹				
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

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

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-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	Potassium	
4-May-15	38.67	894.02	Monitored Semiannually ¹											
4-Aug-15	49.21	883.48	12.50	1253	0.04	-100.7	0.26	7.07	1230	0.01390	<0.00010	6.1		
5-Nov-15	56.85	875.84	11.20	1159	0.02	57.4	0.91	6.75	1190	0.01490	<0.00010	7.0		
8-Feb-16	33.02	899.67	11.60	1429	0.00	167.6	0.10	7.05	1190	0.01940	<0.00010	6.7		
2-May-16	37.48	895.21	Monitored Semiannually ²								Monitored Annually ²			
22-Aug-16	49.78	882.91	12.10	1232	0.06	-143.8	0.77	7.00	Monitored Annually ²					
1-Nov-16	47.49	885.20	Monitored Semiannually ²								Monitored Annually ²			
31-Jan-17	35.57	897.12	11.10	1620	0.05	-241.6	0.24	6.99	1260	0.02180	<0.00010	6.7		
30-May-17	34.70	897.99	Monitored Semiannually ²								Monitored Annually ²			
16-Aug-17	44.32	888.37	11.90	1621	0.12	-144.5	0.47	6.97	Monitored Annually ²					
9-Nov-17	44.71	887.98	Monitored Semiannually ²								Monitored Annually ²			
28-Feb-18	32.04	900.65	10.70	1278	0.16	-58.5	0.11	6.82	1244	0.02240	<0.00010	6.5		
1-May-18	33.99	898.70	Monitored Semiannually ²								Monitored Annually ²			
22-Aug-18	47.95	884.74	11.97	1246	1.17	4.10	0.17	6.88	Monitored Annually ²					
6-Nov-18	52.94	879.75	Monitored Semiannually ²								Monitored Annually ²			
12-Mar-19	33.09	899.60	10.40	1157	0.55	-23.0	0.62	6.81	1200	0.02	<0.0001	0.95		
8-May-19	34.37	898.32	Monitored Semiannually ²								Monitored Annually ²			
27-Aug-19	47.88	884.81	12.51	1314	0.15	Note 1	0.39	6.80	Monitored Annually ²					
13-Nov-19	47.03	885.66	Monitored Semiannually ²								Monitored Annually ²			
14-Feb-20	31.08	901.61	10.60	1249	0.38	-82.2	0.10	6.61	1230	0.0183	0.0001 U	6.36		
13-Aug-20	43.99	888.70	11.70	1176	0.56	-67.7	0.18	6.78	Monitored Annually ²					
9-Dec-20	39.67	893.02	Monitored Semiannually ²								Monitored Annually ²			
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	0.05	-		

Notes:

Top of casing elevation (feet msl): 932.69

Dissolved metals were analyzed at the Site until December 2020 (Q4 2020). Total metals were analyzed for Q4 2020 and will continue to be analyzed moving forward.

- 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-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 ¹									
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 ²									
22-Aug-16	62.11	869.66	11.60	770	0.04	-251.0	0.86	7.50	Monitored Annually ²			
1-Nov-16	61.71	870.06	Monitored Semiannually ²									
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 ²									
16-Aug-17	57.17	874.60	11.80	898	0.12	-210.9	0.22	7.42	Monitored Annually ²			
9-Nov-17	58.71	873.06	Monitored Semiannually ²									
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 ²									
22-Aug-18	60.25	871.52	11.58	705	2.22	-153.0	0.14	7.37	Monitored Annually ²			
6-Nov-18	65.30	866.47	Monitored Semiannually ²									
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 ²									
27-Aug-19	59.87	871.90	11.95	762	0.39	Note 1	0.02	7.20	Monitored Annually ²			
13-Nov-19	60.20	871.57	Monitored Semiannually ²									
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 ²			
9-Dec-20	54.25	877.52	Monitored Semiannually ²									
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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 ¹
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 ¹
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 ¹
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 ¹
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 ¹
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 ¹
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 ¹
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 ²							Monitored Annually ²		
22-Aug-16	34.07	897.38	12.50	571	0.00	-	0.66	7.11	Monitored Annually ²			
1-Nov-16	26.04	905.41	Monitored Semiannually ²							Monitored Annually ²		
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 ²							Monitored Annually ²		
16-Aug-17	28.13	903.32	12.40	826	0.12	-71.9	0.66	7.10	Monitored Annually ²			
9-Nov-17	27.17	904.28	Monitored Semiannually ²							Monitored Annually ²		
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 ²							Monitored Annually ²		
22-Aug-18	32.63	898.82	12.46	655	0.81	-46.4	0.26	7.01	Monitored Annually ²			
6-Nov-18	32.44	899.01	Monitored Semiannually ²							Monitored Annually ²		
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 ²							Monitored Annually ²		
27-Aug-19	33.26	911.70	13.08	688	0.26	Note 1	0.02	6.89	Monitored Annually ²			
13-Nov-19	33.03	898.42	Monitored Semiannually ²							Monitored Annually ²		
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 ²			
9-Dec-20	24.68	906.77	Monitored Semiannually ²							Monitored Annually ²		
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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-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 ¹									
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 ²									
22-Aug-16	13.27	889.08	12.20	559	0.03	-52.7	0.80	7.28	Monitored Annually ²			
1-Nov-16	11.36	890.99	Monitored Semiannually ²									
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 ²									
16-Aug-17	12.08	890.27	12.10	573	0.12	-46.9	1.39	7.26	Monitored Annually ²			
9-Nov-17	11.70	890.65	Monitored Semiannually ²									
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 ²									
22-Aug-18	13.47	888.88	11.61	441	7.44	26.6	0.21	7.11	Monitored Annually ²			
6-Nov-18	13.96	888.39	Monitored Semiannually ²									
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 ²									
27-Aug-19	13.16	889.19	12.19	454	0.45	Note 1	0.02	7.05	Monitored Annually ²			
13-Nov-19	26.35	894.30	Monitored Semiannually ²									
13-Feb-20	20.79	899.86	10.60	387	0.39	-76.5	1.05	7.13	313			
13-Aug-20	25.94	894.71	11.70									
9-Dec-20	24.06	896.59	Monitored Semiannually ²									
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.
- 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 (ReI 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 ¹											
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 ¹											
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 ¹											
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 ¹											
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 ¹											
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 ¹											
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 ¹											
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 ¹											
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 ²								Monitored Annually ²			
24-Aug-16	-	-	13.40	585	9.32	410.0	8.50	7.23	Monitored Annually ²			
1-Nov-16	-	-	10.90	242	9.13	51.4	7.57	7.41	Monitored Annually ²			
31-Jan-17	-	-	8.90	663	10.87	-57.4	6.23	7.50	3390	0.00397	<0.00010	29.2
-	Monitored Semiannually ²								Monitored Annually ²			
17-Aug-17	-	-	11.40	712	9.67	-12.4	9.87	7.30	Monitored Annually ²			
9-Nov-17	Monitored Semiannually ²								Monitored Annually ²			
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 ²								Monitored Annually ²			
21-Aug-18	-	-	13.13	582	12.46	-23.0	23.10	7.24	Monitored Annually ²			
6-Nov-18	Monitored Semiannually ²								Monitored Annually ²			
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 ²								Monitored Annually ²			
27-Aug-19	-	-	10.55	576	11.80	Note 1	154.00	6.78	Monitored Annually ²			
13-Nov-19	Monitored Semiannually ²								Monitored Annually ²			
13-Feb-20	-	-	9.20	382	9.19	-1.3	13.40	6.93	259			
13-Aug-20	-	-	10.10	569	10.01	-27.0	12.20	7.12	Monitored Annually ²			
9-Dec-20	Monitored Semiannually ²								Monitored Annually ²			
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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	9.60	421	2.10	313.0	16.10	7.49	-	-	-	-		
22-Mar-12	183.35	747.87	8.90	546	12.83	166.3	0.56	7.47	-	-	-	-		
18-Jun-12	192.54	738.68	-	-	-	-	-	-	-	-	-	-		
18-Sep-12	199.51	731.71	16.20	508	2.21	120.0	1.27	7.58	-	-	-	-		
18-Dec-12	184.52	746.70	-	-	-	-	-	-	-	-	-	-		
21-Feb-13	190.65	740.57	7.60	678	5.33	342.6	6.61	8.02	-	-	-	-		
22-May-13	198.05	733.17	-	-	-	-	-	-	-	-	-	-		
20-Aug-13	200.47	730.75	13.00	488	3.26	90.2	8.47	7.42	-	-	-	-		
19-Nov-13	196.59	734.63	-	-	-	-	-	-	-	-	-	-		
31-Mar-14	186.78	744.44	11.40	421	7.28	195.1	1.70	7.47	-	-	-	-		
21-May-14	192.27	738.95	-	-	-	-	-	-	-	-	-	-		
15-Aug-14	199.97	731.25	18.90	492	0.97	1.4	52.50	7.01	-	-	-	-		
14-Nov-14	196.60	734.62	-	-	-	-	-	-	-	-	-	-		
10-Feb-15	183.97	747.25	10.20	450	7.65	121.4	1.02	7.34	-	-	-	-		
4-May-15	194.19	737.03	-	-	-	-	-	-	-	-	-	-		
4-Aug-15	198.35	732.87	13.60	432	3.07	18.6	0.27	7.47	-	-	-	-		
3-Nov-15	198.25	732.97	10.30	405	2.57	106.2	7.07	7.35	-	-	-	-		
8-Feb-16	188.43	742.79	12.50	536	2.77	189.8	0.25	7.78	-	-	-	-		
2-May-16	195.72	735.50	Monitored Semiannually ¹									-	-	-
22-Aug-16	197.89	733.33	14.00	418	1.27	-123.1	4.36	7.32	-	-	-	-		
1-Nov-16	195.49	735.73	Monitored Semiannually ¹									-	-	-
31-Jan-17	186.94	744.28	9.20	506	5.26	-45.4	0.38	7.45	-	-	-	-		
30-May-17	190.62	740.60	Monitored Semiannually ¹									-	-	-

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	13.30	540	2.31	37.3	3.42	7.37	-	-	-	-
9-Nov-17	197.11	734.11	Monitored Semiannually ¹					-	-	-	-	-
28-Feb-18	185.96	745.26	10.10	390	5.95	204.7	1.62	7.15	-	-	-	-
1-May-18	184.95	746.27	Monitored Semiannually ¹					-	-	-	-	
22-Aug-18	197.40	733.82	13.70	412	3.10	85.5	1.66	7.27	-	-	-	-
6-Nov-18	197.94	733.28	Monitored Semiannually ¹					-	-	-	-	
12-Mar-19	182.84	748.38	8.70	332	6.25	148.4	1.93	7.28	-	-	-	-
8-May-19	185.36	745.86	Monitored Semiannually ¹					-	-	-	-	
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 ¹					-	-	-	-	
13-Feb-20	177.10	754.12	9.30	453	3.03	91.0	2.31	7.56	-	-	-	-
13-Aug-20	200.97	730.25	12.20	422	3.04	35.0	0.96	7.42	-	-	-	-
9-Dec-20	197.86	733.36	-	-	-	-	-	-	-	-	-	-
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

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 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-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
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 ¹						-	-	-	-
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 ¹						-	-	-	-
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 ¹						-	-	-	-
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 ¹						-	-	-	-
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 ¹						-	-	-	-
22-Aug-18	Could not be safely accessed due to wasp nests.								-	-	-	-
6-Nov-18	21.70	907.11	Monitored Semiannually ¹						-	-	-	-
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 ¹						-	-	-	-
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 ¹						-	-	-	-
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	-	-	-	-	-	-	-	-	-	-
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

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	11.60	18697	0.12	-61.2	17.9	13.30	6560	0.2630	0.293 J	0.0196	0.04 U	2540
Preliminary Standard ^a	-	-	-	700	-	-	-	6.5-8.5	500	TBD ^b	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.

- 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

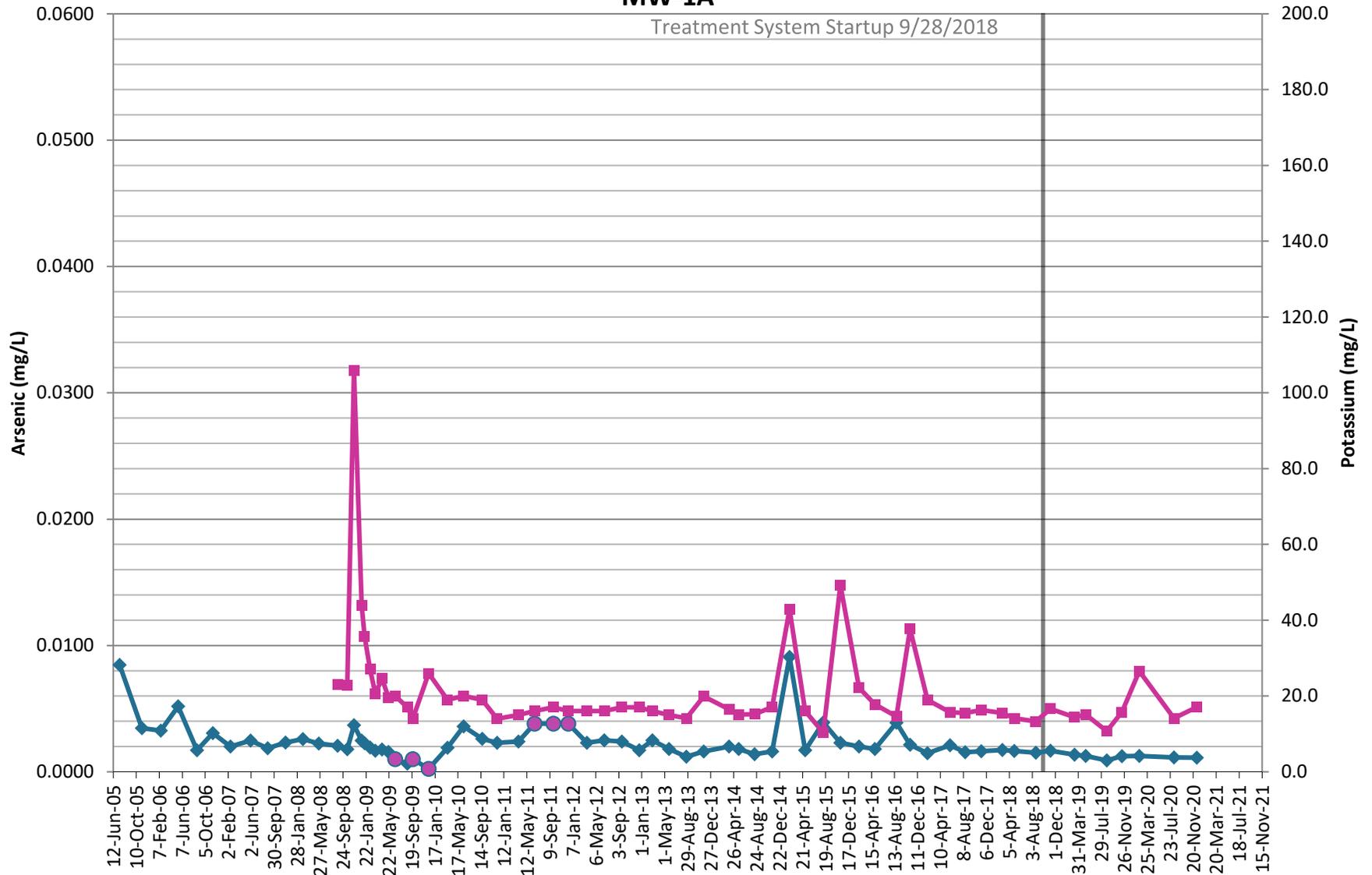
APPENDIX B

Data Graphs

APPENDIX B-1

LDA Shallow/Alluvial Monitoring Wells Data Graphs

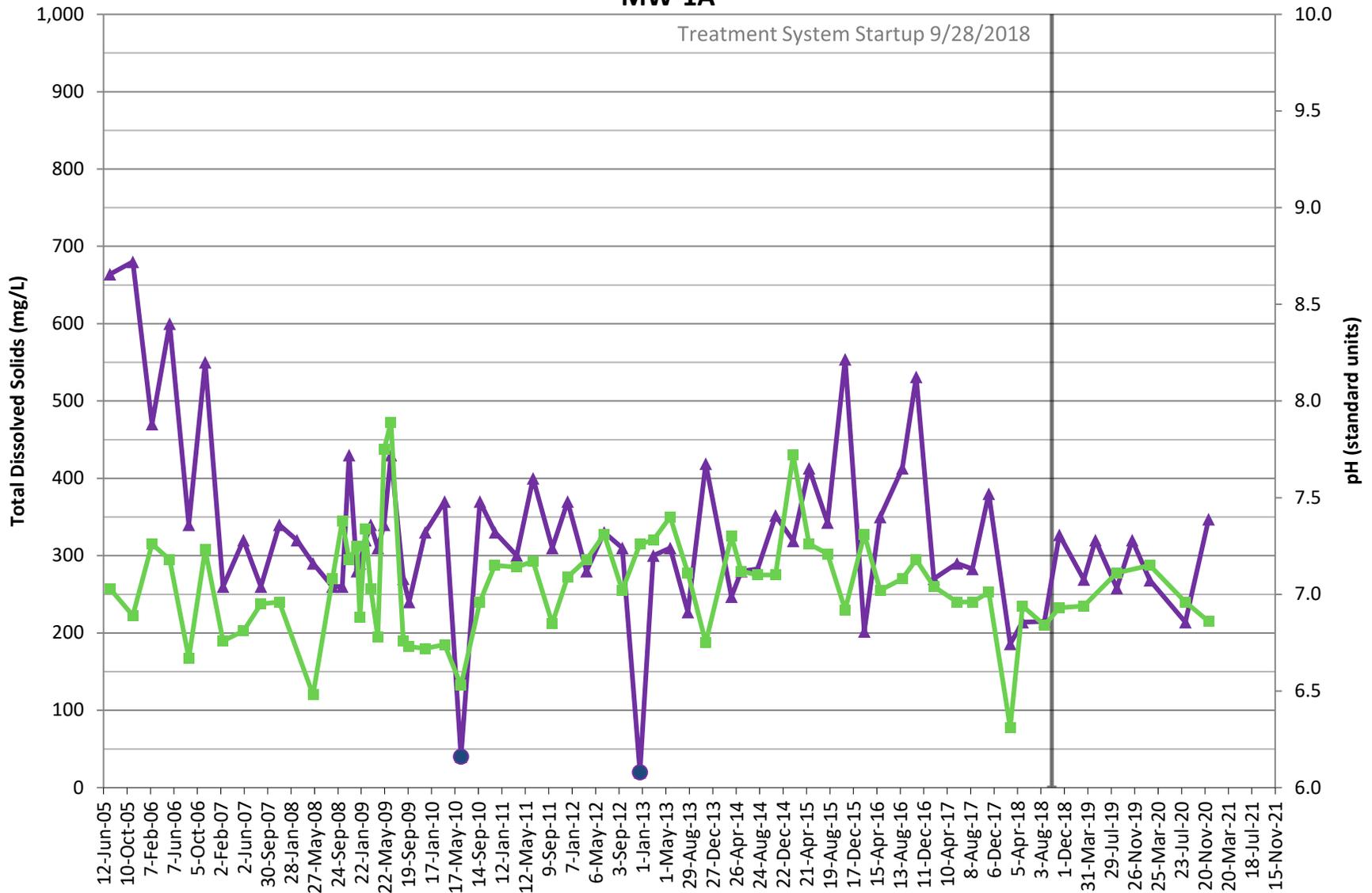
LDA Shallow/Alluvial Monitoring Wells MW-1A



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

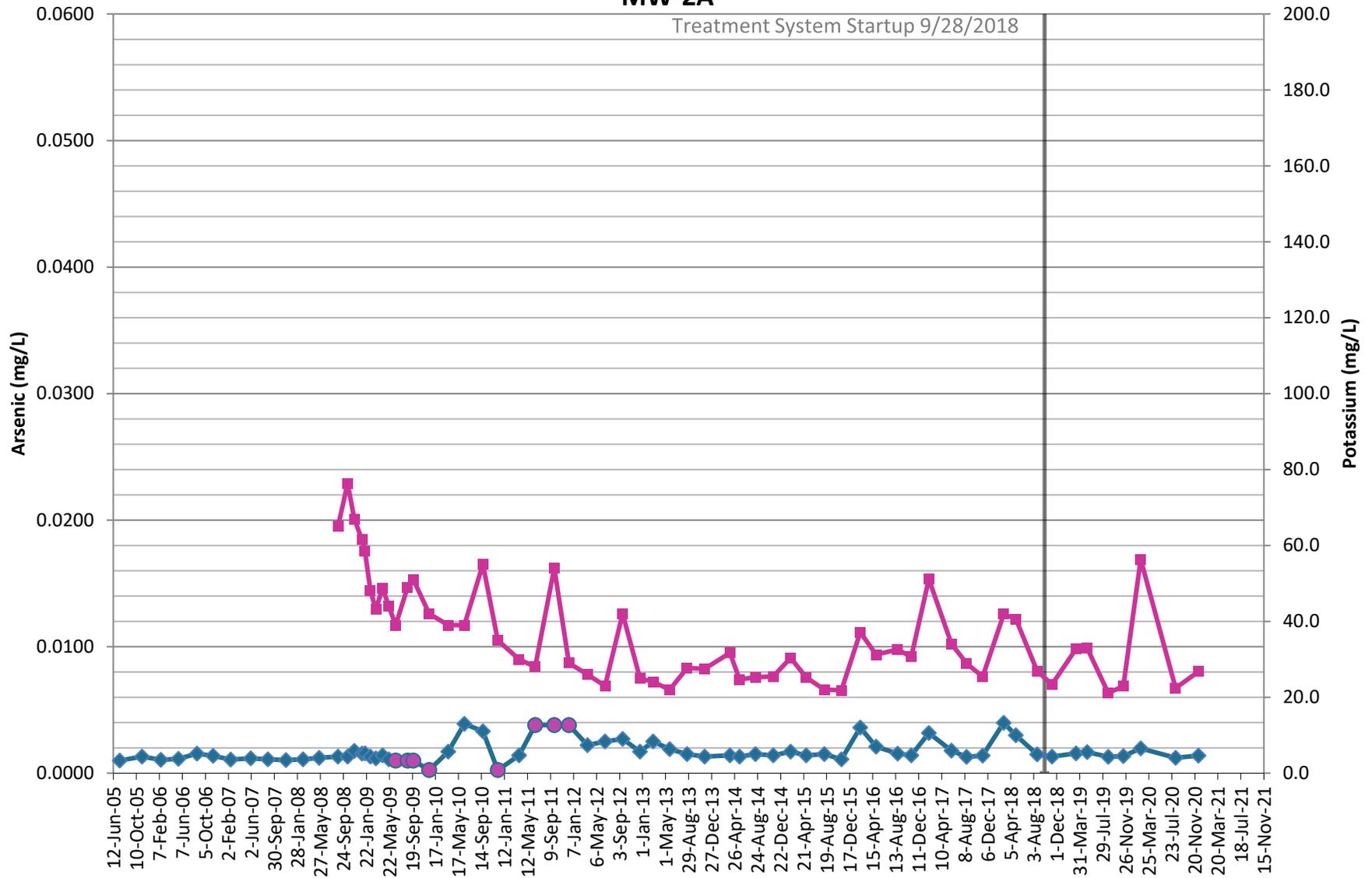


Non-detections plotted at RL beginning in December, 2009;
no prior non-detections.

Date

—▲ TDS
 ● TDS Non-Detections
 —■ pH

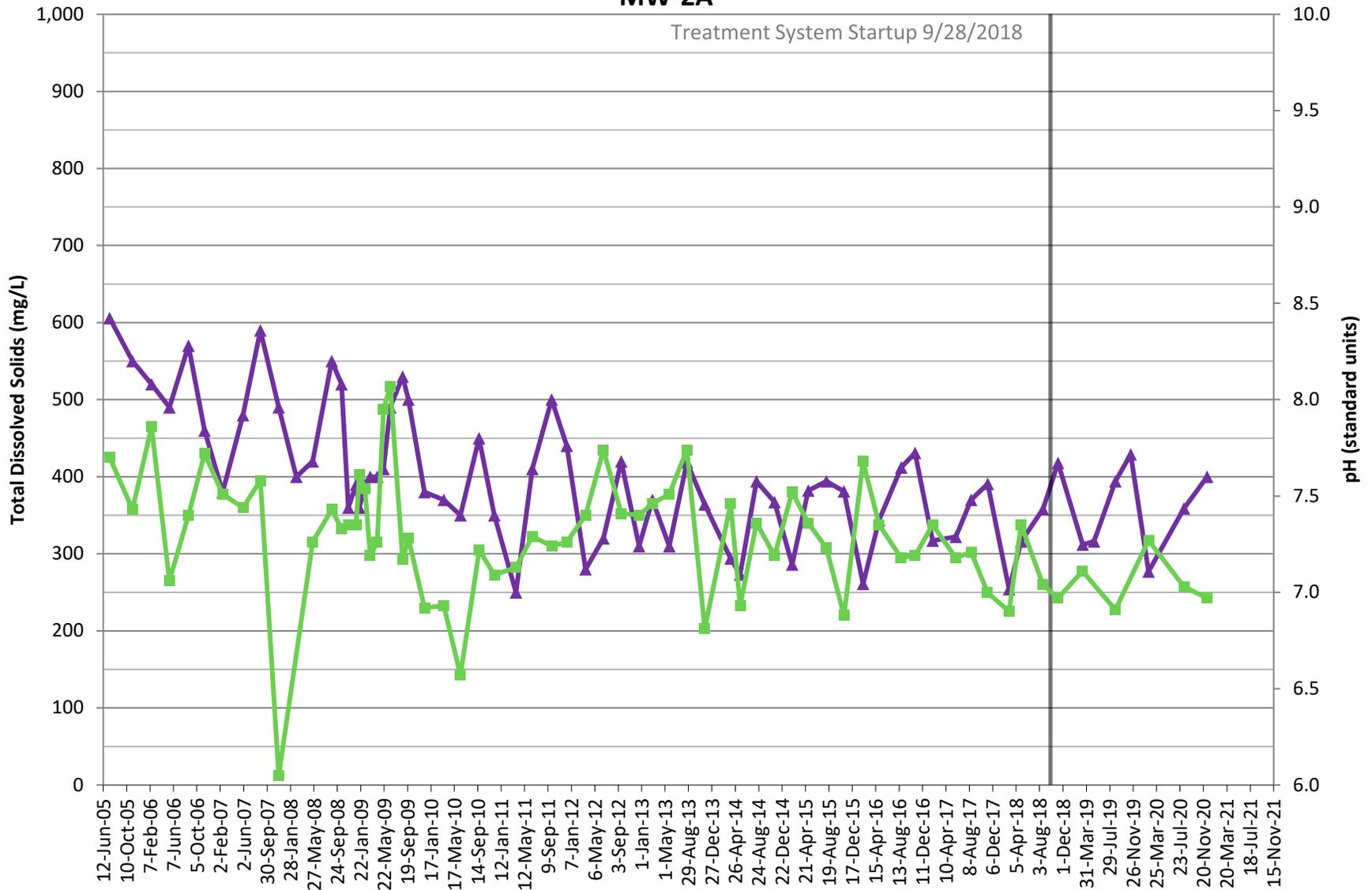
LDA Shallow/Alluvial Monitoring Wells MW-2A



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



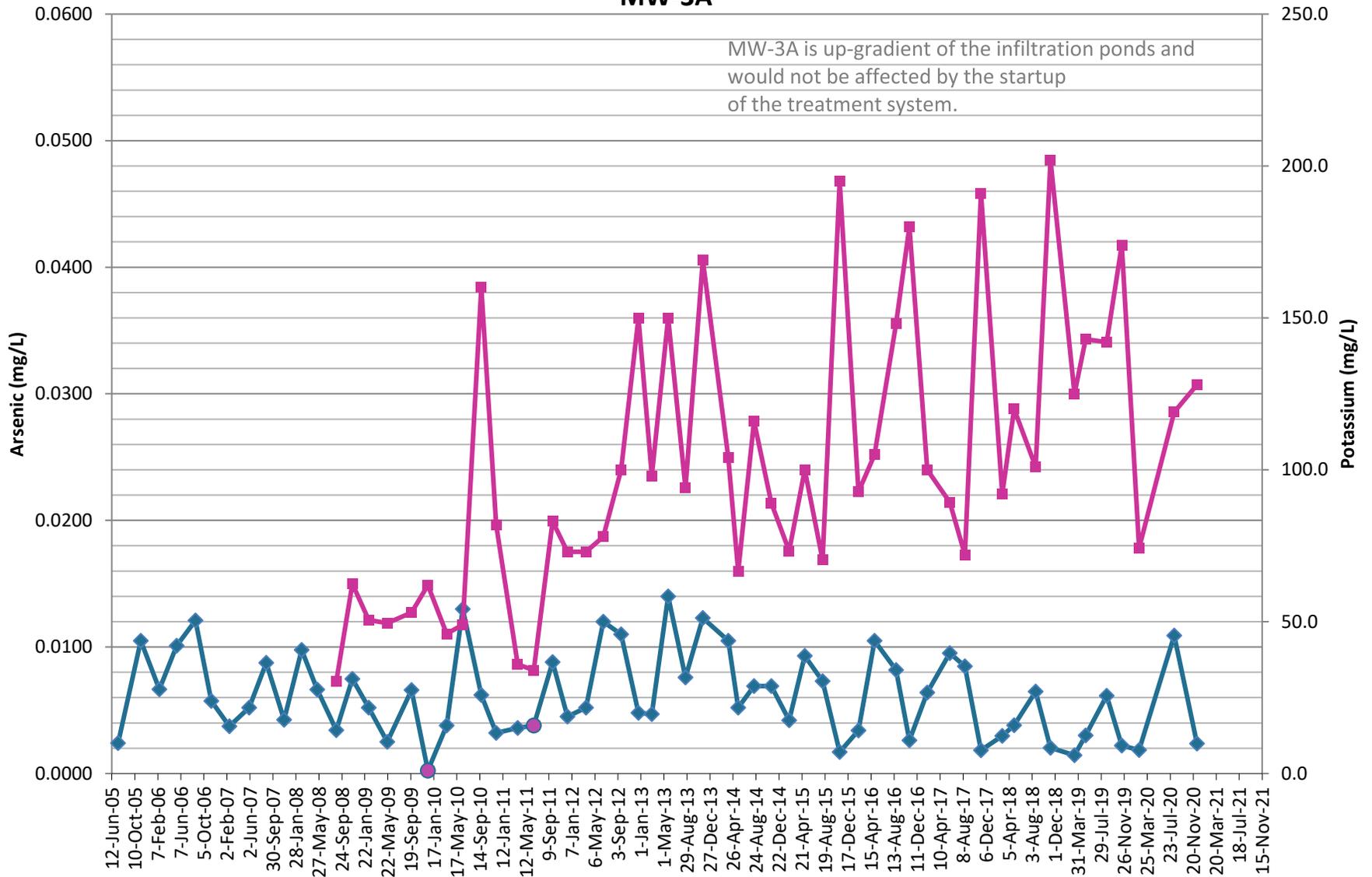
Non-detections plotted at RL beginning in December, 2009;
no prior non-detections.

Date

TDS

pH

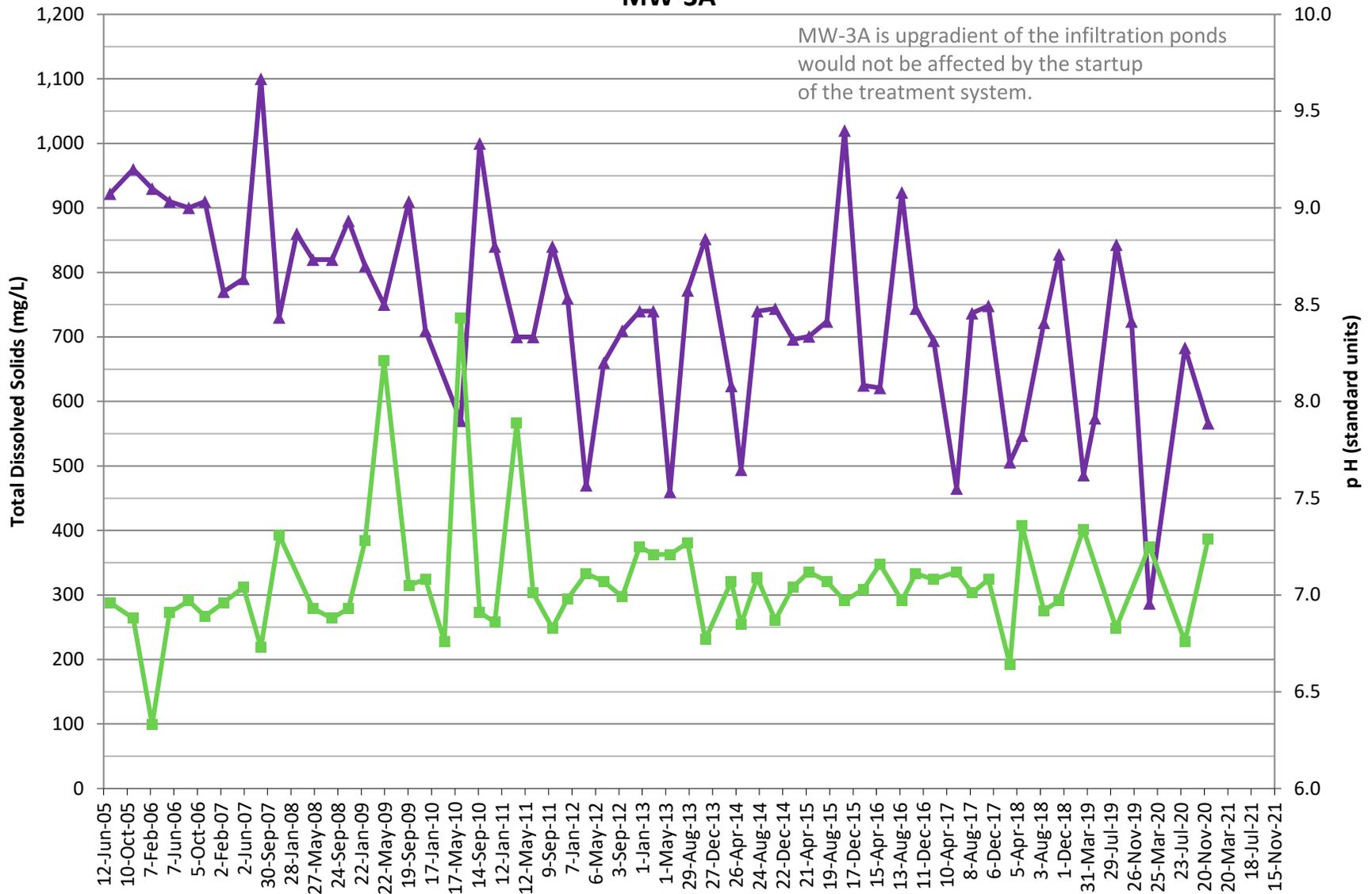
LDA Shallow/Alluvial Monitoring Wells MW-3A



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

◆ Arsenic
 ● Arsenic Non-Detections
 ■ Potassium

LDA Shallow/Alluvial Monitoring Wells MW-3A



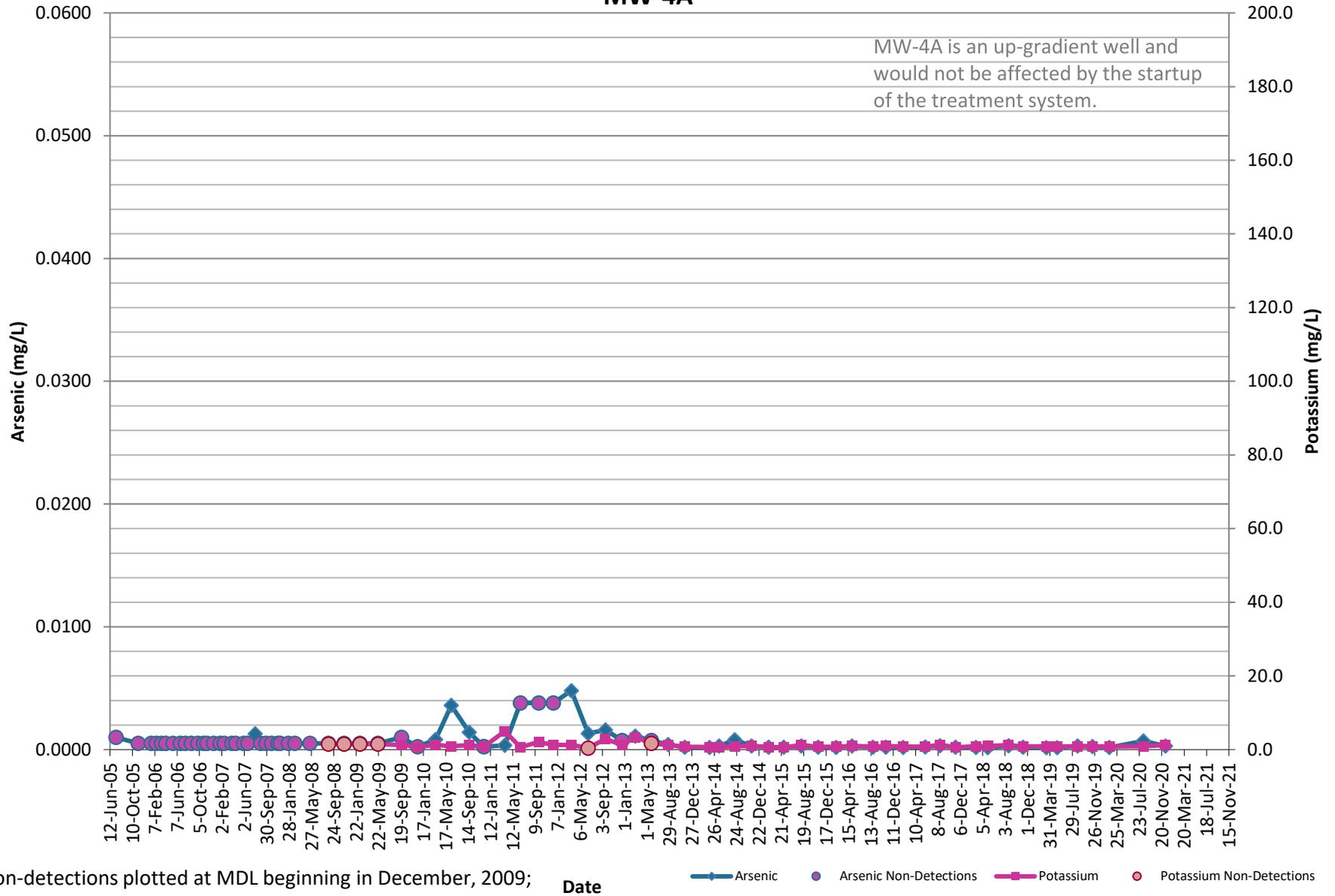
Non-detections plotted at RL beginning in December, 2009;
no prior non-detections.

Date

▲ TDS

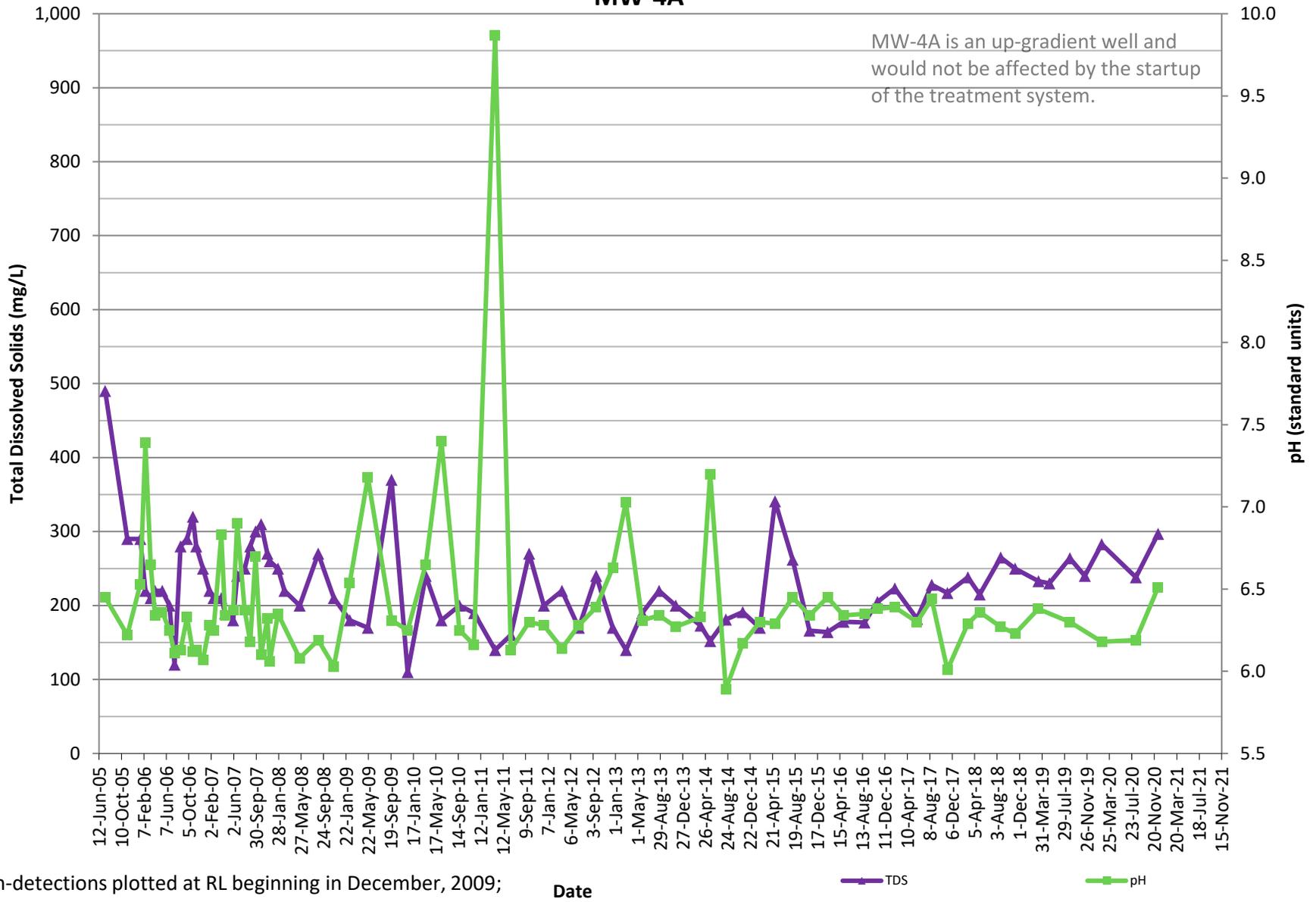
■ pH

LDA Shallow/Alluvial Monitoring Wells MW-4A



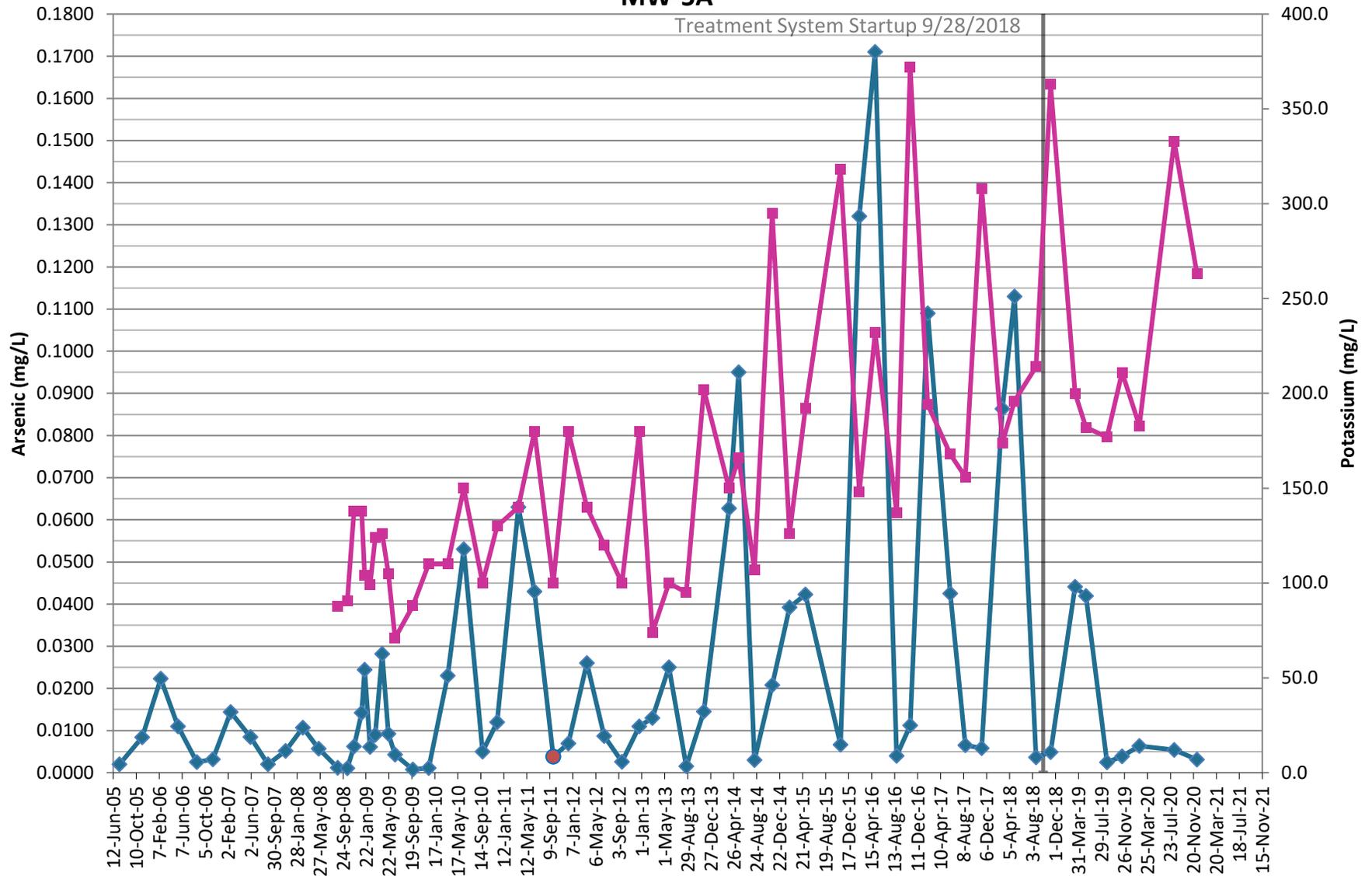
Non-detections plotted at MDL beginning in December, 2009;
prior non-detections plotted at 50% of the RL

LDA Shallow/Alluvial Monitoring Wells MW-4A



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

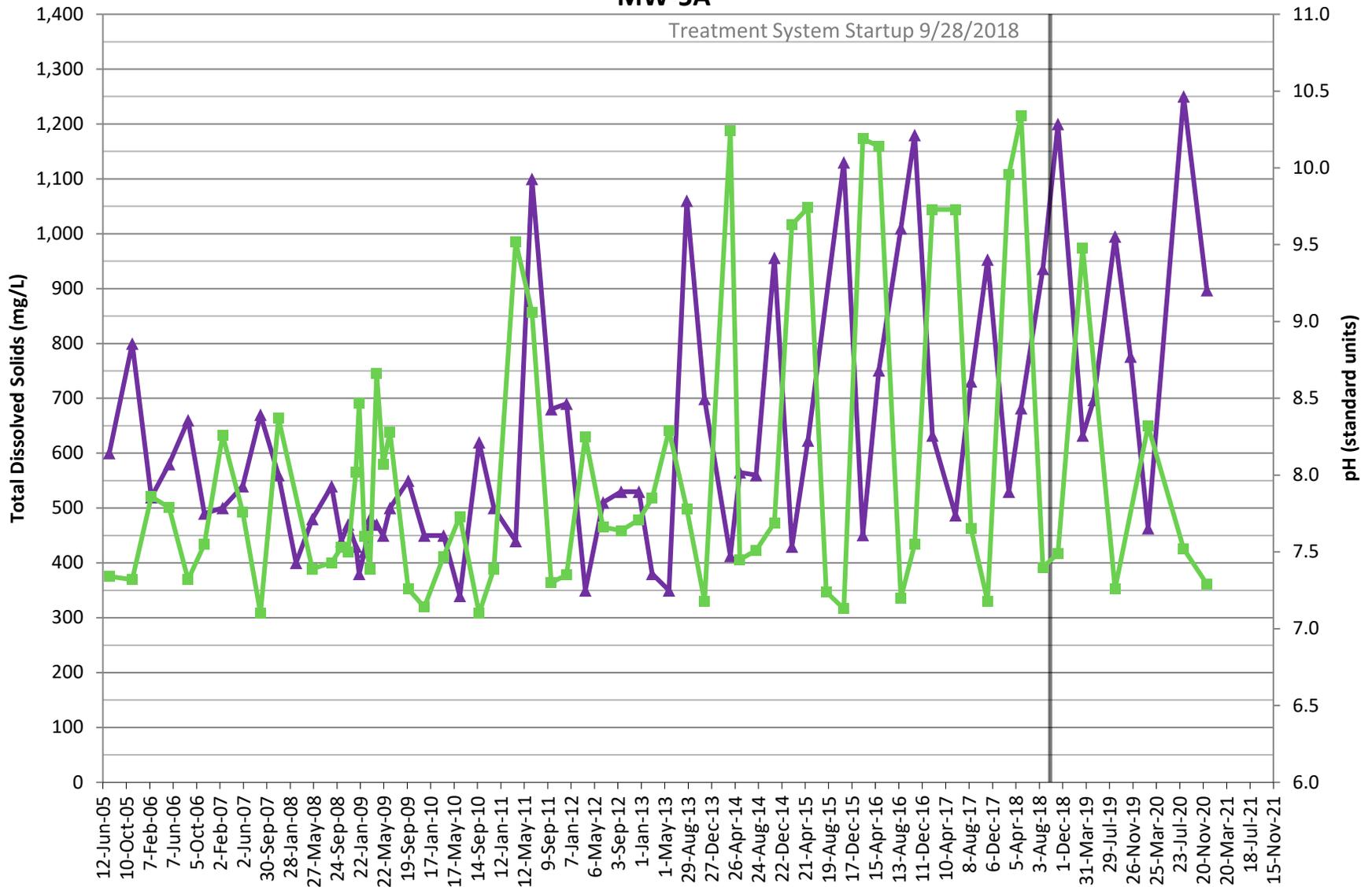
LDA Shallow/Alluvial Monitoring Wells MW-5A



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

◆ Arsenic
 ● Arsenic Non-Detections
 ■ Potassium

LDA Shallow/Alluvial Monitoring Wells MW-5A



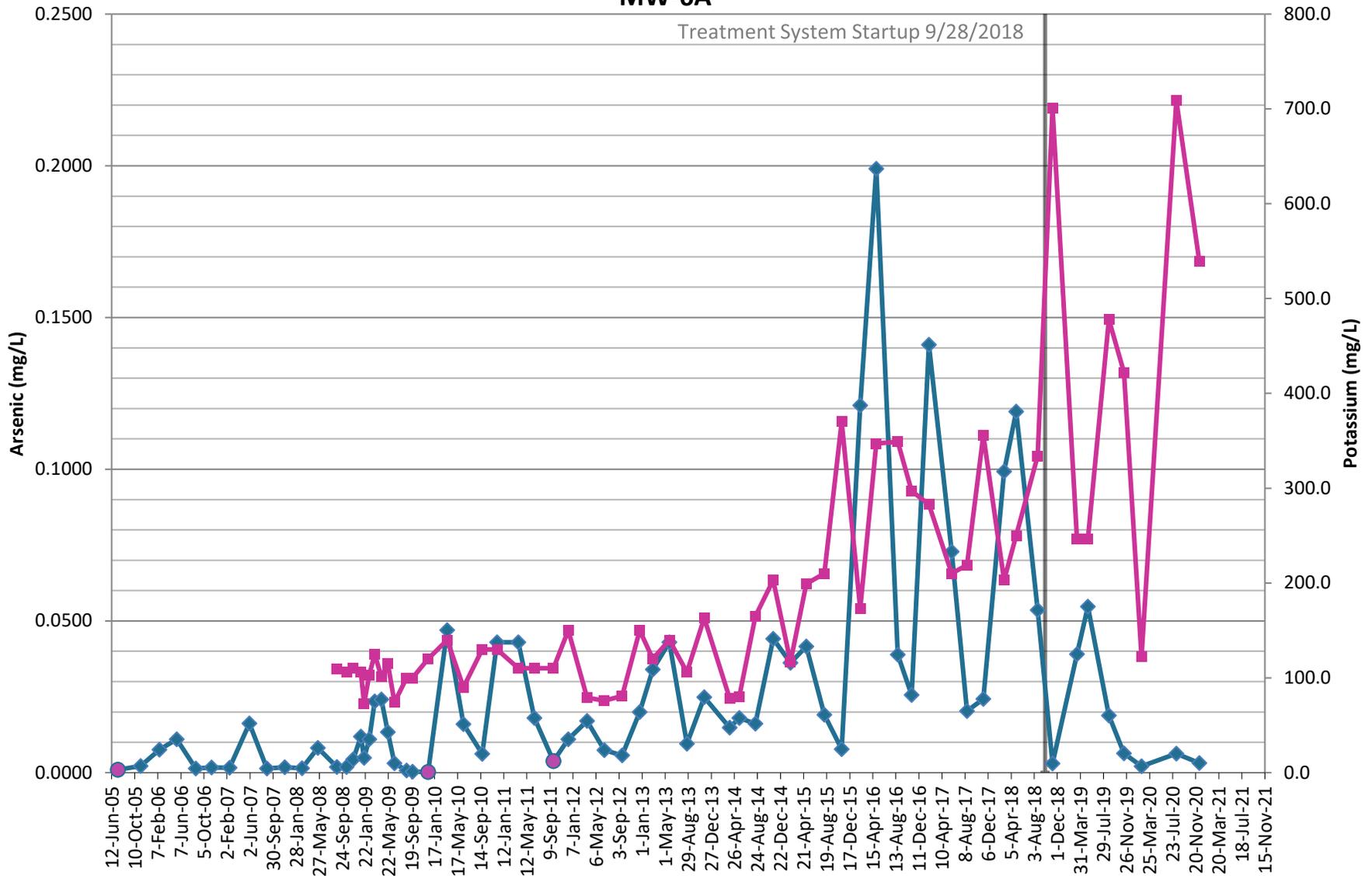
Non-detections plotted at RL beginning in December, 2009;
no prior non-detections.

Date

TDS

pH

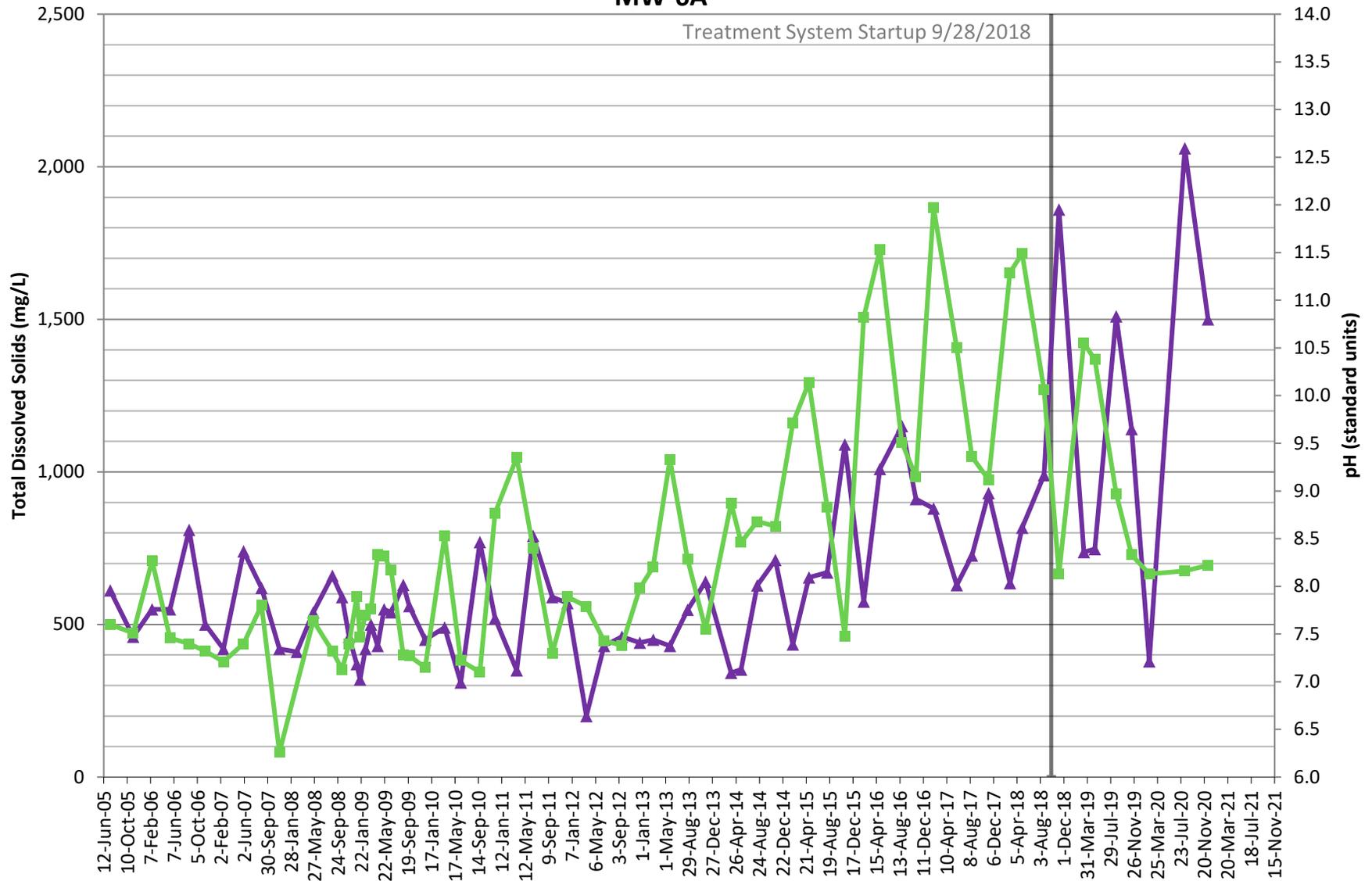
LDA Shallow/Alluvial Monitoring Wells MW-6A



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

◆ Arsenic
 ● Arsenic Non-Detections
 ■ Potassium

LDA Shallow/Alluvial Monitoring Wells MW-6A



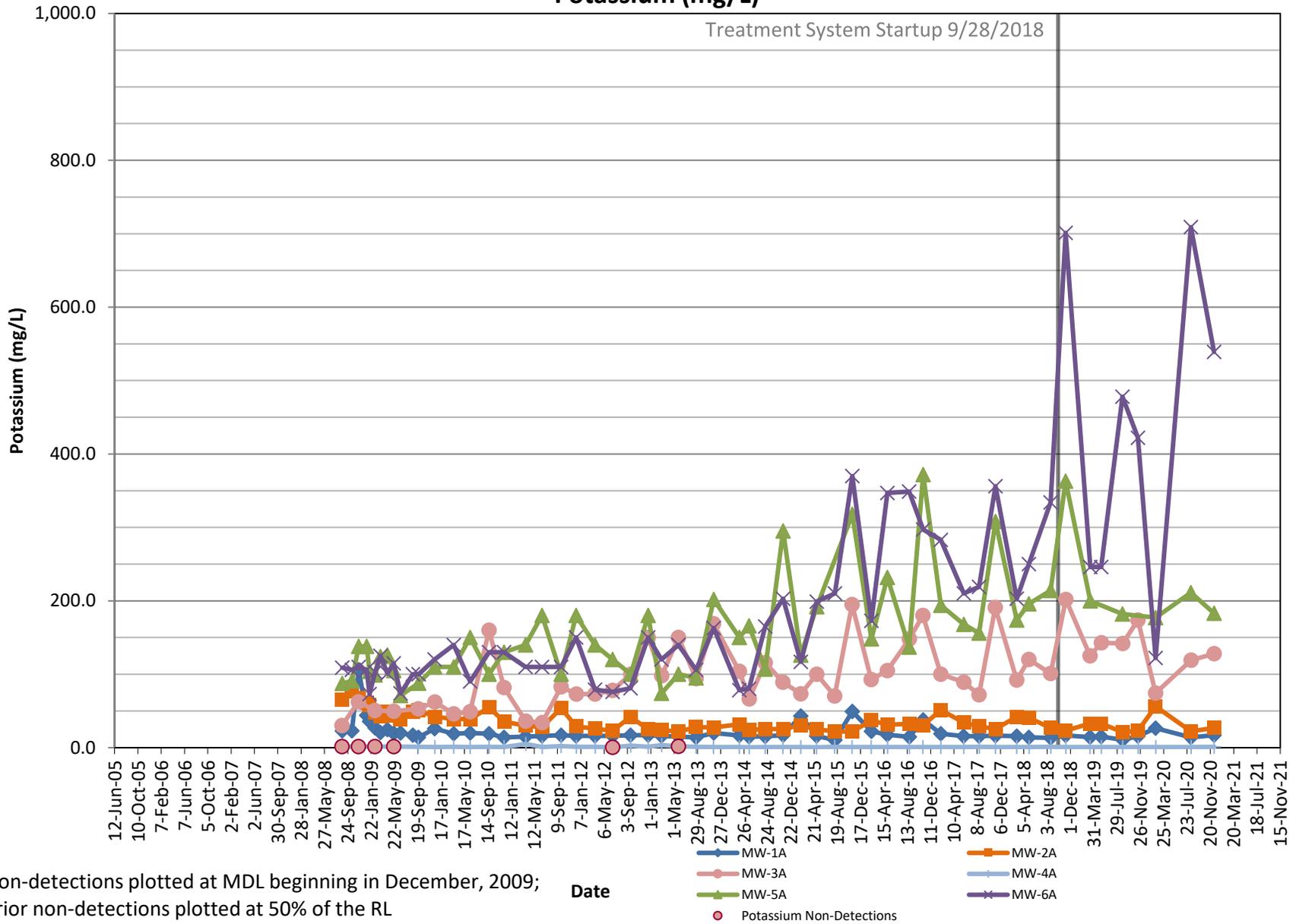
Non-detections plotted at RL beginning in December, 2009;
no prior non-detections.

Date

—▲— TDS

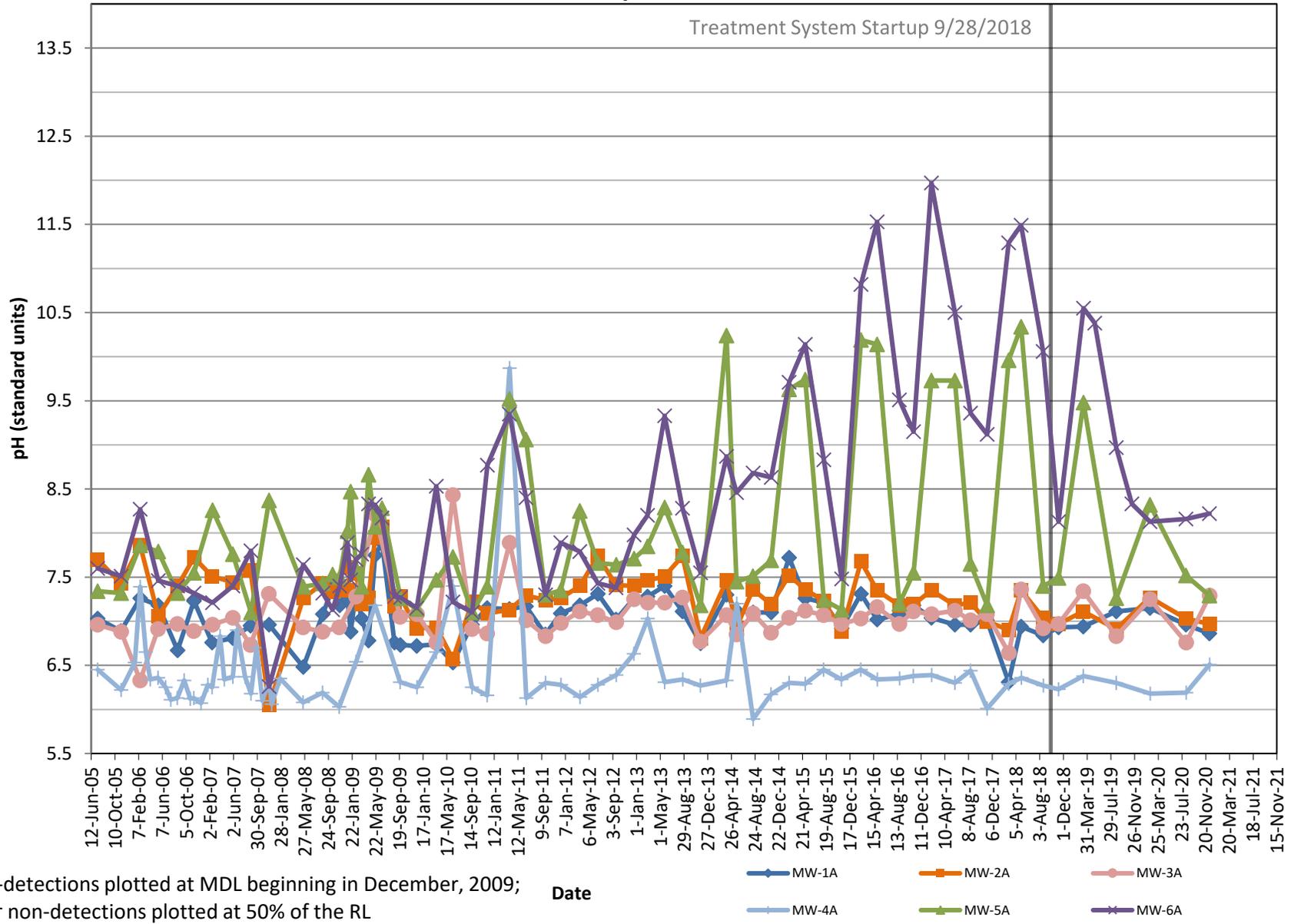
—■— pH

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



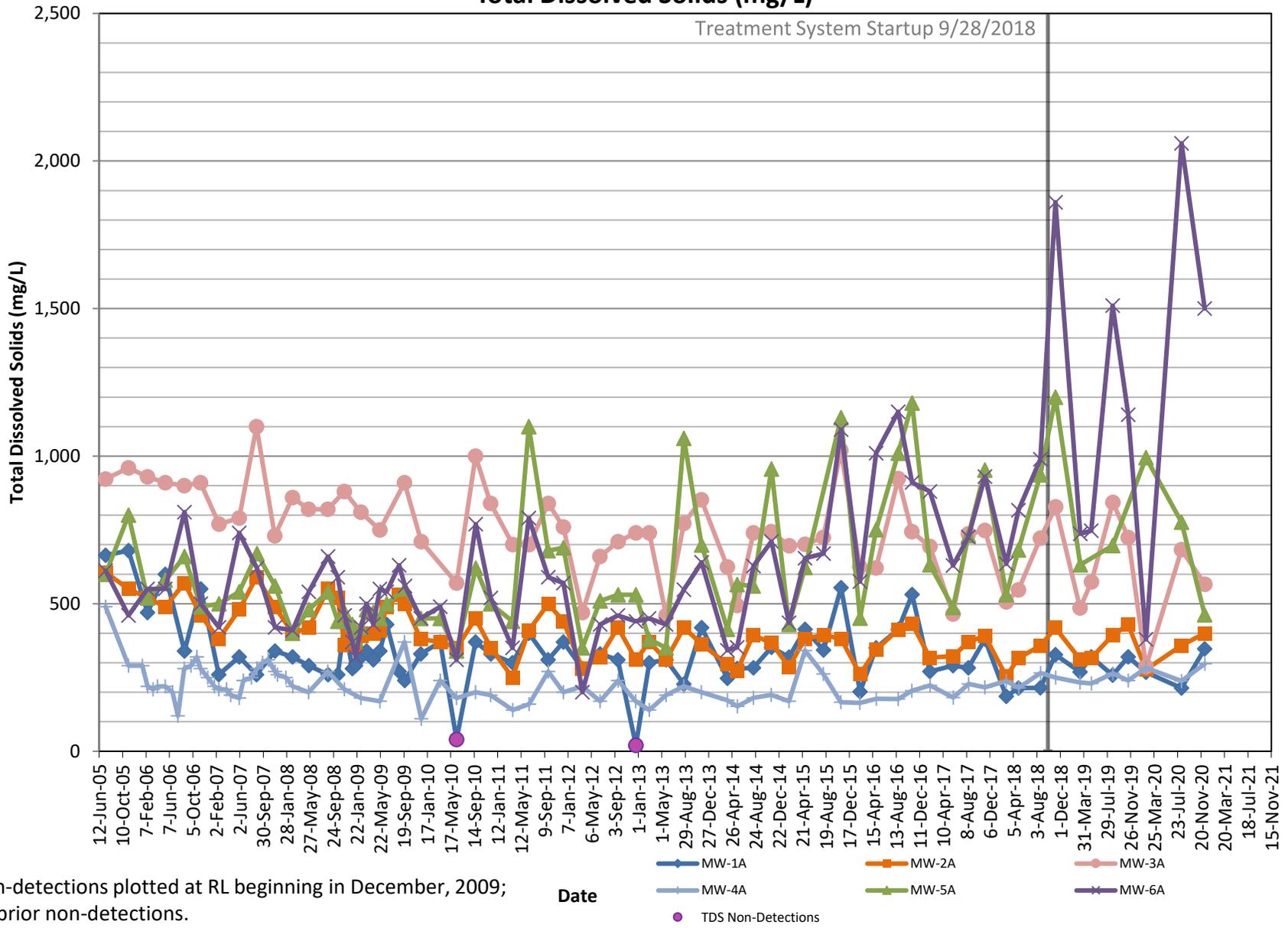
LDA Shallow/Alluvial Monitoring Wells

pH



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

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 and
Laboratory Analytical Results**

DATA VALIDATION CHECKLIST

Project Name:	Ravensdale Project
Project Number:	152030420
Sample Identification(s):	MW-1A-20201209, MW-2A-20201209, MW-45A-20201209, MW-6A-20201209, MW-5A-20201209, MW-99-1-20201209, INFILTRATION PONDS-20201209, MW-35A-20201209
Sample Date(s):	12/9/2021
Sample Team:	Turner Doggett & Tom Haskins, Golder Associates
Sample Matrix:	Aqueous
Analyzing Laboratory:	Analytical Resources, Inc. – Tukwila, WA
Analyses:	TDS (SM 2540C), Metals (EPA 6010C, 200.8, 200.8 UCT-KED) - As, Fe, Pb, K, Mn
Laboratory Report No.:	20L0168

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. 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)
Total Dissolved Solids (TDS)	EPA 160.1	500	SM 2540C	20	20
Iron	EPA 6010B	0.3	EPA 6010C	0.05	0.0107
Manganese	EPA 6010B	0.05	EPA 6010C	0.004	0.0016
Potassium	EPA 6010B	NA	EPA 6010C	0.5	0.107
Arsenic	EPA 6020	TBD	EPA 200.8	0.0002	0.000022
Lead	EPA 6020	0.05	EPA 200.8	0.0001	0.000068

- Dissolved metals were collected (not marked on the COC) and put on hold as noted on the COC. Dissolved metals were not analyzed and not included in the data package. No further action required.
- The laboratory did not provide a data narrative for dissolved solids. Any deficiencies for dissolved solids are discussed in the wet chemistry section below.

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-99-1-20201209) had a low detection of potassium (0.121 J mg/L). Following Guidelines and using historic project practice, when the blank concentration was below the RL, associated sample results greater than the blank result did not require qualification.
- Field duplicates were collected at MW-2A (field duplicate ID is MW-45A) and INFILTRATION PONDS (field duplicate ID is MW-35A). Reporting limits were used to calculate RPDs for non-detect results. Using professional judgment, RPDs were first calculated, and analytes with RPDs above 40% were evaluated. When both results were above the RL and the RPD was above QC criteria, results are qualified as estimated (J).
- The laboratory did not provide LCSD results. LCSD results are not required per method requirements if a laboratory duplicate is analyzed. No laboratory duplicate was analyzed. No action required other than to note.

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-99-1-20201209) had a low detection of dissolved solids (7 mg/L). Following Guidelines and using historic project practice, when the blank concentration was above the RL, associated sample results 10x greater than the blank result did not require qualification.
- Field duplicates were collected at MW-2A (field duplicate ID is MW-45A) and INFILTRATION PONDS (field duplicate ID is MW-35A). All precision is acceptable.
- The laboratory did not provide LCSD results. LCSD results are not required per method requirements if a laboratory duplicate is analyzed. No laboratory duplicate was analyzed. No action required other than to note.

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

Project Name:	Ravensdale Project
Project Number:	152030420
Sample Identification(s):	MW-1A-20201209, MW-2A-20201209, MW-45A-20201209, MW-6A-20201209, MW-5A-20201209, MW-99-1-20201209, INFILTRATION PONDS-20201209, MW-35A-20201209
Sample Date(s):	12/9/2021
Sample Team:	Turner Doggett, Tom Haskins, Golder Associates
Sample Matrix:	Aqueous
Analyzing Laboratory:	Analytical Resources, Inc. – Tukwila, WA
Analyses:	TDS (SM 2540 C), Metals (EPA 6010C, 200.8) - As, Fe, Pb, K, Mn
Laboratory Report No.:	20L0168

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-20201209	Lead	-	-	-	J	Field duplicate imprecision.
MW-45A-20201209	Lead	-	-	-	J	Field duplicate imprecision.
MW-2A-20201209	Iron	-	-	-	J	Field duplicate imprecision.
MW-45A-20201209	Iron	-	-	-	J	Field duplicate imprecision.

VALIDATION PERFORMED BY:	Rachel Brasco, Golder Associates
DATE:	January 19, 2021

DATA VALIDATION CHECKLIST

Project Name:	Ravensdale Project
Project Number:	152030420
Sample Identification(s):	MW-3A-20201210, WEIR-20201210, STILL WELL-20201210, SOUTH POND-20201210, INTERCEPTOR TRENCH-20201210, MW-4A-20201210, P-14-20201211
Sample Date(s):	12/10/2020 and 12/11/2020
Sample Team:	Turner Doggett & Tom Haskins, Golder Associates
Sample Matrix:	Aqueous
Analyzing Laboratory:	Analytical Resources, Inc. – Tukwila, WA
Analyses:	TDS (SM 2540C), Metals (EPA 6010C, 200.8) - As, Fe, Pb, K, Mn
Laboratory Report No.:	20L0224

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. 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)
Total Dissolved Solids (TDS)	EPA 160.1	500	SM 2540 C	200	200
Iron	EPA 6010B	0.3	EPA 6010C	0.05	0.0107
Manganese	EPA 6010B	0.05	EPA 6010C	0.004	0.0016
Potassium	EPA 6010B	NA	EPA 6010C	0.5	0.107
Arsenic	EPA 6020	TBD	EPA 200.8	0.0002	0.000022
Lead	EPA 6020	0.05	EPA 200.8	0.0001	0.000068

- The preservation confirmation noted container IDs 20L0224-12B and 20L224-13A did not meet method requirements due to a pH greater than 2. The containers were preserved to pH <2 on 12/22/2020. No qualifications are required when samples were properly preserved and analyzed within holding time.

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 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.
- The matrix spike recovered high for potassium for sample WEIR-20201210. No qualifications were required when the sample result is greater than 4x the spike added.

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 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.

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

Project Name:	Ravensdale Project
Project Number:	152030420
Sample Identification(s):	MW-3A-20201210, WEIR-20201210, STILL WELL-20201210, SOUTH POND-20201210, INTERCEPTOR TRENCH-20201210, MW-4A-20201210, P-14-20201211
Sample Date(s):	12/10/2020 and 12/11/2020
Sample Team:	Turner Doggett, Tom Haskins, Golder Associates
Sample Matrix:	Aqueous
Analyzing Laboratory:	Analytical Resources, Inc. – Tukwila, WA
Analyses:	TDS (SM 2540C), Metals (EPA 6010C, 200.8) - As, Fe, Pb, K, Mn
Laboratory Report No.:	20L0224

Sample ID	Analyte(s)	Old Result	Old Qualifier	New Result	New Qualifier	Reason(s)
All samples	All analytes	-	-	-	-	Remove any lab applied "D" qualifiers

VALIDATION PERFORMED BY:	Rachel Brasco, Golder Associates
DATE:	January 19, 2021

MW-2A **MW-45A**
Duplicate

Client_Sample_ID	Analyte	Result	Result	RPD	Unit	Qualifier	RL	MDL
MW-2A	Arsenic	1.38	1.38	0%	ug/L		0.2	0.022
MW-2A	Lead	0.49	0.142	110%	ug/L	J	0.1	0.068
MW-2A	Iron	0.2550	0.1540	49%	mg/L	J	0.05	0.0107
MW-2A	Potassium	26.8	26.5	1%	mg/L		0.5	0.107
MW-2A	Manganese	0.0149	0.013	14%	mg/L		0.004	0.0016
MW-2A	Dissolved Solids	400	392	2%	mg/L		10	10

Infiltration Ponds **MW-35A**
Duplicate

Client_Sample_ID	Analyte	Result	Result	RPD	Unit	Qualifier	RL	MDL
Infiltration Ponds	Arsenic	14.9	15.1	1%	ug/L		0.4	0.044
Infiltration Ponds	Lead	5.11	5.21	2%	ug/L		0.1	0.068
Infiltration Ponds	Iron	0.6860	0.7210	5%	mg/L		0.05	0.0107
Infiltration Ponds	Potassium	207	207	0%	mg/L		0.5	0.107
Infiltration Ponds	Manganese	0.0172	0.0177	3%	mg/L		0.004	0.0016
Infiltration Ponds	Dissolved Solids	632	643	2%	mg/L		10	10

QAPP criteria for field duplicates is 40%
na - not applicable, non-detected value



06 January 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>
20L0224	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)
 www.arilabs.com

ARI Assigned Number: <i>20L0224</i>	Turn-around Requested: <i>STANDARD</i>	Page: <i>1</i> of <i>1</i>
ARI Client Company: <i>GOLDER</i>	Phone: <i>425-883-0777</i>	Date: <i>12/11/20</i> Ice Present?
Client Contact: <i>JOSEPH XI, GARY ZIMMERMAN</i>	No. of Coolers: <i>1</i>	Cooler Temps: <i>0.6</i>

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested				Notes/Comments
					TOTAL METALS (2)	DISSOLVED METALS (1) HOLD	TDS		
MW-3A-20201210	12/10/20	0925	GW	3	X		X		HOLD DISSOLVED
WEIR-20201210	12/10/20	1000	SW	5	X		X		↓ + MS/MSD
STILL WELL-20201210	12/10/20	1100	GW	3	X		X		↓
SOUTH POND-20201210	12/10/20	1140	SW	3	X		X		↓
INTERCEPTOR TRENCH-20201210	12/10/20	1225	SW	1	X TH		X		TDS ONLY
MW-4A-20201210	12/10/20	1325	GW	3	X		X		HOLD DISSOLVED
P-14-20201210	12/11/20	1215	GW	3	X		X		↓

Comments/Special Instructions <i>1: As, Fe, Pb, Mn, AND K</i>	Relinquished by: (Signature) <i>Turner</i>	Received by: (Signature) <i>Samantha Colon</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <i>Turner Doggett</i>	Printed Name: <i>Samantha Colon</i>	Printed Name:	Printed Name:
	Company: <i>Golder Associates</i>	Company: <i>ARI</i>	Company:	Company:
	Date & Time: <i>12/11/2020 1622</i>	Date & Time: <i>12/11/2020 1622</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: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



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

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

Reported:
06-Jan-2021 17:58

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-3A-20201210	20L0224-01	Water	10-Dec-2020 09:25	11-Dec-2020 16:22
WEIR-20201210	20L0224-03	Water	10-Dec-2020 10:00	11-Dec-2020 16:22
STILL WELL-20201210	20L0224-05	Water	10-Dec-2020 11:00	11-Dec-2020 16:22
SOUTH POND-20201210	20L0224-07	Water	10-Dec-2020 11:40	11-Dec-2020 16:22
INTERCEPTOR TRENCH-20201210	20L0224-09	Water	10-Dec-2020 12:25	11-Dec-2020 16:22
MW-4A-20201210	20L0224-10	Water	10-Dec-2020 13:25	11-Dec-2020 16:22
P-14-20201211	20L0224-12	Water	11-Dec-2020 12:15	11-Dec-2020 16:22



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

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

Reported:
06-Jan-2021 17:58

Work Order Case Narrative

Total 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.

Sample specific QC was performed in association with sample 20L0224-03 in batch BIL0631. The matrix spike/matrix spike (MS/MSD) percent recoveries, MS/MSD relative percent difference (RPD) and the duplicate (DUP) RPD were within advisory control limit.

Total Metals - EPA Method 6010C

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.

Sample specific QC was performed in association with sample 20L0224-03 in batch BIL0600. The matrix spike/matrix spike (MS/MSD) percent recoveries, MS/MSD relative percent difference (RPD) and the duplicate (DUP) RPD were within advisory control limits.

Wet Chemistry

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

Initial and continuing calibrations were within method requirements.

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

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

The reference material (SRM) percent recoveries were within control limits.



WORK ORDER

20L0224

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

Analysis	Due	TAT	Expires	Comments
Met Diss 6010C - K	12/29/2020	10	06/09/2021	Field Filtered
Met Diss 6010C - Fe	12/29/2020	10	06/09/2021	Field Filtered
Met Diss 200.8 - Pb	12/29/2020	10	06/09/2021	Field Filtered

Preservation Confirmation

Container ID	Container Type	pH	
20L0224-01 A	HDPE NM, 1000 mL		
20L0224-01 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-03 A	HDPE NM, 1000 mL		
20L0224-03 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-03 C	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-03 D	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-04 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-05 A	HDPE NM, 1000 mL		
20L0224-05 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-06 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-07 A	HDPE NM, 1000 mL		
20L0224-07 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-08 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-09 A	HDPE NM, 1000 mL		
20L0224-10 A	HDPE NM, 1000 mL		
20L0224-10 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-11 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-12 A	HDPE NM, 1000 mL		
20L0224-12 B	HDPE NM, 500 mL, 1:1 HNO3	>2	Fail
20L0224-13 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	>2	Fail

ISB
Preservation Confirmed By

12/12/2020
Date



Cooler Receipt Form

ARI Client: Golder

Project Name: Ravensdale 2020 Q4 Sampling

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 20200224

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 1622 0.6

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO 5206

Cooler Accepted by: SC Date: 12/11/2020 Time: 1622

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 SC

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: JAS Date: 12/12/2020 Time: 1016 Labels checked by: JAS

**** 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: _____



WORK ORDER

20L0224

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

Analysis	Due	TAT	Expires	Comments
Met Diss 6010C - K	12/29/2020	10	06/09/2021	Field Filtered
Met Diss 6010C - Fe	12/29/2020	10	06/09/2021	Field Filtered
Met Diss 200.8 - Pb	12/29/2020	10	06/09/2021	Field Filtered

Preservation Confirmation

Container ID	Container Type	pH	
20L0224-01 A	HDPE NM, 1000 mL		
20L0224-01 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-03 A	HDPE NM, 1000 mL		
20L0224-03 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-03 C	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-03 D	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-04 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-05 A	HDPE NM, 1000 mL		
20L0224-05 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-06 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-07 A	HDPE NM, 1000 mL		
20L0224-07 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-08 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-09 A	HDPE NM, 1000 mL		
20L0224-10 A	HDPE NM, 1000 mL		
20L0224-10 B	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
20L0224-11 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
20L0224-12 A	HDPE NM, 1000 mL		
20L0224-12 B	HDPE NM, 500 mL, 1:1 HNO3	>2	Fail ①
20L0224-13 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	>2	Fail

J3
Preservation Confirmed By

12/12/2020
Date

① preserved to pH < 2.0 w/ 2.25 mL conc. HNO₃ (I10976) SD 12/22/20



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: Ravensdale Project Manager: Gary Zimmerman	Reported: 06-Jan-2021 17:58
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MW-3A-20201210
20L0224-01 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Instrument: ICPMS1	Analyst: TCH	Sampled: 12/10/2020 09:25
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Preparation Batch: BIL0631	Analyzed: 12/24/2020 23:43
	Prepared: 12/22/2020	Sample Size: 25 mL	Extract ID: 20L0224-01 B 02
		Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	0.159	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:
06-Jan-2021 17:58

MW-3A-20201210
20L0224-01 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Sampled: 12/10/2020 09:25
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/24/2020 23:43
Sample Preparation:	Extract ID: 20L0224-01 B 02
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BIL0631	Sample Size: 25 mL
Prepared: 12/22/2020	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	2.36	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:
06-Jan-2021 17:58

MW-3A-20201210
20L0224-01 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/10/2020 09:25
Instrument: ICP2 Analyst: MCB Analyzed: 12/23/2020 13:03

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 20L0224-01 B 01
Preparation Batch: BIL0600 Sample Size: 25 mL
Prepared: 12/21/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	0.0698	mg/L	
Manganese	7439-96-5	1	0.0016	0.0040	0.292	mg/L	
Potassium	7440-09-7	1	0.107	0.500	128	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: 06-Jan-2021 17:58
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MW-3A-20201210
20L0224-01 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 12/10/2020 09:25
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0342	Final Volume: 200 mL	Analyzed: 12/14/2020 02:01
Sample Preparation:	Prepared: 12/14/2020		Extract ID: 20L0224-01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	566	mg/L	



Golder Associates
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Redmond WA, 98052-3333

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

Reported:
06-Jan-2021 17:58

WEIR-20201210
20L0224-03 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 Sampled: 12/10/2020 10:00
Instrument: ICPMS1 Analyst: TCH Analyzed: 12/24/2020 23:56
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix Extract ID: 20L0224-03 B 02
Preparation Batch: BIL0631 Sample Size: 25 mL
Prepared: 12/22/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	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:
06-Jan-2021 17:58

WEIR-20201210
20L0224-03 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Sampled: 12/10/2020 10:00
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/24/2020 23:56
Sample Preparation:	Extract ID: 20L0224-03 B 02
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BIL0631	Sample Size: 25 mL
Prepared: 12/22/2020	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	5.13	ug/L	



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

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

Reported:
06-Jan-2021 17:58

WEIR-20201210
20L0224-03 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/10/2020 10:00
Instrument: ICP2 Analyst: MCB Analyzed: 12/23/2020 12:36

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 20L0224-03 B 01
Preparation Batch: BIL0600 Sample Size: 25 mL
Prepared: 12/21/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	0.0290	mg/L	J
Manganese	7439-96-5	1	0.0016	0.0040	0.0089	mg/L	
Potassium	7440-09-7	1	0.107	0.500	126	mg/L	



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WEIR-20201210
20L0224-03 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 12/10/2020 10:00
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0342	Final Volume: 200 mL	Analyzed: 12/14/2020 02:01
Sample Preparation:	Prepared: 12/14/2020		Extract ID: 20L0224-03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	560	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: 06-Jan-2021 17:58
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STILL WELL-20201210
20L0224-05 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Instrument: ICPMS1	Analyst: TCH	Sampled: 12/10/2020 11:00
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Preparation Batch: BIL0631	Analyzed: 12/25/2020 00:38
	Prepared: 12/22/2020	Sample Size: 25 mL	Extract ID: 20L0224-05 B 02
		Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	2	0.136	0.200	11.1	ug/L	D



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

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

Reported:
06-Jan-2021 17:58

STILL WELL-20201210
20L0224-05 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Sampled: 12/10/2020 11:00
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/25/2020 00:38
Sample Preparation:	Extract ID: 20L0224-05 B 02
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BIL0631	Sample Size: 25 mL
Prepared: 12/22/2020	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	2	0.0440	0.400	82.7	ug/L	D



Golder Associates
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Project: Ravensdale
Project Number: Ravensdale
Project Manager: Gary Zimmerman

Reported:
06-Jan-2021 17:58

STILL WELL-20201210
20L0224-05 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/10/2020 11:00
Instrument: ICP2 Analyst: MCB Analyzed: 12/23/2020 14:19

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 20L0224-05 B 01
Preparation Batch: BIL0600 Sample Size: 25 mL
Prepared: 12/21/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	2	0.0214	0.100	0.241	mg/L	D
Manganese	7439-96-5	2	0.0032	0.0080	0.0108	mg/L	D
Potassium	7440-09-7	2	0.214	1.00	510	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: 06-Jan-2021 17:58
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STILL WELL-20201210
20L0224-05 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sample Size: 20 mL	Sampled: 12/10/2020 11:00
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0342	Final Volume: 200 mL	Analyzed: 12/14/2020 02:01
Sample Preparation:	Prepared: 12/14/2020		Extract ID: 20L0224-05

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	50	50	1670	mg/L	



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

Reported:
06-Jan-2021 17:58

SOUTH POND-20201210
20L0224-07 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 12/10/2020 11:40
Instrument: ICPMS1 Analyst: TCH	Preparation Batch: BIL0631	Analyzed: 12/25/2020 00:43
Sample Preparation:	Prepared: 12/22/2020	Extract ID: 20L0224-07 B 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	2	0.136	0.200	6.63	ug/L	D



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SOUTH POND-20201210
20L0224-07 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Sampled: 12/10/2020 11:40
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/25/2020 00:43
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 20L0224-07 B 02
Preparation Batch: BIL0631	Sample Size: 25 mL
Prepared: 12/22/2020	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	2	0.0440	0.400	12.0	ug/L	D



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

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

Reported:
06-Jan-2021 17:58

SOUTH POND-20201210
20L0224-07 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/10/2020 11:40
Instrument: ICP2 Analyst: MCB Analyzed: 12/23/2020 14:23

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 20L0224-07 B 01
Preparation Batch: BIL0600 Sample Size: 25 mL
Prepared: 12/21/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	2	0.0214	0.100	0.993	mg/L	D
Manganese	7439-96-5	2	0.0032	0.0080	0.0382	mg/L	D
Potassium	7440-09-7	2	0.214	1.00	318	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: 06-Jan-2021 17:58
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SOUTH POND-20201210
20L0224-07 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sample Size: 75 mL	Sampled: 12/10/2020 11:40
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0342	Final Volume: 200 mL	Analyzed: 12/14/2020 02:01
Sample Preparation:	Prepared: 12/14/2020		Extract ID: 20L0224-07

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	952	mg/L	



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

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

Reported:
06-Jan-2021 17:58

INTERCEPTOR TRENCH-20201210
20L0224-09 (Water)

Wet Chemistry

Method: SM 2540 C-97 Sampled: 12/10/2020 12:25
Instrument: BAL2 Analyst: KLE Analyzed: 12/14/2020 02:01

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 20L0224-09
Preparation Batch: BIL0342 Sample Size: 100 mL
Prepared: 12/14/2020 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	691	mg/L	



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MW-4A-20201210
20L0224-10 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 12/10/2020 13:25
Instrument: ICPMS1 Analyst: TCH	Preparation Batch: BIL0631	Analyzed: 12/24/2020 23:47
Sample Preparation:	Prepared: 12/22/2020	Extract ID: 20L0224-10 B 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	ND	ug/L	U



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MW-4A-20201210
20L0224-10 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Sampled: 12/10/2020 13:25
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/24/2020 23:47
Sample Preparation:	Extract ID: 20L0224-10 B 02
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BIL0631	Sample Size: 25 mL
Prepared: 12/22/2020	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	0.296	ug/L	



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

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

Reported:
06-Jan-2021 17:58

MW-4A-20201210
20L0224-10 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/10/2020 13:25
Instrument: ICP2 Analyst: MCB Analyzed: 12/23/2020 13:16

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 20L0224-10 B 01
Preparation Batch: BIL0600 Sample Size: 25 mL
Prepared: 12/21/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	0.159	mg/L	
Manganese	7439-96-5	1	0.0016	0.0040	0.0511	mg/L	
Potassium	7440-09-7	1	0.107	0.500	1.26	mg/L	



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MW-4A-20201210
20L0224-10 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sample Size: 200 mL	Sampled: 12/10/2020 13:25
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0342	Final Volume: 200 mL	Analyzed: 12/14/2020 02:01
Sample Preparation:	Prepared: 12/14/2020		Extract ID: 20L0224-10

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	297	mg/L	



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

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

Reported:
06-Jan-2021 17:58

P-14-20201211
20L0224-12 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 12/11/2020 12:15
Instrument: ICPMS1 Analyst: TCH	Preparation Batch: BIL0631	Analyzed: 12/28/2020 18:07
Sample Preparation:	Prepared: 12/22/2020	Extract ID: 20L0224-12 B 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	10	0.680	1.00	19.6	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: 06-Jan-2021 17:58
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P-14-20201211
20L0224-12 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Sampled: 12/11/2020 12:15
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/28/2020 18:07
Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 20L0224-12 B 02
Preparation Batch: BIL0631	Sample Size: 25 mL
Prepared: 12/22/2020	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	10	0.220	2.00	263	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: 06-Jan-2021 17:58
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P-14-20201211
20L0224-12 (Water)

Metals and Metallic Compounds

Method: EPA 6010C	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 12/11/2020 12:15
Instrument: ICP2 Analyst: MCB	Preparation Batch: BIL0600	Final Volume: 25 mL	Analyzed: 12/23/2020 14:28
Sample Preparation:	Prepared: 12/21/2020	Extract ID: 20L0224-12 B 01	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	0.107	0.500	0.293	mg/L	J, D
Manganese	7439-96-5	10	0.0160	0.0400	ND	mg/L	U
Potassium	7440-09-7	10	1.07	5.00	2540	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: 06-Jan-2021 17:58
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P-14-20201211
20L0224-12 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sample Size: 5 mL	Sampled: 12/11/2020 12:15
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0342	Final Volume: 200 mL	Analyzed: 12/14/2020 02:01
Sample Preparation:	Prepared: 12/14/2020		Extract ID: 20L0224-12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	200	200	6560	mg/L	



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

Reported:
06-Jan-2021 17:58

Metals and Metallic Compounds - Quality Control

Batch BIL0600 - TWC EPA 3010A

Instrument: ICP2 Analyst: MCB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0600-BLK1)						Prepared: 21-Dec-2020 Analyzed: 23-Dec-2020 12:08					
Iron	ND	0.0107	0.0500	mg/L							U
Manganese	ND	0.0016	0.0040	mg/L							U
Potassium	ND	0.107	0.500	mg/L							U
LCS (BIL0600-BS1)						Prepared: 21-Dec-2020 Analyzed: 23-Dec-2020 12:49					
Iron	2.04	0.0107	0.0500	mg/L	2.00		102	80-120			
Manganese	0.527	0.0016	0.0040	mg/L	0.500		105	80-120			
Potassium	10.4	0.107	0.500	mg/L	10.0		104	80-120			
Duplicate (BIL0600-DUP1)						Source: 20L0224-03 Prepared: 21-Dec-2020 Analyzed: 23-Dec-2020 12:31					
Iron	0.0290	0.0107	0.0500	mg/L		0.0290			0.11	20	J
Manganese	0.0089	0.0016	0.0040	mg/L		0.0089			0.40	20	
Potassium	128	0.107	0.500	mg/L		126			0.88	20	
Matrix Spike (BIL0600-MS1)						Source: 20L0224-03 Prepared: 21-Dec-2020 Analyzed: 23-Dec-2020 12:40					
Iron	1.99	0.0107	0.0500	mg/L	2.00	0.0290	98.2	75-125			
Manganese	0.512	0.0016	0.0040	mg/L	0.500	0.0089	101	75-125			
Potassium	139	0.107	0.500	mg/L	10.0	126	128	75-125			HC

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BIL0600-MSD1)						Source: 20L0224-03 Prepared: 21-Dec-2020 Analyzed: 23-Dec-2020 12:44					
Iron	1.98	0.0107	0.0500	mg/L	2.00	0.0290	97.7	75-125	0.50	20	
Manganese	0.513	0.0016	0.0040	mg/L	0.500	0.0089	101	75-125	0.23	20	
Potassium	138	0.107	0.500	mg/L	10.0	126	115	75-125	0.95	20	HC

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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

Reported:
06-Jan-2021 17:58

Metals and Metallic Compounds - Quality Control

Batch BIL0631 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0631-BLK1)						Prepared: 22-Dec-2020 Analyzed: 23-Dec-2020 14:08						
Lead	208	ND	0.0680	0.100	ug/L							U
Arsenic	75a	ND	0.0220	0.200	ug/L							U
LCS (BIL0631-BS1)						Prepared: 22-Dec-2020 Analyzed: 23-Dec-2020 14:13						
Lead	208	20.9	0.0680	0.100	ug/L	25.0		83.5	80-120			
Arsenic	75a	23.9	0.0220	0.200	ug/L	25.0		95.7	80-120			
Duplicate (BIL0631-DUP1)						Source: 20L0224-03 Prepared: 22-Dec-2020 Analyzed: 25-Dec-2020 00:01						
Lead	208	ND	0.0680	0.100	ug/L		ND					U
Arsenic	75a	5.50	0.0220	0.200	ug/L		5.13			6.94	20	
Matrix Spike (BIL0631-MS1)						Source: 20L0224-03 Prepared: 22-Dec-2020 Analyzed: 25-Dec-2020 00:07						
Lead	208	22.2	0.0680	0.100	ug/L	25.0	ND	88.8	75-125			
Arsenic	75a	31.3	0.0220	0.200	ug/L	25.0	5.13	105	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.												
Matrix Spike Dup (BIL0631-MSD1)						Source: 20L0224-03 Prepared: 22-Dec-2020 Analyzed: 25-Dec-2020 00:14						
Lead	208	22.0	0.0680	0.100	ug/L	25.0	ND	87.9	75-125	0.97	20	
Arsenic	75a	30.6	0.0220	0.200	ug/L	25.0	5.13	102	75-125	2.53	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: 06-Jan-2021 17:58
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Wet Chemistry - Quality Control

Batch BIL0342 - No Prep Wet Chem

Instrument: BAL2 Analyst: KLE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0342-BLK1)						Prepared: 14-Dec-2020 Analyzed: 14-Dec-2020 02:01					
Dissolved Solids	ND	5	5	mg/L							U
LCS (BIL0342-BS1)						Prepared: 14-Dec-2020 Analyzed: 14-Dec-2020 02:01					
Dissolved Solids	513	10	10	mg/L	500		103	90-110			
Duplicate (BIL0342-DUP1)						Source: 20L0224-03 Prepared: 14-Dec-2020 Analyzed: 14-Dec-2020 02:01					
Dissolved Solids	538	10	10	mg/L		560			4.01	20	



Golder Associates
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Redmond WA, 98052-3333

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

Reported:
06-Jan-2021 17:58

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Lead-208	NELAP,WADOE,WA-DW,DoD-ELAP
Lead-208	WADOE,WA-DW,DoD-ELAP
Lead-208	NELAP,WA-DW,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP
EPA 200.8 UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 6010C in Water	
Iron	WADOE,NELAP,DoD-ELAP
Iron	WADOE,NELAP,DoD-ELAP
Iron	WADOE,DoD-ELAP
Iron	NELAP,DoD-ELAP
Potassium	WADOE,DoD-ELAP
Potassium	NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Manganese	WADOE,NELAP,DoD-ELAP
Manganese	WADOE,DoD-ELAP
Manganese	NELAP,DoD-ELAP
Manganese	WADOE,NELAP,DoD-ELAP
SM 2540 C-97 in Water	
Dissolved Solids	DoD-ELAP,WADOE,NELAP
Dissolved Solids	DoD-ELAP,WADOE,WA-DW,NELAP
Dissolved Solids	DoD-ELAP,WADOE,WA-DW
Dissolved Solids	DoD-ELAP,WA-DW,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021



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

Reported:
06-Jan-2021 17:58

Notes and Definitions

- D The reported value is from a dilution
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- J Estimated concentration value detected below the reporting limit.
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



05 January 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)
20L0168

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.



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)
 www.arilabs.com

ARI Assigned Number: 2020168 Turn-around Requested: STANDARD

Page: 1 of 1

ARI Client Company: GOLDER Phone: _____

Date: 12/9/20 Ice Present? Yes

Client Contact: JOSEPH XI / GARY ZIMMERMAN

No. of Coolers: 2 Cooler Temps: 0.2 4.1

Client Project Name: RAVENSDALE 2020 Q4 SAMPLING

Analysis Requested

Client Project #: 152030420 004 Samplers: T-HASKINS/T-DOGGETT

Notes/Comments

Sample ID	Date	Time	Matrix	No. Containers	TOTAL METALS (L)	DISSOLVED METALS (L) HOLD	TDS					Notes/Comments	
MW-1A-20201209	12/9/20	0945	GW	3	X		X						
MW-2A-20201209		1055		3	X		X						HOLD DISSOLVED
MW-45A-20201209		1100		3	X		X						
MW-6A-20201209		1245		3	X		X						
MW-5A-20201209		1415		3	X		X						
MW-99-1-20201209		1445		DI	2	X		X					
INFILTRATION PONDS - 20201209		1505	GW	3	X		X						HOLD DISSOLVED
MW-35A-20201209	✓	1510	GW	3	X		X						↓

Comments/Special Instructions <u>2: AS, FE, PB, MN, AND K</u>	Relinquished by: (Signature) <u>[Signature]</u>	Received by: (Signature) <u>[Signature]</u>	Relinquished by: (Signature) _____	Received by: (Signature) _____
	Printed Name: <u>Turner Doggett</u>	Printed Name: <u>Jacob Walte</u>	Printed Name: _____	Printed Name: _____
	Company: <u>Golder Associates</u>	Company: <u>ARI</u>	Company: _____	Company: _____
	Date & Time: <u>12/9/2020 1639</u>	Date & Time: <u>12/09/2020 1639</u>	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, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1A-20201209	20L0168-01	Water	09-Dec-2020 09:45	09-Dec-2020 16:39
MW-2A-20201209	20L0168-03	Water	09-Dec-2020 10:55	09-Dec-2020 16:39
MW-45A-20201209	20L0168-05	Water	09-Dec-2020 11:00	09-Dec-2020 16:39
MW-6A-20201209	20L0168-07	Water	09-Dec-2020 12:45	09-Dec-2020 16:39
MW-5A-20201209	20L0168-09	Water	09-Dec-2020 14:15	09-Dec-2020 16:39
MW-99-1-20201209	20L0168-11	Water	09-Dec-2020 14:45	09-Dec-2020 16:39
INFILTRATION PONDS-20201209	20L0168-12	Water	09-Dec-2020 15:05	09-Dec-2020 16:39
MW-35A-20201209	20L0168-14	Water	09-Dec-2020 15:10	09-Dec-2020 16:39



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

Work Order Case Narrative

Total 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.

Total Metals - EPA Method 6010C

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

20L0168

Client: Golder Associates	Project Manager: Kelly Bottem
Project: Ravensdale	Project Number: 152030420004

Preservation Confirmation

Container ID	Container Type	pH	
20L0168-01 A	HDPE NM, 1000 mL		
20L0168-01 B	HDPE NM, 500 mL, 1:1 HNO3	< 2	Pass
20L0168-02 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2	Pass
20L0168-03 A	HDPE NM, 1000 mL		
20L0168-03 B	HDPE NM, 500 mL, 1:1 HNO3	< 2	Pass
20L0168-04 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2	Pass
20L0168-05 A	HDPE NM, 1000 mL		
20L0168-05 B	HDPE NM, 500 mL, 1:1 HNO3	< 2	Pass
20L0168-06 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2	Pass
20L0168-07 A	HDPE NM, 1000 mL		
20L0168-07 B	HDPE NM, 500 mL, 1:1 HNO3	< 2	Pass
20L0168-08 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2	Pass
20L0168-09 A	HDPE NM, 1000 mL		
20L0168-09 B	HDPE NM, 500 mL, 1:1 HNO3	< 2	Pass
20L0168-10 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2	Pass
20L0168-11 A	HDPE NM, 1000 mL		
20L0168-11 B	HDPE NM, 500 mL, 1:1 HNO3	< 2	Pass
20L0168-12 A	HDPE NM, 1000 mL		
20L0168-12 B	HDPE NM, 500 mL, 1:1 HNO3	< 2	Pass
20L0168-13 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2	Pass
20L0168-14 A	HDPE NM, 1000 mL		
20L0168-14 B	HDPE NM, 500 mL, 1:1 HNO3	< 2	Pass
20L0168-15 A	HDPE NM, 500 mL, 1:1 HNO3 (FF)	< 2	Pass

SC
Preservation Confirmed By _____

12/9/2020
Date _____



Cooler Receipt Form

ARI Client: Colde

Project Name: Ravensdale

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 2020168

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 1639

0.2 4.1

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 506

Cooler Accepted by: [Signature]

Date: 12/9/2020

Time: 1639

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

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

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

How were bottles sealed in plastic bags? Individually Grouped Not

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

Were all bottle labels complete and legible? YES NO

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

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

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

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

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

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

Date VOC Trip Blank was made at ARI NA

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

Samples Logged by: SC Date: 12/9/2020 Time: 0824 Labels checked by: SC

**** 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: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-1A-20201209
20L0168-01 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 12/09/2020 09:45
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BIL0563	Analyzed: 12/22/2020 01:24
Sample Preparation:	Prepared: 12/21/2020	Extract ID: 20L0168-01 B 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	ND	ug/L	U



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-1A-20201209
20L0168-01 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Instrument: ICPMS1 Analyst: TCH	Sampled: 12/09/2020 09:45
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Analyzed: 12/22/2020 19:52
	Preparation Batch: BIL0563	Extract ID: 20L0168-01 B 02
	Prepared: 12/21/2020	Sample Size: 25 mL
		Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	1.11	ug/L	



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MW-1A-20201209
20L0168-01 (Water)

Metals and Metallic Compounds

Method: EPA 6010C	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 12/09/2020 09:45
Instrument: ICP2 Analyst: TCH	Preparation Batch: BIL0474	Final Volume: 25 mL	Analyzed: 12/18/2020 15:23
Sample Preparation:	Prepared: 12/17/2020	Extract ID: 20L0168-01 B 01	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	0.0185	mg/L	J
Manganese	7439-96-5	1	0.0016	0.0040	ND	mg/L	U
Potassium	7440-09-7	1	0.107	0.500	17.1	mg/L	



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MW-1A-20201209
20L0168-01 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sampled: 12/09/2020 09:45
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0341	Analyzed: 12/14/2020 01:03
Sample Preparation:	Prepared: 12/14/2020	Extract ID: 20L0168-01
	Sample Size: 100 mL	
	Final Volume: 200 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	347	mg/L	



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MW-2A-20201209
20L0168-03 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 12/09/2020 10:55
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BIL0563	Analyzed: 12/22/2020 01:29
Sample Preparation:	Prepared: 12/21/2020	Extract ID: 20L0168-03 B 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	0.490	ug/L	



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-2A-20201209
20L0168-03 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Sampled: 12/09/2020 10:55
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/22/2020 19:57
Sample Preparation:	Extract ID: 20L0168-03 B 02
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BIL0563	Sample Size: 25 mL
Prepared: 12/21/2020	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	1.38	ug/L	



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MW-2A-20201209
20L0168-03 (Water)

Metals and Metallic Compounds

Method: EPA 6010C	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 12/09/2020 10:55
Instrument: ICP2 Analyst: TCH	Preparation Batch: BIL0474	Final Volume: 25 mL	Analyzed: 12/18/2020 15:27
Sample Preparation:	Prepared: 12/17/2020	Extract ID: 20L0168-03 B 01	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	0.255	mg/L	
Manganese	7439-96-5	1	0.0016	0.0040	0.0149	mg/L	
Potassium	7440-09-7	1	0.107	0.500	26.8	mg/L	



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MW-2A-20201209
20L0168-03 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 12/09/2020 10:55
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0341	Final Volume: 200 mL	Analyzed: 12/14/2020 01:03
Sample Preparation:	Prepared: 12/14/2020		Extract ID: 20L0168-03

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	400	mg/L	



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MW-45A-20201209
20L0168-05 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Instrument: ICPMS1	Analyst: MCB	Sampled: 12/09/2020 11:00
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Preparation Batch: BIL0563	Analyzed: 12/22/2020 01:33
	Prepared: 12/21/2020	Sample Size: 25 mL	Extract ID: 20L0168-05 B 02
		Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	0.142	ug/L	



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MW-45A-20201209
20L0168-05 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Instrument: ICPMS1 Analyst: TCH	Sampled: 12/09/2020 11:00
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Analyzed: 12/22/2020 20:01
	Preparation Batch: BIL0563	Extract ID: 20L0168-05 B 02
	Prepared: 12/21/2020	Sample Size: 25 mL
		Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	1.38	ug/L	



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-45A-20201209
20L0168-05 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/09/2020 11:00
Instrument: ICP2 Analyst: TCH Analyzed: 12/18/2020 15:32

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 20L0168-05 B 01
Preparation Batch: BIL0474 Sample Size: 25 mL
Prepared: 12/17/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	0.154	mg/L	
Manganese	7439-96-5	1	0.0016	0.0040	0.0130	mg/L	
Potassium	7440-09-7	1	0.107	0.500	26.5	mg/L	



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-45A-20201209
20L0168-05 (Water)

Wet Chemistry

Method: SM 2540 C-97 Sampled: 12/09/2020 11:00
Instrument: BAL2 Analyst: KLE Analyzed: 12/14/2020 01:03

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 20L0168-05
Preparation Batch: BIL0341 Sample Size: 100 mL
Prepared: 12/14/2020 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	392	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-6A-20201209
20L0168-07 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Instrument: ICPMS1	Analyst: TCH	Sampled: 12/09/2020 12:45
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Preparation Batch: BIL0563	Analyzed: 12/22/2020 20:23
	Prepared: 12/21/2020	Sample Size: 25 mL	Extract ID: 20L0168-07 B 02
		Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	0.984	ug/L	



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-6A-20201209
20L0168-07 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Sampled: 12/09/2020 12:45
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/22/2020 20:23
Sample Preparation:	Extract ID: 20L0168-07 B 02
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BIL0563	Sample Size: 25 mL
Prepared: 12/21/2020	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	3.14	ug/L	



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-6A-20201209
20L0168-07 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/09/2020 12:45
Instrument: ICP2 Analyst: TCH Analyzed: 12/18/2020 18:26

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 20L0168-07 B 01
Preparation Batch: BIL0474 Sample Size: 25 mL
Prepared: 12/17/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	2	0.0214	0.100	0.592	mg/L	D
Manganese	7439-96-5	2	0.0032	0.0080	0.0216	mg/L	D
Potassium	7440-09-7	2	0.214	1.00	539	mg/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-6A-20201209
20L0168-07 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sampled: 12/09/2020 12:45
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0341	Analyzed: 12/14/2020 01:03
Sample Preparation:	Prepared: 12/14/2020	Extract ID: 20L0168-07
	Sample Size: 50 mL	
	Final Volume: 200 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	20	20	1500	mg/L	



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-5A-20201209
20L0168-09 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 12/09/2020 14:15
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BIL0563	Analyzed: 12/22/2020 01:42
Sample Preparation:	Prepared: 12/21/2020	Extract ID: 20L0168-09 B 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	0.295	ug/L	



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-5A-20201209
20L0168-09 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Sampled: 12/09/2020 14:15
Instrument: ICPMS1 Analyst: TCH	Analyzed: 12/22/2020 20:16
Sample Preparation:	Extract ID: 20L0168-09 B 02
Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	
Preparation Batch: BIL0563	Sample Size: 25 mL
Prepared: 12/21/2020	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	3.12	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-5A-20201209
20L0168-09 (Water)

Metals and Metallic Compounds

Method: EPA 6010C	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 12/09/2020 14:15
Instrument: ICP2 Analyst: TCH	Preparation Batch: BIL0474	Final Volume: 25 mL	Analyzed: 12/18/2020 15:41
Sample Preparation:	Prepared: 12/17/2020		Extract ID: 20L0168-09 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	0.196	mg/L	
Manganese	7439-96-5	1	0.0016	0.0040	0.0064	mg/L	
Potassium	7440-09-7	1	0.107	0.500	263	mg/L	



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-5A-20201209
20L0168-09 (Water)

Wet Chemistry

Method: SM 2540 C-97
Instrument: BAL2 Analyst: KLE

Sampled: 12/09/2020 14:15
Analyzed: 12/14/2020 01:03

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BIL0341 Sample Size: 75 mL
Prepared: 12/14/2020 Final Volume: 200 mL
Extract ID: 20L0168-09

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	13	13	897	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-99-1-20201209
20L0168-11 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Instrument: ICPMS1	Analyst: MCB	Sampled: 12/09/2020 14:45
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Preparation Batch: BIL0563	Analyzed: 12/22/2020 01:46
	Prepared: 12/21/2020	Sample Size: 25 mL	Extract ID: 20L0168-11 B 02
		Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	ND	ug/L	U



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-99-1-20201209
20L0168-11 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Instrument: ICPMS1 Analyst: TCH	Sampled: 12/09/2020 14:45
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Analyzed: 12/22/2020 19:48
	Preparation Batch: BIL0563	Extract ID: 20L0168-11 B 02
	Prepared: 12/21/2020	
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0220	0.200	ND	ug/L	U



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-99-1-20201209
20L0168-11 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/09/2020 14:45
Instrument: ICP2 Analyst: TCH Analyzed: 12/18/2020 15:45

Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 20L0168-11 B 01
Preparation Batch: BIL0474 Sample Size: 25 mL
Prepared: 12/17/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	ND	mg/L	U
Manganese	7439-96-5	1	0.0016	0.0040	ND	mg/L	U
Potassium	7440-09-7	1	0.107	0.500	0.121	mg/L	J



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

MW-99-1-20201209
20L0168-11 (Water)

Wet Chemistry

Method: SM 2540 C-97 Sampled: 12/09/2020 14:45
Instrument: BAL2 Analyst: KLE Analyzed: 12/14/2020 01:03

Sample Preparation: Preparation Method: No Prep Wet Chem Extract ID: 20L0168-11
Preparation Batch: BIL0341 Sample Size: 200 mL
Prepared: 12/14/2020 Final Volume: 200 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	5	7	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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INFILTRATION PONDS-20201209
20L0168-12 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 12/09/2020 15:05
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BIL0563	Analyzed: 12/22/2020 01:51
Sample Preparation:	Prepared: 12/21/2020	Extract ID: 20L0168-12 B 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	5.11	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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**INFILTRATION PONDS-20201209
20L0168-12 (Water)**

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Instrument: ICPMS1 Analyst: TCH	Sampled: 12/09/2020 15:05
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Analyzed: 12/22/2020 20:06
	Preparation Batch: BIL0563	Extract ID: 20L0168-12 B 02
	Prepared: 12/21/2020	Sample Size: 25 mL
		Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	2	0.0440	0.400	14.9	ug/L	D



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

INFILTRATION PONDS-20201209
20L0168-12 (Water)

Metals and Metallic Compounds

Method: EPA 6010C Sampled: 12/09/2020 15:05
Instrument: ICP2 Analyst: TCH Analyzed: 12/18/2020 15:50
Sample Preparation: Preparation Method: TWC EPA 3010A Extract ID: 20L0168-12 B 01
Preparation Batch: BIL0474 Sample Size: 25 mL
Prepared: 12/17/2020 Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	0.686	mg/L	
Manganese	7439-96-5	1	0.0016	0.0040	0.0172	mg/L	
Potassium	7440-09-7	1	0.107	0.500	207	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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INFILTRATION PONDS-20201209
20L0168-12 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 12/09/2020 15:05
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0341	Final Volume: 200 mL	Analyzed: 12/14/2020 01:03
Sample Preparation:	Prepared: 12/14/2020		Extract ID: 20L0168-12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	632	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-35A-20201209
20L0168-14 (Water)

Metals and Metallic Compounds

Method: EPA 200.8	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Sampled: 12/09/2020 15:10
Instrument: ICPMS1 Analyst: MCB	Preparation Batch: BIL0563	Analyzed: 12/22/2020 01:55
Sample Preparation:	Prepared: 12/21/2020	Extract ID: 20L0168-14 B 02
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0680	0.100	5.21	ug/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-35A-20201209
20L0168-14 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED	Instrument: ICPMS1 Analyst: TCH	Sampled: 12/09/2020 15:10
Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Analyzed: 12/22/2020 20:11
	Preparation Batch: BIL0563	Extract ID: 20L0168-14 B 02
	Prepared: 12/21/2020	Sample Size: 25 mL
		Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	2	0.0440	0.400	15.1	ug/L	D



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-35A-20201209
20L0168-14 (Water)

Metals and Metallic Compounds

Method: EPA 6010C	Preparation Method: TWC EPA 3010A	Sample Size: 25 mL	Sampled: 12/09/2020 15:10
Instrument: ICP2 Analyst: TCH	Preparation Batch: BIL0474	Final Volume: 25 mL	Analyzed: 12/18/2020 15:54
Sample Preparation:	Prepared: 12/17/2020		Extract ID: 20L0168-14 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	1	0.0107	0.0500	0.721	mg/L	
Manganese	7439-96-5	1	0.0016	0.0040	0.0177	mg/L	
Potassium	7440-09-7	1	0.107	0.500	207	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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MW-35A-20201209
20L0168-14 (Water)

Wet Chemistry

Method: SM 2540 C-97	Preparation Method: No Prep Wet Chem	Sample Size: 100 mL	Sampled: 12/09/2020 15:10
Instrument: BAL2 Analyst: KLE	Preparation Batch: BIL0341	Final Volume: 200 mL	Analyzed: 12/14/2020 01:03
Sample Preparation:	Prepared: 12/14/2020		Extract ID: 20L0168-14

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	10	643	mg/L	



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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Metals and Metallic Compounds - Quality Control

Batch BIL0474 - TWC EPA 3010A

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0474-BLK1)						Prepared: 17-Dec-2020 Analyzed: 18-Dec-2020 13:34					
Iron	ND	0.0107	0.0500	mg/L							U
Manganese	ND	0.0016	0.0040	mg/L							U
Potassium	ND	0.107	0.500	mg/L							U
LCS (BIL0474-BS1)						Prepared: 17-Dec-2020 Analyzed: 18-Dec-2020 14:13					
Iron	2.08	0.0107	0.0500	mg/L	2.00		104	80-120			
Manganese	0.506	0.0016	0.0040	mg/L	0.500		101	80-120			
Potassium	10.3	0.107	0.500	mg/L	10.0		103	80-120			



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

Metals and Metallic Compounds - Quality Control

Batch BIL0563 - 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
Blank (BIL0563-BLK1)						Prepared: 21-Dec-2020 Analyzed: 21-Dec-2020 22:34						
Lead	208	ND	0.0680	0.100	ug/L							U
Arsenic	75a	ND	0.0220	0.200	ug/L							U
LCS (BIL0563-BS1)						Prepared: 21-Dec-2020 Analyzed: 21-Dec-2020 22:38						
Lead	208	26.0	0.0680	0.100	ug/L	25.0		104	80-120			
Arsenic	75a	25.9	0.0220	0.200	ug/L	25.0		104	80-120			



Golder Associates 18300 NE Union Hill Road Suite 200 Redmond WA, 98052-3333	Project: Ravensdale Project Number: 152030420004 Project Manager: Gary Zimmerman	Reported: 05-Jan-2021 13:20
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Wet Chemistry - Quality Control

Batch BIL0341 - No Prep Wet Chem

Instrument: BAL2 Analyst: KLE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BIL0341-BLK1)						Prepared: 14-Dec-2020 Analyzed: 14-Dec-2020 01:03					
Dissolved Solids	ND	5	5	mg/L							U
LCS (BIL0341-BS1)						Prepared: 14-Dec-2020 Analyzed: 14-Dec-2020 01:03					
Dissolved Solids	507	10	10	mg/L	500		101	90-110			



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

Project: Ravensdale
Project Number: 152030420004
Project Manager: Gary Zimmerman

Reported:
05-Jan-2021 13:20

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Lead-208	NELAP,WADOE,WA-DW,DoD-ELAP
Lead-208	WADOE,WA-DW,DoD-ELAP
Lead-208	NELAP,WA-DW,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP
EPA 200.8 UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 6010C in Water	
Iron	WADOE,NELAP,DoD-ELAP
Iron	WADOE,NELAP,DoD-ELAP
Iron	WADOE,DoD-ELAP
Iron	NELAP,DoD-ELAP
Potassium	WADOE,DoD-ELAP
Potassium	NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Potassium	WADOE,NELAP,DoD-ELAP
Manganese	WADOE,NELAP,DoD-ELAP
Manganese	WADOE,DoD-ELAP
Manganese	NELAP,DoD-ELAP
Manganese	WADOE,NELAP,DoD-ELAP
SM 2540 C-97 in Water	
Dissolved Solids	DoD-ELAP,WADOE,NELAP
Dissolved Solids	DoD-ELAP,WADOE,WA-DW,NELAP
Dissolved Solids	DoD-ELAP,WADOE,WA-DW
Dissolved Solids	DoD-ELAP,WA-DW,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	01/31/2021
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	01/01/2021



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18300 NE Union Hill Road Suite 200

Redmond WA, 98052-3333

Project: Ravensdale

Project Number: 152030420004

Project Manager: Gary Zimmerman

Reported:

05-Jan-2021 13:20

Notes and Definitions

- 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.



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