FINAL REPORT

Triumph Mine Groundwater Flow and Reactive Transport Models

Triumph Mine

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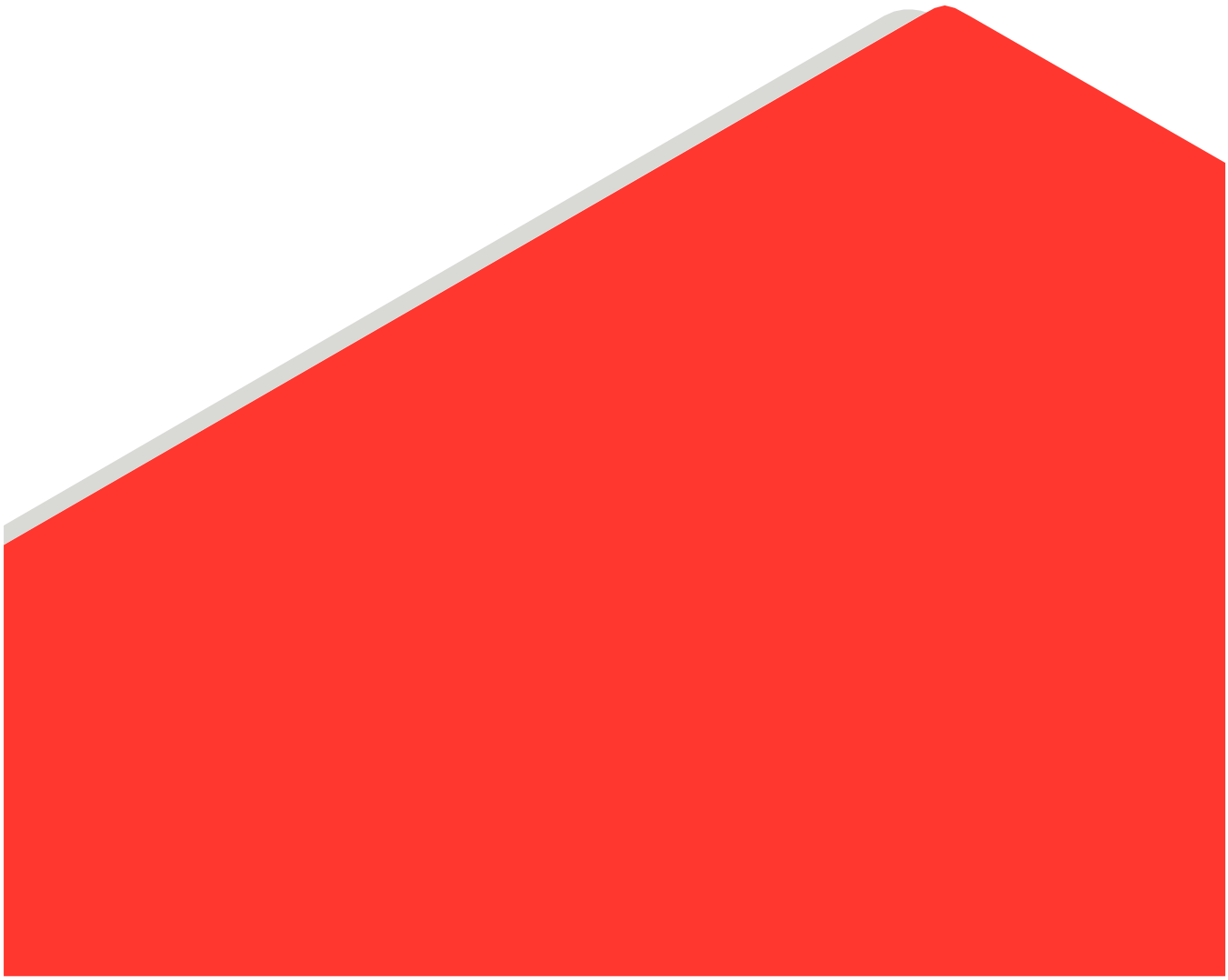
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1.0 INTRODUCTION

This report presents the results of a groundwater flow and reactive transport modeling effort conducted for the Triumph Mine site (Site). The Site is an inactive lead, silver, and zinc mine located in Blaine County, Idaho off the East Fork Big Wood River Road and spans across multiple properties, including properties owned by the Idaho Department of Lands (IDL), Idaho Department of Environmental Quality (IDEQ), and the Bureau of Land Management (BLM). The Site is situated in the mountainous valley of the East Fork Big Wood River (EFBW) and consists of the abandoned Triumph Mine with associated waste rock, tailings piles, and collection ponds for mine-impacted water. Mine-impacted water from collection ponds will be combined and discharged to the proposed infiltration ponds located in the northeast corner of the IDL property (parcel number RP04N18036773A) and just south of the East Fork Big Wood River Road. Mine-impacted surface water historically had elevated concentrations of arsenic, iron, and manganese.

WSP USA Inc. (WSP) was asked by Alta Science & Engineering, Inc. (Alta) and the IDEQ to develop a conceptual site model, groundwater flow model, and reactive transport model to assess the feasibility of discharging mine-impacted water to a two-pond infiltration system. The conceptual site model and numerical modeling address the following questions:

- Can an infiltration gallery be designed that can accept the volume of water generated without ponding the water at the surface? Or stated another way, is the groundwater flow sufficient that the additional water will not raise the groundwater table significantly?
- Based on the concentration of metals, particularly manganese, in the mine-impacted water, can the infiltration gallery be used without further degradation of groundwater quality downgradient (i.e., off IDL property)?
- Can an infiltration gallery be designed such that the water does not discharge to surface water or a functional equivalent (i.e., groundwater discharging to surface water)?

This report summarizes the conceptual site model, the mounding analysis, groundwater flow modeling, and reactive transport modeling analyses.

2.0 HYDROGEOLOGIC CONDITIONS

WSP reviewed relevant available data within the Study Area to develop a conceptual site model. The Study Area includes an approximately 1.5-mile length of the EFBW Valley extending from upgradient of the Triumph Mine workings to 0.3 miles south of the intersection of East Fork Rd and Meadowbrook Rd, as shown in Figure 1-1. Temporal variations in groundwater levels and river discharge volumes were evaluated using available groundwater level elevation data, river discharge data, and precipitation data. Seasonal variations in recharge volumes were evaluated to better understand potential groundwater flow variations. Borehole logs were used to characterize the hydrostratigraphy. Hydraulic testing data were reviewed and used to develop the site conceptual model. Temporal water quality data were evaluated and incorporated into the site conceptual model. The following data were compiled and used to develop the conceptual site model, mounding model, numerical groundwater flow model, and reactive geochemical models:

- Groundwater level elevation data
- River stage and discharge data
- Mine Adit, Surge Pond, and Permanent Pond discharge volumes

- Mine Adit, Surge Pond, and Permanent Pond discharge water quality data
- Precipitation data
- Hydraulic testing data including infiltration testing and slug testing
- Boring logs
- Geophysical data
- LiDAR data
- Groundwater water quality data
- Sediment/soil sequential extraction of metals data
- USGS groundwater flow model for the Big Wood River Valley Aquifer (BWRVA)

An overview map of the Study Area and data collection locations are shown in Figure 1-1.

2.1 Climate

The NOAA Hyndman Station USS0014F16S is located approximately 7 miles east-northeast from the Site. The average measured precipitation between 1982 and 2023 is approximately 25 inches per year (NOAA Hyndman Station USS0014F16S). Precipitation peaks at an average of approximately 3.1 inches per month in December and is lowest in August, with an average of approximately 1.0 inches per month. Average air temperature ranges from about 19 °F in January to about 58 °F in July. A summary of available air temperature, precipitation, and snow depth data at the Hyndman Station from 1982 to 2023 is shown in Figure 2-1.

2.2 Geologic Setting

The Study Area is in the mountainous EFBW Valley, a tributary canyon to the Wood River Valley, as shown in Figure 1-1. The hydrostratigraphy was characterized using a 30-meter (m) DEM (Idaho LiDAR Consortium 2016) and 1-m LiDAR surveys of land surface elevation (GeoTerra 2019), Site geophysical surveys (Golder 2020), boreholes (Appendix B), and recent work including a regional groundwater flow model for the Wood River Valley Aquifer (WRVA), investigation for the 5-year Site report, and recent data collection (USGS 2016, IDEQ 2019, Tetra Tech 2024). Using these data, the hydrostratigraphy can be generalized into three units from top to bottom:

- Fine-grained unit (model layer 1): A fine-grained layer, 2 to 40 feet thick and averaging 6 feet thick, consisting of silt and silty sand.
- Coarse-grained unit (model layer 2): A coarse-grained layer, 2 to 142 feet thick and averaging 55 feet thick, consisting of gravel and sandy gravel.
- Bedrock (model layer 3): Sedimentary bedrock of the Devonian Milligen and Pennsylvanian Wood River formations.

The hydrostratigraphy was developed using 44 boring logs installed between 1997 and 2022 (Appendix B). The land surface elevation models, including a 30-m DEM (Idaho LiDAR Consortium 2016) and 1-m Site LiDAR data (GeoTerra 2019) were used to generate the top of the fine-grained unit. Twenty-eight borehole logs and one test pit were used to interpolate the top of the coarse-grained unit and 15 borehole logs were used to interpolate the

top of bedrock. Interpolation was performed via the Natural Neighbor (Sibson 1981) method in ArcMap v. 10.8 and summarized in Section 3.2.1.

2.3 Surface Water

Surface water features and measurement locations are shown in Figure 1-1. Surface water features include ponds containing mine-impacted water, delineated wetlands, and the EFBW. Mine-impacted water containing dissolved metals flows from the Mine Adit to the lined Surge Pond constructed in 1999 (IDEQ 2019). To limit the discharge of water from the mine shaft, two plugs were installed at 1,175 feet and 235 feet in 2003 and 2016, respectively (IDEQ 2019). The Permanent Pond collects seepage from the waste rock pile, located immediately south and west of the Mine Adit, and two tailings piles referred to as the upper tailings pile (UTP) and a lower tailings pile (LTP), as shown in Figure 1-1.

Water discharged directly from the Mine Adit is collected in the Surge Pond as measured at SW-3. Measured flow between August 2015 and October 2023 at SW-3 ranges from 0 to 11.7 gallons per minute (gpm) and averages 6.5 gpm. Two manually measured flow rates are available at the outflow from the Surge Pond, identified as SW-5; 8.7 gpm in October 2017 and 8.48 gpm in October 2019 (IDEQ, Personal Communication 2024). According to personal communication with IDEQ (2024), flow from the Mine Adit (SW-3) and flow from the Surge Pond (SW-5) are equivalent, as shown in Figure 2-2. All discharge from the Mine Adit is collected in the Surge Pond. The Permanent Pond collects seepage from the waste rock pile and both tailings piles.

Discharge data at the Permanent Pond are collected using a Manta Ray flow meter and are subject to substantial daily variation deemed to be noise derived from instrument error (Appendix A). This noise is removed from the dataset by time-averaging the data to 3-hour intervals, as shown in Figure 2-2. Flow from the Permanent Pond is greater than flow from the Surge Pond, ranging from approximately 0 to 248 gpm, as shown in Figure 2-2. Flow from the Surge Pond and from the Permanent Pond are combined near SW-7 (Figure 1-1). Flow from the Surge Pond is relatively constant at 6.5 gpm. Flow from the Permanent Pond varies seasonally, with higher flows in the Spring and low flows in the Summer. During high flow conditions, the Permanent Pond discharge represents a greater portion of the combined flow and in low flow conditions, the Surge Pond discharge represents a greater portion of the combined flow.

The EFBW runs along the southern margin of the alluvial valley parallel to groundwater flow, as shown in Figure 1-1. Limited, synoptic discharge data were measured at four locations, identified as EFBW-1 through EFBW-4 (Figure 1-1). The EFBW loses approximately 363,000 to 821,000 cubic feet per day (ft^3/day) of water to groundwater over a 4.74-mile reach between Hindman, ID and Gimlet, ID (IDEQ 2019). Given this relationship within the Study Area, the EFBW loses approximately 96,900 to 219,000 ft^3/day to groundwater along the 1.27-mile subsection of the same reach of the EFBW. Stream stage data collected by Golder (2019) at EFBW-1 and EFBW-4 in September 2019 ranged from 0.15 to 1.3 feet across the river. LiDAR data from June 2019 (GeoTerra 2019) was used to approximate the riverbed elevation of the EFBW. These elevations were compared to groundwater elevations at nearby wells, MW-18A, MW-19A, and MW-20A, as shown in Figure 2-3. EFBW riverbed elevations were consistently higher than nearby measured groundwater elevations, indicating that the EFBW acts as a losing stream within the Study Area (Figure 2-3).

2.4 Groundwater Occurrence and Flow

Twenty-four monitoring wells within the Study Area, shown in Figure 1-1, were monitored for water level elevations between 1995 and 2023. Groundwater wells are instrumented with a datalogging pressure transducer and checked with periodical manual measurements. Wells screened in the valley walls (MW-1B, MW-7B-TT,

MW-10S, MW-11D, MW-6B, MW-8B) are screened in bedrock, which is not considered to be a significant recharge source to alluvial groundwater in the valley floor (IDEQ 2019) and therefore, these wells were not used for analysis of the Study Area. Groundwater elevation manual measurements and transducer data were plotted on hydrographs, as shown in Figures 2-4 through 2-6 and summarized in Section 2.4.1. Seasonal groundwater contours were created from manual measurements and transducer data, as shown in Figures 2-7 and 2-8 and summarized in Section 2.4.2. Hydraulic parameters are summarized in Section 2.4.3.

2.4.1 Hydrographs

Historical groundwater elevation data dating back to 1995 are shown in Figure 2-4 and recent groundwater elevation data from 2022 through 2023 (Tetra Tech 2024) are shown in Figure 2-5. Historical and recent groundwater elevation data show consistent groundwater flow directions and gradients within the Study Area. Groundwater primarily occurs within the coarse-grained unit and exhibits consistent horizontal gradients, with water levels fluctuating up to approximately 5 feet during the 2022-2023 water year, as shown in Figure 2-5. The highest groundwater elevations occur in the Spring when precipitation and snow melt provide recharge to groundwater, and the lowest elevations occur in the Fall when there is minimal recharge. Comparing the valley floor monitoring locations hydrographs show that groundwater elevations range from a maximum of approximately 6,102 feet NAVD88 at MW-1 in Spring 2023 to a minimum of approximately 5,999 feet NAVD88 at MW-17B in Fall 2022 and 2023. Figure 2-6 shows groundwater elevations across a cross-valley transect from MW-25A in the north, MW-13A in the valley floor between the UTP and LTP, and MW-24A in the south (see Figure 1-1 for well locations). This subset of wells shows recharge causing groundwater elevations to peak in May and June, and also shows how recharge is greater in the north from tributary valleys. MW-25A, located near the northern slope, shows a greater response to spring recharge than MW-24A, located closer to the river, indicating greater recharge from runoff along the northern slope where drainages form and funnel rainwater and snowmelt into the alluvium, as shown in Figure 2-6.

2.4.2 Groundwater Contour Maps

Groundwater contour maps for January 2023 (Figure 2-7) and July 2023 (Figure 2-8) show that groundwater flows from the northeast to the southwest, parallel to the EFBW. While groundwater elevations fluctuate seasonally, horizontal groundwater flow gradients remain constant at approximately 0.002 ft/ft. Inflow to the valley fill near the Triumph town site is estimated to be approximately 56,000 ft^3/day (USGS 2016) and 72,200 ft^3/day (IDEQ 2019). These inflow estimates will be used to guide model calibration.

2.4.3 Hydraulic Parameters

Hydraulic parameters, including vertical hydraulic conductivity, horizontal hydraulic conductivity, and effective porosity, were estimated from slug testing, infiltration testing, borehole lithologies, and literature sources (Fetter 2001, USGS 2016, IDEQ 2019). Onsite hydraulic testing consisting of infiltration testing and slug testing were performed to estimate hydraulic parameters of the fine-grained and coarse-grained units. Infiltration testing was conducted via double-ring infiltrometer testing in two test pits (TP-1 and TP-2) within the proposed infiltration ponds footprint in Fall 2023 (STRATA 2023). Reported infiltration rates ranged from 2.2 to 3.7 in/hr. These rates are used for a groundwater mounding analysis and groundwater flow modeling described in Section 3.

Twenty-four total slug tests on five wells were performed by Kennedy-Jenks (1997) and Golder (2019). Horizontal hydraulic conductivity was calculated from these tests and the results are summarized as follows:

- Kennedy-Jenks (1997) performed slug testing on monitoring wells MW-1B, MW-2B, MW-3B, and MW-4B. Calculated horizontal hydraulic conductivity ranged from 56 to 173 feet per day (ft/day). These wells have since been decommissioned.
- Golder (2019) performed 12 slug tests on monitoring well MW-23. Calculated horizontal hydraulic conductivity ranged from 13 to 95 ft/day.
- Hydraulic conductivity for the alluvial groundwater system was estimated to range from 1 to 1,900 ft/day (IDEQ 2019) and 24 to 2,800 ft/day (USGS 2016). Bedrock hydraulic conductivity was estimated to range from 2.5E-4 to 14 ft/day (USGS 2016).
- Vertical hydraulic conductivity was assumed to be one-tenth of horizontal hydraulic conductivity.

Effective porosity is estimated to be 0.2 (Fetter 2001) across the model domain. Hydraulic parameter estimates for each hydrostratigraphic unit, based on borehole lithologies, were also estimated from literature sources (Fetter 2001, USGS 2016, IDEQ 2019). Table 2-1 summarizes the potential range of hydraulic parameters to be used in the groundwater flow model.

Table 2-1: Hydraulic Parameters

Hydrostratigraphic Unit	Horizontal Hydraulic Conductivity (ft/day)	Infiltration Rate (in/hr)	Porosity	Source
Fine-Grained Unit (Model Layer 1)	0.0028 – 2.8		0.2	Fetter (2001)
Coarse-Grained Unit (Model Layer 2)	56 – 173			Kennedy Jenks (1997)
	13 – 95			Golder (2019)
	24 – 2,800			USGS (2016)
	1 – 1,900			IDEQ (2019)
		2.2 – 3.7		STRATA (2023)
Bedrock Unit (Model Layer 3)	0.00025 - 14			USGS (2016)

2.5 Water Quality (Surface and Groundwater)

Groundwater and surface water have been sampled at various locations throughout the history of the Site. The master parameters (pH and redox) and major parameters of interest at the Site from 2021 to 2023 are summarized below. At some locations, data as far back as October 2018 were also available and are included as part of this summary.

pH (field): In general, the pH of groundwater at the Site ranged from 5.82 to 8.54 between January 2021 and July 2023. The pH of surface water samples (Permanent Pond and Surge Pond) ranged from 6.9 to 8 between October 2021 and July 2023. Well MW-22A is located immediately downgradient of the proposed area of the

Infiltration Ponds and the geochemical composition of groundwater in this well was used to represent background groundwater quality for modeling purposes. The pH of groundwater in well MW-22A in July 2023 was 7.18.

Redox (field): The oxidation-reduction potential (ORP) of groundwater in the region ranged from -371 to +299 mV between January 2021 and July 2023, while the ORP of the surface water samples (Permanent Pond and Surge Pond) ranged from -211 to +218 mV. ORP in well MW-22A was measured at +112 in July 2023.

Arsenic: In general, arsenic concentrations in groundwater in the region ranged from non-detect to 7.33 mg/L between October 2018 and July 2023. Arsenic concentration in the surface water samples (Permanent Pond and Surge Pond) ranged from 0.004 to 2.55 mg/L between October 2018 and July 2023. The arsenic concentration in well MW-22A was 0.001 mg/L in July 2023.

Manganese: Manganese concentrations in groundwater in the region ranged from non-detect to 30.3 mg/L between October 2018 and July 2023. Manganese concentration in the surface water samples (Permanent Pond and Surge Pond) ranged from 0.001 to 7.78 mg/L between October 2018 and July 2023. The arsenic concentration in well MW-22A was 0.009 mg/L in July 2023.

Iron: Although not a parameter of potential environmental concern, iron is important because adsorption onto ferric oxyhydroxide is a primary attenuation mechanism for trace metals in the environment. Iron concentrations in groundwater in the region ranged from non-detect to 17.4 mg/L between October 2018 and July 2023. Iron concentrations in surface water samples (Permanent Pond and Surge Pond) ranged from non-detect to 43.9 mg/L between October 2018 and July 2023. The iron concentration in well MW-22A was 0.21 mg/L in July 2023.

Based on these results, the Site history, and additional data evaluation of surface and groundwater quality, arsenic and manganese were identified as the primary constituents of interest (COIs) at the Site. However, because geochemical modeling requires whole surface and groundwater sample chemistry (i.e. the seven major cations/anions, field parameters, and other trace metals), secondary evaluation of trace metals barium, cadmium, selenium, and uranium was also included in this evaluation.

2.6 Surface Water Mixing

The surface water compositions of samples SW-5 and SW-6 were mixed in appropriate proportions based on seasonal fluxes to the Surge and Permanent Ponds, mimicking the likely water quality that will be discharged into the proposed Infiltration Ponds. The results from the July 2022 sampling event for these locations were used because they represented the most thorough surface water quality testing recently completed. Results from subsequent sampling events at these locations (October 2022 and April 2023) were not used because major cations/anions were not measured in those samples. The mixing ratios, based on a high flux and low flux scenario, were 93.5% SW-6 and 6.5% SW-5 and 57.6% SW-6 and 42.4% SW-5, respectively. The two flux and mixing ratios were calculated by combining measured rates at SW-5 (the Surge Pond outlet) and SW-6 (The Permanent Pond outlet) on October 25, 2021, and July 25, 2022. At the time of the October 2021 measurement, SW-6 was flowing at approximately 91 gpm while SW-5 was flowing at 6.3 gpm. During the July 2022 measurement, SW-6 was flowing at 7.5 gpm while SW-5 was flowing at 5.5 gpm. Flows for both times were combined to a total of approximately 97 gpm for October 2021 and 13 gpm for July 2022. For both measurement dates, mixing ratios were calculated by dividing the flow from each individual pond from the total flow from both ponds. Based on these results, the flux rates of water entering the Infiltration Ponds for modeling scenarios were calculated to be 97 gpm and 13 gpm for the high and low flux scenarios, respectively.

The geochemical program Geochemist's Workbench® was utilized to mix the compositions of SW-5 and SW-6 at the appropriate ratios and pH/ORP was equilibrated and balanced with alkalinity. Geochemist's Workbench includes a module, Geochemist's Spreadsheet, that is specifically designed to simulate the mixing of different water qualities. The final water qualities for the low and high flux scenarios are provided in Table 2-2. The final mixtures for the low and high flux scenarios were then used as input surface water qualities for MIN3P and PHREEQC modeling as described in Section 3.3. These surface qualities served as the bounding cases for the initial geochemical modeling.

Table 2-2: Simulated Infiltration Water Quality for the Two Modeled Flux Scenarios

Parameter	Low Flux Scenario	High Flux Scenario
pH (S.U.)	7.05	6.99
Eh (mV)	+136	+143
Alkalinity, Total (mg/L as CaCO3)	206	222
Calcium (mg/L)	283	121
Magnesium (mg/L)	113	52
Potassium (mg/L)	7.5	5.4
Chloride (mg/L)	5.5	6.3
Fluoride (mg/L)	0.16	0.16
Sodium (mg/L)	40*	7.7
Sulfate (mg/L)	301	1015
Arsenic (mg/L)	0.180	0.241
Barium (mg/L)	0.029	0.043
Cadmium (mg/L)	8.9E-4	6.0E-4
Manganese (mg/L)	0.585	0.519
Iron (mg/L)	1.02	1.16
Nitrate (mg/L-N)	0.05	0.05
Selenium (mg/L)	0.002	0.003
Uranium (mg/L)	0.05	0.05

Note: Sodium was added to the simulated mixture for the low flux scenario to establish an electrochemically neutral solution

3.0 GROUNDWATER FLOW AND REACTIVE TRANSPORT MODELING

Groundwater flow and reactive transport models were used to evaluate the feasibility of the proposed infiltration ponds (WSP 2024). A 2-dimensional (D) infiltration model was developed to evaluate if the proposed infiltration ponds can accept the volume of water generated without ponding the water at the surface. Multiple 1-D transport models were developed to evaluate the transport of mine-impacted water from the proposed infiltration ponds through the vadose zone. These models evaluated changes to permeability and porosity, mineral precipitation, and saturation in the vadose zone and provided source terms for later modeling. Finally, a groundwater flow model was integrated with 3-D reactive transport modeling to evaluate if the proposed infiltration ponds can be

used to discharge mine-impacted water without further degradation of groundwater quality downgradient. The details of this approach and the results are described in the subsequent sections.

3.1 Infiltration System Mounding Analysis

The infiltration model was developed using MOUNDSOLV version 4.0 (Duffield, 2022) to evaluate the ability of the proposed infiltration ponds (WSP 2024) to accept mine-impacted water without generating a groundwater mound that would exceed the bottom elevation of the infiltration system. The proposed infiltration ponds are designed as a two-pond system located south of the Surge Pond and East Fork Rd, west of the LTP, and north of a delineated wetland, as shown in Figure 1-1. MOUNDSOLV is an analytical modeling software capable of simulating perturbation to a water table from steady-state or transient recharge sources (Duffield 2022). The software can simulate multiple constant recharge sources simultaneously; however, each simulation can only accept one constant recharge rate for each pond. The MOUNDSOLV model simulated parameters and boundary conditions are summarized in Table 3-1 and include pond dimensions, groundwater elevations beneath the ponds, recharge rates, horizontal hydraulic conductivity, and groundwater flow gradient. East and West Pond footprints are implemented as rectangles approximating their proposed footprint. Groundwater elevation measurements at MW--23 and groundwater contours for peak water table conditions during Spring 2023 were used as the initial (pre-infiltration) groundwater elevation beneath the ponds. Simulated recharge rates are calculated as the area of each pond multiplied by the measured infiltration rate of 3.0 in/hr and design infiltration rate of 1.2 in/hr. Horizontal hydraulic conductivity was estimated from hydraulic testing and literature values as described in Section 2.4. Hydraulic conductivity values used in the mounding analysis were taken from the slug testing in MW-23 performed by Golder (2019). The minimum value of 13 ft/day represents the lowest measured value, and the maximum value of 60 ft/day is representative of the upper range of measured values.

Table 3-1: Infiltration Pond Dimensions and MOUNDSOLV Input Parameters

Parameter	Value(s)	Unit(s)
East Pond Width	56	Feet
East Pond Length	112	Feet
East Pond Bottom Elevation	6,042	Feet NAVD88
West Pond Width	60	Feet
West Pond Length	132	Feet
West Pond Bottom Elevation	6,039	Feet NAVD88
Measured Infiltration Rate	3.0	inches/hour
Design Infiltration Rate	1.2	Inches/hour
Horizontal Hydraulic Conductivity	13 and 60	feet/day
Groundwater Elevation, East Pond	6,039	Feet NAVD88
Groundwater Elevation, West Pond	6,035	Feet NAVD88

Simulation results are summarized in Table 3-2. Four mounding conditions were simulated using the range of horizontal hydraulic conductivity values (13 and 60 ft/day) and the range of infiltration rates (1.2 and 3.0 in/hr). Constant rates were simulated for 365 days to reach steady-state conditions for each simulation. The most

conservative scenario, which simulates the lowest horizontal hydraulic conductivity of 13 ft/day and the greatest measured infiltration rate of 3.0 in/hr predicts a maximum groundwater table rise of approximately 1 foot at both the East Pond and the West Pond (Table 3-2). The predicted groundwater elevation after 1 year of infiltration in this scenario is 6,040 feet NAVD88 in the East Pond and 6,036 feet NAVD88 in the West Pond, indicating a depth to water beneath the pond bottom of 2 feet for the East Pond and 3 feet for the West Pond. The MOUNDSOLV simulation results indicate that the proposed infiltration ponds will be able to accommodate the designed infiltration rates without the groundwater table exceeding the bottom elevation of the ponds.

Table 3-2: MOUNDSOLV Simulation Results

Simulation Number	Horizontal Hydraulic Conductivity (feet per day)	Infiltration Rate (inches per hour)	East Pond Water Table Rise (Feet)	West Pond Water Table Rise (Feet)	Average Distance to Water Table (Feet)[1]
1	13	1.2	0.38	0.39	2.6
2	60	1.2	0.09	0.10	2.9
3	13	3.0	0.96	0.98	2.0
4	60	3.0	0.24	0.24	2.8

Note:

1. Average Distance to Water Table = averaged difference of east and west pond bottom elevation to simulated water table elevation

3.2 Groundwater Flow Modeling

A groundwater flow model was constructed using MODFLOW-USG, a control-volume finite-difference code (Panday et al. 2013) to evaluate groundwater flow and to inform the 3-D reactive transport model. MODPATH v. 7 (Pollock 2017) was used to evaluate pathlines of non-reactive particles and understand the flow path of water entering the proposed infiltration basin. The groundwater flow model is based on the groundwater conditions presented in Section 2.0. The groundwater flow model development, calibration, and results are presented below.

3.2.1 The Model Domain/Finite-Difference Grid

The groundwater flow model encompasses a 0.65 square mile area which includes the Permanent Pond, the area of the proposed infiltration ponds, the IDL property boundary, and 1.3 miles of the EFBW, as shown in Figure 1-1. The grid consists of a uniform domain of 25-foot by 25-foot cells. Figure 3-1 shows an overview of the model domain. The groundwater flow model consists of three model layers representing the fine-grained unit, the coarse-grained, unit, and bedrock. The tops and bottoms of these layers were constructed using a 30-m DEM and 1-m LiDAR data (Idaho LiDAR Consortium 2016, GeoTerra 2019), borehole logs, test pits, geophysical survey data, and literature sources. The LiDAR data collected for the Site in June 2019 (GeoTerra 2019) and for the EFBW region (Idaho LiDAR Consortium 2016) were used to generate the top surface of the model, representing ground surface. The top of the coarse-grained layer and the top of bedrock layer were developed using the Natural Neighbor (Sibson 1981) method in ArcMap v. 10.8. 29. Borehole logs and one test pit were used to interpolate the elevation of the contact between the fine-grained layer (model layer 1) and the coarse-grained layer (model layer 2), and 16 borehole logs were used to interpolate the top of the bedrock layer (model layer 3).

All three layers extend throughout the active model domain. The following summarizes the lithologies, thicknesses, and elevations of each layer:

- The fine-grained layer (model layer 1) consists of silts and silty sands. Layer 1 incorporates the LTP and thus its top surface is elevated above its surroundings in the upgradient area of the model domain. Elevations of the top of layer 1 range from about 6,244 feet NAVD88 at the eastern (upgradient) end of the domain to 5,948 feet NAVD88 at the western (downgradient) end of the domain. Thicknesses in Layer 1 range from 2 feet at the edges of the active model domain to 40 feet in the center of the model domain. Elevations for the top of layer 1 are shown in Figure 3-2.
- The coarse-grained layer (model layer 2) consists of gravels and sandy gravels and represents the primary water-bearing formation in the model domain. Elevations of the top of layer 2 range from 6,241 feet NAVD88 at the upgradient end of the domain to 5,944 feet NAVD88 at the downgradient end of the domain. Thicknesses in Layer 2 range from 2 feet at the edges of the active model domain to 142 feet in the center of the domain. Elevations for the top of layer 2 are shown in Figure 3-3.
- The bedrock (model layer 3) consists of relatively impermeable argillites and limestones. Elevations for the top of layer 3 are shown in Figure 3-4. Elevations of the top of layer 3 range from 6,213 feet NAVD88 at the upgradient end of the domain to 5,861 feet NAVD88 at the downgradient end of the domain. Bedrock is generalized to a uniform 50 feet thickness. Elevations at the bottom of the model domain range from 6,163 feet NAVD88 to 5,811 feet NAVD88.

3.2.2 Boundary Conditions and Flow Parameters

Boundary conditions for the groundwater flow model include no-flow boundary conditions, constant head boundary conditions, river boundary conditions, and recharge, as shown in Figure 3-1. The no-flow boundary conditions represent the edge of the valley fill where the bedrock walls are steep to the north and south of the active model domain. It is assumed there is minimal groundwater flow beyond these boundaries. The constant head (CHD) boundaries at the upgradient (eastern) and downgradient (western) edges of the model domain represent groundwater flow into the model domain and out of the model domain, as shown in Figure 3-5. The constant head boundary conditions were adjusted during model calibration to match the observed groundwater elevations and horizontal groundwater gradient. In addition, the upgradient (eastern) constant head boundary was adjusted to be within the range of estimated inflow to the valley fill near Triumph, which ranged from approximately 56,000 ft^3/day to 72,200 ft^3/day. The upgradient (eastern) boundary is set at 6,058 feet NAVD88 and the downgradient (western) boundary is set at 5,928 feet NAVD88.

River boundary cells represent the EFBW. The river boundary was generated using LiDAR data and the conceptualization of the EFBW as a losing stream. The river bottom elevation was taken from LiDAR data, and river stages were measured at two locations, EFBW-1 and EFBW-4, within the Study Area, showing a river depth range from 0.15 to 1.3 feet. The riverbed stage and hydraulic conductivity was adjusted during calibration to match the observed groundwater elevations and to be within the range of estimated EFWR loss to groundwater over the simulated EFWR reach, which ranged from 96,900 to 219,000 ft^3/day. The calibrated river boundary parameters are summarized below:

- Stage: 2 feet
- Riverbed Thickness: 1 foot
- Width of River: 22 feet

- Length of River: 25 feet
- Riverbed Hydraulic Conductivity: 0.5 ft/day
- Riverbed Conductance: 2.78 ft^2/day

The Recharge (RCH) package was used to simulate recharge from precipitation and overland flow. Three recharge rates were applied to the land surface, model layer 1, as shown in Figure 3-1. Recharge zone 1, the recharge rate through the majority of the model domain, represents precipitation minus evapotranspiration; recharge zone 2 represents the area without vegetation, including the Permanent Pond and tailings pile; and recharge zone 3 represents recharge runoff from the northern slope along the valley where drainages form and funnel rainwater and snowmelt into the valley. Recharge rates were adjusted during calibration within the precipitation range described in Section 2.1. The average measured precipitation rate for July 2023, the month for which calibration was performed, was 0.003 ft/day. Recharge zone 1 rate of 0.001 ft/day represents one-third of the average measured precipitation, with the assumption that 2/3 of precipitation is transpired; recharge zone 2 rate of 0.003 ft/day represents the average measured precipitation for July 2023, which assumes there is little to no evapotranspiration; and the recharge zone 3 rate of 0.025 ft/day represents rainfall runoff and snow melt recharging the alluvium along the slope. The calibrated recharge rates resulted in the best match to observed water level elevations, for the assumed hydraulic conductivities embedded in the model.

Table 3-3 shows the potential range and calibrated values of hydraulic conductivity for each layer. Calibrated values fall within the expected range for each layer.

Table 3-3: Calibrated Hydraulic Conductivities

Layer	Type	Estimated Horizontal Hydraulic Conductivity	Calibrated Horizontal Hydraulic Conductivity	Calibrated Vertical Hydraulic Conductivity
1	Fine-Grained	0.028 to 2.8 ft/day	1.0 ft/day	0.1 ft/day
2	Coarse-Grained	13 – 173 ft/day	50 ft/day	5 ft/day
3	Bedrock	2.5×10^{-4} to 14 ft/day	0.1 ft/day	0.01 ft/day

ft/day = feet per day.

3.2.3 Model Calibration

Model calibration is the process of adjusting the model parameters (hydraulic properties and boundary conditions) within observed or reasonable ranges based on the conceptual model of the Site, until the model reasonably replicates observed hydrogeologic conditions. Initially, the model contained initial estimates for hydraulic conductivity, specific storage, specific yield and porosity, river stage, river conductance, recharge, and constant head boundary conditions. During calibration, model hydraulic parameters and boundary conditions were adjusted within reasonable parameter ranges, as summarized in Section 2.0. The model was calibrated to low flow conditions using 19 total water elevation measurements from July 2023, as shown in Figure 3-6. In addition to matching the water level elevations, the model was calibrated to the observed groundwater flow directions, horizontal gradients, and water balance estimates. The resulting calibrated hydraulic conductivities are summarized in Table 3-3. The calibrated water balance is summarized in Table 3-4.

Table 3-4: Calibrated Groundwater Flow Model Water Balance

Simulated Boundary Conditions	Estimate (feet^3/day)	Calibrated Model (feet^3/day)
Eastern Constant Head Inflow	56,000 – 72,700[1]	74,481
Western Constant Head Outflow	None	186,582
River Net Inflow	98,600[2]	71,475
Recharge Inflow	None	40,626

Notes:

feet^3/day = cubic feet per day.

Inflow = Water flux from boundary conditions into groundwater.

Outflow = Water flux from groundwater out of model domain.

River net inflow = net water flux to groundwater from River boundary condition after outflows are subtracted.

1. Estimated inflow to the valley fill aquifer, near Triumph, of 610 acre-feet per year (IDEQ 2019)

2. East Fork Big Wood River estimated to lose approximately 3,040 to 6,880 acre-feet per year to the valley fill aquifer over the approximately 4.75-mile reach between Hyndman, ID and Gimlet, ID (IDEQ 2019).

Simulated contours shown in Figure 3-6 compare well to the observed contours shown in Figure 2-6. Residual values, calculated as the difference between the simulated and observed groundwater elevations are shown in Figure 3-5. Negative values indicate that the model predicted groundwater elevations lower than those observed, and positive values indicate overprediction. The calculated residuals range from -5.28 feet to 9.76 feet with a residual mean of 1.52 feet indicating that simulated water levels are slightly higher than observed overall. The simulated versus observed values are shown in Figure 3-7. The simulated water level elevations are generally within 5 feet of observed values except for three wells partially or completely screened in bedrock: MW-9B, MW-25A, and MW-17B, as shown in Figures 3-6 and 3-7. Table 3-5 summarizes the groundwater flow model calibration statistics. The scaled absolute residual mean, scaled standard deviation, and scaled Root Mean Square (RMS) error are less than 10 percent, indicating a good calibration.

Table 3-5: Groundwater Flow Model Calibration Statistics

Statistic	All Targets
Number of Observations	19
Minimum Residual	-5.28 feet
Maximum Residual	9.76 feet
Resid. Sum of Squares	2.61E+02 feet^2
RMS Error	3.71 feet
Residual Standard Deviation STD	3.38 feet
Absolute Residual Mean	2.79 feet
Residual Mean	1.52 feet

Statistic	All Targets
Range of Observations	63.98 feet
Scaled Residual Standard Deviation STD	5.3%
Scaled Absolute Residual Mean	4.4%
Scaled RMS	5.8%

3.2.4 Groundwater Flow Model Simulations and Results

The calibrated groundwater flow model was used to simulate a predictive infiltration scenario. The horizontal hydraulic conductivity within the area of the ponds was updated to 45 ft/day and the vertical hydraulic conductivity was updated to 5 ft/day to represent excavation into the deeper layer. An additional recharge zone was assigned to the area of the proposed infiltration ponds to represent the design infiltration rate (1.2 in/hr) and the measured infiltration rate (3.0 in/hr), equating a low pond flux scenario and a high pond flux scenario. The low pond flux and high pond flux infiltration rates represent a range of possible recharge rates, actual recharge rates vary seasonally as the combined discharge from the Surge Pond and Permanent Pond fluctuate, as shown in Figure 2-2. Using MODPATH v. 7 (Pollock 2017), particles were seeded within the area of the proposed infiltration ponds to simulate pathlines downgradient from the Infiltration Ponds. Given the simulated steady-state flow conditions for both the low pond flux and high pond flux scenarios, infiltrated particles travel approximately 0.4 miles after one year and approximately 0.8 miles after two years, as shown in Figure 3-8 and Figure 3-9. Simulated pathlines indicate mine-impacted water infiltrated at the proposed infiltration ponds travels to the southwest parallel to the EFBW and that water does not discharge to surface water, or a functional equivalent, as shown in Figures 3-8 and 3-9.

3.3 Geochemical Modeling

Three geochemical computational codes were utilized to evaluate the potential effectiveness of the proposed Infiltration Ponds. These model codes were MIN3P, PHREEQC, and PHAST and each was used for specific evaluations. These computational codes can be described as follows:

- MIN3P is a general reactive transport code for simulating saturated and unsaturated water flow, and thermodynamic and kinetic reactions between aqueous, mineral, and gas phases (Su et al. 2021). The MIN3P code includes gas diffusion and advection, advective diffusive transport, oxidation-reduction reactions, and surface complexation. The ability of MIN3P to account for unsaturated flow conditions, gas transport, and the simultaneous simulation of flow, mineral weathering, and transport reactions make MIN3P a valuable tool to generate robust simulations of the subsurface and predict resulting changes in groundwater and aquifer quality through time.
- The geochemical modeling code PHREEQC V.3.7 was used to support the work presented in this report. PHREEQC V.3.7 is a general-purpose geochemical and reactive transport modeling computer code developed by the U.S. Geological Survey for reactions in water and between water and rocks and sediments (Parkhurst and Appelo 2013). Reactions available for simulation include aqueous equilibria, mineral dissolution and precipitation, ion exchange, surface complexation, solid solutions, gas-water equilibrium, and

kinetic biogeochemical reactions. The Minteq v.4 database (2016) was used as a basis for Thermodynamic Database (TDB) (Allison et al. 1991).

- The geochemical model PHAST V.3 is a computer program developed by the U.S. Geological Survey that simulates multicomponent reactive solute transport in a 3-D saturated groundwater flow system (Parkhurst et al. 2010). PHAST is a versatile groundwater flow and solute transport simulator with capabilities to model a wide range of equilibrium and kinetic geochemical reactions. The flow and transport calculations are based on a modified version of the Heat and Solute Transport Program (HST3D) that is restricted to constant fluid density and constant temperature. The geochemical reactions are simulated with the geochemical model PHREEQC, which is embedded in PHAST. In this application, results from MODFLOW were directly used as initial and target values to ensure seamless model coordination. Thus, flow was not solved independently.

Each model code was applied as follows:

- The initial modeling that was conducted utilized MIN3P to evaluate vadose zone saturation and potential changes to porosity from mineral precipitation and adsorption to ferric oxyhydroxides for the two flux scenarios. The model input parameters (chemistry and transport characteristics) mirrored those used subsequently for the PHREEQC model development. The derivation of the input chemistries for the high and low flux scenarios, based on mixing the geochemical compositions of SW-5 and SW-6, is described in Section 2.6, Table 2-2. A conceptual model for this approach (and the subsequent PHREEQC model) is provided in Figure 3-10. The water qualities exiting the MIN3P model (simulated bottom of the Infiltration Ponds) were utilized for the scenarios developed in the PHAST modeling. The simulation was run for a total of 30 years and, during that time frame, water exiting the model (vadose zone) evolves as adsorption sites reach capacity. Models were only run for 30 years (as opposed to 50 years for subsequent PHAST modeling) because the model results had achieved steady-state with respect to the water quality exiting the model (entering the simulated saturated zone) at this point.
- The second series of models used the code PHREEQC to evaluate changes in dissolved metal concentrations as a source term for PHAST modeling by evaluating adsorption onto newly precipitated minerals, specifically iron hydroxide. The MIN3P code is unable to evaluate this process because this code does not allow adsorption onto minerals that precipitate during the modeling cycles. For this approach, a 1-D transport model in PHREEQC was developed for each scenario that allowed for the sorption of metals in infiltration onto newly precipitated iron hydroxide in the vadose zone. The resulting water qualities from the PHREEQC models were then used as inputs into the 3-D PHAST modeling. The results indicated water quality will evolve over the life of the Infiltration Ponds as adsorption sites in the vadose zone reach capacity and minerals are precipitated. The PHREEQC models were also just run for 30 years because the model results achieved steady-state with respect to the water quality exiting the model (entering the saturated zone) at this point.
- The third computational code, PHAST, was used to determine if concentrations of the COIs will exceed the groundwater protection standard (GWPS) downgradient of the property boundary in any model scenario within 50 years. This approach consisted of updating the existing 3-D reactive transport model with recently collected base groundwater quality data (MW-22) and aquifer solids data, as well as revisions to the flow component from groundwater modeling. In addition, the infiltration water qualities in the PHAST (saturated zone) flux scenarios were based on the results of the MIN3P and PHREEQC models, rather than just mixing SW-5 and SW-6. Consistent with groundwater modeling, the grid of the PHAST model was set 25 feet by 25 feet lateral and horizontal, but 34 feet vertically. The vertical gridding does not match groundwater flow

model layering because reactive transport modeling uses a cell grid basis for reactions rather than aligning with groundwater model layers. The PHAST model was revised with groundwater model exports (Section 3.2) for flow, hydraulic head, conductivities, and boundary conditions as described in those sections. Lateral and horizontal dispersivity were both set at 40 feet and vertical dispersivity was set at 2.5 feet based on groundwater average lateral and vertical velocities, timestep length, and node spacing to minimize numerical dispersion based on Parkhurst et al. (2010), where Peclet*(1+ Courant) < 2. A total of three different scenarios were modeled in PHAST to account for the differing flux rates and flux water quality, to evaluate the effect of sorption and precipitation in the vadose zone on the resulting concentrations of arsenic and manganese in the saturated model (see Table 3-6 for a summary of scenarios).

The model architecture for PHAST used an updated regional 3-Dl numerical groundwater flow model for the Site, constructed in MODFLOW (Section 3.2) and is described in Section 4.0.

Table 3-6: Summary of Model Scenarios and Model Codes

Model Purpose	Model Code	Adsorption	Model Scenario	
Vadose Zone (1-D)	PHREEQC	Includes adsorption to precipitated iron hydroxides	High Flux (80 to 100% saturation)	
	PHREEQC		Low Flux (60 to 100% saturation)	
	MIN3P	No adsorption onto precipitated minerals		
Saturated Zone (3-D)	PHAST	Includes adsorption to precipitated iron hydroxides in the saturated zone	High Flux	PHREEQC infiltration
			Low Flux	PHREEQC infiltration
			Low Flux	MIN3P infiltration

3.3.1 Surface Complexation

Surface complexation can be described using a mechanistic model to account for adsorption onto metal oxide surfaces. The theory is based on Dzombak and Morel (1990) and Karamalidis and Dzombak (2011) utilizing iron (hydrous ferric oxide [Hfo]) as ferrihydrite $Fe(OH)_3$ and aluminum (hydrous aluminum oxide [Hao]) as gibbsite $Al(OH)_{3(am)}$ as adsorbing surfaces based on their concentrations measured in representative solids. Surface site densities are then calculated from these values using formulas for Hfo and Hao, based on Dzombak and Morel (1990) and Karamalidis and Dzombak (2011), respectively. Surface sites are allowed and assumed to obtain equilibrium with ambient groundwater to establish a pre-loaded background condition. The surface complexation model for ferrihydrite includes both strong sites (Hfo_strong) and weak sites (Hfo_weak), which are treated as different surface sites in PHREEQC based on the Dzombak and Morel (1990) model. The surface complexation model for gibbsite only has a single adsorption site type.

A secondary iron surface site (strong and weak) was developed to allow newly precipitated ferrihydrite to become an adsorptive surface without overwriting existing surface sites calculated from sequential extraction. This was done to ensure specified surface sites for the domain were present during the initial condition of the model (as measured from site-specific soil testing data), but then to allow for additional adsorption, if indicated, by

precipitated ferrous iron, as ferrihydrite. This was essential to the modeling approach given the iron concentration in the flux solutions of > 1.0 mg/L infiltrating into oxic groundwater. Without specifying adsorption sites during the initial condition, ferrihydrite is subject to equilibration and is affected by both redox and pH equilibration, causing the dissolution and non-consistency of surface sites in the models. Both MIN3P and PHREEQC indicated the precipitation of ferrihydrite during 1-D modeling (Section 4.0), supporting results of soil analysis and visual evidence for the presence of iron precipitates at the Site. However, the code MIN3P is unable to allow for adsorption to mineral precipitates. For this reason, PHREEQC was also used for the evaluation of attenuation in the vadose zone. While PHREEQC assumes saturated conditions, the MIN3P results indicated greater than 84% saturation in the vadose zone, confirming the use of PHREEQC is reasonable.

To calculate initial adsorption sites for surface complexation, the mass of iron and aluminum in sediment/soil samples was converted using methods described by Dzombak and Morel (1990) and Karamalidis and Dzombak (2011). This was used in combination with the calculation methodology of Appelo and Postma (2005) to calculate the specific quantity of sites on each mineral surface type as well as the amount of each mineral available to participate in the reactions. Briefly, the methodology assumes the number of surface sites (sites) equals the product of the moles of iron ([Fe]) and moles of surface sites per moles of iron ([sites]/[Fe]) (i.e., sites = [Fe] x [sites]/[Fe] or $5.5x10^{-4}$ mol = $2.75x10^{-3}$ mol iron x 0.2 mol sites/mol iron). For the amount of ferrihydrite available for sorption, the Appelo and Postma methodology assumes the mass of ferrihydrite ($_{M}$HFO) in grams (g) available equals the product of [Fe] and the molecular weight of ferrihydrite ($_{MW}$HFO) (i.e., $_{M}$HFO = [Fe] x $_{MW}$HFO; or 0.24 g = 2.75x10-3 mol x 88.85 g/mol). The same approach was used for aluminum. Aluminum, based on Karamalidis and Dzombak (2010), only has a single adsorption site type, at 0.41 mol sites/mol aluminum and a molecular weight of 78 g/mol of $Al(OH)_3$.

Because the quantity of reactive surface sites is dependent on the amount of total iron and aluminum in the soil, the amount of Hfo and Hao present is important to the model. The values for ferrihydrite and gibbsite used for the calculations were based on data presented in Appendix C where iron concentrations in Steps 3 and 4 of Sequential Extraction Procedure (SEP) ranged from 3,100 to 8,000 milligram per kilogram (mg/kg) with a geometric mean of 5,310 mg/kg. Aluminum concentrations in the same steps ranged from 290 to 3,400 mg/kg with a geometric mean of 2,184. The SEP method was based on a modified Tessier et al. (1979) method. To represent the range of concentrations at the Site, the minimum, maximum, and geometric mean of iron and aluminum in the 3rd and 4th fractions of SEP were used to represent iron and aluminum available for attenuation. The resulting calculated surface site density and mass for geochemical modeling are presented in Table 3-7.

The geochemical thermodynamic database Minteq v.4 is a widely accepted database compiled from numerous sources by the United States Environmental Protection Agency (USEPA). However, the Minteq v.4 database does not include partitioning coefficients for metals on gibbsite developed by Karamalidis and Dzombak (2011), iron adsorption constants on carbonate (Van Green et al. 1994), and uranium and iron constants (Liger et al. 1999). Due to the need for these constants to model attenuation on gibbsite surfaces, they were included in the standard Minteq v.4 database to supplement the existing thermodynamic data.

Table 3-7: Surface Parameter Calculations Used for Geochemical Modeling

Parameter	Units	Ferrihydrite			Gibbsite		
		Minimum	Mean	Maximum	Minimum	Mean	Maximum
Geometric Mean of Aquifer Solids Composition	mg/kg X	3,100	5,310	8,000	290	2,184	3,400
	mol X	5.55E-02	9.51E-02	0.143	1.07E-02	8.09E-02	0.126
Surface Site Concentration	mol weak* sites / mol X	0.2			0.41		
	mol strong* sites / mol X	0.005					
Surface Sites	mol weak	1.1E-02	1.9E-02	2.9E-02	4.4E-03	3.3E-02	5.2E-02
	mol strong	2.8E-04	4.8E-04	7.2E-04			
Mass of Ferrihydrite/ Gibbsite	grams	4.93	8.45	12.7	0.838	6.31	9.83

*For gibbsite there is only a single site, unlike ferrihydrite which has both weak and strong sites

3.4 Reactive Transport Modeling Results

WSP assessed the potential for pore clogging (from mineral precipitation), vadose zone saturation, and the potential for concentrations of COIs to exceed the Site Maximum Concentration Limit (MCL) based on the two flux scenarios. Based on these evaluations, the following conclusions can be reached:

- MIN3P modeling indicated that in the low flux scenario, the vadose zone becomes approximately ≥ 60% saturated (Figure 3-11) while in the high flux scenario, the vadose zone becomes approximately ≥84% saturated (Figure 3-12). Additionally, the results from the MIN3P modeling indicated that the minerals ferrihydrite and calcite would precipitate in the upper area of the vadose zone in the low flux scenario. In the high flux scenario, ferrihydrite is indicated to precipitate but calcite is not. After 30 years, approximately 3.5 mg/kg ferrihydrite is modeled to have formed in the first 0.4 m of the vadose zone under the low flux scenario (Figure 3-13) and approximately 35 mg/kg is modeled to have formed in the same area under the high flux scenario (Figure 3-14). Modeling indicated that porosity would only decrease by approximately 1% in the low flux scenario (Figure 3-15) and approximately 5% in the high flux scenario (Figure 3-16) due to this mineral precipitation.
- The modeling code PHREEQC allows for the creation of additional surface complexation sites as ferrihydrite precipitates in the vadose zone and was used to evaluate the infiltration water quality as it exited the vadose zone. Modeling in PHREEQC indicated that the concentrations of COIs exiting the vadose zone would be lower compared to the results from MIN3P due to the fact that sorption was accounted for. MIN3P modeling indicated that arsenic concentrations would decrease from an influx concentration of 0.18 mg/L in the low flux scenario to a concentration of 0.095 mg/L. The results of the PHREEQC simulation, using the same model

parameters, indicated that the highest arsenic concentrations entering the saturated zone would be 0.002 mg/L during the 30 years modeled. MIN3P modeling also indicated that manganese concentrations would remain constant at 0.58 mg/L exiting the vadose zones, while PHREEQC indicated concentrations would range from 0.01 to 0.1 mg/L at the end of the infiltration simulation (30 years). PHREEQC modeling also indicated that iron concentrations in infiltration water decreased from 1.02 to 0.01 mg/L as precipitation and sorption occurred, while MIN3P indicated iron concentrations would only decrease to 0.43 mg/L. The lower concentration of these COIs from the PHREEQC modeling indicates adsorption of arsenic and manganese in the vadose zone on newly precipitated iron hydroxides is predicted to occur. Of note, infiltration water quality of the high flux scenario was only modeled using PHREEQC as the MIN3P modeling indicated that the vadose zone was >80% saturated for the duration of the simulation.

- Because of the potential differences in infiltration water quality between MIN3P and PHREEQC modeling, two PHAST models for the low flux scenario were developed. The infiltration water quality exiting the vadose zone from MIN3P was used as the input for one scenario while the infiltration water quality from PHREEQC was used as the input for the other scenario, with any distinct changes in water quality based on time interval being included in the PHAST models. However, infiltration water quality for the low flux scenario from MIN3P modeling achieved steady-state after approximately 10 years. The other two PHAST models (low and high flux scenario) utilized the infiltration water quality results from PHREEQC (see Table 3-4 for scenarios). The infiltration water chemistries based on the PHREEQC modeling did not become constant until approximately 30 years later. The results of the combined MIN3P, PHREEQC, and PHAST modeling are described in the following sections and summarized in Table 4-1.
  - In the low flux scenario, PHAST modeling predicts that arsenic concentrations will not increase above the MCL of 0.01 mg/L at the IDL property boundary after 50 years of infiltration based on infiltration water quality from MIN3P and PHREEQC (Figures 3-17 and 3-18). Arsenic entering the saturated zone by infiltration, based on PHREEQC and MIN3P modeling, is predicted to range from 0.002 to 0.095 mg/L, respectively, but attenuate quickly to below the MCL (Figures 3-17 and 3-18).
  - In the high flux scenario, arsenic concentrations are not expected to exceed the MCL at the IDL property boundary after 50 years. However, directly under the infiltration ponds, the maximum concentration of arsenic is predicted to be up to 0.098 mg/L (Figure 3-19).
  - Manganese is not predicted to exceed the secondary MCL (0.05 mg/L) at the IDL property boundary in either of the low flux PHAST models after 50 years of infiltration. Directly under the infiltration ponds, modeling predicts a maximum manganese concentration of 0.27 mg/L in the MIN3P scenario (Figure 3-20). When modeling the same scenario using the infiltration water quality from PHREEQC, the maximum manganese concentration in groundwater below the ponds is modeled to be 0.048 mg/L after 50 years (Figure 3-21).
  - In the high flux scenario, manganese concentrations are expected to exceed the secondary MCL at the IDL property boundary after approximately 20 years of infiltration (Figure 3-22).
  - Additional trace metals barium, cadmium, selenium, and uranium were included in this evaluation for assessment of potential exceedances above their respective MCLs, but none are anticipated to do so based on modeling results.

Table 4-1: Summary of Results of Reactive Transport Modeling using PHAST

Parameter	Infiltration Scenario		
Design Infiltration Rate	13 GPM (Low Flux)		97 GPM (High Flux)
Vadose Zone Model	MIN3P	PHREEQC	PHREEQC
Arsenic	no exceedance expected at property boundary after 50 years		
Manganese	no exceedance expected at property boundary after 50 years		exceeds MCLg (0.05 mg/L) at property boundary after 20 years

4.0 MODEL LIMITATIONS

Several simplifications, assumptions, and approximations have been made in developing the groundwater flow and reactive transport models at the Triumph Mine Site. The models have been developed to simulate combined mine-impacted from collections ponds discharged to the proposed infiltration ponds and to evaluate possible ponding within the proposed infiltration ponds, groundwater quality downgradient from the proposed infiltration ponds, and the fate of discharged mine-impacted water. The groundwater flow and reactive transport models have been developed to meet the modeling objectives and should not be used beyond this purpose. The limitations of the modeling efforts are summarized in the subsequent sections.

4.1 MoundSolve limitations and assumptions

The assumptions inherent to the mounding analysis and limitations of those modeling results can be summarized as follows:

- The proposed infiltration ponds geometry was approximated using rectangles.
- The recharge rates used to simulate mine-impacted water discharged into the proposed infiltration ponds are constant.
- The horizontal hydraulic conductivity value is assumed to be homogeneous and isotropic.
- The analytical method used in MOUNDSOLVE (Duffield 2021) is not capable of simulating time-varying infiltration rates; thus, measured recharge rates are conservatively simulated for 1 year of model time to calculate a steady-state groundwater elevation that would result from this condition.

4.2 Groundwater Flow Model Limitations and Assumptions

The assumptions inherent to the groundwater flow model and limitations of those modeling results can be summarized as follows:

- Representation of the model domain by discrete finite-volumes, approximation of groundwater flow by the continuity equation and Darcy's Law, and the approximation of steady-state conditions create a simplified representation of the flow system.

- The groundwater flow system is simulated as steady-state, representing average low flow conditions as typified by conditions in July 2023.
- The hydraulic conductivity values are assumed to be homogeneous and isotropic within each model layer representing an average condition within each hydrostratigraphic unit, when in fact, hydraulic properties vary within the model domain.
- The effective porosity is assumed to be homogenous throughout the model domain representing an average condition, when in fact, effective porosity varies across the model domain and within each hydrostratigraphic unit.
- The hydrostratigraphy is simplified into three continuous horizontal layers.
- Give the lack of river stage measurements, LiDAR data was used to approximate the EFBW boundary condition.
- Recharge rates used for the proposed infiltration ponds discharge scenarios assume low-flow and high-flow discharge rates are constant and steady-state, when in fact, the volume of water combined pond water varies seasonally and ranges between the low-flow and high-flow rates.
- The calibrated hydraulic properties reflect the available data, and represent the conditions at and around the proposed infiltration ponds and not the entire model domain.

4.3 Geochemical Modeling Assumptions and Limitations

The assumptions inherent to the geochemical modeling exercise and limitations of those modeling results can be summarized as follows:

- Surface water data from the July 2022 sampling event were used to represent surface water quality at SW-5 and SW-6.
- Groundwater data from the July 2023 sampling event were used to represent background groundwater quality (MW-22A).
- Water chemistries and flux rates in models and scenarios were constant for PHREEQC, MIN3P, and PHAST for the duration of the simulations and did not change seasonally.
- Groundwater “total” values were used rather than dissolved due to the lack of dissolved data for the Site. Sample results used in the model had turbidity values less than 10 NTU.
- The model time in MIN3P was adjusted internally to minimize numerical dispersion and obtain model convergence. The time step for PHREEQC and PHAST modeling was adjusted manually to do the same and was based on groundwater velocity and transect lengths.
- All reactions occur at thermodynamic equilibrium (i.e., no kinetics or other time-dependent expressions were used to describe the chemical reactions).
- All sorption reactions occur on Hfo and Hao, in the form of metal (hydr)oxide minerals. Other aquifer materials such as clays and particulate organics may play a role in metal attenuation, but these were not included in this modeling effort.

- The attenuation modeling accounts for competitive adsorption from major cations, anions (specifically including sulfate and carbonate), and metal species where thermodynamic data were available from Dzombak and Morel (1990) and Karamalidis and Dzombak (2011).
- Sorption sites in MIN3P were required to be kept constant while new sorption sites in PHREEQC and PHAST were allowed to form by precipitating new iron hydroxide.
- All chemical reactions in the system are described using the equilibrium constants published by the USEPA Minteq v.4 thermodynamic database (Allison et al. 1991) as well as the additional thermodynamic data included in files from Dzombak and Morel (1990) and Karamalidis and Dzombak (2011).

5.0 CONCLUSIONS

The groundwater flow and reactive transport models have been developed to meet the modeling objectives outlined in Section 1.0. Based on the results of the modeling efforts the overall conclusions can be summarized as follows:

- **Mounding Potential Evaluation:** Maximum and minimum infiltration rates and hydraulic conductivities for the underlying groundwater system were used to evaluate the ability of the proposed infiltration ponds to accommodate the volume of discharge water without ponding the water at the surface. Conservative recharge fluxes described in Section 3.1 result in a maximum groundwater table rise of 1 foot, corresponding to a minimum vadose zone thickness of 2 feet.
- **Groundwater Fate Evaluation:** The results of the groundwater flow modeling effort indicate mine-impacted water discharged to the proposed infiltration ponds travels to the southwest parallel to the EFBW and that water does not discharge to surface water or the functional equivalent given model assumptions described in Section 3.2.
- **Metals Infiltration:** The results of the geochemical modeling indicate the vadose zone is an important component for attenuation of arsenic and manganese at the Site. In both cases, the precipitation of iron hydroxide was predicted, which will provide additional attenuation capacity, due to the elevated iron concentration in the mine discharge water. Mineral precipitation led to a decrease in porosity of approximately 1% in the low flux scenario and approximately 5% in the high flux scenario. Arsenic and manganese both showed abundant attenuation in both the vadose and saturated zone. However, modeling indicated manganese would still exceed the MCLg at the IDL property line after 20 years of infiltration under the high flux scenario. In the low flux scenario, manganese did not exceed the MCLg at the property boundary after 50 years. Thus overall, the vadose zone demonstrates significant influence on improving the overall quality of the mine water discharge entering the saturated zone and manganese is the only constituent (high flux scenario only) predicted to exceed the MCL/MCLg at the IDL property line after 50 years of infiltration.
- **Recommendations:** The results of the models indicate manganese would exceed the MCLg at the IDL property in approximately 20 years after the infiltration ponds are functional, based on the high flux scenario. The high flux scenario was used as a conservative approach to evaluating groundwater quality. High flux is historically seen in short seasonal durations. Pre-treatment for manganese should be considered to decrease metal loads entering the infiltration ponds and passing through the vadose zone which would likely extend the time until manganese exceeds the MCLg at the IDL property boundary or alleviates the exceedance altogether. A groundwater monitoring program should be implemented for the aquifer downgradient of the

infiltration ponds to ensure the infiltration ponds and any pre-treatment strategies introduced perform as expected before offsite migration exceeds MCLg for constituents of concern.

WSP USA Inc.



Kate E. Richards, LG, LHG
Assistant Vice President, Hydrogeologist



PJ Nolan, Ph.D.
Assistant Vice President, Chemical Science

https://wsponlinenam.sharepoint.com/sites/us-altatriumphminemodel/31407131001 triumph mine model/6. deliverables/report/31407131.001-rev0-triumphmine_flowandreactivetransport-09032024.docx

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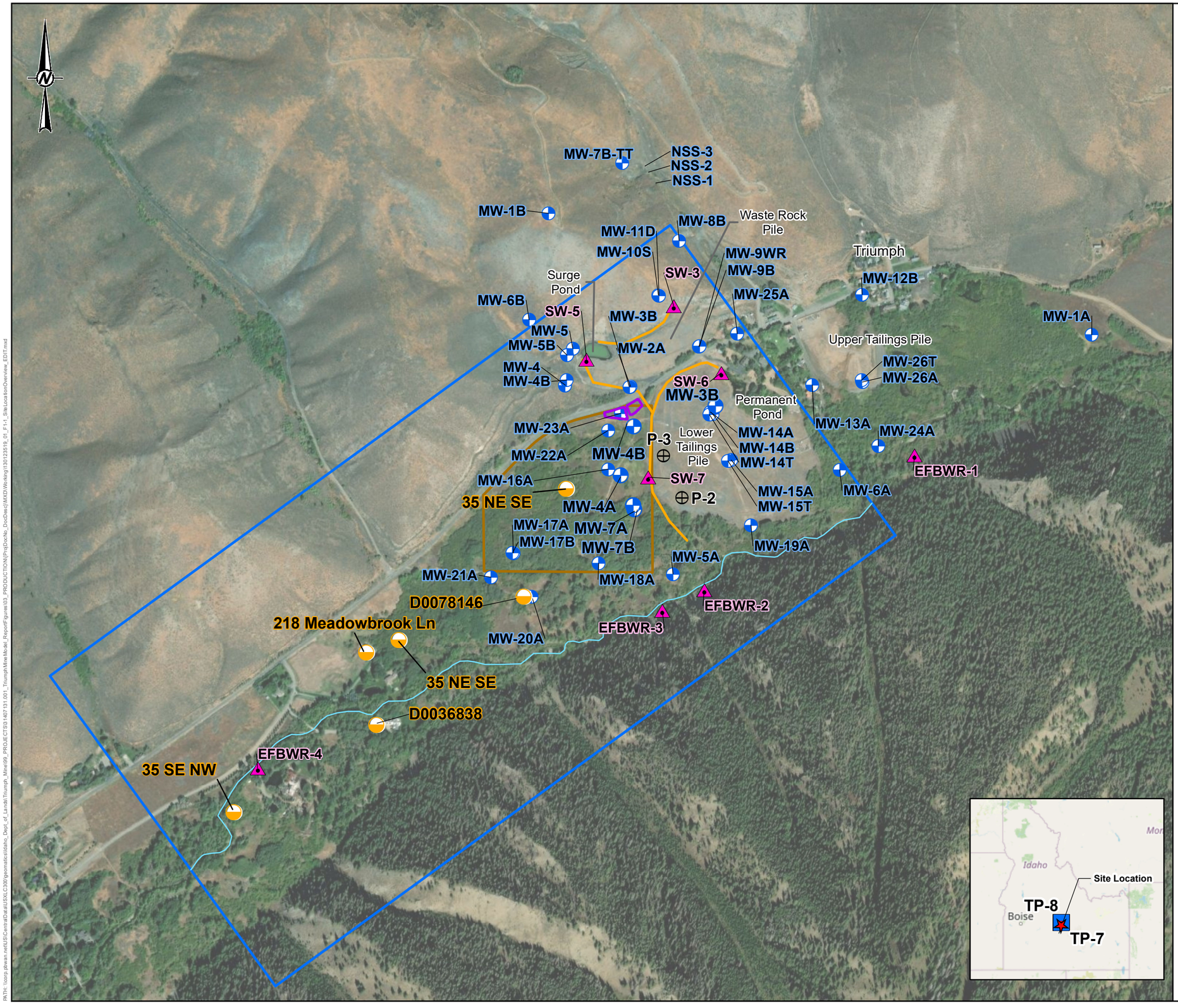
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Figures



LEGEND

- Surface Water Sample Location
- Domestic Well
- Monitoring Well
- Groundwater Model Extent
- Discharge Pipeline
- East Fork Big Wood River
- Design Infiltration Ponds
- Idaho Department of Lands Property Boundary

0 250 500 1,000
FEET

REFERENCE(S)

1. WELLS, SURFACE SAMPLE LOCATIONS, DISCHARGE PIPES (KENNEDY-JENKS 1997, IDL 2019, ALTA 2019, TETRATECH 2024).
2. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
3. SERVICE LAYER CREDITS: © OPENSTREETMAP (AND) CONTRIBUTORS, CC-BY-SA

CLIENT
IDAHO DEPARTMENT OF LANDS

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

TITLE
SITE LOCATION AND STUDY AREA MAP

CONSULTANT

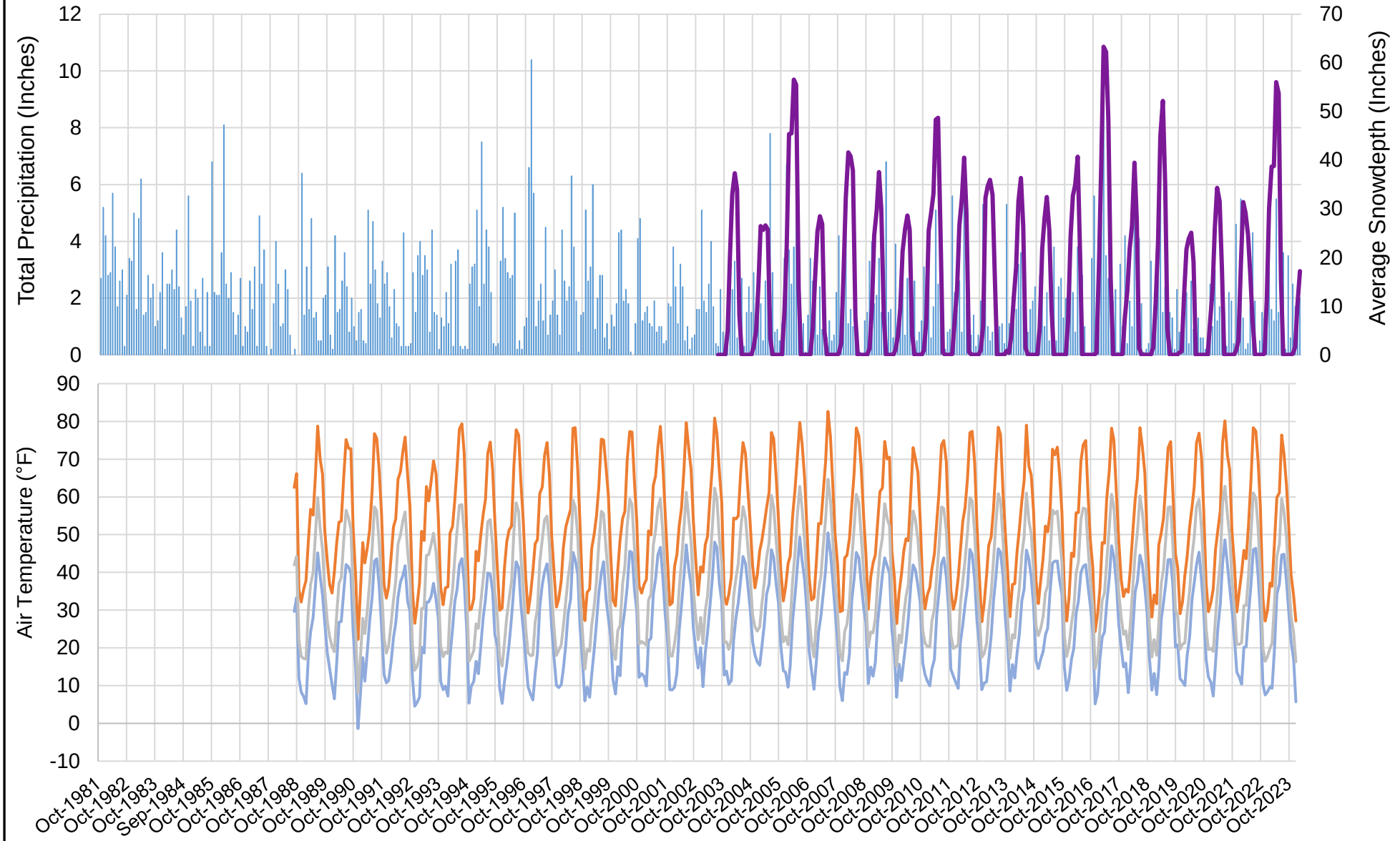
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DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 130123519 | REV. 0 | FIGURE **1-1**

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

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CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE GROUNDWATER FLOW AND TRANSPORT MODEL

CONSULTANT
wsp

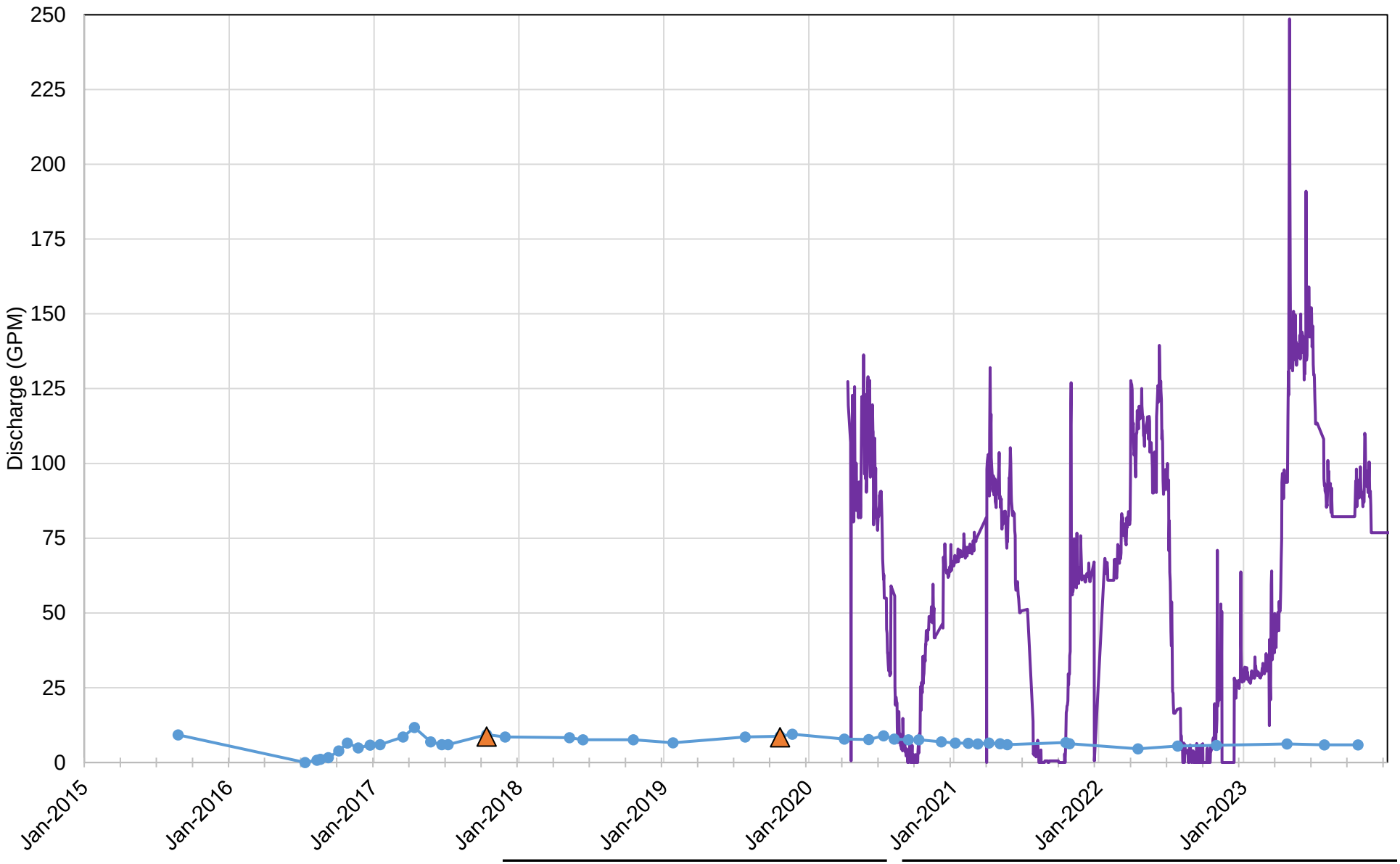
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DESIGNED	GLK
PREPARED	GLK
REVIEWED	KER
APPROVED	KER

TITLE
CLIMATE RECORDS AT NOAA HYNDMAN STATION USS0014F16S

PROJECT NO.	CONTROL	REV.	FIGURE
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CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE GROUNDWATER FLOW AND TRANSPORT MODEL

CONSULTANT
wsp

YYYY-MM-DD	7/10/2024
DESIGNED	GLK
PREPARED	GLK
REVIEWED	KER
APPROVED	KER

TITLE
MINE SURFACE WATER FLOWS

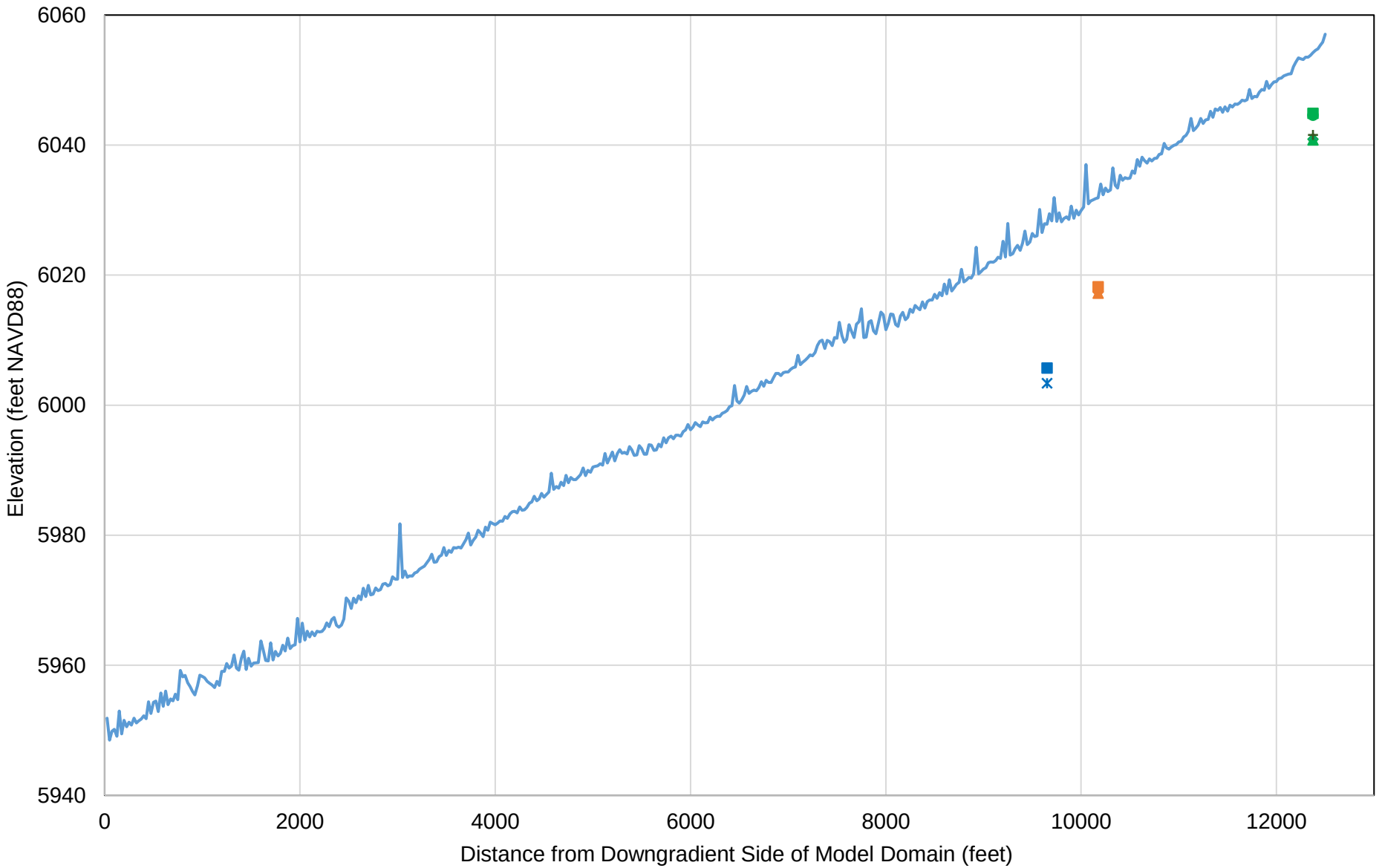
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CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE GROUNDWATER FLOW AND TRANSPORT MODEL

CONSULTANT
wsp

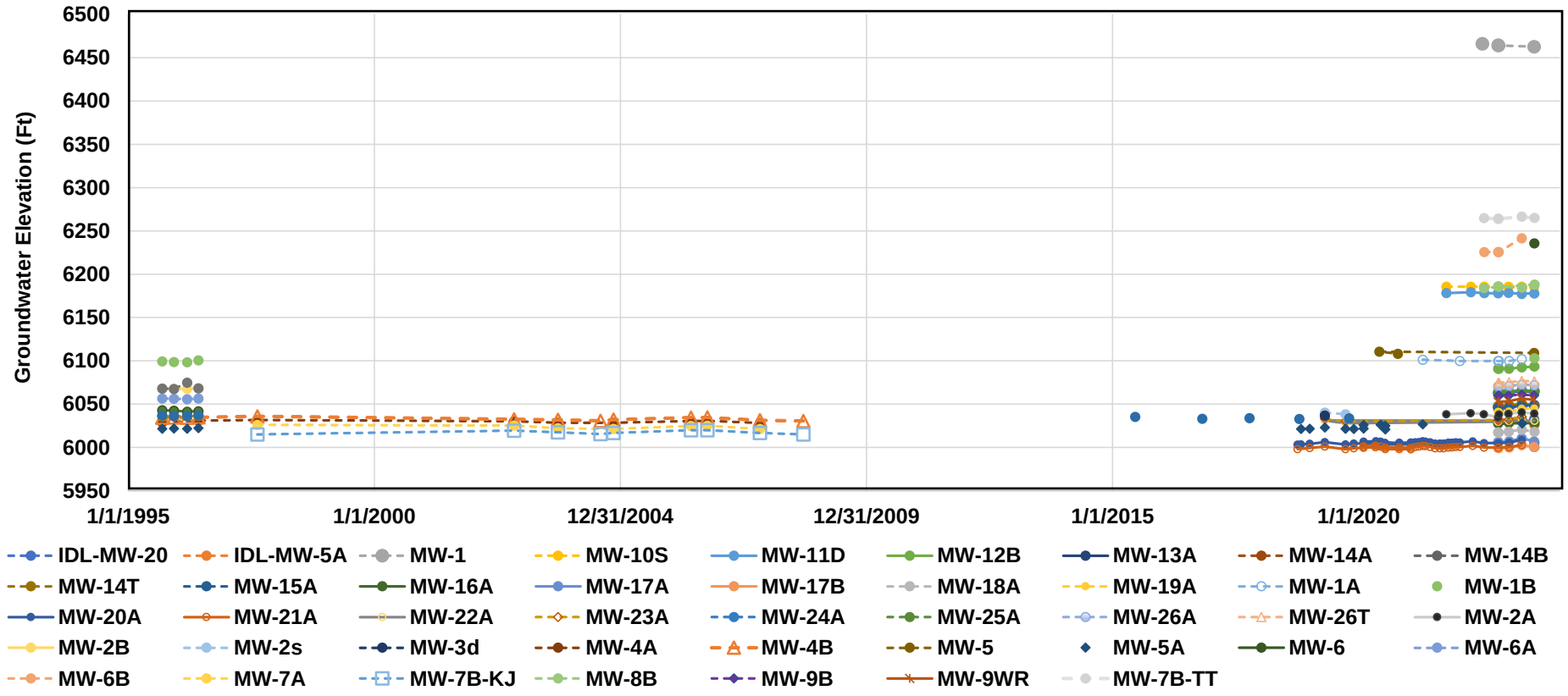
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DESIGNED	GLK
PREPARED	GLK
REVIEWED	KER
APPROVED	KER

TITLE
MODELED EAST FORK BIG WOOD RIVER STAGE AND NEARBY GROUNDWATER ELEVATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
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CLIENT
IDAHO DEPARTMENT
OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE
GROUNDWATER FLOW AND TRANSPORT MODEL

CONSULTANT

YYYY-MM-DD	7/11/2024
DESIGNED	GLK
PREPARED	GLK
REVIEWED	KER
APPROVED	KER

TITLE
STUDY AREA GROUNDWATER ELEVATIONS 1995 to 2024

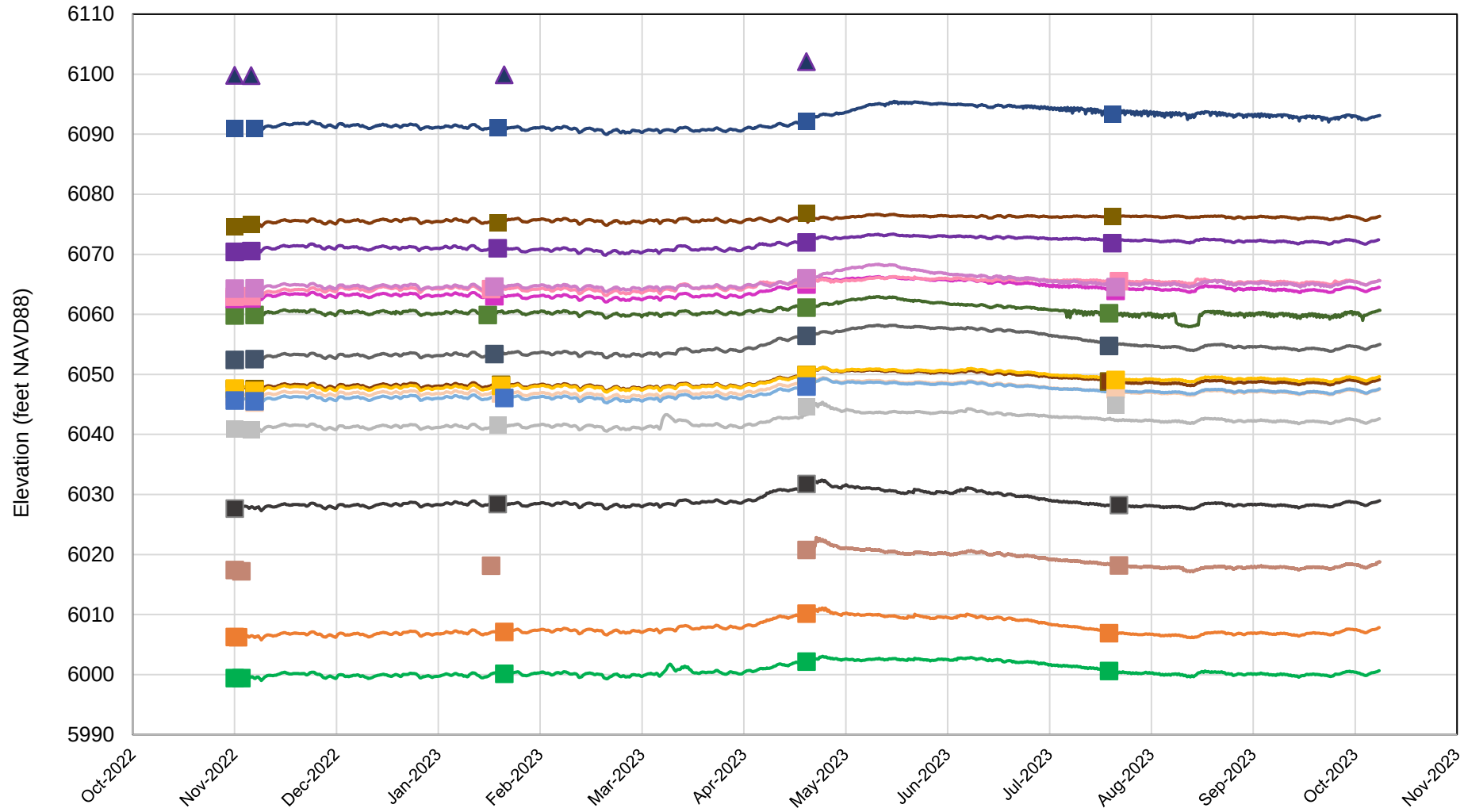
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CLIENT
IDAHO DEPARTMENT
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PROJECT
TRIUMPH MINE
GROUNDWATER FLOW AND TRANSPORT MODEL

CONSULTANT

YYYY-MM-DD	7/11/2024
DESIGNED	GLK
PREPARED	GLK
REVIEWED	KER
APPROVED	KER

TITLE
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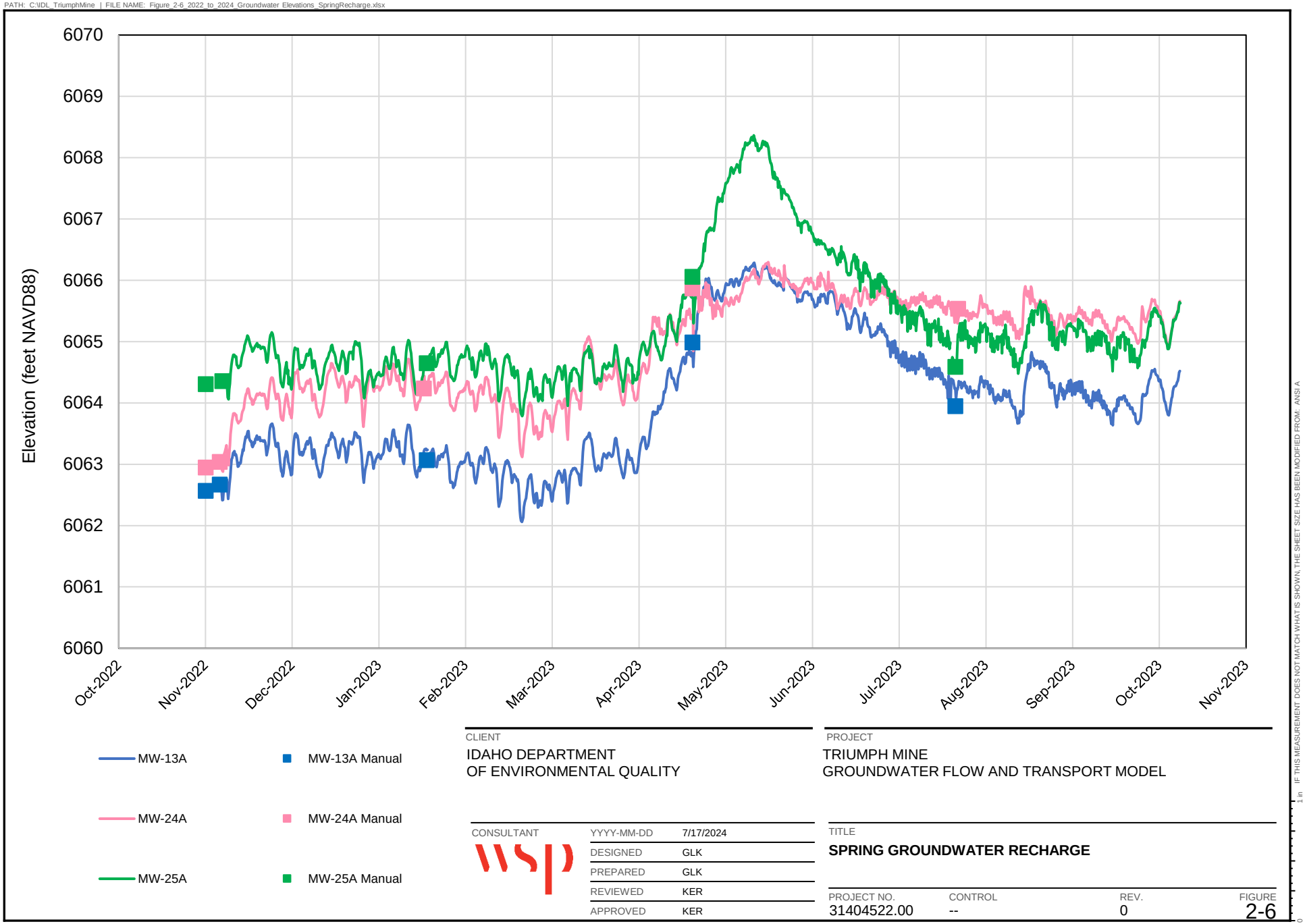
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1 in

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CLIENT
IDAHO DEPARTMENT
OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE
GROUNDWATER FLOW AND TRANSPORT MODEL

CONSULTANT
wsp

YYYY-MM-DD	7/17/2024
DESIGNED	GLK
PREPARED	GLK
REVIEWED	KER
APPROVED	KER

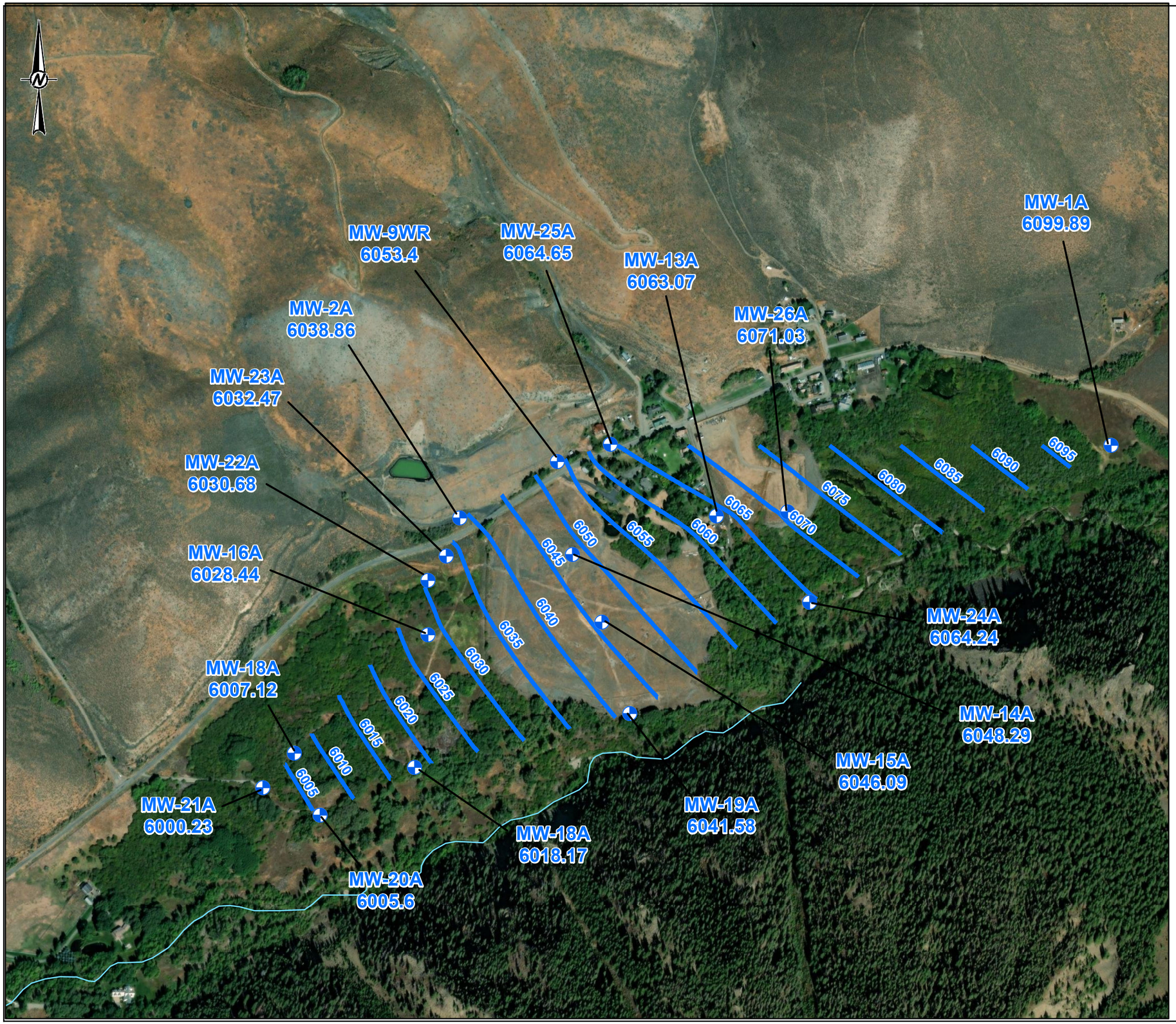
TITLE
SPRING GROUNDWATER RECHARGE

PROJECT NO.	CONTROL	REV.	FIGURE
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

1 in

0



LEGEND

- January 2023 Groundwater Elevation (feet NAVD88)
- January 2023 Groundwater Elevation Contours (feet NAVD88)
- East Fork Big Wood River

0 250 500 1,000

1" = 500 ft FEET

REFERENCE(S)

1. MONITORING WELLS AND GROUNDWATER ELEVATIONS PROVIDED BY TETRA TECH (2024).
2. EAST FORK BIG WOOD RIVER ONLY SHOWN WHERE INCORPORATED TO GROUNDWATER FLOW MODEL
3. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
4. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

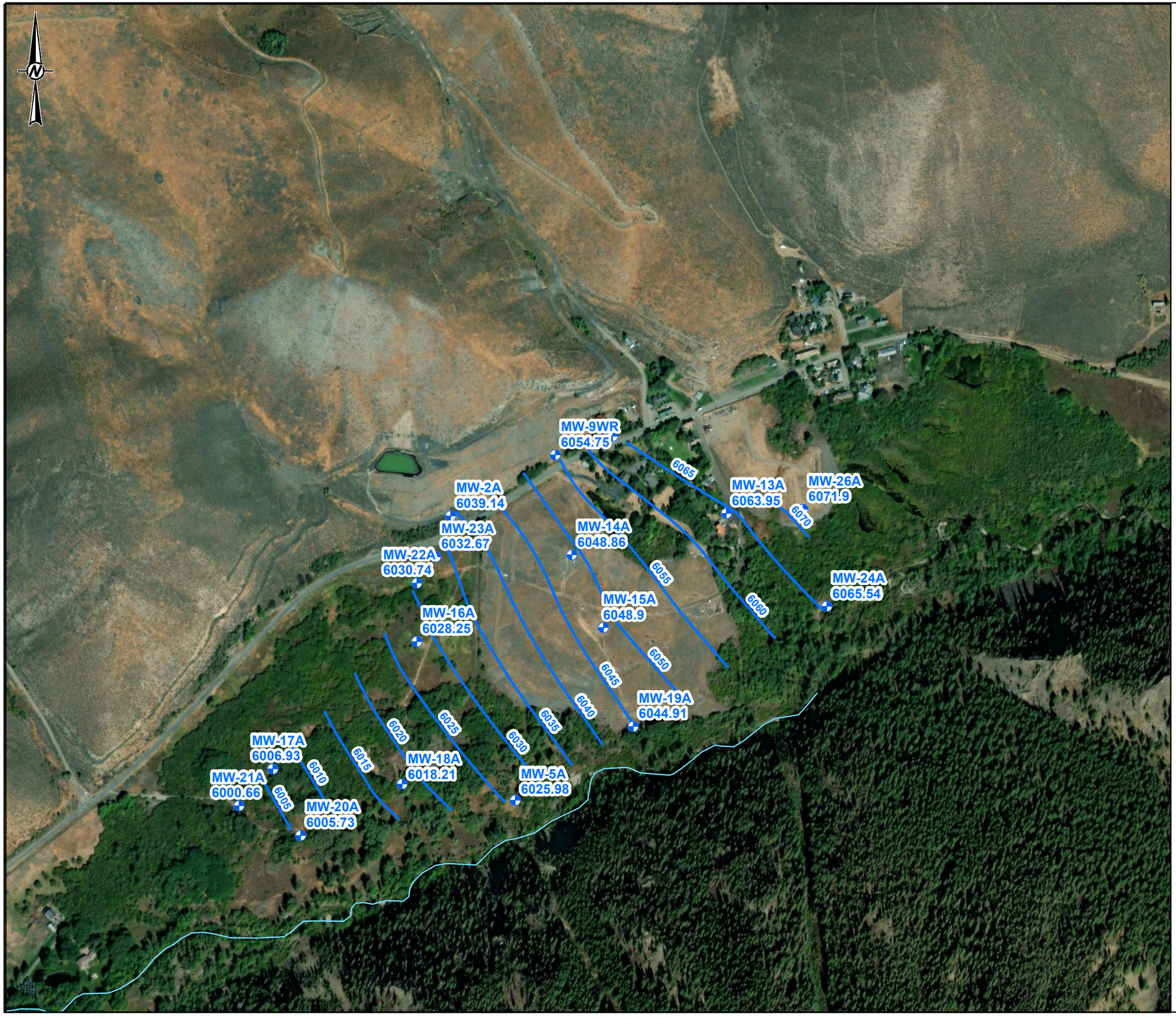
TITLE
JANUARY 2023 GROUNDWATER ELEVATION CONTOURS

CONSULTANT

YYYY-MM-DD	2024-07-15
DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 31407131.001 REV. 0 FIGURE **2-7**

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



LEGEND

- July 2023 Groundwater Elevation (feet NAVD88)
- July 2023 Groundwater Elevation Contours (feet NAVD88)
- East Fork Big Wood River

0 250 500 1,000

1" = 500 ft FEET

REFERENCE(S)

1. MONITORING WELLS AND GROUNDWATER ELEVATIONS PROVIDED BY TETRA TECH (2024).
2. EAST FORK BIG WOOD RIVER ONLY SHOWN WHERE INCORPORATED TO GROUNDWATER FLOW MODEL.
3. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
4. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

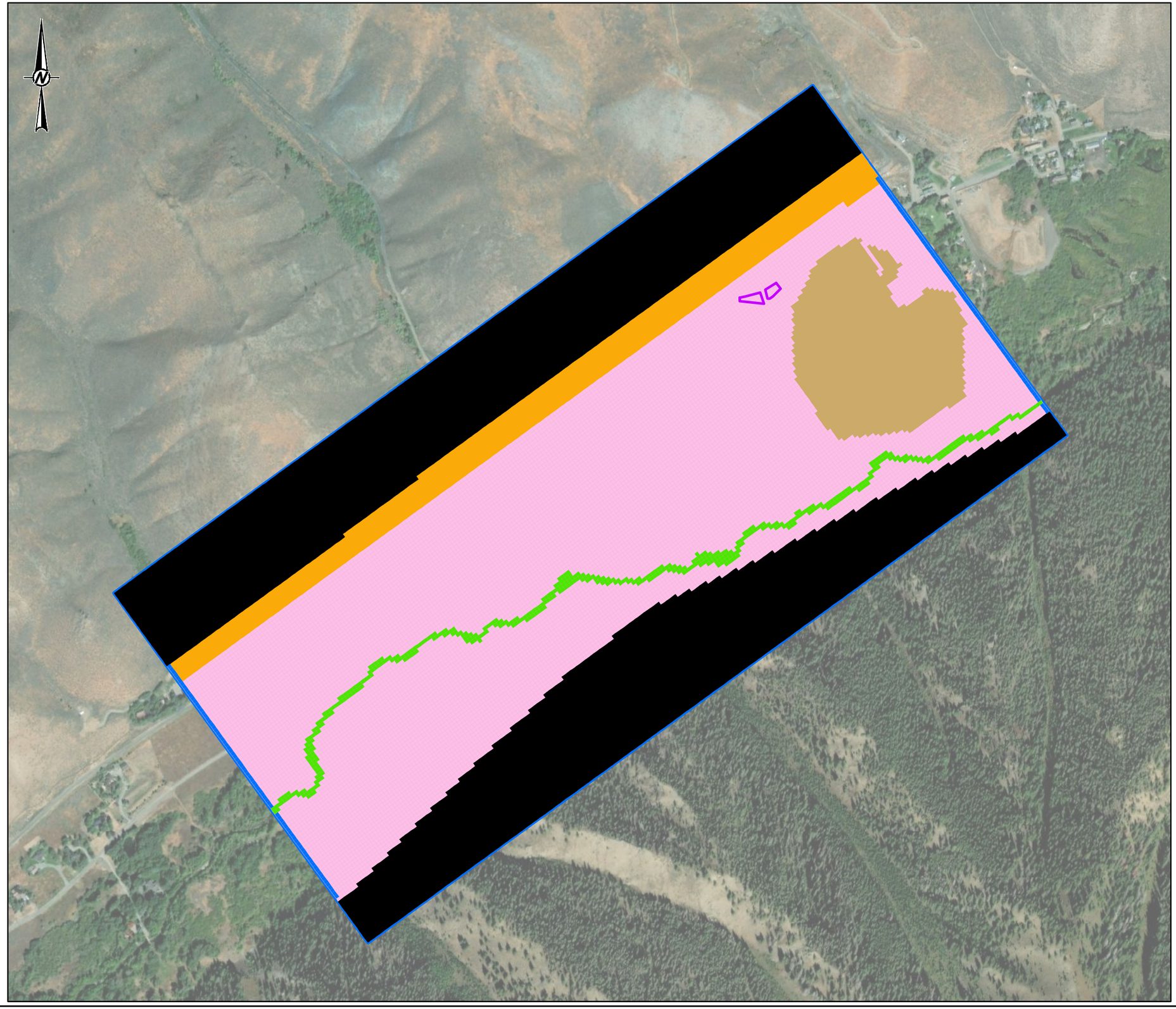
TITLE
JULY 2023 GROUNDWATER ELEVATION CONTOURS

CONSULTANT

YYYY-MM-DD	2024-07-15
DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 31407131.001 REV. 0 FIGURE **2-8**

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



LEGEND

- Model Grid
- Model Extent
- Design Infiltration Ponds

Boundary Conditions

- Constant Head
- No Flow
- River (EFBW)

Recharge Zones (feet/day)

- 0.001
- 0.003
- 0.025

0 250 500 1,000

1' = 500 ft FEET

REFERENCE(S)

1. BOUNDARY CONDITIONS DETERMINED BY LIDAR (GEOTERRA 2019) AND FIELD MEASUREMENTS (TETRA TECH 2024).
2. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
3. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

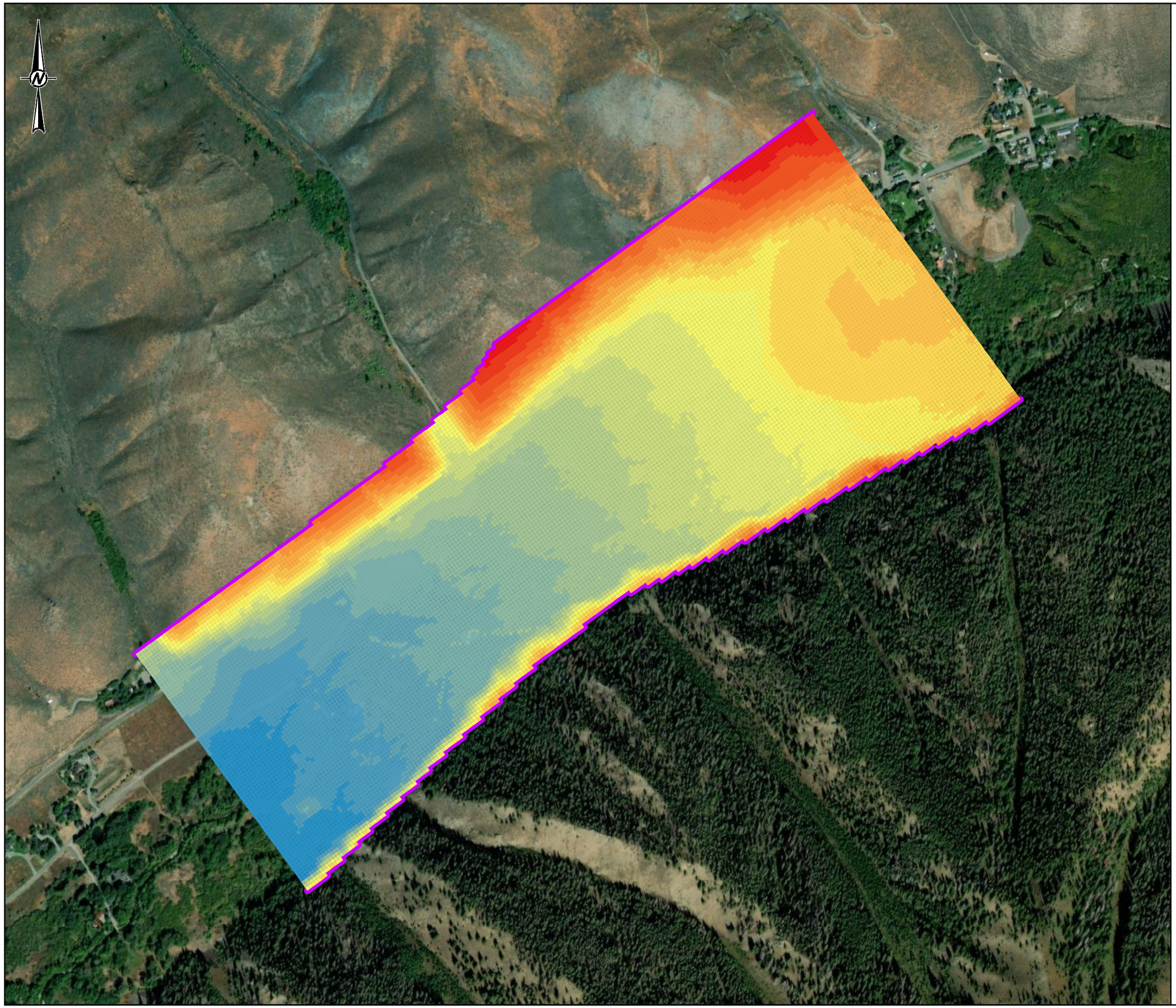
TITLE
GROUNDWATER FLOW MODEL DOMAIN OVERVIEW

CONSULTANT

YYYY-MM-DD	2024-07-16
DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 31407131.001 | REV. 0 | FIGURE **3-1**

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



LEGEND

Top of Model Layer 1 (feet NAVD88)

- 6263 - 6326
- 6215 - 6262
- 6175 - 6214
- 6146 - 6174
- 6121 - 6145
- 6098 - 6120
- 6077 - 6097
- 6063 - 6076
- 6053 - 6062
- 6042 - 6052
- 6033 - 6041
- 6024 - 6032
- 6015 - 6023
- 6006 - 6014
- 5998 - 6005
- 5988 - 5997
- 5980 - 5987
- 5971 - 5979
- 5963 - 5970
- 5948 - 5962
- Model Extent
- No Flow Boundaries

0 250 500 1,000

1' = 500 ft FEET

REFERENCE(S)

1. ELEVATIONS DERIVED FROM SITE LIDAR (GEOTERRA 2019) AND THE IDAHO LIDAR CONSORTIUM (2016).
2. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
3. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE

CLIENT
IDAHO DEPARTMENT OF LANDS

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

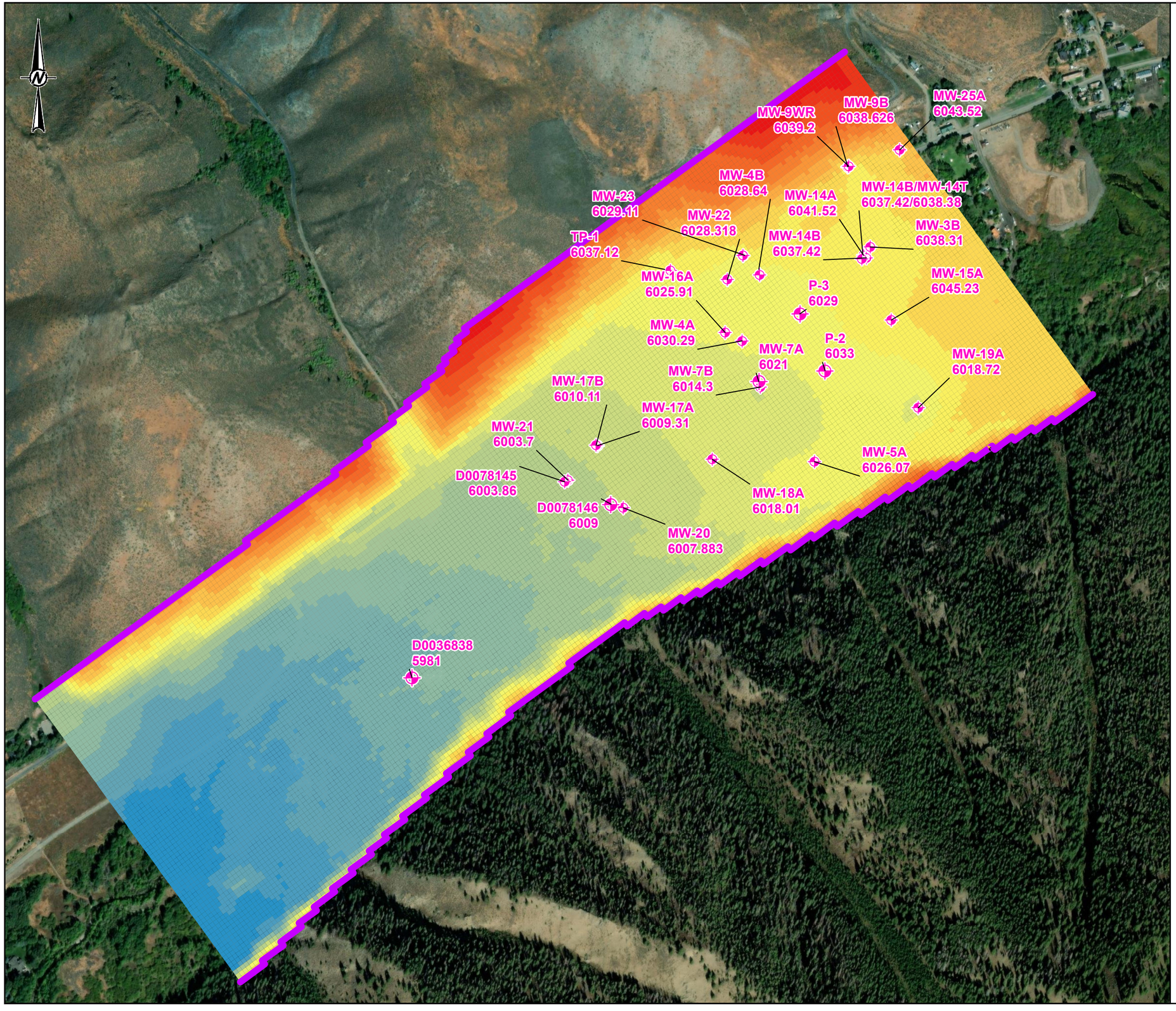
TITLE
GROUNDWATER FLOW MODEL
LAYER 1 TOP SURFACE ELEVATION

CONSULTANT

YYYY-MM-DD	2024-07-11
DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 31407131.001 | REV. 0 | FIGURE **3-2**

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



LEGEND

- No Flow Boundaries
- Borehole top of Gravel Elevations (feet NAVD88)

Top of Gravel (feet NAVD88)

- 6261 - 6324
- 6215 - 6260
- 6174 - 6214
- 6146 - 6173
- 6122 - 6145
- 6100 - 6121
- 6079 - 6099
- 6061 - 6078
- 6048 - 6060
- 6036 - 6047
- 6026 - 6035
- 6017 - 6025
- 6008 - 6016
- 5999 - 6007
- 5990 - 5998
- 5982 - 5989
- 5973 - 5981
- 5965 - 5972
- 5957 - 5964
- 5944 - 5956

0 250 500 1,000

1' = 500 ft FEET

REFERENCE(S)

1. WELLS, SURFACE WATER SAMPLE LOCATIONS, DISCHARGE PIPES (KENNEDY-JENKS 1997, IDL 2019, ALTA 2019, TETRATECH 2024).
2. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
3. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE

CLIENT
IDAHO DEPARTMENT OF LANDS

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

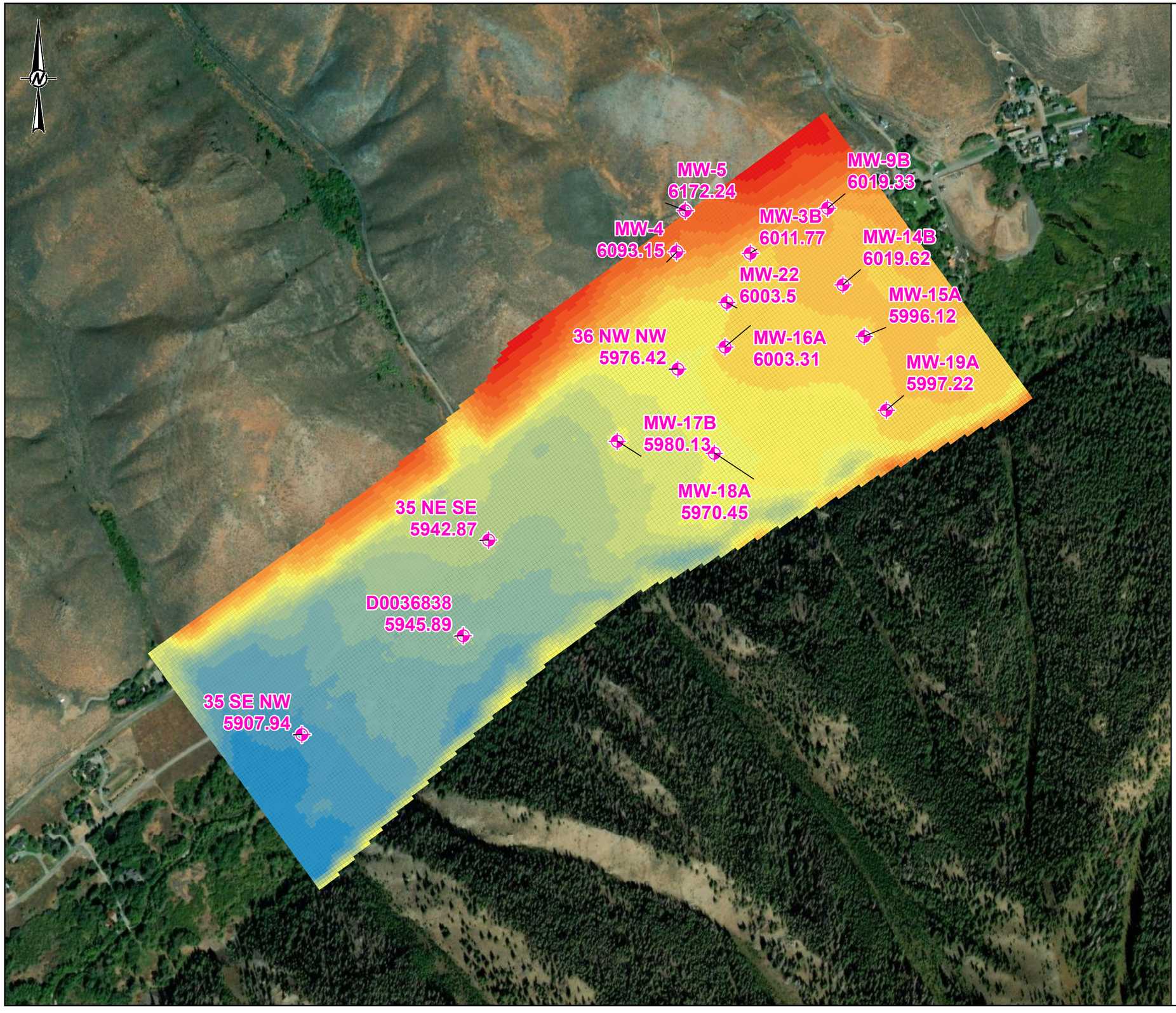
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GROUNDWATER FLOW MODEL
LAYER 2 TOP SURFACE ELEVATION

CONSULTANT

YYYY-MM-DD	2024-07-12
DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 130123519 | REV. 0 | FIGURE **3-3**

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



LEGEND

- Borehole top of Bedrock Elevations (feet NAVD88)
- Model Extent
- No Flow Boundaries

Bedrock Top Elevations (feet NAVD88)

- 6235 - 6301
- 6184 - 6234
- 6142 - 6183
- 6108 - 6141
- 6076 - 6107
- 6047 - 6075
- 6022 - 6046
- 6006 - 6021
- 5993 - 6005
- 5981 - 5992
- 5969 - 5980
- 5955 - 5968
- 5942 - 5954
- 5931 - 5941
- 5921 - 5930
- 5912 - 5920
- 5902 - 5911
- 5892 - 5901
- 5879 - 5891
- 5861 - 5878

0 250 500 1,000

1" = 500 ft FEET

REFERENCE(S)

1. WELLS, SURFACE WATER SAMPLE LOCATIONS, DISCHARGE PIPES (KENNEDY-JENKS 1997, IDL 2019, ALTA 2019, TETRATECH 2024).
2. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
3. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE

CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

TITLE
GROUNDWATER FLOW MODEL
LAYER 3 TOP SURFACE ELEVATION

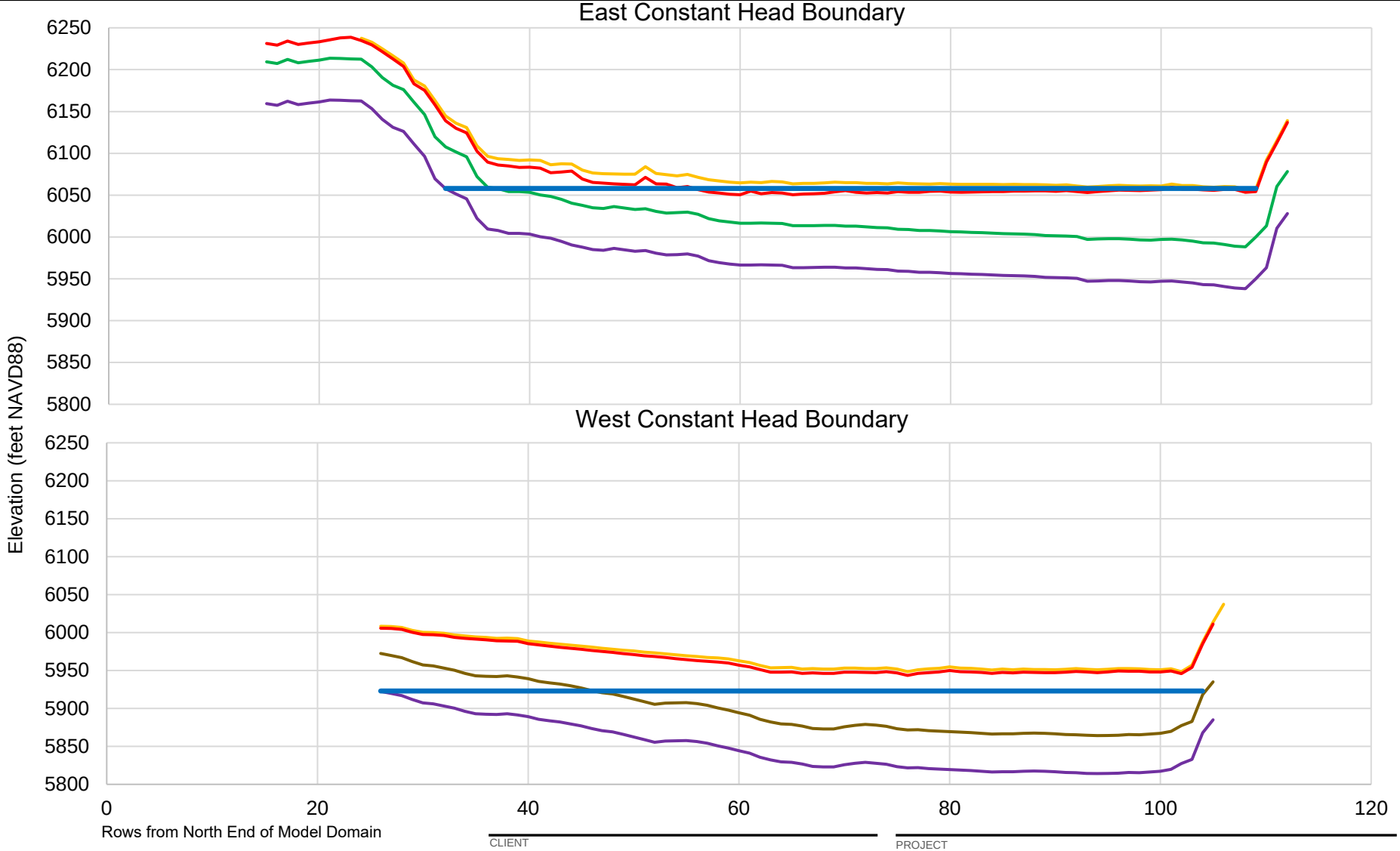
CONSULTANT

YYYY-MM-DD	2024-07-15
DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 130123519 | REV. 0 | FIGURE **3-4**

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

PATH: C:\IDL_TriumphMine | FILE NAME: Figure 3-2_CHD_Boundaries.xlsx



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DEPARTMENT OF ENVIRONMENTAL QUALITY

CONSULTANT

YYYY-MM-DD	7/17/2024
DESIGNED	GLK
PREPARED	GLK
REVIEWED	KER
APPROVED	KER

PROJECT
TRIUMPH MINE
GROUNDWATER FLOW AND TRANSPORT MODEL

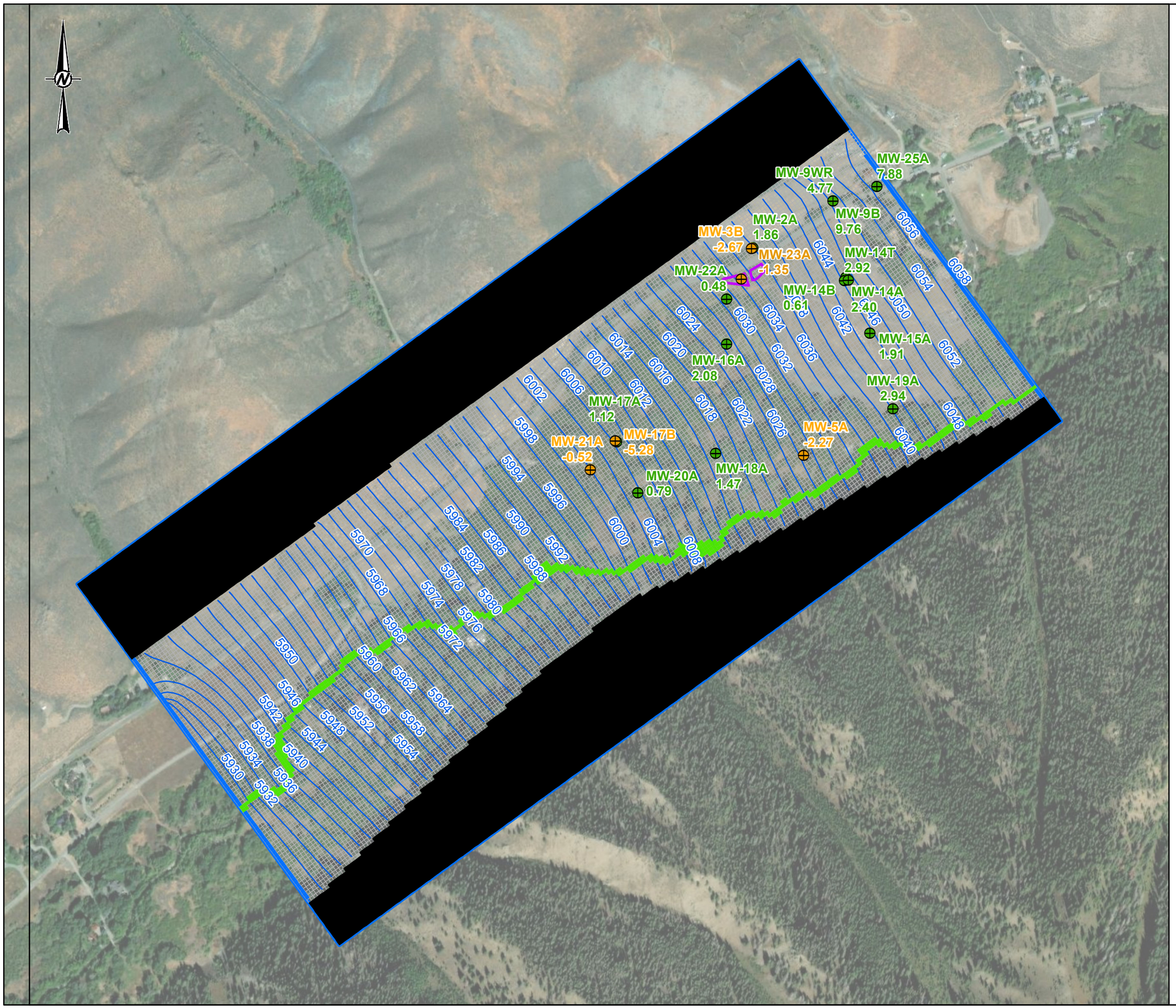
TITLE
GROUNDWATER FLOW MODEL
CONSTANT HEAD BOUNDARY CONDITIONS

PROJECT NO.	CONTROL	REV.	FIGURE
31407131.001	--	0	3-5

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

1 in

0



LEGEND

- Model Grid
- Model Extent
- Simulated Groundwater Elevation Contours (feet NAVD88)
- Design Infiltration Ponds

Boundary Conditions

- Constant Head
- No Flow
- River (EFBW)

Head Targets[1,2] (feet

- Overprediction
- Underprediction

0 250 500 1,000

1' = 500 ft FEET

REFERENCE(S)

1. MONITORING WELLS AND GROUNDWATER ELEVATIONS PROVIDED BY TETRA TECH (2024).
2. OVERPREDICTION AND UNDERPREDICTION REFER TO SIMULATED GROUNDWATER ELEVATIONS BEING ABOVE OR BELOW MEASURED ELEVATIONS, RESPECTIVELY. MEASUREMENTS REPRESENTATIVE OF LATE JULY 2023.
3. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
4. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

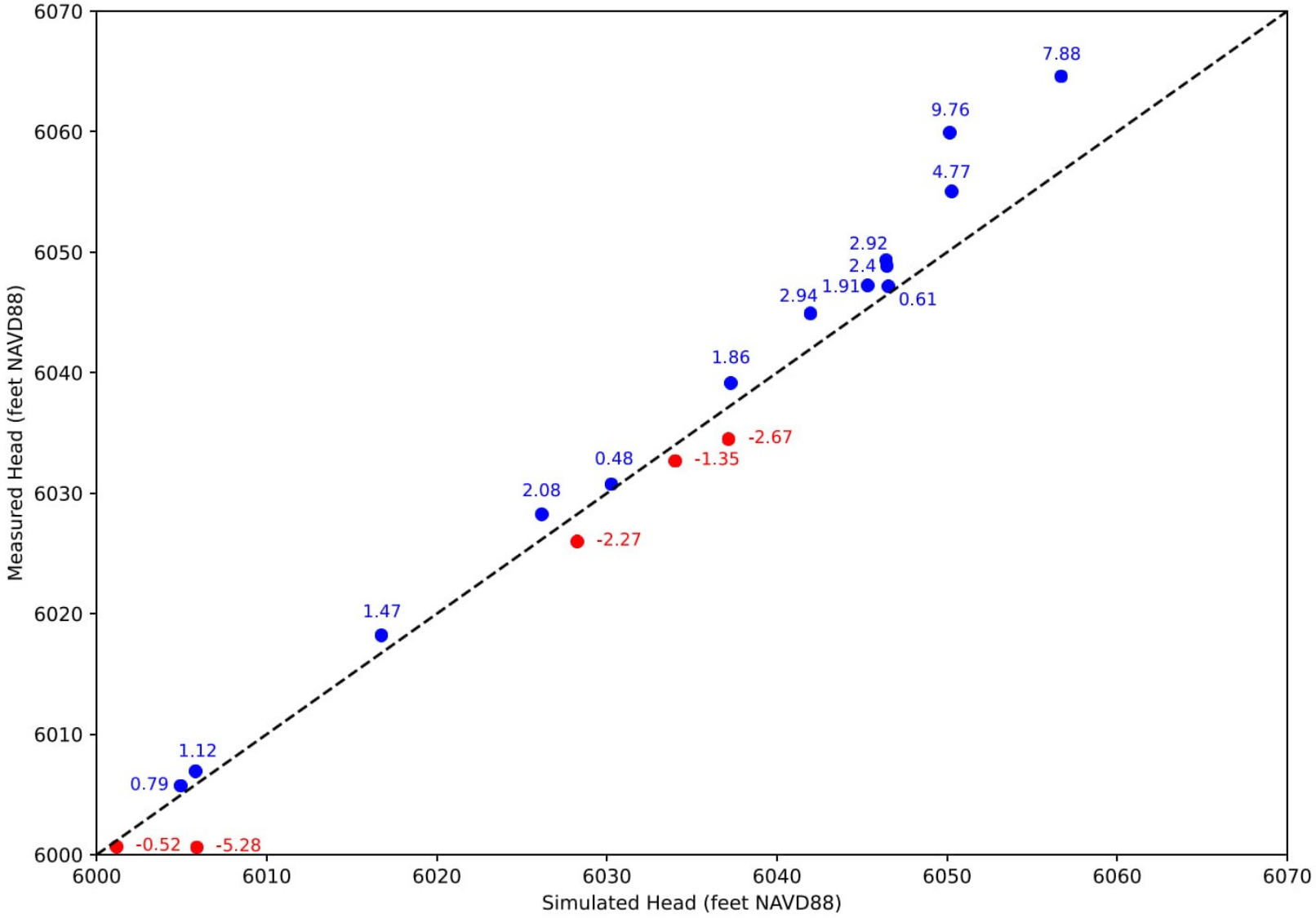
TITLE
GROUNDWATER FLOW MODEL RESULTS

CONSULTANT

YYYY-MM-DD	2024-07-16
DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 31407131.001
REV. 0
FIGURE **3-6**

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



CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE GROUNDWATER FLOW AND TRANSPORT MODEL

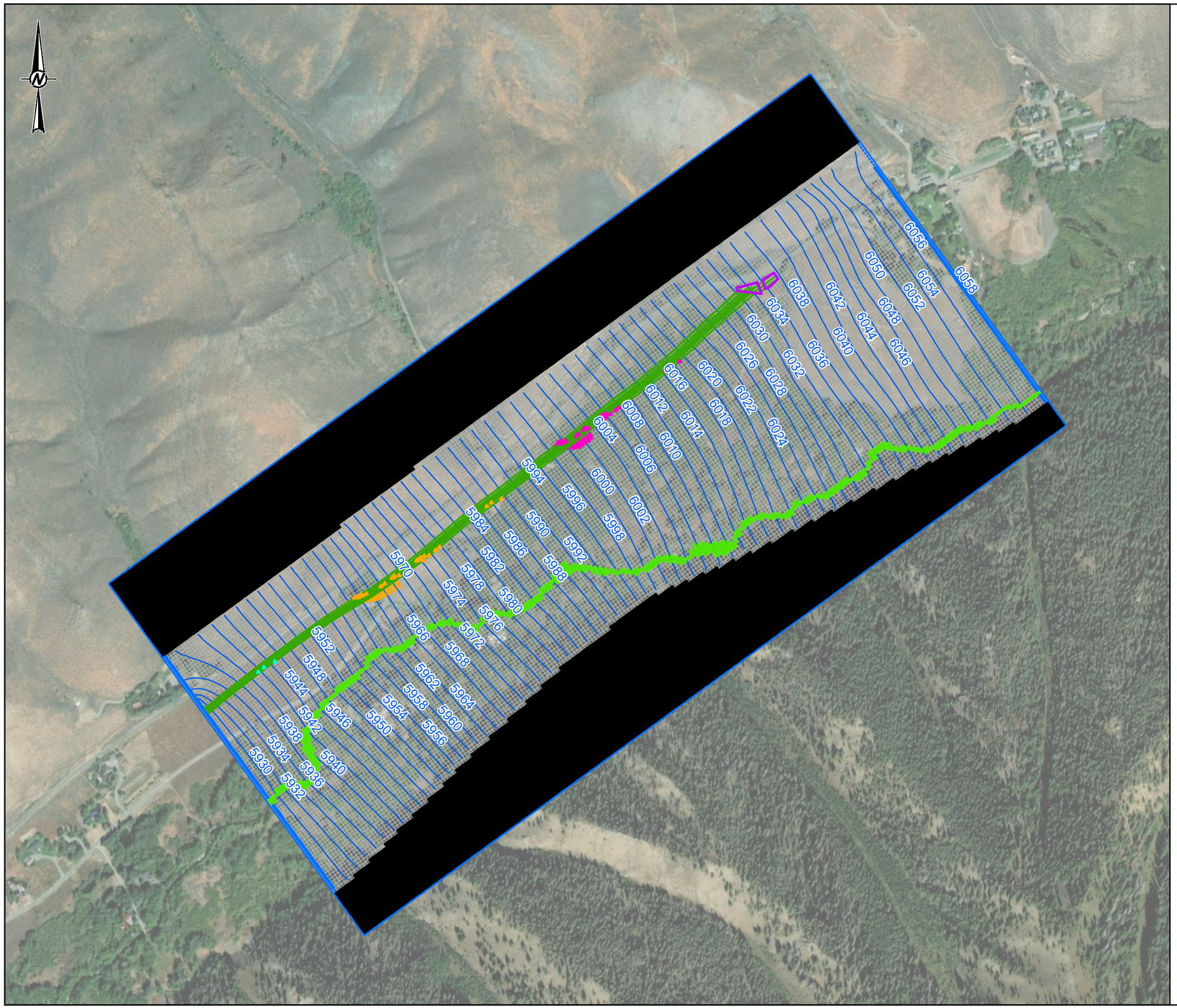
CONSULTANT
wsp

YYYY-MM-DD	7/10/2024
DESIGNED	GLK
PREPARED	GLK
REVIEWED	KER
APPROVED	KER

TITLE
GROUNDWATER FLOW MODEL MEASURED VERSUS SIMULATED HEADS

PROJECT NO.	CONTROL	REV.	FIGURE
31404522.001	--	0	3-7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0



LEGEND

- Model Grid
- Model Extent
- Simulated Groundwater Elevation Contours (feet NAVD88)
- Design Infiltration Ponds
- Particle Tracks

Particle Travel Times

- 1 Year
- 2 Years
- 3 Years

Boundary Conditions

- Constant Head
- No Flow
- River (EFBW)

0 250 500 1,000

FEET

REFERENCE(S)

1. MONITORING WELLS AND GROUNDWATER ELEVATIONS PROVIDED BY TETRA TECH (2024).
2. RESULTS ARE SHOWN FOR LAYER 2.
3. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
4. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

TITLE
GROUNDWATER FLOW MODEL LOW FLUX PARTICLE TRACKS

CONSULTANT

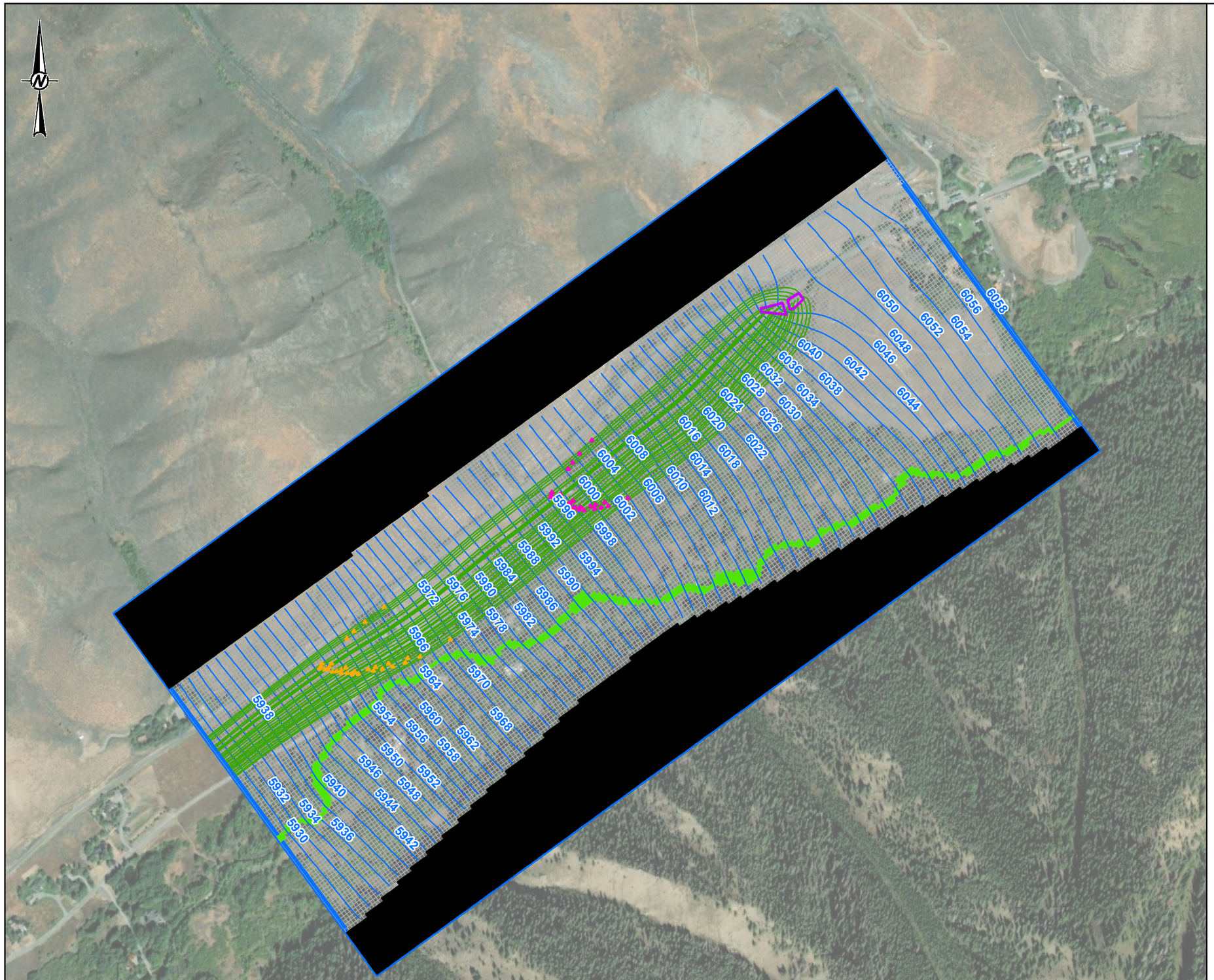
YYYY-MM-DD	2024-07-16
DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 31407131.001

REV. 0

FIGURE **3-8**

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



LEGEND

- Model Grid
- Model Extent
- Simulated Groundwater Elevation Contours (feet NAVD88)
- Design Infiltration Ponds
- Particle Tracks

Particle Travel Times

- 1 Year
- 2 Years

Boundary Conditions

- Constant Head
- No Flow
- River (EFBW)

0 250 500 1,000

1' = 500 ft FEET

REFERENCE(S)

1. MONITORING WELLS AND GROUNDWATER ELEVATIONS PROVIDED BY TETRA TECH (2024).
2. RESULTS ARE SHOWN FOR LAYER 2.
3. COORDINATE SYSTEM: NAD 1983 STATEPLANE IDAHO CENTRAL FIPS 1102 FEET
4. SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY

CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PROJECT
TRIUMPH MINE TAILINGS PILE SITE
TRIUMPH, IDAHO

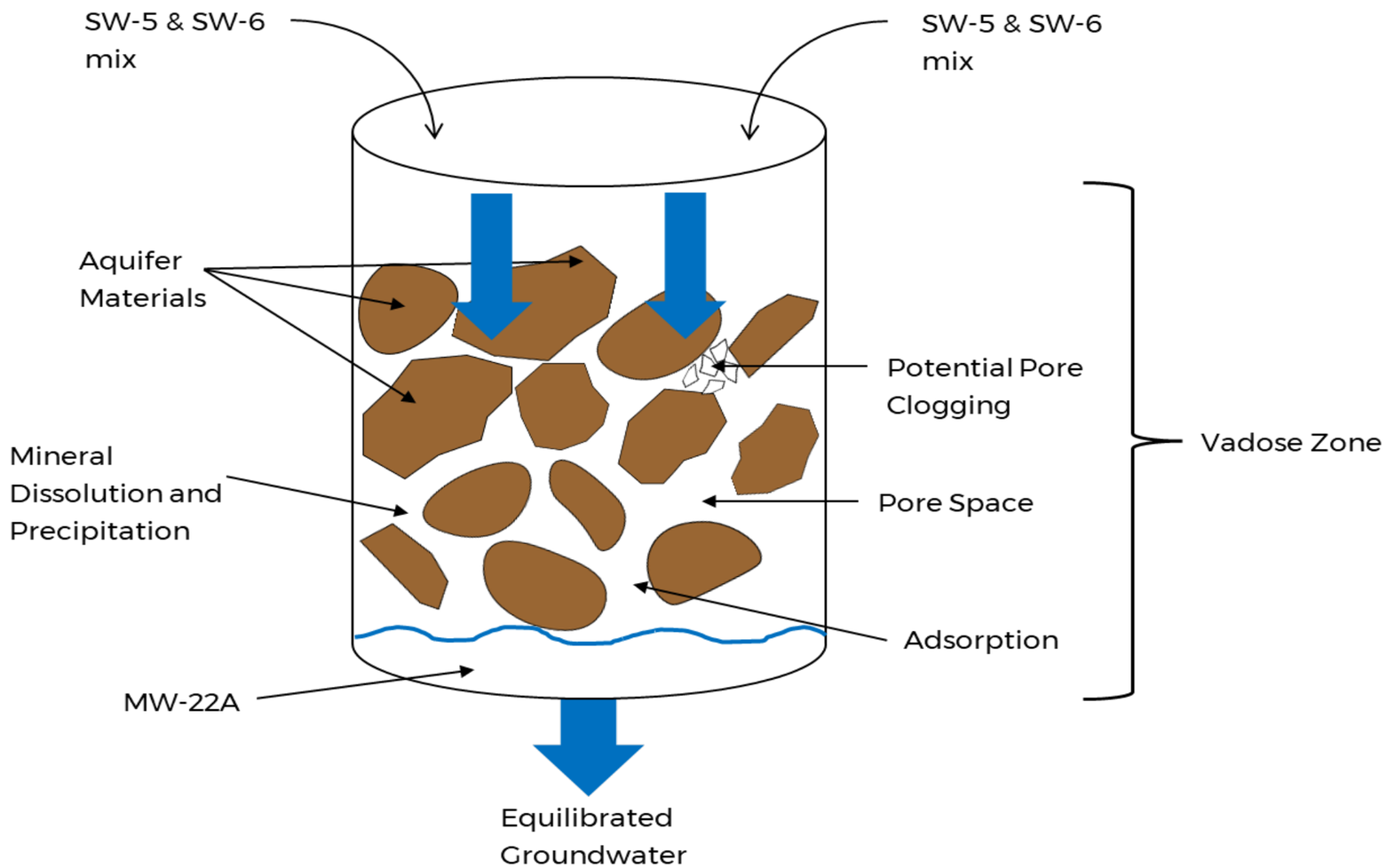
TITLE
GROUNDWATER FLOW MODEL HIGH FLUX PARTICLE TRACKS

CONSULTANT

YYYY-MM-DD	2024-07-16
DESIGNED	GLK
PREPARED	KS
REVIEWED	GLK
APPROVED	KER

PROJECT NO. 31407131.001 | REV. 0 | FIGURE **3-9**

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



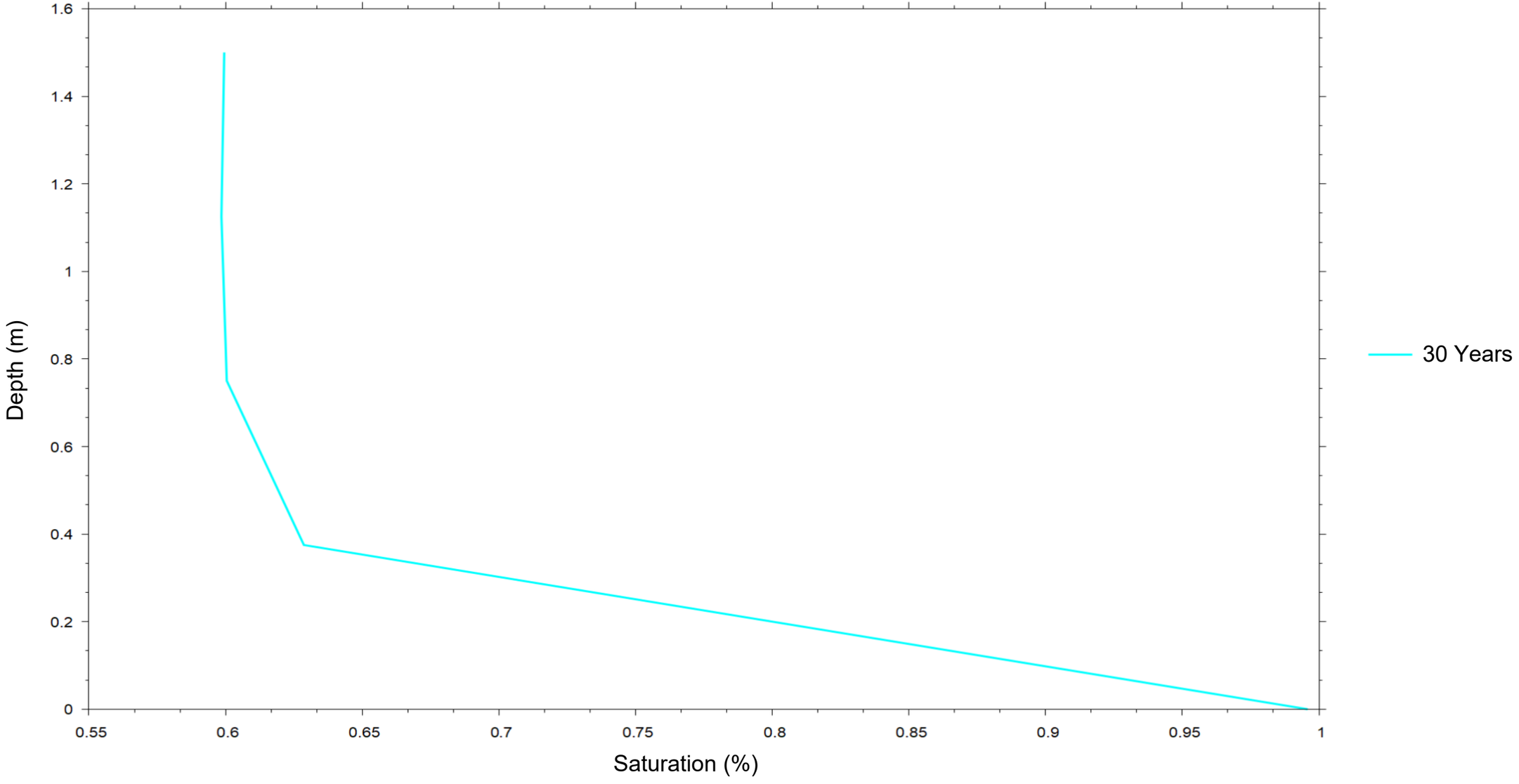
CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW AND TRANSPORT MODEL

TITLE
GEOCHEMICAL CONCEPTUAL SITE MODEL

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-10



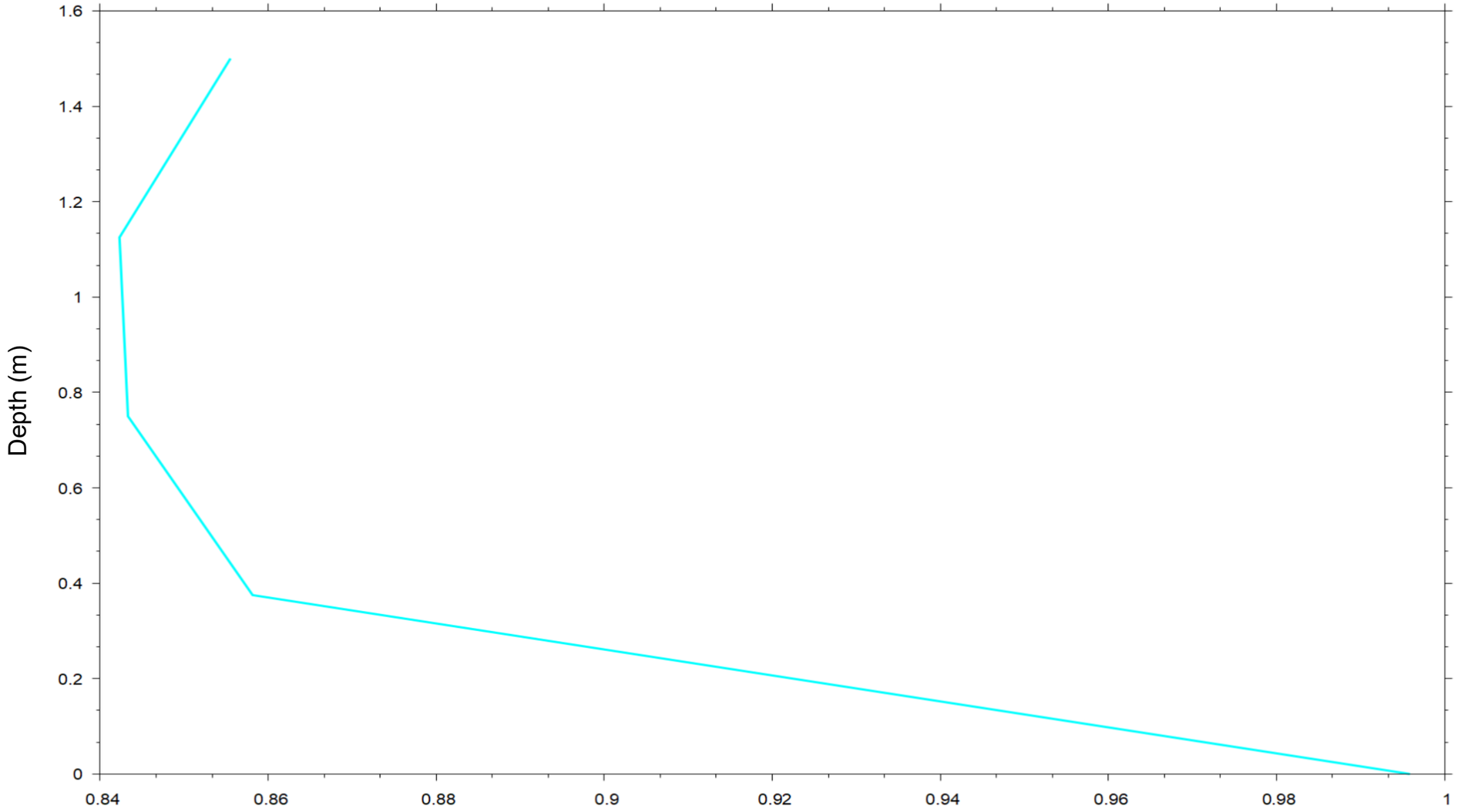
CLIENT
IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

TITLE
VADOSE ZONE SATURATION,
LOW FLUX SCENARIO

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-11



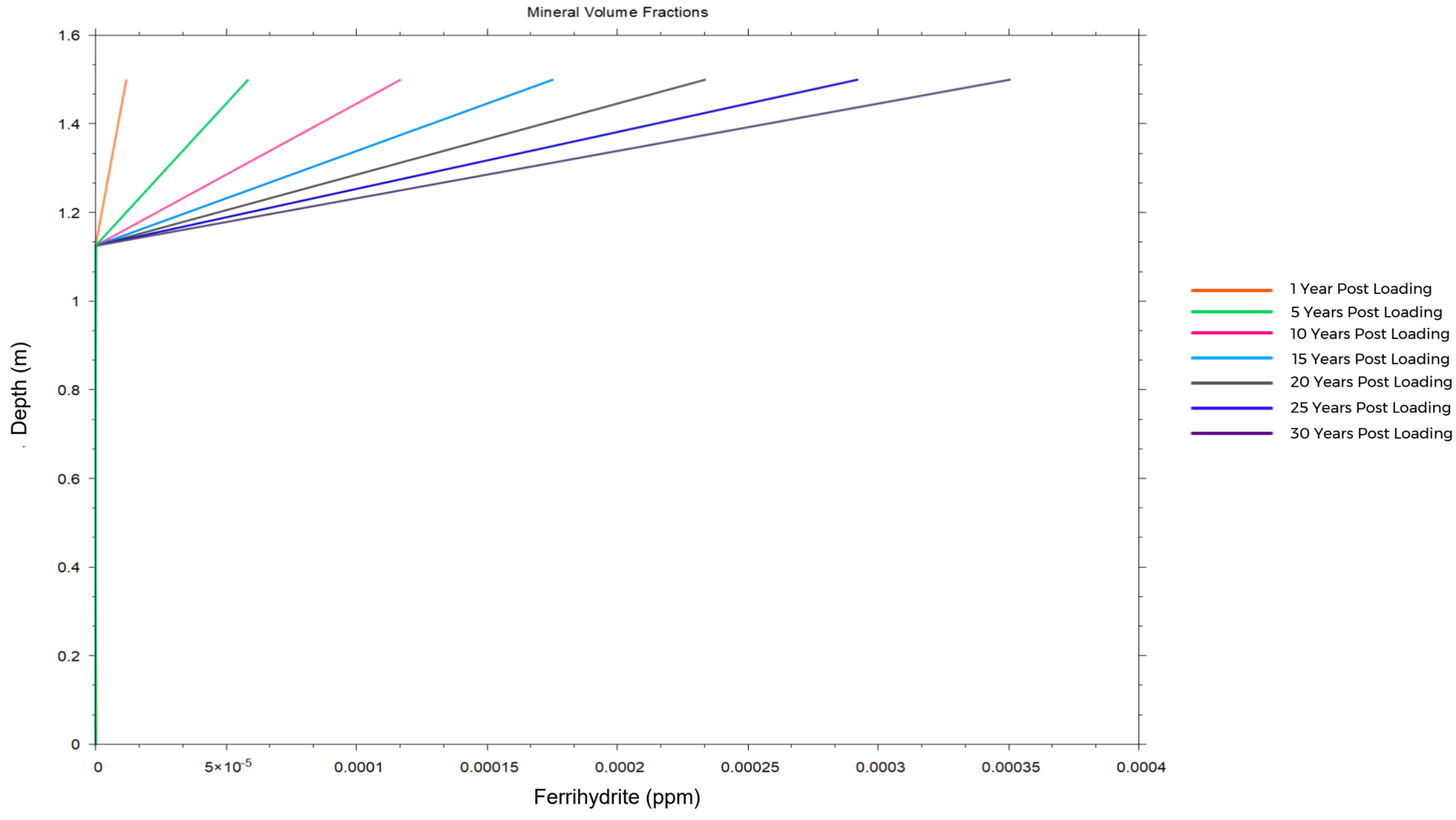
CLIENT
IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

TITLE
VADOSE ZONE SATURATION,
HIGH FLUX SCENARIO

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-12



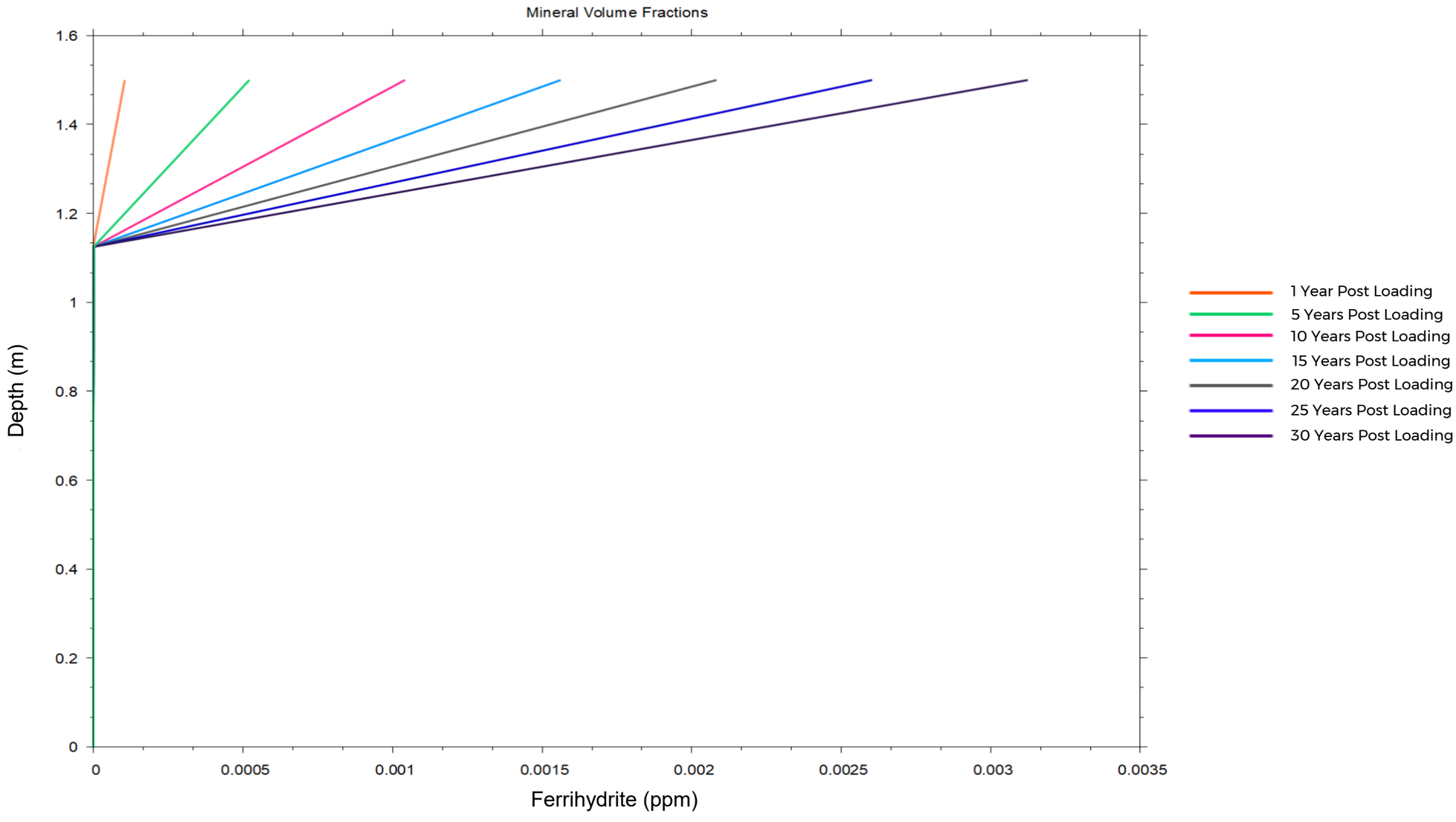
CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW AND TRANSPORT MODEL

TITLE
MODELED PRECIPITATION OF FERRIHYDRITE IN THE VADOSE ZONE, LOW FLUX SCENARIO

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-13



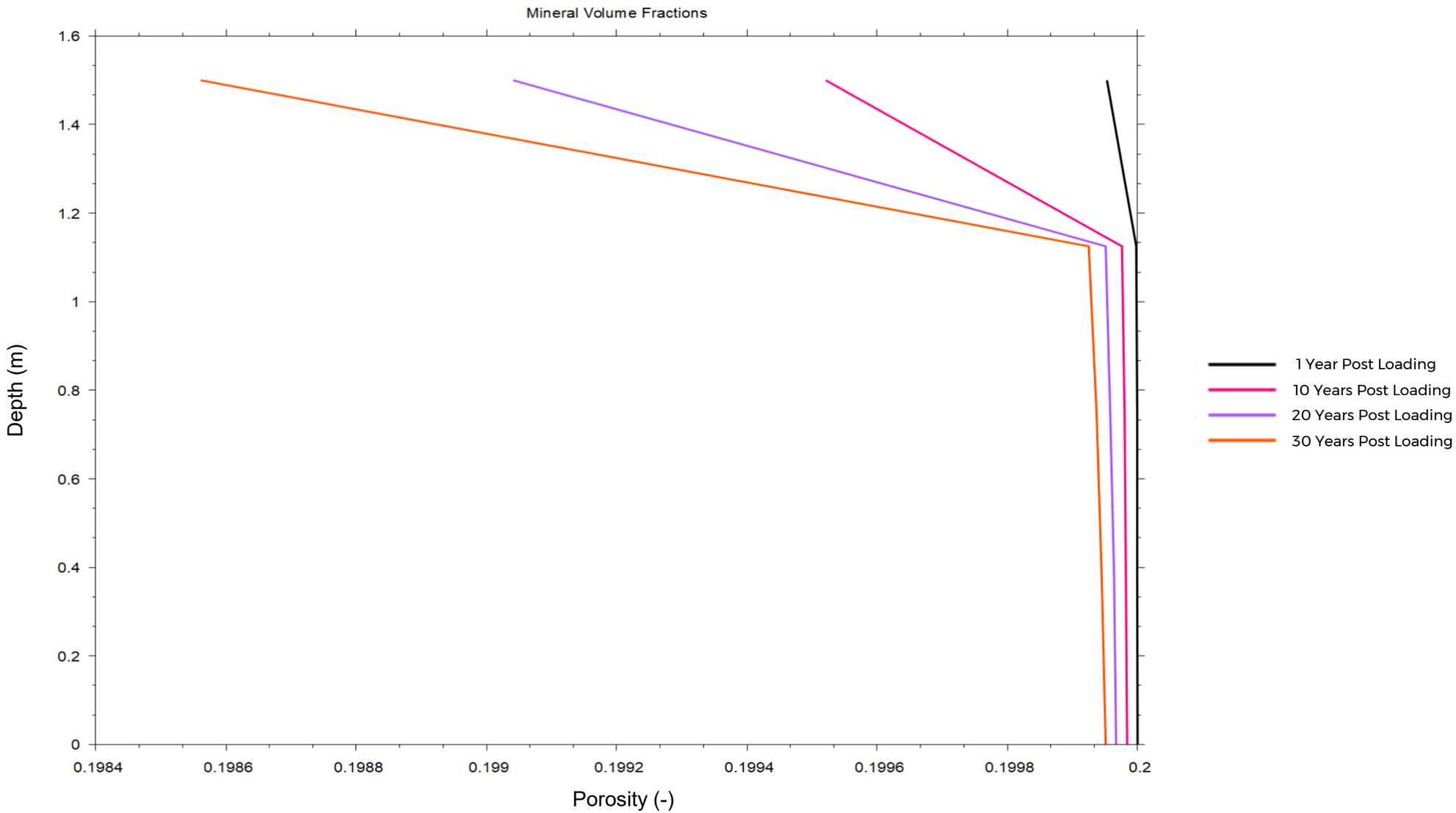
CLIENT
IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

TITLE
MODELED PRECIPITATION OF FERRIHYDRITE IN THE VADOSE ZONE, HIGH FLUX SCENARIO

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-14



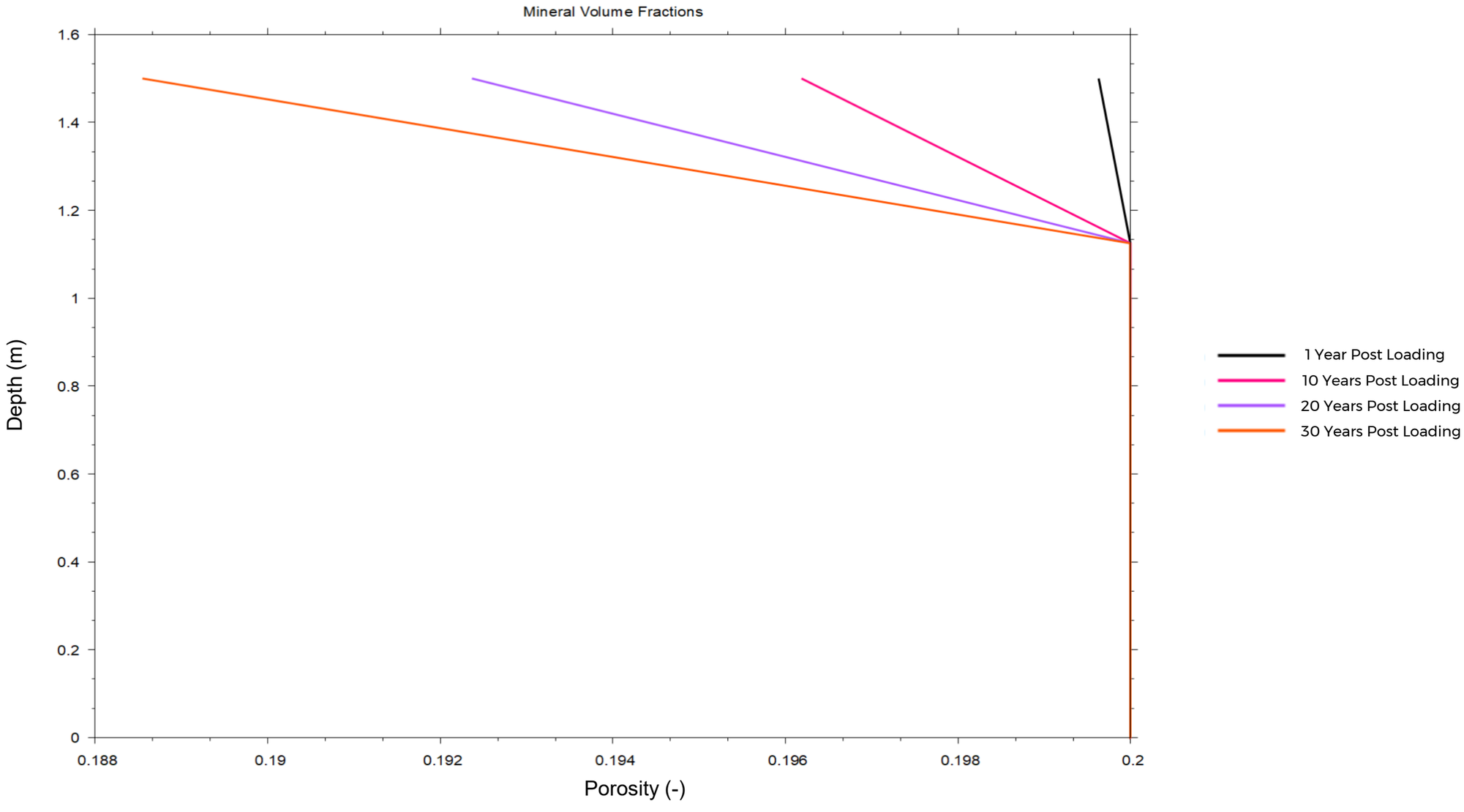
CLIENT
IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

TITLE
MODELED CHANGES IN POROSITY,
LOW FLUX SCENARIO

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-15



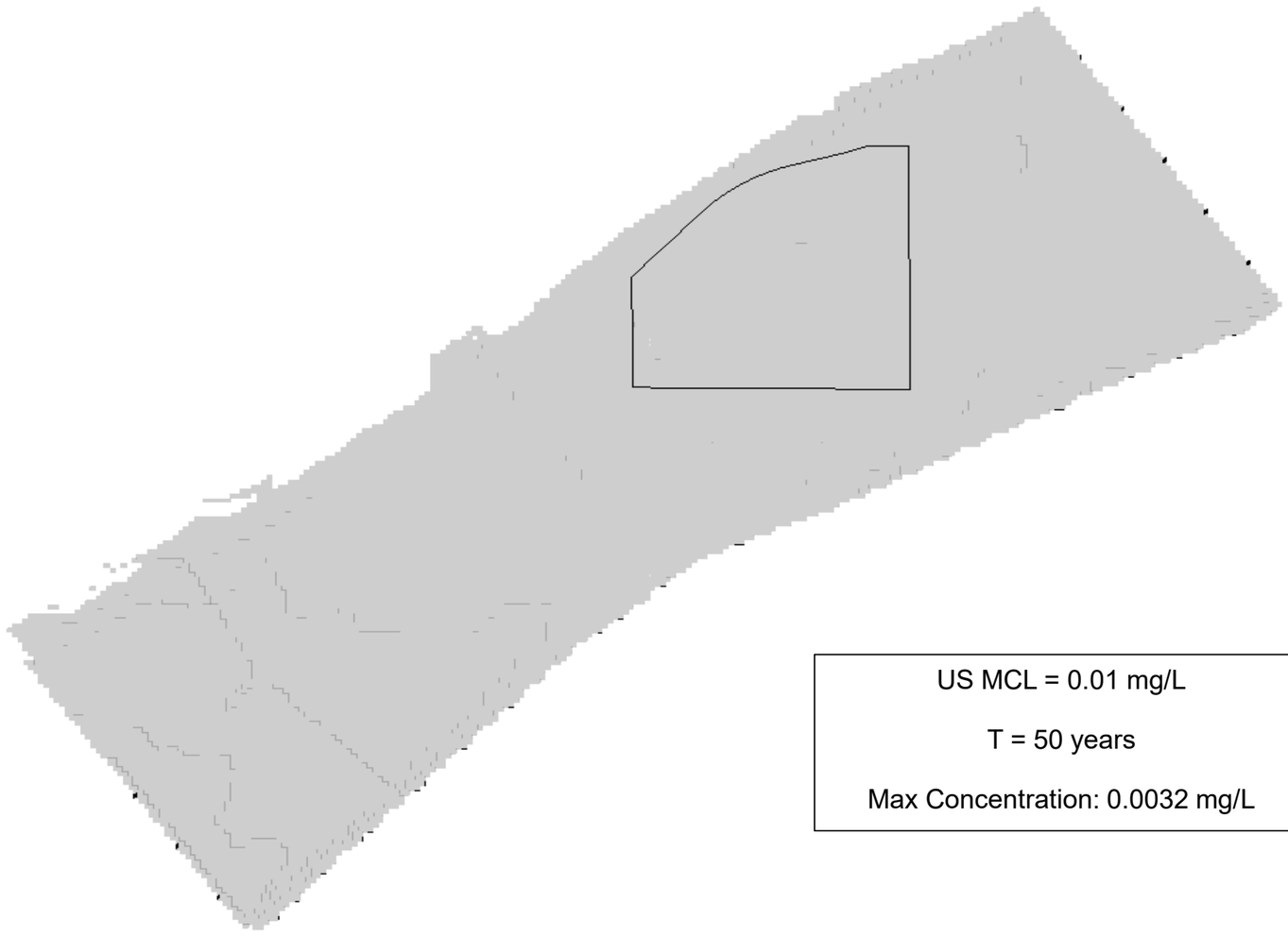
CLIENT
IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

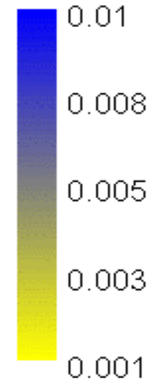
CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW AND TRANSPORT MODEL

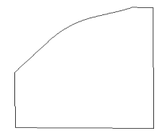
TITLE
MODELED CHANGES IN POROSITY, HIGH FLUX SCENARIO

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-16





Arsenic Concentration (mg/L)



IDL Property Boundary

US MCL = 0.01 mg/L

T = 50 years

Max Concentration: 0.0032 mg/L

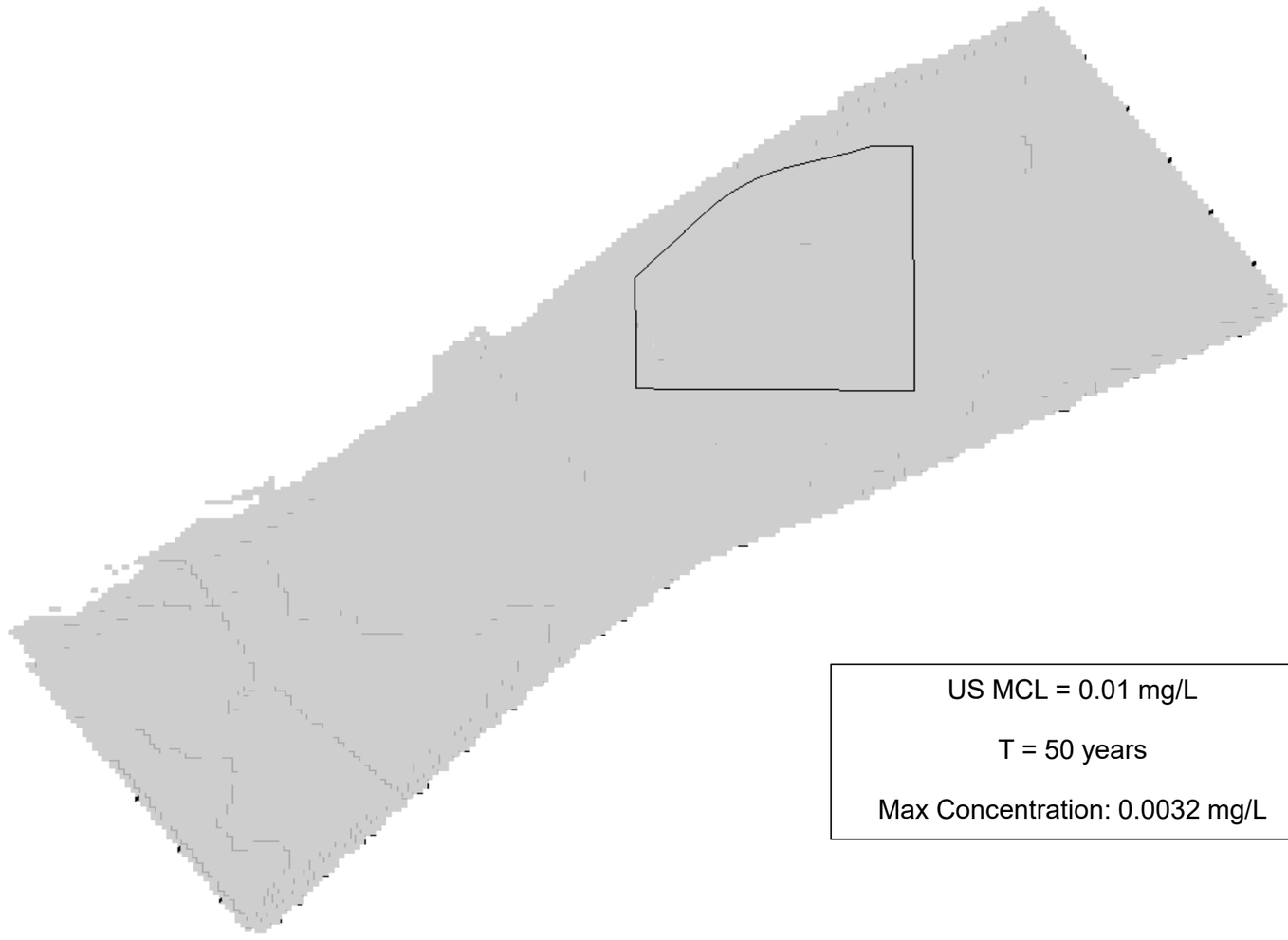
CLIENT
IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

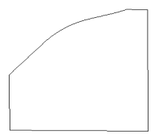
TITLE
MODELED ARSENIC CONCENTRATIONS IN PHAST, LOW FLUX SCENARIO MIN3P

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-17





Arsenic Concentration (mg/L)



IDL Property Boundary

US MCL = 0.01 mg/L

T = 50 years

Max Concentration: 0.0032 mg/L

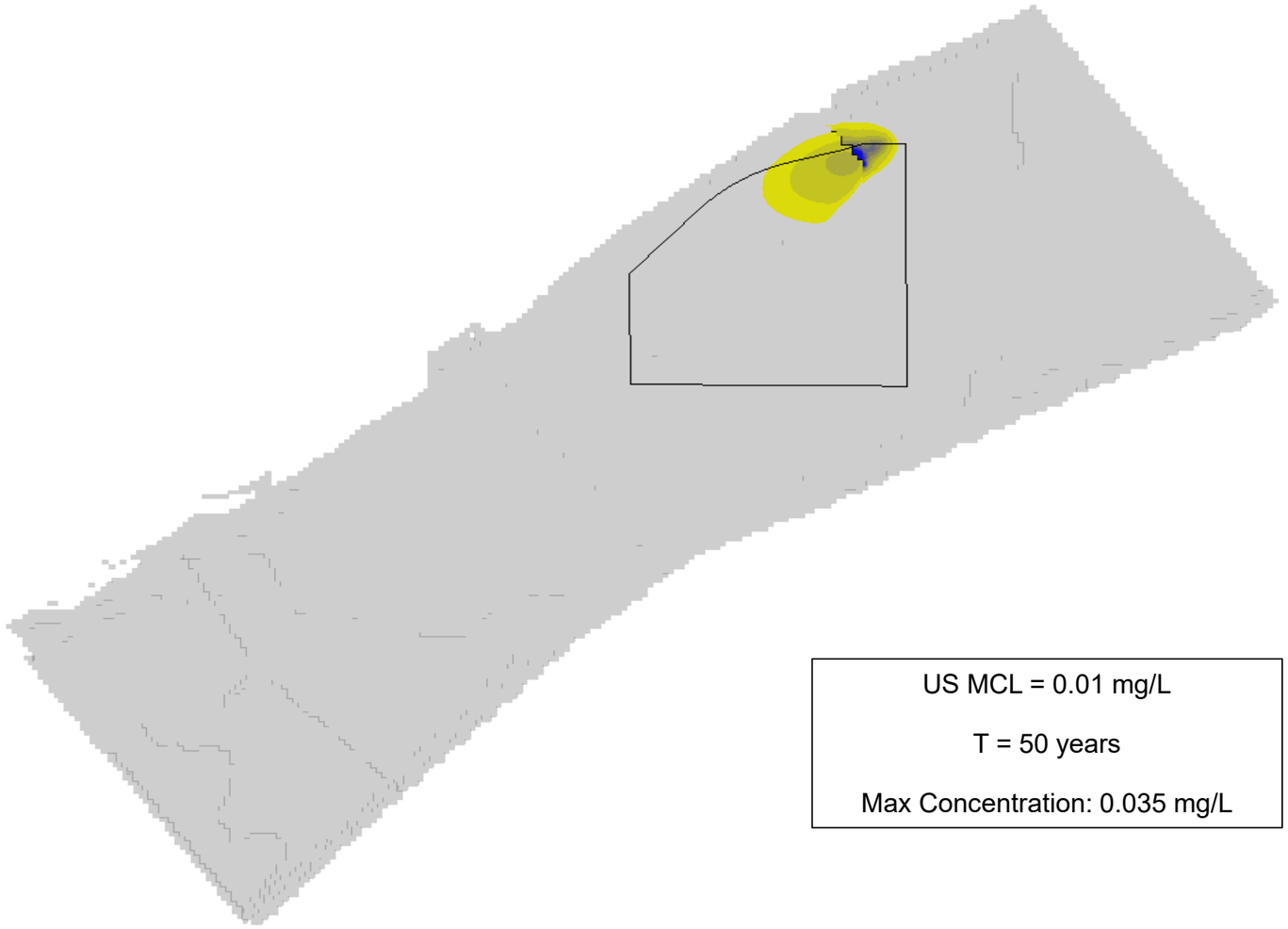
CLIENT
IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

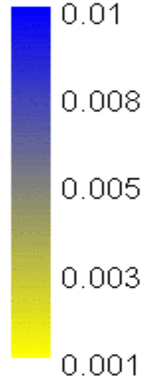
CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

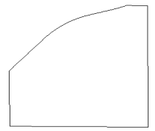
TITLE
MODELED ARSENIC CONCENTRATIONS IN PHAST, LOW FLUX SCENARIO PHREEQC

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-18





Arsenic Concentration (mg/L)



IDL Property Boundary

US MCL = 0.01 mg/L

T = 50 years

Max Concentration: 0.035 mg/L

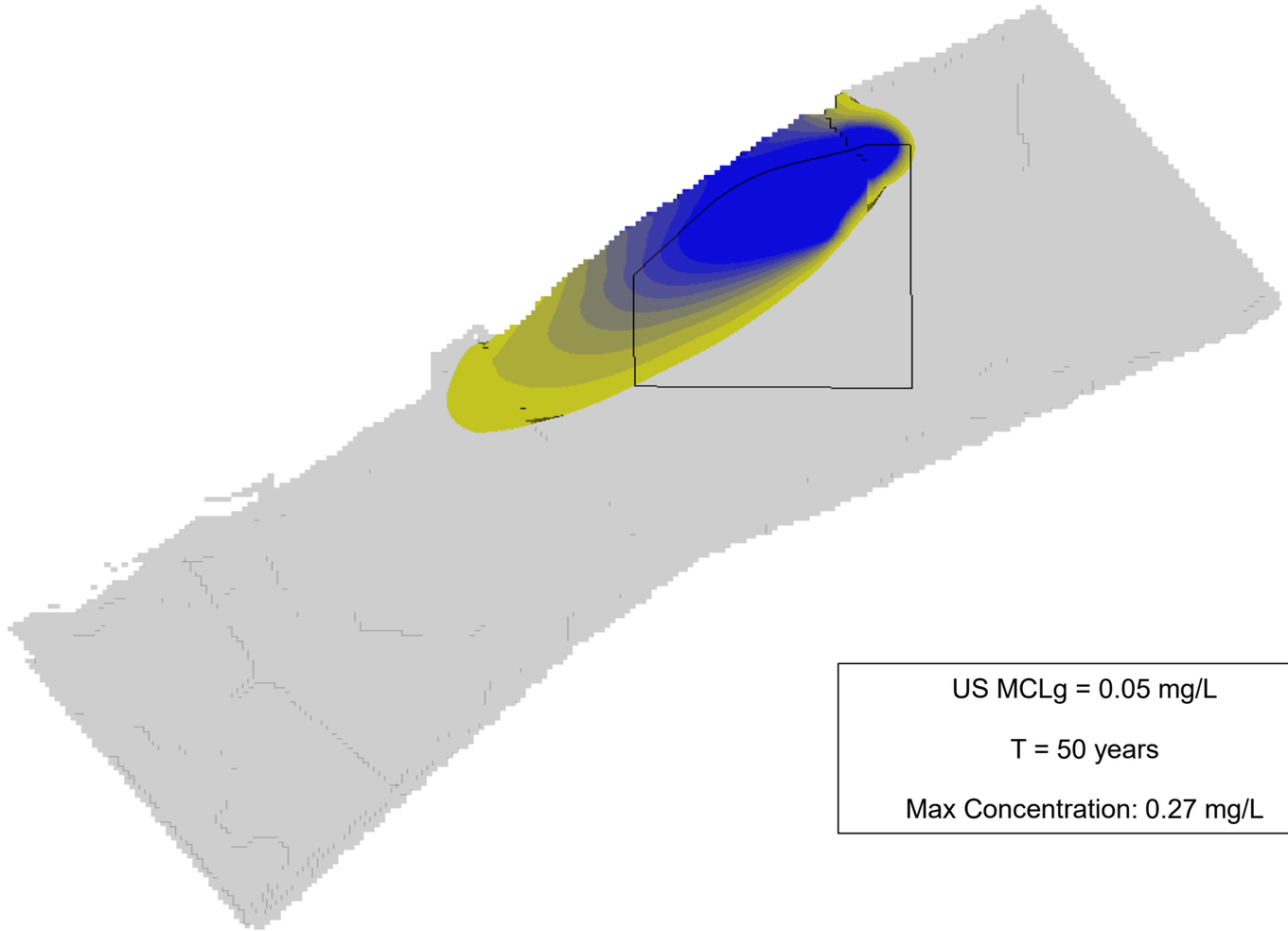
CLIENT
IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

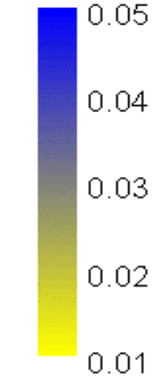
CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

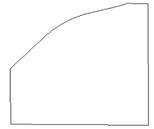
TITLE
MODELED ARSENIC CONCENTRATIONS IN PHAST, HIGH FLUX SCENARIO PHREEQC

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-19





Manganese Concentration (mg/L)



IDL Property Boundary

US MCLg = 0.05 mg/L

T = 50 years

Max Concentration: 0.27 mg/L

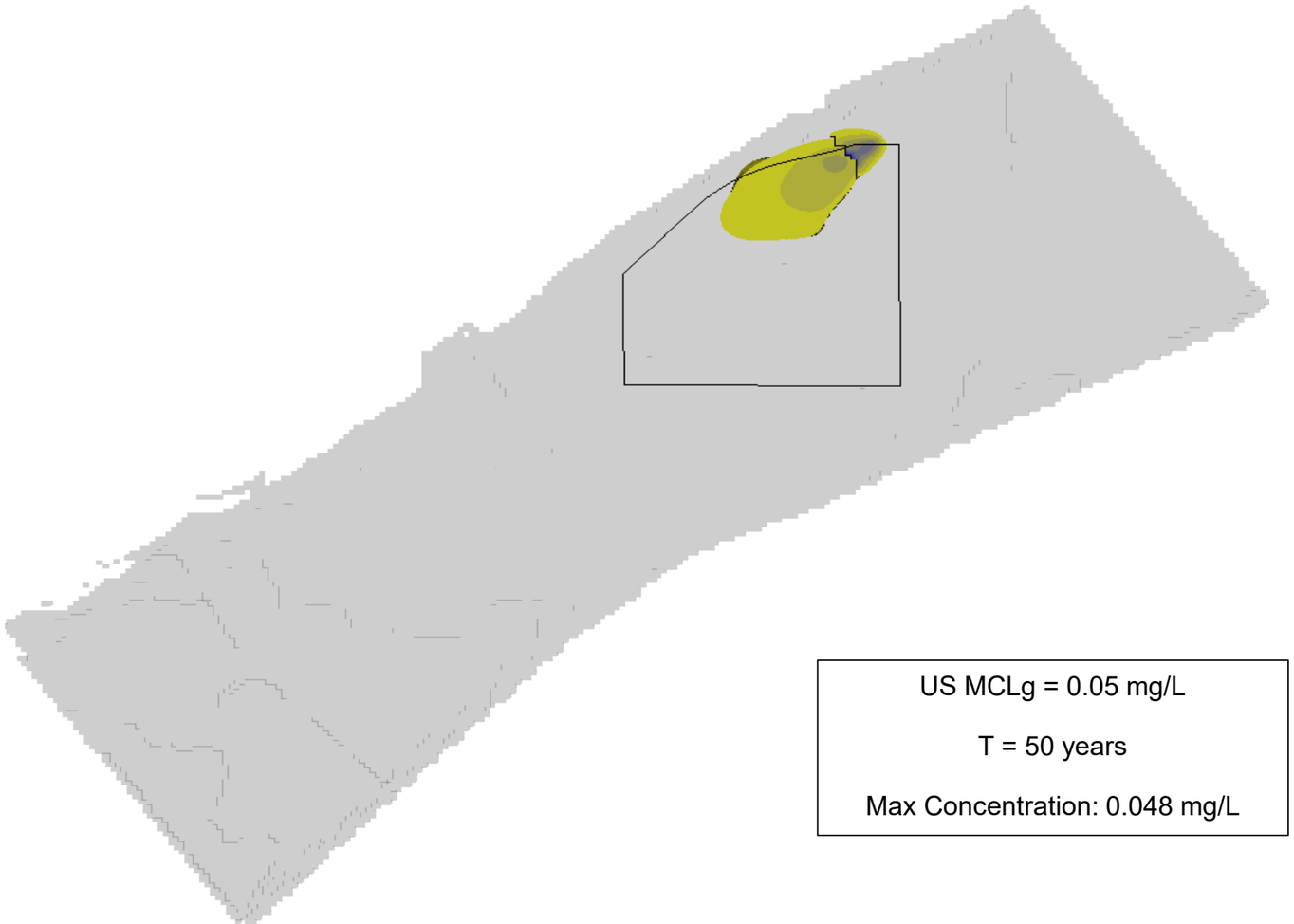
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IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

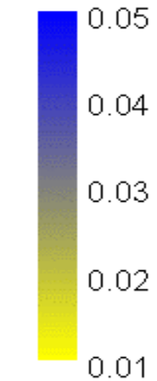
CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

TITLE
MODELED MANGANESE CONCENTRATIONS IN PHAST, LOW FLUX SCENARIO MIN3P

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-20





Manganese Concentration (mg/L)



IDL Property Boundary

US MCLg = 0.05 mg/L

T = 50 years

Max Concentration: 0.048 mg/L

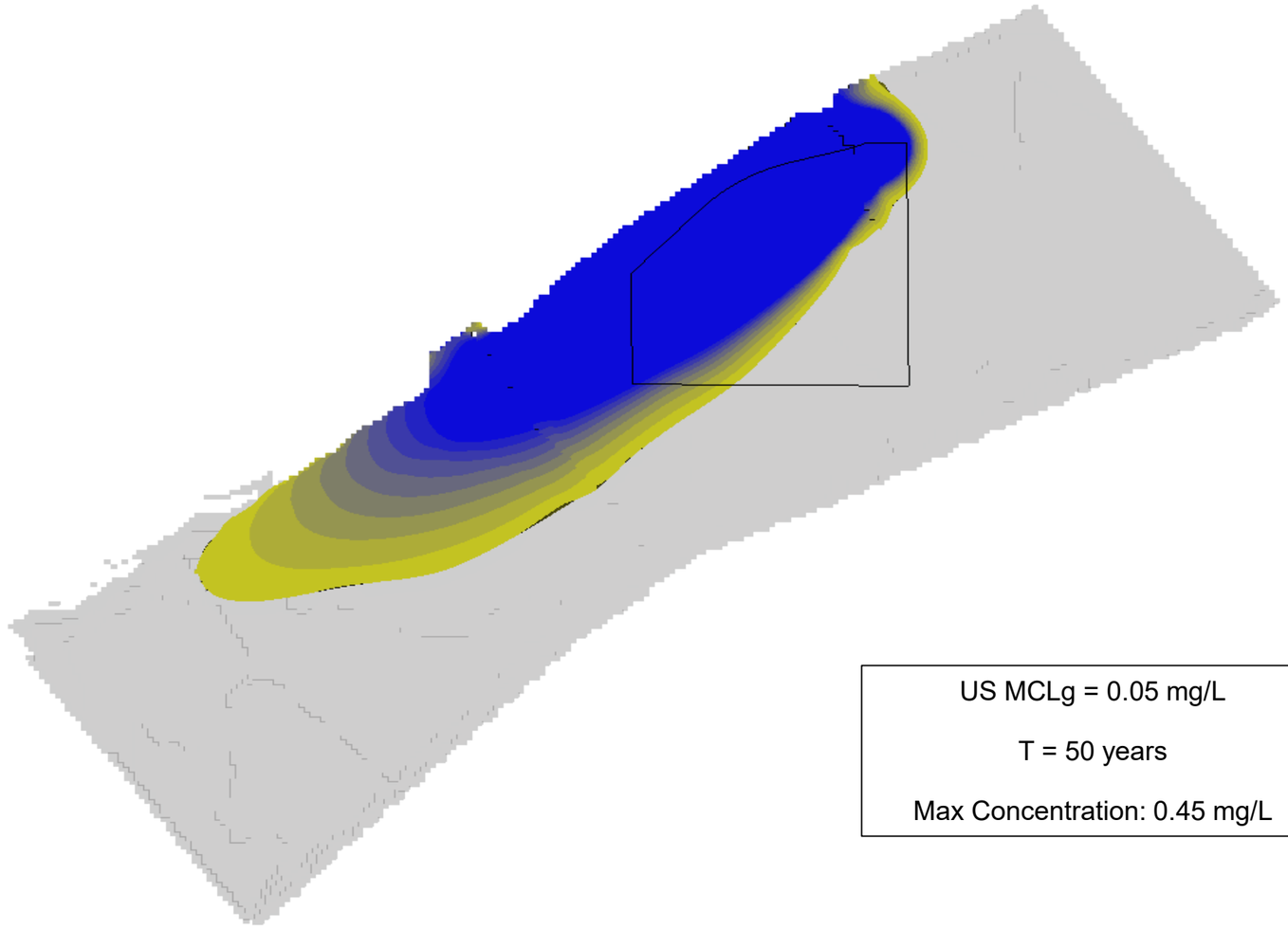
CLIENT
IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

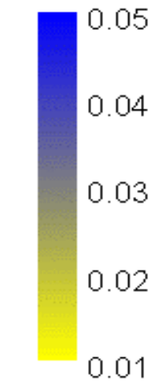
CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

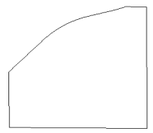
TITLE
MODELED MANGANESE CONCENTRATIONS IN PHAST, LOW FLUX SCENARIO PHREEQC

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-21





Manganese Concentration (mg/L)



IDL Property Boundary

US MCLg = 0.05 mg/L

T = 50 years

Max Concentration: 0.45 mg/L

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IDAHO DEPARTMENT OF
ENVIRONMENTAL QUALITY

CONSULTANT
wsp

PROJECT
TRIUMPH MINE GROUNDWATER FLOW
AND TRANSPORT MODEL

TITLE
MODELED MANGANESE CONCENTRATIONS IN PHAST, HIGH FLUX SCENARIO PHREEQC

PROJECT NO.	PHASE	REV.	FIGURE
31407131.001		0	3-22

APPENDIX A

Surface Water Data

Location	FLOW PARAMETERS					DATE
	Discharge (gpm)	Manta Discharge	Velocity (feet/sec	Calculated velocity	Thickness of water (feet)	
EFBW River - Background	0		0			10/23/2018
EFBW River - Downgradient	0					10/23/2018
EFBWR-1	20.9952		0.1783		0.73	4/18/2023
EFBWR-1			0.7992		0.78	4/18/2023
EFBWR-1			0.8902		1.19	4/18/2023
EFBWR-1			1.1599		1.5	4/18/2023
EFBWR-1			1.5826		1.05	4/18/2023
EFBWR-1			1.6927		0.95	4/18/2023
EFBWR-1			2.0146		1.42	4/18/2023
EFBWR-1			2.4174		1.55	4/18/2023
EFBWR-1			2.1623		1.54	4/18/2023
EFBWR-1			2.2604		1.02	4/18/2023
EFBWR-1			2.0574		1.21	4/18/2023
EFBWR-1			1.3715		1.21	4/18/2023
EFBWR-1			1.3214		0.93	4/18/2023
EFBWR-1			1.2605		1.02	4/18/2023
EFBWR-1			1.6902		0.71	4/18/2023
EFBWR-1			1.3509		0.72	4/18/2023
EFBWR-1			0.1376		0.5	4/18/2023
EFBWR-1			1.0409		0.28	4/18/2023
EFBWR-1		20.9952				4/18/2023
EFBWR-2		21.43				4/18/2023
EFBWR-3		21.43				4/18/2023
EFBWR-4		21.43	1.7915		0.55	4/17/2023
EFBWR-4			1.0242		0.52	4/17/2023
EFBWR-4			0.9557		0.56	4/17/2023
EFBWR-4						4/17/2023
EFBWR-4			0.1386		0.6	4/17/2023
EFBWR-4			1.8659		0.38	4/17/2023
EFBWR-4			1.2494		0.38	4/17/2023
EFBWR-4			1.4378		0.78	4/17/2023
EFBWR-4			1.2351		0.74	4/17/2023
EFBWR-4			1.814		0.61	4/17/2023
EFBWR-4			2.4065		0.58	4/17/2023
EFBWR-4			3.1299		0.64	4/17/2023
EFBWR-4			0.7052		0.71	4/17/2023
EFBWR-4			1.7283		0.9	4/17/2023
EFBWR-4			2.4585		0.59	4/17/2023
EFBWR-4			0.9921		0.53	4/17/2023
EFBWR-4	13.85057				0.41	4/17/2023
HC						4/17/2023
NSS-1						10/13/2021
RDB-1						4/28/2023
SW-7	57.4		2.1	2.1	0.13	11/20/2018
SW-7	57.4		2	2.1	0.13	12/17/2018
SW-7	100.7		1.8	2.6	0.18	1/16/2019
SW-7	133.8		3.4	2.8	0.21	2/13/2019
SW-7	111.5		1.1	2.7	0.19	3/18/2019
SW-7	378.3		1	3.8	0.35	4/19/2019
SW-7	133.8		3.3	2.8	0.21	5/14/2019
SW-7	216		3.4	3.3	0.27	6/3/2019
SW-7	133.8		2.3	2.8	0.21	7/8/2019
SW-7	41.4		1.3	1.8	0.1	8/21/2019
SW-7	57.4		1.5	2.1	0.13	9/17/2019
SW-7	111.5		1.9	2.7	0.19	10/23/2019
SW-7	41.4		2.3	1.8	0.1	11/18/2019
SW-7	73.4			2.3	0.15	12/10/2019
SW-7		106.2			0.1	5/18/2020
SW-7		94			0.17	6/1/2020
SW-7		65.2			0.14	7/8/2020
SW-7		23.4			0.13	8/10/2020
SW-7		7			0.08	9/9/2020
SW-7		12.6			0.09	10/10/2020

Location	FLOW PARAMETERS					DATE
	Discharge (gpm)	Manta Discharge	Velocity (feet/sec	Calculated velocity	Thickness of water (feet)	
SW-7		56.5			0.08	11/11/2020
SW-7		59.5			0.1	12/8/2020
SW-7		65.7			0.17	1/14/2021
SW-7		72.1			0.15	2/16/2021
SW-7					0.16	3/22/2021
SW-7		99.1			0.16	4/5/2021
SW-7		82.2			0.17	5/3/2021
SW-7		88			0.21	6/1/2021
SW-7		10.1			0.09	7/7/2021
SW-7		9.1			0.13	8/3/2021
SW-7					0.15	9/2/2021
SW-7		9.4			0.094	10/12/2021
SW-7		61.3			0.11	11/12/2021
SW-7		57.1			0.21	12/7/2021
SW-7		65.6			0.15	1/25/2022
SW-7		53.7			0.13	2/10/2022
SW-7		79.4			0.14	3/17/2022
SW-7		108			0.14	3/30/2022
SW-7		110			0.15	4/11/2022
SW-7		108			0.2	4/27/2022
SW-7		111			1.9	5/11/2022
SW-7		89			1.9	5/25/2022
SW-7		121			2	6/6/2022
SW-7		23.3			0.08	7/20/2022
SW-7		7			0.15	9/15/2022
SW-7		9.8			0.08	10/17/2022
SW-7						10/27/2022
SW-7		25.2			0.1	11/3/2022
SW-7		17.1			0.13	12/12/2022
SW-7		97.8			0.66	4/17/2023
SW-7		79.7				8/15/2023
SW-7		25.2			0.1	11/3/2022
SW-7		17.1			0.13	12/12/2022
SW-7		97.8			0.66	4/17/2023
SW-7		116.6				5/18/2023
SW-7		130				6/28/2023

APPENDIX B

Borehole Logs

TEST PIT LOG: TP-1

Date: 10/4/2018

Client: Idaho Department of Lands
Project: Triumph Mine Infiltration Assessment
Project No.: 130-123519
Engineer: Jeremy Jones
Contractor: Dahle Construction
Equipment: CAT 305E
Weather: 50ºF Rain
Google Earth (WGS 84): **Lat** 43.642216 **Long** -114.264438
Location: South of East Fork Road, west of Lower Tailings Pile

Notes: Begin 15:30
Finish 16:00
No groundwater observed

Samples:	Sample Type	Material Sampled
TP-1-1.0-9.0'	Composite	Silty Gravel with Sand

Lithology

Depth	***USCS***	***Description***
0-1	ML	*SANDY SILT; brown; dry; slightly plastic; some fine to coarse angular sand and gravel, trace weathered volcanic tuff, white, silt/sand texture, small black inclusions <2-3mm.*
1-9	GM	*SILTY GRAVEL with SAND; dark gray; moist; fine to coarse angular gravel; some fine to coarse angular sand; trace cobbles; fines are slightly plastic.*







TEST PIT LOG: TP-2

Date: 10/4/2018

Client: Idaho Department of Lands
Project: Triumph Mine Infiltration Assessment
Project No.: 130-123519
Engineer: Jeremy Jones
Contractor: Dahle Construction
Equipment: CAT 305E
Weather: 45ºF Rain
Google Earth (WGS 84): **Lat** 43.641985 **Long** -114.263980
Location: South of East Fork Road, west of Lower Tailings Pile

Notes: Begin 14:50
Finish 15:20
Groundwater observed at 6.5 feet

Samples:	Sample Type	Material Sampled
TP-2-0-2'	Composite	Sandy Silt

Lithology

Depth	***USCS***	***Description***
0-2	ML	*SANDY SILT; dark brown to reddish brown; moist; slightly plastic; some fine to coarse angular sand; trace angular fine to coarse gravel; trace decomposed organics*
2-8	MH	*CLAYEY SILT; dark gray; moist to wet; slightly plastic; mottling; some fine to coarse angular sand and gravel; trace highly weathered limestone?. Groundwater observed at 6.5 feet bgs, filled pit rapidly.*







TEST PIT LOG: TP-3

Date: 10/4/2018

Client: Idaho Department of Lands
Project: Triumph Mine Infiltration Assessment
Project No.: 130-123519
Engineer: Jeremy Jones
Contractor: Dahle Construction
Equipment: CAT 305E
Weather: 45ºF Rain
Google Earth (WGS 84): **Lat** 43.642303 **Long** -114.262459
Location: South of East Fork Road, west of Lower Tailings Pile

Notes: Begin 10:20
Finish 10:47
Groundwater observed at 7 feet

Samples:	Sample Type	Material Sampled
TP-3-1.5-4'	Composite	Gravel with Sand and Silt
TP-3-4.0-8.0'	Composite	Gravel with Sand and Silt

Lithology

Depth	***USCS***	***Description***
0-1.5	GM	*SILTY GRAVEL with SAND; light gray; dry; fine to coarse angular gravel; some fine to coarse angular sand; trace organics; fines are slightly plastic.*
1.5-8	GP	*GRAVEL WITH SAND AND SILT; grayish brown to light gray; moist-wet; fine to coarse; angular to subrounded gravel/cobbles; fine to coarse angular to subrounded sand; some silt. Grades to grayish brown are 4.0 feet. Groundwater observed at 7 feet.*









TEST PIT LOG: TP-4

Date: 10/4/2018

Client: Idaho Department of Lands
Project: Triumph Mine Infiltration Assessment
Project No.: 130-123519
Engineer: Jeremy Jones
Contractor: Dahle Construction
Equipment: CAT 305E
Weather: 50ºF Overcast
Google Earth (WGS 84): **Lat** 43.642711 **Long** -114.262343
Location: South of East Fork Road, west of Lower Tailings Pile

Notes: Begin 09:27
Finish 10:05
No groundwater observed

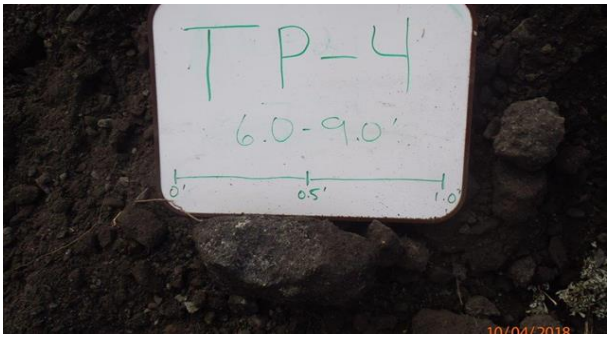
Samples:	Sample Type	Material Sampled
TP-4-0-6'	Composite	Silty Sand with Gravel
TP-4-6-9'	Composite	Silty Sand with Gravel

Lithology

Depth	***USCS***	***Description***
0-9	SM	*SILTY SAND with GRAVEL; dark gray; dry; fine to coarse angular sand; some fine to coarse angular gravel and cobbles; organics to 6 feet bgs; some white precipitate or weathering observed from 6-9 feet bgs. Increase sand at 6 feet bgs, becomes moist.*









TEST PIT LOG: TP-5

Date: 10/4/2018

Client: Idaho Department of Lands
Project: Triumph Mine Infiltration Assessment
Project No.: 130-123519
Engineer: Jeremy Jones
Contractor: Dahle Construction
Equipment: CAT 305E
Weather: 45ºF Rain
Google Earth (WGS 84): **Lat** 43.642185 **Long** -114.263826
Location: South of East Fork Road, west of Lower Tailings Pile

Notes: Begin 14:20
Finish 14:40
No groundwater observed

Samples:	Sample Type	Material Sampled
TP-5-5-10'	Composite	Silty Sand with Gravel

Lithology

Depth	***USCS***	***Description***
0-10	SM	*SILTY SAND with GRAVEL; gray; dry; fine to coarse angular sand; some fine to coarse angular gravel and cobbles; fines are slightly plastic; trace organics to 2.5 feet bgs. Becomes dark gray, moist at 5 feet bgs.*









TEST PIT LOG: TP-6

Date: 10/4/2018

Client: Idaho Department of Lands
Project: Triumph Mine Infiltration Assessment
Project No.: 130-123519
Engineer: Jeremy Jones
Contractor: Dahle Construction
Equipment: CAT 305E
Weather: 50ºF Overcast
Google Earth (WGS 84): **Lat** 43.642410 **Long** -114.262831
Location: South of East Fork Road, west of Lower Tailings Pile

Notes: Begin 11:50
Finish 12:20
No groundwater observed

Samples:	Sample Type	Material Sampled
None		

Lithology

Depth	***USCS***	***Description***
0-9	SM	*SILTY SAND with GRAVEL; light to dark gray; dry; fine to coarse angular sand; some fine to coarse angular gravel and cobbles; fines are slightly plastic; trace organics to 3.0 feet bgs. Slight increase in moisture with depth.*







TEST PIT LOG: TP-7

Date: 10/4/2018

Client: Idaho Department of Lands
Project: Triumph Mine Infiltration Assessment
Project No.: 130-123519
Engineer: Jeremy Jones
Contractor: Dahle Construction
Equipment: CAT 305E
Weather: 45ºF Rain
Google Earth (WGS 84): **Lat** 43.642222 **Long** -114.263030
Location: South of East Fork Road, west of Lower Tailings Pile

Notes: Begin 12:50
Finish 13:10
Groundwater observed at 7 feet

Samples:	Sample Type	Material Sampled
TP-7-0-6'	Composite	Silty Sand

Lithology

Depth	***USCS***	***Description***
0-6	SM	*SILTY SAND; light gray to gray; dry; fine to coarse angular sand; fines are slightly plastic; trace fine to coarse angular gravel and cobbles*
6-8	SM	*SILTY SAND with GRAVEL; dark gray; moist to wet; fine to coarse angular sand; some fine to coarse angular gravel and cobbles; fines are slightly plastic. Groundwater observed at 7.5 feet bgs.*





TEST PIT LOG: TP-8

Date: 10/4/2018

Client: Idaho Department of Lands
Project: Triumph Mine Infiltration Assessment
Project No.: 130-123519
Engineer: Jeremy Jones
Contractor: Dahle Construction
Equipment: CAT 305E
Weather: 45ºF Rain
Google Earth (WGS 84): **Lat** 43.642395 **Long** -114.263369
Location: South of East Fork Road, west of Lower Tailings Pile

Notes: Begin 13:45
Finish 14:05
No groundwater observed

Samples:	Sample Type	Material Sampled
TP-8-0-9'	Composite	Silty Sand with Gravel

Lithology

Depth	***USCS***	***Description***
0-9	SM	*SILTY SAND with GRAVEL; gray to dark gray; dry to moist; fine to coarse angular sand; some fine to coarse angular gravel and cobbles; fines are slightly plastic. Organics/roots to 2.5 feet bgs. Becomes dark gray and moist at 4 feet bgs.*







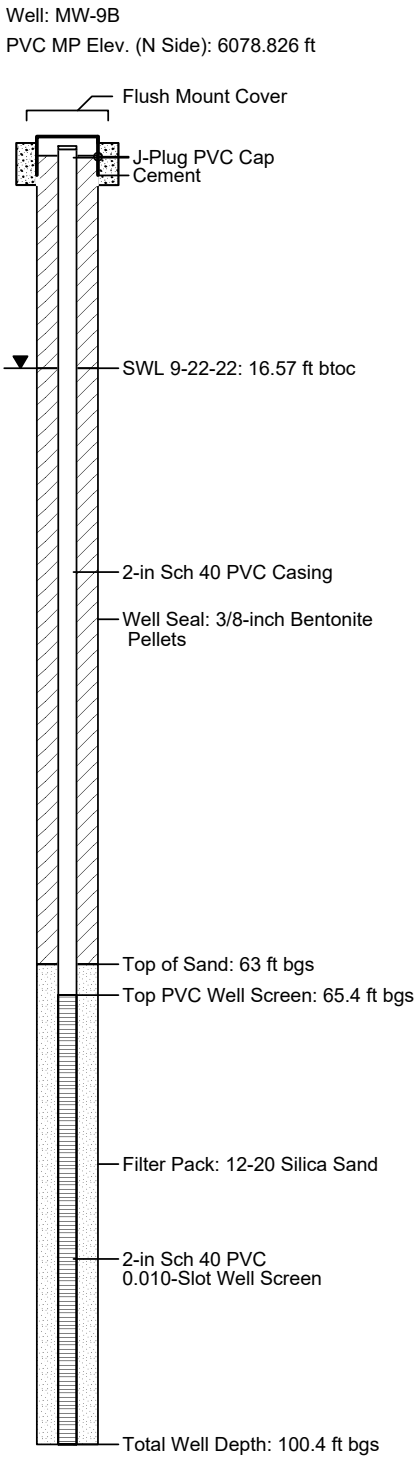
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-9B (D0097447)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-19-22	Static Water Level	: 16.82 ft btoc
Date Completed	: 9-20-22	Northing Coord	: 720673.437
Driller:	: Holt Services	Easting Coord	: 1571448.416
Drilling Method	: Terra Sonic-Roto-Sonic	Location:	: W end 531 E Fork Rd
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	DESCRIPTION	Lab Sample	% Core Recovery
0	FILL (GM/ML)	FILL: Gravelly sandy soil to clayey SILT. Dark olive brown (2.5YR 3/3).		60
5				
10		Densely compacted gravelly SILT, reddish black, noncoehesive, dry.		
10	Waste Rock (GP/GM)	WASTE ROCK FILL Silt with black, sub-angular mudstone gravel (argillite).		60
15				
20		Highly weathered black mudstone (clayey silt) and clasts of black mudstone 1- to 2-inch size. Slightly cohesive, very dark gray.		65
25		As above, saturated.		
30		As above.		80
35				
40	GW	GRAVEL with cobbles, sand and fines. Light yellowish brown (2.5Y 6/4). Alluvium.		80
45				
50		As above with cobbles of quartz and black mudstone (argillite).		80
55				
60	LS	LIMESTONE, black, with fine to medium fossils.		75
65				
70				
75	ARG	MUDSTONE (Argillite), black, siliciferouls, pyritiferous, no visible fossils.		0
80				
85		Silliciferous, black, clayey silt mudstone, highly weathered.		
90				
95	LS	LIMESTONE, algal with crenulated surface and disseminated pyrite cyrstals (3-5%).		95
100				
105				



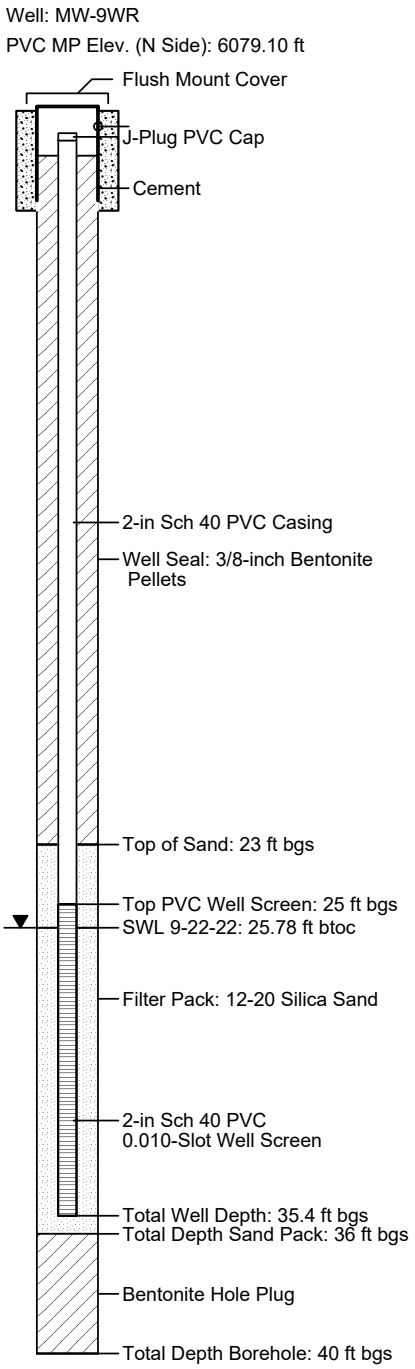
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-9WR (D0097446)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-21-22	Static Water Level	: 25.78 ft btoc
Date Completed	: 9-21-22	Northing Coord	: 720676.17800
Driller:	: Holt Services	Easting Coord	: 1571453.12300
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: W end 531 E Fork Rd
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% Core Recovery
0	FILL (GM)		FILL: Silt with gravel and sand, loose, brown (10YR 4/3).		50
5	Waste Rock (GM/GC)		WASTE ROCK FILL Angular to subangular gravel with sand and silt, dry, loosely compacted, dark brown (10YR 3/3).		
10			Limestone cobbles and rock fragments, dry, loosely compacted.		85
			Limestone cobbles, possible mix with tailings, dry to slightly moist.		
15			Limestone cobbles, dry		
20			Gravelly SILT with waste rock, pyritic fines (possible tailings), moist.		--
25			Clayey SILT with fine to medium subangular rock fragments, moist, very dark grayish brown (10YR 3/2).		
30			Clayey SILT with broken silicified mudstone (limestone or argillite), black, saturated.		--
35			Sandy clayey SILT with broken limestone and argillite, grey (5Y 5/1), saturated.		--
40	GM		GRAVEL, with sands, fines, and cobbles, subangular to subrounded, olive gray (5Y 5/2). Alluvium.		--
45					



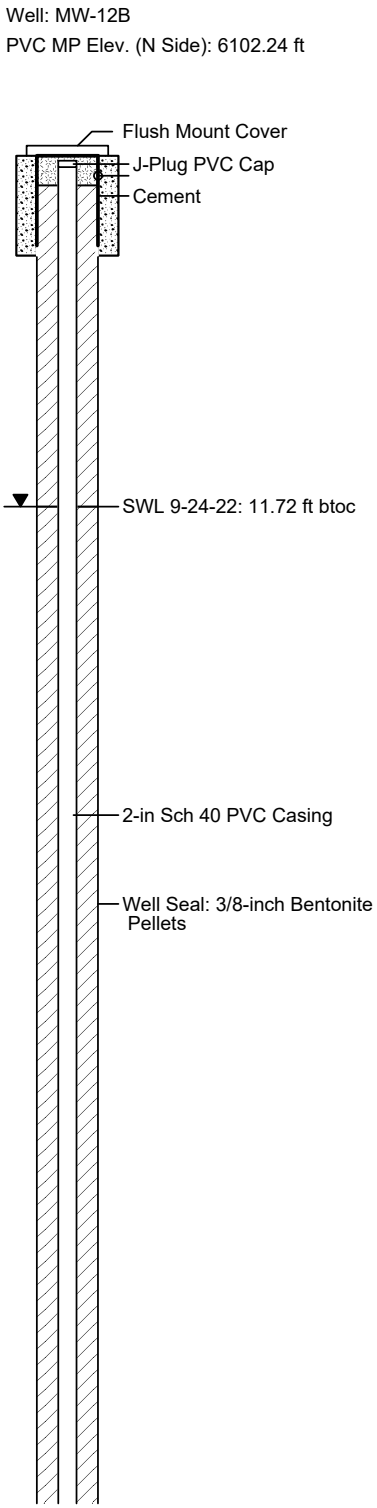
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-12B (D0097449)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-22-22	Static Water Level	: 11.72 ft btoc
Date Completed	: 9-24-22	Northing Coord	: 721079.101
Driller:	: Holt Services	Easting Coord	: 1572725.205
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: Triumph Circle - E Fk Rd
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% Core Recovery
0	SM		Silty loam (topsoil), loose, dray, light gray (7.5YR 5/1).		
	GW		Silty sandy GRAVEL, well graded, very dark gray (7.5YR 3/1), loosely compacted, dry to moist.		
5	ML		Sandy SILT with gravel, dark gray, very moist to saturated Clayey SILT, dark gray (7.5YR 4/1), coehesive, saturated.		85
10	GM		Silty sandy GRAVEL fine to medium, subangular to subrounded, saturated		65
20					
25	ML		Sandy SILT, fine to very fine sand, very dark gray (2.5 3/1), stiff, noncoehesive, wood fragments.		100
30	GM		Silty, sandy GRAVEL, subangular to subrounded, gray (2.5 Y 5/1) to pale brown (2.5Y 7/2) mottling, with clasts of dark gray sllicified limestone white calcite veining		100
35	ML/ PT		Sandy SILT with peat layers, black with oxidized zone of red mottling (5YR 3/2).		
	GM		Sandy silty GRAVEL, mottled.		100
	SM		Sandy SILT, oxidized mottled.		
40	SP		SAND, coarse grades to medium, well sorted, light reddish brown (5YR 5/3). As above, coarse to medium.		80
45					



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Environmental Services

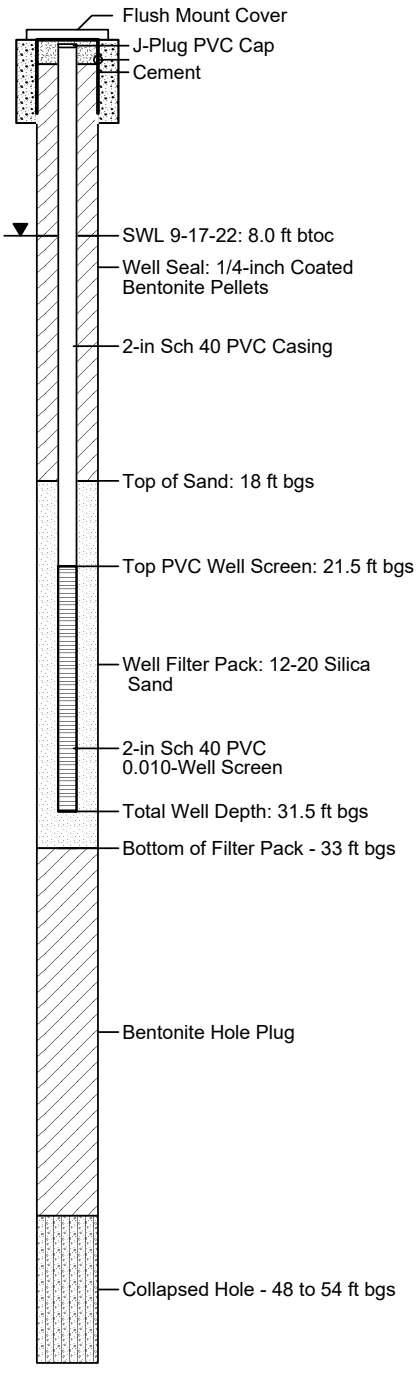
LOG OF BORING / WELL: MW-13A (D0097452)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-16-22	Static Water Level	: 8.0 ft btoc
Date Completed	: 9-17-22	Northing Coord	: 720373.594
Driller:	: Holt Services	Easting Coord	: 1572335.297
Drilling Method	: Roto-Sonic	Location:	: E Fork Lane-Squire Prop
Sampling Method	: 5-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% Core Recovery
0	SM		Topsoil.		
	SP		TAILINGS, sand size, mostly medium subangular to subrounded grains, ranging from coarse (quartz 0.2 mm) to fine (pyrite 0.05 mm), brownish black (5YR 2/1), moist grades to saturated.		
5			TAIILINGS: Clayey silty slimey tailings, primarily <0.1 mm silt fraction with minor clay and fine sand (10%, 0.1 to 0.2 mm), grayish black (N2), pastic to very coehesive. Saturated.		
10	ML				
15	GC/GM		GRAVEL mixed with tailings, moist		
			GRAVEL with silt, clay, sand, includes clasts of weathered limestone that are dusky yellowish greeen (5GY 5/2) with clasts of white quartzite and black limestone.		
20					
25			GRAVEL sand, silt, clay fines, brown (10YR 4/3)		
30	GM/GC		As above, cobbles to 4 inch size.		
35					
40					
45					
	SM		SAND with fines, medium to coarse sand, grayish brown (10YR 5/2).		
	GM		GRAVEL, with fines and broken black argillite rock fragments, angular to subangular.		
50	ARG		ARGILLITE (mudstone), silicified, dark gray (GLEY 4/1).		
55					

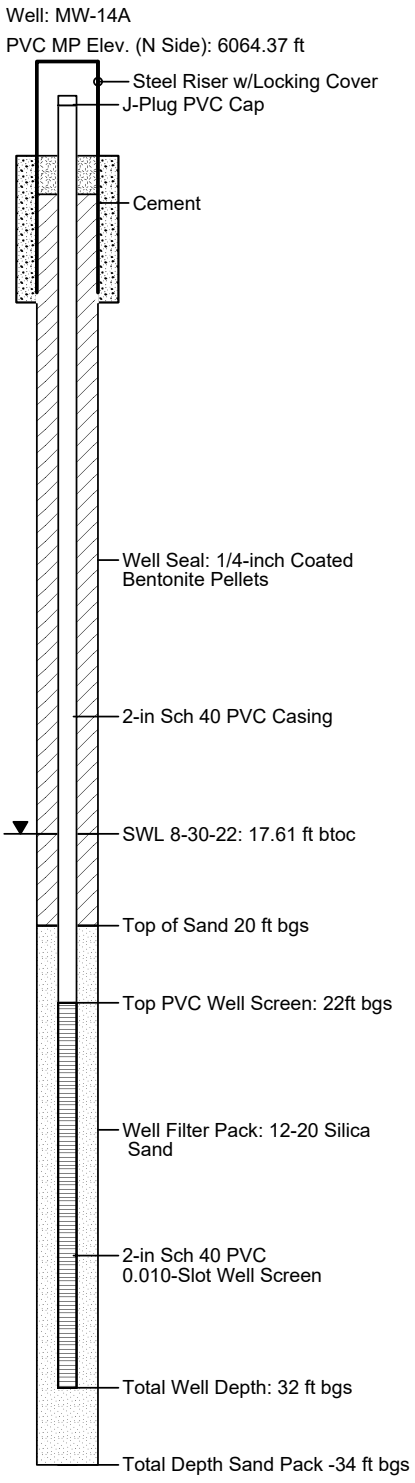
Well: MW-13A
PVC MP Elev. (N Side): 6068.86 ft



Tetra Tech Missoula, MT Environmental Services	LOG OF BORING / WELL: MW-14A (D0097454) (Page 1 of 1)

Idaho DEQ Triumph Mine UTP/LTP Site Investigation	Date Started	: 8-27-22	Static Water Level	: 17.61 ft btoc
	Date Completed	: 8-27-22	Northing Coord	: 720160.231
	Driller:	: Holt Services	Easting Coord	: 1571537.632
Triumph, Idaho	Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: Lower Tailings Pile
Project# 117-8296075	Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% Core Recovery
0	GM		Silty GRAVEL, vegetative cover soil (cap) over Lower Tailings Plile, dark gray (5Y 2.5/1).		
	TAILS (SM/ML)		TAILINGS, silt and sand size, some clay size, dark yellow brown (10YR 4/4) oxidation with black (5Y 2.5/1) reduced zones.		
5	TAILS (SP)		TAILINGS, sand size with fine gravel clasts of mudstone, black (GLEY 2.5/N), subangular.		100
10	TAILS (SM/ML)		TAILINGS, sand and slime (silt/clay) tailings, black (GLEY 1 2.5/N), inorganic salts, pyrite, moist As above, sand subrounded, sulfur odor.		
15			As above at 8 ft bgs with pyrite, sphalerite, galena present, subangular fines. As above with rootlets and mudstone and quartzite pebbles.		
20	GM		GRAVEL with sand and fines, gravel pebble to cobble size, olive brown (2.5Y 4/4), cohesive, fines are plastic at 20 to 22 feet, saturated.		
25			As above.		
30					
35					



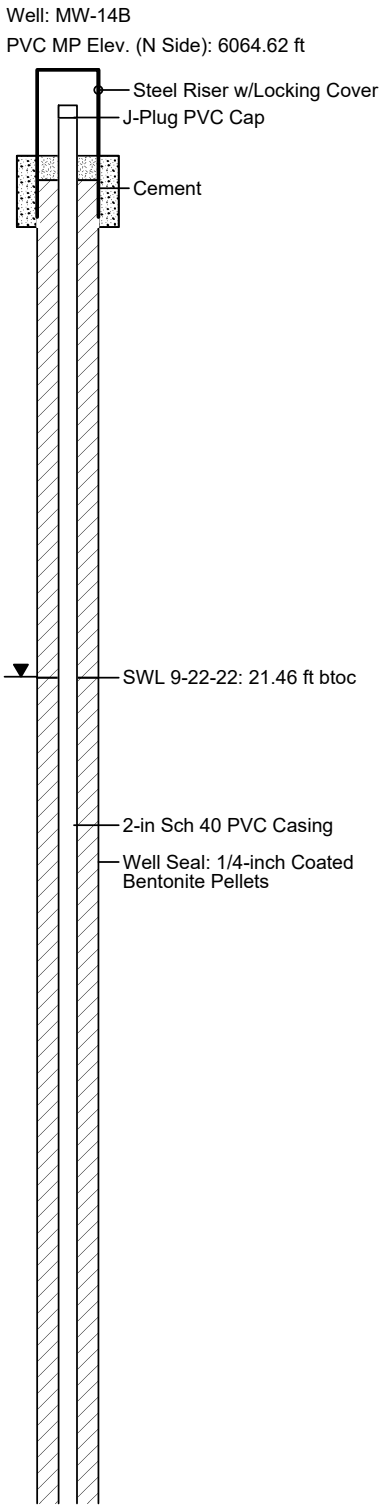
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-14B (D0097456)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-13-22	Static Water Level	: 21.46 ft btoc
Date Completed	: 9-13-22	Northing Coord	: 720145.586
Driller:	: Holt Services	Easting Coord	: 1571554.960
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: Lower Tailings Pile
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	DESCRIPTION	Lab Sample	% Core Recovery
0	GM	Silty sandy GRAVEL, vegetative cover soil (cap) over Lower Tailings Pile, angular rock, light grayish brown, dry.		
5	TAILS (SP)	Silty GRAVEL cover soil mixed with sand size TAILINGS dark yellowish brown (10YR 4/4) with oxidized clumps of silty sand size tailings, dry grades to moist.		100
	TAILS (SP)	TAILINGS, sand size, medium grained, angular to subangular, pyrite, sphalerite, and galena present, black (2.5/N), moist.		
10	TAILS (ML)	TAILINGS slimes, silt size with very fine to fine sand size tailings, root clump at 9.5 ft bgs.		
15		Silt size tailings, very pale orange (10YR 8/2).		
20		Tailings slimes mixed with fine sandy tailings black (GLEY 2.5/N). Slimes consist mostly silt size with very fine sand tailings, coehesive, sands are angular to subangular of pyrite, and galena crystals.		
	PT	PEAT, oganic rich root zone or peat zone at 22 ft bgs.		
25	TAILS(SP)	TAILINGS: Sand size tailings.		
	GM	GRAVEL with sand and fines, dark yellowish brown (10YR 4/2) to olive brown (2.5Y 4/4), coehesive, saturated. Alluvium.		
30		As above, approximately 50% gravel, 50% sands and fines, olive brown (2.5Y 4/4), saturated.		
35				
40				
45	CL	SILT/CLAY with gravel and cobbles, potential weathered limestone paleosol and confining layer, moist.		
	LS	LIMESTONE, silty, light olive gray (5Y 6/1), friable/rotted texture with clay fines (possible gypsium replacement in banded limestone fracture), moist grades to dry.		
50				
55				



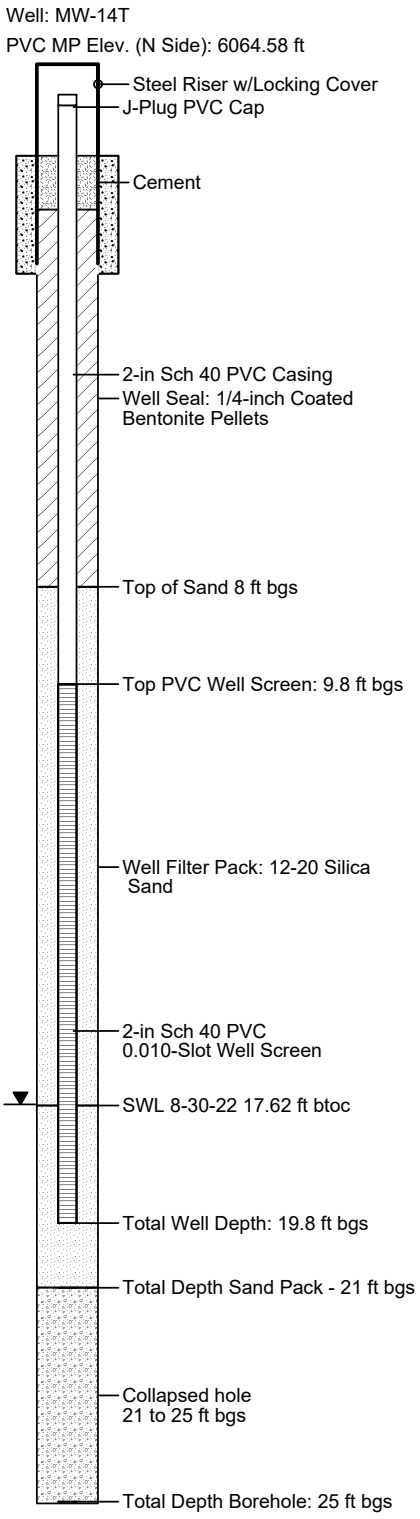
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-14T (D0097455)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 8-29-22	Static Water Level	: 17.62 ft btoc
Date Completed	: 8-29-22	Northing Coord	: 720139.449
Driller:	: Holt Services	Easting Coord	: 1571529.9390
Drilling Method	: Tera Sonic - Roto-Sonic	Location:	: Lower Tailings Pile
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% Core Recovery
0	GM		Silty SAND and angular crushed rock, vegetative cover soil (cap) over Lower Tailings Pile.		
	TAILS (SP)		TAILINGS, reworked fine to medium sand size tailings, reddish brown (5YR 4/6), loosely cemented in places.		
5	TAILS (SM)		TAILINGS, silt and fine to medium sand size tailings with pyrite crystals and sphears, iron oxide-hyroxide blades, and manganese platey crystals, noncoehesive, dry.		
10	TAILS (ML)		TAILINGS, slime tailings consisting of silt and clay size tailings with laminations of subangular to subrounded fine to very fine sand tailings with pyrite crystals, dark gray to black, damp, moderately plastic, slight sulfur odor.		
15	PT		PEAT, organic rich silt with root fragments and occassional wood fragments.		
	TAILS (ML)		TAILINGS, slime tailings consisting of silt and sand size particles, very dark gray (5YR 2.5/1).		
20	TAILS (SM/PT)		Interbedded TAILINGS and PEAT, silt and sand size tailings with organic peat and fines interbeds, gray.		
	TAILS (ML)		TAILINGS, slime tailings as above at 10 feet bgs, saturated		
25	GW		Slty sandy GRAVEL, brown (5YR 5/3), saturated.		



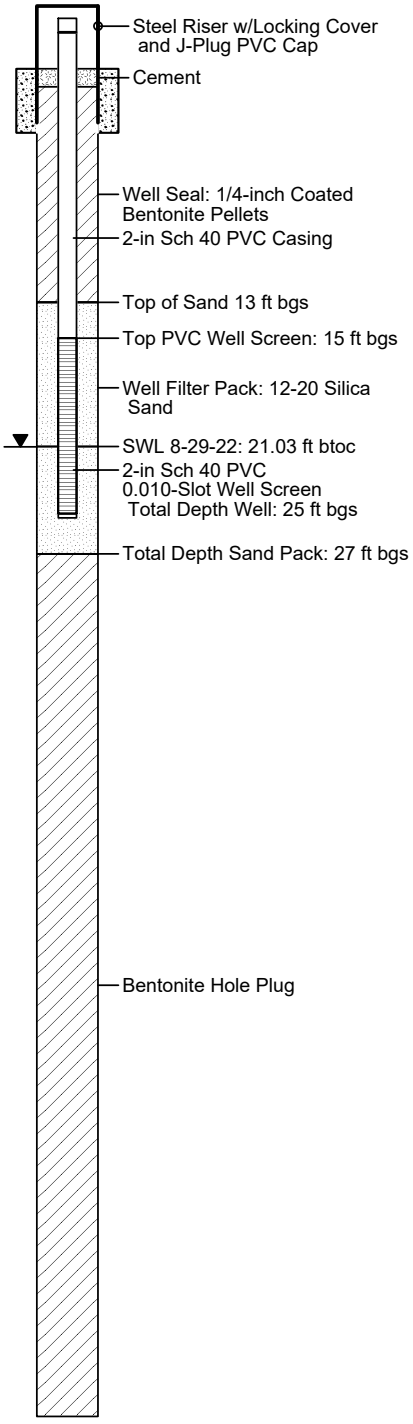
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Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-15A (D0097457)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 8-26-22	Static Water Level	: 21.03 ft btoc
Date Completed	: 8-26-22	Northing Coord	: 719786.093
Driller:	: Holt Services	Easting Coord	: 1571700.719
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: LTP Emphemeral Pond
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	DESCRIPTION	Lab Sample	% Core Recovery
0	GM	Silty sand and angular crushed rock, vegetative cover soil (cap).		
5	TAILS (SM/ML)	TAILINGS, fine sand size tailings with 20% slimes/mud tailings, gray (2.5N) with occasional weakly cemented reddish brown iron oxide lenses, moist.		70
10	FILL(GM)	Sand and gravel FILL, angular siliceous mudstone, gray (N3), moist.		
15	TAILS (ML)	TAILINGS, fine sand size with 30% slit/clay size tailings, occassional clasts of broken siliceous mudstone, moist.		80
20		Geotextile fabric at 12.5 feet bgs.		
25		TAILINGS, laminated fine sand size with slimes (silt/clay size), greenish black (5G 2/1).		
30	GM / GP	Silty SAND with gravel and cobbles, rounded to subrounded, greenish gray (5GY 2/1), moist to saturated at 19 ft bgs.		
35		Silty sandy GRAVEL with minor clay, subrounded to rounded, greenish gray (5GY 2/1), saturated.		
40				
45				
50	SP	Silty SAND with gravel and cobbles, subrounded to rounded, brown (7.5YR 5/3), saturated.		
55				
60				
65				
70	CL	CLAY with cobbles and gravels, subangular to subrounded, olive.		
	ARG	ARGILLITE: Black siliceous mudstone, variable saturation zones bteween 70-75 ft bgs.		
75				



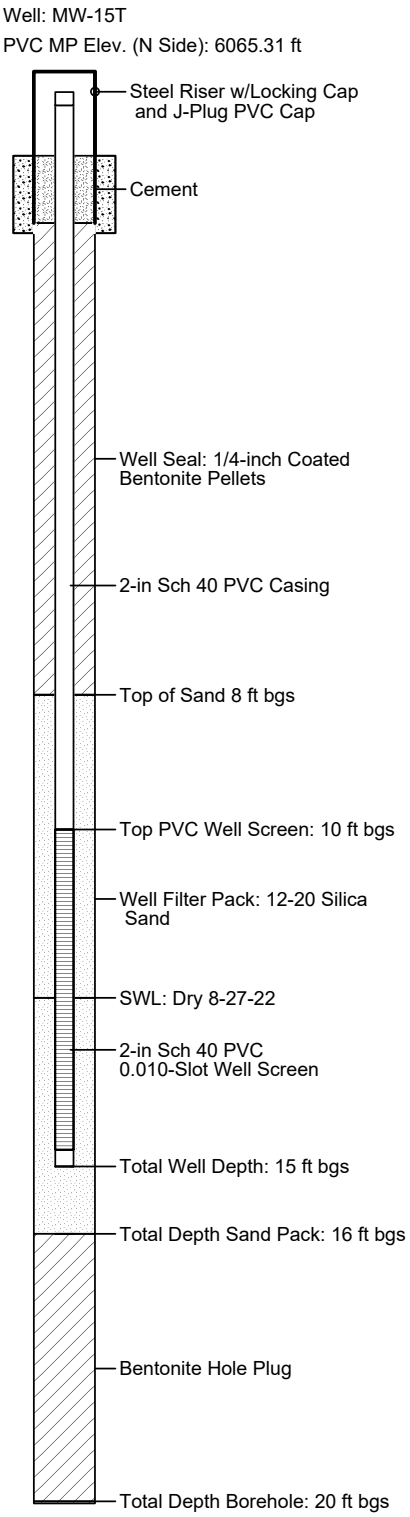
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-15T (D0097458)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 8-27-22	Static Water Level	: Dry
Date Completed	: 8-27-22	Northing Coord	: 719777.579
Driller:	: Holt Services	Easting Coord	: 1571675.881
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: LTP Ephemeral Pond
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% Core Recovery
0	GM		Silty sand and angular crushed rock, vegetative cover soil (cap).		
	TAILS (SM/ML)		TAILINGS, silt and sand size tailingss mixed with silt/clay (slime) size tailings, alternating oxidized reddish brown (2.5YR 5/3) sandy lenses and reduced greenish gray slimes (GLEY 5/1).		
5					90
	FILL (GP)		FILL, waste rock/unprocessed ore, gray, with pure white calcite infilled fractures.		
10			Geotextile fabric at 11.5 feet bgs.		
	TAILS (ML)		TAILINGS, very fine sand and silt/clay (slime) size tailings, laminated.		
	TAILS (CL)		TAILINGS: Black, non-laminated silt/clay slimes (GLEY 2.5/N).		
15					60
	ALLUV/ TAILS (GM/GP)		ALLUVIUM/TAILINGS mixture, sand with silty/clay, and subrounded gravels to 2-inch minus, dark gray. Root fragments to 17 ft bgs, grades to poorly sorted gray silt/clay (GLEY 6/1) with 30% sand and gravel. Saturated at ~19 feet bgs.		
20					



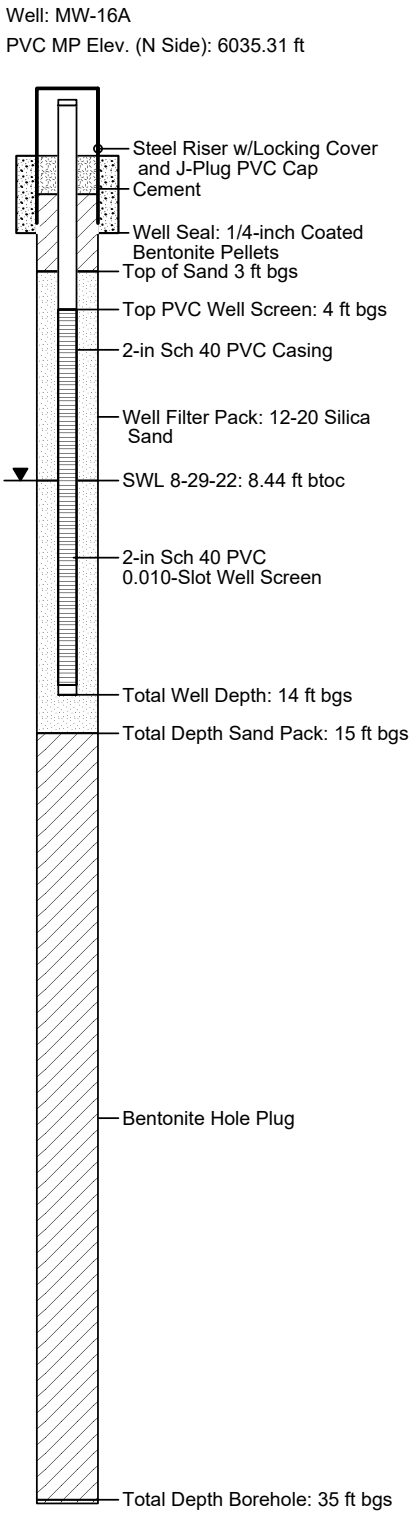
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-16A (D0097460)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 8-23-22	Static Water Level	: 8.44 ft btoc
Date Completed	: 8-23-22	Northing Coord	: 719713.532
Driller:	: Holt Services	Easting Coord	: 1570737.084
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: W of Lower Tailings Pile
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	DESCRIPTION	Lab Sample	% Core Recovery
0	SM	Silty loam (topsoil) with abundant roots, oilive black (5Y 2/1), moist.		
	ML	SILT with clay, medium dark gray (N4), plastic, moist.		
	CH	Silty CLAY, medium dark gray (N4), highly plastic, moist.		
5	SP/SM	Clayey silty fine SAND, medium dark gray (N4), saturated.		55
	GM	Silty SAND (fine) with gravel, minor clay, medium dark gray (N4), saturated.		
10				
	GM / GC	Silty sandy GRAVEL and clay, dark gray (N3), saturated.		15
15				
20				70
25		As above at 12 ft bgs.		60
30		As above at 12 ft bgs.		90
	ARG	ARGILLITE, black siliceous mudstone, black (N1), highly fractured.		
35				



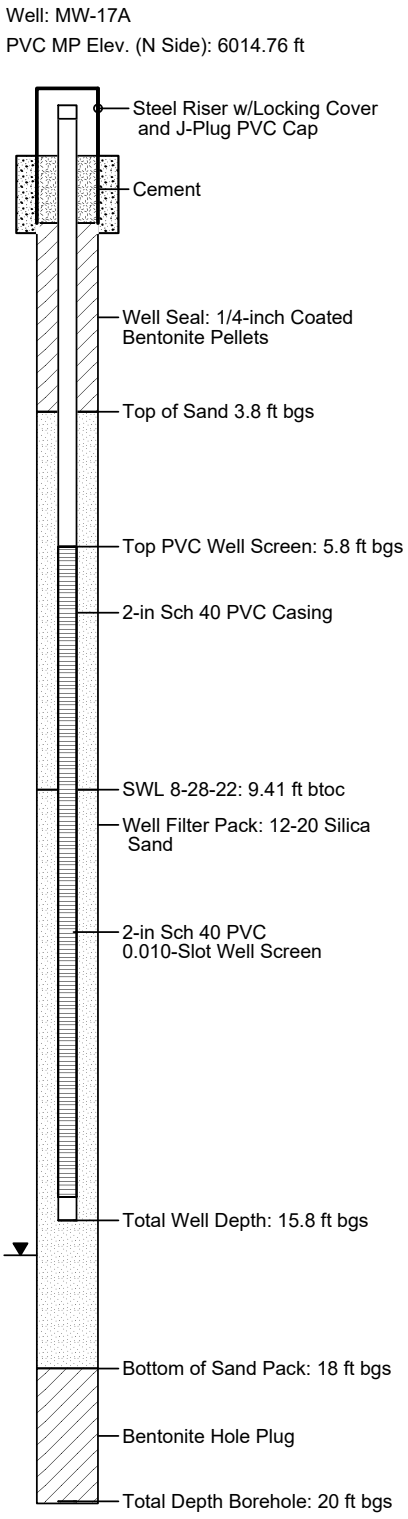
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-17A (D0097462)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 8-22-22	Static Water Level	: 9.41 ft btoc
Date Completed	: 8-22-22	Northing Coord	: 719057.185
Driller:	: Holt Services	Easting Coord	: 1569996.694
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: W-SW IDL Prop. Bound.
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% Core Recovery
0	SM		Silty loam, organic rich topsoil, dark reddish brown (5YR 2.5/2), loose.		
5	GP/SP		Sandy Gravel to Gravelly Sand, subrounded to rounded to 3-inch minus size, sand is fine to coarse grained, grayish brown (2.5Y 5/2), loosely compacted, dry		50
10	GM		Sandy GRAVEL to gravelly SAND with clay/silt, sand is fine to coarse grained, dark grayish brown (2.5 Y 4/2), saturated.		
15	GM/GC		GRAVEL with cobbles, clay, sand (fine to coarse), yellowish brown (10YR 5/6), saturated.		100
20					



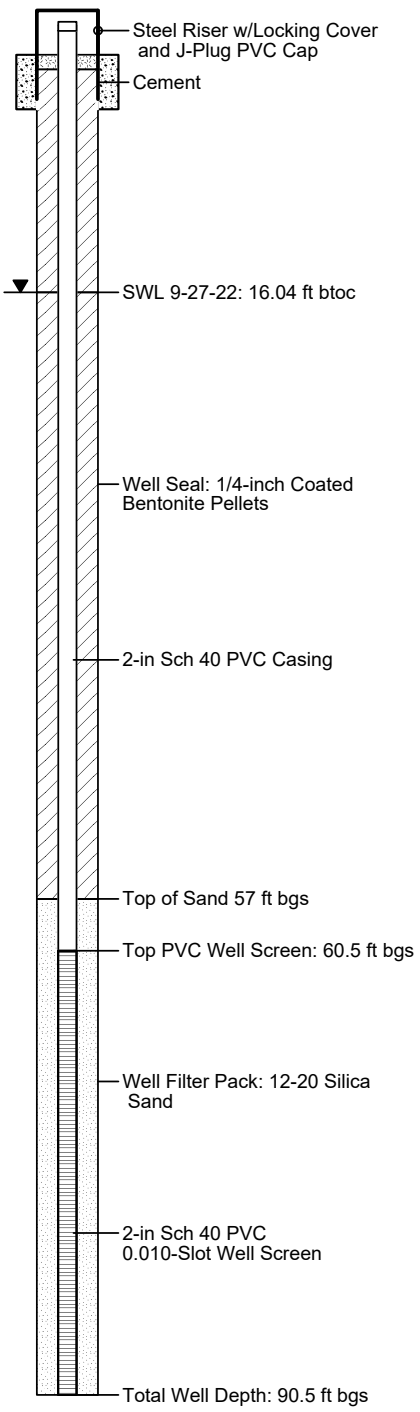
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-17B (D0097463)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-25-22	Static Water Level	: 16.04 ft btoc
Date Completed	: 9-27-22	Northing Coord	: 719060.373
Driller:	: Holt Services	Easting Coord	: 1569988.801
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: W-SW IDL Prop Bound.
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	DESCRIPTION	Lab Sample	% Core Recovery
0	ML/SM	Clayey silt to silty sand, cohesive, moist.		
5	GP/SP	Silty SAND with gravel, subrounded, quartz clasts,		90
10	GW	Sandy GRAVEL to Gravelly SSAND, subrounded to rounded to 3-inch minus size, sand is fine to coarse grained, grayish brown (2.5Y 5/2), loosely compacted, dry.		
15	GM			60
20	GM	Sandy GRAVEL to gravelly SAND with clay/silt, sand is fine to coarse grained, dark grayish brown (2.5 Y 4/2), saturated.		
25	GM/GC	GRAVEL with cobbles, clay, sand (fine to coarse), yellowish brown (10YR 5/6), saturated. Silty sandy GRAVEL with minor clay.		95
30				
35				40
40	LS	LIMESTONE (wackestone to packstone) with abundant crinoid columnals to other crinoid debris, sulfide minerals (pyrite), moderate effervescence, 25% silica replacement, very poor rock quality density (0), 50% rock flour from drilling.		
45				
50				
55				
60				0
65				
70				
75				
80				
85				
90		As above, broken rock, black.		100



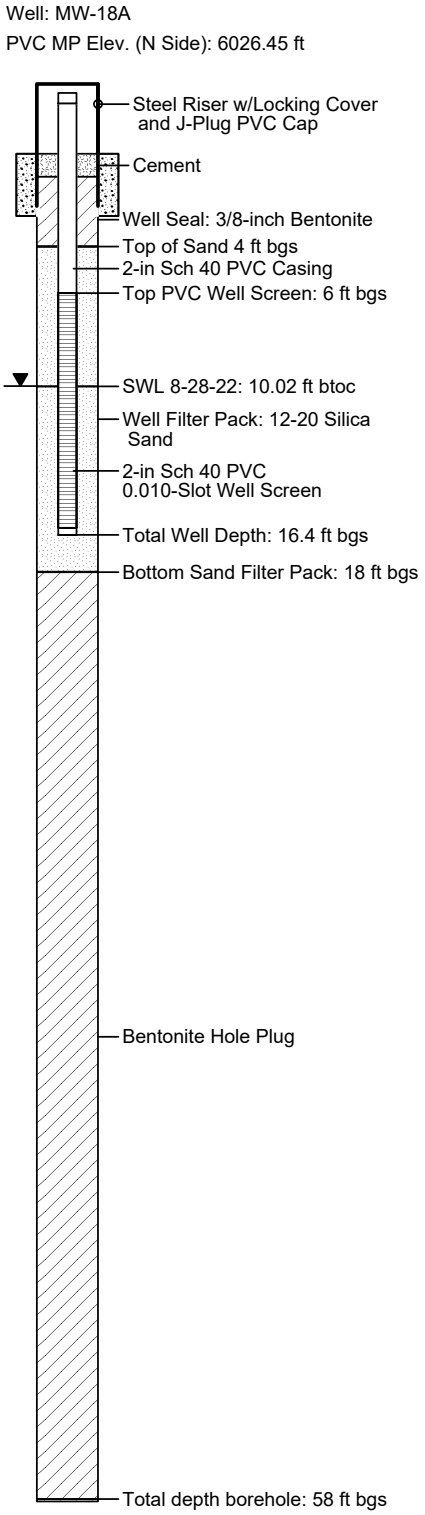
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-18A (D0097464)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 8-22-22	Static Water Level	: 10.02 ft btoc
Date Completed	: 8-23-22	Northing Coord	: 718977.138
Driller:	: Holt Services	Easting Coord	: 1570662.869
Drilling Method	: Terra Sonic-Roto-Sonic	Location:	: SW of LTP
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% REC of Core Run
0	SM		Silty SAND loam with abundant roots (topsoil).		
	ML		SILT, olive gray (5Y 4/1), loosely compacted with abundant root fragments, dry		
5			Sandy GRAVEL, with silt/clay fines, gravel up to 3-inch minus consists of quartz and silicified gray mudstone, greenish gray (5G 2/1), loosely compacted, dry grades to moist at 9 ft bgs, saturated at 10 ft bgs.		60
10			As above, with angular to subrounded cobbles and gravel, fine to medium sand, saturated.		
15					--
20	GM/GC		As above, increase in silt/clay from 18 to 20 ft bgs, saturated.		--
25			As above, saturated.		90
30					
35			Sand and gravel with silt, minor clay, olive gray (5Y 4/1), soupy, less cohesive than above.		100
40			Sandy GRAVEL with silt and clay, gravel/cobbles to 5-inch minus, angular to subrounded, olive gray (5Y 4/1), zone of peaty reddish brown oxidation (organics), sand fraction becoming increasingly angular and black in color with depth. Clay and silt content between 20-25%. Intrepreted as possible debris flows or large avalance debris flows.		
45	GM/GC				100
50					
55					100
	ARG		ARGILLITE, black mudstone, friable/crumbles.		



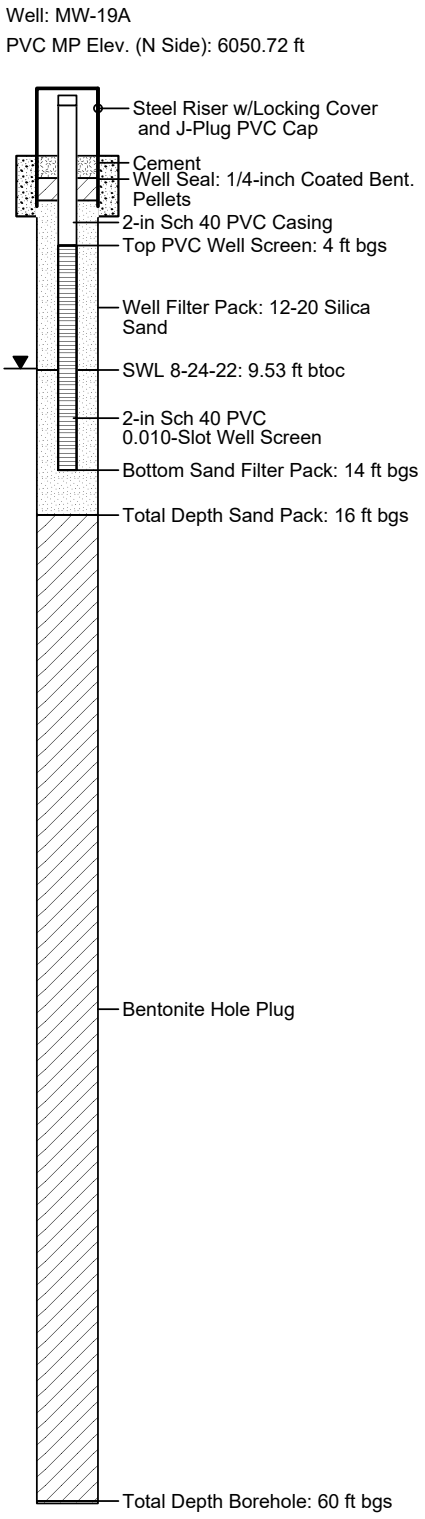
Tetra Tech
Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-19A (D0097459)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 8-24-22	Static Water Level	: 9.53 ft btoc
Date Completed	: 8-24-22	Northing Coord	: 719276.227
Driller:	: Holt Services	Easting Coord	: 1571855.14
Drilling Method	: Terra Sonic-Roto-Sonic	Location:	: S Side of LTP
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% REC of Core Run
0	SM		Silty loam topsoil or cover soil with abundant roots, very dark gray (2.5Y 3/1), moist.		
5	GC		Silty CLAY with occasional rounded gravel, very dark grayish brown (2.5Y 4/2), moist. As above, with cobbles, mixed with reworked tailings (galena crystals present).		55
10	GC		As above, mixed tailings in discrete lenses, saturated.		
15	GC				15
20	GC/ GM		Silty CLAY with gravel, cobbles, sand (fine to coarse), subrounded to rounded. Above grades to GRAVEL with sand, cobbles, silt/clay.		70
25	CL / CH		Slity CLAY with cobbles, gravel, and fine sand, medium to high plasticity, saturated.		60
	SP		SAND tailings lense, coarse, black, low plasticity.		
30	GM		Silty sandy GRAVEL, minor clay, light brownish gray (2.5Y 6/2), saturated		
35	GM		Silty GRAVEL with cobbles, sand, silt/clay, light brownish gray (2.5Y 6/2), saturated.		90
40	SP		SAND, fine to medium, minor silt/clay, grayish brown (2.5 Y 5/2).		
45	GRAVEL		GRAVEL with fine to medium sand, cobbles to 4-inch minus, and fines of silt/clay		80
50	CL		CLAY/SILT, with subrounded to rounded gravel and cobbles. Grades to gray mudstone at 53.5 ft bgs.		
55	ARG		ARGILLITE, gray mudstone.		100
60					



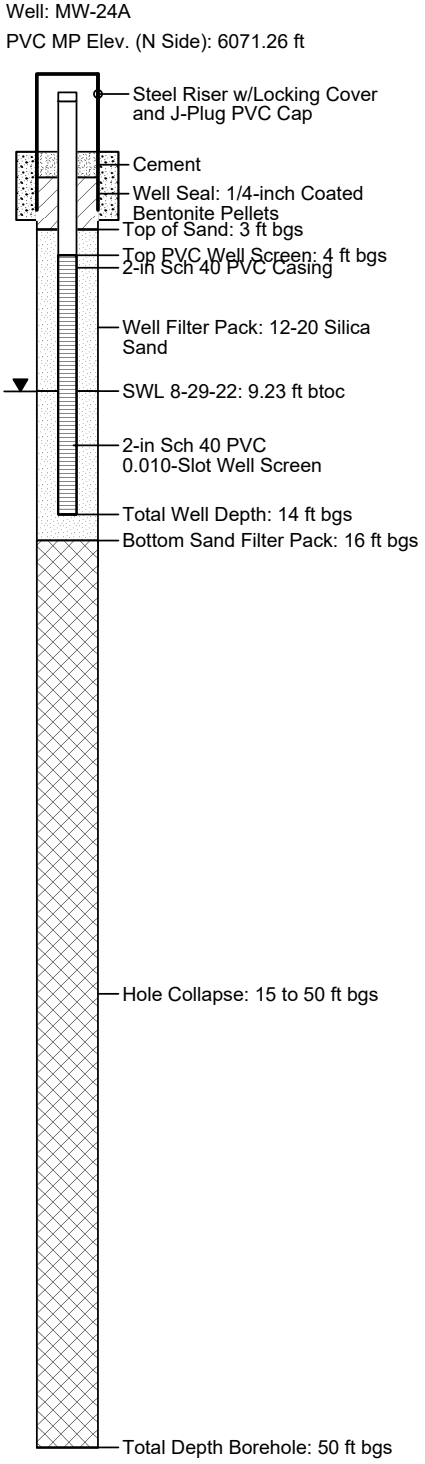
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Missoula, MT
Environmental Services

LOG OF BORING / WELL: MW-24A (D0097465)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 8-29-22	Static Water Level	: 9.23 ft btoc
Date Completed	: 8-29-22	Northing Coord	: 719894.576
Driller:	: Holt Services	Easting Coord	: 1572853.01
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: S of UTP
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	DESCRIPTION	Lab Sample	% REC of Core Run
0	ML	SILT loam topsoil, dark brown, moist, loosely compacted		
	ML	SILT with sand and gravel (~25%), dark brown, moist to saturated, loosely compacted		
5	GM	Silty SAND with gravel to silty sandy GRAVEL, cobbles to 4-inch minus, moderate brown (5YR 3/4), loosely compacted.		50
		As above, saturated at 8 ft bgs.		
10				
15				70
20				
25				20
30		As above, medium to coarse sand, quartz clasts, subrounded.		
	ML/GM	Clayey SILT with estimate <35% cobbles, sand, and gravel, saturated, possible debris flow deposit.		
35	ML	Clayey SILT weathered mudstone, light gray, densely compacted, moist		90
40	ARG	Weathered ARGILLITE (mudstone) conglomerate with clasts of rotted sandstone, pale olive (10Y 6/2) slight effervescence reaction, moist. Interbedded with light gray weathered mudstone as above and black mudstone (N1) with white calcite infilling clasts that have a strong effervescent reaction, moist.		
45	SP	SAND with gravel and silt, (5YR 2/4); interpreted as karstic terrain infilled with debris flow or overbank fine deposits.		90
	ARG	Weathered ARGILLITE mudstone conglomerate, grayish blue (5P 5/2) to olive gray (5Y 4/1).		
50				



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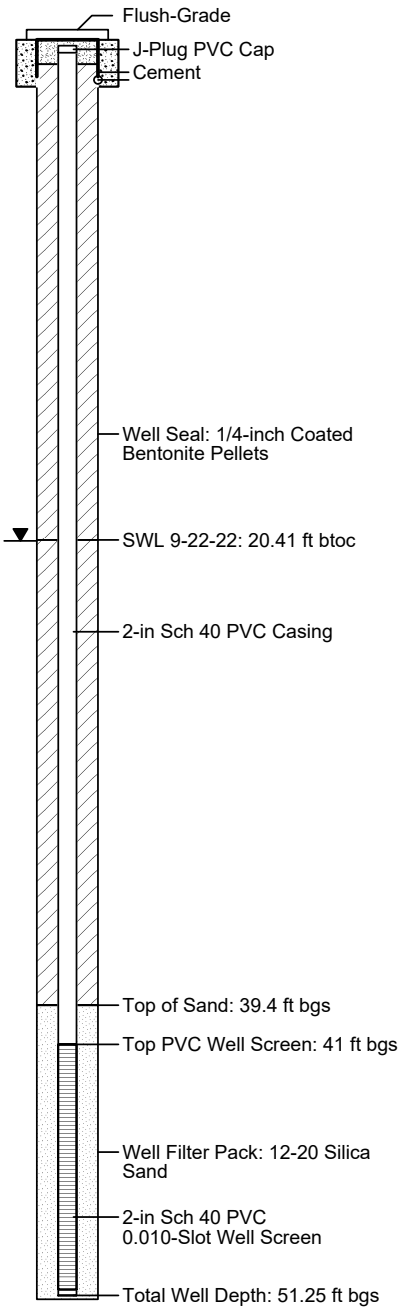
LOG OF BORING / WELL: MW-25A (D0097448)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-22-22	Static Water Level	: 20.41 ft btoc
Date Completed	: 9-22-22	Northing Coord	: 720771.797
Driller:	: Holt Services	Easting Coord	: 1571747.576
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: 531 E. Fork Rd Driveway
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% REC of Core Run
0	FILL(GM)		Gravel with fines, roadbase FILL, subangular to subrounded, dark yellowish brown (10YR 6/6).		
5	Waste Rock (GM)		WASTE ROCK FILL Fill consists of silt/sand black tailings matrix with blocks of subangular broken mudstone and black limestone, approximately 70% clast and 30% matrix, slightly moist, dark gray (N3) to black.		70
10			As above, moist at 13 ft bgs.		
15					
20			As above, saturated at 20 ft bgs. Sandy silty gravel to silty gravelly sand, dark gray (N3) with brown oxidized mottling, cohesive silt and fine, subangular rock fragments.		
25					
30	Waste Rock & Colluvium (GP)		Waste rock/alluvial mixture of alluvial rounded gravel and broken waste rock fragments of mudstone and limestone mixed, saturated		
35					
40	GM		Silty clayey sandy GRAVEL with cobbles to 5-inch minus, very dark grayish brown (10YR 4/2), saturated.		
45					
50					
55					

Well: MW-25A
PVC MP Elev. (N Side): 6083.77 ft



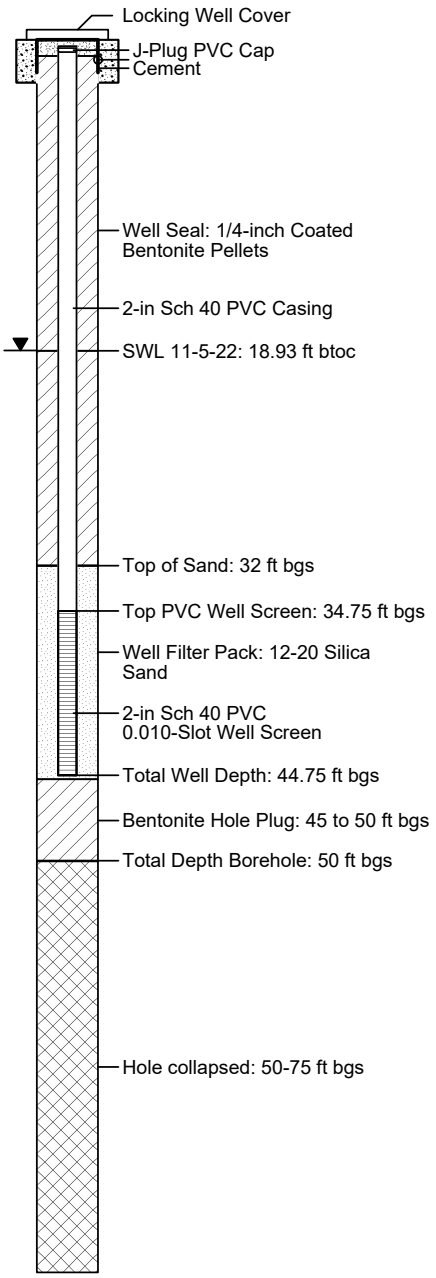
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Missoula, MT
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LOG OF BORING / WELL: MW-26A (D0097450)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-1-22	Static Water Level	: 18.93 ft btoc
Date Completed	: 9-1-22	Northing Coord	: 720395.830
Driller:	: Holt Services	Easting Coord	: 1572728.909
Drilling Method	: Terra Sonic-Roto-Sonic	Location:	: Upper Tailings Pile
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% REC of Core Run
0	SM		Silty sand vegetative cover soil (cap), moderate yellowish brown (10YR 5/4), dry, loosely compacted		
5	TAILS (SP)		Medium sand size TAILINGS, with fine (pyrite) to coarse (quartz) sand size tailings, subangular to subrounded grains. Moisture increses with depth. Tailings become reduced below the water table with a slight sulfur odor.		
10					
15					
20	TAILS (ML)		Clay/silt size (slime) TAILINGS, olive black, coehesive, some root fragments, saturated.		
	TAILS(ML)		Clay/silt size (slime) TAILINGS intermixed with sand size tailings, poorly sorted, non-laminated. Saturated.		
25	TAILS (ML)		Laminated silt/clay size (slime) TAILINGS, light olive gray (5Y 6/1) to dark yellow orange (10-YR 6/6) oxidized laminations. Saturated.		
	TAILS (ML/SM)		Laminated clay/silt (slime) TAILINGS grading to sand size TAILINGS, dark gray (N3), noncoehesive. Saturated.		
30	GM		Silty SAND and gravel with cobbles to 4-inch size, light olive gray (5Y 5/2). Saturated.		
35			Sandy silt and gravel light olive gray (5Y 5/2).		
40					
45	GM		GRAVEL with sand, silt and clay, light olive gray (5Y 5/2). Saturated.		
	Andesite		Porphyritic andesite dike		
50	ARG / LS		ARGILLITE/LIMESTONE, limestone and mudstone, grain size is ~75%, 0.05 mm very fine sand and silt size with inferred clay grain size, dry.		
55					
60	LS		Silicified fossilized LIMESTONE, greenish black (5G 2/1, dry) to grayish black (N2, wet) with 10% pyrite spheres or nodulues 0.1 to 0.2 mm in size, inferred zones of saturation/unsaturation in healvily fractured rock below 65 ft bgs.		
65					
70					
75					
80			Note: MW-26A redrillled due to broken casing. Boring log shows full drill depth of initial boring. Well log shows completion of re-drilled well to total depth of 50 ft bgs. Original boring/well backfilled with bentonite hole plug.		



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Missoula, MT
Environmental Services

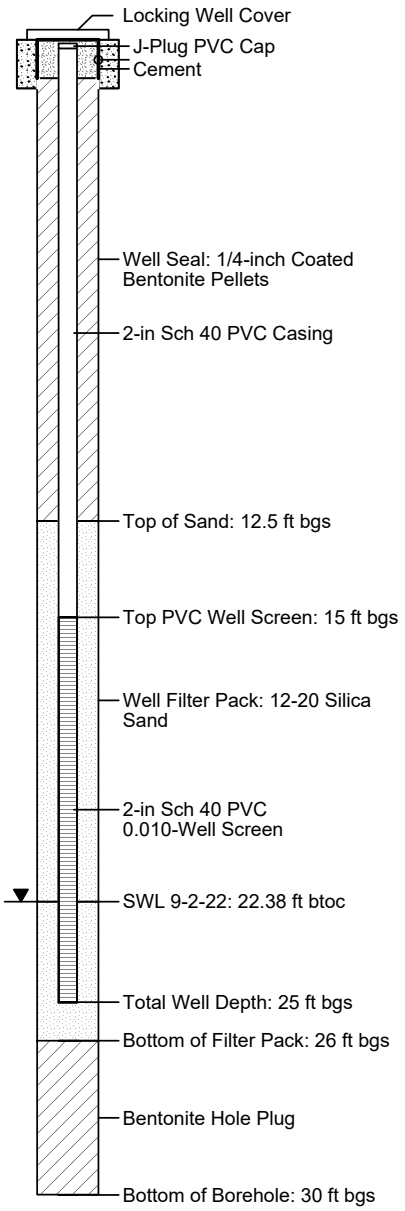
LOG OF BORING / WELL: MW-26T (ABANDONED)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-1-22	Static Water Level	: 22.38 ft btoc
Date Completed	: 9-1-22	Northing Coord	: --
Driller:	: Holt Services	Easting Coord	: --
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: Upper Tailings Pile
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% REC of Core Run
0	SM		Silty sand vegetative cover soil (cap), moderate yellowish brown (10YR 5/4), dry, loosely compacted.		
5	TAILS (SM)		Medium sand size tailings with fine (pyrite) to coarse (quartz) size tailings, subangular to subrounded grains, moisture increases with depth.		
10	TAILS (ML)		Clay/silt size (slime) TAILINGS, grayish black (N2), coehesive moist.		
	TAILS(SM)		Sand size TAILINGS, light gray, moist.		
	TAILS (ML)		Clay/silt size (slime) TAILINGS, grayish black (N2), moist to very moist.		
15	TAILS (SM)		Sand size TAILINGS, olive gray (5Y 6/1), very moist to possibly saturated.		
20	TAILS (ML)		Clay/silt size (slime) TAILINGS, saturated.		
	TAILS(SM)		Sand size TAILINGS, light olive gray (5Y 6/1), saturated.		
25	TAILS (ML/SM)		Laminated clay\silt TAILINGS alternating with sand size TAILINGS, grades progressively more sandy with depth. Saturated..		
	GM		Silty sandy GRAVEL with cobbles to 4-inch size, light olive gray (5Y 5/2), saturated.		
30			Note: Well abandoned due to broken casing. Backfilled with benthonite hole plug.		
35					

Well: MW-26T (ABANDONED)
PVC MP Elev. (N Side):



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Missoula, MT
Environmental Services

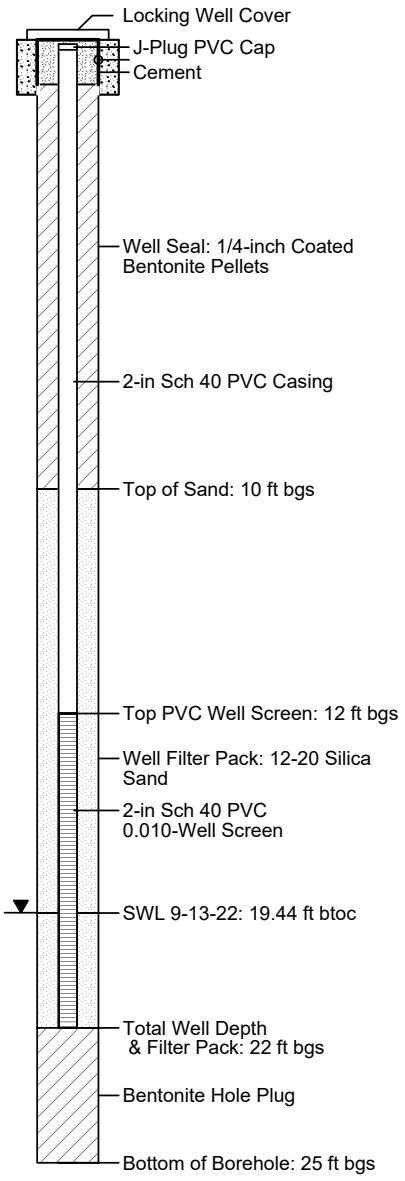
LOG OF BORING / WELL: MW-26T (D0097451)

Idaho DEQ
Triumph Mine
UTP/LTP Site Investigation
Triumph, Idaho
Project# 117-8296075

Date Started	: 9-12-22	Static Water Level	: 19.44 ft btoc
Date Completed	: 9-12-22	Northing Coord	: 720410.934
Driller:	: Holt Services	Easting Coord	: 1572722.059
Drilling Method	: Terra Sonic - Roto-Sonic	Location:	: Upper Tailings Pile
Sampling Method	: 6-in Sonic Core Barrel	Logged By	: B. Craig

DEPTH (ft)	USCS / LITHOLOGY	GRAPHIC	DESCRIPTION	Lab Sample	% REC of Core Run
0	SM		Silty sand vegetative cover soil (cap), moderate yellowish brown (10YR 5/4), dry, loosely compacted.		
5	TAILS (SM)		Medium sand size tailings with fine (pyrite) to coarse (quartz) size tailings, subangular to subrounded grains, moisture increases with depth.		
10	TAILS (ML)		Clay/silt size (slime) TAILINGS, grayish black (N2), coehesive moist.		
	TAILS(SM)		Sand size TAILINGS, light gray, moist.		
	TAILS (ML)		Clay/silt size (slime) TAILINGS, grayish black (N2), moist to very moist.		
15	TAILS (SM)		Sand size TAILINGS, olive gray (5Y 6/1), very moist to possibly saturated.		
20	TAILS (ML)		Clay/silt size (slime) TAILINGS, saturated.		
	TAILS(SM)		Sand size TAILINGS, light olive gray (5Y 6/1), saturated.		
25					
30					

Well: MW-26T
PVC MP Elev. (N Side):: 6089.42 ft



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WELL MW-4

CLIENT Idaho Department of Environmental Quality
PROJECT NAME Triumph Mine
PROJECT NUMBER 18073
PROJECT LOCATION Triumph, Idaho
DATE STARTED 06/12/19 **COMPLETED** 6/13/19
GROUND ELEVATION _____ **HOLE SIZE** 8 in.
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Sonic
AT TIME OF DRILLING ---
LOGGED BY Shelley Hicks **CHECKED BY** Melody Studer
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	SAMPLE ID	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0			Silt, dark brown, minor organics, trace gravel.	Flush mount monument
2.0			Silt, black, minor fine sand.	
10.0			Clayey silt, dark brown, contains clots of black silt. No recovery. Lost during retrieval of broken drill core.	
17.5			Recovered core included broken drilling core with shale rock chips. Dark grey, decomposed shale bedrock (ground from drilling).	4" PVC Pipe
20.0			Argillite with clots of decomposed rock with orange staining. Rock compacts into platey pieces, dark grey.	Grout from 1.5' to 43'
30.0			No recovery.	
32.5			Argillite with minor clots of broken rock chips, dark grey, clayey where wey (from drill water).	

GENERAL BH / TP / WELL - GINT PLOG 20161115.GDT - 7/31/19 12:23 - R:\GINT\ALTA PROJECTS\TRIUMPH MINE.GPJ

(Continued Next Page)

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WELL MW-4

CLIENT Idaho Department of Environmental Quality **PROJECT NAME** Triumph Mine

PROJECT NUMBER 18073 **PROJECT LOCATION** Triumph, Idaho

DEPTH (ft)	SAMPLE ID	GRAPHIC LOG	MATERIAL DESCRIPTION
35			Argillite with minor clots of broken rock chips, dark grey, clayey where wey (from drill water). *(continued)*
36.0			Limestone, dark grey, minor orange oxidation and white precipitates.
50.0			No recovery except for a 12" interval of dark grey powdered argillite.
56.5			Argillite, broken rock chips, dark grey.
59.5	Acid fizz test: Fizz		Decomposed limestone bedrock, minor orange oxidation on some broken surfaces, medium grey.
74.0	Acid fizz test: Fizz		

WELL DIAGRAM:
- 4" slotted well screen 45' to 70'
- 4" slotted well screen 45' to 70'
- Silica sand 43' to 71'
- Silica sand 70' to 71'.
- Grout from 71' to 80'.

GENERAL BH / TP / WELL - GINT PLOG 20161115.GDT - 7/31/19 12:23 - R:\GINT\ALTA PROJECTS\TRIUMPH MINE.GPJ

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WELL MW-4

CLIENT Idaho Department of Environmental Quality **PROJECT NAME** Triumph Mine

PROJECT NUMBER 18073 **PROJECT LOCATION** Triumph, Idaho

DEPTH (ft)	SAMPLE ID	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75				
80	Acid fizz test: No Fizz		Argillite, dark grey, moderate orange oxidation on broken surfaces, breaks easily into small pieces, minor white carbonate precipitates. *(continued)*	Grout from 71' to 80'.
			80.0	

Bottom of borehole at 80.0 feet.

GENERAL BH / TP / WELL - GINT PLOG 20161115.GDT - 7/31/19 12:23 - R:\GINT\ALTA PROJECTS\TRIUMPH MINE.GPJ

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	DOWNGRADIENT OF LOWER TAILINGS PILE		
DRILLING COMPANY	ESD, INC.	DRILLER	ED HILLMAN
DRILLING METHOD	BACKHOE	DRILL BIT(S) SIZE:	NA

		FROM	TO	FT.
ISOLATION CASING	NONE			
BLANK CASING	SCHEDULE 40 STAINLESS STEEL	0.0	4.4	
PERFORATED CASING	SCH 40 PRE-PACK STAINLESS STEEL	4.4	5.4	
SIZE AND TYPE OF FILTER PACK	10/20 SILICA SAND	1.8	5.4	
SEAL	3/8" BENTONITE CHIPS	0.5	1.8	
GROUT	CONCRETE	0.0	1.0	

Boring/Well Name MW-4A (504)

Project Name TRIUMPH

Project Number 946091.01

ELEVATION AND DATUM (FT) 6032.29	TOTAL DEPTH (FT) 5.4
DATE STARTED 08/31/1995	DATE COMPLETED 08/31/1995
INITIAL WATER DEPTH (FT) 2.0	
LOGGED BY TCD	
SAMPLING METHODS NONE	WELL COMPLETION ☐ SURFACE HOUSING ■ STAND PIPE 3.0 FT.

SAMPLES TYPE	SAMPLES RECOVERY (FEET)	SAMPLES PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			0				SC/SM	**Clayey Silty SAND** dark brown, very fine to medium poorly graded sand, cohesive, firm, moist
			5				GW	**Sandy GRAVEL** medium to very coarse poorly graded sand, gravel to 1 inch, cobbles, wet
			10					
			15					
			20					

Notes:

1) Elevation was surveyed at ground surface.

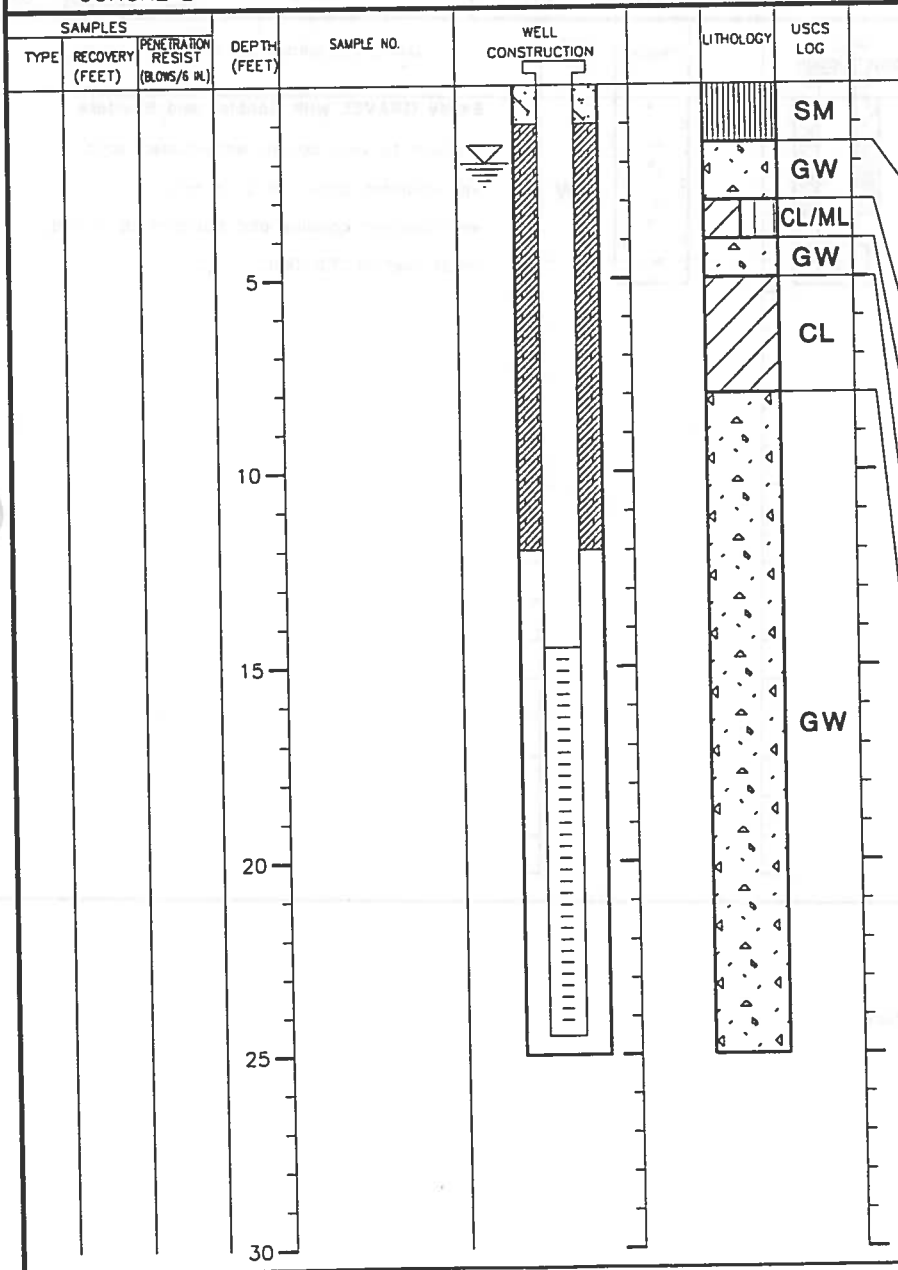
Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	DOWNGRADIENT OF LOWER TAILINGS PILE
DRILLING COMPANY	ESD, INC.
DRILLER	ED HILLMAN
DRILLING METHOD	AIR ROTARY CASING HAMMER
DRILL BIT(S) SIZE	5-7/8"

		FROM	TO	FT.
ISOLATION CASING	NONE			
BLANK CASING	4" SCHEDULE 40 PVC	0.0	14.5	
PERFORATED CASING	4", 0.020" SLOT SCH 40 PVC	14.5	24.5	
SIZE AND TYPE OF FILTER PACK	10/20 SILICA SAND	12.0	25.0	
SEAL	3/8" BENTONITE CHIPS	1.0	12.0	
GROUT	CONCRETE	0.0	1.0	

Boring/Well Name	MW-4B (501)
Project Name	TRIUMPH
Project Number	946091.01
ELEVATION AND DATUM (FT)	6036.64
TOTAL DEPTH (FT)	25.0
DATE STARTED	08/26/1995
DATE COMPLETED	08/26/1995
INITIAL WATER DEPTH (FT)	2.0
LOGGED BY	TCD
SAMPLING METHODS	NONE
WELL COMPLETION	☐ SURFACE HOUSING ■ STAND PIPE 3.0 FT.



Notes:

1) Elevation was surveyed at ground surface.

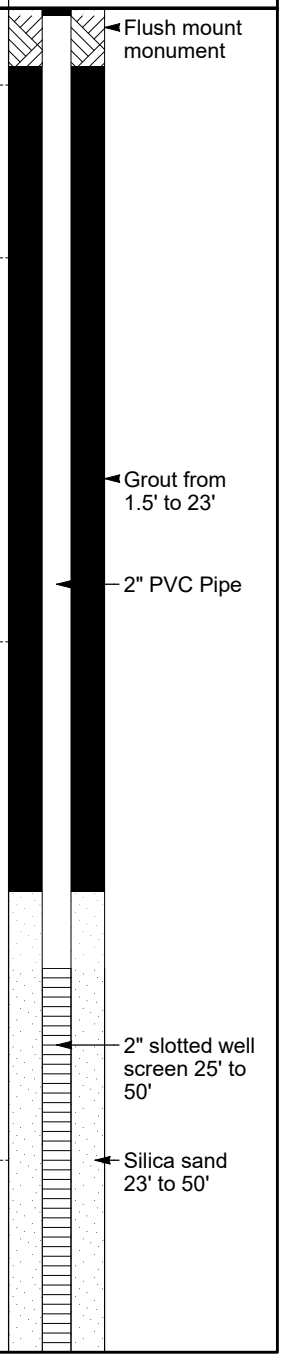
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WELL MW-5

CLIENT Idaho Department of Environmental Quality
PROJECT NAME Triumph Mine
PROJECT NUMBER 18073
PROJECT LOCATION Triumph, Idaho
DATE STARTED 06/10/19 **COMPLETED** 6/13/19
GROUND ELEVATION _____ **HOLE SIZE** 4 in.
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Sonic
AT TIME OF DRILLING ---
LOGGED BY Robin Nimmer **CHECKED BY** Melody Studer
AT END OF DRILLING ---
NOTES _____
AFTER DRILLING ---

DEPTH (ft)	SAMPLE ID	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0				GRAVELLY SILT, (ML) Woody debris with silt, black/dark grey, slightly moist.
	Acid fizz test: No fizz	ML		
2.0				Argillite, more cohesive, grey, dry.
5	Acid fizz test: Fizz			
6.5				Limestone, grey, dry with some moisture.
10				
15				
16.5				Limestone, distinct color change. Beginning to be more competent rock. Light grey, gravel grains appear to be coated.
20				
25	Acid fizz test: Fizz			
30				
30.0				No recovery.
35				

WELL DIAGRAM



GENERAL BH / TP / WELL - GINT PLOG 20161115.GDT - 7/31/19 12:23 - R:\GINT\ALTA PROJECTS\TRIUMPH MINE.GPJ

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WELL MW-5

CLIENT Idaho Department of Environmental Quality **PROJECT NAME** Triumph Mine

PROJECT NUMBER 18073 **PROJECT LOCATION** Triumph, Idaho

DEPTH (ft)	SAMPLE ID	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
35				No recovery. *(continued)*	
				36.0 Suspected rhyolite. Tan.	
	Acid fizz test: Small fizz			38.5 Argillite, black to grey. Fines are claylike matrix when wet, moist, very soft.	2" slotted well screen 25' to 50'
40					
					Silica sand 23' to 50'
45					
50				50.0 Limestone, dark grey, dry, difficult drilling. No white precipitates.	
55	Acid fizz test: Fizz				
60					Grout from 50' to 115'.
65					
70	Acid fizz test: Fizz				
75					

GENERAL BH / TP / WELL - GINT PLOG 20161115.GDT - 7/31/19 12:23 - R:\GINT\ALTA PROJECTS\TRIUMPH MINE.GPJ

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WELL MW-5

CLIENT Idaho Department of Environmental Quality **PROJECT NAME** Triumph Mine

PROJECT NUMBER 18073 **PROJECT LOCATION** Triumph, Idaho

DEPTH (ft)	SAMPLE ID	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
75				Limestone, dark grey, dry, difficult drilling. No white precipitates. *(continued)*	
80				80.0 No recovery.	
				82.5 Limestone, medium to dark grey. Difficult drilling, trace sulfides with some associated oxide minerals. Minor white precipitates.	Grout from 50' to 115'.
85					
90	Acid fizz test: Fizz				
95	Acid fizz test: No fizz			95.0 Argillite, medium to dark grey. Rock is very fractured due to drilling. Fines are claylike matrix when wet. No white precipitates.	
100				100.0 No recovery due to broken casing and wash out.	
105					
110	Acid fizz test: Fizz			110.0 Limestone, dark grey. No white precipitates.	
115				115.0 Bottom of borehole at 115.0 feet.	

GENERAL BH / TP / WELL - GINT PLOG 20161115.GDT - 7/31/19 12:23 - R:\GINT\ALTA PROJECTS\TRIUMPH MINE.GPJ

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	DOWNGRADIENT OF LOWER TAILINGS PILE
DRILLING COMPANY	CASCADE DRILLING, INC.
DRILLER	RODNEY LA BROSSE
DRILLING METHOD	HOLLOW STEM AUGER (4.25" I.D.)
DRILL BIT(S) SIZE	9-INCH

		FROM	TO	FT.
ISOLATION CASING	NONE			
BLANK CASING	2-INCH SCHED. 40 PVC	0.0	6.0	
PERFORATED CASING	2-INCH SCHED. 40 PVC (0.010 SLOT)	6.0	7.0	
SIZE AND TYPE OF FILTER PACK	10-20 COLORADO SILICA SAND	4.5	7.0	
SEAL	BENTONITE CHIPS	0.0	4.5	
GROUT	NONE			

Boring/Well Name MW-7A

Project Name TRIUMPH

Project Number 946091.01

ELEVATION AND DATUM: 6027.4	TOTAL DEPTH: 7.0
DATE STARTED: 08/13/1997	DATE COMPLETED: 08/13/1997
INITIAL WATER DEPTH (FT): 6.0	
LOGGED BY: DON HANSON	
SAMPLING METHODS: SPLIT SPOONS	WELL COMPLETION: ☐ SURFACE HOUSING ■ STAND PIPE 2.5 FT.

SAMPLES TYPE	SAMPLES RECOVERY (FEET)	SAMPLES PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
				STATIC WATER LEVEL 8/15/97 1.63 FT.			OL	**Topsoil** Dark brown, silty organic soil with sand and a trace of gravel, soft, moist, no odors
S	1.4	6 6 9	5	WATER LEVEL DURING DRILLING 6.0 FT.			SM	**Silty fine-medium SAND** Gray, with a little organic material, moist, slight organic odor
							GP/GM	**Fine GRAVEL with silt and sand** Gray, trace of coarse gravel, wet, no odors
			10					

Notes:

1) Elevation was surveyed at ground surface.

2) Sample descriptions are based on observations made during the drilling of monitoring well MW-7B, which was completed approximately 11 feet from this well.

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	DOWNGRADIENT OF LOWER TAILINGS PILE		
DRILLING COMPANY	CASCADE DRILLING, INC.	DRILLER	RODNEY LA BROSSE
DRILLING METHOD	HOLLOW STEM AUGER (4.25" I.D.)	DRILL BIT(S) SIZE:	9-INCH

		FROM	TO	FT.
ISOLATION CASING	NONE			
BLANK CASING	2-INCH SCH. 40 PVC	0.0	15.5	FT.
PERFORATED CASING	2-INCH SCH. 40 PVC (0.010 SLOT) PRE-PACK	15.5	17.5	FT.
SIZE AND TYPE OF FILTER PACK	10-20 COLORADO SILICA SAND	13.5	17.9	FT.
SEAL	BENTONITE CHIPS	12.0	13.5	FT.
GROUT	PORTLAND CEMENT WITH 5% BENTONITE GROUT	0.0	12.0	FT.

Boring/Well Name MW-7B

Project Name TRIUMPH

Project Number 946091.01

ELEVATION AND DATUM: 6022.8	TOTAL DEPTH: 17.9
DATE STARTED: 08/13/1997	DATE COMPLETED: 08/13/1997
INITIAL WATER DEPTH (FT): 5.0	
LOGGED BY: DON HANSON	
SAMPLING METHODS: SPLIT SPOONS	WELL COMPLETION: SURFACE HOUSING; STAND PIPE 3.1 FT.

SAMPLES TYPE	RECOVERY (FEET)	PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
							OH	**Organic topsoil with sand** Dark brown, trace of gravel, moist to wet, organic odor
S	1.4	1 2 2	5	WATER LEVEL DURING DRILLING 5.0 FT.			SM	**Silty fine to medium SAND** Gray, a little organic material, moist, slight organic odor
							GP/ GM	**Fine GRAVEL with silt and sand** Gray, wet at about 6'
S	0.2	20 50/3	10	STATIC WATER LEVEL 8/15/97 11.91 FT.			GP	**Coarse GRAVEL and COBBLES** Gray, wet, no odors, very hard and slow drilling Drilling continues very hard and slow from 10 ft. to 17.9 ft.
			15					

Notes:

1) Elevation was surveyed at ground surface.

2) Grout was placed with a tremie pipe from the bottom up.

DRAFT

RECORD OF BOREHOLE MW-20

SHEET 1 of 1

PROJECT: Triumph Mine
PROJECT NUMBER: 1301235-19
LOCATION: Triumph, Idaho

DRILLING METHOD: Air Rotary
DRILLING DATE: 10/3/18
DRILL RIG: Gardner-Denver T35

DATUM: NAVD88
COORDINATES: N: 43.64 W: 114.27

ELEVATION: 6009.54
INCLINATION: -90
WELL TAG # D0078146

DEPTH (Ft)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	RUN	REC ATT	SAMPLES NUMBER	SAMPLES TYPE	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL; 20 40 60 80)	NOTES WATER LEVELS GRAPHIC
0	Air Rotary (8-Inch Hammer Bit)	0.0 - 6.3 (SM) silty SAND; light brown; dry; fine to coarse, angular; some fine to coarse gravel, angular; trace organics	SM		6003.3 6.3						6" Steel Monument Readi-Mix Cement 3/8" Bentonite Chips
5											
10		6.3 - 30.3 (GP) GRAVEL/COBBLES; light brown to gray; dry to wet; cuttings appear as gravel, coarse, angular; some sand, fine to coarse. Cuttings are broken/pulverized from drilling action. Becomes moist	GP								10-20 Colorado Silica Sand 2" 0.020 Slot PVC Screen
15											
20		Becomes gray, moist Becomes wet, water observed in cuttings, hard drilling (cobble?)									
25		Hard drilling (cobble?), increase fines from 25 to 30-feet (may be from drilling action)									
30					5979.3 30.3						
35		Note: Drilling and well installation oversight performed by Todd Drage (IDL) Boring completed at 30.3 ft.									
40											

After Drilling

1 in to 5 ft
DRILLING CONTRACTOR: Apex Drilling, LLC.
DRILLER: Matt Baker

LOGGED: TDrage
CHECKED: JPepe
DATE: 10/31/2018

GOLDER

RECORD OF SONIC BOREHOLE TRIUMPH_BORING LOGS.GPJ SPARKLE_1.0_DATA_TEMPLATE.GDT 6/18/20

DRAFT

RECORD OF BOREHOLE MW-21

SHEET 1 of 1

PROJECT: Triumph Mine
PROJECT NUMBER: 1301235-19
LOCATION: Triumph, Idaho

DRILLING METHOD: Air Rotary
DRILLING DATE: 10/5/18
DRILL RIG: Gardner-Denver T-35

DATUM: NAVD88
COORDINATES: N: 43.64 W: 114.27

ELEVATION: 6004.93
INCLINATION: -90
WELL TAG # D0078145

DEPTH (Ft)	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	RUN	REC ATT	SAMPLES NUMBER	SAMPLES TYPE	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL; 20 40 60 80)	NOTES WATER LEVELS GRAPHIC
0	Air Rotary (6-Inch Tri-Cone)	0.0 - 1.3 (SM) silty SAND; brown; dry; fine to coarse, angular; some fine to coarse gravel, angular; trace organics	SM		6003.7 1.3						6" Steel Monument Readi-Mix Cement 3/8" Bentonite Chips
		1.3 - 3.8 (GP) GRAVEL; grayish brown; dry; coarse, angular; some sand, fine to coarse	GP		6001.2 3.8						
5		3.8 - 6.0 (GP) sandy GRAVEL; light brown; dry; fine to coarse, angular to subrounded; fine to coarse sand; angular	GP		5998.9 6.0						
		6.0 - 31.0 (GP) GRAVEL/COBBLES; dark gray to brownish-gray; moist to wet; cuttings appear as fine to coarse gravel, angular; some fine to coarse sand, angular; trace non-plastic fines. Cuttings are broken/pulverized from drilling action.									
10	Air Rotary (8-Inch Undereamer)	Hard drilling at 6-feet, cuttings turn dark gray, water observed in cuttings discharge. Hard drilling 10 to 12-feet (cobble?), switch to 8-inch underreamer bit Slight change in drilling action from 12 to 15-feet. Drilling varies between hard and soft drilling, slight increase in fines. Possible sand/silt interbeds (may be from drilling action). Color change to light brown									10-20 Colorado Silica Sand 2" 0.020 Slot PVC Screen
15											
		Slight increase in fines in cuttings discharge, possible silt interbeds (may be from drilling action)	GP								
20	Air Rotary (8-Inch Hammer Bit)	Cobble/boulder at 18 to 20 feet, hard drilling, switch to hammer bit									
25		Increase in fines in cuttings discharge at 27 to 30-feet (may be from drilling action).									
30					5973.9 31.0						
35		Note: Well installation oversight performed by Todd Drage (IDL) Boring completed at 31.0 ft.									
40											

After Drilling

1 in to 5 ft
DRILLING CONTRACTOR: Apex Drilling, LLC.
DRILLER: Matt Baker

LOGGED: JJones/TDrage
CHECKED: JPepe
DATE: 10/31/2018

GOLDER

RECORD OF SONIC BOREHOLE TRIUMPH_BORING LOGS.GPJ SPARKLE_1.0_DATA_TEMPLATE.GDT 6/18/20

DRAFT

RECORD OF BOREHOLE MW-22

SHEET 1 of 1

PROJECT: Triumph Mine
PROJECT NUMBER: 1301235-19
LOCATION: Triumph, Idaho

DRILLING METHOD: Sonic
DRILLING DATE: 4/23/19
DRILL RIG: Boart Longyear 100C

DATUM: NAVD88
COORDINATES: N: 43.64 W: 114.26

ELEVATION: 6033.52
INCLINATION: -90
WELL TAG # D0080825

DEPTH (Ft)	BORING METHOD	DESCRIPTION	USCS	ELEV. / DEPTH (ft)	RUN	REC / ATT	NUMBER	TYPE	PENETRATION RESISTANCE BLOWS / ft (10 20 30 40; PL MC LL 20 40 60 80)	NOTES WATER LEVELS GRAPHIC
0	Sonic (6-Inch OD Casing, 4-Inch OD Core Barrel)	0.0 - 0.2 (ML) SILT; brown, moist, loose, some organics (roots); trace fine sand and trace reddish-brown oxidation/mottling.	ML	0.2		2.5 / 2.5				6" Steel Monument; Readi-Mix Cement; 3/8" Bentonite Chips
		0.2 - 9.0 (ML) clayey SILT; gray to dark gray, moist (W ~PL), soft to firm, some organics; trace fine sand and reddish-brown oxidation/mottling. Increased density with depth.	ML			2.5 / 2.5				
5						2.5 / 2.5				
		5.0-9 feet bgs: some thin laminations and mineralization				2.5 / 2.5				
		9.0 - 10.0 (SM) silty SAND; light grayish brown, moist-wet, loose to compact, trace laminations.	SM	6024.5 / 9.0 / 6023.5 / 10.0		2.5 / 2.5				10-20 Colorado Silica Sand; 2" 0.020 Slot PVC Screen
10		10.0 - 30.0 (GP) GRAVEL/COBBLES; light grayish brown, moist to wet, loose, fine to coarse, subangular to subrounded; fine to coarse sand matrix; trace to some fines, trace reddish oxidation.	GP			2.5 / 2.5				
15						2.5 / 2.5				
						2.5 / 2.5				
20						2.5 / 2.5				
		20-25 feet bgs: decrease cobbles, coarse gravel (mostly fine gravel)				2.5 / 2.5				
25						2.5 / 2.5				
						2.5 / 2.5				
30		29-30 feet bgs: weathered shale/siltstone?; black, highly weathered. Possible top of bedrock?		6003.5 / 30.0						
		Boring completed at 30.0 ft.								
35										
40										

After Drilling

1 in to 5 ft
DRILLING CONTRACTOR: Cascade Drilling, L.P.
DRILLER: Travis Ratliff

LOGGED: JJones
CHECKED: JPepe
DATE: 6/18/2020

GOLDER

RECORD OF SONIC BOREHOLE TRIUMPH_BORING LOGS.GPJ SPARKLE_1.0_DATA_TEMPLATE.GDT 6/18/20

DRAFT

RECORD OF BOREHOLE MW-23

SHEET 1 of 1

PROJECT: Triumph Mine
PROJECT NUMBER: 1301235-19
LOCATION: Triumph, Idaho

DRILLING METHOD: Sonic
DRILLING DATE: 4/23/19
DRILL RIG: Boart Longyear 100C

DATUM: NAVD88
COORDINATES: N: 43.64 W: 114.26

ELEVATION: 6043.51
INCLINATION: -90
WELL TAG # D0080826

DEPTH (Ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	RUN	REC / ATT	SAMPLES: NUMBER	SAMPLES: TYPE	PENETRATION RESISTANCE BLOWS / ft ◆ (10 20 30 40; PL MC LL; 20 40 60 80)	NOTES WATER LEVELS GRAPHIC
0	Sonic (6-Inch OD Casing, 4-Inch OD Core Barrel)	0.0 - 18.0 (GP-GM) silty GRAVEL/gravelly SILT: dark gray, loose, dry; fine to coarse gravel, angular to subrounded; some sand, fine; trace fines. Some organics (roots) from 0-1 feet bgs.	GP-GM				2.5 / 2.5				6" Steel Monument Readi-Mix Cement 3/8" Bentonite Chips
5							2.5 / 2.5 2.5 / 2.5				
10		7 feet bgs: driller notes slightly harder drilling					2.5 / 2.5 2.5 / 2.5				
15		12.5 feet bgs: becomes moist					2.5 / 2.5 2.5 / 2.5				10-20 Colorado Silica Sand 2" 0.020 Slot PVC Screen
					6025.5						
		18.0 - 19.0 (SP) SAND: dark gray to black, fine to coarse, wet, angular. Reddish-brown oxidation at 18.5-19 feet bgs in mostly fine sand.	SP		18.0 6024.5		2.5 / 2.5				
20		19.0 - 25.0 (GP) GRAVEL/COBBLES: light brownish gray, fine to coarse, wet, subrounded to rounded; some fine to coarse sand; trace fines	GP		19.0		2.5 / 2.5 2.5 / 2.5				
25					6018.5						
		Boring completed at 25.0 ft.			25.0						
30											
35											
40											

After Drilling

1 in to 5 ft
DRILLING CONTRACTOR: Cascade Drilling, L.P.
DRILLER: Travis Ratliff

LOGGED: JJones
CHECKED: JPepe
DATE: 6/18/2020

GOLDER

RECORD OF SONIC BOREHOLE TRIUMPH_BORING LOGS.GPJ SPARKLE_1.0_DATA_TEMPLATE.GDT 6/18/20

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	UPGRADIENT OF TRIUMPH AND TAILINGS PILES
DRILLING COMPANY	ESD, INC.
DRILLER	ED HILLMAN
DRILLING METHOD	AIR ROTARY CASING HAMMER
DRILL BIT(S) SIZE	5-7/8"

		FROM	TO	FT.
ISOLATION CASING	NONE			
BLANK CASING	4" SCHEDULE 40 PVC	0.0	14.5	
PERFORATED CASING	4", 0.020" SLOT SCH 40 PVC	14.5	24.5	
SIZE AND TYPE OF FILTER PACK	10/20 SILICA SAND	13.0	28.0	
SEAL	3/8" BENTONITE CHIPS	1.0	13.0	
GROUT	CONCRETE	0.0	1.0	

Boring/Well Name	MW-1B (503)
Project Name	TRIUMPH
Project Number	946091.01
ELEVATION AND DATUM (FT)	6103.14
TOTAL DEPTH (FT)	28.0
DATE STARTED	08/31/1995
DATE COMPLETED	08/31/1995
INITIAL WATER DEPTH (FT)	4.5
LOGGED BY	TCD
SAMPLING METHODS	2.5" SPLIT-BARREL
WELL COMPLETION	☐ SURFACE HOUSING ▬ STAND PIPE 3.0 FT.

SAMPLES TYPE	SAMPLES RECOVERY (FEET)	SAMPLES PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			0				SP/SM	**Clayey Silty SAND** dark gray brown, fine to medium poorly graded sand, silt, trace clay, soft, moist
			5				GP	**Sandy GRAVEL** fine to 1 inch subangular to rounded gravel, coarse to very coarse poorly graded sand, moist, loose cobble chips at 8 and 12 feet wet at 14 feet
			10					
			15					
			20				GW	**Well-graded GRAVEL** fine to 1/2-inch subangular to rounded gravel, broken cobble chips, wet hard drilling, cobble chips
			25					
			30					

Notes:

1) Elevation was surveyed at ground surface.

2) Sample was collected from 1.0 to 3.0 feet bgs.

Boring & Well Construction Log

Kennedy/Jenks Consultants

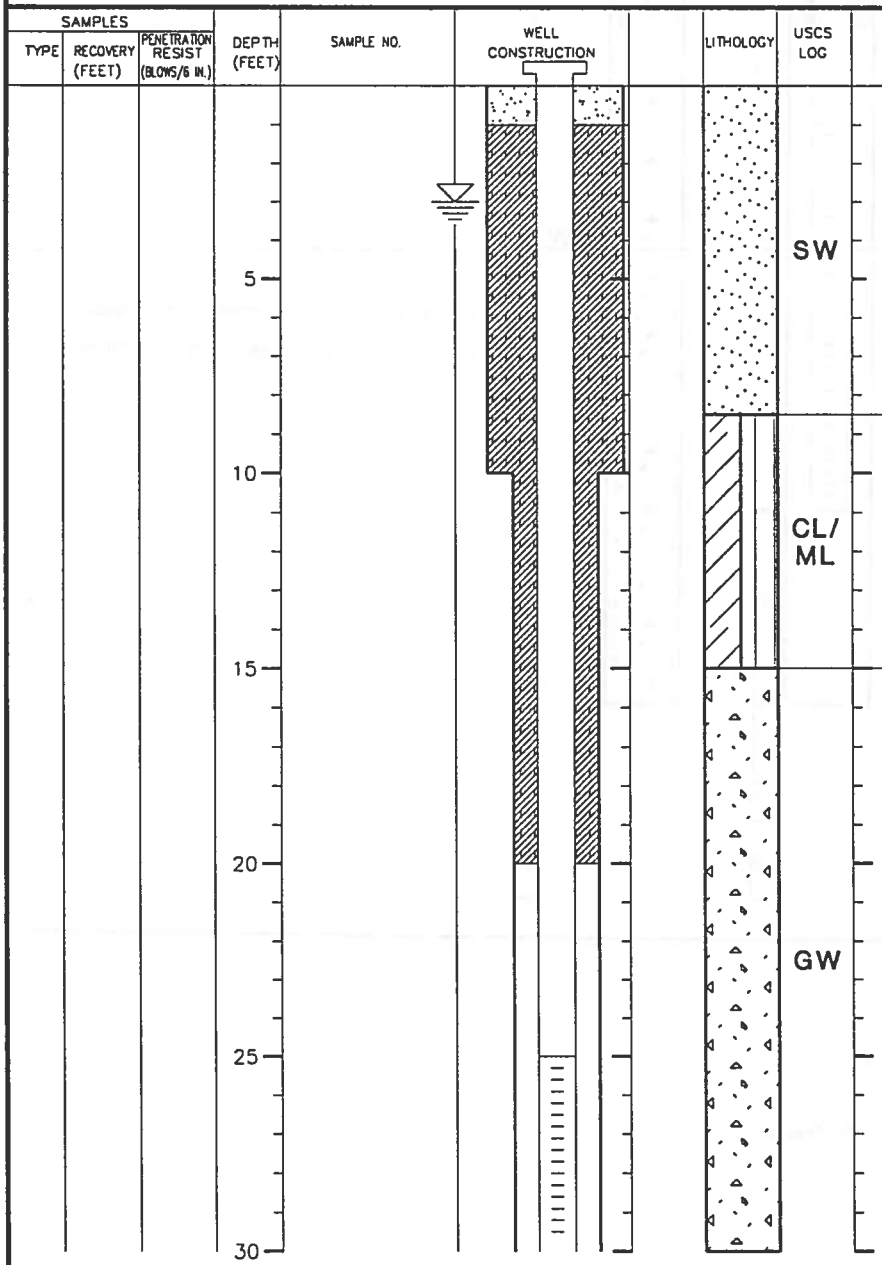
BORING LOCATION	LOWER TAILINGS PILE		
DRILLING COMPANY	ESD, INC.	DRILLER	ED HILLMAN
DRILLING METHOD	AIR ROTARY CASING HAMMER	DRILL BIT(S) SIZE:	7-7/8", 5-7/8"
ISOLATION CASING	TEMPORARY 8" MILD STEEL	FROM 0.0 TO 10.0 FT.	
BLANK CASING	4" SCHEDULE 40 PVC	FROM 10.0 TO 25.0 FT.	
PERFORATED CASING	4", 0.020" SLOT SCH 40 PVC	FROM 25.0 TO 35.0 FT.	
SIZE AND TYPE OF FILTER PACK	10/20 SILICA SAND	FROM 20.0 TO 37.0 FT.	
SEAL	3/8" BENTONITE CHIPS	FROM 1.0 TO 20.0 FT.	
GROUT	CONCRETE	FROM 0.0 TO 1.0 FT.	

Boring/Well Name MW-3B (502)

Project Name TRIUMPH

Project Number 946091.01

ELEVATION AND DATUM (FT) 6053.31	TOTAL DEPTH (FT) 37.0
DATE STARTED 08/28/1995	DATE COMPLETED 08/28/1995
INITIAL WATER DEPTH (FT) 3.0	
LOGGED BY TCD	
SAMPLING METHODS 2.5" SPLIT-BARREL	WELL COMPLETION ☐ SURFACE HOUSING ■ STAND PIPE 3.0 FT.



TAILINGS

medium to dark gray, very fine to coarse well-graded sand, moist, wet at 3 feet

Silty CLAY

medium gray brown, non-plastic, firm, moist, vegetation

Well-graded GRAVEL

fine to 3/4 inch subangular to rounded gravel, some angular broken cobble chips, hard drilling to 16 feet, wet

Boring & Well Construction Log

Kennedy/Jenks Consultants

Project Name TRIUMPH **Project Number** 946091.01 **Boring/Well Name** MW-3B

SAMPLES TYPE	SAMPLES RECOVERY (FEET)	SAMPLES PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			35				GW/ SW	**Sandy GRAVEL** fine to very coarse subangular to subrounded sand, angular to subrounded gravel and cobble chips to 1 inch, wet
			40					

Notes:

1) Elevation was surveyed at ground surface.

2) Sample was collected from 9.0 to 11.0 feet bgs.

APPENDIX C

Sequential Extraction Procedure Results

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ANALYTICAL REPORT

PREPARED FOR

Attn: Robin Nimmer
Alta Science and Engineering, Inc.
220 East 5th Street
Suite 325
Moscow, Idaho 83843

Generated 1/4/2024 10:34:39 AM

JOB DESCRIPTION

Triumph Mine - Idaho

JOB NUMBER

140-34329-1

Eurofins Knoxville
5815 Middlebrook Pike
Knoxville TN 37921

See page two for job notes and contact information.

my EOL

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins TestAmerica Project Manager.

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Authorized for release by
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(865)291-3006

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Definitions/Glossary

Client: Alta Science and Engineering, Inc. Job ID: 140-34329-1
Project/Site: Triumph Mine - Idaho

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
F3	Duplicate RPD exceeds the control limit
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL, and the absolute difference between results is < the upper reporting limits for both.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 140-34329-1 Eurofins Knoxville

Job Narrative
140-34329-1

Receipt
The samples were received on 11/10/2023 at 11:20am and arrived in good condition. The temperature of the cooler at receipt was 19.0º C.

Receipt Exceptions
The Field Sampler was not listed on the Chain of Custody.

COC list MS/MSD. MS/MSD cannot be performed for this method.

TP-1-2.5' (140-34329-1), TP-1-3.0' (140-34329-2), TP-1-3.5' (140-34329-3), TP-2-2.5' (140-34329-4), TP-2-3.0' (140-34329-5), TP-2-3.5' (140-34329-6), DTP-1-1' (140-34329-7), DTP-2-2' (140-34329-8), DTP-3-3' (140-34329-9), DTP-4-4' (140-34329-10), DTP-5-5' (140-34329-11) and DTP-6-6' (140-34329-12)

Metals
7 Step Sequential Extraction Procedure

These soil samples were prepared and analyzed using Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0008, "7 Step Sequential Extraction Procedure". SW-846 Method 6010B as incorporated in Eurofins TestAmerica Knoxville standard operating procedure KNOX-MT-0007 was used to perform the final instrument analyses.

An aliquot of each sample was sequentially extracted using the steps listed below:

· Step 1 - Exchangeable Fraction: A 5 gram aliquot of sample was extracted with 25 mL of 1M magnesium sulfate (MgSO4), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 2 - Carbonate Fraction: The sample residue from step 1 was extracted with 25 mL of 1M sodium acetate/acetic acid (NaOAc/HOAc) at pH 5, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 3 - Non-crystalline Materials Fraction: The sample residue from step 2 was extracted with 25 mL of 0.2M ammonium oxalate (pH 3), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 4 - Metal Hydroxide Fraction: The sample residue from step 3 was extracted with 25 mL of 1M hydroxylamine hydrochloride solution in 25% v/v acetic acid, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 5 - Organic-bound Fraction: The sample residue from step 4 was extracted three times with 25 mL of 5% sodium hypochlorite (NaClO) at pH 9.5, centrifuged and filtered. The resulting leachates were combined and 5 mL were digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 6 - Acid/Sulfide Fraction: The sample residue from step 5 was extracted with 25 mL of a 3:1:2 v/v solution of HCl-HNO3-H2O, centrifuged and filtered. 5 mL of the resulting leachate was diluted to 50 mL with reagent water and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
· Step 7 - Residual Fraction: A 1.0 g aliquot of the sample residue from step 6 was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Results are reported in mg/kg on a dry weight basis.

In addition, a 1.0 g aliquot of the original sample was digested using HF, HNO3, HCl and H3BO3. The digestate was analyzed by ICP using method 6010B. Total metal results are reported in mg/kg on a dry weight basis.

Results were calculated using the following equation:

Result, µg/g or mg/Kg, dry weight = (C × V × V1 × D) / (W × S × V2)

Where:
C = Concentration from instrument readout, µg/mL
V = Final volume of digestate, mL
D = Instrument dilution factor
V1 = Total volume of leachate, mL
V2 = Volume of leachate digested, mL
W = Wet weight of sample, g
S = Percent solids/100

Job ID: 140-34329-1 (Continued) Eurofins Knoxville

A method blank, laboratory control sample and laboratory control sample duplicate were prepared and analyzed with each SEP step in order to provide information about both the presence of elements of interest in the extraction solutions, and the recovery of elements of interest from the extraction solutions. Results outside of laboratory QC limits do not reflect out of control performance, but rather the effect of the extraction solution upon the analyte.

A laboratory sample duplicate was prepared and analyzed with each batch of samples in order to provide information regarding the reproducibility of the procedure.

SEP Report Notes:

The final report lists the results for each step, the result for the total digestion of the sample, and a sum of the results of steps 1 through 7 by element.

Magnesium was not reported for step 1 because the extraction solution for this step (magnesium sulfate) contains high levels of magnesium.

Sodium was not reported for steps 2 and 5 since the extraction solution for these steps contain high levels of sodium.

The sum of steps 1 through 7 is much higher than the total result for sodium and magnesium due to the magnesium and sodium introduced by the extraction solutions.

The digestates for steps 1, 2 and 5 were analyzed at a dilution due to instrument problems caused by the high solids content of the digestates. The reporting limits were adjusted accordingly.

Method 6010B: The serial dilution performed for the following samples associated with batch 140-81885 was outside control limits: TP-2-2.5' (140-34329-4), (140-34329-A-4-A SD ^10) and (140-34329-A-4-A SD ^5)

Method 6010B: The following samples were diluted due to the nature of the sample matrix: TP-1-2.5' (140-34329-1), TP-1-3.0' (140-34329-2), TP-1-3.5' (140-34329-3), TP-2-2.5' (140-34329-4), TP-2-3.0' (140-34329-5), TP-2-3.5' (140-34329-6), DTP-1-1' (140-34329-7), DTP-2-2' (140-34329-8), DTP-3-3' (140-34329-9), DTP-4-4' (140-34329-10), DTP-5-5' (140-34329-11) and DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided for Aluminum and Zinc.

Method 6010B: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following samples: TP-1-2.5' (140-34329-1), TP-1-3.5' (140-34329-3), TP-2-2.5' (140-34329-4) and TP-2-3.0' (140-34329-5).

Method 6010B: The following samples were diluted due to the presence of Titanium which interferes with Lead: TP-1-2.5' (140-34329-1), TP-1-3.0' (140-34329-2), TP-1-3.5' (140-34329-3), TP-2-2.5' (140-34329-4), TP-2-3.0' (140-34329-5), TP-2-3.5' (140-34329-6), DTP-1-1' (140-34329-7), DTP-2-2' (140-34329-8), DTP-3-3' (140-34329-9), DTP-4-4' (140-34329-10) and DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted due to the presence of Silicon which interferes with Arsenic, Lead and Selenium: DTP-4-4' (140-34329-10), DTP-5-5' (140-34329-11) and DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided.

Method 6010B: The following sample was diluted due to the presence of Manganese which interferes with Selenium: DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided.

Method 6010B: The following sample was diluted to bring the concentration of target analyte, Manganese, within the calibration range: DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided.

Method 6010B: The following samples were diluted to bring the concentration of target analyte, Zinc, within the calibration range: DTP-3-3' (140-34329-9) and DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The sample duplicate (DUP) precision for preparation batch 140-80895 and 140-80950 and analytical batch 140-81639 was outside control limits. Sample heterogeneity is suspected.

Method 6010B SEP: The sample duplicate (DUP) precision for preparation batch 140-80958 and 140-81017 and analytical batch 140-81693 was outside control limits. Sample non-homogeneity is suspected.

Method 6010B SEP: The following sample was diluted to bring the concentration of target analyte, Manganese, within the calibration range: DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following sample was diluted due to the presence of Manganese which interferes with Selenium: DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The sample duplicate (DUP) precision for preparation batch 140-81012, 140-81185, 140-81233 and 140-81291 and analytical batch 140-81837 was outside control limits. Sample non-homogeneity is suspected.

Method 6010B SEP: The serial dilution performed for the following samples associated with batch 140-81837 was outside control limits: TP-2-2.5' (140-34329-4) and (140-34329-A-4-W SD ^5)

Method 6010B SEP: The method blank for preparation batch 140-81012 and 140-81233 contained Selenium above the reporting limit (RL). The sample results associated with this method blank were either estimated values or non-detects; therefore, re-extraction and/or re-analysis of samples were not performed.

Method 6010B SEP: The sample duplicate (DUP) precision for preparation batch 140-81296 and analytical batch 140-81849 was outside control limits. Sample non-homogeneity is suspected.

Method 6010B SEP: The following samples were diluted due to the nature of the sample matrix: TP-1-2.5' (140-34329-1), TP-1-3.0' (140-34329-2), TP-1-3.5' (140-34329-3), TP-2-2.5' (140-34329-4), TP-2-3.0' (140-34329-5), TP-2-3.5' (140-34329-6), DTP-1-1' (140-34329-7), DTP-2-2' (140-34329-8), DTP-3-3' (140-34329-9), DTP-4-4' (140-34329-10), DTP-5-5' (140-34329-11) and DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided for Aluminum and Zinc.

Method 6010B SEP: The following samples were diluted due to the presence of Titanium which interferes with Lead: TP-1-2.5' (140-34329-1), TP-1-3.0' (140-34329-2), TP-1-3.5' (140-34329-3), TP-2-2.5' (140-34329-4), TP-2-3.0' (140-34329-5), TP-2-3.5' (140-34329-6), DTP-1-1' (140-34329-7), DTP-2-2' (140-34329-8), DTP-3-3' (140-34329-9), DTP-4-4' (140-34329-10) and DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided.

Method 6010B SEP: The following samples were diluted due to the presence of Silicon which interferes with Arsenic, Lead and Selenium: TP-1-3.0' (140-34329-2), TP-1-3.5' (140-34329-3), TP-2-2.5' (140-34329-4), TP-2-3.0' (140-34329-5), TP-2-3.5' (140-34329-6), DTP-1-1' (140-34329-7), DTP-2-2' (140-34329-8), DTP-3-3' (140-34329-9), DTP-4-4' (140-34329-10), DTP-5-5' (140-34329-11) and DTP-6-6' (140-34329-12). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
% Moisture: The samples were analyzed for percent moisture using SOP number KNOX-WC-0012 (based on Modified MCAWW 160.3 and SM2540B and on the percent moisture determinations described in methods 3540C and 3550B).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-34329-1	TP-1-2.5'	Solid	10/30/23 10:45	11/10/23 11:20
140-34329-2	TP-1-3.0'	Solid	10/30/23 10:50	11/10/23 11:20
140-34329-3	TP-1-3.5'	Solid	10/30/23 10:55	11/10/23 11:20
140-34329-4	TP-2-2.5'	Solid	10/30/23 11:00	11/10/23 11:20
140-34329-5	TP-2-3.0'	Solid	10/30/23 11:05	11/10/23 11:20
140-34329-6	TP-2-3.5'	Solid	10/30/23 11:10	11/10/23 11:20
140-34329-7	DTP-1-1'	Solid	11/02/23 09:30	11/10/23 11:20
140-34329-8	DTP-2-2'	Solid	11/02/23 09:35	11/10/23 11:20
140-34329-9	DTP-3-3'	Solid	11/02/23 09:40	11/10/23 11:20
140-34329-10	DTP-4-4'	Solid	11/02/23 09:45	11/10/23 11:20
140-34329-11	DTP-5-5'	Solid	11/02/23 09:50	11/10/23 11:20
140-34329-12	DTP-6-6'	Solid	11/02/23 09:55	11/10/23 11:20

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-2.5'

Date Collected: 10/30/23 10:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-1

Matrix: Solid
Percent Solids: 91.9

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		44	7.0	mg/Kg	☼	12/04/23 08:00	12/20/23 11:48	4
Antimony	ND		13	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 11:48	4
Arsenic	ND		2.2	0.57	mg/Kg	☼	12/04/23 08:00	12/20/23 11:48	4
Cadmium	**0.11**	**J**	1.1	0.070	mg/Kg	☼	12/04/23 08:00	12/20/23 11:48	4
Iron	ND		22	13	mg/Kg	☼	12/04/23 08:00	12/20/23 11:48	4
Lead	ND		2.2	0.48	mg/Kg	☼	12/04/23 08:00	12/20/23 11:48	4
Manganese	ND		3.3	0.13	mg/Kg	☼	12/04/23 08:00	12/20/23 11:48	4
Selenium	ND		2.2	0.74	mg/Kg	☼	12/04/23 08:00	12/20/23 11:48	4
Zinc	ND		4.4	1.0	mg/Kg	☼	12/04/23 08:00	12/20/23 11:48	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**5.3**	**J**	33	5.2	mg/Kg	☼	12/05/23 08:00	12/20/23 13:32	3
Antimony	ND		9.8	0.91	mg/Kg	☼	12/05/23 08:00	12/20/23 13:32	3
Arsenic	ND		1.6	0.42	mg/Kg	☼	12/05/23 08:00	12/20/23 13:32	3
Cadmium	**0.85**		0.82	0.036	mg/Kg	☼	12/05/23 08:00	12/20/23 13:32	3
Iron	ND		16	9.5	mg/Kg	☼	12/05/23 08:00	12/20/23 13:32	3
Lead	ND		1.6	0.36	mg/Kg	☼	12/05/23 08:00	12/20/23 13:32	3
Manganese	**1.4**	**J**	2.4	0.91	mg/Kg	☼	12/05/23 08:00	12/20/23 13:32	3
Selenium	ND		1.6	0.55	mg/Kg	☼	12/05/23 08:00	12/20/23 13:32	3
Zinc	**5.9**		3.3	0.65	mg/Kg	☼	12/05/23 08:00	12/20/23 13:32	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**470**		11	2.3	mg/Kg	☼	12/06/23 08:00	12/21/23 13:24	1
Antimony	ND		3.3	0.30	mg/Kg	☼	12/06/23 08:00	12/21/23 13:24	1
Arsenic	**0.58**		0.54	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 13:24	1
Cadmium	**0.40**		0.27	0.012	mg/Kg	☼	12/06/23 08:00	12/21/23 13:24	1
Iron	**230**		5.4	3.2	mg/Kg	☼	12/06/23 08:00	12/21/23 13:24	1
Lead	**1.5**		0.54	0.12	mg/Kg	☼	12/06/23 08:00	12/21/23 13:24	1
Manganese	**220**	**B**	0.82	0.029	mg/Kg	☼	12/06/23 08:00	12/21/23 13:24	1
Selenium	ND		0.54	0.18	mg/Kg	☼	12/06/23 08:00	12/21/23 13:24	1
Zinc	**15**	**B**	1.1	0.11	mg/Kg	☼	12/06/23 08:00	12/21/23 13:24	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2700**		11	1.7	mg/Kg	☼	12/12/23 08:00	12/27/23 12:51	1
Antimony	ND		3.3	0.49	mg/Kg	☼	12/12/23 08:00	12/27/23 12:51	1
Arsenic	**2.7**		0.54	0.24	mg/Kg	☼	12/12/23 08:00	12/27/23 12:51	1
Cadmium	**2.1**		0.27	0.012	mg/Kg	☼	12/12/23 08:00	12/27/23 12:51	1
Iron	**5200**		5.4	3.2	mg/Kg	☼	12/12/23 08:00	12/27/23 12:51	1
Lead	**24**		0.54	0.12	mg/Kg	☼	12/12/23 08:00	12/27/23 12:51	1
Manganese	**75**		0.82	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 12:51	1
Selenium	ND		0.54	0.51	mg/Kg	☼	12/12/23 08:00	12/27/23 12:51	1
Zinc	**130**	**B**	1.1	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 12:51	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**31**	**J**	160	26	mg/Kg	☼	12/13/23 08:00	12/27/23 14:33	5
Antimony	ND		49	4.6	mg/Kg	☼	12/13/23 08:00	12/27/23 14:33	5

Client Sample ID: TP-1-2.5'

Date Collected: 10/30/23 10:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-1

Matrix: Solid
Percent Solids: 91.9

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.1	J	8.2	2.1	mg/Kg	☼	12/13/23 08:00	12/27/23 14:33	5
Cadmium	0.36	J	4.1	0.17	mg/Kg	☼	12/13/23 08:00	12/27/23 14:33	5
Iron	ND		82	48	mg/Kg	☼	12/13/23 08:00	12/27/23 14:33	5
Lead	3.3	J	8.2	1.8	mg/Kg	☼	12/13/23 08:00	12/27/23 14:33	5
Manganese	7.8	J	12	2.0	mg/Kg	☼	12/13/23 08:00	12/27/23 14:33	5
Selenium	ND		8.2	2.8	mg/Kg	☼	12/13/23 08:00	12/27/23 14:33	5
Zinc	23		16	1.6	mg/Kg	☼	12/13/23 08:00	12/27/23 14:33	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	16000		11	1.7	mg/Kg	☼	12/12/23 12:00	12/27/23 16:19	1
Antimony	2.4	J	3.3	0.30	mg/Kg	☼	12/12/23 12:00	12/27/23 16:19	1
Arsenic	7.9		0.54	0.16	mg/Kg	☼	12/12/23 12:00	12/27/23 16:19	1
Cadmium	0.46		0.27	0.012	mg/Kg	☼	12/12/23 12:00	12/27/23 16:19	1
Iron	13000		5.4	3.2	mg/Kg	☼	12/12/23 12:00	12/27/23 16:19	1
Lead	11		0.54	0.12	mg/Kg	☼	12/12/23 12:00	12/27/23 16:19	1
Manganese	83		0.82	0.27	mg/Kg	☼	12/12/23 12:00	12/27/23 16:19	1
Selenium	0.82		0.54	0.18	mg/Kg	☼	12/12/23 12:00	12/27/23 16:19	1
Zinc	230		1.1	0.11	mg/Kg	☼	12/12/23 12:00	12/27/23 16:19	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	23000		110	17	mg/Kg	☼	12/13/23 08:00	12/28/23 11:31	10
Antimony	1.2	J	3.3	0.15	mg/Kg	☼	12/13/23 08:00	12/28/23 12:59	1
Arsenic	2.5		0.54	0.33	mg/Kg	☼	12/13/23 08:00	12/28/23 12:59	1
Cadmium	0.080	J	0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/28/23 12:59	1
Iron	4000		5.4	4.5	mg/Kg	☼	12/13/23 08:00	12/28/23 12:59	1
Lead	2.7		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/28/23 14:46	2
Manganese	61		0.82	0.34	mg/Kg	☼	12/13/23 08:00	12/28/23 12:59	1
Selenium	0.18	J	0.54	0.18	mg/Kg	☼	12/13/23 08:00	12/28/23 12:59	1
Zinc	48		11	2.5	mg/Kg	☼	12/13/23 08:00	12/28/23 11:31	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	42000		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	3.5		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	16		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	4.4		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	23000		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	42		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	450		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	1.0		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	460		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	58000		110	17	mg/Kg	☼	12/13/23 08:00	12/29/23 10:48	10
Antimony	4.6	J	6.5	0.30	mg/Kg	☼	12/13/23 08:00	12/29/23 13:57	2
Arsenic	14		1.1	0.65	mg/Kg	☼	12/13/23 08:00	12/29/23 13:57	2
Cadmium	3.8		0.54	0.024	mg/Kg	☼	12/13/23 08:00	12/29/23 13:57	2

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-2.5'
Date Collected: 10/30/23 10:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-1
Matrix: Solid
Percent Solids: 91.9

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	20000		11	8.9	mg/Kg	☼	12/13/23 08:00	12/29/23 13:57	2
Lead	37		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/29/23 13:57	2
Manganese	410		1.6	0.67	mg/Kg	☼	12/13/23 08:00	12/29/23 13:57	2
Selenium	1.0	J	1.1	0.37	mg/Kg	☼	12/13/23 08:00	12/29/23 13:57	2
Zinc	520		11	2.5	mg/Kg	☼	12/13/23 08:00	12/29/23 10:48	10

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-3.0'
Date Collected: 10/30/23 10:50
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-2
Matrix: Solid
Percent Solids: 91.5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		44	7.0	mg/Kg	☼	12/04/23 08:00	12/20/23 11:53	4
Antimony	ND		13	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 11:53	4
Arsenic	ND		2.2	0.57	mg/Kg	☼	12/04/23 08:00	12/20/23 11:53	4
Cadmium	**0.11**	**J**	1.1	0.070	mg/Kg	☼	12/04/23 08:00	12/20/23 11:53	4
Iron	ND		22	13	mg/Kg	☼	12/04/23 08:00	12/20/23 11:53	4
Lead	ND		2.2	0.48	mg/Kg	☼	12/04/23 08:00	12/20/23 11:53	4
Manganese	ND		3.3	0.14	mg/Kg	☼	12/04/23 08:00	12/20/23 11:53	4
Selenium	ND		2.2	0.74	mg/Kg	☼	12/04/23 08:00	12/20/23 11:53	4
Zinc	ND		4.4	1.0	mg/Kg	☼	12/04/23 08:00	12/20/23 11:53	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		33	5.2	mg/Kg	☼	12/05/23 08:00	12/20/23 13:37	3
Antimony	ND		9.8	0.92	mg/Kg	☼	12/05/23 08:00	12/20/23 13:37	3
Arsenic	ND		1.6	0.43	mg/Kg	☼	12/05/23 08:00	12/20/23 13:37	3
Cadmium	**0.87**		0.82	0.036	mg/Kg	☼	12/05/23 08:00	12/20/23 13:37	3
Iron	ND		16	9.5	mg/Kg	☼	12/05/23 08:00	12/20/23 13:37	3
Lead	**0.48**	**J**	1.6	0.36	mg/Kg	☼	12/05/23 08:00	12/20/23 13:37	3
Manganese	ND		2.5	0.92	mg/Kg	☼	12/05/23 08:00	12/20/23 13:37	3
Selenium	ND		1.6	0.56	mg/Kg	☼	12/05/23 08:00	12/20/23 13:37	3
Zinc	**6.5**		3.3	0.66	mg/Kg	☼	12/05/23 08:00	12/20/23 13:37	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**350**		11	2.3	mg/Kg	☼	12/06/23 08:00	12/21/23 13:29	1
Antimony	ND		3.3	0.31	mg/Kg	☼	12/06/23 08:00	12/21/23 13:29	1
Arsenic	**0.39**	**J**	0.55	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 13:29	1
Cadmium	**0.24**	**J**	0.27	0.012	mg/Kg	☼	12/06/23 08:00	12/21/23 13:29	1
Iron	**220**		5.5	3.2	mg/Kg	☼	12/06/23 08:00	12/21/23 13:29	1
Lead	**1.4**		0.55	0.12	mg/Kg	☼	12/06/23 08:00	12/21/23 13:29	1
Manganese	**200**	**B**	0.82	0.030	mg/Kg	☼	12/06/23 08:00	12/21/23 13:29	1
Selenium	ND		0.55	0.19	mg/Kg	☼	12/06/23 08:00	12/21/23 13:29	1
Zinc	**18**	**B**	1.1	0.11	mg/Kg	☼	12/06/23 08:00	12/21/23 13:29	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2500**		11	1.7	mg/Kg	☼	12/12/23 08:00	12/27/23 12:55	1
Antimony	ND		3.3	0.49	mg/Kg	☼	12/12/23 08:00	12/27/23 12:55	1
Arsenic	**3.5**		0.55	0.24	mg/Kg	☼	12/12/23 08:00	12/27/23 12:55	1
Cadmium	**2.1**		0.27	0.012	mg/Kg	☼	12/12/23 08:00	12/27/23 12:55	1
Iron	**6000**		5.5	3.2	mg/Kg	☼	12/12/23 08:00	12/27/23 12:55	1
Lead	**27**		0.55	0.12	mg/Kg	☼	12/12/23 08:00	12/27/23 12:55	1
Manganese	**56**		0.82	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 12:55	1
Selenium	ND		0.55	0.51	mg/Kg	☼	12/12/23 08:00	12/27/23 12:55	1
Zinc	**150**	**B**	1.1	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 12:55	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**29**	**J**	160	26	mg/Kg	☼	12/13/23 08:00	12/27/23 14:39	5
Antimony	ND		49	4.6	mg/Kg	☼	12/13/23 08:00	12/27/23 14:39	5

Client Sample ID: TP-1-3.0'

Date Collected: 10/30/23 10:50
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-2

Matrix: Solid
Percent Solids: 91.5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.6	J	8.2	2.1	mg/Kg	☼	12/13/23 08:00	12/27/23 14:39	5
Cadmium	0.40	J	4.1	0.17	mg/Kg	☼	12/13/23 08:00	12/27/23 14:39	5
Iron	ND		82	48	mg/Kg	☼	12/13/23 08:00	12/27/23 14:39	5
Lead	2.2	J	8.2	1.8	mg/Kg	☼	12/13/23 08:00	12/27/23 14:39	5
Manganese	ND		12	2.0	mg/Kg	☼	12/13/23 08:00	12/27/23 14:39	5
Selenium	ND		8.2	2.8	mg/Kg	☼	12/13/23 08:00	12/27/23 14:39	5
Zinc	26		16	1.6	mg/Kg	☼	12/13/23 08:00	12/27/23 14:39	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	15000		11	1.7	mg/Kg	☼	12/12/23 12:00	12/27/23 16:24	1
Antimony	2.9	J	3.3	0.31	mg/Kg	☼	12/12/23 12:00	12/27/23 16:24	1
Arsenic	7.4		0.55	0.16	mg/Kg	☼	12/12/23 12:00	12/27/23 16:24	1
Cadmium	0.46		0.27	0.012	mg/Kg	☼	12/12/23 12:00	12/27/23 16:24	1
Iron	12000		5.5	3.2	mg/Kg	☼	12/12/23 12:00	12/27/23 16:24	1
Lead	13		0.55	0.12	mg/Kg	☼	12/12/23 12:00	12/27/23 16:24	1
Manganese	82		0.82	0.27	mg/Kg	☼	12/12/23 12:00	12/27/23 16:24	1
Selenium	1.3		0.55	0.19	mg/Kg	☼	12/12/23 12:00	12/27/23 16:24	1
Zinc	240		1.1	0.11	mg/Kg	☼	12/12/23 12:00	12/27/23 16:24	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	23000		110	17	mg/Kg	☼	12/13/23 08:00	12/28/23 11:36	10
Antimony	1.3	J	3.3	0.15	mg/Kg	☼	12/13/23 08:00	12/28/23 13:04	1
Arsenic	2.6		1.1	0.66	mg/Kg	☼	12/13/23 08:00	12/28/23 14:51	2
Cadmium	0.083	J	0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/28/23 13:04	1
Iron	3800		5.5	4.5	mg/Kg	☼	12/13/23 08:00	12/28/23 13:04	1
Lead	3.0		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/28/23 14:51	2
Manganese	53		0.82	0.34	mg/Kg	☼	12/13/23 08:00	12/28/23 13:04	1
Selenium	0.47	J	1.1	0.37	mg/Kg	☼	12/13/23 08:00	12/28/23 14:51	2
Zinc	54		11	2.5	mg/Kg	☼	12/13/23 08:00	12/28/23 11:36	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	41000		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	4.2		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	16		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	4.3		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	22000		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	47		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	390		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	1.8		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	490		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	48000		110	17	mg/Kg	☼	12/13/23 08:00	12/29/23 10:53	10
Antimony	3.5		3.3	0.15	mg/Kg	☼	12/13/23 08:00	12/29/23 12:22	1
Arsenic	12		0.55	0.33	mg/Kg	☼	12/13/23 08:00	12/29/23 12:22	1
Cadmium	3.3		0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/29/23 12:22	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-3.0'
Date Collected: 10/30/23 10:50
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-2
Matrix: Solid
Percent Solids: 91.5

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	16000		5.5	4.5	mg/Kg	☼	12/13/23 08:00	12/29/23 12:22	1
Lead	39		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/29/23 14:02	2
Manganese	320		0.82	0.34	mg/Kg	☼	12/13/23 08:00	12/29/23 12:22	1
Selenium	1.2		0.55	0.19	mg/Kg	☼	12/13/23 08:00	12/29/23 12:22	1
Zinc	480		11	2.5	mg/Kg	☼	12/13/23 08:00	12/29/23 10:53	10

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-3.5'
Date Collected: 10/30/23 10:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-3
Matrix: Solid
Percent Solids: 91.0

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		44	7.0	mg/Kg	☼	12/04/23 08:00	12/20/23 11:58	4
Antimony	ND		13	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 11:58	4
Arsenic	ND		2.2	0.57	mg/Kg	☼	12/04/23 08:00	12/20/23 11:58	4
Cadmium	**0.11**	**J**	1.1	0.070	mg/Kg	☼	12/04/23 08:00	12/20/23 11:58	4
Iron	ND		22	13	mg/Kg	☼	12/04/23 08:00	12/20/23 11:58	4
Lead	ND		2.2	0.48	mg/Kg	☼	12/04/23 08:00	12/20/23 11:58	4
Manganese	ND		3.3	0.14	mg/Kg	☼	12/04/23 08:00	12/20/23 11:58	4
Selenium	ND		2.2	0.75	mg/Kg	☼	12/04/23 08:00	12/20/23 11:58	4
Zinc	**1.8**	**J**	4.4	1.1	mg/Kg	☼	12/04/23 08:00	12/20/23 11:58	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7.2**	**J**	33	5.3	mg/Kg	☼	12/05/23 08:00	12/20/23 13:42	3
Antimony	ND		9.9	0.92	mg/Kg	☼	12/05/23 08:00	12/20/23 13:42	3
Arsenic	**0.56**	**J**	1.6	0.43	mg/Kg	☼	12/05/23 08:00	12/20/23 13:42	3
Cadmium	**0.94**		0.82	0.036	mg/Kg	☼	12/05/23 08:00	12/20/23 13:42	3
Iron	ND		16	9.6	mg/Kg	☼	12/05/23 08:00	12/20/23 13:42	3
Lead	**0.78**	**J**	1.6	0.36	mg/Kg	☼	12/05/23 08:00	12/20/23 13:42	3
Manganese	**1.0**	**J**	2.5	0.92	mg/Kg	☼	12/05/23 08:00	12/20/23 13:42	3
Selenium	ND		1.6	0.56	mg/Kg	☼	12/05/23 08:00	12/20/23 13:42	3
Zinc	**12**		3.3	0.66	mg/Kg	☼	12/05/23 08:00	12/20/23 13:42	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**380**		11	2.3	mg/Kg	☼	12/06/23 08:00	12/21/23 13:34	1
Antimony	**0.43**	**J**	3.3	0.31	mg/Kg	☼	12/06/23 08:00	12/21/23 13:34	1
Arsenic	**2.5**		0.55	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 13:34	1
Cadmium	**0.30**		0.27	0.012	mg/Kg	☼	12/06/23 08:00	12/21/23 13:34	1
Iron	**230**		5.5	3.2	mg/Kg	☼	12/06/23 08:00	12/21/23 13:34	1
Lead	**1.4**		0.55	0.12	mg/Kg	☼	12/06/23 08:00	12/21/23 13:34	1
Manganese	**210**	**B**	0.82	0.030	mg/Kg	☼	12/06/23 08:00	12/21/23 13:34	1
Selenium	ND		0.55	0.19	mg/Kg	☼	12/06/23 08:00	12/21/23 13:34	1
Zinc	**24**	**B**	1.1	0.11	mg/Kg	☼	12/06/23 08:00	12/21/23 13:34	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2500**		11	1.8	mg/Kg	☼	12/12/23 08:00	12/27/23 13:00	1
Antimony	ND		3.3	0.49	mg/Kg	☼	12/12/23 08:00	12/27/23 13:00	1
Arsenic	**4.1**		0.55	0.24	mg/Kg	☼	12/12/23 08:00	12/27/23 13:00	1
Cadmium	**2.2**		0.27	0.012	mg/Kg	☼	12/12/23 08:00	12/27/23 13:00	1
Iron	**5400**		5.5	3.2	mg/Kg	☼	12/12/23 08:00	12/27/23 13:00	1
Lead	**36**		0.55	0.12	mg/Kg	☼	12/12/23 08:00	12/27/23 13:00	1
Manganese	**67**		0.82	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 13:00	1
Selenium	ND		0.55	0.52	mg/Kg	☼	12/12/23 08:00	12/27/23 13:00	1
Zinc	**150**	**B**	1.1	0.18	mg/Kg	☼	12/12/23 08:00	12/27/23 13:00	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**28**	**J**	160	26	mg/Kg	☼	12/13/23 08:00	12/27/23 14:44	5
Antimony	ND		49	4.6	mg/Kg	☼	12/13/23 08:00	12/27/23 14:44	5

Client Sample ID: TP-1-3.5'

Date Collected: 10/30/23 10:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-3

Matrix: Solid
Percent Solids: 91.0

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	3.2	J	8.2	2.1	mg/Kg	☼	12/13/23 08:00	12/27/23 14:44	5
Cadmium	0.35	J	4.1	0.18	mg/Kg	☼	12/13/23 08:00	12/27/23 14:44	5
Iron	ND		82	48	mg/Kg	☼	12/13/23 08:00	12/27/23 14:44	5
Lead	3.9	J	8.2	1.8	mg/Kg	☼	12/13/23 08:00	12/27/23 14:44	5
Manganese	ND		12	2.0	mg/Kg	☼	12/13/23 08:00	12/27/23 14:44	5
Selenium	ND		8.2	2.9	mg/Kg	☼	12/13/23 08:00	12/27/23 14:44	5
Zinc	20		16	1.6	mg/Kg	☼	12/13/23 08:00	12/27/23 14:44	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	15000		11	1.8	mg/Kg	☼	12/12/23 12:00	12/27/23 16:29	1
Antimony	3.0	J	3.3	0.31	mg/Kg	☼	12/12/23 12:00	12/27/23 16:29	1
Arsenic	9.8		0.55	0.16	mg/Kg	☼	12/12/23 12:00	12/27/23 16:29	1
Cadmium	0.49		0.27	0.012	mg/Kg	☼	12/12/23 12:00	12/27/23 16:29	1
Iron	13000		5.5	3.2	mg/Kg	☼	12/12/23 12:00	12/27/23 16:29	1
Lead	14		0.55	0.12	mg/Kg	☼	12/12/23 12:00	12/27/23 16:29	1
Manganese	84		0.82	0.27	mg/Kg	☼	12/12/23 12:00	12/27/23 16:29	1
Selenium	0.80		0.55	0.19	mg/Kg	☼	12/12/23 12:00	12/27/23 16:29	1
Zinc	240		1.1	0.11	mg/Kg	☼	12/12/23 12:00	12/27/23 16:29	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	19000		110	18	mg/Kg	☼	12/13/23 08:00	12/28/23 11:41	10
Antimony	1.7	J	3.3	0.15	mg/Kg	☼	12/13/23 08:00	12/28/23 13:09	1
Arsenic	3.1		1.1	0.66	mg/Kg	☼	12/13/23 08:00	12/28/23 14:56	2
Cadmium	0.080	J	0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/28/23 13:09	1
Iron	4000		5.5	4.5	mg/Kg	☼	12/13/23 08:00	12/28/23 13:09	1
Lead	3.0		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/28/23 14:56	2
Manganese	62		0.82	0.34	mg/Kg	☼	12/13/23 08:00	12/28/23 13:09	1
Selenium	ND		1.1	0.37	mg/Kg	☼	12/13/23 08:00	12/28/23 14:56	2
Zinc	46		11	2.5	mg/Kg	☼	12/13/23 08:00	12/28/23 11:41	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	37000		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	5.1		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	23		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	4.5		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	23000		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	59		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	430		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	0.80		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	490		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	49000		110	18	mg/Kg	☼	12/13/23 08:00	12/29/23 10:58	10
Antimony	4.9		3.3	0.15	mg/Kg	☼	12/13/23 08:00	12/29/23 12:27	1
Arsenic	17		0.55	0.33	mg/Kg	☼	12/13/23 08:00	12/29/23 12:27	1
Cadmium	3.6		0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/29/23 12:27	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-3.5'
Date Collected: 10/30/23 10:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-3
Matrix: Solid
Percent Solids: 91.0

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	23000		11	9.0	mg/Kg	☼	12/13/23 08:00	12/29/23 14:07	2
Lead	52		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/29/23 14:07	2
Manganese	330		0.82	0.34	mg/Kg	☼	12/13/23 08:00	12/29/23 12:27	1
Selenium	1.5		0.55	0.19	mg/Kg	☼	12/13/23 08:00	12/29/23 12:27	1
Zinc	570		11	2.5	mg/Kg	☼	12/13/23 08:00	12/29/23 10:58	10

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-2-2.5'

Date Collected: 10/30/23 11:00
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-4

Matrix: Solid
Percent Solids: 92.5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		43	6.9	mg/Kg	☼	12/04/23 08:00	12/20/23 12:03	4
Antimony	ND		13	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 12:03	4
Arsenic	ND		2.2	0.56	mg/Kg	☼	12/04/23 08:00	12/20/23 12:03	4
Cadmium	ND		1.1	0.069	mg/Kg	☼	12/04/23 08:00	12/20/23 12:03	4
Iron	ND		22	13	mg/Kg	☼	12/04/23 08:00	12/20/23 12:03	4
Lead	ND		2.2	0.48	mg/Kg	☼	12/04/23 08:00	12/20/23 12:03	4
Manganese	ND		3.2	0.13	mg/Kg	☼	12/04/23 08:00	12/20/23 12:03	4
Selenium	ND		2.2	0.74	mg/Kg	☼	12/04/23 08:00	12/20/23 12:03	4
Zinc	ND		4.3	1.0	mg/Kg	☼	12/04/23 08:00	12/20/23 12:03	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		32	5.2	mg/Kg	☼	12/05/23 08:00	12/20/23 13:47	3
Antimony	ND		9.7	0.91	mg/Kg	☼	12/05/23 08:00	12/20/23 13:47	3
Arsenic	ND		1.6	0.42	mg/Kg	☼	12/05/23 08:00	12/20/23 13:47	3
Cadmium	**1.1**		0.81	0.036	mg/Kg	☼	12/05/23 08:00	12/20/23 13:47	3
Iron	ND		16	9.4	mg/Kg	☼	12/05/23 08:00	12/20/23 13:47	3
Lead	**2.7**		1.6	0.36	mg/Kg	☼	12/05/23 08:00	12/20/23 13:47	3
Manganese	**24**		2.4	0.91	mg/Kg	☼	12/05/23 08:00	12/20/23 13:47	3
Selenium	ND		1.6	0.55	mg/Kg	☼	12/05/23 08:00	12/20/23 13:47	3
Zinc	**13**		3.2	0.65	mg/Kg	☼	12/05/23 08:00	12/20/23 13:47	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**580**		11	2.3	mg/Kg	☼	12/06/23 08:00	12/21/23 13:39	1
Antimony	**0.64**	**J**	3.2	0.30	mg/Kg	☼	12/06/23 08:00	12/21/23 13:39	1
Arsenic	**2.3**		0.54	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 13:39	1
Cadmium	**0.15**	**J**	0.27	0.012	mg/Kg	☼	12/06/23 08:00	12/21/23 13:39	1
Iron	**270**		5.4	3.1	mg/Kg	☼	12/06/23 08:00	12/21/23 13:39	1
Lead	**1.6**		0.54	0.12	mg/Kg	☼	12/06/23 08:00	12/21/23 13:39	1
Manganese	**190**	**B**	0.81	0.029	mg/Kg	☼	12/06/23 08:00	12/21/23 13:39	1
Selenium	ND		0.54	0.18	mg/Kg	☼	12/06/23 08:00	12/21/23 13:39	1
Zinc	**19**	**B**	1.1	0.11	mg/Kg	☼	12/06/23 08:00	12/21/23 13:39	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1400**		11	1.7	mg/Kg	☼	12/12/23 08:00	12/27/23 13:05	1
Antimony	ND		3.2	0.49	mg/Kg	☼	12/12/23 08:00	12/27/23 13:05	1
Arsenic	**2.6**		0.54	0.24	mg/Kg	☼	12/12/23 08:00	12/27/23 13:05	1
Cadmium	**1.9**		0.27	0.012	mg/Kg	☼	12/12/23 08:00	12/27/23 13:05	1
Iron	**3500**		5.4	3.1	mg/Kg	☼	12/12/23 08:00	12/27/23 13:05	1
Lead	**37**		0.54	0.12	mg/Kg	☼	12/12/23 08:00	12/27/23 13:05	1
Manganese	**89**		0.81	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 13:05	1
Selenium	ND		0.54	0.51	mg/Kg	☼	12/12/23 08:00	12/27/23 13:05	1
Zinc	**100**	**B**	1.1	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 13:05	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**230**		160	25	mg/Kg	☼	12/13/23 08:00	12/27/23 14:49	5
Antimony	ND		49	4.5	mg/Kg	☼	12/13/23 08:00	12/27/23 14:49	5

Client Sample ID: TP-2-2.5'

Date Collected: 10/30/23 11:00
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-4

Matrix: Solid
Percent Solids: 92.5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.3	J	8.1	2.1	mg/Kg	☼	12/13/23 08:00	12/27/23 14:49	5
Cadmium	0.45	J	4.1	0.17	mg/Kg	☼	12/13/23 08:00	12/27/23 14:49	5
Iron	66	J	81	48	mg/Kg	☼	12/13/23 08:00	12/27/23 14:49	5
Lead	9.4		8.1	1.8	mg/Kg	☼	12/13/23 08:00	12/27/23 14:49	5
Manganese	15		12	2.0	mg/Kg	☼	12/13/23 08:00	12/27/23 14:49	5
Selenium	ND		8.1	2.8	mg/Kg	☼	12/13/23 08:00	12/27/23 14:49	5
Zinc	21		16	1.6	mg/Kg	☼	12/13/23 08:00	12/27/23 14:49	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	13000		11	1.7	mg/Kg	☼	12/12/23 12:00	12/27/23 16:34	1
Antimony	3.3		3.2	0.30	mg/Kg	☼	12/12/23 12:00	12/27/23 16:34	1
Arsenic	11		0.54	0.16	mg/Kg	☼	12/12/23 12:00	12/27/23 16:34	1
Cadmium	0.44		0.27	0.012	mg/Kg	☼	12/12/23 12:00	12/27/23 16:34	1
Iron	12000		5.4	3.1	mg/Kg	☼	12/12/23 12:00	12/27/23 16:34	1
Lead	13		0.54	0.12	mg/Kg	☼	12/12/23 12:00	12/27/23 16:34	1
Manganese	68		0.81	0.27	mg/Kg	☼	12/12/23 12:00	12/27/23 16:34	1
Selenium	0.75		0.54	0.18	mg/Kg	☼	12/12/23 12:00	12/27/23 16:34	1
Zinc	180		1.1	0.11	mg/Kg	☼	12/12/23 12:00	12/27/23 16:34	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	20000		110	17	mg/Kg	☼	12/13/23 08:00	12/28/23 11:46	10
Antimony	0.81	J	3.2	0.15	mg/Kg	☼	12/13/23 08:00	12/28/23 13:14	1
Arsenic	3.3		1.1	0.65	mg/Kg	☼	12/13/23 08:00	12/28/23 15:01	2
Cadmium	0.065	J	0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/28/23 13:14	1
Iron	4000		5.4	4.4	mg/Kg	☼	12/13/23 08:00	12/28/23 13:14	1
Lead	3.7		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/28/23 15:01	2
Manganese	49		0.81	0.34	mg/Kg	☼	12/13/23 08:00	12/28/23 13:14	1
Selenium	ND		1.1	0.37	mg/Kg	☼	12/13/23 08:00	12/28/23 15:01	2
Zinc	40		11	2.5	mg/Kg	☼	12/13/23 08:00	12/28/23 11:46	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	35000		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	4.7		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	21		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	4.1		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	20000		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	68		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	430		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	0.75		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	380		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	48000		110	17	mg/Kg	☼	12/13/23 08:00	12/29/23 11:02	10
Antimony	5.8		3.2	0.15	mg/Kg	☼	12/13/23 08:00	12/29/23 12:33	1
Arsenic	20		0.54	0.32	mg/Kg	☼	12/13/23 08:00	12/29/23 12:33	1
Cadmium	3.2		0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/29/23 12:33	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-2-2.5'
Date Collected: 10/30/23 11:00
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-4
Matrix: Solid
Percent Solids: 92.5

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	20000		11	8.9	mg/Kg	☼	12/13/23 08:00	12/29/23 14:13	2
Lead	67		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/29/23 14:13	2
Manganese	340		0.81	0.34	mg/Kg	☼	12/13/23 08:00	12/29/23 12:33	1
Selenium	1.1		0.54	0.18	mg/Kg	☼	12/13/23 08:00	12/29/23 12:33	1
Zinc	470		11	2.5	mg/Kg	☼	12/13/23 08:00	12/29/23 11:02	10

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-2-3.0'

Date Collected: 10/30/23 11:05
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-5

Matrix: Solid
Percent Solids: 93.0

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		43	6.9	mg/Kg	☼	12/04/23 08:00	12/20/23 12:13	4
Antimony	ND		13	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 12:13	4
Arsenic	ND		2.2	0.56	mg/Kg	☼	12/04/23 08:00	12/20/23 12:13	4
Cadmium	ND		1.1	0.069	mg/Kg	☼	12/04/23 08:00	12/20/23 12:13	4
Iron	**23**		22	12	mg/Kg	☼	12/04/23 08:00	12/20/23 12:13	4
Lead	ND		2.2	0.47	mg/Kg	☼	12/04/23 08:00	12/20/23 12:13	4
Manganese	**0.22**	**J**	3.2	0.13	mg/Kg	☼	12/04/23 08:00	12/20/23 12:13	4
Selenium	ND		2.2	0.73	mg/Kg	☼	12/04/23 08:00	12/20/23 12:13	4
Zinc	ND		4.3	1.0	mg/Kg	☼	12/04/23 08:00	12/20/23 12:13	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		32	5.2	mg/Kg	☼	12/05/23 08:00	12/20/23 13:57	3
Antimony	ND		9.7	0.90	mg/Kg	☼	12/05/23 08:00	12/20/23 13:57	3
Arsenic	ND		1.6	0.42	mg/Kg	☼	12/05/23 08:00	12/20/23 13:57	3
Cadmium	**0.86**		0.81	0.035	mg/Kg	☼	12/05/23 08:00	12/20/23 13:57	3
Iron	ND		16	9.4	mg/Kg	☼	12/05/23 08:00	12/20/23 13:57	3
Lead	**0.61**	**J**	1.6	0.35	mg/Kg	☼	12/05/23 08:00	12/20/23 13:57	3
Manganese	**6.1**		2.4	0.90	mg/Kg	☼	12/05/23 08:00	12/20/23 13:57	3
Selenium	ND		1.6	0.55	mg/Kg	☼	12/05/23 08:00	12/20/23 13:57	3
Zinc	**5.2**		3.2	0.65	mg/Kg	☼	12/05/23 08:00	12/20/23 13:57	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**530**		11	2.3	mg/Kg	☼	12/06/23 08:00	12/21/23 13:49	1
Antimony	ND		3.2	0.30	mg/Kg	☼	12/06/23 08:00	12/21/23 13:49	1
Arsenic	**0.55**		0.54	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 13:49	1
Cadmium	**0.19**	**J**	0.27	0.012	mg/Kg	☼	12/06/23 08:00	12/21/23 13:49	1
Iron	**210**		5.4	3.1	mg/Kg	☼	12/06/23 08:00	12/21/23 13:49	1
Lead	**1.0**		0.54	0.12	mg/Kg	☼	12/06/23 08:00	12/21/23 13:49	1
Manganese	**200**	**B**	0.81	0.029	mg/Kg	☼	12/06/23 08:00	12/21/23 13:49	1
Selenium	ND		0.54	0.18	mg/Kg	☼	12/06/23 08:00	12/21/23 13:49	1
Zinc	**13**	**B**	1.1	0.11	mg/Kg	☼	12/06/23 08:00	12/21/23 13:49	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2100**		11	1.7	mg/Kg	☼	12/12/23 08:00	12/27/23 13:14	1
Antimony	ND		3.2	0.48	mg/Kg	☼	12/12/23 08:00	12/27/23 13:14	1
Arsenic	**2.3**		0.54	0.24	mg/Kg	☼	12/12/23 08:00	12/27/23 13:14	1
Cadmium	**1.8**		0.27	0.012	mg/Kg	☼	12/12/23 08:00	12/27/23 13:14	1
Iron	**4200**		5.4	3.1	mg/Kg	☼	12/12/23 08:00	12/27/23 13:14	1
Lead	**21**		0.54	0.12	mg/Kg	☼	12/12/23 08:00	12/27/23 13:14	1
Manganese	**82**		0.81	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 13:14	1
Selenium	ND		0.54	0.51	mg/Kg	☼	12/12/23 08:00	12/27/23 13:14	1
Zinc	**100**	**B**	1.1	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 13:14	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**72**	**J**	160	25	mg/Kg	☼	12/13/23 08:00	12/27/23 14:59	5
Antimony	ND		48	4.5	mg/Kg	☼	12/13/23 08:00	12/27/23 14:59	5

Client Sample ID: TP-2-3.0'

Date Collected: 10/30/23 11:05
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-5

Matrix: Solid
Percent Solids: 93.0

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.0	J	8.1	2.0	mg/Kg	☼	12/13/23 08:00	12/27/23 14:59	5
Cadmium	0.40	J	4.0	0.17	mg/Kg	☼	12/13/23 08:00	12/27/23 14:59	5
Iron	ND		81	47	mg/Kg	☼	12/13/23 08:00	12/27/23 14:59	5
Lead	3.3	J	8.1	1.8	mg/Kg	☼	12/13/23 08:00	12/27/23 14:59	5
Manganese	11	J	12	2.0	mg/Kg	☼	12/13/23 08:00	12/27/23 14:59	5
Selenium	ND		8.1	2.8	mg/Kg	☼	12/13/23 08:00	12/27/23 14:59	5
Zinc	17		16	1.6	mg/Kg	☼	12/13/23 08:00	12/27/23 14:59	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	12000		11	1.7	mg/Kg	☼	12/12/23 12:00	12/27/23 16:44	1
Antimony	2.5	J	3.2	0.30	mg/Kg	☼	12/12/23 12:00	12/27/23 16:44	1
Arsenic	8.3		0.54	0.16	mg/Kg	☼	12/12/23 12:00	12/27/23 16:44	1
Cadmium	0.41		0.27	0.012	mg/Kg	☼	12/12/23 12:00	12/27/23 16:44	1
Iron	12000		5.4	3.1	mg/Kg	☼	12/12/23 12:00	12/27/23 16:44	1
Lead	10		0.54	0.12	mg/Kg	☼	12/12/23 12:00	12/27/23 16:44	1
Manganese	67		0.81	0.27	mg/Kg	☼	12/12/23 12:00	12/27/23 16:44	1
Selenium	0.67		0.54	0.18	mg/Kg	☼	12/12/23 12:00	12/27/23 16:44	1
Zinc	170		1.1	0.11	mg/Kg	☼	12/12/23 12:00	12/27/23 16:44	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	18000		110	17	mg/Kg	☼	12/13/23 08:00	12/28/23 11:55	10
Antimony	2.1	J	3.2	0.15	mg/Kg	☼	12/13/23 08:00	12/28/23 13:24	1
Arsenic	5.5		1.1	0.65	mg/Kg	☼	12/13/23 08:00	12/28/23 15:11	2
Cadmium	0.11	J	0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/28/23 13:24	1
Iron	5300		5.4	4.4	mg/Kg	☼	12/13/23 08:00	12/28/23 13:24	1
Lead	4.0		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/28/23 15:11	2
Manganese	47		0.81	0.33	mg/Kg	☼	12/13/23 08:00	12/28/23 13:24	1
Selenium	0.89	J	1.1	0.37	mg/Kg	☼	12/13/23 08:00	12/28/23 15:11	2
Zinc	37		11	2.5	mg/Kg	☼	12/13/23 08:00	12/28/23 11:55	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	33000		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	4.6		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	19		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	3.7		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	22000		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	40		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	410		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	1.6		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	340		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	45000		110	17	mg/Kg	☼	12/13/23 08:00	12/29/23 11:12	10
Antimony	4.2		3.2	0.15	mg/Kg	☼	12/13/23 08:00	12/29/23 12:44	1
Arsenic	14		0.54	0.32	mg/Kg	☼	12/13/23 08:00	12/29/23 12:44	1
Cadmium	3.1		0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/29/23 12:44	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-2-3.0'
Date Collected: 10/30/23 11:05
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-5
Matrix: Solid
Percent Solids: 93.0

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	20000		11	8.8	mg/Kg	☼	12/13/23 08:00	12/29/23 14:23	2
Lead	37		1.1	0.24	mg/Kg	☼	12/13/23 08:00	12/29/23 14:23	2
Manganese	330		0.81	0.33	mg/Kg	☼	12/13/23 08:00	12/29/23 12:44	1
Selenium	1.2		0.54	0.18	mg/Kg	☼	12/13/23 08:00	12/29/23 12:44	1
Zinc	420		11	2.5	mg/Kg	☼	12/13/23 08:00	12/29/23 11:12	10

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-2-3.5'

Date Collected: 10/30/23 11:10
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-6

Matrix: Solid
Percent Solids: 93.7

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		43	6.8	mg/Kg	☼	12/04/23 08:00	12/20/23 12:32	4
Antimony	ND		13	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 12:32	4
Arsenic	ND		2.1	0.56	mg/Kg	☼	12/04/23 08:00	12/20/23 12:32	4
Cadmium	ND		1.1	0.068	mg/Kg	☼	12/04/23 08:00	12/20/23 12:32	4
Iron	ND		21	12	mg/Kg	☼	12/04/23 08:00	12/20/23 12:32	4
Lead	ND		2.1	0.47	mg/Kg	☼	12/04/23 08:00	12/20/23 12:32	4
Manganese	ND		3.2	0.13	mg/Kg	☼	12/04/23 08:00	12/20/23 12:32	4
Selenium	ND		2.1	0.73	mg/Kg	☼	12/04/23 08:00	12/20/23 12:32	4
Zinc	ND		4.3	1.0	mg/Kg	☼	12/04/23 08:00	12/20/23 12:32	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		32	5.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:17	3
Antimony	ND		9.6	0.90	mg/Kg	☼	12/05/23 08:00	12/20/23 14:17	3
Arsenic	ND		1.6	0.42	mg/Kg	☼	12/05/23 08:00	12/20/23 14:17	3
Cadmium	**0.99**		0.80	0.035	mg/Kg	☼	12/05/23 08:00	12/20/23 14:17	3
Iron	ND		16	9.3	mg/Kg	☼	12/05/23 08:00	12/20/23 14:17	3
Lead	**0.70**	**J**	1.6	0.35	mg/Kg	☼	12/05/23 08:00	12/20/23 14:17	3
Manganese	**11**		2.4	0.90	mg/Kg	☼	12/05/23 08:00	12/20/23 14:17	3
Selenium	ND		1.6	0.54	mg/Kg	☼	12/05/23 08:00	12/20/23 14:17	3
Zinc	**5.4**		3.2	0.64	mg/Kg	☼	12/05/23 08:00	12/20/23 14:17	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**500**		11	2.2	mg/Kg	☼	12/06/23 08:00	12/21/23 14:09	1
Antimony	ND		3.2	0.30	mg/Kg	☼	12/06/23 08:00	12/21/23 14:09	1
Arsenic	**0.47**	**J**	0.53	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 14:09	1
Cadmium	**0.12**	**J**	0.27	0.012	mg/Kg	☼	12/06/23 08:00	12/21/23 14:09	1
Iron	**180**		5.3	3.1	mg/Kg	☼	12/06/23 08:00	12/21/23 14:09	1
Lead	**0.67**		0.53	0.12	mg/Kg	☼	12/06/23 08:00	12/21/23 14:09	1
Manganese	**160**	**B**	0.80	0.029	mg/Kg	☼	12/06/23 08:00	12/21/23 14:09	1
Selenium	ND		0.53	0.18	mg/Kg	☼	12/06/23 08:00	12/21/23 14:09	1
Zinc	**11**	**B**	1.1	0.11	mg/Kg	☼	12/06/23 08:00	12/21/23 14:09	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2100**		11	1.7	mg/Kg	☼	12/12/23 08:00	12/27/23 13:34	1
Antimony	ND		3.2	0.48	mg/Kg	☼	12/12/23 08:00	12/27/23 13:34	1
Arsenic	**2.7**		0.53	0.23	mg/Kg	☼	12/12/23 08:00	12/27/23 13:34	1
Cadmium	**1.7**		0.27	0.012	mg/Kg	☼	12/12/23 08:00	12/27/23 13:34	1
Iron	**4600**		5.3	3.1	mg/Kg	☼	12/12/23 08:00	12/27/23 13:34	1
Lead	**23**		0.53	0.12	mg/Kg	☼	12/12/23 08:00	12/27/23 13:34	1
Manganese	**69**		0.80	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 13:34	1
Selenium	ND		0.53	0.50	mg/Kg	☼	12/12/23 08:00	12/27/23 13:34	1
Zinc	**110**	**B**	1.1	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 13:34	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**150**	**J**	160	25	mg/Kg	☼	12/13/23 08:00	12/27/23 15:19	5
Antimony	ND		48	4.5	mg/Kg	☼	12/13/23 08:00	12/27/23 15:19	5

Client Sample ID: TP-2-3.5'

Date Collected: 10/30/23 11:10
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-6

Matrix: Solid
Percent Solids: 93.7

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.3	J	8.0	2.0	mg/Kg	☼	12/13/23 08:00	12/27/23 15:19	5
Cadmium	0.38	J	4.0	0.17	mg/Kg	☼	12/13/23 08:00	12/27/23 15:19	5
Iron	50	J	80	47	mg/Kg	☼	12/13/23 08:00	12/27/23 15:19	5
Lead	4.6	J	8.0	1.8	mg/Kg	☼	12/13/23 08:00	12/27/23 15:19	5
Manganese	9.9	J	12	2.0	mg/Kg	☼	12/13/23 08:00	12/27/23 15:19	5
Selenium	ND		8.0	2.8	mg/Kg	☼	12/13/23 08:00	12/27/23 15:19	5
Zinc	20		16	1.5	mg/Kg	☼	12/13/23 08:00	12/27/23 15:19	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	13000		11	1.7	mg/Kg	☼	12/12/23 12:00	12/27/23 17:03	1
Antimony	3.3		3.2	0.30	mg/Kg	☼	12/12/23 12:00	12/27/23 17:03	1
Arsenic	12		0.53	0.16	mg/Kg	☼	12/12/23 12:00	12/27/23 17:03	1
Cadmium	0.47		0.27	0.012	mg/Kg	☼	12/12/23 12:00	12/27/23 17:03	1
Iron	13000		5.3	3.1	mg/Kg	☼	12/12/23 12:00	12/27/23 17:03	1
Lead	12		0.53	0.12	mg/Kg	☼	12/12/23 12:00	12/27/23 17:03	1
Manganese	65		0.80	0.27	mg/Kg	☼	12/12/23 12:00	12/27/23 17:03	1
Selenium	0.93		0.53	0.18	mg/Kg	☼	12/12/23 12:00	12/27/23 17:03	1
Zinc	180		1.1	0.11	mg/Kg	☼	12/12/23 12:00	12/27/23 17:03	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22000		110	17	mg/Kg	☼	12/13/23 08:00	12/28/23 12:15	10
Antimony	1.5	J	3.2	0.15	mg/Kg	☼	12/13/23 08:00	12/28/23 13:30	1
Arsenic	3.1		1.1	0.64	mg/Kg	☼	12/13/23 08:00	12/28/23 15:16	2
Cadmium	0.063	J	0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/28/23 13:30	1
Iron	2800		5.3	4.4	mg/Kg	☼	12/13/23 08:00	12/28/23 13:30	1
Lead	2.9		1.1	0.23	mg/Kg	☼	12/13/23 08:00	12/28/23 15:16	2
Manganese	44		0.80	0.33	mg/Kg	☼	12/13/23 08:00	12/28/23 13:30	1
Selenium	ND		1.1	0.36	mg/Kg	☼	12/13/23 08:00	12/28/23 15:16	2
Zinc	34		11	2.5	mg/Kg	☼	12/13/23 08:00	12/28/23 12:15	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	37000		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	4.8		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	20		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	3.8		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	20000		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	43		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	360		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	0.93		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	360		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	34000		110	17	mg/Kg	☼	12/13/23 08:00	12/29/23 11:32	10
Antimony	4.1		3.2	0.15	mg/Kg	☼	12/13/23 08:00	12/29/23 12:50	1
Arsenic	15		0.53	0.32	mg/Kg	☼	12/13/23 08:00	12/29/23 12:50	1
Cadmium	2.8		0.27	0.012	mg/Kg	☼	12/13/23 08:00	12/29/23 12:50	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-2-3.5'
Date Collected: 10/30/23 11:10
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-6
Matrix: Solid
Percent Solids: 93.7

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	13000		5.3	4.4	mg/Kg	☼	12/13/23 08:00	12/29/23 12:50	1
Lead	34		1.1	0.23	mg/Kg	☼	12/13/23 08:00	12/29/23 14:29	2
Manganese	260		0.80	0.33	mg/Kg	☼	12/13/23 08:00	12/29/23 12:50	1
Selenium	1.2		0.53	0.18	mg/Kg	☼	12/13/23 08:00	12/29/23 12:50	1
Zinc	340		11	2.5	mg/Kg	☼	12/13/23 08:00	12/29/23 11:32	10

Client Sample ID: DTP-1-1'

Date Collected: 11/02/23 09:30
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-7

Matrix: Solid
Percent Solids: 79.9

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50	8.0	mg/Kg	☼	12/04/23 08:00	12/20/23 12:37	4
Antimony	ND		15	1.4	mg/Kg	☼	12/04/23 08:00	12/20/23 12:37	4
Arsenic	ND		2.5	0.65	mg/Kg	☼	12/04/23 08:00	12/20/23 12:37	4
Cadmium	ND		1.3	0.080	mg/Kg	☼	12/04/23 08:00	12/20/23 12:37	4
Iron	ND		25	15	mg/Kg	☼	12/04/23 08:00	12/20/23 12:37	4
Lead	ND		2.5	0.55	mg/Kg	☼	12/04/23 08:00	12/20/23 12:37	4
Manganese	ND		3.8	0.16	mg/Kg	☼	12/04/23 08:00	12/20/23 12:37	4
Selenium	ND		2.5	0.85	mg/Kg	☼	12/04/23 08:00	12/20/23 12:37	4
Zinc	**4.3**	**J**	5.0	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 12:37	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		38	6.0	mg/Kg	☼	12/05/23 08:00	12/20/23 14:22	3
Antimony	ND		11	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:22	3
Arsenic	**1.2**	**J**	1.9	0.49	mg/Kg	☼	12/05/23 08:00	12/20/23 14:22	3
Cadmium	**0.29**	**J**	0.94	0.041	mg/Kg	☼	12/05/23 08:00	12/20/23 14:22	3
Iron	ND		19	11	mg/Kg	☼	12/05/23 08:00	12/20/23 14:22	3
Lead	ND		1.9	0.41	mg/Kg	☼	12/05/23 08:00	12/20/23 14:22	3
Manganese	**2.6**	**J**	2.8	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:22	3
Selenium	ND		1.9	0.64	mg/Kg	☼	12/05/23 08:00	12/20/23 14:22	3
Zinc	**44**		3.8	0.75	mg/Kg	☼	12/05/23 08:00	12/20/23 14:22	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**610**		13	2.6	mg/Kg	☼	12/06/23 08:00	12/21/23 14:14	1
Antimony	ND		3.8	0.35	mg/Kg	☼	12/06/23 08:00	12/21/23 14:14	1
Arsenic	**13**		0.63	0.16	mg/Kg	☼	12/06/23 08:00	12/21/23 14:14	1
Cadmium	**0.19**	**J**	0.31	0.014	mg/Kg	☼	12/06/23 08:00	12/21/23 14:14	1
Iron	**970**		6.3	3.6	mg/Kg	☼	12/06/23 08:00	12/21/23 14:14	1
Lead	**1.7**		0.63	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 14:14	1
Manganese	**280**	**B**	0.94	0.034	mg/Kg	☼	12/06/23 08:00	12/21/23 14:14	1
Selenium	ND		0.63	0.21	mg/Kg	☼	12/06/23 08:00	12/21/23 14:14	1
Zinc	**91**	**B**	1.3	0.13	mg/Kg	☼	12/06/23 08:00	12/21/23 14:14	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2600**		13	2.0	mg/Kg	☼	12/12/23 08:00	12/27/23 13:39	1
Antimony	ND		3.8	0.56	mg/Kg	☼	12/12/23 08:00	12/27/23 13:39	1
Arsenic	**4.2**		0.63	0.28	mg/Kg	☼	12/12/23 08:00	12/27/23 13:39	1
Cadmium	**0.45**		0.31	0.014	mg/Kg	☼	12/12/23 08:00	12/27/23 13:39	1
Iron	**4300**		6.3	3.6	mg/Kg	☼	12/12/23 08:00	12/27/23 13:39	1
Lead	**11**		0.63	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 13:39	1
Manganese	**78**		0.94	0.16	mg/Kg	☼	12/12/23 08:00	12/27/23 13:39	1
Selenium	ND		0.63	0.59	mg/Kg	☼	12/12/23 08:00	12/27/23 13:39	1
Zinc	**84**	**B**	1.3	0.20	mg/Kg	☼	12/12/23 08:00	12/27/23 13:39	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**110**	**J**	190	29	mg/Kg	☼	12/13/23 08:00	12/27/23 15:24	5
Antimony	ND		56	5.3	mg/Kg	☼	12/13/23 08:00	12/27/23 15:24	5

Client Sample ID: DTP-1-1'

Date Collected: 11/02/23 09:30
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-7

Matrix: Solid
Percent Solids: 79.9

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.4**	**J**	9.4	2.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:24	5
Cadmium	ND		4.7	0.20	mg/Kg	☼	12/13/23 08:00	12/27/23 15:24	5
Iron	ND		94	55	mg/Kg	☼	12/13/23 08:00	12/27/23 15:24	5
Lead	**3.7**	**J**	9.4	2.1	mg/Kg	☼	12/13/23 08:00	12/27/23 15:24	5
Manganese	**12**	**J**	14	2.3	mg/Kg	☼	12/13/23 08:00	12/27/23 15:24	5
Selenium	ND		9.4	3.3	mg/Kg	☼	12/13/23 08:00	12/27/23 15:24	5
Zinc	**13**	**J**	19	1.8	mg/Kg	☼	12/13/23 08:00	12/27/23 15:24	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**11000**		13	2.0	mg/Kg	☼	12/12/23 12:00	12/27/23 17:08	1
Antimony	**0.48**	**J**	3.8	0.35	mg/Kg	☼	12/12/23 12:00	12/27/23 17:08	1
Arsenic	**5.1**		0.63	0.19	mg/Kg	☼	12/12/23 12:00	12/27/23 17:08	1
Cadmium	ND		0.31	0.014	mg/Kg	☼	12/12/23 12:00	12/27/23 17:08	1
Iron	**14000**		6.3	3.6	mg/Kg	☼	12/12/23 12:00	12/27/23 17:08	1
Lead	**3.3**		0.63	0.14	mg/Kg	☼	12/12/23 12:00	12/27/23 17:08	1
Manganese	**80**		0.94	0.31	mg/Kg	☼	12/12/23 12:00	12/27/23 17:08	1
Selenium	ND		0.63	0.21	mg/Kg	☼	12/12/23 12:00	12/27/23 17:08	1
Zinc	**82**		1.3	0.13	mg/Kg	☼	12/12/23 12:00	12/27/23 17:08	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**26000**		130	20	mg/Kg	☼	12/13/23 08:00	12/28/23 12:20	10
Antimony	ND		3.8	0.18	mg/Kg	☼	12/13/23 08:00	12/28/23 13:35	1
Arsenic	**2.6**		1.3	0.75	mg/Kg	☼	12/13/23 08:00	12/28/23 15:21	2
Cadmium	ND		0.31	0.014	mg/Kg	☼	12/13/23 08:00	12/28/23 13:35	1
Iron	**6700**		6.3	5.1	mg/Kg	☼	12/13/23 08:00	12/28/23 13:35	1
Lead	**3.3**		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/28/23 15:21	2
Manganese	**120**		0.94	0.39	mg/Kg	☼	12/13/23 08:00	12/28/23 13:35	1
Selenium	ND		1.3	0.43	mg/Kg	☼	12/13/23 08:00	12/28/23 15:21	2
Zinc	**20**		13	2.9	mg/Kg	☼	12/13/23 08:00	12/28/23 12:20	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**41000**		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	**0.48**	**J**	3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	**30**		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	**0.93**		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	**26000**		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	**23**		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	**580**		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	ND		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	**340**		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**45000**		130	20	mg/Kg	☼	12/13/23 08:00	12/29/23 11:37	10
Antimony	**0.67**	**J**	3.8	0.18	mg/Kg	☼	12/13/23 08:00	12/29/23 12:55	1
Arsenic	**35**		0.63	0.38	mg/Kg	☼	12/13/23 08:00	12/29/23 12:55	1
Cadmium	**1.1**		0.31	0.014	mg/Kg	☼	12/13/23 08:00	12/29/23 12:55	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-1-1'
Date Collected: 11/02/23 09:30
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-7
Matrix: Solid
Percent Solids: 79.9

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	21000		6.3	5.1	mg/Kg	☼	12/13/23 08:00	12/29/23 12:55	1
Lead	24		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/29/23 14:34	2
Manganese	500		0.94	0.39	mg/Kg	☼	12/13/23 08:00	12/29/23 12:55	1
Selenium	ND		0.63	0.21	mg/Kg	☼	12/13/23 08:00	12/29/23 12:55	1
Zinc	410		13	2.9	mg/Kg	☼	12/13/23 08:00	12/29/23 11:37	10

Client Sample ID: DTP-2-2'

Date Collected: 11/02/23 09:35
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-8

Matrix: Solid
Percent Solids: 75.0

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		53	8.5	mg/Kg	☼	12/04/23 08:00	12/20/23 12:42	4
Antimony	ND		16	1.5	mg/Kg	☼	12/04/23 08:00	12/20/23 12:42	4
Arsenic	ND		2.7	0.69	mg/Kg	☼	12/04/23 08:00	12/20/23 12:42	4
Cadmium	ND		1.3	0.085	mg/Kg	☼	12/04/23 08:00	12/20/23 12:42	4
Iron	ND		27	15	mg/Kg	☼	12/04/23 08:00	12/20/23 12:42	4
Lead	ND		2.7	0.59	mg/Kg	☼	12/04/23 08:00	12/20/23 12:42	4
Manganese	ND		4.0	0.17	mg/Kg	☼	12/04/23 08:00	12/20/23 12:42	4
Selenium	ND		2.7	0.91	mg/Kg	☼	12/04/23 08:00	12/20/23 12:42	4
Zinc	ND		5.3	1.3	mg/Kg	☼	12/04/23 08:00	12/20/23 12:42	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7.8**	**J**	40	6.4	mg/Kg	☼	12/05/23 08:00	12/20/23 14:27	3
Antimony	ND		12	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:27	3
Arsenic	**1.6**	**J**	2.0	0.52	mg/Kg	☼	12/05/23 08:00	12/20/23 14:27	3
Cadmium	**0.67**	**J**	1.0	0.044	mg/Kg	☼	12/05/23 08:00	12/20/23 14:27	3
Iron	ND		20	12	mg/Kg	☼	12/05/23 08:00	12/20/23 14:27	3
Lead	**1.0**	**J**	2.0	0.44	mg/Kg	☼	12/05/23 08:00	12/20/23 14:27	3
Manganese	**42**		3.0	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:27	3
Selenium	ND		2.0	0.68	mg/Kg	☼	12/05/23 08:00	12/20/23 14:27	3
Zinc	**36**		4.0	0.80	mg/Kg	☼	12/05/23 08:00	12/20/23 14:27	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**500**		13	2.8	mg/Kg	☼	12/06/23 08:00	12/21/23 14:19	1
Antimony	**0.82**	**J**	4.0	0.37	mg/Kg	☼	12/06/23 08:00	12/21/23 14:19	1
Arsenic	**18**		0.67	0.17	mg/Kg	☼	12/06/23 08:00	12/21/23 14:19	1
Cadmium	**0.091**	**J**	0.33	0.015	mg/Kg	☼	12/06/23 08:00	12/21/23 14:19	1
Iron	**1000**		6.7	3.9	mg/Kg	☼	12/06/23 08:00	12/21/23 14:19	1
Lead	**0.97**		0.67	0.15	mg/Kg	☼	12/06/23 08:00	12/21/23 14:19	1
Manganese	**470**	**B**	1.0	0.036	mg/Kg	☼	12/06/23 08:00	12/21/23 14:19	1
Selenium	ND		0.67	0.23	mg/Kg	☼	12/06/23 08:00	12/21/23 14:19	1
Zinc	**54**	**B**	1.3	0.13	mg/Kg	☼	12/06/23 08:00	12/21/23 14:19	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2900**		13	2.1	mg/Kg	☼	12/12/23 08:00	12/27/23 13:44	1
Antimony	ND		4.0	0.60	mg/Kg	☼	12/12/23 08:00	12/27/23 13:44	1
Arsenic	**6.1**		0.67	0.29	mg/Kg	☼	12/12/23 08:00	12/27/23 13:44	1
Cadmium	**0.36**		0.33	0.015	mg/Kg	☼	12/12/23 08:00	12/27/23 13:44	1
Iron	**5000**		6.7	3.9	mg/Kg	☼	12/12/23 08:00	12/27/23 13:44	1
Lead	**13**		0.67	0.15	mg/Kg	☼	12/12/23 08:00	12/27/23 13:44	1
Manganese	**140**		1.0	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 13:44	1
Selenium	ND		0.67	0.63	mg/Kg	☼	12/12/23 08:00	12/27/23 13:44	1
Zinc	**82**	**B**	1.3	0.21	mg/Kg	☼	12/12/23 08:00	12/27/23 13:44	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**36**	**J**	200	31	mg/Kg	☼	12/13/23 08:00	12/27/23 15:29	5
Antimony	ND		60	5.6	mg/Kg	☼	12/13/23 08:00	12/27/23 15:29	5

Client Sample ID: DTP-2-2'

Date Collected: 11/02/23 09:35
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-8

Matrix: Solid
Percent Solids: 75.0

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	3.6	J	10	2.5	mg/Kg	☼	12/13/23 08:00	12/27/23 15:29	5
Cadmium	ND		5.0	0.21	mg/Kg	☼	12/13/23 08:00	12/27/23 15:29	5
Iron	ND		100	59	mg/Kg	☼	12/13/23 08:00	12/27/23 15:29	5
Lead	2.4	J	10	2.2	mg/Kg	☼	12/13/23 08:00	12/27/23 15:29	5
Manganese	14	J	15	2.5	mg/Kg	☼	12/13/23 08:00	12/27/23 15:29	5
Selenium	ND		10	3.5	mg/Kg	☼	12/13/23 08:00	12/27/23 15:29	5
Zinc	11	J	20	1.9	mg/Kg	☼	12/13/23 08:00	12/27/23 15:29	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9100		13	2.1	mg/Kg	☼	12/12/23 12:00	12/27/23 17:13	1
Antimony	0.79	J	4.0	0.37	mg/Kg	☼	12/12/23 12:00	12/27/23 17:13	1
Arsenic	4.9		0.67	0.20	mg/Kg	☼	12/12/23 12:00	12/27/23 17:13	1
Cadmium	ND		0.33	0.015	mg/Kg	☼	12/12/23 12:00	12/27/23 17:13	1
Iron	12000		6.7	3.9	mg/Kg	☼	12/12/23 12:00	12/27/23 17:13	1
Lead	3.4		0.67	0.15	mg/Kg	☼	12/12/23 12:00	12/27/23 17:13	1
Manganese	78		1.0	0.33	mg/Kg	☼	12/12/23 12:00	12/27/23 17:13	1
Selenium	ND		0.67	0.23	mg/Kg	☼	12/12/23 12:00	12/27/23 17:13	1
Zinc	68		1.3	0.13	mg/Kg	☼	12/12/23 12:00	12/27/23 17:13	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	29000		130	21	mg/Kg	☼	12/13/23 08:00	12/28/23 12:25	10
Antimony	0.26	J	4.0	0.19	mg/Kg	☼	12/13/23 08:00	12/28/23 13:40	1
Arsenic	2.3		1.3	0.80	mg/Kg	☼	12/13/23 08:00	12/28/23 15:26	2
Cadmium	ND		0.33	0.015	mg/Kg	☼	12/13/23 08:00	12/28/23 13:40	1
Iron	6800		6.7	5.5	mg/Kg	☼	12/13/23 08:00	12/28/23 13:40	1
Lead	3.3		1.3	0.29	mg/Kg	☼	12/13/23 08:00	12/28/23 15:26	2
Manganese	120		1.0	0.41	mg/Kg	☼	12/13/23 08:00	12/28/23 13:40	1
Selenium	ND		1.3	0.45	mg/Kg	☼	12/13/23 08:00	12/28/23 15:26	2
Zinc	21		13	3.1	mg/Kg	☼	12/13/23 08:00	12/28/23 12:25	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	42000		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	1.9	J	3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	37		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	1.1		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	25000		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	24		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	860		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	ND		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	270		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	42000		130	21	mg/Kg	☼	12/13/23 08:00	12/29/23 11:42	10
Antimony	3.0	J	4.0	0.19	mg/Kg	☼	12/13/23 08:00	12/29/23 13:01	1
Arsenic	34		0.67	0.40	mg/Kg	☼	12/13/23 08:00	12/29/23 13:01	1
Cadmium	1.2		0.33	0.015	mg/Kg	☼	12/13/23 08:00	12/29/23 13:01	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-2-2'
Date Collected: 11/02/23 09:35
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-8
Matrix: Solid
Percent Solids: 75.0

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	19000		6.7	5.5	mg/Kg	☼	12/13/23 08:00	12/29/23 13:01	1
Lead	22		1.3	0.29	mg/Kg	☼	12/13/23 08:00	12/29/23 14:40	2
Manganese	770		1.0	0.41	mg/Kg	☼	12/13/23 08:00	12/29/23 13:01	1
Selenium	ND		0.67	0.23	mg/Kg	☼	12/13/23 08:00	12/29/23 13:01	1
Zinc	270		13	3.1	mg/Kg	☼	12/13/23 08:00	12/29/23 11:42	10

Client Sample ID: DTP-3-3'

Date Collected: 11/02/23 09:40
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-9

Matrix: Solid
Percent Solids: 77.2

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		52	8.3	mg/Kg	☼	12/04/23 08:00	12/20/23 12:47	4
Antimony	ND		16	1.5	mg/Kg	☼	12/04/23 08:00	12/20/23 12:47	4
Arsenic	**3.4**		2.6	0.67	mg/Kg	☼	12/04/23 08:00	12/20/23 12:47	4
Cadmium	ND		1.3	0.083	mg/Kg	☼	12/04/23 08:00	12/20/23 12:47	4
Iron	ND		26	15	mg/Kg	☼	12/04/23 08:00	12/20/23 12:47	4
Lead	ND		2.6	0.57	mg/Kg	☼	12/04/23 08:00	12/20/23 12:47	4
Manganese	ND		3.9	0.16	mg/Kg	☼	12/04/23 08:00	12/20/23 12:47	4
Selenium	ND		2.6	0.88	mg/Kg	☼	12/04/23 08:00	12/20/23 12:47	4
Zinc	**4.0**	**J**	5.2	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 12:47	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		39	6.2	mg/Kg	☼	12/05/23 08:00	12/20/23 14:32	3
Antimony	ND		12	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:32	3
Arsenic	**13**		1.9	0.51	mg/Kg	☼	12/05/23 08:00	12/20/23 14:32	3
Cadmium	**1.6**		0.97	0.043	mg/Kg	☼	12/05/23 08:00	12/20/23 14:32	3
Iron	ND		19	11	mg/Kg	☼	12/05/23 08:00	12/20/23 14:32	3
Lead	**5.2**		1.9	0.43	mg/Kg	☼	12/05/23 08:00	12/20/23 14:32	3
Manganese	**47**		2.9	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:32	3
Selenium	ND		1.9	0.66	mg/Kg	☼	12/05/23 08:00	12/20/23 14:32	3
Zinc	**160**		3.9	0.78	mg/Kg	☼	12/05/23 08:00	12/20/23 14:32	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**380**		13	2.7	mg/Kg	☼	12/06/23 08:00	12/21/23 14:25	1
Antimony	**3.3**	**J**	3.9	0.36	mg/Kg	☼	12/06/23 08:00	12/21/23 14:25	1
Arsenic	**210**		0.65	0.17	mg/Kg	☼	12/06/23 08:00	12/21/23 14:25	1
Cadmium	**0.18**	**J**	0.32	0.014	mg/Kg	☼	12/06/23 08:00	12/21/23 14:25	1
Iron	**2300**		6.5	3.8	mg/Kg	☼	12/06/23 08:00	12/21/23 14:25	1
Lead	**5.3**		0.65	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 14:25	1
Manganese	**590**	**B**	0.97	0.035	mg/Kg	☼	12/06/23 08:00	12/21/23 14:25	1
Selenium	ND		0.65	0.22	mg/Kg	☼	12/06/23 08:00	12/21/23 14:25	1
Zinc	**230**	**B**	1.3	0.13	mg/Kg	☼	12/06/23 08:00	12/21/23 14:25	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**2700**		13	2.1	mg/Kg	☼	12/12/23 08:00	12/27/23 13:48	1
Antimony	ND		3.9	0.58	mg/Kg	☼	12/12/23 08:00	12/27/23 13:48	1
Arsenic	**48**		0.65	0.28	mg/Kg	☼	12/12/23 08:00	12/27/23 13:48	1
Cadmium	**0.82**		0.32	0.014	mg/Kg	☼	12/12/23 08:00	12/27/23 13:48	1
Iron	**5700**		6.5	3.8	mg/Kg	☼	12/12/23 08:00	12/27/23 13:48	1
Lead	**59**		0.65	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 13:48	1
Manganese	**310**		0.97	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 13:48	1
Selenium	**0.61**	**J B**	0.65	0.61	mg/Kg	☼	12/12/23 08:00	12/27/23 13:48	1
Zinc	**360**	**B**	1.3	0.21	mg/Kg	☼	12/12/23 08:00	12/27/23 13:48	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**46**	**J**	190	30	mg/Kg	☼	12/13/23 08:00	12/27/23 15:34	5
Antimony	ND		58	5.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:34	5

Client Sample ID: DTP-3-3'

Date Collected: 11/02/23 09:40
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-9

Matrix: Solid
Percent Solids: 77.2

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**14**		9.7	2.5	mg/Kg	☼	12/13/23 08:00	12/27/23 15:34	5
Cadmium	ND		4.9	0.21	mg/Kg	☼	12/13/23 08:00	12/27/23 15:34	5
Iron	ND		97	57	mg/Kg	☼	12/13/23 08:00	12/27/23 15:34	5
Lead	**6.0**	**J**	9.7	2.1	mg/Kg	☼	12/13/23 08:00	12/27/23 15:34	5
Manganese	**28**		15	2.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:34	5
Selenium	ND		9.7	3.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:34	5
Zinc	**48**		19	1.9	mg/Kg	☼	12/13/23 08:00	12/27/23 15:34	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**9000**		13	2.1	mg/Kg	☼	12/12/23 12:00	12/27/23 17:18	1
Antimony	**2.6**	**J**	3.9	0.36	mg/Kg	☼	12/12/23 12:00	12/27/23 17:18	1
Arsenic	**24**		0.65	0.19	mg/Kg	☼	12/12/23 12:00	12/27/23 17:18	1
Cadmium	ND		0.32	0.014	mg/Kg	☼	12/12/23 12:00	12/27/23 17:18	1
Iron	**12000**		6.5	3.8	mg/Kg	☼	12/12/23 12:00	12/27/23 17:18	1
Lead	**7.7**		0.65	0.14	mg/Kg	☼	12/12/23 12:00	12/27/23 17:18	1
Manganese	**98**		0.97	0.32	mg/Kg	☼	12/12/23 12:00	12/27/23 17:18	1
Selenium	ND		0.65	0.22	mg/Kg	☼	12/12/23 12:00	12/27/23 17:18	1
Zinc	**90**		1.3	0.13	mg/Kg	☼	12/12/23 12:00	12/27/23 17:18	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**28000**		130	21	mg/Kg	☼	12/13/23 08:00	12/28/23 12:30	10
Antimony	**1.1**	**J**	3.9	0.18	mg/Kg	☼	12/13/23 08:00	12/28/23 14:00	1
Arsenic	**6.8**		1.3	0.78	mg/Kg	☼	12/13/23 08:00	12/28/23 15:46	2
Cadmium	ND		0.32	0.014	mg/Kg	☼	12/13/23 08:00	12/28/23 14:00	1
Iron	**7200**		6.5	5.3	mg/Kg	☼	12/13/23 08:00	12/28/23 14:00	1
Lead	**4.0**		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/28/23 15:46	2
Manganese	**120**		0.97	0.40	mg/Kg	☼	12/13/23 08:00	12/28/23 14:00	1
Selenium	ND		1.3	0.44	mg/Kg	☼	12/13/23 08:00	12/28/23 15:46	2
Zinc	**26**		13	3.0	mg/Kg	☼	12/13/23 08:00	12/28/23 12:30	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**40000**		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	**7.0**		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	**320**		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	**2.6**		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	**27000**		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	**88**		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	**1200**		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	**0.61**		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	**910**		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**36000**		130	21	mg/Kg	☼	12/13/23 08:00	12/29/23 11:47	10
Antimony	**10**		3.9	0.18	mg/Kg	☼	12/13/23 08:00	12/29/23 13:21	1
Arsenic	**350**		0.65	0.39	mg/Kg	☼	12/13/23 08:00	12/29/23 13:21	1
Cadmium	**3.2**		0.32	0.014	mg/Kg	☼	12/13/23 08:00	12/29/23 13:21	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-3-3'
Date Collected: 11/02/23 09:40
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-9
Matrix: Solid
Percent Solids: 77.2

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	21000		6.5	5.3	mg/Kg	☼	12/13/23 08:00	12/29/23 13:21	1
Lead	110		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/29/23 15:00	2
Manganese	1200		0.97	0.40	mg/Kg	☼	12/13/23 08:00	12/29/23 13:21	1
Selenium	ND		0.65	0.22	mg/Kg	☼	12/13/23 08:00	12/29/23 13:21	1
Zinc	1100		13	3.0	mg/Kg	☼	12/13/23 08:00	12/29/23 11:47	10

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-4-4'

Date Collected: 11/02/23 09:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-10

Matrix: Solid
Percent Solids: 78.0

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		51	8.2	mg/Kg	☼	12/04/23 08:00	12/20/23 12:52	4
Antimony	ND		15	1.4	mg/Kg	☼	12/04/23 08:00	12/20/23 12:52	4
Arsenic	**1.3**	**J**	2.6	0.67	mg/Kg	☼	12/04/23 08:00	12/20/23 12:52	4
Cadmium	ND		1.3	0.082	mg/Kg	☼	12/04/23 08:00	12/20/23 12:52	4
Iron	ND		26	15	mg/Kg	☼	12/04/23 08:00	12/20/23 12:52	4
Lead	ND		2.6	0.56	mg/Kg	☼	12/04/23 08:00	12/20/23 12:52	4
Manganese	ND		3.8	0.16	mg/Kg	☼	12/04/23 08:00	12/20/23 12:52	4
Selenium	ND		2.6	0.87	mg/Kg	☼	12/04/23 08:00	12/20/23 12:52	4
Zinc	ND		5.1	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 12:52	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		38	6.2	mg/Kg	☼	12/05/23 08:00	12/20/23 14:37	3
Antimony	ND		12	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:37	3
Arsenic	**3.0**		1.9	0.50	mg/Kg	☼	12/05/23 08:00	12/20/23 14:37	3
Cadmium	**0.75**	**J**	0.96	0.042	mg/Kg	☼	12/05/23 08:00	12/20/23 14:37	3
Iron	ND		19	11	mg/Kg	☼	12/05/23 08:00	12/20/23 14:37	3
Lead	**4.2**		1.9	0.42	mg/Kg	☼	12/05/23 08:00	12/20/23 14:37	3
Manganese	**30**		2.9	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:37	3
Selenium	ND		1.9	0.65	mg/Kg	☼	12/05/23 08:00	12/20/23 14:37	3
Zinc	**54**		3.8	0.77	mg/Kg	☼	12/05/23 08:00	12/20/23 14:37	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**200**		13	2.7	mg/Kg	☼	12/06/23 08:00	12/21/23 14:30	1
Antimony	**1.8**	**J**	3.8	0.36	mg/Kg	☼	12/06/23 08:00	12/21/23 14:30	1
Arsenic	**48**		0.64	0.17	mg/Kg	☼	12/06/23 08:00	12/21/23 14:30	1
Cadmium	**0.019**	**J**	0.32	0.014	mg/Kg	☼	12/06/23 08:00	12/21/23 14:30	1
Iron	**900**		6.4	3.7	mg/Kg	☼	12/06/23 08:00	12/21/23 14:30	1
Lead	**0.59**	**J**	0.64	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 14:30	1
Manganese	**290**	**B**	0.96	0.035	mg/Kg	☼	12/06/23 08:00	12/21/23 14:30	1
Selenium	ND		0.64	0.22	mg/Kg	☼	12/06/23 08:00	12/21/23 14:30	1
Zinc	**72**	**B**	1.3	0.13	mg/Kg	☼	12/06/23 08:00	12/21/23 14:30	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1600**		13	2.1	mg/Kg	☼	12/12/23 08:00	12/27/23 13:53	1
Antimony	ND		3.8	0.58	mg/Kg	☼	12/12/23 08:00	12/27/23 13:53	1
Arsenic	**23**		0.64	0.28	mg/Kg	☼	12/12/23 08:00	12/27/23 13:53	1
Cadmium	**0.36**		0.32	0.014	mg/Kg	☼	12/12/23 08:00	12/27/23 13:53	1
Iron	**4400**		6.4	3.7	mg/Kg	☼	12/12/23 08:00	12/27/23 13:53	1
Lead	**28**		0.64	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 13:53	1
Manganese	**180**		0.96	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 13:53	1
Selenium	ND		0.64	0.60	mg/Kg	☼	12/12/23 08:00	12/27/23 13:53	1
Zinc	**200**	**B**	1.3	0.21	mg/Kg	☼	12/12/23 08:00	12/27/23 13:53	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**35**	**J**	190	30	mg/Kg	☼	12/13/23 08:00	12/27/23 15:39	5
Antimony	ND		58	5.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:39	5

Client Sample ID: DTP-4-4'

Date Collected: 11/02/23 09:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-10

Matrix: Solid
Percent Solids: 78.0

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**9.8**		9.6	2.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:39	5
Cadmium	ND		4.8	0.21	mg/Kg	☼	12/13/23 08:00	12/27/23 15:39	5
Iron	ND		96	56	mg/Kg	☼	12/13/23 08:00	12/27/23 15:39	5
Lead	**4.4**	**J**	9.6	2.1	mg/Kg	☼	12/13/23 08:00	12/27/23 15:39	5
Manganese	**2.8**	**J**	14	2.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:39	5
Selenium	ND		9.6	3.3	mg/Kg	☼	12/13/23 08:00	12/27/23 15:39	5
Zinc	**31**		19	1.9	mg/Kg	☼	12/13/23 08:00	12/27/23 15:39	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**9400**		13	2.1	mg/Kg	☼	12/12/23 12:00	12/27/23 17:24	1
Antimony	**2.6**	**J**	3.8	0.36	mg/Kg	☼	12/12/23 12:00	12/27/23 17:24	1
Arsenic	**14**		0.64	0.19	mg/Kg	☼	12/12/23 12:00	12/27/23 17:24	1
Cadmium	ND		0.32	0.014	mg/Kg	☼	12/12/23 12:00	12/27/23 17:24	1
Iron	**12000**		6.4	3.7	mg/Kg	☼	12/12/23 12:00	12/27/23 17:24	1
Lead	**9.4**		0.64	0.14	mg/Kg	☼	12/12/23 12:00	12/27/23 17:24	1
Manganese	**120**		0.96	0.32	mg/Kg	☼	12/12/23 12:00	12/27/23 17:24	1
Selenium	ND		0.64	0.22	mg/Kg	☼	12/12/23 12:00	12/27/23 17:24	1
Zinc	**100**		1.3	0.13	mg/Kg	☼	12/12/23 12:00	12/27/23 17:24	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**28000**		130	21	mg/Kg	☼	12/13/23 08:00	12/28/23 12:34	10
Antimony	**0.44**	**J**	3.8	0.18	mg/Kg	☼	12/13/23 08:00	12/28/23 14:05	1
Arsenic	**2.8**		1.3	0.77	mg/Kg	☼	12/13/23 08:00	12/28/23 15:51	2
Cadmium	ND		0.32	0.014	mg/Kg	☼	12/13/23 08:00	12/28/23 14:05	1
Iron	**5800**		6.4	5.3	mg/Kg	☼	12/13/23 08:00	12/28/23 14:05	1
Lead	**3.5**		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/28/23 15:51	2
Manganese	**110**		0.96	0.40	mg/Kg	☼	12/13/23 08:00	12/28/23 14:05	1
Selenium	ND		1.3	0.44	mg/Kg	☼	12/13/23 08:00	12/28/23 15:51	2
Zinc	**19**		13	2.9	mg/Kg	☼	12/13/23 08:00	12/28/23 12:34	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**39000**		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	**4.8**		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	**100**		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	**1.1**		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	**23000**		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	**51**		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	**740**		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	ND		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	**470**		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**35000**		130	21	mg/Kg	☼	12/13/23 08:00	12/29/23 11:51	10
Antimony	**4.5**		3.8	0.18	mg/Kg	☼	12/13/23 08:00	12/29/23 13:27	1
Arsenic	**64**		1.3	0.77	mg/Kg	☼	12/13/23 08:00	12/29/23 15:05	2
Cadmium	**1.1**		0.32	0.014	mg/Kg	☼	12/13/23 08:00	12/29/23 13:27	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-4-4'
Date Collected: 11/02/23 09:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-10
Matrix: Solid
Percent Solids: 78.0

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	17000		6.4	5.3	mg/Kg	☼	12/13/23 08:00	12/29/23 13:27	1
Lead	35		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/29/23 15:05	2
Manganese	530		0.96	0.40	mg/Kg	☼	12/13/23 08:00	12/29/23 13:27	1
Selenium	ND		1.3	0.44	mg/Kg	☼	12/13/23 08:00	12/29/23 15:05	2
Zinc	370		13	2.9	mg/Kg	☼	12/13/23 08:00	12/29/23 11:51	10

Client Sample ID: DTP-5-5'

Date Collected: 11/02/23 09:50
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-11

Matrix: Solid
Percent Solids: 78.6

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		51	8.1	mg/Kg	☼	12/04/23 08:00	12/20/23 12:57	4
Antimony	ND		15	1.4	mg/Kg	☼	12/04/23 08:00	12/20/23 12:57	4
Arsenic	**2.4**	**J**	2.5	0.66	mg/Kg	☼	12/04/23 08:00	12/20/23 12:57	4
Cadmium	ND		1.3	0.081	mg/Kg	☼	12/04/23 08:00	12/20/23 12:57	4
Iron	ND		25	15	mg/Kg	☼	12/04/23 08:00	12/20/23 12:57	4
Lead	ND		2.5	0.56	mg/Kg	☼	12/04/23 08:00	12/20/23 12:57	4
Manganese	ND		3.8	0.16	mg/Kg	☼	12/04/23 08:00	12/20/23 12:57	4
Selenium	ND		2.5	0.86	mg/Kg	☼	12/04/23 08:00	12/20/23 12:57	4
Zinc	**2.2**	**J**	5.1	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 12:57	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**7.2**	**J**	38	6.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:42	3
Antimony	ND		11	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:42	3
Arsenic	**5.5**		1.9	0.50	mg/Kg	☼	12/05/23 08:00	12/20/23 14:42	3
Cadmium	**1.2**		0.95	0.042	mg/Kg	☼	12/05/23 08:00	12/20/23 14:42	3
Iron	**11**	**J**	19	11	mg/Kg	☼	12/05/23 08:00	12/20/23 14:42	3
Lead	**4.1**		1.9	0.42	mg/Kg	☼	12/05/23 08:00	12/20/23 14:42	3
Manganese	**83**		2.9	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:42	3
Selenium	ND		1.9	0.65	mg/Kg	☼	12/05/23 08:00	12/20/23 14:42	3
Zinc	**160**		3.8	0.76	mg/Kg	☼	12/05/23 08:00	12/20/23 14:42	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**140**		13	2.7	mg/Kg	☼	12/06/23 08:00	12/21/23 14:35	1
Antimony	**2.3**	**J**	3.8	0.36	mg/Kg	☼	12/06/23 08:00	12/21/23 14:35	1
Arsenic	**130**		0.64	0.17	mg/Kg	☼	12/06/23 08:00	12/21/23 14:35	1
Cadmium	**0.16**	**J**	0.32	0.014	mg/Kg	☼	12/06/23 08:00	12/21/23 14:35	1
Iron	**1600**		6.4	3.7	mg/Kg	☼	12/06/23 08:00	12/21/23 14:35	1
Lead	**2.2**		0.64	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 14:35	1
Manganese	**850**	**B**	0.95	0.034	mg/Kg	☼	12/06/23 08:00	12/21/23 14:35	1
Selenium	ND		0.64	0.22	mg/Kg	☼	12/06/23 08:00	12/21/23 14:35	1
Zinc	**240**	**B**	1.3	0.13	mg/Kg	☼	12/06/23 08:00	12/21/23 14:35	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**150**		13	2.0	mg/Kg	☼	12/12/23 08:00	12/27/23 13:58	1
Antimony	**0.80**	**J**	3.8	0.57	mg/Kg	☼	12/12/23 08:00	12/27/23 13:58	1
Arsenic	**17**		0.64	0.28	mg/Kg	☼	12/12/23 08:00	12/27/23 13:58	1
Cadmium	**1.0**		0.32	0.014	mg/Kg	☼	12/12/23 08:00	12/27/23 13:58	1
Iron	**1500**		6.4	3.7	mg/Kg	☼	12/12/23 08:00	12/27/23 13:58	1
Lead	**44**		0.64	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 13:58	1
Manganese	**400**		0.95	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 13:58	1
Selenium	ND		0.64	0.60	mg/Kg	☼	12/12/23 08:00	12/27/23 13:58	1
Zinc	**200**	**B**	1.3	0.20	mg/Kg	☼	12/12/23 08:00	12/27/23 13:58	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**82**	**J**	190	30	mg/Kg	☼	12/13/23 08:00	12/27/23 15:44	5
Antimony	ND		57	5.3	mg/Kg	☼	12/13/23 08:00	12/27/23 15:44	5

Client Sample ID: DTP-5-5' Lab Sample ID: 140-34329-11

Date Collected: 11/02/23 09:50 **Matrix: Solid**
Date Received: 11/10/23 11:20 **Percent Solids: 78.6**

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	16		9.5	2.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:44	5
Cadmium	ND		4.8	0.20	mg/Kg	☼	12/13/23 08:00	12/27/23 15:44	5
Iron	ND		95	56	mg/Kg	☼	12/13/23 08:00	12/27/23 15:44	5
Lead	2.6	J	9.5	2.1	mg/Kg	☼	12/13/23 08:00	12/27/23 15:44	5
Manganese	7.1	J	14	2.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:44	5
Selenium	ND		9.5	3.3	mg/Kg	☼	12/13/23 08:00	12/27/23 15:44	5
Zinc	28		19	1.8	mg/Kg	☼	12/13/23 08:00	12/27/23 15:44	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	8600		13	2.0	mg/Kg	☼	12/12/23 12:00	12/27/23 17:29	1
Antimony	1.4	J	3.8	0.36	mg/Kg	☼	12/12/23 12:00	12/27/23 17:29	1
Arsenic	24		0.64	0.19	mg/Kg	☼	12/12/23 12:00	12/27/23 17:29	1
Cadmium	0.11	J	0.32	0.014	mg/Kg	☼	12/12/23 12:00	12/27/23 17:29	1
Iron	10000		6.4	3.7	mg/Kg	☼	12/12/23 12:00	12/27/23 17:29	1
Lead	12		0.64	0.14	mg/Kg	☼	12/12/23 12:00	12/27/23 17:29	1
Manganese	220		0.95	0.32	mg/Kg	☼	12/12/23 12:00	12/27/23 17:29	1
Selenium	1.5		0.64	0.22	mg/Kg	☼	12/12/23 12:00	12/27/23 17:29	1
Zinc	160		1.3	0.13	mg/Kg	☼	12/12/23 12:00	12/27/23 17:29	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	21000		130	20	mg/Kg	☼	12/13/23 08:00	12/28/23 12:39	10
Antimony	0.70	J	3.8	0.18	mg/Kg	☼	12/13/23 08:00	12/28/23 14:11	1
Arsenic	3.5		1.3	0.76	mg/Kg	☼	12/13/23 08:00	12/28/23 15:56	2
Cadmium	0.022	J	0.32	0.014	mg/Kg	☼	12/13/23 08:00	12/28/23 14:11	1
Iron	3700		6.4	5.2	mg/Kg	☼	12/13/23 08:00	12/28/23 14:11	1
Lead	3.6		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/28/23 15:56	2
Manganese	68		0.95	0.39	mg/Kg	☼	12/13/23 08:00	12/28/23 14:11	1
Selenium	ND		1.3	0.43	mg/Kg	☼	12/13/23 08:00	12/28/23 15:56	2
Zinc	23		13	2.9	mg/Kg	☼	12/13/23 08:00	12/28/23 12:39	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	5.2		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	200		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	2.6		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	17000		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	68		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	1600		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	1.5		0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	810		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22000		130	20	mg/Kg	☼	12/13/23 08:00	12/29/23 11:56	10
Antimony	2.1	J	3.8	0.18	mg/Kg	☼	12/13/23 08:00	12/29/23 13:32	1
Arsenic	41		1.3	0.76	mg/Kg	☼	12/13/23 08:00	12/29/23 15:11	2
Cadmium	0.60		0.32	0.014	mg/Kg	☼	12/13/23 08:00	12/29/23 13:32	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-5-5'
Date Collected: 11/02/23 09:50
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-11
Matrix: Solid
Percent Solids: 78.6

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**14000**		6.4	5.2	mg/Kg	☼	12/13/23 08:00	12/29/23 13:32	1
Lead	**18**		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/29/23 15:11	2
Manganese	**1000**		0.95	0.39	mg/Kg	☼	12/13/23 08:00	12/29/23 13:32	1
Selenium	ND		1.3	0.43	mg/Kg	☼	12/13/23 08:00	12/29/23 15:11	2
Zinc	**250**		13	2.9	mg/Kg	☼	12/13/23 08:00	12/29/23 11:56	10

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-6-6'
Date Collected: 11/02/23 09:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-12
Matrix: Solid
Percent Solids: 77.6

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		52	8.2	mg/Kg	☼	12/04/23 08:00	12/20/23 13:02	4
Antimony	ND		15	1.4	mg/Kg	☼	12/04/23 08:00	12/20/23 13:02	4
Arsenic	**2.8**		2.6	0.67	mg/Kg	☼	12/04/23 08:00	12/20/23 13:02	4
Cadmium	ND		1.3	0.082	mg/Kg	☼	12/04/23 08:00	12/20/23 13:02	4
Iron	ND		26	15	mg/Kg	☼	12/04/23 08:00	12/20/23 13:02	4
Lead	ND		2.6	0.57	mg/Kg	☼	12/04/23 08:00	12/20/23 13:02	4
Manganese	ND		3.9	0.16	mg/Kg	☼	12/04/23 08:00	12/20/23 13:02	4
Selenium	ND		2.6	0.88	mg/Kg	☼	12/04/23 08:00	12/20/23 13:02	4
Zinc	**5.2**		5.2	1.2	mg/Kg	☼	12/04/23 08:00	12/20/23 13:02	4

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		39	6.2	mg/Kg	☼	12/05/23 08:00	12/20/23 14:48	3
Antimony	ND		12	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:48	3
Arsenic	**8.1**		1.9	0.50	mg/Kg	☼	12/05/23 08:00	12/20/23 14:48	3
Cadmium	**2.0**		0.97	0.043	mg/Kg	☼	12/05/23 08:00	12/20/23 14:48	3
Iron	ND		19	11	mg/Kg	☼	12/05/23 08:00	12/20/23 14:48	3
Lead	**4.0**		1.9	0.43	mg/Kg	☼	12/05/23 08:00	12/20/23 14:48	3
Manganese	**37**		2.9	1.1	mg/Kg	☼	12/05/23 08:00	12/20/23 14:48	3
Selenium	ND		1.9	0.66	mg/Kg	☼	12/05/23 08:00	12/20/23 14:48	3
Zinc	**230**		3.9	0.77	mg/Kg	☼	12/05/23 08:00	12/20/23 14:48	3

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**200**		13	2.7	mg/Kg	☼	12/06/23 08:00	12/21/23 14:40	1
Antimony	**3.6**	**J**	3.9	0.36	mg/Kg	☼	12/06/23 08:00	12/21/23 14:40	1
Arsenic	**260**		0.64	0.17	mg/Kg	☼	12/06/23 08:00	12/21/23 14:40	1
Cadmium	**0.37**		0.32	0.014	mg/Kg	☼	12/06/23 08:00	12/21/23 14:40	1
Iron	**2800**		6.4	3.7	mg/Kg	☼	12/06/23 08:00	12/21/23 14:40	1
Lead	**6.0**		0.64	0.14	mg/Kg	☼	12/06/23 08:00	12/21/23 14:40	1
Manganese	**1400**	**B**	1.9	0.070	mg/Kg	☼	12/06/23 08:00	12/21/23 15:05	2
Selenium	ND		1.3	0.44	mg/Kg	☼	12/06/23 08:00	12/21/23 15:05	2
Zinc	**420**	**B**	1.3	0.13	mg/Kg	☼	12/06/23 08:00	12/21/23 14:40	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**1700**		13	2.1	mg/Kg	☼	12/12/23 08:00	12/27/23 14:03	1
Antimony	ND		3.9	0.58	mg/Kg	☼	12/12/23 08:00	12/27/23 14:03	1
Arsenic	**78**		0.64	0.28	mg/Kg	☼	12/12/23 08:00	12/27/23 14:03	1
Cadmium	**1.8**		0.32	0.014	mg/Kg	☼	12/12/23 08:00	12/27/23 14:03	1
Iron	**5200**		6.4	3.7	mg/Kg	☼	12/12/23 08:00	12/27/23 14:03	1
Lead	**93**		0.64	0.14	mg/Kg	☼	12/12/23 08:00	12/27/23 14:03	1
Manganese	**450**		0.97	0.17	mg/Kg	☼	12/12/23 08:00	12/27/23 14:03	1
Selenium	ND		0.64	0.61	mg/Kg	☼	12/12/23 08:00	12/27/23 14:03	1
Zinc	**420**	**B**	1.3	0.21	mg/Kg	☼	12/12/23 08:00	12/27/23 14:03	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		190	30	mg/Kg	☼	12/13/23 08:00	12/27/23 15:49	5
Antimony	ND		58	5.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:49	5

Client Sample ID: DTP-6-6' Lab Sample ID: 140-34329-12

Date Collected: 11/02/23 09:55 **Matrix: Solid**
Date Received: 11/10/23 11:20 **Percent Solids: 77.6**

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 5 (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	21		9.7	2.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:49	5
Cadmium	0.33	J	4.8	0.21	mg/Kg	☼	12/13/23 08:00	12/27/23 15:49	5
Iron	ND		97	57	mg/Kg	☼	12/13/23 08:00	12/27/23 15:49	5
Lead	6.0	J	9.7	2.1	mg/Kg	☼	12/13/23 08:00	12/27/23 15:49	5
Manganese	ND		14	2.4	mg/Kg	☼	12/13/23 08:00	12/27/23 15:49	5
Selenium	ND		9.7	3.3	mg/Kg	☼	12/13/23 08:00	12/27/23 15:49	5
Zinc	62		19	1.9	mg/Kg	☼	12/13/23 08:00	12/27/23 15:49	5

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	8300		13	2.1	mg/Kg	☼	12/12/23 12:00	12/27/23 17:34	1
Antimony	2.7	J	3.9	0.36	mg/Kg	☼	12/12/23 12:00	12/27/23 17:34	1
Arsenic	41		0.64	0.19	mg/Kg	☼	12/12/23 12:00	12/27/23 17:34	1
Cadmium	0.13	J	0.32	0.014	mg/Kg	☼	12/12/23 12:00	12/27/23 17:34	1
Iron	9800		6.4	3.7	mg/Kg	☼	12/12/23 12:00	12/27/23 17:34	1
Lead	17		0.64	0.14	mg/Kg	☼	12/12/23 12:00	12/27/23 17:34	1
Manganese	160		0.97	0.32	mg/Kg	☼	12/12/23 12:00	12/27/23 17:34	1
Selenium	0.32	J	0.64	0.22	mg/Kg	☼	12/12/23 12:00	12/27/23 17:34	1
Zinc	120		1.3	0.13	mg/Kg	☼	12/12/23 12:00	12/27/23 17:34	1

Method: SW846 6010B SEP - SEP Metals (ICP) - Step 7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	35000		130	21	mg/Kg	☼	12/13/23 08:00	12/28/23 12:44	10
Antimony	0.60	J	3.9	0.18	mg/Kg	☼	12/13/23 08:00	12/28/23 14:16	1
Arsenic	5.6		1.3	0.77	mg/Kg	☼	12/13/23 08:00	12/28/23 16:01	2
Cadmium	ND		0.32	0.014	mg/Kg	☼	12/13/23 08:00	12/28/23 14:16	1
Iron	5300		6.4	5.3	mg/Kg	☼	12/13/23 08:00	12/28/23 14:16	1
Lead	6.2		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/28/23 16:01	2
Manganese	100		0.97	0.40	mg/Kg	☼	12/13/23 08:00	12/28/23 14:16	1
Selenium	ND		1.3	0.44	mg/Kg	☼	12/13/23 08:00	12/28/23 16:01	2
Zinc	23		13	3.0	mg/Kg	☼	12/13/23 08:00	12/28/23 12:44	10

Method: SW846 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	45000		10	1.6	mg/Kg			01/03/24 12:27	1
Antimony	6.9		3.0	0.14	mg/Kg			01/03/24 12:27	1
Arsenic	420		0.50	0.13	mg/Kg			01/03/24 12:27	1
Cadmium	4.6		0.25	0.011	mg/Kg			01/03/24 12:27	1
Iron	23000		5.0	4.1	mg/Kg			01/03/24 12:27	1
Lead	130		0.50	0.11	mg/Kg			01/03/24 12:27	1
Manganese	2200		0.75	0.052	mg/Kg			01/03/24 12:27	1
Selenium	0.32	J	0.50	0.17	mg/Kg			01/03/24 12:27	1
Zinc	1300		1.0	0.10	mg/Kg			01/03/24 12:27	1

Method: SW846 6010B - SEP Metals (ICP) - Total

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	36000		130	21	mg/Kg	☼	12/13/23 08:00	12/29/23 12:01	10
Antimony	8.8		3.9	0.18	mg/Kg	☼	12/13/23 08:00	12/29/23 13:38	1
Arsenic	360		1.3	0.77	mg/Kg	☼	12/13/23 08:00	12/29/23 15:16	2
Cadmium	4.2		0.32	0.014	mg/Kg	☼	12/13/23 08:00	12/29/23 13:38	1

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-6-6'
Date Collected: 11/02/23 09:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-12
Matrix: Solid
Percent Solids: 77.6

Method: SW846 6010B - SEP Metals (ICP) - Total (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	18000		6.4	5.3	mg/Kg	☼	12/13/23 08:00	12/29/23 13:38	1
Lead	110		1.3	0.28	mg/Kg	☼	12/13/23 08:00	12/29/23 15:16	2
Manganese	2100		1.9	0.80	mg/Kg	☼	12/13/23 08:00	12/29/23 15:16	2
Selenium	0.69	J	1.3	0.44	mg/Kg	☼	12/13/23 08:00	12/29/23 15:16	2
Zinc	1500		13	3.0	mg/Kg	☼	12/13/23 08:00	12/29/23 12:01	10

Default Detection Limits

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Method: 6010B SEP - SEP Metals (ICP) - Step 1

Prep: 3010A

SEP: Exchangeable

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Cadmium	0.25	0.016	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Manganese	0.75	0.031	mg/Kg
Selenium	0.50	0.17	mg/Kg
Zinc	1.0	0.24	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 2

Prep: 3010A

SEP: Carbonate

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Manganese	0.75	0.28	mg/Kg
Selenium	0.50	0.17	mg/Kg
Zinc	1.0	0.20	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 3

Prep: 3010A

SEP: Non-Crystalline

Analyte	RL	MDL	Units
Aluminum	10	2.1	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Manganese	0.75	0.027	mg/Kg
Selenium	0.50	0.17	mg/Kg
Zinc	1.0	0.10	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.45	mg/Kg
Arsenic	0.50	0.22	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Manganese	0.75	0.13	mg/Kg
Selenium	0.50	0.47	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units
Zinc	1.0	0.16	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 5

Prep: 3010A

SEP: Organic-Bound

Analyte	RL	MDL	Units
Aluminum	30	4.7	mg/Kg
Antimony	9.0	0.84	mg/Kg
Arsenic	1.5	0.38	mg/Kg
Cadmium	0.75	0.032	mg/Kg
Iron	15	8.8	mg/Kg
Lead	1.5	0.33	mg/Kg
Manganese	2.3	0.37	mg/Kg
Selenium	1.5	0.52	mg/Kg
Zinc	3.0	0.29	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 6

SEP: Acid/Sulfide

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.28	mg/Kg
Arsenic	0.50	0.15	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Iron	5.0	2.9	mg/Kg
Lead	0.50	0.11	mg/Kg
Manganese	0.75	0.25	mg/Kg
Selenium	0.50	0.17	mg/Kg
Zinc	1.0	0.10	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Step 7

Prep: Residual

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.30	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Iron	5.0	4.1	mg/Kg
Lead	0.50	0.11	mg/Kg
Manganese	0.75	0.31	mg/Kg
Selenium	0.50	0.17	mg/Kg
Zinc	1.0	0.23	mg/Kg

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.13	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Iron	5.0	4.1	mg/Kg
Lead	0.50	0.11	mg/Kg

Default Detection Limits

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	RL	MDL	Units
Manganese	0.75	0.052	mg/Kg
Selenium	0.50	0.17	mg/Kg
Zinc	1.0	0.10	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Prep: Total

Analyte	RL	MDL	Units
Aluminum	10	1.6	mg/Kg
Antimony	3.0	0.14	mg/Kg
Arsenic	0.50	0.30	mg/Kg
Cadmium	0.25	0.011	mg/Kg
Iron	5.0	4.1	mg/Kg
Lead	0.50	0.11	mg/Kg
Manganese	0.75	0.31	mg/Kg
Selenium	0.50	0.17	mg/Kg
Zinc	1.0	0.23	mg/Kg

Method: 6010B - SEP Metals (ICP) - Total

Lab Sample ID: MB 140-80623/14-A
Matrix: Solid
Analysis Batch: 81885

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 80623

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		12/13/23 08:00	12/29/23 10:33	1
Antimony	ND		3.0	0.14	mg/Kg		12/13/23 08:00	12/29/23 10:33	1
Arsenic	ND		0.50	0.30	mg/Kg		12/13/23 08:00	12/29/23 10:33	1
Cadmium	ND		0.25	0.011	mg/Kg		12/13/23 08:00	12/29/23 10:33	1
Iron	ND		5.0	4.1	mg/Kg		12/13/23 08:00	12/29/23 10:33	1
Lead	ND		0.50	0.11	mg/Kg		12/13/23 08:00	12/29/23 10:33	1
Manganese	ND		0.75	0.31	mg/Kg		12/13/23 08:00	12/29/23 10:33	1
Selenium	ND		0.50	0.17	mg/Kg		12/13/23 08:00	12/29/23 10:33	1
Zinc	ND		1.0	0.23	mg/Kg		12/13/23 08:00	12/29/23 10:33	1

Lab Sample ID: LCS 140-80623/15-A
Matrix: Solid
Analysis Batch: 81885

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 80623

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	100	101		mg/Kg		101	80 - 120
Antimony	25.0	25.4		mg/Kg		102	80 - 125
Arsenic	5.00	5.11		mg/Kg		102	80 - 120
Cadmium	2.50	2.60		mg/Kg		104	80 - 125
Iron	50.0	54.1		mg/Kg		108	80 - 120
Lead	5.00	4.97		mg/Kg		99	80 - 120
Manganese	5.00	5.71		mg/Kg		114	80 - 120
Selenium	7.50	7.23		mg/Kg		96	80 - 120
Zinc	25.0	25.8		mg/Kg		103	80 - 125

Lab Sample ID: LCSD 140-80623/16-A
Matrix: Solid
Analysis Batch: 81885

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 80623

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	99.4		mg/Kg		99	80 - 120	2	30
Antimony	25.0	25.0		mg/Kg		100	80 - 125	2	30
Arsenic	5.00	5.04		mg/Kg		101	80 - 120	1	30
Cadmium	2.50	2.58		mg/Kg		103	80 - 125	1	30
Iron	50.0	53.4		mg/Kg		107	80 - 120	1	30
Lead	5.00	4.98		mg/Kg		100	80 - 120	0	30
Manganese	5.00	5.50		mg/Kg		110	80 - 120	4	30
Selenium	7.50	7.12		mg/Kg		95	80 - 120	2	30
Zinc	25.0	25.5		mg/Kg		102	80 - 125	1	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81885

Client Sample ID: TP-2-2.5'
Prep Type: Total/NA
Prep Batch: 80623

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	48000		48000		mg/Kg	☼	1	30
Zinc	470		479		mg/Kg	☼	2	30

Method: 6010B - SEP Metals (ICP) - Total (Continued)

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81885

Client Sample ID: TP-2-2.5'
Prep Type: Total/NA
Prep Batch: 80623

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Antimony	5.8			6.74		mg/Kg	☼			16	30
Arsenic	20			23.9		mg/Kg	☼			17	30
Cadmium	3.2			3.52		mg/Kg	☼			9	30
Manganese	340			363		mg/Kg	☼			6	30
Selenium	1.1			0.934		mg/Kg	☼			13	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81885

Client Sample ID: TP-2-2.5'
Prep Type: Total/NA
Prep Batch: 80623

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Iron	20000			20100		mg/Kg	☼			1	30
Lead	67			79.4		mg/Kg	☼			17	30

Method: 6010B SEP - SEP Metals (ICP)

Lab Sample ID: MB 140-80624/14-B ^4
Matrix: Solid
Analysis Batch: 81639

Client Sample ID: Method Blank
Prep Type: Step 1
Prep Batch: 80851

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		40	6.4	mg/Kg		12/04/23 08:00	12/20/23 15:43	4
Antimony	ND		12	1.1	mg/Kg		12/04/23 08:00	12/20/23 15:43	4
Arsenic	ND		2.0	0.52	mg/Kg		12/04/23 08:00	12/20/23 15:43	4
Cadmium	ND		1.0	0.064	mg/Kg		12/04/23 08:00	12/20/23 15:43	4
Iron	ND		20	12	mg/Kg		12/04/23 08:00	12/20/23 15:43	4
Lead	ND		2.0	0.44	mg/Kg		12/04/23 08:00	12/20/23 15:43	4
Manganese	ND		3.0	0.12	mg/Kg		12/04/23 08:00	12/20/23 15:43	4
Selenium	ND		2.0	0.68	mg/Kg		12/04/23 08:00	12/20/23 15:43	4
Zinc	ND		4.0	0.96	mg/Kg		12/04/23 08:00	12/20/23 15:43	4

Lab Sample ID: LCS 140-80624/15-B ^5
Matrix: Solid
Analysis Batch: 81639

Client Sample ID: Lab Control Sample
Prep Type: Step 1
Prep Batch: 80851

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Aluminum			100	85.8		mg/Kg		86	80 - 120		
Antimony			25.0	23.1		mg/Kg		92	80 - 120		
Arsenic			5.00	4.44		mg/Kg		89	80 - 120		
Cadmium			2.50	2.24		mg/Kg		90	80 - 120		
Iron			50.0	45.6		mg/Kg		91	80 - 120		
Lead			5.00	4.47		mg/Kg		89	80 - 120		
Manganese			5.00	4.57		mg/Kg		91	80 - 120		
Selenium			7.50	6.48		mg/Kg		86	80 - 120		
Zinc			25.0	23.1		mg/Kg		92	80 - 120		

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-80624/16-B ^5
Matrix: Solid
Analysis Batch: 81639

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 1
Prep Batch: 80851

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum			100	86.2		mg/Kg		86	80 - 120	0	30
Antimony			25.0	22.4		mg/Kg		90	80 - 120	3	30
Arsenic			5.00	4.57		mg/Kg		91	80 - 120	3	30
Cadmium			2.50	2.22		mg/Kg		89	80 - 120	1	30
Iron			50.0	45.1		mg/Kg		90	80 - 120	1	30
Lead			5.00	4.55		mg/Kg		91	80 - 120	2	30
Manganese			5.00	4.53		mg/Kg		91	80 - 120	1	30
Selenium			7.50	6.86		mg/Kg		92	80 - 120	6	30
Zinc			25.0	22.8		mg/Kg		91	80 - 120	1	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81639

Client Sample ID: TP-2-2.5'
Prep Type: Step 1
Prep Batch: 80851

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	ND			ND		mg/Kg	☼			NC	30
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	ND			ND		mg/Kg	☼			NC	30
Cadmium	ND			ND		mg/Kg	☼			NC	30
Iron	ND			ND		mg/Kg	☼			NC	30
Lead	ND			ND		mg/Kg	☼			NC	30
Manganese	ND			ND		mg/Kg	☼			NC	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Zinc	ND			1.06	J	mg/Kg	☼			NC	30

Lab Sample ID: MB 140-80895/14-B ^3
Matrix: Solid
Analysis Batch: 81639

Client Sample ID: Method Blank
Prep Type: Step 2
Prep Batch: 80950

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		12/05/23 08:00	12/20/23 13:17	3
Antimony	ND		9.0	0.84	mg/Kg		12/05/23 08:00	12/20/23 13:17	3
Arsenic	ND		1.5	0.39	mg/Kg		12/05/23 08:00	12/20/23 13:17	3
Cadmium	ND		0.75	0.033	mg/Kg		12/05/23 08:00	12/20/23 13:17	3
Iron	ND		15	8.7	mg/Kg		12/05/23 08:00	12/20/23 13:17	3
Lead	ND		1.5	0.33	mg/Kg		12/05/23 08:00	12/20/23 13:17	3
Manganese	ND		2.3	0.84	mg/Kg		12/05/23 08:00	12/20/23 13:17	3
Selenium	ND		1.5	0.51	mg/Kg		12/05/23 08:00	12/20/23 13:17	3
Zinc	ND		3.0	0.60	mg/Kg		12/05/23 08:00	12/20/23 13:17	3

Lab Sample ID: LCS 140-80895/15-B ^5
Matrix: Solid
Analysis Batch: 81639

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 80950

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Aluminum			100	ND		mg/Kg		2			
Antimony			25.0	20.1		mg/Kg		80	70 - 120		
Arsenic			5.00	3.73		mg/Kg		75	60 - 120		
Cadmium			2.50	2.38		mg/Kg		95	80 - 120		

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-80895/15-B ^5
Matrix: Solid
Analysis Batch: 81639

Client Sample ID: Lab Control Sample
Prep Type: Step 2
Prep Batch: 80950

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	50.0	ND		mg/Kg		7	
Lead	5.00	4.80		mg/Kg		96	70 - 120
Manganese	5.00	4.80		mg/Kg		96	80 - 120
Selenium	7.50	6.53		mg/Kg		87	70 - 120
Zinc	25.0	23.7		mg/Kg		95	80 - 120

Lab Sample ID: LCSD 140-80895/16-B ^5
Matrix: Solid
Analysis Batch: 81639

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 2
Prep Batch: 80950

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	ND		mg/Kg		-0.6		362	
Antimony	25.0	20.4		mg/Kg		82	70 - 120	2	30
Arsenic	5.00	3.87		mg/Kg		77	60 - 120	4	30
Cadmium	2.50	2.36		mg/Kg		94	80 - 120	1	30
Iron	50.0	ND		mg/Kg		3		73	
Lead	5.00	4.46		mg/Kg		89	70 - 120	7	30
Manganese	5.00	4.79		mg/Kg		96	80 - 120	0	30
Selenium	7.50	6.58		mg/Kg		88	70 - 120	1	30
Zinc	25.0	23.7		mg/Kg		95	80 - 120	0	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81639

Client Sample ID: TP-2-2.5'
Prep Type: Step 2
Prep Batch: 80950

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	ND		ND		mg/Kg	☼	NC	
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND		0.529	J	mg/Kg	☼	NC	30
Cadmium	1.1		0.795	J F5	mg/Kg	☼	34	30
Iron	ND		ND		mg/Kg	☼	NC	
Lead	2.7		1.48	J F5	mg/Kg	☼	59	30
Manganese	24		2.39	J F3	mg/Kg	☼	164	30
Selenium	ND		ND		mg/Kg	☼	NC	30
Zinc	13		9.54	F3	mg/Kg	☼	32	30

Lab Sample ID: MB 140-80958/14-B
Matrix: Solid
Analysis Batch: 81693

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 81017

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	2.1	mg/Kg		12/06/23 08:00	12/21/23 13:09	1
Antimony	ND		3.0	0.28	mg/Kg		12/06/23 08:00	12/21/23 13:09	1
Arsenic	ND		0.50	0.13	mg/Kg		12/06/23 08:00	12/21/23 13:09	1
Cadmium	ND		0.25	0.011	mg/Kg		12/06/23 08:00	12/21/23 13:09	1
Iron	ND		5.0	2.9	mg/Kg		12/06/23 08:00	12/21/23 13:09	1
Lead	ND		0.50	0.11	mg/Kg		12/06/23 08:00	12/21/23 13:09	1
Manganese	0.0905	J	0.75	0.027	mg/Kg		12/06/23 08:00	12/21/23 13:09	1
Selenium	ND		0.50	0.17	mg/Kg		12/06/23 08:00	12/21/23 13:09	1

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-80958/14-B
Matrix: Solid
Analysis Batch: 81693

Client Sample ID: Method Blank
Prep Type: Step 3
Prep Batch: 81017

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	0.582	J	1.0	0.10	mg/Kg		12/06/23 08:00	12/21/23 13:09	1

Lab Sample ID: LCS 140-80958/15-B
Matrix: Solid
Analysis Batch: 81693

Client Sample ID: Lab Control Sample
Prep Type: Step 3
Prep Batch: 81017

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Aluminum			100	92.0		mg/Kg		92	80 - 120		
Antimony			25.0	23.8		mg/Kg		95	80 - 120		
Arsenic			5.00	4.49		mg/Kg		90	80 - 120		
Cadmium			2.50	1.05		mg/Kg		42	10 - 120		
Iron			50.0	49.1		mg/Kg		98	80 - 120		
Lead			5.00	ND		mg/Kg		1			
Manganese			5.00	4.85		mg/Kg		97	80 - 120		
Selenium			7.50	7.41		mg/Kg		99	80 - 120		
Zinc			25.0	23.7		mg/Kg		95	80 - 120		

Lab Sample ID: LCSD 140-80958/16-B
Matrix: Solid
Analysis Batch: 81693

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 3
Prep Batch: 81017

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum			100	93.0		mg/Kg		93	80 - 120	1	30
Antimony			25.0	24.2		mg/Kg		97	80 - 120	2	30
Arsenic			5.00	4.51		mg/Kg		90	80 - 120	0	30
Cadmium			2.50	1.05		mg/Kg		42	10 - 120	0	30
Iron			50.0	48.3		mg/Kg		97	80 - 120	2	30
Lead			5.00	ND		mg/Kg		2		42	
Manganese			5.00	4.91		mg/Kg		98	80 - 120	1	30
Selenium			7.50	7.52		mg/Kg		100	80 - 120	1	30
Zinc			25.0	24.2		mg/Kg		97	80 - 120	2	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81693

Client Sample ID: TP-2-2.5'
Prep Type: Step 3
Prep Batch: 81017

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	580			686		mg/Kg	☼			16	30
Antimony	0.64	J		0.911	J F5	mg/Kg	☼			34	30
Arsenic	2.3			2.97		mg/Kg	☼			26	30
Cadmium	0.15	J		0.322	F5	mg/Kg	☼			71	30
Iron	270			289		mg/Kg	☼			7	30
Lead	1.6			3.93		mg/Kg	☼			87	
Manganese	190	B		218		mg/Kg	☼			16	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Zinc	19	B		24.8		mg/Kg	☼			24	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: MB 140-81012/14-B
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Method Blank
Prep Type: Step 4
Prep Batch: 81233

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		12/12/23 08:00	12/27/23 12:36	1
Antimony	ND		3.0	0.45	mg/Kg		12/12/23 08:00	12/27/23 12:36	1
Arsenic	ND		0.50	0.22	mg/Kg		12/12/23 08:00	12/27/23 12:36	1
Cadmium	ND		0.25	0.011	mg/Kg		12/12/23 08:00	12/27/23 12:36	1
Iron	ND		5.0	2.9	mg/Kg		12/12/23 08:00	12/27/23 12:36	1
Lead	ND		0.50	0.11	mg/Kg		12/12/23 08:00	12/27/23 12:36	1
Manganese	ND		0.75	0.13	mg/Kg		12/12/23 08:00	12/27/23 12:36	1
Selenium	0.538		0.50	0.47	mg/Kg		12/12/23 08:00	12/27/23 12:36	1
Zinc	0.244	J	1.0	0.16	mg/Kg		12/12/23 08:00	12/27/23 12:36	1

Lab Sample ID: LCS 140-81012/15-B
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Lab Control Sample
Prep Type: Step 4
Prep Batch: 81233

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	100	90.3		mg/Kg		90	80 - 120
Antimony	25.0	23.3		mg/Kg		93	80 - 130
Arsenic	5.00	4.64		mg/Kg		93	80 - 130
Cadmium	2.50	2.35		mg/Kg		94	80 - 120
Iron	50.0	47.6		mg/Kg		95	80 - 120
Lead	5.00	4.51		mg/Kg		90	80 - 120
Manganese	5.00	4.83		mg/Kg		97	80 - 120
Selenium	7.50	0.629		mg/Kg		8	
Zinc	25.0	23.5		mg/Kg		94	80 - 120

Lab Sample ID: LCSD 140-81012/16-B
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 4
Prep Batch: 81233

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	100	91.5		mg/Kg		92	80 - 120	1	30
Antimony	25.0	23.4		mg/Kg		94	80 - 130	0	30
Arsenic	5.00	4.72		mg/Kg		94	80 - 130	2	30
Cadmium	2.50	2.38		mg/Kg		95	80 - 120	1	30
Iron	50.0	47.9		mg/Kg		96	80 - 120	1	30
Lead	5.00	4.60		mg/Kg		92	80 - 120	2	30
Manganese	5.00	4.90		mg/Kg		98	80 - 120	1	30
Selenium	7.50	0.561		mg/Kg		7		11	
Zinc	25.0	23.8		mg/Kg		95	80 - 120	1	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: TP-2-2.5'
Prep Type: Step 4
Prep Batch: 81233

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	1400		2390	F3	mg/Kg	☼	52	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	2.6		3.98	F3	mg/Kg	☼	43	30
Cadmium	1.9		2.04		mg/Kg	☼	8	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: TP-2-2.5'
Prep Type: Step 4
Prep Batch: 81233

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Iron	3500		4340		mg/Kg	☼	23	30
Lead	37		47.7		mg/Kg	☼	24	30
Manganese	89		78.1		mg/Kg	☼	13	30
Selenium	ND		0.536	J	mg/Kg	☼	NC	
Zinc	100	B	119		mg/Kg	☼	16	30

Lab Sample ID: MB 140-81185/14-B ^5
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Method Blank
Prep Type: Step 5
Prep Batch: 81291

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		12/13/23 08:00	12/27/23 14:18	5
Antimony	ND		45	4.2	mg/Kg		12/13/23 08:00	12/27/23 14:18	5
Arsenic	ND		7.5	1.9	mg/Kg		12/13/23 08:00	12/27/23 14:18	5
Cadmium	ND		3.8	0.16	mg/Kg		12/13/23 08:00	12/27/23 14:18	5
Iron	ND		75	44	mg/Kg		12/13/23 08:00	12/27/23 14:18	5
Lead	ND		7.5	1.7	mg/Kg		12/13/23 08:00	12/27/23 14:18	5
Manganese	ND		11	1.9	mg/Kg		12/13/23 08:00	12/27/23 14:18	5
Selenium	ND		7.5	2.6	mg/Kg		12/13/23 08:00	12/27/23 14:18	5
Zinc	ND		15	1.5	mg/Kg		12/13/23 08:00	12/27/23 14:18	5

Lab Sample ID: LCS 140-81185/15-B ^5
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Lab Control Sample
Prep Type: Step 5
Prep Batch: 81291

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	300	ND		mg/Kg		3	
Antimony	75.0	73.3		mg/Kg		98	80 - 120
Arsenic	15.0	11.3		mg/Kg		75	60 - 100
Cadmium	7.50	7.85		mg/Kg		105	80 - 130
Iron	150	ND		mg/Kg		2	
Lead	15.0	8.76		mg/Kg		58	40 - 80
Manganese	15.0	4.62	J	mg/Kg		31	1 - 60
Selenium	22.5	22.8		mg/Kg		101	80 - 140
Zinc	75.0	77.4		mg/Kg		103	80 - 130

Lab Sample ID: LCSD 140-81185/16-B ^5
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 81291

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	300	ND		mg/Kg		1		88	
Antimony	75.0	73.2		mg/Kg		98	80 - 120	0	30
Arsenic	15.0	12.1		mg/Kg		81	60 - 100	7	30
Cadmium	7.50	7.75		mg/Kg		103	80 - 130	1	30
Iron	150	ND		mg/Kg		3		21	
Lead	15.0	8.62		mg/Kg		57	40 - 80	2	30
Manganese	15.0	4.07	J	mg/Kg		27	1 - 60	13	30
Selenium	22.5	22.2		mg/Kg		99	80 - 140	3	30

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-81185/16-B ^5
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 5
Prep Batch: 81291

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Zinc			75.0	77.0		mg/Kg		103	80 - 130	0	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: TP-2-2.5'
Prep Type: Step 5
Prep Batch: 81291

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	230			62.6	J	mg/Kg	☼			115	
Antimony	ND			ND		mg/Kg	☼			NC	30
Arsenic	2.3	J		3.39	J F5	mg/Kg	☼			37	30
Cadmium	0.45	J		0.316	J F5	mg/Kg	☼			34	30
Iron	66	J		ND		mg/Kg	☼			NC	
Lead	9.4			6.82	J F5	mg/Kg	☼			32	30
Manganese	15			9.43	J F5	mg/Kg	☼			43	30
Selenium	ND			ND		mg/Kg	☼			NC	30
Zinc	21			18.3		mg/Kg	☼			15	30

Lab Sample ID: MB 140-81281/14-A
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Method Blank
Prep Type: Step 6
Prep Batch: 81281

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		12/12/23 12:00	12/27/23 16:04	1
Antimony	ND		3.0	0.28	mg/Kg		12/12/23 12:00	12/27/23 16:04	1
Arsenic	ND		0.50	0.15	mg/Kg		12/12/23 12:00	12/27/23 16:04	1
Cadmium	ND		0.25	0.011	mg/Kg		12/12/23 12:00	12/27/23 16:04	1
Iron	ND		5.0	2.9	mg/Kg		12/12/23 12:00	12/27/23 16:04	1
Lead	ND		0.50	0.11	mg/Kg		12/12/23 12:00	12/27/23 16:04	1
Manganese	ND		0.75	0.25	mg/Kg		12/12/23 12:00	12/27/23 16:04	1
Selenium	ND		0.50	0.17	mg/Kg		12/12/23 12:00	12/27/23 16:04	1
Zinc	ND		1.0	0.10	mg/Kg		12/12/23 12:00	12/27/23 16:04	1

Lab Sample ID: LCS 140-81281/15-A
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Lab Control Sample
Prep Type: Step 6
Prep Batch: 81281

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Aluminum			100	102		mg/Kg		102	80 - 120		
Antimony			25.0	25.4		mg/Kg		102	80 - 120		
Arsenic			5.00	5.18		mg/Kg		104	80 - 120		
Cadmium			2.50	2.67		mg/Kg		107	80 - 120		
Iron			50.0	53.2		mg/Kg		106	80 - 120		
Lead			5.00	5.24		mg/Kg		105	80 - 120		
Manganese			5.00	5.45		mg/Kg		109	80 - 120		
Selenium			7.50	7.72		mg/Kg		103	80 - 120		
Zinc			25.0	26.5		mg/Kg		106	80 - 120		

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCSD 140-81281/16-A
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 6
Prep Batch: 81281

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum			100	97.4		mg/Kg		97	80 - 120	5	30
Antimony			25.0	24.4		mg/Kg		98	80 - 120	4	30
Arsenic			5.00	5.02		mg/Kg		100	80 - 120	3	30
Cadmium			2.50	2.58		mg/Kg		103	80 - 120	3	30
Iron			50.0	51.5		mg/Kg		103	80 - 120	3	30
Lead			5.00	5.08		mg/Kg		102	80 - 120	3	30
Manganese			5.00	5.28		mg/Kg		106	80 - 120	3	30
Selenium			7.50	7.39		mg/Kg		98	80 - 120	4	30
Zinc			25.0	25.6		mg/Kg		102	80 - 120	3	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81837

Client Sample ID: TP-2-2.5'
Prep Type: Step 6
Prep Batch: 81281

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	13000			13500		mg/Kg	☼			5	30
Antimony	3.3			3.33		mg/Kg	☼			1	30
Arsenic	11			10.4		mg/Kg	☼			5	30
Cadmium	0.44			0.379		mg/Kg	☼			14	30
Iron	12000			12200		mg/Kg	☼			2	30
Lead	13			11.8		mg/Kg	☼			11	30
Manganese	68			69.0		mg/Kg	☼			1	30
Selenium	0.75			0.726		mg/Kg	☼			4	30
Zinc	180			186		mg/Kg	☼			3	30

Lab Sample ID: MB 140-81296/14-A
Matrix: Solid
Analysis Batch: 81849

Client Sample ID: Method Blank
Prep Type: Step 7
Prep Batch: 81296

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		12/13/23 08:00	12/28/23 11:16	1
Antimony	ND		3.0	0.14	mg/Kg		12/13/23 08:00	12/28/23 11:16	1
Arsenic	ND		0.50	0.30	mg/Kg		12/13/23 08:00	12/28/23 11:16	1
Cadmium	ND		0.25	0.011	mg/Kg		12/13/23 08:00	12/28/23 11:16	1
Iron	ND		5.0	4.1	mg/Kg		12/13/23 08:00	12/28/23 11:16	1
Lead	ND		0.50	0.11	mg/Kg		12/13/23 08:00	12/28/23 11:16	1
Manganese	ND		0.75	0.31	mg/Kg		12/13/23 08:00	12/28/23 11:16	1
Selenium	ND		0.50	0.17	mg/Kg		12/13/23 08:00	12/28/23 11:16	1
Zinc	ND		1.0	0.23	mg/Kg		12/13/23 08:00	12/28/23 11:16	1

Lab Sample ID: LCS 140-81296/15-A
Matrix: Solid
Analysis Batch: 81849

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 81296

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Aluminum			100	95.0		mg/Kg		95	80 - 120		
Antimony			25.0	24.2		mg/Kg		97	80 - 125		
Arsenic			5.00	4.84		mg/Kg		97	80 - 120		
Cadmium			2.50	2.48		mg/Kg		99	80 - 125		

Method: 6010B SEP - SEP Metals (ICP) (Continued)

Lab Sample ID: LCS 140-81296/15-A
Matrix: Solid
Analysis Batch: 81849

Client Sample ID: Lab Control Sample
Prep Type: Step 7
Prep Batch: 81296

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Iron			50.0	58.1		mg/Kg		116	80 - 120		
Lead			5.00	4.78		mg/Kg		96	80 - 120		
Manganese			5.00	5.23		mg/Kg		105	80 - 120		
Selenium			7.50	6.73		mg/Kg		90	80 - 120		
Zinc			25.0	24.7		mg/Kg		99	80 - 125		

Lab Sample ID: LCSD 140-81296/16-A
Matrix: Solid
Analysis Batch: 81849

Client Sample ID: Lab Control Sample Dup
Prep Type: Step 7
Prep Batch: 81296

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum			100	97.0		mg/Kg		97	80 - 120	2	30
Antimony			25.0	24.5		mg/Kg		98	80 - 125	1	30
Arsenic			5.00	4.92		mg/Kg		98	80 - 120	2	30
Cadmium			2.50	2.50		mg/Kg		100	80 - 125	1	30
Iron			50.0	52.6		mg/Kg		105	80 - 120	10	30
Lead			5.00	4.79		mg/Kg		96	80 - 120	0	30
Manganese			5.00	5.42		mg/Kg		108	80 - 120	4	30
Selenium			7.50	6.79		mg/Kg		91	80 - 120	1	30
Zinc			25.0	25.0		mg/Kg		100	80 - 125	1	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81849

Client Sample ID: TP-2-2.5'
Prep Type: Step 7
Prep Batch: 81296

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	20000			23400		mg/Kg	☼			17	30
Zinc	40			39.7		mg/Kg	☼			0.6	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81849

Client Sample ID: TP-2-2.5'
Prep Type: Step 7
Prep Batch: 81296

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Antimony	0.81	J		1.62	J F5	mg/Kg	☼			67	30
Cadmium	0.065	J		0.0752	J	mg/Kg	☼			15	30
Iron	4000			3530		mg/Kg	☼			12	30
Manganese	49			46.8		mg/Kg	☼			5	30

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Analysis Batch: 81849

Client Sample ID: TP-2-2.5'
Prep Type: Step 7
Prep Batch: 81296

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Arsenic	3.3			3.14		mg/Kg	☼			5	30
Lead	3.7			2.70		mg/Kg	☼			30	30
Selenium	ND			ND		mg/Kg	☼			NC	30

Metals

Prep Batch: 80623

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Total/NA	Solid	Total	
140-34329-2	TP-1-3.0'	Total/NA	Solid	Total	
140-34329-3	TP-1-3.5'	Total/NA	Solid	Total	
140-34329-4	TP-2-2.5'	Total/NA	Solid	Total	
140-34329-5	TP-2-3.0'	Total/NA	Solid	Total	
140-34329-6	TP-2-3.5'	Total/NA	Solid	Total	
140-34329-7	DTP-1-1'	Total/NA	Solid	Total	
140-34329-8	DTP-2-2'	Total/NA	Solid	Total	
140-34329-9	DTP-3-3'	Total/NA	Solid	Total	
140-34329-10	DTP-4-4'	Total/NA	Solid	Total	
140-34329-11	DTP-5-5'	Total/NA	Solid	Total	
140-34329-12	DTP-6-6'	Total/NA	Solid	Total	
MB 140-80623/14-A	Method Blank	Total/NA	Solid	Total	
LCS 140-80623/15-A	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-80623/16-A	Lab Control Sample Dup	Total/NA	Solid	Total	
140-34329-4 DU	TP-2-2.5'	Total/NA	Solid	Total	

SEP Batch: 80624

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 1	Solid	Exchangeable	
140-34329-2	TP-1-3.0'	Step 1	Solid	Exchangeable	
140-34329-3	TP-1-3.5'	Step 1	Solid	Exchangeable	
140-34329-4	TP-2-2.5'	Step 1	Solid	Exchangeable	
140-34329-5	TP-2-3.0'	Step 1	Solid	Exchangeable	
140-34329-6	TP-2-3.5'	Step 1	Solid	Exchangeable	
140-34329-7	DTP-1-1'	Step 1	Solid	Exchangeable	
140-34329-8	DTP-2-2'	Step 1	Solid	Exchangeable	
140-34329-9	DTP-3-3'	Step 1	Solid	Exchangeable	
140-34329-10	DTP-4-4'	Step 1	Solid	Exchangeable	
140-34329-11	DTP-5-5'	Step 1	Solid	Exchangeable	
140-34329-12	DTP-6-6'	Step 1	Solid	Exchangeable	
MB 140-80624/14-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-80624/15-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-80624/16-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	
140-34329-4 DU	TP-2-2.5'	Step 1	Solid	Exchangeable	

Prep Batch: 80851

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 1	Solid	3010A	80624
140-34329-2	TP-1-3.0'	Step 1	Solid	3010A	80624
140-34329-3	TP-1-3.5'	Step 1	Solid	3010A	80624
140-34329-4	TP-2-2.5'	Step 1	Solid	3010A	80624
140-34329-5	TP-2-3.0'	Step 1	Solid	3010A	80624
140-34329-6	TP-2-3.5'	Step 1	Solid	3010A	80624
140-34329-7	DTP-1-1'	Step 1	Solid	3010A	80624
140-34329-8	DTP-2-2'	Step 1	Solid	3010A	80624
140-34329-9	DTP-3-3'	Step 1	Solid	3010A	80624
140-34329-10	DTP-4-4'	Step 1	Solid	3010A	80624
140-34329-11	DTP-5-5'	Step 1	Solid	3010A	80624
140-34329-12	DTP-6-6'	Step 1	Solid	3010A	80624
MB 140-80624/14-B ^4	Method Blank	Step 1	Solid	3010A	80624

Metals (Continued)

Prep Batch: 80851 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 140-80624/15-B ^5	Lab Control Sample	Step 1	Solid	3010A	80624
LCSD 140-80624/16-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	80624
140-34329-4 DU	TP-2-2.5'	Step 1	Solid	3010A	80624

SEP Batch: 80895

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 2	Solid	Carbonate	
140-34329-2	TP-1-3.0'	Step 2	Solid	Carbonate	
140-34329-3	TP-1-3.5'	Step 2	Solid	Carbonate	
140-34329-4	TP-2-2.5'	Step 2	Solid	Carbonate	
140-34329-5	TP-2-3.0'	Step 2	Solid	Carbonate	
140-34329-6	TP-2-3.5'	Step 2	Solid	Carbonate	
140-34329-7	DTP-1-1'	Step 2	Solid	Carbonate	
140-34329-8	DTP-2-2'	Step 2	Solid	Carbonate	
140-34329-9	DTP-3-3'	Step 2	Solid	Carbonate	
140-34329-10	DTP-4-4'	Step 2	Solid	Carbonate	
140-34329-11	DTP-5-5'	Step 2	Solid	Carbonate	
140-34329-12	DTP-6-6'	Step 2	Solid	Carbonate	
MB 140-80895/14-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-80895/15-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-80895/16-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	
140-34329-4 DU	TP-2-2.5'	Step 2	Solid	Carbonate	

Prep Batch: 80950

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 2	Solid	3010A	80895
140-34329-2	TP-1-3.0'	Step 2	Solid	3010A	80895
140-34329-3	TP-1-3.5'	Step 2	Solid	3010A	80895
140-34329-4	TP-2-2.5'	Step 2	Solid	3010A	80895
140-34329-5	TP-2-3.0'	Step 2	Solid	3010A	80895
140-34329-6	TP-2-3.5'	Step 2	Solid	3010A	80895
140-34329-7	DTP-1-1'	Step 2	Solid	3010A	80895
140-34329-8	DTP-2-2'	Step 2	Solid	3010A	80895
140-34329-9	DTP-3-3'	Step 2	Solid	3010A	80895
140-34329-10	DTP-4-4'	Step 2	Solid	3010A	80895
140-34329-11	DTP-5-5'	Step 2	Solid	3010A	80895
140-34329-12	DTP-6-6'	Step 2	Solid	3010A	80895
MB 140-80895/14-B ^3	Method Blank	Step 2	Solid	3010A	80895
LCS 140-80895/15-B ^5	Lab Control Sample	Step 2	Solid	3010A	80895
LCSD 140-80895/16-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	80895
140-34329-4 DU	TP-2-2.5'	Step 2	Solid	3010A	80895

SEP Batch: 80958

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 3	Solid	Non-Crystalline	
140-34329-2	TP-1-3.0'	Step 3	Solid	Non-Crystalline	
140-34329-3	TP-1-3.5'	Step 3	Solid	Non-Crystalline	
140-34329-4	TP-2-2.5'	Step 3	Solid	Non-Crystalline	
140-34329-5	TP-2-3.0'	Step 3	Solid	Non-Crystalline	
140-34329-6	TP-2-3.5'	Step 3	Solid	Non-Crystalline	
140-34329-7	DTP-1-1'	Step 3	Solid	Non-Crystalline	

Metals (Continued)

SEP Batch: 80958 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-8	DTP-2-2'	Step 3	Solid	Non-Crystalline	
140-34329-9	DTP-3-3'	Step 3	Solid	Non-Crystalline	
140-34329-10	DTP-4-4'	Step 3	Solid	Non-Crystalline	
140-34329-11	DTP-5-5'	Step 3	Solid	Non-Crystalline	
140-34329-12	DTP-6-6'	Step 3	Solid	Non-Crystalline	
MB 140-80958/14-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-80958/15-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-80958/16-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	
140-34329-4 DU	TP-2-2.5'	Step 3	Solid	Non-Crystalline	

SEP Batch: 81012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 4	Solid	Metal Hydroxide	
140-34329-2	TP-1-3.0'	Step 4	Solid	Metal Hydroxide	
140-34329-3	TP-1-3.5'	Step 4	Solid	Metal Hydroxide	
140-34329-4	TP-2-2.5'	Step 4	Solid	Metal Hydroxide	
140-34329-5	TP-2-3.0'	Step 4	Solid	Metal Hydroxide	
140-34329-6	TP-2-3.5'	Step 4	Solid	Metal Hydroxide	
140-34329-7	DTP-1-1'	Step 4	Solid	Metal Hydroxide	
140-34329-8	DTP-2-2'	Step 4	Solid	Metal Hydroxide	
140-34329-9	DTP-3-3'	Step 4	Solid	Metal Hydroxide	
140-34329-10	DTP-4-4'	Step 4	Solid	Metal Hydroxide	
140-34329-11	DTP-5-5'	Step 4	Solid	Metal Hydroxide	
140-34329-12	DTP-6-6'	Step 4	Solid	Metal Hydroxide	
MB 140-81012/14-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-81012/15-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-81012/16-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	
140-34329-4 DU	TP-2-2.5'	Step 4	Solid	Metal Hydroxide	

Prep Batch: 81017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 3	Solid	3010A	80958
140-34329-2	TP-1-3.0'	Step 3	Solid	3010A	80958
140-34329-3	TP-1-3.5'	Step 3	Solid	3010A	80958
140-34329-4	TP-2-2.5'	Step 3	Solid	3010A	80958
140-34329-5	TP-2-3.0'	Step 3	Solid	3010A	80958
140-34329-6	TP-2-3.5'	Step 3	Solid	3010A	80958
140-34329-7	DTP-1-1'	Step 3	Solid	3010A	80958
140-34329-8	DTP-2-2'	Step 3	Solid	3010A	80958
140-34329-9	DTP-3-3'	Step 3	Solid	3010A	80958
140-34329-10	DTP-4-4'	Step 3	Solid	3010A	80958
140-34329-11	DTP-5-5'	Step 3	Solid	3010A	80958
140-34329-12	DTP-6-6'	Step 3	Solid	3010A	80958
MB 140-80958/14-B	Method Blank	Step 3	Solid	3010A	80958
LCS 140-80958/15-B	Lab Control Sample	Step 3	Solid	3010A	80958
LCSD 140-80958/16-B	Lab Control Sample Dup	Step 3	Solid	3010A	80958
140-34329-4 DU	TP-2-2.5'	Step 3	Solid	3010A	80958

SEP Batch: 81185

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 5	Solid	Organic-Bound	

Metals (Continued)

SEP Batch: 81185 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-2	TP-1-3.0'	Step 5	Solid	Organic-Bound	
140-34329-3	TP-1-3.5'	Step 5	Solid	Organic-Bound	
140-34329-4	TP-2-2.5'	Step 5	Solid	Organic-Bound	
140-34329-5	TP-2-3.0'	Step 5	Solid	Organic-Bound	
140-34329-6	TP-2-3.5'	Step 5	Solid	Organic-Bound	
140-34329-7	DTP-1-1'	Step 5	Solid	Organic-Bound	
140-34329-8	DTP-2-2'	Step 5	Solid	Organic-Bound	
140-34329-9	DTP-3-3'	Step 5	Solid	Organic-Bound	
140-34329-10	DTP-4-4'	Step 5	Solid	Organic-Bound	
140-34329-11	DTP-5-5'	Step 5	Solid	Organic-Bound	
140-34329-12	DTP-6-6'	Step 5	Solid	Organic-Bound	
MB 140-81185/14-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-81185/15-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-81185/16-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	
140-34329-4 DU	TP-2-2.5'	Step 5	Solid	Organic-Bound	

Prep Batch: 81233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 4	Solid	3010A	81012
140-34329-2	TP-1-3.0'	Step 4	Solid	3010A	81012
140-34329-3	TP-1-3.5'	Step 4	Solid	3010A	81012
140-34329-4	TP-2-2.5'	Step 4	Solid	3010A	81012
140-34329-5	TP-2-3.0'	Step 4	Solid	3010A	81012
140-34329-6	TP-2-3.5'	Step 4	Solid	3010A	81012
140-34329-7	DTP-1-1'	Step 4	Solid	3010A	81012
140-34329-8	DTP-2-2'	Step 4	Solid	3010A	81012
140-34329-9	DTP-3-3'	Step 4	Solid	3010A	81012
140-34329-10	DTP-4-4'	Step 4	Solid	3010A	81012
140-34329-11	DTP-5-5'	Step 4	Solid	3010A	81012
140-34329-12	DTP-6-6'	Step 4	Solid	3010A	81012
MB 140-81012/14-B	Method Blank	Step 4	Solid	3010A	81012
LCS 140-81012/15-B	Lab Control Sample	Step 4	Solid	3010A	81012
LCSD 140-81012/16-B	Lab Control Sample Dup	Step 4	Solid	3010A	81012
140-34329-4 DU	TP-2-2.5'	Step 4	Solid	3010A	81012

SEP Batch: 81281

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 6	Solid	Acid/Sulfide	
140-34329-2	TP-1-3.0'	Step 6	Solid	Acid/Sulfide	
140-34329-3	TP-1-3.5'	Step 6	Solid	Acid/Sulfide	
140-34329-4	TP-2-2.5'	Step 6	Solid	Acid/Sulfide	
140-34329-5	TP-2-3.0'	Step 6	Solid	Acid/Sulfide	
140-34329-6	TP-2-3.5'	Step 6	Solid	Acid/Sulfide	
140-34329-7	DTP-1-1'	Step 6	Solid	Acid/Sulfide	
140-34329-8	DTP-2-2'	Step 6	Solid	Acid/Sulfide	
140-34329-9	DTP-3-3'	Step 6	Solid	Acid/Sulfide	
140-34329-10	DTP-4-4'	Step 6	Solid	Acid/Sulfide	
140-34329-11	DTP-5-5'	Step 6	Solid	Acid/Sulfide	
140-34329-12	DTP-6-6'	Step 6	Solid	Acid/Sulfide	
MB 140-81281/14-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-81281/15-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	

Metals (Continued)

SEP Batch: 81281 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 140-81281/16-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	
140-34329-4 DU	TP-2-2.5'	Step 6	Solid	Acid/Sulfide	

Prep Batch: 81291

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 5	Solid	3010A	81185
140-34329-2	TP-1-3.0'	Step 5	Solid	3010A	81185
140-34329-3	TP-1-3.5'	Step 5	Solid	3010A	81185
140-34329-4	TP-2-2.5'	Step 5	Solid	3010A	81185
140-34329-5	TP-2-3.0'	Step 5	Solid	3010A	81185
140-34329-6	TP-2-3.5'	Step 5	Solid	3010A	81185
140-34329-7	DTP-1-1'	Step 5	Solid	3010A	81185
140-34329-8	DTP-2-2'	Step 5	Solid	3010A	81185
140-34329-9	DTP-3-3'	Step 5	Solid	3010A	81185
140-34329-10	DTP-4-4'	Step 5	Solid	3010A	81185
140-34329-11	DTP-5-5'	Step 5	Solid	3010A	81185
140-34329-12	DTP-6-6'	Step 5	Solid	3010A	81185
MB 140-81185/14-B ^5	Method Blank	Step 5	Solid	3010A	81185
LCS 140-81185/15-B ^5	Lab Control Sample	Step 5	Solid	3010A	81185
LCSD 140-81185/16-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	81185
140-34329-4 DU	TP-2-2.5'	Step 5	Solid	3010A	81185

Prep Batch: 81296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 7	Solid	Residual	
140-34329-2	TP-1-3.0'	Step 7	Solid	Residual	
140-34329-3	TP-1-3.5'	Step 7	Solid	Residual	
140-34329-4	TP-2-2.5'	Step 7	Solid	Residual	
140-34329-5	TP-2-3.0'	Step 7	Solid	Residual	
140-34329-6	TP-2-3.5'	Step 7	Solid	Residual	
140-34329-7	DTP-1-1'	Step 7	Solid	Residual	
140-34329-8	DTP-2-2'	Step 7	Solid	Residual	
140-34329-9	DTP-3-3'	Step 7	Solid	Residual	
140-34329-10	DTP-4-4'	Step 7	Solid	Residual	
140-34329-11	DTP-5-5'	Step 7	Solid	Residual	
140-34329-12	DTP-6-6'	Step 7	Solid	Residual	
MB 140-81296/14-A	Method Blank	Step 7	Solid	Residual	
LCS 140-81296/15-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-81296/16-A	Lab Control Sample Dup	Step 7	Solid	Residual	
140-34329-4 DU	TP-2-2.5'	Step 7	Solid	Residual	

Analysis Batch: 81639

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 1	Solid	6010B SEP	80851
140-34329-1	TP-1-2.5'	Step 2	Solid	6010B SEP	80950
140-34329-2	TP-1-3.0'	Step 1	Solid	6010B SEP	80851
140-34329-2	TP-1-3.0'	Step 2	Solid	6010B SEP	80950
140-34329-3	TP-1-3.5'	Step 1	Solid	6010B SEP	80851
140-34329-3	TP-1-3.5'	Step 2	Solid	6010B SEP	80950
140-34329-4	TP-2-2.5'	Step 1	Solid	6010B SEP	80851
140-34329-4	TP-2-2.5'	Step 2	Solid	6010B SEP	80950

Metals (Continued)

Analysis Batch: 81639 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-5	TP-2-3.0'	Step 1	Solid	6010B SEP	80851
140-34329-5	TP-2-3.0'	Step 2	Solid	6010B SEP	80950
140-34329-6	TP-2-3.5'	Step 1	Solid	6010B SEP	80851
140-34329-6	TP-2-3.5'	Step 2	Solid	6010B SEP	80950
140-34329-7	DTP-1-1'	Step 1	Solid	6010B SEP	80851
140-34329-7	DTP-1-1'	Step 2	Solid	6010B SEP	80950
140-34329-8	DTP-2-2'	Step 1	Solid	6010B SEP	80851
140-34329-8	DTP-2-2'	Step 2	Solid	6010B SEP	80950
140-34329-9	DTP-3-3'	Step 1	Solid	6010B SEP	80851
140-34329-9	DTP-3-3'	Step 2	Solid	6010B SEP	80950
140-34329-10	DTP-4-4'	Step 1	Solid	6010B SEP	80851
140-34329-10	DTP-4-4'	Step 2	Solid	6010B SEP	80950
140-34329-11	DTP-5-5'	Step 1	Solid	6010B SEP	80851
140-34329-11	DTP-5-5'	Step 2	Solid	6010B SEP	80950
140-34329-12	DTP-6-6'	Step 1	Solid	6010B SEP	80851
140-34329-12	DTP-6-6'	Step 2	Solid	6010B SEP	80950
MB 140-80624/14-B ^4	Method Blank	Step 1	Solid	6010B SEP	80851
MB 140-80895/14-B ^3	Method Blank	Step 2	Solid	6010B SEP	80950
LCS 140-80624/15-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	80851
LCS 140-80895/15-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	80950
LCSD 140-80624/16-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	80851
LCSD 140-80895/16-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	80950
140-34329-4 DU	TP-2-2.5'	Step 1	Solid	6010B SEP	80851
140-34329-4 DU	TP-2-2.5'	Step 2	Solid	6010B SEP	80950

Analysis Batch: 81693

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 3	Solid	6010B SEP	81017
140-34329-2	TP-1-3.0'	Step 3	Solid	6010B SEP	81017
140-34329-3	TP-1-3.5'	Step 3	Solid	6010B SEP	81017
140-34329-4	TP-2-2.5'	Step 3	Solid	6010B SEP	81017
140-34329-5	TP-2-3.0'	Step 3	Solid	6010B SEP	81017
140-34329-6	TP-2-3.5'	Step 3	Solid	6010B SEP	81017
140-34329-7	DTP-1-1'	Step 3	Solid	6010B SEP	81017
140-34329-8	DTP-2-2'	Step 3	Solid	6010B SEP	81017
140-34329-9	DTP-3-3'	Step 3	Solid	6010B SEP	81017
140-34329-10	DTP-4-4'	Step 3	Solid	6010B SEP	81017
140-34329-11	DTP-5-5'	Step 3	Solid	6010B SEP	81017
140-34329-12	DTP-6-6'	Step 3	Solid	6010B SEP	81017
140-34329-12	DTP-6-6'	Step 3	Solid	6010B SEP	81017
MB 140-80958/14-B	Method Blank	Step 3	Solid	6010B SEP	81017
LCS 140-80958/15-B	Lab Control Sample	Step 3	Solid	6010B SEP	81017
LCSD 140-80958/16-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	81017
140-34329-4 DU	TP-2-2.5'	Step 3	Solid	6010B SEP	81017

Analysis Batch: 81837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 4	Solid	6010B SEP	81233
140-34329-1	TP-1-2.5'	Step 5	Solid	6010B SEP	81291
140-34329-1	TP-1-2.5'	Step 6	Solid	6010B SEP	81281
140-34329-2	TP-1-3.0'	Step 4	Solid	6010B SEP	81233

Metals (Continued)

Analysis Batch: 81837 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-2	TP-1-3.0'	Step 5	Solid	6010B SEP	81291
140-34329-2	TP-1-3.0'	Step 6	Solid	6010B SEP	81281
140-34329-3	TP-1-3.5'	Step 4	Solid	6010B SEP	81233
140-34329-3	TP-1-3.5'	Step 5	Solid	6010B SEP	81291
140-34329-3	TP-1-3.5'	Step 6	Solid	6010B SEP	81281
140-34329-4	TP-2-2.5'	Step 4	Solid	6010B SEP	81233
140-34329-4	TP-2-2.5'	Step 5	Solid	6010B SEP	81291
140-34329-4	TP-2-2.5'	Step 6	Solid	6010B SEP	81281
140-34329-5	TP-2-3.0'	Step 4	Solid	6010B SEP	81233
140-34329-5	TP-2-3.0'	Step 5	Solid	6010B SEP	81291
140-34329-5	TP-2-3.0'	Step 6	Solid	6010B SEP	81281
140-34329-6	TP-2-3.5'	Step 4	Solid	6010B SEP	81233
140-34329-6	TP-2-3.5'	Step 5	Solid	6010B SEP	81291
140-34329-6	TP-2-3.5'	Step 6	Solid	6010B SEP	81281
140-34329-7	DTP-1-1'	Step 4	Solid	6010B SEP	81233
140-34329-7	DTP-1-1'	Step 5	Solid	6010B SEP	81291
140-34329-7	DTP-1-1'	Step 6	Solid	6010B SEP	81281
140-34329-8	DTP-2-2'	Step 4	Solid	6010B SEP	81233
140-34329-8	DTP-2-2'	Step 5	Solid	6010B SEP	81291
140-34329-8	DTP-2-2'	Step 6	Solid	6010B SEP	81281
140-34329-9	DTP-3-3'	Step 4	Solid	6010B SEP	81233
140-34329-9	DTP-3-3'	Step 5	Solid	6010B SEP	81291
140-34329-9	DTP-3-3'	Step 6	Solid	6010B SEP	81281
140-34329-10	DTP-4-4'	Step 4	Solid	6010B SEP	81233
140-34329-10	DTP-4-4'	Step 5	Solid	6010B SEP	81291
140-34329-10	DTP-4-4'	Step 6	Solid	6010B SEP	81281
140-34329-11	DTP-5-5'	Step 4	Solid	6010B SEP	81233
140-34329-11	DTP-5-5'	Step 5	Solid	6010B SEP	81291
140-34329-11	DTP-5-5'	Step 6	Solid	6010B SEP	81281
140-34329-12	DTP-6-6'	Step 4	Solid	6010B SEP	81233
140-34329-12	DTP-6-6'	Step 5	Solid	6010B SEP	81291
140-34329-12	DTP-6-6'	Step 6	Solid	6010B SEP	81281
MB 140-81012/14-B	Method Blank	Step 4	Solid	6010B SEP	81233
MB 140-81185/14-B ^5	Method Blank	Step 5	Solid	6010B SEP	81291
MB 140-81281/14-A	Method Blank	Step 6	Solid	6010B SEP	81281
LCS 140-81012/15-B	Lab Control Sample	Step 4	Solid	6010B SEP	81233
LCS 140-81185/15-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	81291
LCS 140-81281/15-A	Lab Control Sample	Step 6	Solid	6010B SEP	81281
LCSD 140-81012/16-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	81233
LCSD 140-81185/16-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	81291
LCSD 140-81281/16-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	81281
140-34329-4 DU	TP-2-2.5'	Step 4	Solid	6010B SEP	81233
140-34329-4 DU	TP-2-2.5'	Step 5	Solid	6010B SEP	81291
140-34329-4 DU	TP-2-2.5'	Step 6	Solid	6010B SEP	81281

Analysis Batch: 81849

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Step 7	Solid	6010B SEP	81296
140-34329-1	TP-1-2.5'	Step 7	Solid	6010B SEP	81296
140-34329-1	TP-1-2.5'	Step 7	Solid	6010B SEP	81296
140-34329-2	TP-1-3.0'	Step 7	Solid	6010B SEP	81296

Metals (Continued)

Analysis Batch: 81849 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-2	TP-1-3.0'	Step 7	Solid	6010B SEP	81296
140-34329-2	TP-1-3.0'	Step 7	Solid	6010B SEP	81296
140-34329-3	TP-1-3.5'	Step 7	Solid	6010B SEP	81296
140-34329-3	TP-1-3.5'	Step 7	Solid	6010B SEP	81296
140-34329-3	TP-1-3.5'	Step 7	Solid	6010B SEP	81296
140-34329-4	TP-2-2.5'	Step 7	Solid	6010B SEP	81296
140-34329-4	TP-2-2.5'	Step 7	Solid	6010B SEP	81296
140-34329-4	TP-2-2.5'	Step 7	Solid	6010B SEP	81296
140-34329-5	TP-2-3.0'	Step 7	Solid	6010B SEP	81296
140-34329-5	TP-2-3.0'	Step 7	Solid	6010B SEP	81296
140-34329-5	TP-2-3.0'	Step 7	Solid	6010B SEP	81296
140-34329-6	TP-2-3.5'	Step 7	Solid	6010B SEP	81296
140-34329-6	TP-2-3.5'	Step 7	Solid	6010B SEP	81296
140-34329-6	TP-2-3.5'	Step 7	Solid	6010B SEP	81296
140-34329-7	DTP-1-1'	Step 7	Solid	6010B SEP	81296
140-34329-7	DTP-1-1'	Step 7	Solid	6010B SEP	81296
140-34329-7	DTP-1-1'	Step 7	Solid	6010B SEP	81296
140-34329-8	DTP-2-2'	Step 7	Solid	6010B SEP	81296
140-34329-8	DTP-2-2'	Step 7	Solid	6010B SEP	81296
140-34329-8	DTP-2-2'	Step 7	Solid	6010B SEP	81296
140-34329-9	DTP-3-3'	Step 7	Solid	6010B SEP	81296
140-34329-9	DTP-3-3'	Step 7	Solid	6010B SEP	81296
140-34329-9	DTP-3-3'	Step 7	Solid	6010B SEP	81296
140-34329-10	DTP-4-4'	Step 7	Solid	6010B SEP	81296
140-34329-10	DTP-4-4'	Step 7	Solid	6010B SEP	81296
140-34329-10	DTP-4-4'	Step 7	Solid	6010B SEP	81296
140-34329-11	DTP-5-5'	Step 7	Solid	6010B SEP	81296
140-34329-11	DTP-5-5'	Step 7	Solid	6010B SEP	81296
140-34329-11	DTP-5-5'	Step 7	Solid	6010B SEP	81296
140-34329-12	DTP-6-6'	Step 7	Solid	6010B SEP	81296
140-34329-12	DTP-6-6'	Step 7	Solid	6010B SEP	81296
140-34329-12	DTP-6-6'	Step 7	Solid	6010B SEP	81296
MB 140-81296/14-A	Method Blank	Step 7	Solid	6010B SEP	81296
LCS 140-81296/15-A	Lab Control Sample	Step 7	Solid	6010B SEP	81296
LCSD 140-81296/16-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	81296
140-34329-4 DU	TP-2-2.5'	Step 7	Solid	6010B SEP	81296
140-34329-4 DU	TP-2-2.5'	Step 7	Solid	6010B SEP	81296
140-34329-4 DU	TP-2-2.5'	Step 7	Solid	6010B SEP	81296

Analysis Batch: 81885

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Total/NA	Solid	6010B	80623
140-34329-1	TP-1-2.5'	Total/NA	Solid	6010B	80623
140-34329-2	TP-1-3.0'	Total/NA	Solid	6010B	80623
140-34329-2	TP-1-3.0'	Total/NA	Solid	6010B	80623
140-34329-2	TP-1-3.0'	Total/NA	Solid	6010B	80623
140-34329-3	TP-1-3.5'	Total/NA	Solid	6010B	80623
140-34329-3	TP-1-3.5'	Total/NA	Solid	6010B	80623
140-34329-3	TP-1-3.5'	Total/NA	Solid	6010B	80623
140-34329-4	TP-2-2.5'	Total/NA	Solid	6010B	80623
140-34329-4	TP-2-2.5'	Total/NA	Solid	6010B	80623

Metals (Continued)

Analysis Batch: 81885 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-4	TP-2-2.5'	Total/NA	Solid	6010B	80623
140-34329-5	TP-2-3.0'	Total/NA	Solid	6010B	80623
140-34329-5	TP-2-3.0'	Total/NA	Solid	6010B	80623
140-34329-5	TP-2-3.0'	Total/NA	Solid	6010B	80623
140-34329-6	TP-2-3.5'	Total/NA	Solid	6010B	80623
140-34329-6	TP-2-3.5'	Total/NA	Solid	6010B	80623
140-34329-6	TP-2-3.5'	Total/NA	Solid	6010B	80623
140-34329-7	DTP-1-1'	Total/NA	Solid	6010B	80623
140-34329-7	DTP-1-1'	Total/NA	Solid	6010B	80623
140-34329-7	DTP-1-1'	Total/NA	Solid	6010B	80623
140-34329-8	DTP-2-2'	Total/NA	Solid	6010B	80623
140-34329-8	DTP-2-2'	Total/NA	Solid	6010B	80623
140-34329-8	DTP-2-2'	Total/NA	Solid	6010B	80623
140-34329-9	DTP-3-3'	Total/NA	Solid	6010B	80623
140-34329-9	DTP-3-3'	Total/NA	Solid	6010B	80623
140-34329-9	DTP-3-3'	Total/NA	Solid	6010B	80623
140-34329-10	DTP-4-4'	Total/NA	Solid	6010B	80623
140-34329-10	DTP-4-4'	Total/NA	Solid	6010B	80623
140-34329-10	DTP-4-4'	Total/NA	Solid	6010B	80623
140-34329-11	DTP-5-5'	Total/NA	Solid	6010B	80623
140-34329-11	DTP-5-5'	Total/NA	Solid	6010B	80623
140-34329-11	DTP-5-5'	Total/NA	Solid	6010B	80623
140-34329-12	DTP-6-6'	Total/NA	Solid	6010B	80623
140-34329-12	DTP-6-6'	Total/NA	Solid	6010B	80623
140-34329-12	DTP-6-6'	Total/NA	Solid	6010B	80623
MB 140-80623/14-A	Method Blank	Total/NA	Solid	6010B	80623
LCS 140-80623/15-A	Lab Control Sample	Total/NA	Solid	6010B	80623
LCSD 140-80623/16-A	Lab Control Sample Dup	Total/NA	Solid	6010B	80623
140-34329-4 DU	TP-2-2.5'	Total/NA	Solid	6010B	80623
140-34329-4 DU	TP-2-2.5'	Total/NA	Solid	6010B	80623
140-34329-4 DU	TP-2-2.5'	Total/NA	Solid	6010B	80623

Analysis Batch: 81979

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-2	TP-1-3.0'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-3	TP-1-3.5'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-4	TP-2-2.5'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-5	TP-2-3.0'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-6	TP-2-3.5'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-7	DTP-1-1'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-8	DTP-2-2'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-9	DTP-3-3'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-10	DTP-4-4'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-11	DTP-5-5'	Sum of Steps 1-7	Solid	6010B SEP	
140-34329-12	DTP-6-6'	Sum of Steps 1-7	Solid	6010B SEP	

QC Association Summary

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

General Chemistry

Analysis Batch: 80279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-34329-1	TP-1-2.5'	Total/NA	Solid	Moisture	
140-34329-2	TP-1-3.0'	Total/NA	Solid	Moisture	
140-34329-3	TP-1-3.5'	Total/NA	Solid	Moisture	
140-34329-4	TP-2-2.5'	Total/NA	Solid	Moisture	
140-34329-5	TP-2-3.0'	Total/NA	Solid	Moisture	
140-34329-6	TP-2-3.5'	Total/NA	Solid	Moisture	
140-34329-7	DTP-1-1'	Total/NA	Solid	Moisture	
140-34329-8	DTP-2-2'	Total/NA	Solid	Moisture	
140-34329-9	DTP-3-3'	Total/NA	Solid	Moisture	
140-34329-10	DTP-4-4'	Total/NA	Solid	Moisture	
140-34329-11	DTP-5-5'	Total/NA	Solid	Moisture	
140-34329-12	DTP-6-6'	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-2.5'
Date Collected: 10/30/23 10:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: TP-1-2.5'
Date Collected: 10/30/23 10:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-1
Matrix: Solid
Percent Solids: 91.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 10:48	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 13:57	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 11:48	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 13:32	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 13:24	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 12:51	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 14:33	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 16:19	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 11:31	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 12:59	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-2.5'
Date Collected: 10/30/23 10:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-1
Matrix: Solid
Percent Solids: 91.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 14:46	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: TP-1-3.0'
Date Collected: 10/30/23 10:50
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: TP-1-3.0'
Date Collected: 10/30/23 10:50
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-2
Matrix: Solid
Percent Solids: 91.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 10:53	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 12:22	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 14:02	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 11:53	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 13:37	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 13:29	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 12:55	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-3.0'
Date Collected: 10/30/23 10:50
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-2
Matrix: Solid
Percent Solids: 91.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 14:39	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 16:24	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 11:36	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 13:04	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 14:51	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: TP-1-3.5'
Date Collected: 10/30/23 10:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-3
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: TP-1-3.5'
Date Collected: 10/30/23 10:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-3
Matrix: Solid
Percent Solids: 91.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 10:58	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 12:27	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 14:07	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 11:58	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-1-3.5'

Date Collected: 10/30/23 10:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-3

Matrix: Solid
Percent Solids: 91.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 13:42	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 13:34	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:00	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 14:44	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 16:29	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 11:41	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 13:09	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 14:56	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: TP-2-2.5'

Date Collected: 10/30/23 11:00
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-4

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-2-2.5'

Date Collected: 10/30/23 11:00
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-4

Matrix: Solid
Percent Solids: 92.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 11:02	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 12:33	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 14:13	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 12:03	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 13:47	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 13:39	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:05	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 14:49	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 16:34	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 11:46	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 13:14	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 15:01	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-2-3.0'
Date Collected: 10/30/23 11:05
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-5
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: TP-2-3.0'
Date Collected: 10/30/23 11:05
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-5
Matrix: Solid
Percent Solids: 93.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 11:12	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 12:44	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 14:23	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 12:13	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 13:57	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 13:49	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:14	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 14:59	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 16:44	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 11:55	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: TP-2-3.0'
Date Collected: 10/30/23 11:05
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-5
Matrix: Solid
Percent Solids: 93.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 13:24	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 15:11	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: TP-2-3.5'
Date Collected: 10/30/23 11:10
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-6
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: TP-2-3.5'
Date Collected: 10/30/23 11:10
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-6
Matrix: Solid
Percent Solids: 93.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 11:32	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 12:50	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 14:29	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 12:32	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 14:17	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 14:09	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: TP-2-3.5'

Lab Sample ID: 140-34329-6
Date Collected: 10/30/23 11:10
Matrix: Solid
Date Received: 11/10/23 11:20
Percent Solids: 93.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:34	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 15:19	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 17:03	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 12:15	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 13:30	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 15:16	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: DTP-1-1'

Lab Sample ID: 140-34329-7
Date Collected: 11/02/23 09:30
Matrix: Solid
Date Received: 11/10/23 11:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: DTP-1-1'

Lab Sample ID: 140-34329-7
Date Collected: 11/02/23 09:30
Matrix: Solid
Date Received: 11/10/23 11:20
Percent Solids: 79.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 11:37	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 12:55	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 14:34	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-1-1'

Date Collected: 11/02/23 09:30
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-7

Matrix: Solid
Percent Solids: 79.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 12:37	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 14:22	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 14:14	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:39	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 15:24	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 17:08	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 12:20	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 13:35	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 15:21	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: DTP-2-2'

Date Collected: 11/02/23 09:35
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-8

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-2-2'

Date Collected: 11/02/23 09:35
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-8

Matrix: Solid
Percent Solids: 75.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 11:42	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 13:01	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 14:40	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 12:42	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 14:27	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 14:19	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:44	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 15:29	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 17:13	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 12:25	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 13:40	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 15:26	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-3-3'
Date Collected: 11/02/23 09:40
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-9
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: DTP-3-3'
Date Collected: 11/02/23 09:40
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-9
Matrix: Solid
Percent Solids: 77.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 11:47	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 13:21	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 15:00	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 12:47	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 14:32	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 14:25	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:48	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 15:34	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 17:18	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 12:30	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: DTP-3-3'

Date Collected: 11/02/23 09:40
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-9

Matrix: Solid
Percent Solids: 77.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 14:00	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 15:46	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: DTP-4-4'

Date Collected: 11/02/23 09:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-10

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: DTP-4-4'

Date Collected: 11/02/23 09:45
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-10

Matrix: Solid
Percent Solids: 78.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 11:51	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 13:27	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 15:05	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 12:52	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 14:37	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 14:30	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: DTP-4-4'

Lab Sample ID: 140-34329-10

Date Collected: 11/02/23 09:45
Matrix: Solid
Date Received: 11/10/23 11:20
Percent Solids: 78.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:53	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 15:39	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 17:24	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 12:34	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 14:05	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 15:51	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: DTP-5-5'

Lab Sample ID: 140-34329-11

Date Collected: 11/02/23 09:50
Matrix: Solid
Date Received: 11/10/23 11:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Client Sample ID: DTP-5-5'

Lab Sample ID: 140-34329-11

Date Collected: 11/02/23 09:50
Matrix: Solid
Date Received: 11/10/23 11:20
Percent Solids: 78.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 11:56	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 13:32	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 15:11	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: DTP-5-5'

Date Collected: 11/02/23 09:50
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-11

Matrix: Solid
Percent Solids: 78.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 12:57	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 14:42	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 14:35	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:58	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 15:44	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 17:29	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 12:39	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 14:11	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 15:56	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: DTP-6-6'

Date Collected: 11/02/23 09:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-12

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			81979	01/03/24 12:27	KNC	EET KNX
	Instrument ID: NOEQUIP									
Total/NA	Analysis	Moisture		1			80279	11/15/23 09:18	TMB	EET KNX
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: DTP-6-6'

Date Collected: 11/02/23 09:55
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-12

Matrix: Solid
Percent Solids: 77.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 12:01	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 13:38	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 15:16	KNC	EET KNX
	Instrument ID: DUO									
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 13:02	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 14:48	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 14:40	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		2			81693	12/21/23 15:05	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 14:03	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 15:49	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 17:34	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 12:44	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 14:16	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 16:01	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-80623/14-A

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 10:33	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-80624/14-B ^4

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 15:43	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-80895/14-B ^3

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 13:17	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-80958/14-B

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 13:09	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank — Lab Sample ID: MB 140-81012/14-B

Date Collected: N/A — **Matrix: Solid**
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 12:36	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: Method Blank
Lab Sample ID: MB 140-81185/14-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 14:18	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-81281/14-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 16:04	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-81296/14-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 11:16	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-80623/15-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 10:38	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-80624/15-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		5			81639	12/20/23 11:38	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-80895/15-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		5			81639	12/20/23 13:22	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-80958/15-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 13:14	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-81012/15-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 12:41	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-81185/15-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 14:23	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-81281/15-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 16:09	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-81296/15-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 11:21	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-80623/16-A
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 10:43	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-80624/16-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		5			81639	12/20/23 11:43	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-80895/16-B ^5
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		5			81639	12/20/23 13:27	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Lab Sample ID: LCSD 140-80958/16-B
Date Collected: N/A
Matrix: Solid
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 13:19	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 140-81012/16-B
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 12:46	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 140-81185/16-B ^5
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 14:28	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 140-81281/16-A
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 16:14	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 140-81296/16-A
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 11:26	KNC	EET KNX
	Instrument ID: DUO									

Client Sample ID: TP-2-2.5'
Date Collected: 10/30/23 11:00
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-4 DU
Matrix: Solid
Percent Solids: 92.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		10			81885	12/29/23 11:07	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		1			81885	12/29/23 12:38	KNC	EET KNX
	Instrument ID: DUO									
Total/NA	Prep	Total			1.000 g	50 mL	80623	12/13/23 08:00	JDM	EET KNX
Total/NA	Analysis	6010B		2			81885	12/29/23 14:18	KNC	EET KNX
	Instrument ID: DUO									

Lab Chronicle

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Client Sample ID: TP-2-2.5'

Date Collected: 10/30/23 11:00
Date Received: 11/10/23 11:20

Lab Sample ID: 140-34329-4 DU

Matrix: Solid
Percent Solids: 92.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	80624	12/01/23 08:00	JDM	EET KNX
Step 1	Prep	3010A			5 mL	50 mL	80851	12/04/23 08:00	JDM	EET KNX
Step 1	Analysis	6010B SEP		4			81639	12/20/23 12:08	KNC	EET KNX
	Instrument ID: DUO									
Step 2	SEP	Carbonate			5.000 g	25 mL	80895	12/04/23 08:00	JDM	EET KNX
Step 2	Prep	3010A			5 mL	50 mL	80950	12/05/23 08:00	JDM	EET KNX
Step 2	Analysis	6010B SEP		3			81639	12/20/23 13:52	KNC	EET KNX
	Instrument ID: DUO									
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	80958	12/05/23 08:00	JDM	EET KNX
Step 3	Prep	3010A			5 mL	50 mL	81017	12/06/23 08:00	JDM	EET KNX
Step 3	Analysis	6010B SEP		1			81693	12/21/23 13:44	KNC	EET KNX
	Instrument ID: DUO									
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	81012	12/06/23 08:00	JDM	EET KNX
Step 4	Prep	3010A			5 mL	50 mL	81233	12/12/23 08:00	JDM	EET KNX
Step 4	Analysis	6010B SEP		1			81837	12/27/23 13:10	KNC	EET KNX
	Instrument ID: DUO									
Step 5	SEP	Organic-Bound			5.000 g	75 mL	81185	12/12/23 08:00	JDM	EET KNX
Step 5	Prep	3010A			5 mL	50 mL	81291	12/13/23 08:00	JDM	EET KNX
Step 5	Analysis	6010B SEP		5			81837	12/27/23 14:54	KNC	EET KNX
	Instrument ID: DUO									
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	81281	12/12/23 12:00	JDM	EET KNX
Step 6	Analysis	6010B SEP		1			81837	12/27/23 16:39	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		10			81849	12/28/23 11:50	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		1			81849	12/28/23 13:19	KNC	EET KNX
	Instrument ID: DUO									
Step 7	Prep	Residual			1.000 g	50 mL	81296	12/13/23 08:00	JDM	EET KNX
Step 7	Analysis	6010B SEP		2			81849	12/28/23 15:06	KNC	EET KNX
	Instrument ID: DUO									

Laboratory References:

EET KNX = Eurofins Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: Alta Science and Engineering, Inc. Job ID: 140-34329-1
Project/Site: Triumph Mine - Idaho

Laboratory: Eurofins Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
	AFCEE	N/A	
ANAB	Dept. of Defense ELAP	L2311	02-13-25
ANAB	Dept. of Energy	L2311.01	02-13-25
ANAB	ISO/IEC 17025	L2311	02-13-25
Arkansas DEQ	State	88-0688	06-16-24
Colorado	State	TN00009	02-29-24
Connecticut	State	PH-0223	09-30-25
Florida	NELAP	E87177	06-30-24
Georgia (DW)	State	906	07-27-25
Hawaii	State	NA	07-27-24
Kansas	NELAP	E-10349	10-31-24
Kentucky (DW)	State	90101	12-31-23 *
Louisiana (All)	NELAP	83979	06-30-24
Louisiana (DW)	State	LA019	12-31-24
Maryland	State	277	03-31-24
Michigan	State	9933	07-27-25
Nevada	State	TN00009	07-31-24
New Hampshire	NELAP	2999	01-17-24
New Jersey	NELAP	TN001	07-01-24
New York	NELAP	10781	03-31-24
North Carolina (DW)	State	21705	07-31-24
North Carolina (WW/SW)	State	64	12-31-24
Oklahoma	State	9415	12-31-23 *
Oregon	NELAP	TNI0189	01-01-25
Pennsylvania	NELAP	68-00576	12-31-24
Tennessee	State	02014	07-27-25
Texas	NELAP	T104704380-23-18	08-31-24
US Fish & Wildlife	US Federal Programs	058448	07-31-24
USDA	US Federal Programs	525-22-279-18762	10-06-25
Utah	NELAP	TN00009	07-31-24
Virginia	NELAP	460176	09-14-24
Washington	State	C593	01-19-24
West Virginia (DW)	State	9955C	12-31-23 *
West Virginia DEP	State	345	04-30-24
Wisconsin	State	998044300	08-31-24

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Alta Science and Engineering, Inc.
Project/Site: Triumph Mine - Idaho

Job ID: 140-34329-1

Method	Method Description	Protocol	Laboratory
6010B	SEP Metals (ICP) - Total	SW846	EET KNX
6010B SEP	SEP Metals (ICP)	SW846	EET KNX
Moisture	Percent Moisture	EPA	EET KNX
3010A	Preparation, Total Metals	SW846	EET KNX
Acid/Sulfide	Sequential Extraction Procedure, Acid/Sulfide Fraction	TAL-KNOX	EET KNX
Carbonate	Sequential Extraction Procedure, Carbonate Fraction	TAL-KNOX	EET KNX
Exchangeable	Sequential Extraction Procedure, Exchangeable Fraction	TAL-KNOX	EET KNX
Metal Hydroxide	Sequential Extraction Procedure, Metal Hydroxide Fraction	TAL-KNOX	EET KNX
Non-Crystalline	Sequential Extraction Procedure, Non-crystalline Materials	TAL-KNOX	EET KNX
Organic-Bound	Sequential Extraction Procedure, Organic Bound Fraction	TAL-KNOX	EET KNX
Residual	Sequential Extraction Procedure, Residual Fraction	TAL-KNOX	EET KNX
Total	Preparation, Total Material	TAL-KNOX	EET KNX

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-KNOX = TestAmerica Laboratories, Knoxville, Facility Standard Operating Procedure.

Laboratory References:

EET KNX = Eurofins Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

>> Select a Laboratory or Service Center <<

Eurofins Test America Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
865-291-3006

Chain of Custody Record

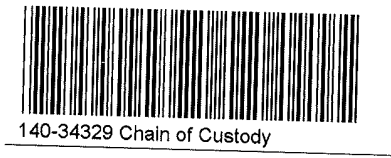
eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Eurofins Environment Testing America

Client Contact	Project Manager: Robin Nimmer	Site Contact: Brady Brantley	Date:11/6/2023	COC No:
Alta Science and Engineering, Inc.	Email: robin.nimmer@alta-se.com	Lab Contact: Ryan Henry	Carrier: FedEx	1 of 2 COCs
220 E 5th Street, Suite 325	Tel/Fax: 208-336-7080			TALS Project #:
Moscow, ID 83843	Analysis Turnaround Time			Sampler:
208-882-7858	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
208-883-3785 FAX	TAT if different from Below: Standard			Walk-in Client:
Project Name: Triumph Mine	2 weeks			Lab Sampling:
Site: Triumph Mine, Blaine County, Idaho	1 week			
P O #: [redacted] 23129	2 days			Job / SDG No.: 23129
	1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals-USEPA 6010B SEP	Sample Specific Notes:
TP-1-2.5'	10/30/23	1045	G	Soil	1	N		X	
TP-1-3.0'	10/30/23	1050	G	Soil	1	N		X	
TP-1-3.5'	10/30/23	1055	G	Soil	1	N		X	
TP-2-2.5'	10/30/23	1100	G	Soil	2	N	Y	X	MS/MSD
TP-2-[illegible], MS/MSD	10/30/23	1100	G	Soil	1	N	Y	X	[illegible] BB
TP-2-3.0'	10/30/23	1105	G	Soil	1	N		X	
TP-2-3.5'	10/30/23	1110	G	Soil	1	N		X	
DTP-1-1'	11/2/23	0930	G	Soil	1	N		X	
DTP-2-2'	11/2/23	0935	G	Soil	1	N		X	
DTP-3-3'	11/2/23	0940	G	Soil	1	N		X	
DTP-4-4'	11/2/23	0945	G	Soil	1	N		X	
DTP-5-5'	11/2/23	0950	G	Soil	1	N		X	



Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other 1

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: Analysis —> Metals by USEPA 6010 B -SEP Testing
SEP = Sequential Extraction Procedure

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by: [signature]	Company: Alta Science + Engineering	Date/Time: 11/6 12:00	Received by: [signature]	Company: ESTA knox	Date/Time: 11-10-23 11:20
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

1400717

1/4/2024

>> Select a Laboratory or Service Center <<

Eurofins Test America Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
865-291-3006

Chain of Custody Record

eurofins | Environment Testing America

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Eurofins Environment Testing America

Client Contact	Project Manager: Robin Nimmer	Site Contact: Brady Brantley	Date:11/6/2023	COC No:
Alta Science and Engineering, Inc.	Email: robin.nimmer@alta-se.com	Lab Contact: Ryan Henry	Carrier: FedEx	2 of 2 COCs
220 E 5th Street, Suite 325	Tel/Fax: 208-336-7080			TALS Project #:
Moscow, ID 83843	Analysis Turnaround Time			Sampler:
208-882-7858	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
208-883-3785 FAX	TAT if different from Below: Standard			Walk-in Client:
Project Name: Triumph Mine	☐ 2 weeks			Lab Sampling:
Site: Triumph Mine, Blaine County, Idaho	☐ 1 week			
P O #: [redacted] 23129	☐ 2 days ☐ 1 day			Job / SDG No.: 23129

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals - USEPA 6010 B JEP	Sample Specific Notes:
DTP-6-6'	11/2/23	0955	G	Soil	1	N		X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other 1

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments: Analysis → Metals by USEPA 6010 B - JEP Testing
SEP = Sequential Extraction Procedure

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: ____ Corr'd: ____ Therm ID No.: ____

	Company:	Date/Time:		Company:	Date/Time:
Relinquished by: [signature]	Alta Science & Engineering	11/6 12:00	Received by: [signature]	FEDEX	11-10-23 11:20
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

1/4/2024

EUROFINS/TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST **Log In Number:**

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	✓			☐ Containers, Broken
2. Were ambient air containers received intact?			✓	☐ Checked in lab
3. The coolers/containers custody seal if present, is it intact?	✓			☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : SC76 Correction factor: +0.4°C	✓			☐ Cooler Out of Temp, Client Contacted, Proceed/Cancel ☐ Cooler Out of Temp, Same Day Receipt
5. Were all of the sample containers received intact?	✓			☐ Containers, Broken
6. Were samples received in appropriate containers?	✓			☐ Containers, Improper; Client Contacted; Proceed/Cancel
7. Do sample container labels match COC? (IDs, Dates, Times)	✓			☐ COC & Samples Do Not Match ☐ COC Incorrect/Incomplete ☐ COC Not Received
8. Were all of the samples listed on the COC received?	✓			☐ Sample Received, Not on COC ☐ Sample on COC, Not Received
9. Is the date/time of sample collection noted?	✓			☐ COC; No Date/Time; Client Contacted
10. Was the sampler identified on the COC?		✓		☑ Sampler Not Listed on COC
11. Is the client and project name/# identified?	✓			☐ COC Incorrect/Incomplete
12. Are tests/parameters listed for each sample?	✓			☐ COC No tests on COC
13. Is the matrix of the samples noted?	✓			☐ COC Incorrect/Incomplete
14. Was COC relinquished? (Signed/Dated/Timed)	✓			☐ COC Incorrect/Incomplete
15. Were samples received within holding time?	✓			☐ Holding Time - Receipt
16. Were samples received with correct chemical preservative (excluding Encore)?			✓	☐ pH Adjusted, pH Included (See box 16A) ☐ Incorrect Preservative
17. Were VOA samples received without headspace?			✓	☐ Headspace (VOA only)
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			✓	☐ Residual Chlorine
19. For 1613B water samples is pH<9?			✓	☐ If no, notify lab to adjust
20. For rad samples was sample activity info. Provided?			✓	☐ Project missing info

Comments/Actions Taken

Custody Seal Intact
Received at RT 19.6/CT 19.0C
CAR 11-10-23
Fedex 6 7859 9995 2478

10

Observation MS/MSD cannot be Performed

Labeling Verified by: **Date:**

pH test strip lot number:

Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:	
Lot Number:	
Exp Date:	
Analyst:	
Date:	
Time:	

Project #: 14007217 PM Instructions:

Sample Receiving Associate: Chris Stevens Date: 11-10-23

QA026R32.doc, 062719



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