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Pumping Test Program
Berry Deposit Area
Valentine Gold Project
Marathon Gold Corporation
Valentine Lake, NL

GEMTEC Project: 100107.005

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January 30, 2024
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EXECUTIVE SUMMARY

On behalf of Marathon Gold, Terrane Geoscience Inc. (Terrane) retained GEMTEC Consulting Engineers and Scientists Ltd. (GEMTEC) to carry out a pumping test for the proposed open pit at the Project's Berry deposit area.

The broad purpose of the pumping test program was to determine a more representative value of the bulk hydraulic conductivity (K) for the rock mass in the proposed Berry pit area. This updated bulk K value will be useful for more accurate dewatering predictions and for pit wall design.

The pumping test program involved field, laboratory, and office analytical work. Field work included drilling a deep (nominally 230 m) 150 mm-diameter pumping test well and an array of NQ-size open borehole observation wells around the test well. Hydraulic head data loggers were installed in the test and observation wells to monitor groundwater levels during the constant-rate test drawdown and recovery. Groundwater samples were collected at various times during the pumping test to determine the quality of deep groundwater (of the type likely to discharge into the pit). All field work was coordinated with mine site staff to adhere to operational and safety procedures. Pumping test data were corrected and reduced, then analyzed in the AQTESOLV® Pro software package, an industry-standard hydrogeology analysis software.

Our conclusions related directly to the specific objectives of the program are as follows:

Objective 1: Using long-term (nominally seven-day) constant-rate pumping test and recovery data, determine aquifer hydraulic parameters: transmissivity (T) and storativity (S). From the T value, calculate the bulk K value for the rock mass affected by the pumping test.

A long-term (nominally seven-day pumping and one day of recovery monitoring) CRT was designed for the Berry deposit area. However, the CRT was terminated one day early (day six of test) as weather reports indicated that a large rain event would occur on the seventh day.

The maximum drawdown in the PW was 85.32 m, the response in the OWs were relatively small ≤0.3m. Aquifer hydraulic parameters were estimated from the pumping test results. The geometric mean of T estimated from the response in the OWs was 4.4E-05 m^2/s, while the geometric mean of T estimated using the response at the PW was 9.5E-08 m^2/s. Values of S ranged from 0.0006 to 0.02, with a geometric mean of 0.006.

K values calculated from the above geometric mean T values and assuming an aquifer thickness of 230 m (depth of B-PW-01) were 4.2E-10 m/s (for the pumping well) and 1.9E-07 m/s (for the OWs).

Objective 2: Using an array of observation wells (specifically installed for this program and selected existing exploration boreholes), assess the anisotropy (directionality) of the drawdown cone developed during the pumping test and, if present, relate this directionality to mine site geology (i.e., orientation of lithological boundaries or structures).

We observed no discernable anisotropy of the drawdown cone.

Objective 3: Using the pumping test data, assess the nature and location of substantial changes in hydraulic response across lithological boundaries or prominent structures (faults or fault zones) within the drawdown cone.

We did not identify any marked variations in K associated with faults or fault zones.

Objective 4: Using the pumping test data, assess the presence and nature of any boundary conditions encountered affecting groundwater flow within the drawdown cone of the pumping well (e.g., a constant head boundary from a large water source, or a no-flow boundary due to very low permeability rock).

Given the limited response to pumping at the OWs, it was difficult to assess the presence or nature of boundary effects from the pumping test data. Perturbations in drawdown data are explainable as the result of overprinting influences from seasonal groundwater level changes and rainfall. Based on the data collected, we could discern no profound boundary conditions affecting these test results.

Objective 5: Compare the bulk K value from this pumping test with the geometric mean K value determined from packer tests in the proposed open pit area, as well as those previously used to estimate groundwater inflows into the proposed pits by Terrane (2023) using an analytical calculation method, and by Stantec (2023) using steady-state numerical groundwater flow modelling.

The K value calculated from the geometric mean of the T values obtained for B-PW-01 and the OWs were 4.2E-10 m/s and 1.9E-07 m/s, respectively .

A wide range of K values have been observed at the site from packer testing results carried out by GEMTEC (2022b) and GEMTEC (2023): 7E-10 to 3E-06 m/s. The K calculated from the response at OWs are within the range observed for the packer testing, and the lower K estimate obtained from the results at the PW is near the lower range of K values estimated from packer testing.

A dewatering estimate of the pit based on the K values obtained from packer testing and using a steady-state analytical model was carried by GEMTEC (2023). That calculation used a bulk K for the rock mass of 4.55E-08 m/s, which is of comparable magnitude to K values calculated from the response at the OWs in this study.

The calculated K values presented here from the response of B-PW-01 and the OWs are within the range of K values used by Stantec to calibrate their steady-state, numerical groundwater flow model. This provides a useful confirmation of the bedrock K values used in Stantec's model and, in turn, adds weight to the validity of their predicted groundwater inflow estimate for the Berry pit.

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1.0 INTRODUCTION

1.1 General

Marathon Gold Corporation (Marathon Gold) is developing its Valentine Gold Project (the Project) located in central Newfoundland and Labrador (NL).

On behalf of Marathon Gold, Terrane Geoscience Inc. (Terrane) retained GEMTEC Consulting Engineers and Scientists Ltd. (GEMTEC) to carry out a pumping test for the proposed open pit at the Project's Berry deposit area. [Note the proposed open pit development at Berry is divided into three sub-pits; in this report unless an individual sub-pit is referenced, the three sub-pit areas are collectively referred to as one pit].

The broad purpose of the pumping test program was to determine a more representative value of the bulk hydraulic conductivity (K) for the rock mass in the proposed Berry pit area. This updated bulk K value will be useful for more accurate dewatering predictions and for pit wall design.

1.2 Scope

The scope of this pumping test program was described in "Proposal for Detailed Design (Level 4) Geotechnical and Hydrogeological Data Collection and Analysis, Berry Deposit, Valentine Gold Project, Newfoundland and Labrador" submitted by Terrane to Mr. Timothy Williams, Chief Operating Officer of Marathon Gold Corp. on December 15th, 2022. Further details of the pumping test design were communicated in email correspondence "MOZ Berry Pumping Test Program – Details/Schedule" by GEMTEC to Marathon on August 18, 2023.

The scope of the pumping test field program included the following:

- Drilling a deep (nominally 230 m) 150 mm-diameter pumping test well and an array of NQ-size open borehole observation wells around the test well.
- Installing hydraulic head data loggers in the test and observation wells to monitor groundwater levels during the pumping testing program.
- Conducting a constant-rate pumping test followed by recovery monitoring. [Note, an initial step drawdown test in the test well was included in the original program scope to determine an optimum pumping rate for the constant rate pumping test. However, this was not completed since air lift testing during drilling indicated that the test well had a very low yield and a pumping rate of around 3 litres/per minute (L/min) was likely to be the maximum sustainable rate for the test.]
- Collecting groundwater samples at various times during the pumping test to determine the quality of deep groundwater (of the type likely to discharge into the pit).

All field work was coordinated with mine site staff to adhere to operational and safety procedures.

Pumping test data were corrected and reduced, then analyzed in the AQTESOLV® Pro software package, an industry-standard hydrogeology analysis software.

1.3 Objectives

The specific objectives of this pumping test program were as follows:

1. Using long-term (nominally seven-day) constant-rate pumping test and recovery data, determine aquifer hydraulic parameters: transmissivity (T) and storativity (S). From the T value, calculate the bulk K value for the rock mass affected by the pumping test.

2. Using an array of observation wells (specifically installed for this program along with selected existing exploration boreholes), assess the anisotropy (directionality) of the drawdown cone developed during the pumping test and, if present, relate this directionality to mine site geology (i.e., orientation of lithological boundaries or structures).

3. Using the pumping test data, identify and assess substantial changes in hydraulic response, which may occur across lithological boundaries or prominent structures (faults or fault zones) within the drawdown cone.

4. Using the pumping test data, assess the presence and nature of any boundary conditions encountered affecting groundwater flow within the drawdown cone (e.g., a constant head boundary from a large water source, or a no-flow boundary due to very low permeability rock).

5. Compare the bulk K value from this pumping test with the geometric mean K value determined from packer tests in the proposed Berry pit area. In addition, compare the bulk K value with K values used previously to estimate groundwater inflows into the proposed Berry pit by Terrane (2023) using analytical methods, and by Stantec (2023) using steady-state numerical groundwater flow modelling.

Beyond our specific objectives and scope, we anticipate that the results of this program will benefit mine development in the following ways:

- Provide additional K results and calibration targets for pit-scale, transient, numerical groundwater flow modelling. Such modelling would be useful for predicting groundwater heads in and around the pit at various stages of development, and during post-closure pit flooding. Such a model would also support planning for detailed design-level pit dewatering and depressurization; and,

- Satisfy due-diligence expectations from permitting regulators and stakeholders.

1.4 Previous Work

Two previous hydrogeological field investigations have been completed that include the Berry deposit area:

- Valentine Gold Project 2022 Feasibility Study Update Geotechnical and Hydrogeological Investigation (GEMTEC, 2022b); and,
- Berry Deposit Feasibility Design Report (Terrane, 2023).

Previous estimates of K determined for the rock mass in the Berry deposit area based on these investigations are presented below (Section 2.5.1).

The K dataset obtained by Terrane (2023) was used to determine a preliminary estimate of groundwater inflow into the proposed pit using an analytical calculation method. Subsequently Stantec (2023) constructed a steady-state numerical groundwater flow model of the Berry deposit area utilizing both GEMTEC and Terrane K datasets. Stantec's groundwater model was used to predict updated groundwater inflow estimates. The estimate of groundwater inflow to the proposed Berry pit determined by Stantec (2023) is further discussed in the context of this pumping test program in Section 6.4.

2.0 PROJECT SETTING

The Project area is situated approximated 55 km southwest of the Town of Millertown, NL, and is accessed by an 88 km well-maintained, year-round gravel road.

Five gold deposits have been identified within the Project area to date: the Leprechaun, Marathon, Berry, Sprite, and Victory deposits. The Berry deposit is the third proposed open pit development for the Project (Terrane, 2023). Figure A.1 (Appendix A) shows a general location plan for proposed open pit developments, including the two other proposed open pit developments at the Marathon and Leprechaun deposit areas.

The proposed open pit development at Berry is divided into three sub-pits, shown on Figure A.2 (Appendix A). Each pit is referred to by its relative location: Southwest Pit, Central Pit, and Northeast Pit.

2.1 Topography and Drainage

As described in GEMTEC (2022b), the Project area is dominated by hummocky terrain and is situated along a prominent northeast trending ridge with an approximately 100 m of relief above surrounding low-lying areas. The ridge is situated at the divide between three drainage catchment areas, sloping moderately downwards on its northwest side towards Valentine Lake, on its southeast side towards Victoria Lake to the south, and down to Victoria River to the north.

Valentine Lake drains northeast into Victoria River. Victoria Lake was originally the headwater of the Victoria River watershed, which ultimately flows north into the Exploits River; but has been diverted to the south by a diversion dam located at the outlet of Victoria River from Victoria Lake. Victoria Lake acts as a hydroelectric reservoir for the NL Hydro Granite Lake power generating station located 40 km to the southeast.

The Berry deposit is located midway between the Leprechaun and Marathon deposits along the crest of the northeast-trending ridge see Figure A.1 (Appendix A). The terrain slopes moderately downwards on the flanks of the ridge in the Berry deposit area, northwest towards Valentine Lake and southeast towards Victoria Lake. The local area of the pumping test has dry ground conditions and is treed; while an extensive blanket bog with small ponds and pools surround the site to the northeast, southeast and southwest.

2.2 Climate Data

Precipitation data over the period of pre-test monitoring and the pumping test were obtained from the Project's onsite weather station. The precipitation records over the period of interest from September 15 to October 15, 2023, were provided by Marathon as hourly measurements, which we summed to determine daily precipitation totals (in millimetres) for this program.

2.3 Surficial Geology

As described in GEMTEC (2022), regional surficial geology mapping indicates that till up to 15 m thick is the dominant overburden material within the project area. The till comprises diamicton (poorly-sorted material containing a mixture of grain-sizes ranging from clay to boulders).

Areas of high ground along the crest of the ridge corresponding to the Project deposit areas (including the Berry deposit) are characterized by bedrock outcrops exposed through the till veneer and various other surficial deposits along with bogland areas.

Subsurface materials at the Berry deposit area, observed as part of the GEMTEC (2022) field program, included organic soils with thickness up to 1.4 m and till with thickness up to 8.6 m.

2.4 Bedrock Geology

A detailed description of bedrock and structural geology is provided in Terrane (2023).

As a brief synopsis, the Project including the Berry deposit area is situated within Precambrian felsic intrusive rocks of the Valentine Lake Intrusive Suite (VLIS) that are in unconformable fault contact with the Silurian-age Rogerson Lake Conglomerate (RLC) (formally referred to as the Rogerson Lake Formation on bedrock geology maps of the area). The primary classification of the VLIS in the Project area is quartz monzonite.

Bedrock in the Project area, including in the Berry deposit area, has a complex deformational history, spanning three pulses of Appalachian orogenesis. These rocks are multiply-deformed, folded and faulted with complex geometric relationships between rock units and structures. The steeply-inclined Valentine Lake Thrust Fault (VLTF; referred to as the Valentine Lake Shear Zone by Terrane) is the dominant structural feature in the Berry deposit area, separating the VLIS to the northwest from the RLC to the southeast.

In addition, Terrane (2023) identified a number of other high- to low confidence faults in the Berry deposit area with both steep and gentle dips.

Based on bedrock logging results for the pumping well and principal observation wells, bedrock in the local area of the pumping test comprises a quartz-eye porphyry (QEP) (a porphyritic variety of the VLIS quartz monzonite) and is intruded by minor mafic dykes. Logging observations and drilling performance suggest that the rock at the location of the pumping well is competent with no significant fractures. In one of the pumping test observation wells (B-OW-04), a fault was encountered at a depth of about 96 m (logged as gouge) that extended through a zone of increased shearing to about 110 m. Based on Terrane's (2023) fault model of the Berry deposit area this fault/shear zone is interpreted to correspond to the VLFT.

2.5 Hydrogeological Setting

An irregular distribution of flowing (artesian) exploration wells, completed to various depths, was observed as part of site investigations at the Marathon and Leprechaun deposits. This was interpreted to mean that different domains (compartments) of bedrock behaved as confined zones leading to artesian flows while others did not. Importantly, a clearly-defined, low-permeability layer or rock type causing confined hydraulic conditions was not identified (GEMTEC, 2022a).

As described in GEMTEC (2023), the Berry deposit area is interpreted to occur within a similar hydrogeological setting as the Marathon and Leprechaun deposit areas, characterized by an unconfined aquifer system with localized confining conditions contained within the intrusive and sedimentary bedrock hosting the deposits. Given the relative position of the Berry deposit between the Marathon and Leprechaun deposits, and the broadly similar physiographic and geological setting of all the deposits, we infer that a regional upward hydraulic gradient would be present at depth at the Berry deposit, as is postulated for the Marathon and Leprechaun deposits areas.

Shallow groundwater in the till typically occurs from 0-10 m below ground surface and is inferred to mimic the local topography and surface water run-off patterns.

Groundwater flow in the deeper bedrock is controlled by secondary fractures and joints (rather than through primary connected porosity of the rocks). Static water levels measured prior to the pumping test are reported below (Section 5.1.2). In general, depth to water in the Berry deposit test area was within 1 m below ground surface (mbgs).

2.5.1 Hydraulic Conductivity Testing

In-situ K testing (single well response tests and packer tests) of the bedrock in the Berry deposit area was completed by GEMTEC in 2022 and 2023.

GEMTEC (2022b) carried out this testing at seven locations. All seven locations were located outside of the footprint of the proposed pit area: six were located between the proposed Berry pit and Valentine Lake, and one was located southwest of the Berry pit. Five tests were completed in mafic intrusive rocks (gabbro), four tests in conglomerate, and five tests were completed in the VLIS intrusive rocks (one in QEP, two in granite and two in trondhjemite). Tested depths in bedrock ranged from 2.0 to 31.6 mbgs. Estimated K values for various bedrock units within the Berry deposit area ranged from 6E-08 to 3E-06 meters per second (m/s), with a geometric mean of 4E-07 m/s. No obvious correlation between K and bedrock type or depth was identified for the Berry deposit area.

GEMTEC (2023) carried out packer testing at seven geotechnical drill holes located within the footprint of the proposed Berry open pit: three in the southwest pit, one in the central pit, and three in the northeast pit. All holes were packer-tested with continuous intervals covering the entire drilled depths. A total of 69 successful packer tests were completed. Estimated K values for the major bedrock units in the Berry deposit area (i.e. the QEP and conglomerate) ranged 7E-10 to 2E-06 m/s, with a geometric mean of 5E-08 m/s. Packer testing results showed no obvious correlation between K and bedrock type, fault structure (including the VLTF), or between sub-pits. A weakly-defined decrease of K with depth was identified for rocks in the proposed Berry pit area.

K values estimated from both investigations were similar to those reported for the Marathon and Leprechaun deposits (Terrane, 2020 and 2021). In addition, the K values in all three sub-pit areas were within the range of literature values for similar fractured and unfractured rocks (Freeze and Cherry, 1979).

3.0 RATIONALE AND CONSTRUCTION OF PUMPING WELLS AND OBSERVATION WELLS

Figure A.3 (Appendix A) shows a detailed test location plan for the Berry deposit area. Gravel drill roads and tracks provide access to and around the deposit area.

3.1 Rationale for Location and Depth of Pumping Well and Observation Wells

The Berry deposit area comprises three proposed pit areas, separated by saddles which will not be excavated. As available information indicates that the bedrock and structural geology are broadly similar in all three Berry sub-pits, the central pit was selected for the location of this pumping test. This was based on the assumption that the groundwater hydraulic information obtained from this test could also be reasonably applied to the northeast and southwest sub-pit areas.

Figure A.3 (Appendix A) shows the locations of the pumping well (B-PW-01) and observation wells (B-OW-01 to -06); herein referred to as the PW and OWs. These were located in an area of relatively dry ground along the southwestern extent of the proposed center pit shell. These locations were chosen so they would be accessible on existing drill roads/tracks but still distant from surface water bodies that might affect test results.

Similar to the layout used for the previous Marathon and Leprechaun pumping tests, the OW locations were preselected using professional judgement to fall within the anticipated radius of influence of pumping test drawdown. Based on previous tests, this distance was expected to be in the order of 100 to 200 m. The OWs were arranged in a spoke pattern with the intent to identify drawdown anisotropy, with wells placed both along and across the dominant northeast to southwest-oriented structural grain of the rock mass in the test area.

In addition, B-OW-04 was sited within the VLTF so that its potential hydraulic influence might be observed in the drawdown response at that OW.

Table 3.1 summarizes the locations, elevations, orientations, well dimensions and radial distance of principal OWs from the PW.

The PW depth was selected to be approximately equivalent to the maximum pit depth (nominally 230 mbgs). For drilling economy, the OWs drilled specifically for this program were advanced to half of the PW depth (i.e., nominally 130 m).

Three existing exploration boreholes (BHs) (VL-21-970, VL-21-1068, and VL-22-1202) were also used as OWs during the pumping test. These are included in Table 3.1 and are shown on Figure A.3 (Appendix A). These existing BHs are located within the test area and were added to the program to enhance the drawdown data set in the event of a limited drawdown cone that did not extend out to the furthest principal OWs. Constant-rate test (CRT) drawdown data were collected from these BHs and analyzed, but these results were considered to have low reliability since the exploration BHs are old and were not developed to remove residual drill cuttings (and possibly drilling muds) prior to use. Such residual fines can form a surface cake around the borehole wall, altering its hydraulic properties and reducing the calculated apparent hydraulic conductivity of bedrock adjacent to the borehole (skin effect).

3.2 Pumping Well Drilling and Construction

Drilling of the PW was carried out by DS Drilling Services Ltd. of Conception Bay South, NL (DSD) from September 22 - 23, 2023. DSD used air rotary drilling methods with a Gefco Star 30K drill rig with Sullair 1000 GFM 350 psi air compressor, mounted on a Peterbilt 357 truck. Water for drilling was supplied by Marathon from its site water supply at Victoria Lake and delivered to the drill site by water truck. Produced water and development water was discharged into a ditch adjacent to the road near the well site. Photos of B-PW-01 are provided in Appendix B.

After initial drilling to target depth, the PW was reamed by running the drill bit up and down the completed hole twice to drill out any fragments or collapsed rock from the borehole wall. The PW was developed using air lift methods immediately following completion of drilling. Development was continued until the development water was visibly clear.

A well construction log and core photos for the PW are presented in Appendix C.

3.3 Observation Well Drilling and Construction

Six OWs (B-OW-01 to -06) were specifically drilled in the test area for this program. All of these OWs were vertical NQ sizer (76 mm borehole diameter) diamond drillholes drilled by R&R Diamond Drilling (R&R) of Springdale, NL from August 29 to September 4, 2023. R&R used wash-bore diamond drilling methods with a Duralite 800 diamond drill rig. Water for drilling was obtained from nearby bog pools. The OW drilling program was overseen by Marathon field staff. Produced water and development water were discharged into a ditch adjacent to the road near the well sites. Photos of the OWs are provided in Appendix B.

The OWs were reamed using the same diameter drill bit to drill out any fragments or collapsed rock from the borehole wall. The wells were developed by flushing with water through the drill rods and continued until the development water was visibly clear (approximately 1 hour in each OW).

The driller recorded drill rig performance and depths of lost water during drilling. Core recovered during drilling was logged by Marathon and this information is presented on well logs along with core photos in Appendix C.

Table 3.1 Summary of Pumping and Observation Well Information

Well ID	Easting* (m)	Northing* (m)	Surface Elevation (masl)	Total AH Depth (m)	Total Vertical Depth (m)	Dip (°)	Stickup (m)	BH Diameter (mm)	Radial Distance from PW (m)
B-PW-01	489905.0	5358255.0	431.4	230	230	90	0.81	152	0
B-OW-01	489921.0	5358267.4	431.6	115	115	90	0.20	76	20.3
B-OW-02	489952.8	5358292.0	431.8	115	115	90	0.29	76	60.5
B-OW-03	489917.0	5358238.7	431.2	115	115	90	0.12	76	20.2
B-OW-04	489940.5	5358206.7	430	115	115	90	0.44	76	60
B-OW-05	489884.8	5358257.3	431.5	115	115	90	0.20	76	20.3
B-OW-06	489845.1	5358261.9	431.5	115	115	90	0.17	75	60.3
VL-21-970	489922.7	5358287.5	431.5	200	187.9	70	0.27	76	37.0
VL-21-1068	489887.7	5358229.8	430.2	200	197.0	80	0.24	76	30.6
VL-22-1202	489909.8	5358247.9	431.4	302	198.9	84	0.15	76	8.6

Notes:
* - Coordinates of top of open hole; masl – meters above sea level; AH – along hole; BH – borehole; PW – pumping well; OW – observation well
All well survey coordinates and measured ground surface elevations provided by Marathon Gold

4.0 PUMPING TEST DESIGN

A submersible well pump (Goulds Model 10SB10, 1 hp motor) was installed at a depth of 89.5 mbgs in the PW, with power cables and 1 inch diameter plastic discharge line to the surface. From the well, the discharge line was routed to a constant-head tank used to moderate the low pumping rate for the test. A discharge valve located at the bottom of the tank regulated outflow and was monitored using an in-line flow meter (Endress Hauser Picomag Flowmeter with totalizer). A water port was placed along the discharge line at the wellhead to collect water samples at various times during the CRT. Pumped water was discharged into an open blanket bog area approximately 90 m southeast and downgradient of the PW, as shown on Figure A.3 (Appendix A). To confirm flow meter readings, discharge flows were also measured by pail and stopwatch method at the end of the discharge line.

The CRT was conducted by DSD, with oversight by GEMTEC field staff (Mr. Daniel Robbins). Power for the pump was supplied by an on-site diesel generator supplied by DSD. GEMTEC staff were present full-time 12-hours per day (day shift) through the CRT. DSD staff were on-site full time 24-hours per day through the CRT.

For the CRT, data loggers (Solinst Leveloggers©) were placed in the PW and OWs to electronically collect water level measurements. Manual water levels were also measured using a Solinst Model 101 electric water level tape. Water level measurement methods used for the CRT are further described in Section 4.3 below.

4.1 Determination of Long-Term Pumping Test Rate

Figure A.4 (Appendix A) provides a profile of groundwater inflows encountered during drilling of the PW. A slight trickle of inflow was noted at 119 m depth but was considered to minor to include on the inflow profile. As the inflow plot shows no appreciable water bearing zones were encountered in the upper approximately 152 m of the well. At 152 m depth, a small amount of groundwater inflow (1 L/min; 0.26 USgpm) was measured during air-lift pumping, and another small amount (2 L/min, 0.53 USpgm) was encountered at approximately 204 m depth; resulting in an estimated total cumulative short-term airlift well yield for the well of 3 L/min (0.79 USgpm). This very low well yield supports well drilling logging results and suggests that the rock mass in the vicinity of the well is competent with limited fracturing and likely has very low permeability. Based on these airlift results, a pumping rate of around 3 litres/per minute (L/min) was anticipated to be the maximum sustainable rate to avoid excessive drawdown in the well for the CRT.

Pumping rates, interruptions and variability during testing are described in Section 5.0.

4.2 Long-Term Constant-Head Pumping Test

A long-term (nominally seven-day pumping and one day of recovery monitoring) CRT was designed for the Berry deposit area. However, the CRT was terminated one day early (day six of test) as weather reports indicated that a large rain event would occur on the seventh day (October 13, 2023).

4.3 Data Logger and Manual Water Level Measurements

All deployed pressure transducers were set to record at 30-second intervals. This time interval was chosen to capture early-time water level data, with unneeded excess data removed from late-time data, if needed. Table 4.1 below summarizes details of the loggers used during the CRT.

Manual groundwater level measurements were taken at regular intervals for the PW and OWs ranging from 0.5 minutes during the first 10 minutes of the test to 480 minutes after 24 hours.

4.4 Water Level Data Corrections and Elevation Controls

Raw data logger and manual water level data were corrected prior to analysis as follows:

1. **Copy Raw Data Files** – stored in archive folder; working files made for analysis

2. **Compile and plot pumping rates (Q) and rainfall vs time** – these are shown in Figure A.5 (Appendix A) as a two-axis histogram for the CRT.

3. **Compile and Plot Manual Drawdown Data -** depth to static water level (SWL) at each well at the start of the test was recorded. Data were entered by hand into Excel worksheets and organized. Drawdown (s) were calculated as depth to pumping water level (PWL) minus SWL, or:

   $$s = PWL - SWL$$

   For inclined OWs (exploration BHs), manually measured depths to water levels were converted to vertical measurements for analysis.

   Drawdown from manual measurements were plotted versus time to check for spurious points and to confirm that manual measurements were generally consistent with s values from data logger measurements.

Table 4.1 Summary of Test Water Level Monitoring Equipment and Measurement Details

Well ID	Water Level Measurement Method	Datalogger Accuracy (+/- in cm)	Depth of Datalogger Intake (mbgs)
B-PW-01	DL [LL 5 M200] / Manual	10	84.61
B-OW-01	DL [LL 5 M5] / Manual	0.3	2.80
B-OW-02	DL [LL 5 M5] / Manual	0.3	2.71
B-OW-03	DL [LL 5 M5] / Manual	0.3	2.88
B-OW-04	DL [LL 5 M5] / Manual	0.3	2.56
B-OW-05	DL [LL 5 M5] / Manual	0.3	2.80
B-OW-06	DL [LL 5 M5]} / Manual	0.3	2.84
VL-21-970	DL [LL Edge M5] / Manual	0.3	2.73
VL-21-1068	DL [LL Edge M5] / Manual	0.3	2.76
VL-22-1202	DL [LL Edge Gold M30] / Manual	1.5	19.85

Notes: DL – Datalogger; LL ## = Levelogger model; mbgs = m below ground surface.

4. **Preprocessing and initial inspection of data logger data -**

- Confirmed that data logger records (using logger S/N) corresponded to correct well locations.
- Plotted entire raw data set vs time for each logger (continuous data set from start of CRT through to recovery). Inspected for unsteady trends in SWL and spurious start-up/installation spikes.
- Performed barometric compensation of filtered raw logger data using barologger data and Solinst software.
- Applied a barometric efficiency correction of compensated water level data using the median-of-ratios method described in Gonthier (2007) for each OW. The correction of water level data for barometric efficiency resulted in mild smoothing of noise within the data.
- Calculated drawdown (s) for logger data (as in Step 3 above).
- Plotted s vs time (with linear axes, semi-log, log-log time axis) to assess curve shapes.

5.0 PUMPING TEST RESULTS AND ANALYSIS

5.1 Test Schedule and Conditions

5.1.1 Test Schedule

The pumping test activities were carried out on the following dates:

- Test set-up and pre-test monitoring [September 15 to October 5, 2023]
- CRT - Pumping [October 6 to 12, 2023],
- CRT - Groundwater sampling [October 6, 9 and 12, 2023]
- CRT - Recovery [October 12 to 13, 2023]

5.1.2 Pre-Test Groundwater Conditions

Groundwater elevations were monitored using data loggers (Solinst Canada Ltd. Leveloggers©) at three boreholes, 22BH-03A, 22BH-03B and B-OW-05, in the Berry deposit area between September 15 to October 5, 2023, prior to pumping. Manual water level measurements were collected on October 5, 2023. The location of B-OW-05 is shown on Figure A.3 (Appendix A), and the locations of 22BH-03A and 22BH-03B are shown on Figure A.1 (Appendix A).

The water levels in all three boreholes were responsive to recorded rainfall events between September 15 and 25, 2023. Boreholes 22BH-03A and 22BH-03B are paired (one shallow and one deep installed next to each other); response to rainfall in this paired well system is observed to be attenuated with depth.

No precipitation was recorded between September 26 and October 5, 2023, and during this period a decreasing groundwater level trend was observed at all three monitoring locations. Over this

approximately eleven-day period, water levels declined linearly at an average rate of 2.5 centimetres per day (cm/day). Table 5.1 summarizes groundwater levels measured during this dry period.

Table 5.1 Pre-test Groundwater Level Monitoring

Well ID	October 5, 2023		Minimum Elevation Measured using a Datalogger (masl)	Maximum Elevation Measured using a Datalogger (masl)	Rate of Groundwater Level Decline over dry period[a] (cm/day)
	Manual GW Level (mbgs)	Manual GW Elevation (masl)			
22BH-03A	1.44	424.3	424.3	424.7	2.0
22BH-03B	3.49	422.3	422.3	422.7	2.2
B-OW-05	0.91	430.8	430.8	431.1	2.0
[a] Dry period between September 25 and October 5, 2023.					

Static water levels were measured manually by GEMTEC staff from the PW and all of the OWs on October 5, 2023. Table 5.2 summarizes the pre-test static groundwater level measurements.

Table 5.2 Pre-Test Static Groundwater Levels

Well ID	Measurement Date/Time	Water Level (mbgs)	Water Elevation (masl)	Radial Distance from B-PW-01 (m)
B-PW-01	2023-10-05 16:15	0.43	431.0	0
B-OW-01	2023-10-05 13:51	0.83	430.8	20.3
B-OW-02	2023-10-05 13:30	0.86	430.9	60.5
B-OW-03	2023-10-05 14:20	0.91	430.3	20.2
B-OW-04	2023-10-05 14:50	-0.21	430.2	60
B-OW-05	2023-10-05 15:30	0.71	430.8	20.3
B-OW-06	2023-10-05 16:00	0.84	430.7	60.3
VL-21-970	2023-10-05 18:15	0.98	429.2	37.0
VL-21-1068	2023-10-05 18:20	-0.09	431.5	30.6
VL-22-1202	2023-10-05 17:59	0.79	430.6	8.6
Notes: mbgs – metres below ground surface; masl – meters above sea level; PW = pumping well All well survey coordinates and measured ground surface elevations obtained from Marathon Gold				

Static groundwater elevations in the PW and OWs ranged from 429.2 to 431.5 masl, defining a water table that is generally flat with a gentle slope towards the southeast at a horizontal gradient of 0.05 (Figure A.3 in Appendix A).

5.1.3 Weather Conditions During Test

Figure A.5 (Appendix A) includes rainfall measured at the onsite weather station before and during the testing period. Light precipitation occurred during three consecutive days of the six days of pumping (from October 10 to end of CRT on October 12), ranging in magnitude between 1 to 6 mm/day.

Light to heavy rain occurred during the recovery period (between 8:00 and 16:00 on October 13th, 2023), with recorded rainfall at the onsite station of 34 mm on that day.

5.2 Constant Rate Test

5.2.1 Pumping Rates and Test Duration

At the PW, the initial pumping rate was set to a very low rate (1.3 L/min) at the start of the test, and was increased slightly after the first 10 minutes, again at the end of the first day and on the second day of pumping to further hydraulically stress the surrounding bedrock. The PW was pumped at a rate of 2.5 L/min for most of the test.

Table 5.3 summarizes the pumping rates used during the CRT for B-PW-01. The pumping rate profile is also shown on Figure 5.1 below. The variable pumping rates during the CRT were taken into account in the analysis of the data (Section 5.2.5.2).

Table 5.3 Pumping Rates during Constant Rate Test - B-PW-01

Test Time (minutes)		Pumping Rate (L/min)
From	To	
0	10	1.3
10	1208	2.0
1208	1920	2.4
1920	8294	2.5
Time-Weighted Average		**2.42**

5.2.2 Hydraulic Responses at Pumping and Observation Wells

Water levels measured in the PW and OWs during the CRT and recovery monitoring are presented in Figure D-1 (Appendix D), and time-drawdown and recovery plots for each well are presented in Figures D-2 to D-11 in Appendix D.

Water elevation at B-PW-01 during pumping and recovery are presented in Figure 5.1. This plot shows the expected increase in drawdown in response to the increase in pumping rate after 1208 minutes of pumping and (to very minor extent) after 1920 minutes of pumping on October 7, 2023.

Late on October 11, 2023 there is a distinct drop of approximate 5 m in water elevation, from approximately 355 to 350 masl. The changes observed were compared to the borehole record for B-PW-01 (Appendix C). The drop in water level appears to coincide with an interval of easier drilling from about 354 to 342 masl (79 to 91 mbgs), which is logged as a possible mafic dyke within the QEP. The sudden drop in water level around 355 masl could be the result of water level in the PW falling below a water-bearing zone related to this feature, although no water inflow was noted on the drilling log. This perturbation on drawdown near the end of the pumping test does not materially alter overall results or conclusions.

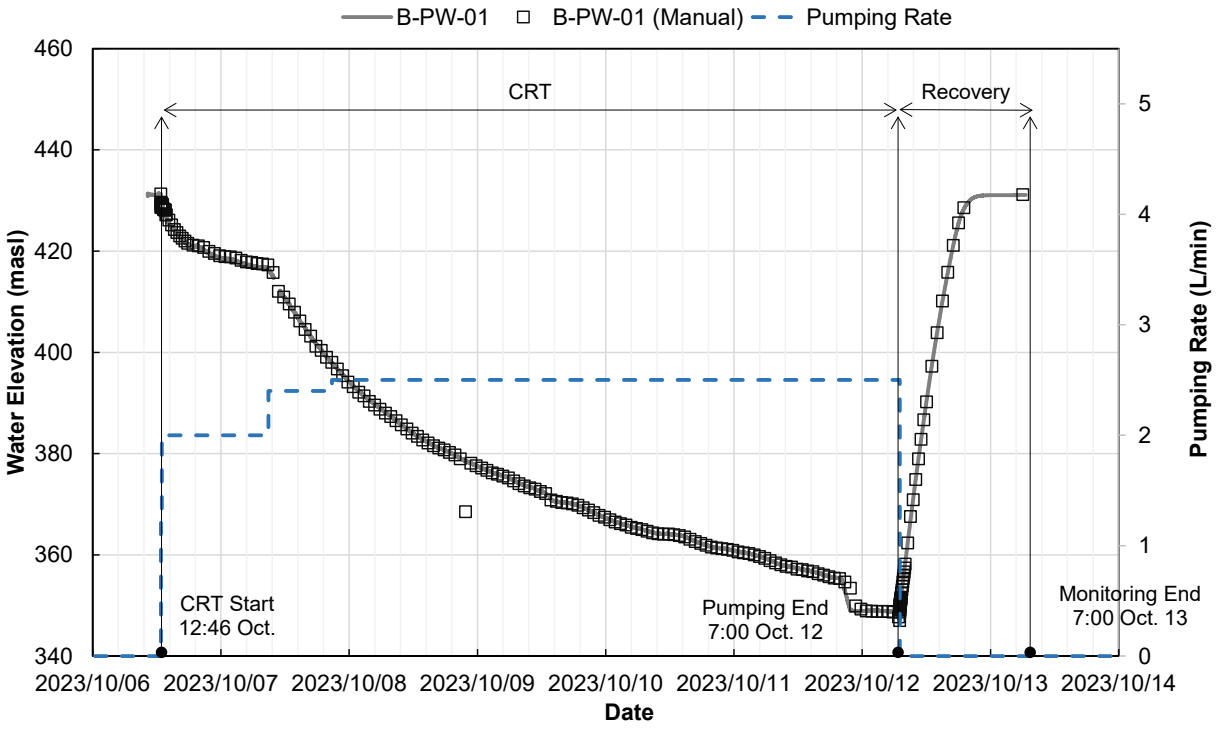


Figure 5.1 Groundwater Elevation at B-PW-01 & Pumping Rate during CRT

Water elevations in the OWs during pumping and recovery are presented in Figure 5.2. The response in the nearby OWs over the six days of pumping was quite small relative to the drawdown within the PW. Table 5.4 shows the maximum drawdown during the CRT at the PW and OWs. At the end of the test, 85.32 m of drawdown was observed at the PW. In contrast, the observed drawdown at the nearest OW, VL-22-1202 located 8.6 m away from the PW, was only 0.30 m. The maximum decrease of water level at the other eight OWs was also relatively small. At B-OW-01, -03 and -05, nominally 20 meters away from the PW, drawdown ranged from 0.10 to 0.16 m. As expected, maximum drawdowns at the OWs farthest from B-PW-01 (B-OW-02, -04 and -06 nominally 60 m away), were lowest, ranging from 0.08 to 0.11 m.

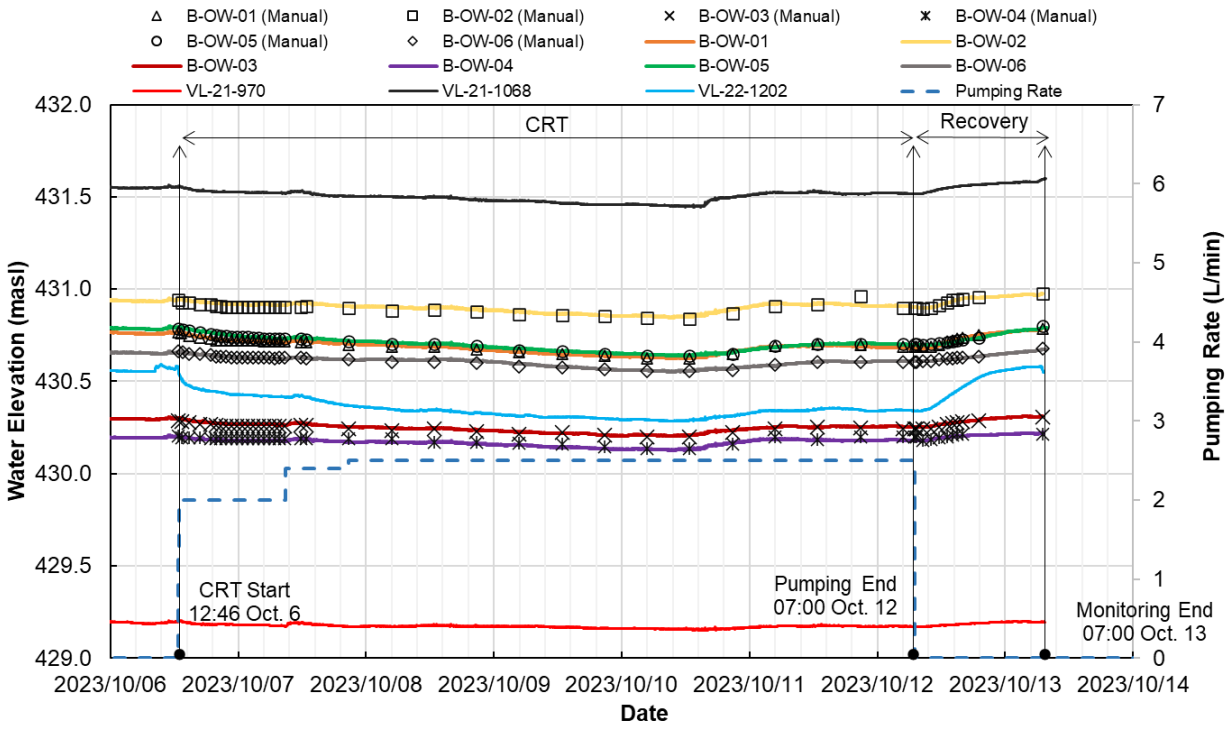


Figure 5.2 Groundwater Elevation in OWs during CRT[1]

[1] Note that the water level elevations of two exploration holes are not presented on the chart (did not fit within range of Y axis). Water levels in both of those BHs showed similar response.

Table 5.4 Maximum Drawdown Measured at Wells

Well ID	Maximum Drawdown (m)	Radial Distance to Pumping Well (m)
B-PW-01	85.32	0
VL-22-1202	0.30	8.6
B-OW-03	0.10	20.2
B-OW-01	0.14	20.3
B-OW-05	0.16	20.3
VL-21-1068	0.11	30.6
VL-21-970	0.05	37
B-OW-04	0.08	60
B-OW-06	0.11	60.3
B-OW-02	0.10	60.5

The responses at the OWs indicate a characteristic drawdown response curve similar to the PW. However, we note that several potential external factors unrelated to the CRT may have affected water levels during the test, particularly in the OWs located farthest from the PW where drawdown was limited. In particular, the seasonal recessional water level trend observed during pre-test monitoring may have continued to affect water levels during the CRT.

Further, on October 10, 2023 an increase in water level elevations of about 5 cm occurred at every OW despite continued pumping. No changes to pumping rate occurred at this time, and we attribute this increase in water levels to groundwater recharge in response to light rainfall that occurred in the area at this time.

While the change in water levels observed at the OWs are likely a combination of several conditions (drawdown from pumping, seasonal variations in shallow groundwater levels, and response to precipitation), it is difficult to untangle the effect of these external factors from the small drawdown response at the OWs. Acknowledging this, the observed water levels were used as is to calculate the bedrock hydraulic parameters.

5.2.3 Response of Wells to Precipitation

The potential effects of rainfall recharge were observed on October 10, 2023 when an increase in water level elevations of about 5 cm occurred at every OW despite continued pumping. We attribute this increase in water levels to groundwater recharge in response to light rainfall that occurred in the area at this time. Infiltration and shallow groundwater recharge in response to rainfall during the CRT may have reduced drawdowns on the OWs leading to an overestimation of T.

Also, heavy precipitation (3.4 cm) was observed during the recovery period (October 12-13, 2023) at the test site. Infiltration and shallow groundwater recharge in response to rainfall during recovery may have accelerated water level recovery in the OWs, leading to an overestimation of T.

No such cm-scale infiltration is expected to have affected drawdown and recovery at the PW given the relatively substantial amount of drawdown (85 m) that occurred in this well.

5.2.4 Well Storage Effect

Well storage would have been a factor affecting early-time pumping, given the well volume and low inflow rates. Based on the geometry of the well, without any groundwater inflows we would expect that it would take at least 1,750 minutes for well bore storage to be fully removed from the well. Due to suspected well storage effects, only data after 1,750 minutes and recovery data are use for hydraulic analysis of the PW and OWs data.

5.2.5 Constant Rate Test Analysis

5.2.5.1 Pumping Test Analysis Software

The software package AQTESOLV® Pro (version 4.50.002, distributed by HydroSOLVE Inc.) was used to analyze drawdown from the CRT.

5.2.5.2 Aquifer Properties from Pumping Test Analysis

AQTESOLV has various analytical solutions for interpretation of pumping test data depending on the type of aquifer system and the boundary conditions. As is typical in real-world pumping tests, certain assumptions made in developing these solutions were violated in the actual test set-up or hydrogeological setting.

As an approach to hedge against these deviations from ideal assumptions in solution models, we applied four different methods to analyze the CRT data; all of which are applicable for unsteady flow to a fully-penetrating well in an unconfined/semi-confined aquifer:

- Theis, 1935 (curve matching method)
- Hantush-Jacob, 1955 (curve matching method)
- Theis Recovery, 1935 (residual drawdown method)
- Theis, 1935 (distance-drawdown method)

The analyzed drawdown data for the PW and OWs using the selected solution methods are graphically presented in Appendix E and include plots of computed drawdown derivatives (showing the *rate of change* in drawdown). Derivative plots are useful to highlight subtle changes in drawdown and well hydraulic behaviour that are difficult to see or identify visually on the main drawdown curves.

Derivative plots of the PW and OW drawdown data showed irregular up and down patterns typical of a heterogenous fractured bedrock aquifer. Distinctive shapes in the derivative plots were discernible reflecting various well and flow conditions and were used to improve solution method curve matching and to identify stages of wellbore storage and radial flow in all data sets.

Derivative plots for the PW and OWs showed overall flattening of the derivative curve (indicating that the rate of drawdown stabilized) starting at approximately 1800 minutes. This period of flattening of the derivative curve likely reflects the end of well storage effects and is inferred to indicate a period of conventional radial flow and was used for solution curve-matching.

The following aquifer parameters were calculated in AQTESOLV:

- Transmissivity (T) - m^2/s; and,
- Storativity (S) - unitless.

The results of the pumping test analyses are summarized in Table 5.5. The calculated values of T for the Hantush-Jacob, Theis and Theis Recovery Methods from the PW cluster in a tight range from 6.4E-08 m^2/s to 1.3E-07 m^2/s, with a geometric mean of 9.5E-08 m^2/s.

Table 5.5 Summary of Pumping Test Analysis Results

Well ID	Constant Head Test		
	T (m^2/s)	S (-)	Analysis Method
B-PW-01	1.01E-07	-	Hantush-Jacob (1955)
	1.34E-07	-	Theis (1935)
	6.43E-08	-	Theis Recovery
B-OW-01	2.42E-05	1.30E-02	Hantush-Jacob (1955)
	5.23E-05	1.31E-02	Theis (1935)
	5.94E-05	-	Theis Recovery
B-OW-02	3.11E-06	5.51E-04	Hantush-Jacob (1955)
	6.04E-05	2.61E-03	Theis (1935)
	4.84E-05	-	Theis Recovery
B-OW-03	6.38E-05	2.00E-02	Hantush-Jacob (1955)
	7.16E-05	1.85E-02	Theis (1935)
	9.12E-05	-	Theis Recovery
B-OW-04	2.88E-05	2.49E-03	Hantush-Jacob (1955)
	6.38E-05	4.00E-03	Theis (1935)
	1.62E-04	-	Theis Recovery
B-OW-05	2.21E-05	1.02E-02	Hantush-Jacob (1955)
	5.24E-05	1.08E-02	Theis (1935)
	3.41E-05	-	Theis Recovery
B-OW-06	5.29E-06	7.71E-04	Hantush-Jacob (1955)
	5.73E-05	3.10E-03	Theis (1935)
	5.73E-05	-	Theis Recovery
VL-21-970	1.32E-04	1.09E-02	Hantush-Jacob (1955)
	1.62E-04	1.17E-02	Theis (1935)
	1.17E-04	-	Theis Recovery
VL-21-1068	2.19E-05	5.74E-03	Hantush-Jacob (1955)
	5.74E-05	8.38E-03	Theis (1935)
	1.03E-04	-	Theis Recovery
VL-22-1202	2.06E-05	1.71E-02	Hantush-Jacob (1955)
	4.90E-05	5.45E-03	Theis (1935)
	1.53E-05	-	Theis Recovery
All_OWs	5.08E-05	5.12E-03	Theis Distance Drawdown

Notes:
"-" parameter not analyzed using this analytical solution

The calculated values of T for the Hantush-Jacob, Theis and Theis Recovery Methods for the OWs ranged from 3.1E-06 m^2/s to 1.6E-04 m^2/s, with a geometric mean of 4.4E-05 m^2/s. The results using the Theis time-drawdown methods, which provides composite estimate of aquifer parameters from the OWs, calculated a transmissivity of 5.1E-05 m^2/s.

The calculated T value for the Theis time-drawdown method was similar to the geometric mean of the results of the Hantush-Jacob, Theis and Theis Recovery Methods from curve fitting of the OWs. However, the calculated T values from the PW were three orders of magnitude lower than those calculated from the OWs. The lower K value obtained at the PW suggest a localized more competent, less fractured rock mass in the local area of the PW.

It is assumed for the calculation of K, that the PW fully penetrates the aquifer that would contribute water to the future pit. Using the geometric mean for T for the PW of 9.5E-08 m^2/s and dividing by the inferred aquifer thickness (229.9 m; the saturated depth of the PW), the calculated hydraulic conductivity for the bedrock in the local area of the PW was 4.2E-10 m/s. The low K at this location is substantiated by low air lift yields for the PW and qualitative observations regarding the competence of the bedrock from rock core logging at B-PW-01.

Using the geometric mean T of the Hantush-Jacob, Theis and Theis Recovery Methods for OWs of 4.4E-05 m^2/s and dividing by the inferred aquifer thickness (229.9 m; the saturated depth of the PW), the calculated hydraulic conductivity for the OWs was 1.9E-07 m/s.

The S values from the CRT analysis (Hantush-Jacob, Theis, Theis Recovery Methods and Theis distance drawdown) ranged from 0.0006 to 0.02, with a geometric mean of 0.006. These values are similar to published literature values for fractured to sound bedrock (Batu, 1998)

5.2.6 Anisotropy and Radius of Influence

It is difficult to assess the anisotropy of drawdown responses due to the limited response and area of hydraulic influence associated with the test. However, from the results, we observed no substantial anisotropy. This is reasonable given the narrow range in K values calculated from the OWs and a relatively uniform circular cone of depression from the maximum drawdown during the pumping test (depicted on Figure A.3 in Appendix A).

As indicated in Section 3.1, B-OW-04 was placed specifically to intercept the VLTF. One of the objectives of this study was to assess if there are influences on hydraulic properties related to the orientation of lithological boundaries and structures (such as the VLTF). Results from the pumping test indicate that there are no marked variations in K associated with faults or fault zones, which is consistent with findings from the Marathon and Leprechaun deposit Areas (GEMTEC, 2022a).

The radius of influence from the pumping test is estimated to be roughly 100 m, which is presented on Figure A.3 (Appendix A). It was estimated from the distanced drawdown curve from the OWs, show in Figure 5.3.

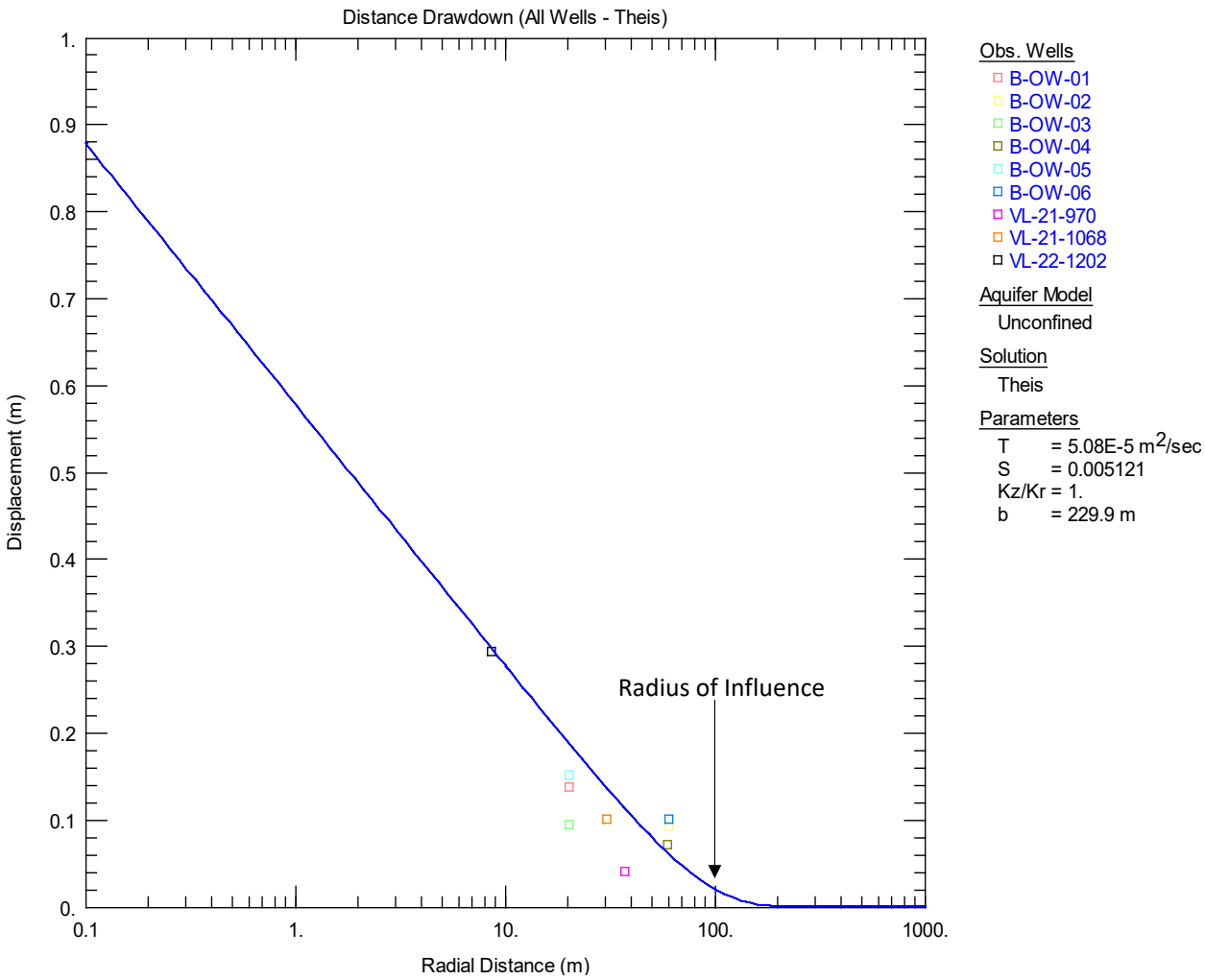


Figure 5.3 Maximum Drawdown with Distance

5.2.7 Boundary Effects

Given the limited response to pumping at the OWs it is difficult to assess the potential of boundary effects from the pumping data. Perturbations in drawdown data are explainable as the result of overprinting influences from seasonal groundwater level changes and rainfall. Based on the data collected, we could discern no profound boundary conditions affecting these test results.

5.3 Water Quality

5.3.1 Quality of Pumped Groundwater

Four groundwater samples were collected from the surface sampling port of B-PW-01 including one duplicate sample for quality assurance purposes. The samples were taken at the following times after the CRT began (WS = water sample; SD = sample duplicate):

- B-PT-01-WS1 – Taken on October 6, 2023;
- B-PT-01-WS2 and B-PT-SD – Taken on October 9, 2023; and
- B-PT-01-WS3 – Taken on October 12, 2023.

Groundwater samples were stored in a cooler packer with ice and submitted under chain of custody to a laboratory that has Standards Council of Canada (SCC) accreditation. The samples were submitted to AGAT Laboratories in Dartmouth, Nova Scotia for laboratory analysis of general chemistry and total metals. The Certificate of Analysis are presented in Appendix F, laboratory analytical results are summarized in Tables F-1 and F-2 in Appendix F, and a piper trilinear diagram of concentrations of major ions for the groundwater samples is provided in Figure F-1 in Appendix F.

Deep groundwater in the Berry deposit area can be generally classified as calcium-bicarbonate type, typical of shallow groundwater flow systems recharged by meteoric water. The groundwater samples are generally neutral to slightly basic, with pH values ranging from 6.91 to 7.38. Total alkalinity (mg-$CaCO_3$/L) ranged from 119 to 166 mg/L, and hardness (mg-$CaCO_3$/L) values range from 95.9 to 140 mg/L (moderately hard to hard). Electrical conductivity values for samples collected range from 237 to 309 umho/cm (freshwater conditions), total dissolved solids ranged from 125 mg/L to 172 mg/L, turbidity measurements ranged from 1.74 NTU to 5.98 NTU, and color measurements were non-detect for all samples (<5 TCU) except for the sample taken on October 6, 2023, which returned a value of 12.1 TCU. Figure F-1 shows that all of the sample data plot in a very tight cluster, indicating that groundwater flowing to B-PW-01 during the pumping test was of very consistent quality, with no mixing effects from introduced drilling water.

Analytical results for groundwater samples were compared to the Canadian Council of Ministers of the Environment Water Quality Guidelines for the Protection of Aquatic Life (freshwater, long-term) (CCME-FAL) (CCME, 1999 and updates). The following parameters exceeded the CCME-FAL guidelines:

- Aluminum exceeded the pH dependent CCME guideline of 100 ug/L on October 6, 2023, with a result of 166 mg/L;

- Copper concentration exceeded the hardness dependent CCME guideline in on October 6, 2023, and October 12, 2023 (with guidelines of 2.28 and 2.90 ug/L and values of 28 and 6 ug/L, respectively);

- Fluoride exceeded the CCME guideline of 0.12 mg/L in on October 6, 2023, with a result of 0.19 mg/L;

- Iron concentration exceeded the CCME guideline of 300 ug/L in on October 6, 2023, with a result of 838 ug/L; and

- Lead concentration exceeded the hardness dependent CCME guideline of 3.02 ug/L on October 6, 2023, with a result of 13.1 ug/L.

Analytical results were compared with previous results from similar pumping tests completed in the Marathon and Leprechaun deposit areas (GEMTEC, 2022a). The water quality results from the Berry CRT were generally similar to the results from the Marathon and Leprechaun deposit areas, with the following notable differences:

- The groundwater sampled during the pumping test from the Marathon deposit area had elevated manganese concentrations in exceedance of the CCME FAL guideline, which were not observed in the Leprechaun or Berry tests;

- Samples from B-PW-01 had higher concentrations of barium, iron and phosphorus (not in exceedance of the CCME FAL guidelines, apart from iron in the sample of October 6, 2023) in comparison with the results from Marathon and Leprechaun.

Analytical results were also compared with previous results from the Berry deposit area by GEMTEC (2022a). The water quality results from the Berry CRT were generally similar to the results from the geotechnical and hydrogeological investigation with the following notable differences:

- The BHs from feasibility-level study were generally higher in turbidity with values ranging from 1.5 to 297 NTU. Turbidity is caused by suspended particulates. Elevated levels are common in OWs screened in fine-grained soil where ingress of formational fines occurs during pumping for sampling.

- Samples from B-PW-01 had higher concentrations of copper, iron, lead, phosphorus and zinc than the shallower groundwater results from the feasibility-level studies. The relatively higher concentrations for these parameters are likely attributed to increased residence time in the host rock formations with depth.

The reported water quality from B-PW-01 represents the general quality of deep groundwater we anticipate will flow into the pit during development. These samples do not indicate the possible

variability of groundwater quality, either spatially around the pit, or due to seasonal or inter-year variations.

5.3.2 Quality Assurance / Quality Control of Groundwater Samples

One field duplicate sample (B-PT-SD) was collected during the sampling event on October 9, 2023 to check for the natural sample variance and the consistency of field techniques and laboratory analysis. The initial sample bottles for a particular parameter or set of parameters were filled first and then the duplicate sample bottles were filled. The duplicate samples were handled in the same manner as the initial samples. One duplicate sample, equal to 25% of the total number of samples analysed, was assigned a QA/QC identification number, stored in an iced cooler, and shipped to the laboratory with the other samples.

The relative percent difference (RPD) is used to evaluate sample result variability for duplicate samples and is calculated by the following equation:

$$RPD = \left[\frac{|S1 - S2|}{S3}\right] \times 100$$

where: RPD = relative percent difference
S1 = original sample concentration
S2 = duplicate sample concentration
S3 = average concentration = (S1 + S2)/2

Results of the quality control sampling for the October 9, 2023 sampling event are provided in Table 5.6.

The RPDs for the field duplicate groundwater sample for both the inorganic parameters and total metals were generally less than 25%; with an average RPD of 6.3% and 3.0%, respectively. Based on these results the data quality is considered acceptable. Further the individual parameters were classified the same (either above or below guidelines) in both the original and duplicate samples during both events.

Results of quality assurance calculations (i.e., matrix spike, spiked blank, method blank and RPD calculations) for the laboratory duplicated sample are presented in the laboratory provided certificates of analysis provided in Appendix F. The overall quality control was considered to meet acceptability criteria.

Table 5.6 Summary of QA/QC Sampling for Field Duplicate B-PT-SD

Sample Media Type	Analysis	Range of %RPD	No. of parameters within RPD	Acceptable Duplicate Correlation
Groundwater	Inorganic Parameters	0% to 35.5%; Average 6.3%	29 of 31	Yes
	Total Metals	0% to 28.6%; Average 3.0%	26 of 27	Yes

6.0 DISCUSSION

6.1 Hydraulic Behaviour of Different Rock Units and Structures

Record of borehole logs indicate that all of the OWs and PW are located within the QEP. Therefore, the pumping test only tested one rock type.

As indicated in Section 3.1, B-OW-04 was located specifically to intercept the VLTF. One of the objectives of this study was to assess if there are influences on hydraulic properties related to the presence and orientation of lithological boundaries and structures (such as the VLTF). Results from the pumping test indicate that there are no marked variations in K associated with faults or fault zones, which is consistent with findings of the packer testing program in the Berry deposit area (GEMTEC, 2023) and from previous hydrogeological programs in the Marathon and Leprechaun deposit areas (GEMTEC, 2022a).

6.2 Anisotropy and Significance for Pit Dewatering

It is difficult to assess the anisotropy of drawdown responses due to the limited response and area of hydraulic influence due to pumping. However, based on the test results, we did not identify any anisotropic trends in drawdown or K that would suggest directional groundwater flow. While this pumping test had a limited radius of influence with respect to the full size of the proposed Berry Pit complex, our results are in keeping with the findings of the GEMTEC (2023) pit-scale packer testing program. Those results indicated that the rock mass generally had low permeability with no distinct changes in permeability associated with the faults encountered within the packer test intervals. Based on the findings of the current pumping test and GEMTEC (2023) results, we do not anticipate that faults intersecting or present near the proposed pit will be preferred pathways for groundwater flow or require extraordinary engineering measures for seepage control and pit dewatering.

6.3 Shallow Bedrock Response to Precipitation and Significance for Pit Dewatering

Groundwater elevations were monitored using dataloggers at three wells in the Berry deposit area prior to pumping. Two of the boreholes were paired (one shallow and one deep installed next to each other). The water levels in all three boreholes were responsive to rainfall events, and the response to rainfall was observed to be attenuated with depth at the nested pair. Further a rapid and widespread response in groundwater levels was observed (in the OWs) to rainfall events that occurred during the CRT and recovery monitoring. From this we conclude that there is an efficient hydraulic connection between rainfall, surface infiltration, and prompt response of shallow bedrock groundwater levels in the Berry deposit area. An efficient hydraulic connection between rainfall and response in the shallow bedrock was also observed during the previous pumping test in the Marathon deposit area (GEMTEC, 2022a). Such rapid response of shallow groundwater levels to rainfall events could have implications for groundwater control around the rim and upper levels of the proposed pit.

6.4 Comparison of Geometric Mean K Values for Different Approaches

In-situ K testing of the bedrock in the Berry deposit area was completed by GEMTEC in 2022 and 2023.

GEMTEC (2022b) carried out single-well response tests and packer tests outside of the Berry pit area, with tested depths in bedrock ranging from 2.0 to 31.6 mbgs. Estimated K values ranged from 6E-08 to 3E-06 m/s, with a geometric mean of 4E-07 m/s. No obvious correlation between K and bedrock type or depth was identified.

GEMTEC (2023) carried out packer testing within the footprint of the proposed Berry pit, with tested intervals in bedrock ranging from near-surface to great than 200 mbgs. Estimated K values ranged from 7E-10 to 2E-06 m/s, with a geometric mean of 5E-08 m/s. The results showed no obvious correlation between K and bedrock type, fault structure (including the VLTF), or between pits; however, a weakly-defined decrease of K with depth was identified.

The estimated hydraulic conductivity values for the PW and OWs in this study fell within the range of the GEMTEC (2023) packer test estimates. For this pumping test, the geometric mean of K estimate for the PW was 4.2E-10 m/s. The geometric mean K value for all of the OWs was 1.9E-07 m/s.

6.5 Significance of Pumping Test Results on Current Groundwater Inflow Estimates

The calculated K values from this pumping test were compared to K values used in a steady-state, three-dimensional numerical groundwater flow model of the Berry deposit area by Stantec (2023). Stantec's model included three hydrostratigraphic layers in the bedrock: Upper, Intermediate, and Deep Bedrock. These model layers were assigned thicknesses of 20, 100, and 250 m, respectively.

In Stantec's model the Berry deposit area is understood to be located in the K zone for the VLIS quartz monzonite (referred to as the Valentine Lake Quartz Monzonite (VLQ) in Stantec's 2023 modeling report). The K values Stantec used for the Upper, Intermediate, and Deep Bedrock layers to calibrate their model were: 1.1E-6, 3.7E-9, and 1.3E-11 m/s, respectively.

The K values presented in this report represent a composite hydraulic response to the QEP (VLQ equivalent) rock mass in the test area over a depth range (up to 300 mbgs) that spans the Upper, Intermediate, and part of the Deep Bedrock layers in Stantec's model. The calculated K values presented here are within the range of K values used by Stantec for their bedrock layers to calibrate their model. This is an important finding. It provides a useful confirmation of the bedrock K values used in Stantec's model and, in turn, adds weight to the validity of their predicted groundwater inflow estimate for the Berry pit.

7.0 CONCLUSIONS

Our conclusions relate directly to the specific objectives presented in Section 1.3.

Objective 1: Using long-term (nominally seven-day) constant-rate pumping test and recovery data, determine aquifer hydraulic parameters: transmissivity (T) and storativity (S). From the T value, calculate the bulk K value for the rock mass affected by the pumping test.

A long-term (nominally seven-day pumping and one day of recovery monitoring) CRT was designed for the Berry deposit area. However, the CRT was terminated one day early (day six of test) as weather reports indicated that a large rain event would occur on the seventh day.

The maximum drawdown in the PW was 85.32 m, the response in the OWs were relatively small ≤0.3m. Aquifer hydraulic parameters were estimated from the pumping test results. The geometric mean of T estimated from the response in the OWs was 4.4E-05 m^2/s, while the geometric mean of T estimated using the response at the PW was 9.5E-08 m^2/s. Values of S ranged from 0.0006 to 0.02, with a geometric mean of 0.006.

K values calculated from the above geometric mean T values and assuming an aquifer thickness of 230 m (depth of B-PW-01) were 4.2E-10 m/s (for the pumping well) and 1.9E-07 m/s (for the OWs).

Objective 2: Using an array of observation wells (specifically installed for this program and selected existing exploration boreholes), assess the anisotropy (directionality) of the drawdown cone developed during the pumping test and, if present, relate this directionality to mine site geology (i.e., orientation of lithological boundaries or structures).

We observed no discernable anisotropy of the drawdown cone.

Objective 3: Using the pumping test data, assess the nature and location of substantial changes in hydraulic response across lithological boundaries or prominent structures (faults or fault zones) within the drawdown cone.

We did not identify any marked variations in K associated with faults or fault zones.

Objective 4: Using the pumping test data, assess the presence and nature of any boundary conditions encountered affecting groundwater flow within the drawdown cone of the pumping well

(e.g., a constant head boundary from a large water source, or a no-flow boundary due to very low permeability rock).

Given the limited response to pumping at the OWs, it was difficult to assess the presence or nature of boundary effects from the pumping test data. Perturbations in drawdown data are explainable as the result of overprinting influences from seasonal groundwater level changes and rainfall. Based on the data collected, we could discern no profound boundary conditions affecting these test results.

Objective 5: Compare the bulk K value from this pumping test with the geometric mean K value determined from packer tests in the proposed open pit area, as well as those previously used to estimate groundwater inflows into the proposed pits by Terrane (2023) using an analytical calculation method, and by Stantec (2023) using steady-state numerical groundwater flow modelling.

The K value calculated from the geometric mean of the T values obtained for B-PW-01 and the OWs were 4.2E-10 m/s and 1.9E-07 m/s, respectively .

A wide range of K values have been observed at the site from packer testing results carried out by GEMTEC (2022b) and GEMTEC (2023): 7E-10 to 3E-06 m/s. The K calculated from the response at OWs are within the range observed for the packer testing, and the lower K estimate obtained from the results at the PW is near the lower range of K values estimated from packer testing.

A dewatering estimate of the pit based on the K values obtained from packer testing and using a steady-state analytical model was carried by GEMTEC (2023). That calculation used a bulk K for the rock mass of 4.55E-08 m/s, which is of comparable magnitude to K values calculated from the response at the OWs in this study.

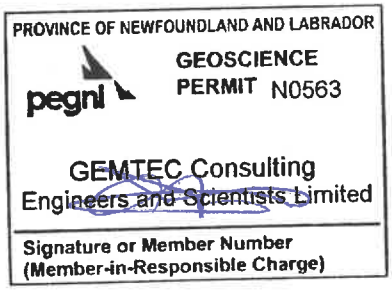
The calculated K values presented here from the response of B-PW-01 and the OWs are within the range of K values used by Stantec to calibrate their steady-state, numerical groundwater flow model. This provides a useful confirmation of the bedrock K values used in Stantec's model and, in turn, adds weight to the validity of their predicted groundwater inflow estimate for the Berry pit.

8.0 CLOSURE

This report was prepared by Jacqueline Brook, M.Sc., P.Geo. and Carolyn Anstey-Moore, M.Sc., M.A,Sc., P.Geo. with data management and processing by Jason KarisAllen, MASc, EIT, and report review by H. Scott Schillereff, Ph.D., P.Geo., FGC. We trust that this report meets your present requirements. If you have any questions or require additional information, please contact our office at your convenience.

Respectfully Submitted,

GEMTEC Consulting Engineers and Scientist Limited



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APPENDIX A

Figures

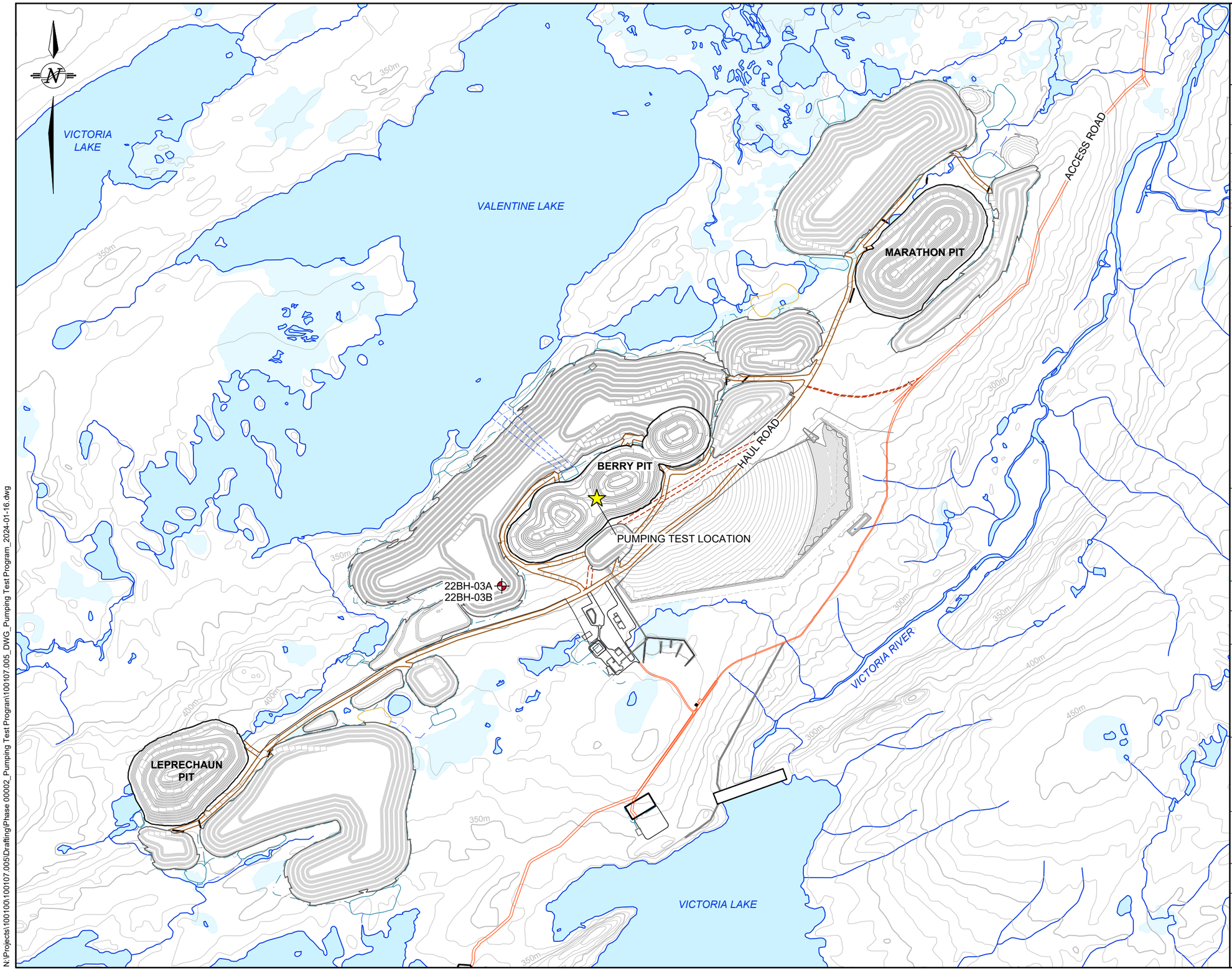
Figure A.1 – Site Location Plan

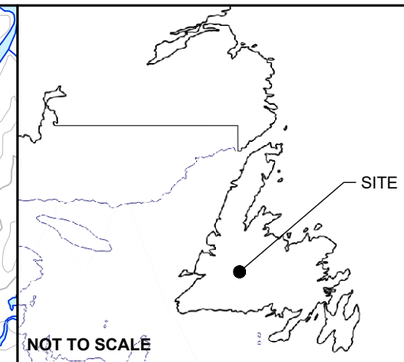
Figure A.2 – Berry Deposit Pit Classification

Figure A.3 – Detailed Test Location Plan Berry Deposit Area

Figure A.4 – Profile of Inflow Rates versus Depth for Pumping Well B-PW-01

Figure A.5 - Pumping Rates versus Daily Precipitation – Pumping Test Program





NOT TO SCALE

Legend

- PUMPING TEST LOCATION
- BOREHOLE LOCATION
- 350m 10m CONTOUR
- WATERCURSE
- WATERBODY
- WETLAND

General Notes

1. This drawing is a schematic representation. Sizes, locations and dimensions are approximate.
2. Coordinate system: NAD83(CSRS) / UTM zone 21N.
3. Base map features and contour from Data Extraction, Government of Canada.
4. Mine Infrastructure layout from Terrane (2023).

Date	Draw by	Checked by
JANUARY 2024	CHG	CAM

Client: TERRANE GEOSCIENCE INC.

Project: PUMPING TEST PROGRAM
BERRY DEPOSIT AREA,
VALENTINE GOLD PROJECT
MARATHON GOLD CORPORATION
VALENTINE LAKE, NL

Drawing: SITE LOCATION PLAN

Scale: 1:7500

0 150 300 450m

Project No.	Drawing No.	Rev. No.
100107.005	FIGURE A.1	0

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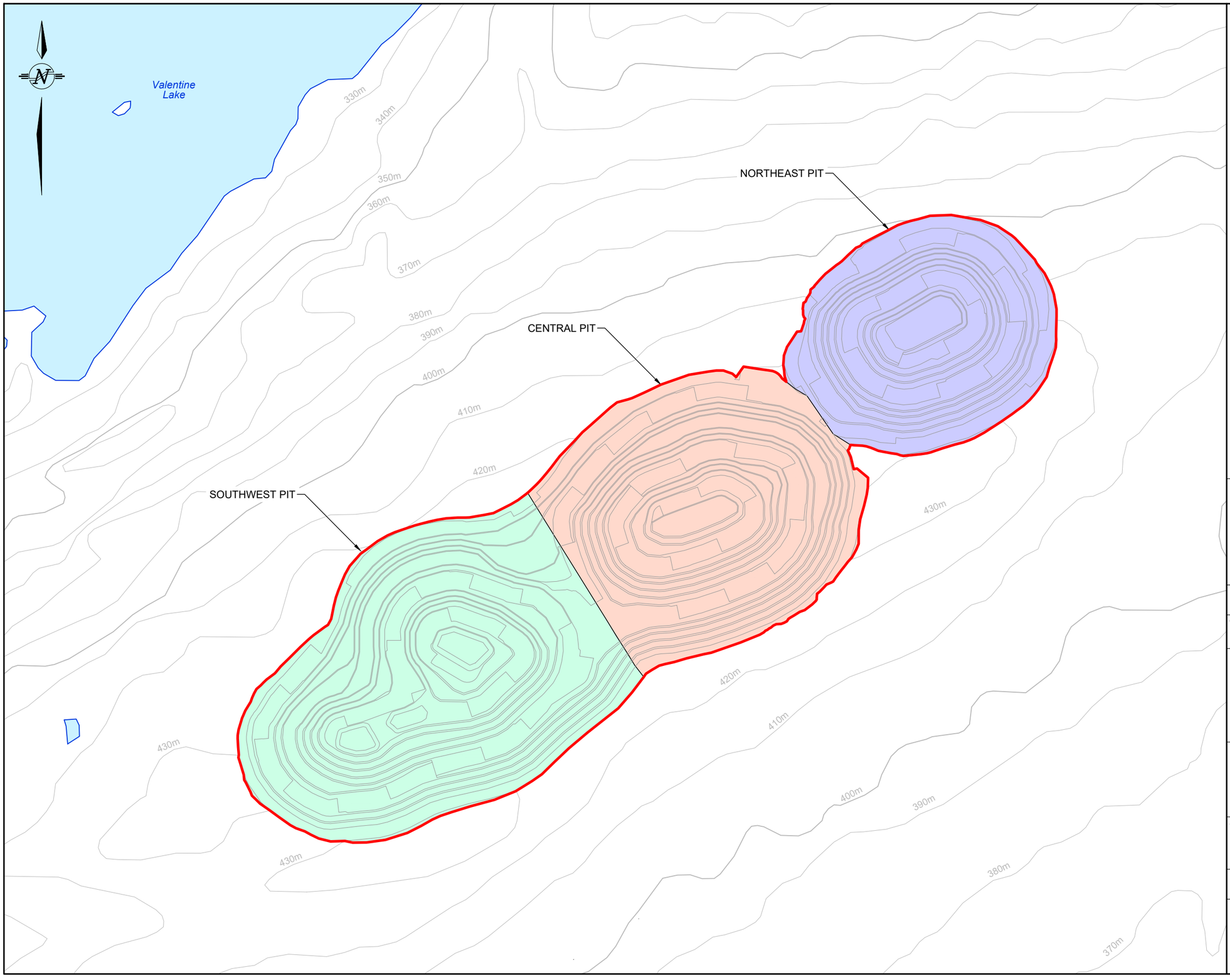

Legend

- 350m — 10m CONTOUR
- NORTHEAST PIT AREA
- CENTRAL PIT AREA
- SOUTHWEST PIT AREA
- BERRY OPEN PIT
- WATERBODY

General Notes

1. This drawing is a schematic representation. Sizes, locations and dimensions are approximate.
2. Coordinate system: NAD83(CSRS) / UTM zone 21N.
3. Base map features and contour from Data Extraction, Government of Canada.
4. Pit area classification based on Figure 2 'Berry Deposit Pit Classification' from Terrane (2023).

Date	Draw by	Checked by
JANUARY 2024	CHG	CAM

Client: TERRANE GEOSCIENCE INC.

Project: PUMPING TEST PROGRAM
BERRY DEPOSIT AREA,
VALENTINE GOLD PROJECT
MARATHON GOLD CORPORATION
VALENTINE LAKE, NL

Drawing: BERRY DEPOSIT PIT CLASSIFICATION

Scale 1:7500

0 150 300 450m

Project No.	Drawing No.	Rev. No.
100107.005	FIGURE A.2	0

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B-OW-02

VL-21-970

430.8 m

B-OW-01

B-OW-06

1 m

10 m

50 m

70 m

B-OW-05

B-PW-01

430.6 m

VL-22-1202

430.4 m

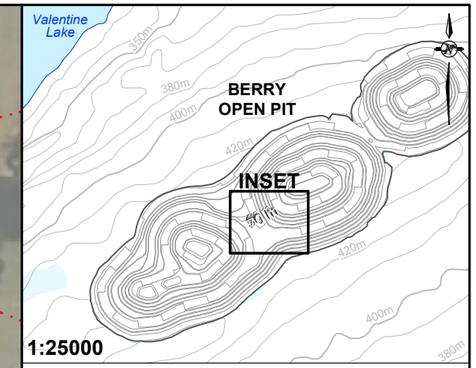
B-OW-03

VL-21-1068

B-OW-04

DISCHARGE POINT

VALENTINE LAKE THRUST FAULT



Legend

- PUMPING WELL
- OBSERVATION WELL
- EXPLORATION BOREHOLE
- DISCHARGE POINT
- RADIUS OF INFLUENCE (100m OUT FROM PUMPING WELL)
- 430.8 m — GROUNDWATER ELEVATION CONTOURS (masl)
- 10 m — DRAWDOWN AT END OF CONSTANT RATE PUMPING TEST (m)
- FAULT SURFACE TRACE

General Notes

1. This drawing is a schematic representation. Sizes, locations and dimensions are approximate.
2. Coordinate system: NAD83(CSRS) / UTM zone 21N.
3. Base map features and contour from Data Extraction, Government of Canada.
4. Background aerial image from 2020. Source: Google Earth.
5. Fault surface trade from Terrane (2023).
6. Mine infrastructure layout from Terrane (2023).

Date	Draw by	Checked by
JANUARY 2024	CHG	CAM

Client: TERRANE GEOSCIENCE INC.

Project: PUMPING TEST PROGRAM
BERRY DEPOSIT AREA,
VALENTINE GOLD PROJECT
MARATHON GOLD CORPORATION
VALENTINE LAKE, NL

Drawing: DETAILED TEST LOCATION PLAN
BERRY DEPOSIT AREA

Scale 1:1000

0 20 40 60m

Project No.	Drawing No.	Rev. No.
100107.005	FIGURE A.3	0

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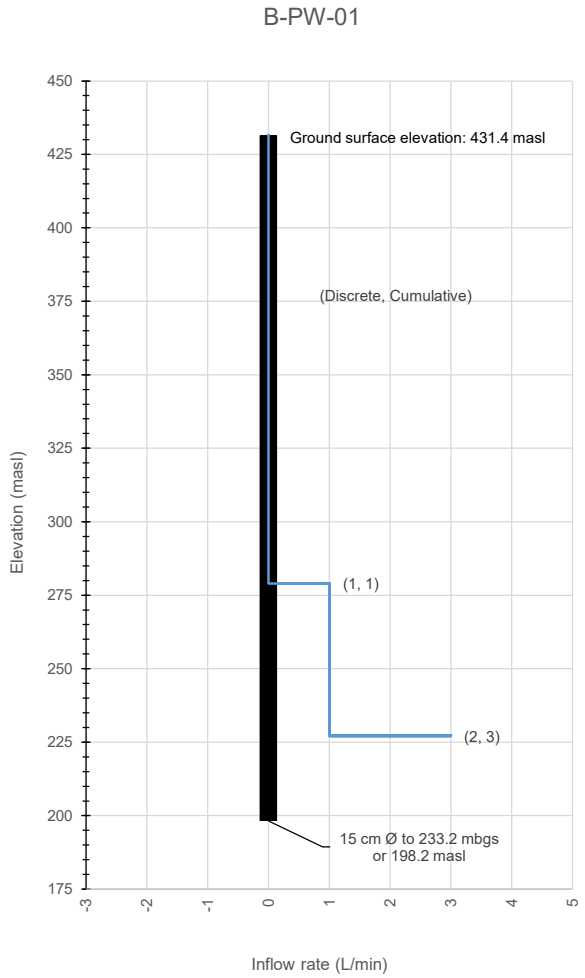
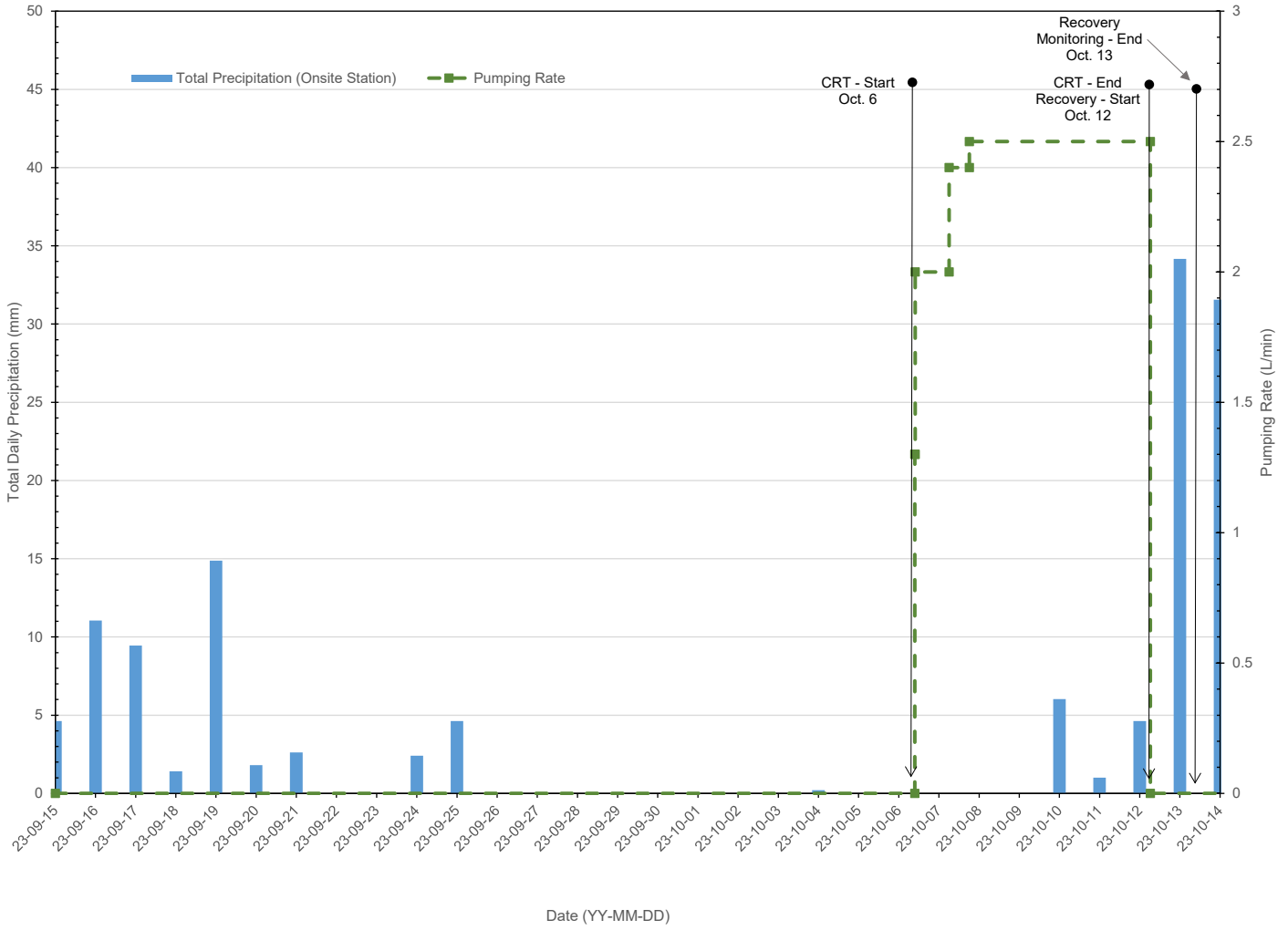
Title: **Figure A.4 - Profile of Inflow Rates versus Depth for Pumping Well B-PW-01**

Project: Pumping Test Program Berry Deposit
Valentine Gold Project, Marathon Gold Corporation, Valentine Lake, NL



Title: **Figure A.5 - Pumping Rates versus Daily Precipitation – Pumping Test Program**

Project: Pumping Test Program Berry Deposit
Valentine Gold Project, Marathon Gold Corporation, Valentine Lake, NL



APPENDIX B

Photographs

PHOTO 1 - Pumping test setup at B-PW-01 showing blue constant head tank. Photo looking east.

PHOTO 2 - Close up of top of B-PW-01 well casing during pumping test. Red reel is electrical water level tape. Black plastic pipes are outflow and return lines from the constant head tank.

PHOTO 3 - Close up of CRT setup at B-PW-01. Photo looking south.


PHOTO 4 - Close up of CRT tank. Photo looking north.

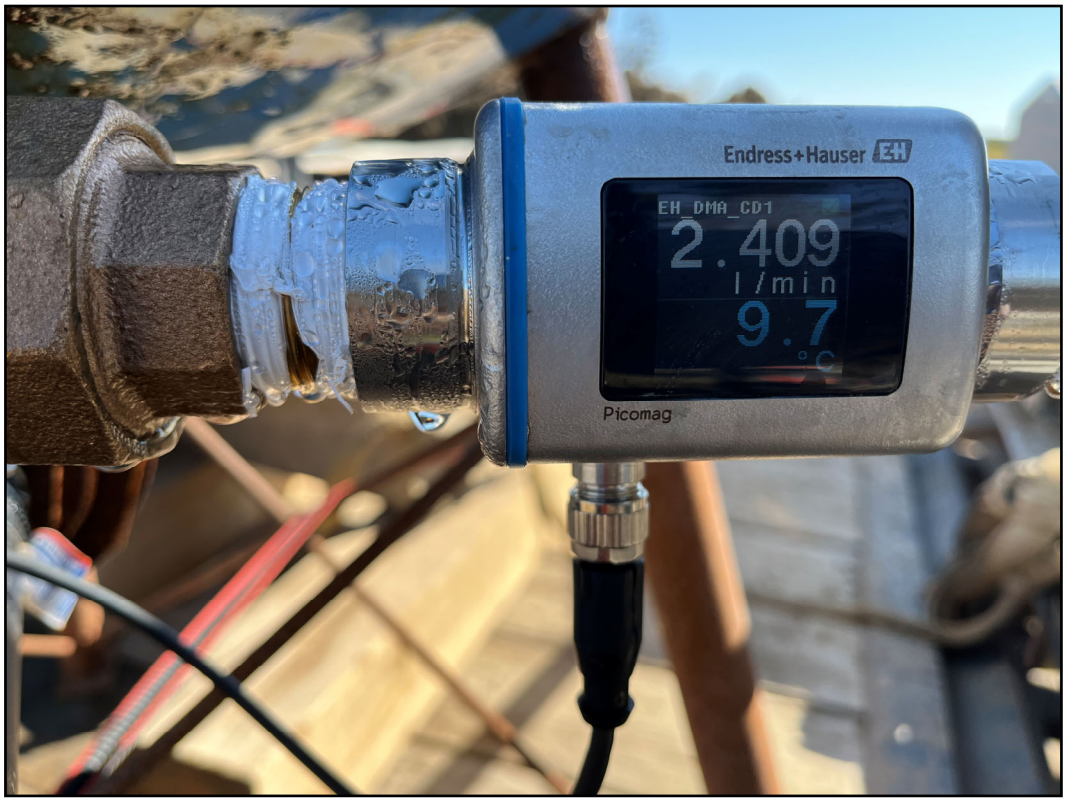


PHOTO 5 - Closeup of flow meter.

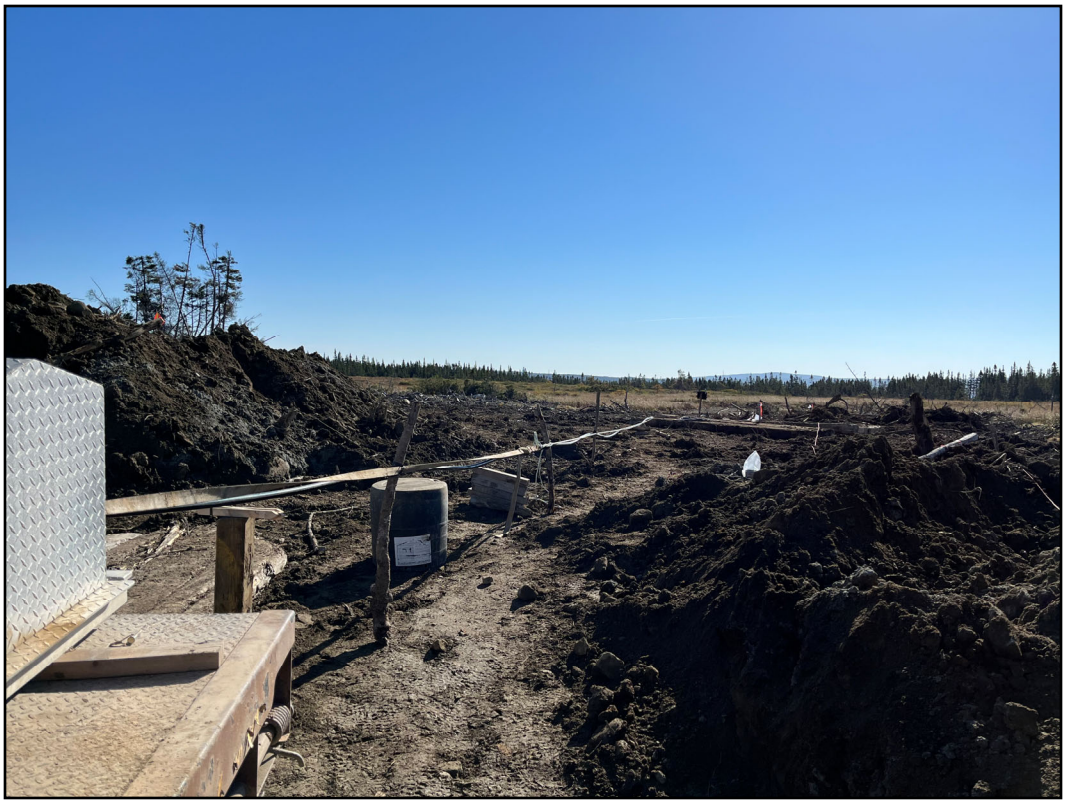


PHOTO 6 - View of B-PW-01 discharge line heading towards discharge point. Photo looking south-east.

PHOTO 7 - View of B-PW-01 discharge line. Photo looking south.

PHOTO 8 - Close up view of the end of the discharge line (discharge point).

PHOTO 9 - View of B-OW-01 during test. Photo looking west.

PHOTO 10 - View of B-OW-02 during test. Photo looking east.

PHOTO 11 - View of B-OW-03 during test. Photo looking west.

PHOTO 12 - View of B-OW-04 during test. Photo looking north-east.

PHOTO 13 - View of B-OW-05 during test. Photo looking north-west.

PHOTO 14 - View of B-OW-06 during test. Photo looking west.

PHOTO 15 - View of VL-21-1068 during test. Photo looking west.

PHOTO 16 - View of VL-22-1202 during test. Photo looking north.

APPENDIX C

Well Logs

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 1 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

DEPTH SCALE METRES	BORING METHOD	LITHOLOGY: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: SAMPLE ID	TYPE	RECOVERY (%) or TCR (%)	SPT N VALUE or RQD (%)	LAB. TESTING	INSTALLATION DETAIL: COMMENTS	INSTALLATION PLOT
0		Ground Surface		431.40						Stickup = 0.81	
1		Grey brown, silty sand and gravel. Grey drill fragments (dry) returns: OVERBURDEN		0.00						152.4 mm diameter steel surface casing	
2											
3											
4				427.40							
5		QUARTZ EYE PORPHYRY *-Grey drill water and fragments returns, cuttings are coarse with quartz fragments*		4.00							
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27										152.4 mm diameter open borehole from end of surface casing to end of hole	
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
40											
41											
42											
43											
44											
45											
46											
47											
48											
49											
50											

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
RMR76
UCS PEAK STRENGTH (MPa)
YOUNG'S MODULUS (GPa)
10 20 30 40 50 60 70 80 90

SHEAR STRENGTH (Cu), kPA
NATURAL REMOULDED

WATER CONTENT, %
W_P W W_L

GROUNDWATER OBSERVATIONS

DATE	10/5/2023				
DEPTH (m)	0.43				
ELEV. (m)	430.97				

NOTES

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NL BH 100042001_ALL_MARATHON_DATA.GPJ GEMTEC 2018.GDT 1/23/24

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 2 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

DEPTH SCALE METRES	BORING METHOD	LITHOLOGY: DESCRIPTION	LITHOLOGY: STRATA PLOT	LITHOLOGY: ELEV. / DEPTH (m)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: RECOVERY (%) or TCR (%)	SAMPLES: SPT N VALUE or RQD (%)	PENETRATION RESISTANCE (N), BLOWS/0.3m; DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; RMR76; UCS PEAK STRENGTH (MPa); YOUNG'S MODULUS (GPa); SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED); WATER CONTENT, % (W_P, W, W_L)	LAB. TESTING	INSTALLATION DETAIL: COMMENTS	INSTALLATION DETAIL: INSTALLATION PLOT
50–100		*-Drilling is softer from 79 m to 91 m (possibly mafic dyke?)* *-Cuttings are less coarse* *-Slightly darker grey returns from 100 m*									152.4 mm diameter open borehole from end of surface casing to end of hole	

GROUNDWATER OBSERVATIONS

DATE	10/5/2023				
DEPTH (m)	0.43 ▽	▼			
ELEV. (m)	430.97				

NOTES

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NL BH 100042001_ALL_MARATHON_DATA.GPJ GEMTEC 2018.GDT 1/23/24

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 3 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

DEPTH SCALE METRES	BORING METHOD	LITHOLOGY: DESCRIPTION	LITHOLOGY: STRATA PLOT	LITHOLOGY: ELEV. / DEPTH (m)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: RECOVERY (%) or TCR (%)	SAMPLES: SPT N VALUE or RQD (%)	PENETRATION RESISTANCE (N), BLOWS/0.3m; DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; RMR76; UCS PEAK STRENGTH (MPa); YOUNG'S MODULUS (GPa); SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED); WATER CONTENT, % (W_P, W, W_L)	LAB. TESTING	INSTALLATION DETAIL: COMMENTS	INSTALLATION DETAIL: INSTALLATION PLOT
101												
102												
103												
104		*-Cuttings are coarse*										
105												
106												
107												
108												
109												
110												
111												
112												
113												
114												
115												
116												
117												
118												
119		*-Slight trickle of water coming in from formation around 119 m, as observed when drill paused*										
120												
121												
122												
123												
124												
125												
126												152.4 mm diameter open borehole from end of surface casing to end of hole
127												
128												
129												
130												
131												
132												
133												
134												
135												
136												
137												
138												
139												
140												
141												
142												
143												
144												
145												
146												
147												
148												
149												
150		*-Drilling is softer from 150 m to 157 m (possibly mafic dyke?)*										
151												

GROUNDWATER OBSERVATIONS

DATE	10/5/2023				
DEPTH (m)	0.43 ▽	▼			
ELEV. (m)	430.97				

NOTES

GEMTEC Consulting Engineers and Scientists

NL BH 100042001 ALL MARATHON DATA.GPJ GEMTEC 2018.GDT 1/23/24

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 4 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

DEPTH SCALE METRES	BORING METHOD	LITHOLOGY: DESCRIPTION	LITHOLOGY: STRATA PLOT	LITHOLOGY: ELEV. / DEPTH (m)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: RECOVERY (%) or TCR (%)	SAMPLES: SPT N VALUE or RQD (%)	PENETRATION RESISTANCE (N), BLOWS/0.3m; DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; RMR76; UCS PEAK STRENGTH (MPa); YOUNG'S MODULUS (GPa); SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED); WATER CONTENT, % (W_P, W, W_L); 10 20 30 40 50 60 70 80 90	LAB. TESTING	INSTALLATION DETAIL: COMMENTS	INSTALLATION DETAIL: INSTALLATION PLOT
152		*-From 152.4 m air-lift pumping an estimated 1 L/min from formation*										
153												
154												
155												
156		*-Cuttings have pink (feldspar?) fragments*										
157												
158												
159												
160												
161												
162												
163												
164												
165												
166												
167												
168												
169												
170												
171												
172												
173												
174												
175												
176												
177												152.4 mm diameter open borehole from end of surface casing to end of hole
178												
179												
180												
181												
182												
183												
184												
185												
186												
187												
188												
189												
190												
191												
192												
193												
194												
195												
196												
197												
198												
199												
200												
201												
202												

GROUNDWATER OBSERVATIONS

DATE	10/5/2023				
DEPTH (m)	0.43 ▽	▼			
ELEV. (m)	430.97				

NOTES

GEMTEC Consulting Engineers and Scientists

NL BH 100042001 ALL MARATHON DATA.GPJ GEMTEC 2018.GDT 1/23/24

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 5 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

DEPTH SCALE METRES	BORING METHOD	LITHOLOGY: DESCRIPTION	LITHOLOGY: STRATA PLOT	LITHOLOGY: ELEV. / DEPTH (m)	SAMPLES: SAMPLE ID	SAMPLES: TYPE	SAMPLES: RECOVERY (%) or TCR (%)	SAMPLES: SPT N VALUE or RQD (%)	PENETRATION RESISTANCE (N), BLOWS/0.3m; DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; RMR76; UCS PEAK STRENGTH (MPa); YOUNG'S MODULUS (GPa)	SHEAR STRENGTH (Cu), kPA: NATURAL, REMOULDED; WATER CONTENT, %	LAB. TESTING	INSTALLATION DETAIL: COMMENTS	INSTALLATION DETAIL: INSTALLATION PLOT
203–253		*-Returns are slightly darker grey* *-From 204.2 m air-lift pumping an estimated 2 L/min from formation*										152.4 mm diameter open borehole from end of surface casing to end of hole	
		End of Borehole, terminated 233.17m below existing ground surface.		198.23 / 233.17									

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
RMR76
UCS PEAK STRENGTH (MPa)
YOUNG'S MODULUS (GPa)
10 20 30 40 50 60 70 80 90

SHEAR STRENGTH (Cu), kPA: NATURAL, REMOULDED
WATER CONTENT, %: W_P — W — W_L

GROUNDWATER OBSERVATIONS

DATE	10/5/2023				
DEPTH (m)	0.43 ▽	▼			
ELEV. (m)	430.97				

NOTES

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NL BH 100042001 ALL MARATHON DATA.GPJ GEMTEC 2018.GDT 1/23/24

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 6 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

BOREHOLE PHOTOS

Figure B-PW-01.1
Completed Well

Figure B-PW-01.2
CS01

GROUNDWATER OBSERVATIONS							NOTES
	DATE	10/5/2023					
	DEPTH (m)	0.43	▽	▼			
	ELEV. (m)	430.97					

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Consulting Engineers and Scientists

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 7 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

BOREHOLE PHOTOS

Figure B-PW-01.3
CS02

Figure B-PW-01.4
CS03

GROUNDWATER OBSERVATIONS							NOTES
	DATE	10/5/2023					
	DEPTH (m)	0.43 ▽	▼				
	ELEV. (m)	430.97					

GEMTEC Consulting Engineers and Scientists

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 8 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

BOREHOLE PHOTOS

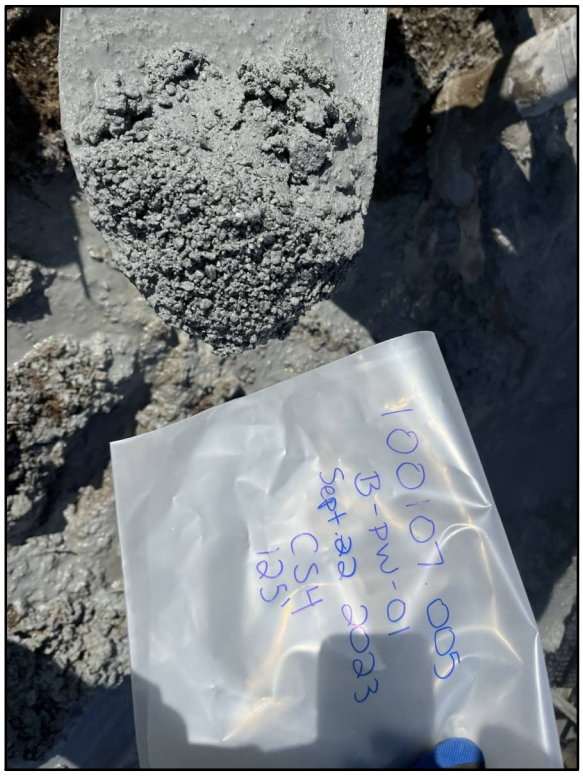

Figure B-PW-01.5
CS04

Figure B-PW-01.6
CS05

GROUNDWATER OBSERVATIONS

DATE	10/5/2023					NOTES
DEPTH (m)	0.43 ▽	▼				
ELEV. (m)	430.97					

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NL BH 100042001_ALL_MARATHON_DATA.GPJ GEMTEC 2018.GDT 1/23/24

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 9 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

BOREHOLE PHOTOS

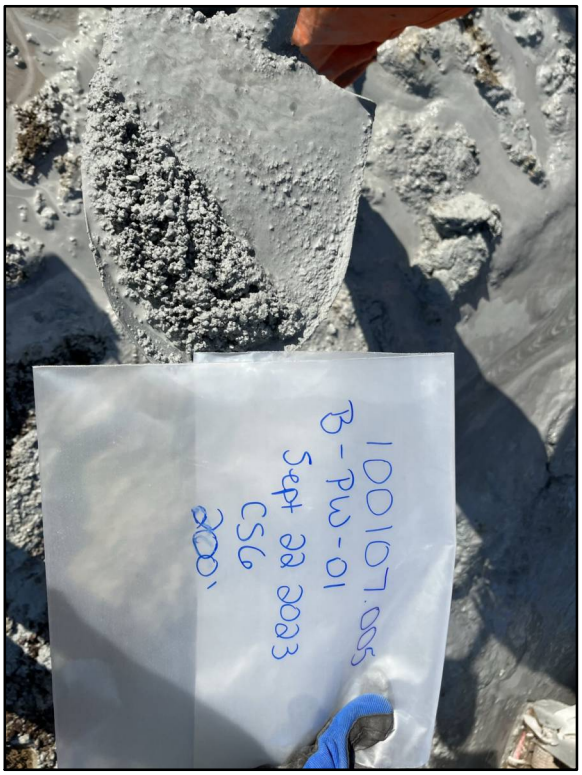

Figure B-PW-01.7
CS06

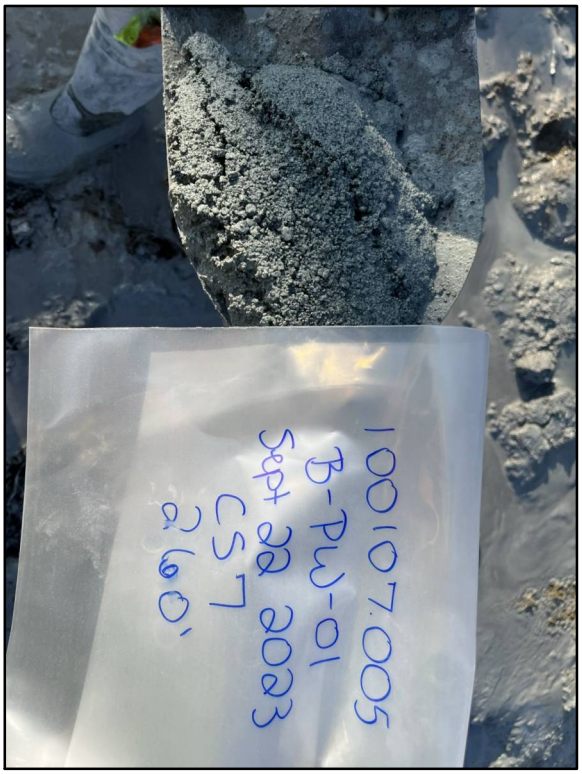

Figure B-PW-01.8
CS07

GROUNDWATER OBSERVATIONS							NOTES
	DATE	10/5/2023					
	DEPTH (m)	0.43	▽	▼			
	ELEV. (m)	430.97					

GEMTEC Consulting Engineers and Scientists

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 10 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

BOREHOLE PHOTOS

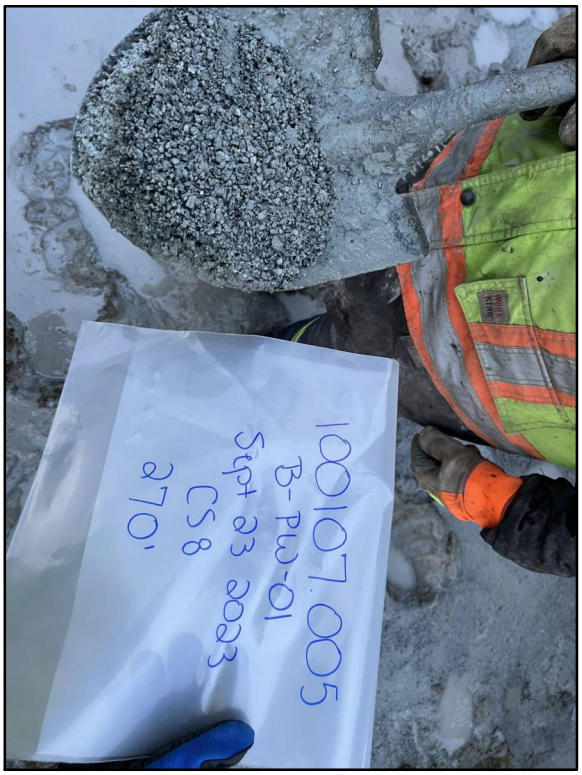

Figure B-PW-01.9
CS08

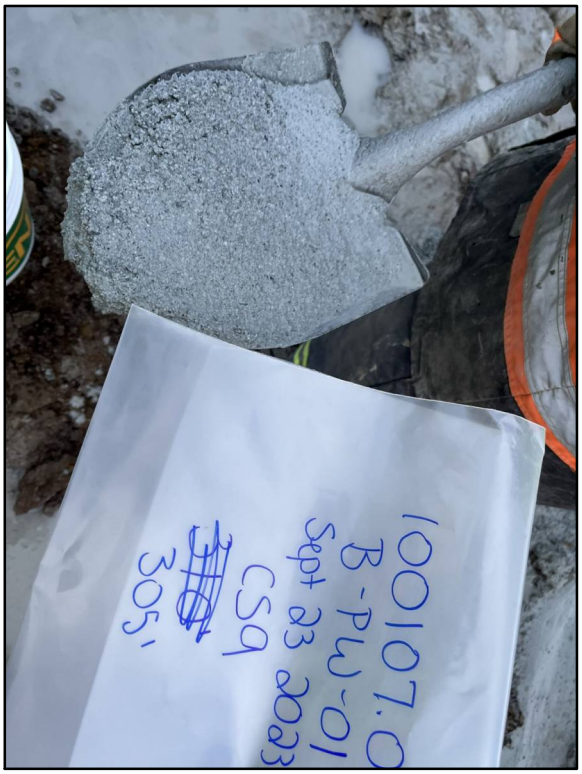

Figure B-PW-01.10
CS09

GROUNDWATER OBSERVATIONS

DATE	10/5/2023					
DEPTH (m)	0.43	▽	▼			
ELEV. (m)	430.97					

NOTES

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RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 11 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

BOREHOLE PHOTOS

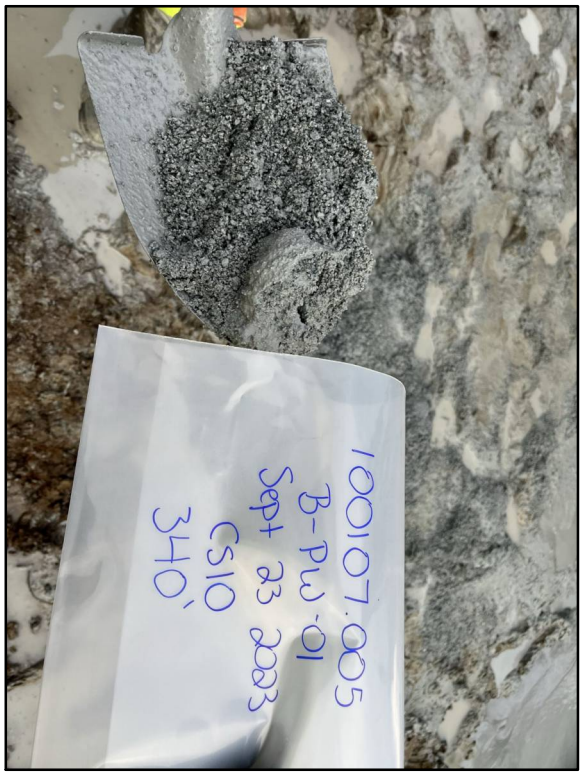

Figure B-PW-01.11
CS10

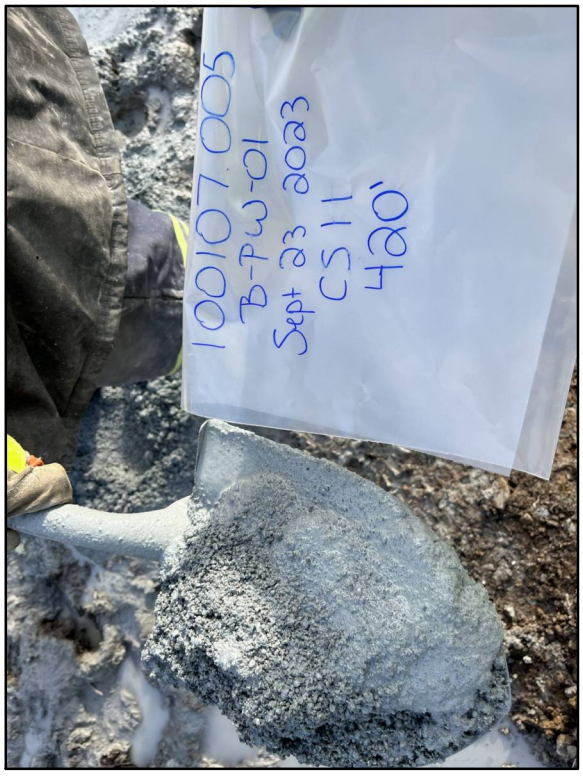

Figure B-PW-01.12
CS11

GROUNDWATER OBSERVATIONS							NOTES
	DATE	10/5/2023					
	DEPTH (m)	0.43 ▽	▼				
	ELEV. (m)	430.97					

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RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 12 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

BOREHOLE PHOTOS

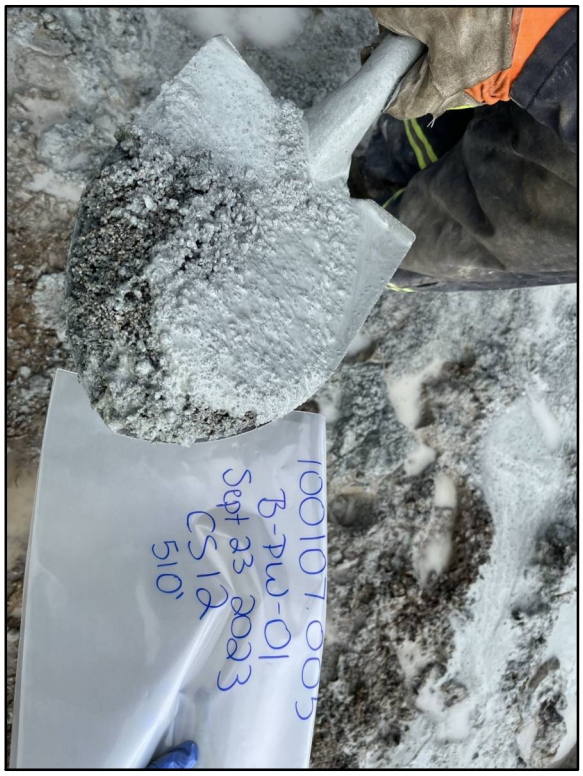

Figure B-PW-01.13
CS12

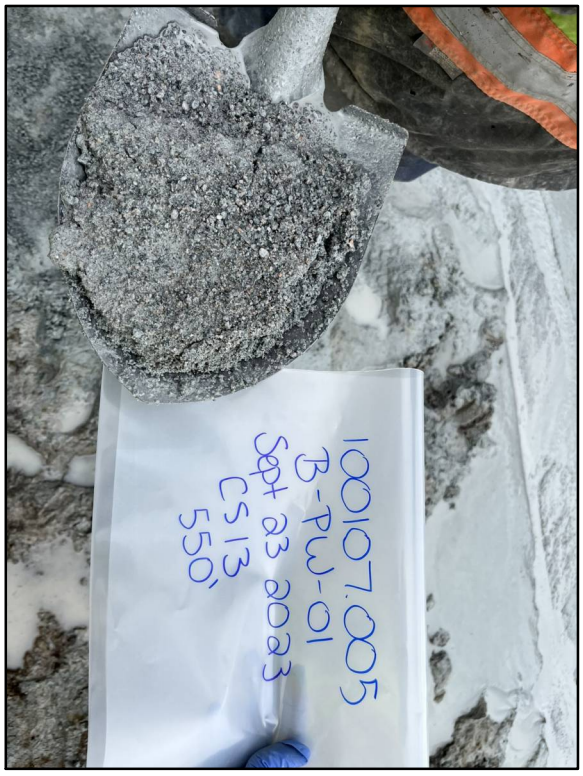

Figure B-PW-01.14
CS13

GROUNDWATER OBSERVATIONS							NOTES
	DATE	10/5/2023					
	DEPTH (m)	0.43 ▽	▼				
	ELEV. (m)	430.97					

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NL BH 100042001_ALL_MARATHON_DATA.GPJ GEMTEC 2018.GDT 1/23/24

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 13 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

BOREHOLE PHOTOS

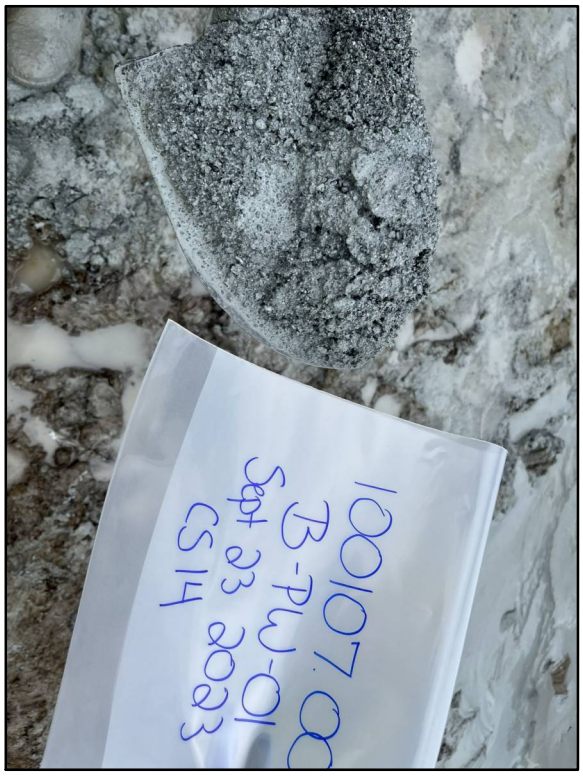


Figure B-PW-01.15
CS14

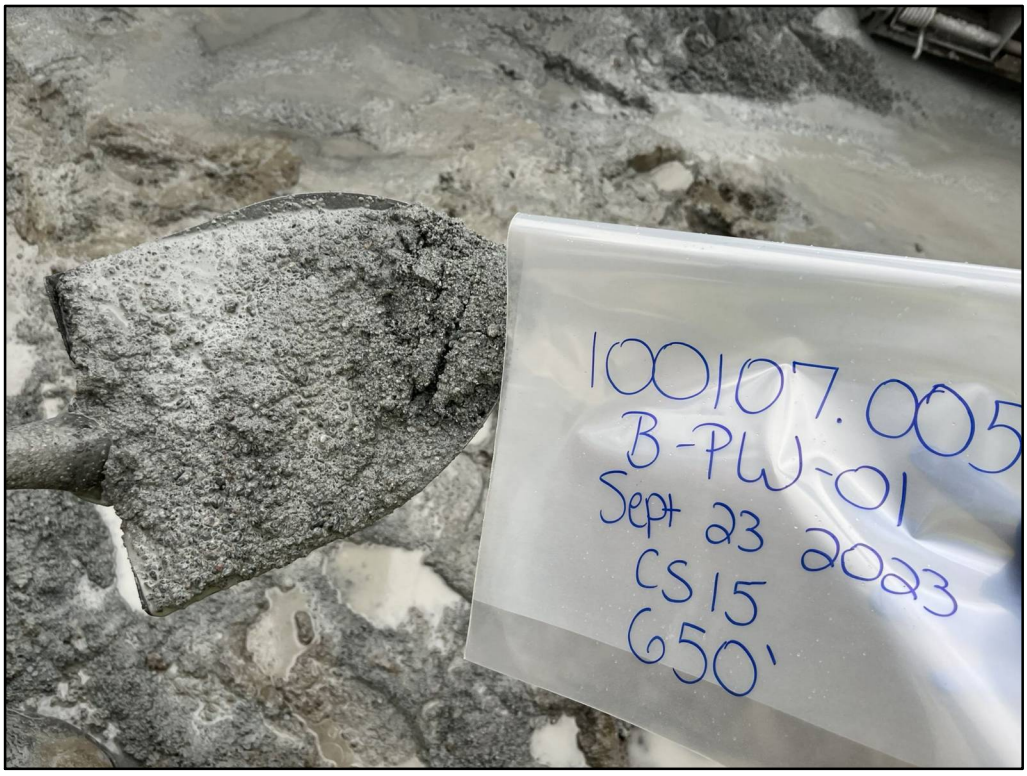


Figure B-PW-01.16
CS15

GROUNDWATER OBSERVATIONS							NOTES
	DATE	10/5/2023					
	DEPTH (m)	0.43 ▽	▼				
	ELEV. (m)	430.97					

NL_BH_100042001_ALL_MARATHON_DATA.GPJ GEMTEC 2018.GDT 1/23/24

GEMTEC
Consulting Engineers and Scientists

RECORD OF BOREHOLE

CLIENT: Marathon Gold Corp.
PROJECT: Berry Pit Pumping Test
JOB#: 100107.005
LOCATION: Berry Pit Footprint

BORING DATE: Sep 22 2023
TOTAL DEPTH: 233.17m
ELEVATION: 431.4m (CGVD2013)
COORDINATES: N 5358255 E 489905 (NAD83 CSRS UTM Zone 21)
SHEET: 14 OF 14

BOREHOLE ID: B-PW-01
LOG STATUS:
LOGGED: CW
CHECKED: CAM

BOREHOLE PHOTOS

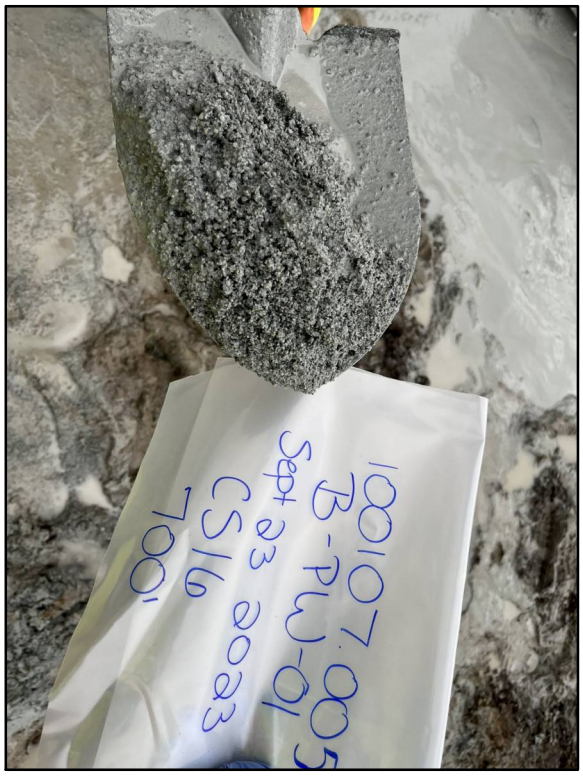


Figure B-PW-01.17
CS16

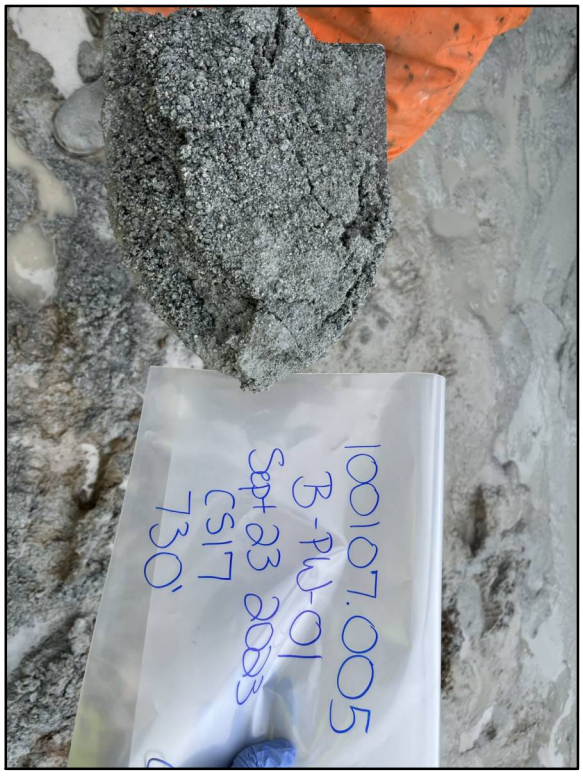


Figure B-PW-01.18
CS17

GROUNDWATER OBSERVATIONS							NOTES
	DATE	10/5/2023					
	DEPTH (m)	0.43	▽	▼			
	ELEV. (m)	430.97					

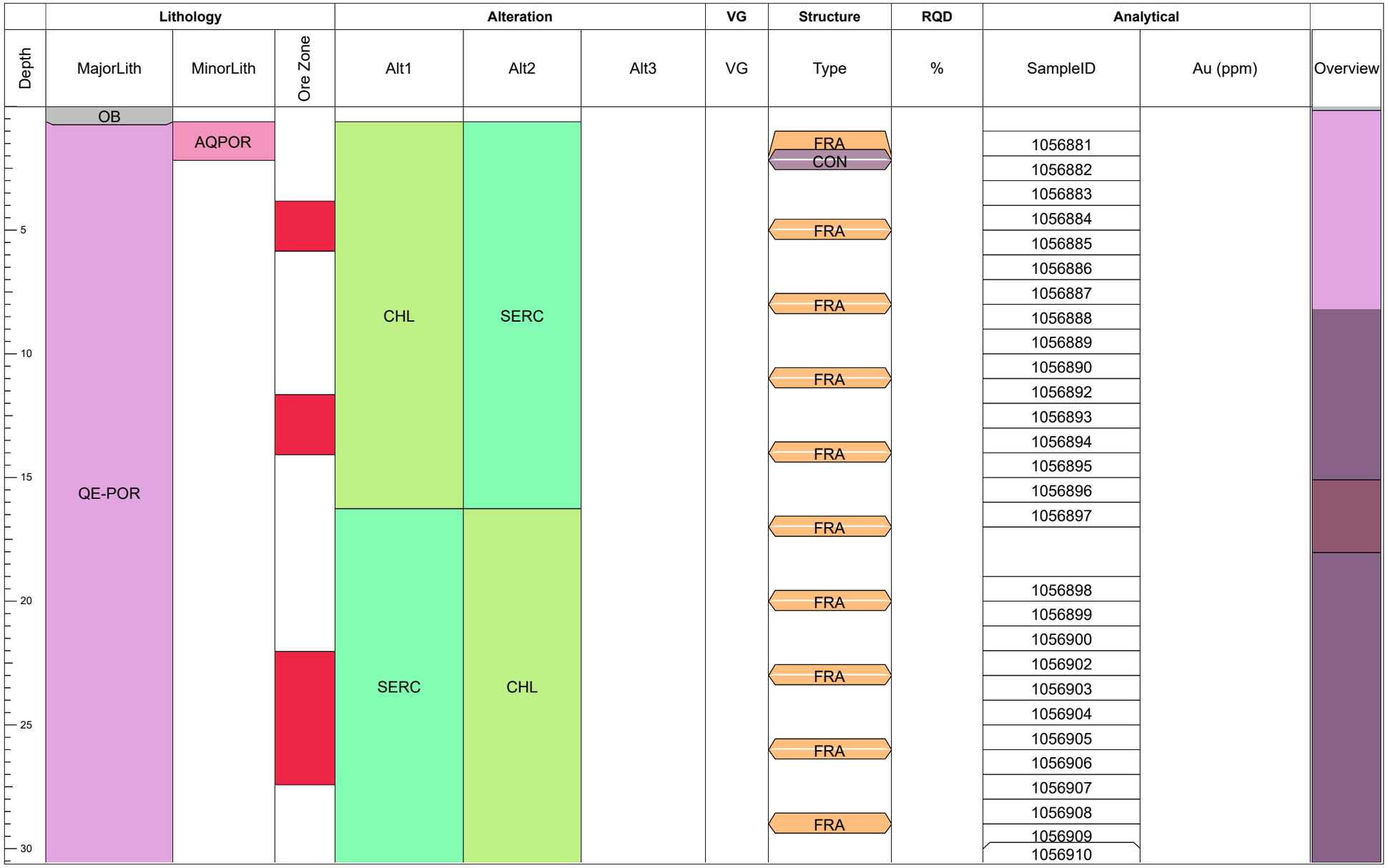
GEMTEC Consulting Engineers and Scientists

NL BH 100042001_ALL_MARATHON_DATA.GPJ GEMTEC 2018.GDT 1/23/24

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-01	VGP	BZ	115	04-Sep-2023	04-Sep-2023				Adrienne Noftall

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Overburden
- Qtz-eye Porphyry

MajorLith
- Overburden
- Qtz-eye Porphyry

MinorLith
- Aphanitic Qtz Porphyry

Alt1
- sericite
- chlorite

Alt2
- sericite
- chlorite

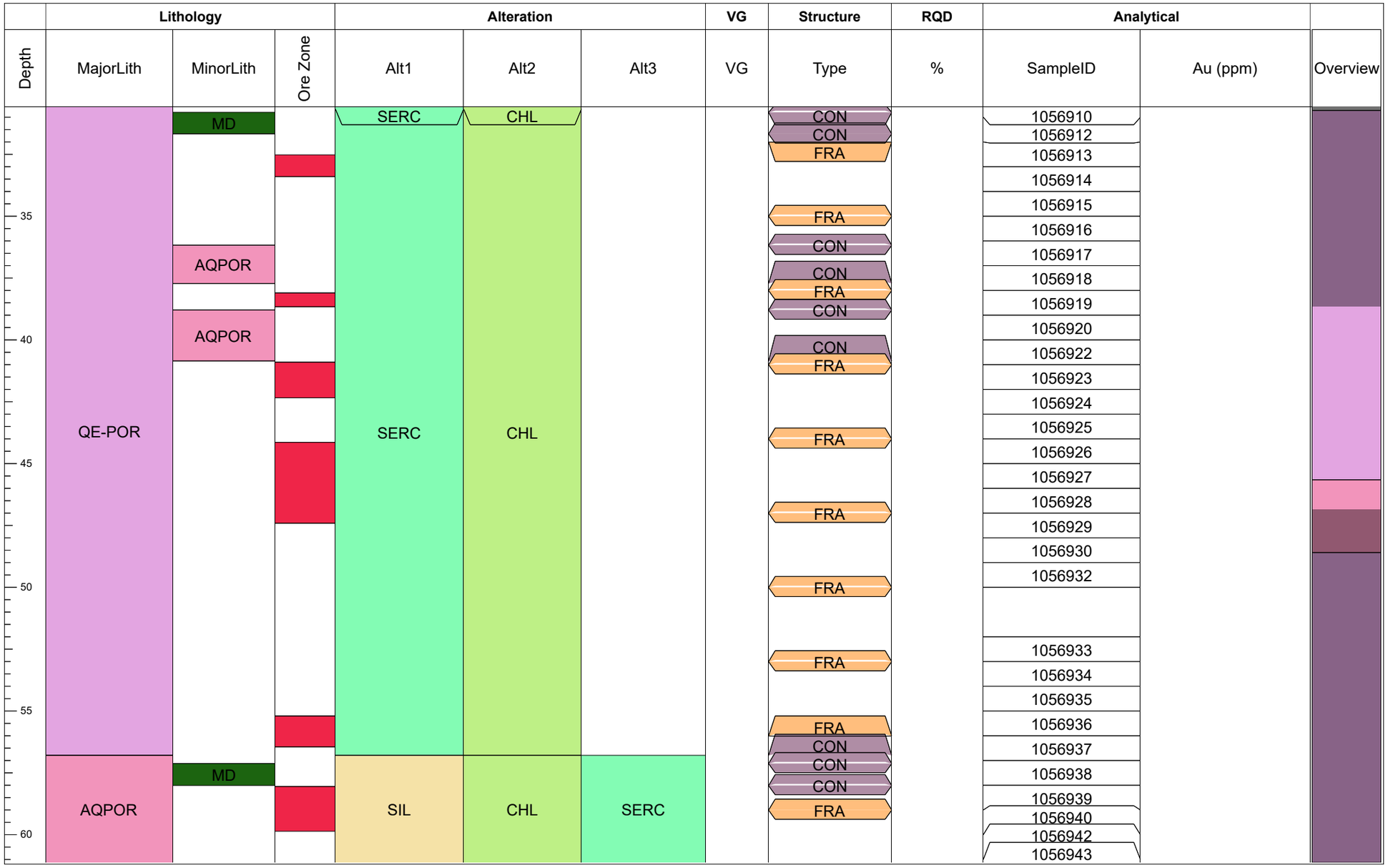
Alt3
- sericite

Type
- Fractured
- Contact

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-01	**VGP**	BZ	115	04-Sep-2023	04-Sep-2023				Adrienne Noftall

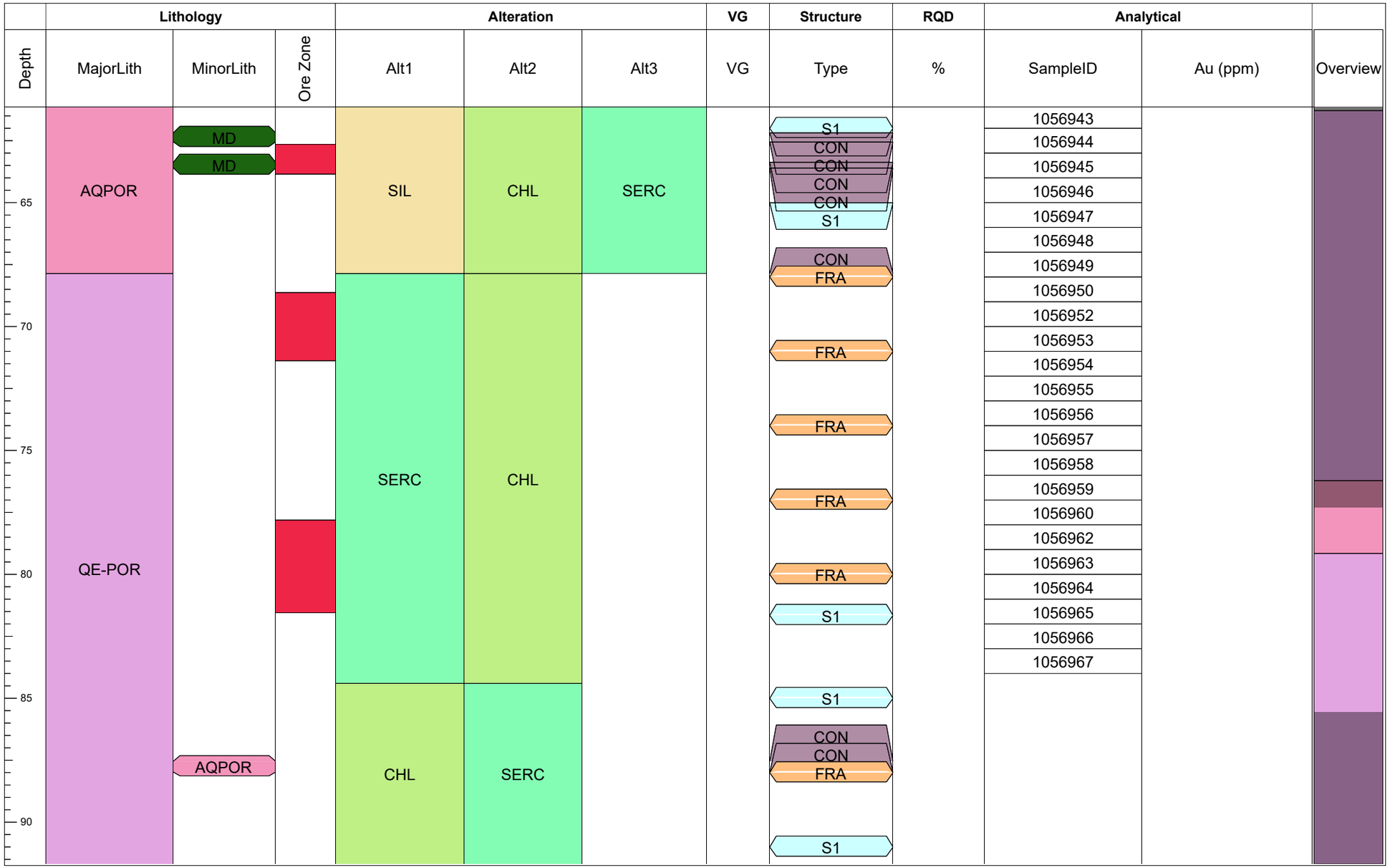
Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-01	**VGP**	BZ	115	04-Sep-2023	04-Sep-2023				Adrienne Noftall

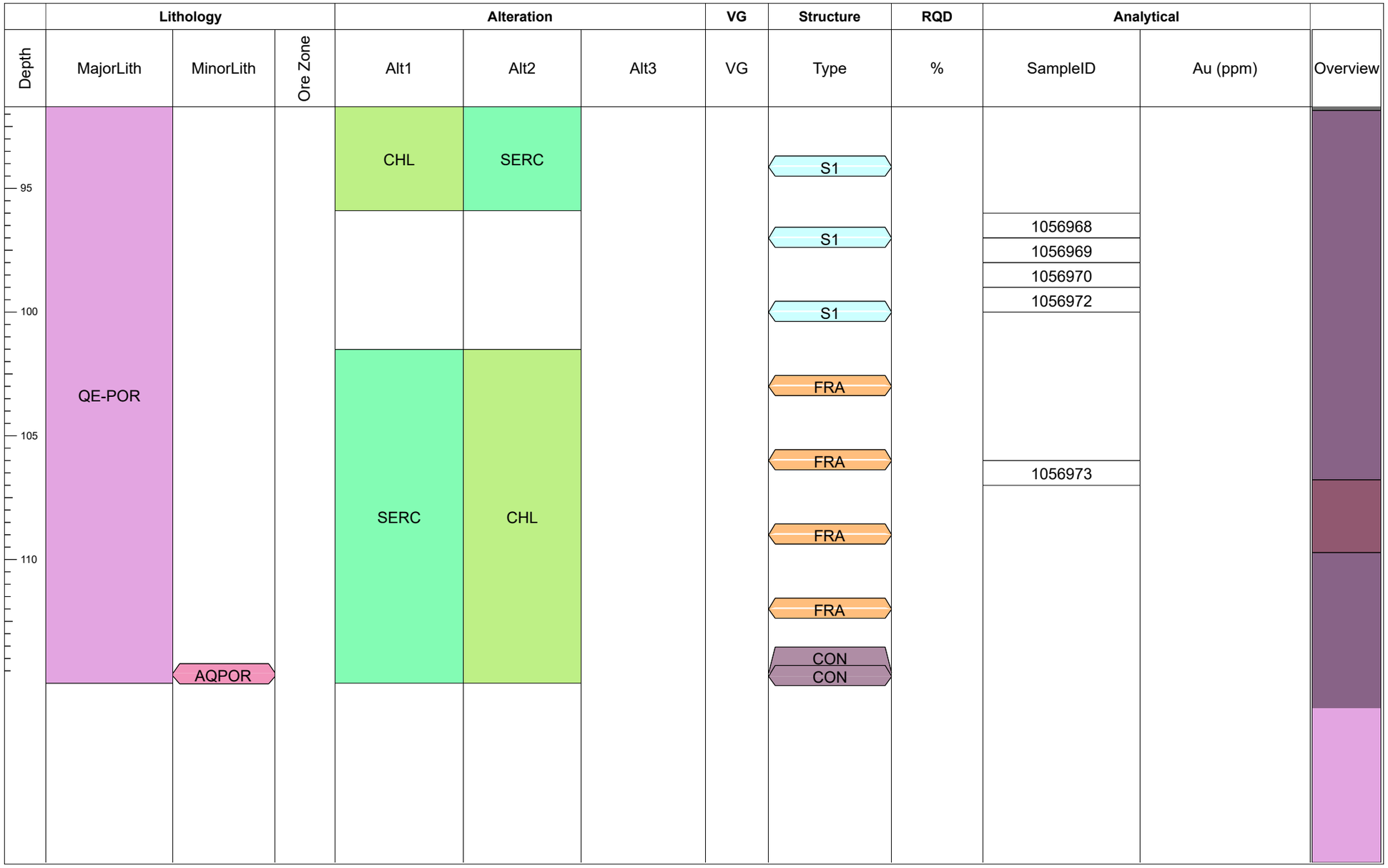
Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-01	**VGP**	BZ	115	04-Sep-2023	04-Sep-2023				Adrienne Noftall

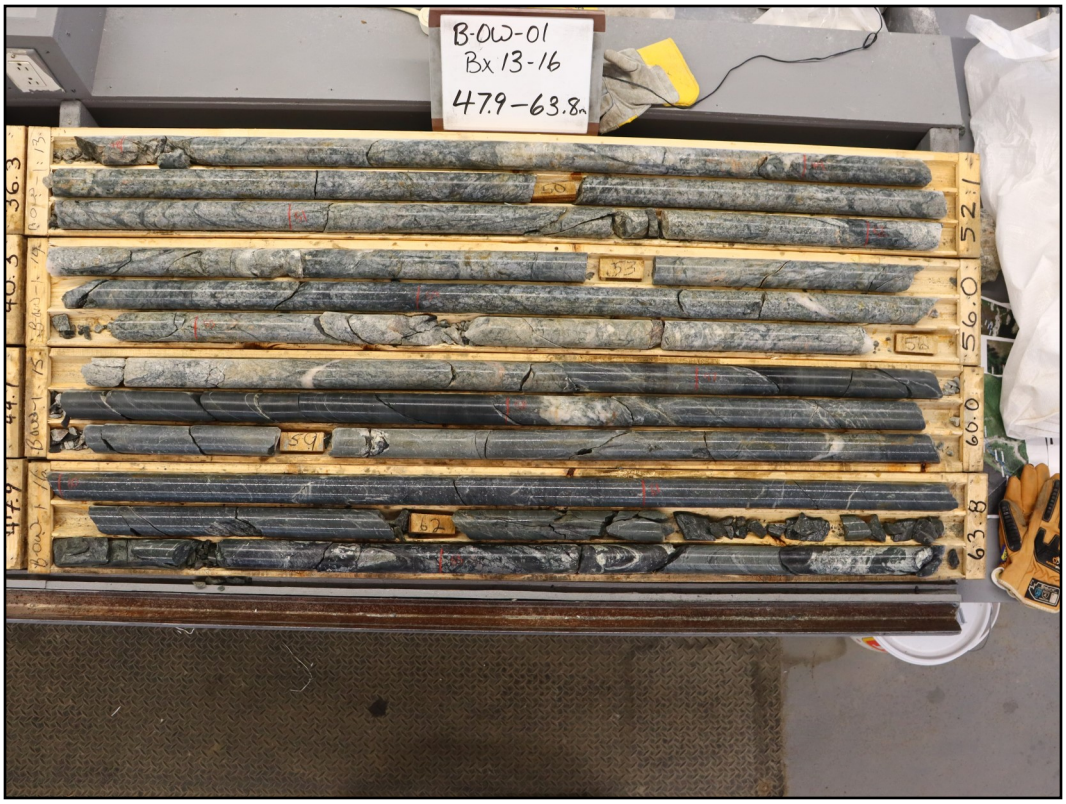
Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		

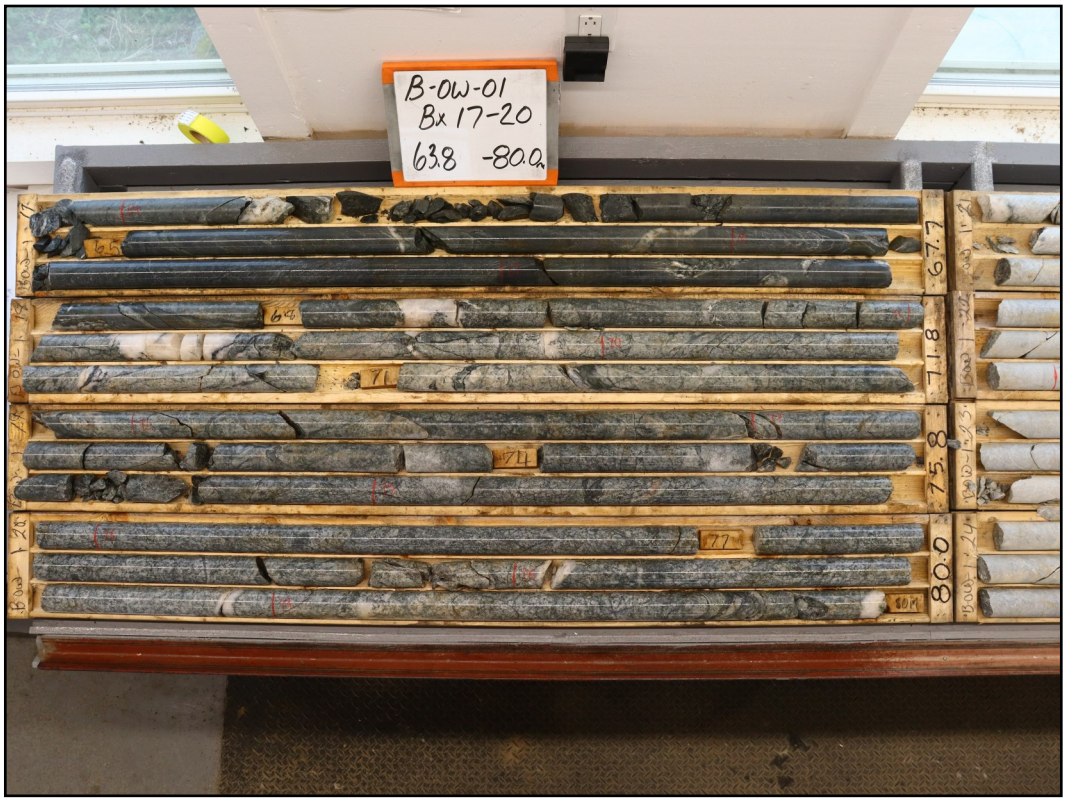



B-OW-01
Bx 1-4
0.62-16.3m
4.2
8.0
12.2
16.3m


B-OW-01
Bx 5-8
16.3-32.1
4.2
8.0
20.2
24.3
28.2
32.1


B-OW-01
Bx 9-12
32.1 - 47.9m
36.3
40.3
44.1
47.9


B-OW-01
Bx 13-16
47.9 - 63.8m
36.3
40.3
44.1
47.9
52.1
56.0
60.0
63.8


B-OW-01
Bx 17-20
63.8 -80.0m
67.7
71.8
75.8
80.0


B-OW-01
Bx 21-24
80.0-95.9m
84
88.2
92.0
95.9

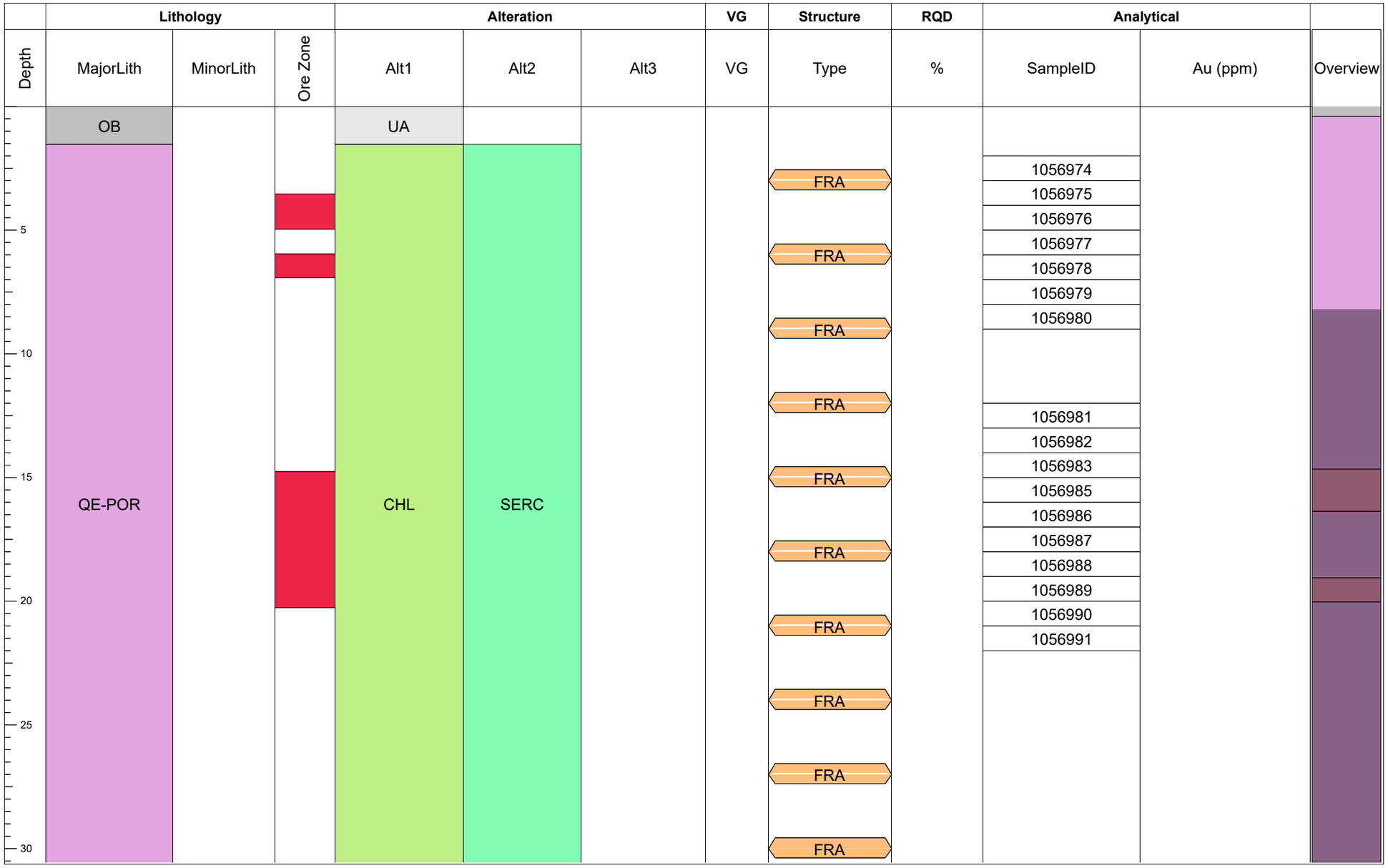

B-OW-01
Bx 25-28
~95.9-111.1m


B-OW-01
Bx 29-30
111.1-115.0m EOH
EOH 115.0m

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-02	VGP	BZ	115	03-Sep-2023	04-Sep-2023				Abigail Kennedy

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Overburden
- Qtz-eye Porphyry

MajorLith
- Overburden
- Qtz-eye Porphyry

MinorLith
- Mafic Dike

Alt1
- chlorite
- Unaltered

Alt2
- sericite

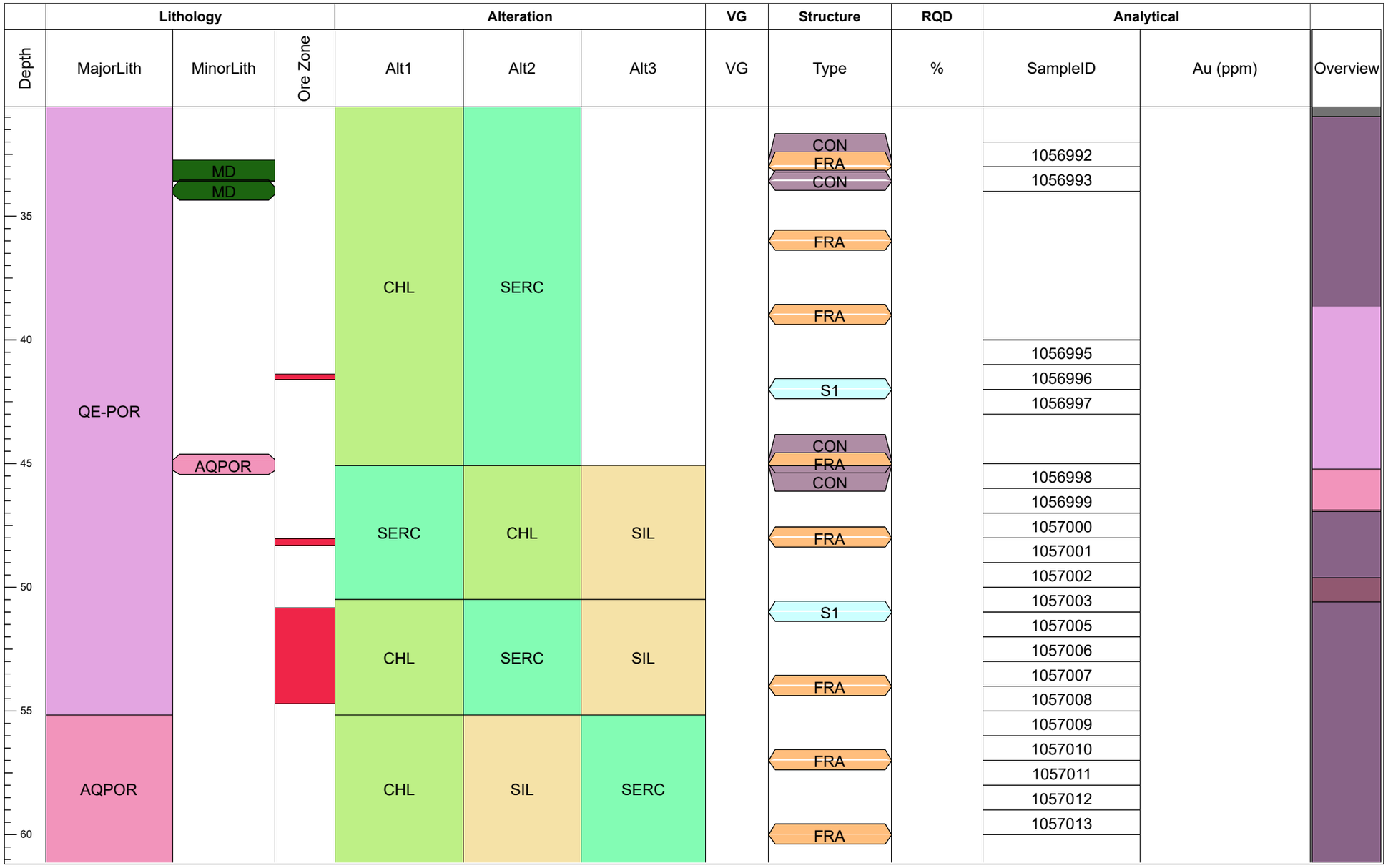
Alt3
- silica

Type
- Fractured

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-02	**VGP**	BZ	115	03-Sep-2023	04-Sep-2023				Abigail Kennedy

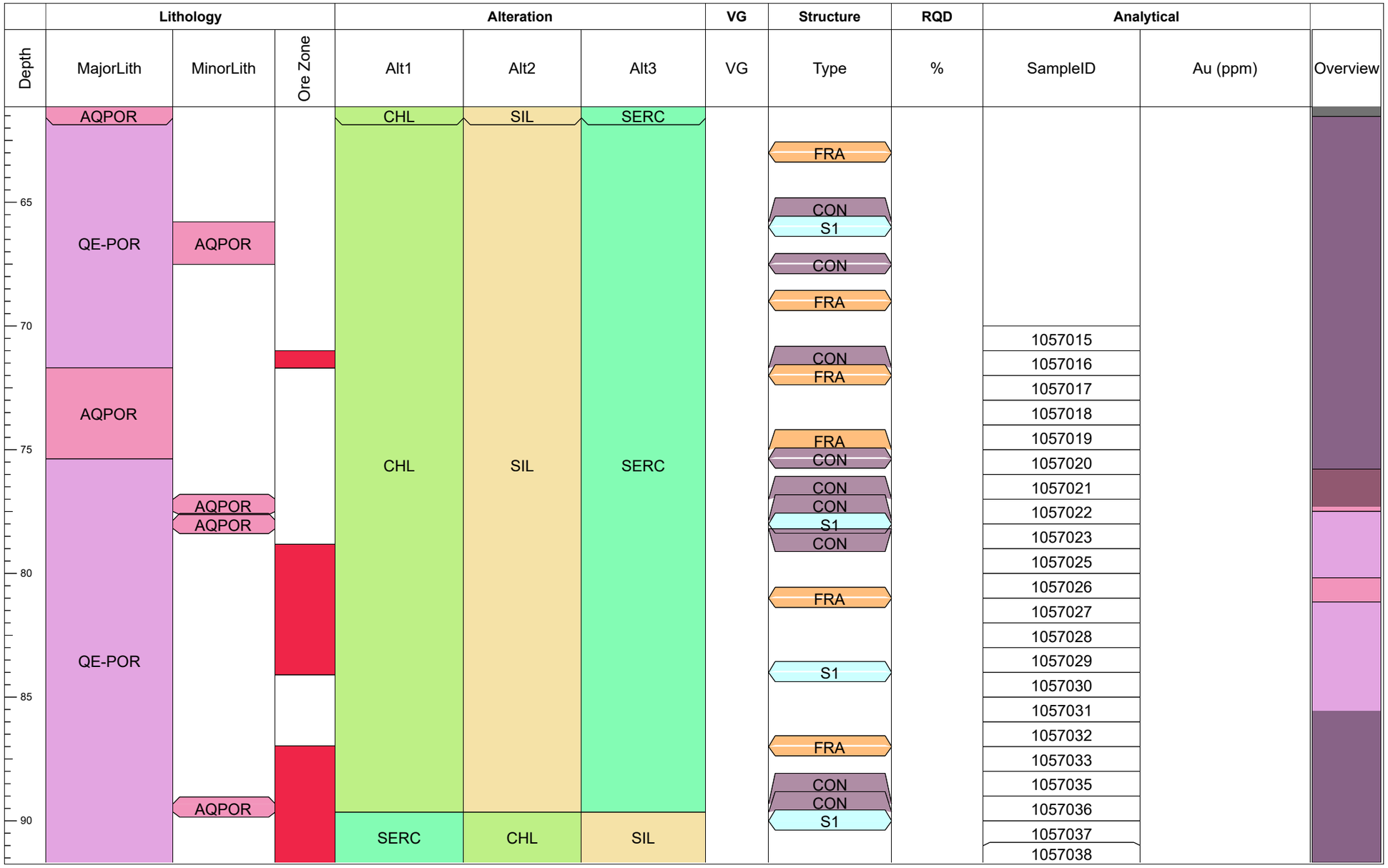
Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-02	**VGP**	BZ	115	03-Sep-2023	04-Sep-2023				Abigail Kennedy

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Aphanitic Qtz Porphyry
- Qtz-eye Porphyry

MajorLith
- Aphanitic Qtz Porphyry
- Qtz-eye Porphyry

MinorLith
- Aphanitic Qtz Porphyry

Alt1
- sericite
- chlorite

Alt2
- silica
- chlorite

Alt3
- silica
- sericite

Type
- Foliation
- Fractured
- Contact

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-02	VGP	BZ	115	03-Sep-2023	04-Sep-2023				Abigail Kennedy

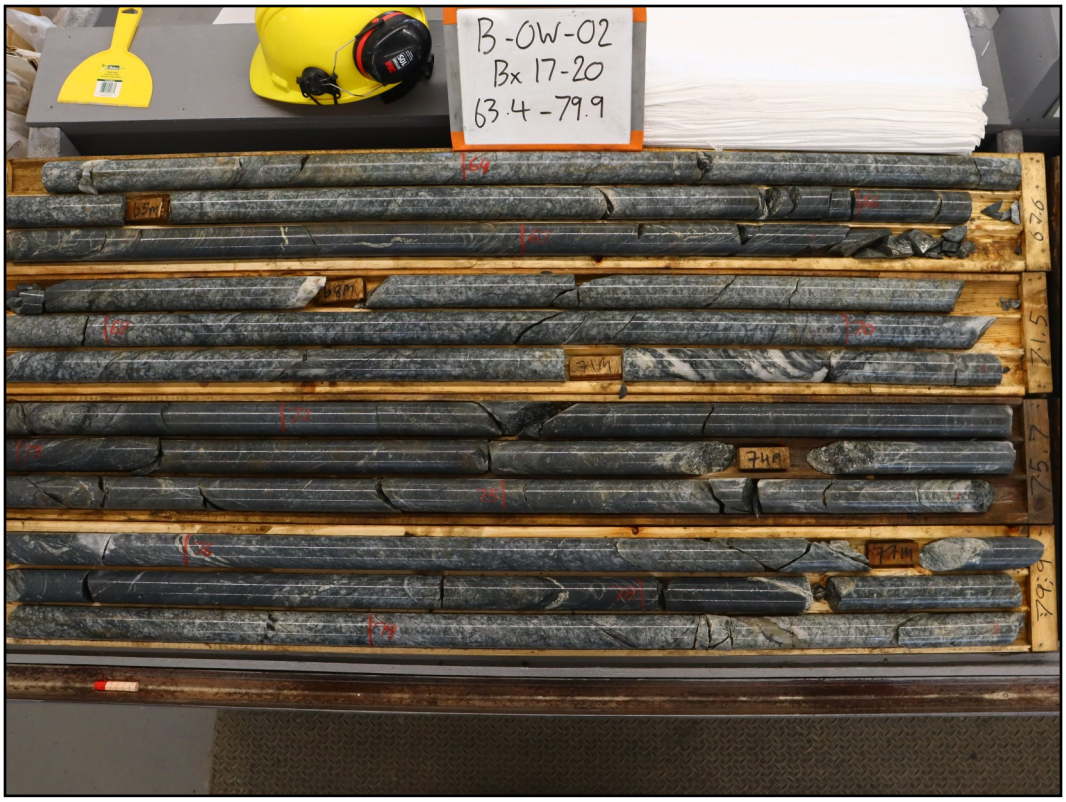
Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		

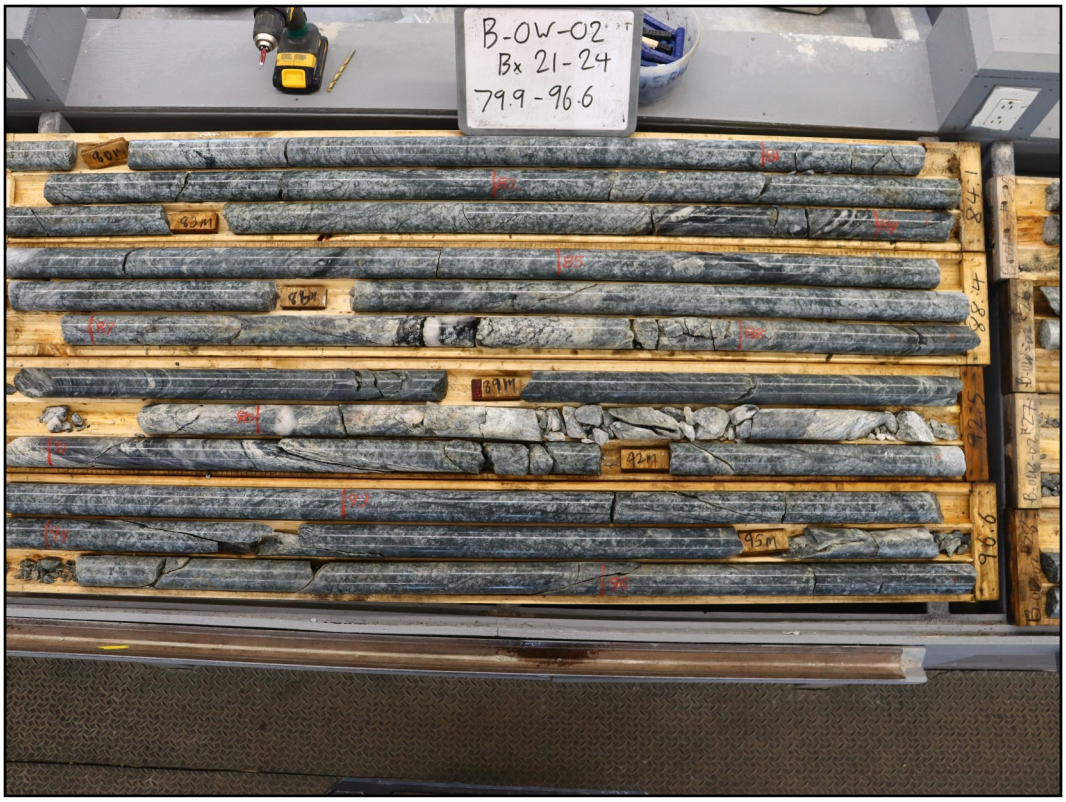

B-OW-02
Bx 1-4
1.53 - 16.9

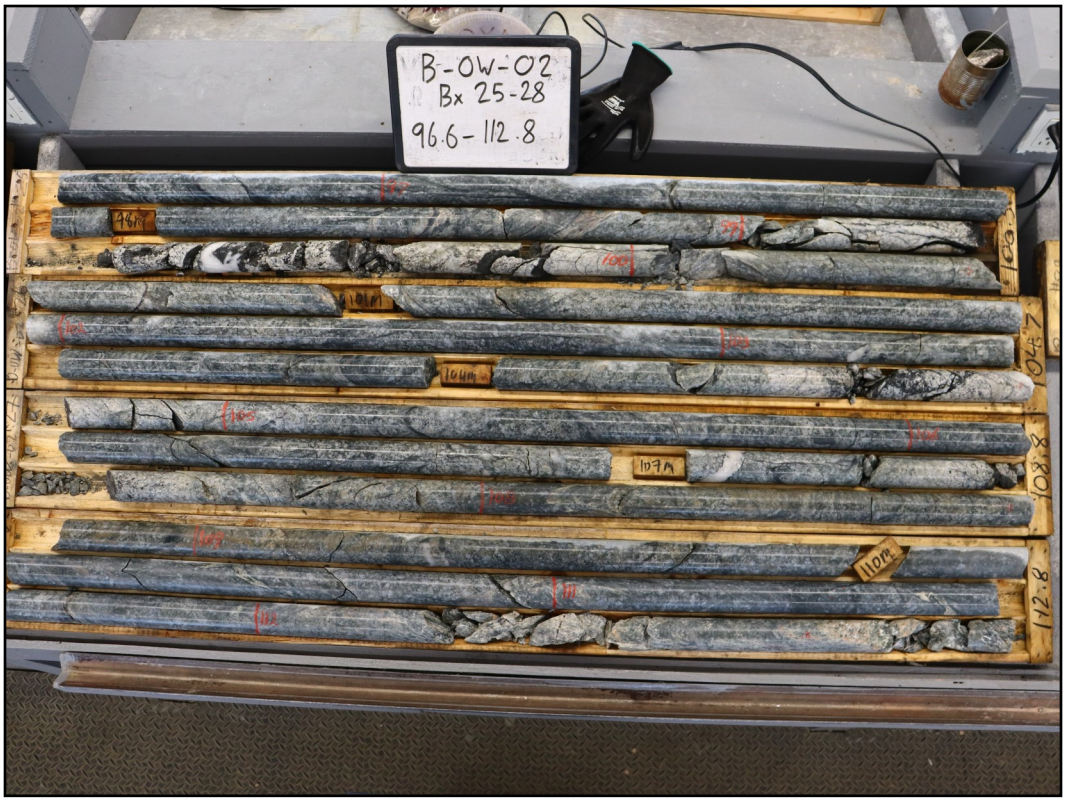

B-OW-02
Bx 5-8
16.9 - 33.0

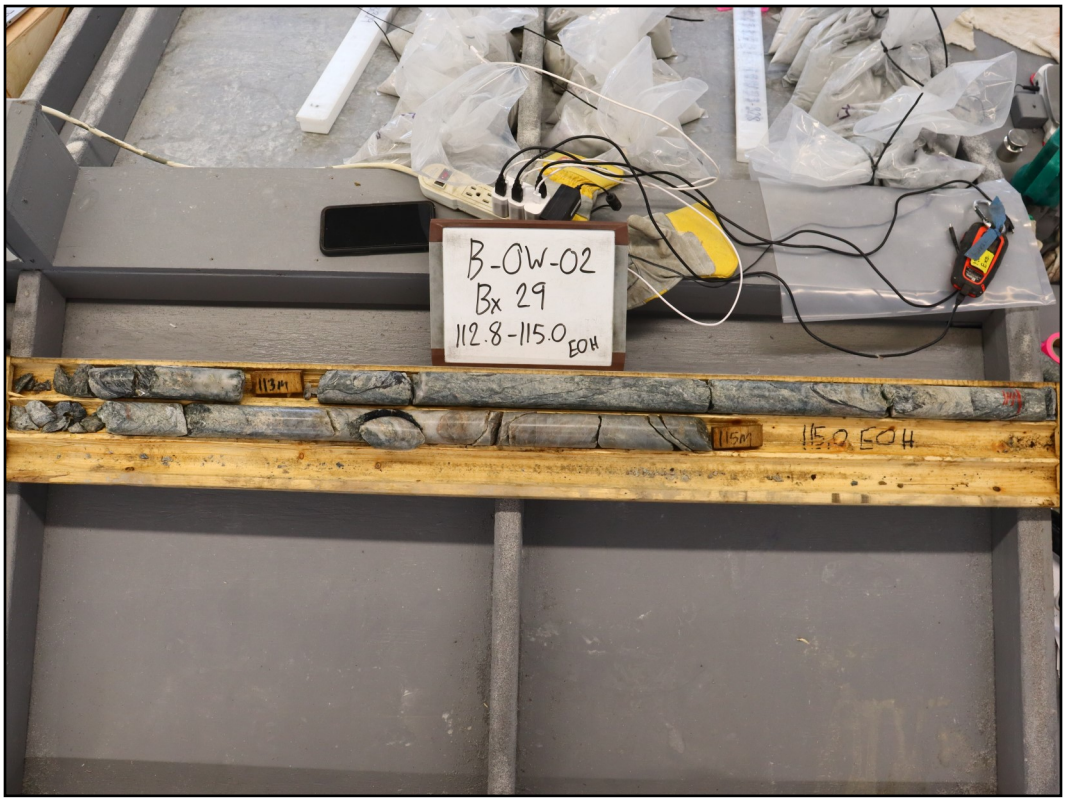

B-OW-02
Bx 9-12
33.0-48.7


B-OW-02
Bx 13-16
48.7-63.4


B-OW-02
Bx 17-20
63.4 - 79.9


B-OW-02
Bx 21-24
79.9 - 96.6

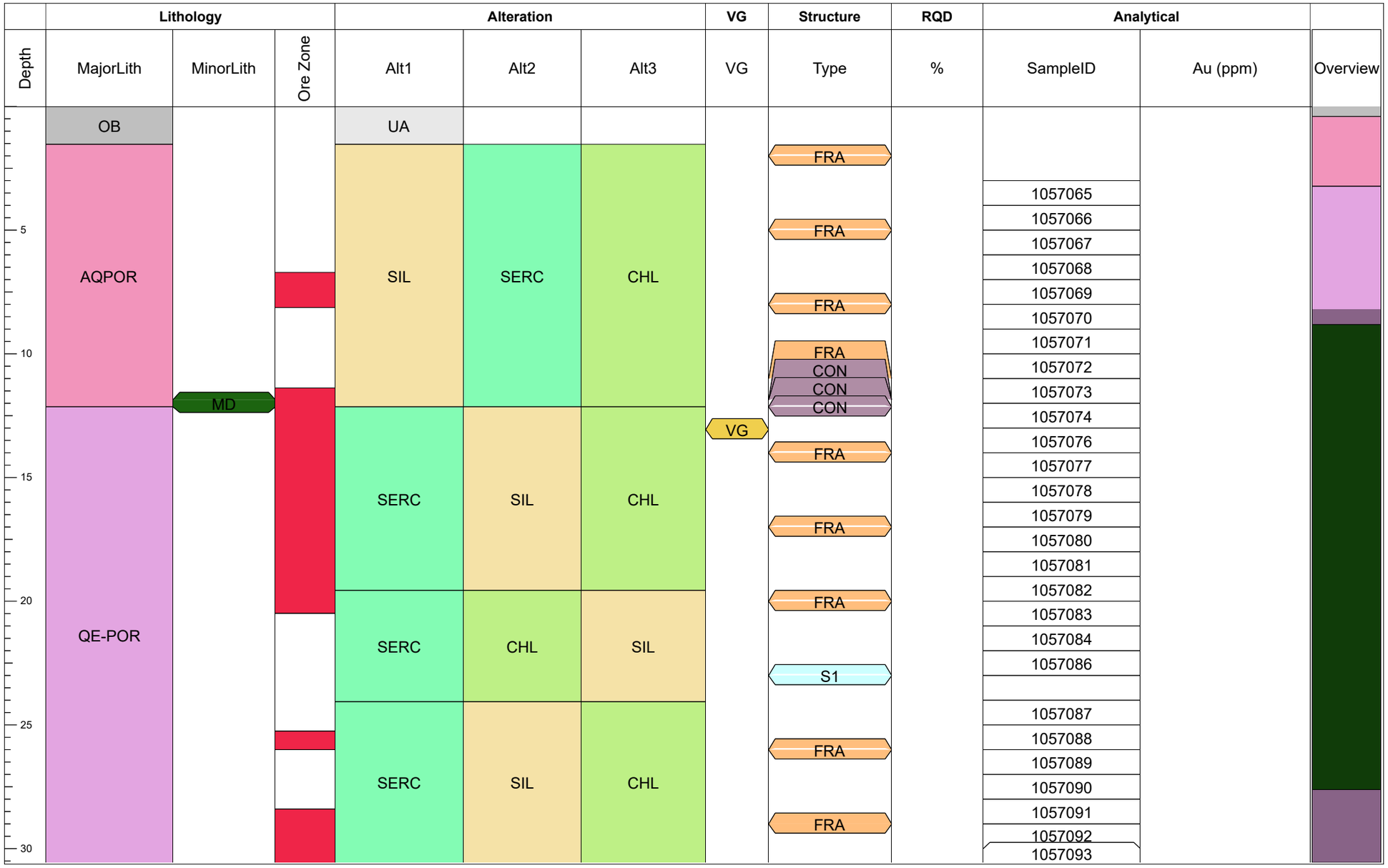

B-OW-02
Bx 25-28
96.6-112.8
96m
100m
104m
107m
110m
104.7
108.8
112.8


B-OW-02
Bx 29
112.8-115.0 EOH
113m
115m
115.0 EOH

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-03	**VGP**	BZ	115	30-Aug-2023	31-Aug-2023				Adrienne Noftall

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Aphanitic Qtz Porphyry
- Overburden
- Qtz-eye Porphyry

MajorLith
- Aphanitic Qtz Porphyry
- Overburden
- Qtz-eye Porphyry

MinorLith
- Mafic Dike

Alt1
- silica
- sericite
- Unaltered

Alt2
- silica
- sericite
- chlorite

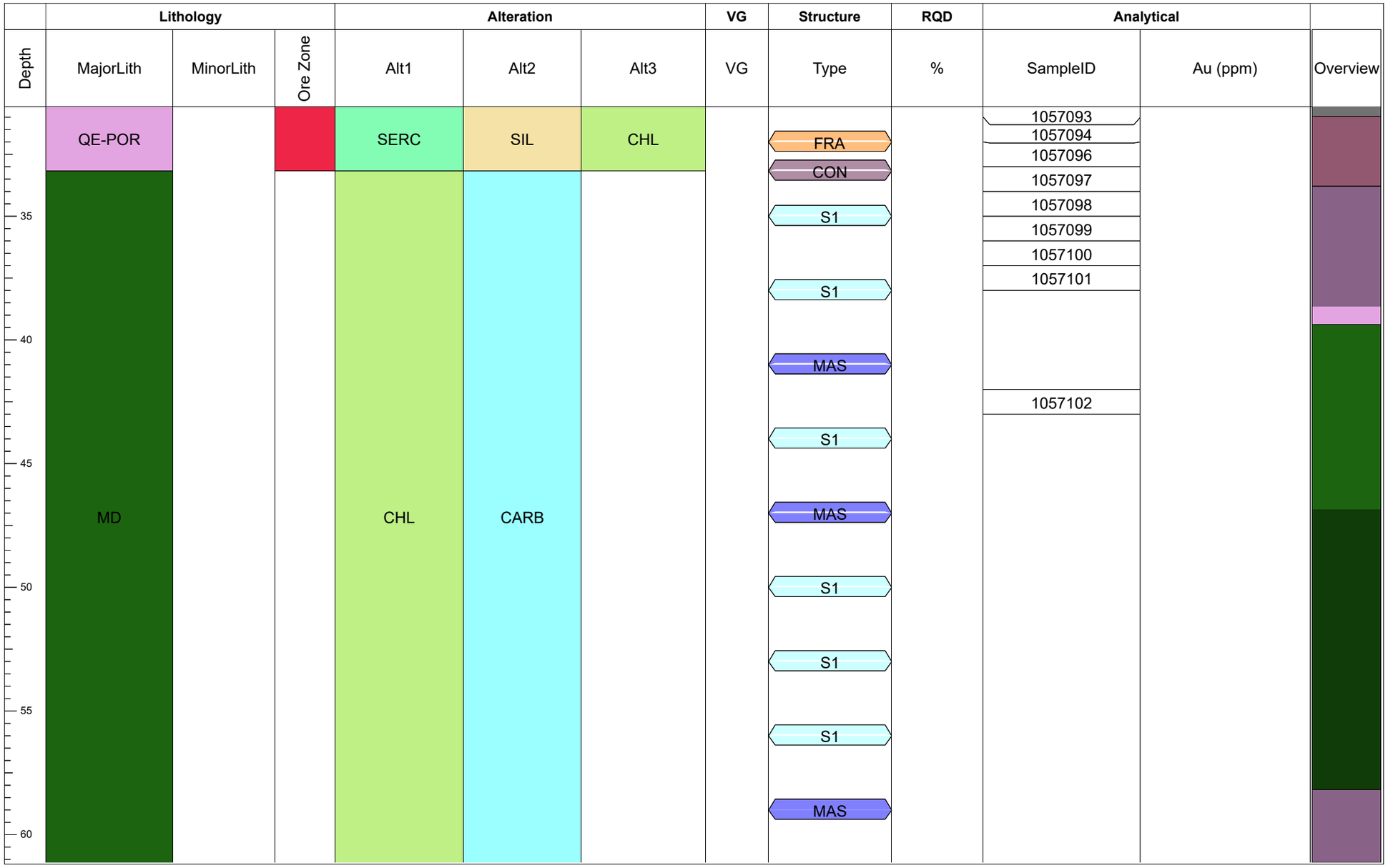
Alt3
- silica
- chlorite

Type
- Foliation
- Fractured
- Contact

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-03	**VGP**	BZ	115	30-Aug-2023	31-Aug-2023				Adrienne Noftall

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Mafic Dike
- Qtz-eye Porphyry

MajorLith
- Mafic Dike
- Qtz-eye Porphyry

Alt1
- sericite
- chlorite

Alt2
- silica
- carbonate

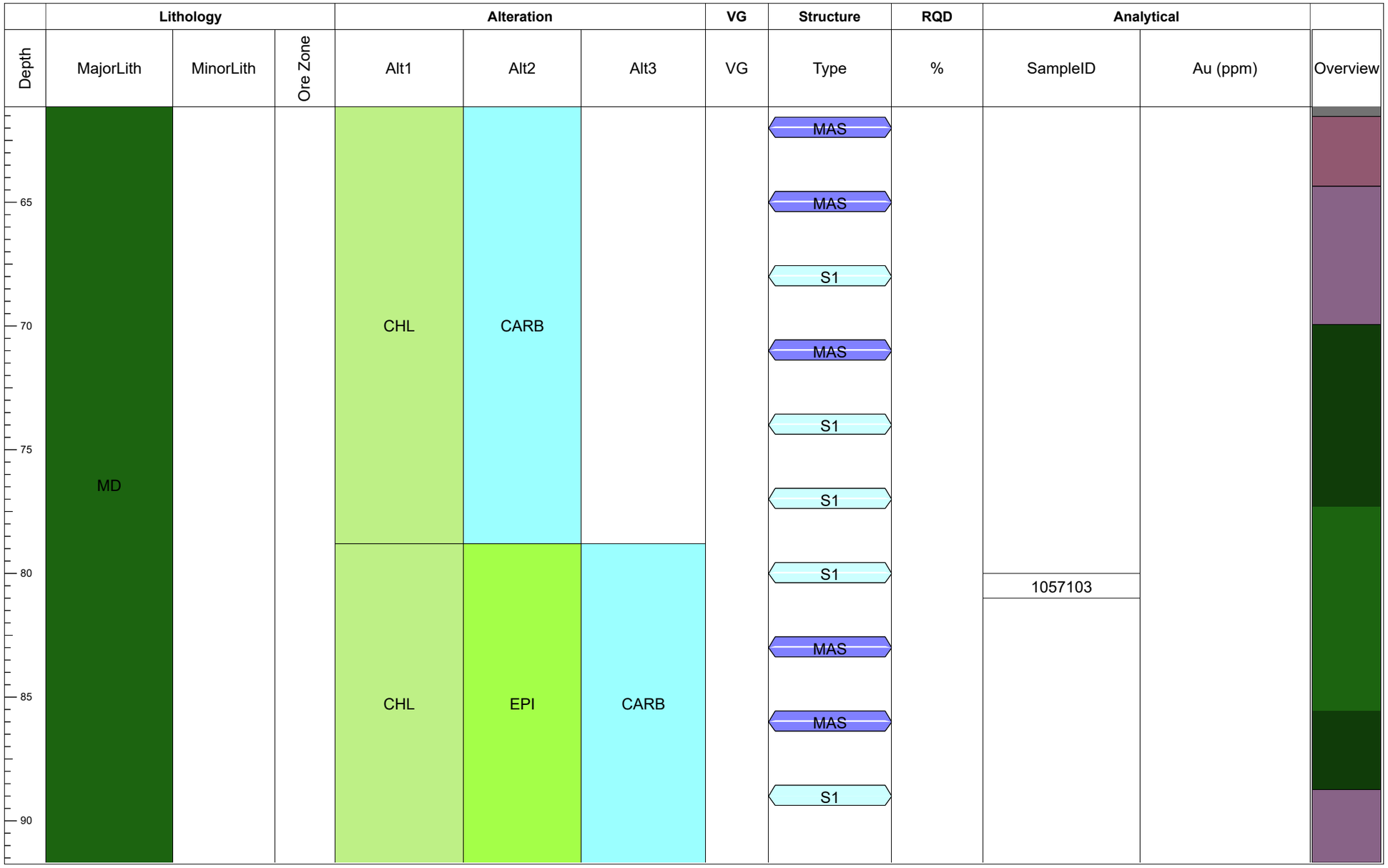
Alt3
- chlorite

Type
- Foliation
- Fractured
- Massive
- Contact

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-03	**VGP**	BZ	115	30-Aug-2023	31-Aug-2023				Adrienne Noftall

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
Mafic Dike

MajorLith
Mafic Dike

Alt1
chlorite

Alt2
epidote
carbonate

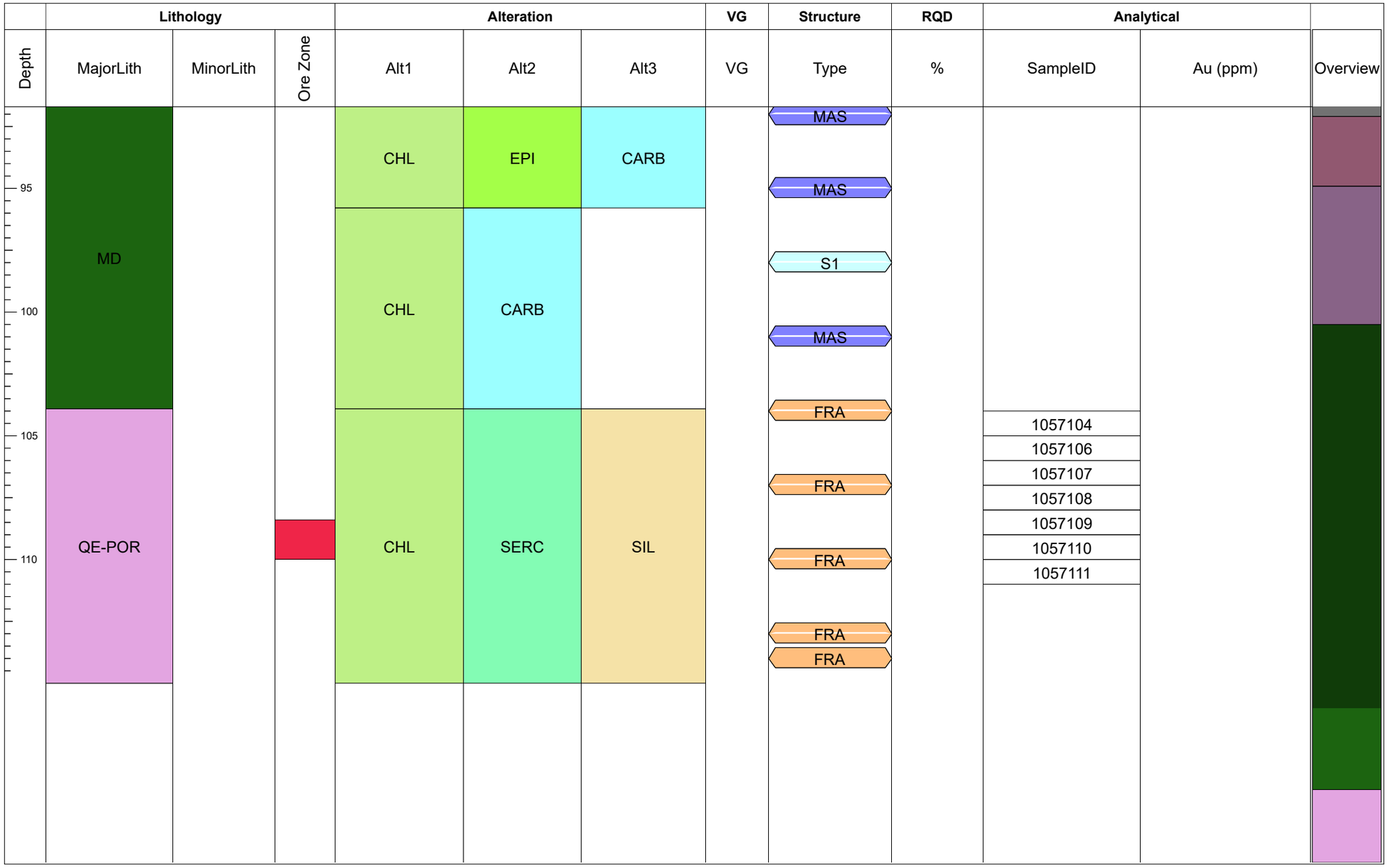
Alt3
carbonate

Type
Foliation
Massive

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-03	**VGP**	BZ	115	30-Aug-2023	31-Aug-2023				Adrienne Noftall

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Mafic Dike
- Qtz-eye Porphyry

MajorLith
- Mafic Dike
- Qtz-eye Porphyry

Alt1
- chlorite

Alt2
- sericite
- epidote
- carbonate

Alt3
- silica
- carbonate

Type
- Foliation
- Fractured
- Massive


B-OW-03
Bx 1-4
1.53-16.4


B-OW-03
Bx 5-8
16.4 -32.1
20.3


B-OW-03
Bx 9-12
32.1 -48.6
35.7
40.1
44.3
48.6
35M
41M
44M
47M


B-OW-03
Bx 13-16
48.6-65.3
52.9
57.0
61.2
50M
53M
56M
59M
62M
65M


B-OW-03
Bx 17-20
65.3-81.7


B-OW-03
Bx 21-24
81.7 -98.7

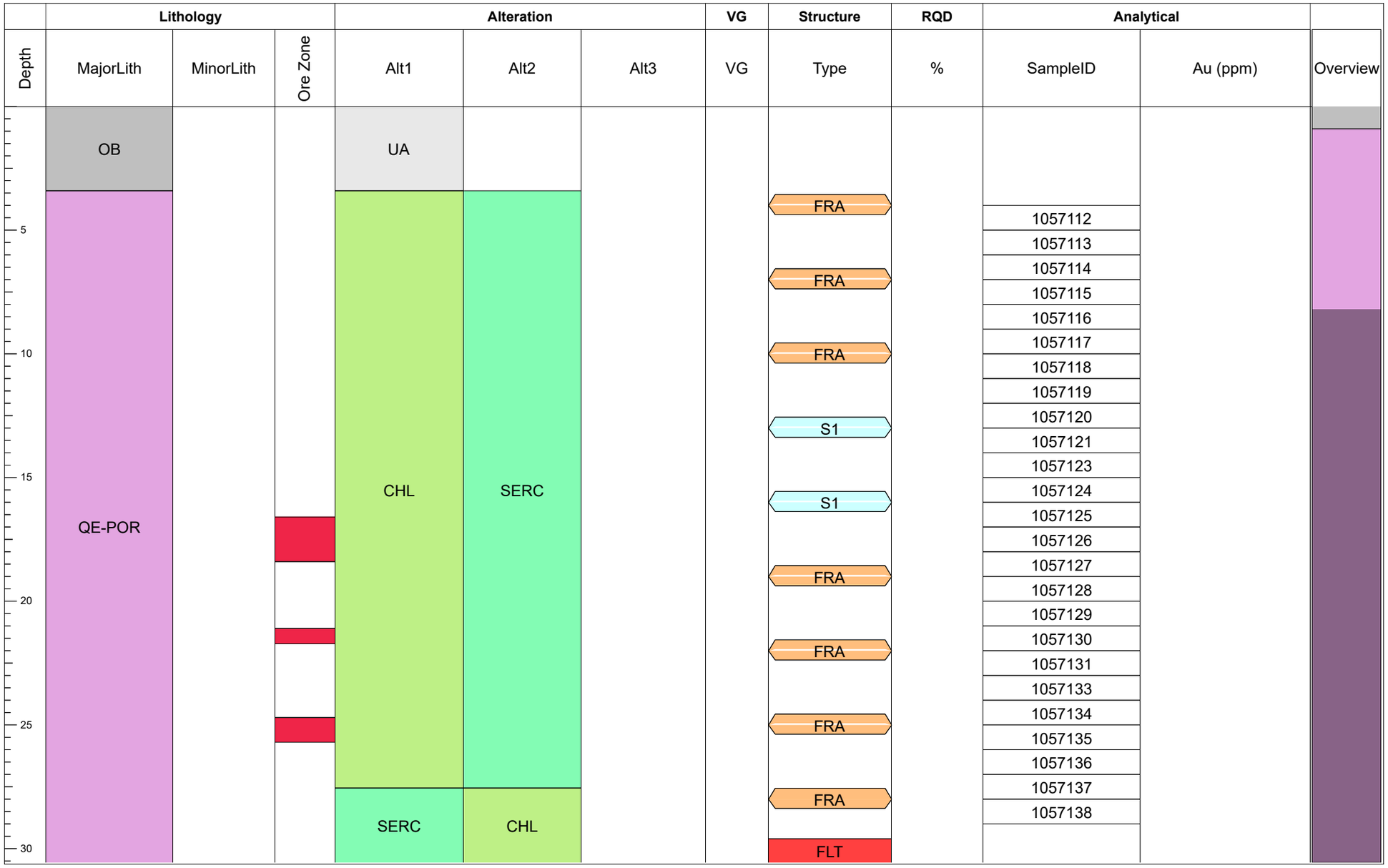

B-OW-03
Bx 25-28
98.7 - 114.7
101
104
107
110
103.1
106.8
110.8
114.7


B-OW-03
Bx 29
114.7-115 EOH
116
EOH
103.1
106.8
110.8
114.7

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-04	**VGP**	BZ	115	02-Sep-2023	03-Sep-2023				

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Overburden
- Qtz-eye Porphyry

MajorLith
- Overburden
- Qtz-eye Porphyry

Alt1
- sericite
- chlorite
- Unaltered

Alt2
- sericite
- chlorite

Alt3
- silica

Type
- Foliation
- Fractured
- Fault

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-04	**VGP**	BZ	115	02-Sep-2023	03-Sep-2023				

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		

MajorLith
- Qtz-eye Porphyry

MajorLith
- Qtz-eye Porphyry

Alt1
- sericite
- chlorite

Alt2
- sericite
- chlorite

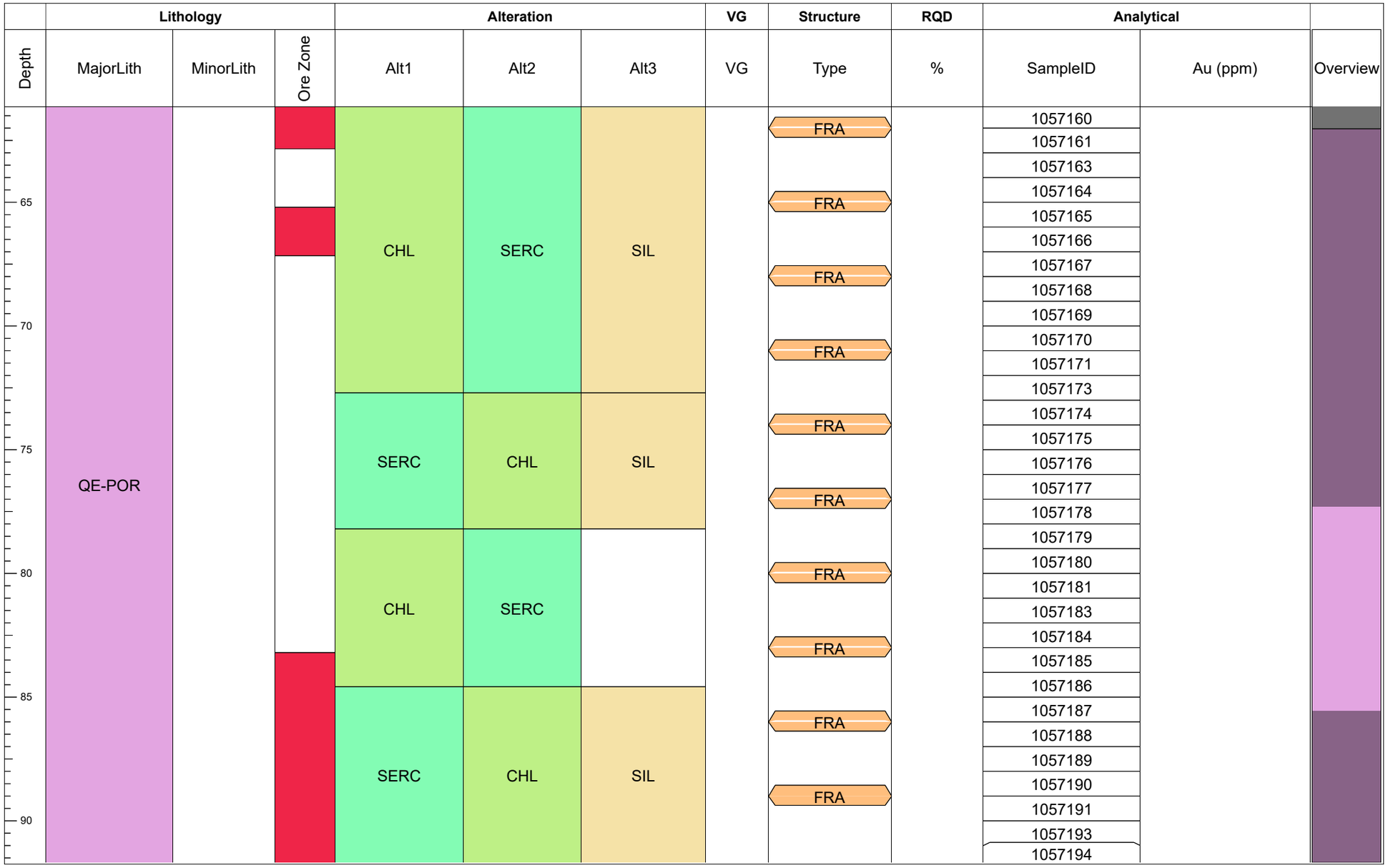
Alt3
- silica

Type
- Foliation
- Fractured
- Fault
- Gouge

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-04	VGP	BZ	115	02-Sep-2023	03-Sep-2023				

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
Qtz-eye Porphyry

MajorLith
Qtz-eye Porphyry

Alt1
sericite
chlorite

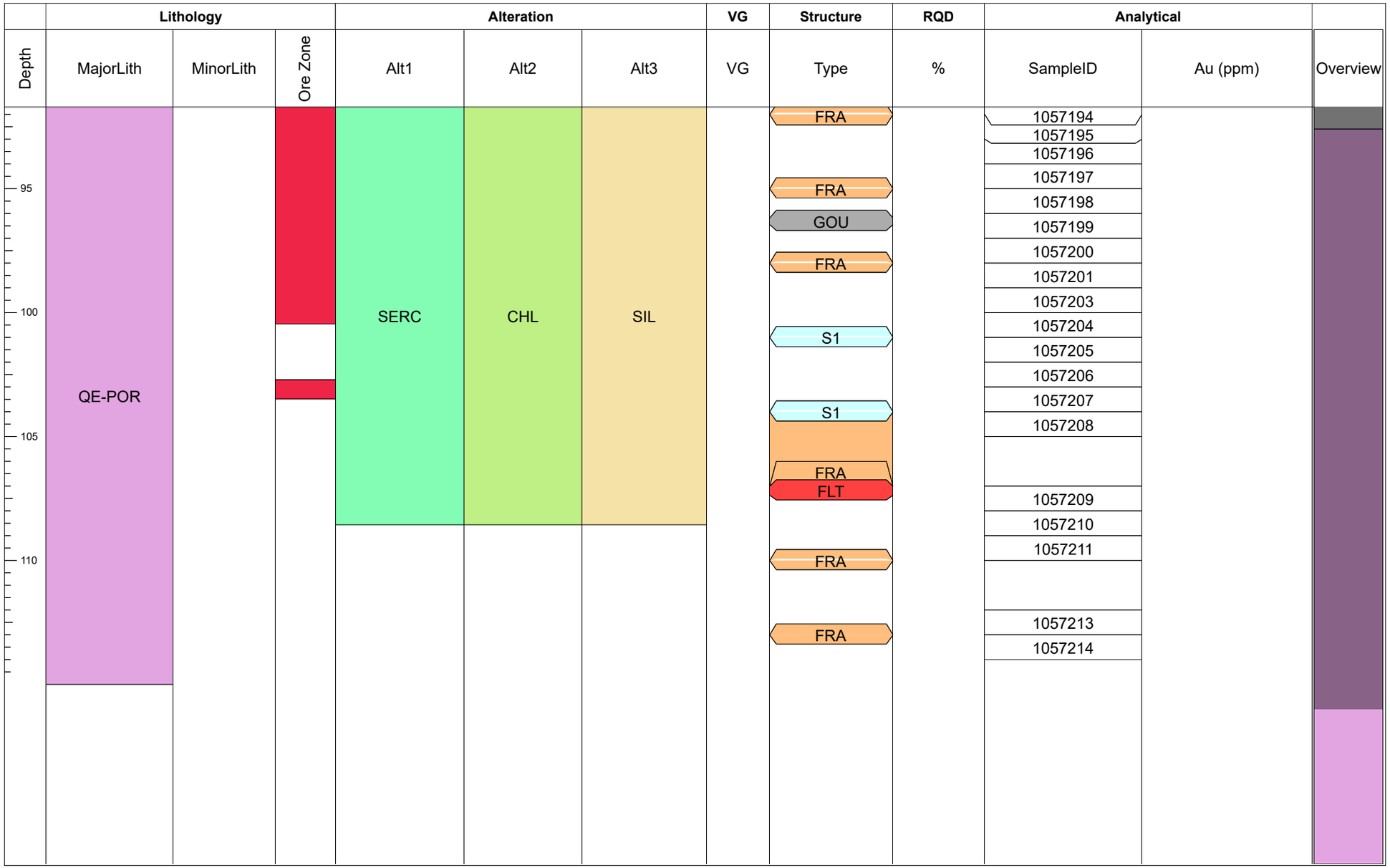
Alt2
sericite
chlorite

Alt3
silica

Type
Fractured

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-04	VGP	BZ	115	02-Sep-2023	03-Sep-2023				

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
Qtz-eye Porphyry

MajorLith
Qtz-eye Porphyry

Alt1
sericite

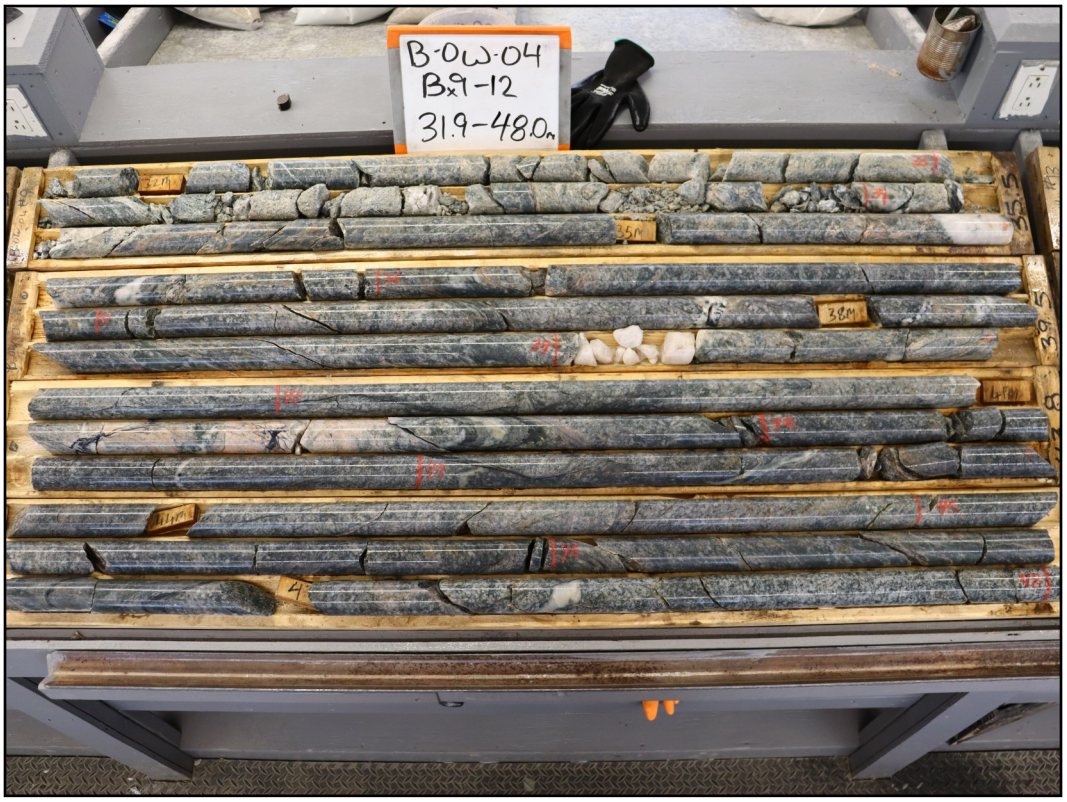
Alt2
chlorite

Alt3
silica

Type
Foliation
Fractured
Fault
Gouge


B-OW-04
Bx 1-4
3.41-18.5


B-OW-04
Bx5-8
18.5-31.9m


B-DW-04
Bx9-12
31.9-48.0m


B-DW-04
Bx 13-16
48.0-63.6m


B-OW-04
Bx 17-20
63.6-79.6m


B-OW-04
Bx 21-24
79.6-94.7m

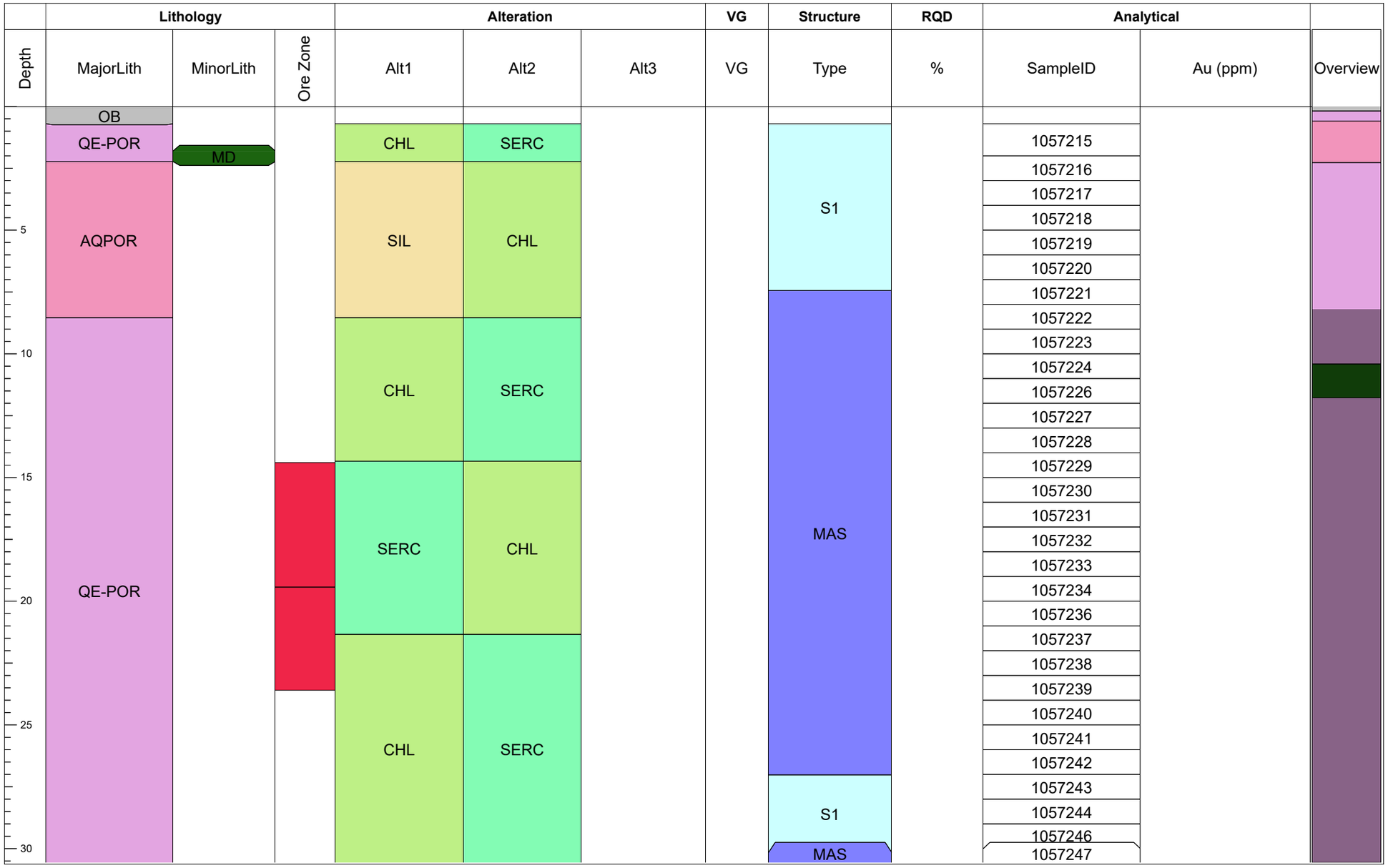

B-OW-04
Bx 25-28
94.7-107.5m
95m
96m
101m
107m
94.7
101.3
104.8
107.5


Gear Bag
B-OW-04
Bx 29-30
107.5-115m
EOH
110m
113m
115m

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-05	**VGP**	BZ	115	01-Sep-2023	02-Sep-2023				

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Aphanitic Qtz Porphyry
- Overburden
- Qtz-eye Porphyry

MajorLith
- Aphanitic Qtz Porphyry
- Overburden
- Qtz-eye Porphyry

MinorLith
- Mafic Dike

Alt1
- silica
- sericite
- chlorite

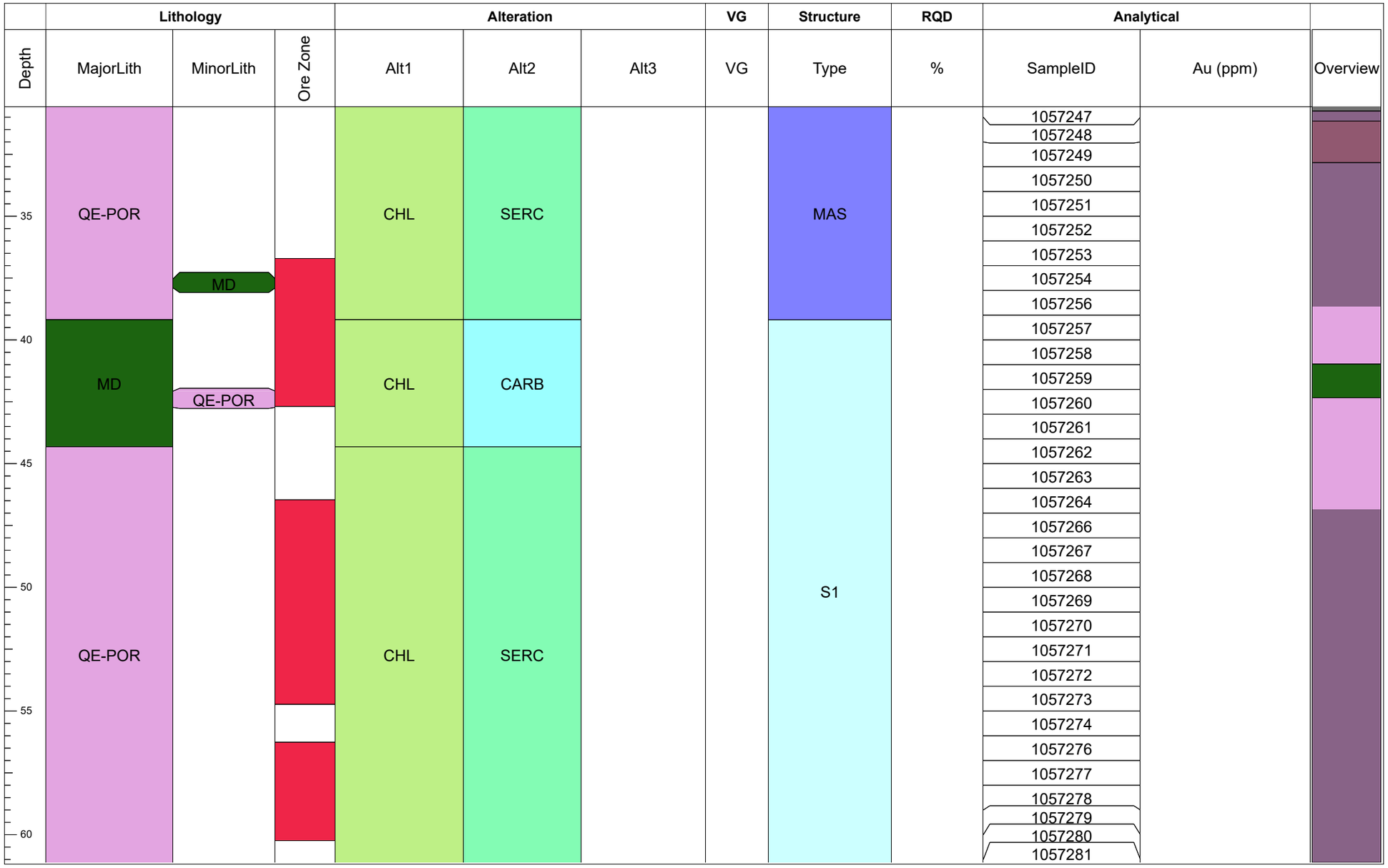
Alt2
- sericite
- chlorite

Type
- Foliation
- Massive

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-05	**VGP**	BZ	115	01-Sep-2023	02-Sep-2023				

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Mafic Dike
- Qtz-eye Porphyry

MajorLith
- Mafic Dike
- Qtz-eye Porphyry

MinorLith
- Mafic Dike
- Qtz-eye Porphyry

Alt1
- chlorite

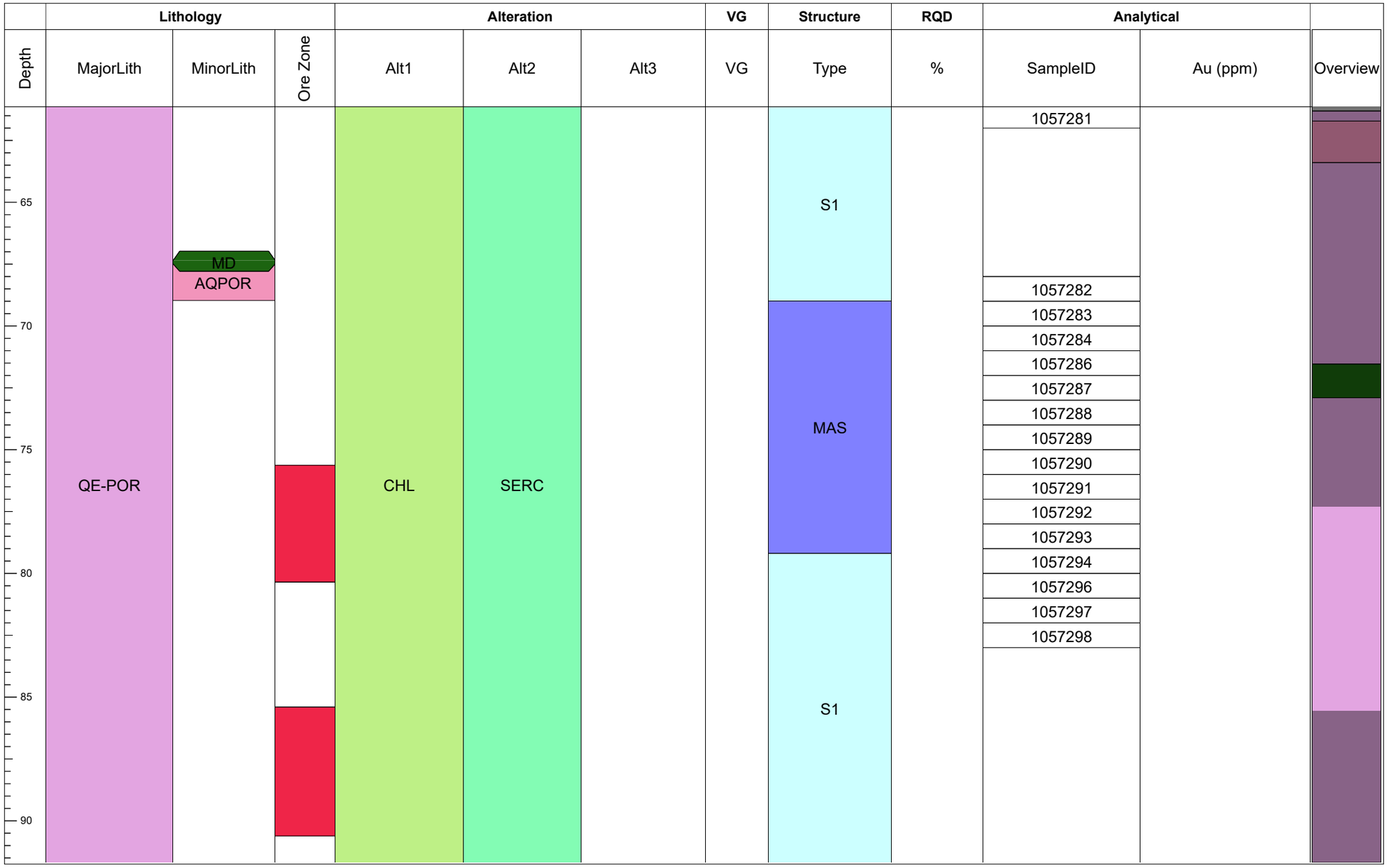
Alt2
- sericite
- carbonate

Type
- Foliation
- Massive

MARATHON GOLD

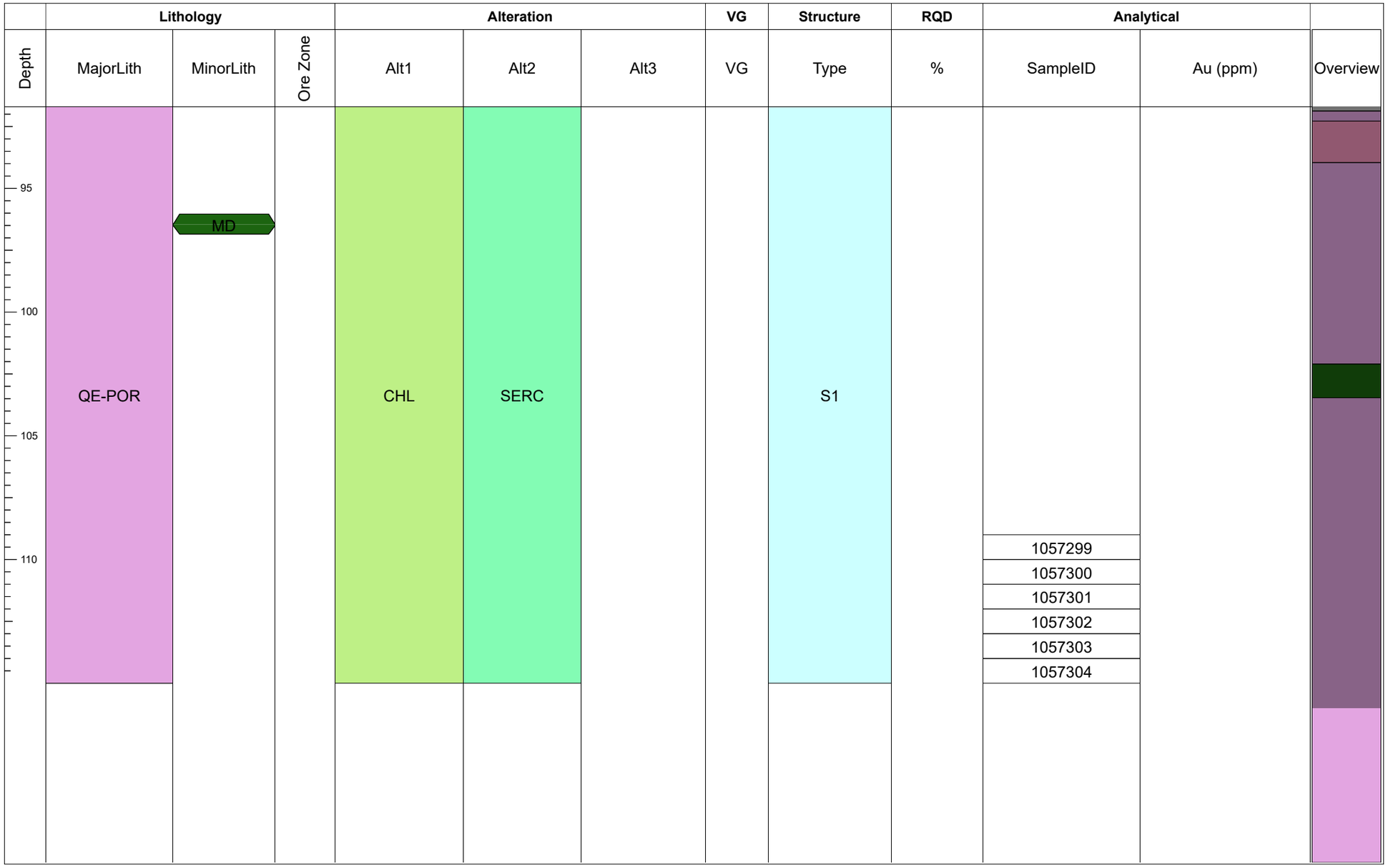
Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-05	**VGP**	BZ	115	01-Sep-2023	02-Sep-2023				

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-05	**VGP**	BZ	115	01-Sep-2023	02-Sep-2023				

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
Qtz-eye Porphyry

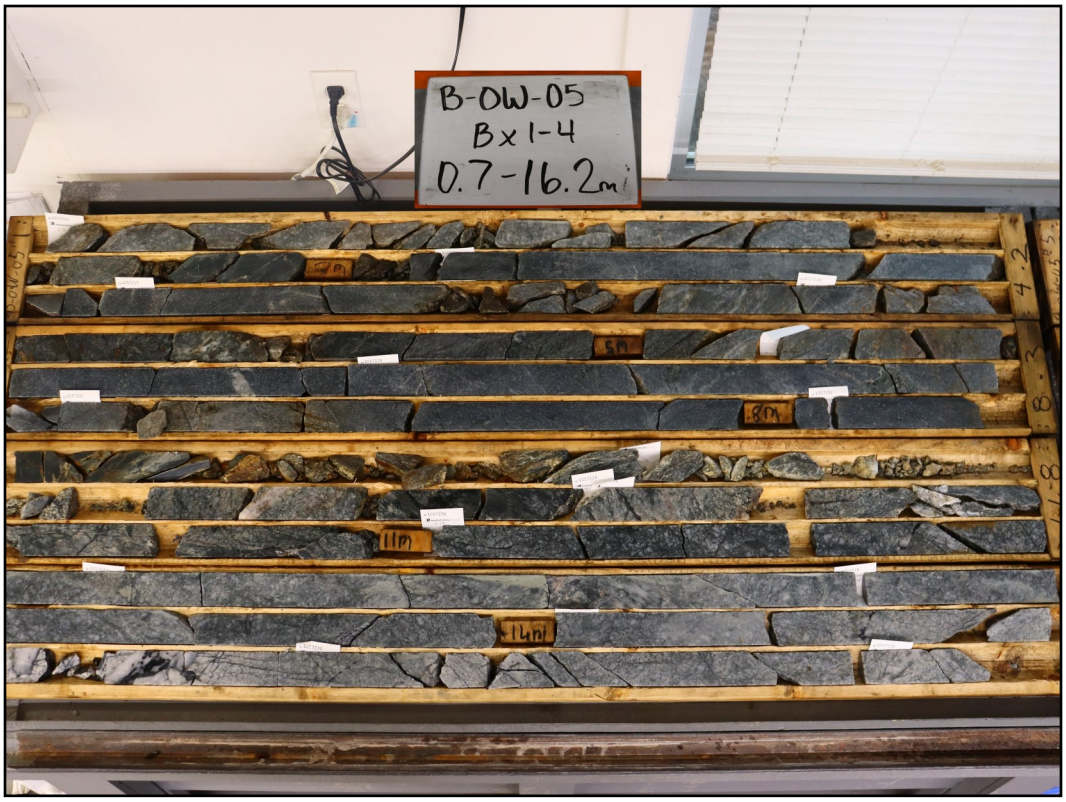
MajorLith
Qtz-eye Porphyry

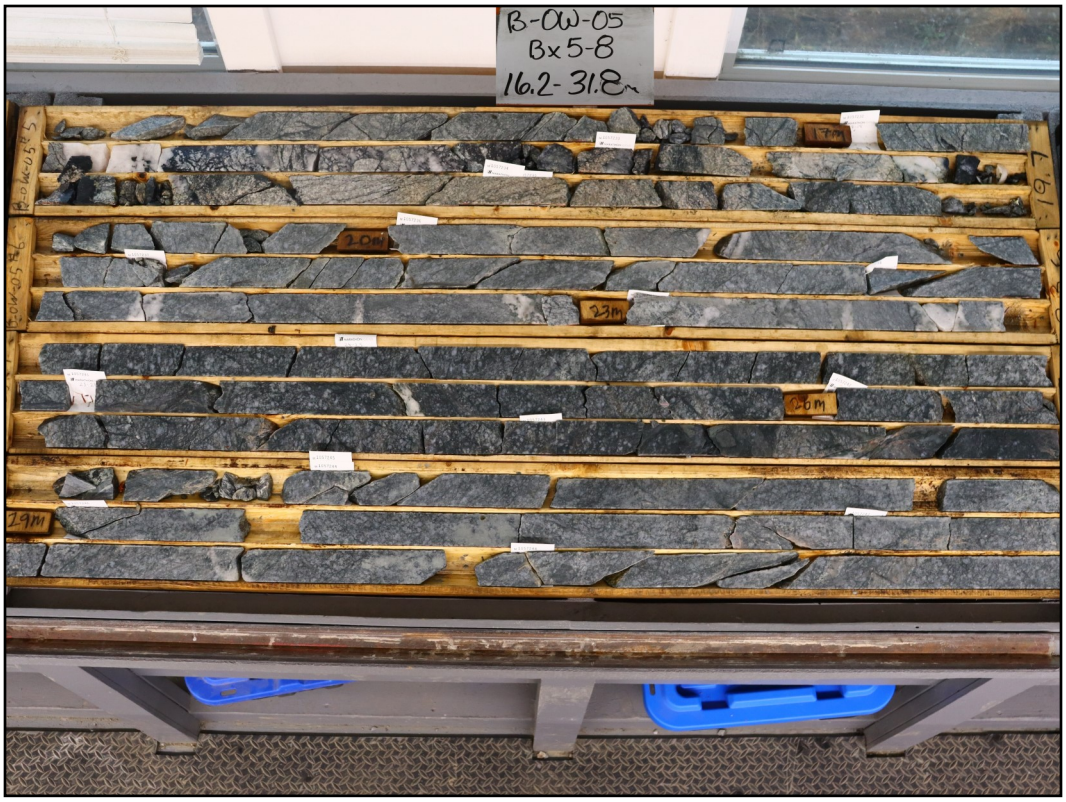
MinorLith
Mafic Dike

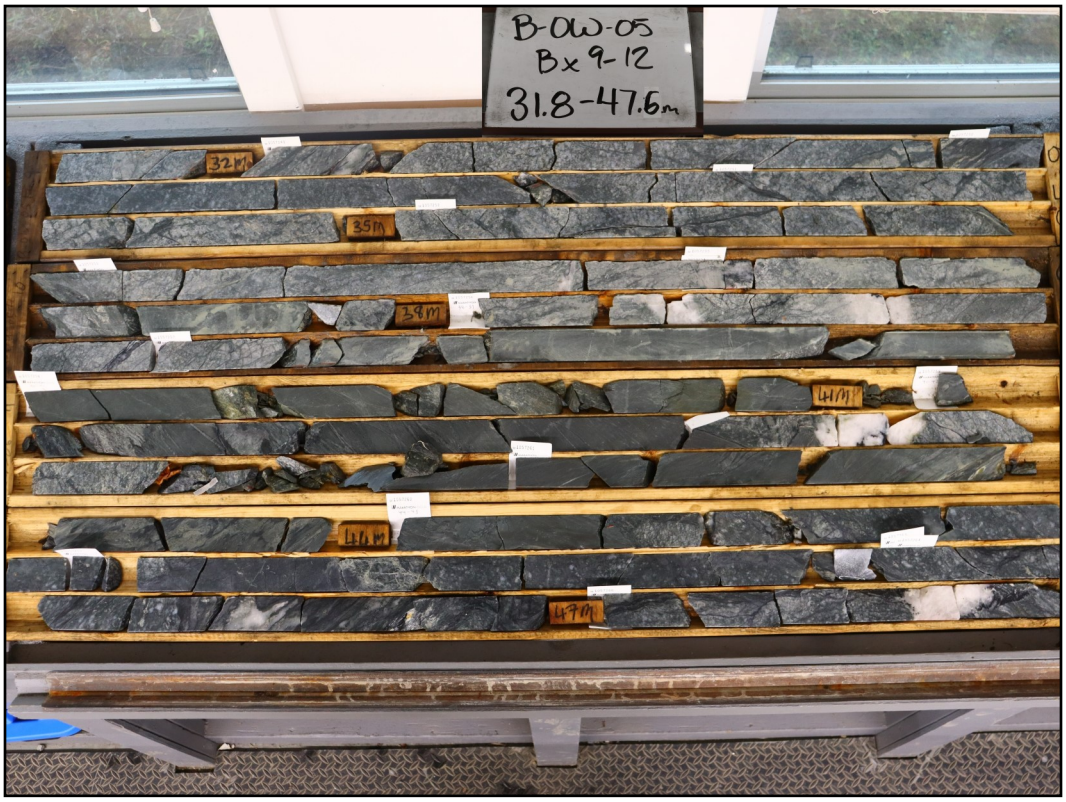
Alt1
chlorite

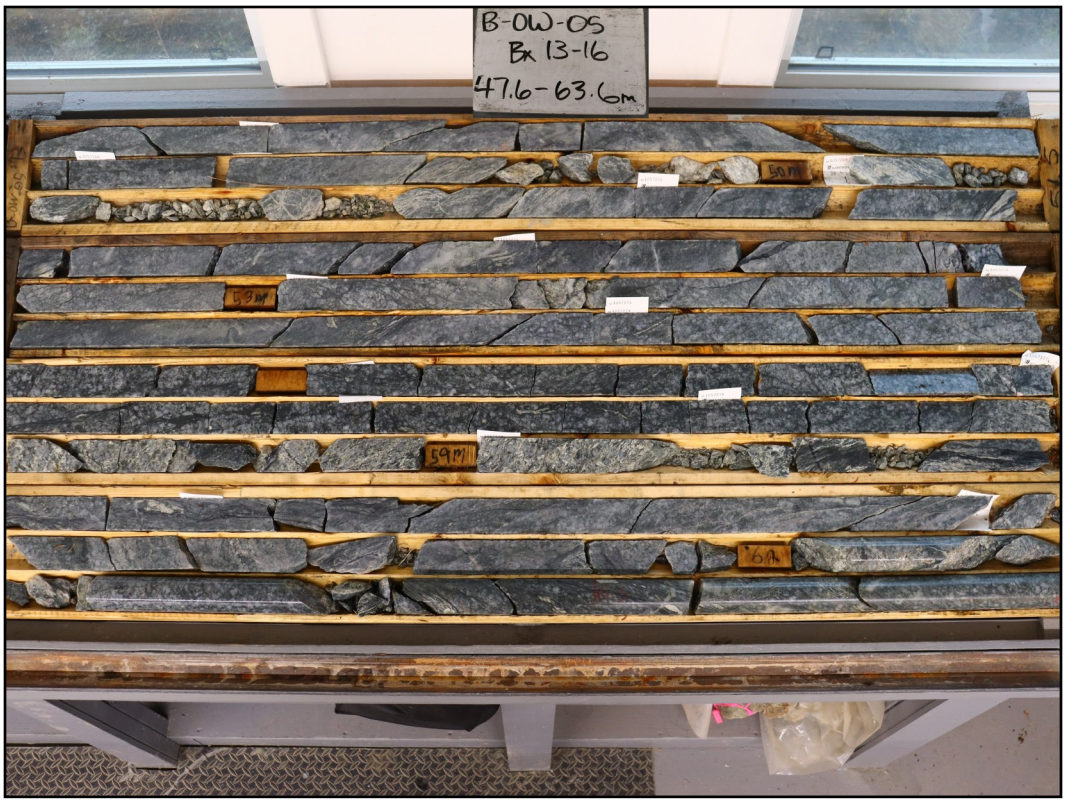
Alt2
sericite

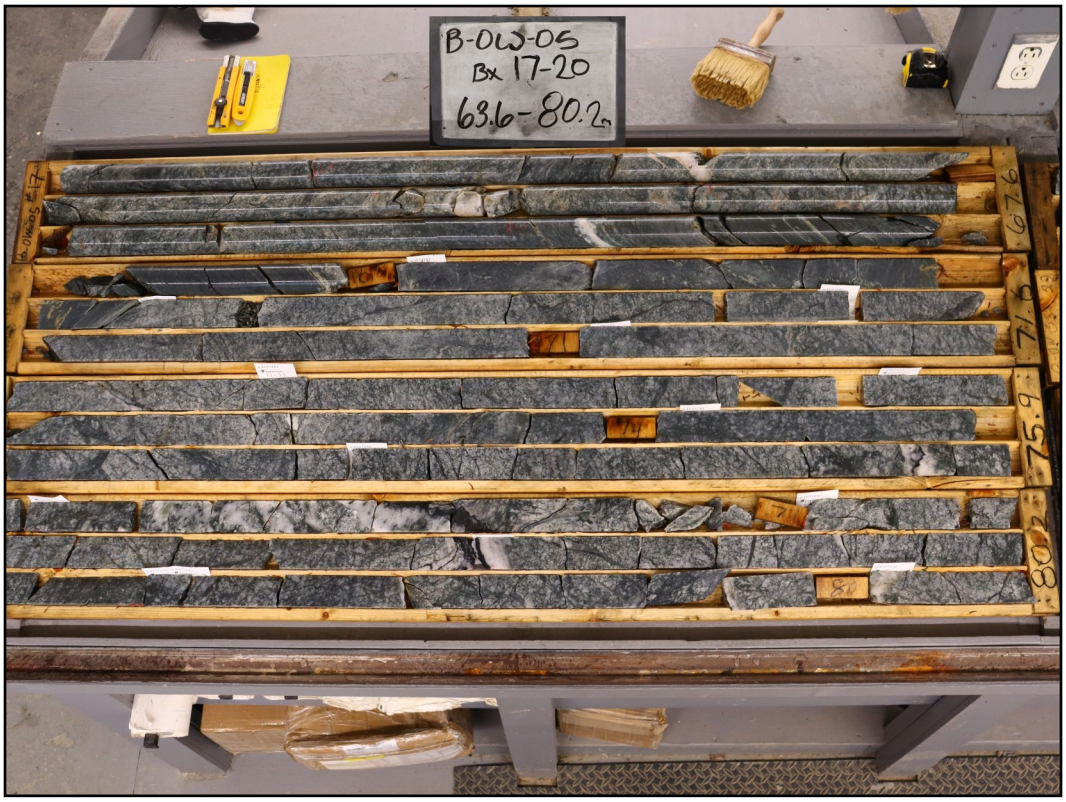
Type
Foliation


B-OW-05
Bx 1-4
0.7-16.2m
5m
8m
11m
14m


B-OW-05
Bx 5-8
16.2-31.8m
17m
20m
23m
26m
29m


B-OW-05
Bx 9-12
31.8-47.6m
32m
35m
38m
41m
46m
47m


B-OW-05
Bx 13-16
47.6-63.6m
50m
53m
59m
60m


B-DW-05
Bx 17-20
63.6-80.2m


B-DW-05
Bx 21-24
80.2-97.1m

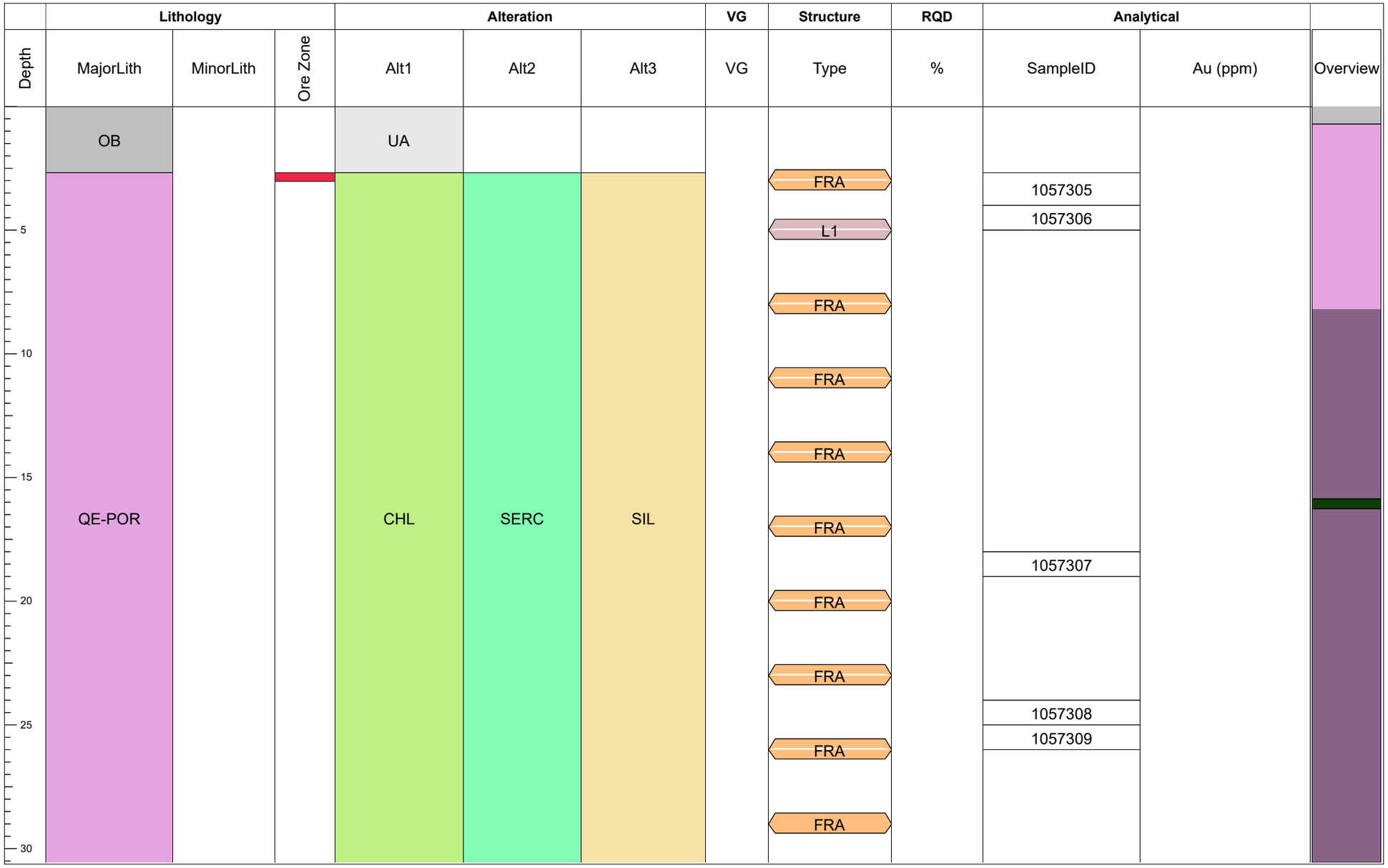

B-OW-05
Bx 25-28
97.1-113.7m


B-OW-05
Bx 29
113.7-115.0m
EOH

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-06	**VGP**	BZ	115	29-Aug-2023	30-Aug-2023				Adrienne Noftall

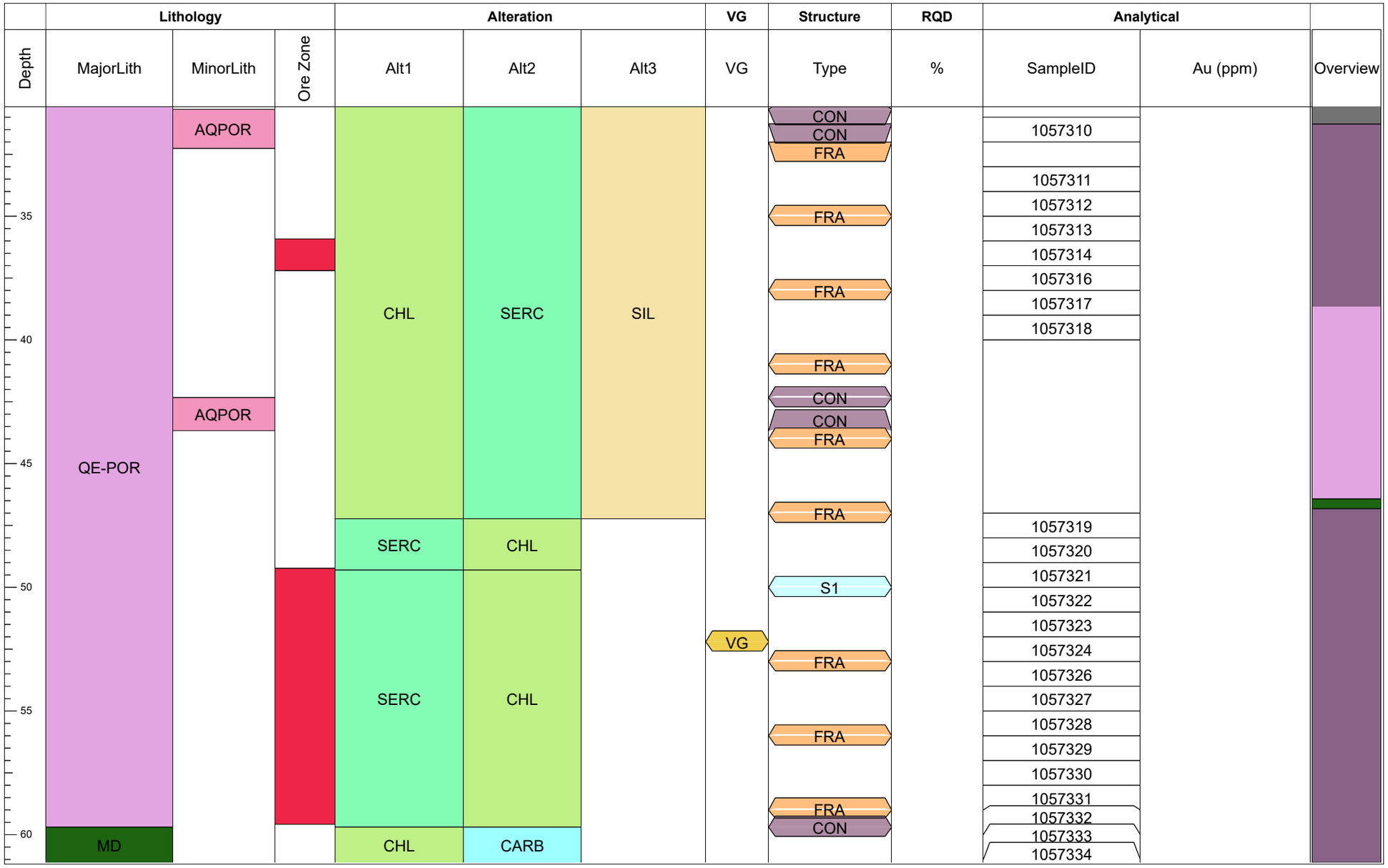
Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-06	VGP	BZ	115	29-Aug-2023	30-Aug-2023				Adrienne Noftall

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Mafic Dike
- Qtz-eye Porphyry

MajorLith
- Mafic Dike
- Qtz-eye Porphyry

MinorLith
- Aphanitic Qtz Porphyry

Alt1
- sericite
- chlorite

Alt2
- sericite
- chlorite
- carbonate

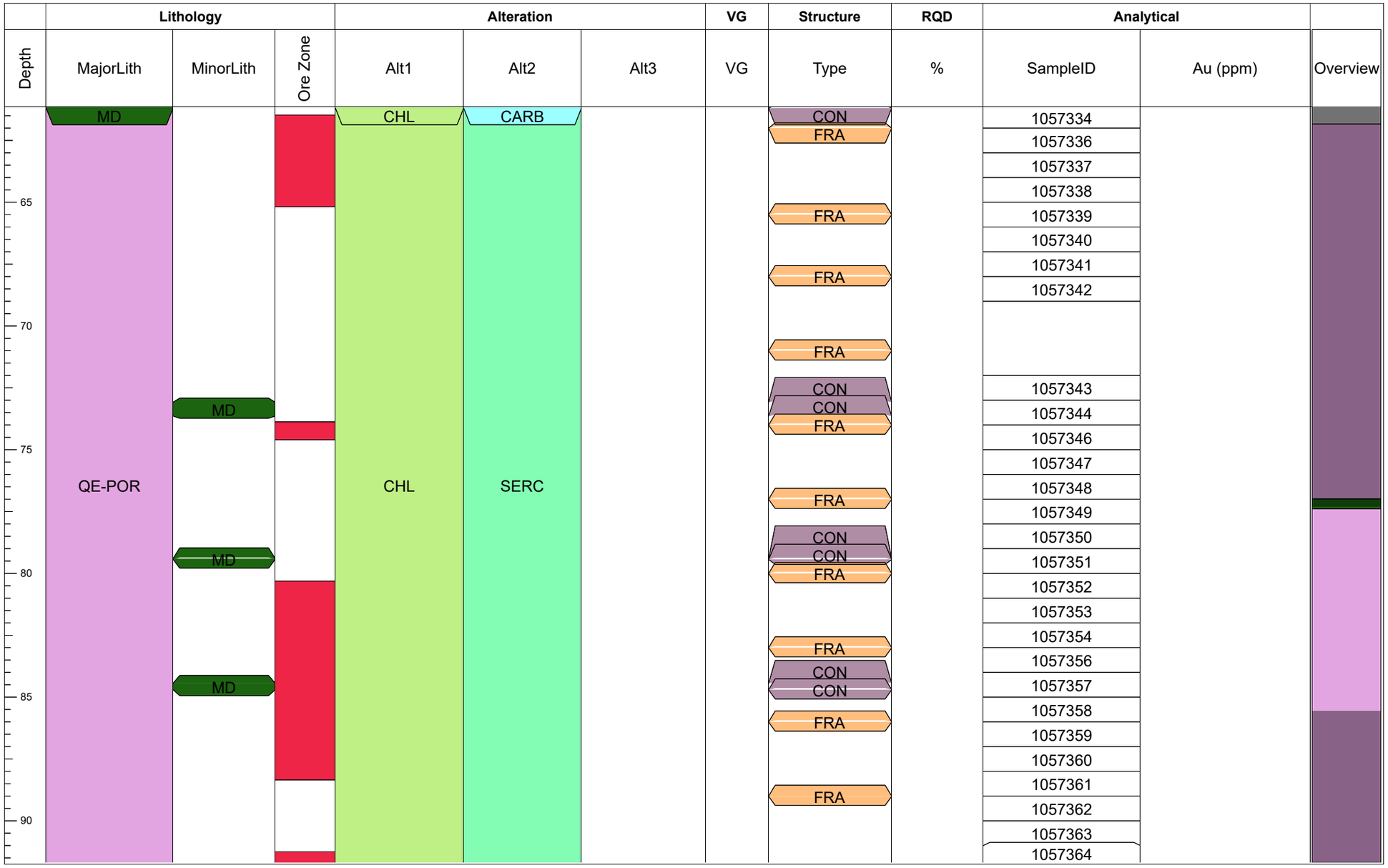
Alt3
- silica

Type
- Foliation
- Fractured
- Contact

MARATHON GOLD

Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-06	**VGP**	BZ	115	29-Aug-2023	30-Aug-2023				Adrienne Noftall

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		



MajorLith
- Mafic Dike
- Qtz-eye Porphyry

MajorLith
- Mafic Dike
- Qtz-eye Porphyry

MinorLith
- Mafic Dike

Alt1
- chlorite

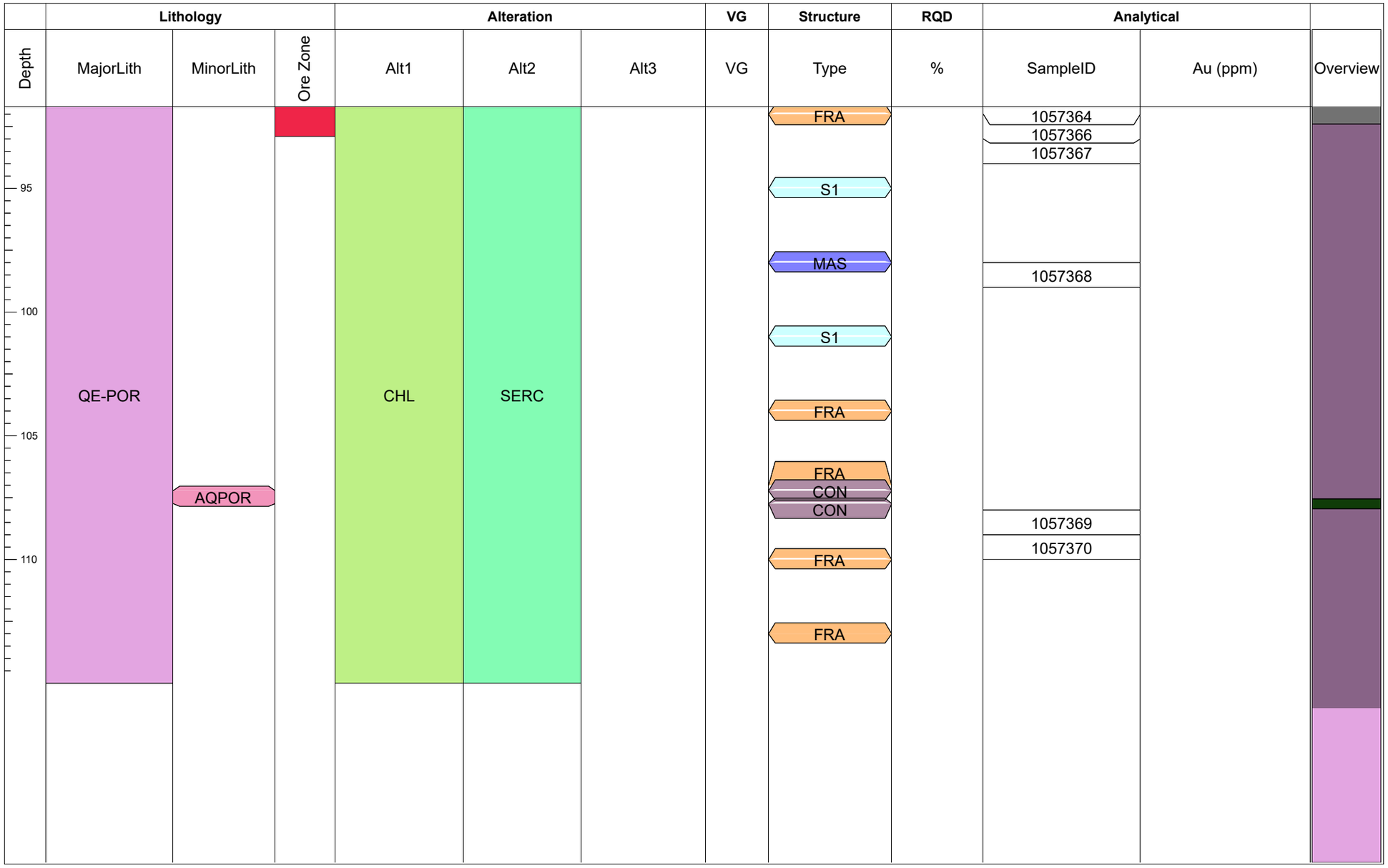
Alt2
- sericite
- carbonate

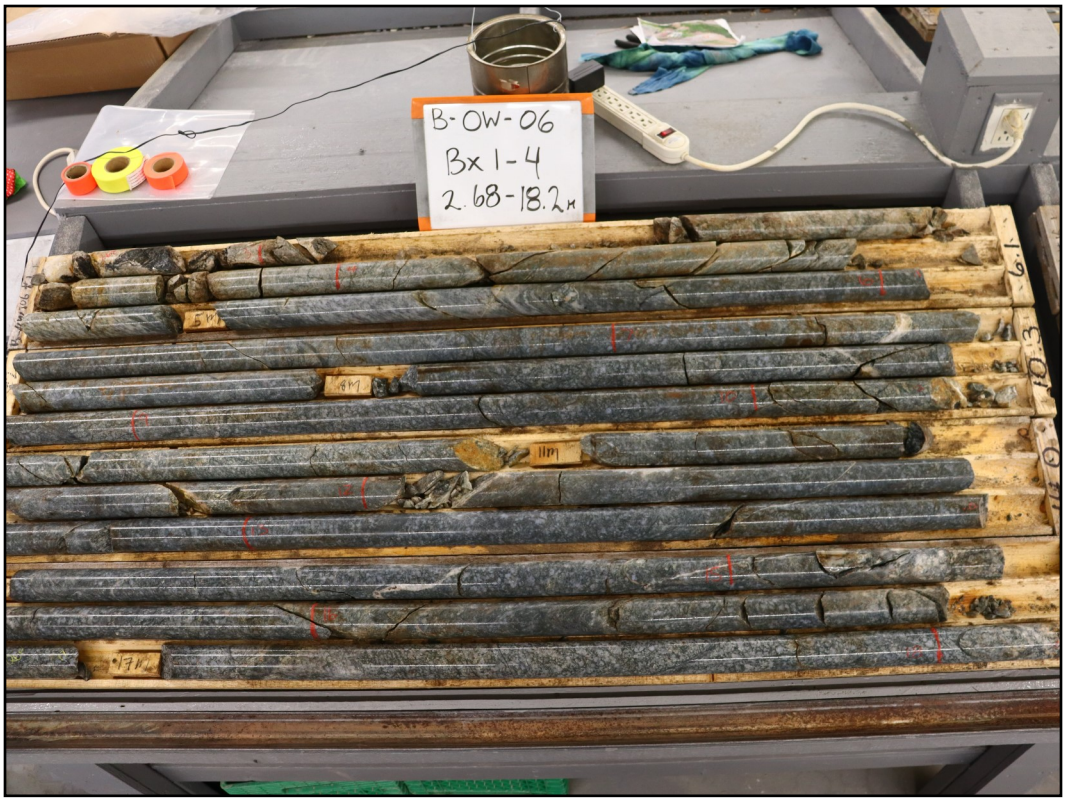
Type
- Fractured
- Contact

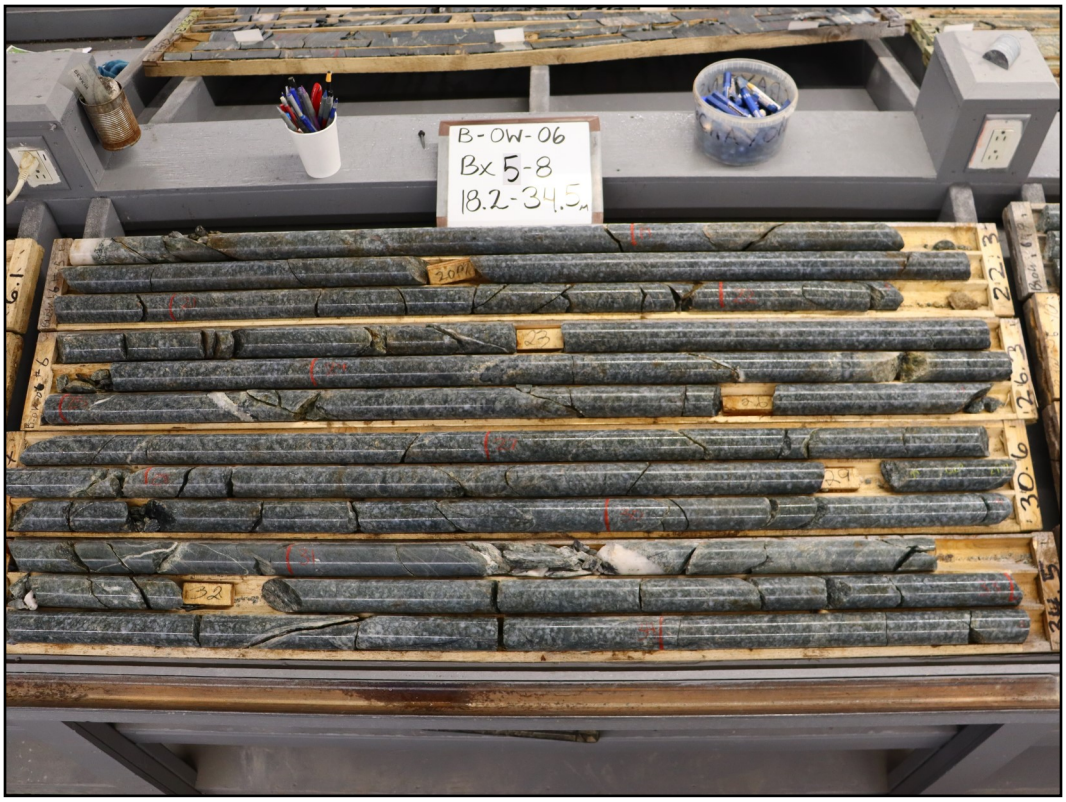
MARATHON GOLD

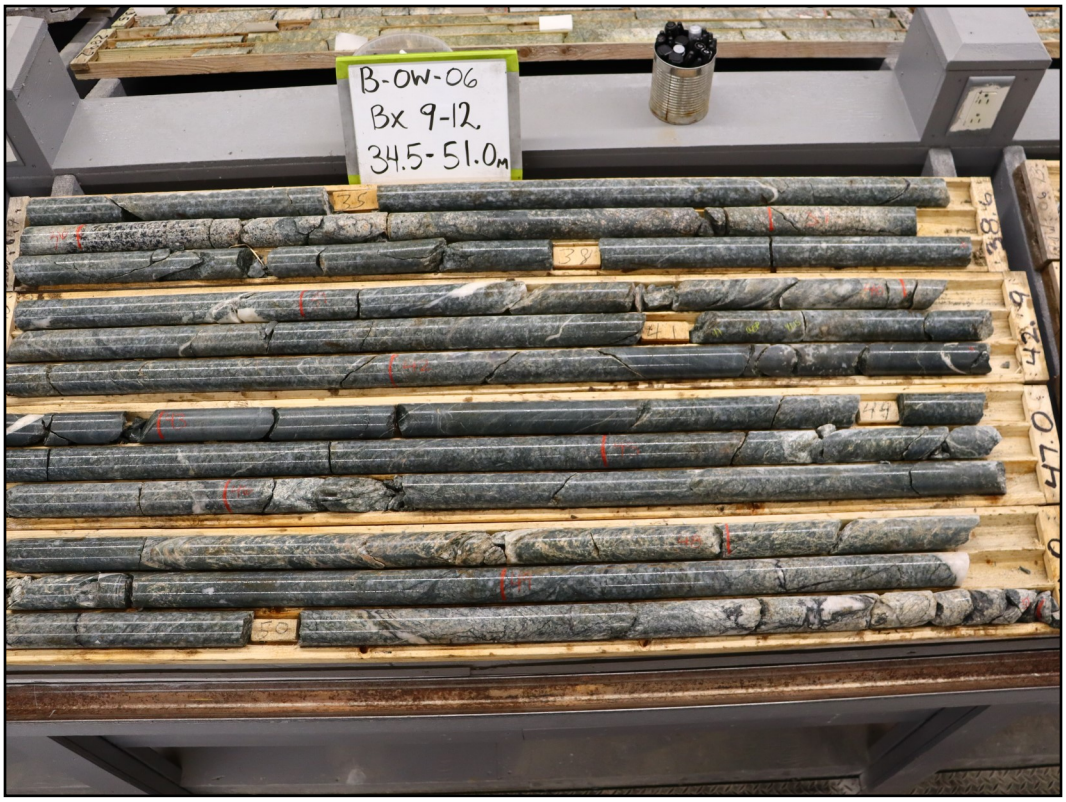
Hole ID	Project	Prospect	EOH Depth	Start Date	End Date	Easting	Northing	Elevation	Geologist
B-OW-06	**VGP**	BZ	115	29-Aug-2023	30-Aug-2023				Adrienne Noftall

Collar_Azi	Collar Dip	Planned Azi	Planned Dip	Planned HoleID	Planned Depth
0	90	0	90		




B-OW-06
Bx 1-4
2.68-18.2m


B-OW-06
Bx 5-8
18.2-34.5m


B-OW-06
Bx 9-12.
34.5-51.0m


B-OW-06
Bx 13-16
51.0-67.4m


B-OW-06
Bx 17-20
67.4-84.1m

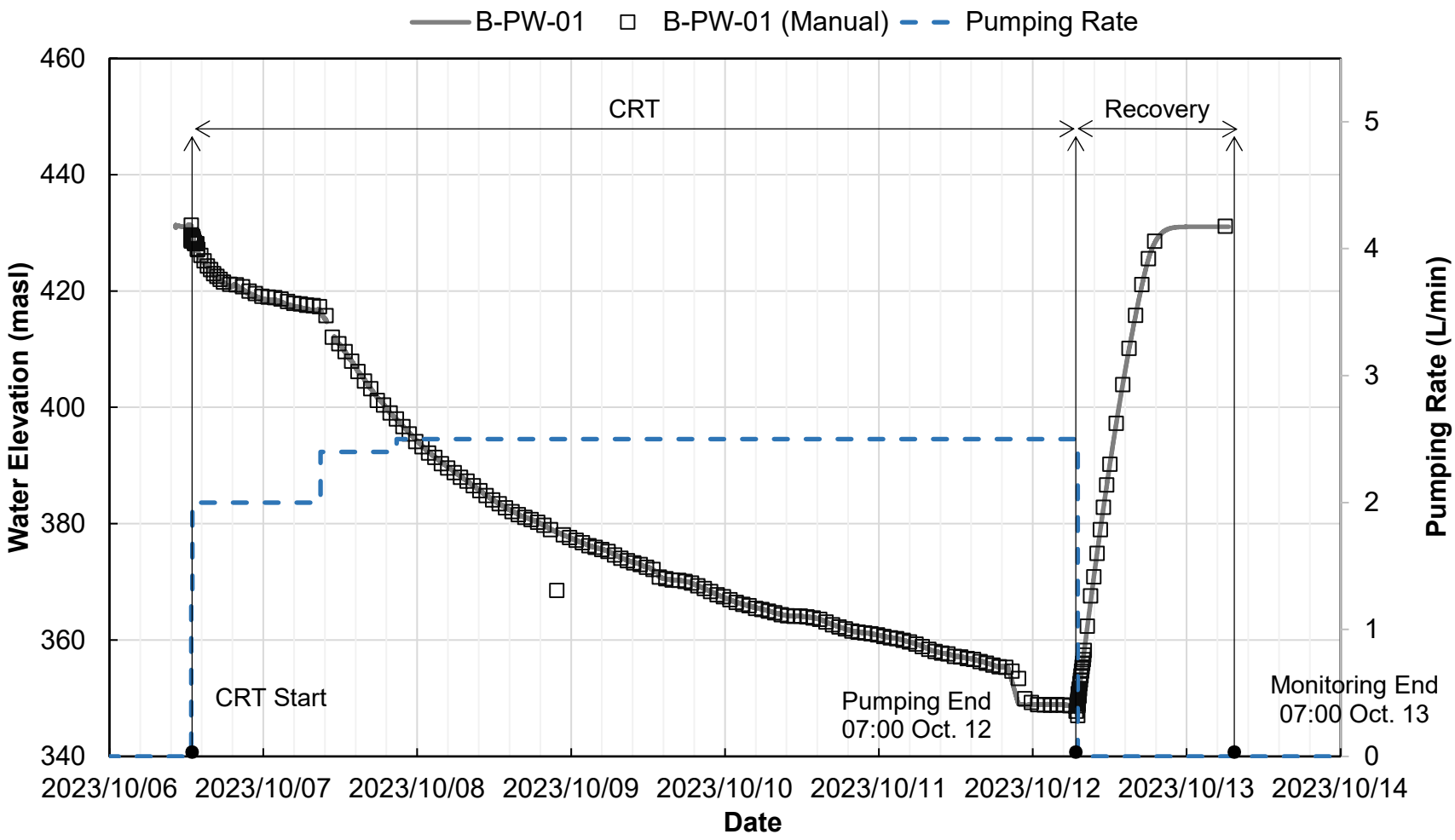

B-OW-06
Bx 21-24
84.1 - 100.5m


B-OW-06
Bx 25-28
100.5-115.0m
EOH

APPENDIX D

Pumping Test Hydraulic Plots

(a)



(b)

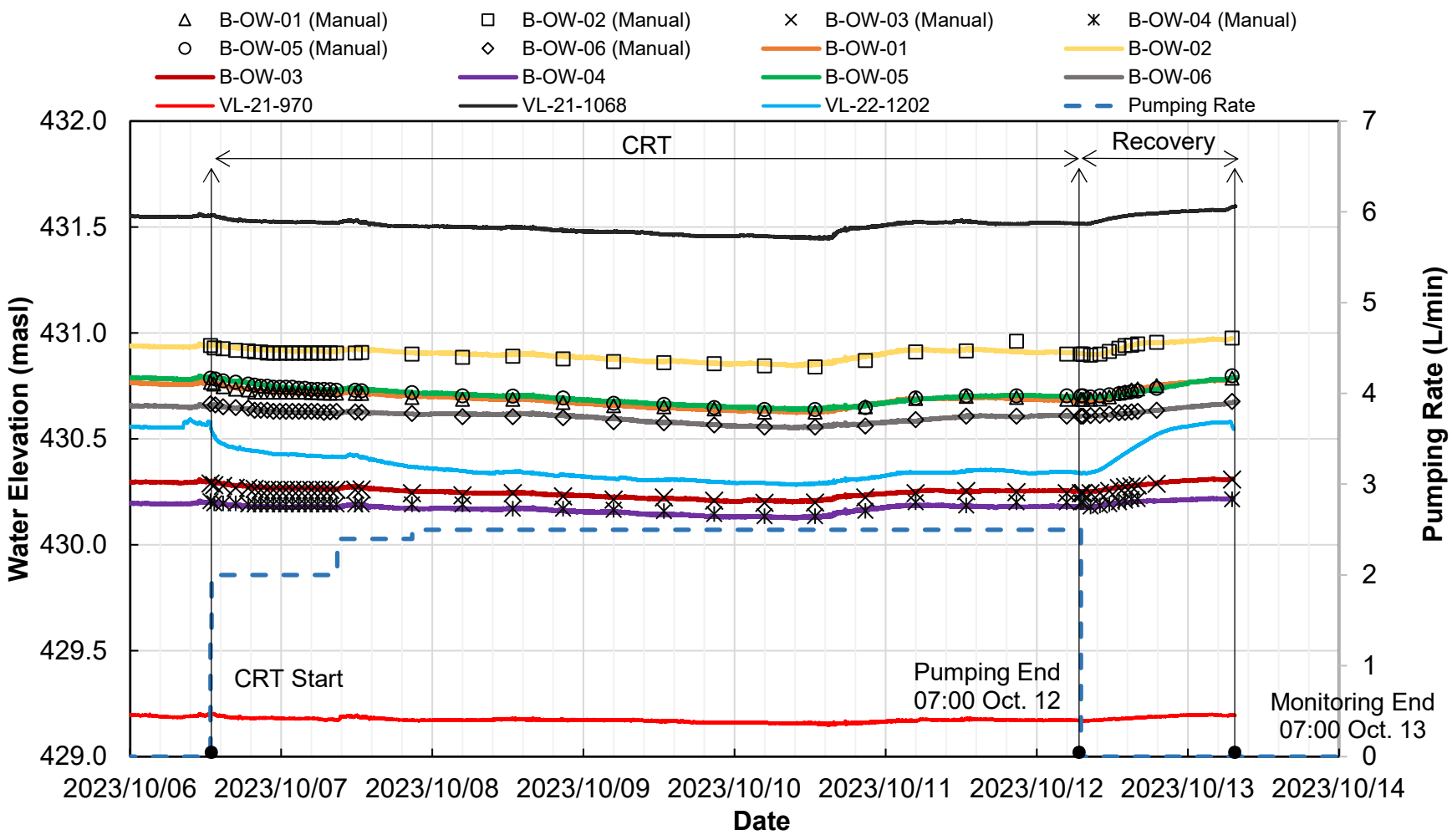


Figure D-1 Water Elevation and Pumping Rate for Pumping (a) and Observation (b) Wells during Pumping Test on B-PW-01

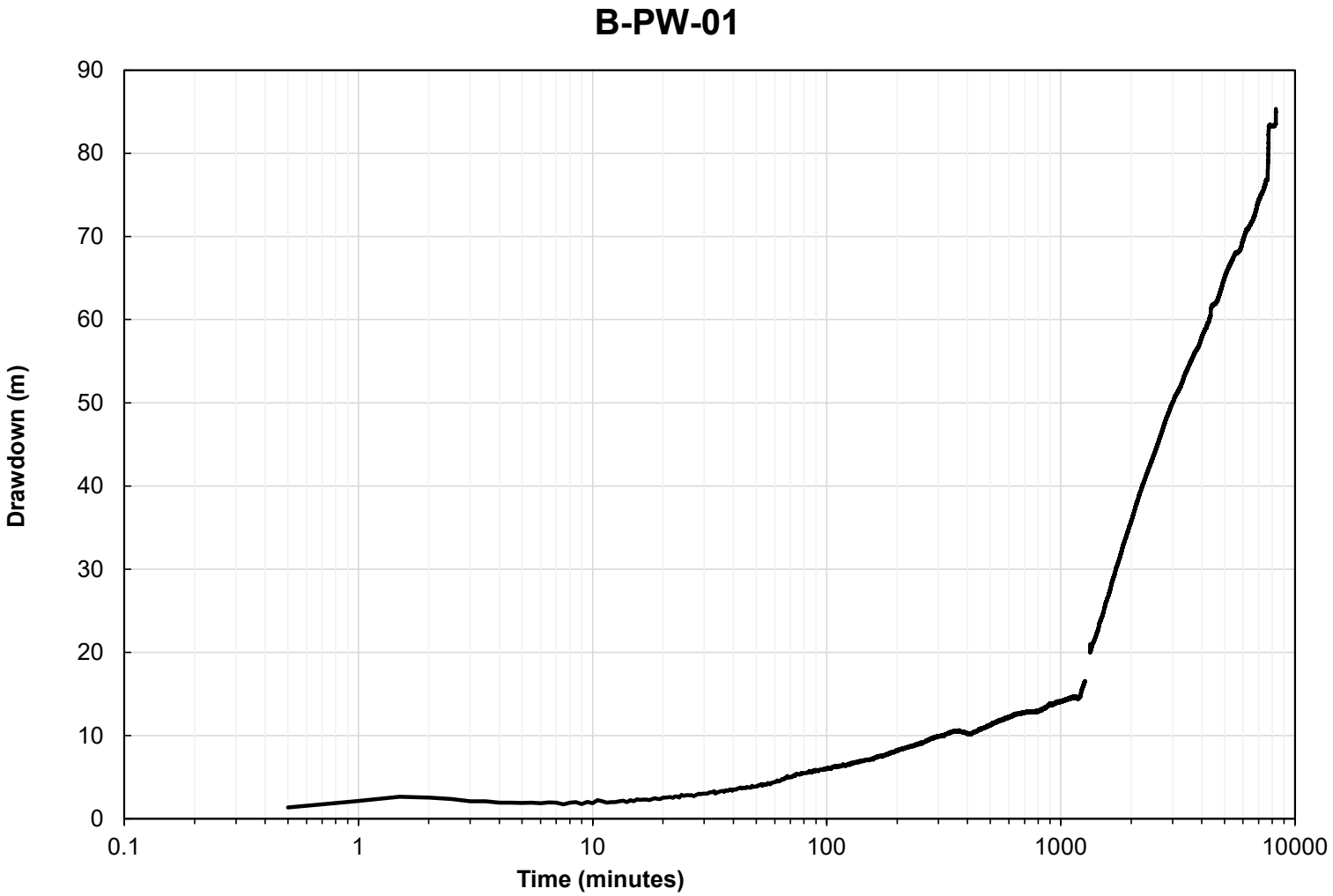


Figure D-2a Semi-log Plot of Drawdown Versus Time for Constant Rate Test B-PW-01

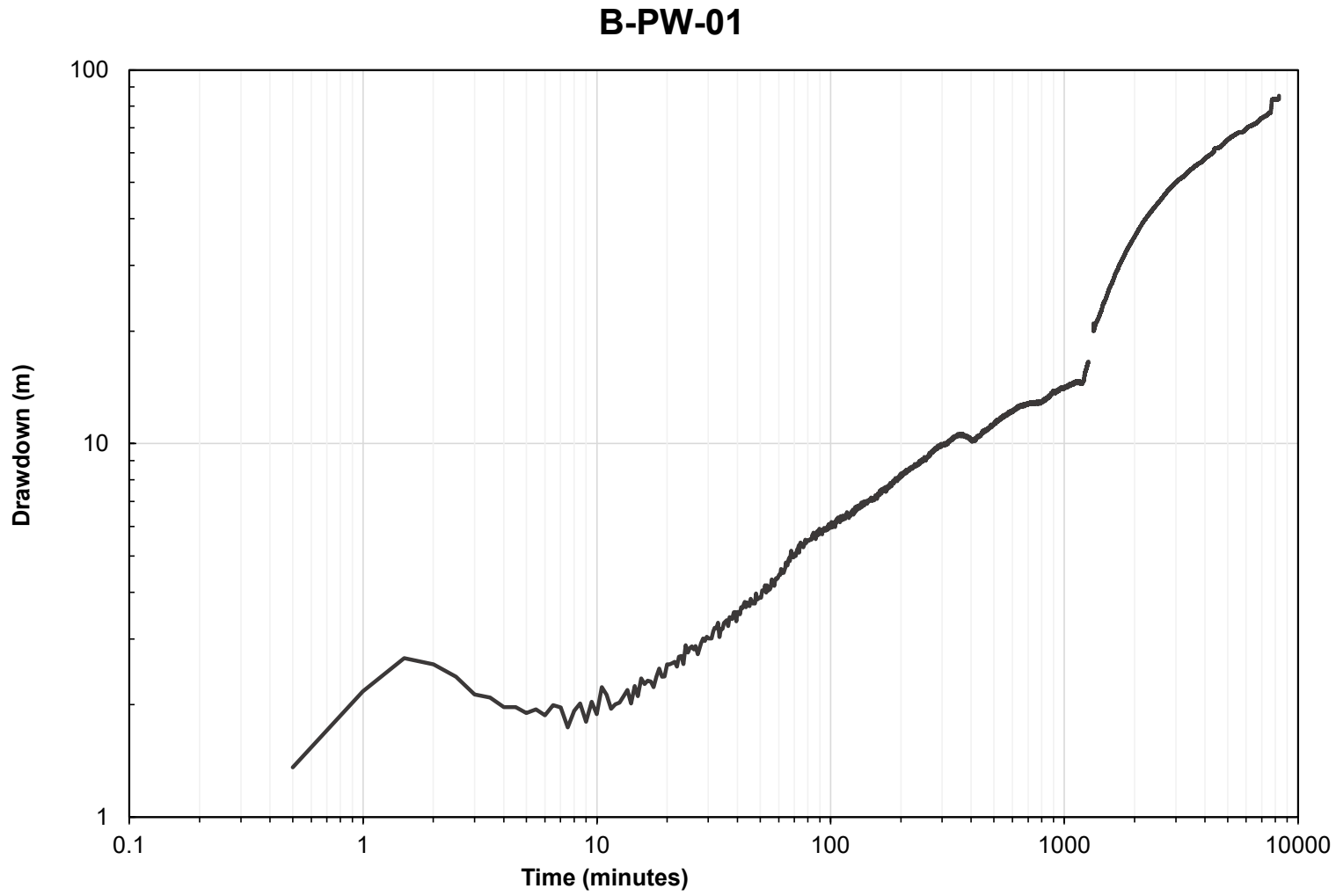


Figure D-2b Log-log Plot of Drawdown Versus Time for Constant Rate Test - B-PW-01

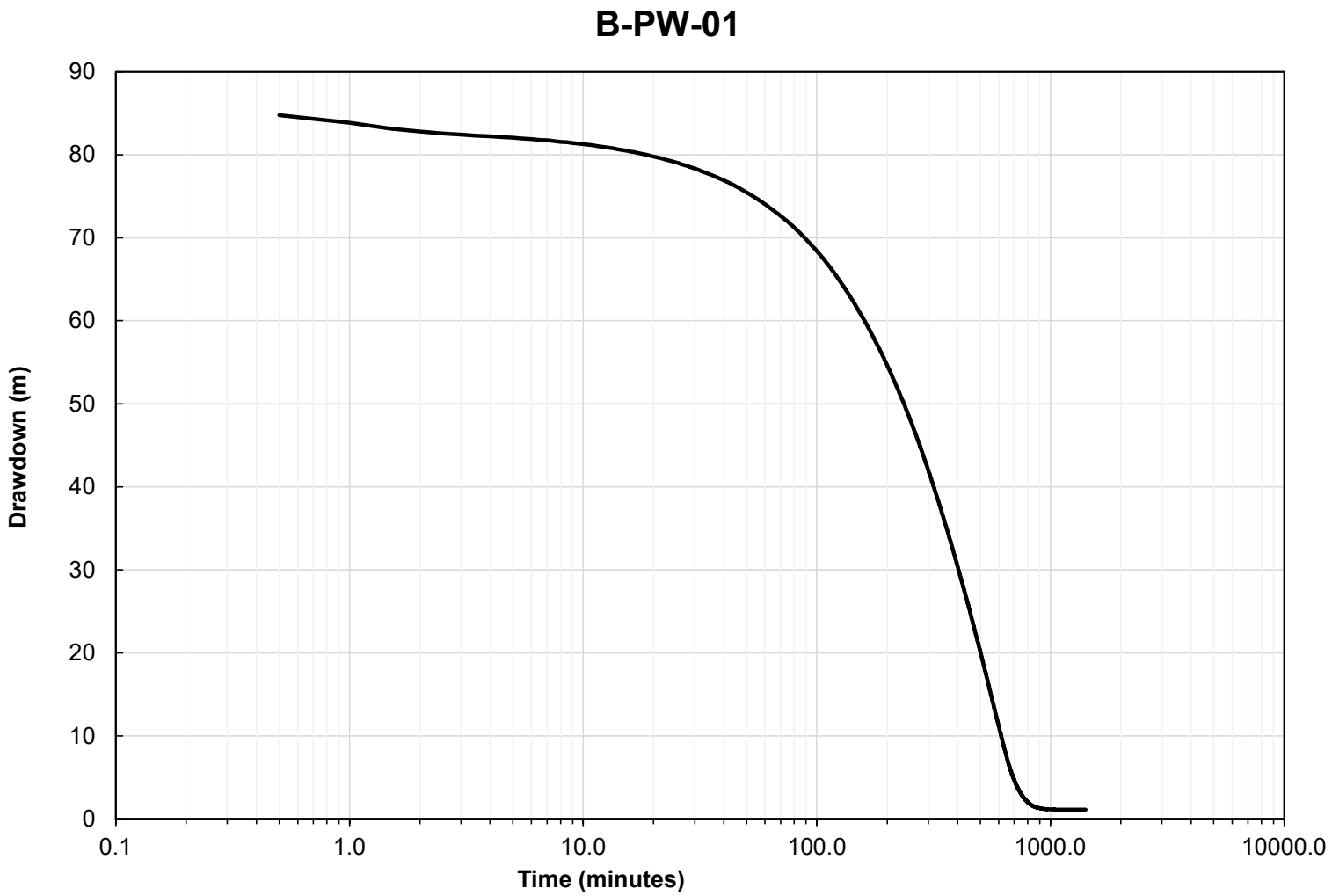


Figure D-2c Semi-log Plot of Recovery Versus Time for Constant Rate Test B-PW-01

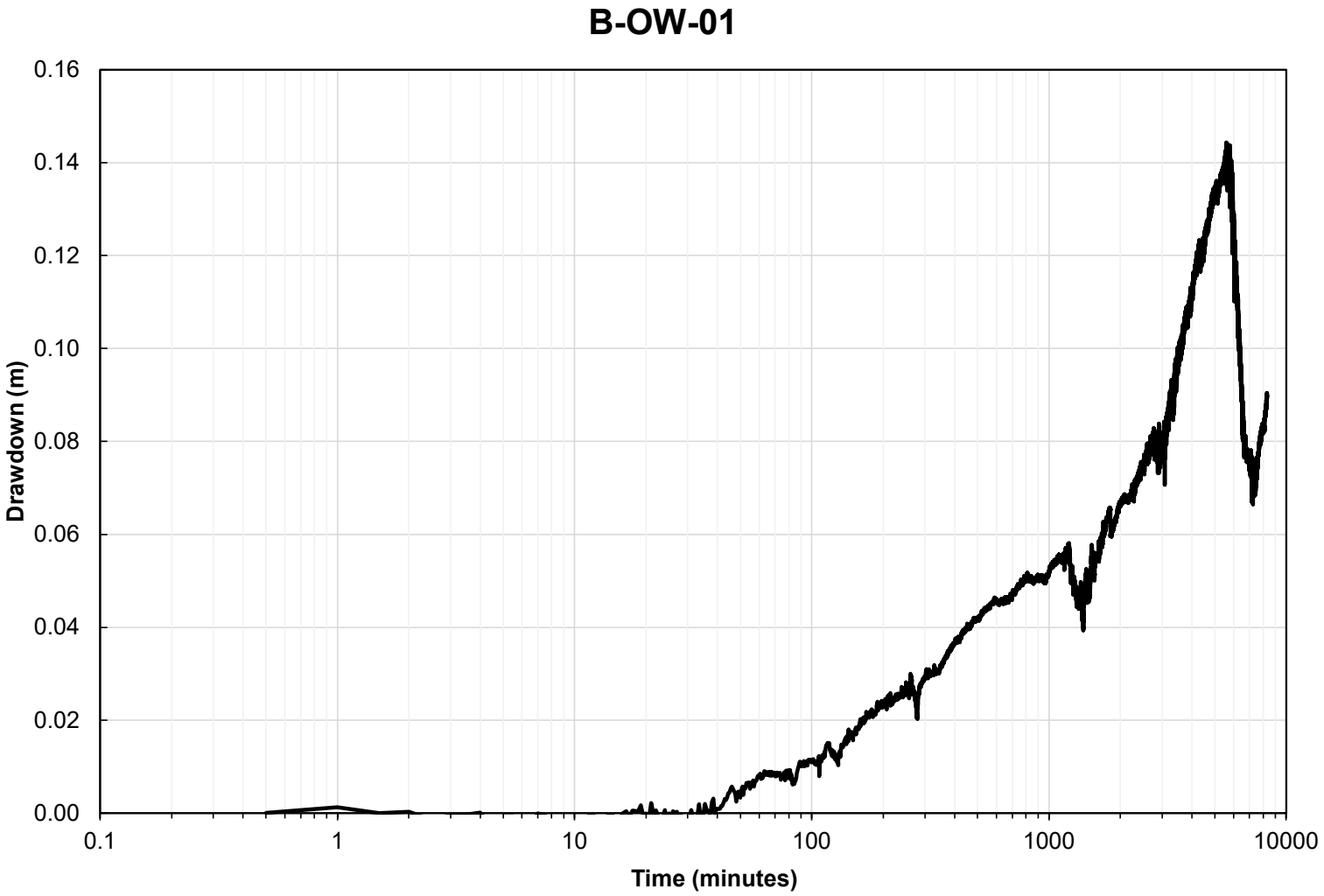


Figure D-3a Semi-log Plot of Drawdown Versus Time for Constant Rate Test B-OW-01

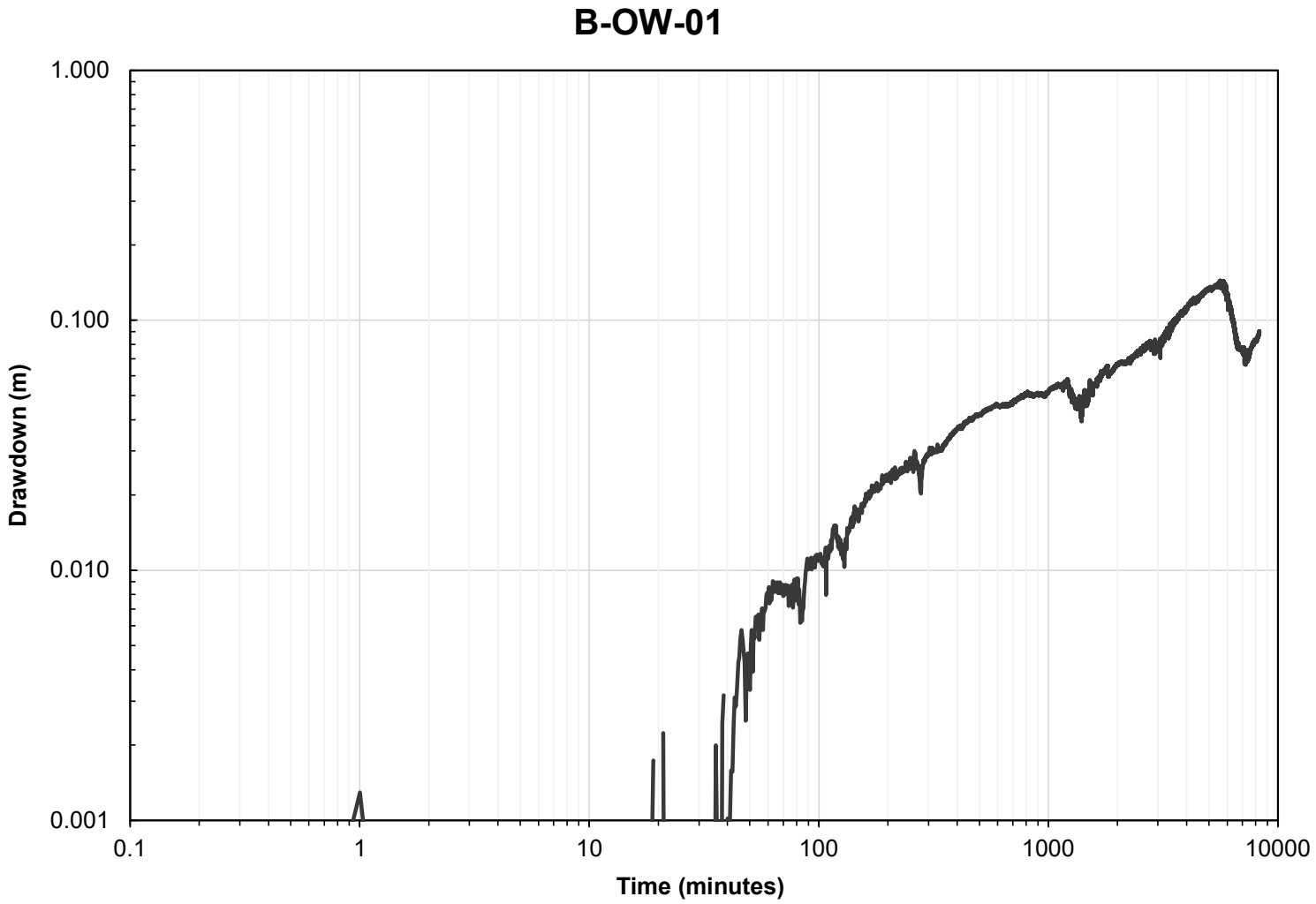


Figure D-3b Log-log Plot of Drawdown Versus Time for Constant Rate Test - B-OW-01

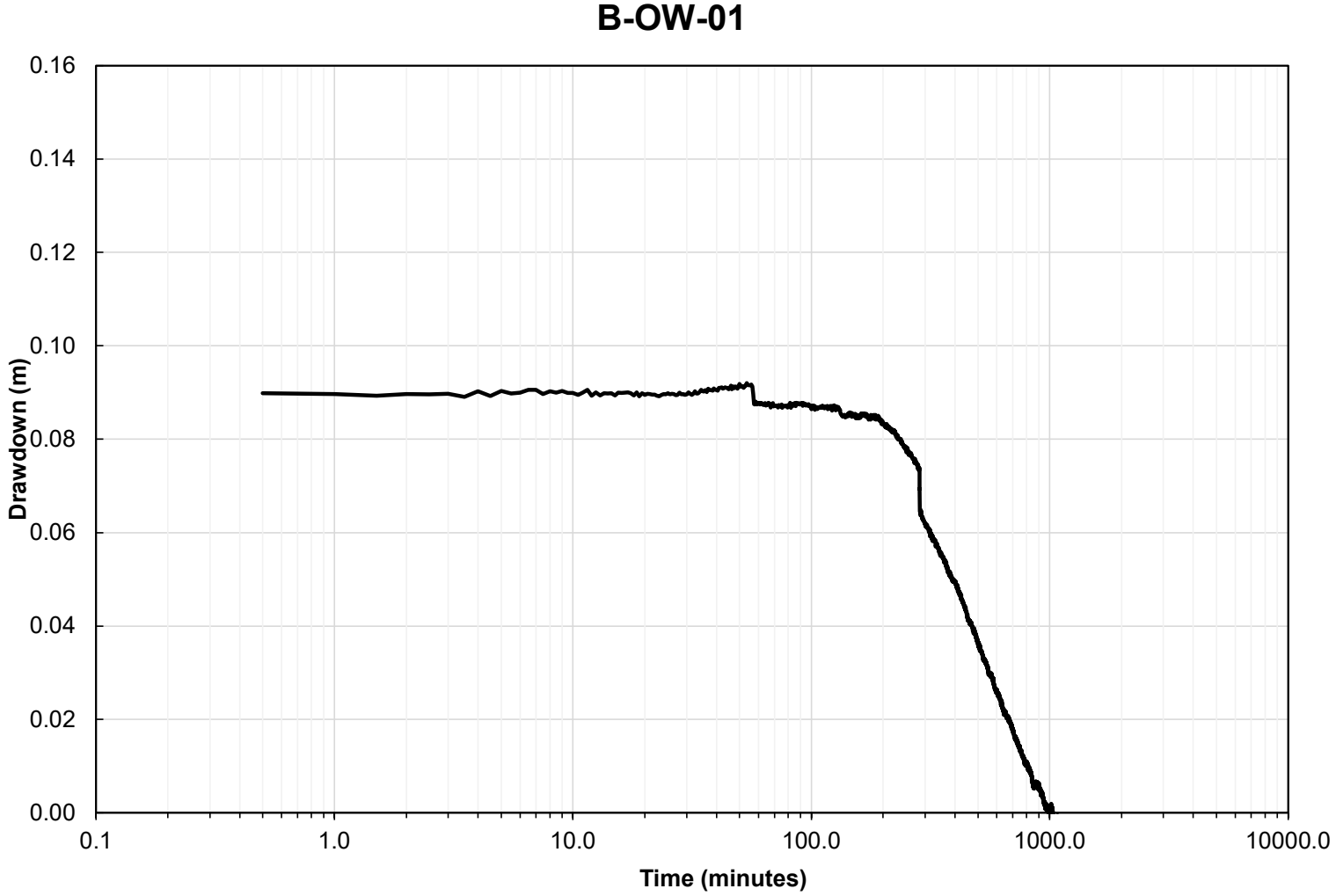


Figure D-3c Semi-log Plot of Recovery Versus Time for Constant Rate Test B-OW-01

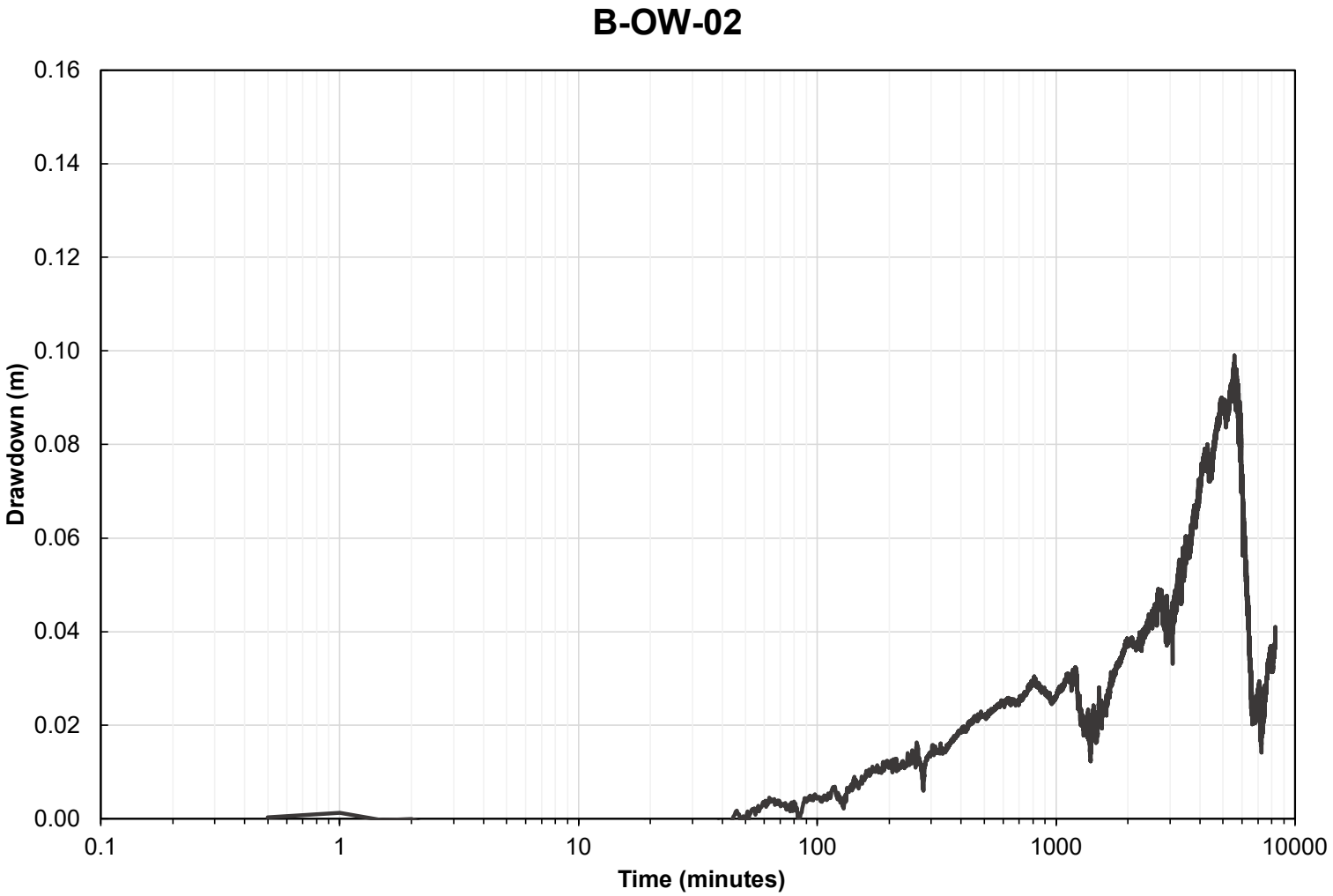


Figure D-4a Semi-log Plot of Drawdown Versus Time for Constant Rate Test B-OW-02

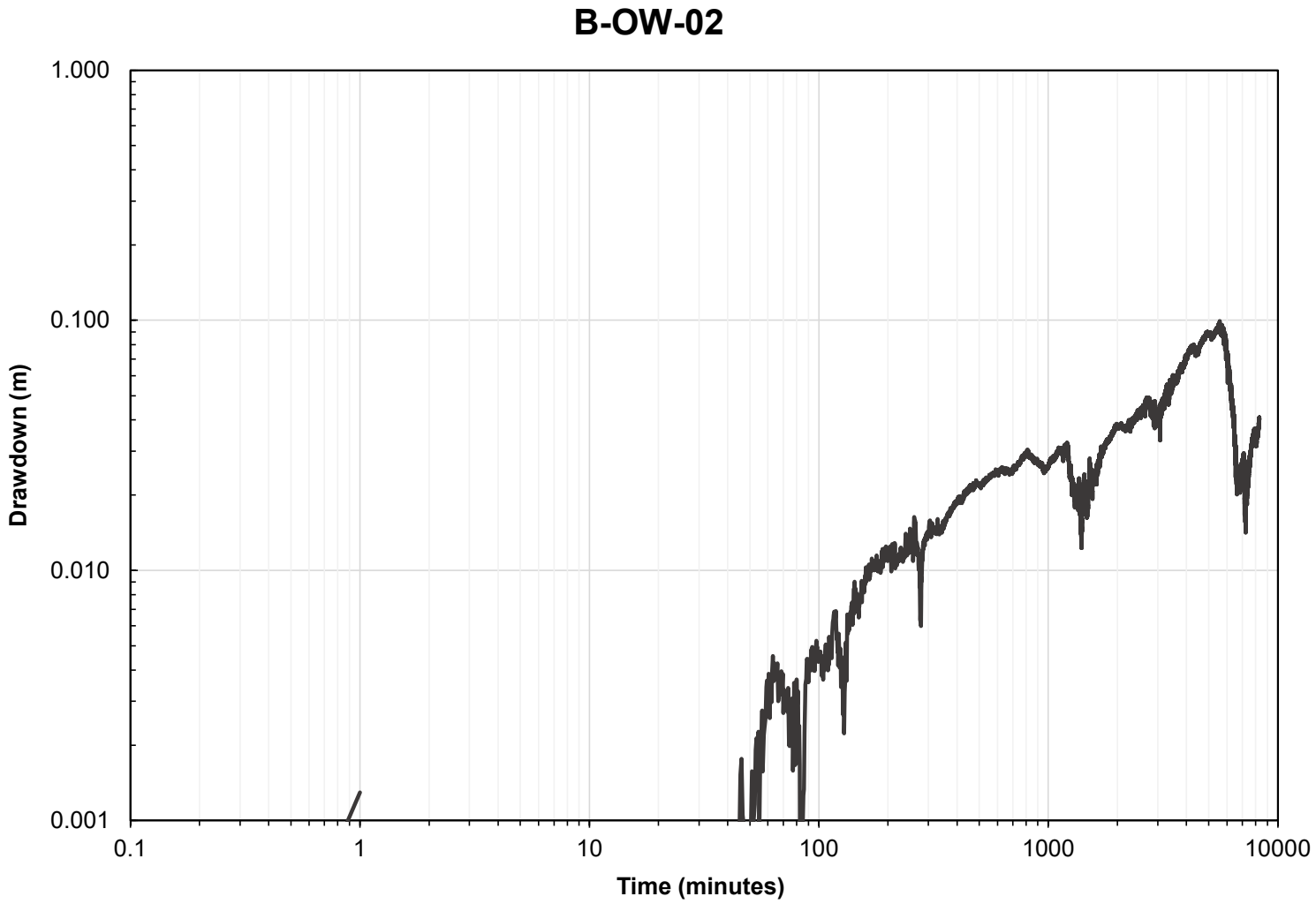


Figure D-4b Log-log Plot of Drawdown Versus Time for Constant Rate Test - B-OW-02

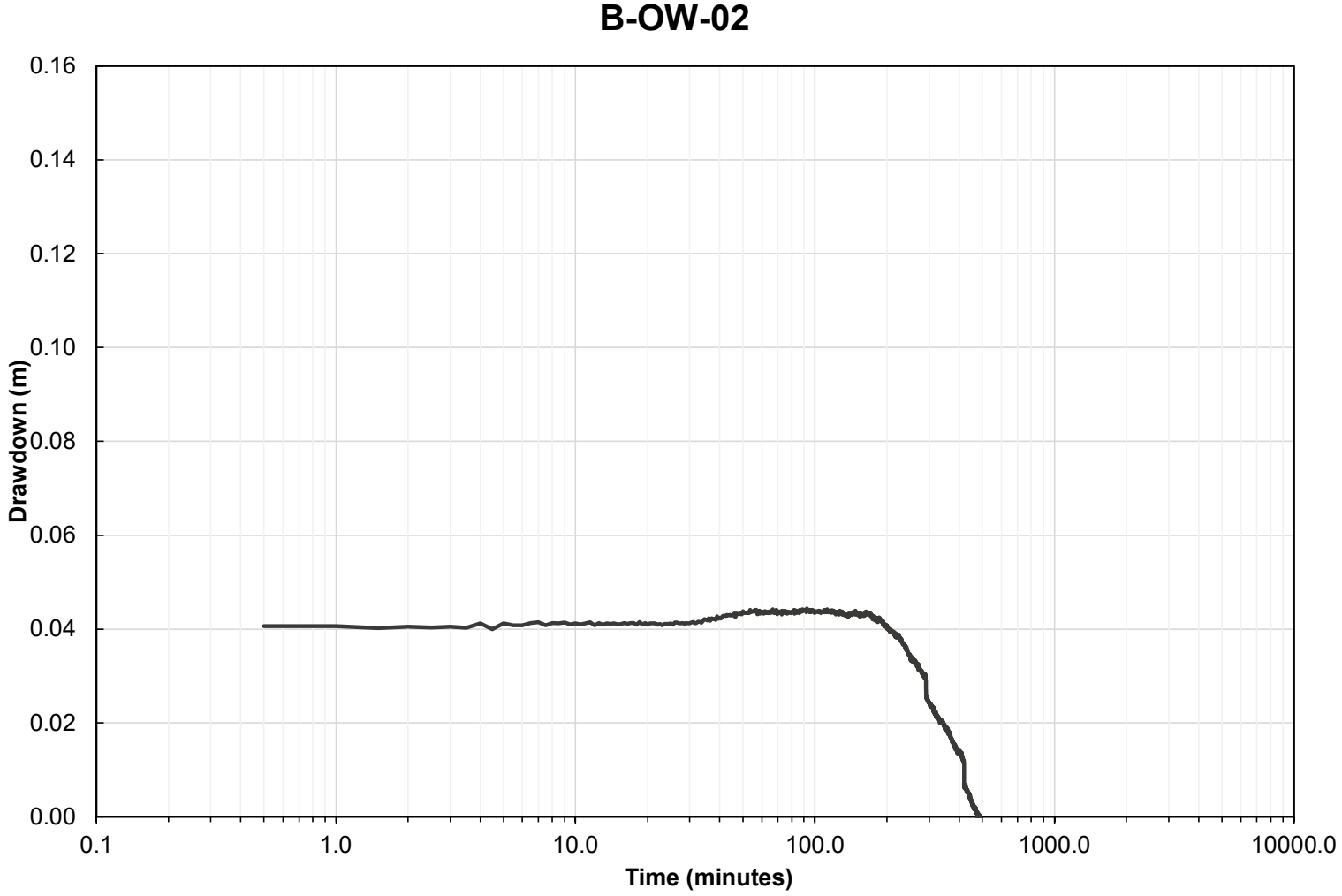


Figure D-4c Semi-log Plot of Recovery Versus Time for Constant Rate Test B-OW-02

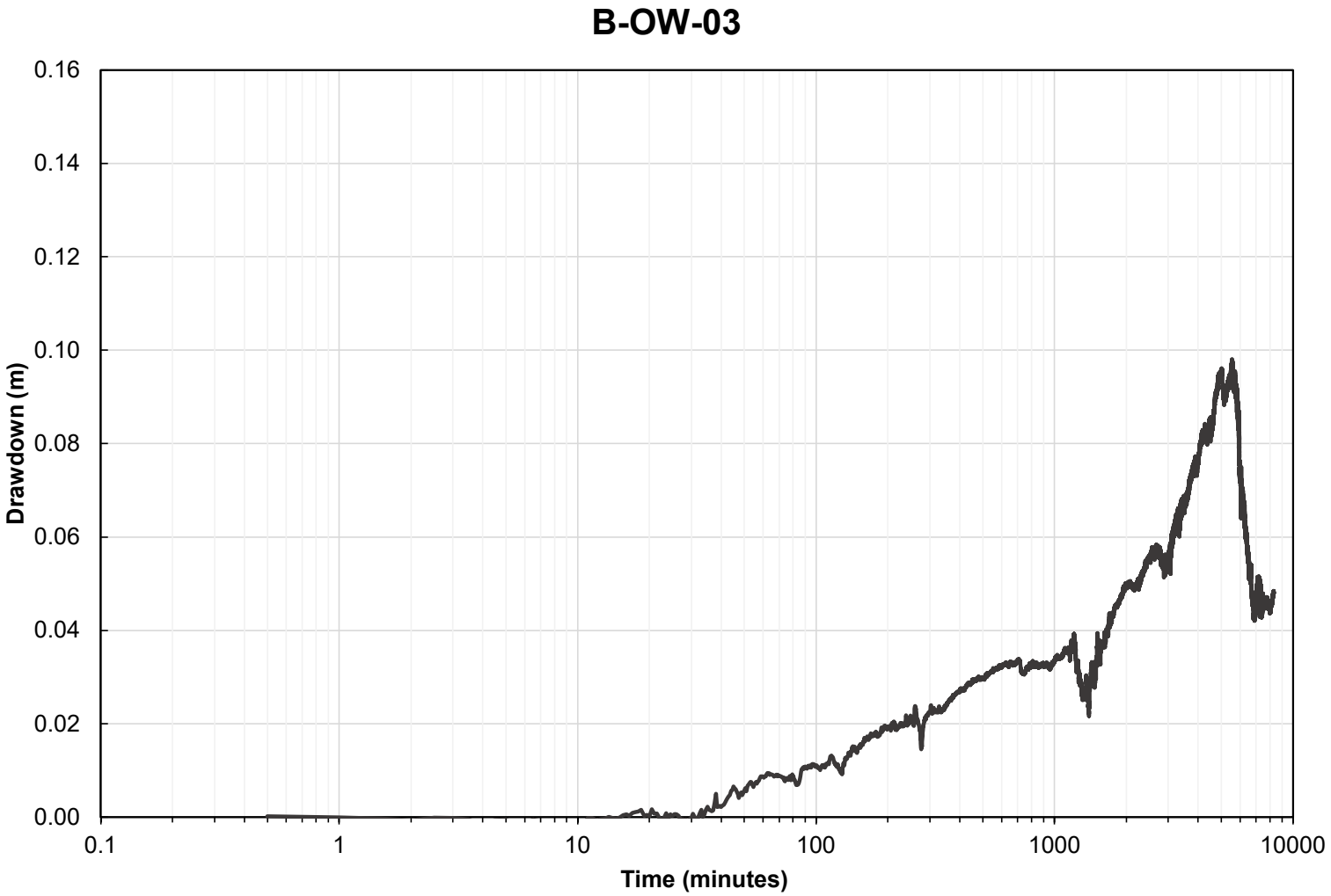


Figure D-5a Semi-log Plot of Drawdown Versus Time for Constant Rate Test B-OW-03

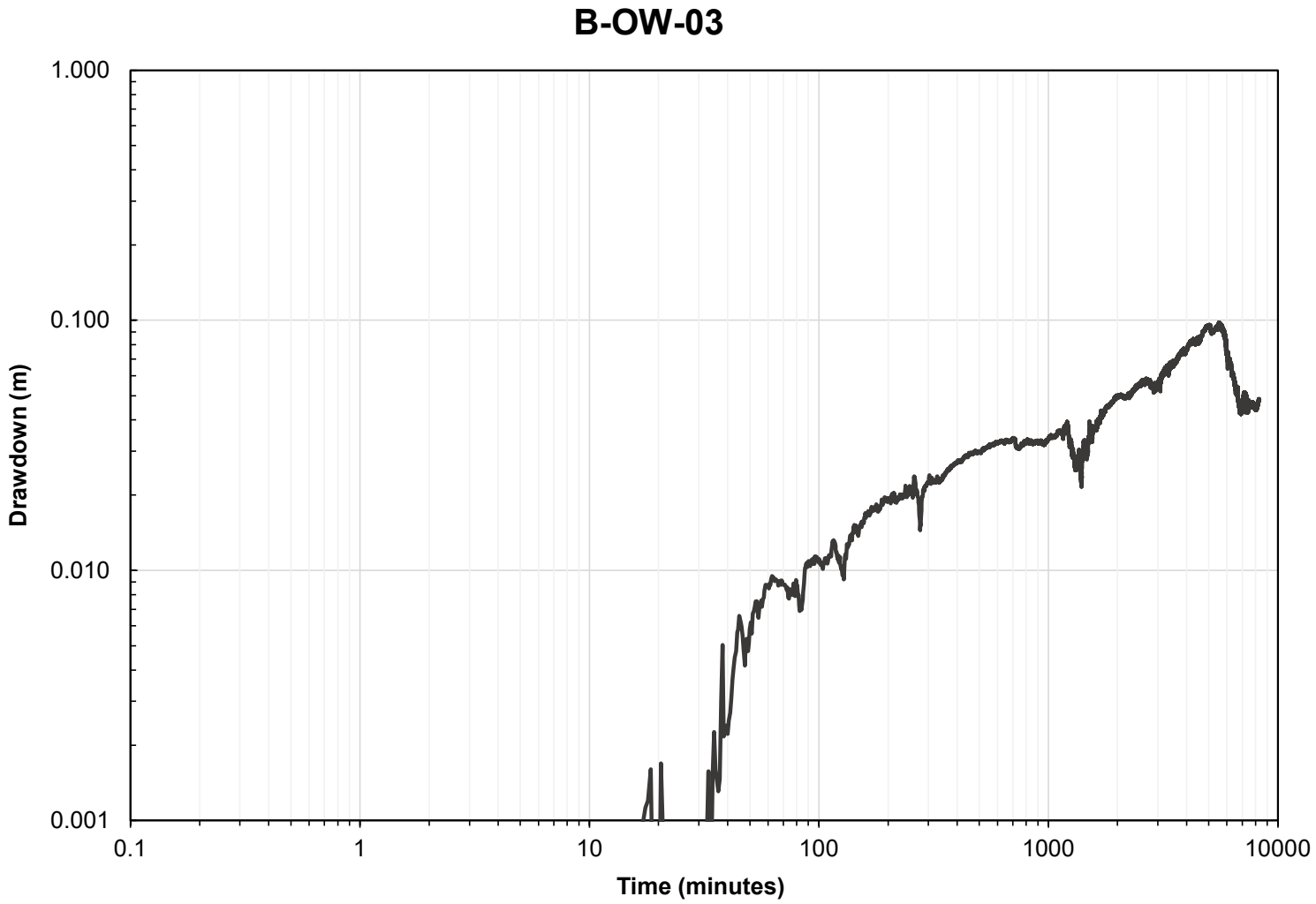


Figure D-5b Log-log Plot of Drawdown Versus Time for Constant Rate Test - B-OW-03

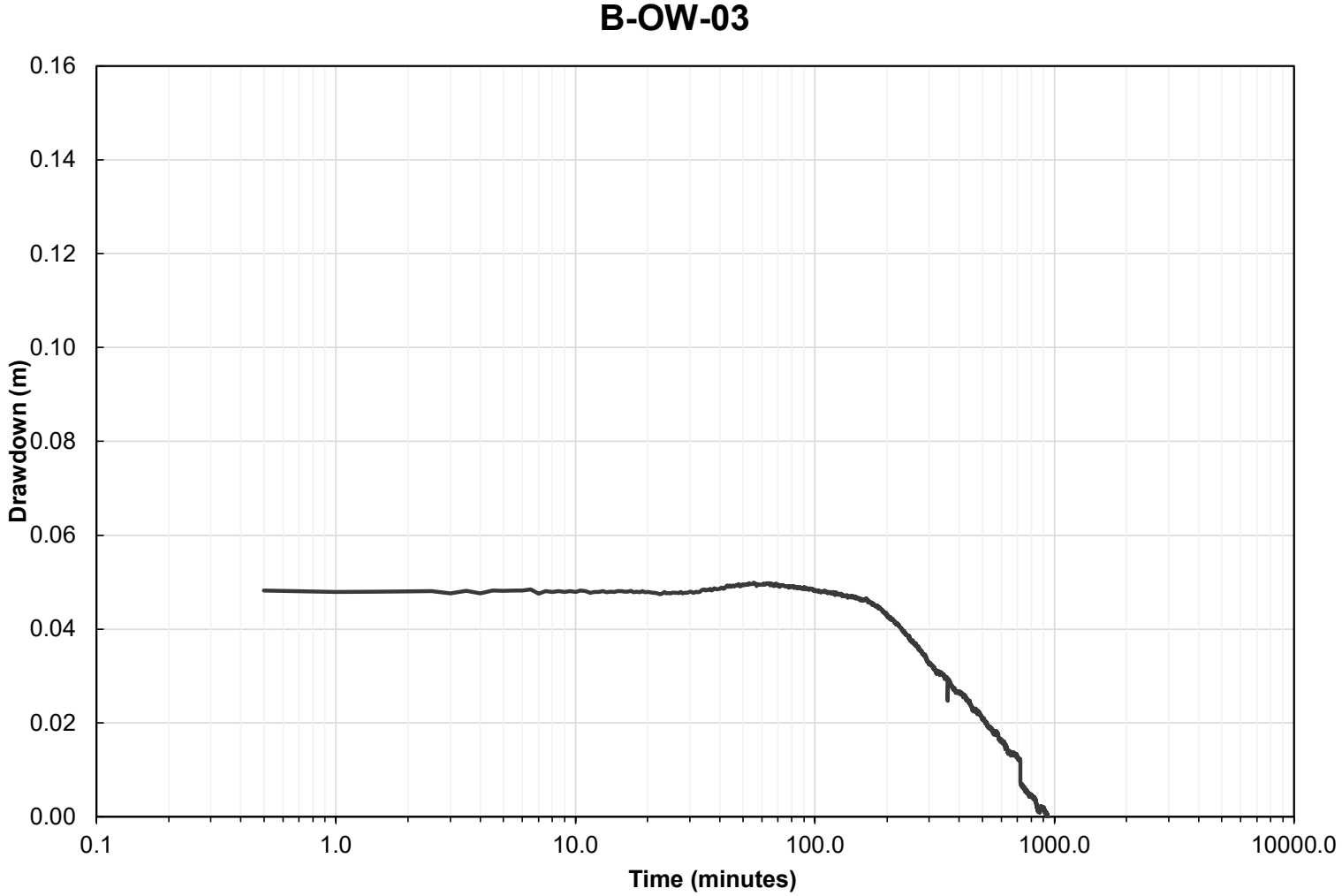


Figure D-5c Semi-log Plot of Recovery Versus Time for Constant Rate Test B-OW-03

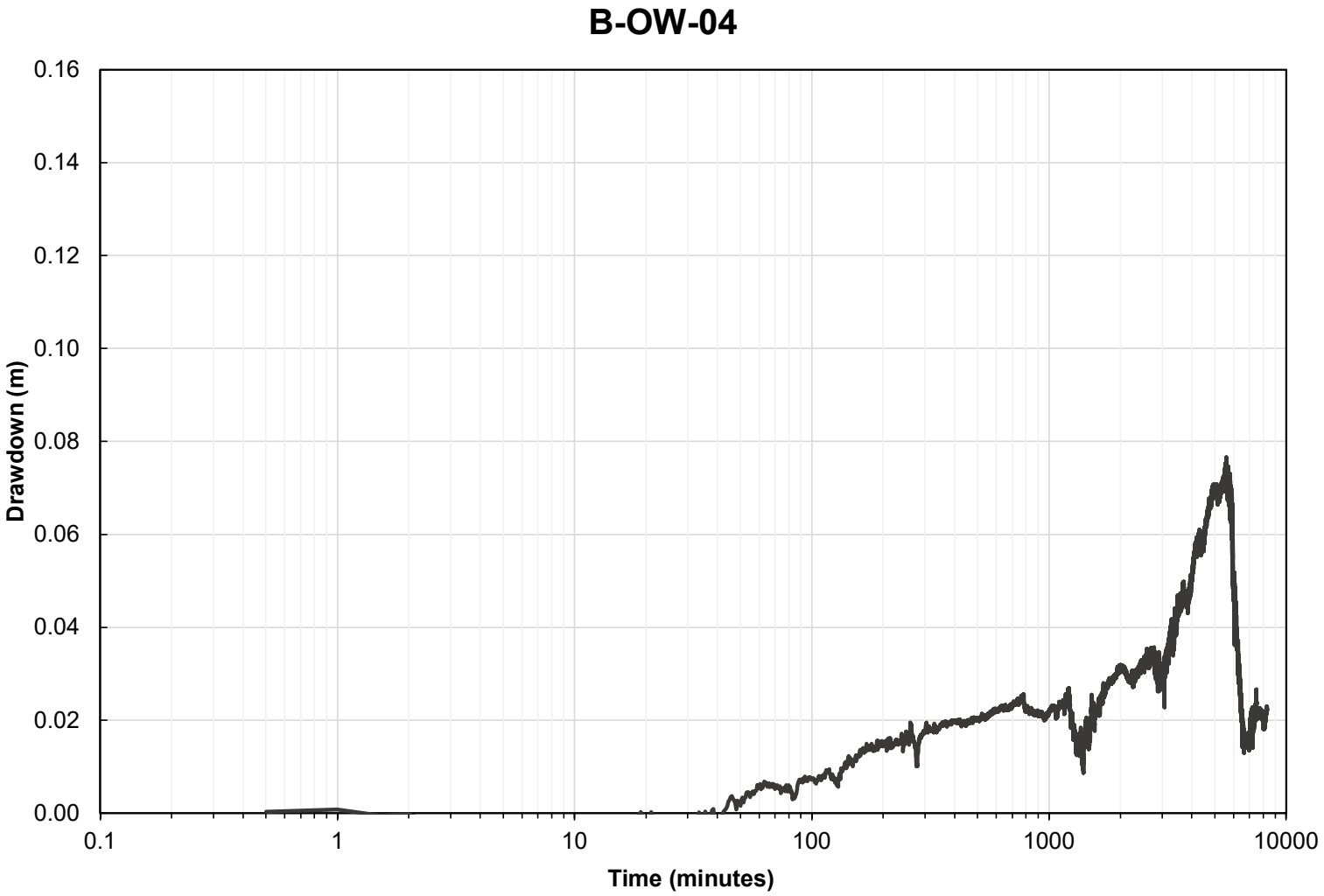


Figure D-6a Semi-log Plot of Drawdown Versus Time for Constant Rate Test B-OW-04

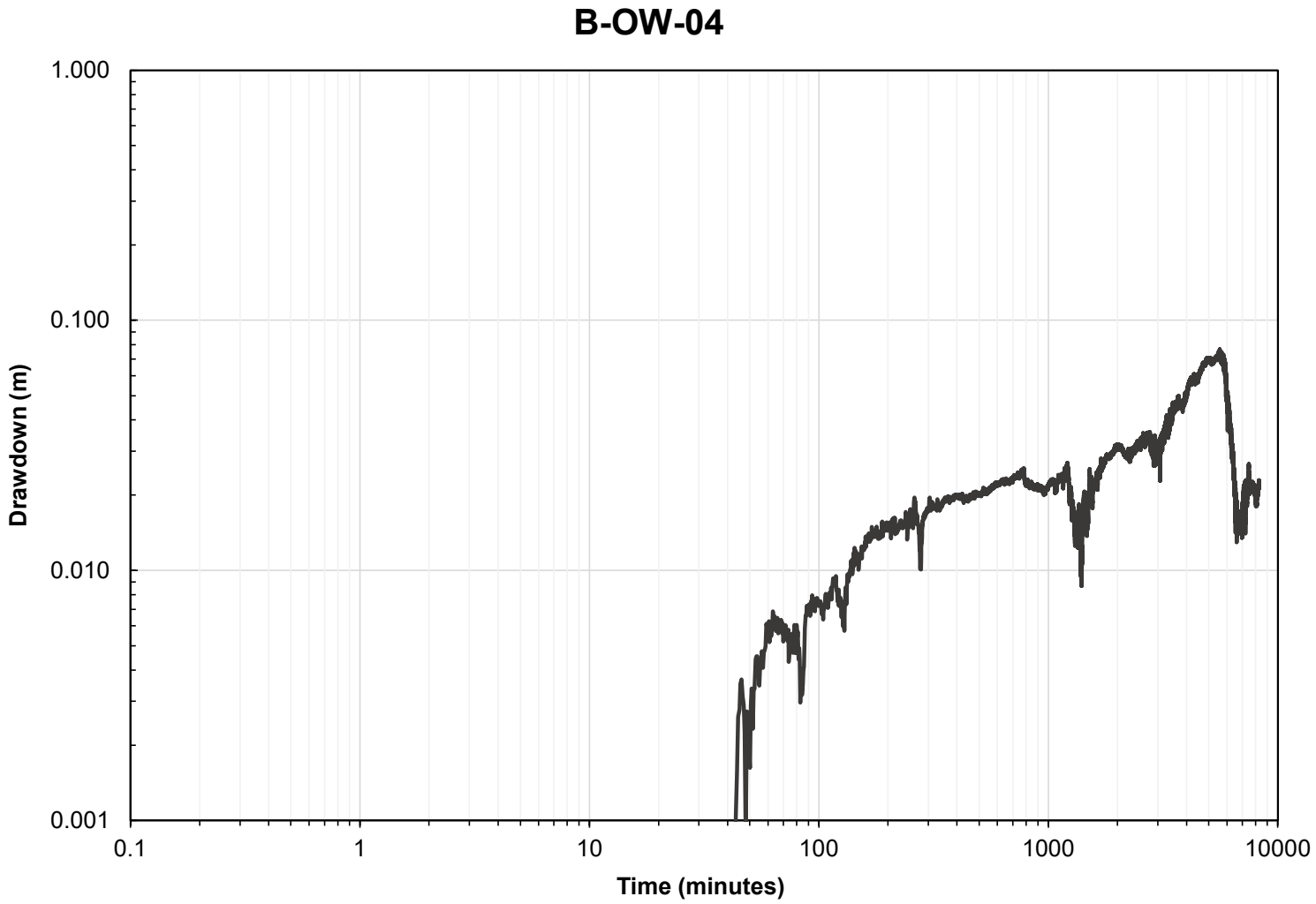


Figure D-6b Log-log Plot of Drawdown Versus Time for Constant Rate Test - B-OW-04

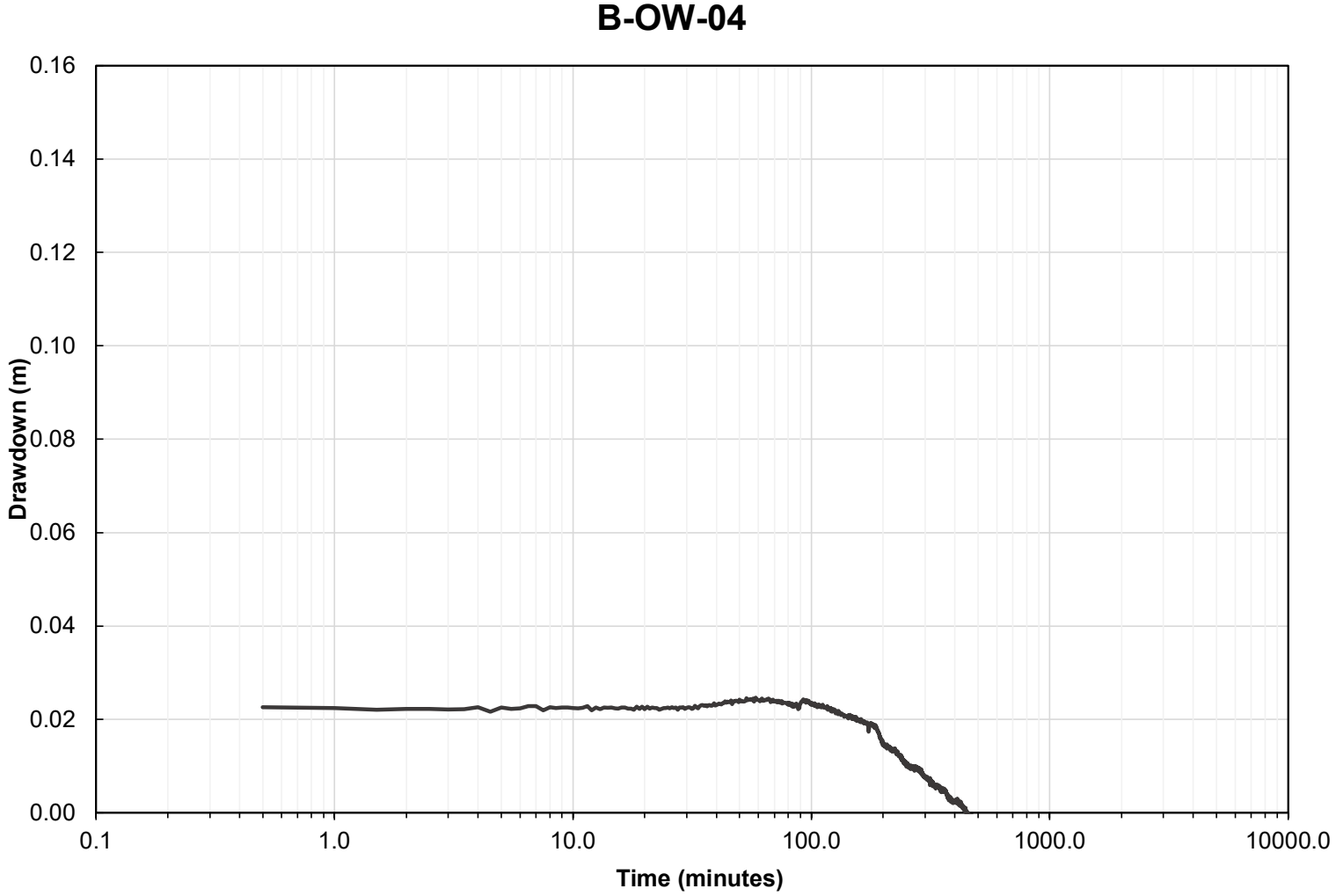


Figure D-6c Semi-log Plot of Recovery Versus Time for Constant Rate Test B-OW-04

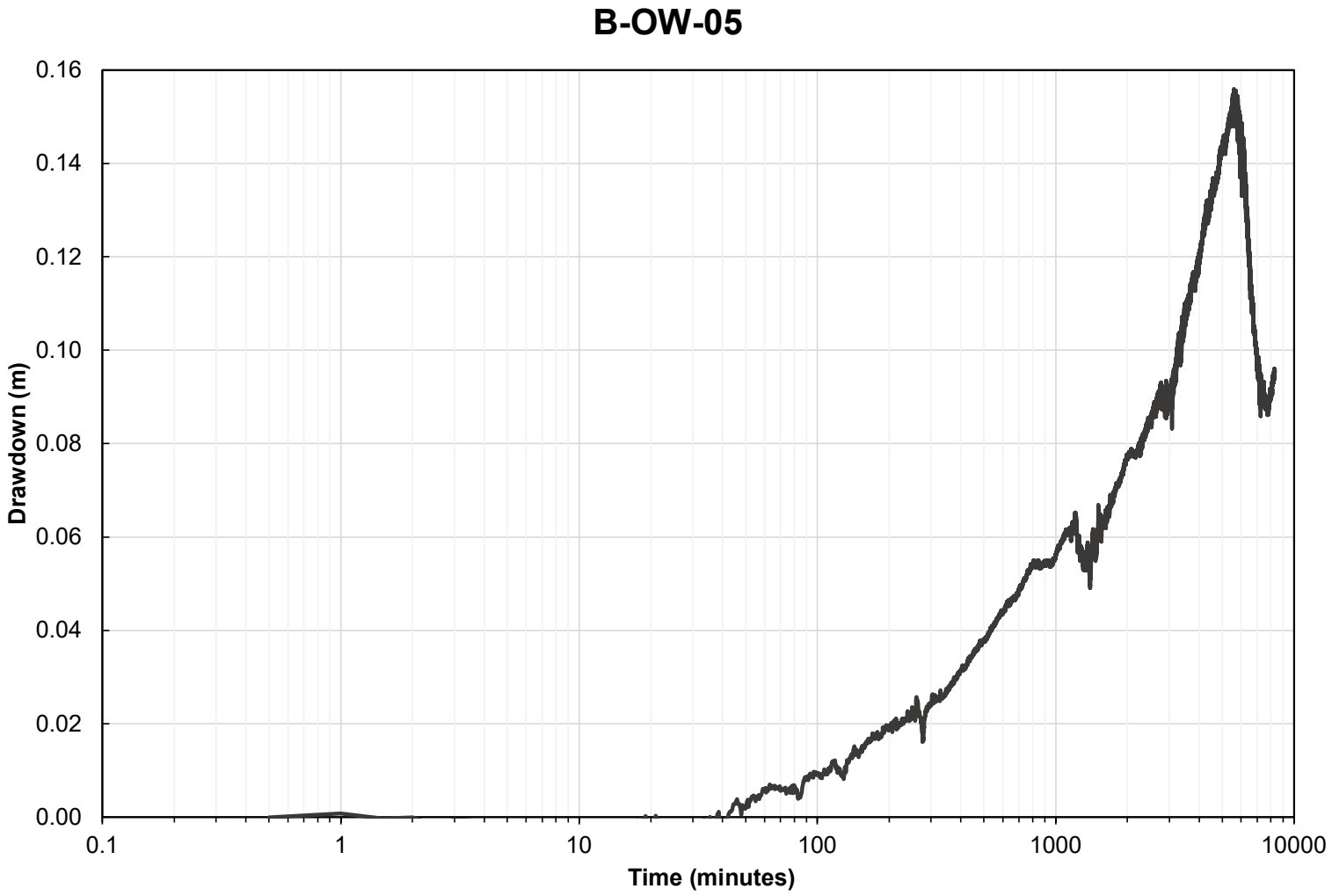


Figure D-7a Semi-log Plot of Drawdown Versus Time for Constant Rate Test B-OW-05

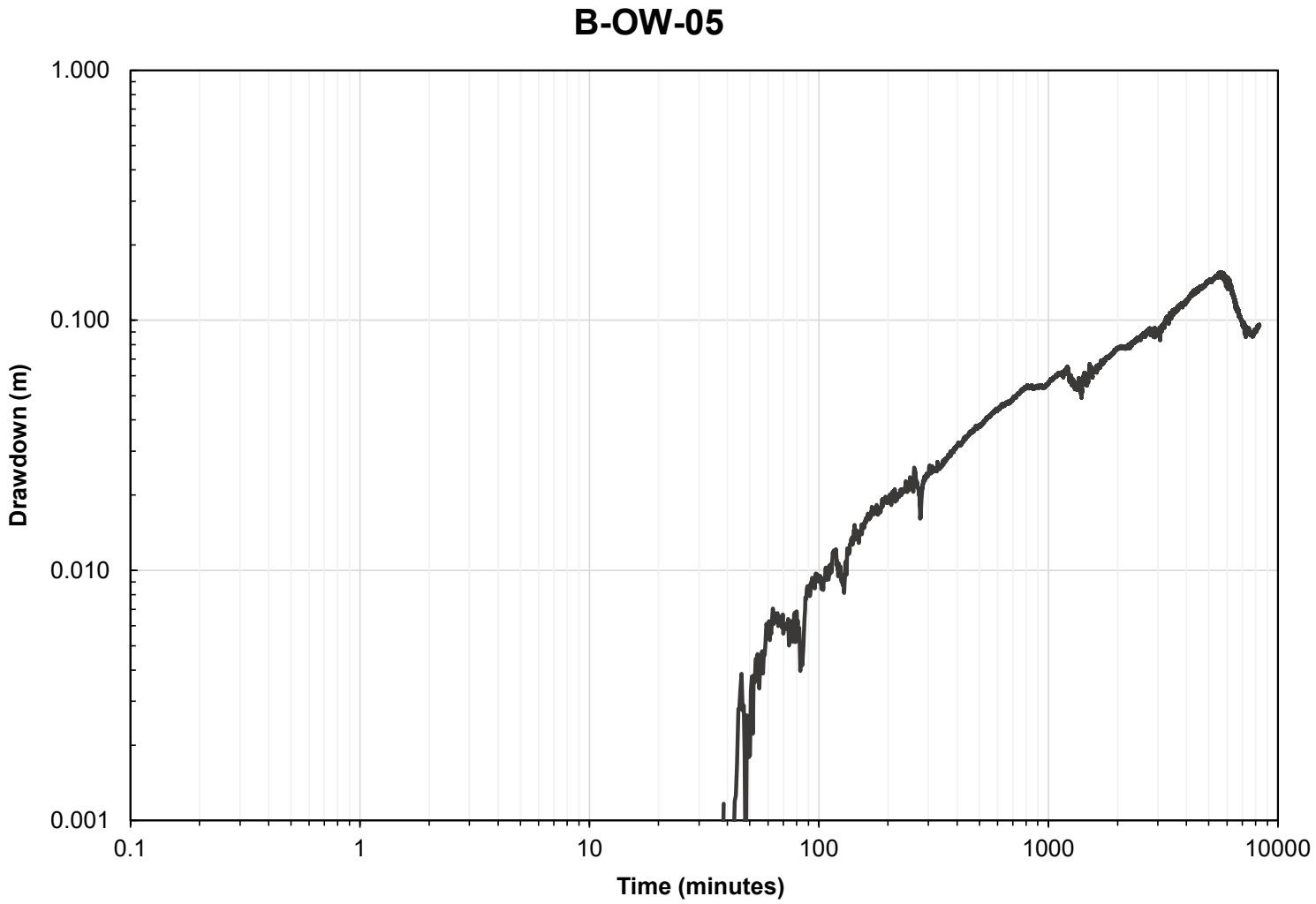


Figure D-7b Log-log Plot of Drawdown Versus Time for Constant Rate Test - B-OW-05

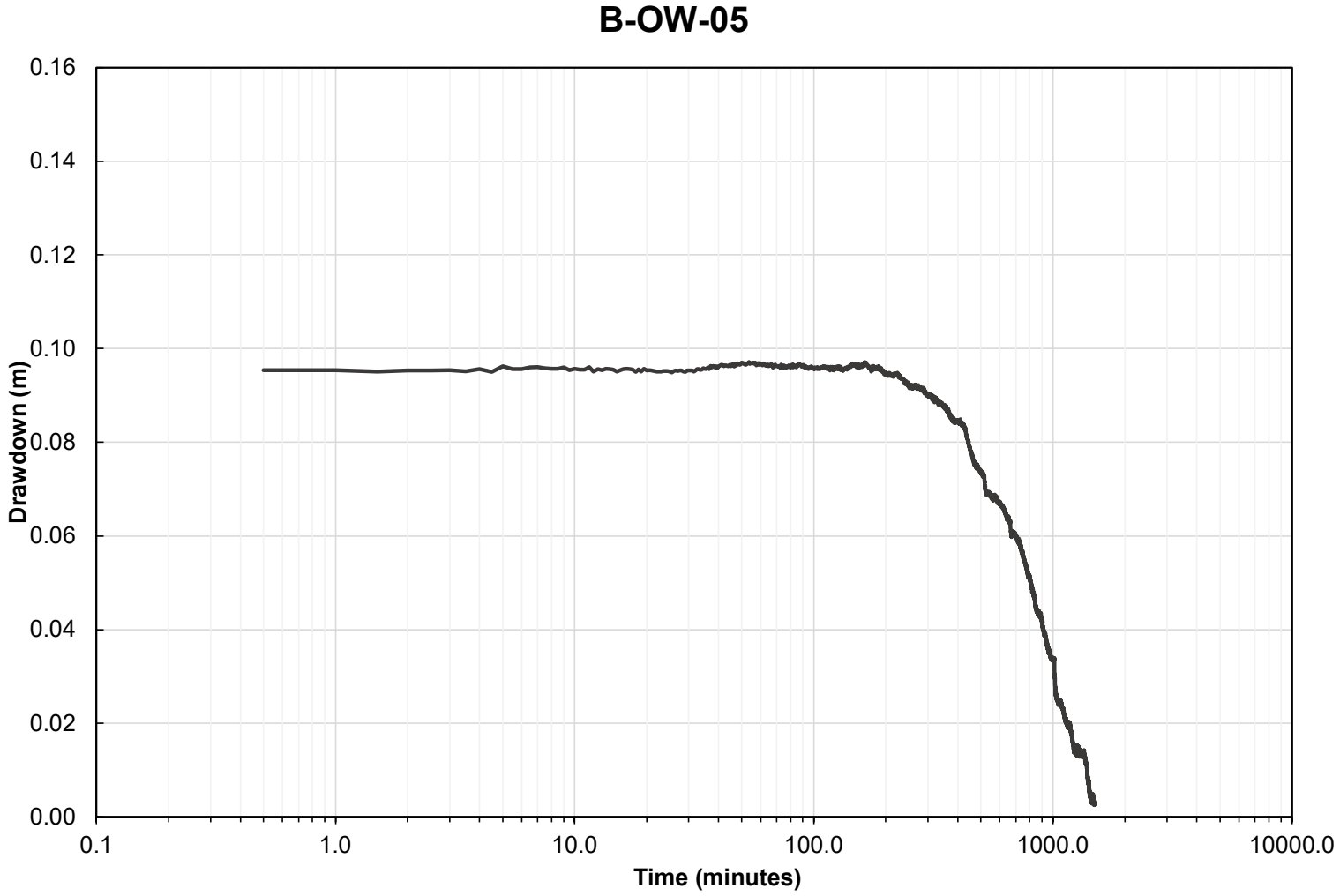


Figure D-7c Semi-log Plot of Recovery Versus Time for Constant Rate Test B-OW-05

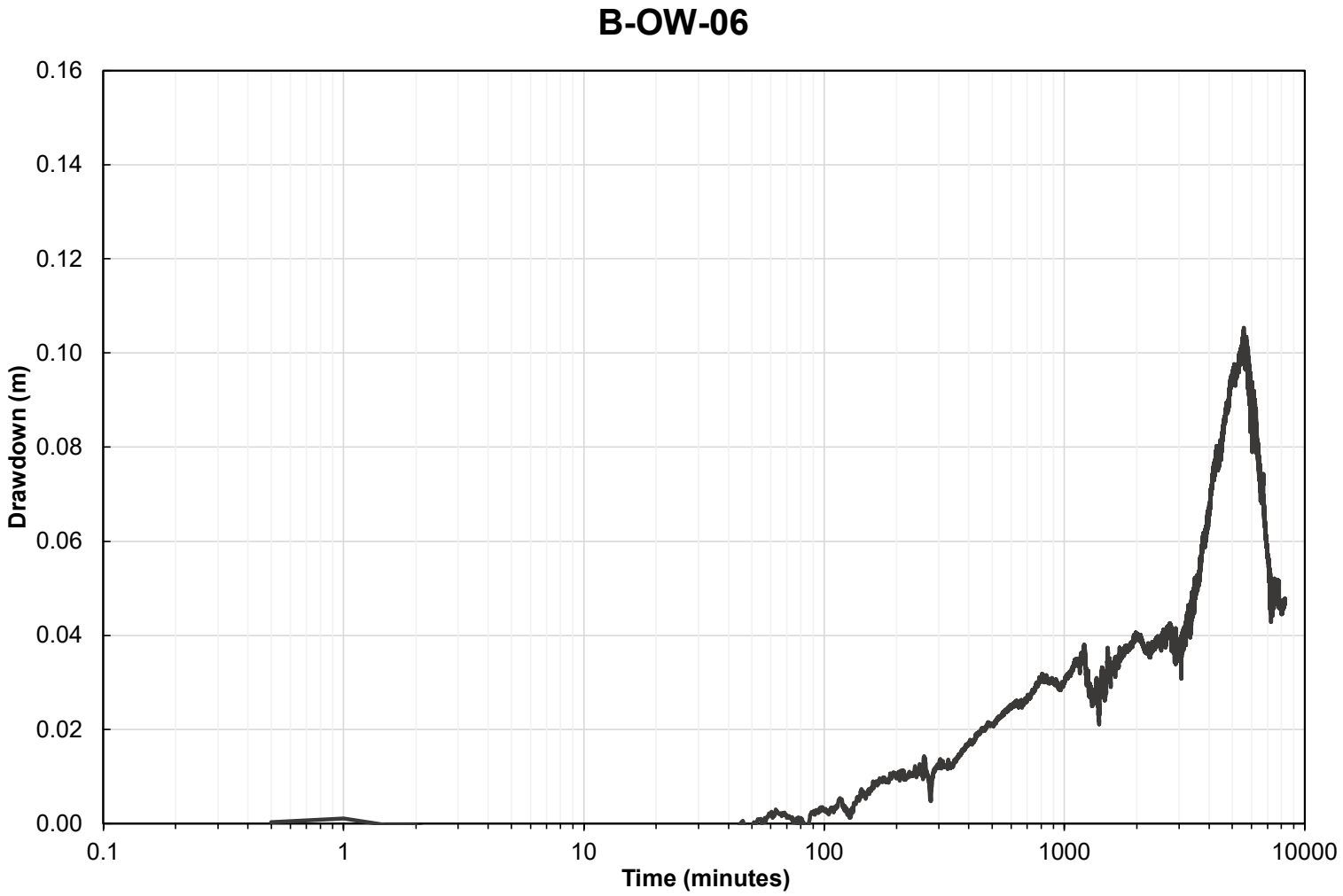


Figure D-8a Semi-log Plot of Drawdown Versus Time for Constant Rate Test B-OW-06

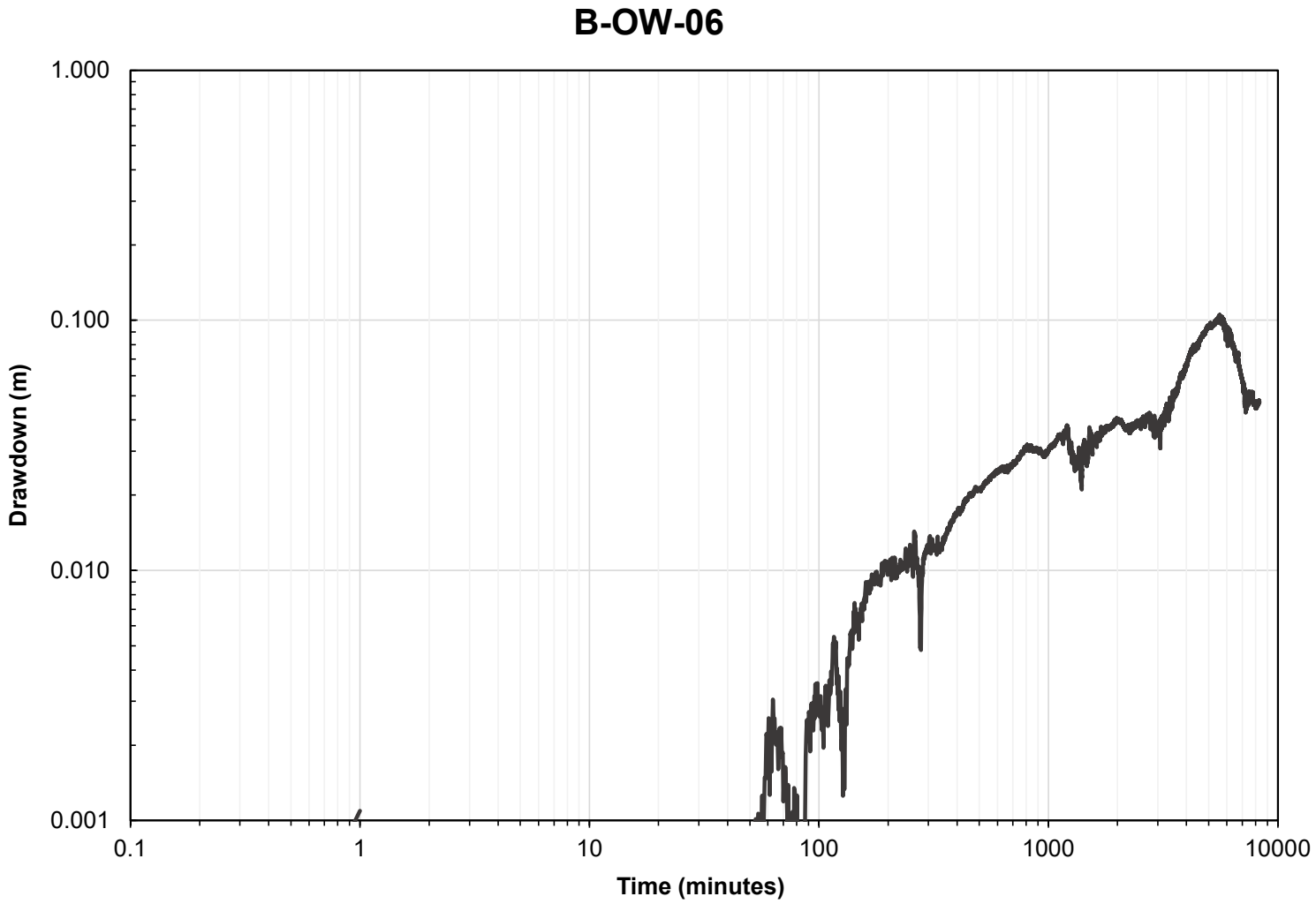


Figure D-8b Log-log Plot of Drawdown Versus Time for Constant Rate Test - B-OW-06

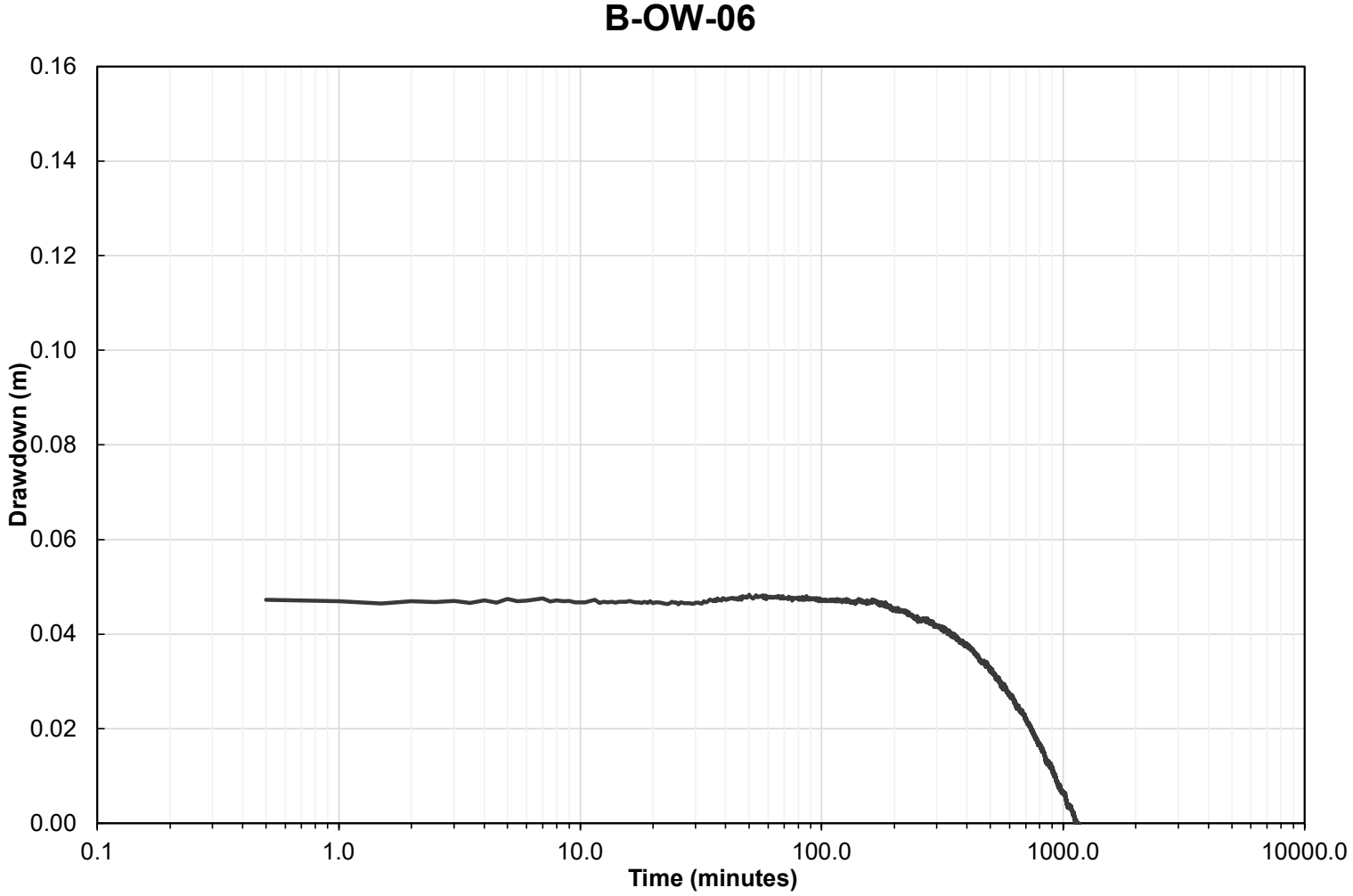


Figure D-8c Semi-log Plot of Recovery Versus Time for Constant Rate Test B-OW-06

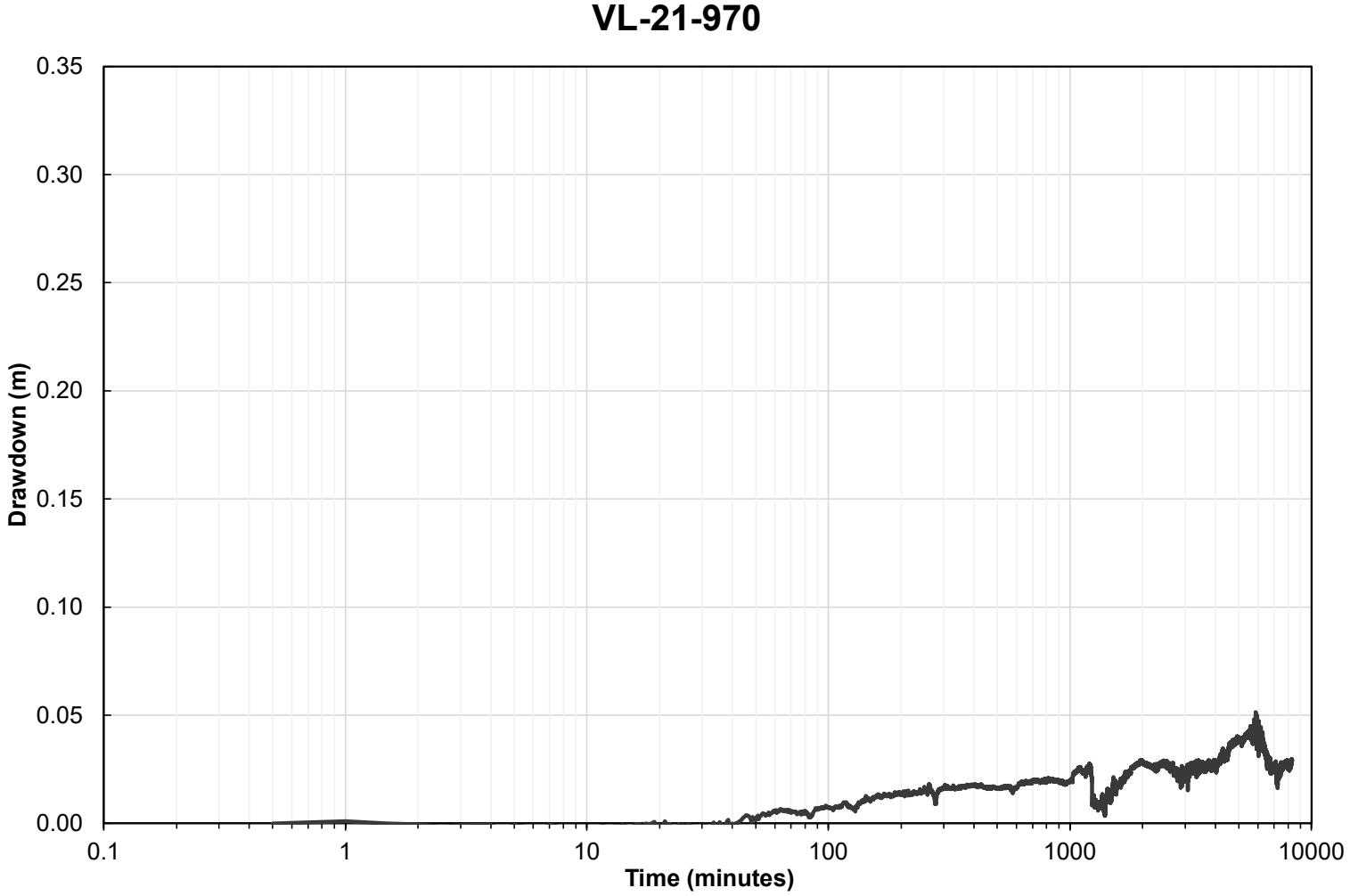


Figure D-9a Semi-log Plot of Drawdown Versus Time for Constant Rate Test VL-21-970

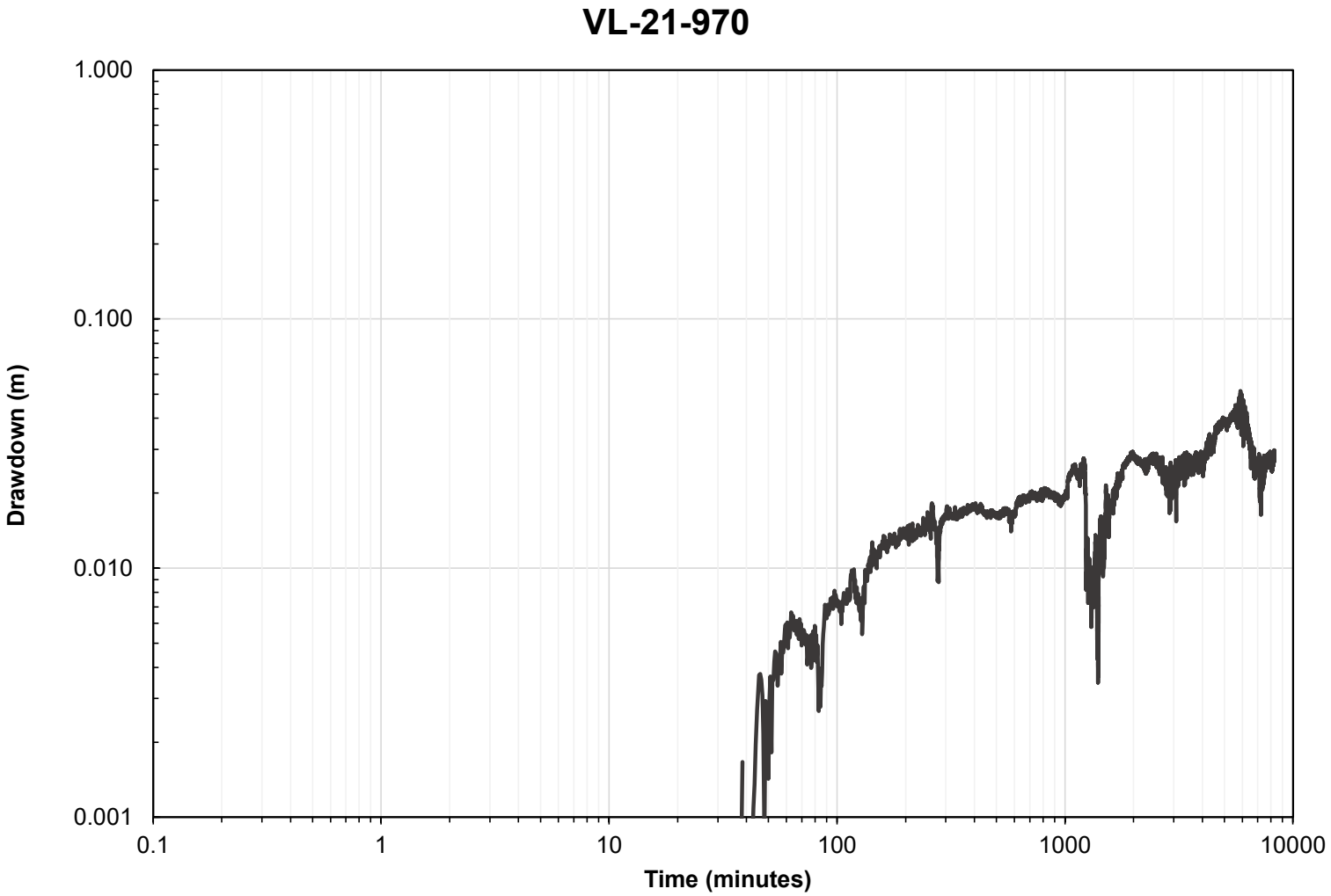


Figure D-9b Log-log Plot of Drawdown Versus Time for Constant Rate Test - VL-21-970

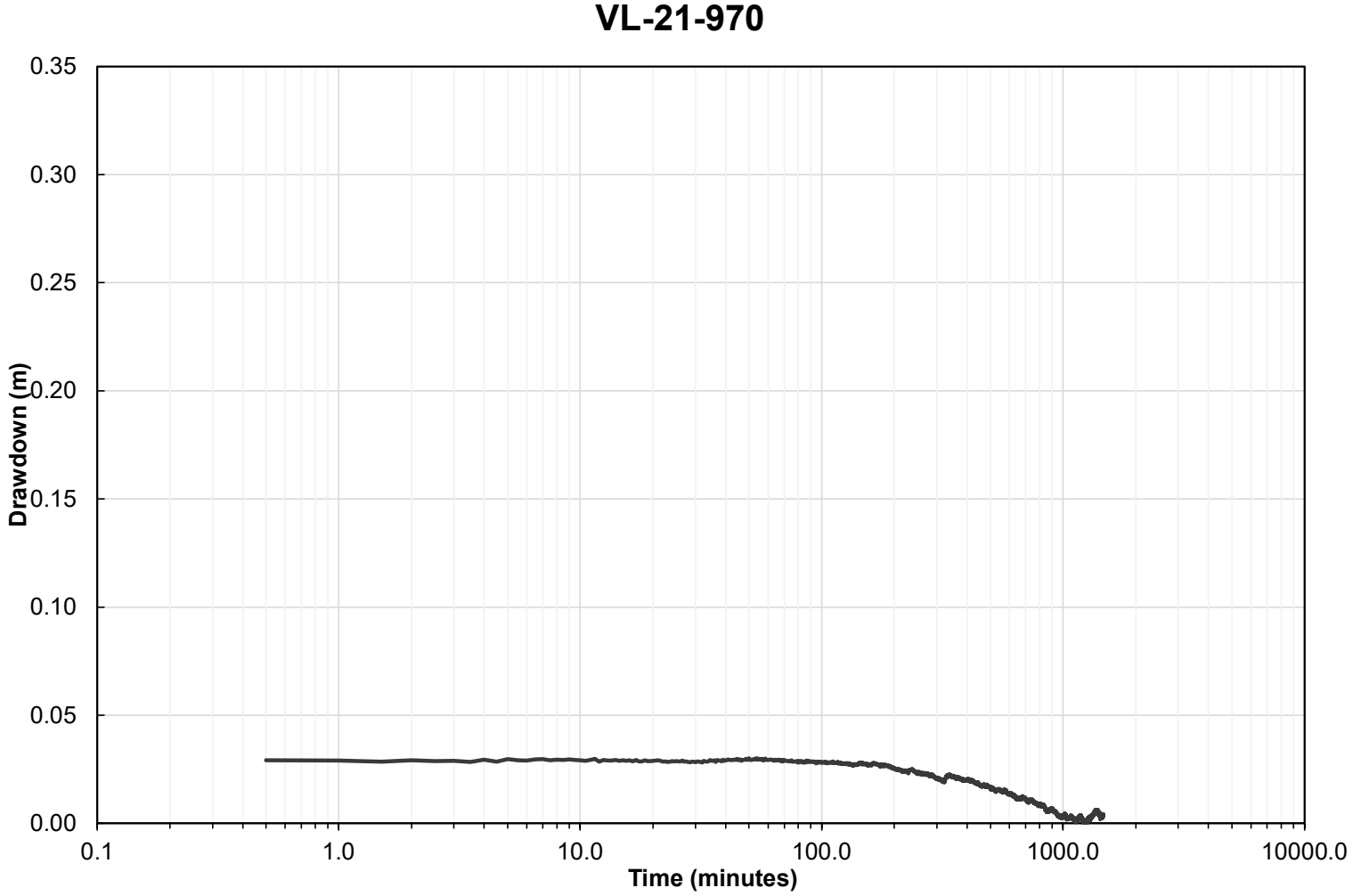


Figure D-9c Semi-log Plot of Recovery Versus Time for Constant Rate Test VL-21-970

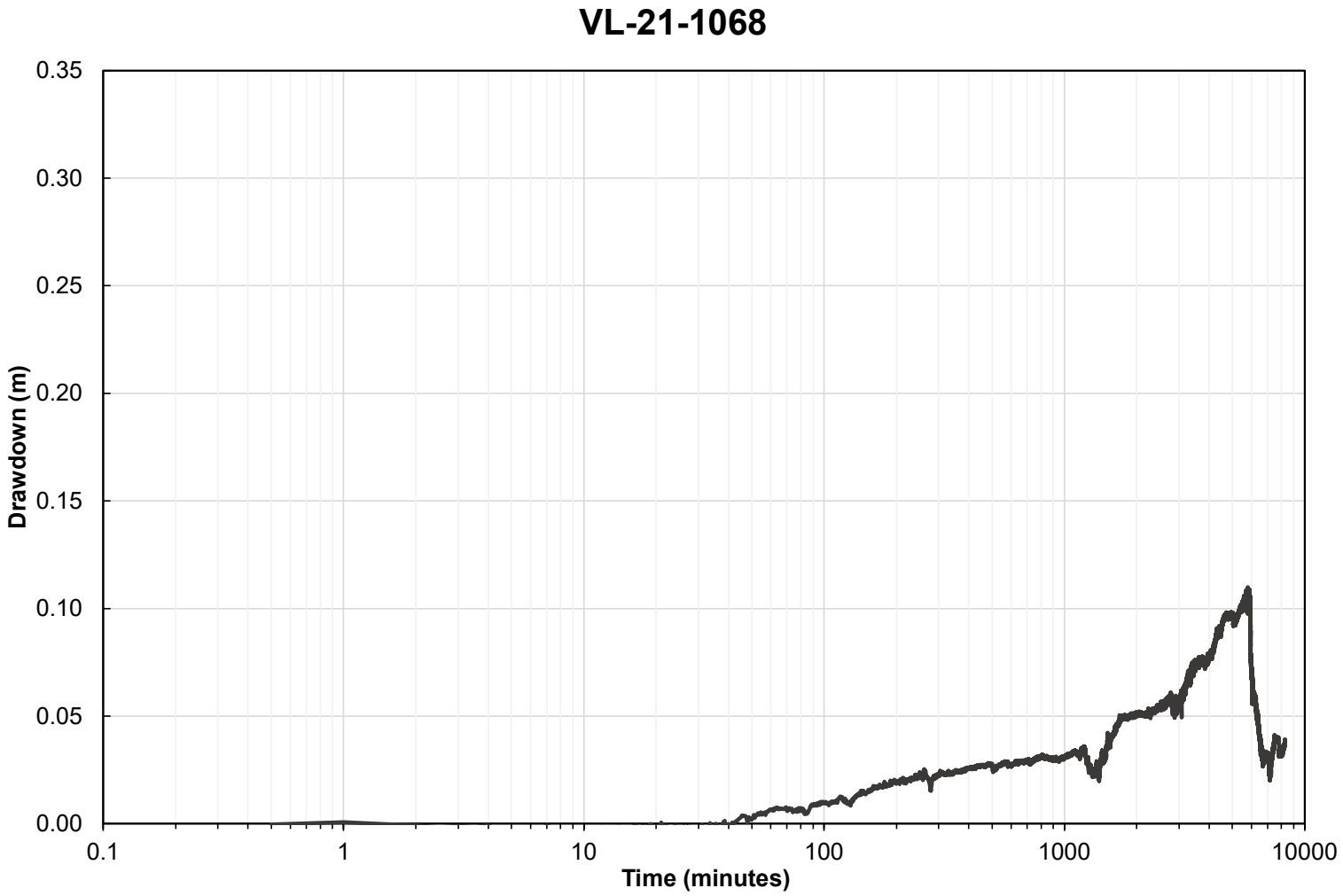


Figure D-10a Semi-log Plot of Drawdown Versus Time for Constant Rate Test VL-21-1068

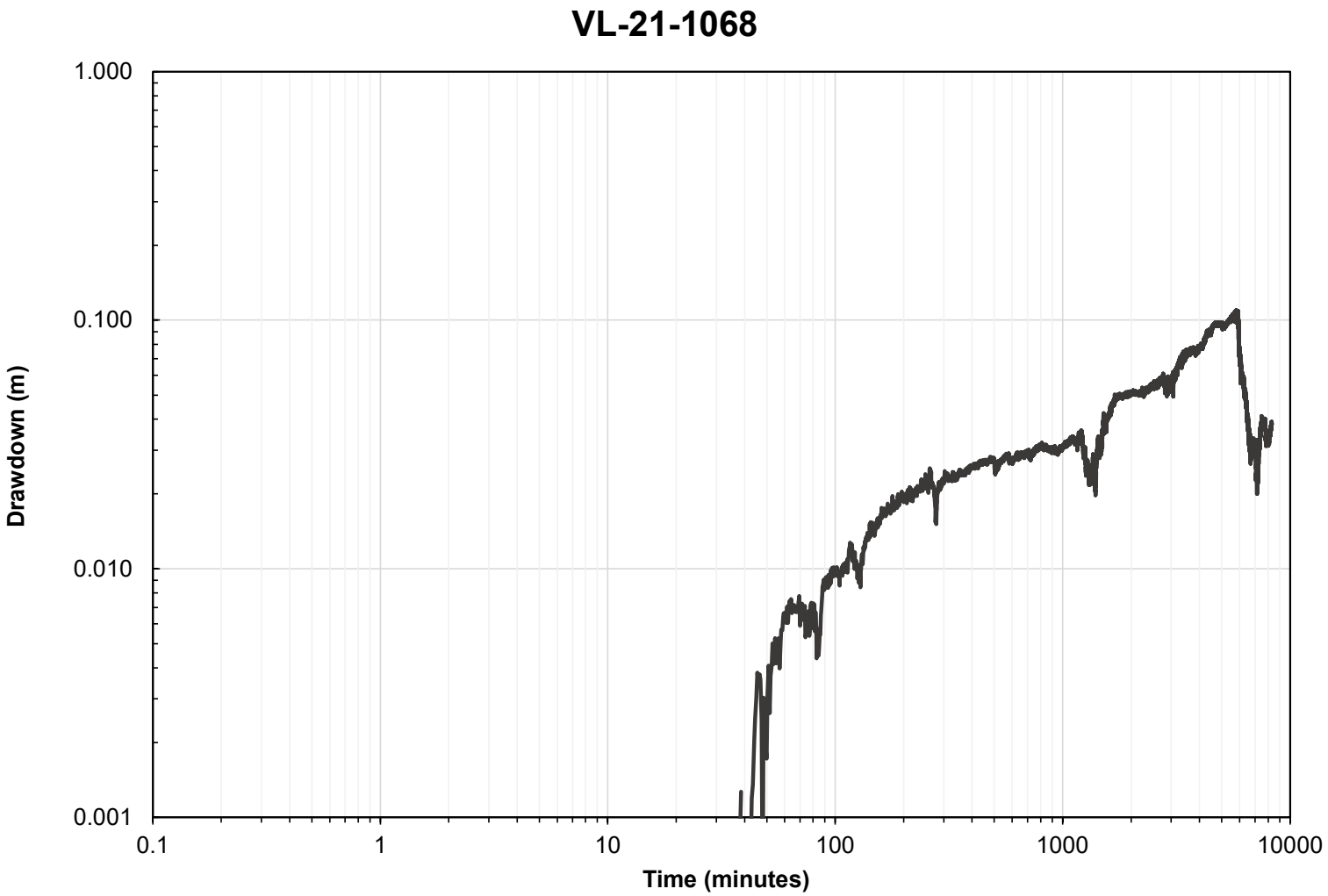


Figure D-10b Log-log Plot of Drawdown Versus Time for Constant Rate Test - VL-21-1068

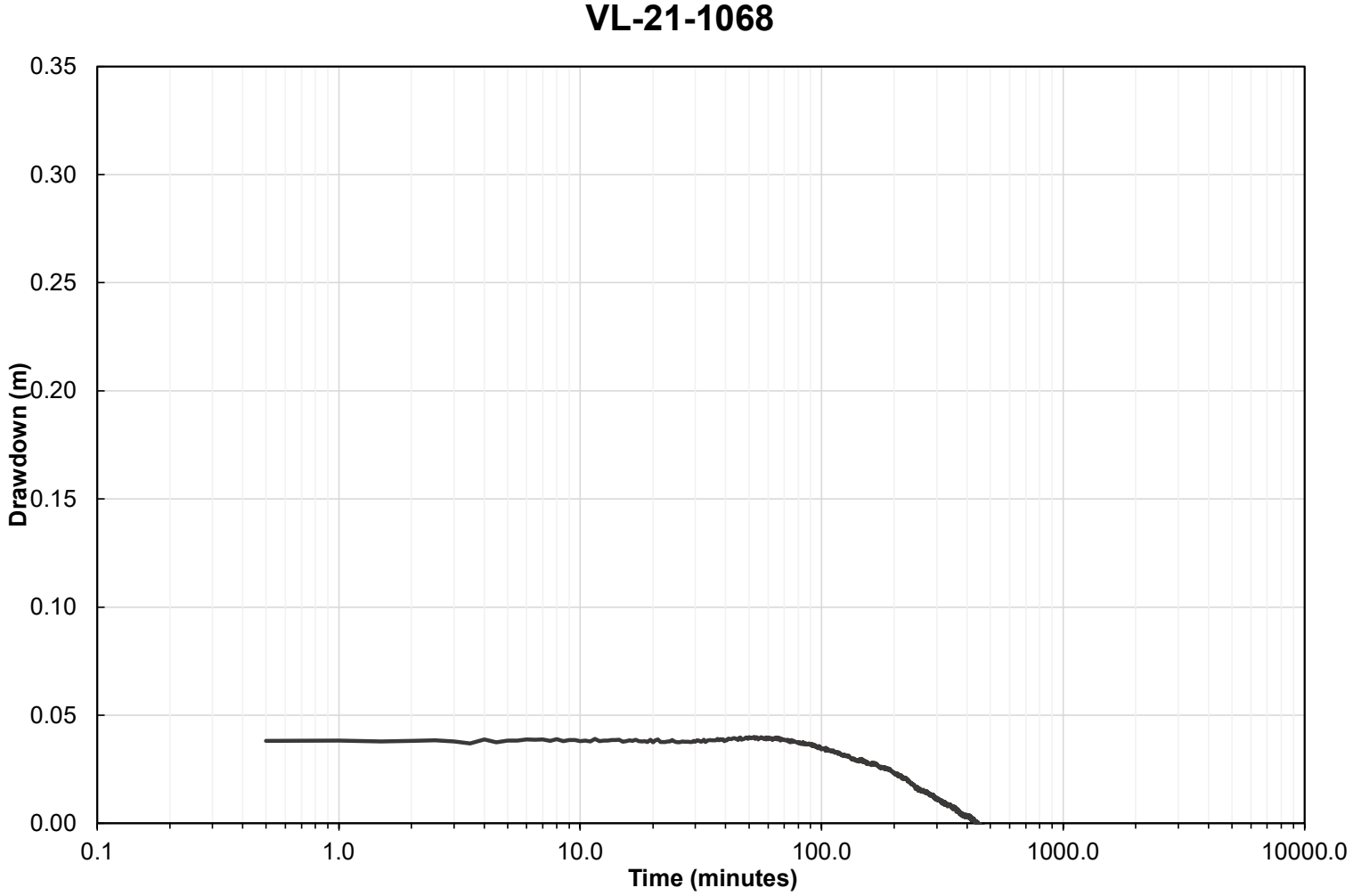


Figure D-10c Semi-log Plot of Recovery Versus Time for Constant Rate Test VL-21-1068

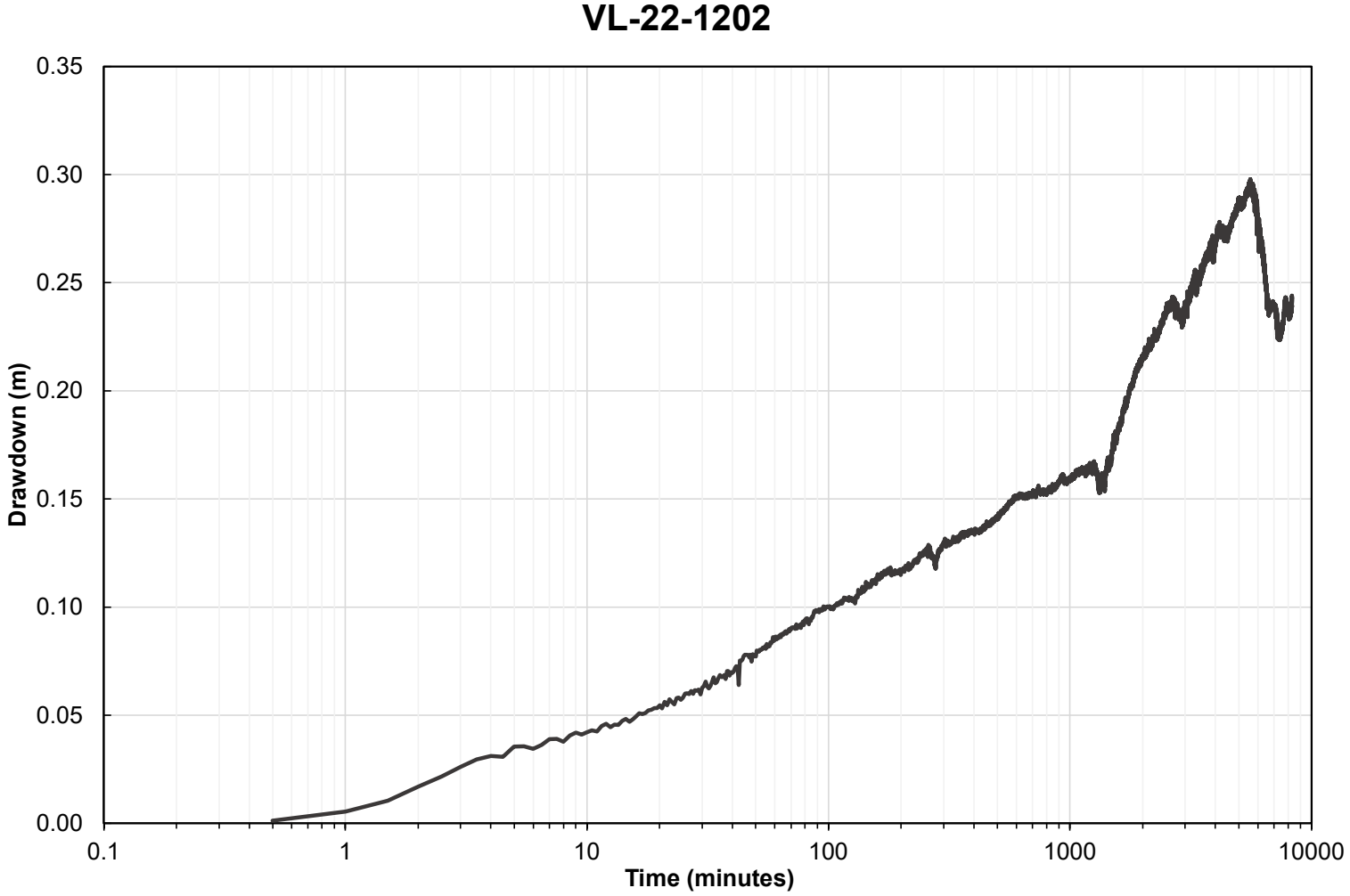


Figure D-11a Semi-log Plot of Drawdown Versus Time for Constant Rate Test VL-22-1202

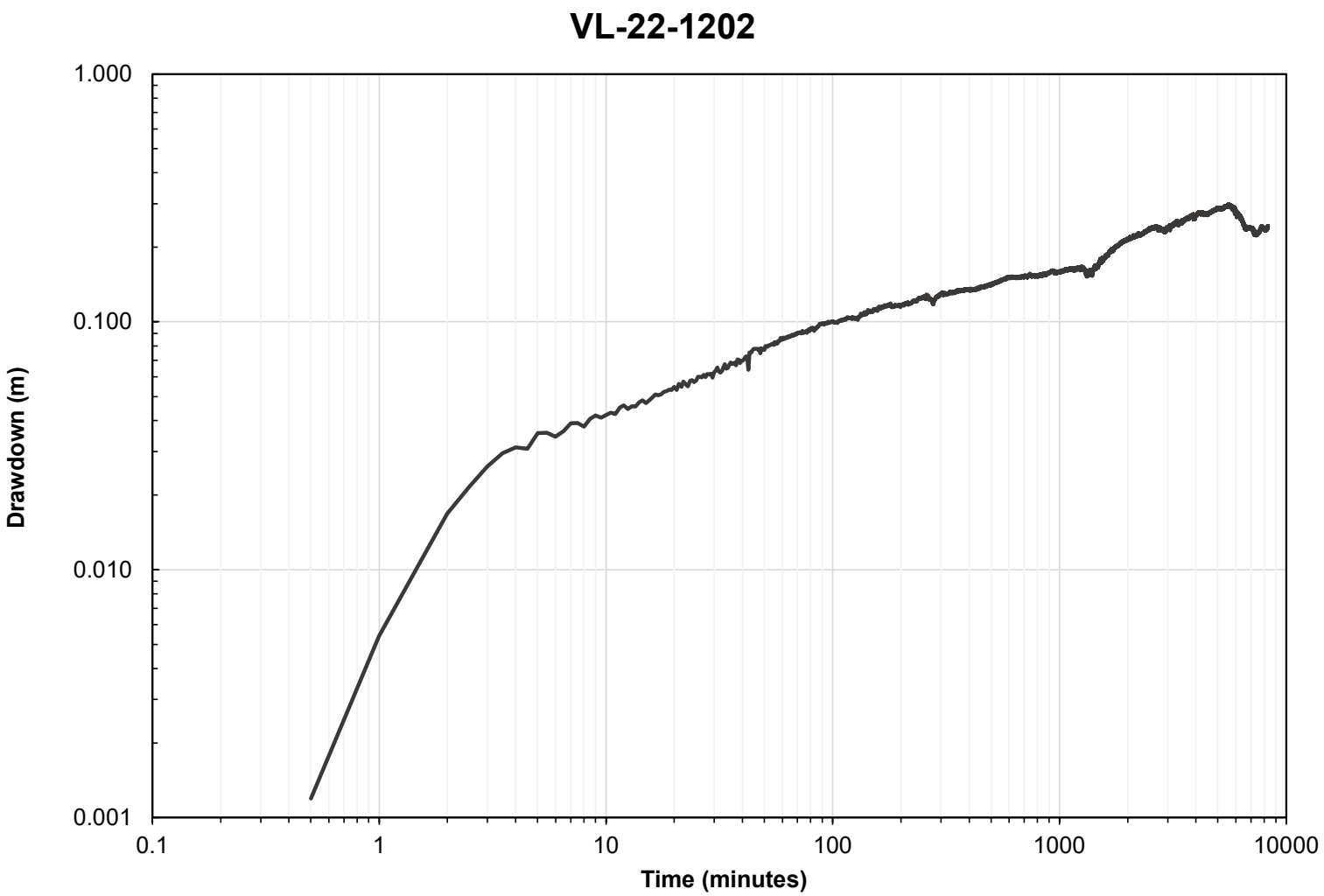


Figure D-11b Log-log Plot of Drawdown Versus Time for Constant Rate Test - VL-22-1202

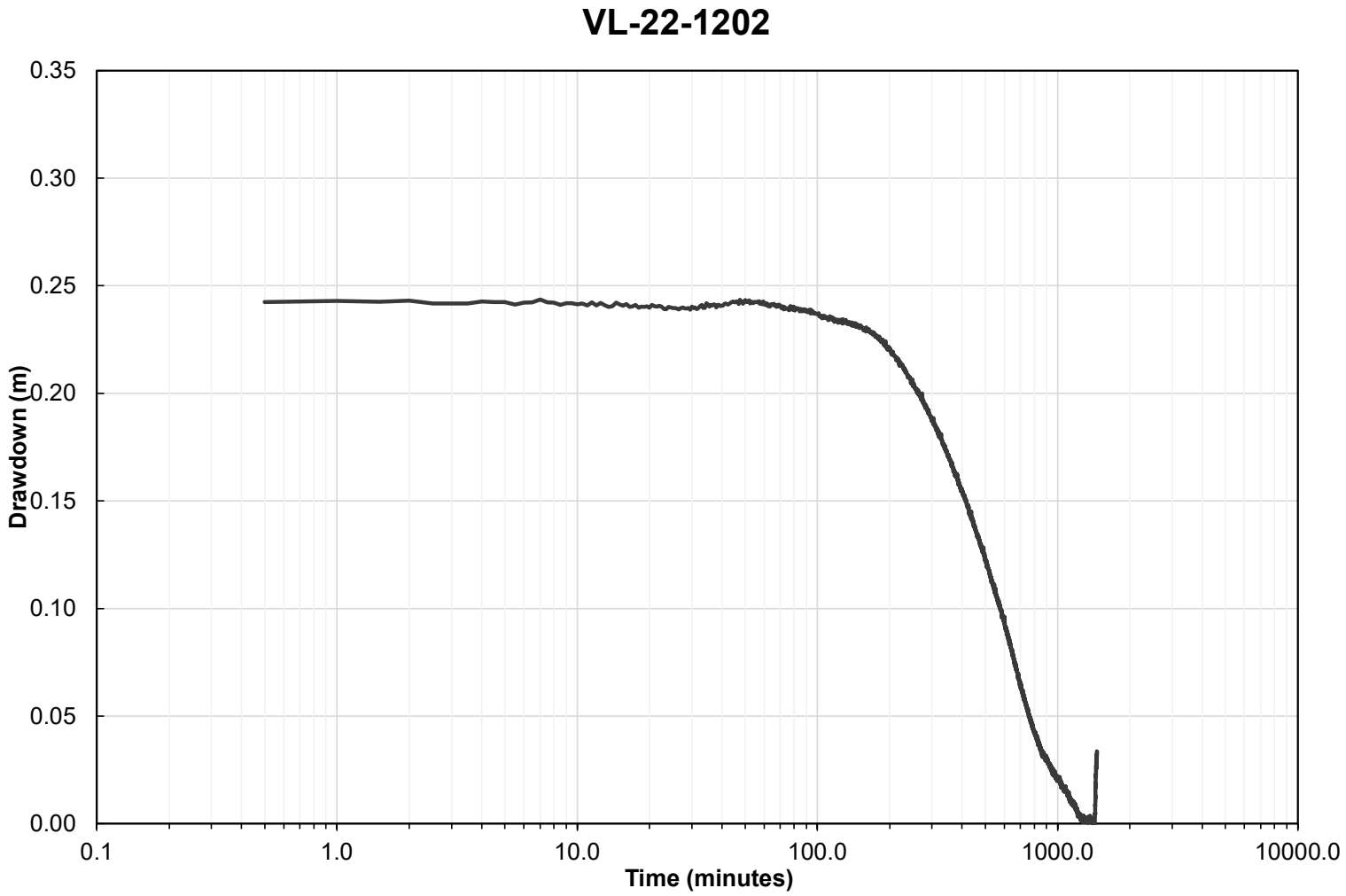
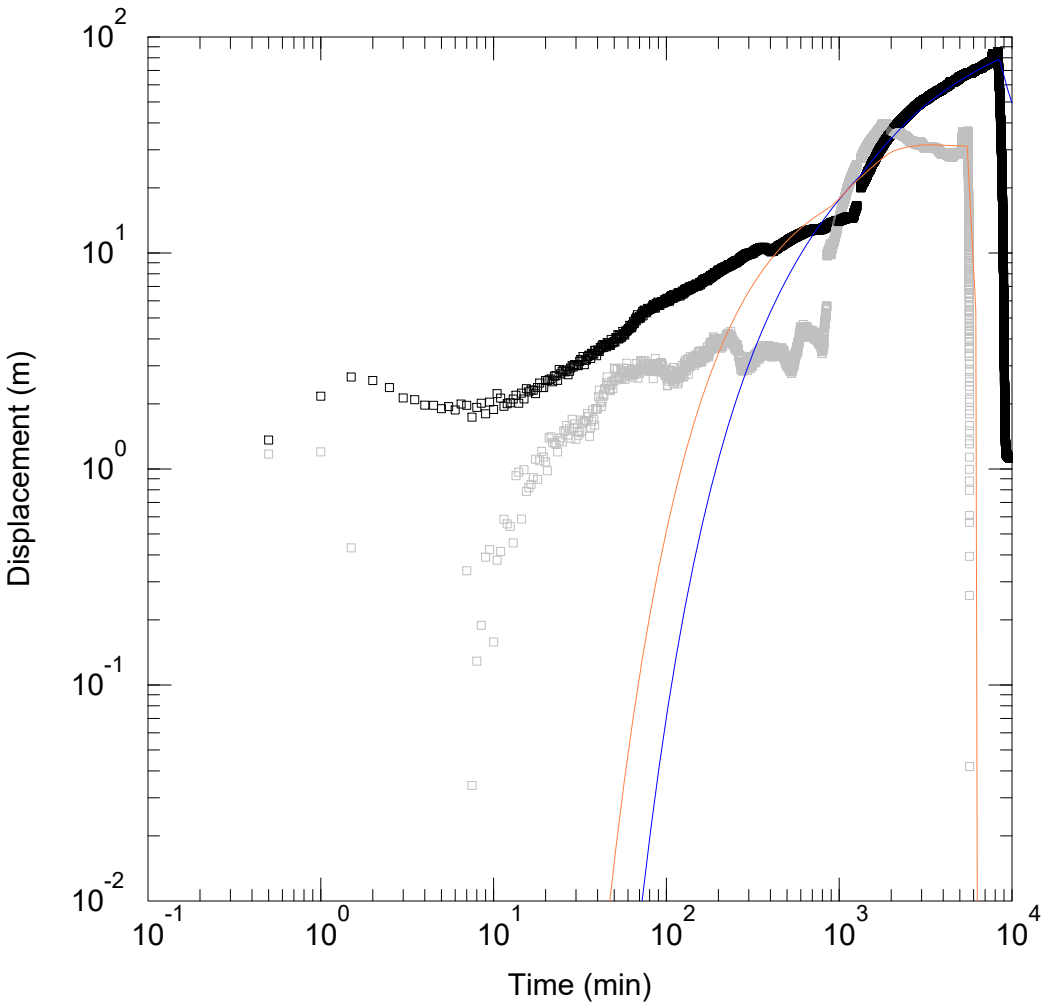


Figure D-11c Semi-log Plot of Recovery Versus Time for Constant Rate Test VL-22-1202

APPENDIX E

Constant Rate Pumping Test Analysis Reports



HANTUSH-JACOB (B-PW-01)

Data Set: N:\...\PT_PW1_Hantush_Jacob.aqt
Date: 01/21/24 Time: 11:09:40

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

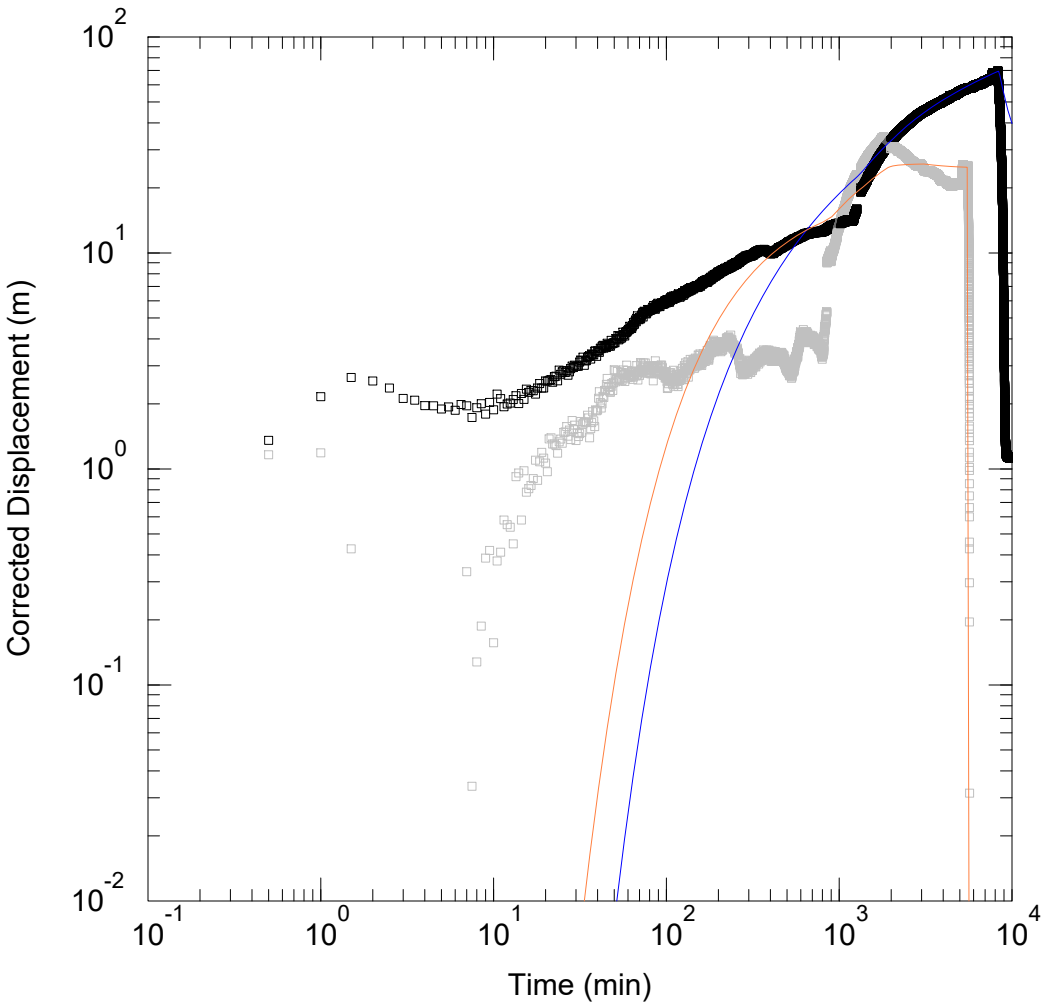
Well Name	X (m)	Y (m)
▫ B-PW-01	489905	5358255

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 1.012E-7 m^2/sec
r/B = 0.1
b = 229.9 m

S = 1.744
Kz/Kr = 1.



THEIS (B-PW-01)

Data Set: N:\...\PT_PW1_Theis.aqt
Date: 01/21/24 Time: 11:05:59

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

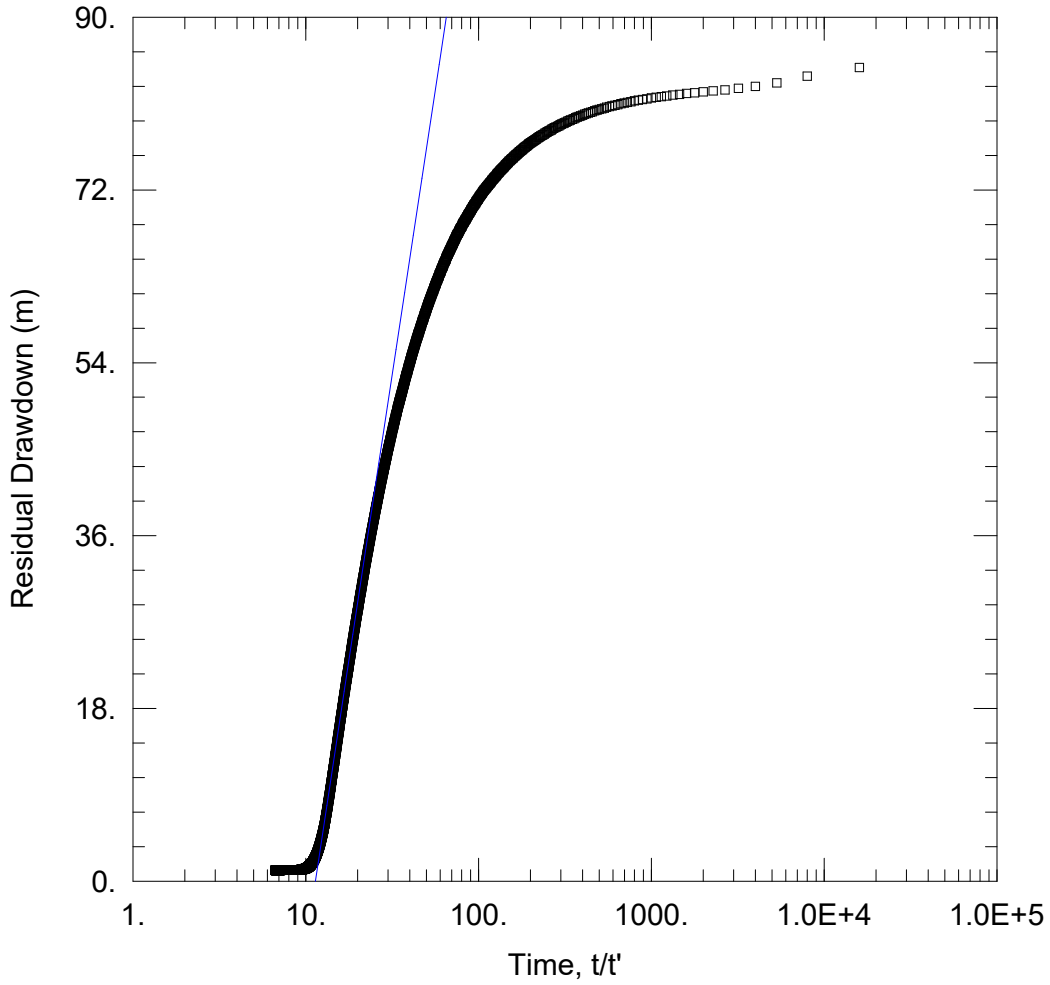
Observation Wells

Well Name	X (m)	Y (m)
▫ B-PW-01	489905	5358255

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 1.344E-7 m^2/sec
S = 1.567
Kz/Kr = 1.
b = 229.9 m



THEIS (B-PW-01)

Data Set: N:\...\PT_PW1_Theis_Rec.aqt
Date: 01/20/24 Time: 20:15:25

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

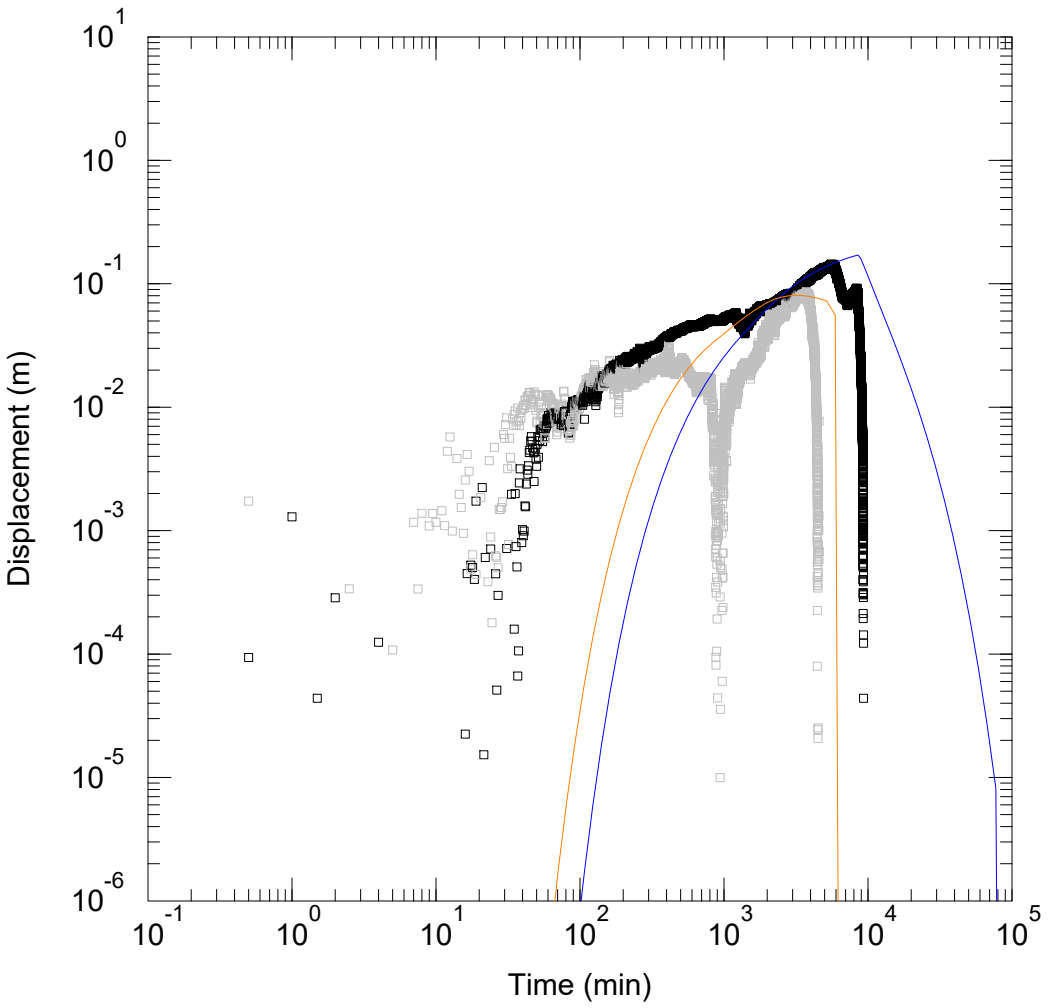
Observation Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 6.43E-8 m^2/sec S/S' = 11.37



HANTUSH-JACOB (B-OW-01)

Data Set: N:\...\PT_OW1_H-J_DD_REV.aqt
Date: 01/21/24 Time: 11:37:16

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

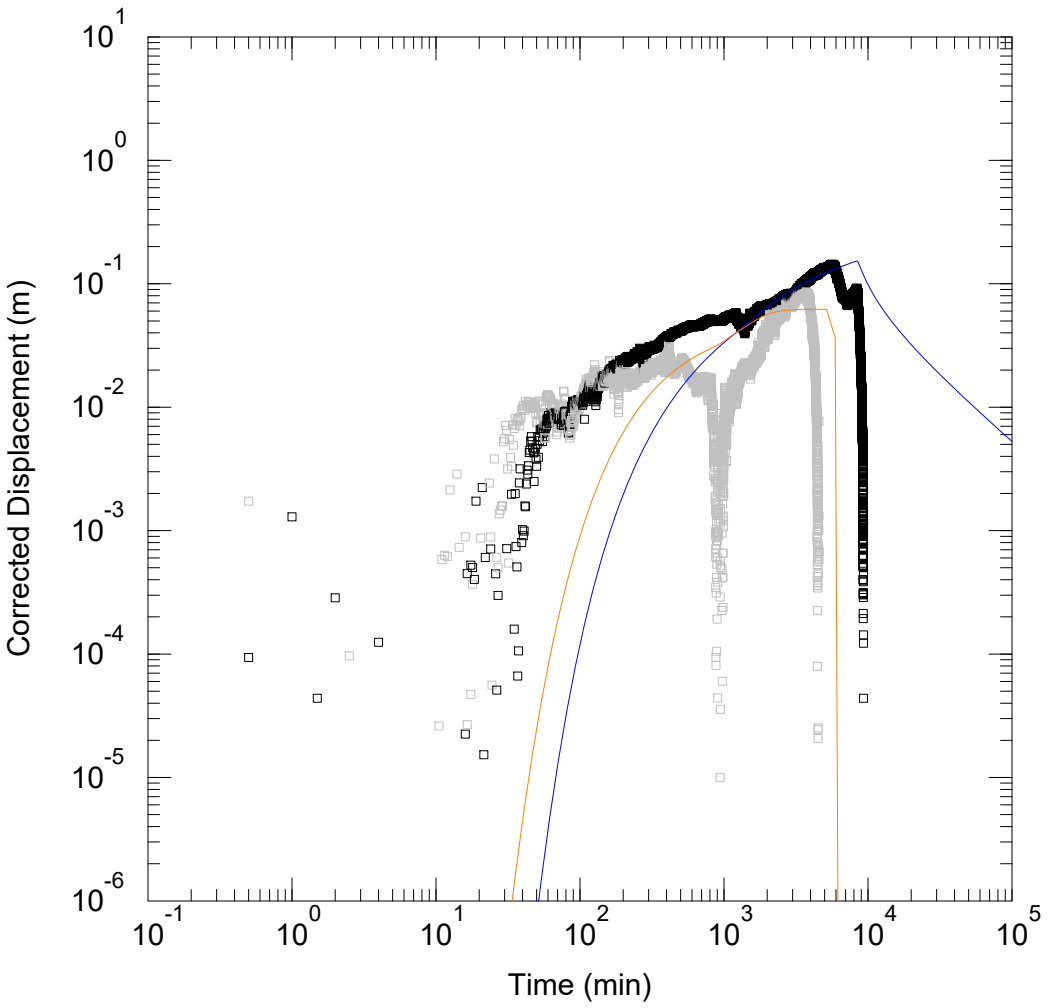
Well Name	X (m)	Y (m)
B-OW-01	489921	5358267.4

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 2.421E-5 m^2/sec
1/B = 0.03045 m^{-1}
b = 229.9 m

S = 0.01304
Kz/Kr = 1.



THEIS (B-OW-01)

Data Set: N:\...\PT_OW1_Theis_DD.aqt
Date: 01/21/24 Time: 11:43:58

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

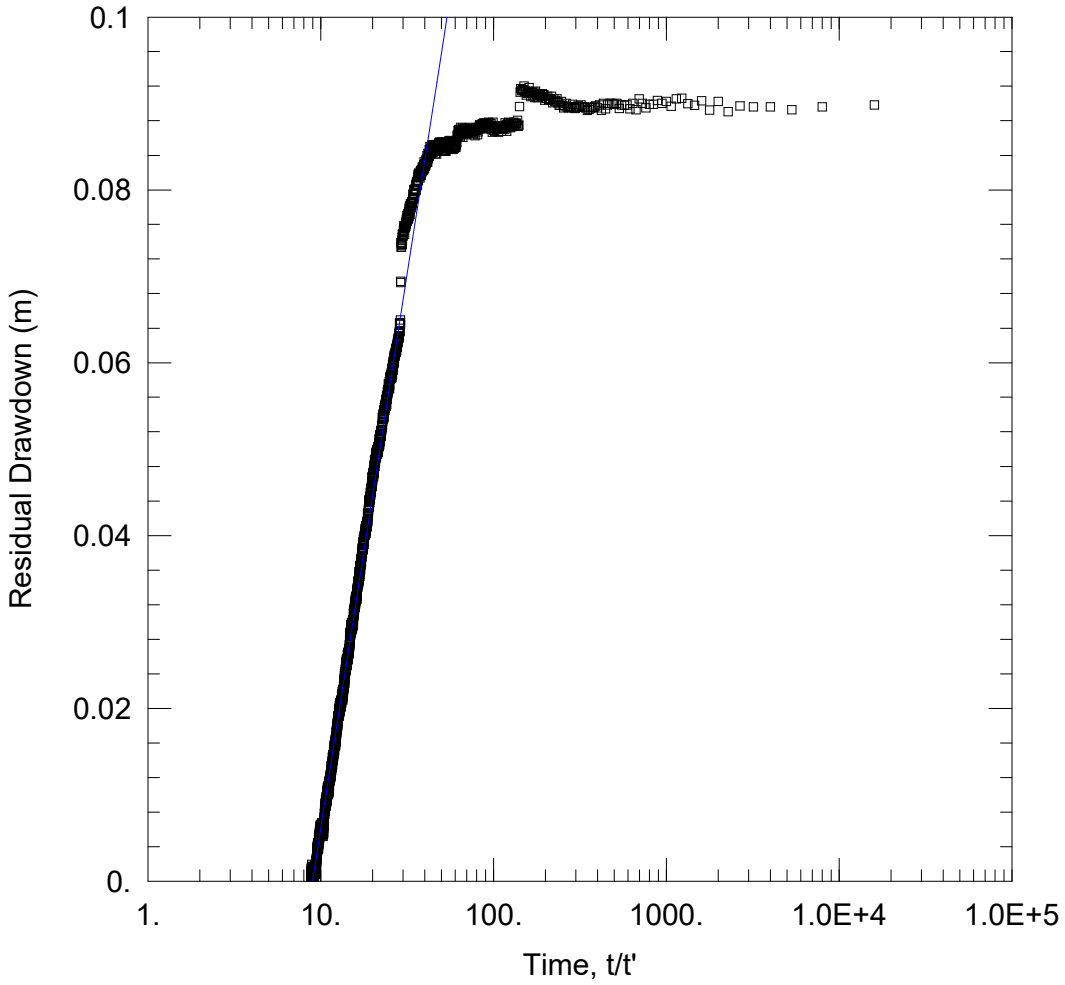
Observation Wells

Well Name	X (m)	Y (m)
B-OW-01	489921	5358267.4

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 5.234E-5 m^2/sec
S = 0.01306
Kz/Kr = 1.
b = 229.9 m



THEIS RECOVERY (B-OW-01)

Data Set: N:\...\PT_OW1_Theis_Rec.aqt
Date: 01/20/24 Time: 19:57:04

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

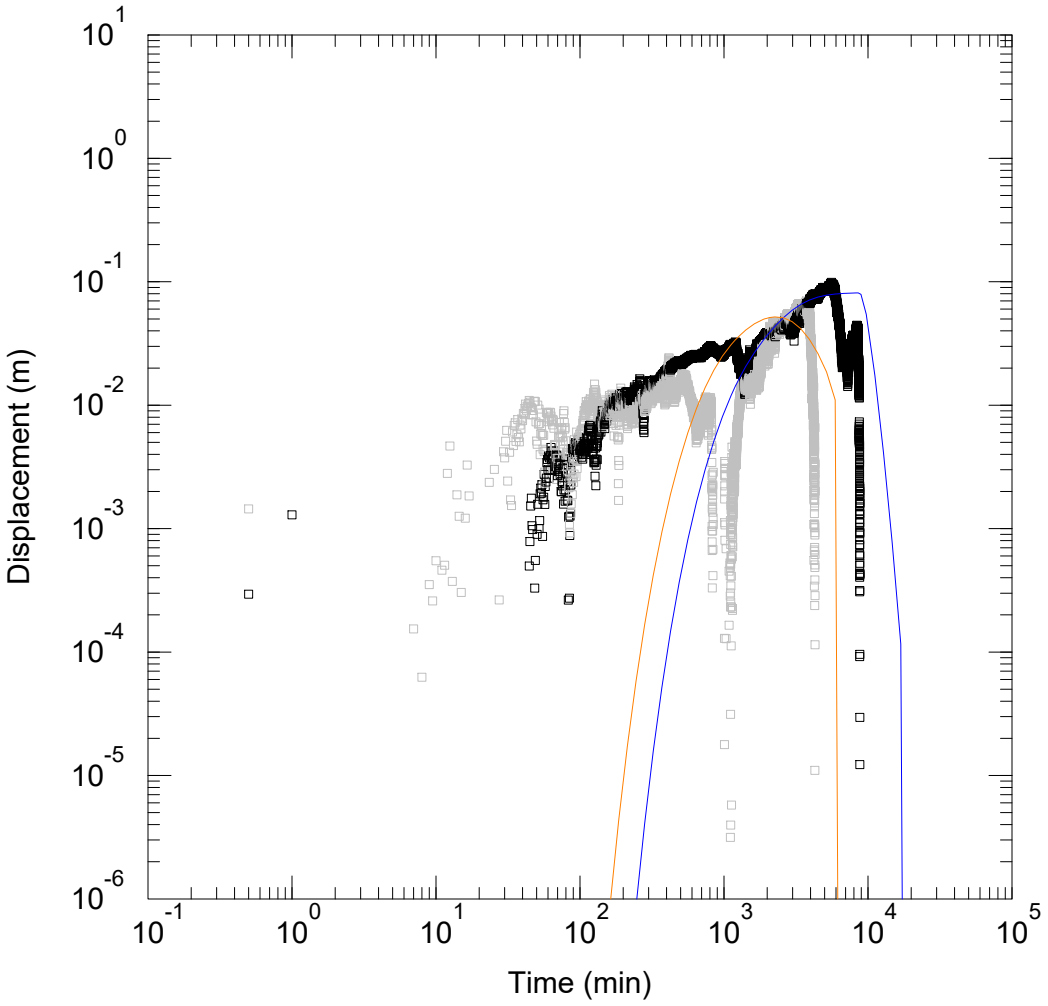
Observation Wells

Well Name	X (m)	Y (m)
B-OW-01	489921	5358267.4

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 5.944E-5 m^2/sec S/S' = 8.966



HANTUSH-JACOB (B-OW-02)

Data Set: N:\...\PT_OW2_H-J_DD_REV.aqt
Date: 01/21/24 Time: 11:53:48

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

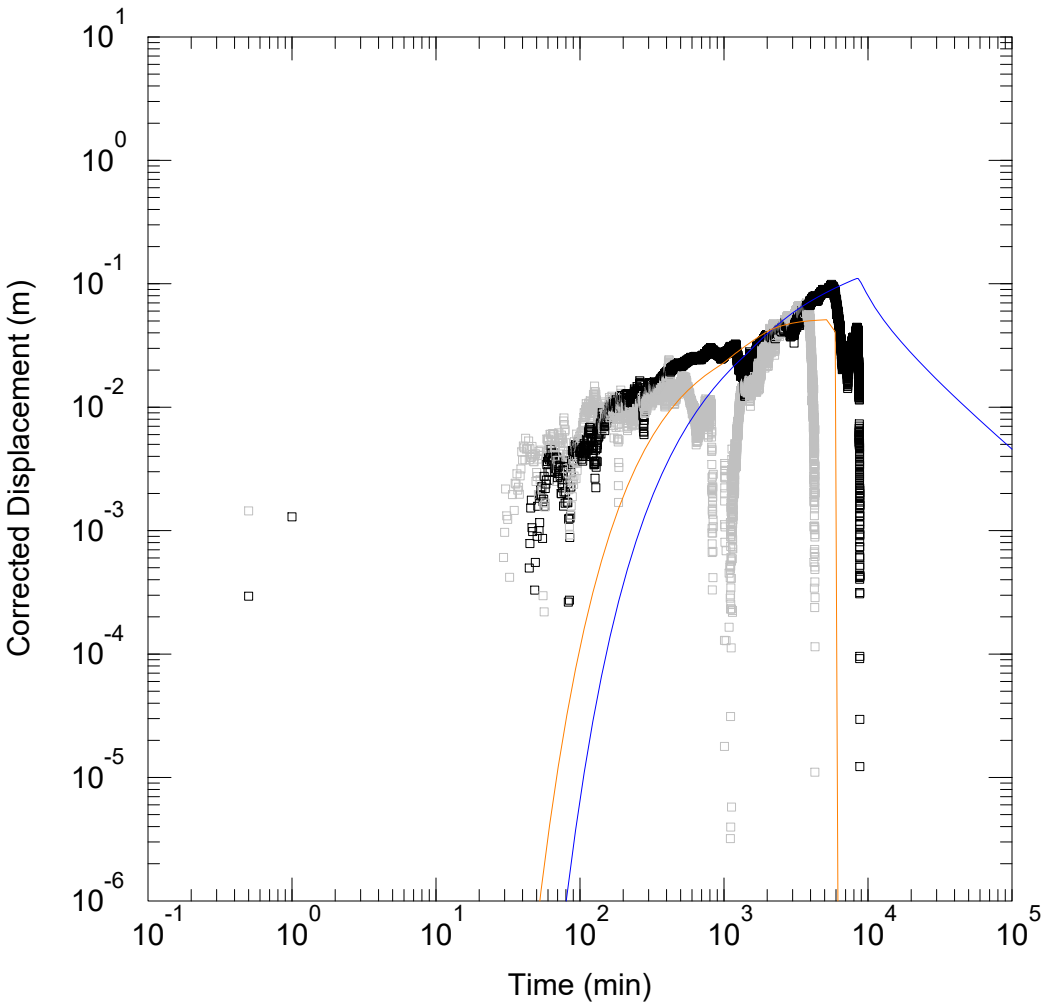
Well Name	X (m)	Y (m)
B-OW-02	489952.8	5358292

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 3.112E-6 m^2/sec
1/B = 0.04828 m^{-1}
b = 229.9 m

S = 0.0005514
Kz/Kr = 1.



THEIS (B-OW-02)

Data Set: N:\...\PT_OW2_Theis_DD_REV.aqt
Date: 01/21/24 Time: 11:49:15

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

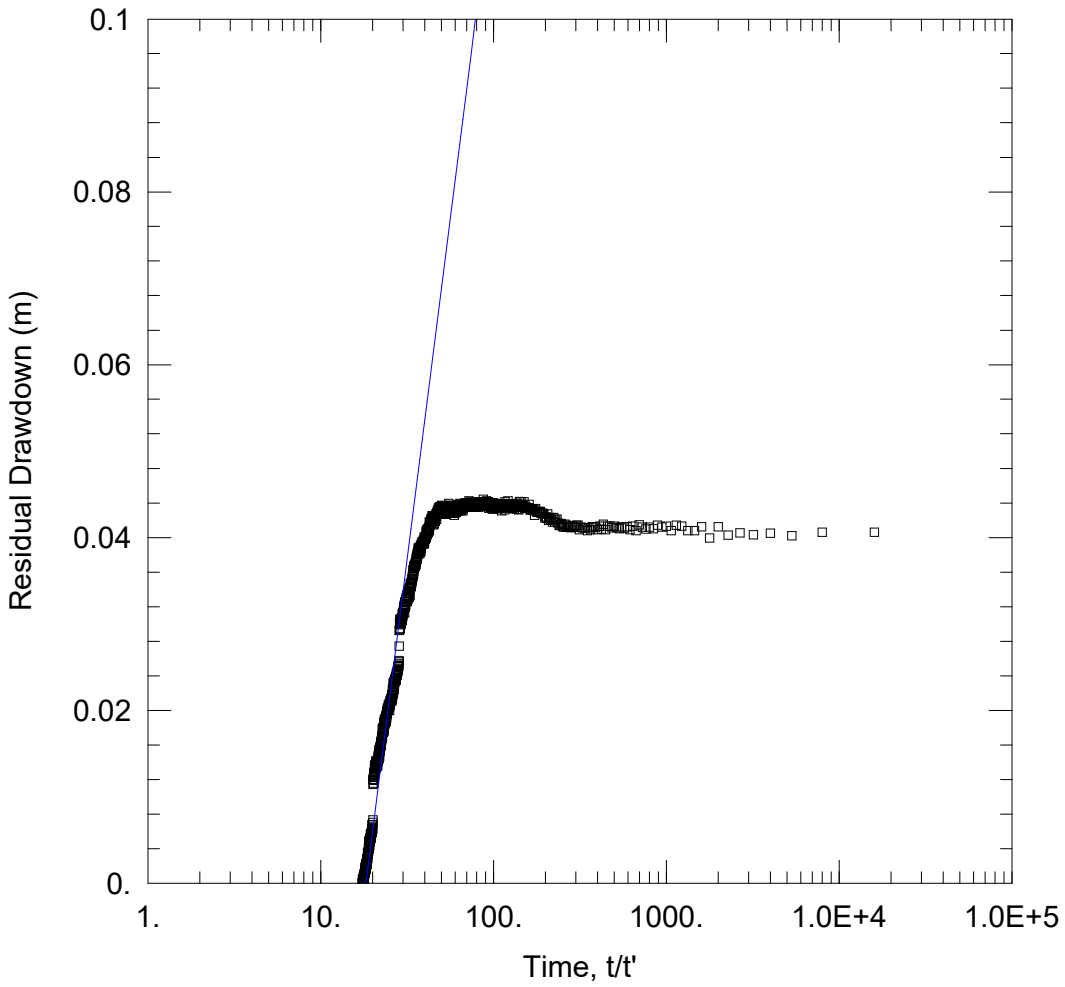
Observation Wells

Well Name	X (m)	Y (m)
B-OW-02	489952.8	5358292

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 6.035E-5 m^2/sec
S = 0.00261
Kz/Kr = 1.
b = 229.9 m



THEIS RECOVERY (B-OW-02)

Data Set: N:\...\PT_OW2_Theis_Rec.aqt
Date: 01/20/24 Time: 19:59:08

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

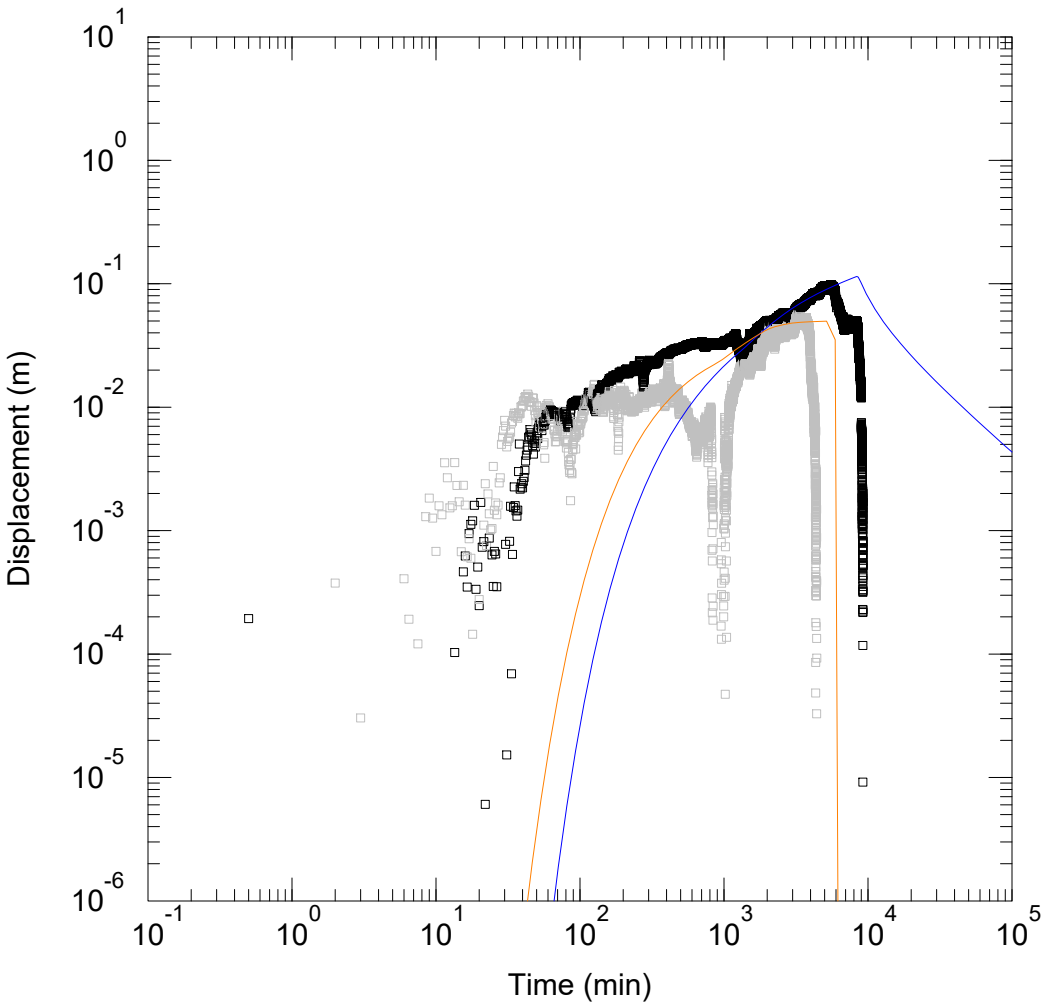
Observation Wells

Well Name	X (m)	Y (m)
B-OW-02	489952.8	5358292

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 4.841E-5 m^2/sec S/S' = 18.28



HANTUSH-JACOB (B-OW-03)

Data Set: N:\...\PT_OW3_H-J_DD_REV.aqt
Date: 01/21/24 Time: 12:01:10

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

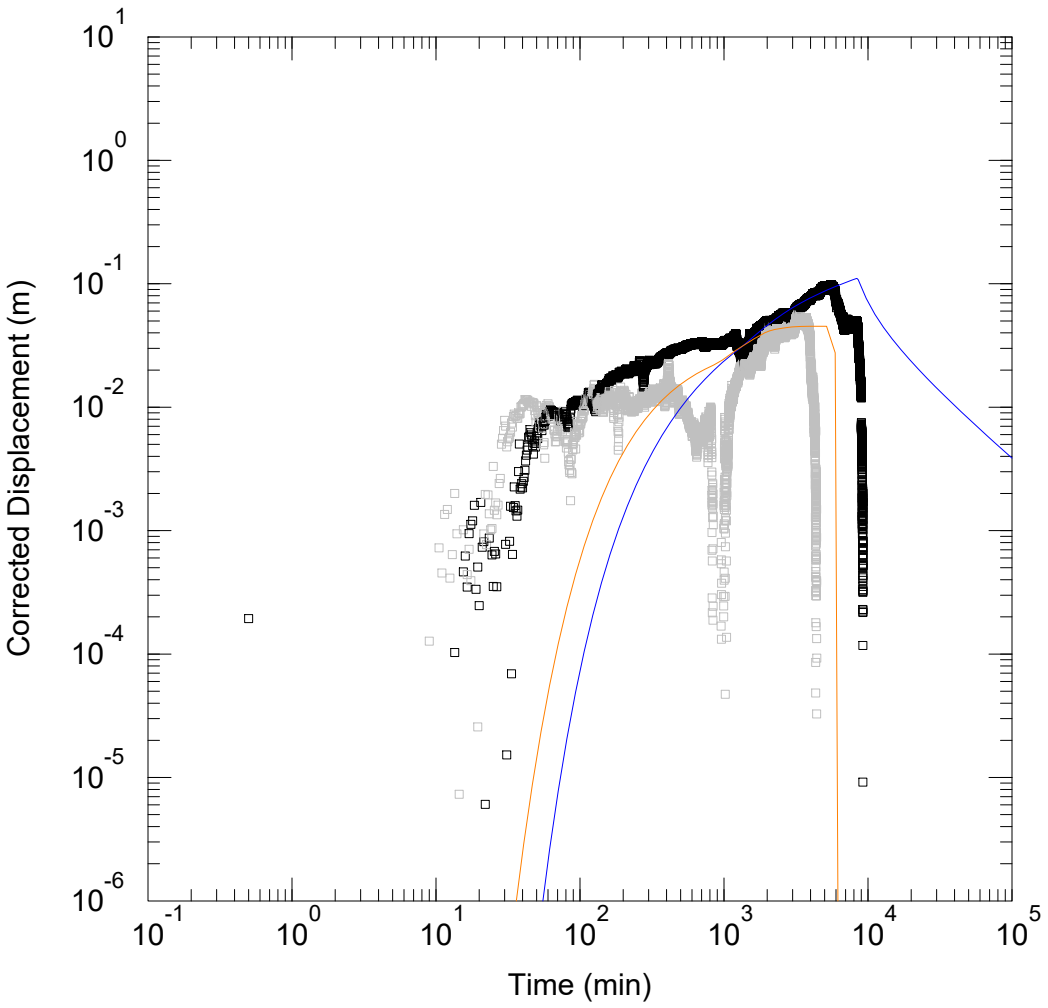
Well Name	X (m)	Y (m)
B-OW-03	489917	5358238.7

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 6.379E-5 m^2/sec
1/B = 0.0002287 m^{-1}
b = 229.9 m

S = 0.01999
Kz/Kr = 1.



THEIS (B-OW-03)

Data Set: N:\...\PT_OW3_Theis_DD_REV.aqt
Date: 01/21/24 Time: 11:58:57

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

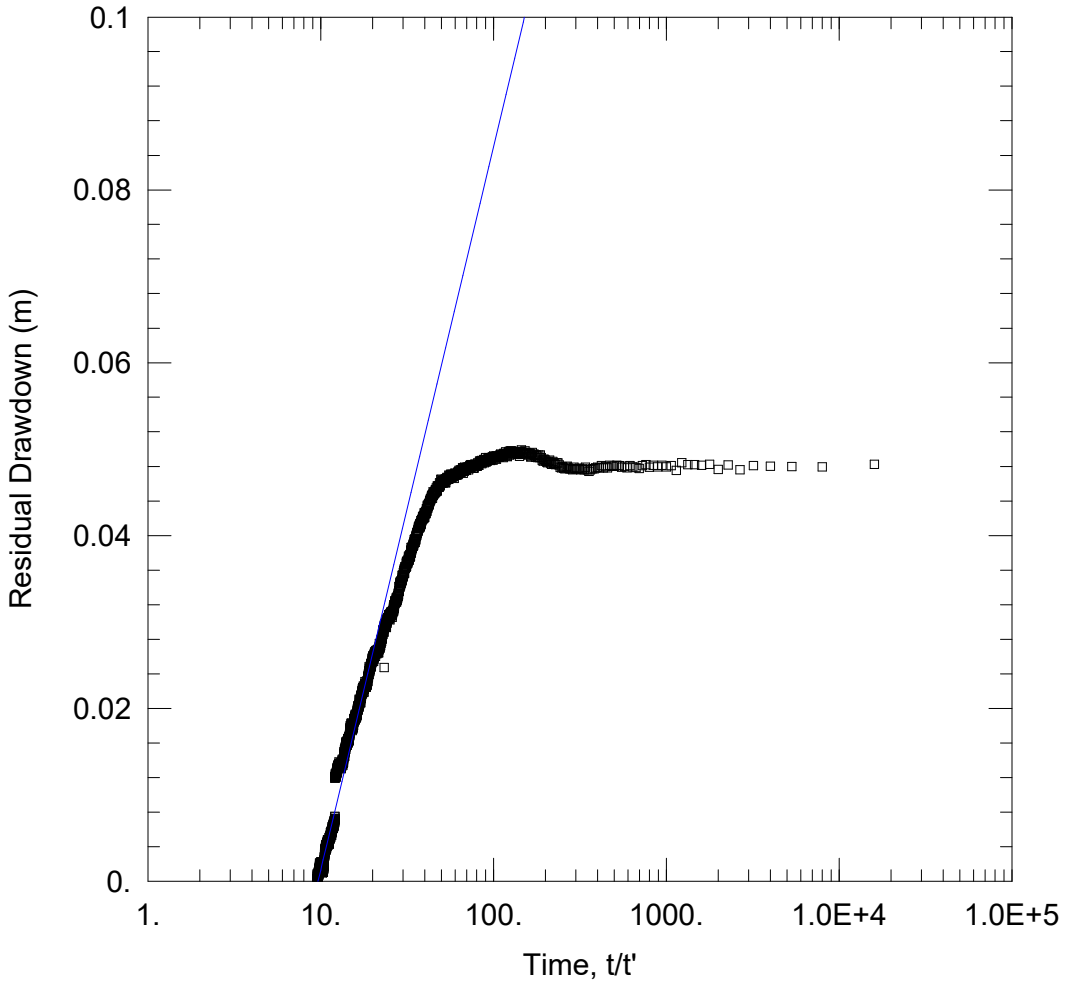
Observation Wells

Well Name	X (m)	Y (m)
B-OW-03	489917	5358238.7

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 7.156E-5 m^2/sec
S = 0.01847
Kz/Kr = 1.
b = 229.9 m



THEIS RECOVERY (B-OW-03)

Data Set: N:\...\PT_OW3_Theis_Rec.aqt
Date: 01/20/24 Time: 20:01:25

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

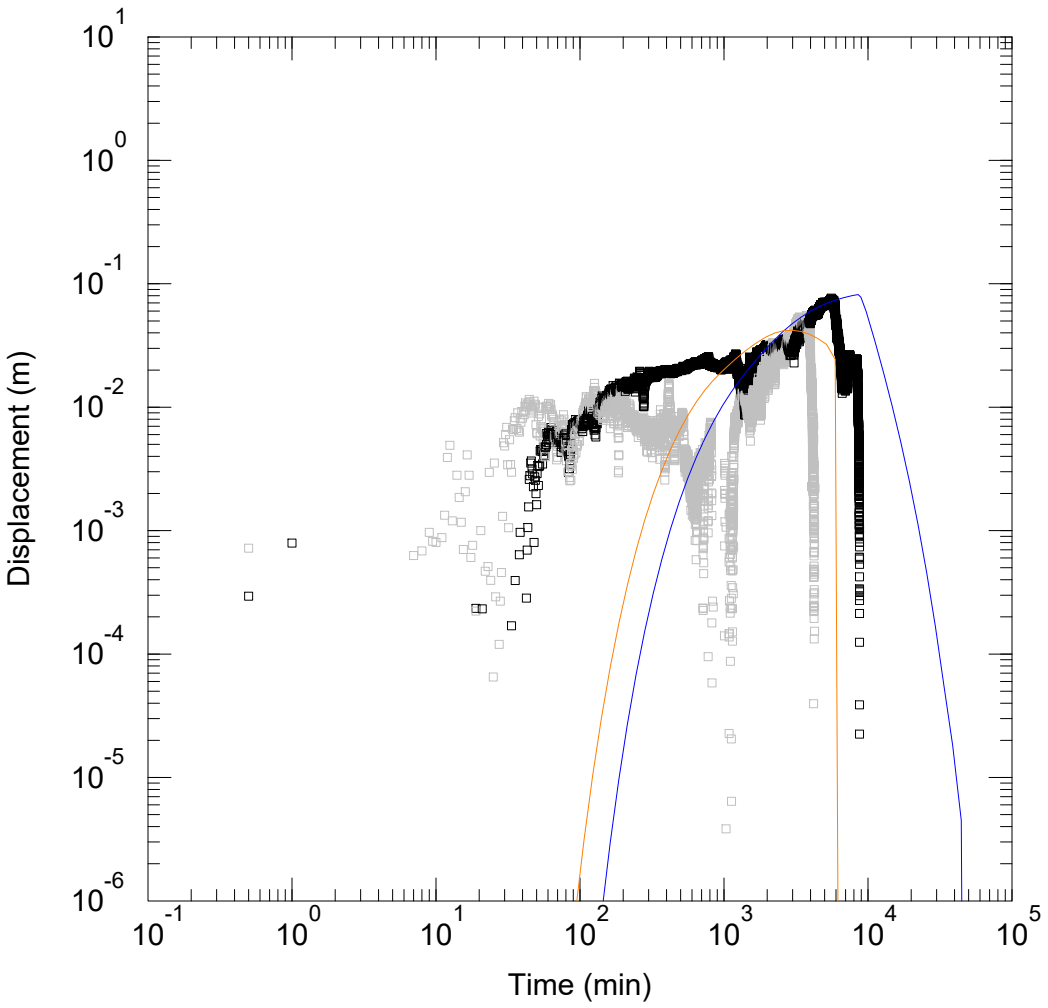
Observation Wells

Well Name	X (m)	Y (m)
B-OW-03	489917	5358238.7

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 9.121E-5 m^2/sec S/S' = 9.66



HANTUSH-JACOB (B-OW-04)

Data Set: N:\...\PT_OW4_H-J_DD_REV.aqt
Date: 01/21/24 Time: 12:11:04

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

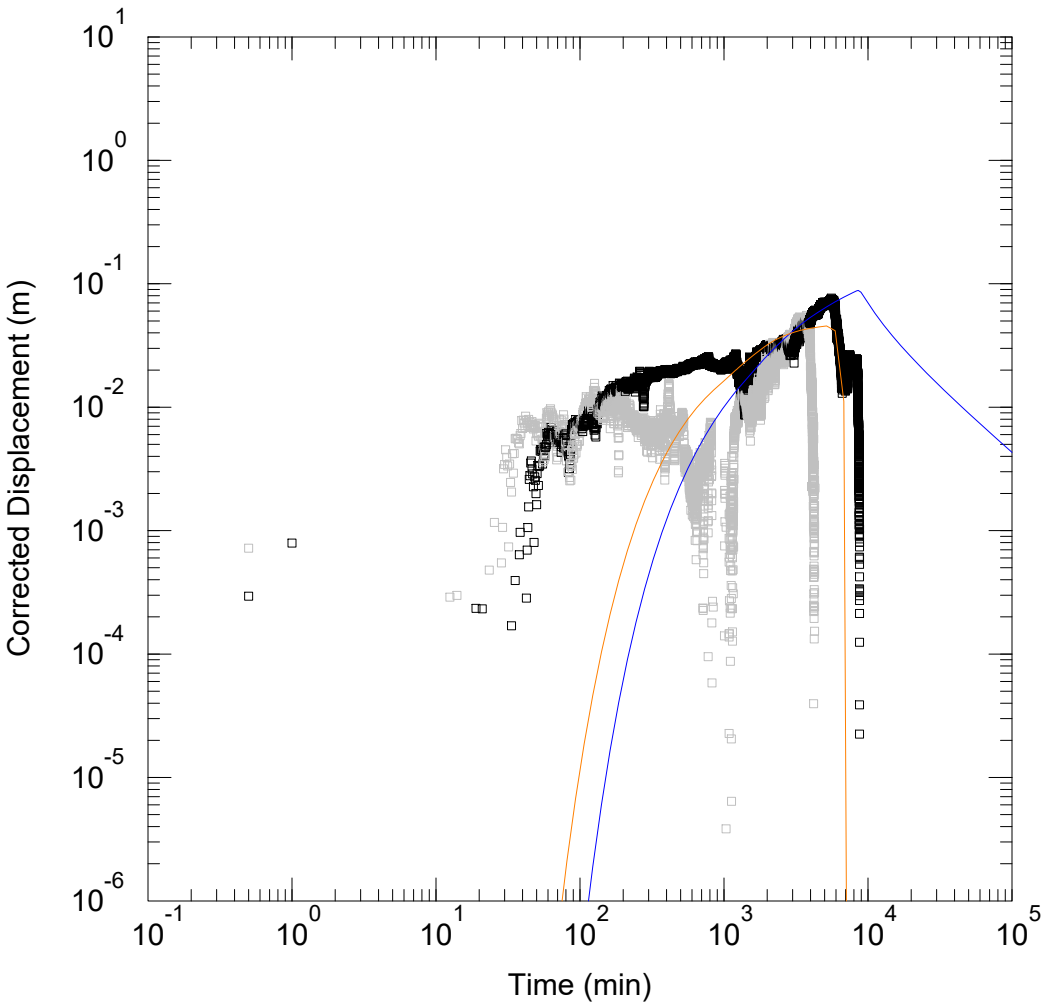
Well Name	X (m)	Y (m)
B-OW-04	489940.5	5358206.7

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 2.878E-5 m^2/sec
1/B = 0.01778 m^{-1}
b = 229.9 m

S = 0.002485
Kz/Kr = 1.



THEIS (B-OW-04)

Data Set: N:\...\PT_OW4_Theis_DD_REV.aqt
Date: 01/21/24 Time: 12:07:25

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

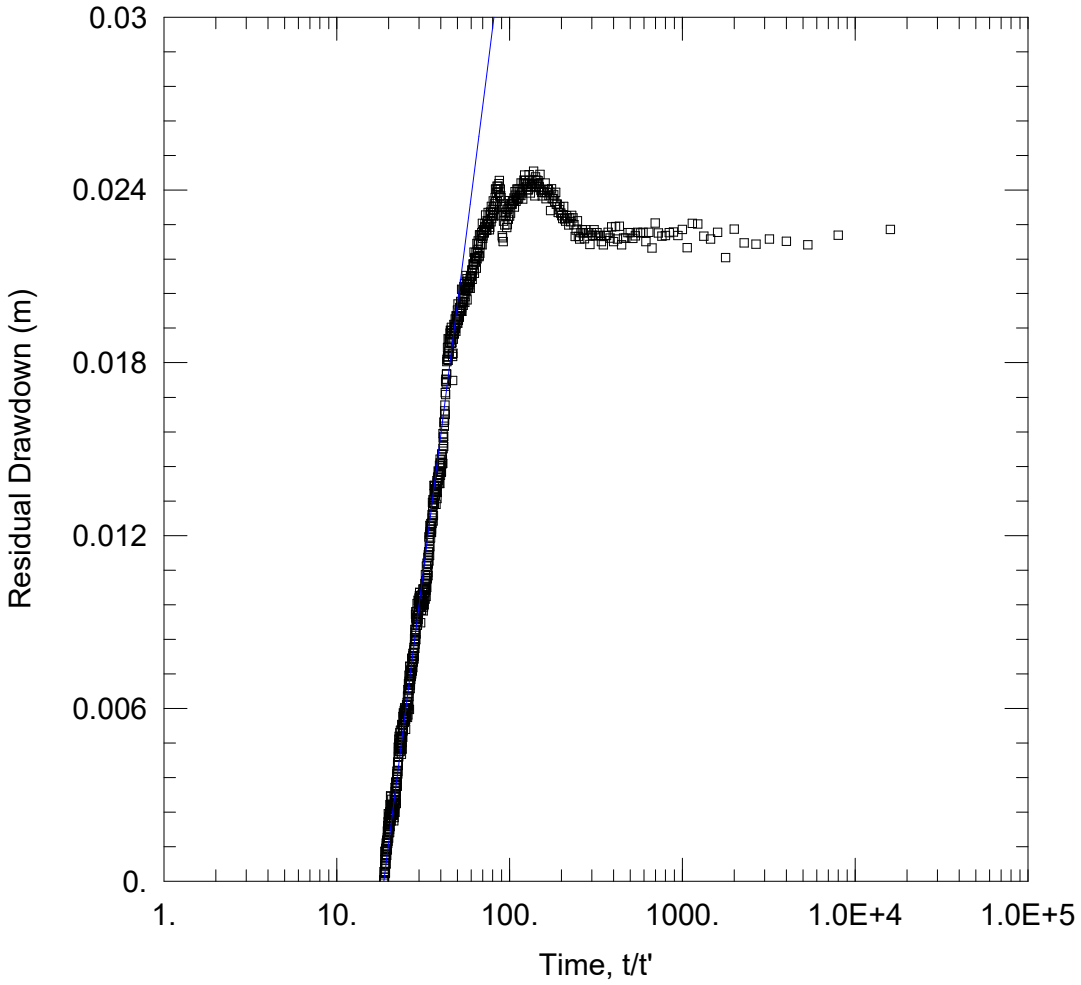
Observation Wells

Well Name	X (m)	Y (m)
B-OW-04	489940.5	5358206.7

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 6.383E-5 m^2/sec
S = 0.004003
Kz/Kr = 1.
b = 229.9 m



THEIS RECOVERY (B-OW-04)

Data Set: N:\...\PT_OW4_Theis_Rec.aqt
Date: 01/20/24 Time: 20:04:28

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

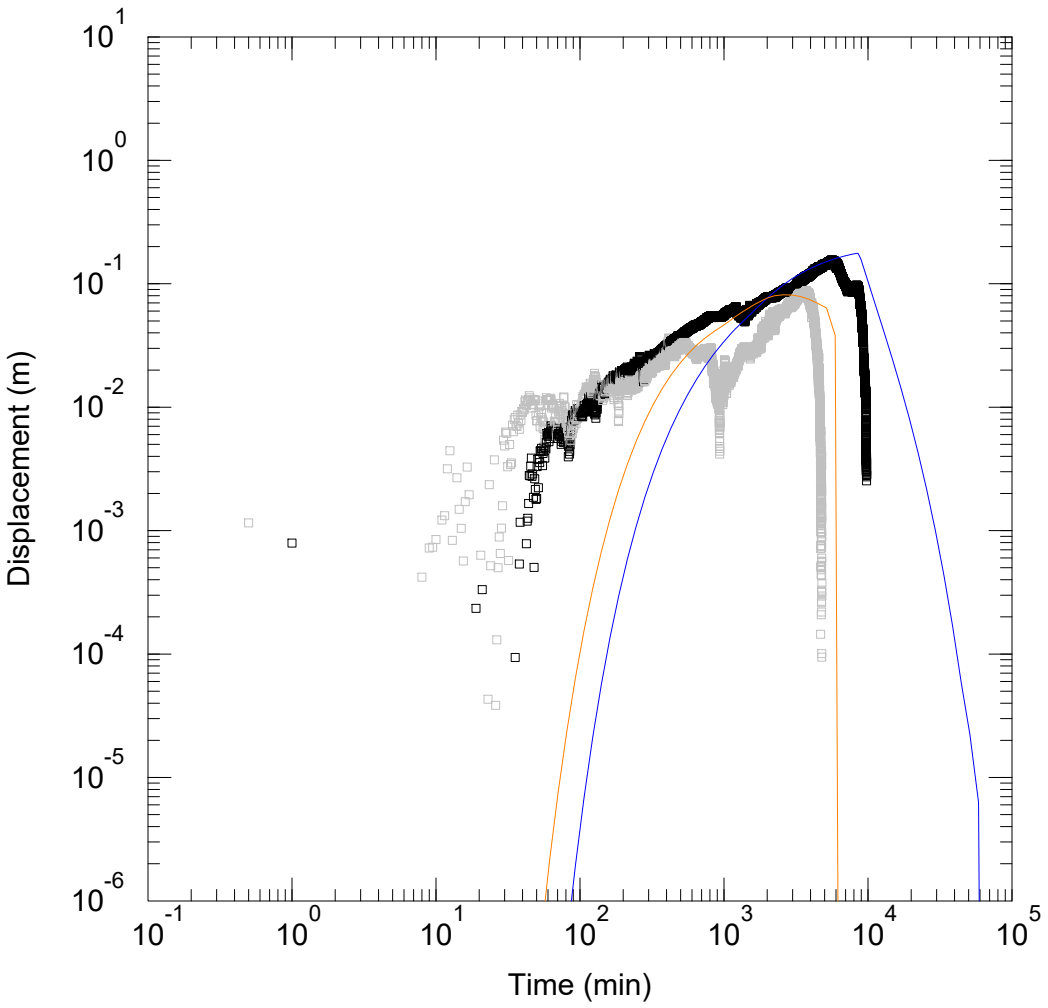
Observation Wells

Well Name	X (m)	Y (m)
B-OW-04	489940.5	5358206.7

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 0.0001624 m^2/sec S/S' = 18.73



HANTUSH-JACOB (B-OW-05)

Data Set: N:\...\PT_OW5_H-J_DD_REV.aqt
Date: 01/21/24 Time: 12:18:20

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

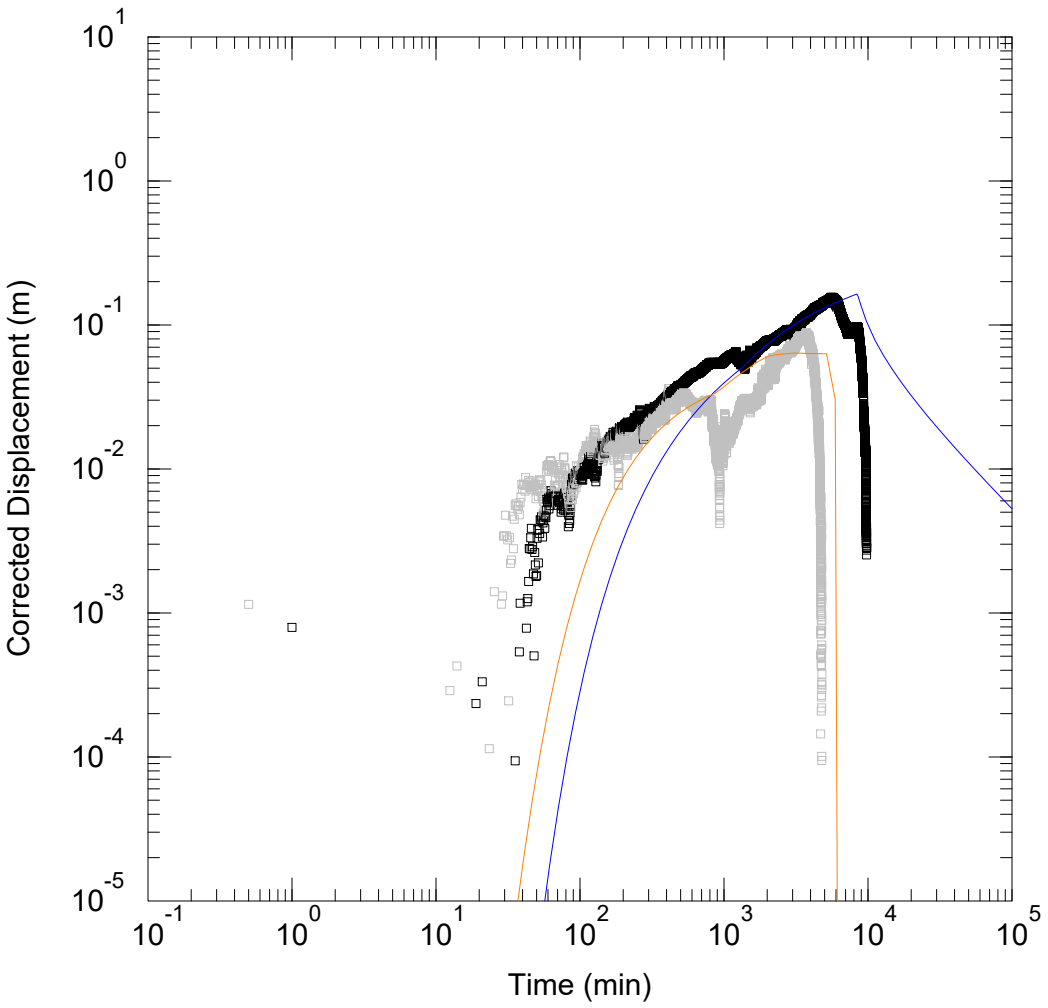
Well Name	X (m)	Y (m)
B-OW-05	489884.8	5358257.3

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 2.21E-5 m^2/sec
1/B = 0.03467 m^{-1}
b = 229.9 m

S = 0.01016
Kz/Kr = 1.



THEIS (B-OW-05)

Data Set: N:\...\PT_OW5_Theis_DD_REV.aqt
Date: 01/21/24 Time: 12:16:16

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

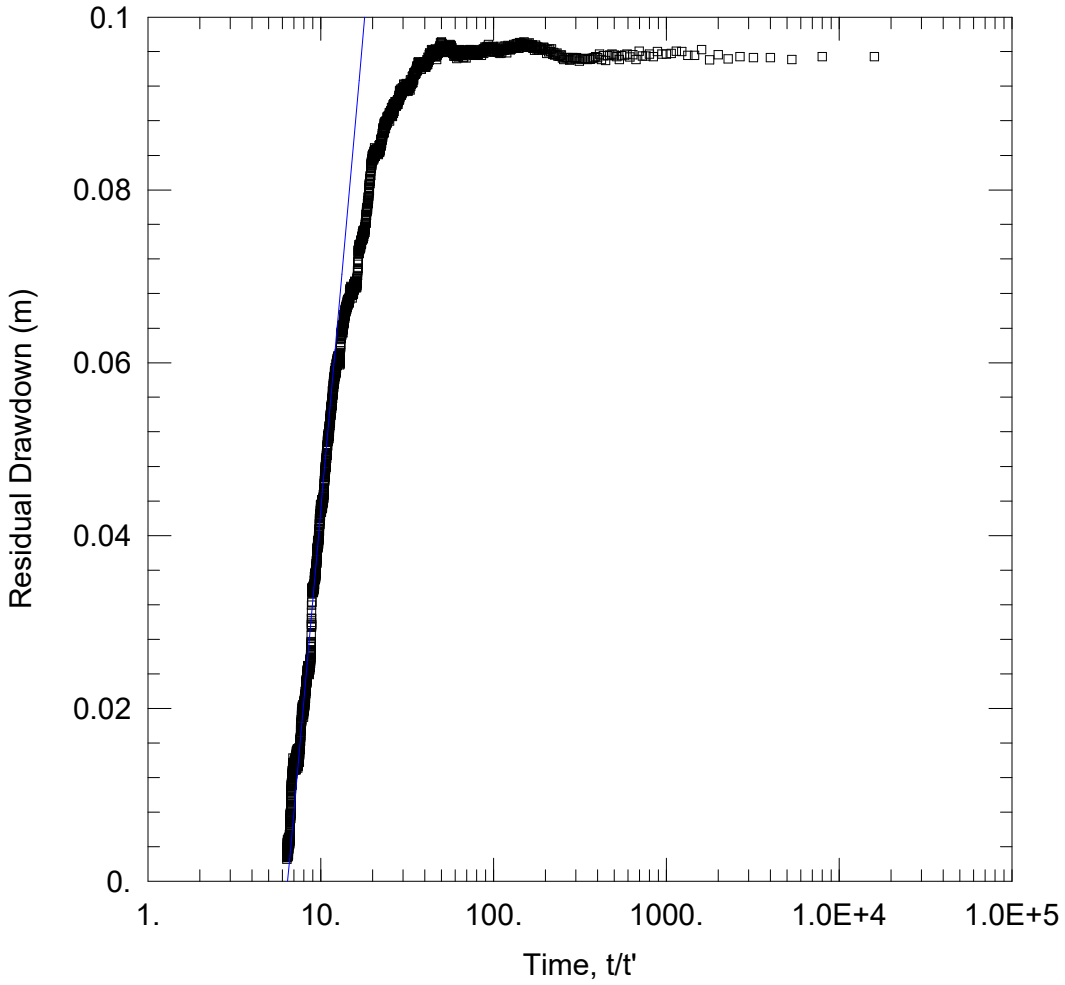
Observation Wells

Well Name	X (m)	Y (m)
B-OW-05	489884.8	5358257.3

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 5.24E-5 m^2/sec
S = 0.01082
Kz/Kr = 1.
b = 229.9 m



THEIS RECOVERY (B-OW-05)

Data Set: N:\...\PT_OW5_Theis_Rec.aqt
Date: 01/20/24 Time: 20:08:51

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

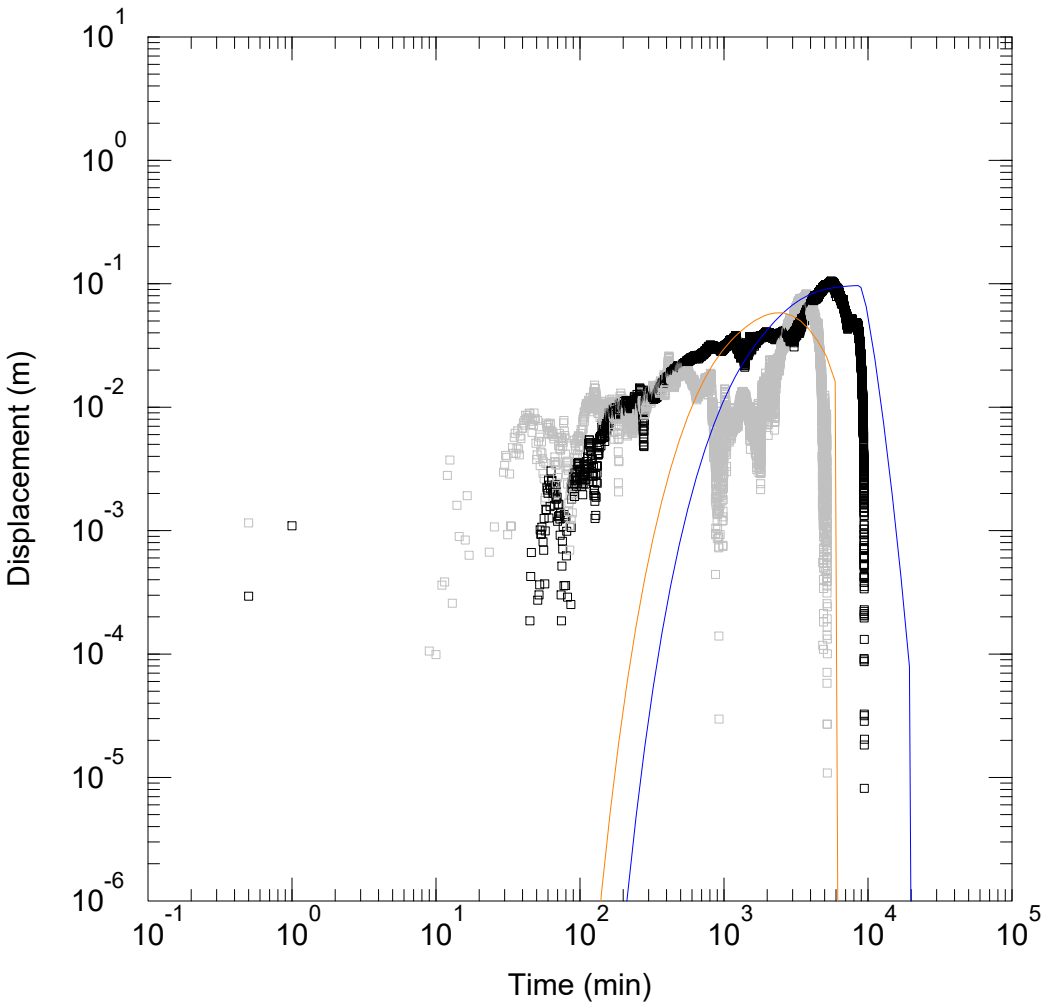
Observation Wells

Well Name	X (m)	Y (m)
B-OW-05	489884.8	5358257.3

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 3.405E-5 m^2/sec S/S' = 6.443



HANTUSH-JACOB (B-OW-06)

Data Set: N:\...\PT_OW6_H-J_DD_REV.aqt
Date: 01/21/24 Time: 12:29:08

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

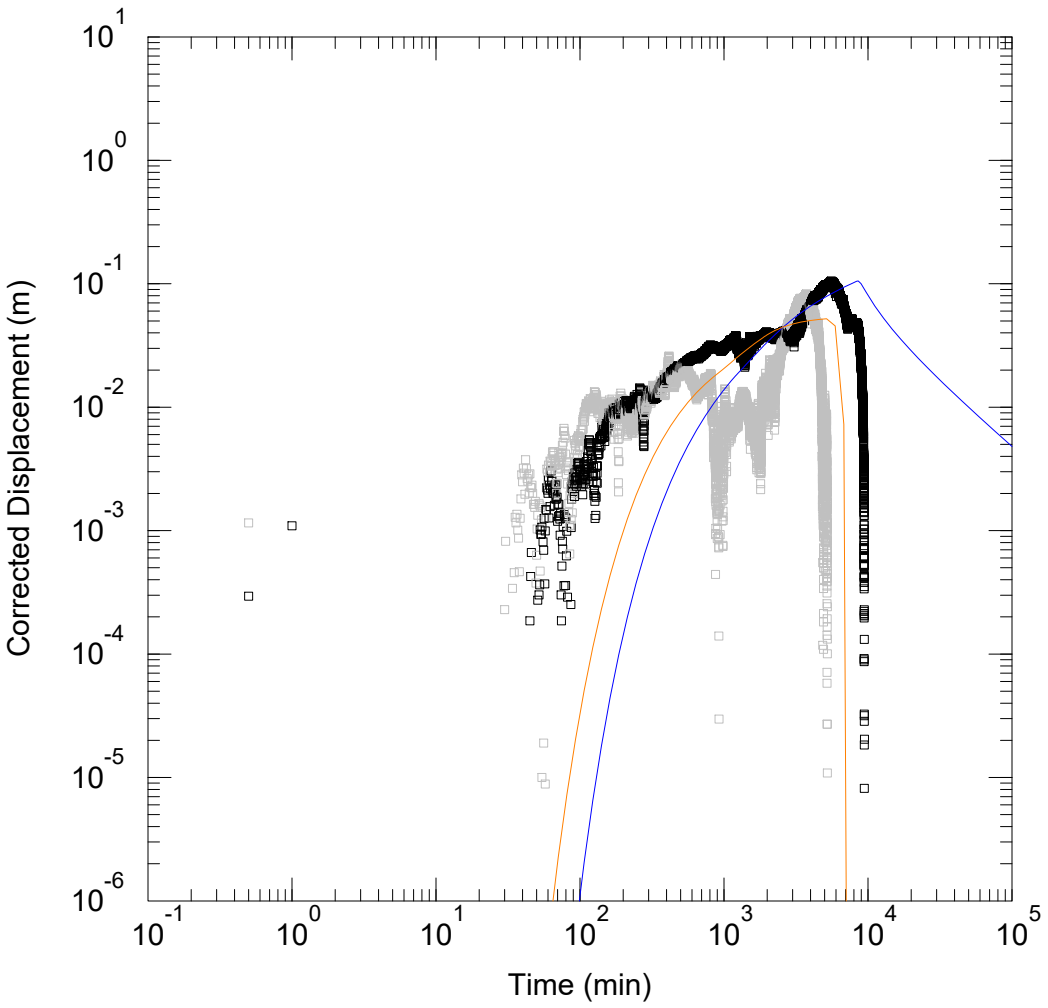
Well Name	X (m)	Y (m)
B-OW-06	489845.1	5358261.9

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 5.288E-6 m^2/sec
1/B = 0.03843 m^{-1}
b = 229.9 m

S = 0.0007709
Kz/Kr = 1.



THEIS (B-OW-06)

Data Set: N:\...\PT_OW6_Theis_DD_REV.aqt
Date: 01/21/24 Time: 12:25:15

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

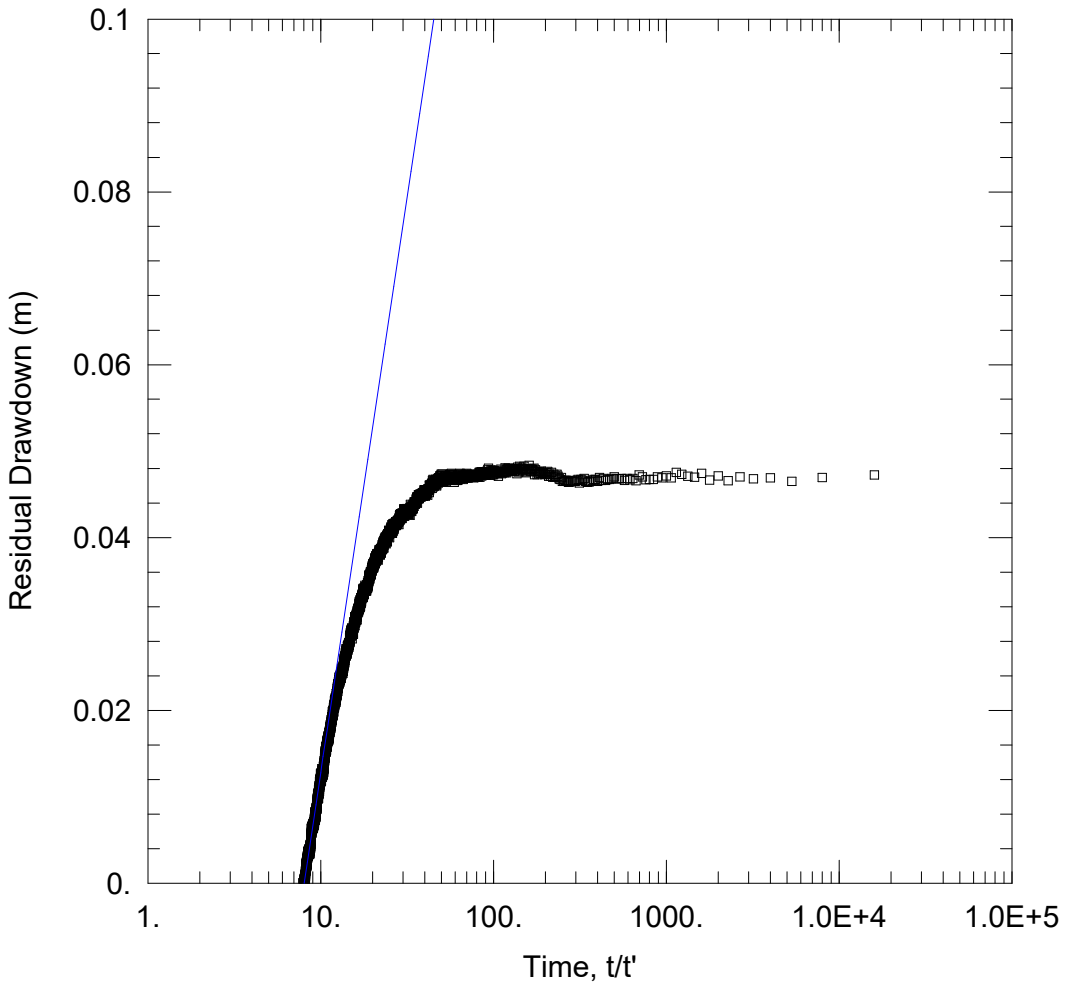
Observation Wells

Well Name	X (m)	Y (m)
B-OW-06	489845.1	5358261.9

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 5.726E-5 m^2/sec
S = 0.003094
Kz/Kr = 1.
b = 229.9 m



THEIS RECOVERY (B-OW-06)

Data Set: N:\...\PT_OW6_Theis_Rec.aqt
Date: 01/20/24 Time: 20:11:39

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

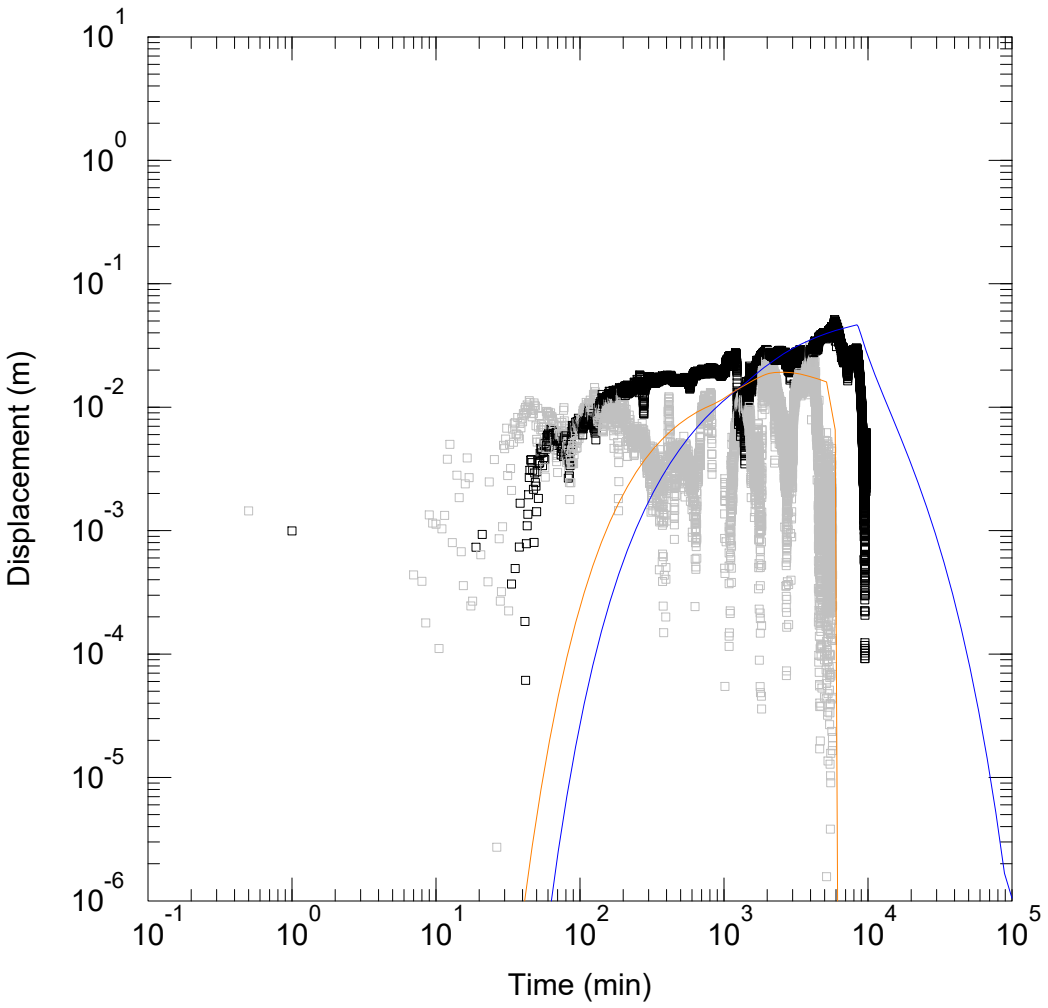
Observation Wells

Well Name	X (m)	Y (m)
B-OW-06	489845.1	5358261.9

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 5.727E-5 m^2/sec S/S' = 8.025



HANTUSH-JACOB (VL-21-970)

Data Set: N:\...\PT_VL970_H-J_DD_REV.aqt
Date: 01/21/24 Time: 12:38:18

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

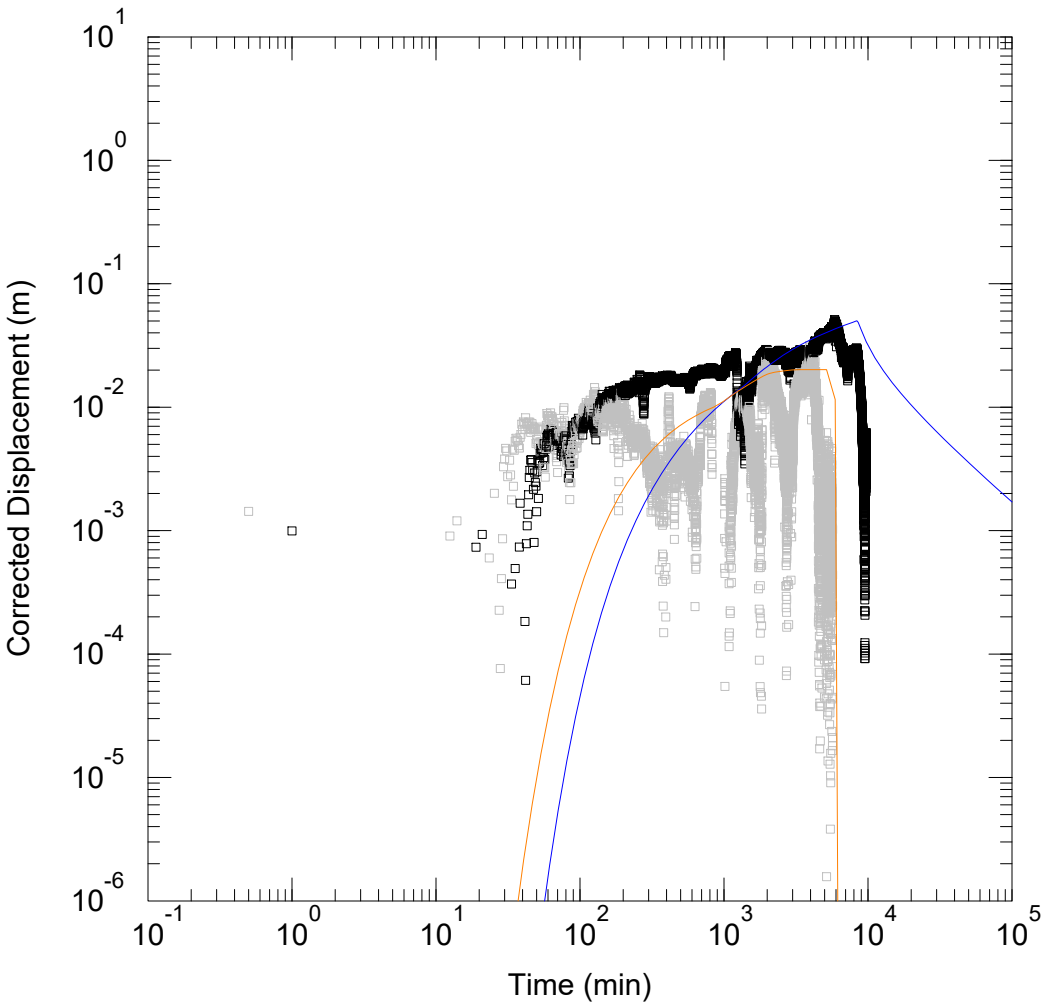
Well Name	X (m)	Y (m)
VL-21-970	489922.7	5358287.5

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 0.0001322 m^2/sec
1/B = 0.01089 m^{-1}
b = 229.9 m

S = 0.01092
Kz/Kr = 1.



THEIS (VL-21-970)

Data Set: N:\...\PT_VL970_Theis_DD_REV.aqt
Date: 01/21/24 Time: 12:35:05

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

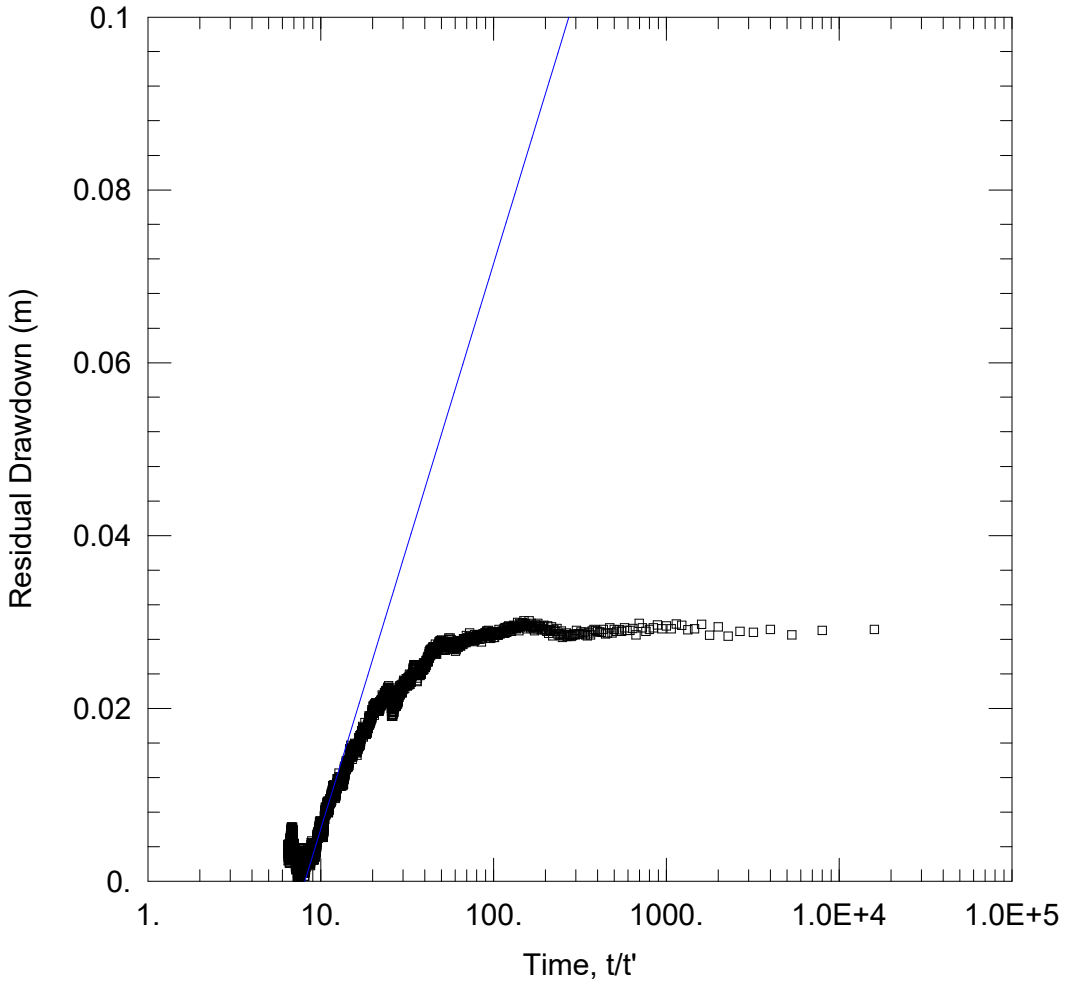
Observation Wells

Well Name	X (m)	Y (m)
VL-21-970	489922.7	5358287.5

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 0.000162 m^2/sec
S = 0.01172
Kz/Kr = 1.
b = 229.9 m



THEIS RECOVERY (VL-21-970)

Data Set: N:\...\PT_VL970_Theis_Rec.aqt
Date: 01/20/24 Time: 20:17:16

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

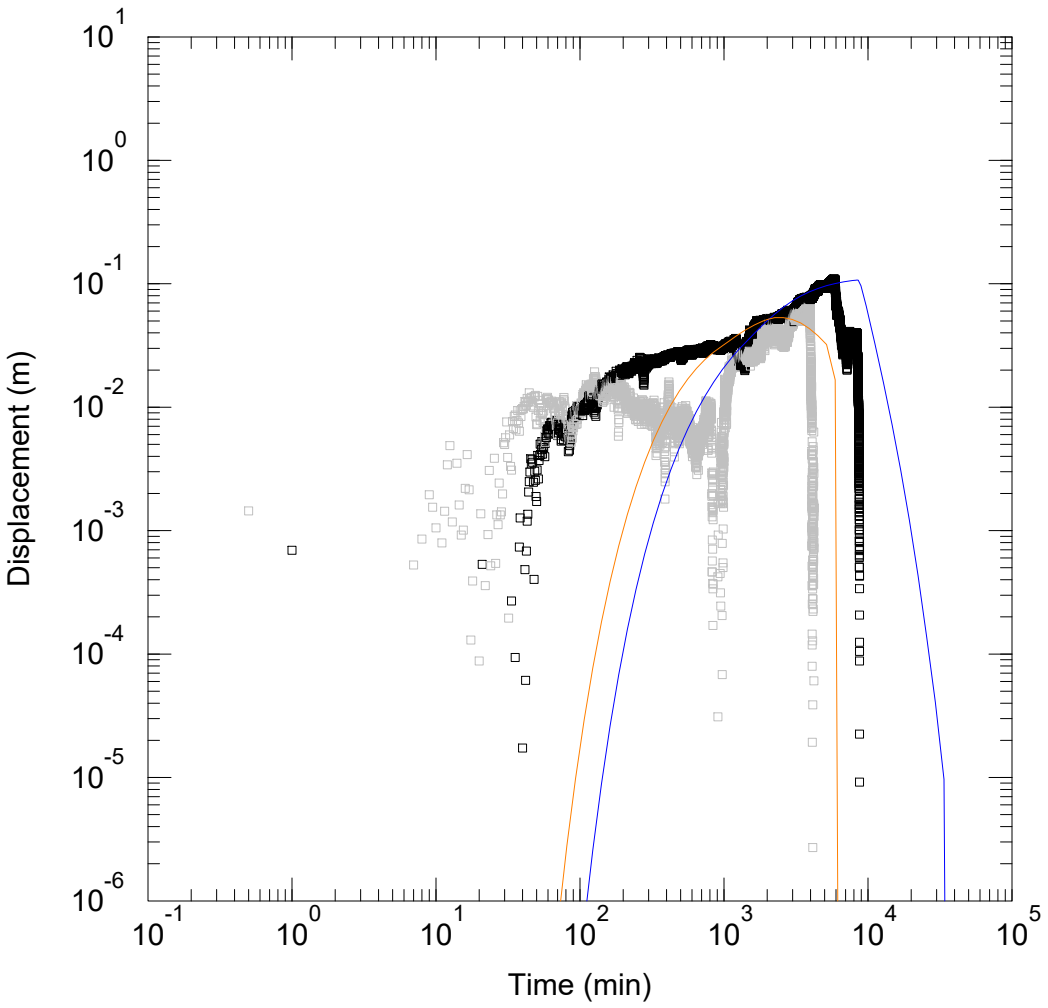
Observation Wells

Well Name	X (m)	Y (m)
VL-21-970	489922.7	5358287.5

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 0.0001167 m^2/sec S/S' = 8.094



HANTUSH-JACOB (VL-21-1068)

Data Set: N:\...\PT_VL1068_H-J_DD_REV.aqt
Date: 01/21/24 Time: 12:46:43

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

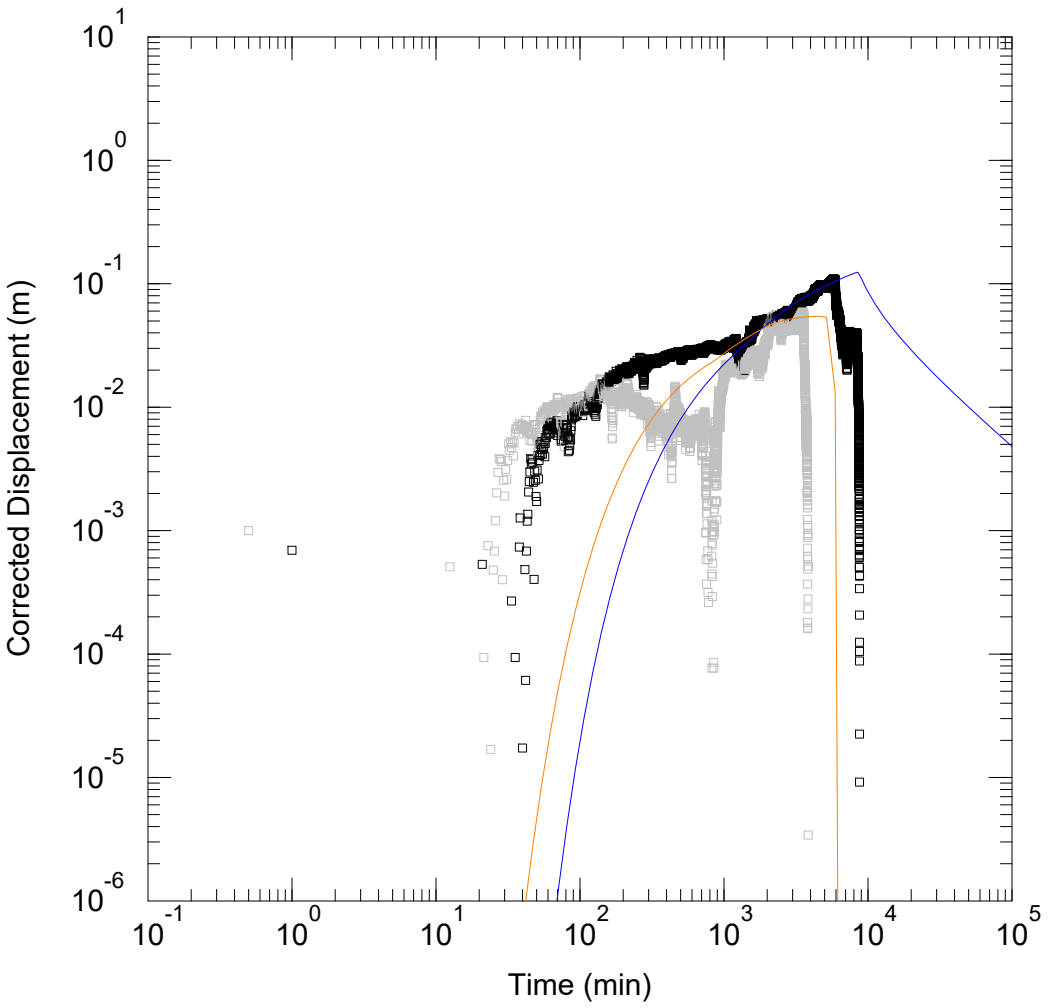
Well Name	X (m)	Y (m)
VL-21-1068	489887.7	5358229.8

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 2.193E-5 m^2/sec
1/B = 0.03584 m^{-1}
b = 229.9 m

S = 0.005737
Kz/Kr = 1.



THEIS (VL-21-1068)

Data Set: N:\...\PT_VL1068_Theis_DD_REV.aqt
Date: 01/21/24 Time: 12:42:41

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

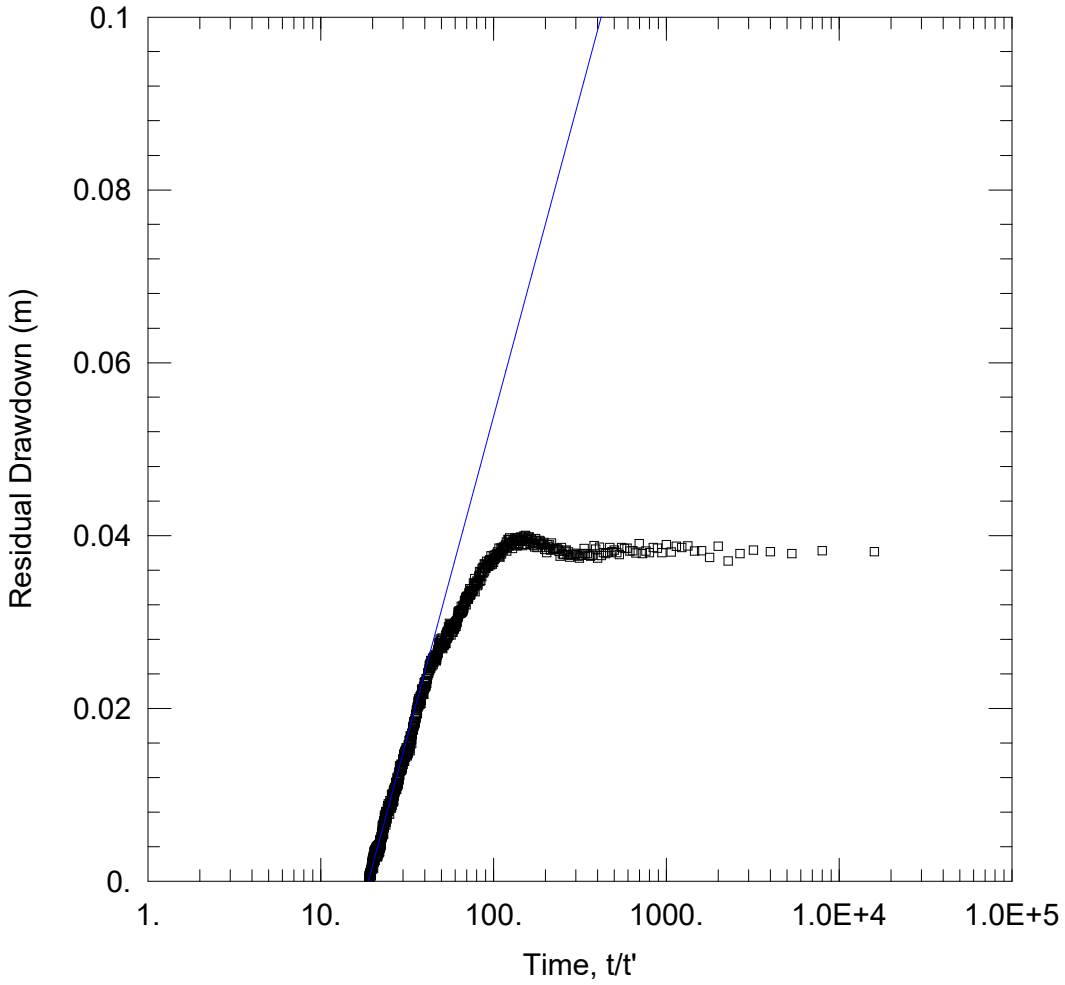
Observation Wells

Well Name	X (m)	Y (m)
VL-21-1068	489887.7	5358229.8

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 5.741E-5 m^2/sec
S = 0.008384
Kz/Kr = 1.
b = 229.9 m



THEIS RECOVERY (VL-21-1068)

Data Set: N:\...\PT_VL1068_Theis_Rec.aqt
Date: 01/20/24 Time: 20:20:34

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

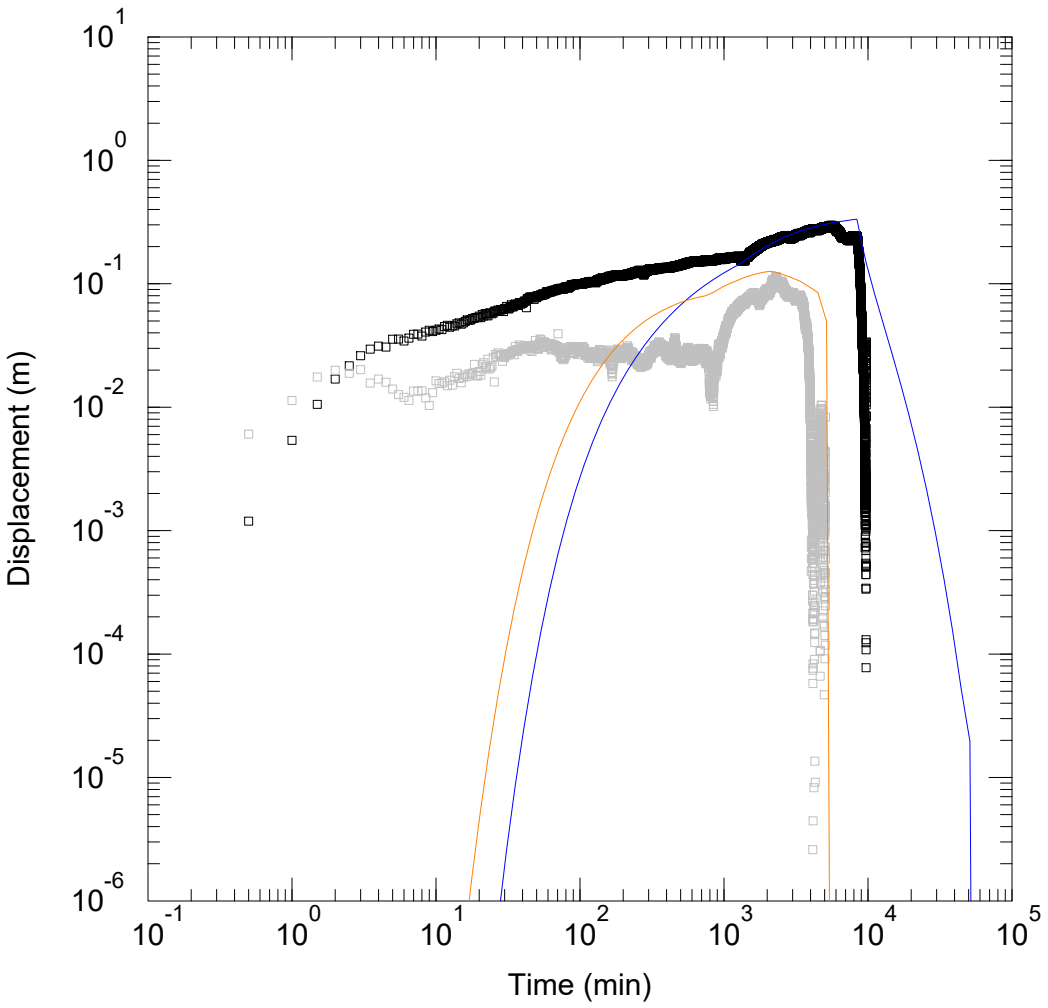
Observation Wells

Well Name	X (m)	Y (m)
VL-21-1068	489887.7	5358229.8

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 0.0001028 m^2/sec S/S' = 18.88



HANTUSH-JACOB (VL-22-1202)

Data Set: N:\...\PT_VL1202_H-J_DD_REV.aqt
Date: 01/21/24 Time: 12:56:07

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

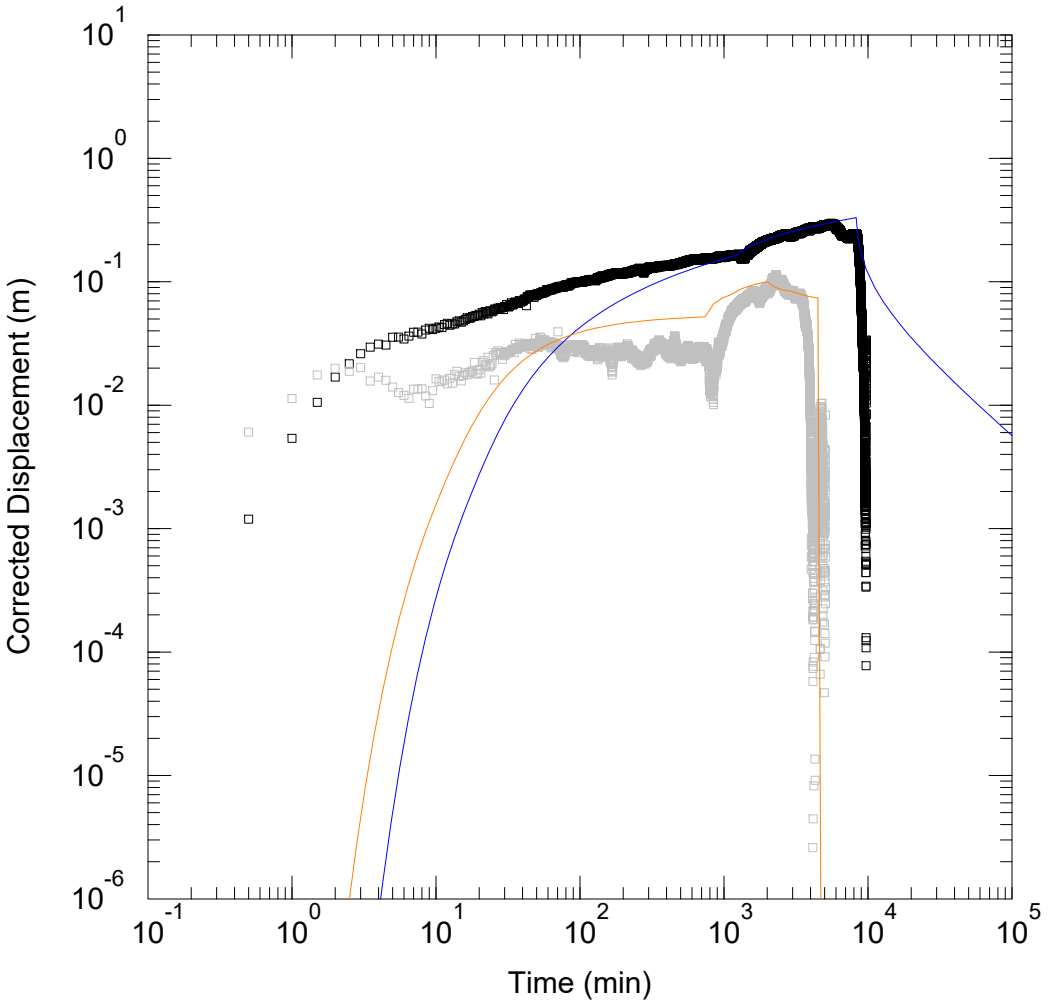
Well Name	X (m)	Y (m)
VL-22-1202	489909.8	5358247.9

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 2.064E-5 m^2/sec
1/B = 0.04726 m^{-1}
b = 229.9 m

S = 0.01707
Kz/Kr = 1.



THEIS (VL-22-1202)

Data Set: N:\...\PT_VL1202_Theis_DD_REV.aqt
Date: 01/21/24 Time: 12:52:21

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

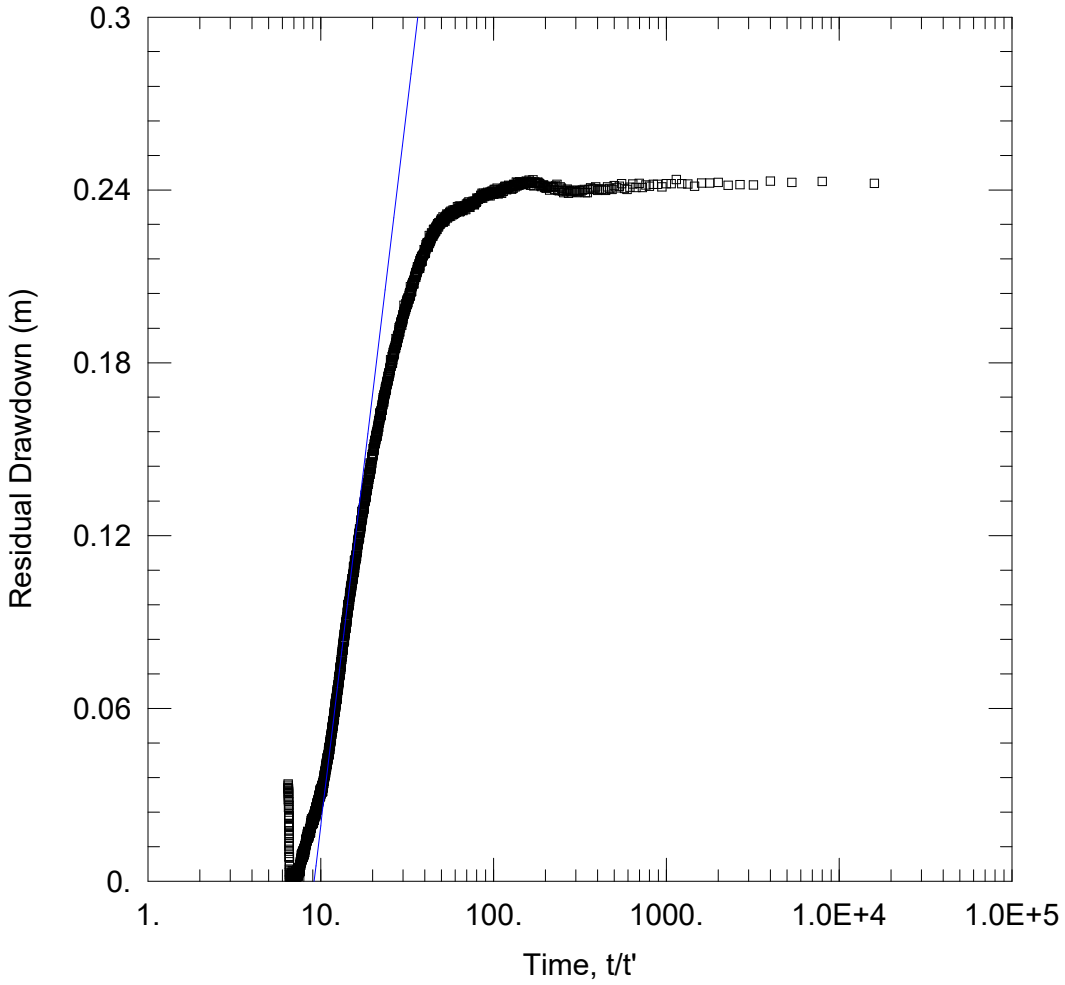
Observation Wells

Well Name	X (m)	Y (m)
VL-22-1202	489909.8	5358247.9

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 4.896E-5 m^2/sec
S = 0.005453
Kz/Kr = 1.
b = 229.9 m



PUMPING TEST 1

Data Set: N:\...\PT_VL1202_Theis_Rec.aqt
Date: 01/20/24 Time: 20:23:10

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Oct 6, 2023

AQUIFER DATA

Saturated Thickness: 229.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

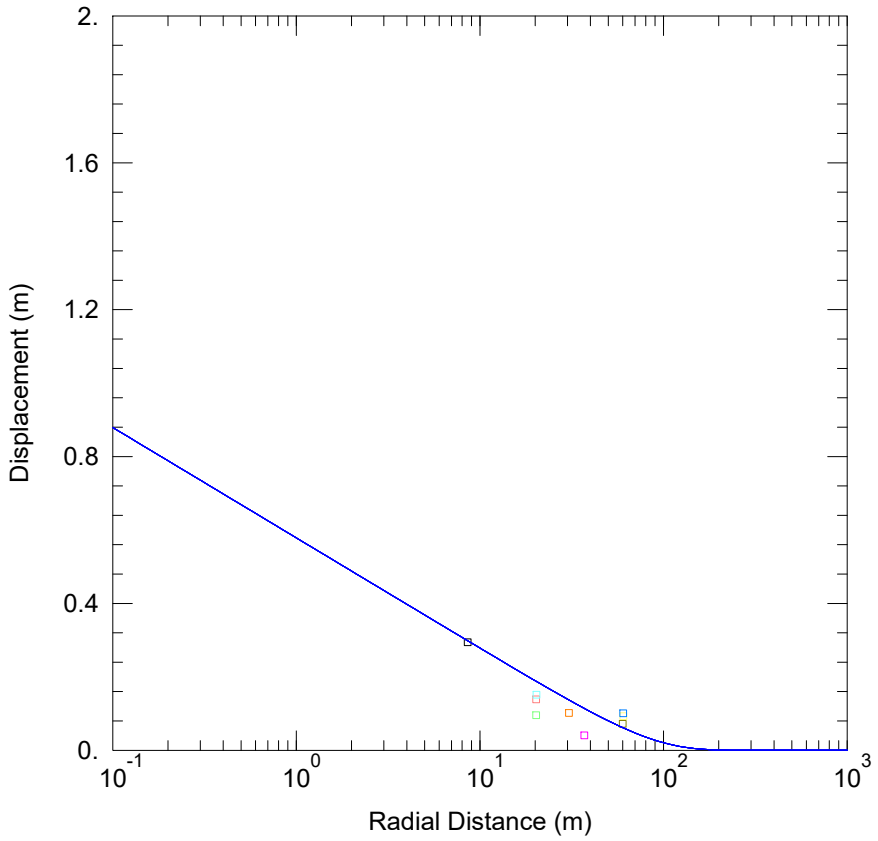
Observation Wells

Well Name	X (m)	Y (m)
VL-22-1202	489909.8	5358247.9

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 1.527E-5 m^2/sec S/S' = 9.157



DISTANCE DRAWDOWN (ALL WELLS - THEIS)

Data Set: N:\...\Pumping Test_AllWells.aqt
Date: 01/21/24 Time: 13:48:55

PROJECT INFORMATION

Company: GEMTEC
Client: Terrane Geoscience
Project: 100107.005
Location: Berry Deposit Area
Test Well: B-PW-01
Test Date: Nov 2, 2023

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
B-PW-01	489905	5358255

Observation Wells

Well Name	X (m)	Y (m)
B-OW-01	489921	5358267.4
B-OW-02	489952.8	5358292
B-OW-03	489917	5358238.7
B-OW-04	489940.5	5358206.7
B-OW-05	489884.8	5358257.3
B-OW-06	489845.1	5358261.9
VL-21-970	489922.7	5358287.5
VL-21-1068	489887.7	5358229.8
VL-22-1202	489909.8	5358247.9

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 5.08E-5 m^2/sec
Kz/Kr = 1.

S = 0.005121
b = 229.9 m

APPENDIX F

Groundwater Quality Analytical Results

Title: **Figure F-1 - Piper Plot of Groundwater Samples from B-PW-01**

Project: Pumping Test Program Berry Deposit
Valentine Gold Project, Marathon Gold Corporation, Valentine Lake, NL

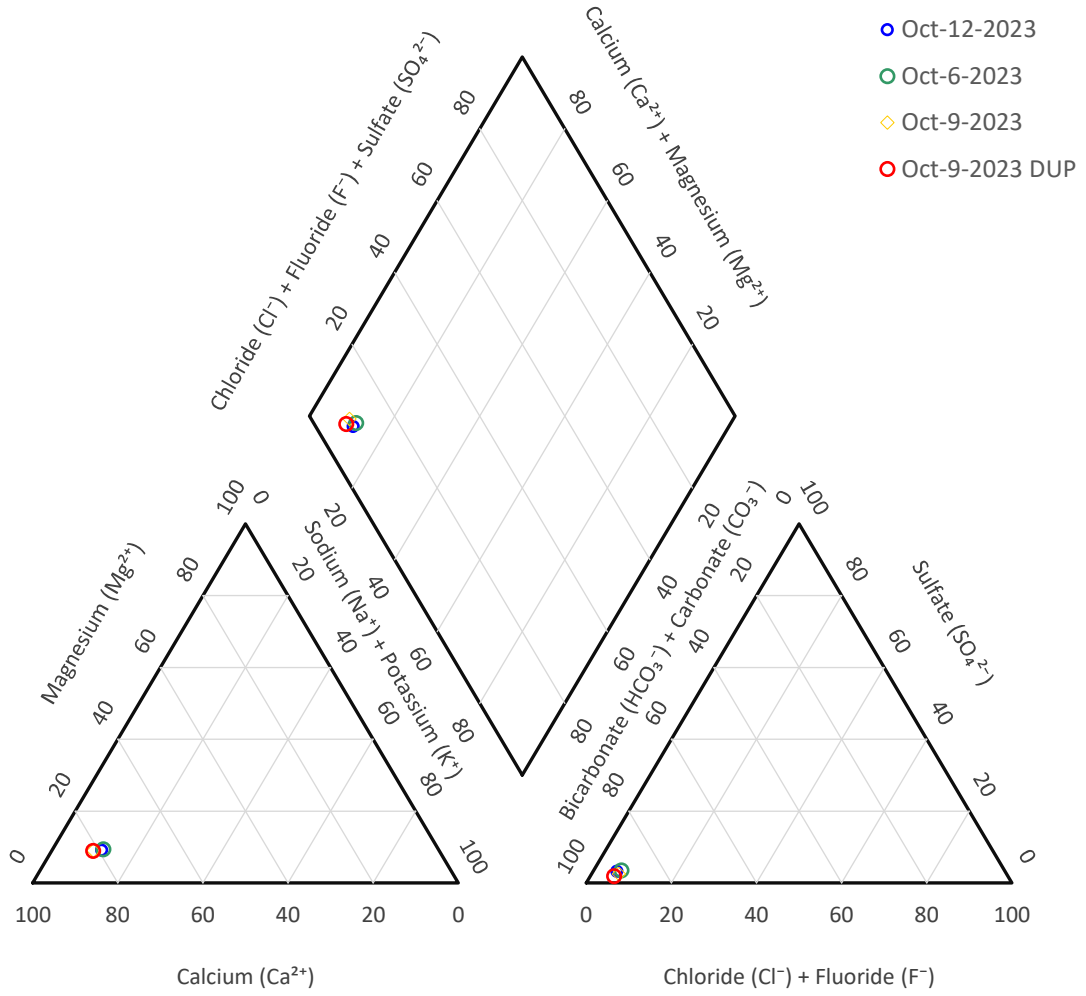


Table F-1: Analytical Results for Inorganic Parameters in Groundwater

Sample Location:	Units	RDL	Guideline	B-PT-01	B-PT-01	B-PT-01	B-PT-SD
Date Sampled:			**CCME FAL[1]**	**10/06/2023**	**10/09/2023**	**10/12/2023**	**10/09/2023**
Field-measured pH[2]			-	6.91	7.33	7.21	7.38
Field-measured Temperature (°C)			-	10	10	10	10
CCME calculated ammonia guideline (mg/L as N)			-	8.47	2.68	2.68	2.68
Inorganics							
pH	-		6.5 - 9.0	6.91	7.33	7.21	7.38
Reactive Silica as SiO2	mg/L	0.5	-	10	13.9	14.4	14.3
Chloride	mg/L	1	120	5	7	6	6
Fluoride	mg/L	0.12	0.12	**0.19**	<0.12	<0.12	<0.12
Sulphate	mg/L	2	-	4	4	5	3
Alkalinity	mg/L	5	-	119	166	164	166
True Color	TCU	5.00	-	12.1	<5.00	<5.00	<5.00
Turbidity	NTU	0.50	-	5.98	1.74	2.42	2.49
Electrical Conductivity	umho/cm	1	-	237	309	304	306
Nitrate + Nitrite as N	mg/L	0.05	-	0.06	0.1	0.09	0.09
Nitrate as N	mg/L	0.05	13	0.06	0.1	0.09	0.09
Nitrite as N	mg/L	0.05	-	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L	0.03	Calculated[2]	<0.03	<0.03	<0.03	<0.03
Ortho-Phosphate as P	mg/L	0.01	-	<0.01	<0.01	<0.01	<0.01
Dissolved Sodium	mg/L	0.1	-	5.5	6.5	7.4	6.2
Dissolved Potassium	mg/L	0.1	-	0.7	0.6	0.5	0.5
Dissolved Calcium	mg/L	0.1	-	34.3	50.3	45.7	47.7
Dissolved Magnesium	mg/L	0.1	-	2.5	3.4	3.2	3.2
Organics							
Total Organic Carbon	mg/L	0.5	-	2.0	1.3	1.2	1.1
Calculated Parameters							
Bicarb. Alkalinity (as CaCO3)	mg/L	5	-	119	166	164	166
Carb. Alkalinity (as CaCO3)	mg/L	10	-	<10	<10	<10	<10
Hydroxide	mg/L	5	-	<5	<5	<5	<5
Calculated TDS	mg/L	1	-	125	172	167	167
Hardness	mg/L	NA	-	95.9	140	127	132
Langelier Index (@20C)	NA	NA	-	-1.08	-0.36	-0.52	-0.33
Langelier Index (@ 4C)	NA	NA	-	-1.4	-0.68	-0.84	-0.65
Saturation pH (@ 20C)	NA	NA	-	7.99	7.69	7.73	7.71
Saturation pH (@ 4C)	NA	NA	-	8.31	8.01	8.05	8.03
Anion Sum	me/L	NA	-	2.61	3.61	3.56	3.56
Cation sum	me/L	NA	-	2.23	3.1	2.89	2.94
% Difference/ Ion Balance	%	NA	-	7.8	7.5	10.4	9.5

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life (freshwater, long-term; 1999 and updates).

2 = The guideline for Ammonia decreases as pH and temperature increase. Field pH and field temperature are used to select the guideline value; field parameters were not collected for the pumping test water sampling programs, and laboratory-measured pH and a conservative assumption of 10 degrees celsius were assumed. Tabulated values were multipled by 0.8224 to convert from mg/L as NH_3 to mg/L as N.

"-" = None established.

RDL = Reported Detection Limit.

NA = Not applicable.

Results that exceed the applicable guideline are bold and shaded.

Table F-2: Analytical Results for Total Metals in Groundwater

Sample Location:	Units	RDL	Guideline	B-PT-01	B-PT-01	B-PT-01	B-PT-SD
Date Sampled:			CCME FAL[1]	10/06/2023	10/09/2023	10/12/2023	10/09/2023
pH				6.91	7.33	7.21	7.38
Hardness (mg/L as CaCO3)				95.9	140	127	132
CCME calculated Aluminum guideline (ug/L)				100	100	100	100
CCME calculated Cadmium guideline (ug/L)				0.15	0.21	0.19	0.20
CCME calculated Copper guideline (ug/L)				2.28	3.15	2.90	3.00
CCME calculated Lead guideline (ug/L)				3.02	4.88	4.31	4.53
CCME calculated Manganese guideline (ug/L)				590	570	660	570
CCME calculated Nickel guideline (ug/L)				92.58	123.43	114.62	118.03
Total Aluminum (Al)	ug/L	5	Calculated [2]	**166**	29	17	25
Total Antimony (Sb)	ug/L	2	–	<2	<2	<2	<2
Total Arsenic (As)	ug/L	2	5	<2	<2	<2	<2
Total Barium (Ba)	ug/L	5	–	10	21	22	19
Total Beryllium (Be)	ug/L	2	–	<2	<2	<2	<2
Total Bismuth (Bi)	ug/L	2	–	<2	<2	<2	<2
Total Boron (B)	ug/L	5	1,500	10	8	6	6
Total Cadmium (Cd)	ug/L	0.09	Calculated [3]	<0.09	<0.09	<0.09	<0.09
Total Chromium (Cr)	ug/L	2	–	<2	<2	<2	<2
Total Cobalt (Co)	ug/L	1	–	<1	<1	<1	<1
Total Copper (Cu)	ug/L	2	Calculated [4]	**28**	<2	**6**	<2
Total Iron (Fe)	ug/L	50	300	**838**	107	<50	100
Total Lead (Pb)	ug/L	0.5	Calculated [5]	**13.1**	0.7	0.5	0.7
Total Manganese (Mn)	ug/L	2	Calculated [6]	118	136	125	126
Total Mercury (Hg)	ug/L	0.026	0.026	<0.026	<0.026	<0.026	<0.026
Total Molybdenum (Mo)	ug/L	2	73	<2	<2	<2	<2
Total Nickel (Ni)	ug/L	2	Calculated [7]	<2	<2	<2	<2
Total Phosphorus (P)	mg/L	0.07	–	2.3	3.16	3.02	2.93
Total Selenium (Se)	ug/L	1	1	<1	<1	<1	<1
Total Silver (Ag)	ug/L	0.1	0.25	<0.1	<0.1	<0.1	<0.1
Total Strontium (Sr)	ug/L	5	–	126	159	185	151
Total Thallium (Tl)	ug/L	0.1	0.8	<0.1	<0.1	<0.1	<0.1
Total Tin (Sn)	ug/L	2	–	<2	<2	<2	24
Total Titanium (Ti)	ug/L	3	–	4	<3	<3	<3
Total Uranium (U)	ug/L	0.2	15	0.4	0.6	0.5	0.6
Total Vanadium (V)	ug/L	2	–	<2	<2	<2	<2
Total Zinc (Zn)	ug/L	5	–	31	6	9	6

Notes:

1 = Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life (freshwater, long-term; 1999 and updates).

2 = Aluminum guideline = 5 µg/L at pH<6.5, or 100 µg/L at pH>=6.5

3 = Cadmium guideline [µg/L] = $10^{0.83[\log(\text{hardness})]-2.46}$, for water hardness between 17 and 280 mg/L as CaCO3; For water hardness<17, guideline -0.04; For water hardness>280, guideline =0.37; For unknown water hardness, guideline = 0.04

4 = Copper guideline [µg/L] = $0.2 * e^{0.8545[\ln(\text{hardness})]-1.465}$, for water hardness between 82 and 180 mg/L as $CaCO_3$; If water hardness is <82, guideline = 2; If water hardness is >180, guideline = 4; If water hardness is unknown, guideline = 2

5 = Lead guideline [µg/L] = $e^{1.273[\ln(\text{hardness})]-4.705}$, for water hardness between 60 and 180 mg/L as $CaCO_3$; If water hardness is less than 60, guideline = 1; If water hardness is greater than 180, guideline = 7; If water hardness is unknown, guideline = 1

6 = Manganese guideline [ug/L] is calculated using the Table "Long-Term CWQG values for dissolved manganese (ug/L)" in Appendix B of the Scientific Criteria Document for the Development of the Canadian Water Quality Guidelines for the Protection of Aquatic Life: Manganese.

7 = Nickel guideline [µg/L] = $e^{0.76[\ln(\text{hardness})]+1.06}$, for water hardness between <60 to 180 mg/L as CaCO3. If water hardness <60 mg/L, guideline = 25 ug/L; For water hardness >180 mg/L, guideline = 150 ug/L. If hardness is unknown, guideline is 25 ug/L.

"-" = None established or guideline not applicable.

RDL = Reported Detection Limit.

Results that exceed an applicable guideline are bolded and shaded.

AGAT Laboratories

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CLIENT NAME: GEMTEC LIMITED
10 Maverick Place
Paradise, NL A1L 1Y8
709722-2275
ATTENTION TO: Carolyn Anstey-Moore
PROJECT: 100107.005
AGAT WORK ORDER: 23K081231
WATER ANALYSIS REVIEWED BY: Kaliegh Cullen, Report Writer
DATE REPORTED: Oct 26, 2023
PAGES (INCLUDING COVER): 11
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (709)747-8573

*Notes

Disclaimer:

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Certificate of Analysis

AGAT WORK ORDER: 23K081231

PROJECT: 100107.005

CLIENT NAME: GEMTEC LIMITED

ATTENTION TO: Carolyn Anstey-Moore

SAMPLING SITE:

SAMPLED BY:

Mercury Analysis in Water (Total)

DATE RECEIVED: 2023-10-16

DATE REPORTED: 2023-10-26

		SAMPLE DESCRIPTION:		B-PT-01	B-PT-01	B-PT-01	B-PT-SD
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		2023-10-06	2023-10-09	2023-10-12	2023-10-09
Parameter	Unit	G / S	RDL	5368727	5368728	5368729	5368730
Total Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Kaleigh Cullen

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 23K081231

PROJECT: 100107.005

CLIENT NAME: GEMTEC LIMITED

ATTENTION TO: Carolyn Anstey-Moore

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-10-16

DATE REPORTED: 2023-10-26

		SAMPLE DESCRIPTION:		B-PT-01	B-PT-01	B-PT-01	B-PT-SD
		SAMPLE TYPE:		Water	Water	Water	Water
		DATE SAMPLED:		2023-10-06	2023-10-09	2023-10-12	2023-10-09
Parameter	Unit	G / S	RDL	5368727	5368728	5368729	5368730
pH				6.91	7.33	7.21	7.38
Reactive Silica as SiO2	mg/L		0.5	10.0	13.9	14.4	14.3
Chloride	mg/L		1	5	7	6	6
Fluoride	mg/L		0.12	0.19	<0.12	<0.12	<0.12
Sulphate	mg/L		2	4	4	5	3
Alkalinity	mg/L		5	119	166	164	166
True Color	TCU		5.00	12.1	<5.00	<5.00	<5.00
Turbidity	NTU		0.50	5.98	1.74	2.42	2.49
Electrical Conductivity	umho/cm		1	237	309	304	306
Nitrate + Nitrite as N	mg/L		0.05	0.06	0.10	0.09	0.09
Nitrate as N	mg/L		0.05	0.06	0.10	0.09	0.09
Nitrite as N	mg/L		0.05	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03	<0.03	<0.03	<0.03
Total Organic Carbon	mg/L		0.5	2.0	1.3	1.2	1.1
Ortho-Phosphate as P	mg/L		0.01	<0.01	<0.01	<0.01	<0.01
Total Sodium	mg/L		0.1	5.5	6.5	7.4	6.2
Total Potassium	mg/L		0.1	0.7	0.6	0.5	0.5
Total Calcium	mg/L		0.1	34.3	50.3	45.7	47.7
Total Magnesium	mg/L		0.1	2.5	3.4	3.2	3.2
Bicarb. Alkalinity (as CaCO3)	mg/L		5	119	166	164	166
Carb. Alkalinity (as CaCO3)	mg/L		10	<10	<10	<10	<10
Hydroxide	mg/L		5	<5	<5	<5	<5
Calculated TDS	mg/L		1	125	172	167	167
Hardness	mg/L			95.9	140	127	132
Langelier Index (@20C)	NA			-1.08	-0.36	-0.52	-0.33
Langelier Index (@ 4C)	NA			-1.40	-0.68	-0.84	-0.65
Saturation pH (@ 20C)	NA			7.99	7.69	7.73	7.71
Saturation pH (@ 4C)	NA			8.31	8.01	8.05	8.03
Anion Sum	me/L			2.61	3.61	3.56	3.56
Cation sum	me/L			2.23	3.10	2.89	2.94

Certified By: Kaleigh Cullen

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Certificate of Analysis

AGAT WORK ORDER: 23K081231

PROJECT: 100107.005

CLIENT NAME: GEMTEC LIMITED

ATTENTION TO: Carolyn Anstey-Moore

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-10-16

DATE REPORTED: 2023-10-26

SAMPLE DESCRIPTION:				B-PT-01	B-PT-01	B-PT-01	B-PT-SD
SAMPLE TYPE:				Water	Water	Water	Water
DATE SAMPLED:				2023-10-06	2023-10-09	2023-10-12	2023-10-09
Parameter	Unit	G / S	RDL	5368727	5368728	5368729	5368730
% Difference/ Ion Balance	%			7.8	7.5	10.4	9.5
Total Aluminum	ug/L		5	166	29	17	25
Total Antimony	ug/L		2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2
Total Barium	ug/L		5	10	21	22	19
Total Beryllium	ug/L		2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2
Total Boron	ug/L		5	10	8	6	6
Total Cadmium	ug/L		0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		2	<2	<2	<2	<2
Total Cobalt	ug/L		1	<1	<1	<1	<1
Total Copper	ug/L		2	28	<2	6	<2
Total Iron	ug/L		50	838	107	<50	100
Total Lead	ug/L		0.5	13.1	0.7	0.5	0.7
Total Manganese	ug/L		2	118	136	125	126
Total Molybdenum	ug/L		2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	<2
Total Phosphorous	mg/L		0.07	2.30	3.16	3.02	2.93
Total Selenium	ug/L		1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	126	159	185	151
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	24
Total Titanium	ug/L		3	4	<3	<3	<3
Total Uranium	ug/L		0.2	0.4	0.6	0.5	0.6
Total Vanadium	ug/L		2	<2	<2	<2	<2
Total Zinc	ug/L		5	31	6	9	6

Certified By: Kaleigh Cullen

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Certificate of Analysis

AGAT WORK ORDER: 23K081231

PROJECT: 100107.005

CLIENT NAME: GEMTEC LIMITED

ATTENTION TO: Carolyn Anstey-Moore

SAMPLING SITE:

SAMPLED BY:

Standard Water Analysis + Total Metals

DATE RECEIVED: 2023-10-16 **DATE REPORTED: 2023-10-26**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5368727-5368728 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

5368729 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result
Ion Balance is biased high, contributing parameters have been confirmed.

5368730 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.
pH has been analyzed past the recommended holding time of 15 minutes from sampling. Field measurement recommended for most accurate result

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Kaleigh Cullen

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Quality Assurance

CLIENT NAME: GEMTEC LIMITED

AGAT WORK ORDER: 23K081231

PROJECT: 100107.005

ATTENTION TO: Carolyn Anstey-Moore

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Oct 26, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Total Metals															
pH	5368678		7.31	7.05	3.6%	<	100%	80%	120%	NA			NA		
Reactive Silica as SiO2	5377828		15.4	15.4	0.0%	< 0.5	107%	80%	120%	105%	80%	120%	100%	80%	120%
Chloride	5363305		<1	<1	NA	< 1	97%	80%	120%	NA	80%	120%	101%	70%	130%
Fluoride	5363305		<0.12	<0.12	NA	< 0.12	96%	80%	120%	NA	80%	120%	99%	70%	130%
Sulphate	5363305		<2	<2	NA	< 2	115%	80%	120%	NA	80%	120%	105%	70%	130%
Alkalinity	5368678		177	176	0.8%	< 5	100%	80%	120%	NA			NA		
True Color	5377828		<5.00	<5.00	NA	< 5	98%	80%	120%	102%	80%	120%	NA		
Turbidity	5365840		166	174	4.7%	< 0.5	96%	80%	120%	NA			NA		
Electrical Conductivity	5368678		559	563	0.7%	< 1	99%	90%	110%	NA			NA		
Nitrate as N	5363305		<0.05	<0.05	NA	< 0.05	103%	80%	120%	NA	80%	120%	95%	70%	130%
Nitrite as N	5363305		<0.05	<0.05	NA	< 0.05	82%	80%	120%	NA	80%	120%	103%	70%	130%
Ammonia as N	5377825		0.07	0.04	NA	< 0.03	101%	80%	120%	101%	80%	120%	100%	70%	130%
Total Organic Carbon	5350276		2.8	2.7	3.2%	< 0.5	91%	80%	120%	NA	80%	120%	97%	80%	120%
Ortho-Phosphate as P	5377828		<0.01	<0.01	NA	< 0.01	97%	80%	120%	101%	80%	120%	103%	80%	120%
Total Sodium	5367163		35.7	35.6	0.2%	< 0.1	96%	80%	120%	86%	80%	120%	NA	70%	130%
Total Potassium	5367163		1.7	1.7	0.4%	<0.1	93%	80%	120%	89%	80%	120%	94%	70%	130%
Total Calcium	5367163		225	223	0.9%	<0.1	92%	80%	120%	87%	80%	120%	NA	70%	130%
Total Magnesium	5367163		8.3	8.3	0.3%	<0.1	95%	80%	120%	90%	80%	120%	113%	70%	130%
Bicarb. Alkalinity (as CaCO3)	5368678		177	176	0.8%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	5368678		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	5368678		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	5367163		12	12	NA	< 5	91%	80%	120%	94%	80%	120%	94%	70%	130%
Total Antimony	5367163		<2	<2	NA	< 2	88%	80%	120%	88%	80%	120%	85%	70%	130%
Total Arsenic	5367163		<2	<2	NA	< 2	92%	80%	120%	86%	80%	120%	87%	70%	130%
Total Barium	5367163		6	7	NA	< 5	90%	80%	120%	86%	80%	120%	86%	70%	130%
Total Beryllium	5367163		<2	<2	NA	< 2	93%	80%	120%	97%	80%	120%	95%	70%	130%
Total Bismuth	5367163		<2	<2	NA	< 2	93%	80%	120%	105%	80%	120%	91%	70%	130%
Total Boron	5367163		60	63	4.9%	< 5	94%	80%	120%	93%	80%	120%	114%	70%	130%
Total Cadmium	5367163		<0.09	<0.09	NA	< 0.09	91%	80%	120%	88%	80%	120%	84%	70%	130%
Total Chromium	5367163		<2	<2	NA	< 1	93%	80%	120%	85%	80%	120%	87%	70%	130%
Total Cobalt	5367163		<1	<1	NA	< 1	93%	80%	120%	87%	80%	120%	86%	70%	130%
Total Copper	5367163		<2	<2	NA	< 1	95%	80%	120%	88%	80%	120%	86%	70%	130%
Total Iron	5367163		<50	<50	NA	< 50	92%	80%	120%	88%	80%	120%	88%	70%	130%
Total Lead	5367163		<0.5	<0.5	NA	< 0.5	91%	80%	120%	86%	80%	120%	88%	70%	130%
Total Manganese	5367163		<2	<2	NA	< 2	93%	80%	120%	88%	80%	120%	88%	70%	130%
Total Molybdenum	5367163		3	3	NA	< 2	89%	80%	120%	83%	80%	120%	86%	70%	130%
Total Nickel	5367163		<2	<2	NA	< 2	98%	80%	120%	92%	80%	120%	86%	70%	130%
Total Phosphorous	5367163		3.13	3.24	3.4%	< 0.02	89%	80%	120%	86%	80%	120%	NA	70%	130%
Total Selenium	5367163		1	1	NA	< 1	92%	80%	120%	91%	80%	120%	86%	70%	130%

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Quality Assurance

CLIENT NAME: GEMTEC LIMITED

AGAT WORK ORDER: 23K081231

PROJECT: 100107.005

ATTENTION TO: Carolyn Anstey-Moore

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Oct 26, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Silver	5367163		<0.1	<0.1	NA	< 0.1	93%	80%	120%	85%	80%	120%	82%	70%	130%
Total Strontium	5367163		1520	1520	0.1%	< 5	92%	80%	120%	89%	80%	120%	NA	70%	130%
Total Thallium	5367163		<0.1	<0.1	NA	< 0.1	91%	80%	120%	86%	80%	120%	87%	70%	130%
Total Tin	5367163		<2	<2	NA	< 2	88%	80%	120%	86%	80%	120%	86%	70%	130%
Total Titanium	5367163		<3	<3	NA	< 2	89%	80%	120%	87%	80%	120%	90%	70%	130%
Total Uranium	5367163		7.0	7.1	0.6%	< 0.2	91%	80%	120%	84%	80%	120%	89%	70%	130%
Total Vanadium	5367163		<2	<2	NA	< 2	91%	80%	120%	76%	80%	120%	87%	70%	130%
Total Zinc	5367163		6	<5	NA	< 5	92%	80%	120%	92%	80%	120%	87%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

Mercury Analysis in Water (Total)

Total Mercury	5369449		<0.026	<0.026	NA	< 0.026	101%	80%	120%	NA	80%	120%	110%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: Kaleigh Cullen

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QC Exceedance

CLIENT NAME: GEMTEC LIMITED

AGAT WORK ORDER: 23K081231

PROJECT: 100107.005

ATTENTION TO: Carolyn Anstey-Moore

RPT Date: Oct 26, 2023		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Standard Water Analysis + Total Metals										
Total Vanadium		91%	80%	120%	76%	80%	120%	87%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.
More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

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Method Summary

CLIENT NAME: GEMTEC LIMITED

AGAT WORK ORDER: 23K081231

PROJECT: 100107.005

ATTENTION TO: Carolyn Anstey-Moore

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Mercury	MET-121-6107	SM 3112 B	CV/AA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6001	SM 2130 B	PC TITRATE
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Total Organic Carbon	INOR-121-6026	SM 5310 B	TOC ANALYZER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Method Summary

CLIENT NAME: GEMTEC LIMITED

AGAT WORK ORDER: 23K081231

PROJECT: 100107.005

ATTENTION TO: Carolyn Anstey-Moore

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

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Chain of Custody Record

Laboratory Use Only
Arrival Condition: ☐ Good ☐ Poor (see notes)
Arrival Temperature: 3.5, 5.6, 5.2
Hold Time:
AGAT Job Number: 23K081231
Notes:

Report Information
Company: GEMTEC Consulting Engineers and Scientists Ltd.
Contact: Carolyn Anstey-Moore
Address: 19 Dundee Ave.
Mount Pearl, NL, A1N 4R6
Phone: 709-693-9171 Fax:
Client Project #: 100107.005
AGAT Quotation:
Please Note: If quotation number is not provided client will be billed full price for analysis.

Report Information (Please print):
1. Name: Carolyn Anstey-Moore
Email: carolyn.anstey-moore@gemtec.ca
2. Name:
Email:

Report Format
☐ Single Sample per page
☑ Multiple Samples per page
☑ Excel Format Included
☐ Export

Turnaround Time Required (TAT)
Regular TAT ☑ 5 to 7 working days
Rush TAT ☐ Same day ☐ 1 day ☐ 2 days ☐ 3 days
Date Required:

Invoice To
Same Yes ☐ / No ☐
Company: GEMTEC Consulting Engineers and Scientists Ltd.
Contact: A/P
Address: Head Office Fredericton, NB
191 Doak Rd, E3C 2E6
Phone: Fax:
PO/Credit Card#:

Regulatory Requirements (Check):
☐ List Guidelines on Report ☑ Do not list Guidelines on Report
☐ PIRI
☐ Tier 1 ☐ Res ☐ Pot ☐ Coarse
☐ Tier 2 ☐ Com ☐ N/Pot ☐ Fine
☐ Gas ☐ Fuel ☐ Lube
☐ CCME ☐ CDWQ
☐ Industrial ☐ NL DOEC GW
☐ Commercial
☐ Res/Park ☐ NLDOEC Discharge
☐ Agricultural
☐ FWAL
☐ Sediment ☐ Other

Drinking Water Sample: ☐ Yes ☐ No **Salt Water Sample** ☐ Yes ☐ No
Reg. No.:

Sample Identification	Date/Time Sampled	Sample Matrix	# Containers	Comments – Site/Sample Info. Sample Containment
B-PT-01	Oct 06, 2023	GW	5	
B-PT-01	Oct 09, 2023	GW	5	
B-PT-01	Oct 12, 2023	GW	5	
B-PT-SD	Oct 09/2023	GW	5	

Field Filtered/Preserved	Standard Water Analysis	Metals: ☐ Total ☑ Diss ☐ Available	Mercury	☐ BOD ☐ CBOD	pH	☐ TSS ☐ TDS ☐ VSS	TKN	Total Phosphorus	Phenols	Tier 1: TPH/BTEX (PIRI) ☐ low level	Tier 2: TPH/BTEX Fractionation	CCME-CWS TPH/BTEX	VOC	THM	HAA	PAH	PCB	TC + EC ☐ P/A ☐ MPN ☐ MF	☐ HPC ☐ Pseudomonas	Fecal Coliform ☐ MPN ☐ MF	Other:	Other:	Hazardous (Y/N)
	☑	☑	☑																			
	☑	☑	☑																			
	☑	☑	☑																			
	✓	✓	✓																			

Samples Relinquished By (Print Name):	Date/Time	Samples Received By (Print Name):	Date/Time
Daniel Robbins	Oct 16, 2:00pm		Oct 16/23
Samples Relinquished By (Sign):	Date/Time	Samples Received By (Sign):	Date/Time
		Oct 17/23	1400

Pink Copy - Client
Yellow Copy - AGAT
White Copy- AGAT

Page 1 of 1
N°:

$30 41.41.3.3

experience • knowledge • integrity

civil	civil
geotechnical	géotechnique
environmental	environnement
structural	structures
field services	surveillance de chantier
materials testing	service de laboratoire des matériaux

expérience • connaissance • intégrité