



Tyrone Operations
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August 10, 2021

Certified Mail #7021035000082299945
Return Receipt Requested

Mr. Brad Reid
New Mexico Environment Department
Ground Water Quality Bureau
PO Box 5469
Santa Fe, NM 87502

Dear Mr. Reid:

Re: Submittal of Well Installation Report, Tyrone Mine

Freeport-McMoRan Tyrone Inc. (Tyrone) is pleased to submit the enclosed document entitled *Well Installation Report, December 2020–March 2021, Tyrone Mine* to the New Mexico Environment Department (NMED). Daniel B. Stephens & Associates, Inc. prepared this document on behalf of Tyrone.

If you require additional information or wish to discuss the report in more detail, please contact me at (575) 912-5777.

Sincerely,

A handwritten signature in blue ink that reads 'Lee A. Nix'.

Lee A. Nix
Chief Environmental Engineer
Environmental Services

LAN
Enclosure
20210810-100

Well Installation Report

December 2020–March 2021

Tyrone Mine

Prepared for
Freeport-McMoRan Tyrone Inc.
Tyrone, New Mexico

Prepared by



DBS&A
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July 29, 2021

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1. Introduction

Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this completion report describing drilling and monitor well installation activities conducted between December 2020 and March 2021 at the Freeport-McMoRan Tyrone Inc. (Tyrone) mine located in Grant County, New Mexico. Five groundwater monitor wells, one open exploratory borehole, and one alluvial piezometer were constructed. Figure 1 shows the locations of the wells and borehole. Tables 1 and 2 provide survey information and completion details, respectively. Borehole and well completion logs are provided in Appendix A.

DBS&A contracted with Enviro-Drill, Inc. (Enviro-Drill) to install the alluvial piezometer in Deadman Canyon (designated as 166-2020-01). Tyrone contracted with Major Drilling Group International Inc. (Major Drilling) to install the remaining monitor wells and advance the open exploratory borehole (designated as 396-2021-01). DBS&A provided oversight during drilling and well construction. The wells were constructed in accordance with applicable requirements of Subsection D of 20.6.7.28 NMAC.

Before drilling activities began, Tyrone obtained New Mexico Office of the State Engineer (OSE) well permits for the seven drill sites. Drilling and well installation activities were conducted in accordance with the conditions of the OSE well permits. The drilling contractors submitted well records to OSE at the completion of each drilling campaign. Table 1 provides the OSE well permit number for each drill site.

Section 2 of this completion report provides a summary of each drill site, including a description of each well or borehole and its intended purpose. Sections 3 and 4 describe drilling and well construction activities, including a discussion of borehole characterization work performed by COLOG, Inc. (COLOG) that was used to help determine completion specifications for monitor wells 166-2021-01 and 166-2021-02 and exploratory borehole 396-2021-01. Well development and the results of initial water quality sampling are discussed in Section 5. Section 6 provides conclusions.

2. Borehole and Monitor Well Descriptions

This section provides a description of each well or borehole and its intended use. The drill sites are located at various locations at the Tyrone mine (Figure 1), in different operational discharge

permit (DP) areas, and the wells were completed to different depths and in different geologic units (Appendix A). Descriptions and intended uses are as follows:

- *Well 166-2020-01 (Deadman Canyon Collection System downgradient piezometer):* Tyrone installed well 166-2020-01 immediately downgradient of the Deadman Canyon Collection System to better characterize conditions at the system and to better assess the system's effectiveness at providing containment. The Deadman Canyon Collection System is in Deadman Canyon, downgradient of the 5E Canyon tributary drainage. The system was installed in 2017 and consists of a cutoff wall, quartz-gravel collection trench, and 316-stainless steel standpipe that houses pumps and instrumentation (DBS&A, 2017). This new well will be monitored under DP-166.
- *Well 166-2021-01 (deep groundwater monitor well) and well 166-2021-02 (shallow groundwater monitor well):* Tyrone installed these wells to determine hydrogeologic conditions and regional groundwater quality downgradient of South Rim Pit Lake (DBS&A, 2020) and to satisfy a New Mexico Environment Department (NMED) requirement (NMED, 2020). The groundwater monitor wells were installed southeast and downgradient of South Rim Pit Lake, on the south side of the San Salvador Fault (Figure 1).

Tyrone did not initially intend to install two wells. However, results of COLOG's characterization work (Section 4.1) at the borehole for well 166-2021-01 showed groundwater entering the borehole at two discrete depths: (1) between approximately 45 to 120 feet below ground surface (bgs) and (2) between approximately 410 and 440 feet bgs (Section 4.1). Well 166-2021-02 was completed as a shallow groundwater monitor well to characterize the shallow groundwater observed at the borehole for well 166-2021-01. Well 166-2021-01 was completed as a deep groundwater monitor well. The decision to construct two monitor wells instead of one, as well as decisions on screen placements, were made in consultation with NMED. These two monitor wells will be monitored under DP-166.

- *Well 286-2021-01 (former monitor well P-14 A replacement):* Tyrone installed well 286-2021-01 as a replacement for former regional groundwater monitor well P-14A. On June 24, 2019, monitor well P-14A was destroyed when a semi-truck carrying copper cathodes from the solution extraction/electrowinning (SX/EW) Plant to the front gate experienced brake failure and drove into the well and, ultimately, the No. 3 PLS overflow pond (DBS&A, 2019). Well 286-2021-01 is a regional groundwater monitor well, screened in saturated Gila Conglomerate. Tyrone will monitor this well under DP-286.

- *Exploratory borehole 396-2021-01 and well 396-2021-02 (Emma Groundwater Characterization):* Two boreholes were advanced at the Emma Exploration Prospect to characterize regional groundwater conditions, including depth to water, groundwater flow direction, and water quality. The Emma Exploration Prospect is located south of the Tyrone mine. One borehole was left open with no well constructed (designated as 396-2021-01), and a regional groundwater monitor well was constructed in the other borehole (designated as 396-2021-02).

Exploratory borehole 396-2021-01 is located at the south end of the Emma Exploration Prospect. Groundwater yield at this drill site is low. The borehole remained dry during drilling; however, groundwater was present in the borehole after drilling stopped and the borehole was left open for approximately a week. A monitor well was not constructed in the borehole due to its low yield and because the location where groundwater was entering the borehole was not apparent from the borehole characterization work (Section 4). The upper portion of the borehole is stabilized with approximately 20 feet of steel surface casing (Appendix A). The borehole is expected to remain open given the competency of the Precambrian granite in which the borehole was advanced.

Regional groundwater monitor well 396-2021-02 was installed at the west end of the Emma Exploration Prospect, near the Sprouse-Copeland Fault. The monitor well was placed at this location to form a triangle with exploratory borehole 396-2021-01 and existing monitor well MB-44, located east of the prospect. Hydraulic gradient and groundwater flow direction can be determined from measurement of water levels at the three monitoring locations.

Exploratory borehole 396-2021-01 and monitor well 396-2021-02 will be monitored under DP-396.

- *Well 455-2021-01 (former monitor well GLD-4A replacement):* Well GLD-4A was a regional groundwater monitor well located southeast of the Gettysburg open pit and screened in saturated Tertiary quartz monzonite. The well was eventually mined out and has a very short period of record (1998–1999). Tyrone installed monitor well 455-2021-01 to help define groundwater flow direction between the San Salvador Fault and Sprouse-Copeland Fault, which are regional faults located along the east and south sides of the mine. Well 455-2021-01 is located approximately 500 feet east of the former location of well GLD-4A, and will be monitored under DP-455.

3. Drilling and Well Construction

The wells were installed during two drilling campaigns: (1) December 2020 using Enviro-Drill, and (2) January through March 2020 using Major Drilling. Enviro-Drill installed the shallow alluvial piezometer downgradient of the Deadman Canyon Collection System (designated 166-2020-01). Major Drilling installed the remaining wells. DBS&A provided oversight during both drilling campaigns.

DBS&A field geologists providing oversight described drill cuttings and split-spoon samples. The descriptions include lithology, mineralogy, color, texture, and alteration, as well as observed hydrologic conditions including static water level. Based on the descriptions, field geologists assigned a rock unit designation (e.g., Precambrian granite) to each sample. Lithologic descriptions are included on the well completion logs provided in Appendix A. Photographs taken during drilling and well installation are provided in Appendix B.

Rock and sediment samples were also analyzed in the field for paste electrical conductivity (EC) and paste pH. For each sample, approximately 1 cup of rock or sediment was composited and mixed with 1 cup of deionized water; then the paste EC and pH were measured with a YSI multi-meter. Results of these analyses are included on the well completion logs provided in Appendix A.

All equipment was decontaminated prior to mobilization to the mine. All downhole equipment was decontaminated between boreholes.

3.1 Well 166-2020-01 (Enviro-Drill Campaign)

The borehole for the shallow alluvial piezometer installed downgradient of the Deadman Canyon Collection System was advanced through Quaternary alluvium to the underlying Precambrian granite using the hollow stem auger drilling method. The inside and outside diameters of the hollow stem augers were 4 and 8 inches, respectively. Sediment samples were collected using a split-spoon sampler, allowing the DBS&A field geologist to look for the presence of shallow alluvial groundwater at discrete depths.

After the borehole was advanced, Enviro-Drill constructed well 166-2020-01 within the hollow-stem augers, which were temporarily left in place to stabilize the soft alluvial sediments as the well was constructed. The well screen and casing were suspended at the ground surface while the filter pack and annular seal materials were emplaced. The well was constructed as follows:

- A 2.5-foot-long, 0.010-inch slot, 2-inch-diameter Schedule (SCH) 40 polyvinyl chloride (PVC) screen was placed at the base of the alluvium, immediately above the alluvium-Precambrian granite contact.
- The remaining casing length was constructed of blank, 2-inch-diameter SCH 40 PVC.
- Filter pack consisting of 12/20 silica sand was placed by hand from the bottom of the borehole to 2 feet above the top of the well screen. It was settled by swabbing during emplacement.
- Annular seal consists of $\frac{3}{8}$ -inch bentonite chips to approximately 1.25 feet bgs.
- The remaining annular space to ground surface was sealed with neat cement grout.
- Surface completion consists of an approximately 2-foot stickup with a locking well plug (J-plug) covered by a 4-inch-diameter protective steel riser with a locking cap and a 36-inch-diameter by 0.5-foot-thick concrete well pad.

Table 2 provides well completion information, including screen interval and total depth. The initial depth to water is also reported in the table. Appendix A provides the well 166-2020-01 completion log.

3.2 Other Drilling Sites (Major Drilling Campaign)

Major Drilling advanced boreholes for the other six drilling sites using the reverse circulation drilling method. The boreholes were advanced using minimal water injection (approximately 2 to 5 gallons per minute [gpm]) to facilitate the identification of first groundwater (i.e., depth where groundwater is first encountered). Water injection was needed to help lift drill cutting and suppress dust. The water injection rate may have been greater than 2 to 5 gpm during the advancement of the first two boreholes (i.e., 396-2021-01 and 286-2021-01), as a flow meter was installed and water injection more closely monitored later in the drilling campaign. As drilling advancement reached expected groundwater depths, injected water was air-lifted from the boreholes and the boreholes were allowed to sit for several minutes (and at times a few hours) to see if groundwater entered them, allowing the DBS&A field geologists to routinely monitor for presence of groundwater at discrete depths. After static depths to groundwater (or groundwater production zones) were determined, Major Drilling cleaned and conditioned the boreholes in preparation for well construction.

At each drilling site, 10-inch-diameter steel surface casing was installed to a depth sufficient to seat the casing into competent rock. The surface casings were temporarily set to stabilize the

upper portions of the boreholes and to seal the boreholes with the cutting diverter and establish a reverse circulation system. After the surface casing was set, the remainder of each borehole was advanced using the reverse circulation drilling method with a 9 $\frac{7}{8}$ -inch-diameter downhole hammer bit. The surface casings were removed during well construction, except for at exploratory borehole 396-2021-01. Because a monitor well was not constructed at 396-2021-01, the 10-inch-diameter steel surface casing was left in place to provide borehole stability and access.

Except for exploratory borehole 396-2021-01, a monitor well was constructed in the open borehole immediately after each borehole was drilled. Well screens and casings were suspended at the ground surface as filter packs and annular seal materials were emplaced by tremie pipe. Monitor wells completed to depths less than 300 feet were constructed of 4-inch-diameter SCH 40 PVC, and monitor wells completed to depths greater than 300 feet were constructed of 5-inch-diameter SCH 80 PVC. Additional well construction specifications are as follows:

- 5-foot sumps with threaded PVC end caps.
- 0.020-inch slot PVC screens. Centralizers were placed at the top and bottom of each screen, except for wells 396-2021-02 and 455-2021-01 (Appendix A). Screen lengths vary and were determined based on observed hydrogeologic conditions (Section 3.3).
- Remaining casing lengths were constructed of blank PVC.
- Filter packs consisting of 12/20 silica sand, installed by tremie and settled by swabbing, extend from the bottom of each borehole to a minimum of 5 feet above the top of well screens.
- Well seals consisting of at least 5 feet of $\frac{1}{4}$ -inch coated bentonite pellets were installed by tremie immediately above the filter packs.
- The remaining annular space to approximately 5 feet bgs was sealed with neat cement grout (approximately 5 percent bentonite) or bentonite chips.
- Cement extending from approximately 5 feet bgs to ground surface.
- Surface completion consisting of a 2- to 3-foot-tall stickup with a locking well plug (J-plug) covered by a 10-inch-diameter protective steel riser with a locking cap and a 36-inch by 36-inch by 0.5-foot-thick concrete well pad.

Table 2 provides well completion information, including screen intervals and total depths. The initial depths to water are also reported in the table. Appendix A provides well completion logs.

3.3 Determination of Screen Lengths and Placement

The typical length of monitor well screens at Tyrone is 30 feet, with targeted placement of 5 feet of screen placed above the water table and 25 feet of screen placed below the water table. There are some discrepancies from this typical length and placement due to site-specific hydrogeologic conditions and observed variations in groundwater levels. For instance, greater screen lengths are used at monitor wells installed near the open pits because groundwater levels near the pits tend to decline in response to pit dewatering. The greater screen lengths provide more available drawdown and extend the lives of the wells. Also, shorter screen lengths (i.e., less than 30 feet) may be used for shallow perched zone monitor wells to allow for the construction of sufficiently thick annular seals. These shallow wells tend to be completed to depths near the ground surface, and the saturated thicknesses of the perched groundwater zones are thin (e.g., less than 20 feet).

The Copper Mine Rule stipulates a maximum screen length for water table monitor wells of 20 feet, but allows NMED to approve greater screen lengths based on hydraulic properties of the aquifer, hydrogeologic setting, groundwater level decline, and well depth [20.7.28.D(7)(a) NMAC]. The Copper Mine Rule also stipulates a maximum screen length for confined aquifer monitor wells of 10 feet, but again allows NMED to approve greater screen lengths based on site-specific hydrogeologic conditions. NMED has generally accepted the typical screen length of 30 feet for Tyrone monitor wells, with screens placed across the water table or groundwater production zone. Deviations from this typical length are made in consultation with NMED.

The following summaries describe the determination of screen lengths and placement for the monitor wells installed at Tyrone between December 2020 and March 2021:

- *Well 166-2020-01:* The screen was placed at the base of the alluvium, immediately above the alluvium-Precambrian granite contact. The screen was limited to a length of 2.5 feet to allow for the construction of an annular seal, as the well is only 7.5 feet deep (Appendix A).
- *Wells 166-2021-01 and 166-2021-02:* These two wells are completed with 60-foot screens (Table 2) in Tertiary quartz monzonite (Appendix A). The screen lengths and their placements were determined from the results of borehole characterization work conducted by COLOG (Section 4). The borehole characterization work identified two groundwater production zones—one shallow and the other deep. DBS&A presented results of the

borehole characterization work to Mr. Keith Ehlert and Mr. Brad Reid of NMED during a February 24, 2021 conference call. The decision to install the two monitor wells with 60-foot screens placed across the two groundwater production zones was made in consultation with NMED. Well 166-2021-02 is screened from 60 to 120 feet bgs, across the shallow groundwater production zone. Well 166-2021-01 is the deeper monitor well and is screened from 385 to 445 feet bgs.

- *Well 286-2021-01:* The screen length is the typical 30 feet, with a target placement of 5 feet above the water table and 25 feet below the water table. This monitor well is completed in Quaternary-Tertiary Gila Conglomerate (Appendix A).
- *Exploratory boring 396-2021-01:* A monitor well was not constructed at the 396-2021-01 drilling site. Instead, it was left as an open borehole with the 10-inch-diameter steel surface casing left in place (Appendix A). The decision to leave it as an open borehole was based on borehole characterization work and uncertainty regarding where groundwater was entering the borehole (Section 4). The borehole was advanced in Precambrian granite.
- *Well 396-2021-02:* The screen length is 60 feet, and the well is completed in Precambrian granite. A 60-foot screen length was used rather than a 30-foot length due to the potentially low groundwater yield of the granite and to screen across a greater interval of fractures. During drilling, groundwater was first observed in the borehole for well 396-2021-02 at a depth of approximately 410 feet bgs (Appendix A). The groundwater level rose to a depth of 340 to 350 feet bgs after the borehole was blown dry and allowed to recover. The well is screened from 355 to 415 feet bgs.
- *Well 455-2021-01:* The screen length is 50 feet, and the well is completed in Tertiary quartz monzonite (Appendix A). A 50-foot screen length was used, rather than a 30-foot length, due to the proximity of the well to the Gettysburg open pit, where groundwater is extracted.

4. Borehole Characterization

DBS&A contracted with COLOG to characterize the 166-2021-01 and 396-2021-01 boreholes. The work was conducted on February 11 and 12, 2021 to support the determination of where groundwater is flowing into the boreholes and the subsequent placement of well screens. COLOG's borehole geophysical services consisted of downhole video logging, optical and acoustic televueing, and Corehole Dynamic Flowmeter (CDFM) testing. Appendix C provides COLOG's data and results, including the downhole videos.

DBS&A projected depths to water at the two borehole locations before drilling commenced. These depths were 150 to 250 feet bgs at 166-2021-01 and 150 to 350 feet bgs at 396-2021-01. The projections were based on water levels at existing, nearby wells and were used during drilling in an attempt to identify the depth where groundwater was first encountered at each borehole and to determine subsequent placement of the well screen. As the advancement of the drill bit approached the projected depth to water, DBS&A began to routinely check for the presence of groundwater by having Major Drilling remove any drilling water from the borehole (i.e., blow the borehole dry) and then monitoring for water level recovery using an electronic water level sounder. Both boreholes remained dry during drilling, precluding the determination of first groundwater with this approach. It was only after the boreholes sat for several days with no drilling activity that water entered the boreholes and slowly rose (Appendix D). Borehole characterization was used to help identify groundwater production zones in the fractured rock and assist with the placement of well screens.

Downhole video logging was used to identify fractures and zones of saturation above the water level in each borehole. Saturation appeared as either glistening rock or flowing water. Optical televising is like downhole video logging. It provided a 360-degree image of each borehole. Acoustic televising uses ultrasonic pulses to image a borehole and was used at 166-2021-01 to image the borehole below the water level. CDFM testing was used to determine depths where groundwater either flowed in or out of each borehole.

Borehole characterization results are summarized in the following subsections.

4.1 166-2021-01

COLOG conducted borehole characterization at the 166-2021-01 borehole on February 12, 2021, five days after drilling activities had stopped. When the borehole characterization work was performed, the total borehole depth was 440 feet bgs. The borehole had been drilled to 450 feet bgs, but had filled with approximately 10 feet of slough. Water was present at approximately 404 feet bgs. Before a well was constructed in the borehole, it was drilled to a total depth of 460 feet bgs (Appendix A). When borehole characterization was conducted, the water level in the borehole was still rising at a rate of 8 feet per day (ft/d) (Appendix D). The rate slowed to less than 1 ft/d about a week later.

Two monitor wells instead of one were ultimately installed south of South Rim Pit Lake due to the results of the borehole characterization work conducted at 166-2021-01. The borehole characterization work identified two groundwater production zones: one shallow (45 to 120 feet

bgs) and the other deep (410 and 440 feet bgs). Based on the results of the borehole characterization work and in consultation with NMED, well 166-2021-02 was screened from 60 to 120 feet bgs and well 166-2021-01 was screened from 385 to 445 feet bgs.

Review of the downhole video log and optical televiewer imagery showed some fracturing and groundwater yield above the water level in the borehole. The groundwater yield is low, as only glistening on the borehole wall from approximately 45 to 120 feet bgs was apparent. Water flowing from fractures and down the borehole was not seen. Well 166-2021-02 was constructed to monitor this shallow zone of low groundwater yield.

COLOG used acoustic televiewing and CDFM testing to characterize conditions below the water present in the borehole (below 404 feet bgs). Review of the acoustic televiewer imagery suggested fracturing below the water level (i.e., variations in the travel time and amplitude of the ultrasonic pulses were seen), and CDFM testing showed groundwater entering and exiting the borehole between approximately 411 and 431 feet bgs (Appendix C). The CDFM testing also showed both upward and downward flow, and was repeated at some intervals to confirm results. Well 166-2021-01 was screened from 385 to 445 feet bgs to monitor this deeper zone where groundwater appeared to flow in and out of the borehole.

4.2 396-2021-01

COLOG conducted borehole characterization at the 396-2021-01 borehole on February 11, 2021, approximately 2½ weeks after drilling activities had stopped. When the borehole characterization work was performed, the total borehole depth was approximately 700 feet bgs. The borehole had been drilled to 760 feet bgs, but had filled with approximately 60 feet of slough. Water was present at approximately 331 feet bgs. When the borehole characterization work was performed, the water level in the borehole was still rising at a rate of 16 ft/d (Appendix D).

Review of the downhole video log and optical televiewer imagery showed some fracturing and little groundwater yield above the water level in the borehole. The borehole walls appeared wet (i.e., glistened) below 110 feet bgs; however, water was not seen flowing from fractures and down the borehole wall. Despite the evidence of some water, no obvious contributions of groundwater from fractures above water level were apparent. The granite appears to be very dense and competent based on the downhole video log. The borehole maintains an almost perfect circular shape for much of its length, with little irregularity.

COLOG used downhole video logging, optical televueing, and CDFM testing to characterize conditions below the water present in the borehole (below 331 feet bgs). Acoustic televueing was not conducted because the quality of the downhole video log and optical televueing imagery was sufficient to characterize the borehole within most of the water column. Optical televueing stopped at 664 feet bgs due to water turbidity and poor visibility (Appendix C). Several fracture zones were observed with the optical televueer, and were subsequently targeted for CDFM testing. CDFM testing results were inconclusive (Appendix C). They showed groundwater entering and exiting the borehole at very low rates (i.e., 0.01 to 0.05 gpm)—near the measurement limit of the tool—making it difficult to accurately identify where groundwater was entering the borehole in the 369-foot water column.

Ultimately, the decision was made to not construct a monitor well in the borehole (Appendix A) due to the low groundwater yield and because the location where groundwater was entering the borehole was not clear from the characterization work. On April 13, 2021, the static depth to water at 396-2021-01 was 169.34 feet bgs. This measurement was recorded about 3 months after the borehole was advanced. The associated water level elevation is 5,993.63 feet above mean sea level (feet msl), approximately 40 feet lower than the water level recorded at 2020-04-Emma (a wireline piezometer located within the Emma Exploration Prospect) and approximately 180 feet higher than the water level recorded at existing monitor well MB-44, located 0.6 mile to the northeast.

5. Well Development and Initial Water Quality Sampling

The monitor wells were developed by bailing, or swabbing and air-lifting, until produced water contained little to no sand and consistent (minimum three consecutive measured values within 10 percent) field parameter (EC, temperature, and pH) measurements were achieved. Table 3 reports final field parameter measurements recorded at the end of development at each monitor well. The table also provides the development approach that was used at each well. Because a well was not constructed in the 396-2021-01 borehole, development was not conducted at this location.

Enviro-Drill developed monitor well 166-2020-01 using a bailer. Major Drilling conducted development at monitor well 286-2021-01. They swabbed the well screen and air-lifted water

from the well. The other monitor wells were developed by TL Enterprise Well Drilling and Pump Services, who used a bailer to clean and purge the wells.

After well development, water quality samples were collected from the new monitor wells and the 396-2021-01 borehole. Water quality samples were not collected from wells 166-2020-01 and 166-2021-01. Well 166-2021-01 only yielded a small amount of water before going dry. The samples were submitted to SVL Analytical, Inc. in Kellogg, Idaho for analysis of major ions and metals.

Water quality analytical results are summarized in Table 4, with comparison to the groundwater quality standards specified in 20.6.2.3103 NMAC (Section 3103 standards). Complete laboratory reports are provided in Appendix E. Results for the collected samples are summarized as follows:

- 166-2021-02: Results exceeded Section 3103 standards for manganese, sulfate, and total dissolved solids (TDS).
- 286-2021-01: Results exceeded Section 3103 standards for manganese, sulfate, and TDS.
- 396-2021-01: Results exceeded Section 3103 standards for fluoride, sulfate, TDS, and a number of metals (arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, and nickel).
- 396-2021-02: All detected constituent concentrations were below Section 3103 standards.
- 455-2021-01: Results exceeded Section 3103 standards for manganese, sulfate, and TDS.

6. Conclusion

This report documents drilling and monitor well installation activities conducted at Tyrone between December 2020 and March 2021, including details of borehole characterization work performed at the 166-2021-01 and 396-2021-01 drill sites. A total of seven boreholes were advanced, and monitor wells were constructed in six of the seven boreholes. A monitor well was not constructed at 396-2021-01 due to low groundwater yield and uncertainty regarding the depth where groundwater was entering the borehole. Instead, 396-2021-01 was left as an open borehole with the 10-inch-diameter steel surface casing left in place. The monitor wells were completed to different depths, in different geologic units, and to satisfy various permit

conditions at Tyrone. The monitor wells and the 396-2021-01 exploratory borehole will be monitored in accordance with the discharge permits to which they have been assigned.

References

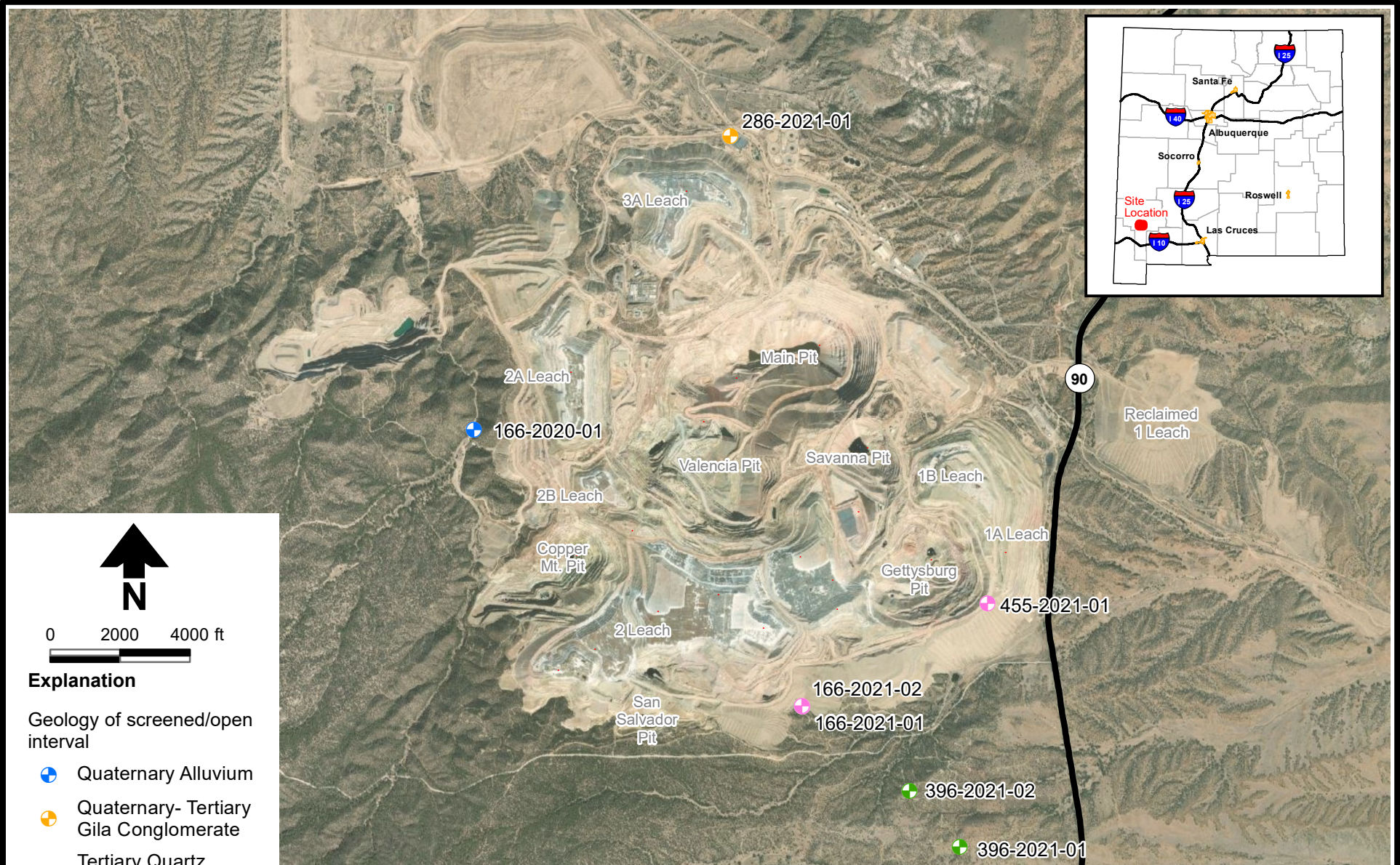
Daniel B. Stephens & Associates, Inc. (DBS&A). 2017. Letter from John Ayarbe to Don Vernon, Freeport-McMoRan Tyrone Inc. regarding Tyrone Mine Deadman Canyon cutoff wall and groundwater collection system. October 4, 2017.

DBS&A. 2019. *Semiannual monitoring report, DP-286, January 1 through June 30, 2019*. Prepared for Freeport-McMoRan Tyrone Inc., Tyrone, New Mexico. March 27, 2020.

DBS&A. 2020. *Corrective action plan for the release of pregnant leach solution into the South Rim Pit, Tyrone Mine, DP-166*. Prepared for Freeport-McMoRan Tyrone Inc., Tyrone, New Mexico. March 27, 2020.

New Mexico Environment Department (NMED). 2020. Letter from Rebecca Roose to Lee Nix, Freeport-McMoRan Tyrone Inc., regarding Approval of corrective action plan, DP-166, release of pregnant leach solution into the South Rim Pit, Freeport-McMoRan Tyrone Mine. June 30, 2020.

Figure



Source: Maxar, 10/25/2019



**TYRONE MINE
Borehole and Monitor Well Locations**

Tables

Table 1. Borehole and Monitor Well Survey Information

Designation	OSE Permit No.	Completion Date	Tyrone Mine Coordinates (feet)		Coordinates (Degrees, Minutes, Seconds) ^a		Ground Surface Elevation (feet msl)	Top of Casing Elevation (feet msl)
			Northing	Easting	Latitude	Longitude		
166-2020-01	GSF-4301-POD176	12/10/2020	11,986.65	2,956.85	32° 38' 41.3"N	108° 23' 53.1"W	5,947.88	5,949.52
166-2021-01	M-10584-POD32	3/01/2021	4,051.10	12,377.69	32° 37' 21.4"N	108° 22' 4.4"W	6,239.76	6,242.03
166-2021-02	M-10584-POD36	3/03/2021	4,057.20	12,368.75	32° 37' 21.5"N	108° 22' 4.5"W	6,239.84	6,242.53
286-2021-01	GSF-4301-POD181	2/02/2021	20,389.89	10,307.62	32° 40' 3.3"N	108° 22' 25.7"W	5,672.61	5,674.85
396-2021-01	M-10584-POD34	1/24/2021	18.23	16,879.37	32° 36' 40.9"N	108° 21' 12.6"W	6,160.62	6,162.97
396-2021-02	M-10584-POD35	2/24/2021	1,626.05	15,439.22	32° 36' 57.0"N	108° 21' 29.1"W	6,278.42	6,280.53
455-2021-01	M-10584-POD33	2/13/2021	6,992.25	17,679.13	32° 37' 49.7"N	108° 21' 1.9"W	6,253.08	6,255.83

^a Geographic Coordinate System: World Geodetic System, 1984

OSE = Office of the State Engineer

msl = Above mean sea level

Table 2. Borehole and Monitor Well Completion Information

Designation	Casing Material and Diameter	Screen Interval (feet bgs)		Total Borehole Depth (feet bgs)	Total Well Depth (feet bgs)	Depth to Water (feet btoc)	Date of Depth to Water Measurement
		Top	Bottom				
166-2020-01	2-inch SCH 40 PVC	5	7.5	10	7.5	6.35	12/10/2020
166-2021-01	5-inch SCH 80 PVC	385	445	460	450	392.84	3/04/2021
166-2021-02	4-inch SCH 40 PVC	60	120	130	125	22.60	3/11/2021
286-2021-01	4-inch SCH 40 PVC	125	155	167	160	129.70	2/07/2021
396-2021-01 ^a	Steel surface casing to ~20 feet bgs	9 $\frac{7}{8}$ -inch open borehole		181.5	—	176.89	3/04/2021
396-2021-02	5-inch SCH 80 PVC	355	415	435	420	324.00	3/04/2021
455-2021-01	5-inch SCH 80 PVC	512	562	585	567	522.11	3/02/2021

^a Open borehole; a monitor well was not constructed.

bgs = Below ground surface

btoc = Below top of casing

Table 3. Final Well Development Field Parameter Measurements

Well	Date	Purge Method	Electrical Conductivity (µmhos/cm @ 25°C)	pH	Temperature (°C)	Final Appearance	Total Volume Removed (gallons)
166-2020-01	12/10/2020	Bailer	9,001	3.41	19.1	Clear	—
166-2021-01	5/21/2021	Bailer	1,222	7.84	22.9	Thick brown	7 (bailed dry)
166-2021-02	5/21/2021	Bailer	1,710	8.60	18.2	Hazy tan	170
286-2021-01	2/3/2021 and 5/19/2021	Swabbing/air-lifting of water/bailer	1,710	6.43	18.1	Clear	125
396-2021-01 ^a	5/21/2021	Pump	1,827	6.54	19.8	Clear	800
396-2021-02	5/18/2021	Bailer	887	7.45	20.7	Hazy red	500
455-2021-01	5/19/2021	Bailer	1,609	6.83	21.1	Hazy red	350

Note: Field parameters measured at completion of well development.

^a Borehole was not developed because a monitor well was not constructed. Total volume removed is the water extracted during a pumping test.

µmhos/cm = Micromhos per centimeter

Table 4. Initial Water Quality Sampling Results
Page 1 of 2

Analyte	Concentration (mg/L)							
	Section 3103 Standard	166-2020-01	166-2021-01	166-2021-02 (5/21/2021)	286-2021-01 (5/19/2021)	396-2021-01 (5/21/2021)	396-2021-02 (5/18/2021)	455-2021-01 (5/19/2021)
Alkalinity, total (as CaCO ₃)	NS	—	—	101	144	120	234	122
Aluminum, dissolved	5.0	—	—	<0.080	<0.080	1.03	<0.080	<0.080
Arsenic, dissolved	0.01	—	—	<0.025	<0.025	1.05	<0.025	<0.025
Bicarbonate (as CaCO ₃)	NS	—	—	101	144	120	234	122
Cadmium, dissolved	0.005	—	—	<0.0020	<0.0020	1.00	<0.0020	<0.0020
Calcium, dissolved	NS	—	—	352	341	303	121	349
Carbonate (as CaCO ₃)	NS	—	—	<1.0	<1.0	<1.0	<1.0	<1.0
Chloride	250	—	—	72.0	NR	33.5	40.6	55.0
Chromium, dissolved	0.05	—	—	<0.0060	<0.0060	0.994	<0.0060	<0.0060
Cobalt, dissolved	0.05	—	—	<0.0060	<0.0060	0.980	<0.0060	<0.0060
Copper, dissolved	1.0	—	—	<0.0100	0.0353	1.06	<0.0100	0.0402
Fluoride	1.6	—	—	0.924	0.796	3.09	0.398	0.485
Iron, dissolved	1.0	—	—	<0.100	<0.100	10.1	<0.100	<0.100
Lead, dissolved	0.015	—	—	<0.0075	<0.0075	0.991	<0.0075	<0.0075
Magnesium, dissolved	NS	—	—	42.3	47.9	85.5	18.1	50.4
Manganese, dissolved	0.2	—	—	0.563	0.780	3.84	0.175	0.806
Nickel, dissolved	0.2	—	—	<0.0100	<0.0100	0.979	<0.0100	<0.0100
Potassium, dissolved	NS	—	—	8.25	8.25	29.2	3.65	8.88

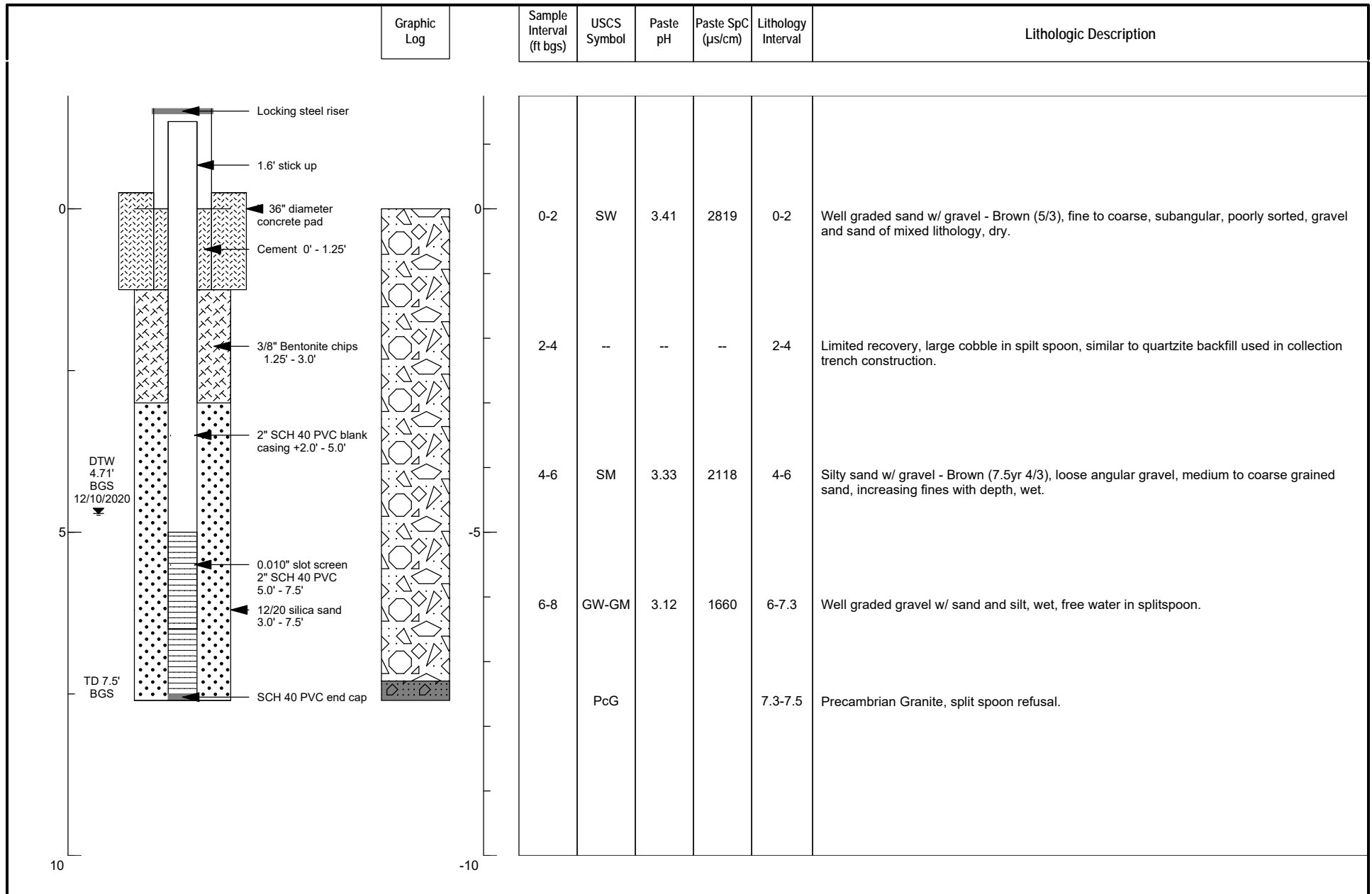
Bold indicates that value exceeds the Section 3103 standard (20.6.2.3103 NMAC).
 mg/L = Milligrams per liter — = Well was dry; no sample collected
 NS = No standard NR = Not reported

Table 4. Initial Water Quality Sampling Results
Page 2 of 2

Analyte	Concentration (mg/L)							
	Section 3103 Standard	166-2020-01	166-2021-01	166-2021-02 (5/21/2021)	286-2021-01 (5/19/2021)	396-2021-01 (5/21/2021)	396-2021-02 (5/18/2021)	455-2021-01 (5/19/2021)
Sodium, dissolved	NS	—	—	79.0	44.8	133	59.0	47.2
Sulfate	600	—	—	1,060	1,020	1,120	191	840
Total dissolved solids	1,000	—	—	2,140	1,590	1,850	646	1,410
Zinc, dissolved	10	—	—	<0.0100	0.0544	1.08	<0.0100	0.0642

Bold indicates that value exceeds the Section 3103 standard (20.6.2.3103 NMAC).
 mg/L = Milligrams per liter — = Well was dry; no sample collected
 NS = No standard NR = Not reported

Appendix A
Borehole and
Well Completion
Logs



Geologist: M. Zbrozek
 Driller: Enviro-Drill, Inc.
 Date completed: 12/10/2020

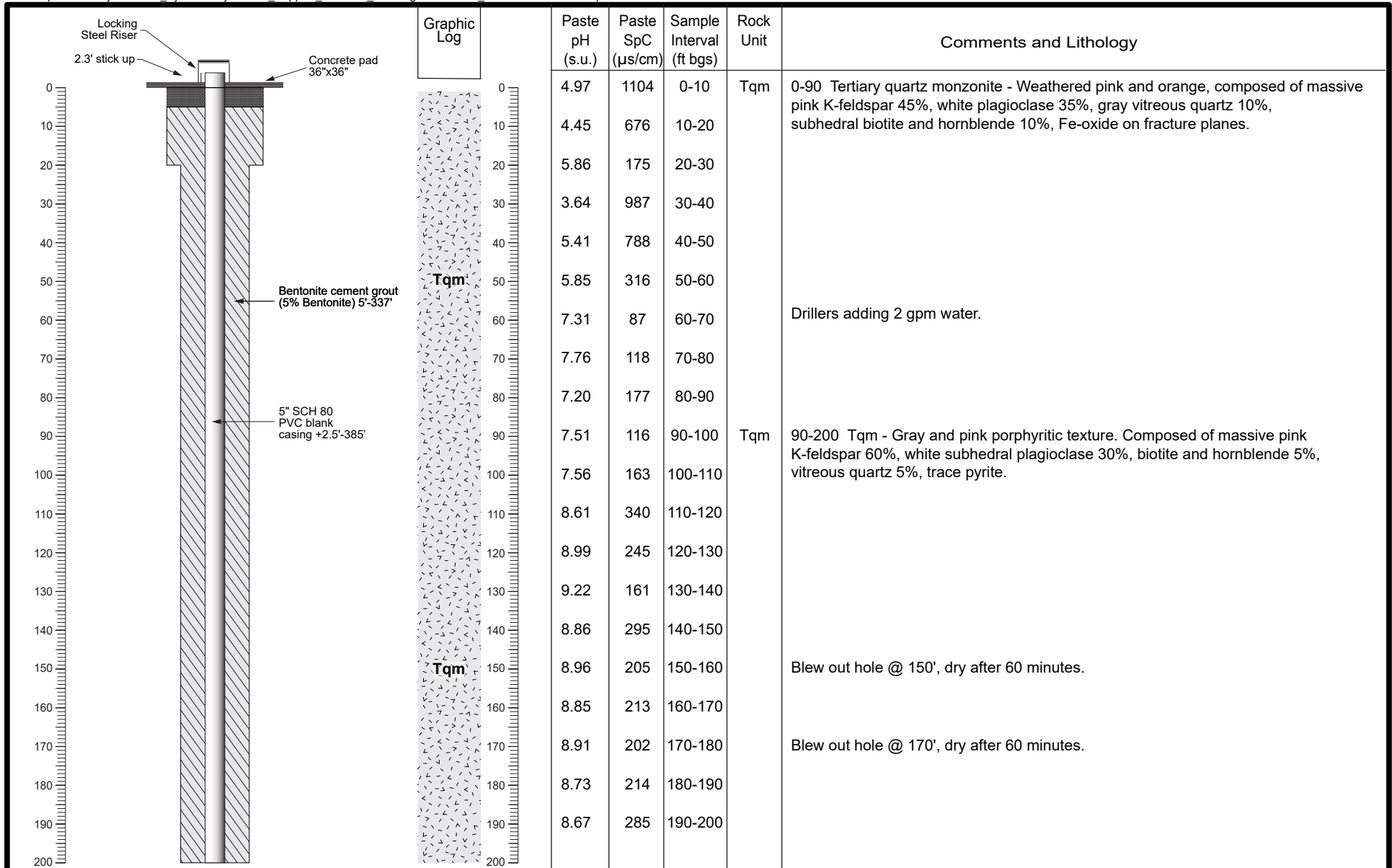
Drilling method: Hollow stem auger
 Bit diameter: 8" O.D. - 4" I.D.
 Sampling method: Split Spoon 2' x 1.5" I.D.

Northing: 11986.65'
 Easting: 2956.85'
 Elevation: 5,949.52 ft msl (top of casing)



Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.
 (3) Split spoon hammer weight - 140 lbs.

TYRONE MINE
Monitor Well 166-2020-01



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 03/01/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 4051.10'
 Easting: 12377.69'
 Elevation: 6242.03' msl (top of casing)

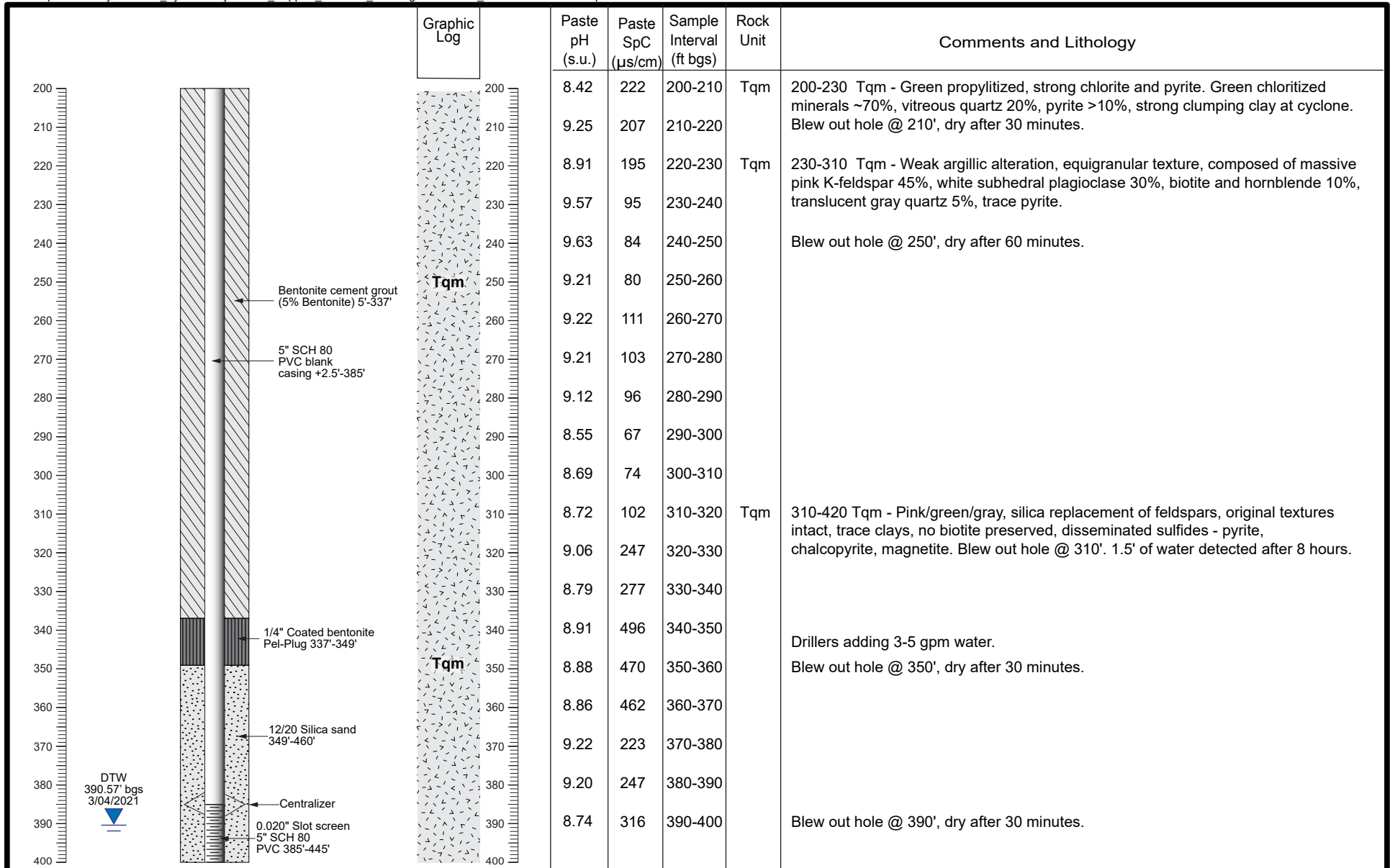


TYRONE MINE
 Well 166-2021-01



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 7/26/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 03/01/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 4051.10'
 Easting: 12377.69'
 Elevation: 6242.03' msl (top of casing)

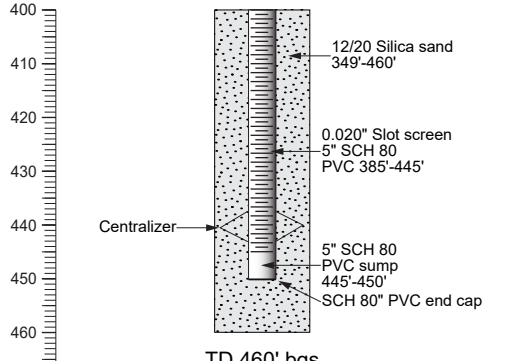



TYRONE MINE
 Well 166-2021-01



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Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.

Graphic Log		Paste pH (s.u.)	Paste SpC (µs/cm)	Sample Interval (ft bgs)	Rock Unit	Comments and Lithology
 <p>TD 460' bgs</p>	 <p>Tqm</p>	9.14	190	400-410		Blew out hole @ 410', dry after 5 hours.
		7.87	54	410-420		
		8.58	25	420-430	Tqm	420-460 Tqm - Grey to greenish grey w/ some reddish brown, increasing subhedral biotite, quartz grains, plagioclase, subhedral K-feldspars, disseminated sulfides. Drillers adding 3-5 gpm water.
		8.14	24	430-440		
		8.26	50	440-450		Water detected at 439.15' after 24 hours. Water detected at 429.50' after 48 hours.
		--	--	450-460		Blew out hole @ 450', water detected at 430.20'. Recovered to 389.70' measured 15 days after the borehole was advanced (2/22/21).

Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 03/01/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 4051.10'
 Easting: 12377.69'
 Elevation: 6242.03' msl (top of casing)

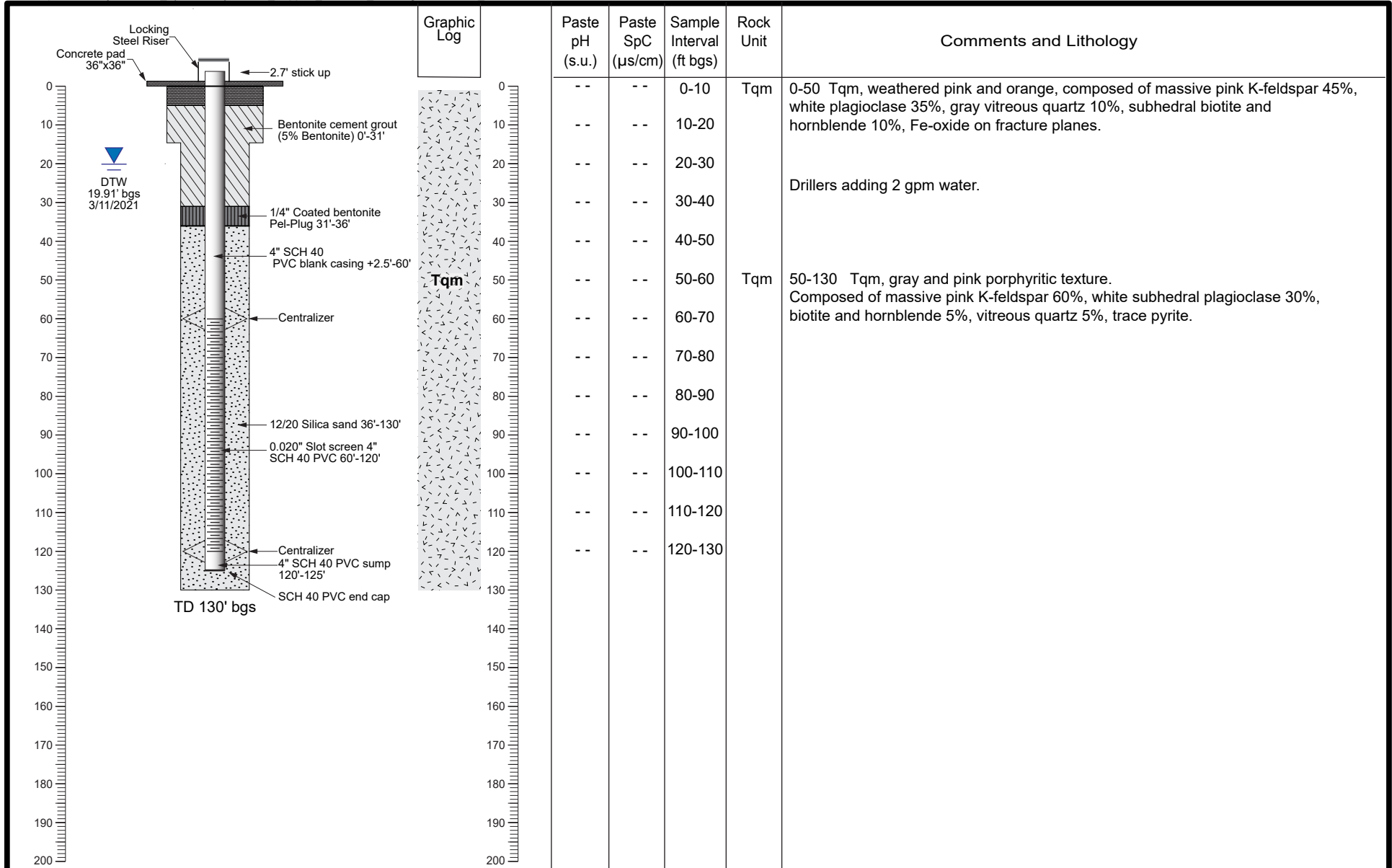


TYRONE MINE
 Well 166-2021-01



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 7/26/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 03/03/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 4057.20'
 Easting: 12368.75'
 Elevation: 6242.53' msl (top of casing)

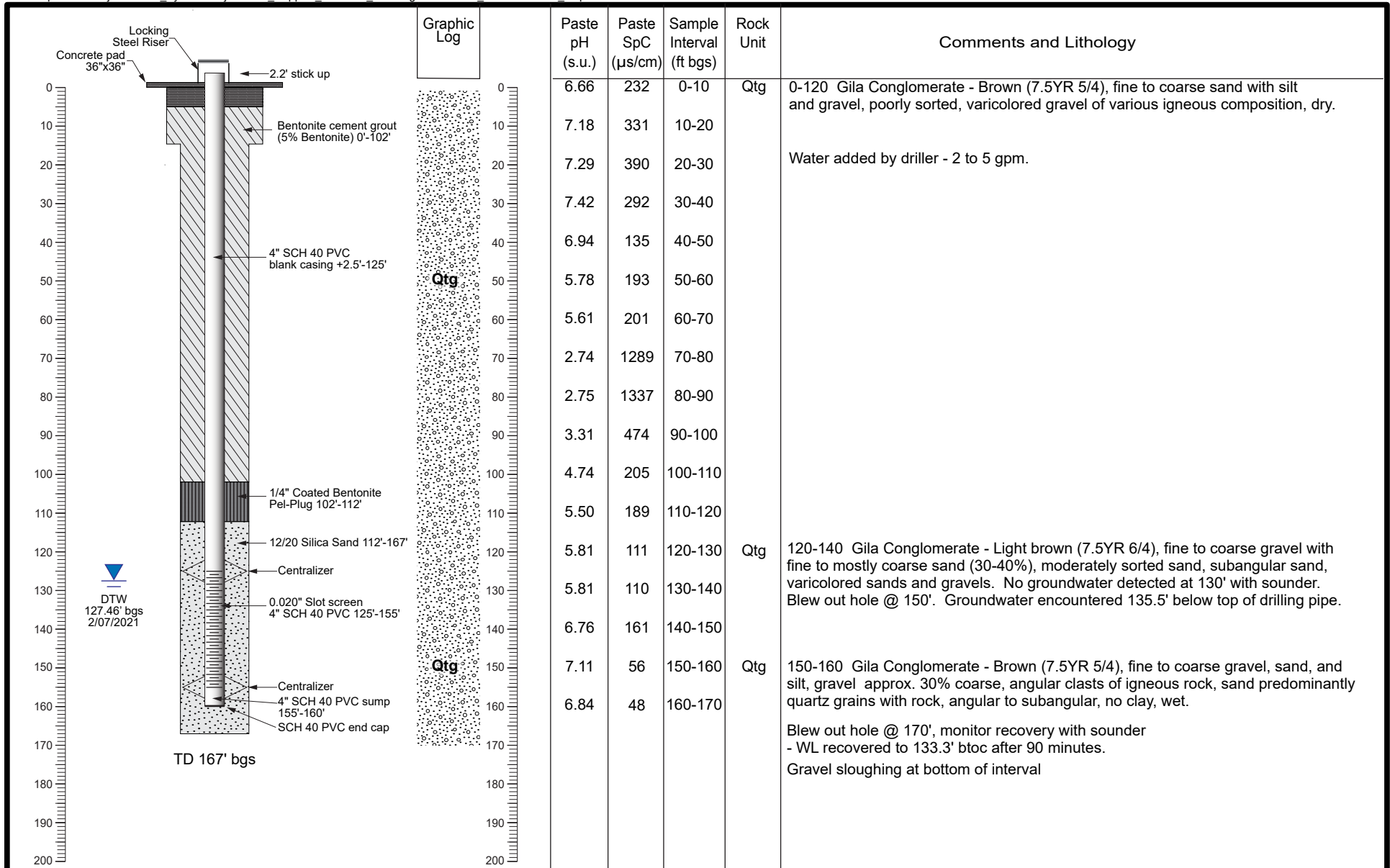


TYRONE MINE
 Well 166-2021-02



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 7/28/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 2/2/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 20389.89'
 Easting: 10307.62'
 Elevation: 5674.85' msl (top of casing)

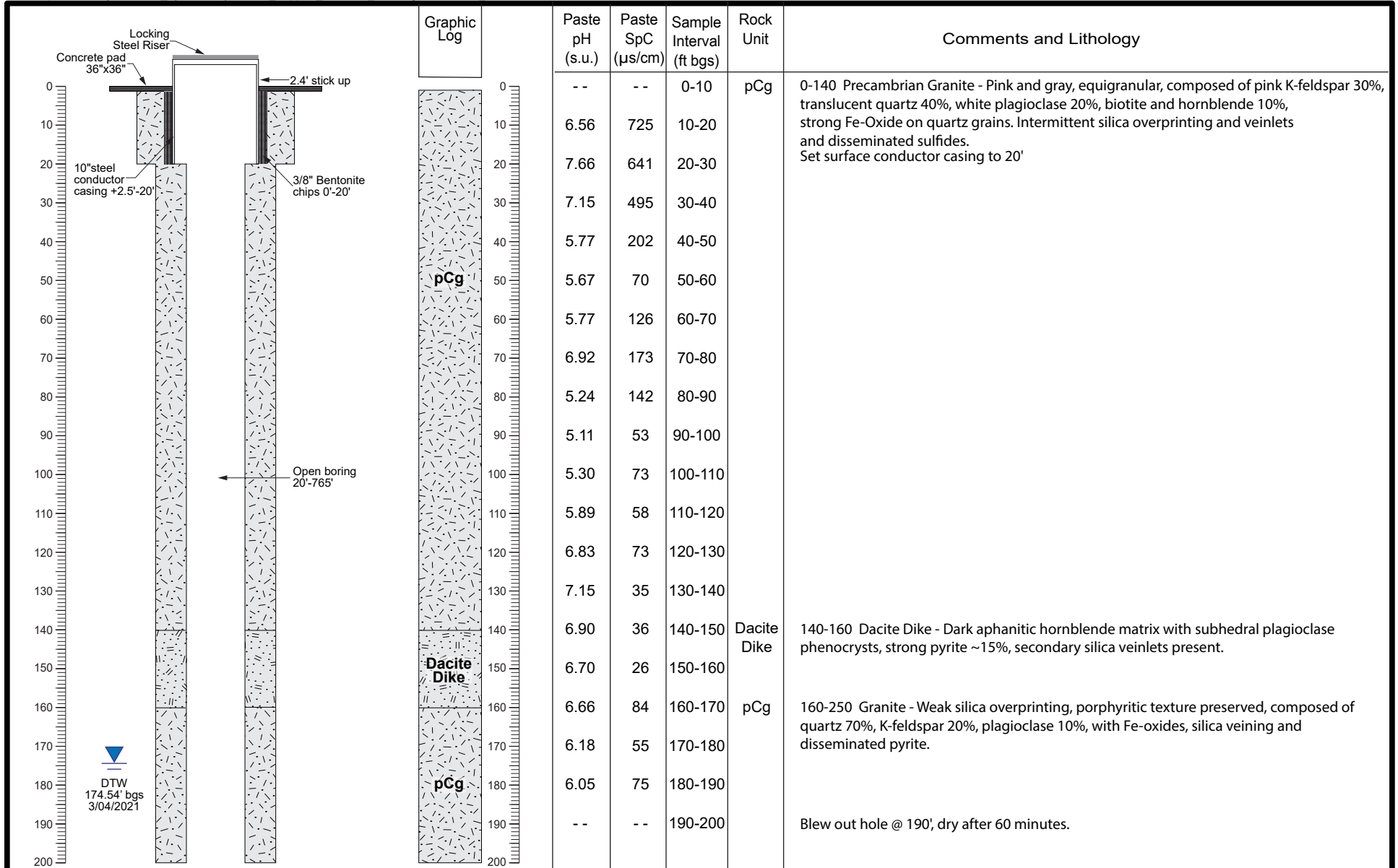


TYRONE MINE
 Well 286-2021-01



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Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 01/24/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 18.23'
 Easting: 16879.37'
 Elevation: 6162.97' msl (top of casing)



TYRONE MINE
 Well 396-2021-01



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 7/26/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.

Graphic Log		Paste pH (s.u.)	Paste SpC (µs/cm)	Sample Interval (ft bgs)	Rock Unit	Comments and Lithology	
	<p>200</p> <p>210</p> <p>220</p> <p>230</p> <p>240</p> <p>250</p> <p>260</p> <p>270</p> <p>280</p> <p>290</p> <p>300</p> <p>310</p> <p>320</p> <p>330</p> <p>340</p> <p>350</p> <p>360</p> <p>370</p> <p>380</p> <p>390</p> <p>400</p>	6.25	74	200-210	pCg	250-480 Granite - Equigranular, weakly silicified, gray green, anhedral frosted quartz 40-50%, K-feldspar 20%, Plagioclase 20%, some chlorite and clay replacement of plagioclase, sulfides common. Blew out hole @ 250', dry after 90 minutes.	
		6.47	64	210-220			Blew out hole @ 210', dry after 60 minutes.
		6.65	18	220-230			
		6.40	115	230-240			Blew out hole @ 230', dry after 60 minutes.
		6.78	140	240-250			
		8.07	103	250-260			
		8.02	123	260-270			
		6.29	191	270-280			
		5.97	87	280-290			
		6.68	74	290-300			
		7.15	89	300-310			Blew out hole @ 310', dry after 120 minutes.
		7.40	29	310-320			
		8.17	31	320-330			
		8.09	102	330-340			
		8.24	175	340-350			Blew out hole @ 340', drillers trip out of hole. Trace water detected at bottom, determined to be added water.
		8.41	107	350-360			
		7.81	194	360-370			
		8.66	34	370-380			
		8.61	84	380-390			
		8.45	81	390-400			Blew out hole @ 390', dry after 60 minutes.

Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 01/24/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 18.23'
 Easting: 16879.37'
 Elevation: 6162.97' msl (top of casing)



TYRONE MINE
 Well 396-2021-01



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 7/26/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.

Graphic Log		Paste pH (s.u.)	Paste SpC (µs/cm)	Sample Interval (ft bgs)	Rock Unit	Comments and Lithology	
		6.96	67	400-410	pCg	Blew out hole @ 410', drillers trip out of hole. Trace water detected at bottom, determined to be added water. Blew out hole @ 450', dry after 60 minutes. 480-765 Granite - Gray/green with weak silica overprinting, equigranular, quartz 40%, pink K-feldspar 30%, plagioclase 30%, disseminated black sulfide minerals, chalcopyrite common. Driller trip out of hole to change tooling, dry after 4 hours. Blew out hole @ 550', dry after 120 minutes. Blew out hole @ 590', dry after 60 minutes.	
		410	7.75	160			410-420
		420	7.95	124			420-430
		430	8.46	115			430-440
		440	8.89	105			440-450
		450	8.71	94			450-460
		460	8.96	126			460-470
		470	9.09	72			470-480
		480	8.72	81			480-490
		490	9.52	52			490-500
		500	8.95	187			500-510
		510	8.14	182			510-520
		520	8.68	184			520-530
		530	8.72	92			530-540
		540	9.36	94			540-550
550	9.24	124	550-560				
560	9.15	124	560-570				
570	9.30	72	570-580				
580	8.90	90	580-590				
590	9.05	89	590-600				

Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 01/24/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 18.23'
 Easting: 16879.37'
 Elevation: 6162.97' msl (top of casing)

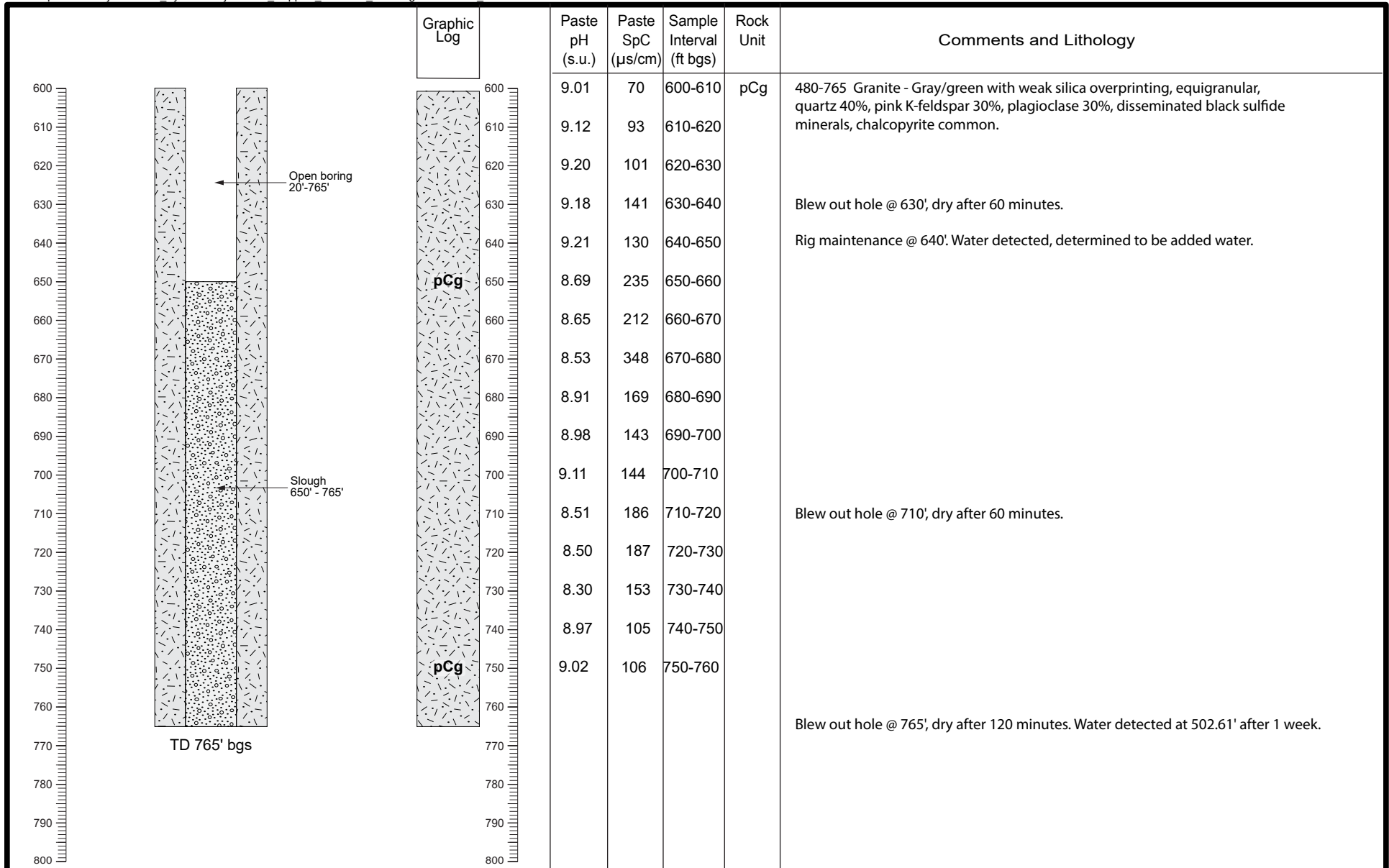


TYRONE MINE
 Well 396-2021-01



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 7/26/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 01/24/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 18.23'
 Easting: 16879.37'
 Elevation: 6162.97' msl (top of casing)

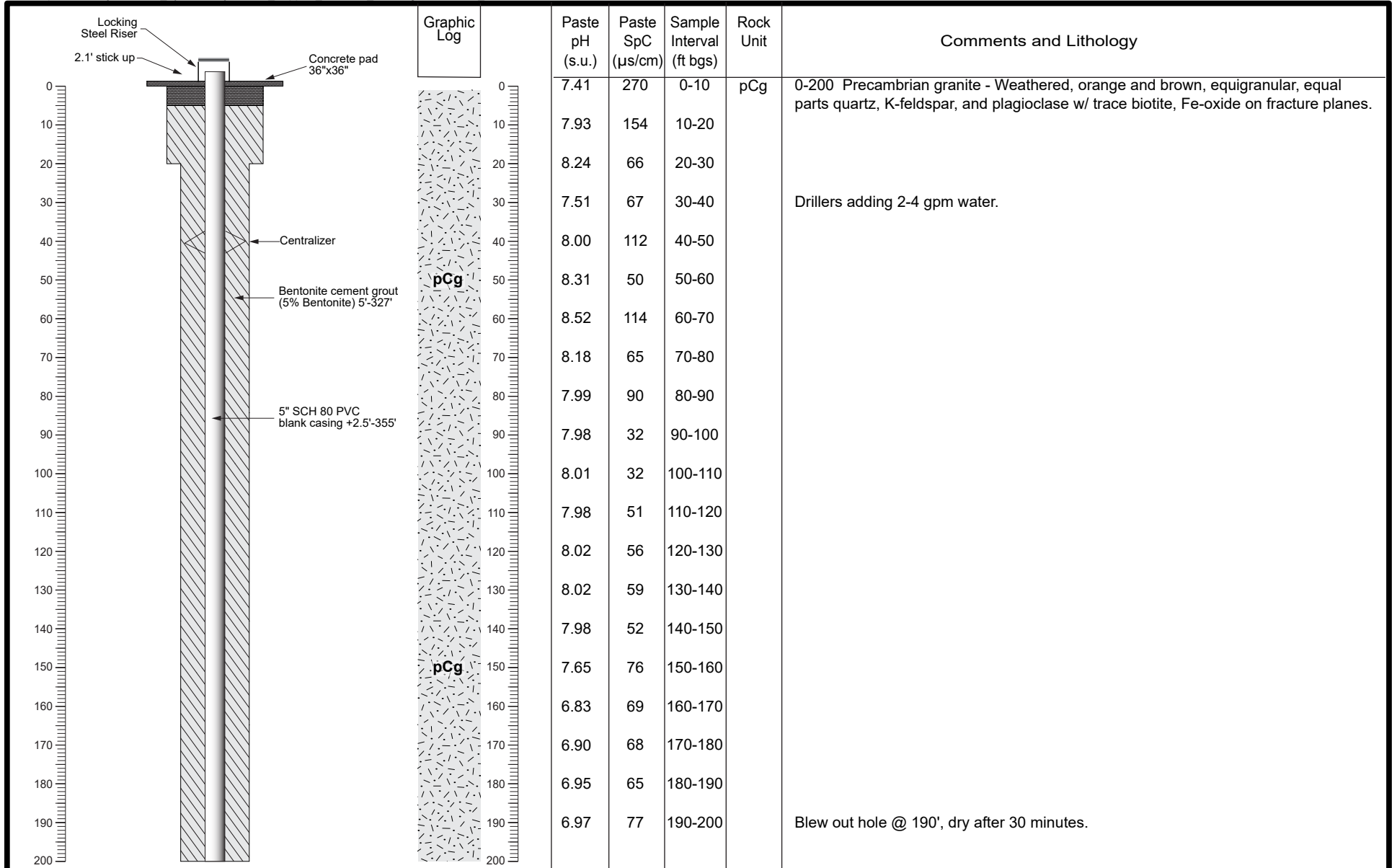


TYRONE MINE
 Well 396-2021-01



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 7/26/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 2/25/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 1626.05'
 Easting: 15439.22'
 Elevation: 6280.53' msl (top of casing)

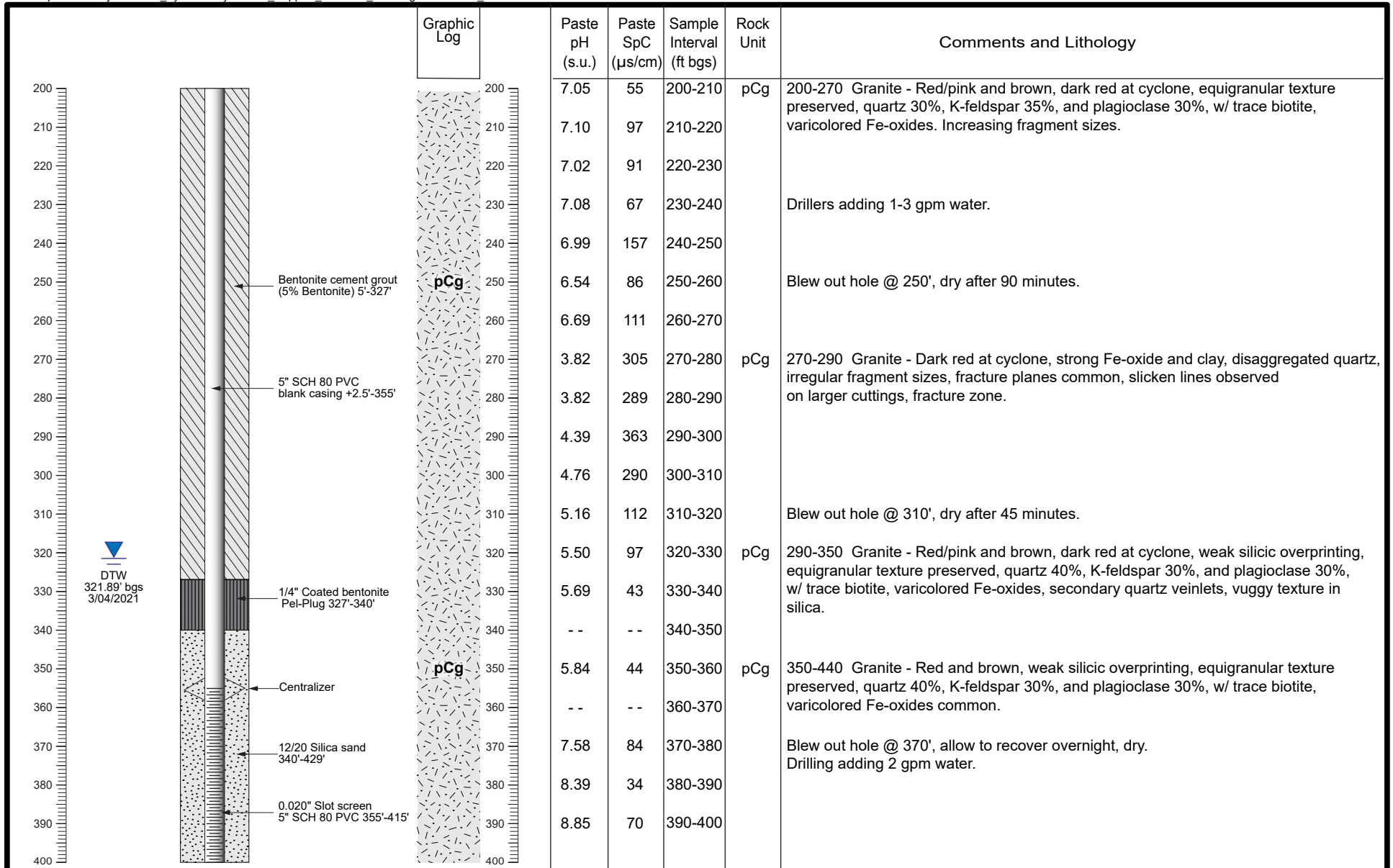


TYRONE MINE
 Well 396-2021-02



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 7/28/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 2/25/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 1626.05'
 Easting: 15439.22'
 Elevation: 6280.53' msl (top of casing)

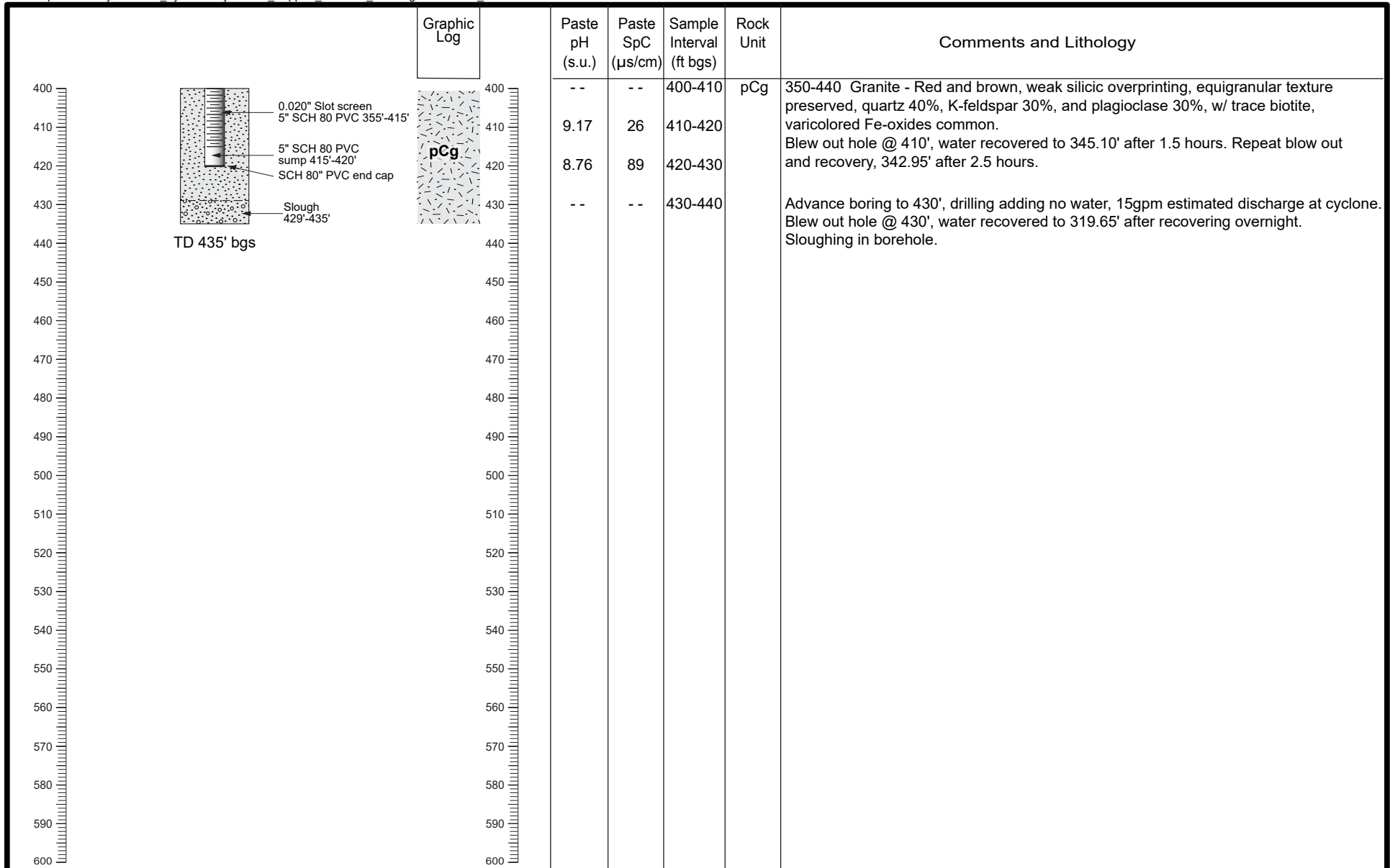


TYRONE MINE
 Well 396-2021-02



DBS&A
 Daniel B. Stephens & Associates, Inc.
 7/28/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 2/25/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 1626.05'
 Easting: 15439.22'
 Elevation: 6280.53' msl (top of casing)

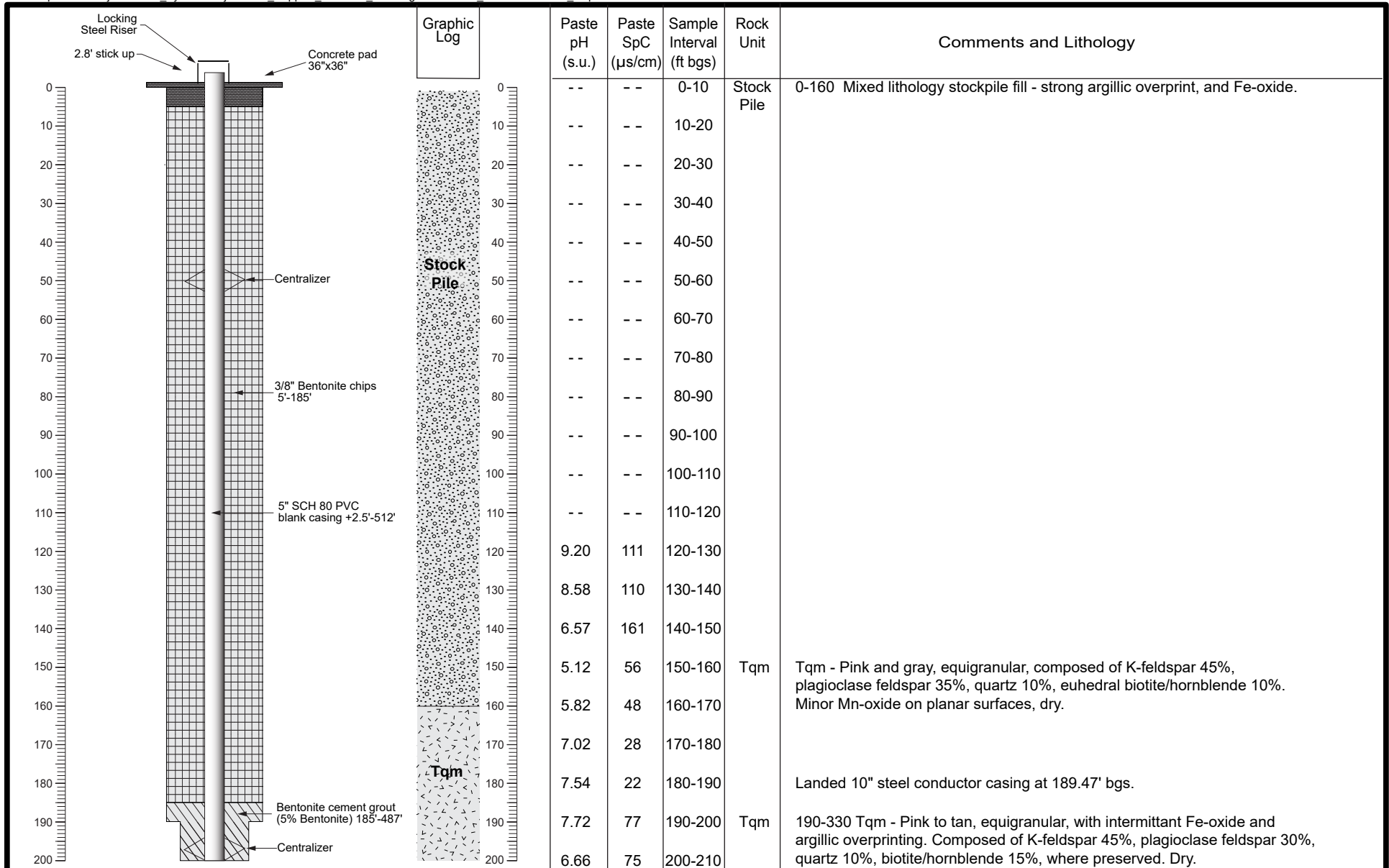


TYRONE MINE
 Well 396-2021-02



DBS & A
 Daniel B. Stephens & Associates, Inc.
 7/28/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 02/13/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 6992.25'
 Easting: 17679.13'
 Elevation: 6255.83' msl (top of casing)



TYRONE MINE
 Well 455-2021-01



DBS&A
 Daniel B. Stephens & Associates, Inc.
 7/26/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.

Graphic Log		Paste pH (s.u.)	Paste SpC (µs/cm)	Sample Interval (ft bgs)	Rock Unit	Comments and Lithology
<p>Bentonite cement grout (5% Bentonite) 185'-487'</p> <p>5" SCH 80 PVC blank casing +2.5'-512'</p> <p>Centralizer</p>	200	6.66	75	200-210	Tqm	190-330 Tqm - Pink to tan, equigranular, with intermittent Fe-oxide and argillic overprinting. Composed of K-feldspar 45%, plagioclase feldspar 30%, quartz 10%, where preserved. Dry. Weak silica overprinting, clumping Fe-oxide rich clays.
	210	5.94	83	210-220		
	220	5.70	45	220-230		
	230	5.45	52	230-240		
	240	5.26	66	240-250		
	250	5.13	53	250-260		
	260	5.43	54	260-270		
	270	5.41	30	270-280		
	280	5.44	31	280-290		
	290	5.67	72	290-300		
	300	--	--	300-310	Tqm	330-480 Tqm - Strong Fe-oxide, at cyclone. Pink and gray, composed of K-feldspar 40%, plagioclase 40%, translucent quartz 5%, biotite/hornblende 10%, where preserved. Dry.
	310	5.59	32	310-320		
	320	5.84	34	320-330		
	330	5.79	29	330-340		
	340	5.98	16	340-350		
	350	5.97	24	350-360		
	360	5.93	32	360-370		
370	5.90	37	370-380			
380	5.81	38	380-390			
390	5.65	44	390-400			
400	--	--	400-410			

Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 02/13/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 6992.25'
 Easting: 17679.13'
 Elevation: 6255.83' msl (top of casing)

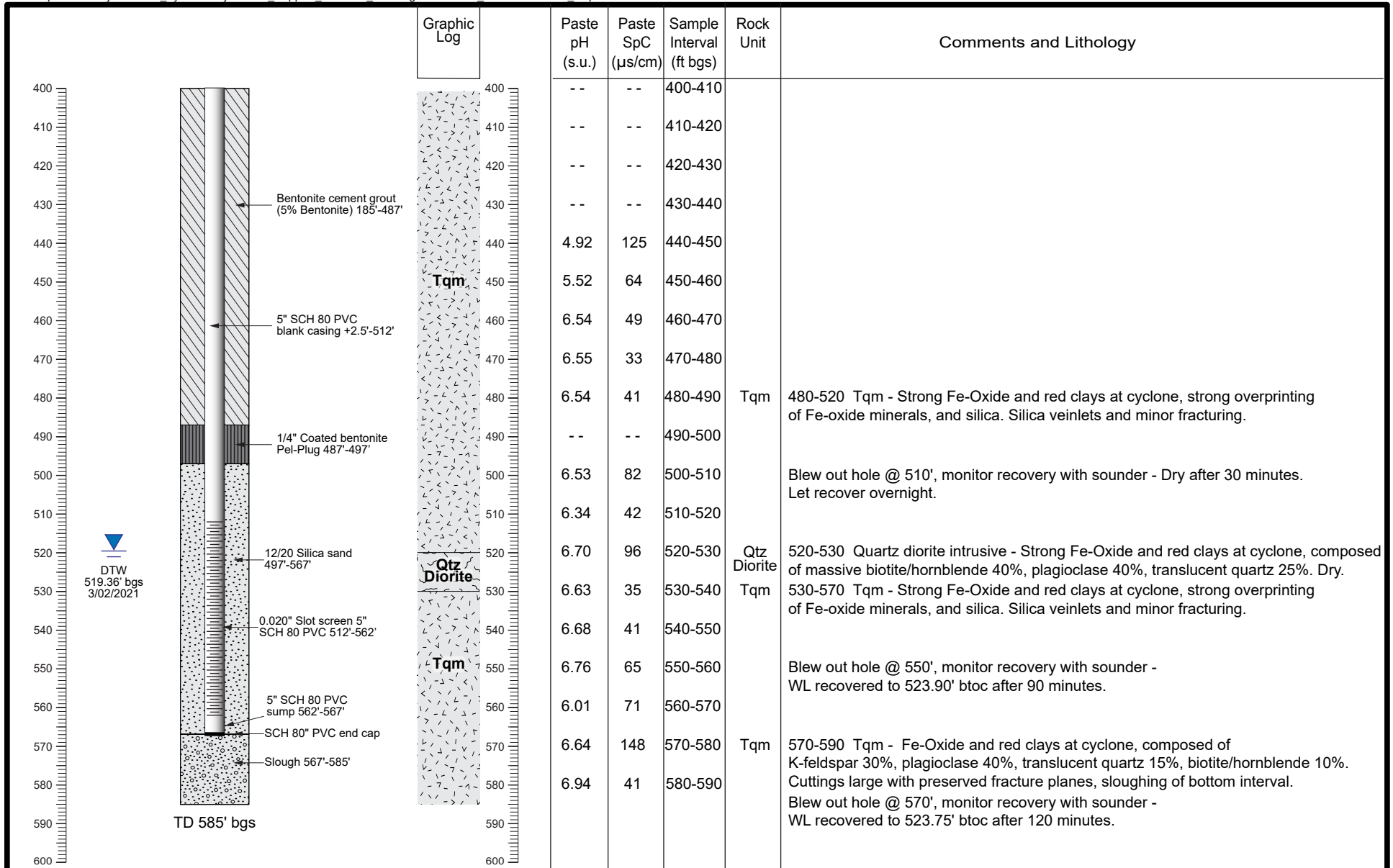


TYRONE MINE
 Well 455-2021-01



DBS&A
 Daniel B. Stephens & Associates, Inc.
 7/26/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.



Geologist: M. Zbrozek
 Driller: Major Drilling
 Date completed: 02/13/2021

Drilling method: Reverse circulation w/ air and water
 Bit diameter: 14-3/4" (Surface casing) / 9-7/8" (Borehole)
 Sampling: Cuttings

Northing: 6992.25'
 Easting: 17679.13'
 Elevation: 6255.83' msl (top of casing)



TYRONE MINE
 Well 455-2021-01



DBS&A
 Daniel B. Stephens & Associates, Inc.
 7/26/2021 DB20.1392

Note(s): (1) Depth to water measured below ground surface (feet).
 (2) Northing and Easting in the Tyrone Mine coordinate system.

Appendix B
Photographs



1. 12/10/2020: Enviro-Drill advancing split spoon into alluvium downgradient of Deadman Canyon system (view to north)



2. 12/10/2020: Enviro-Drill advancing borehole 166-2020-01 using hollow-stem auger method (view to north)



3. 12/10/2020: 166-01-2020 2-inch SCH 40 PVC screen and well assembly



4. 12/10/2020: Monitor well 166-2020-01 surface completion (view to north)



5. 1/17/2021: Major Drilling advancing borehole 396-2021-01 at the Emma South location (view to north)



6. 2/14/2021: Major Drilling advancing GLD-4A replacement well 455-2021-01 in snow (view to west)



7. 2/4/2021: Major Drilling rig set up at 166-2021-01 location (view to west)



8. 2/10/2021: Surface conductor casing diameter measurement: 10 inches



9. 2/10/2021: Major Drilling crew maneuvering surface casing into place at monitor well 455-2021-01 (view to west)



10. 2/10/2021: Major staff welding together surface casing joints at monitor well 455-2021-01 (view to southwest)



11. 2/7/2021: Major Drilling hammer assembly (view to west)



12. 1/20/2021: Crew using pipe tongs to safely maneuver drill rod into place and make connections to advance boring at 396-2021-01 (view to northeast)



13. 1/19/2021: Freeport safety representative reviews safe pipe handling procedures (view to east)



14. 2/5/2021: In-line water meter allowing drillers to monitor rate of water injection during drilling



15. 1/23/2021: Water is flushed from the borehole using air pressure; this water is observed at the cyclone, and is collected in an earthen sump (view to northeast)



16. 2/6/2021: DBS&A field staff deploy a water sounder down the borehole to measure water recovery



17. 2/24/2021: Major drilling 5-inch-diameter SCH 80 PVC for construction of monitor well 396-2021-02 (view to northwest)



18. 2/13/2021: Measurement of 0.020-slot 5-inch-diameter SCH 80 PVC slotted screen



19. 2/24/2021: Installation of 5-inch-diameter SCH 80 PVC slotted screen



20. 2/24/2021: Centralizer being installed above screen interval at monitor well 396-2021-02



21. 3/2/2021: 1-inch-diameter tremie pipe for sand placement and PVC swab assembly to settle sand filter pack along well screen



22. 3/2/2021: Major crew member opening a bucket of ¼-inch coated bentonite chips to create a seal above the filter pack at monitor well 166-2021-01 (view to southwest)



23. 3/2/2021: Major crew mixing 5% bentonite cement grout (view to southwest)



24. 2/3/2021: Crew deploying PVC swab to agitate well during development at monitor well 286-2021-01



25. 2/3/2021: Development of monitor well 286-2021-01; water is airlifted from well casing and discharged to earthen sump (view to west)



26. 2/28/2021: Example of surface completion at monitor well 396-2021-02 consisting of concrete filled bollards, locking well cap and concrete well pad (view to northwest)



27. 3/4/2021: Surface completions at monitor wells 166-2021-01 (right) and 166-2021-02 (left) (view to north)



28. 2/3/2021: Sunrise during installation of monitor well 286-2021-01 (view to east)

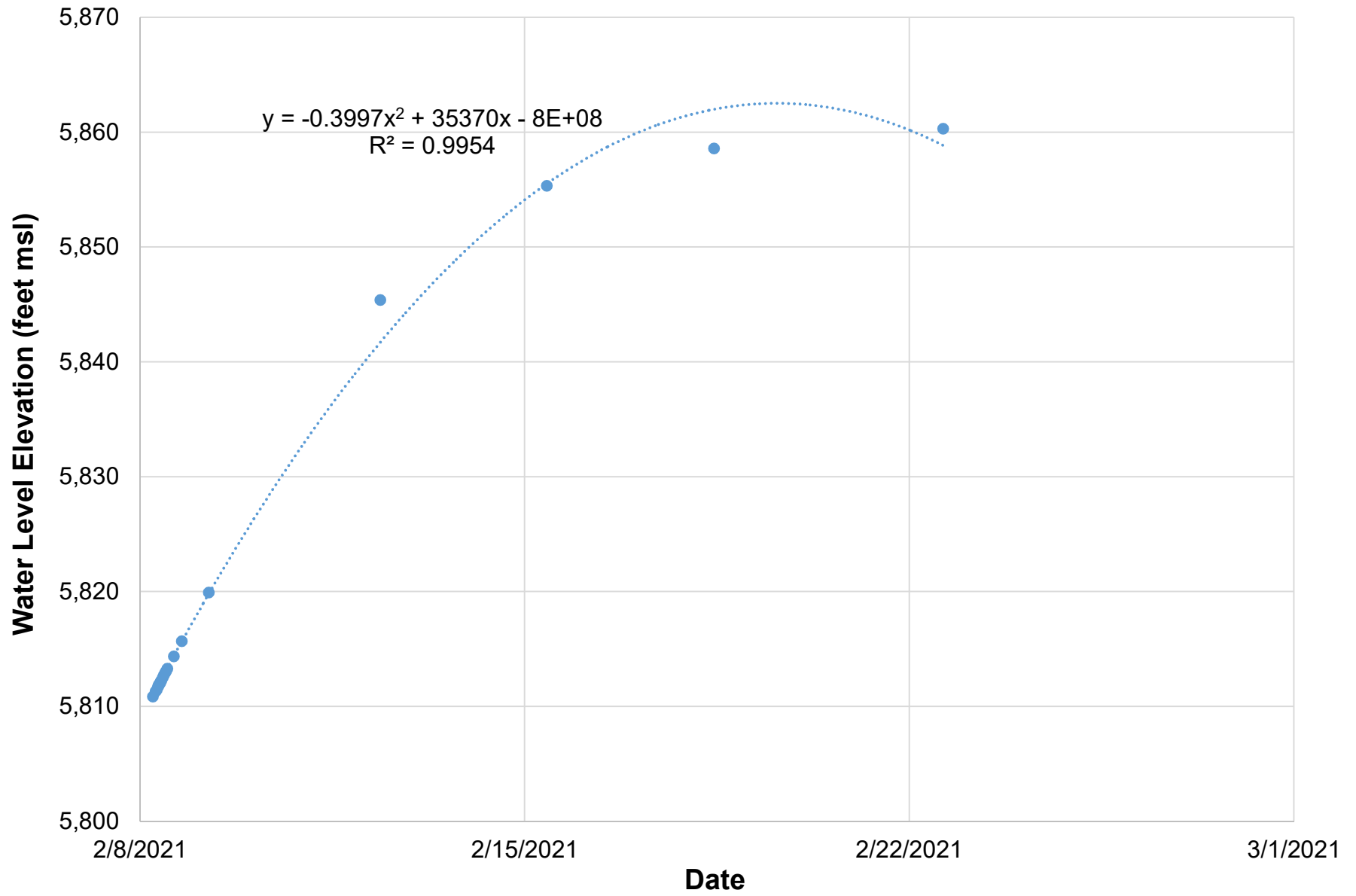
Appendix C
COLOG Results

This appendix has been provided on a flash drive.

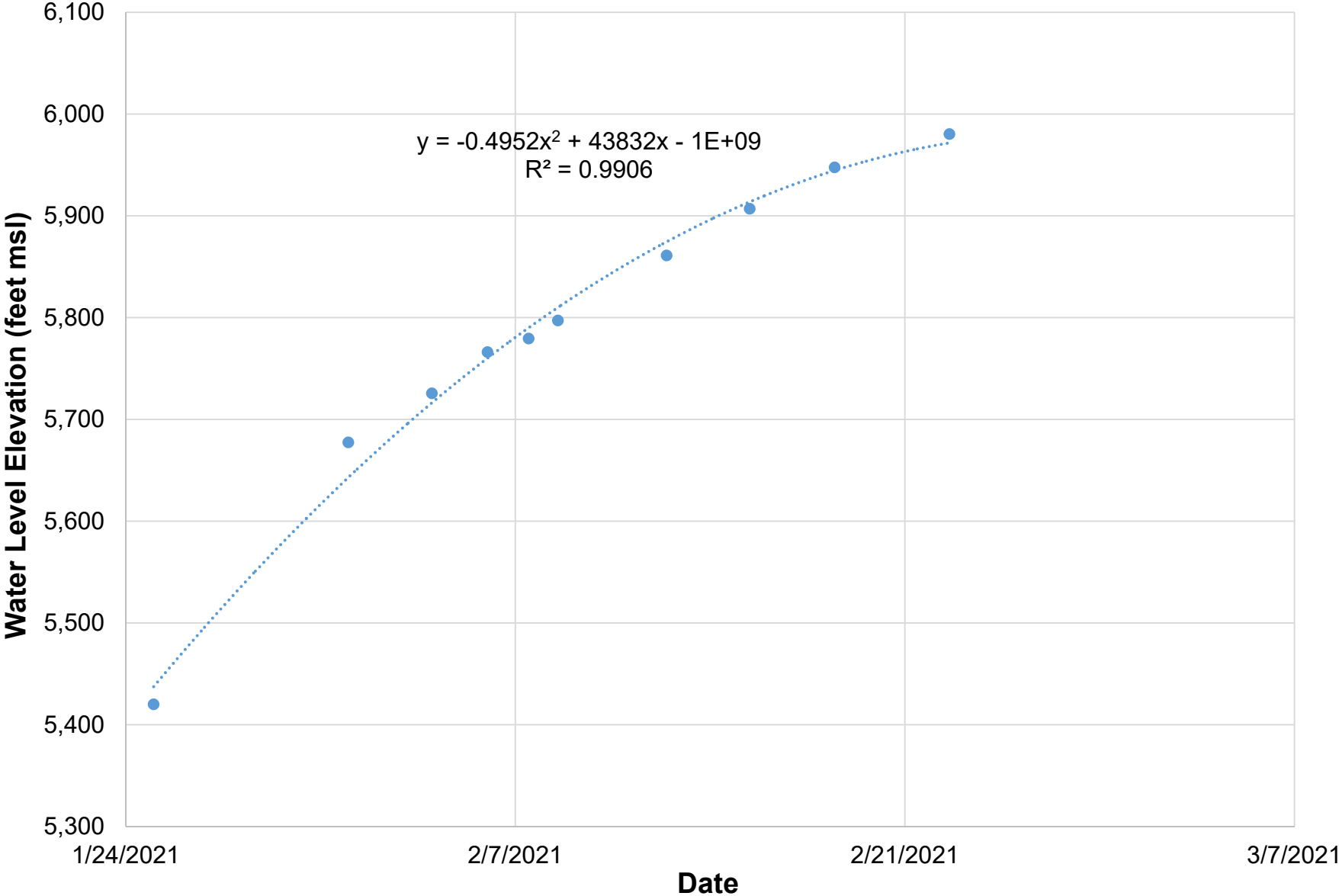
Appendix D

Hydrographs:
396-2021-01 and
166-2021-01

166-2021-01 Water Level Elevation



396-2021-01 Water Level Elevation



Appendix E
Laboratory
Analytical Reports



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0399**
Reported: 09-Jun-21 12:52

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
396-2021-02	X1E0399-01	Water	18-May-21 17:35	MZ	21-May-2021	
455-2021-01	X1E0399-02	Water	19-May-21 15:45	MZ	21-May-2021	
286-2021-01	X1E0399-03	Water	19-May-21 17:15	MZ	21-May-2021	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

Analyses were performed in accordance with SVL standard operating procedures and calibrations were performed and met SVL internal QC criteria.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

This report shall not be reproduced except in full, without the written approval of SVL Analytical, Inc.

Case Narrative: X1E0399

The state of origin only accredits for drinking water analyses.



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0399**
Reported: 09-Jun-21 12:52

Client Sample ID: **396-2021-02**

Sampled: 18-May-21 17:35

SVL Sample ID: **X1E0399-01 (Water)**

Received: 21-May-21

Sample Report Page 1 of 1

Sampled By: MZ

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	< 0.080	mg/L	0.080	0.054		X124138	AM	06/09/21 08:06	
EPA 200.7	Arsenic	< 0.025	mg/L	0.025	0.012		X124138	AM	06/09/21 08:06	
EPA 200.7	Cadmium	< 0.0020	mg/L	0.0020	0.0016		X124138	AM	06/09/21 08:06	
EPA 200.7	Calcium	121	mg/L	0.100	0.069		X124138	AM	06/09/21 08:06	M3
EPA 200.7	Chromium	< 0.0060	mg/L	0.0060	0.0020		X124138	AM	06/09/21 08:06	
EPA 200.7	Cobalt	< 0.0060	mg/L	0.0060	0.0046		X124138	AM	06/09/21 08:06	
EPA 200.7	Copper	< 0.0100	mg/L	0.0100	0.0027		X124138	AM	06/09/21 08:06	
EPA 200.7	Iron	< 0.100	mg/L	0.100	0.056		X124138	AM	06/09/21 08:06	
EPA 200.7	Lead	< 0.0075	mg/L	0.0075	0.0049		X124138	AM	06/09/21 08:06	
EPA 200.7	Magnesium	18.1	mg/L	0.500	0.090		X124138	AM	06/09/21 08:06	
EPA 200.7	Manganese	0.175	mg/L	0.0080	0.0034		X124138	AM	06/09/21 08:06	
EPA 200.7	Nickel	< 0.0100	mg/L	0.0100	0.0048		X124138	AM	06/09/21 08:06	
EPA 200.7	Potassium	3.65	mg/L	0.50	0.18		X124138	AM	06/09/21 08:06	
EPA 200.7	Sodium	59.0	mg/L	0.50	0.12		X124138	AM	06/09/21 08:06	
EPA 200.7	Zinc	< 0.0100	mg/L	0.0100	0.0054		X124138	AM	06/09/21 08:06	

Classical Chemistry Parameters

SM 2320 B	Total Alkalinity	234	mg/L as CaCO3	1.0			X122133	KAG	06/01/21 13:00	
SM 2320 B	Bicarbonate	234	mg/L as CaCO3	1.0			X122133	KAG	06/01/21 13:00	
SM 2320 B	Carbonate	< 1.0	mg/L as CaCO3	1.0			X122133	KAG	06/01/21 13:00	
SM 2540 C	Total Diss. Solids	646	mg/L	10			X122020	PRM	05/24/21 16:15	

Anions by Ion Chromatography

EPA 300.0	Chloride	40.6	mg/L	5.00	3.50	25	X122037	RS	05/24/21 15:48	D2
EPA 300.0	Fluoride	0.398	mg/L	0.100	0.062		X122037	RS	05/24/21 15:30	
EPA 300.0	Sulfate as SO4	191	mg/L	7.50	4.50	25	X122037	RS	05/24/21 15:48	D2

Cation/Anion Balance and TDS Ratios

Cation Sum: 10.2 meq/L Anion Sum: 9.82 meq/L C/A Balance: 1.92 % Calculated TDS: 574 TDS/cTDS: 1.13

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Dave Tryon
Project Manager



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0399**
Reported: 09-Jun-21 12:52

Client Sample ID: **455-2021-01**

Sampled: 19-May-21 15:45

SVL Sample ID: **X1E0399-02 (Water)**

Received: 21-May-21

Sample Report Page 1 of 1

Sampled By: MZ

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	< 0.080	mg/L	0.080	0.054		X122100	AS	06/03/21 10:54	
EPA 200.7	Arsenic	< 0.025	mg/L	0.025	0.012		X122100	AS	06/03/21 10:54	
EPA 200.7	Cadmium	< 0.0020	mg/L	0.0020	0.0016		X122100	AS	06/03/21 10:54	
EPA 200.7	Calcium	349	mg/L	0.100	0.069		X122100	AS	06/03/21 10:54	
EPA 200.7	Chromium	< 0.0060	mg/L	0.0060	0.0020		X122100	AS	06/03/21 10:54	
EPA 200.7	Cobalt	< 0.0060	mg/L	0.0060	0.0046		X122100	AS	06/03/21 10:54	
EPA 200.7	Copper	0.0402	mg/L	0.0100	0.0027		X122100	AS	06/03/21 10:54	
EPA 200.7	Iron	< 0.100	mg/L	0.100	0.056		X122100	AS	06/03/21 10:54	
EPA 200.7	Lead	< 0.0075	mg/L	0.0075	0.0049		X122100	AS	06/03/21 10:54	
EPA 200.7	Magnesium	50.4	mg/L	0.500	0.090		X122100	AS	06/03/21 10:54	
EPA 200.7	Manganese	0.806	mg/L	0.0080	0.0034		X122100	AS	06/03/21 10:54	
EPA 200.7	Nickel	< 0.0100	mg/L	0.0100	0.0048		X122100	AS	06/03/21 10:54	
EPA 200.7	Potassium	8.88	mg/L	0.50	0.18		X122100	AS	06/03/21 10:54	
EPA 200.7	Sodium	47.2	mg/L	0.50	0.12		X122100	AS	06/03/21 10:54	
EPA 200.7	Zinc	0.0642	mg/L	0.0100	0.0054		X122100	AS	06/03/21 10:54	

Classical Chemistry Parameters

SM 2320 B	Total Alkalinity	122	mg/L as CaCO3	1.0			X122133	KAG	06/01/21 13:04	
SM 2320 B	Bicarbonate	122	mg/L as CaCO3	1.0			X122133	KAG	06/01/21 13:04	
SM 2320 B	Carbonate	< 1.0	mg/L as CaCO3	1.0			X122133	KAG	06/01/21 13:04	
SM 2540 C	Total Diss. Solids	1410	mg/L	10			X122020	PRM	05/24/21 16:15	

Anions by Ion Chromatography

EPA 300.0	Chloride	55.0	mg/L	10.0	7.00	50	X122037	RS	05/24/21 16:23	D2
EPA 300.0	Fluoride	0.485	mg/L	0.100	0.062		X122037	RS	05/24/21 16:05	
EPA 300.0	Sulfate as SO4	840	mg/L	15.0	9.00	50	X122037	RS	05/24/21 16:23	D2

Cation/Anion Balance and TDS Ratios

Cation Sum: 23.9 meq/L Anion Sum: 21.5 meq/L C/A Balance: 5.25 % Calculated TDS: 1424 TDS/cTDS: 0.99

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Dave Tryon
Project Manager



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0399**
Reported: 09-Jun-21 12:52

Client Sample ID: **286-2021-01**

Sampled: 19-May-21 17:15

SVL Sample ID: **X1E0399-03 (Water)**

Received: 21-May-21

Sample Report Page 1 of 1

Sampled By: MZ

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	< 0.080	mg/L	0.080	0.054		X124138	AM	06/09/21 08:15	
EPA 200.7	Arsenic	< 0.025	mg/L	0.025	0.012		X124138	AM	06/09/21 08:15	
EPA 200.7	Cadmium	< 0.0020	mg/L	0.0020	0.0016		X124138	AM	06/09/21 08:15	
EPA 200.7	Calcium	341	mg/L	0.100	0.069		X124138	AM	06/09/21 08:15	
EPA 200.7	Chromium	< 0.0060	mg/L	0.0060	0.0020		X124138	AM	06/09/21 08:15	
EPA 200.7	Cobalt	< 0.0060	mg/L	0.0060	0.0046		X124138	AM	06/09/21 08:15	
EPA 200.7	Copper	0.0353	mg/L	0.0100	0.0027		X124138	AM	06/09/21 08:15	
EPA 200.7	Iron	< 0.100	mg/L	0.100	0.056		X124138	AM	06/09/21 08:15	
EPA 200.7	Lead	< 0.0075	mg/L	0.0075	0.0049		X124138	AM	06/09/21 08:15	
EPA 200.7	Magnesium	47.9	mg/L	0.500	0.090		X124138	AM	06/09/21 08:15	
EPA 200.7	Manganese	0.780	mg/L	0.0080	0.0034		X124138	AM	06/09/21 08:15	
EPA 200.7	Nickel	< 0.0100	mg/L	0.0100	0.0048		X124138	AM	06/09/21 08:15	
EPA 200.7	Potassium	8.25	mg/L	0.50	0.18		X124138	AM	06/09/21 08:15	
EPA 200.7	Sodium	44.8	mg/L	0.50	0.12		X124138	AM	06/09/21 08:15	
EPA 200.7	Zinc	0.0544	mg/L	0.0100	0.0054		X124138	AM	06/09/21 08:15	

Classical Chemistry Parameters

SM 2320 B	Total Alkalinity	144	mg/L as CaCO3	1.0			X122133	KAG	06/01/21 13:09	
SM 2320 B	Bicarbonate	144	mg/L as CaCO3	1.0			X122133	KAG	06/01/21 13:09	
SM 2320 B	Carbonate	< 1.0	mg/L as CaCO3	1.0			X122133	KAG	06/01/21 13:09	
SM 2540 C	Total Diss. Solids	1590	mg/L	10			X122020	PRM	05/24/21 16:15	

Anions by Ion Chromatography

EPA 300.0	Fluoride	0.796	mg/L	0.100	0.062		X122037	RS	05/24/21 17:16	
EPA 300.0	Sulfate as SO4	1020	mg/L	15.0	9.00	50	X122037	RS	05/24/21 17:33	D2

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Dave Tryon
Project Manager



Freeport McMoRan - Tyrone Mine
 PO Box 10
 Bayard, NM 88023

Project Name: Tyrone Routine
 Work Order: **X1E0399**
 Reported: 09-Jun-21 12:52

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Metals (Dissolved)								
EPA 200.7	Aluminum	mg/L	<0.080	0.054	0.080	X122100	03-Jun-21	
EPA 200.7	Aluminum	mg/L	<0.080	0.054	0.080	X124138	09-Jun-21	
EPA 200.7	Arsenic	mg/L	<0.025	0.012	0.025	X122100	03-Jun-21	
EPA 200.7	Arsenic	mg/L	<0.025	0.012	0.025	X124138	09-Jun-21	
EPA 200.7	Cadmium	mg/L	<0.0020	0.0016	0.0020	X122100	03-Jun-21	
EPA 200.7	Cadmium	mg/L	<0.0020	0.0016	0.0020	X124138	09-Jun-21	
EPA 200.7	Calcium	mg/L	<0.100	0.069	0.100	X122100	03-Jun-21	
EPA 200.7	Calcium	mg/L	<0.100	0.069	0.100	X124138	09-Jun-21	
EPA 200.7	Chromium	mg/L	<0.0060	0.0020	0.0060	X122100	03-Jun-21	
EPA 200.7	Chromium	mg/L	<0.0060	0.0020	0.0060	X124138	09-Jun-21	
EPA 200.7	Cobalt	mg/L	<0.0060	0.0046	0.0060	X122100	03-Jun-21	
EPA 200.7	Cobalt	mg/L	<0.0060	0.0046	0.0060	X124138	09-Jun-21	
EPA 200.7	Copper	mg/L	<0.0100	0.0027	0.0100	X122100	03-Jun-21	
EPA 200.7	Copper	mg/L	<0.0100	0.0027	0.0100	X124138	09-Jun-21	
EPA 200.7	Iron	mg/L	<0.100	0.056	0.100	X122100	03-Jun-21	
EPA 200.7	Iron	mg/L	<0.100	0.056	0.100	X124138	09-Jun-21	
EPA 200.7	Lead	mg/L	<0.0075	0.0049	0.0075	X122100	03-Jun-21	
EPA 200.7	Lead	mg/L	<0.0075	0.0049	0.0075	X124138	09-Jun-21	
EPA 200.7	Magnesium	mg/L	<0.500	0.090	0.500	X122100	03-Jun-21	
EPA 200.7	Magnesium	mg/L	<0.500	0.090	0.500	X124138	09-Jun-21	
EPA 200.7	Manganese	mg/L	<0.0080	0.0034	0.0080	X122100	03-Jun-21	
EPA 200.7	Manganese	mg/L	<0.0080	0.0034	0.0080	X124138	09-Jun-21	
EPA 200.7	Nickel	mg/L	<0.0100	0.0048	0.0100	X122100	03-Jun-21	
EPA 200.7	Nickel	mg/L	<0.0100	0.0048	0.0100	X124138	09-Jun-21	
EPA 200.7	Potassium	mg/L	<0.50	0.18	0.50	X122100	03-Jun-21	
EPA 200.7	Potassium	mg/L	<0.50	0.18	0.50	X124138	09-Jun-21	
EPA 200.7	Sodium	mg/L	<0.50	0.12	0.50	X122100	03-Jun-21	
EPA 200.7	Sodium	mg/L	<0.50	0.12	0.50	X124138	09-Jun-21	
EPA 200.7	Zinc	mg/L	<0.0100	0.0054	0.0100	X122100	03-Jun-21	
EPA 200.7	Zinc	mg/L	<0.0100	0.0054	0.0100	X124138	09-Jun-21	

Classical Chemistry Parameters

SM 2320 B	Total Alkalinity	mg/L as CaCO3	<1.0		1.0	X122133	01-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	<1.0		1.0	X122133	01-Jun-21	
SM 2320 B	Carbonate	mg/L as CaCO3	<1.0		1.0	X122133	01-Jun-21	
SM 2540 C	Total Diss. Solids	mg/L	<10		10	X122020	24-May-21	

Anions by Ion Chromatography

EPA 300.0	Chloride	mg/L	<0.20	0.14	0.20	X122037	24-May-21	
EPA 300.0	Fluoride	mg/L	<0.100	0.062	0.100	X122037	24-May-21	
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.18	0.30	X122037	24-May-21	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Dissolved)									
EPA 200.7	Aluminum	mg/L	1.05	1.00	105	85 - 115	X122100	03-Jun-21	
EPA 200.7	Aluminum	mg/L	1.04	1.00	104	85 - 115	X124138	09-Jun-21	
EPA 200.7	Arsenic	mg/L	0.983	1.00	98.3	85 - 115	X122100	03-Jun-21	
EPA 200.7	Arsenic	mg/L	0.999	1.00	99.9	85 - 115	X124138	09-Jun-21	
EPA 200.7	Cadmium	mg/L	1.01	1.00	101	85 - 115	X122100	03-Jun-21	
EPA 200.7	Cadmium	mg/L	0.982	1.00	98.2	85 - 115	X124138	09-Jun-21	
EPA 200.7	Calcium	mg/L	19.7	20.0	98.5	85 - 115	X122100	03-Jun-21	



Freeport McMoRan - Tyrone Mine
 PO Box 10
 Bayard, NM 88023

Project Name: Tyrone Routine
 Work Order: **X1E0399**
 Reported: 09-Jun-21 12:52

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Dissolved) (Continued)									
EPA 200.7	Calcium	mg/L	19.5	20.0	97.4	85 - 115	X124138	09-Jun-21	
EPA 200.7	Chromium	mg/L	0.992	1.00	99.2	85 - 115	X122100	03-Jun-21	
EPA 200.7	Chromium	mg/L	0.986	1.00	98.6	85 - 115	X124138	09-Jun-21	
EPA 200.7	Cobalt	mg/L	0.976	1.00	97.6	85 - 115	X122100	03-Jun-21	
EPA 200.7	Cobalt	mg/L	0.981	1.00	98.1	85 - 115	X124138	09-Jun-21	
EPA 200.7	Copper	mg/L	1.01	1.00	101	85 - 115	X122100	03-Jun-21	
EPA 200.7	Copper	mg/L	0.959	1.00	95.9	85 - 115	X124138	09-Jun-21	
EPA 200.7	Iron	mg/L	10.1	10.0	101	85 - 115	X122100	03-Jun-21	
EPA 200.7	Iron	mg/L	9.55	10.0	95.5	85 - 115	X124138	09-Jun-21	
EPA 200.7	Lead	mg/L	1.00	1.00	100	85 - 115	X122100	03-Jun-21	
EPA 200.7	Lead	mg/L	0.935	1.00	93.5	85 - 115	X124138	09-Jun-21	
EPA 200.7	Magnesium	mg/L	19.5	20.0	97.3	85 - 115	X122100	03-Jun-21	
EPA 200.7	Magnesium	mg/L	19.0	20.0	94.9	85 - 115	X124138	09-Jun-21	
EPA 200.7	Manganese	mg/L	0.999	1.00	99.9	85 - 115	X122100	03-Jun-21	
EPA 200.7	Manganese	mg/L	0.921	1.00	92.1	85 - 115	X124138	09-Jun-21	
EPA 200.7	Nickel	mg/L	0.978	1.00	97.8	85 - 115	X122100	03-Jun-21	
EPA 200.7	Nickel	mg/L	0.944	1.00	94.4	85 - 115	X124138	09-Jun-21	
EPA 200.7	Potassium	mg/L	20.5	20.0	103	85 - 115	X122100	03-Jun-21	
EPA 200.7	Potassium	mg/L	18.8	20.0	94.1	85 - 115	X124138	09-Jun-21	
EPA 200.7	Sodium	mg/L	19.2	19.0	101	85 - 115	X122100	03-Jun-21	
EPA 200.7	Sodium	mg/L	18.2	19.0	96.0	85 - 115	X124138	09-Jun-21	
EPA 200.7	Zinc	mg/L	1.01	1.00	101	85 - 115	X122100	03-Jun-21	
EPA 200.7	Zinc	mg/L	0.930	1.00	93.0	85 - 115	X124138	09-Jun-21	

Classical Chemistry Parameters

SM 2320 B	Total Alkalinity	mg/L as CaCO3	99.1	99.3	99.8	94.3 - 106	X122133	01-Jun-21	
SM 2320 B	Total Alkalinity	mg/L as CaCO3	102	99.3	102	94.3 - 106	X122133	01-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	99.1	99.3	99.8	95.1 - 106	X122133	01-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	102	99.3	102	95.1 - 106	X122133	01-Jun-21	

Anions by Ion Chromatography

EPA 300.0	Chloride	mg/L	3.12	3.00	104	90 - 110	X122037	24-May-21	
EPA 300.0	Fluoride	mg/L	1.99	2.00	99.6	90 - 110	X122037	24-May-21	
EPA 300.0	Sulfate as SO4	mg/L	10.7	10.0	107	90 - 110	X122037	24-May-21	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch and Source ID	Analyzed	Notes
Classical Chemistry Parameters									
SM 2320 B	Total Alkalinity	mg/L as CaCO3	<1.0	<1.0	UDL	20	X122133 - X1E0402-03	01-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	<1.0	<1.0	UDL	20	X122133 - X1E0402-03	01-Jun-21	
SM 2320 B	Carbonate	mg/L as CaCO3	<1.0	<1.0	UDL	20	X122133 - X1E0402-03	01-Jun-21	
SM 2540 C	Total Diss. Solids	mg/L	1180	1150	2.4	10	X122020 - X1E0402-06	24-May-21	
SM 2540 C	Total Diss. Solids	mg/L	1350	1350	0.0	10	X122020 - X1E0401-02	24-May-21	



Freeport McMoRan - Tyrone Mine
 PO Box 10
 Bayard, NM 88023

Project Name: Tyrone Routine
 Work Order: **X1E0399**
 Reported: 09-Jun-21 12:52

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch and Source ID	Analyzed	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	mg/L	1.33	0.223	1.00	110	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Aluminum	mg/L	1.04	<0.080	1.00	104	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Arsenic	mg/L	1.10	<0.025	1.00	110	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Arsenic	mg/L	1.03	<0.025	1.00	103	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Cadmium	mg/L	1.09	<0.0020	1.00	109	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Cadmium	mg/L	1.00	<0.0020	1.00	100	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Calcium	mg/L	76.3	55.8	20.0	103	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Calcium	mg/L	135	121	20.0	0.30R>S	70 - 130	X124138 - X1E0399-01	09-Jun-21	M3
EPA 200.7	Chromium	mg/L	1.06	<0.0060	1.00	106	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Chromium	mg/L	0.982	<0.0060	1.00	97.9	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Cobalt	mg/L	1.04	<0.0060	1.00	104	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Cobalt	mg/L	0.967	<0.0060	1.00	96.7	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Copper	mg/L	1.09	0.0345	1.00	106	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Copper	mg/L	0.957	<0.0100	1.00	95.7	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Iron	mg/L	11.1	0.270	10.0	108	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Iron	mg/L	9.53	<0.100	10.0	95.3	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Lead	mg/L	1.07	<0.0075	1.00	107	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Lead	mg/L	0.927	<0.0075	1.00	92.7	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Magnesium	mg/L	27.0	5.53	20.0	108	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Magnesium	mg/L	36.3	18.1	20.0	90.8	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Manganese	mg/L	1.15	0.0996	1.00	106	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Manganese	mg/L	1.09	0.175	1.00	91.3	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Nickel	mg/L	1.06	0.0184	1.00	104	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Nickel	mg/L	0.926	<0.0100	1.00	92.6	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Potassium	mg/L	25.7	3.57	20.0	110	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Potassium	mg/L	22.8	3.65	20.0	95.6	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Sodium	mg/L	41.5	21.3	19.0	106	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Sodium	mg/L	74.9	59.0	19.0	83.6	70 - 130	X124138 - X1E0399-01	09-Jun-21	
EPA 200.7	Zinc	mg/L	1.31	0.216	1.00	109	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Zinc	mg/L	0.937	<0.0100	1.00	93.7	70 - 130	X124138 - X1E0399-01	09-Jun-21	

Anions by Ion Chromatography

EPA 300.0	Chloride	mg/L	30.7	27.9	3.00	93.7	90 - 110	X122037 - X1E0401-01	24-May-21	D2
EPA 300.0	Chloride	mg/L	4.10	1.01	3.00	103	90 - 110	X122037 - X1E0407-02	24-May-21	
EPA 300.0	Fluoride	mg/L	2.09	0.342	2.00	87.4	90 - 110	X122037 - X1E0401-01	24-May-21	M2
EPA 300.0	Fluoride	mg/L	2.01	0.133	2.00	94.1	90 - 110	X122037 - X1E0407-02	24-May-21	
EPA 300.0	Sulfate as SO4	mg/L	194	185	10.0	0.30R>S	90 - 110	X122037 - X1E0401-01	24-May-21	D2,M4
EPA 300.0	Sulfate as SO4	mg/L	28.6	17.9	10.0	107	90 - 110	X122037 - X1E0407-02	24-May-21	

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	% Recovery	Batch and Source ID	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	mg/L	1.26	1.33	1.00	5.4	20	104	X122100 - X1E0397-02	
EPA 200.7	Aluminum	mg/L	1.03	1.04	1.00	0.3	20	103	X124138 - X1E0399-01	
EPA 200.7	Arsenic	mg/L	1.02	1.10	1.00	7.3	20	102	X122100 - X1E0397-02	
EPA 200.7	Arsenic	mg/L	1.04	1.03	1.00	0.4	20	104	X124138 - X1E0399-01	
EPA 200.7	Cadmium	mg/L	1.00	1.09	1.00	8.2	20	100	X122100 - X1E0397-02	
EPA 200.7	Cadmium	mg/L	1.00	1.00	1.00	0.4	20	100	X124138 - X1E0399-01	
EPA 200.7	Calcium	mg/L	75.4	76.3	20.0	1.2	20	98.2	X122100 - X1E0397-02	
EPA 200.7	Calcium	mg/L	136	135	20.0	0.9	20	74.5	X124138 - X1E0399-01	
EPA 200.7	Chromium	mg/L	0.990	1.06	1.00	7.2	20	99.0	X122100 - X1E0397-02	
EPA 200.7	Chromium	mg/L	0.988	0.982	1.00	0.6	20	98.5	X124138 - X1E0399-01	



Freeport McMoRan - Tyrone Mine
 PO Box 10
 Bayard, NM 88023

Project Name: Tyrone Routine
 Work Order: **X1E0399**
 Reported: 09-Jun-21 12:52

Quality Control - MATRIX SPIKE DUPLICATE Data (Continued)

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	% Recovery	Batch and Source ID	Notes
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Metals (Dissolved) (Continued)

EPA 200.7	Cobalt	mg/L	0.964	1.04	1.00	8.0	20	96.4	X122100 - X1E0397-02	
EPA 200.7	Cobalt	mg/L	0.968	0.967	1.00	0.1	20	96.8	X124138 - X1E0399-01	
EPA 200.7	Copper	mg/L	1.02	1.09	1.00	6.7	20	98.7	X122100 - X1E0397-02	
EPA 200.7	Copper	mg/L	0.963	0.957	1.00	0.6	20	96.3	X124138 - X1E0399-01	
EPA 200.7	Iron	mg/L	10.4	11.1	10.0	6.0	20	101	X122100 - X1E0397-02	
EPA 200.7	Iron	mg/L	9.61	9.53	10.0	0.8	20	96.1	X124138 - X1E0399-01	
EPA 200.7	Lead	mg/L	0.984	1.07	1.00	8.7	20	98.4	X122100 - X1E0397-02	
EPA 200.7	Lead	mg/L	0.932	0.927	1.00	0.5	20	93.2	X124138 - X1E0399-01	
EPA 200.7	Magnesium	mg/L	25.7	27.0	20.0	4.9	20	101	X122100 - X1E0397-02	
EPA 200.7	Magnesium	mg/L	36.6	36.3	20.0	0.9	20	92.5	X124138 - X1E0399-01	
EPA 200.7	Manganese	mg/L	1.10	1.15	1.00	5.2	20	99.7	X122100 - X1E0397-02	
EPA 200.7	Manganese	mg/L	1.10	1.09	1.00	0.9	20	92.2	X124138 - X1E0399-01	
EPA 200.7	Nickel	mg/L	0.975	1.06	1.00	8.1	20	95.7	X122100 - X1E0397-02	
EPA 200.7	Nickel	mg/L	0.930	0.926	1.00	0.4	20	93.0	X124138 - X1E0399-01	
EPA 200.7	Potassium	mg/L	24.4	25.7	20.0	5.0	20	104	X122100 - X1E0397-02	
EPA 200.7	Potassium	mg/L	22.9	22.8	20.0	0.5	20	96.1	X124138 - X1E0399-01	
EPA 200.7	Sodium	mg/L	40.4	41.5	19.0	2.6	20	101	X122100 - X1E0397-02	
EPA 200.7	Sodium	mg/L	75.4	74.9	19.0	0.7	20	86.4	X124138 - X1E0399-01	
EPA 200.7	Zinc	mg/L	1.22	1.31	1.00	6.8	20	101	X122100 - X1E0397-02	
EPA 200.7	Zinc	mg/L	0.938	0.937	1.00	0.1	20	93.8	X124138 - X1E0399-01	

Anions by Ion Chromatography

EPA 300.0	Chloride	mg/L	4.11	4.10	3.00	0.3	20	103	X122037 - X1E0407-02	
EPA 300.0	Fluoride	mg/L	2.02	2.01	2.00	0.2	20	94.2	X122037 - X1E0407-02	
EPA 300.0	Sulfate as SO4	mg/L	28.7	28.6	10.0	0.3	20	108	X122037 - X1E0407-02	



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0399**
Reported: 09-Jun-21 12:52

Notes and Definitions

D2	Sample required dilution due to high concentration of target analyte.
M2	Matrix spike recovery was low, but the LCS recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
M4	The analysis of the spiked sample required a dilution such that the spike recovery calculation does not provide useful information. The LCS recovery was acceptable.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
0.30R>S	% recovery not applicable; spike level is less than 30% of the sample concentration
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0432**
Reported: 09-Jun-21 16:50

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
396-2021-01	X1E0432-01	Water	21-May-21 10:20	25-May-2021	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

Analyses were performed in accordance with SVL standard operating procedures and calibrations were performed and met SVL internal QC criteria.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

This report shall not be reproduced except in full, without the written approval of SVL Analytical, Inc.

Case Narrative: X1E0432

The state of origin only accredits for drinking water analyses.



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0432**
Reported: 09-Jun-21 16:50

Client Sample ID: **396-2021-01**

Sampled: 21-May-21 10:20

SVL Sample ID: **X1E0432-01 (Water)**

Received: 25-May-21

Sample Report Page 1 of 1

Sampled By:

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	1.03	mg/L	0.080	0.054		X122100	AS	06/03/21 11:46	
EPA 200.7	Arsenic	1.05	mg/L	0.025	0.012		X122100	AS	06/03/21 11:46	
EPA 200.7	Cadmium	1.00	mg/L	0.0020	0.0016		X122100	AS	06/03/21 11:46	
EPA 200.7	Calcium	303	mg/L	0.100	0.069		X122100	AS	06/03/21 11:46	
EPA 200.7	Chromium	0.994	mg/L	0.0060	0.0020		X122100	AS	06/03/21 11:46	
EPA 200.7	Cobalt	0.980	mg/L	0.0060	0.0046		X122100	AS	06/03/21 11:46	
EPA 200.7	Copper	1.06	mg/L	0.0100	0.0027		X122100	AS	06/03/21 11:46	
EPA 200.7	Iron	10.1	mg/L	0.100	0.056		X122100	AS	06/03/21 11:46	
EPA 200.7	Lead	0.991	mg/L	0.0075	0.0049		X122100	AS	06/03/21 11:46	
EPA 200.7	Magnesium	85.5	mg/L	0.500	0.090		X122100	AS	06/03/21 11:46	
EPA 200.7	Manganese	3.84	mg/L	0.0080	0.0034		X122100	AS	06/03/21 11:46	
EPA 200.7	Nickel	0.979	mg/L	0.0100	0.0048		X122100	AS	06/03/21 11:46	
EPA 200.7	Potassium	29.2	mg/L	0.50	0.18		X122100	AS	06/03/21 11:46	
EPA 200.7	Sodium	133	mg/L	0.50	0.12		X122100	AS	06/03/21 11:46	
EPA 200.7	Zinc	1.08	mg/L	0.0100	0.0054		X122100	AS	06/03/21 11:46	

Classical Chemistry Parameters

SM 2320 B	Total Alkalinity	120	mg/L as CaCO3	1.0			X123149	KAG	06/03/21 14:51	
SM 2320 B	Bicarbonate	120	mg/L as CaCO3	1.0			X123149	KAG	06/03/21 14:51	
SM 2320 B	Carbonate	< 1.0	mg/L as CaCO3	1.0			X123149	KAG	06/03/21 14:51	
SM 2540 C	Total Diss. Solids	1850	mg/L	40			X122205	tjl	05/28/21 16:00	D2

Anions by Ion Chromatography

EPA 300.0	Chloride	33.5	mg/L	10.0	7.00	50	X122131	RS	05/26/21 12:52	D2
EPA 300.0	Fluoride	3.09	mg/L	0.100	0.062		X122131	RS	05/26/21 12:35	
EPA 300.0	Sulfate as SO4	1120	mg/L	15.0	9.00	50	X122131	RS	05/26/21 12:52	D2

Cation/Anion Balance and TDS Ratios

Cation Sum: 29.4 meq/L Anion Sum: 26.8 meq/L C/A Balance: 4.65 % Calculated TDS: 1779 TDS/cTDS: 1.04

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Dave Tryon
Project Manager



Freeport McMoRan - Tyrone Mine
 PO Box 10
 Bayard, NM 88023

Project Name: Tyrone Routine
 Work Order: **X1E0432**
 Reported: 09-Jun-21 16:50

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Metals (Dissolved)								
EPA 200.7	Aluminum	mg/L	<0.080	0.054	0.080	X122100	03-Jun-21	
EPA 200.7	Arsenic	mg/L	<0.025	0.012	0.025	X122100	03-Jun-21	
EPA 200.7	Cadmium	mg/L	<0.0020	0.0016	0.0020	X122100	03-Jun-21	
EPA 200.7	Calcium	mg/L	<0.100	0.069	0.100	X122100	03-Jun-21	
EPA 200.7	Chromium	mg/L	<0.0060	0.0020	0.0060	X122100	03-Jun-21	
EPA 200.7	Cobalt	mg/L	<0.0060	0.0046	0.0060	X122100	03-Jun-21	
EPA 200.7	Copper	mg/L	<0.0100	0.0027	0.0100	X122100	03-Jun-21	
EPA 200.7	Iron	mg/L	<0.100	0.056	0.100	X122100	03-Jun-21	
EPA 200.7	Lead	mg/L	<0.0075	0.0049	0.0075	X122100	03-Jun-21	
EPA 200.7	Magnesium	mg/L	<0.500	0.090	0.500	X122100	03-Jun-21	
EPA 200.7	Manganese	mg/L	<0.0080	0.0034	0.0080	X122100	03-Jun-21	
EPA 200.7	Nickel	mg/L	<0.0100	0.0048	0.0100	X122100	03-Jun-21	
EPA 200.7	Potassium	mg/L	<0.50	0.18	0.50	X122100	03-Jun-21	
EPA 200.7	Sodium	mg/L	<0.50	0.12	0.50	X122100	03-Jun-21	
EPA 200.7	Zinc	mg/L	<0.0100	0.0054	0.0100	X122100	03-Jun-21	

Classical Chemistry Parameters

SM 2320 B	Total Alkalinity	mg/L as CaCO3	<1.0		1.0	X123149	03-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	<1.0		1.0	X123149	03-Jun-21	
SM 2320 B	Carbonate	mg/L as CaCO3	<1.0		1.0	X123149	03-Jun-21	
SM 2540 C	Total Diss. Solids	mg/L	<10		10	X122205	28-May-21	

Anions by Ion Chromatography

EPA 300.0	Chloride	mg/L	<0.20	0.14	0.20	X122131	26-May-21	
EPA 300.0	Fluoride	mg/L	<0.100	0.062	0.100	X122131	26-May-21	
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.18	0.30	X122131	26-May-21	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Dissolved)									
EPA 200.7	Aluminum	mg/L	1.05	1.00	105	85 - 115	X122100	03-Jun-21	
EPA 200.7	Arsenic	mg/L	0.983	1.00	98.3	85 - 115	X122100	03-Jun-21	
EPA 200.7	Cadmium	mg/L	1.01	1.00	101	85 - 115	X122100	03-Jun-21	
EPA 200.7	Calcium	mg/L	19.7	20.0	98.5	85 - 115	X122100	03-Jun-21	
EPA 200.7	Chromium	mg/L	0.992	1.00	99.2	85 - 115	X122100	03-Jun-21	
EPA 200.7	Cobalt	mg/L	0.976	1.00	97.6	85 - 115	X122100	03-Jun-21	
EPA 200.7	Copper	mg/L	1.01	1.00	101	85 - 115	X122100	03-Jun-21	
EPA 200.7	Iron	mg/L	10.1	10.0	101	85 - 115	X122100	03-Jun-21	
EPA 200.7	Lead	mg/L	1.00	1.00	100	85 - 115	X122100	03-Jun-21	
EPA 200.7	Magnesium	mg/L	19.5	20.0	97.3	85 - 115	X122100	03-Jun-21	
EPA 200.7	Manganese	mg/L	0.999	1.00	99.9	85 - 115	X122100	03-Jun-21	
EPA 200.7	Nickel	mg/L	0.978	1.00	97.8	85 - 115	X122100	03-Jun-21	
EPA 200.7	Potassium	mg/L	20.5	20.0	103	85 - 115	X122100	03-Jun-21	
EPA 200.7	Sodium	mg/L	19.2	19.0	101	85 - 115	X122100	03-Jun-21	
EPA 200.7	Zinc	mg/L	1.01	1.00	101	85 - 115	X122100	03-Jun-21	
Classical Chemistry Parameters									
SM 2320 B	Total Alkalinity	mg/L as CaCO3	101	99.3	102	94.3 - 106	X123149	03-Jun-21	
SM 2320 B	Total Alkalinity	mg/L as CaCO3	97.6	99.3	98.3	94.3 - 106	X123149	03-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	95.9	99.3	96.6	95.1 - 106	X123149	03-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	97.6	99.3	98.3	95.1 - 106	X123149	03-Jun-21	



Freeport McMoRan - Tyrone Mine
 PO Box 10
 Bayard, NM 88023

Project Name: Tyrone Routine
 Work Order: **X1E0432**
 Reported: 09-Jun-21 16:50

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Anions by Ion Chromatography									
EPA 300.0	Chloride	mg/L	3.12	3.00	104	90 - 110	X122131	26-May-21	
EPA 300.0	Fluoride	mg/L	2.01	2.00	100	90 - 110	X122131	26-May-21	
EPA 300.0	Sulfate as SO4	mg/L	10.3	10.0	103	90 - 110	X122131	26-May-21	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch and Source ID	Analyzed	Notes
Classical Chemistry Parameters									
SM 2320 B	Total Alkalinity	mg/L as CaCO3	121	120	0.8	20	X123149 - X1E0432-01	03-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	121	120	0.8	20	X123149 - X1E0432-01	03-Jun-21	
SM 2320 B	Carbonate	mg/L as CaCO3	<1.0	<1.0	UDL	20	X123149 - X1E0432-01	03-Jun-21	
SM 2540 C	Total Diss. Solids	mg/L	40	46	14.0	10	X122205 - X1E0491-08	28-May-21	R2B
SM 2540 C	Total Diss. Solids	mg/L	788	750	4.9	10	X122205 - X1E0442-01	28-May-21	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch and Source ID	Analyzed	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	mg/L	1.33	0.223	1.00	110	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Arsenic	mg/L	1.10	<0.025	1.00	110	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Cadmium	mg/L	1.09	<0.0020	1.00	109	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Calcium	mg/L	76.3	55.8	20.0	103	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Chromium	mg/L	1.06	<0.0060	1.00	106	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Cobalt	mg/L	1.04	<0.0060	1.00	104	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Copper	mg/L	1.09	0.0345	1.00	106	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Iron	mg/L	11.1	0.270	10.0	108	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Lead	mg/L	1.07	<0.0075	1.00	107	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Magnesium	mg/L	27.0	5.53	20.0	108	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Manganese	mg/L	1.15	0.0996	1.00	106	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Nickel	mg/L	1.06	0.0184	1.00	104	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Potassium	mg/L	25.7	3.57	20.0	110	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Sodium	mg/L	41.5	21.3	19.0	106	70 - 130	X122100 - X1E0397-02	03-Jun-21	
EPA 200.7	Zinc	mg/L	1.31	0.216	1.00	109	70 - 130	X122100 - X1E0397-02	03-Jun-21	
Anions by Ion Chromatography										
EPA 300.0	Chloride	mg/L	5.07	1.94	3.00	104	90 - 110	X122131 - X1E0436-02	26-May-21	
EPA 300.0	Chloride	mg/L	7.33	4.20	3.00	104	90 - 110	X122131 - X1E0437-01	26-May-21	
EPA 300.0	Fluoride	mg/L	2.03	<0.100	2.00	98.2	90 - 110	X122131 - X1E0436-02	26-May-21	
EPA 300.0	Fluoride	mg/L	1.83	<0.100	2.00	91.6	90 - 110	X122131 - X1E0437-01	26-May-21	
EPA 300.0	Sulfate as SO4	mg/L	45.8	35.3	10.0	106	90 - 110	X122131 - X1E0437-01	26-May-21	
EPA 300.0	Sulfate as SO4	mg/L	70.6	62.3	10.0	0.30R>S	90 - 110	X122131 - X1E0436-02	27-May-21	D2,M4



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Project Name: Tyrone Routine
 Work Order: **X1E0432**
 Reported: 09-Jun-21 16:50

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	% Recovery	Batch and Source ID	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	mg/L	1.26	1.33	1.00	5.4	20	104	X122100 - X1E0397-02	
EPA 200.7	Arsenic	mg/L	1.02	1.10	1.00	7.3	20	102	X122100 - X1E0397-02	
EPA 200.7	Cadmium	mg/L	1.00	1.09	1.00	8.2	20	100	X122100 - X1E0397-02	
EPA 200.7	Calcium	mg/L	75.4	76.3	20.0	1.2	20	98.2	X122100 - X1E0397-02	
EPA 200.7	Chromium	mg/L	0.990	1.06	1.00	7.2	20	99.0	X122100 - X1E0397-02	
EPA 200.7	Cobalt	mg/L	0.964	1.04	1.00	8.0	20	96.4	X122100 - X1E0397-02	
EPA 200.7	Copper	mg/L	1.02	1.09	1.00	6.7	20	98.7	X122100 - X1E0397-02	
EPA 200.7	Iron	mg/L	10.4	11.1	10.0	6.0	20	101	X122100 - X1E0397-02	
EPA 200.7	Lead	mg/L	0.984	1.07	1.00	8.7	20	98.4	X122100 - X1E0397-02	
EPA 200.7	Magnesium	mg/L	25.7	27.0	20.0	4.9	20	101	X122100 - X1E0397-02	
EPA 200.7	Manganese	mg/L	1.10	1.15	1.00	5.2	20	99.7	X122100 - X1E0397-02	
EPA 200.7	Nickel	mg/L	0.975	1.06	1.00	8.1	20	95.7	X122100 - X1E0397-02	
EPA 200.7	Potassium	mg/L	24.4	25.7	20.0	5.0	20	104	X122100 - X1E0397-02	
EPA 200.7	Sodium	mg/L	40.4	41.5	19.0	2.6	20	101	X122100 - X1E0397-02	
EPA 200.7	Zinc	mg/L	1.22	1.31	1.00	6.8	20	101	X122100 - X1E0397-02	
Anions by Ion Chromatography										
EPA 300.0	Chloride	mg/L	5.07	5.07	3.00	0.1	20	104	X122131 - X1E0436-02	
EPA 300.0	Fluoride	mg/L	2.04	2.03	2.00	0.6	20	98.8	X122131 - X1E0436-02	
EPA 300.0	Sulfate as SO4	mg/L	70.8	70.6	10.0	0.3	20	0.30R>S	X122131 - X1E0436-02	D2,M4



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0432**
Reported: 09-Jun-21 16:50

Notes and Definitions

D2	Sample required dilution due to high concentration of target analyte.
M4	The analysis of the spiked sample required a dilution such that the spike recovery calculation does not provide useful information. The LCS recovery was acceptable.
R2B	RPD exceeded the laboratory acceptance limit.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
0.30R>S	% recovery not applicable; spike level is less than 30% of the sample concentration
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0499**
Reported: 10-Jun-21 16:44

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received	Notes
166-2021-02	X1E0499-01	Water	21-May-21 15:39	MZ	26-May-2021	

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

Analyses were performed in accordance with SVL standard operating procedures and calibrations were performed and met SVL internal QC criteria.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.

This report shall not be reproduced except in full, without the written approval of SVL Analytical, Inc.

Case Narrative: X1E0499

The state of origin only accredits for drinking water analyses.



Freeport McMoRan - Tyrone Mine
PO Box 10
Bayard, NM 88023

Project Name: Tyrone Routine
Work Order: **X1E0499**
Reported: 10-Jun-21 16:44

Client Sample ID: **166-2021-02**

Sampled: 21-May-21 15:39

SVL Sample ID: **X1E0499-01 (Water)**

Received: 26-May-21

Sample Report Page 1 of 1

Sampled By: MZ

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	< 0.080	mg/L	0.080	0.054		X123073	AS	06/08/21 07:48	
EPA 200.7	Arsenic	< 0.025	mg/L	0.025	0.012		X123073	AS	06/08/21 07:48	
EPA 200.7	Cadmium	< 0.0020	mg/L	0.0020	0.0016		X123073	AS	06/08/21 07:48	
EPA 200.7	Calcium	352	mg/L	0.100	0.069		X123073	AS	06/08/21 07:48	
EPA 200.7	Chromium	< 0.0060	mg/L	0.0060	0.0020		X123073	AS	06/08/21 07:48	
EPA 200.7	Cobalt	< 0.0060	mg/L	0.0060	0.0046		X123073	AS	06/08/21 07:48	
EPA 200.7	Copper	< 0.0100	mg/L	0.0100	0.0027		X123073	AS	06/08/21 07:48	
EPA 200.7	Iron	< 0.100	mg/L	0.100	0.056		X123073	AS	06/08/21 07:48	
EPA 200.7	Lead	< 0.0075	mg/L	0.0075	0.0049		X123073	AS	06/08/21 07:48	
EPA 200.7	Magnesium	42.3	mg/L	0.500	0.090		X123073	AS	06/08/21 07:48	
EPA 200.7	Manganese	0.563	mg/L	0.0080	0.0034		X123073	AS	06/08/21 07:48	
EPA 200.7	Nickel	< 0.0100	mg/L	0.0100	0.0048		X123073	AS	06/08/21 07:48	
EPA 200.7	Potassium	8.25	mg/L	0.50	0.18		X123073	AS	06/08/21 07:48	
EPA 200.7	Sodium	79.0	mg/L	0.50	0.12		X123073	AS	06/08/21 07:48	
EPA 200.7	Zinc	< 0.0100	mg/L	0.0100	0.0054		X123073	AS	06/08/21 07:48	

Classical Chemistry Parameters

SM 2320 B	Total Alkalinity	101	mg/L as CaCO3	1.0			X123149	KAG	06/03/21 14:33	
SM 2320 B	Bicarbonate	101	mg/L as CaCO3	1.0			X123149	KAG	06/03/21 14:33	
SM 2320 B	Carbonate	< 1.0	mg/L as CaCO3	1.0			X123149	KAG	06/03/21 14:33	
SM 2540 C	Total Diss. Solids	2140	mg/L	40			X122205	tjl	05/28/21 16:00	D2

Anions by Ion Chromatography

EPA 300.0	Chloride	72.0	mg/L	10.0	7.00	50	X122255	RS	06/02/21 13:50	D2
EPA 300.0	Fluoride	0.924	mg/L	0.100	0.062		X122255	RS	06/02/21 13:32	
EPA 300.0	Sulfate as SO4	1060	mg/L	15.0	9.00	50	X122255	RS	06/02/21 13:50	D2

Cation/Anion Balance and TDS Ratios

Cation Sum: 24.7 meq/L Anion Sum: 26.2 meq/L C/A Balance: -2.84 % Calculated TDS: 1675 TDS/cTDS: 1.28

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

Dave Tryon
Project Manager



Freeport McMoRan - Tyrone Mine
 PO Box 10
 Bayard, NM 88023

Project Name: Tyrone Routine
 Work Order: **X1E0499**
 Reported: 10-Jun-21 16:44

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
Metals (Dissolved)								
EPA 200.7	Aluminum	mg/L	<0.080	0.054	0.080	X123073	08-Jun-21	
EPA 200.7	Arsenic	mg/L	<0.025	0.012	0.025	X123073	08-Jun-21	
EPA 200.7	Cadmium	mg/L	<0.0020	0.0016	0.0020	X123073	08-Jun-21	
EPA 200.7	Calcium	mg/L	<0.100	0.069	0.100	X123073	08-Jun-21	
EPA 200.7	Chromium	mg/L	<0.0060	0.0020	0.0060	X123073	08-Jun-21	
EPA 200.7	Cobalt	mg/L	<0.0060	0.0046	0.0060	X123073	08-Jun-21	
EPA 200.7	Copper	mg/L	<0.0100	0.0027	0.0100	X123073	08-Jun-21	
EPA 200.7	Iron	mg/L	<0.100	0.056	0.100	X123073	08-Jun-21	
EPA 200.7	Lead	mg/L	<0.0075	0.0049	0.0075	X123073	08-Jun-21	
EPA 200.7	Magnesium	mg/L	<0.500	0.090	0.500	X123073	08-Jun-21	
EPA 200.7	Manganese	mg/L	<0.0080	0.0034	0.0080	X123073	08-Jun-21	
EPA 200.7	Nickel	mg/L	<0.0100	0.0048	0.0100	X123073	08-Jun-21	
EPA 200.7	Potassium	mg/L	<0.50	0.18	0.50	X123073	08-Jun-21	
EPA 200.7	Sodium	mg/L	<0.50	0.12	0.50	X123073	08-Jun-21	
EPA 200.7	Zinc	mg/L	<0.0100	0.0054	0.0100	X123073	08-Jun-21	

Classical Chemistry Parameters

SM 2320 B	Total Alkalinity	mg/L as CaCO3	<1.0		1.0	X123149	03-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	<1.0		1.0	X123149	03-Jun-21	
SM 2320 B	Carbonate	mg/L as CaCO3	<1.0		1.0	X123149	03-Jun-21	
SM 2540 C	Total Diss. Solids	mg/L	<10		10	X122205	28-May-21	

Anions by Ion Chromatography

EPA 300.0	Chloride	mg/L	<0.20	0.14	0.20	X122255	02-Jun-21	
EPA 300.0	Fluoride	mg/L	<0.100	0.062	0.100	X122255	02-Jun-21	
EPA 300.0	Sulfate as SO4	mg/L	<0.30	0.18	0.30	X122255	02-Jun-21	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Metals (Dissolved)									
EPA 200.7	Aluminum	mg/L	1.02	1.00	102	85 - 115	X123073	08-Jun-21	
EPA 200.7	Arsenic	mg/L	0.930	1.00	93.0	85 - 115	X123073	08-Jun-21	
EPA 200.7	Cadmium	mg/L	0.979	1.00	97.9	85 - 115	X123073	08-Jun-21	
EPA 200.7	Calcium	mg/L	19.5	20.0	97.5	85 - 115	X123073	08-Jun-21	
EPA 200.7	Chromium	mg/L	0.955	1.00	95.5	85 - 115	X123073	08-Jun-21	
EPA 200.7	Cobalt	mg/L	0.957	1.00	95.7	85 - 115	X123073	08-Jun-21	
EPA 200.7	Copper	mg/L	0.945	1.00	94.5	85 - 115	X123073	08-Jun-21	
EPA 200.7	Iron	mg/L	9.82	10.0	98.2	85 - 115	X123073	08-Jun-21	
EPA 200.7	Lead	mg/L	0.975	1.00	97.5	85 - 115	X123073	08-Jun-21	
EPA 200.7	Magnesium	mg/L	19.4	20.0	96.9	85 - 115	X123073	08-Jun-21	
EPA 200.7	Manganese	mg/L	0.954	1.00	95.4	85 - 115	X123073	08-Jun-21	
EPA 200.7	Nickel	mg/L	0.949	1.00	94.9	85 - 115	X123073	08-Jun-21	
EPA 200.7	Potassium	mg/L	20.7	20.0	104	85 - 115	X123073	08-Jun-21	
EPA 200.7	Sodium	mg/L	18.9	19.0	99.2	85 - 115	X123073	08-Jun-21	
EPA 200.7	Zinc	mg/L	0.973	1.00	97.3	85 - 115	X123073	08-Jun-21	
Classical Chemistry Parameters									
SM 2320 B	Total Alkalinity	mg/L as CaCO3	101	99.3	102	94.3 - 106	X123149	03-Jun-21	
SM 2320 B	Total Alkalinity	mg/L as CaCO3	97.6	99.3	98.3	94.3 - 106	X123149	03-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	95.9	99.3	96.6	95.1 - 106	X123149	03-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	97.6	99.3	98.3	95.1 - 106	X123149	03-Jun-21	



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Project Name: Tyrone Routine
 Work Order: **X1E0499**
 Reported: 10-Jun-21 16:44

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
Anions by Ion Chromatography									
EPA 300.0	Chloride	mg/L	2.89	3.00	96.4	90 - 110	X122255	02-Jun-21	
EPA 300.0	Fluoride	mg/L	1.98	2.00	98.8	90 - 110	X122255	02-Jun-21	
EPA 300.0	Sulfate as SO4	mg/L	10.1	10.0	101	90 - 110	X122255	02-Jun-21	

Quality Control - DUPLICATE Data

Method	Analyte	Units	Duplicate Result	Sample Result	RPD	RPD Limit	Batch and Source ID	Analyzed	Notes
Classical Chemistry Parameters									
SM 2320 B	Total Alkalinity	mg/L as CaCO3	121	120	0.8	20	X123149 - X1E0432-01	03-Jun-21	
SM 2320 B	Bicarbonate	mg/L as CaCO3	121	120	0.8	20	X123149 - X1E0432-01	03-Jun-21	
SM 2320 B	Carbonate	mg/L as CaCO3	<1.0	<1.0	UDL	20	X123149 - X1E0432-01	03-Jun-21	
SM 2540 C	Total Diss. Solids	mg/L	40	46	14.0	10	X122205 - X1E0491-08	28-May-21	R2B
SM 2540 C	Total Diss. Solids	mg/L	788	750	4.9	10	X122205 - X1E0442-01	28-May-21	

Quality Control - MATRIX SPIKE Data

Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch and Source ID	Analyzed	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	mg/L	24.9	23.9	1.00	108	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Arsenic	mg/L	1.14	<0.025	1.00	112	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Cadmium	mg/L	1.23	0.134	1.00	110	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Calcium	mg/L	239	220	20.0	97.1	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Chromium	mg/L	1.04	<0.0060	1.00	104	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Cobalt	mg/L	1.46	0.373	1.00	108	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Copper	mg/L	67.3	64.7	1.00	0.30R>S	70 - 130	X123073 - X1E0497-01	08-Jun-21	D2,M4
EPA 200.7	Iron	mg/L	11.1	<0.100	10.0	110	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Lead	mg/L	1.11	<0.0075	1.00	111	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Magnesium	mg/L	109	88.4	20.0	103	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Manganese	mg/L	59.0	58.6	1.00	0.30R>S	70 - 130	X123073 - X1E0497-01	08-Jun-21	M3
EPA 200.7	Nickel	mg/L	1.19	0.0941	1.00	109	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Potassium	mg/L	31.4	6.47	20.0	125	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Sodium	mg/L	70.4	49.0	19.0	113	70 - 130	X123073 - X1E0497-01	08-Jun-21	
EPA 200.7	Zinc	mg/L	20.5	19.7	1.00	82.8	70 - 130	X123073 - X1E0497-01	08-Jun-21	
Anions by Ion Chromatography										
EPA 300.0	Chloride	mg/L	3.45	0.48	3.00	98.9	90 - 110	X122255 - X1E0514-01	02-Jun-21	
EPA 300.0	Chloride	mg/L	4.39	1.37	3.00	100	90 - 110	X122255 - X1E0514-03	02-Jun-21	
EPA 300.0	Fluoride	mg/L	2.03	<0.100	2.00	102	90 - 110	X122255 - X1E0514-01	02-Jun-21	
EPA 300.0	Fluoride	mg/L	2.03	<0.100	2.00	102	90 - 110	X122255 - X1E0514-03	02-Jun-21	
EPA 300.0	Sulfate as SO4	mg/L	13.0	2.88	10.0	101	90 - 110	X122255 - X1E0514-01	02-Jun-21	
EPA 300.0	Sulfate as SO4	mg/L	12.7	2.80	10.0	99.5	90 - 110	X122255 - X1E0514-03	02-Jun-21	



Freeport McMoRan - Tyrone Mine
 PO Box 10
 Bayard, NM 88023

Project Name: Tyrone Routine
 Work Order: **X1E0499**
 Reported: 10-Jun-21 16:44

Quality Control - MATRIX SPIKE DUPLICATE Data

Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	% Recovery	Batch and Source ID	Notes
Metals (Dissolved)										
EPA 200.7	Aluminum	mg/L	24.7	24.9	1.00	0.8	20	87.4	X123073 - X1E0497-01	
EPA 200.7	Arsenic	mg/L	1.14	1.14	1.00	0.3	20	112	X123073 - X1E0497-01	
EPA 200.7	Cadmium	mg/L	1.22	1.23	1.00	1.2	20	108	X123073 - X1E0497-01	
EPA 200.7	Calcium	mg/L	238	239	20.0	0.7	20	89.1	X123073 - X1E0497-01	
EPA 200.7	Chromium	mg/L	1.03	1.04	1.00	0.6	20	103	X123073 - X1E0497-01	
EPA 200.7	Cobalt	mg/L	1.44	1.46	1.00	1.2	20	107	X123073 - X1E0497-01	
EPA 200.7	Copper	mg/L	67.8	67.3	1.00	0.7	20	0.30R>S	X123073 - X1E0497-01	D2,M4
EPA 200.7	Iron	mg/L	11.1	11.1	10.0	0.1	20	110	X123073 - X1E0497-01	
EPA 200.7	Lead	mg/L	1.09	1.11	1.00	1.2	20	109	X123073 - X1E0497-01	
EPA 200.7	Magnesium	mg/L	108	109	20.0	0.5	20	100	X123073 - X1E0497-01	
EPA 200.7	Manganese	mg/L	58.2	59.0	1.00	1.5	20	0.30R>S	X123073 - X1E0497-01	M3
EPA 200.7	Nickel	mg/L	1.18	1.19	1.00	0.6	20	109	X123073 - X1E0497-01	
EPA 200.7	Potassium	mg/L	31.3	31.4	20.0	0.2	20	124	X123073 - X1E0497-01	
EPA 200.7	Sodium	mg/L	69.9	70.4	19.0	0.6	20	110	X123073 - X1E0497-01	
EPA 200.7	Zinc	mg/L	20.4	20.5	1.00	0.4	20	74.3	X123073 - X1E0497-01	
Anions by Ion Chromatography										
EPA 300.0	Chloride	mg/L	3.43	3.45	3.00	0.3	20	98.5	X122255 - X1E0514-01	
EPA 300.0	Fluoride	mg/L	2.04	2.03	2.00	0.6	20	102	X122255 - X1E0514-01	
EPA 300.0	Sulfate as SO4	mg/L	13.0	13.0	10.0	0.2	20	101	X122255 - X1E0514-01	



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Notes and Definitions

D2	Sample required dilution due to high concentration of target analyte.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
M4	The analysis of the spiked sample required a dilution such that the spike recovery calculation does not provide useful information. The LCS recovery was acceptable.
R2B	RPD exceeded the laboratory acceptance limit.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
0.30R>S	% recovery not applicable; spike level is less than 30% of the sample concentration
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable
