# Appendix E.3

## Geochemistry Report

# *Goldboro Project: Geochemical Characterization & Source Terms*

**Prepared for:**
**Anaconda Mining Inc.**
**20 Adelaide St. East, Suite 915**
**Toronto, Ontario, Canada M5C 2T6**

**Prepared by:**
**Lorax Environmental Services Ltd.**
**2289 Burrard St.**
**Vancouver, BC, V6J 3H9**

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# Executive Summary

The Goldboro Gold Project (the Project), owned by Anaconda Mining Inc. (Anaconda), is a turbidite-hosted gold deposit located on the eastern shore of Nova Scotia, approximately 175 km northeast of the city of Halifax. Planned Project infrastructure as outlined under the 2021 Feasibility Study (Nordmin, 2022) includes a tailings management facility (TMF), two open pits, four waste rock storage areas (WRSA; one of which is currently designed to only contain till), segregated till and organics stockpiles, a processing plant, a polishing pond, and a water treatment plant (WTP). Lorax initiated a comprehensive metal leaching and acid rock drainage (ML/ARD) program in 2020 to support the Project's Feasibility Study (FS) and Environmental Assessment Registration Document (EARD) required for provincial permitting. This program includes static and kinetic testing of waste rock, ore, tailings, and overburden. The geochemical data generated form the basis for the generation of contact water chemistry predictions (*i.e.*, geochemical source terms) in support of the site water quality model prepared by others.

Geochemical characterization aims to understand and minimize the potential for and effects of ML/ARD that result from the exposure of sulphide-bearing mine materials during the construction and operation of mines. Samples submitted for static testing include waste rock (n = 174), ore (n = 14), tailings (n = 8), historic tailings (n = 6), and overburden (soil and till; n = 28). All samples were submitted for acid-base accounting (ABA) and solid phase metals analysis, while a subset of samples underwent more advanced geochemical and mineralogical analyses. Composite ore samples (n = 5) were also collected from the existing stockpile left on site after the 2018 bulk sampling program. A total of eight (8) tailings samples were submitted for geochemical testwork, two of which represent "master" composite samples considered representative of bulk tailings material to be produced during operations.

Total S contents for waste rock range from <0.005% to 1.7% with a relatively low median value of 0.05%. Mineralogical investigations identified pyrite, pyrrhotite, and arsenopyrite as being the most common sulphide minerals. Both ore and tailings are relatively enriched in total S compared with the waste rock population exhibiting median contents of 0.51% and 0.27%, respectively. Historic tailings have a similar median total S (0.29%). The general absence of sulphate phases observed during geochemical and mineralogical analyses suggests that the majority of the sulphur inventory is hosted in sulphide phases and can therefore be assumed to contribute to the material's acid potential (AP). Overburden materials show a lower median total S content of 0.041%; however due to the high organics inventory in soil materials in particular, the speciation of sulphur in these materials is likely less straightforward than for bedrock.

The available neutralization potential (NP) of waste rock and ore samples is relatively low overall with a median content of 4.0 kg $CaCO_3$/t (range: <0.1 - 26 kg $CaCO_3$/t). This is consistent with mineralogical testwork which yielded a carbonate abundance of <1.0% in all but one sample. Carbonate minerals identified include calcite, dolomite, and ankerite. Tailings (<10 kg $CaCO_3$/t), historic tailings (<3 kg $CaCO_3$/t), and overburden (<2 kg $CaCO_3$/t) also have low NP.

Operationally, the distinction and quantification of potentially acid generating (PAG) and non-PAG (NPAG) material is important for mine planning since the exposure of PAG mine rock or tailings is expected to have negative impacts on mine site drainage quality. The ARD characteristics of Goldboro geologic materials was defined through the net potential ratio (NPR = NP/AP) as follows:

- PAG1: NPR < 1 or 1 ≤ NPR ≤ 2 and total S ≥ 0.2 wt. %
- PAG2: 1 ≤ NPR ≤ 2 and total S < 0.2 wt. %
- NPAG: NPR > 2

NP values used for this calculation were adjusted conservatively to account for limited exposure of carbonate phases in blasted mine rock. Among the static test population, the majority of waste rock was classified as NPAG (63%), while 37% of samples were deemed PAG. Ore, tailings, and historical tailings materials are dominantly PAG1. There is no significant geochemical trend with respect to PAG proportions across the different lithological units. Rather, the distribution of sulphur contents and PAG propensity, like gold, appear to be controlled structurally with higher PAG proportions occurring within or near the hinges of the geologic anticline. It was found that assay Ca/S ratios provide a good surrogate for NPR and, consequently, PAG and NPAG tonnages were derived via geologic block modelling using the much larger exploration assay database. This approach is thought to increase the confidence in PAG occurrence in the two open pits significantly and was used for the development of PAG and NPAG tonnages to inform the mine schedule. Overburden was generally classified as PAG, although further characterization is recommended due to the unique geochemical characteristics of these oxidized materials.

Solid phase metals analysis results were compared to Average Upper Continental Crustal Abundance (AUCCA; Rudnick and Gao, 2014) to provide a general indication of metal enrichment across the Goldboro deposit. Arsenic generally exceeds 3x the AUCCA and is commonly elevated by more than 10x in waste rock, ore, and tailings samples. Other parameters that show less frequent enrichment above 3x their respective AUCCA values include Cd, Cr, Mo, Pb, Sb, and Zn. Metal contents were generally lower in the overburden samples.

All waste rock and tailings SFE leachates had circumneutral to slightly alkaline pH. Solute concentrations were compared to Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (NSE, 2021). Leachate concentrations in contact with waste rock were generally low (commonly below the detection limit), except for Al and As concentrations which are above their respective Tier 1 EQS in the majority of samples including tailings. Cobalt, Cu, and Fe concentrations were above their respective Tier 1 EQS in one or more tailings samples which is likely an artifact of mill processes (*e.g.,* cyanidation). Overburden as well as historic tailings SFE leachates had slightly acidic pH (<6.5), with several metal concentrations above their respective Tier 1 EQS. This indicates that there is some leaching potential from overburden and historic tailings under mildly acidic conditions. Historic tailings samples will be relocated to the lined TMF where metal leaching will be mitigated by covering with fresh run-of-mine (ROM) tailings and saturating tailings during early operations.

Ongoing field (n = 4) and laboratory (n = 8) kinetic test programs were initiated in 2021 using representative sub-samples for a range of Goldboro material types. To date, humidity cell leachate pH from all waste rock samples has remained circumneutral. Sulphate loading rates generally show a decreasing trend and the PAG humidity cells have higher sulphate loading rates relative to the NPAG humidity cells. This observation is in agreement with the higher solid-phase total S content in PAG samples. In contrast to sulphate, NPAG and PAG2 humidity cells were found to release the highest As loads and therefore elevated As concentrations are not expected to be limited to waste rock with a high ARD risk. Other metal loading rates are generally low and comparable across the different humidity cells; however, increased metal loading rates are anticipated for PAG humidity cells once acidic conditions are established. Time to onset of acidic conditions for the PAG samples was estimated between 2 and 26 years, based on an average NP depletion rate.

All field bin leachates remain circumneutral (field pH 6.7 to 8.3) and have relatively low sulphate concentrations (<80 mg/L). Both sulphate and metal concentrations show a decreasing trend which is attributed to the rinsing of soluble surface oxidation products in the early experimental stages. Arsenic concentrations exceed the Tier 1 EQS in all leachate samples. The highest As concentrations (>1.0 mg/L) are consistently being produced by FB-1 (bulk sample ore) while waste rock field bins have released lower As concentrations of ≤ 0.11 mg/L to date.

Tailings kinetic testing includes a humidity cell and a saturated column. The humidity cell leachate has remained slightly alkaline with a decreasing trend. Several parameters have shown an increase in loading rates since approximately week 5 (*e.g.*, sulphate, cyanide species, As, Cd, Pb, Mo). The time to onset of acidic conditions was estimated at approximately one year.

The saturated tailings column simulates the geochemical behaviour of tailings under conditions representing the planned storage design for the Goldboro TMF. Effluent from the column has remained circumneutral to slightly alkaline (pH 7.6 to 8.1). Sulphate concentrations are high (1,240 to 2,330 mg/L) but are showing a decreasing trend. Arsenic concentrations have stabilized around 1.4 mg/L in the more recent tailings effluent samples. Other metals (*e.g.*, Cd) generally show a decreasing trend approaching influent (process water) concentrations. Long term total cyanide concentrations in column effluent will need to be re-evaluated once more stable conditions have been achieved following the switch of column influent to lower-cyanide process water in December 2021.

The contact water chemistry for most mine components was modelled by upscaling humidity cell loading rates to full scale site dimensions and calibrated with field bin and site analogue data. These mine components include:

- WRSAs (exclusive of overburden stockpile);
- Pit backfill;
- Pit walls;
- ROM ore stockpile;
- TMF embankments;
- PAG1 exposures in TMF (temporary); and
- TMF closure cover.

Nitrogen leaching predictions associated with the flushing of explosives residue from blasted materials are based on the mine schedule, site analogue as well as explosive type and characteristics.

Source terms for tailings contact water were developed using representative tailings supernatant samples produced during bench-scale metallurgical testing. TMF seepage chemistry predictions relied on results from saturated column testing, while overburden runoff chemistry was conservatively predicted using material-specific SFE data.

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# List of Acronyms and Abbreviations

| | |
|---|---|
| ABA | Acid base accounting |
| AP | Acid Potential |
| AUCCA | Average Upper Continental Crust Abundance |
| CaNP | Carbonate Neutralization Potential |
| CMR | Carbonate Molar Ratio |
| DOC | Dissolved Organic Carbon |
| EQS | Environmental Quality Standards |
| FOV | Field of View |
| HDPE | High-density Polyethylene |
| ICP | Inductively Coupled Plasma |
| ML/ARD | Metal Leaching and Acid Rock Drainage |
| NAG | Net Acid Generation |
| NP | Neutralization Potential |
| NPAG | Non-Potentially Acid Generating |
| NPR | Neutralization Potential Ratio |
| PAG | Potentially Acid Generating |
| PPL | Plane-Polarized Light |
| QA/QC | Quality Assurance/Quality Control |
| QEMSCAN | Quantitative Evaluation of Minerals by SCANning electron microscopy |
| SFE | Shake Flask Extraction |
| TAP | Total Acid Potential |
| TIC | Total Inorganic Carbon |
| TMF | Tailings Management Facility |
| TSS | Total Suspended Solids |
| WRSA | Waste Rock Storage Area |
| XPL | Crossed Polar |

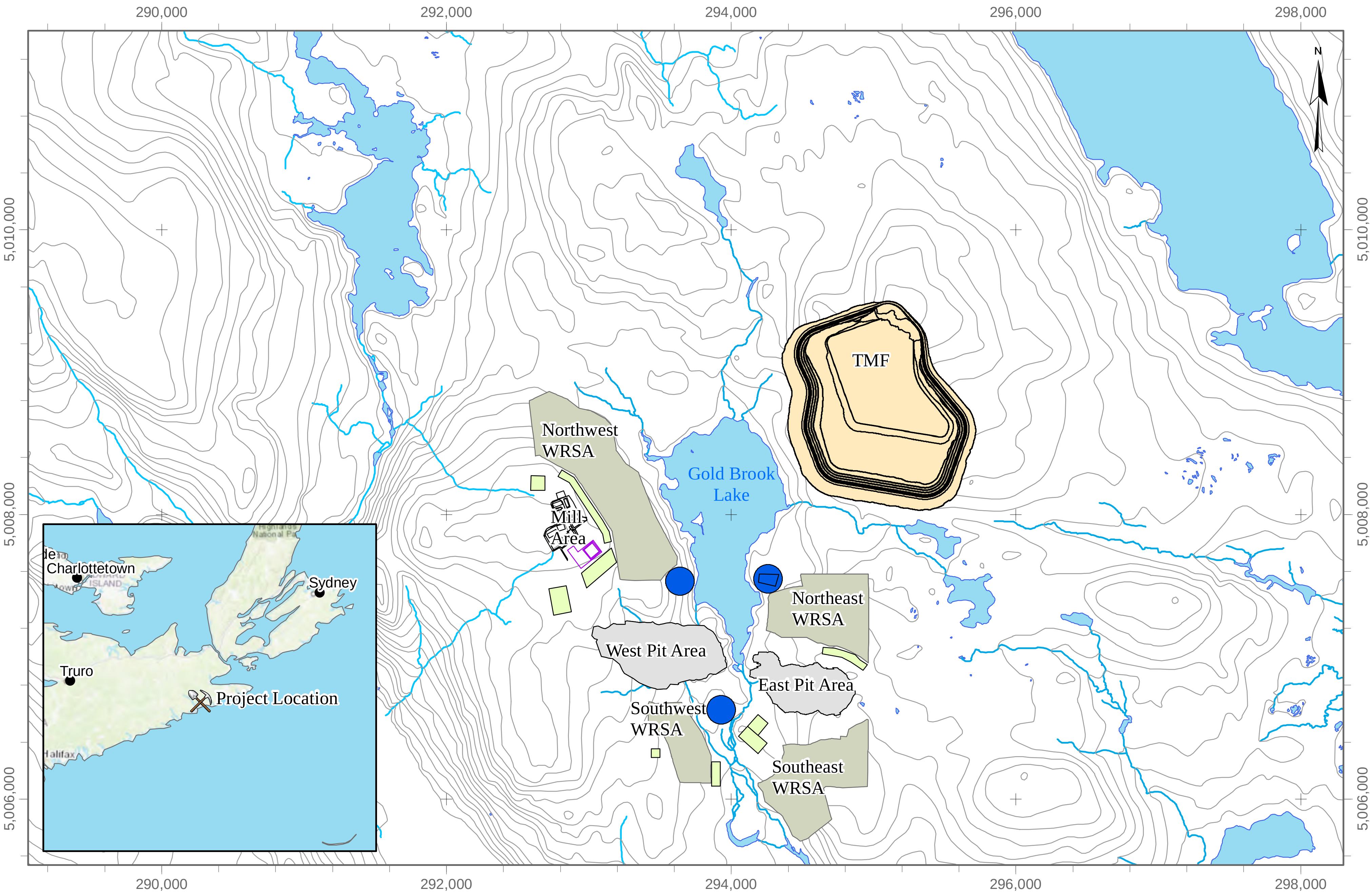
# 1. Introduction

## 1.1 Overview

The Goldboro Gold Project is located on the eastern shore of Nova Scotia, approximately 175 km northeast of the city of Halifax and 60 km southeast of the town of Antigonish. The Project, owned by Anaconda, is a turbidite-hosted gold deposit and includes three gold systems referred to as West Goldbrook, Boston Richardson, and East Goldbrook. Open pit mining is currently proposed over an 11-year mine life. Project infrastructure includes a tailings management facility (TMF), two open pits (West Pit and the East Pit), four waste rock storage areas (WRSA; one of which is currently designed to only contain till), segregated till and organics stockpiles, a processing plant, a polishing pond, and essential site infrastructure (Figure 1-1).

In general terms, geochemical characterization aims to understand and minimize the potential for and effects of metal leaching and acid rock drainage (ML/ARD) that result from the disturbance of mine rock (waste, ore) and tailings during the construction and operation of mines. The oxidation of sulphide minerals, such as pyrite and pyrrhotite, generally presents the main source of acidity in such environments and is often an important control on mine drainage quality. Whether a rock type or sample is in fact potentially acid generating (PAG) will however also depend on the mineralogy and dissolution kinetics of pH-neutralizing phases, most importantly carbonate minerals.

Preliminary ML/ARD investigations were conducted for the Project in 2017 (GEMTEC, 2018) and 2019 (WSP, 2019) in which 86 samples were submitted for static test analyses. These initial characterizations indicated that the waste rock was generally expected to be non-potentially acid generating (NPAG) with lesser PAG material, while the ore was characterized as PAG. However, changes in the mine plan and open pit designs resulted in the majority of these previous samples falling outside of the targeted zones and thereby rendering these investigations largely unrepresentative. To close geochemical information gaps, Lorax Environmental Services Ltd (Lorax) initiated a comprehensive ML/ARD program in 2020 considering the current open pit dimensions.




**LEGEND**

- Watercourse
- Waterbody
- Organic Stockpile
- Pit
- Potential Settling Pond Area
- ROM Area
- TMF
- WRSA

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| **REVIEWED:** | JO |
| **VERSION:** | 1 |

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*CLIENT:*

LORAX ENVIRONMENTAL

*PROJECT:*

**Goldboro Project**

*TITLE:*

Planned General Arrangement

*PROJECT #:* A606

*FIGURE:* 1-1

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## 1.2 Geological Setting

The Goldboro deposit is situated within turbiditic sediments of the Goldenville Formation of the Meguma Supergroup (Cambrian to Ordovician) which hosts several gold deposits in southern and central Nova Scotia. The following description of the Goldboro geological setting is adopted from the most recent Project description (Nordmin, 2022).

The dominant rock types include greywacke and argillite which occur in alternating beds. The sediments overprinted by alteration, the degree and type of which appears to be controlled by lithology. Greywacke units have varying amounts of biotite and muscovite that have likely both detrital and metamorphic origins. The greywacke beds generally exhibit weaker alteration than the finer argillite units but does exhibit bleaching that consists of both albite and sericite alteration. In contrast, argillite units show the greatest changes in alteration mineralogy proximal to quartz veins. For example, background siltstones are generally layered and laminated and are brown-green with minor biotite and chlorite, whereas proximal to well mineralized veins they exhibit black to black-green colouration and are pervasively altered to chlorite with biotite, sericite, albite, quartz, carbonate, and sulphide.

Structurally, the Project is comprised of three domains known as the West Goldbrook (WG), Boston Richardson (BR), and East Goldbrook (EG) Gold Systems. The WG Gold System is separated from the BR Gold System by a north trending, near vertical fault with tens of metres of apparent offset. The EG Gold System is separated from the BR Gold System by a thick greywacke sequence or marker unit. The marker unit consists of a 40 m to 50 m greywacke bed that is commonly intersected during drilling and in underground workings. The main structural feature in the area is the Upper Seal Harbour Anticline which folds all levels of stratigraphy observed in core and underground to form an upright, tight anticline that plunges 20° eastward with stratigraphic younging being upward.

Gold and sulphide mineralization has occurred preferentially in or near the hinges of the anticline and is associated with both wall rock and quartz veining. Argillites contain diagenetic pyrite, pyrrhotite, and arsenopyrite. There are several generations of veins with the majority of coarse gold in veins associated with second generation arsenopyrite, galena, and to a lesser extent chalcopyrite and sphalerite. A typical cross-section illustrating the Upper Seal Harbour anticline and location of the market unit is given in Figure 1-2.

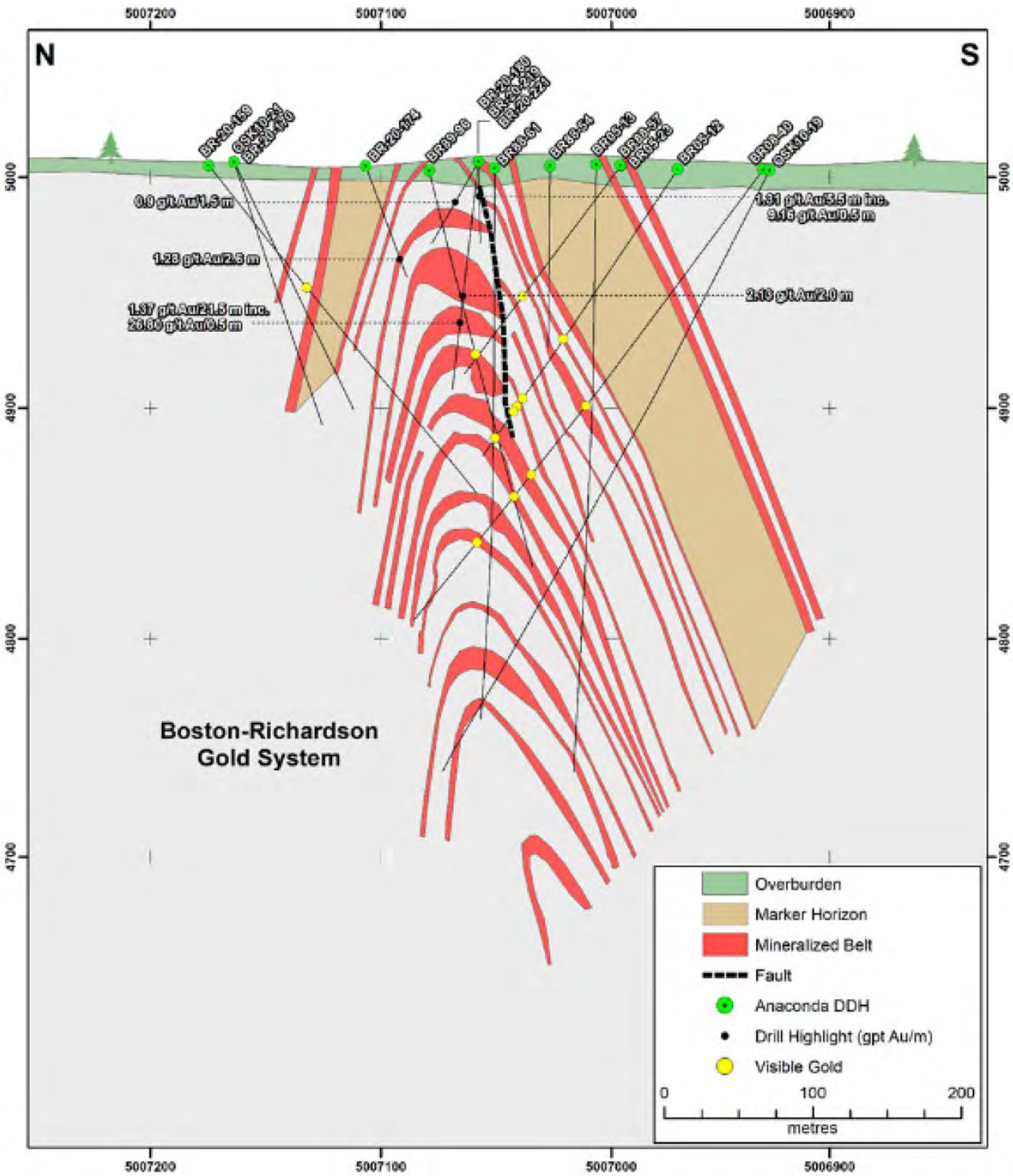



**Figure 1-2: Typical geological cross section at 9300E (looking east) through the deposit area (from Nordmin, 2022).**

# 2. Methods

## 2.1 Sampling Methods

### 2.1.1 Mine Rock

The mine rock (waste rock and ore) static test sampling campaign includes 188 samples plus seven duplicate samples for quality assurance and control (QA/QC) purposes. Plan maps and a series of geological cross-sections illustrating the ML/ARD sample locations in the pit footprint and with depth are compiled in Appendix A. The static test sample selection and collection was conducted in multiple phases as follows:

- Phase Ia - 2 m intervals - drill core;
- Phase Ib - 2 m intervals - pulp or drill core;
- Phase II - 5 m intervals - pulp or drill core; and
- Bulk sample stockpile samples.

The guiding selection criteria for all phases include:

- Proportional representation of major and minor lithological units;
- Spatial distribution within current pit shells; and
- Inclusion of samples near common structural features.

Phase Ia comprised 120 samples, including 106 waste rock samples, nine ore samples, and five duplicate samples (Table 2-1). For the purposes of sample selection, an ore grade cut-off of 0.55 ppm Au was used based on guidance from Nordmin. Lorax provided a list of sample intervals to site and the sampling was conducted by Anaconda personnel. An interval length of 2 m was targeted where possible; however, slightly shorter intervals were samples occasionally to avoid crossing of lithological boundaries. The purpose of Phase Ib was to provide infill characterization for single-lithological samples after refinement of the mine plan supporting the FS. A total of 35 x 2 m intervals were selected by Lorax personnel (Table 2-1). Of these, 26 composite samples were made up of pulps and nine samples comprised core material.

**Table 2-1:**
**Phase Ia and Ib Sampling Summary**

| Lithology | Ore | Waste | | Total | % of Total |
|---|---|---|---|---|---|
| | Phase Ia | Phase Ia | Phase Ib | | |
| Argillite | 6 | 36 | 15 | 57 | 38% |
| Argillite + Quartz Vein | 3 | - | 1 | 4 | 3% |
| Greywacke | - | 61 | 18 | 79 | 53% |
| Greywacke + Quartz Vein | - | 3 | - | 3 | 2% |
| Quartz Vein | - | 3 | - | 3 | 2% |
| Greywacke Marker Unit | - | 3 | 1 | 4 | 3% |
| ***Total*** | 9 | 106 | 35 | 150 | |

Phase II included 33 x 5 m composite samples selected by Nordmin to support the integration of geochemical results into the block model. The locations of these samples were selected to close current gaps within the block model zones. The choice of 5 m interval was made to better represent the minimum bench height that would be mined operationally. As a result of the relatively fine interbedding of sedimentary units within the deposit, these composites often contain two or more different lithologies (Table 2-2). Waste blocks during Phase II sampling were targeted based on the resource model. Ultimately, the results from this sampling were incorporated into the block model in order to calculate the expected PAG and NPAG tonnages of waste rock.

Of the Phase II samples, 26 were composed of pulps stored at Eastern Analytical laboratory and seven were selected from core for intervals where pulp samples were unavailable. Due to the variable sample lengths of the pulp samples, each 5 m composite is made up of between five and ten individual samples. All core samples were made up of 5 x 1 m intervals. Core materials were composited at site, while pulp materials were blended proportionally at the receiving analytical laboratory (SGS Lakefield).

**Table 2-2:**
**Phase II Sampling Summary**

| Lithology | Number of Samples |
|---|---|
| Argillite | 2 |
| Argillite + Quartz Vein[a] | 2 |
| Argillite + Greywacke[a] | 4 |
| Greywacke, Argillite + Quartz Vein[a] | 10 |
| Greywacke | 5 |
| Greywacke + Quartz Vein[a] | 5 |
| Quartz Vein | 1 |
| Greywacke Marker Unit | 4 |
| ***Total*** | 33 |

**Note:**
[a]Proportions of the different lithologies within these samples vary.

A stockpile of residual ore material from the 2018 bulk sampling program remains on site and has been exposed to weathering since then (Figure 2-1). Five composite samples were collected from the bulk sample stockpile by Anaconda personnel. Each sample was recovered by combining subsamples from three approximately 0.5 m deep test pits along a 3 m long transect. Materials were field-sieved to target the <1” particle size fraction.

**Figure 2-1: Ore stockpile from the 2018 bulk sampling campaign.**

### 2.1.2 Tailings

Metallurgical testwork was conducted at BaseMet Laboratories in Kamloops to determine process design criteria for comminution, gravity concentration, gold leaching, carbon adsorption, and cyanide destruction. The latter utilizes an $SO_2$/Air process with $Na_2S_2O_5$ (Na-Metabisulfite) as a source of $SO_2$ targeting a discharge product measuring below 3 mg/L weak acid dissociable (WAD) cyanide. Arsenic precipitation (ASP) was implemented following cyanide detoxification to lower arsenic in process water to ≤0.5 mg/L. Conditions for ASP included contacting the cyanide detox pulp discharged from cyanide destruction with ferric sulphide at a ratio of 8:1 Fe to As (BaseMet Labs, 2021).

Two Master Composite tailings samples and six additional tailings samples were generated and submitted for geochemical testing. The Master Composite materials are a derivative of bulk ore composites and considered the most representative of the tailings that will ultimately be discharged in the TMF. These samples were provided in the form of a tailings slurry contained in 5-gallon pails. Tailings process water was produced by decanting and filtering after the tailings solids were left to settle within the covered pails. Master Composite solids were then subsampled by coring through the sedimented tailings package.

The six additional tailings samples represent different ore grades and locations (*i.e.*, operational phases) and served the evaluation of the geochemical variability of tailings materials throughout the life of mine with respect to the two Master Composites. These samples were provided as dried filter cakes and submitted to the analytical laboratory as such.

All tailings samples were submitted for ABA and solid phase metals, while all but the 2020 Master Composite sample were submitted for net acid generation (NAG) pH. The 2020 and 2021 Master Composites and two additional composites, made to represent low- and high-grade tailings products, were submitted for Shake Flask Extraction (SFE) analysis. A subsample of the process waters from each Master Composite slurries underwent chemical analysis with the remaining water being used as saturated column influent.

### 2.1.3 Historic Tailings Samples

Historic tailings deposits are known to occur across the Goldboro project site and will be excavated, where necessary, during mine construction. All disturbed material will be deposited within the lined footprint of the TMF and ultimately covered with ROM tailings during the production phase.

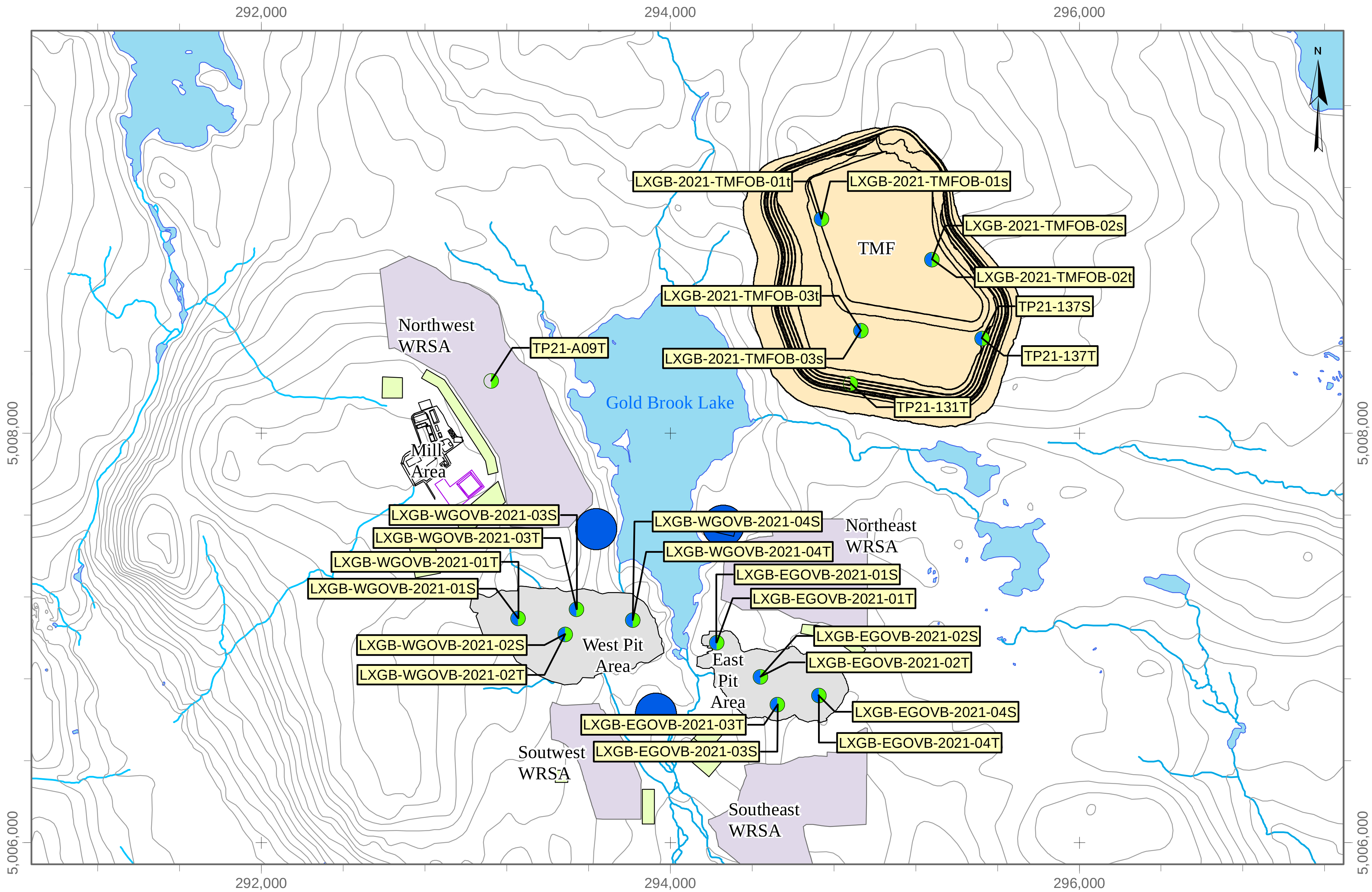
To assess a range of properties of the historic tailings, several sampling campaigns were undertaken by Anaconda personnel via manual test pitting of multiple well-delineated surface deposits. Of the collected samples, six (6) were chosen for in-depth geochemical testing based on spatial distribution and representative to high solid phase As and Hg contents determined for other purposes (GHD, 2022). To that end, all six of these historic tailings samples were submitted for ABA and a subset of four samples was submitted for SFE testing.

### 2.1.4 Overburden

Twenty-eight (28) overburden samples were collected by Anaconda personnel under guidance from Lorax for static testing. These include 12 soil samples and 16 till samples.

Two samples were often collected from the same test pit, one sample from the soil horizon and the second sample from the till horizon (Figure 2-2). Test pits were distributed within the East Pit (n = 4), West Pit (n = 4), TMF footprint (n = 6), northwest WRSA (n = 1), and portal (n = 1) areas (Figure 2-3).

**Figure 2-2: Example of an overburden test pit (LXGB-2021-TMFOB-02) displaying distinct organics (top, dark) and till (beige) horizons.**




## LEGEND

- Soil
- Till
- Watercourse
- Waterbody
- Organic Stockpile
- Pit
- Potential Settling Pond Area
- ROM Area
- TMF
- WRSA

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LORAX ENVIRONMENTAL

PROJECT:

**Goldboro Mine**

TITLE:

Location of Overburden Samples

PROJECT #: A606

FIGURE: 2-3

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## 2.2 Static Test Methods

### 2.2.1 Mineralogy

Mineralogical analyses assist in determining the forms of acid producing minerals (*i.e.*, sulphides) and acid neutralizing minerals (*i.e.*, carbonates and silicates) in a sample. A subset of 20 mine rock samples underwent Quantitative Evaluation of Minerals by SCANning electron microscopy (QEMSCAN) analysis at SGS Lakefield. This included 11 Phase I samples, three Phase II samples, and all six humidity cell samples (Table 2-3). In addition, one tailings sample (2021 Master Composite) was also submitted for TESCAN Integrated Mineral Analyser (TIMA) analysis which is a novel automated mineralogy technique. Both QEMSCAN and TIMA provide information on the modal mineral abundances as well as grain sizes and exposure surfaces (*e.g.*, degree of liberation) of the sulphide and carbonate minerals in the sample. Both techniques offer real-time collection of mineral chemistry data and allow for direct reconciliation of minerals to assays.

Standard (30 µm) polished thin sections were also prepared for all QEMSCAN subsamples and inspected by optical microscopy at the Lorax laboratory using a Nikon Optiphot polarizing microscope with transmitted and reflected light capabilities. Photomicrographs were taken using a Nikon EOS 70D camera.

### 2.2.2 Acid-Base Accounting

Static testing for waste rock and ore samples was conducted at SGS Lakefield, whereas tailings and overburden static testing was conducted at Bureau Veritas (tailings, except for 2021 Master Composite) or SGS Canada (2021 Master Composite tailings and overburden). Analyses included modified ABA, NAG pH, solid phase metals, and shake SFE. ABA consists of a series of static tests (*i.e.*, paste pH, sulphur species, neutralization potential [NP], and acid potential [AP]) which are used to evaluate the acid generation and neutralization potential of the material. This suite of tests was conducted on all ore, waste rock, tailings, and overburden samples (Table 2-3). The paste pH measurement provides an indication as to whether a sample is currently acid generating or if it has an inherent buffering capacity. The knowledge of sulphur speciation is important as some sulphur species do not contribute to ARD when dissolved.

**Table 2-3:**
**Sample Inventory of the Current Geochemical Assessment Program Conducted**

| Sample Type | Mineralogy | ABA | Solid Phase Metals | NAG pH | SFE |
|---|---|---|---|---|---|
| *Static Testing* | | | | | |
| Waste Rock Samples | 14 | 174 | 174 | 11 | 36 |
| Ore Samples | 0 | 14 | 14 | 0 | 5 |
| Duplicates (Waste Rock) | 0 | 7 | 7 | 0 | 0 |
| Tailings Samples | 0 | 8 | 8 | 7 | 4 |
| Overburden Samples | 0 | 28 | 28 | 0 | 14 |
| **Total (static testing)** | **14** | **231** | **231** | **18** | **59** |
| *Kinetic Testing* | | | | | |
| Waste Rock Humidity Cells | 6 | 6 | 6 | 0 | 6 |
| Field Bins | 0 | 4 | 4 | 0 | 4 |
| Tailings Humidity Cell | 0 | a | a | a | a |
| Tailings Saturated Column | 0 | a | a | a | a |
| **Total (static + kinetic testing)** | 20 | 241 | 241 | 18 | 69 |

**Note:**
ABA: Acid-Base Accounting; NAG pH: Net Acid Generation pH; SFE: Shake Flask Extraction.
a: Tailings kinetic test samples were analyzed as part of the static testing program.

Minerals that most readily buffer acid generating reactions and provide NP to a system are carbonate minerals (*i.e.*, calcite, dolomite), although slower dissolving silicate and aluminosilicate minerals may also contribute to this parameter. Samples were analyzed for both Modified NP and CaNP to gain an in-depth understanding of the acid-buffering phase assemblage.

NAG pH tests are used to determine if the neutralizing minerals in a sample are able to neutralize the acidity produced by the oxidation of sulphide minerals. In a single addition NAG test, hydrogen peroxide is added to the sample and allowed to react with the sample until effervescence stops. The sample is cooled, and the pH is measured (referred to as the NAG pH). A sample is considered PAG if the NAG pH is less than 4.5 and NPAG if the NAG pH is greater than 4.5 (Price, 2009). NAG pH was conducted on a subset of waste rock and tailings samples (Table 2-3).

### 2.2.3 Solid-Phase Elemental Abundance

Solid phase elemental abundance data are used to characterize materials and to identify elements of potential environmental concern. The relatively aggressive four-acid digestion was used for the waste rock and ore samples in order to provide consistency between this method and the assay database. The tailings and overburden samples were digested using aqua regia ($HNO_3$ + 3HCl). For both methods, the extract is diluted and analyzed for metals by inductively coupled plasma mass spectrometer (ICP-MS).

The degree of enrichment as compared to average upper continental crust abundance (AUCCA, Rudnick and Gao, 2014) can provide a general indication of the overall metal leaching potential. However, elemental enrichment in the solid-phase does not necessarily indicate that the element will become an environmental concern in contact, in particular when four-acid digestion is used. Rather, the mineralogical association, pH, and redox conditions are considered master controls with respect to aqueous geochemistry.

#### 2.2.4 Shake Flask Extraction

A subset of 25 Phase Ia samples, three Phase Ib samples, five Phase II samples, two bulk sample stockpile samples, four tailings samples, and 14 overburden samples, as well as subsamples from all humidity cell (n = 6) and field bin (n = 4) samples were submitted for SFE (Table 2-3). The Phase Ia SFE samples were selected to represent a range of S and arsenic (As) contents from the different lithologies. SFE tests provide a measure of the mass of readily soluble metals which will be immediately available for leaching upon exposure to infiltrating water. The procedure consists of agitating a representative sample (crushed to <1/4“ for rock samples) in deionized water, typically at a water to solids ratio of 3:1, for 24 hours. The leachate chemistry can be used as a cursory tool in determining the potential short-term chemistry of water in contact with disturbed rock.

### *2.3 Kinetic Test Methods*

#### 2.3.1 Humidity Cells

Laboratory-based humidity cells were set up at SGS Lakefield (waste rock) and SGS Canada (tailings). These cells are composed of a plexiglass cylinder filled with approximately 1 kg of sample which, for mine rock, is crushed to 80% passing 6.4 mm. The contents of the cells are subjected to moist air for three days, followed by dry air for three days (< 10% relative humidity). At the end of each wet/dry cycle, the contents of the cell are leached with 500 mL distilled de-ionized water on day seven (Price, 1997; Lapakko, 2003). The purpose of the leaching step is to recover any readily soluble products that have formed due to mineral dissolution or sulphide oxidation in order to determine the dissolved load contributed from the previous week’s test. The leachate is then analyzed for pH, alkalinity, sulphate, and any solutes of interest (*e.g.,* metals).

Six waste rock humidity cells (HC1 through HC6) have initiated for the Project using crushed (<1/4 “) drill core material. The material for the initial four humidity cells initiated in June 2021 was selected to represent median to high sulphur contents for the two main lithologies (argillite and greywacke). Two additional humidity cells were initiated in July 2021 with samples selected to represent PAG2 (HC5) and the greywacke marker unit

(HC6) (Table 2-4). The objective of the kinetic testing program is to provide sulphide oxidation and leaching rates to be used as input for the geochemical source term model.

One tailings humidity cell has been initiated for the Project. This humidity cell contains a subsample from the 2020 Master Composite and is currently being operated at SGS Canada in Burnaby, BC. While tailings are not expected to remain permanently saturated or covered, this test is designed to understand the leaching behaviour and carbonate depletion rates of tailings under oxidizing conditions should a beach develop temporarily.

**Table 2-4:**
**Humidity Cell Sample Description**

| Humidity Cell | Lithology | Designation | Targeted Material | Subsamples[a] |
|---|---|---|---|---|
| HC1 | Argillite | NPAG | Argillite, Median Total S and As | GB-2020-70<br>GB-2020-100 |
| HC2 | Argillite | PAG1 | Argillite, 90$^{th}$ Percentile Total S and As | GB-2020-06<br>GB-2020-37<br>GB-2020-72 |
| HC3 | Greywacke | NPAG | Greywacke, Median Total S, 75$^{th}$ Percentile As | GB-2020-15<br>GB-2020-34<br>GB-2020-54 |
| HC4 | Greywacke | PAG1 | Greywacke, 90$^{th}$ Percentile Total S and As | GB-2020-55<br>GB-2020-83 |
| HC5 | 50% Argillite, 50% Greywacke | PAG2 | PAG2 | GB-2020-012<br>GB-2020-080<br>GB-2020-030<br>GB-2020-081 |
| HC6 | Greywacke Marker Unit | PAG2 | Greywacke Marker Unit | GB-2020-046<br>GB-2020-048<br>GB-NM2021-32 |
| HCT1 | Mixed | PAG1 | Tailings | 2020 Master Composite |

**Notes:**
[a]Subsamples represent equal proportions to generate humidity cell composite.
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating.
The definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.

### 2.3.2 Field Bins

The four field bins use industrial-grade, 115L plastic drums that have been tested for this purpose at several other mine sites. Natural precipitation passes through the rock material and drains out of the bottom of the field bin via a small hole that is connected to collection jugs via HDPE tubing. Leachate samples are taken when a sufficient water volume has collected in the collection jug and submitted to Bureau Veritas Laboratories for water quality analysis, including pH, conductivity, alkalinity, acidity, hardness, sulphate, chloride, phosphorus, and dissolved metals.

Four field bins were set up at the Project site in June (FB-1) and July (FB-2 through FB-4) 2021 (Figure 2-4; Table 2-5) with the help from Anaconda staff. Approximately 180 kg of material was selected for each of the field bins. FB-1 contains material from the bulk sample stockpile, while FB-2 through FB-4 contain quarter cut drill core. The drill core intervals were selected to target specific NPR classes and lithologies using results from the block model (Table 2-5). A representative subsample for static testing was collected from the excess material and submitted for static characterization.

To date, leachate results are available for eight samples from FB-1 and for six samples from FB-2 through FB-4. Quality assurance/quality control (QA/QC) sampling for the field bins includes a field blank and a field duplicate for each sampling event. The field blanks are collected by filling the sampling bottles with deionized water, while the field duplicates are two samples collected from the same field bin collection jug with sufficient leachate. QA/QC samples are submitted for the same suite of parameters as the regular field bin samples.

**Figure 2-4: Field bin setup at the Goldboro Project site.**

**Table 2-5:**
**Field Bin Sample Description**

| Field Bin | Material Type | Lithology | Designation |
|---|---|---|---|
| 1 | Bulk Sample Stockpile | Mixed | PAG1 |
| 2 | Drill Core | Mixed | NPAG |
| 3 | Drill Core | Greywacke | PAG1 |
| 4 | Drill Core | Argillite | NPAG |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating.
The definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.

### 2.3.3 Saturated Column

Saturated columns provide information on the geochemical behaviour of geologic material which may become flooded as a result of mining activities. Saturation of tailings is the planned storage method during operations and it is expected that the bulk of the tailings will remain saturated during post-closure. The column test is therefore designed to capture the geochemical regime controlling TMF porewater and seepage chemistry.

One tailings saturated column containing the 2020 Master Composite tailings sample has been set up for the Project. The saturated column was constructed from a Plexiglass cylinder (13.3 cm inside diameter, 25.2 cm length) and filled with 5.7 kg of material (dry weight). Before the addition of any column substrates, the bottom of the column was lined with a dispersion plate (perforated disk), a sheet of non-reactive mesh fabric, and a layer of silica sand (500 g) to allow for the even distribution of water over the surface area of the column bottom before contacting the sample.

The column is equipped with an inlet at the base of the column and one port at the top of the column for sampling. Note that the experiment was designed so that influent entered from the bottom of the column and flowed upward. In other words, the bottom of the column is effectively upgradient and the top of the column is downgradient. This is a standard measure to ensure even flow through the column materials and minimize the risk of uncontrolled gravity-driven drainage and development of preferential flow paths (*e.g.*, Jurjovec *et al.*, 2002; Petrunic *et al.*, 2005). Tailings supernatant is being used as the column influent. The first batch of influent was used for the first 22 weeks at which time the influent was switched to tailings supernatant that had undergone more a more rigorous cyanide detoxication.

Leachate samples are collected bi-weekly. Conductivity, pH, and total alkalinity are measured at the in-house laboratory, while subsamples are sent to ALS Environmental Laboratories in Vancouver, BC for sulphate, nitrogen species, cyanide species, dissolved organic carbon (DOC), and dissolved metals. The two column influent samples, which are tailings supernatant, were analyzed for the same suite of parameters.

### 2.3.4 Ore Stockpile Water Quality

Water quality samples representing ore stockpile runoff are collected from a lined ditch immediately adjacent to the ore pile (Figure 2-2). This water quality monitoring program began in September 2018 and has occurred approximately three times per year. Samples are submitted to Bureau Veritas Laboratories and analyzed for pH, conductivity, alkalinity, total suspended solids (TSS), hardness, sulphate, chloride, nitrogen species, orthophosphate, total organic carbon, total metals, and dissolved metals. Since 2021 runoff from the ore stockpile is being sampled in conjunction with the field bin program and includes dissolved metals analyses.

Each set of samples submitted for analyses is subjected to an internal laboratory QA/QC program. This program includes duplicate samples and analytical standard analysis. Any laboratory duplicate result or standard that does not adhere to the precision specifications for the different parameters triggers a re-analysis.

# *3. Static Test Results*

## *3.1 Mine Rock*

### 3.1.1 Mineralogy

Mineralogical abundance, grain sizes and textures were determined by QEMSCAN and petrographic analysis (Appendix B). In combination with geochemical static and kinetic testwork, the understanding of the mineralogical make-up of a rock sample helps with the interpretation of ML/ARD characteristics. For instance, the particle size, distribution and liberation of carbonate phases relative to sulphide minerals will influence the effectiveness of acid buffering reactions and thereby the timing of ARD onset. Further, the determination of sulphide mineral chemistry and textural relationships sheds light on metal leaching rates such as As release.

The 20 Goldboro samples submitted for mineralogical testwork to date represent waste rock from multiple phases of the static test program. The sample suite includes subsamples from all humidity cells as well as a range of predominantly mono-lithological materials from different zones of the two open pits. Rock-forming phases making up well over 90% of the total mineral inventory and include, sorted by average abundance, quartz, plagioclase, muscovite, biotite, chlorite, and K-feldspar (Figure 3-1). Minor and trace minerals (exclusive of sulphides and carbonates) are represented by Ti-oxides, apatite, epidote, amphibole ± pyroxene, talc, and Fe-oxides. The overall mineral composition is reflective of turbiditic sediments that underwent low-grade, greenschist metamorphism. It is of note that with exception of one sample which may have been misclassified lithologically (GB-200-106), greywacke samples show a distinctly higher quartz content (50-55%) than argillite materials (20-45%) and are somewhat richer in both plagioclase and K-feldspar. Conversely, argillite assemblages exhibit higher mica (muscovite and biotite) abundances as well as slightly increased chlorite contents (Figure 3-1). These phases are interpreted to be indicative of prograde alteration of clay phases which are expected to be enriched in a lower-energy marine sediment deposit. Where humidity cell subsamples were intended to represent one lithology only (HC 1 through HC 4), the primary mineral abundances appear to reflect the described mineralogical trends for the corresponding rock unit accurately.

Textural characteristics observed in thin section range from fine-grained, highly foliated, sometimes micro-folded, groundmass with few larger (> 0.1 mm) biotite grains (Figure 3-2 a, b) to coarser poorly- to moderately-sorted assemblages with subangular to subrounded quartz-feldspar dominated matrix without clear bedding/foliation planes (Figure 3-2c, d).

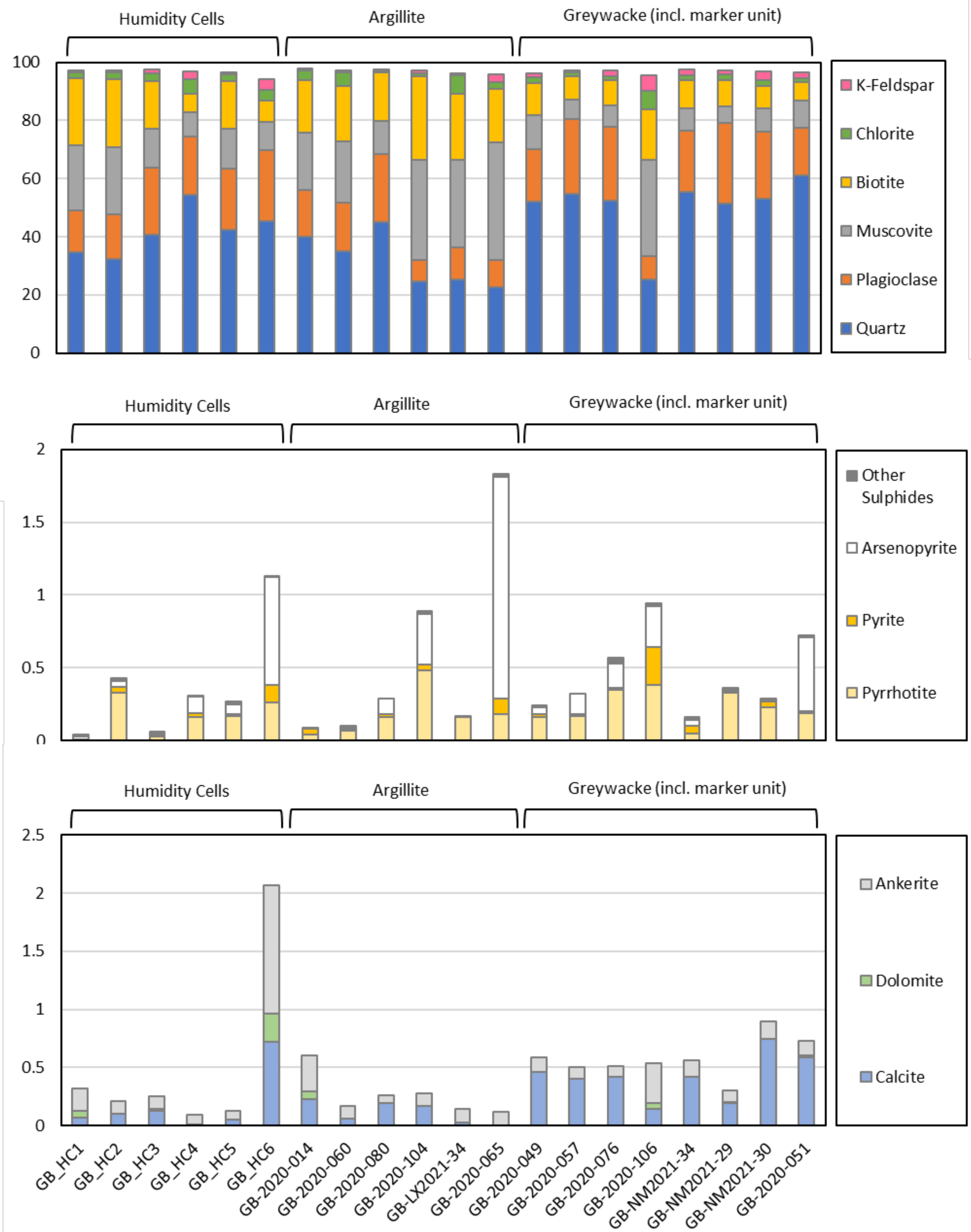



**Figure 3-1: Modal abundances of rock-forming (top), sulphide (middle), and carbonate (bottom) minerals determined by QEMSCAN analysis.**

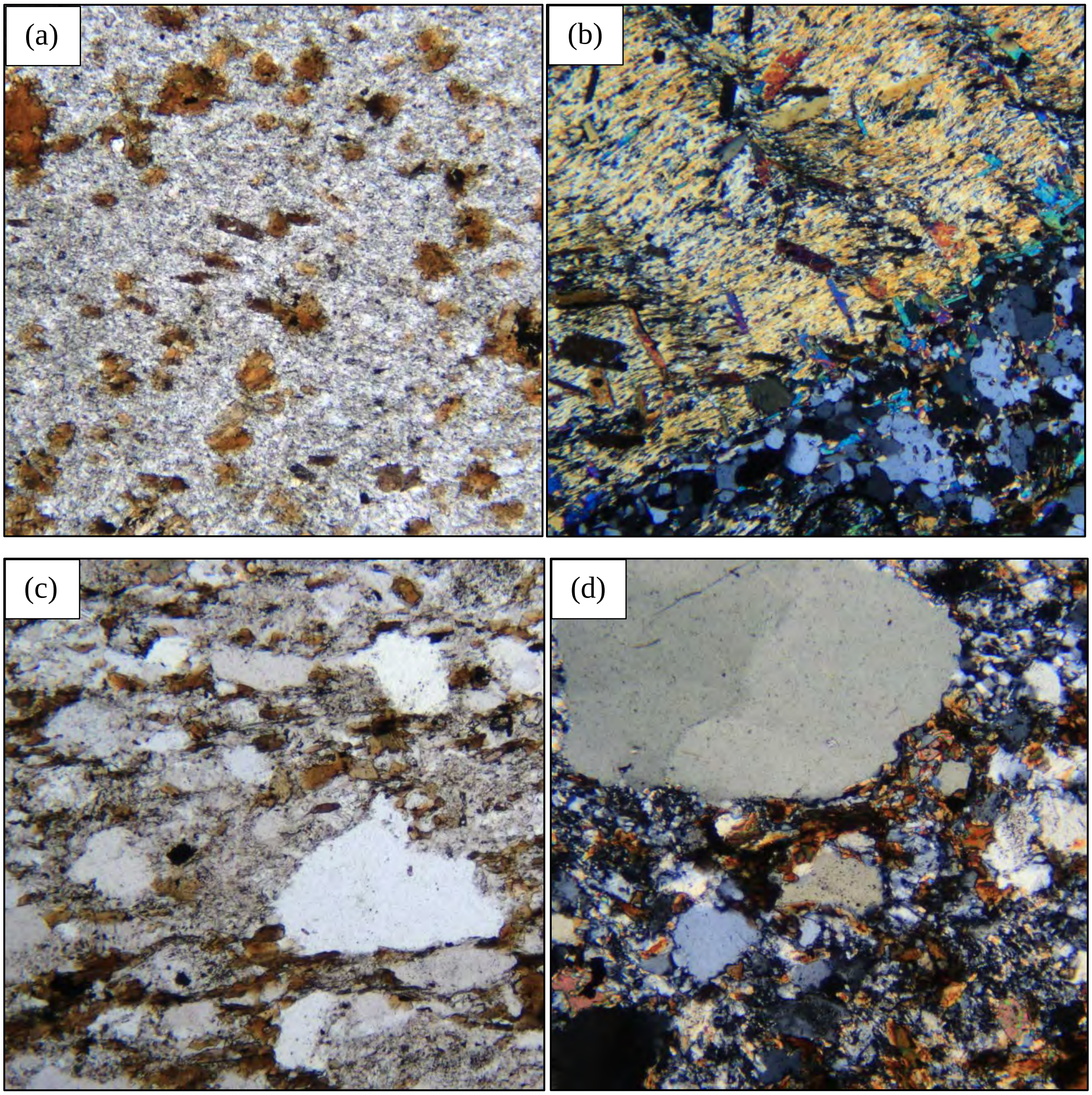



**Figure 3-2: Photomicrographs of textures typically observed in the Goldboro mineralogy samples. Field of view (FOV) in all images is ~ 1.4 mm. (a) weakly oriented, fine-grained meta-argillite with recrystallized or hydro-thermal biotite (plane-polarized light = PPL); (b) micro-folded matrix of predominantly muscovite and cross-cutting biotite in contact with lens of recrystallized quartz, possibly representing a pressure shadow (crossed polar = XPL); (c) weakly metamorphosed greywacke with subangular to subrounded, coarse feldspar and quartz embedded in matrix of oriented mica and clay (PPL); (d) similar to (c) but displaying less particle sorting and matrix is more randomly oriented (XPL).**

These textural end-members are also interpreted to represent the main lithological end-members namely argillite and greywacke, respectively. Intermediate textures include coarse quartz and feldspar grains embedded in a weakly-foliated, relatively fine groundmass consisting largely of mica (muscovite, biotite) and sericite ± clay which are commonly oriented along bedding and/or foliation planes. Quartz and felspar are typically, isometric, subangular to subrounded, and occur over a wide range of grain sizes making the transition from clast- to groundmass-dominated textures gradational in some samples.

Biotite may occur as elongated, tabular grains oriented dominantly along bedding or foliation plane or as recrystallized, isometric patches filling/replacing groundmass. Muscovite/sericite most commonly occurs as subhedral needles or platy crystals. Chlorite was observed as patches replacing feldspar or clay and is commonly oriented along the bedding plane. Other occurrences include agglomerates of randomly oriented chlorite, biotite and ilmenite likely representing complete replacement of feldspar grains during hydrothermal activity.

Locally, both quartz and biotite form medium- to fine-grained, equigranular clusters with recrystallized grain boundaries suggesting that these samples have undergone a higher-temperature metamorphism than other samples. A further example of overprinting features is the near-complete replacement of feldspar grains by inferred clay-sericite assemblages too fine to identify conclusively.

Overall, most samples, irrespective of the lithology type identified during core logging, contain a range of the described textures and grain sizes. This underscores the fine interbedding of greywacke and argillite in the Goldboro deposit on a sample scale (1-5 m intervals). Therefore, while lithological trends do exist, the vast majority of blasted waste rock is expected to contain a mix of the two major lithologies.

Sulphide minerals were identified in all studied samples and comprise arsenopyrite, pyrrhotite, and pyrite (Figure 3-1). All of these sulphides contain Fe and generate acidity when oxidized. Trace amounts of unknown (other) sulphides were also detected. There is a weak relationship with respect to sulphide abundance and waste rock lithology where the argillite population displays a slightly higher sulphide mineral content than the greywacke-bearing samples. This is especially true if GB-2020-106 was misclassified and is in fact an argillite sample.

There is no relationship between sulphide abundance and rock type. While pyrrhotite was detected in all samples, arsenopyrite is the dominant sulphide phase in a subset of the tested materials, independent of lithology, reaching up to >0.5% (Figure 3-1). With few exceptions, pyrite was found to be rarer than the other two sulphide phases detected by

QEMSCAN. Unidentified sulphide phases make up less than a third and typically less than 10% of the sulphide inventory across the mineralogical sample suite.

The arsenopyrite modal abundance was compared with the solid-phase As content to identify the host phases of this species (Figure 3-3). It was found that a good correlation ($r^2$ = 0.92) exists between these parameters with a higher relative variability in samples with a lower As content. To assist with the interpretation of this trend, the total sulphide mineral abundance was also plotted against the corresponding total S value of the analysed materials. The finding that this correlation shows a similar curve as well as $r^2$ value suggest that both the imperfect sulphur and As relationships may be affected by sample heterogeneity and sub-sampling artifacts rather than elemental speciation discrepancies. This interpretation is based on the assumption that sulphate minerals, primary or secondary, are sufficiently scarce to not impact the total S inventory of Goldboro waste rock and ore. As a result, while As may occur in an adsorbed state or as impurities within pyrite and pyrrhotite to an extent, it is inferred to be predominantly hosted in arsenopyrite. Consequently, As leaching may be enhanced and/or longer-lasting if waste rock is stored under unsaturated conditions under which arsenopyrite is oxidized. At 0.04 and 0.06% respectively, humidity cell samples HC1 and HC3 have lower sulphide mineral contents than the other mineralogical samples. Indeed, after recalculation into total S (in %), these samples show lower sulphur contents than the respective static test materials (Table 3-6). As discussed above, this is most likely a result of sample preparation issues where the subsample used for the QEMSCAN analysis is not entirely representative of the static test sample which is larger in mass. If more emphasis is given to the geochemical analysis, it is evident that these two samples are still representative of the argillite and greywacke populations as intended.

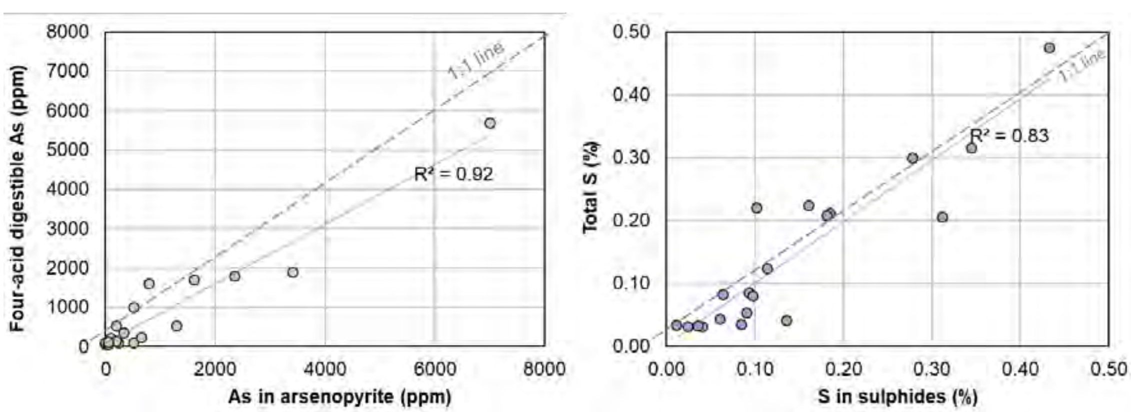



**Figure 3-3: Comparison of mineralogical data with solid-phase elemental abundance for arsenic and sulphur.**

Optical microscopy showed that arsenopyrite was generally identified somewhat concentrated in a given rock fragment of the studied grain mounts, while other fragments of the same sample are entirely devoid of this phase. One unique finding in sample GB-2020-51 is a relatively high density of subhedral arsenopyrite of variable grain size was identified adjacent to what appears to be a hydrothermal quartz vein. More commonly however, arsenopyrite forms medium to coarse (> 0.5 mm), euhedral to subhedral grains and may be in contact with pressure shadows filled with euhedral biotite (Figure 3-4a, b). In most instances growth surfaces are relatively fresh with incipient surface weathering visible only in a small number of grains. In contrast, pyrrhotite and pyrite are smaller in grain size (< 0.2 mm) and were found as disseminated, anhedral blebs (Figure 3-4c) within the rock matrix replacing primary phases or filling voids, often adjacent to hydrothermal biotite grains or patches. In the examined samples, minute pyrite blebs are mostly associated (via exsolution?) with pyrrhotite grains. Rarely, pyrite was precipitated discretely as vein or microcrack fill (HC6; Figure 3-4d). Pyrrhotite and pyrite show more pervasive signs of oxidation than arsenopyrite as evidenced by the partial to full replacement of pyrrhotite grains in some samples (Figure 3-4c). On average, it is estimated that approximately 20% of this phase have been replaced by what is inferred to be amorphous Fe-hydroxides.

The visually-determined grain size distribution of sulphide phases differs somewhat from the automated QEMSCAN results where pyrite tends to be slightly finer-grained than pyrrhotite and arsenopyrite. Overall, mean grain sizes for these phases range from 5 to 57 µm, with most samples displaying a range from 10 to 30 µm (Table 3-1). Although mineral exposure characteristics were constrained during QEMSCAN analysis, these semi-quantitative results should be interpreted with caution due to the automated nature of the method and the finely crushed samples which are not representative of blast rock under full-scale field conditions. Nevertheless, high-level results are presented herein. Note that these results apply to Fe-sulphides, calcite, and dolomite only. Liberated sulphide grains (80-100% exposure) make up 30 to >90% of the different mineral assemblages with a median value of 78%. Partially exposed (20-80% exposure) grains are less common overall with a median value of 19% of the mineral assemblage. Only a small portion of sulphide grains (≤5%) are fully locked within the mineral matrix across all samples (Appendix B).

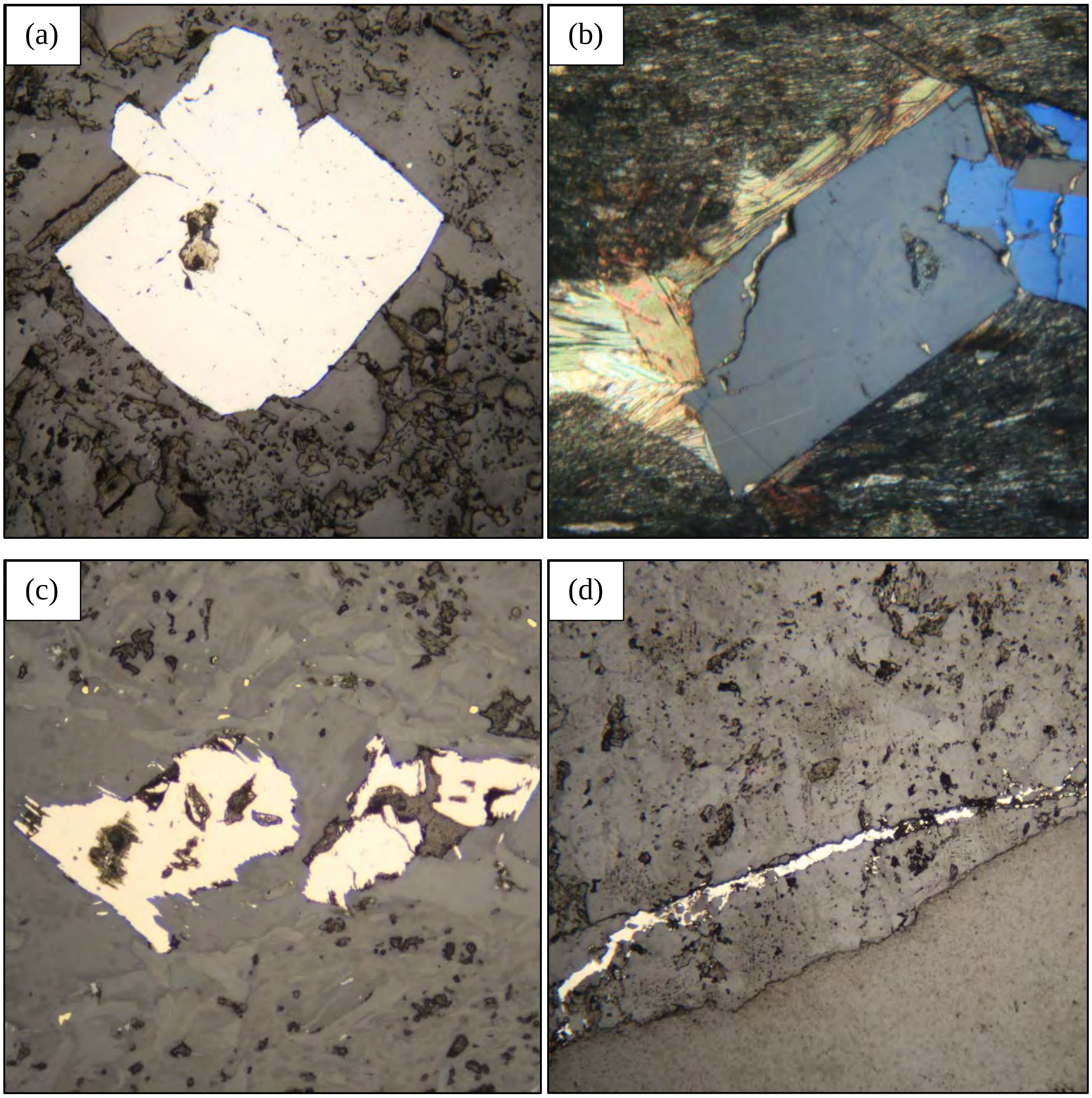



**Figure 3-4: Photomicrographs of various sulphide minerals observed in the Goldboro mineralogy samples. (a) Subhedral, isometric arsenopyrite grain (reflected PPL; FOV ~ 1.4 mm); (b) twinned, euhedral, rhombic arsenopyrite grains in contact with an agglomerate of plat biotite filling pressure shadow (reflected XPL; FOV ~ 1.4 mm); (c) partially oxidized, anhedral pyrrhotite with corroded grain boundaries reflected (PPL; FOV ~ 0.55 mm); (d) microcrack filled with pyrite (reflected PPL; FOV ~ 1.4 mm).**

**Table 3-1:**
**Mean Particle Size (in µm) Distribution Measured by QEMSCAN**

| Sample ID | Rock Type | Mean Particle Size (µm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | All | Pyrrhotite | Pyrite | Arsenopyrite | Calcite | Dolomite | Ankerite |
| **HC1** | argillite | 24 | 6.2 | 9.4 | 12 | 10 | 8.1 | 7.8 |
| **HC2** | argillite | 26 | 17 | 9.7 | 14 | 19 | 5.6 | 6.3 |
| **HC3** | greywacke | 32 | 12 | 10 | 6.6 | 16 | 6.9 | 7.0 |
| **HC4** | greywacke | 31 | 16 | 15 | 13 | 8.1 | 9.1 | 6.5 |
| **HC5** | 50% argillite, 50% greywacke | 29 | 20 | 13 | 14 | 10 | 5.6 | 6.3 |
| **HC6** | greywacke marker unit | 31 | 17 | 17 | 29 | 20 | 7.2 | 17 |
| **GB-2020-014** | argillite | 32 | 10 | 14 | 5.6 | 19 | 10 | 13 |
| **GB-2020-060** | argillite | 26 | 17 | 7.4 | 15 | 11 | 5.8 | 6.8 |
| **GB-2020-080** | argillite | 30 | 25 | 18 | 25 | 15 | 6.6 | 6.5 |
| **GB-2020-104** | argillite | 25 | 20 | 14 | 45 | 21 | 12 | 6.9 |
| **GB-LX2021-34** | argillite | 26 | 22 | 7.1 | 9.4 | 11 | 5.9 | 6.5 |
| **GB-2020-065** | argillite + quartz vein | 24 | 15 | 16 | 28 | 6.6 | 5.8 | 7.2 |
| **GB-2020-049** | greywacke | 27 | 21 | 14 | 34 | 19 | 7.0 | 7.2 |
| **GB-2020-057** | greywacke | 35 | 22 | 13 | 33 | 16 | N/A | 6.9 |
| **GB-2020-076** | greywacke | 35 | 29 | 14 | 28 | 19 | 7.9 | 7.0 |
| **GB-2020-106** | greywacke | 25 | 19 | 19 | 27 | 14 | 8.0 | 11 |
| **GB-NM2021-34** | greywacke | 35 | 13 | 24 | 32 | 19 | 5.6 | 7.2 |
| **GB-NM2021-29** | greywacke marker unit | 35 | 57 | 11 | 16 | 15 | 20 | 6.8 |
| **GB-NM2021-30** | greywacke marker unit | 32 | 18 | 21 | 13 | 23 | 5.6 | 7.3 |
| **GB-2020-051** | greywacke + quartz vein | 30 | 21 | 10 | 23 | 19 | 8.8 | 7.2 |

The carbonate mineral abundance is relatively low, falling below 1% in all samples analyzed with the exception of HC6. The argillite sub-population shows the lowest carbonate contents relatively consistently. Carbonate minerals identified include calcite, dolomite, and ankerite and occur at variable proportions (Figure 3-1c). Calcite appears to show a slightly higher abundance in the greywacke population while dolomite only occurs as a minor phase or is negligible in the tested waste rock samples. Both calcite and dolomite, if sufficiently liberated are known to provide effective neutralizing capacity when in contact with acidic waters.

Carbonates were observed most commonly as feldspar replacement patches in association with chlorite in unbedded, recrystallized assemblages (Figure 3-5a, b). On occasion, subhedral and euhedral, relatively coarse carbonate crystals were also observed clustered near the contact to quartz-veins (Figure 3-5c). In one example, this crystal habit was observed in the same rock fragment displaying arsenopyrite clustering. Carbonate minerals are typically finer than sulphides with mean values ranging from 5 to 23 µm as determined by QEMCSAN analysis (Table 3-1). Most commonly however, the mean diameters measured fall below 20 µm with calcite commonly representing the larger fractions. This may lead to the relatively accelerated depletion of carbonate minerals under non-acidic conditions which could affect the timing of ARD onset. Notably, carbonate phases were found to be slightly less liberated than sulphide phases with the median value falling at 56% (range: 19 to 86%). A larger percentage of carbonate grains are partially exposed, while similarly few carbonate phases are fully locked (Appendix B). The relatively lower liberation of carbonate *versus* sulphide phases constitutes another control on the timing of ARD in PAG materials since availability of carbonates to buffer acidity from sulphide oxidation may be limited.

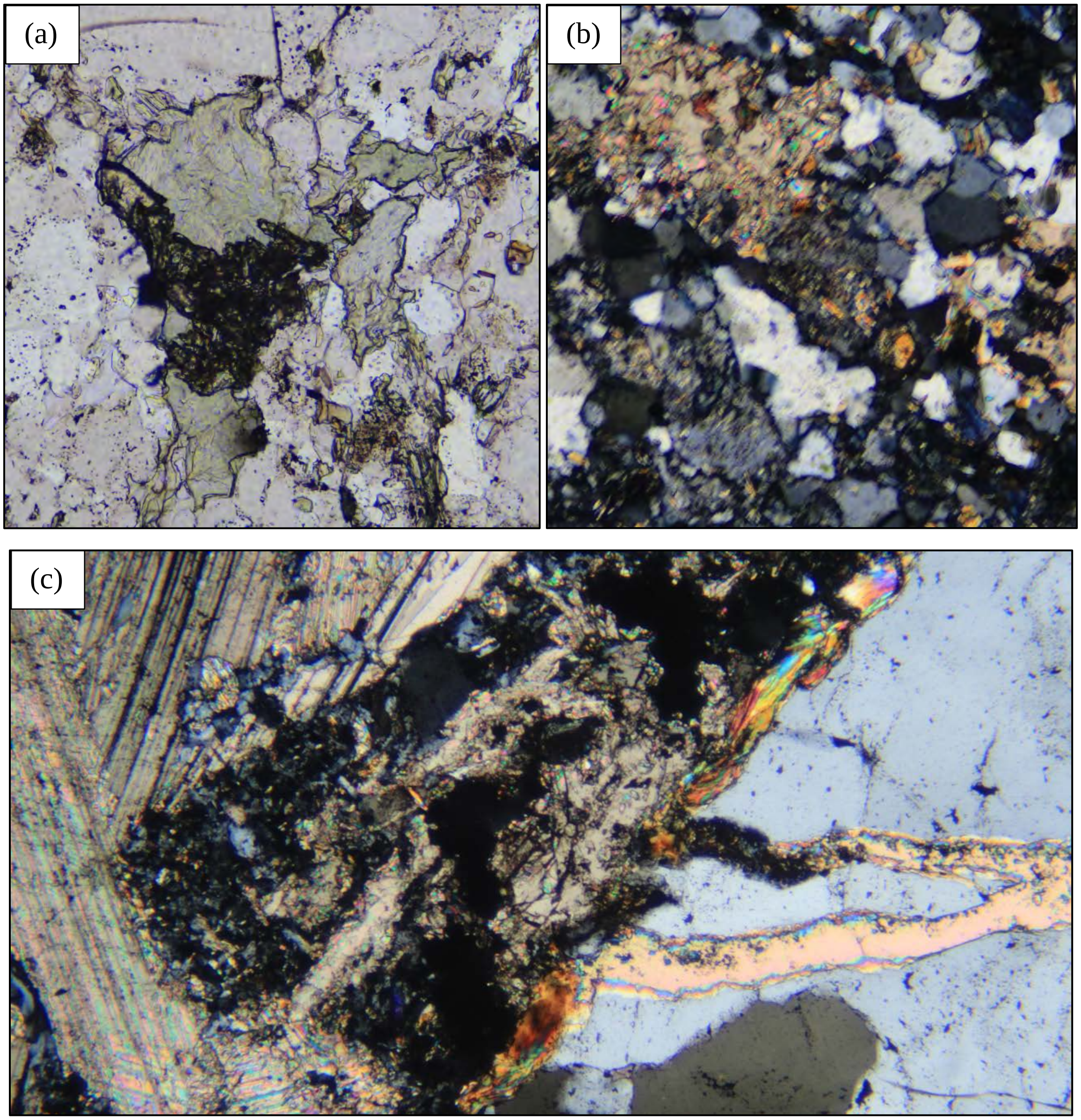



**Figure 3-5: Photomicrographs of carbonate occurrences in the Goldboro mineralogy samples. (a) Aggregate of subhedral dolomite-ankerite grains (dark, high relief) in association with light-green chlorite patch (PPL; FOV ~ 0.55 mm); (b) replacive carbonate embedded quartz-feldspar matrix (XPL; FOV ~ 0.55 mm); (c) coarse, euhedral calcite grains (left) crystallized adjacent to a quartz vein (right) separated by hydrothermal muscovite. A carbonate filled microcrack (pink) cross-cuts the quartz vein horizontally (PPL; FOV ~ 1.4 mm).**

### 3.1.2 Acid-Base Accounting

The full suite of ABA analyses for all waste rock and ore samples is presented in Appendix C.1. The following discussion focusses on these samples grouped by environmental designation (*i.e.*, NPAG, PAG1, PAG2) and includes all samples from Phase I, Phase II, and the bulk sample stockpile. Subsections of this discussion deal with lithological sample populations (Phase I only) and the kinetic test samples.

Paste pH provides an indication of whether a sample is currently generating acidity at the time of sampling. The paste pH for all samples was above 7.0, indicating that none of the analyze materials are currently acid generating (Table 3-2). There is no trend in paste pH values with respect to NPAG, PAG1 and PAG2 populations.

Total S varies from <0.005 to 1.7% for the full dataset. In general, total S contents increase from NPAG to PAG2 to PAG1 waste rock (median values: 0.029%, 0.086%, and 0.24% respectively). The ore samples have the highest median total S content (0.48%), but overall values fall within the range for the waste rock. The majority of the sulphur inventory is comprised of sulphide S; however, some sulphate S was measured in the samples (Figure 3-6). It should be noted that no sulphate minerals were identified in the mineralogical analysis, and it is thus assumed that sulphate minerals are a negligible portion of the total S inventory. It is therefore assumed that measured sulphate S either represents oxidation products that have accumulated in the stored samples or that the HCl leaching method used for the determination of sulphate S partially dissolves sulphide minerals. Consequently, in accordance with the mineralogical understanding of the deposit and in order to maintain conservatism, total S was used to calculate the AP for all samples. AP is expressed in units of calcium carbonate equivalents (kg $CaCO_3$/t) and is calculated stoichiometrically as:

$$AP = \text{Total S} \times 31.25 \qquad \text{(Eq. 1)}$$

Total inorganic C (TIC) is a chemical metric representing the carbonate content of a sample and can be converted into CaNP, also in units of kg $CaCO_3$/t, as:

$$CaNP = TIC \times 83.33 \qquad \text{(Eq. 2)}$$

CaNP in Goldboro mine rock samples is relatively low and shows little variability between NPAG and PAG waste rock (Table 3-2). CaNP ranges from <0.4 to 22 kg $CaCO_3$/t for the waste rock samples and from 1.5 to 18 kg $CaCO_3$/t for the ore samples. For the majority of samples, the Modified NP is greater than the CaNP (Figure 3-7). This result suggests that minerals other than carbonate (*i.e.*, aluminosilicates) contribute to NP during the employed test method. This NP is not as readily available as the CaNP; however, when sulphide values are low the NP from the dissolution of non-carbonate minerals may be sufficient to neutralize the low rates of acid production. In order to ensure that the non-carbonate NP is not overestimated, a corrected Modified NP value was calculated by subtracting 5 kg $CaCO_3$/t from the Modified NP measurement. This results in better agreement between the CaNP and corrected Modified NP (Figure 3-7) and accounts for the more limited liberation observed for carbonate phases relative to sulphide minerals (Appendix B). Samples with significantly higher CaNP than corrected Modified NP are inferred to contain significant ankerite [$Ca(Fe, Mg, Mn)(CO_3)_2$]. Due to the presence of Fe and/or Mn in this mineral's crystal structure, the dissolution of ankerite will only provide limited buffering capacity where the neutralization potential is inversely proportional to the Fe- and Mn-content of the phase.

The net potential ratio (NPR = NP/AP) represents a metric that can be used to assess whether a sample will be potentially acid generating (PAG). The ARD characteristics of Project geologic materials was defined through the NPR as follows:

- PAG1 – NPR < 1 or 1 ≤ NPR ≤ 2 and total S ≥ 0.2 wt. %
- PAG2 – 1 ≤ NPR ≤ 2 and total S < 0.2 wt. %
- NPAG – NPR > 2

This classification scheme is in general agreement with recommendations made in Price (2009) and provides increased resolution on PAG risk where PAG1 materials are considered more likely to generate low-pH drainage in the long-term.

NPR (NP/AP) values were calculated as the ratio of both the CaNP and the corrected Modified NP to AP. An operational NPR value was defined as the higher of these two values. In general, the operational NPR is negatively correlated with total S (Figure 3-8). Due to the low variability in NP, the total S content has a stronger control on the environmental classification. Within the ML/ARD database, waste rock is dominantly NPAG (63%), while ore is generally PAG (93%) (Table 3-3). It is important to note however, that the geochemical proxies based on results from this study were imported into the geological block model (prepared by others) to constrain tonnages of PAG1, PAG2, and NPAG rock over the life of mine more accurately.

## Table 3-2:
## Summary of Acid Base Accounting Results by NPR Designation

| Parameter | Paste pH | Total S | Sulphate S | Sulphide S | Total C | Inorganic C | CaNP | Corrected Mod. NP | Operational NPR |
|---|---|---|---|---|---|---|---|---|---|
| **Units** | **-** | **wt.%** | **wt.%** | **wt.%** | **wt.%** | **wt.%** | **kg $CaCO_3$/t** | **kg $CaCO_3$/t** | **-** |
| **Waste Rock (n = 174)** | | | | | | | | | |
| *NPAG (n = 110)* | | | | | | | | | |
| Min | 8.1 | <0.005 | <0.04 | <0.04 | 0.018 | <0.005 | 0.42 | 0.10 | 2.2 |
| Median | 9.5 | 0.029 | <0.04 | <0.04 | 0.075 | 0.044 | 3.6 | 4.8 | 6.7 |
| P90 | 9.8 | 0.066 | 0.041 | 0.050 | 0.16 | 0.091 | 7.6 | 16 | 19 |
| Max | 10 | 0.32 | 0.13 | 0.19 | 0.34 | 0.27 | 22 | 26 | 32 |
| *PAG1 ( n = 45)* | | | | | | | | | |
| Min | 7.9 | 0.083 | <0.04 | <0.04 | 0.018 | <0.005 | 0.42 | 0.10 | 0.076 |
| Median | 9.2 | 0.24 | 0.080 | 0.16 | 0.099 | 0.048 | 4.0 | 3.0 | 0.55 |
| P90 | 9.6 | 0.54 | 0.16 | 0.42 | 0.18 | 0.092 | 7.6 | 6.0 | 0.94 |
| Max | 9.8 | 1.7 | 0.22 | 1.5 | 0.29 | 0.16 | 13 | 12 | 1.6 |
| *PAG2 (n = 19)* | | | | | | | | | |
| Min | 8.4 | 0.032 | <0.04 | <0.04 | 0.017 | <0.005 | 0.42 | 1.5 | 1.0 |
| Median | 9.3 | 0.086 | <0.04 | 0.050 | 0.073 | 0.045 | 3.8 | 3.4 | 1.4 |
| P90 | 9.8 | 0.17 | 0.080 | 0.10 | 0.12 | 0.069 | 5.8 | 6.1 | 1.8 |
| Max | 9.9 | 0.18 | 0.10 | 0.14 | 0.14 | 0.081 | 6.8 | 10 | 1.8 |
| **Ore (n = 15)** | | | | | | | | | |
| Min | 8.1 | 0.16 | 0.080 | 0.080 | 0.052 | 0.018 | 1.5 | 0.10 | 0.087 |
| Median | 8.9 | 0.48 | 0.14 | 0.35 | 0.27 | 0.14 | 11 | 5.3 | 0.68 |
| P90 | 9.5 | 0.82 | 0.22 | 0.63 | 0.39 | 0.20 | 17 | 8.0 | 1.1 |
| Max | 9.7 | 0.95 | 0.35 | 0.72 | 0.43 | 0.22 | 18 | 9.7 | 3.3 |

**Notes:**
CaNP: Carbonate Neutralization Potential; Mod. NP: Modified NP; NPR: Net Potential Ratio.
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
Light grey shading indicates 1 < NPR < 2; dark grey shading indicates NPR < 1.

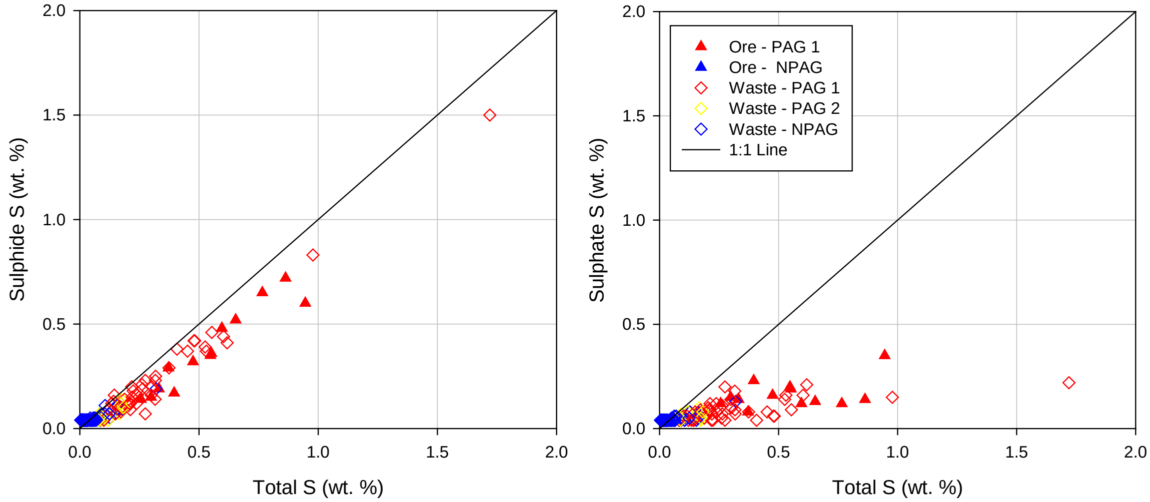



**Figure 3-6: Sulphide S *versus* Total S (left) and Sulphate S *versus* Total S (right) for mine rock samples.**

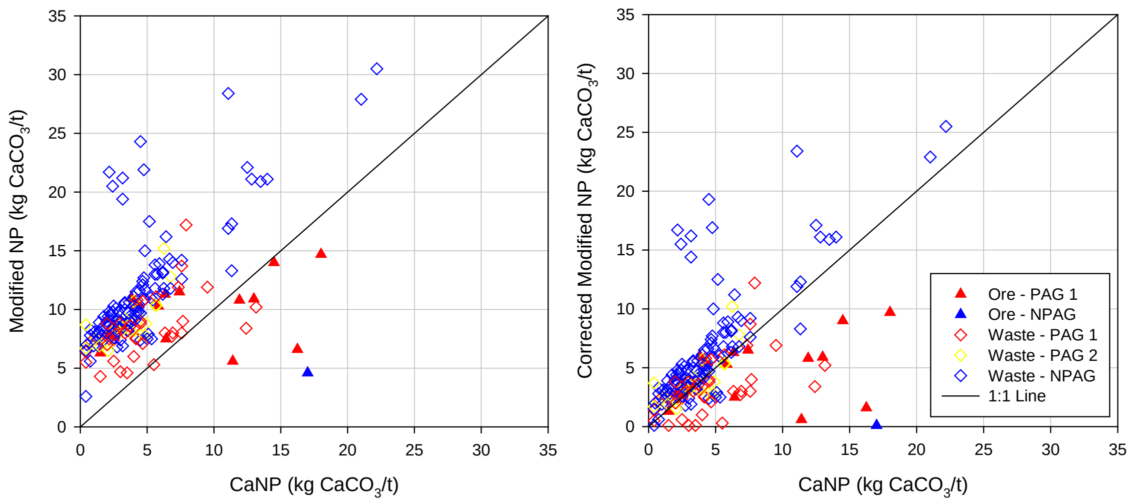



**Figure 3-7: Modified Neutralization Potential (NP) *versus* Carbonate Neutralization Potential (CaNP) (left) and Corrected Modified NP *versus* CaNP (right) for Phase I and Phase II samples.**

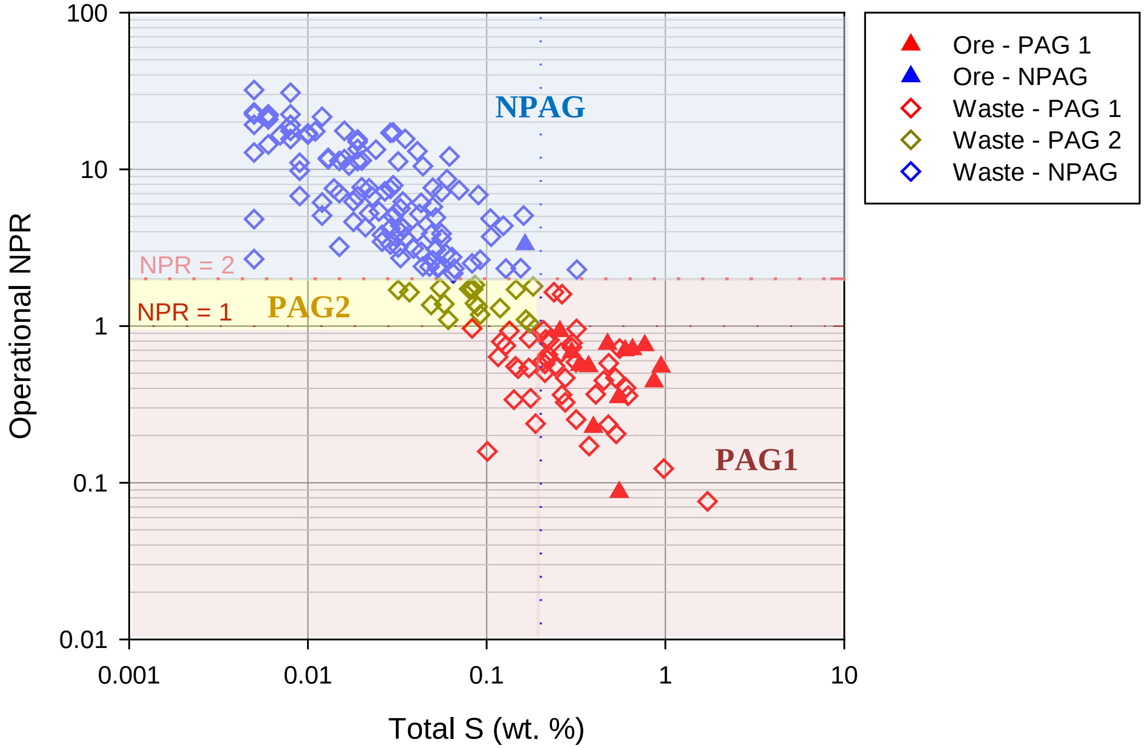



**Figure 3-8: Operational NPR *versus* Total S content for Phase I and Phase II samples. Samples are grouped by NPR designation.**

**Table 3-3:
Proportion of PAG1, PAG2, and NPAG Samples in Goldboro Mine Rock Samples**

| Class | Waste | Ore |
|---|---|---|
| PAG1 | 26% | 93% |
| PAG2 | 11% | 0% |
| NPAG | 63% | 7% |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.

### *3.1.2.1 Lithological Sample Populations (Phase I only)*

It is understood that argillite and greywacke are very finely interbedded at the Project and that carrying forward a distinction of these units would be somewhat impractical for mine planning and material segregation. Nevertheless, the static test results from the Phase Ia and Phase Ib were analyzed to determine if there are geochemical trends related to lithology (Table 3-4). The following key observations were made with respect to lithological units:

- There were no notable differences in paste pH between the different lithologies.
- The majority of samples with >0.2% total S are argillite (Figure 3-9). Overall, the median total S for the argillite samples (0.041%) is slightly higher than the median for the greywacke samples (0.031%).
- No notable trends were observed between lithology and NP.
- A slightly higher percentage of argillite samples were classified as PAG1, in comparison to greywacke (20% relative to 13%; Figure 3-10; Table 3-5). However, a comparable percentage of samples from each of these lithologies is classified as NPAG (73% for argillite; 76% for greywacke).
- Rather than being correlated to lithology, the distribution of sulphur content and PAG propensity, like gold, appear to be controlled structurally with higher PAG proportions occurring within or near the hinges of the geologic anticline.
- Less than five samples were collected for minor geological units such as greywacke + quartz vein (n = 3), quartz vein (n = 3), and the greywacke marker unit (n = 4). However, at least one sample from each of these lithologies had higher total S (>0.20%) and was classified as PAG1.

## Table 3-4:
## Summary of Acid Base Accounting Results by Lithology

| Parameter | Paste pH | Total S | Sulphate S | Sulphide S | Total C | Inorganic C | CaNP | Corrected Mod. NP | Operational NPR |
|---|---|---|---|---|---|---|---|---|---|
| *Units* | - | *wt.%* | *wt.%* | *wt.%* | *wt.%* | *wt.%* | *kg $CaCO_3$/t* | *kg $CaCO_3$/t* | - |
| **Waste Rock** | | | | | | | | | |
| *Greywacke (n = 79)* | | | | | | | | | |
| Min | 8.1 | <0.005 | <0.04 | <0.04 | 0.017 | <0.005 | 0.42 | 0.50 | 0.16 |
| Median | 9.6 | 0.031 | <0.04 | <0.04 | 0.063 | 0.034 | 2.8 | 4.2 | 5.1 |
| Max | 10.0 | 0.32 | 0.18 | 0.14 | 0.21 | 0.17 | 14 | 17 | 23 |
| *Argillite (n = 51)* | | | | | | | | | |
| Min | 8.5 | <0.005 | <0.04 | <0.04 | 0.018 | <0.005 | 0.42 | 1.4 | 0.24 |
| Median | 9.3 | 0.041 | <0.04 | <0.04 | 0.080 | 0.050 | 4.2 | 3.8 | 3.8 |
| Max | 9.8 | 0.62 | 0.21 | 0.41 | 0.34 | 0.27 | 22 | 26 | 32 |
| *Greywacke Marker Unit (n = 4)* | | | | | | | | | |
| Min | 8.5 | 0.066 | <0.04 | <0.04 | 0.072 | 0.040 | 3.3 | 3.0 | 0.50 |
| Median | 9.4 | 0.20 | 0.090 | 0.095 | 0.11 | 0.064 | 5.3 | 5.9 | 1.3 |
| Max | 9.7 | 0.30 | 0.12 | 0.20 | 0.13 | 0.088 | 7.3 | 10 | 2.3 |
| *Greywacke + Quartz Vein (n = 3)* | | | | | | | | | |
| Min | 9.0 | 0.14 | <0.04 | 0.12 | 0.048 | 0.018 | 1.5 | 0.10 | 0.17 |
| Max | 9.3 | 0.37 | 0.080 | 0.29 | 0.11 | 0.068 | 5.7 | 5.4 | 1.0 |
| *Quartz Vein (n = 3)* | | | | | | | | | |
| Min | 8.1 | <0.005 | <0.04 | <0.04 | 0.024 | <0.005 | 0.42 | 0.10 | 0.25 |
| Max | 9.3 | 0.32 | 0.090 | 0.23 | 0.11 | 0.068 | 5.7 | 6.1 | 2.7 |
| **Ore** | | | | | | | | | |
| *Argillite (n = 6)* | | | | | | | | | |
| Min | 8.9 | 0.26 | 0.12 | 0.14 | 0.052 | 0.018 | 1.5 | 1.3 | 0.087 |
| Median | 9.1 | 0.47 | 0.20 | 0.27 | 0.10 | 0.058 | 4.8 | 4.1 | 0.45 |
| Max | 9.7 | 0.95 | 0.35 | 0.60 | 0.40 | 0.19 | 16 | 6.5 | 0.92 |
| *Argillite + Quartz Vein (n = 3)* | | | | | | | | | |
| Min | 8.5 | 0.16 | 0.080 | 0.080 | 0.13 | 0.076 | 6.3 | 0.10 | 0.68 |
| Max | 9.3 | 0.48 | 0.16 | 0.32 | 0.37 | 0.20 | 17 | 6.3 | 3.3 |

**Notes:**
CaNP: Carbonate Neutralization Potential; Mod. NP: Modified NP; NPR: Net Potential Ratio.
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
Light grey shading indicates 1 < NPR < 2; dark grey shading indicates NPR < 1.

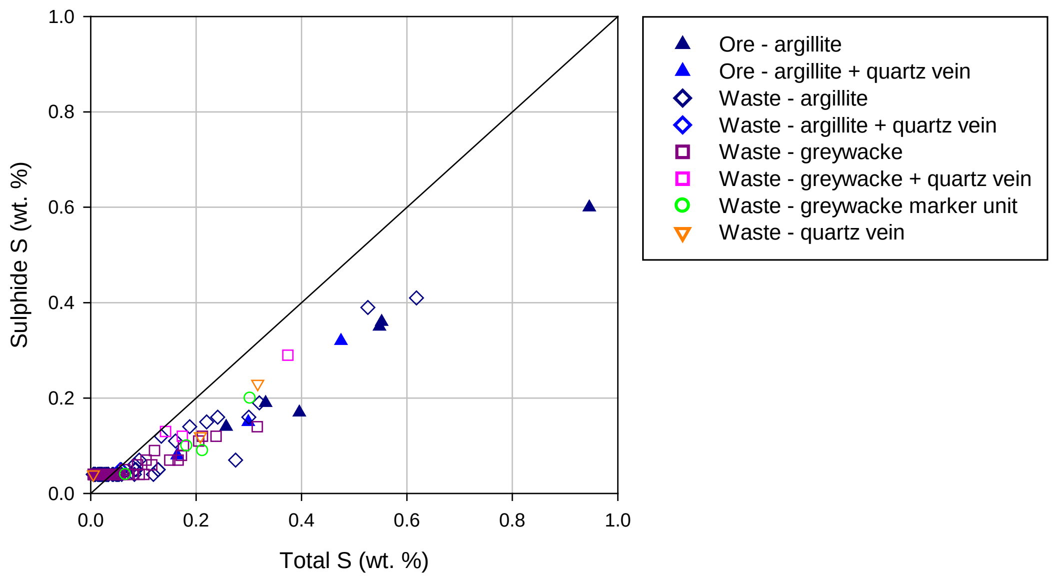



**Figure 3-9: Sulphide S *versus* Total S for Phase I samples.**

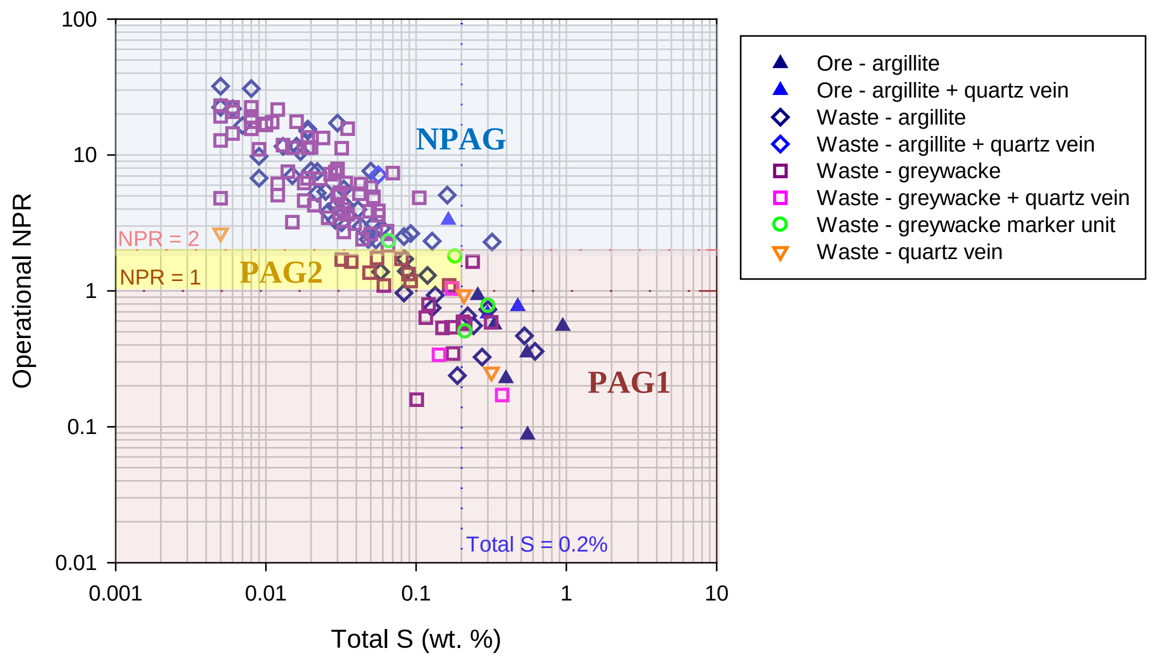



**Figure 3-10: Operational NPR *versus* Total S content for Phase I samples.**

**Table 3-5:**
**Summary of Number and Percentage of NPAG, PAG1 and PAG2 Samples for Each Lithology - Phase I**

| Lithology | n | NPAG | | PAG1 | | PAG2 | |
|---|---|---|---|---|---|---|---|
| | | n | Percent of samples | n | Percent of samples | n | Percent of samples |
| *Waste Rock* | | | | | | | |
| Greywacke | 79 | 60 | 76% | 10 | 13% | 9 | 11% |
| Argillite | 51 | 37 | 73% | 10 | 20% | 4 | 8% |
| Greywacke Marker Unit | 4 | 1 | 25% | 2 | 50% | 1 | 25% |
| Argillite + Quartz Vein | 1 | 1 | 100% | 0 | 0% | 0 | 0% |
| Greywacke + Quartz Vein | 3 | 0 | 0% | 2 | 67% | 1 | 33% |
| Quartz Vein | 3 | 1 | 33% | 2 | 67% | 0 | 0% |
| *Ore* | | | | | | | |
| Argillite | 6 | 0 | 0% | 6 | 100% | 0 | 0% |
| Argillite + Quartz Vein | 3 | 1 | 33% | 2 | 67% | 0 | 0% |

**Notes:**
n: sample count; PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.

### *3.1.2.2 Kinetic Test Subsamples*

The ABA results for the humidity cells and the field bin subsamples are summarized in Table 3-6. The initial four humidity cell samples were selected to represent median and high total S values for argillite (HC1, HC2) and greywacke (HC3, HC4). Subsamples selected to represent median total S are NPAG and have close to median values for all NPAG samples, while subsamples that were selected to represent high total S are classified as PAG1 and have close to median total S values for this unit (Figure 3-11). The HC6 (greywacke marker unit) subsample is classified as PAG1 and also has a median S content representative of this unit. The PAG2 humidity cell (HC5) shows 25$^{th}$ percentile total S for this NPR designation.

The total S content of the NPAG field bin subsamples (FB-2 and FB-4) was slightly lower than median values for all NPAG samples in the static testing database (between 25$^{th}$ percentile and median). It should be noted that FB-2 was selected to target PAG1 material; however, the subsample from this field bin contains low total S (0.020%) and is classified as NPAG. This discrepancy may be due to sample heterogeneity and the field bin containing a greater proportion of NPAG material than expected. The field bin containing bulk stockpile sample material (FB-1) and FB-3 were classified as PAG1 and exhibit a relatively high total S content for PAG1 samples in the static testing database (75$^{th}$

percentile value or greater). The sample selection for FB-3 attempted to target PAG2 material and the greywacke lithology; however, due to the high total S, this field bin is classified as PAG1.

Kinetic test samples generally fall within the $25^{th}$ to $75^{th}$ percentile window of corrected Modified NP for the respective NPR designations (Figure 3-12). The only exception was HC6 which had approximately $90^{th}$ percentile corrected Modified NP in comparison to the dataset for the corresponding PAG1 population. The kinetic test program as a whole captures the range of lithologies and environmental classes expected to be exposed at site during operations and can be considered representative of the ABA variability displayed by the static test population.

**Table 3-6:**
**Summary of Kinetic Test Sample Acid Base Accounting Results**

| Sample ID | Rock Type | Grade | Paste pH | Total S | Sulphate S | Sulphide S | Total C | CaNP | Corrected Mod. NP | Operational NPR | Designation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | - | *wt.%* | *wt.%* | *wt.%* | *wt.%* | *kg $CaCO_3$/t* | *kg $CaCO_3$/t* | - | |
| **Humidity Cells** | | | | | | | | | | | |
| HC1 | argillite | waste | 9.6 | 0.034 | <0.04 | 0.040 | 0.11 | 3.5 | 4.3 | 4.0 | NPAG |
| HC2 | argillite | waste | 9.3 | 0.22 | 0.050 | 0.17 | 0.11 | 3.8 | 4.1 | 0.59 | PAG I |
| HC3 | greywacke | waste | 9.9 | 0.032 | <0.04 | 0.040 | 0.055 | 1.7 | 4.6 | 4.6 | NPAG |
| HC4 | greywacke | waste | 9.2 | 0.22 | 0.040 | 0.18 | 0.024 | 0.42 | 1.7 | 0.25 | PAG I |
| HC5 | 50% argillite, 50% greywacke | waste | 9.7 | 0.054 | <0.04 | 0.070 | 0.063 | 1.9 | 2.5 | 1.5 | PAG II |
| HC6 | greywacke marker unit | waste | 9.3 | 0.21 | 0.050 | 0.16 | 0.13 | 6.4 | 6.8 | 1.1 | PAG I |
| **Field Bins** | | | | | | | | | | | |
| FB-1 | Mixed Ore- Bulk sample stockpile | ore | 9.5 | 0.46 | 0.090 | 0.37 | 0.33 | 17 | 2.4 | 1.2 | PAG I |
| FB-2 | PAG1, mixed lithology | waste | 9.8 | 0.020 | <0.04 | <0.04 | 0.099 | 3.7 | 7.6 | 12 | NPAG |
| FB-3 | PAG2, greywacke | waste | 9.8 | 0.39 | 0.14 | 0.25 | 0.062 | 2.1 | 4.2 | 0.35 | PAG I |
| FB-4 | NPAG, argillite | waste | 9.7 | 0.020 | <0.04 | <0.04 | 0.073 | 2.8 | 6.2 | 9.9 | NPAG |

**Notes:**
CaNP: Carbonate Neutralization Potential; Mod. NP: Modified NP; NPR: Net Potential Ratio.
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
Light grey shading indicates 1 < NPR < 2; dark grey shading indicates NPR < 1.

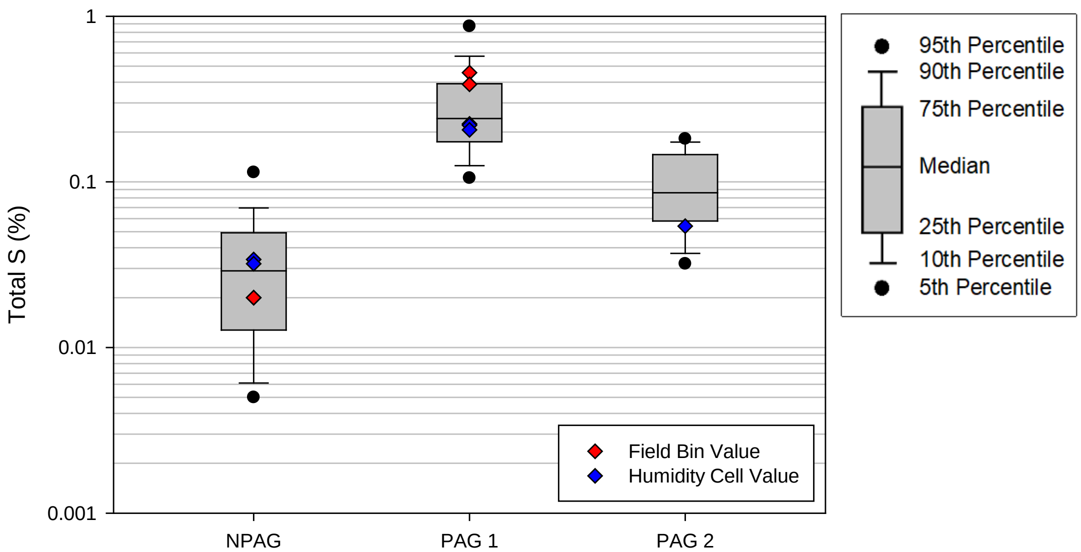



**Figure 3-11: Box and whisker plots showing the humidity cell and field bin total S values in comparison with the range determined for the static test population, grouped by NPR designation.**

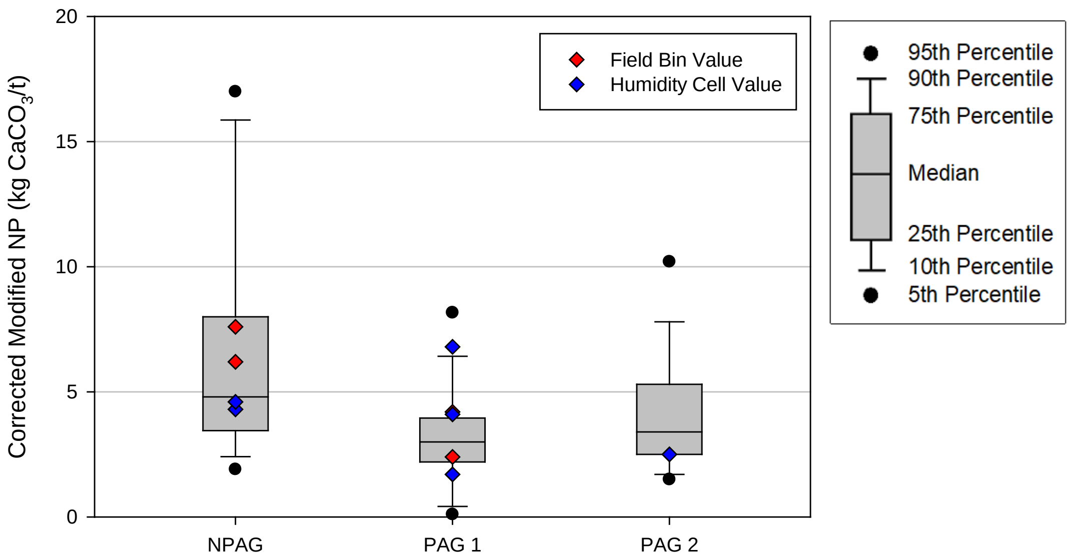



**Figure 3-12: Box and whisker plots showing the humidity cell and field bin Corrected Modified Neutralization Potential (NP) in comparison with the range determined for the static test population, grouped by NPR designation.**

The NAG pH test defines PAG samples as those with a NAG pH below 4.5, while a sample is considered NPAG if the NAG pH is above 4.5 (Price, 2009). A higher NAG pH indicates that the sample contains sufficient neutralizing capacity to buffer acidity produced by sulphide mineral oxidation. The results indicate that the majority of samples classified as PAG1 (4 of 5 samples) have a NAG pH < 4.5, while all PAG2 samples have a NAG pH > 4.5 (Table 3-7). This result supports the NPR designation of PAG1, which is considered to have a higher ARD risk than PAG2. The one PAG1 sample that had NAG pH > 4.5 had a slightly higher operational NPR relative to other PAG1 samples (close to 1).

**Table 3-7:**
**NAG pH Results for Selected Mine Rock Samples**

| Rock Type | Sample ID | Operational NPR | Designation | NAG pH |
|---|---|---|---|---|
| Argillite | GB-2020-014 | 3.2 | NPAG | 7.2 |
| | GB-2020-002 | 0.66 | PAG1 | 4.1 |
| | GB-2020-029 | 0.33 | PAG1 | 3.7 |
| | GB-2020-069 | 0.36 | PAG1 | 2.9 |
| | GB-LX2021-34 | 0.96 | PAG1 | 7.9 |
| | GB-2020-012 | 1.7 | PAG2 | 6.2 |
| | GB-2020-080 | 1.4 | PAG2 | 5.9 |
| Greywacke | GB-2020-076 | 0.57 | PAG1 | 4.2 |
| | GB-2020-009 | 1.1 | PAG2 | 6.8 |
| | GB-2020-057 | 1.7 | PAG2 | 7.6 |
| | GB-2020-030 | 1.2 | PAG2 | 7.4 |

**Notes:**
NPR: Net Potential Ratio.
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
Grey shading indicates a NAG pH value below 4.5.

### 3.1.3 Solid Phase Metals

The results of the solid phase elemental analysis are presented in Appendix C.1. The initial discussion focusses on these samples grouped by NPR designation and includes all samples from Phase I, Phase II, and the bulk sample stockpile. Lithological trends (Phase I only) and the kinetic test samples are discussed in subsections.

Elements that are greater than 3x their respective AUCCA values (Rudnick and Gao, 2014) in waste rock samples include Ag, As, Bi, Cd, Cr, Li, Mo, Pb, Sb, Se, Sn, and Zn (Table 3-8; Appendix C.1). Of these, at least one sample is above 10x the AUCCA for Ag, As, Bi, Cd, Mo, Pb, and Sb. Arsenic is the main element of concern and is above 3x the AUCCA in 99% of waste rock samples and above 10x the AUCCA in 73% of samples. There is a positive correlation between As and total S, which also correlates with NPR designation (Figure 3-13). Median As content increases from a median of 62 ppm for NPAG samples up to 1,700 ppm for PAG1 samples. The ore population has the highest median As content (5,700 ppm). Ore also has the higher median value for Cd, Cr, Mo, Pb, and Sb and the highest maximum Zn content; however, with the exception of Pb and Zn, metals contents were measured in the PAG1 samples. Species present at an elevated concentration in the solid phase may not necessarily become a metal leaching issue and vice versa. There are several factors that influence the leaching rates of elements, including the mineral association and stability, as well as the chemistry of the water coming in contact with the rocks. To that end, the solid-phase elemental composition provides a means to quantify the geochemical variability of ML/ARD samples and flag species for further evaluation during leach testing.

#### *3.1.3.1 Lithological Sample Populations (Phase I only)*

Solid phase metal results for Phase Ia and Phase Ib samples grouped by lithology are presented in Table 3-9. Metal contents are generally similar between the different lithologies. However, there is some indication that argillite has a higher As content (median: 140 ppm) relative to greywacke (median: 50 ppm) (Figure 3-13).

#### *3.1.3.2 Kinetic Test Subsamples*

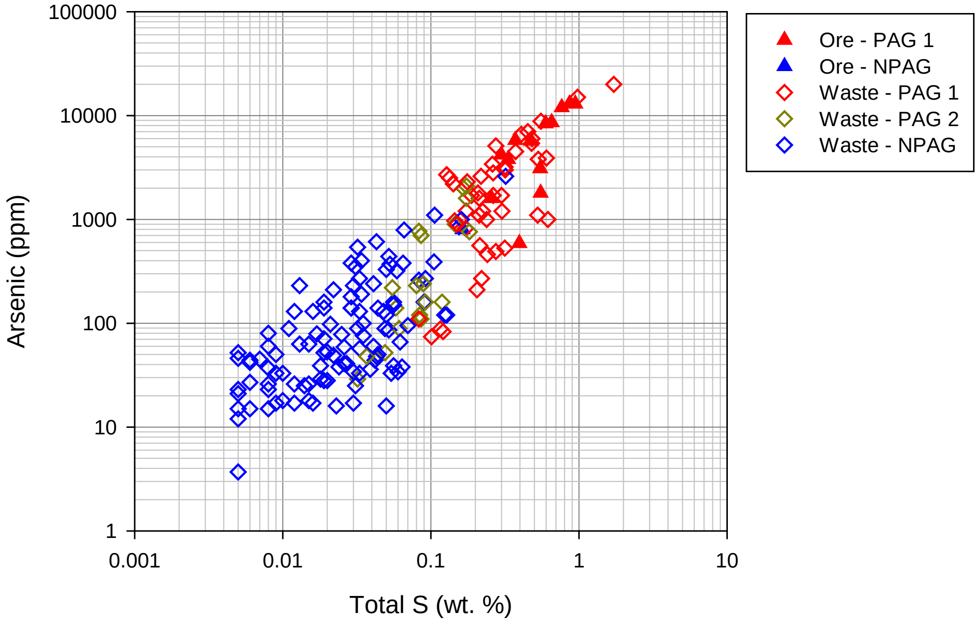
The metal concentrations that are elevated in the kinetic test subsamples are similar to those for the broader static testing database. Metals with values above 3x the AUCCA in at least one kinetic test sample include As, Cr, Mo, and Sb (Table 3-10). Of these, only As and Sb contests are shown to exceed 10x the AUCCA. Arsenic concentrations are elevated in all kinetic test subsamples, while Sb is only elevated above 10x AUCCA in FB-1 (bulk sample stockpile) and FB-3 (PAG1, greywacke).

Relative to the static test database As values, the NPAG kinetic tests show values close to the respective median (HC3 and FB-2) and 75$^{th}$ percentile (HC1 and FB-4) As contents (Figure 3-14). The PAG1 kinetic tests show a range of As contents, ranging from less than the 25$^{th}$ percentile (HC2), close to the 25$^{th}$ percentile (HC4), median (HC6), 75$^{th}$ percentile (FB-3), and 90$^{th}$ percentile (FB-1). The only PAG2 kinetic test (HC5) has an As content between the median and 75$^{th}$ percentile values for this unit. In conclusion, kinetic test samples provide a wide range of As contents suitable to assess As leaching potential of waste rock and ore.

## Table 3-8:
## Summary of Solid Phase Metal Results for Selected Parameters - by NPR Designation

| Parameter | As | Ca | Cd | Co | Cr | Cu | Fe | K | Mg | Mn | Mo | Na | Ni | Pb | Sb | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Units** | **µg/g** | **%** | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **%** | **%** | **µg/g** | **µg/g** | **%** | **µg/g** | **µg/g** | **µg/g** | **µg/g** |
| *AUCCA* | *4.8* | *2.57* | *0.09* | *17.3* | *92* | *28* | *3.92* | *2.32* | *1.5* | *774* | *1.1* | *2.43* | *47* | *17* | *0.4* | *67* |
| **Waste Rock (n = 174)** | | | | | | | | | | | | | | | | |
| *NPAG (n = 110)* | | | | | | | | | | | | | | | | |
| Min | 3.7 | 0.029 | <0.02 | 0.11 | 5.1 | 2.1 | 0.24 | 0.018 | 0.0038 | 46 | 0.10 | 0.012 | 0.60 | <0.05 | <0.8 | 0.70 |
| P10 | 18 | 0.66 | <0.02 | 7.0 | 22 | 9.8 | 2.1 | 1.2 | 0.65 | 509 | 0.30 | 1.1 | 17 | 8.9 | <0.8 | 36 |
| Median | 62 | 0.89 | 0.050 | 11 | 40 | 16 | 3.0 | 1.9 | 0.97 | 695 | 0.40 | 1.6 | 26 | 17 | <0.8 | 62 |
| P90 | 380 | 1.3 | 0.12 | 17 | 111 | 36 | 4.3 | 3.2 | 1.5 | 921 | 0.80 | 1.9 | 40 | 37 | 1.2 | 110 |
| Max | 2600 | 1.9 | 1.8 | 23 | 250 | 55 | 5.8 | 5.5 | 1.9 | 1500 | 3.2 | 2.1 | 51 | 190 | 6.5 | 450 |
| *PAG1 (n = 45)* | | | | | | | | | | | | | | | | |
| Min | 74 | 0.29 | <0.02 | 4.0 | 18 | 3.2 | 1.2 | 0.71 | 0.38 | 230 | 0.20 | 0.39 | 11 | 9.9 | <0.8 | 21 |
| P10 | 234 | 0.41 | 0.040 | 6.5 | 23 | 5.7 | 2.0 | 1.4 | 0.57 | 410 | 0.30 | 0.83 | 16 | 10 | <0.8 | 34 |
| Median | 1700 | 0.73 | 0.14 | 9.7 | 69 | 20 | 2.9 | 2.0 | 0.94 | 640 | 0.50 | 1.3 | 25 | 20 | 1.8 | 55 |
| P90 | 6360 | 1.0 | 0.40 | 19 | 200 | 48 | 4.7 | 3.8 | 1.6 | 790 | 3.2 | 1.9 | 45 | 53 | 7.8 | 98 |
| Max | 20000 | 1.6 | 3.2 | 30 | 330 | 69 | 5.4 | 4.7 | 1.7 | 1000 | 36 | 2.2 | 61 | 150 | 32 | 160 |
| *PAG2 (n = 19)* | | | | | | | | | | | | | | | | |
| Min | 29 | 0.4 | <0.02 | 6.0 | 17 | 9.9 | 1.9 | 1.4 | 0.52 | 380 | 0.20 | 0.73 | 15 | 11 | <0.8 | 26 |
| P10 | 51 | 0.58 | <0.02 | 8.1 | 24 | 15 | 2.3 | 1.5 | 0.75 | 468 | 0.28 | 0.94 | 20 | 13 | <0.8 | 42 |
| Median | 220 | 0.82 | 0.11 | 11 | 38 | 23 | 3.2 | 2.2 | 1.1 | 640 | 0.40 | 1.6 | 28 | 20 | <0.8 | 70 |
| P90 | 1680 | 0.97 | 0.66 | 18 | 112 | 39 | 4.6 | 3.1 | 1.6 | 818 | 0.92 | 1.9 | 43 | 46 | 2.2 | 142 |
| Max | 2100 | 1.1 | 8.0 | 22 | 150 | 48 | 5.6 | 5.6 | 1.9 | 960 | 6.6 | 2.0 | 51 | 56 | 3.3 | 230 |
| **Ore (n = 15)** | | | | | | | | | | | | | | | | |
| Min | 590 | 0.37 | 0.050 | 7.6 | 28 | 13 | 2.3 | 1.7 | 0.72 | 430 | 0.20 | 0.33 | 25 | 16 | 0.90 | 43 |
| P10 | 1120 | 0.45 | 0.064 | 10 | 43 | 16 | 2.46 | 2.2 | 0.7 | 480 | 0.30 | 0.42 | 25 | 23 | 1.7 | 50 |
| Median | 5700 | 0.64 | 0.17 | 14 | 90 | 31 | 3.3 | 3 | 1.1 | 660 | 0.60 | 0.99 | 34 | 30 | 5.5 | 58 |
| P90 | 12600 | 1.04 | 0.36 | 20 | 106 | 55 | 4.86 | 4.22 | 1.7 | 970 | 3.0 | 1.3 | 46 | 52 | 9.4 | 116 |
| Max | 13000 | 1.1 | 2.0 | 22 | 150 | 57 | 5.9 | 5 | 1.8 | 1000 | 3.2 | 1.5 | 50 | 170 | 11 | 860 |

**Notes:**
Solid phase metals by four-acid digestion.
AUCCA: Average Upper Continental Crustal Abundance (Rudnick and Gao, 2014).
Light grey shading indicates a value >3x AUCCA; Dark grey shading indicates a value >10x AUCCA .
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.



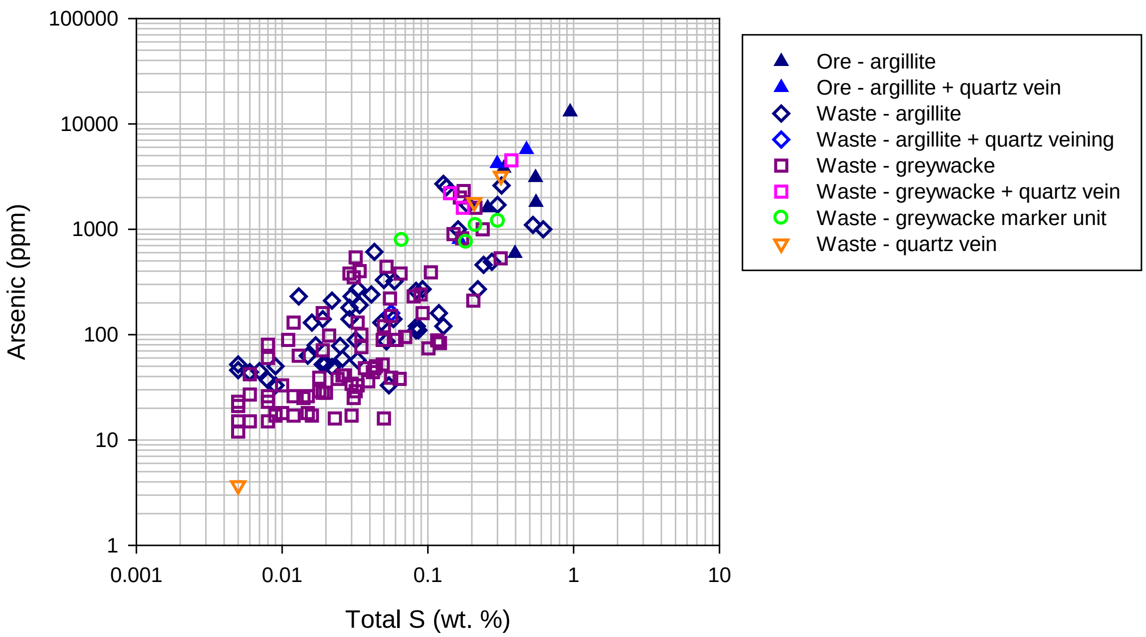




**Figure 3-13: Arsenic *versus* Total S content for by NPR designation (top) and lithology (bottom).**

## Table 3-9:
## Summary of Solid Phase Metal Results for Selected Parameters by Lithology

| Parameter | As | Ca | Cd | Co | Cr | Cu | Fe | K | Mg | Mn | Mo | Na | Ni | Pb | Sb | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Units** | **µg/g** | **%** | **µg/g** | **µg/g** | **µg/g** | **µg/g** | **%** | **%** | **%** | **µg/g** | **µg/g** | **%** | **µg/g** | **µg/g** | **µg/g** | **µg/g** |
| *AUCCA* | *4.8* | *2.6* | *0.09* | *17* | *92* | *28* | *3.9* | *2.3* | *1.5* | *774* | *1.1* | *2.4* | *47* | *17* | *0.40* | *67* |
| **Waste Rock** | | | | | | | | | | | | | | | | |
| *Greywacke (n = 79)* | | | | | | | | | | | | | | | | |
| Min | 12 | 0.32 | <0.02 | 5.1 | 14 | 4.9 | 1.8 | 0.81 | 0.55 | 410 | 0.20 | 1.1 | 12 | 3.3 | <0.8 | 34 |
| Median | 50 | 0.84 | 0.050 | 9.2 | 31 | 15 | 2.7 | 1.9 | 0.86 | 620 | 0.40 | 1.7 | 22 | 15 | <0.8 | 48 |
| Max | 2300 | 1.6 | 8.0 | 19 | 250 | 48 | 4.4 | 3.8 | 1.5 | 970 | 36 | 2.1 | 42 | 100 | 3.5 | 280 |
| *Argillite (n = 51)* | | | | | | | | | | | | | | | | |
| Min | 33 | 0.29 | <0.02 | 8.5 | 24 | 8.7 | 2.2 | 1.1 | 0.74 | 500 | 0.10 | 0.39 | 20 | 9.0 | <0.8 | 37 |
| Median | 140 | 0.89 | 0.070 | 16 | 51 | 28 | 4.1 | 2.8 | 1.4 | 760 | 0.40 | 1.2 | 37 | 21 | <0.8 | 82 |
| Max | 2700 | 1.6 | 0.47 | 30 | 240 | 69 | 5.8 | 5.6 | 1.9 | 1400 | 15 | 1.6 | 61 | 150 | 6.6 | 160 |
| *Greywacke Marker Unit (n = 4)* | | | | | | | | | | | | | | | | |
| Min | 760 | 0.42 | <0.02 | 2.6 | 8.1 | 2.6 | 0.87 | 0.54 | 0.24 | 200 | 0.40 | 0.69 | 5.6 | 4.7 | <0.8 | 14 |
| Median | 945 | 0.67 | 0.080 | 6.2 | 20 | 15 | 2.0 | 1.5 | 0.57 | 395 | 0.50 | 1.9 | 15 | 11 | <0.8 | 33 |
| Max | 1200 | 0.74 | 0.15 | 7.0 | 30 | 28 | 2.1 | 1.5 | 0.63 | 670 | 0.90 | 2.2 | 17 | 13 | 3.3 | 41 |
| *Argillite + Quartz Vein (n = 1)* | 160 | 1.9 | 0.090 | 15 | 190 | 13 | 4.2 | 1.4 | 1.6 | 1000 | 0.70 | 1.3 | 35 | 25 | 0.80 | 110 |
| *Greywacke + Quartz Vein (n = 3)* | | | | | | | | | | | | | | | | |
| Min | 1600 | 0.37 | 0.080 | 6.6 | 18 | 3.2 | 1.2 | 0.71 | 0.38 | 230 | 0.40 | 1.1 | 13 | 14 | 1.8 | 30 |
| Max | 2200 | 0.60 | 0.28 | 8.4 | 26 | 17 | 2.4 | 2.1 | 0.85 | 620 | 0.50 | 1.3 | 21 | 130 | 2.1 | 70 |
| *Quartz Vein (n = 3)* | | | | | | | | | | | | | | | | |
| Min | 3.7 | 0.029 | <0.02 | 0.11 | 5.1 | 2.1 | 0.24 | 0.018 | 0.0038 | 46 | 0.50 | 0.012 | 0.60 | <0.05 | <0.8 | 0.70 |
| Max | 3200 | 0.59 | 0.30 | 6.1 | 28 | 6.5 | 1.5 | 1.6 | 0.48 | 620 | 0.70 | 1.4 | 13 | 19 | 4.8 | 23 |
| ***Ore*** | | | | | | | | | | | | | | | | |
| *Argillite (n = 6)* | | | | | | | | | | | | | | | | |
| Min | 590 | 0.43 | 0.060 | 16 | 41 | 34 | 4.0 | 3.4 | 1.4 | 590 | 0.20 | 0.43 | 34 | 23 | 1.5 | 88 |
| Median | 2450 | 0.79 | 0.15 | 19 | 57 | 51 | 4.7 | 3.8 | 1.7 | 920 | 0.35 | 1.2 | 43 | 26 | 2.4 | 105 |
| Max | 13000 | 1.1 | 2.0 | 22 | 96 | 57 | 5.9 | 5.0 | 1.8 | 1000 | 0.60 | 1.5 | 50 | 170 | 9.8 | 860 |
| *Argillite + Quartz Vein (n = 3)* | | | | | | | | | | | | | | | | |
| Min | 800 | 0.37 | 0.050 | 7.6 | 49 | 18 | 2.3 | 2.0 | 0.77 | 430 | 0.30 | 0.33 | 25 | 16 | 0.90 | 53 |
| Max | 5700 | 1.1 | 0.34 | 16 | 95 | 40 | 3.5 | 3.5 | 1.3 | 660 | 0.90 | 1.3 | 35 | 32 | 3.9 | 88 |

**Notes:** Solid phase metals by four-acid digestion.
AUCCA: Average Upper Continental Crustal Abundance (Rudnick and Gao, 2014).
Light grey shading indicates a value >3x AUCCA; Dark grey shading indicates a value >10x AUCCA

## Table 3-10:
## Solid Phase Metals Summary for Kinetic Test Samples

| **Para-meters** | **Units** | **AUCCA** | **Humidity Cells** | | | | | | **Field Bins** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **HC1** | **HC2** | **HC3** | **HC4** | **HC5** | **HC6** | **FB-1** | **FB-2** | **FB-3** | **FB-4** |
| | | | argillite | argillite | greywacke | greywacke | 50% argillite, 50% greywacke | greywacke marker unit | Mixed ore, bulk sample | PAG1, mixed lithology | PAG2, greywacke | NPAG, argillite |
| As | µg/g | 4.8 | 220 | 540 | 68 | 1000 | 360 | 1900 | 6400 | 80 | 3100 | 190 |
| Ca | % | 2.6 | 0.93 | 0.98 | 1.4 | 0.52 | 1.1 | 1.0 | 0.80 | 0.79 | 0.70 | 0.76 |
| Cd | µg/g | 0.090 | 0.070 | 0.14 | 0.20 | 0.070 | 0.16 | 0.13 | 0.11 | 0.060 | 0.080 | 0.080 |
| Co | µg/g | 17 | 16 | 15 | 11 | 10 | 15 | 8.0 | 11 | 10 | 9.0 | 14 |
| Cr | µg/g | 92 | 190 | 170 | 180 | 300 | 78 | 56 | 28 | 98 | 146 | 109 |
| Cu | µg/g | 28 | 17 | 39 | 17 | 17 | 20 | 19 | 20 | 15 | 16 | 22 |
| Fe | % | 3.9 | 4.3 | 4.9 | 3.7 | 3.7 | 4.1 | 2.6 | 3.2 | 2.7 | 2.6 | 3.6 |
| K | % | 2.3 | 3.9 | 4.1 | 2.9 | 2.2 | 3.3 | 1.8 | 3.0 | 2.1 | 1.7 | 2.6 |
| Mg | % | 1.5 | 1.5 | 1.6 | 1.2 | 0.94 | 1.4 | 0.79 | 1.0 | 0.82 | 0.66 | 1.1 |
| Mn | µg/g | 774 | 800 | 830 | 870 | 650 | 810 | 730 | 660 | 590 | 500 | 690 |
| Mo | µg/g | 1.1 | 4.1 | 2.7 | 0.50 | 6.5 | 0.60 | 0.60 | 0.90 | 0.40 | 0.60 | 0.50 |

**Notes:** Solid phase metals by four-acid digestion.
AUCCA: Average Upper Continental Crustal Abundance (Rudnick and Gao, 2014).
Light grey shading indicates a value >3x AUCCA; Dark grey shading indicates a value >10x AUCCA

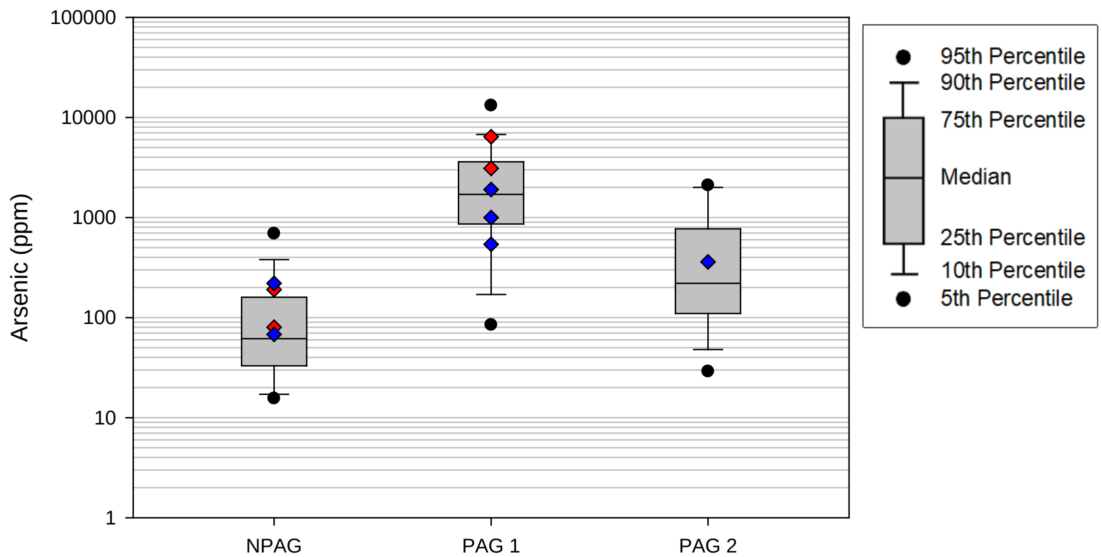



**Figure 3-14: Box and whisker plots showing the humidity cell and field bin arsenic concentration in comparison with the range determined for the static test population, grouped by NPR designation.**

### 3.1.4 Shake Flask Extractions

The SFE results for the subset of static test samples (n = 31) and the kinetic test samples are summarized in Table 3-11 and Table 3-12, respectively. The full database is included in Appendix C.1. The SFE results are compared to the Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (NSECC, 2021), which are used for screening purposes to provide an indication of parameters that may become an environmental concern. Site-wide water quality modelling will provide a more accurate evaluation of specific parameter exceedances in mine contact water and the downstream environment.

SFE leachate samples are generally slightly alkaline (pH 7.8 to 10) and have low sulphate concentrations (≤51 mg/L). Metal concentrations are generally low and below their respective Tier 1 EQS. Parameters with values above the Tier 1 EQS include Al and As for all samples. Aluminum concentrations are often elevated in SFE tests due to colloids passing through the filter due to the high TSS generated by stirring a crushed sample. As such, the elevated Al concentrations measured in the pH-neutral SFE tests are likely not a reliable indication for contact water chemistry.

The elevated As concentrations confirm As as a parameter of concern for the site even under neutral drainage conditions. Arsenic concentrations range from 0.057 to 4.9 mg/L for waste rock samples. One of the bulk sample stockpile subsamples has the highest As concentration for the dataset (7.5 mg/L). There is a positive correlation between SFE As concentration and solid phase As content (Figure 3-15). Samples with less than 1,000 ppm solid phase As show a range of SFE As concentrations (0.057 to 1.3 mg/L) with minimal correlation between the two parameters. There is no notable difference in SFE As concentration between the different lithologies; however, in general, As concentrations leached from PAG1 material is higher relative to NPAG and PAG2 samples (Figure 3-15).

### 3.1.5 Quality Assurance/Quality Control

In addition to the internal QA/QC programs conducted at the laboratories, seven duplicate samples were collected from drill core and submitted for ABA and solid phase metals. In order to compare the results, the relative percent difference (RPD) was calculated as:

$$\frac{|Result\ A - Result\ B|}{Average\ of\ Result\ A + Result\ B}\ x\ 100\%$$

Solid phase samples generally have a high degree of heterogeneity; however, the majority of the results are within an RPD of 50%, with the following exceptions:

- GB-2020-98/GB-2020-116: total S (93%), Cd (133%), and Pb (83%);
- GB-2020-19/GB-2020-117: total S (157%), As (106%), Cr (72%), Cu (76%), and Na (76%);
- GB-2020-36/GB-2020-118: total S (149%), Sulphate S (55%), As (123%), Bi (70%), and Mo (67%);
- GB-2020-54/GB-2020-119: Bi (88%), Cd (120%), and Cu (108%);
- GB-2020-76/GB-2020-120: Acid Potential (100%), total S (76%), sulphide S (100%), NPR (73%), As (144%), Bi (120%), Cr (80%), Na (82%), and Pb (157%);
- GB-LX2021-04/DUP: no parameters with RPD >50%; and
- GB-LX2021-27/GB-LX2021-36: no parameters with RPD >50%.

**Table 3-11:**
**Summary of Shake Flask Extraction Results for Waste Rock Samples**

| Parameter | Units | Tier 1 EQS | NPAG (n = 13) | | | PAG1 (n = 13) | | | PAG2 (n = 5) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Median | Max | Min | Median | Max | Min | Median | Max |
| pH | No unit | 6.5-9.0 | 8.1 | 8.9 | 9.8 | 6.9 | 8.0 | 9.9 | 9.8 | 9.9 | 10 |
| Sulphate | mg/L | 128 | 2.0 | 2.0 | 10 | 2.0 | 5.5 | 49 | 2.0 | 2.0 | 2.0 |
| Hg | mg/L | 0.000026 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Ag | mg/L | 0.00025 | 0.000050 | 0.000050 | 0.000050 | 0.000050 | 0.000050 | 0.000050 | 0.000050 | 0.000050 | 0.000050 |
| Al | mg/L | 0.0050 | 0.33 | 0.88 | 3.9 | 0.17 | 0.72 | 2.5 | 1.3 | 1.7 | 3.0 |
| As | mg/L | 0.0050 | 0.057 | 0.37 | 0.77 | 0.13 | 1.4 | 4.9 | 0.25 | 0.73 | 1.1 |
| Ba | mg/L | 1.0 | 0.00090 | 0.0035 | 0.014 | 0.00087 | 0.0048 | 0.011 | 0.0059 | 0.0091 | 0.011 |
| Ca | mg/L | - | 0.49 | 2.7 | 6.6 | 0.56 | 3.1 | 16 | 0.80 | 1.5 | 2.9 |
| Cd | mg/L | 0.000090 | <0.000003 | <0.000003 | 0.000010 | <0.000003 | <0.000003 | 0.000026 | <0.000003 | 0.0000050 | 0.0000070 |
| Co | mg/L | 0.0010 | 0.0000080 | 0.000075 | 0.00070 | 0.000041 | 0.000082 | 0.00038 | 0.00022 | 0.00037 | 0.00049 |
| Cr | mg/L | 0.0010 | 0.000080 | 0.00035 | 0.0014 | 0.00010 | 0.00039 | 0.0011 | 0.00074 | 0.0011 | 0.0011 |
| Cu | mg/L | 0.0020 | 0.00020 | 0.00030 | 0.0012 | 0.00030 | 0.00050 | 0.0012 | 0.00070 | 0.0010 | 0.0010 |
| Fe | mg/L | 0.30 | 0.016 | 0.12 | 0.73 | 0.0070 | 0.13 | 0.63 | 0.38 | 0.59 | 0.72 |
| K | mg/L | - | 6.0 | 11 | 22 | 4.5 | 21 | 30 | 7.7 | 14 | 22 |
| Mg | mg/L | - | 0.26 | 0.35 | 0.97 | 0.25 | 0.48 | 2.5 | 0.20 | 0.38 | 0.55 |
| Mn | mg/L | 0.43 | 0.00060 | 0.0031 | 0.018 | 0.0030 | 0.0076 | 0.016 | 0.011 | 0.014 | 0.015 |
| Mo | mg/L | 0.073 | 0.00012 | 0.00045 | 0.0033 | 0.00028 | 0.00060 | 0.0017 | 0.00025 | 0.00042 | 0.00099 |
| Na | mg/L | - | 3.9 | 5.7 | 14 | 2.3 | 4.7 | 13 | 3.6 | 5.5 | 20 |
| Ni | mg/L | 0.025 | 0.00010 | 0.00090 | 0.0051 | 0.00020 | 0.0040 | 0.017 | 0.00080 | 0.0046 | 0.0080 |
| Pb | mg/L | 0.0010 | 0.000030 | 0.00021 | 0.0016 | 0.000020 | 0.00044 | 0.0029 | 0.00034 | 0.00090 | 0.0020 |
| Sb | mg/L | 0.0090 | 0.0011 | 0.0034 | 0.0096 | 0.0016 | 0.0041 | 0.012 | 0.0020 | 0.0026 | 0.0042 |
| Se | mg/L | 0.0010 | 0.000040 | 0.00014 | 0.00040 | 0.000040 | 0.00030 | 0.00067 | 0.000040 | 0.000060 | 0.00010 |
| Tl | mg/L | 0.00080 | 0.0000050 | 0.0000060 | 0.000022 | 0.0000050 | 0.000011 | 0.000042 | 0.0000070 | 0.000018 | 0.000036 |
| U | mg/L | 0.015 | 0.000093 | 0.00032 | 0.00058 | 0.000024 | 0.00033 | 0.00059 | 0.00033 | 0.00045 | 0.0014 |
| V | mg/L | 0.12 | 0.0032 | 0.011 | 0.020 | 0.0019 | 0.011 | 0.015 | 0.012 | 0.014 | 0.016 |
| Zn | mg/L | 0.0070 | 0.0020 | 0.0020 | 0.0050 | 0.0020 | 0.0020 | 0.0030 | 0.0020 | 0.0020 | 0.0030 |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
Grey shading indicates a concentration above the Tier 1 Environmental Quality Standards (EQS) for Surface Water (NSECC, 2021).

## Table 3-12:
## Summary of Shake Flask Extraction Results - Kinetic Test Samples

| Parameter | Units | Tier 1 EQS | HC1 | HC2 | HC3 | HC4 | HC5 | HC6 | FB-1 | FB-2 | FB-3 | FB-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **NPAG** | **PAG1** | **NPAG** | **PAG1** | **PAG2** | **PAG1** | **PAG1** | **NPAG** | **PAG1** | **NPAG** |
| | | | Argillite | Argillite | Greywacke | Greywacke | 50% argillite, 50% greywacke | Greywacke marker unit | Bulk stockpile | Mixed lithology | Greywacke | Argillite |
| pH | No unit | 6.5-9.0 | 8.2 | 8.2 | 9.2 | 7.8 | 9.8 | 9.2 | 8.0 | 8.6 | 8.0 | 8.6 |
| Sulphate | mg/L | 128 | 2.0 | 17 | 5.0 | 32 | <2 | 23 | 13 | <2 | 2.0 | <2 |
| Hg | mg/L | 0.000026 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Al | mg/L | 0.0050 | 1.00 | 0.73 | 1.7 | 0.25 | 2.3 | 0.43 | 0.52 | 0.61 | 0.54 | 0.81 |
| As | mg/L | 0.0050 | 0.97 | 0.56 | 0.67 | 0.36 | 0.58 | 0.78 | 5.5 | 0.44 | 1.7 | 0.47 |
| Ba | mg/L | 1.0 | 0.0024 | 0.0070 | 0.0037 | 0.0024 | 0.014 | 0.0052 | 0.0027 | 0.0037 | 0.0028 | 0.0051 |
| Ca | mg/L | - | 3.0 | 5.1 | 1.2 | 4.4 | 1.9 | 11 | 10 | 1.4 | 1.4 | 1.1 |
| Cd | mg/L | 0.000090 | 0.0000040 | 0.0000070 | 0.0000050 | 0.0000080 | 0.0000050 | 0.0000030 | 0.0000060 | <0.000003 | <0.000003 | 0.0000040 |
| Co | mg/L | 0.0010 | 0.000082 | 0.000092 | 0.00029 | 0.000088 | 0.00042 | 0.00013 | 0.000017 | 0.000081 | 0.000096 | 0.00012 |
| Cr | mg/L | 0.0010 | 0.00019 | 0.00016 | 0.00061 | 0.00016 | 0.0016 | 0.00015 | 0.000090 | 0.00037 | 0.00043 | 0.00047 |
| Cu | mg/L | 0.0020 | 0.00030 | 0.00030 | 0.00050 | 0.00050 | 0.0010 | 0.0021 | 0.00040 | 0.00040 | 0.00020 | 0.00020 |
| Fe | mg/L | 0.30 | 0.069 | 0.052 | 0.21 | 0.036 | 0.80 | 0.054 | 0.031 | 0.16 | 0.14 | 0.17 |
| K | mg/L | - | 20 | 24 | 13 | 12 | 16 | 13 | 18 | 7.8 | 6.6 | 9.8 |
| Mg | mg/L | - | 0.40 | 0.74 | 0.18 | 0.95 | 0.53 | 1.8 | 0.74 | 0.19 | 0.19 | 0.19 |
| Mn | mg/L | 0.43 | 0.0029 | 0.0031 | 0.0058 | 0.015 | 0.017 | 0.028 | 0.0068 | 0.0037 | 0.0042 | 0.0043 |
| Mo | mg/L | 0.073 | 0.00058 | 0.0032 | 0.00053 | 0.0014 | 0.00087 | 0.00089 | 0.0016 | 0.00022 | 0.00066 | 0.00061 |
| Na | mg/L | - | 3.8 | 7.2 | 19 | 18 | 9.4 | 6.8 | 3.5 | 6.9 | 9.6 | 6.5 |
| Ni | mg/L | 0.025 | 0.0019 | 0.0045 | 0.0088 | 0.00080 | 0.0046 | 0.014 | 0.00030 | 0.00030 | 0.0011 | 0.00040 |
| Pb | mg/L | 0.0010 | 0.00020 | 0.00012 | 0.00045 | 0.00019 | 0.0015 | 0.00019 | 0.00025 | 0.00044 | 0.00031 | 0.00057 |
| Sb | mg/L | 0.0090 | 0.0048 | 0.0033 | 0.0040 | 0.0059 | 0.0044 | 0.0023 | 0.0073 | 0.0046 | 0.0031 | 0.0058 |
| Se | mg/L | 0.0010 | <0.00004 | 0.000070 | 0.000060 | 0.00022 | 0.000090 | 0.000070 | 0.00014 | 0.000050 | <0.00004 | 0.000050 |
| Tl | mg/L | 0.00080 | 0.0000090 | 0.0000070 | 0.0000090 | 0.0000060 | 0.000024 | 0.0000090 | 0.00035 | 0.0000060 | 0.0000060 | 0.0000090 |
| U | mg/L | 0.015 | 0.00067 | 0.00033 | 0.00056 | 0.00011 | 0.00048 | 0.00030 | 0.0057 | 0.00037 | 0.00027 | 0.00027 |
| V | mg/L | 0.12 | 0.014 | 0.0078 | 0.018 | 0.0035 | 0.017 | 0.0041 | - | 0.0094 | 0.0088 | 0.010 |
| Zn | mg/L | 0.0070 | 0.0030 | <0.002 | <0.002 | 0.0040 | 0.0020 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
Grey shading indicates a concentration above the Tier 1 Environmental Quality Standards (EQS) for Surface Water (NSECC, 2021).

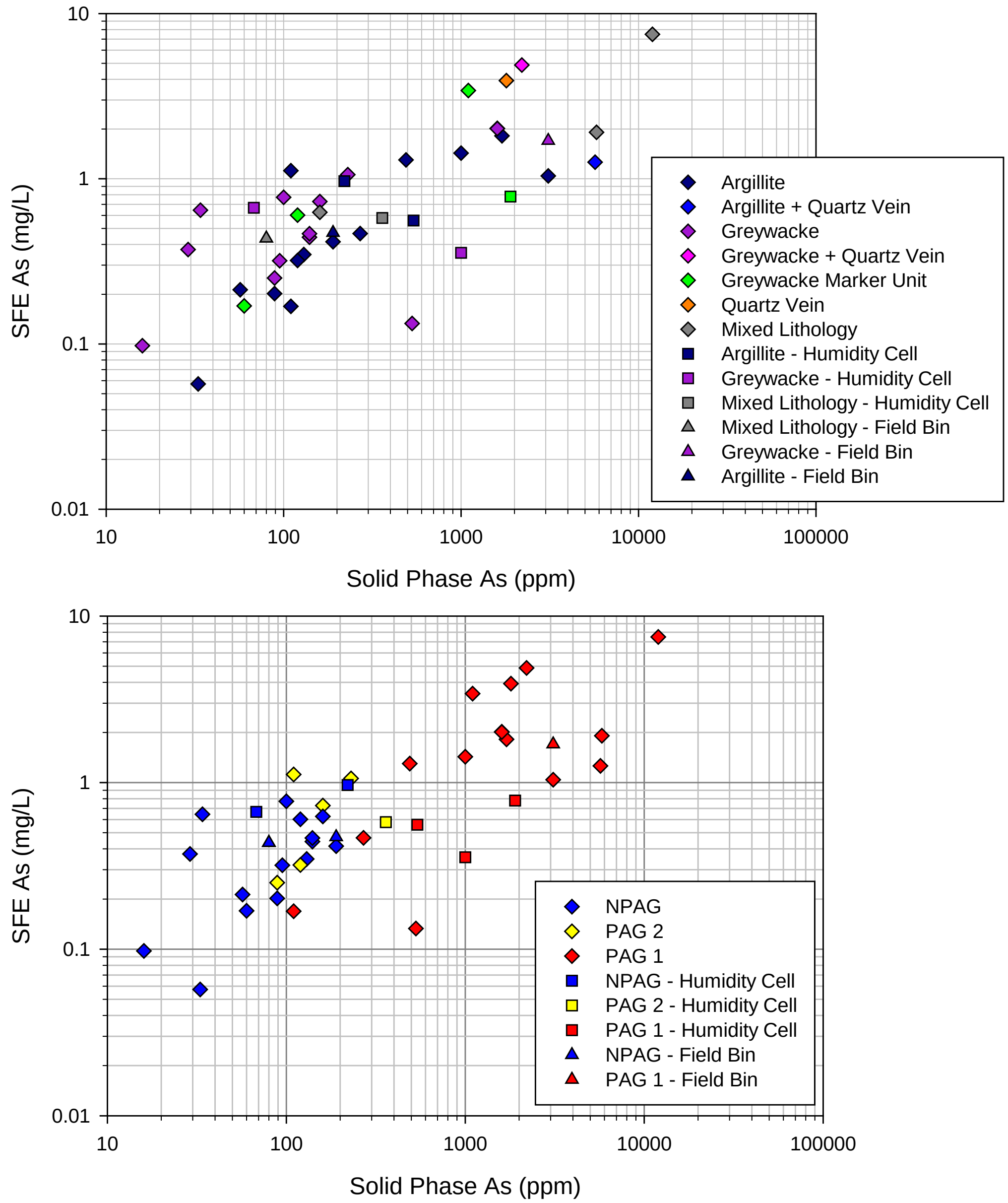



**Figure 3-15: Comparison of SFE arsenic concentration and solid phase arsenic content by NPR designation (top) and by lithology (bottom).**

## *3.2 Tailings*

### 3.2.1 Mineralogy

The 2021 Master Composite tailings sample was submitted for TIMA analysis to assess whether tailings materials are comparable to the mineralogical composition of waste rock and ore and to provide additional insight on mineralogical controls on leaching behaviour. The modal abundances determined for tailings are summarized in Table 3-13. The full TIMA dataset is included in Appendix B. Similar to ore feed and waste materials, the tailings mineralogy largely comprises quartz, felspars, and micas with lesser chlorite and clay. The carbonate phase abundance is low (0.59%) and so is the sulphide inventory (0.40%). Sulphide phases are represented by similar amounts of pyrite and arsenopyrite. This is in contrast to the mine rock QEMSCAN data where pyrrhotite was identified at abundances consistently higher than pyrite. It is thus inferred that TIMA method is insensitive to the mineralogical differences between pyrite and pyrrhotite and that the latter was grouped into the pyrite "bin" during analysis. Clarification from the laboratory is outstanding. Sphalerite was identified as an accessory sulphide phase. It should also be noted that small amounts of sulphate phases were detected, likely constituting sulphide oxidation products that may have formed during the metallurgical test procedure.

**Table 3-13:**
**Mineralogical Composition of the 2021 Master Composite Tailings Sample**

| Mineral | Abundance (%) |
|---|---|
| Pyrite | 0.17 |
| Arsenopyrite | 0.23 |
| Other Sulphides | 0.010 |
| Quartz | 47 |
| Plagioclase | 16 |
| K-Feldspar | 12 |
| Micas | 16 |
| Chlorites | 2.1 |
| Clays | 3.8 |
| Amphiboles | 0.039 |
| Pyroxenes | 0.011 |
| Other Silicates | 0.85 |
| Fe-Oxides | 0.11 |
| Other Oxides | 0.33 |
| Carbonates | 0.59 |
| Sulphates | 0.013 |
| Other | 0.64 |

### 3.2.2 Acid-Base Accounting

All tailings samples had slightly alkaline paste pH values (8.4 to 8.9) while total S contents ranged from 0.16 to 0.57 wt.% (Table 3-14; Appendix C.2). Sample BP1 had the highest total S content and sample LGHP2 had the lowest, consistent with these materials representing high-grade and low-grade ore, respectively. Sulphate S and sulphide S were not measured in the majority of samples; however, the two samples with sulphate S and sulphide S measurements indicate that the majority of the sulphur is present as sulphide S.

As observed for waste rock, NP is relatively low (<15 kg $CaCO_3$/t) and Modified NP values are greater than CaNP values. A corrected Modified NP was calculated by subtracting 5 kg $CaCO_3$/t from the Modified NP value (consistent with waste rock). All tailings samples were classified as PAG1, with NPR less than or close to 1.

Seven tailings samples were submitted for NAG pH testing (Table 3-15). Although the ABA results indicated that all samples were PAG, four of the six samples have NAG pH > 4.5, indicating some buffering potential. The other three samples were confirmed as PAG with NAG pH < 4.5. As for mine rock, the environmental classification of tailings will continue to be based on NPR rather than NAG pH measurements.

**Table 3-14:**
**Summary of Acid Base Accounting Results for Tailings Samples**

| Parameter | Paste pH | Total S | Sulphate S | Sulphide S | CaNP | Corrected Mod. NP | Operational NPR |
|---|---|---|---|---|---|---|---|
| *Units* | - | *wt.%* | *wt.%* | *wt.%* | *kg $CaCO_3$/t* | *kg $CaCO_3$/t* | - |
| 2020 Master Composite | 8.4 | 0.41 | 0.040 | 0.37 | 2.5 | 3.5 | 0.27 |
| 2021 Master Composite | 8.4 | 0.22 | <0.01 | 0.22 | 7.5 | 6.1 | 1.1 |
| BP1 | 8.8 | 0.57 | - | - | 3.9 | 4.8 | 0.27 |
| BP2 | 8.8 | 0.22 | - | - | 3.2 | 3.3 | 0.48 |
| BP3 | 8.6 | 0.29 | - | - | 3.9 | 4.3 | 0.47 |
| LGHP1 | 8.9 | 0.24 | - | - | 3.4 | 4.5 | 0.60 |
| LGHP2 | 8.7 | 0.16 | - | - | 2.5 | 3.0 | 0.60 |
| LGHP3 | 8.7 | 0.31 | - | - | 3.9 | 5.0 | 0.52 |

**Notes:**
CaNP: carbonate neutralization potential; Mod. NP: Modified neutralization potential; NPR: net potential ratio.
Light grey shading indicates 1 < NPR < 2; dark grey shading indicates NPR < 1.

**Table 3-15:**
**Tailings NAG pH Summary**

| Sample ID | NAG pH |
|---|---|
| | pH Units |
| 2021 Master Composite | 5.9 |
| BP1 | 3.0 |
| BP2 | 4.9 |
| BP3 | 4.2 |
| LGHP1 | 4.2 |
| LGHP2 | 5.9 |
| LGHP3 | 5.9 |

**Notes:**
NAG: Net Acid Generation
Grey shading indicates a NAG pH < 4.5

### 3.2.3 Solid Phase Metals

Solid phase metals results are included in Appendix C.2 and summarized in Table 3-16. All tailings samples had As contents above 10x the AUCCA, consistent with findings for mine rock. Other metal contents that were above 3x the AUCCA in at least one tailings sample included Ag, Bi, Cd, Cu, Hg, Mo, Pb, and Sb (Table 3-16). Of these elements, Hg and Sb were above 10x the AUCCA in one sample each.

**Table 3-16:**
**Summary of Solid Phase Metal Results for Selected Parameters for Tailings Samples**

| Parameter | Units | AUCCA | 2020 Master Composite | 2021 Master Composite | BP1 | BP2 | BP3 | LGHP1 | LGHP2 | LGHP3 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ag | ppm | 0.053 | 0.30 | 0.36 | 0.20 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Al | % | 8.15 | 1.5 | 1.8 | 1.6 | 1.9 | 1.7 | 1.7 | 2.1 | 1.6 |
| As | ppm | 4.8 | 5040 | 1589 | 8080 | 1440 | 2020 | 2050 | 953 | 2800 |
| Au | ppb | - | 159 | - | 303 | 37 | 16 | 11 | 6.2 | 62 |
| B | ppm | 17 | <20 | - | <20 | <20 | <20 | <20 | <20 | <20 |
| Ba | ppm | 628 | 95 | 108 | 94 | 124 | 97 | 105 | 161 | 85 |
| Bi | ppm | 0.16 | 0.40 | 0.40 | 0.50 | 0.20 | 0.40 | 0.30 | 0.30 | 0.30 |
| Ca | % | 2.57 | 0.33 | 0.50 | 0.42 | 0.36 | 0.42 | 0.42 | 0.33 | 0.50 |
| Cd | ppm | 0.09 | 0.40 | 0.24 | 0.50 | 0.10 | 0.20 | 0.20 | 0.50 | 0.10 |
| Co | ppm | 17.3 | 13 | 9.1 | 14 | 15 | 14 | 12 | 16 | 14 |
| Cr | ppm | 92 | 208 | 45 | 204 | 177 | 185 | 194 | 169 | 171 |
| Cu | ppm | 28 | 74 | 247 | 36 | 41 | 41 | 37 | 36 | 34 |
| Fe | % | 3.92 | 3.1 | 3.4 | 3.3 | 3.5 | 3.3 | 3.2 | 3.7 | 3.2 |
| Hg | ppm | 0.05 | 0.030 | 0.75 | 0.010 | 0.010 | 0.010 | <0.01 | 0.030 | 0.020 |
| K | % | 2.32 | 0.90 | 0.99 | 0.93 | 1.0 | 0.96 | 1.0 | 1.3 | 0.83 |
| Mg | % | 1.5 | 0.87 | 0.99 | 0.94 | 1.1 | 1.0 | 1.0 | 1.2 | 0.96 |
| Mn | ppm | 774 | 505 | 565 | 557 | 598 | 576 | 611 | 642 | 593 |
| Mo | ppm | 1.1 | 7.0 | 0.81 | 6.9 | 5.7 | 5.8 | 5.9 | 5.0 | 6.4 |
| Na | % | 2.43 | 0.030 | 0.030 | 0.014 | 0.011 | 0.012 | 0.014 | 0.015 | 0.010 |
| Ni | ppm | 47 | 105 | 27 | 123 | 109 | 110 | 113 | 99 | 100 |
| P | % | 0.0655 | 0.064 | 0.060 | 0.060 | 0.065 | 0.069 | 0.066 | 0.072 | 0.070 |
| Pb | ppm | 17 | 40 | 36 | 32 | 19 | 26 | 55 | 12 | 34 |
| S | % | - | 0.39 | 0.23 | 0.52 | 0.22 | 0.29 | 0.26 | 0.16 | 0.31 |
| Sb | ppm | 0.4 | 3.7 | 3.4 | 4.8 | 0.70 | 1.4 | 1.0 | 0.50 | 2.2 |
| Se | ppm | 0.09 | <0.5 | <1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Sr | ppm | 320 | 18 | 22 | 18 | 18 | 21 | 18 | 17 | 20 |
| Th | ppm | 10.5 | 7.0 | 6.6 | 6.9 | 7.2 | 6.7 | 6.9 | 8.0 | 6.3 |
| Ti | % | 0.384 | 0.12 | 0.15 | 0.14 | 0.16 | 0.15 | 0.16 | 0.18 | 0.12 |
| Tl | ppm | 0.9 | 0.30 | 0.41 | 0.40 | 0.40 | 0.40 | 0.40 | 0.50 | 0.30 |
| U | ppm | 2.7 | 0.70 | 1.0 | 0.80 | 0.80 | 0.80 | 0.80 | 0.90 | 0.70 |
| V | ppm | 97 | 33 | 35 | 33 | 40 | 35 | 37 | 45 | 32 |
| W | ppm | 1.9 | 3.6 | 0.80 | 2.6 | 0.90 | 0.70 | 1.7 | 1.0 | 0.70 |
| Zn | ppm | 67 | 128 | 128 | 110 | 95 | 97 | 109 | 84 | 107 |

**Notes:**
Solid phase metals by aqua regia digestion;
AUCCA: Average Upper Continental Crustal Abundance (Rudnick and Gao, 2014);
Light grey shading indicates a value above 3x the AUCCA;
Dark grey shading indicates a value above 10x the AUCCA.

### 3.2.4 Shake Flask Extractions

The 2020 and 2021 Master Composite samples, a BP1+BP2 (high-grade) composite, and a LGHP1 + LGHP2 (low grade) composite were submitted for SFE testing (Table 3-17; Appendix C.2). Leachate pH was slightly alkaline for all samples (pH 8.3 to 9.3) and sulphate concentrations were low (<60 mg/L). All samples had Al and As concentrations above the Tier 1 EQS. In addition, the 2020 and 2021 Master Composite leachates both had Cu concentrations above the Tier 1 EQS, while Co and Fe concentrations were above their respective Tier 1 EQS in the 2020 Master Composite leachate only.

Arsenic is the primary parameter of concern for leaching from tailings, as indicated by the elevated SFE concentrations (0.40 to 2.2 mg/L). The other parameters above their Tier 1 EQS are considered lower concern. As previously described in discussion of other SFE tests (Section 3.1.4), elevated dissolved Al concentrations in SFE leachate may be attributed to the high TSS of SFE samples. Cobalt, Cu, and Fe were only elevated in one of the tailings samples. In addition, these concentrations generally remain <2x their respective Tier 1 EQS, with the exception of Cu concentrations in the 2020 Master Composite leachate. High values of Co, Cu, and Fe may in part be due to the enhanced mobility of these species in the presence of residual cyanide (Table 3-17) and reagents added during cyanide destruction.

## Table 3-17:
## Summary of Shake Flask Extraction Results for Tailings Samples

| Parameter | Units | Tier 1 EQS | 2020 Master Composite | 2021 Master Composite | BP1+BP2 Composite | LGHP 1 + LGHP 2 Composite |
|---|---|---|---|---|---|---|
| pH | pH Units | 6.5 - 9.0 | 8.9 | 8.3 | 9.2 | 9.3 |
| Conductivity | µS/cm | - | 173 | 249 | 87 | 76 |
| Sulphate | mg/L | 128 | 44 | 56 | 12 | 11 |
| Total Alkalinity | mg/L | - | 27 | 47 | 22 | 18 |
| Nitrate | mg/L | 13 | <0.2 | <0.06 | - | - |
| Nitrite | mg/L | 0.06 | 0.090 | <0.03 | - | - |
| Total Ammonia | mg/L | 5.7 | 0.65 | 0.50 | - | - |
| Free Cyanide | µg/L | 5 | 4.1 | - | - | - |
| SAD Cyanide | mg/L | - | 1.8 | - | - | - |
| WAD Cyanide | mg/L | - | 0.0074 | - | - | - |
| Al | mg/L | 0.005 | 0.44 | 0.16 | 0.40 | 0.47 |
| Sb | mg/L | 0.009 | 0.0076 | 0.0073 | 0.0048 | 0.0029 |
| As | mg/L | 0.005 | 1.8 | 0.38 | 2.2 | 0.88 |
| Ba | mg/L | 1 | 0.0018 | 0.0093 | 0.0015 | 0.0016 |
| Be | mg/L | 0.00015 | <0.000050 | < 0.000007 | <0.000050 | <0.000020 |
| B | mg/L | 1.5 | <0.25 | 0.016 | <0.25 | <0.10 |
| Cd | mg/L | 0.00009 | <0.000025 | 0.000011 | <0.000025 | <0.000010 |
| Ca | mg/L | - | 8.1 | 27 | 11 | 9.1 |
| Cr | mg/L | 0.001 | <0.00050 | 0.00020 | <0.00050 | 0.00040 |
| Co | mg/L | 0.001 | 0.0020 | 0.00071 | 0.00075 | 0.00053 |
| Cu | mg/L | 0.002 | 0.0071 | 0.0032 | <0.00025 | 0.00035 |
| Fe | mg/L | 0.3 | 0.59 | 0.013 | 0.050 | 0.074 |
| Pb | mg/L | 0.001 | 0.00051 | 0.00013 | 0.00018 | 0.00045 |
| Mg | mg/L | - | 0.26 | 2.0 | <0.25 | 0.15 |
| Mn | mg/L | 0.43 | 0.0036 | 0.012 | 0.0010 | 0.0015 |
| P | mg/L | - | 0.015 | 0.0070 | 0.070 | 0.046 |
| Mo | mg/L | 0.073 | 0.00095 | 0.0057 | 0.0012 | 0.00083 |
| Ni | mg/L | 0.025 | 0.00057 | 0.00030 | 0.00030 | 0.00022 |
| K | mg/L | - | 4.6 | 9.6 | 3.5 | 3.5 |
| Se | mg/L | 0.001 | <0.00020 | 0.00028 | <0.00020 | 0.00020 |
| Si | mg/L | - | 1.5 | 1.8 | 2.2 | 2.1 |
| Ag | mg/L | 0.00025 | <0.000025 | <0.00005 | <0.000025 | 0.000040 |
| Na | mg/L | - | 19 | 13 | 2.2 | 2.1 |
| Sr | mg/L | 21 | 0.048 | 0.17 | 0.067 | 0.052 |
| Tl | mg/L | 0.0008 | <0.000010 | 0.000030 | <0.000010 | 0.000013 |
| U | mg/L | 0.015 | 0.00015 | 0.00021 | 0.00019 | 0.00018 |
| V | mg/L | 0.12 | 0.0010 | 0.00091 | 0.0018 | 0.0020 |
| Zn | mg/L | 0.007 | 0.0022 | < 0.002 | <0.00050 | 0.00045 |
| Hg | mg/L | 0.000026 | <0.00025 | <0.0001 | <0.00025 | <0.00010 |

**Notes:**
SAD cyanide: Strong Acid Dissociable cyanide; WAD cyanide: Weak Acid Dissociable cyanide.
Tier 1 EQS: Tier 1 Environmental Quality Standards (EQS) for Surface Water (NSECC, 2021).
Grey shading indicates a concentration above the Tier 1 EQS.

### 3.2.5 Particle Size Distribution

The particle size distribution (PSD) results for the 2020 and 2021 Master Composite tailings samples are included in Appendix C.2 and summarized in Figure 3-16. These results were derived by Malvern Particle Size Analyzer. The PSD results show that the two tailings samples have similar particle size distributions, ranging from clay to sand size. The majority of the material is silt-size.

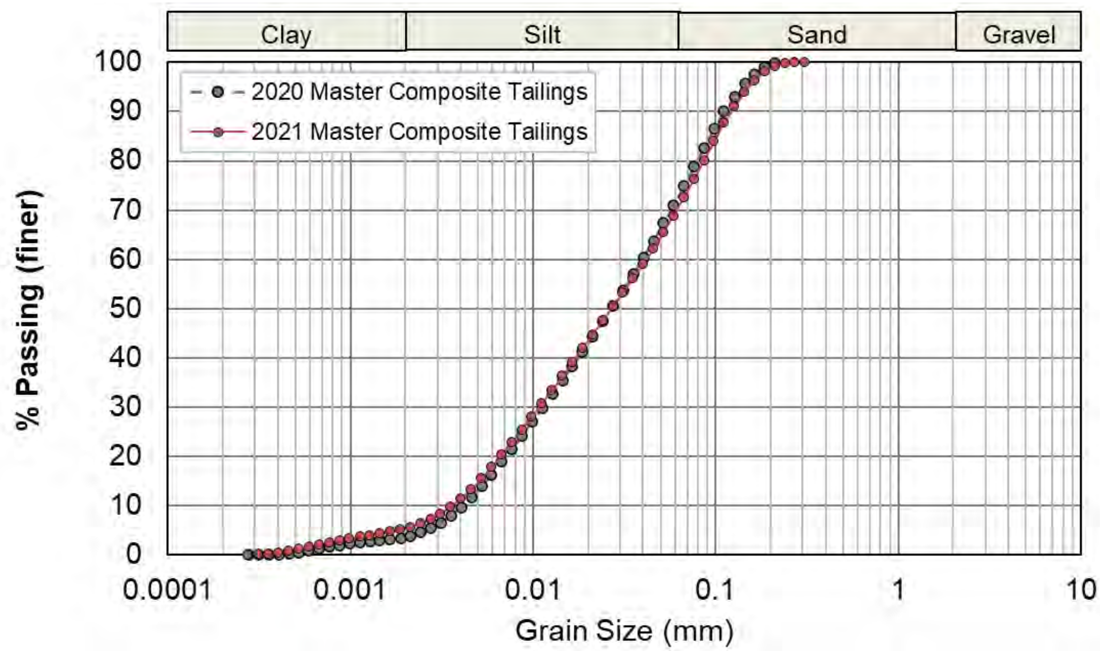



**Figure 3-16: Particle Size Distribution for 2020 and 2021 Master Composite Tailings Samples**

## *3.3 Historic Tailings*

### 3.3.1 Acid-Base Accounting

The historic tailings samples have slightly acidic to circumneutral paste pH values (pH 4.3 to 6.4; Table 3-18; Appendix C.3). Five of the six samples contain moderate total S (> 0.20 wt.%), which is present primarily as sulphide S. This is an important finding given the ~100 years of weathering as it indicates that sulphide oxidation in these materials is relatively slow and that sulphide grains may develop oxidation rims inhibiting further degradation over time. Alternatively, this finding may also be a result of the development of an oxidation front within the tailing deposits below which oxidation is limited. Nevertheless, the presence of sulphate S at concentrations higher than those seen in the Master Composite tailings samples or in mine rock, suggests that these materials have undergone some weathering.

**Table 3-18:**
**Summary of Acid Base Accounting Results for Historic Tailings Samples**

| Parameter | Paste pH | Total S | Sulphate S | Sulphide S | Modified NP | NPR |
|---|---|---|---|---|---|---|
| *Units* | - | *wt.%* | *wt.%* | *wt.%* | *kg $CaCO_3$/t* | - |
| ANX-A3B | 5.2 | 0.27 | 0.050 | 0.22 | -6.9 | -0.82 |
| ANX-A2A-M | 5.3 | 0.27 | 0.080 | 0.19 | -5.4 | -0.64 |
| ANX-D4A-M | 4.3 | 0.47 | 0.13 | 0.34 | -5.3 | -0.36 |
| ANX-D8A-M | 6.4 | 0.020 | 0.060 | <0.02 | 2.7 | 4.3 |
| ANX-D3A-M | 4.8 | 0.31 | 0.070 | 0.24 | -2.0 | -0.21 |
| ANX-D5A-M | 4.7 | 0.48 | 0.040 | 0.44 | -2.0 | -0.13 |

**Notes:**
NP: Neutralization potential; NPR: Net potential ratio.
NPR is calculated as Modified NP / (Total S x 31.25).

The same five samples lack NP and are thus classified as PAG (NPR < 2). The remaining sample (ANX-D8A-M) contains low total S (0.020 wt.%), minor NP, and is classified as NPAG. Overall, historic tailings should be considered PAG and are expected to generate mildly acidic runoff soon after disturbance.

### 3.3.2 Solid Phase Metals

Solid phase metal contents were determined by others for the purpose of historic tailings deposit delineation based on As and Hg contents amongst other parameters and are discussed in GHD (2022).

### 3.3.3 Shake Flask Extractions

Four of the six historic tailings samples were submitted for SFE (Appendix C.3). The pH values of the SFE leachates were generally acidic (pH 3.6 to 5.8; Table 3-19). These relatively low pH values are in agreement with the paste pH values and indicate that runoff from exposed historic tailings is expected to be acidic immediately upon disturbance. Sulphate concentrations ranged from 8.0 to 332 mg/L, with the highest concentration exceeding the Tier 1 EQS for sulphate. One sample (ANX-D5A-M) also had a fluoride concentration marginally above the Tier 1 EQS.

Several metal concentrations are above their respective Tier 1 EQS in at least three of the four samples, including Al, As, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni, and Zn (Table 3-19). In general, lower metal concentrations are measured in ANX-D8A-M leachate. This sample had the highest leachate pH and lowest total S content. Additional metals with concentrations above the Tier 1 EQS in one of the four samples include Sb, Se, and Hg. These results indicate that metal leaching from the historic tailings is expected and is in part driven by acidic conditions. Metal leaching will be mitigated by relocating the historic tailings to the lined TMF where they will be covered by fresh ROM tailings and will be saturated in early operations. Therefore, the release of contact water from historic tailings within the TMF is not anticipated.

**Table 3-19:**
**Summary of Shake Flask Extraction Results for Historic Tailings Samples**

| **Parameter** | **Units** | **Tier 1 EQS** | **ANX-D4A-M** | **ANX-D8A-M** | **ANX-D3A-M** | **ANX-D5A-M** |
|---|---|---|---|---|---|---|
| pH | pH Units | 6.5 - 9.0 | 3.6 | 5.8 | 4.2 | 4.2 |
| Conductivity | µS/cm | - | 662 | 40 | 277 | 258 |
| Sulphate | mg/L | 128 | 332 | 8.0 | 111 | 95 |
| Total Alkalinity | mg/L | - | <0.5 | 0.60 | <0.5 | <0.5 |
| Fluoride | mg/L | 0.12 | 0.11 | 0.060 | 0.11 | 0.13 |
| Chloride | mg/L | 120 | 2.2 | 2.4 | 1.1 | 2.3 |
| Ammonia (N) | mg/L | 5.7* | 0.71 | 0.94 | 0.56 | 1.0 |
| Nitrate-N | mg/L | 13 | <0.2 | <0.2 | <0.2 | <0.2 |
| Nitrite-N | mg/L | 0.06 | <0.05 | <0.05 | <0.05 | <0.05 |
| TD-P | mg/L | - | 1.1 | 0.13 | 0.55 | 1.2 |
| DOC | mg/L | - | 7.2 | 20 | 11 | 29 |
| **Dissolved Metals** | | | | | | |
| Al | mg/L | 0.005 | 16 | 0.38 | 0.67 | 1.4 |
| Sb | mg/L | 0.009 | 0.0056 | 0.0037 | 0.0069 | 0.020 |
| As | mg/L | 0.005 | 17 | 1.4 | 7.8 | 16 |
| Ba | mg/L | 1 | <0.0004 | 0.0023 | 0.092 | 0.080 |
| Be | mg/L | 0.00015 | 0.0040 | 0.000048 | 0.00073 | 0.00090 |
| B | mg/L | 1.5 | <1 | <0.1 | <0.5 | <1 |
| Cd | mg/L | 0.00009 | 0.011 | 0.000046 | 0.0036 | 0.0036 |
| Ca | mg/L | - | 13 | 0.51 | 11 | 11 |
| Cr | mg/L | 0.001 | 0.0048 | 0.0011 | <0.001 | 0.0022 |
| Co | mg/L | 0.001 | 1.1 | 0.00079 | 0.28 | 0.32 |
| Cu | mg/L | 0.002 | 0.29 | 0.0074 | 0.012 | 0.011 |
| Fe | mg/L | 0.3 | 79 | 0.48 | 24 | 13 |
| Pb | mg/L | 0.001 | 0.0073 | 0.0023 | 0.0056 | 0.019 |
| Mg | mg/L | - | 3.7 | 0.18 | 1.8 | 3.8 |
| Mn | mg/L | 0.43 | 1.4 | 0.029 | 1.2 | 0.80 |
| Mo | mg/L | 0.073 | <0.001 | 0.00059 | <0.0005 | <0.001 |
| Ni | mg/L | 0.025 | 2.0 | 0.0026 | 0.51 | 0.48 |
| K | mg/L | - | 3.4 | 2.8 | 3.8 | 3.4 |
| Se | mg/L | 0.001 | 0.0011 | 0.00027 | <0.0004 | <0.0008 |
| Si | mg/L | - | 6.3 | 2.5 | 5.0 | 3.2 |
| Ag | mg/L | 0.00025 | <0.0001 | 0.000018 | <0.00005 | <0.0001 |
| Na | mg/L | - | 7.2 | 3.6 | 2.5 | 3.9 |
| Sr | mg/L | 21 | 0.12 | 0.0055 | 0.15 | 0.092 |
| Tl | mg/L | 0.0008 | <0.00004 | 0.000037 | 0.00030 | 0.00067 |
| U | mg/L | 0.015 | 0.00033 | 0.00011 | 0.000020 | <0.00004 |
| V | mg/L | 0.12 | <0.004 | 0.0014 | <0.002 | <0.004 |
| Zn | mg/L | 0.007 | 4.8 | 0.0042 | 1.7 | 1.8 |
| Hg | mg/L | 0.000026 | <0.001 | 0.00010 | <0.0005 | <0.001 |

**Notes:**
TD-P: Total Dissolved Phosphorus; DOC: Dissolved Organic Carbon;
Tier 1 EQS: Tier 1 Environmental Quality Standards (EQS) for Surface Water (NSECC, 2021);
*Ammonia-N guideline is pH and temperature dependent. Value shown is for pH 7.0 and temperature of 15°C.
Grey shading indicates a concentration above the Tier 1 EQS.

## 3.4 Overburden

### 3.4.1 Acid-Base Accounting

Overburden material representing organic substrate (*i.e.,* soil) and till will be stripped in various Project site areas during the construction phase. The largest volume of overburden is expected to be disturbed and removed in the footprint of the open pits. Organics and till will be segregated and stored in temporary stockpiles during operations for later use in the construction of infrastructure (*e.g.,* TMF embankment) and WRSA reclamation covers. The ABA results for the overburden samples are summarized in Table 3-20 with full results presented in Appendix C.4. The majority of the samples have paste pH values below 5.5, indicating that the samples are devoid of readily available neutralization potential such as carbonates. Total S content is relatively low with most samples (8 of 12 soil samples; 15 of 16 till samples) having total S content of less than 0.2%. Although the maximum total S was measured in a till sample (0.34%), overall, the till samples have lower total S (median 0.034%) relative to the soil samples (median 0.098%). Sulphate S is low for all overburden samples (≤0.070%) and sulphide S makes up the majority of the sulphur balance.

In accordance with paste pH results, TIC contents are low and frequently below the detection limit in the overburden samples. In contrast, total C is relatively high, particularly for the soil samples (median 30%), indicating a high organic C content as expected for this material type. Due to the low TIC content, the overburden samples have low CaNP and also lack Modified NP. As a result of the low NP for these samples, all soil samples and most till samples (14 of 16 samples) are considered PAG with NPR values below 2.0. The majority of the till samples with NPR < 2.0 (11 samples) also have paste pH < 5.5.

### 3.4.2 Solid Phase Metals

Solid phase metal results for the soil and till samples are included in Appendix C.4. These results were compared to the AUCCA (Rudnick and Gao, 2014) in order to provide an indication of elemental enrichments (Table 3-21). Elements which had median values above 3x AUCCA included Cd, Hg, and Se for the soil samples. No median values were above 3x AUCCA for the till samples. Additional parameters with maximum values above at least 3x AUCCA included Ag, As, Hg, Pb (till only), and W (soil only). Some solid-phase contents were notably higher in till relative to the soil (*e.g.,* Al, Cr, Fe) while others were notably higher in the soil sampled (*e.g.,* Ag, Ca, Cd, Sr).

Arsenic contents in overburden are lower relative to waste rock; however, the maximum As values for both soil and till samples were above 10x the AUCCA. In general, metal contents are lower in the overburden samples in comparison to waste rock, with Se being an exception. Selenium content was below the detection limit (<0.70 ppm) in all waste rock samples but was measured at concentrations as high as 4.0 ppm in the overburden samples.

### 3.4.3 Shake Flask Extractions

SFE tests generally produced leachates with slightly acidic pH consistent with paste pH results. All soil samples and the majority of till samples (6 of 9 samples) showed pH < 5.5, while all samples had pH < 6.5 (Table 3-22; Appendix C.4). For the soil samples especially, it is likely that some of the generated acidity comes from organic phases rather than or alongside with sulphide oxidation. As a result, runoff from overburden stockpiles and soil materials in particular may initially generate acidic runoff. However, due to the relatively low sulphur content, the overburden samples are not expected to generate long-term ARD. The source of acidity will need to be confirmed in future testwork.

There were several metals with elevated concentrations in the leachate for both the soil and till samples. Median values for soil samples above the Tier 1 EQS included Al, As, Cd, Cr, Co, Cu, Fe, Pb, and Zn, while median values for till samples above the Tier 1 EQS included Al, Cr, Cu, Fe, Pb, Se, and Zn. Maximum values for additional parameters for both soil and till are above the Tier 1 EQS (Table 3-22). These results indicate that there is some metal leaching potential from overburden material under mildly acidic conditions.

**Table 3-20:**
**Summary of Overburden Acid Base Accounting Results**

| Sample Type | Statistic | Paste pH | Total S | Sulphate S | Sulphide S | CaNP | Total C | Mod. NP | NPR |
|---|---|---|---|---|---|---|---|---|---|
| | | - | % | % | % | kg $CaCO_3$/t | % | kg $CaCO_3$/t | - |
| Soil (n = 12) | Min | 3.2 | 0.020 | <0.01 | <0.01 | <0.80 | 0.28 | -67 | -176 |
| | P10 | 3.2 | 0.043 | 0.021 | <0.01 | <0.80 | 4.7 | -61 | -163 |
| | Median | 3.6 | 0.098 | 0.050 | 0.073 | <0.80 | 30 | -42 | -11 |
| | P90 | 4.5 | 0.24 | 0.059 | 0.17 | <0.80 | 50 | -11 | -6.1 |
| | Max | 5.7 | 0.24 | 0.070 | 0.19 | 0.83 | 58 | -6.1 | -5.1 |
| Till (n = 16) | Min | 4.8 | <0.005 | <0.01 | <0.01 | <0.80 | 0.10 | -19 | -39 |
| | P10 | 4.9 | 0.0075 | <0.01 | <0.01 | <0.80 | 0.38 | -12 | -22 |
| | Median | 5.3 | 0.034 | 0.010 | 0.012 | <0.80 | 2.5 | -5.0 | -11 |
| | P90 | 6.9 | 0.058 | 0.030 | 0.034 | 0.83 | 4.9 | 1.0 | 2.8 |
| | Max | 7.2 | 0.34 | 0.050 | 0.29 | 1.7 | 21 | 1.7 | 5.6 |

**Notes:**
CaNP: Carbonate Neutralization Potential; Mod. NP: Modified Neutralization Potential; NPR: Net Potential Ratio.
Light grey shading indicates NPR < 2.

# Table 3-21:
# Summary of Overburden Solid Phase Metal Results

| Parameter | Units | AUCCA | Soil (n = 12) | | | | | Till (n = 16) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | P10 | Median | P90 | Max | Min | P10 | Median | P90 | Max |
| Ag | mg/kg | *0.053* | 0.020 | 0.072 | 0.13 | 0.25 | 3.4 | 0.010 | 0.010 | 0.025 | 0.060 | 0.28 |
| Al | % | *8.15* | 0.090 | 0.13 | 0.17 | 1.3 | 2.0 | 0.63 | 0.72 | 0.96 | 1.9 | 2.2 |
| As | ppm | *4.8* | 2.0 | 2.0 | 7.5 | 42 | 98 | 3.0 | 3.5 | 7.0 | 39 | 1278 |
| Ba | ppm | *628* | 14 | 18 | 38 | 49 | 68 | 19 | 20 | 27 | 52 | 90 |
| Be | ppm | *2.1* | <0.10 | <0.10 | <0.10 | 0.37 | 0.40 | 0.10 | 0.10 | 0.20 | 0.40 | 0.60 |
| Bi | ppm | *0.16* | 0.050 | 0.071 | 0.13 | 0.16 | 0.17 | 0.090 | 0.090 | 0.13 | 0.19 | 0.32 |
| Ca | % | *2.57* | 0.020 | 0.032 | 0.10 | 0.26 | 0.31 | <0.10 | 0.010 | 0.015 | 0.10 | 0.11 |
| Cd | ppm | *0.09* | 0.020 | 0.033 | 0.29 | 0.40 | 0.44 | 0.010 | 0.010 | 0.020 | 0.060 | 0.11 |
| Co | ppm | *17.3* | 0.30 | 0.40 | 0.55 | 3.6 | 9.9 | 0.90 | 1.0 | 1.7 | 4.7 | 9.6 |
| Cr | ppm | *92* | 1.0 | 1.0 | 2.0 | 23 | 24 | 11 | 12 | 14 | 23 | 26 |
| Cu | ppm | *28* | 3.2 | 4.6 | 6.5 | 12 | 26 | 1.2 | 1.7 | 5.2 | 11 | 17 |
| Fe | % | *3.92* | 0.11 | 0.13 | 0.32 | 2.2 | 2.7 | 1.0 | 1.3 | 1.8 | 2.5 | 3.4 |
| Hg | ppm | *0.05* | <0.01 | 0.093 | 0.18 | 0.32 | 0.40 | <0.01 | <0.01 | 0.040 | 0.11 | 0.23 |
| K | % | *2.32* | 0.030 | 0.030 | 0.055 | 0.17 | 0.43 | 0.060 | 0.070 | 0.090 | 0.25 | 0.45 |
| Li | ppm | *24* | <1 | <1 | <1 | 15 | 25 | 3.0 | 3.0 | 7.0 | 16 | 26 |
| Mg | % | *1.5* | 0.060 | 0.10 | 0.13 | 0.29 | 0.50 | 0.060 | 0.075 | 0.15 | 0.31 | 0.57 |
| Mn | ppm | *774* | 10 | 16 | 70 | 194 | 371 | 99 | 107 | 145 | 296 | 440 |
| Mo | ppm | *1.1* | 0.18 | 0.24 | 0.43 | 0.64 | 0.76 | 0.27 | 0.28 | 0.43 | 0.59 | 0.74 |
| Na | % | *2.43* | 0.010 | 0.011 | 0.020 | 0.040 | 0.050 | 0.010 | 0.020 | 0.020 | 0.030 | 0.030 |
| Ni | ppm | *47* | 2.0 | 2.0 | 3.5 | 11 | 19 | 3.0 | 3.0 | 5.0 | 11 | 21 |
| P | % | *0.0655* | 0.020 | 0.030 | 0.040 | 0.060 | 0.060 | 0.010 | 0.010 | 0.020 | 0.055 | 0.060 |
| Pb | ppm | *17* | 7.1 | 8.3 | 22 | 42 | 43 | 3.0 | 4.3 | 5.9 | 19 | 112 |
| Rb | ppm | *84* | 1.4 | 1.7 | 3.7 | 12 | 32 | 3.1 | 3.8 | 5.6 | 18 | 33 |
| S | % | *0.0621* | <0.01 | 0.030 | 0.12 | 0.14 | 0.15 | <0.01 | <0.01 | 0.020 | 0.030 | 0.17 |
| Sb | ppm | *0.4* | <0.05 | 0.20 | 0.42 | 0.54 | 0.72 | <0.05 | <0.05 | 0.090 | 0.30 | 0.66 |
| Se | ppm | *0.09* | <1 | 1.0 | 2.0 | 2.9 | 4.0 | <1 | <1 | 1.0 | 1.5 | 4.0 |
| Sn | ppm | *2.1* | 0.30 | 0.40 | 0.80 | 1.3 | 3.0 | 0.30 | 0.35 | 0.60 | 1.0 | 2.0 |
| Sr | ppm | *320* | 3.2 | 4.9 | 24 | 40 | 46 | 1.9 | 2.0 | 2.9 | 6.0 | 8.1 |
| Th | ppm | *10.5* | <0.1 | <0.1 | 0.35 | 3.6 | 9.0 | 0.40 | 3.3 | 4.7 | 6.3 | 7.2 |
| Ti | % | *0.384* | <0.1 | <0.1 | <0.10 | 0.10 | 0.10 | 0.040 | 0.060 | 0.075 | 0.11 | 0.11 |
| Tl | ppm | *0.9* | 0.030 | 0.032 | 0.060 | 0.11 | 0.23 | 0.040 | 0.050 | 0.070 | 0.13 | 0.22 |
| U | ppm | *2.7* | 0.050 | 0.064 | 0.14 | 0.62 | 1.2 | 0.54 | 0.57 | 0.75 | 0.95 | 1.2 |
| V | ppm | *97* | 3.0 | 3.1 | 5.5 | 29 | 33 | 13 | 15 | 24 | 35 | 41 |
| W | ppm | *1.9* | <0.1 | <0.1 | 0.30 | 1.4 | 8.1 | <0.1 | <0.1 | 0.20 | 0.55 | 1.0 |
| Zn | ppm | *67* | 9.0 | 11 | 23 | 44 | 48 | 5.0 | 7.0 | 14 | 24 | 46 |
| Zr | ppm | *193* | <0.5 | <0.5 | 1.8 | 5.4 | 6.9 | 0.80 | 1.1 | 4.0 | 5.1 | 5.8 |

**Notes:**
Solid phase metals by aqua regia digestion.
AUCCA: Average Upper Continental Crustal Abundance (Rudnick and Gao, 2014).
Light grey indicates a value >3x the AUCCA.
Dark grey indicates a value >10x the AUCCA.

**Table 3-22:**
**Summary of Overburden Shake Flask Extraction Results**

| Parameter | Units | Tier 1 EQS | Soil (n = 5) | | | Till (n = 9) | | |
|---|---|---|---|---|---|---|---|---|
| | | | Min | Median | Max | Min | Median | Max |
| pH | | 6.5-9.0 | 3.3 | 3.8 | 4.8 | 4.1 | 5.0 | 6.3 |
| Conductivity | µS/cm | - | 78 | 341 | 737 | 35 | 81 | 323 |
| Alkalinity | mg $CaCO_3$/L | - | 0 | 0 | 1.7 | 0 | 2.8 | 7.1 |
| Chloride | mg/L | 120 | 4.0 | 61 | 190 | 5.0 | 6.0 | 80 |
| Fluoride | mg/L | 0.12 | <0.06 | <0.06 | 0.13 | <0.06 | <0.06 | <0.06 |
| Nitrate (N) | mg/L | 13 | 0.26 | 0.62 | 4.6 | <0.06 | 0.37 | 5.3 |
| Nitrite (N) | mg/L | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Ammonia (N) | mg/L | 5.7* | 0.50 | 1.4 | 10 | <0.1 | 0.30 | 0.60 |
| DOC | mg/L | - | 40 | 103 | 180 | 6.0 | 36 | 59 |
| Phosphorus (total reactive) | mg/L | - | <0.03 | 0.42 | 5.0 | <0.03 | <0.03 | <0.03 |
| Sulphate | mg/L | 128 | 3.1 | 15 | 29 | 1.8 | 2.6 | 9.6 |
| **Dissolved Metals** | | | | | | | | |
| Hardness | mg/L | | 16 | 47 | 66 | 6.3 | 15 | 36 |
| Al | mg/L | 0.005 | 1.7 | 6.3 | 19 | 0.96 | 1.6 | 14 |
| Sb | mg/L | 0.009 | <0.0009 | <0.0009 | 0.0052 | <0.0009 | <0.0009 | <0.0009 |
| As | mg/L | 0.005 | 0.0045 | 0.0072 | 0.019 | 0.00070 | 0.0025 | 0.017 |
| Ba | mg/L | 1 | 0.033 | 0.038 | 0.35 | 0.0047 | 0.010 | 0.21 |
| Be | mg/L | 0.00015 | 0.000070 | 0.00012 | 0.00038 | 0.000020 | 0.000043 | 0.00018 |
| B | mg/L | 1.5 | 0.036 | 0.092 | 0.13 | 0.013 | 0.023 | 0.037 |
| Cd | mg/L | 0.00009 | 0.00013 | 0.00018 | 0.00064 | 0.0000 | 0.000046 | 0.00023 |
| Ca | mg/L | - | 3.1 | 11 | 19 | 1.5 | 3.2 | 12 |
| Cr | mg/L | 0.001 | 0.00093 | 0.0021 | 0.0033 | 0.00074 | 0.0025 | 0.0038 |
| Co | mg/L | 0.001 | 0.00094 | 0.0012 | 0.0016 | 0.00021 | 0.00063 | 0.00085 |
| Cu | mg/L | 0.002 | 0.0042 | 0.0079 | 0.011 | 0.0020 | 0.0027 | 0.0041 |
| Fe | mg/L | 0.3 | 0.15 | 0.42 | 0.81 | 0.049 | 0.30 | 0.67 |
| Pb | mg/L | 0.001 | 0.0033 | 0.011 | 0.017 | 0.00052 | 0.0013 | 0.014 |
| Mg | mg/L | - | 1.9 | 3.9 | 7.1 | 0.63 | 1.3 | 2.7 |
| Mn | mg/L | 0.43 | 0.018 | 0.092 | 0.18 | 0.0065 | 0.027 | 0.24 |
| Hg | µg/L | 0.026 | 0.010 | 0.020 | 0.040 | <0.01 | <0.01 | 0.010 |
| Mo | mg/L | 0.073 | 0.0015 | 0.0057 | 0.0086 | 0.000090 | 0.00068 | 0.012 |
| Ni | mg/L | 0.025 | 0.0014 | 0.0031 | 0.0043 | 0.00050 | 0.0013 | 0.0025 |
| K | mg/L | - | 2.9 | 6.2 | 20 | 1.1 | 1.7 | 2.9 |
| Se | mg/L | 0.001 | 0.00010 | 0.00097 | 0.0018 | 0.00033 | 0.0012 | 0.0017 |
| Ag | mg/L | 0.00025 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |
| Na | mg/L | - | 3.1 | 12 | 22 | 1.8 | 3.3 | 7.1 |
| Sr | mg/L | 21 | 0.015 | 0.094 | 0.16 | 0.0077 | 0.017 | 0.11 |
| Tl | mg/L | 0.0008 | 0.000070 | 0.00021 | 0.00027 | 0.0000080 | 0.000030 | 0.00011 |
| U | mg/L | 0.015 | 0.00010 | 0.00021 | 0.00044 | 0.000060 | 0.00011 | 0.0015 |
| V | mg/L | 0.12 | 0.0020 | 0.0036 | 0.0049 | 0.00039 | 0.0015 | 0.0031 |
| Zn | mg/L | 0.007 | 0.048 | 0.16 | 0.31 | 0.0040 | 0.039 | 0.18 |

**Notes:**
DOC: Dissolved Organic Carbon
*Ammonia-N guideline is pH and temperature dependent. Value shown is for pH 7.0 and temperature of 15°C.
Grey shading indicates a concentration above the Tier 1 Environmental Quality Standards (EQS) for Surface Water (NSECC, 2021).

# 4. Kinetic Test Results

## 4.1 Mine Rock

### 4.1.1 Humidity Cells

Humidity cell testing is used to mimic the natural weathering processes that act on crushed rock or tailings material. The results are used as the basis for the derivation of geochemical loading rates for materials stored in surface facilities under oxidizing conditions. These experiments provide data on the primary weathering rates of waste materials and, therefore, the results from this type of testing may be used to estimate the rate of acid generation and metal release to the environment. As well, these data may be used to estimate drainage chemistry via upscaling models.

During the initial cycles of humidity cell testing, sulphate and metals often have highly variable release rates before stabilizing at a relatively constant rate. This variability is a geochemical response to surface exposure of freshly crushed samples and the accelerated leaching/oxidizing conditions induced in a humidity cell. Once exposed mineral surfaces have equilibrated to this environment, stable reaction rates can be determined. Humidity cells often require several weeks to approach geochemical stability, and reaction rates rarely remain constant on a week-to-week basis. As a result, data from a number of cycles over which rates vary within a definable and constant range are commonly used to calculate long-term reaction rates.

The six Goldboro humidity cell tests are currently ongoing. These humidity cells have been running for 32 weeks (HC1 to HC4) or 28 weeks (HC5 and HC6) at the time of preparation of this report. The summary of key parameters over the last three available weeks are provided in Table 4-1. Full kinetic test results are included in Appendix D.1.

**Table 4-1:**
**Summary of Waste Rock Humidity Cell Test Results From the Last Three Available Weeks That Metal Analyses Were Conducted**

| | | | | | Average Over the Final Three Weeks[1] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Cell ID** | **Description** | **Initial Total S** | **Corrected Modified NP** | **# of Weeks** | **pH** | **Alkalinity** | **Acidity** | **Sulphate** | **CMR** |
| | | **%** | **kg $CaCO_3$/t** | | | **mg$CaCO_3$/L** | **mg$CaCO_3$/L** | **mg/kg/wk** | |
| HC1 | Argillite, NPAG | 0.030 | 4.3 | 32 | 6.9 | 3.0 | <1 | 0.93 | 2.8 |
| HC2 | Argillite, PAG1 | 0.22 | 4.1 | 32 | 6.5 | 1.7 | <1 | 5.0 | 1.1 |
| HC3 | Greywacke, NPAG | 0.032 | 4.6 | 32 | 6.8 | 3.0 | <1 | 0.93 | 2.6 |
| HC4 | Greywacke, PAG1 | 0.22 | 1.7 | 32 | 6.4 | <1 | 2.0 | 3.4 | 0.8 |
| HC5 | Argillite + Greywacke, PAG2 | 0.054 | 2.5 | 28 | 6.9 | 3.0 | <1 | 2.6 | 1.6 |
| HC6 | Greywacke Marker Unit, PAG1 | 0.21 | 6.8 | 28 | 7.0 | 3.7 | <1 | 1.6 | 3.9 |

**Notes:**
[1]Average over the final three weeks with available results;
NP: Neutralization Potential; CMR: Carbonate Molar Ratio;
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.

#### *4.1.1.1 pH and Alkalinity*

Weekly pH values provide insight to the balance between acid generating and acid neutralizing reactions in a humidity cell sample. If the leachate pH remains near pH 7, neutralization potential is derived from a reactive carbonate source and acid consuming reactions predominate. However, once the reactive NP is exhausted, pH will decrease rapidly if the sample maintains a source of acid production. When neutralization potential is derived from a less reactive source, a trend of gradually decreasing pH is commonly observed as the NP is depleted and the equilibrium pH of the next most reactive mineral phase is reached.

The leachates from all waste rock humidity cells have remained circumneutral with pH value between 6.0 and 7.5 since week 10 (Figure 4-1). The two PAG1 humidity cells (HC2 and HC4) produced slightly lower pH values in recent weeks relative to the other humidity cells and are showing a slightly decreasing trend. All humidity cells have relatively low alkalinity (<5 mg $CaCO_3$/L; Figure 4-1). HC4 has the lowest alkalinity, falling below the detection limit for several weeks (<1 mg $CaCO_3$/L). Depending on the ongoing rate of acid generation as well as the reactivity of non-carbonate NP, HC4 can be expected to turn acidic (*i.e.*, pH < 5.5) in the near future. In order to evaluate metal leaching rates under acidic conditions for Goldboro PAG1 waste rock, this cell was requested to be operated past the routine 40 weeks of humidity cell runtime.

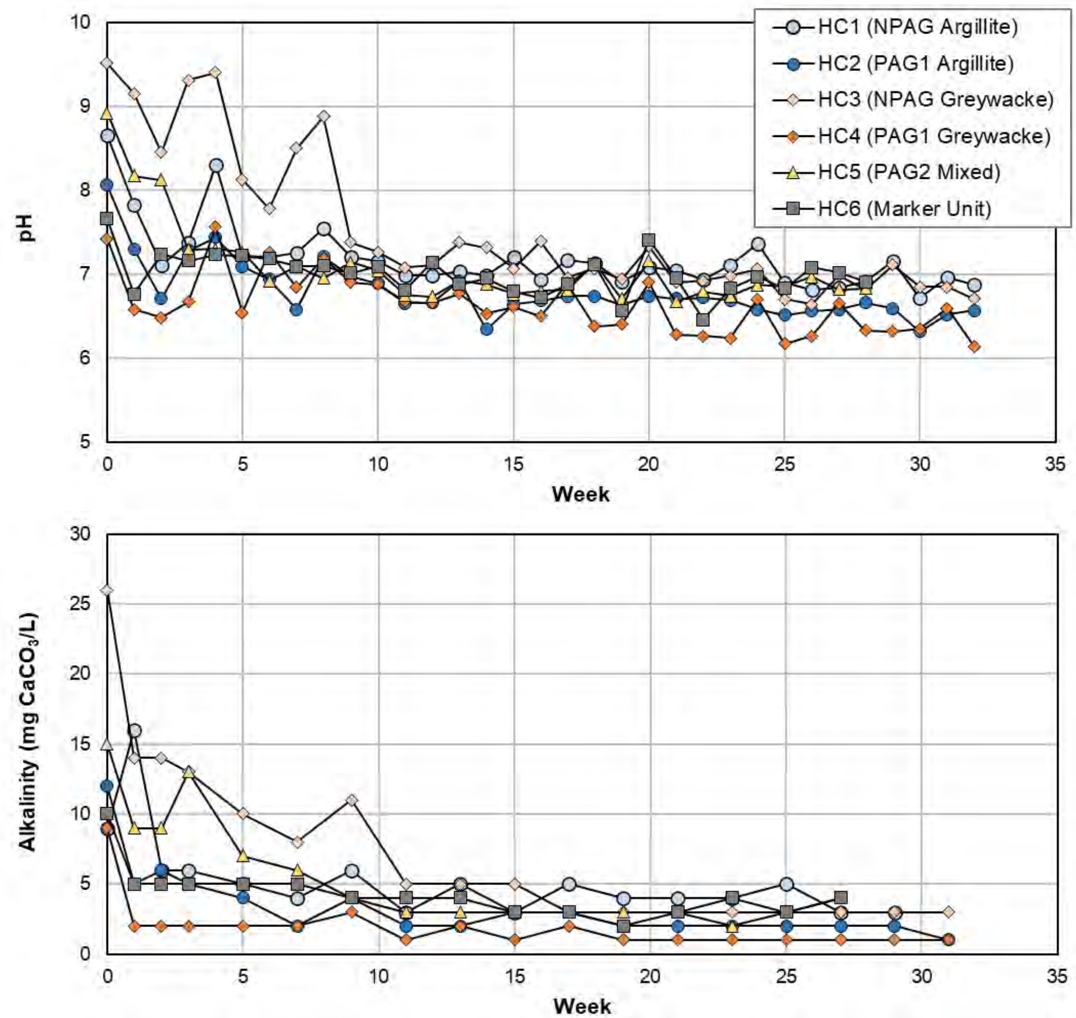



**Figure 4-1: Waste Rock humidity cell leachate pH values (top) and alkalinity time series (bottom).**

### *4.1.1.2 Sulphate Production and NP Depletion*

The rates of sulphide oxidation and NP consumption are two important parameters derived from the analysis of humidity cell leachates. Humidity cell tests determine the rate of sulphide mineral oxidation by the presence of sulphate in weekly leachates. Sulphide oxidation is typically the major source of acid production and metal loading in mine drainage.

The rate of sulphide oxidation in the waste rock samples is estimated from sulphate analyses of the humidity cell leachates. To obtain sulphide oxidation rates, weekly sulphate concentrations are normalized to the mass of sample in the humidity cell (mg/kg/week). Elevated sulphate loading rates are expected in the first few weeks of the test due to dissolution and flushing of readily soluble surface oxidation products (*e.g.*, secondary sulphates) from crushed samples. The sulphate loading rates are subsequently expected to reach relatively stable values. Overall, the sulphate loading rates are low for the Goldboro humidity cells with values stabilizing relatively rapidly below 10 mg/kg/wk. In recent weeks, sulphate loading rates from the two PAG1 humidity cells (HC2, HC4) and the PAG2 humidity cell (HC5) had the highest sulphate loading rates (approximately 2 to 6 mg/kg/wk), while the PAG1 marker unit humidity cell (HC6) had slightly lower sulphate loading rates (1 to 2 mg/kg/wk; Figure 4-2). The sulphate loading rates from the two NPAG humidity cells have been consistently low (<1 mg/kg/wk) since at least week 5. There is a weak positive correlation between solid phase sulphur and sulphate loading (Figure 4-3). However, the greywacke marker unit sample has relatively high total S and a relatively low sulphate loading.

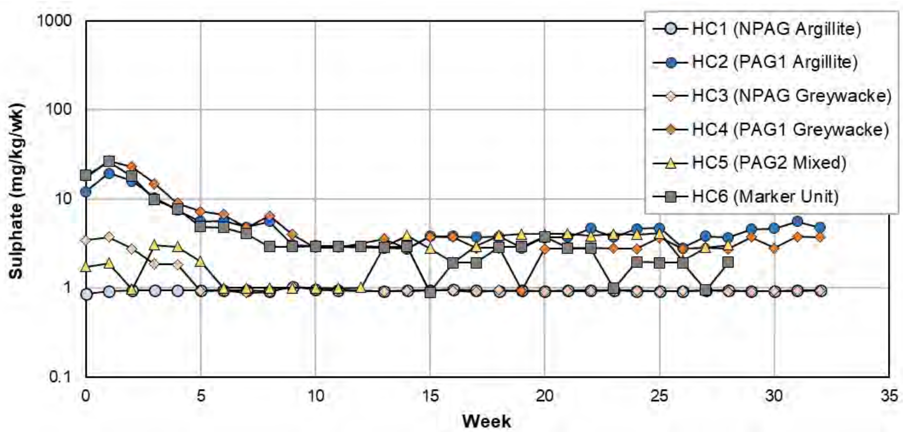



**Figure 4-2: Sulphate loading rates in humidity cells over time.**

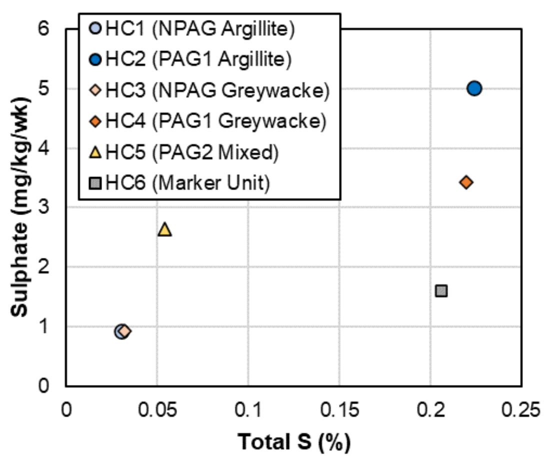



**Figure 4-3: Average stable sulphate load *versus* total sulphur content in humidity cell samples.**

The carbonate molar ratio (CMR) is a proxy for the rate of carbonate dissolution (NP depletion) and sulphide oxidation occurring in the laboratory test reactor, assuming that the cations are derived only from the NP source and the sulphate is derived from the oxidation of Fe-sulphides. The CMR is calculated as:

$$CMR = \frac{[Ca^{2+}] + [Mg^{2+}]}{[SO_4^{2-}]} \qquad \text{(Eq. 3)}$$

In the most simplistic scenario for pyrite oxidation, when carbonate minerals are present, the oxidation-neutralization reaction is pH-dependent. Assuming no Ca and $SO_4$ are lost to gypsum precipitation, two carbonate consumption reactions can describe the process, including:

at pH<6.3:

$$FeS_2 + {}^{15}\!/_4\, O_2 + {}^{7}\!/_2\, H_2O + 2[Ca^{2+}, Mg^{2+}]CO_3 \longrightarrow Fe(OH)_3 + 2SO_4^{2-} + 2H_2CO_3^0 + 2[Ca^{2+}, Mg^{2+}] \qquad \text{(Eq. 4)}$$

at 6.3<pH<10.3:

$$FeS_2 + {}^{15}\!/_4\, O_2 + {}^{7}\!/_2\, H_2O + 4[Ca^{2+}, Mg^{2+}]CO_3 \longrightarrow Fe(OH)_3 + 2SO_4^{2-} + 4HCO_3^- + 4[Ca^{2+}, Mg^{2+}] \qquad \text{(Eq. 5)}$$

Equation 4 indicates that in theory, neutralization of acidity up to pH levels of 6.3 will produce one mole of Ca for each mole of $SO_4$ released, giving a 1:1 carbonate molar ratio (CMR = 1). However, this is a somewhat idealized representation that does not consider the exsolution of $CO_2$ gas; the contribution of non-carbonate minerals releasing Ca and Mg ions; or the dissolution of carbonates by dilute waters in the absence of sulphide oxidation. These processes could all increase the rate of Ca and Mg release relative to $SO_4$ production.

At circumneutral pH levels, $H_2CO_3$ is not stable and the dominant form of inorganic carbonate in an aqueous solution is $HCO_3^-$. Equation 5 indicates that, at near-neutral pH levels, calcium carbonate is less efficient at neutralizing acidity and will produce a CMR of 2.0.

Chemical analysis of the humidity cell leachates provide weekly leachate concentrations of Ca, Mg, and $SO_4$, which can be used to calculate the CMR. The relationships derived from these chemical equations assume that pyrite oxidation is the sole source of sulphur and iron in the product that take the form of sulphate and iron hydroxide, respectively. Thus, the oxidation of other sulphide minerals, dissolution of soluble sulphate minerals, the formation of other secondary products, or dissolution of carbonates by dilute waters in the absence of significant sulphide oxidation may alter this relationship (Mattson, 2005). If it is assumed that $Fe(OH)_3$ is produced as a product of pyrrhotite oxidation, the moles of acidity released during this reaction are identical to that of pyrite oxidation (Nicholson, 1994). Since it is known that Goldboro mine rock contains arsenopyrite which releases relatively higher amounts of acidity per mole of sulphur oxidized (Blowes *et al.*, 2003), use of the CMR as described can be considered an approximation only. In theory, the CMR generated by arsenopyrite oxidation alone would be higher than for pyrite.

The CMR for the humidity cells are variable but generally remain below 3.0, excluding some variability for HC6 (Figure 4-4). The two PAG1 humidity cells (HC2 and HC4) have the lowest CMR values which have been relatively stable for several weeks close to 1.0. HC6 shows variable CMR values from approximately 1.0 to 5.0. Of the remaining three humidity cells, HC1 has the highest CMR, while the other two humidity cells (HC3, HC5) show lower but increasing CMR values between 1.0 and 3.0.

The CMR can be used to calculate the CaNP depletion rate which can in turn be used to calculate the amount of time required to consume all available CaNP from the humidity cell samples. The CaNP depletion rate is calculated as follows:

*CaNP depletion rate = CMR x Sulphate loading rate (in kg $CaCO_3$/t/wk equivalents)*

For the PAG humidity cells that are expected to become acidic, the time to NP depletion theoretically corresponds to the time to onset of acid generating conditions, although relative grain liberation is an important factor. Note that for the purposes of calculating NP depletion rates and the time for complete depletion of NP, the initial sulphate production rates, which reflect the flushing of non-acid generating surface oxidation products such as gypsum, were not considered. Rather the relatively stable NP depletion rates in later cycles of the tests more appropriately reflect depletion based on sulphate produced by sulphide oxidation. This will prevent overestimating NP depletion rates and thereby underestimating the lag time to the onset of acidic conditions.

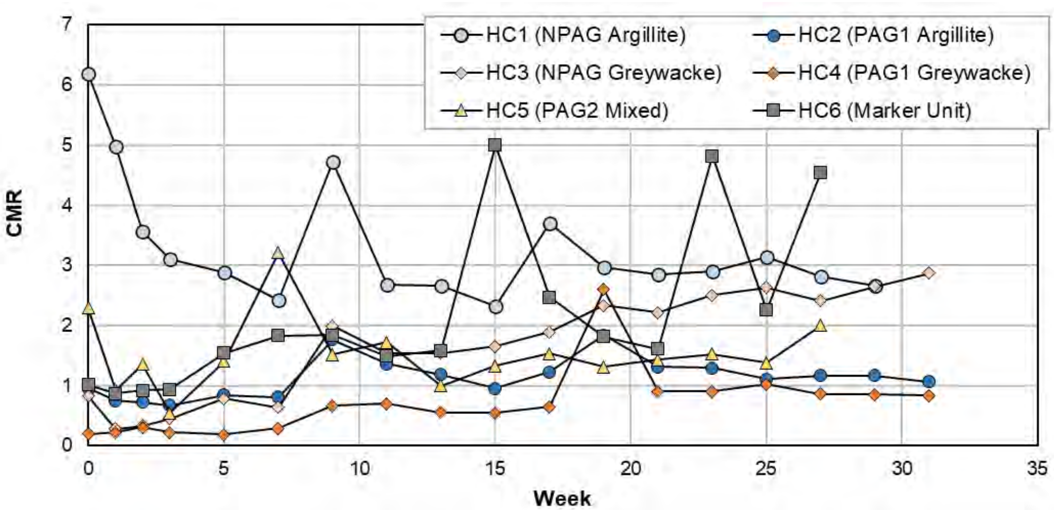



**Figure 4-4: Carbonate Molar Ratio trends for waste rock humidity cells**

Using an average CaNP depletion rate of the last three available weeks for all PAG humidity cells, yields a CaNP depletion rate of 0.0048 kg $CaCO_3$/t/wk. By applying this rate to the CaNP values of the PAG humidity cells indicates that CaNP will be depleted between 2 and 26 years, marking the lag time to onset of acidic conditions. The QEMSCAN results indicated that the carbonate minerals may be depleted more rapidly than the sulphide minerals due to the smaller grain size, which may lead to more rapid ARD onset. Conversely, the finding that some NP will be afforded by non-carbonate phases, especially under the low acid generation rates observed, may offset this timing.

The calculated CaNP depletion rate was also applied to the CaNP of all PAG waste rock samples within the static test population to quantify a range of lag times that can be expected until this population releases net acidic drainage. The results of this exercise are shown in Figure 4-5 and show that it will take approximately 9 years for 25% of all PAG samples to turn acidic and around 25 years for 75% of PAG samples to become acidic. These values could be conservative as they do not consider the reduced sulphide oxidation rate at colder temperatures or the slowing of oxidation rates due to coating of sulphide minerals over time. On the other hand, Sexsmith *et al.* (2015) have shown that the calculated lag time to onset of acidic conditions may be longer than the observed timeline which was, in part, attributed to the limited availability of NP within the studied materials. As such, the implementation of such lag times to estimate the timing for ARD development in full-scale mine facilities should be done with caution. It is recommended that, considering the information a hand to date, ARD onset be conservatively modelled to occur at five years after material exposure for PAG1 materials.

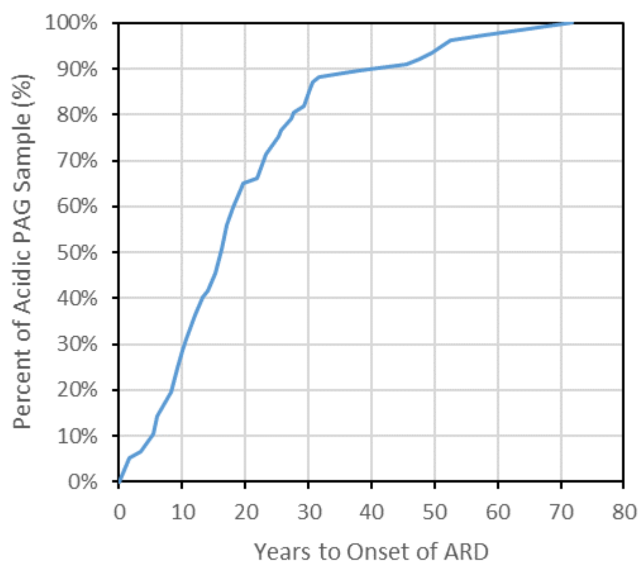



**Figure 4-5: Estimate of time to onset of acidic conditions in Goldboro Potentially Acid Generating (PAG) samples**

#### *4.1.1.3 Metal Release Rates*

Humidity cell leachate concentrations represent primary metal release rates that allow for the calculation of mineral reaction kinetics as a function of the solid phase composition of a sample and the pH regime. Due to the test design utilizing a high water/rock ratio intended to contact all material surfaces, humidity cell concentration data do not provide a strictly quantitative estimate of drainage chemistry. To provide a more functional parameter, metal concentrations in the humidity cell leachates were normalized to the mass of sample. This conversion allows the measured parameters to be documented in units of mass loading (mg/kg/wk). Loading values provide consistent representations of the amount of metal released and facilitate inter-cycle comparison.

Of the parameters with solid phase values >10x the AUCCA in one or more samples (see Section 0), only As, Cd, and Mo have humidity cell leachate concentrations that are generally measured at values above the detection limit. Of the other metals identified as elevated in the solid phase (*i.e.*, Ag, Bi, Cu, Pb, Sb, Zn), leachate concentrations were measured at values close to or below the detection limit in the majority of humidity cell leachate samples, suggesting that there is a low leaching potential for these elements under neutral conditions (Appendix D.1). Increased metal loading rates are anticipated for some of these parameters in PAG humidity cells once acidic conditions are established. For the purpose of this discussion, only the loading rates for As, Cd, and Mo are presented.

Arsenic loading rates have been remarkably stable in humidity cell tests to date (Figure 4-6). HC1 (argillite, NPAG) has the highest As loading rates (approximately 0.05 mg/kg/wk), while HC2 (argillite, PAG1) has the lowest As loading rates (approximately 0.01 mg/kg/wk). the remaining humidity cells have produced intermediate values. These results indicate that elevated As concentrations are not expected to be limited to waste rock with a high ARD risk under neutral conditions. Mineralogical analysis indicated that As predominantly occurs in arsenopyrite or as impurities within pyrite and pyrrhotite (Section 3.1.1). Interestingly, there is a weak inverse correlation of As loading rates with solid phase As content (Figure 4-7). At the same time, pH is positively correlated with As loading rate (Figure 4-8) which suggests that As mobility is controlled by pH rather than solid phase abundance in the humidity cell environment. While it can be assumed that arsenopyrite oxidation in the PAG1 cells would be larger source of As from these materials relative to the NPAG cells, attenuation processes (*e.g.*, adsorption) are inferred limit As loading rates at a pH of ≤7.5. At comparable pH, PAG1 materials would be expected to produce higher As concentrations as seen in SFE testing.

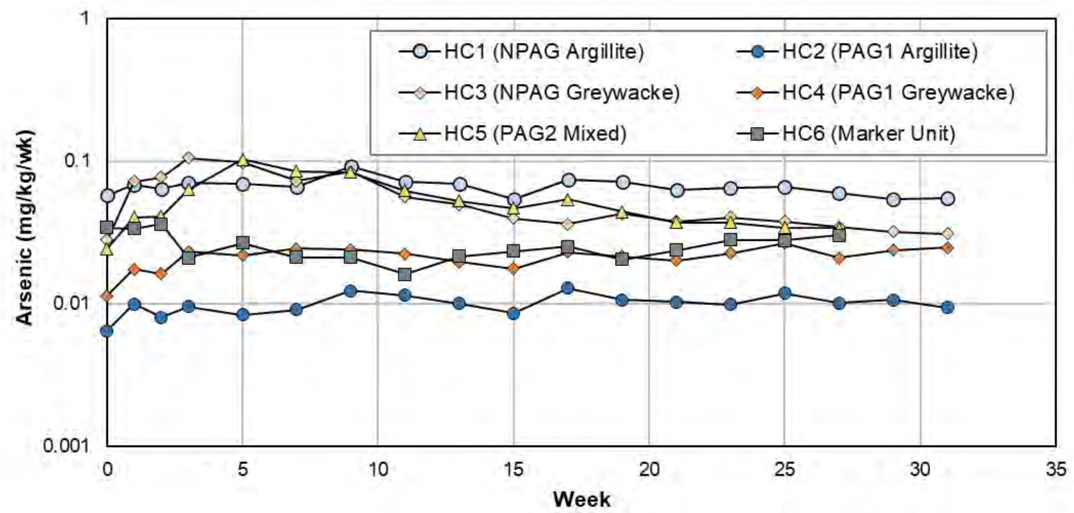



**Figure 4-6: Waste rock humidity cell arsenic load over time**

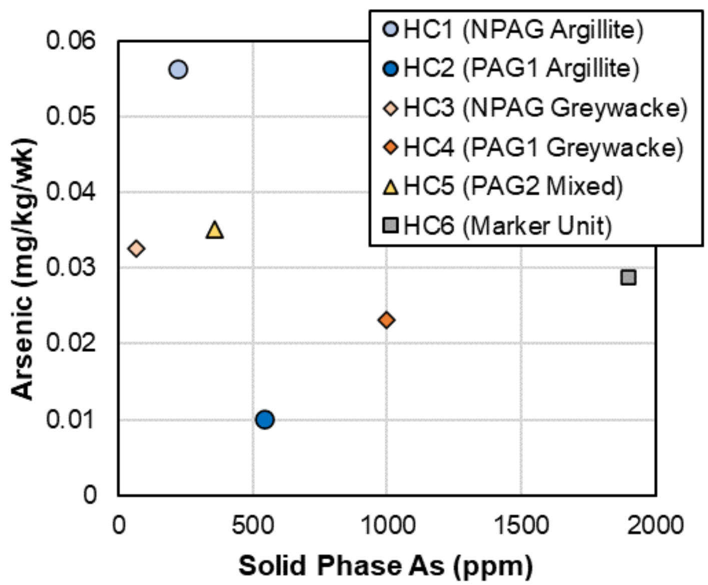



**Figure 4-7: Average arsenic load for last three available test cycles vs Initial solid phase arsenic content**

Cadmium and Mo show erratic loading rates with no distinct trends between the humidity cell types (Figure 4-9; Figure 4-10). Cadmium loading rates vary from 0.0000019 to 0.0000064 mg/kg/wk, while Mo loading rates vary from 0.000087 to 0.0029 mg/kg/wk over the last three weeks reported. These parameters will be monitored as part of the site-wide water quality monitoring program; however, they are not considered parameters of concern under neutral conditions.

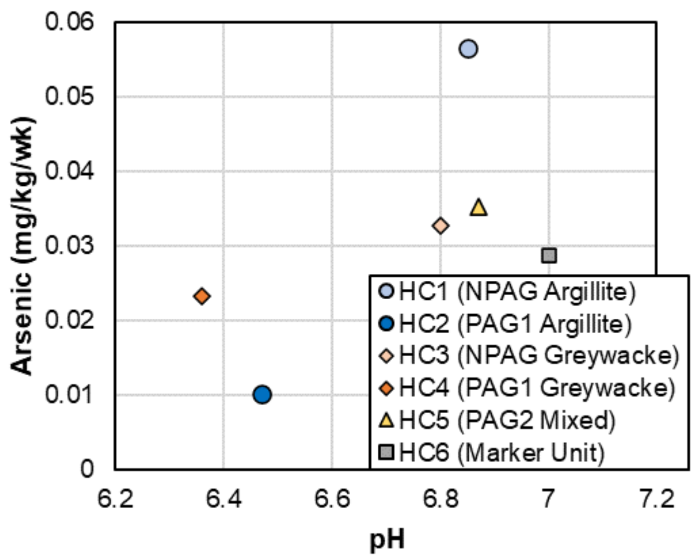



**Figure 4-8: Average arsenic load vs pH for the last three available test cycles**

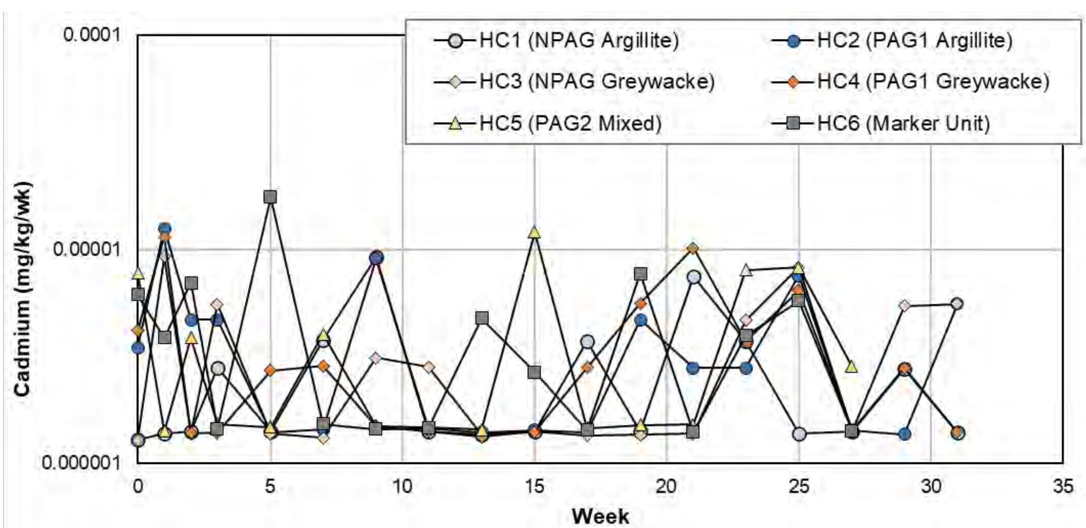



**Figure 4-9: Waste rock humidity cell cadmium load over time**

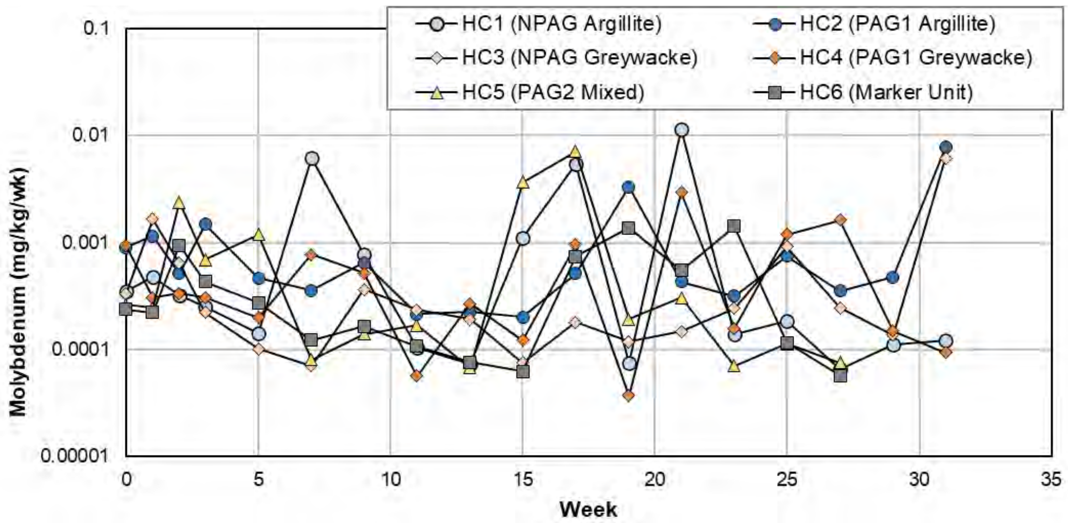



**Figure 4-10: Waste rock humidity cell molybdenum load over time**

### 4.1.2 Field Bins

Field bin leachate is used to help predict the drainage chemistry from the mine rock. These tests provide an indication of runoff chemistry under mine site conditions and are conducted at a larger scale relative to humidity cells (*i.e.*, 150-200 kg *versus* 1 kg). FB-1 was first sampled in June 2021, while FB-2 through FB-4 were first sampled in July 2021. Field bin leachates have been sampled on a monthly basis, up to December 2021 (Appendix D.2). Leachate sample collection is anticipated to continue in 2022.

All field bin leachate samples collected to date have remained circumneutral pH values between 6.7 and 8.3 (Figure 4-11). Sulphate concentrations in the field bin leachates were relatively low overall with the highest values coming from FB-1 (~75 mg/L; Figure 4-11). FB-1 leachate sulphate concentrations showed a decreasing trend over the first four months, which can be attributed to the initial flushing of readily soluble oxidation products that may have formed prior to field bin installation. The other three field bins produced stable sulphate concentrations in the leachate below 25 mg/L.

The field bin leachate results for dissolved metals were screened against the Tier 1 EQS for surface water (NSECC, 2021) to provide a high-level indication of parameters that may be of concern in site drainage (Table 4-2). Parameters exceeding the Tier 1 EQS in field bin leachates include Al, As, Cu, and Zn.

Arsenic has been identified as the main parameter of concern for the project and As concentrations in all leachate samples collected to date are above the Tier 1 EQS of 0.005 mg/L. The highest As concentrations were measured in leachate from FB-1 (0.30 to 5.8 mg/L; Figure 4-11). The other three field bins leached lower As concentrations (0.014 to 0.11 mg/L). It is important to note that the solid-phase As content of the FB-1 sample is also the highest of the tested mine rock (6400 ppm; Table 3-10) and is reflective of ore material. Nevertheless, the data show that high (> 1 mg/L) As concentrations are not unexpected in mine rock contact water at Goldboro.

Copper concentrations in field bin leachates have generally shown a decreasing trend, although concentrations remain above the Tier 1 EQS in all samples (>2 µg/L). Zinc concentrations were variable, but concentrations above the Tier 1 EQS have been measured. The highest Zn concentrations were measured in leachate from FB-1 (up to 68 µg/L). FB-3 and FB-4 have the lowest Zn concentrations, which are often below the detection limit.

The field bin QA/QC program includes field blanks and field duplicate samples collected during each sampling event. Results are included in Appendix D.2. Overall, the QA/QC program shows good data quality. Most of the parameter concentrations in the six field blank samples were below their respective detection limits and those that were above the detection limit were generally below 2x the detection limit. The only exceptions were conductivity, turbidity, and dissolved Na in the July 2021 field blank. Six field duplicates have been collected to date. Acceptable precision and accuracy for evaluating the field duplicate samples is defined to be within 20% relative percent difference (RPD) at concentrations greater than five times the detection limit. The majority of the parameters measured at concentrations above five times the detection limit had RPD values below 20%, with the exception of dissolved P and turbidity (July 2021), and conductivity (September 2021).

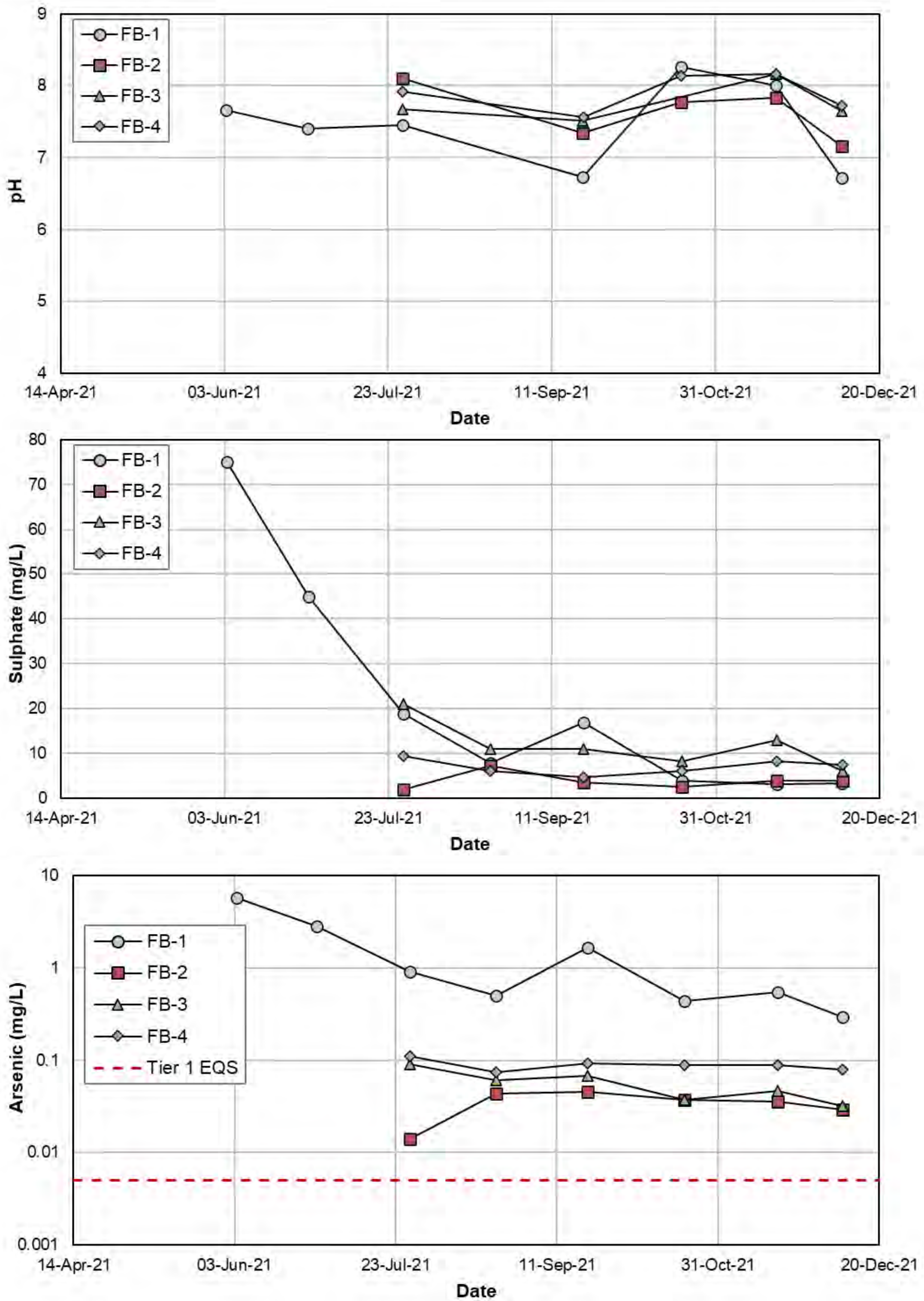



**Figure 4-11: Time series plots of pH (top), sulphate (middle), and arsenic (bottom) in field bin leachates.**

## Table 4-2:
## Summary of Field Bin Leachate Chemistry

| Parameter | Units | Tier 1 EQS | FB-1 (ore stockpile, PAG1) | | FB-2 (mixed lithology, NPAG) | | FB-3 (greywacke, PAG1) | | FB-4 (argillite, NPAG) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Median | Max | Median | Max | Median | Max | Median | Max |
| Field pH | - | 6.5 - 9.0 | 7.5 | 6.7* | 7.8 | 7.2* | 7.7 | 7.5* | 7.9 | 7.6* |
| Field Conductivity | µS/cm | - | 120 | 547 | 63 | 122 | 95 | 176 | 87 | 131 |
| Lab pH | pH | 6.5 - 9.0 | 7.1 | 6.6* | 7.4 | 7.1* | 7.5 | 7.3* | 7.5 | 7.4* |
| Lab Conductivity | µS/cm | - | 52.5 | 220 | 64 | 80 | 94 | 150 | 76 | 110 |
| Total Alkalinity | mg $CaCO_3$/L | - | 7.5 | 5.1* | 18 | 11* | 26 | 14* | 27 | 25* |
| Sulphate | mg/L | 128 | 12 | 75 | 3.8 | 7.3 | 11 | 21 | 6.9 | 9.5 |
| **Dissolved Metals** | | | | | | | | | | |
| Al | µg/L | 5 | 6.7 | 31 | 24 | 60 | 83 | 99 | 31 | 170 |
| Sb | µg/L | 9 | <1 | 5.1 | 2.1 | 4.5 | 1.3 | 1.9 | 4.8 | 7.5 |
| As | µg/L | 5 | 736 | 5800 | 36 | 45 | 54 | 91 | 89 | 110 |
| Ba | µg/L | 1000 | 1.2 | 3.0 | 1.9 | 2.7 | <1 | 1.8 | <1 | 2.2 |
| Cd | µg/L | 0.09 | <0.01 | 0.029 | 0.014 | 0.018 | <0.01 | 0.012 | <0.01 | 0.012 |
| Cr | µg/L | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Co | µg/L | 10 | <0.4 | 0.42 | 0.50 | 2.5 | <0.4 | 1.7 | <0.4 | 0.78 |
| Cu | µg/L | 2 | 8.1 | 63 | 13 | 34 | 12 | 37 | 14 | 41 |
| Fe | µg/L | 300 | <50 | <50 | 56 | 66 | <50 | <50 | <50 | 120 |
| Pb | µg/L | 1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.51 |
| Mn | µg/L | 430 | 14 | 85 | 32 | 50 | 54 | 140 | 8.4 | 26 |
| Mo | µg/L | 73 | <2 | 3.2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Ni | µg/L | 25 | <2 | <2 | 2.1 | 3.1 | <2 | 6.5 | <2 | <2 |
| Se | µg/L | 1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Ag | µg/L | 0.25 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Tl | µg/L | 0.8 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| U | µg/L | 15 | <0.1 | 0.26 | 0.48 | 1.1 | 0.46 | 0.93 | 0.85 | 1.6 |
| V | µg/L | 120 | <2 | <2 | <2 | <2 | <2 | 2.6 | <2 | 2.5 |
| Zn | µg/L | 7 | 21 | 68 | 15 | 29 | <5 | 7.7 | <5 | <5 |

**Notes:**
Tier 1 EQS - Tier 1 Environmental Quality Standards for Surface Water and Groundwater Discharging to Surface Water (NSECC, 2021);
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2;
*Value shown is the minimum value;
Grey shading indicates a value above the Tier 1 EQS.

### 4.1.3 Bulk Sample Stockpile Runoff Water Quality

The bulk sample stockpile runoff water has been sampled since September 2018 as part of the regular site water quality monitoring program. It is important to note that the ditch collection system is considered “uncontrolled” meaning that water levels and flows are not being measured and that direct precipitation, natural ground runoff, and evaporation effects on water chemistry are expected to an extent. Nevertheless, the system is thought to primarily capture ore material contact water. Ongoing comparison of the obtained water quality data with FB-1 leachate chemistry will provide further insight into the data quality. The 2021 results are included in Appendix E.

Ore drainage pH has been variable with laboratory pH readings between 5.1 up to 7.2 (Table 4-3). In general, pH has remained above pH 6.0 with 2021 pH readings between 6.4 and 6.8. No trends in pH over time are evident which indicates that the stockpile has not become acid generating although this material was classified as PAG1 and is expected to eventually generate ARD if it remains exposed at the surface. Sulphate concentrations have remained low over the monitoring period (<30 mg/L).

The discussion on metal concentrations herein focusses on 2021 results since dissolved metals were not included in the water chemistry analyses for years prior. Parameters with concentrations measured above the Tier 1 EQS in one or more 2021 samples include Al, As, Cu, Pb, and Zn (Table 4-3), generally consistent with observation from field bin testing. Of these parameters, Cu, Pb, and Zn concentrations remain within 2x the Tier 1 EQS value. Arsenic has the greatest factor of exceedance above the Tier 1 EQS (4x to >500x), which is consistent with other geochemical testwork identifying As to be the main parameter of concern for the Project.

## Table 4-3:
## Summary of Bulk Sample Stockpile Runoff Water Quality

| Parameter | Units | Tier 1 EQS | Median | Max |
|---|---|---|---|---|
| Lab pH | - | 6.5 - 9.0 | 6.4 | 5.1* |
| Conductivity | µS/cm | - | 42 | 99 |
| Alkalinity | mg $CaCO_3$/L | - | 3.1 | 1.3* |
| Sulphate | mg/L | 128 | 9.7 | 29 |
| **Dissolved metals** | | | | |
| Al | mg/L | 0.005 | 0.016 | 0.10 |
| Sb | mg/L | 0.009 | <0.001 | 0.0018 |
| As | mg/L | 0.005 | 0.63 | 3.4 |
| Ba | mg/L | 1 | 0.0013 | 0.0040 |
| Be | mg/L | 0.00015 | 0.00055 | <0.001 |
| Bi | mg/L | - | <0.002 | <0.002 |
| B | mg/L | 1.5 | <0.05 | <0.05 |
| Cd | mg/L | 0.00009 | 0.000028 | 0.000038 |
| Ca | mg/L | - | 3.7 | 13 |
| Cr | mg/L | 0.001 | <0.001 | <0.001 |
| Co | mg/L | 0.01 | <0.0004 | <0.0004 |
| Cu | mg/L | 0.002 | 0.00098 | 0.0032 |
| Fe | mg/L | 0.3 | <0.05 | 0.056 |
| Pb | mg/L | 0.001 | <0.0005 | 0.0011 |
| Mg | mg/L | - | 0.28 | 0.71 |
| Mn | mg/L | 0.43 | 0.012 | 0.023 |
| Mo | mg/L | 0.073 | <0.002 | <0.002 |
| Ni | mg/L | 0.025 | <0.002 | 0.0053 |
| P | mg/L | - | <0.1 | <0.1 |
| K | mg/L | - | 0.65 | 1.4 |
| Se | mg/L | 0.001 | <0.0005 | <0.0005 |
| Ag | mg/L | 0.00025 | <0.0001 | <0.0001 |
| Na | mg/L | - | 1.3 | 2.4 |
| Sr | mg/L | - | 0.011 | 0.042 |
| Tl | mg/L | 0.0008 | <0.0001 | <0.0001 |
| Sn | mg/L | - | <0.002 | <0.002 |
| Ti | mg/L | - | <0.002 | <0.002 |
| U | mg/L | 0.015 | <0.0001 | <0.0001 |
| V | mg/L | 0.12 | <0.002 | <0.002 |
| Zn | mg/L | 0.007 | 0.0089 | 0.013 |

**Notes:**
Grey shading indicates a concentration above the Tier 1 Environmental Quality Standards (EQS) for Surface Water (NSECC, 2021).
* Value shown is the minimum value.
Data range for lab pH, conductivity, and sulphate, is September 2018 to December 2021.
Data range for alkalinity and dissolved metals is June to December 2021.

## *4.2 Tailings*

### 4.2.1 Humidity Cell

One tailings humidity cell has been set up for the Project to assess the leaching behaviour of tailings under oxidizing conditions (*e.g.*, TMF beaches). A summary of key parameters over the last three available weeks is provided in Table 4-4 and full results are included in Appendix D.3.

**Table 4-4:**
**Summary of Tailings Humidity Cell Test Results From the Last Three Available Weeks That Metal Analyses Were Conducted**

| | | | | | Average Over the Final Three Weeks[1] | | | |
|---|---|---|---|---|---|---|---|---|
| **Cell ID** | **Description** | **Initial Total S** | **Corrected Modified NP** | **# of Weeks** | **pH** | **Alkalinity** | **Sulphate** | **CMR** |
| | | **%** | **kg $CaCO_3$/t** | | | **mg$CaCO_3$/L** | **mg/kg/wk** | |
| T1 | 2020 Master Composite | 0.41 | 3.5 | 22 | 7.8 | 48 | 64 | 1.3 |

**Notes:**
[1]Average over the final three weeks with available results (Week 20-22).
NP: Neutralization Potential; CMR: Carbonate Molar Ratio.

#### *4.2.1.1 pH and Alkalinity*

The tailings humidity cell has remained mildly alkaline over the 22 weeks that the test has been running; however, the pH has shown a slight decrease over time (Figure 4-12). For comparison, the median pH over the first five weeks was 8.0, while the median pH over the last five weeks was 7.8. Alkalinity decreased rapidly over the initial five weeks from 99 to 55 mg $CaCO_3$/L before being relatively stable between weeks 5 to 17 (~60 mg $CaCO_3$/L; Figure 4-12). After week 17, alkalinity has shown a slight decrease (week 22: 47 mg $CaCO_3$/L). This decrease in alkalinity is expected to continue as the available NP and metallurgical additives (*e.g.*, lime) are depleted.

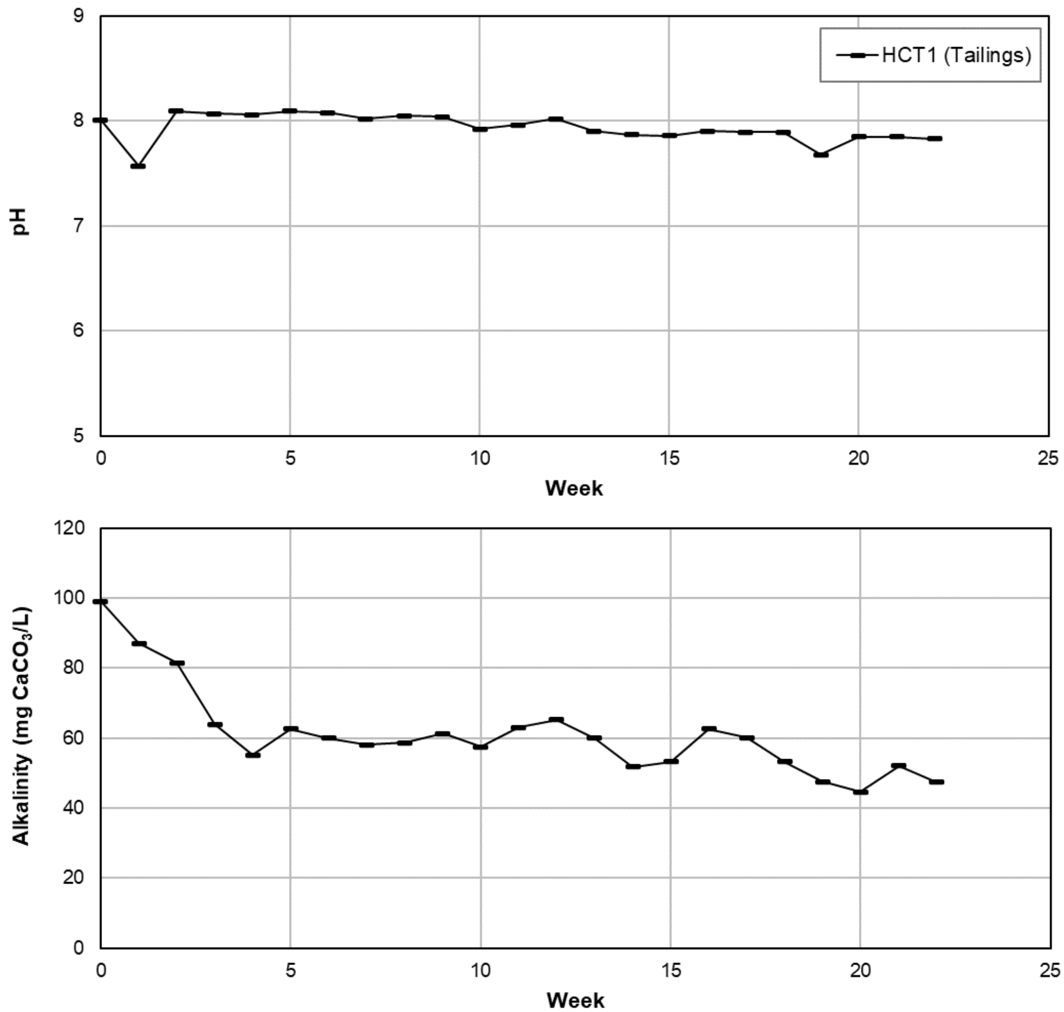



**Figure 4-12: Tailings humidity cell leachate pH values (top) and alkalinity time series (bottom).**

### *4.2.1.2 Sulphate Production and NP Depletion*

Sulphate loading rates initially decreased as the readily soluble surface oxidation products were rinsed from the surfaces. Since week 4, sulphate loading rates have been relatively stable and even increased slightly (Figure 4-13). In week 4, the sulphate loading rate was 43 mg/kg/wk, while it had increased to 66 mg/kg/wk in week 22. The sulphate loading rates from the tailings humidity cell are significantly higher relative to those measured in waste rock humidity cells (<10 kg/kg/wk). This result can be partially attributed to the higher sulphur content of the tailings sample, as well as the flushing of mill process reagents including Na-MBS and copper sulphate added during cyanide detoxification. Given these complicating factors affecting Ca and sulphate loading rates in the short-term at a minimum, the CMR is currently deemed unreliable in the determination of the timing to onset of ARD for tailings. This will be re-evaluated after a longer humidity cell runtime.

Under current mine plan considerations, the exposure time of tailings under atmospheric conditions is assumed to be minimal and acidic drainage within the TMF is not expected.

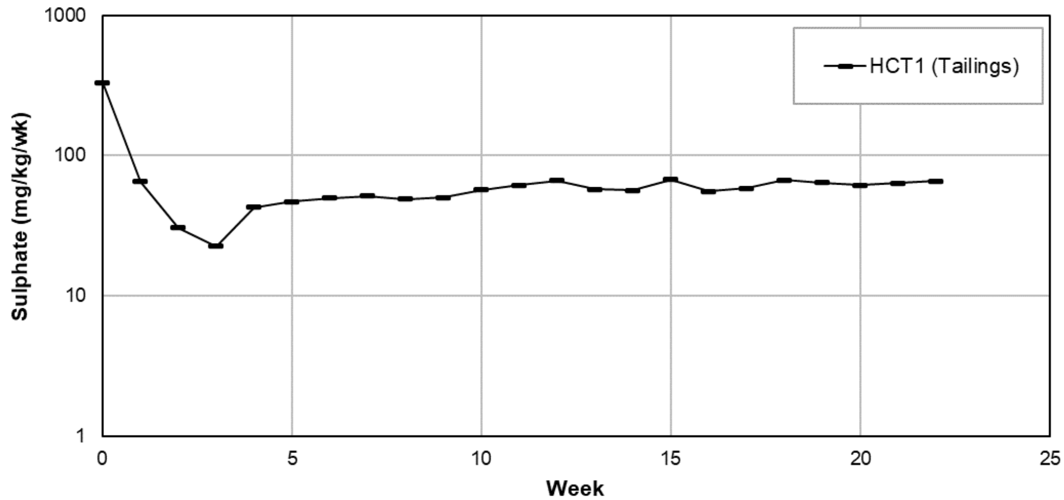



**Figure 4-13: Tailings humidity cell sulphate load over time.**

### *4.2.1.3 Cyanide and Nitrogen Species*

Total cyanide loading rates initially decrease but have shown an increasing trend since week 5 (Figure 4-14). Free and WAD cyanide loading rates are similar and show an increasing trend beginning in week 5. This follows timing of the decrease in alkalinity, as well as an increase in loading rates for some metals (see next section). In combination, these trends show that cyanide species can remain relatively stable in a tailings humidity cell environment for several weeks. One explanation for this observation could be limited oxygen ingress into the fine-grained tailings sample.

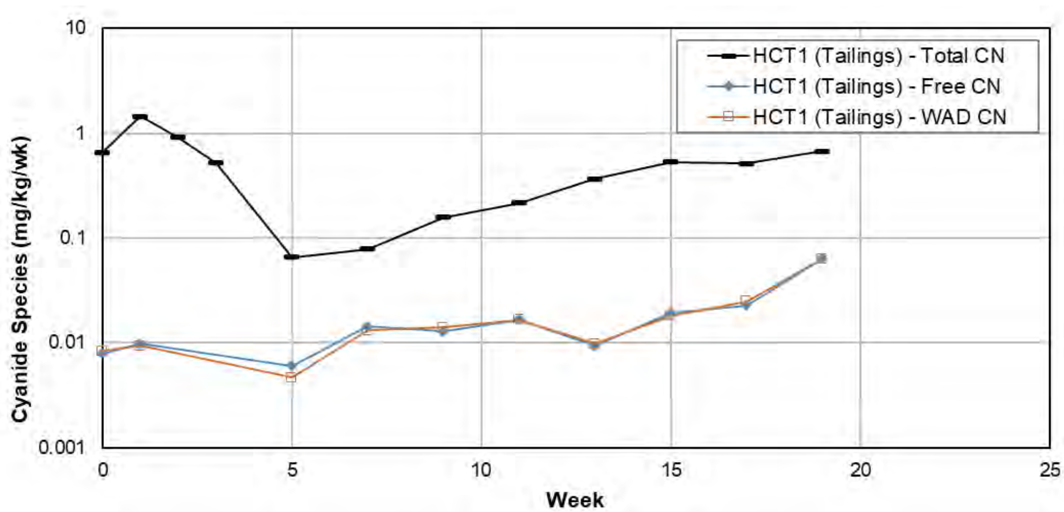



**Figure 4-14: Tailings humidity cell cyanide species load over time.**

Nitrogen species (*i.e.*, ammonia, nitrate, nitrite) concentrations are low and below the detection limit in at least the last four available test cycles that analyses were conducted for these parameters. Ammonia concentrations have shown a decrease over time from 6.9 mg-N/L in the first week of testing to <0.05 mg-N/L after week 11. Nitrate and nitrite have generally remained below the detection limit in all samples.

#### *4.2.1.4 Metal Release Rates*

Metals that were identified as being elevated in tailings samples in the solid phase analysis included As, Ag, Bi, Cd, Mo, Pb, and Sb. Of these parameters, Ag and Bi concentrations were generally below the detection limit in the humidity cell leachate.

Arsenic loading rates are relatively high and often above 1 mg/kg/wk (Figure 4-15). An increase in As loading rates is evident beginning in week 5. Other metals also show a similar increase (*e.g.,* Cd, Pb; Figure 4-15 and Mo; Figure 4-16). The timing of this increase corresponds with the declining trend in alkalinity and slight increase in sulphate loading rates. In contrast, Sb loading rates have decreased (Figure 4-16), while other metal loading rates are relatively stable (*e.g.,* Co, Cu; not shown). Overall, it is evident that metal loading rates from tailings are consistently higher than those measured in mine rock humidity cells. This can be explained by the finer grain size of the tailings as well as the dissolution of labile, metal-bearing oxidation products that are formed in the mill environment.

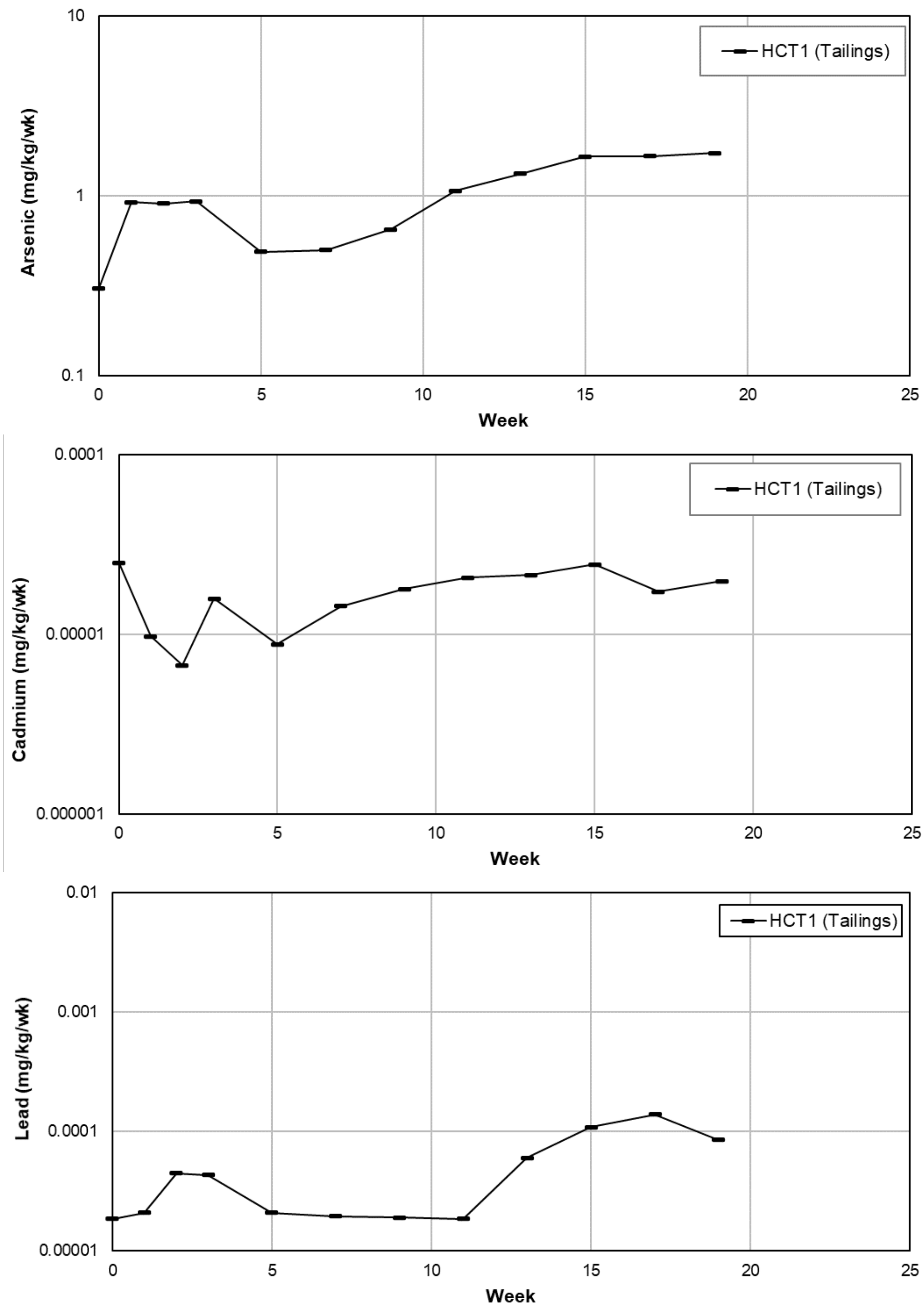



**Figure 4-15: Tailings humidity cell loading rates over time for As (top), Cd (middle), and Pb (bottom).**

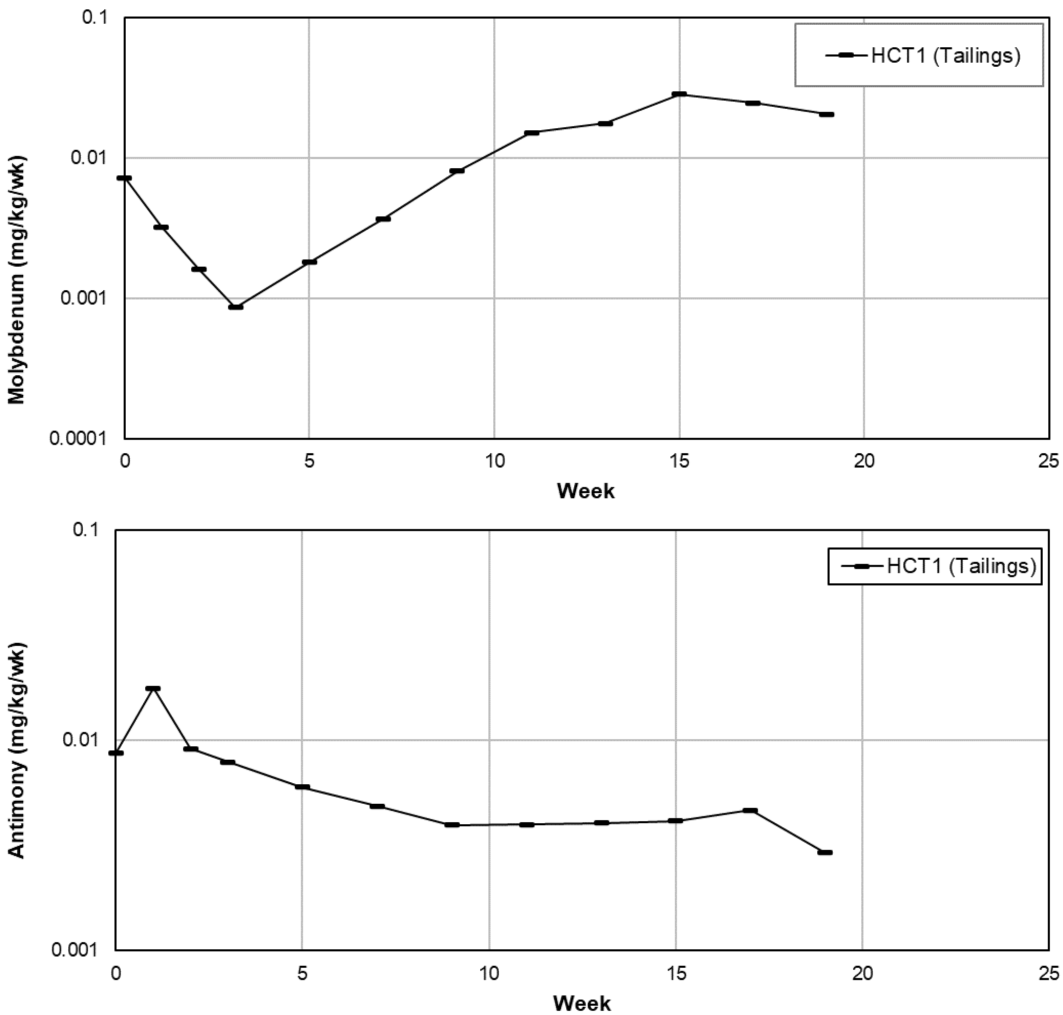



**Figure 4-16: Tailings humidity cell loading rates over time for Mo (top) and Sb (bottom).**

### 4.2.2 Saturated Column

The saturated tailings column has been running for 30 weeks and is ongoing. This column was set up with tailings supernatant as the column influent. The initial influent (Influent 1; 2020 Master Composite sample) had higher cyanide concentrations (among other parameters) due to the metallurgical test design. This influent was used from week 0 to week 22. The second influent (Influent 2; 2021 Master Composite sample) underwent a more rigorous cyanide detoxification process in the laboratory and has been used from week 24 onwards. Influent and effluent results are summarized in Table 4-5. Full results are provided in Appendix D.4.

**Table 4-5:**
**Summary of Tailings Saturated Column Influent and Effluent Chemistry**

| Parameter | Units | Influent 1 | Influent 2 | Effluent | | |
|---|---|---|---|---|---|---|
| | | | | Min | Median | Max |
| pH | pH | 7.8 | 7.2 | 7.6 | 7.7 | 8.1 |
| Conductivity | µS/cm | 3030 | 1392 | 2606 | 3175 | 3940 |
| Total Alkalinity | mg/L | 255 | 109 | 118 | 175 | 202 |
| DOC | mg/L | 29 | 5.6 | 4.2 | 8.8 | 12 |
| NH3 | mg/L | 26 | 3.9 | 1.7 | 8.2 | 13 |
| NO2-N | mg/L | 0.039 | 0.059 | <0.02 | <0.02 | 0.053 |
| NO3-N | mg/L | <0.1 | 0.049 | <0.1 | <0.1 | <0.1 |
| WAD CN | mg/L | <1 | <0.005 | <0.005 | <0.04 | <0.2 |
| Total CN | mg/L | 33 | 0.015 | 0.33 | 1.5 | 7.7 |
| Sulphate | mg/L | 1350 | 588 | 1240 | 1660 | 2330 |
| Cl | mg/L | 11 | 10 | 11 | 12 | 13 |
| F | mg/L | <0.4 | 0.19 | <0.4 | <0.4 | 0.51 |
| **Dissolved Metals** | | | | | | |
| Ag | mg/L | 0.000022 | 0.000065 | <0.00001 | <0.00002 | 0.000095 |
| Al | mg/L | 0.012 | 0.012 | 0.0064 | 0.0078 | 0.017 |
| As | mg/L | 0.99 | 0.53 | 0.39 | 1.3 | 1.5 |
| B | mg/L | 0.045 | 0.046 | 0.054 | 0.076 | 0.090 |
| Ba | mg/L | 0.054 | 0.036 | 0.019 | 0.025 | 0.043 |
| Ca | mg/L | 199 | 104 | 160 | 276 | 445 |
| Cd | mg/L | <0.00001 | <0.000015 | <0.00001 | 0.000018 | 0.00026 |
| Co | mg/L | 0.099 | 0.027 | 0.024 | 0.032 | 0.042 |
| Cr | mg/L | <0.0002 | <0.0001 | <0.0002 | <0.0005 | <0.001 |
| Cu | mg/L | 0.00057 | 0.056 | <0.0001 | 0.00040 | 0.0036 |
| Fe | mg/L | 11 | <0.001 | 0.18 | 0.67 | 2.5 |
| Hg | mg/L | <0.000005 | <0.000005 | <0.000005 | 0.000005 | <0.0001 |
| K | mg/L | 45 | 46 | 42 | 54 | 85 |
| Li | mg/L | 0.020 | 0.038 | 0.021 | 0.030 | 0.057 |
| Mg | mg/L | 5.8 | 4.1 | 13 | 24 | 35 |
| Mn | mg/L | 0.014 | 0.050 | 0.18 | 0.21 | 0.59 |
| Mo | mg/L | 0.033 | 0.029 | 0.043 | 0.048 | 0.056 |
| Na | mg/L | 437 | 147 | 404 | 448 | 544 |
| Ni | mg/L | 0.00075 | 0.0016 | 0.00039 | 0.0010 | 0.0054 |
| P | mg/L | <0.1 | <0.05 | <0.1 | <0.1 | <0.25 |
| Pb | mg/L | 0.000022 | 0.000036 | <0.00002 | 0.000050 | <0.0001 |
| Sb | mg/L | 0.041 | 0.036 | 0.0053 | 0.0083 | 0.016 |
| Se | mg/L | 0.0014 | 0.00094 | <0.00008 | 0.00020 | 0.0012 |
| Si | mg/L | 4.5 | 2.8 | 5.5 | 6.7 | 7.7 |
| Sn | mg/L | 0.0015 | 0.00033 | 0.00016 | 0.00092 | 0.0010 |
| Sr | mg/L | 1.5 | 0.95 | 1.1 | 1.7 | 2.9 |
| Tl | mg/L | 0.000012 | 0.000076 | <0.00001 | <0.00002 | 0.000092 |
| U | mg/L | 0.0091 | 0.00046 | 0.00060 | 0.0012 | 0.0019 |
| V | mg/L | 0.00033 | 0.00030 | 0.00020 | 0.00040 | 0.0010 |
| W | mg/L | 0.0032 | 0.0024 | 0.00055 | 0.00068 | 0.0012 |
| Zn | mg/L | <0.001 | 0.0014 | <0.001 | <0.002 | 0.0067 |

**Notes:**
DOC: dissolved organic carbon; NH3: ammonia; NO2-N: nitrite-N; NO3-N: nitrate-N; WAD CN: weak acid dissociable cyanide; Total CN: total cyanide.

### *4.2.2.1 pH and Sulphate*

The pH of the saturated column effluent has remained circumneutral and relatively stable (approximately pH 7.7; Figure 4-17). This pH is close to that of Influent 1 (7.8), while Influent 2 has a slightly lower pH (7.2).

Sulphate concentrations have shown a decreasing trend from a maximum of 2,330 mg/L in week 2 to a minimum of 1,240 mg/L in week 30 (Figure 4-17). This result is consistent with the oxidation of sulphides as well as the flushing of soluble sulphide oxidation products and mill reagents. The sulphate concentrations briefly stabilized from week 18 to week 24, before continuing to decrease once the influent was changed to Influent 2 which has a lower sulphate concentration (588 mg/L) relative to Influent 1 (1,350 mg/L).

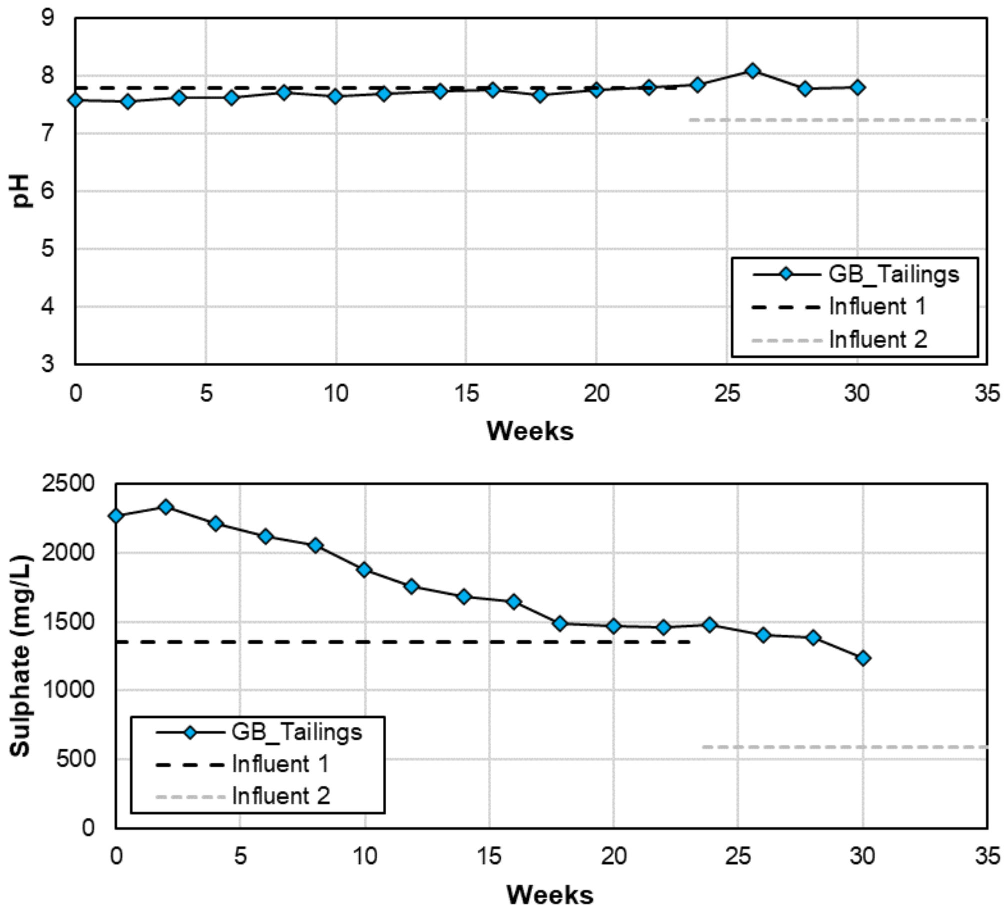



**Figure 4-17: pH (top) and sulphate concentrations (bottom) in tailings saturated column leachates over time.**

### *4.2.2.2 Cyanide and Nitrogen Species*

Influent 1 had a high total cyanide concentration (33 mg/L) possibly due to an ineffective cyanide detoxification process used in the 2020 bench scale metallurgical testwork. Total cyanide concentrations in the column effluent were lower relative to Influent 1 concentrations, reaching a peak of 7.7 mg/L in week 6 (Figure 4-18). By the last week that Influent 1 was used (week 22), total cyanide concentrations in column effluent had decreased to 0.96 mg/L. These initial results should be considered conservative due to the high cyanide concentration of the influent. Total cyanide concentrations have continued to decrease once Influent 2 was used. A minimum effluent total cyanide concentration of 0.33 mg/L was measured in week 30. The more rigorous cyanide detoxication resulted in a total cyanide concentration of 0.015 mg/L in Influent 2, which is considered more representative of operational tailings supernatant. Column effluent cyanide concentrations are expected to continue to decrease. Weak acid dissociable (WAD) cyanide concentrations were generally below the detection limit (Table 4-5).

The dominant nitrogen species in column effluent is ammonia (Table 4-5; Figure 4-18), which is a common, early decay product of cyanide and cyanate in tailings environments. The persistence of ammonia in column leachate (1.7 to 13 mg/L) indicates that conditions are sufficiently reducing (*i.e.*, oxygen is limited) to favor ammonia stability. Nitrate concentrations were consistently below the detection limit (<0.1 mg/L) in column effluent, while nitrite concentrations were generally close to or below the detection limit (<0.02 mg/L) in all but the week 10 sample. The elevated nitrite concentration in the week 10 sample (0.053 mg/L) may be an error as it is above the nitrite concentration in the influent at this time.

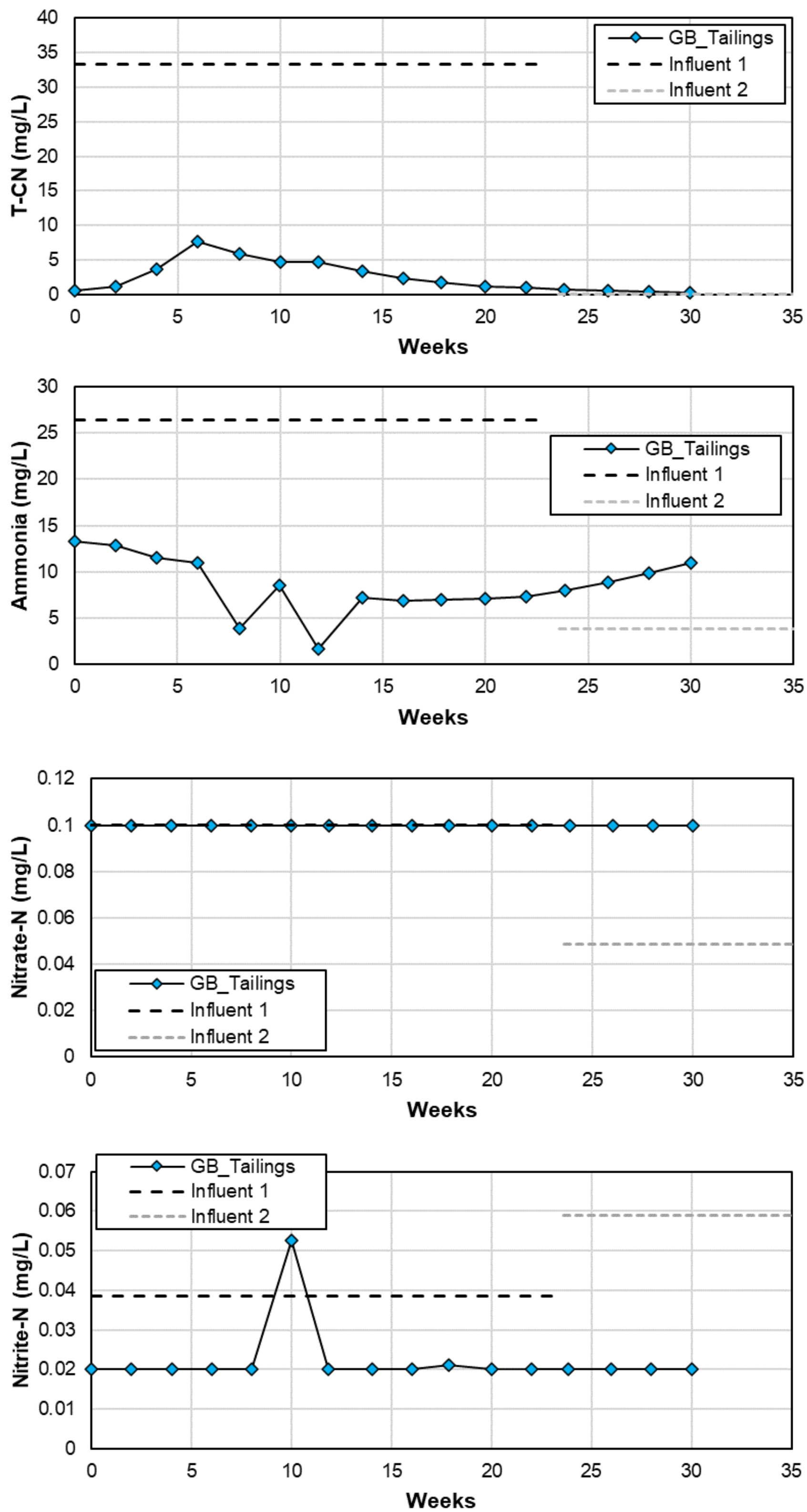



**Figure 4-18: Concentrations of total cyanide and nitrogen species in tailings saturated column leachates over time.**

#### *4.2.2.3 Metal Leaching Results*

Arsenic concentrations increased in the saturated column effluent and stabilized at approximately 1.4 mg/L, which is higher than the As concentration in both Influent 1 (0.99 mg/L) and Influent 2 (0.53 mg/L) (Figure 4-19; Table 4-5). This elevated concentration indicates that the tailings are releasing As under saturated conditions. This is counterintuitive at first sight since the As occurrence was interpreted to be predominantly linked to arsenopyrite, the dissolution of which should be inhibited under oxygen-deprived conditions encountered in the saturated column test. However, the mill process in which arsenopyrite is ground and oxidized followed by the precipitation of Fe-arsenates during process water treatment may produce adsorbed As and Fe-As-hydroxide phases which are unstable under the reducing conditions predicted for tailings pore water in the long-term.

Other metals generally show decreasing trends (*e.g.*, Cd) or stable concentrations (*e.g.*, Mo; Figure 4-19). The higher concentrations in the early stages of the experiment are consistent with rinsing of water-soluble oxides and mineral surface bound metals through the initial phase of the experiment. Concentrations of several metals (*e.g.*, Cd, Pb, and Zn) were often below the detection limit in column effluent (Table 4-5).

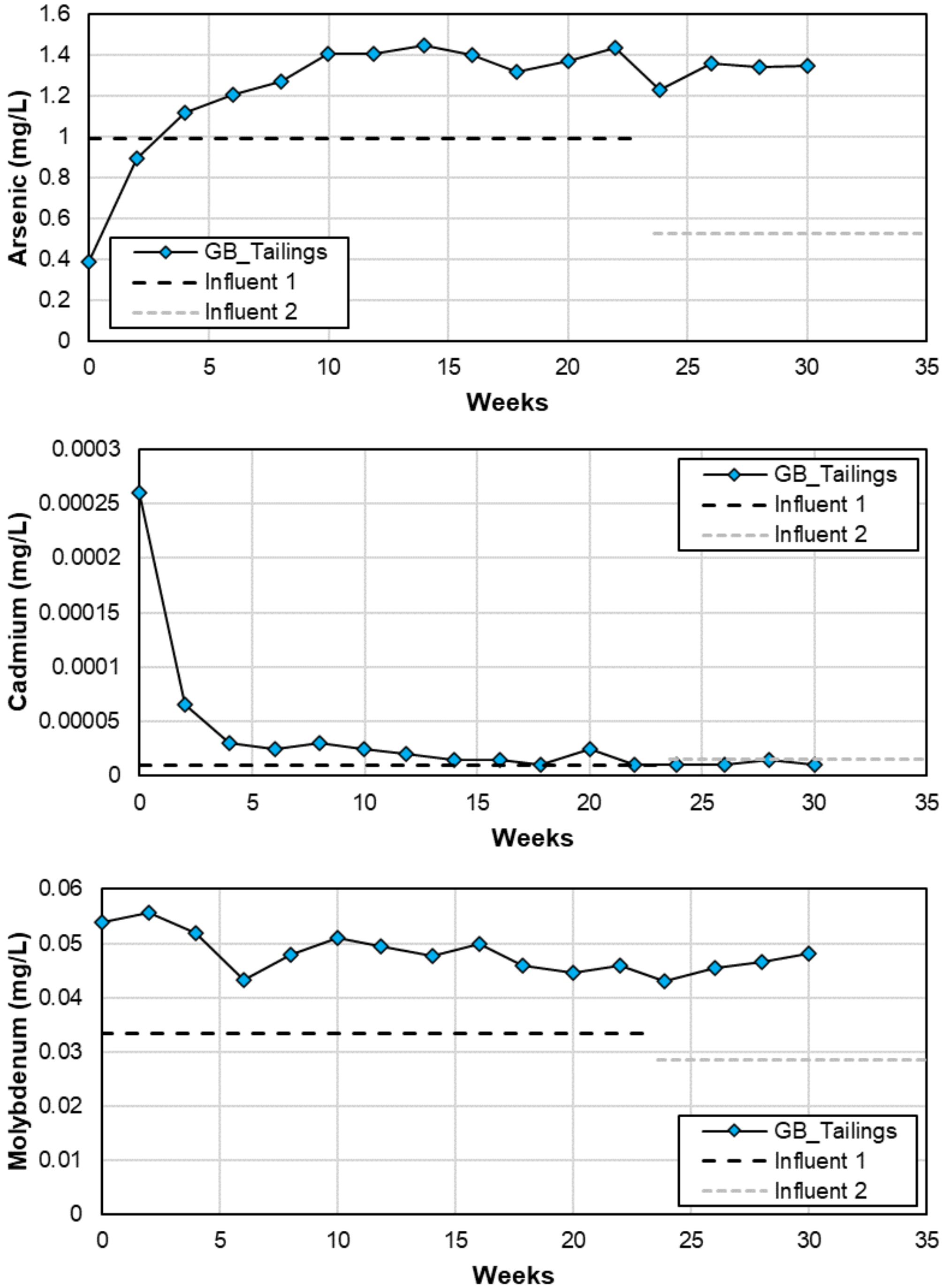



**Figure 4-19: Arsenic (top), Cd (middle), and Mo (bottom) concentrations in tailings saturated column leachates over time.**

# 5. Source Terms

## 5.1 Waste Rock Storage Facilities

The chemistry of water in contact with the Goldboro WRSAs will be driven by a variety of factors including climatic controls (*e.g.*, precipitation distribution, temperatures), physical controls (*e.g.*, WRSA dimensions, particle size of rock), as well as solid-phase characteristics of the rock itself (*e.g.*, geology, mineralogy, chemical composition). Many of these factors influence each other producing a complex geochemical system that needs to be constrained in order to produce realistic WRSA drainage chemistry predictions. For example, the dominant unsaturated flow regime within the WRSA, focused *versus* matric, is strongly dependent on precipitation intensity and the particle size of the material deposited. Particle size, in turn, is a function of the rock's competence (*i.e.*, geology) as well as operational practices (*e.g.*, blast hole density, WRSA construction method). Relatively fine waste rock materials are generally more reactive due to the increased surface area which may preferentially liberate sulphide or carbonate minerals. Geochemical source term modelling attempts to capture a multitude of interactive mechanisms by scaling the results of representative kinetic tests to mine-site dimensions. For Goldboro WRSAs, scaling of humidity cell results was used as the basis for the drainage quality predictions. Upscaled loading rates are then corrected to account for discrepancies between laboratory and field, converted into concentrations, and speciated/capped based on geochemical first principles. This approach was applied to all facilities containing temporarily or permanently exposed blasted mine rock material and captures the following mine components:

- Southeast WRSA;
- Northeast WRSA;
- Northwest WRSA;
- Backfill into East Pit;
- PAG1 material in TMF; and
- NPAG closure cover in TMF.

Due to uncertainties around the design and dimensions of the TMF embankments and the ROM ore stockpile, these facilities were not modelled explicitly but rather approximated conservatively by other source terms that are thought to best represent the materials in question. Specifically, the ROM ore stockpile is a transient feature and is being modelled with the source term predictions derived for the PAG1 material in the TMF since ore is largely characterized as PAG1. Similarly, the TMF embankment will be constructed with NPAG waste rock and is expected to produce a water chemistry similar to or better than that of the WRSAs. Hence, the lowest concentrations predicted for the WRSAs was used as a proxy for TMF embankment runoff. Since the Southwest WRSA is constructed with overburden material only, the corresponding source term for this facility is expected to be geochemically distinct and was not developed on the basis of humidity upscaling. Rather, the approach for overburden source term (outlined in Section 5.4) was applied.

A high-level overview of the workflow producing WRSA source terms is illustrated in Figure 5-1. Each of these work stages is described in detail below. Note that the prediction of nitrogen (ammonia, nitrite, nitrate) concentrations associated with the leaching of blast residues in WRSA and pit wall contact water is discussed separately in Sections 5.1.5 and 5.2.5, respectively.

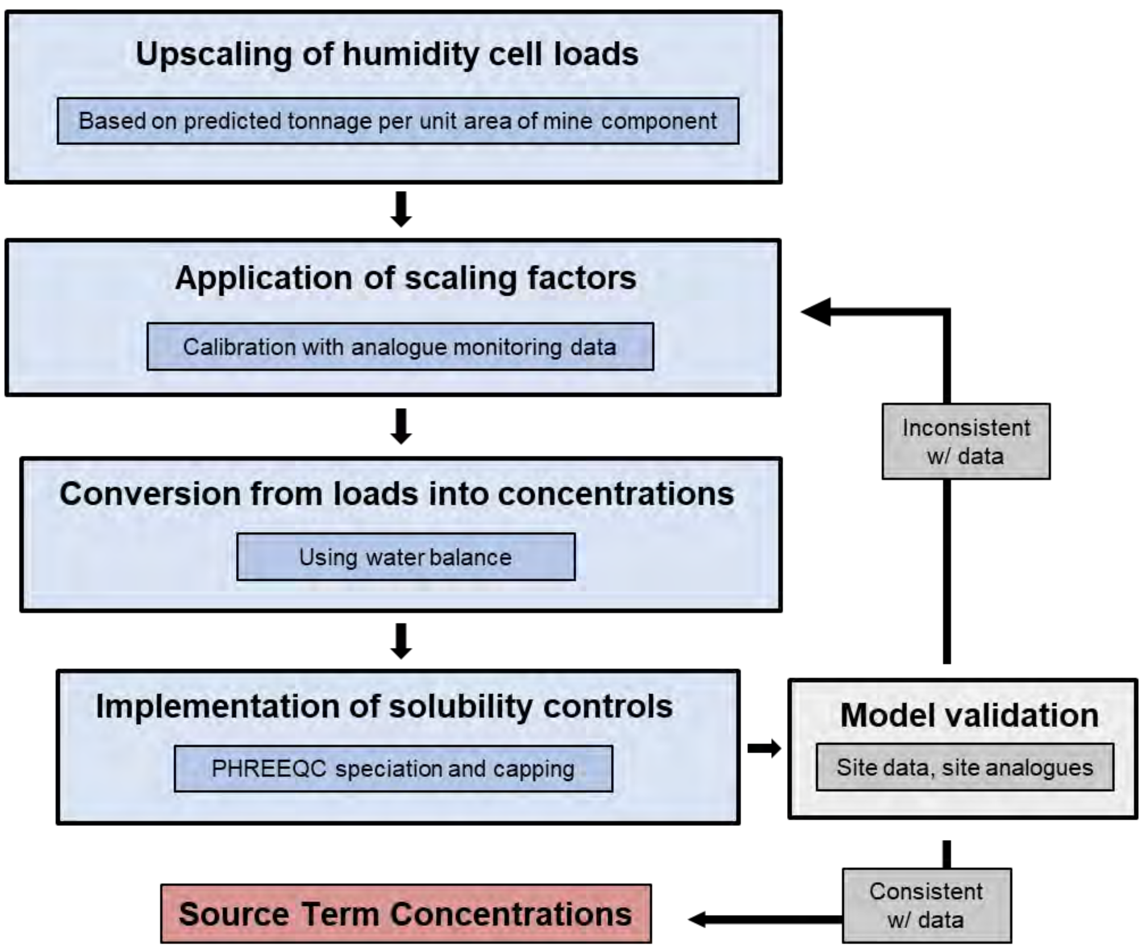



**Figure 5-1: Work stages involved in the scaling of geochemical source terms.**

### 5.1.1 Derivation of Humidity Cell Loading Rate

Humidity cell loading rates are calculated as the mass of a solute released per kg of rock material over one week of humidity cell testing (mg/kg/wk). Two mine phases were broken out temporally for source term considerations, namely short-term and long-term. Conceptually, this approach relies on the assumption that geochemical loading rates during operations are influenced to an extent by readily soluble phases liberated during blasting, while long-term contact water chemistry is characterized by the dissolution of less labile sulphide and carbonate phases. For PAG materials, where sulphide minerals are expected to outlast carbonates, a drop in drainage pH would occur in the long-term. However, PAG1 material will be segregated and stored under saturated conditions within the TMF operationally and PAG2 rock volumes are considered sufficiently small to be operationally intermixed with NPAG rock in the WRSAs preventing ARD onset. As such, Goldboro WRSAs are not expected to release ARD after mine closure and therefore an acid correction for long-term source terms was not necessary.

Upon review of the geochemical trends in Goldboro humidity cell testing, the short- and long-term input loading rates were calculated as the median of cycles 5-15 and 19-25, respectively. Subsequently, selected humidity cell loading rates were averaged to translate these data into lithological groups that are consistent with proportions of rock types specified in the mine schedule available for each WRSA. Loading rates from HC5, which represents mixed-lithology PAG2 material, were split between argillite and greywacke for the WRSA model input (*i.e.*, NPAG + PAG2). An overview of all input data used for the WRSA source term model is presented in Table 5-1.

### 5.1.2 Scaling of Humidity cell Loading Rates

Following the definition of representative model input loading rates, these rates (in mg/kg/wk) are upscaled to annual loads being released from a full-scale WRSA. Since humidity cell testing promotes the flushing of all crushed sample particles under relatively high water/rock ratios (0.5 L/kg), the resulting upscaled load is deemed the maximum leachable load (ML) of a given species i and waste rock lithology x, and is calculated as

$$ML_{ix} = r_{ix} * m * t \qquad \text{(Eq. 6)}$$

where $r_{ix}$ is the humidity cell loading rate for species i and lithology x; m is the mass (in kg) of the material contained in the facility of interest; and t (in wk) is the time interval of interest. Since WRSAs are blends of multiple lithologies, the cumulative load (in mg/year) can be written as

$$ML_i = ML_{ix1} + ML_{ix2} + ML_{ix3} \qquad \text{(Eq. 7)}$$

# Table 5-1:
# Proportioning and Input Loading Rates (in units of mg/kg/wk) Used for the Calculation of WRSA Source Terms

| Class | NPAG + PAG2 - Short Term | | | NPAG + PAG2 - Long Term | | | PAG1 - Short Term | | |
|---|---|---|---|---|---|---|---|---|---|
| **Lithology** | Greywacke | Argillite | Marker Unit | Greywacke | Argillite | Marker Unit | Greywacke | Argillite | Marker Unit |
| **Cells Used** | HC3<br>0.5 x HC5 | HC1<br>0.5 x HC5 | HC6 | HC3<br>0.5 x HC5 | HC1<br>0.5 x HC5 | HC6 | HC4 | HC2 | HC6 |
| **Sulphate** | 1.4 | 1.4 | 2.9 | 2.9 | 3.0 | 2.8 | 3.9 | 3.4 | 2.9 |
| **Cl** | 1.1 | 1.2 | 0.50 | 0.71 | 0.72 | 0.49 | 0.93 | 0.95 | 0.50 |
| **F** | 0.043 | 0.043 | 0.029 | 0.043 | 0.043 | 0.029 | 0.028 | 0.029 | 0.029 |
| **Al** | 0.092 | 0.079 | 0.033 | 0.053 | 0.068 | 0.027 | 0.034 | 0.028 | 0.033 |
| **Sb** | 0.00077 | 0.00077 | 0.00044 | 0.00076 | 0.00077 | 0.00043 | 0.00042 | 0.00043 | 0.00044 |
| **As** | 0.10 | 0.11 | 0.021 | 0.058 | 0.084 | 0.026 | 0.022 | 0.0096 | 0.021 |
| **Ba** | 0.00071 | 0.00077 | 0.00061 | 0.00078 | 0.0010 | 0.00053 | 0.00046 | 0.00084 | 0.00061 |
| **Be** | 0.0000050 | 0.0000050 | 0.0000034 | 0.0000050 | 0.0000051 | 0.0000034 | 0.0000033 | 0.0000034 | 0.0000034 |
| **B** | 0.0030 | 0.0022 | 0.0015 | 0.0014 | 0.0014 | 0.00098 | 0.0018 | 0.00097 | 0.0015 |
| **Cd** | 0.0000021 | 0.0000022 | 0.0000021 | 0.0000054 | 0.0000050 | 0.0000049 | 0.0000015 | 0.0000014 | 0.0000021 |
| **Ca** | 0.97 | 1.3 | 1.7 | 1.8 | 1.9 | 1.6 | 0.62 | 1.3 | 1.7 |
| **Cr** | 0.00012 | 0.000057 | 0.000039 | 0.000084 | 0.000081 | 0.000039 | 0.000039 | 0.000038 | 0.000039 |
| **Co** | 0.000093 | 0.000078 | 0.000038 | 0.00014 | 0.00015 | 0.000038 | 0.00011 | 0.000055 | 0.000038 |
| **Cu** | 0.00017 | 0.00017 | 0.000098 | 0.00014 | 0.00014 | 0.000096 | 0.000095 | 0.000099 | 0.000098 |
| **Fe** | 0.024 | 0.016 | 0.0034 | 0.013 | 0.015 | 0.0034 | 0.015 | 0.010 | 0.0034 |
| **Pb** | 0.000094 | 0.000065 | 0.000044 | 0.000064 | 0.000065 | 0.000043 | 0.000091 | 0.000043 | 0.000044 |
| **Mg** | 0.13 | 0.21 | 0.25 | 0.22 | 0.29 | 0.20 | 0.12 | 0.21 | 0.25 |
| **Mn** | 0.0047 | 0.0096 | 0.039 | 0.0080 | 0.011 | 0.032 | 0.0055 | 0.0082 | 0.039 |
| **Hg** | 0.0000072 | 0.0000072 | 0.0000049 | 0.0000071 | 0.0000072 | 0.0000048 | 0.0000047 | 0.0000048 | 0.0000049 |
| **Mo** | 0.00022 | 0.00053 | 0.00012 | 0.00027 | 0.00024 | 0.00096 | 0.00023 | 0.00029 | 0.00012 |
| **Ni** | 0.00022 | 0.00011 | 0.00028 | 0.00029 | 0.00020 | 0.00014 | 0.00032 | 0.00019 | 0.00028 |
| **K** | 1.3 | 1.7 | 0.79 | 1.4 | 1.7 | 0.60 | 0.57 | 1.1 | 0.79 |
| **Se** | 0.000029 | 0.000029 | 0.000020 | 0.000029 | 0.000029 | 0.000019 | 0.000019 | 0.000019 | 0.000020 |
| **Ag** | 0.000036 | 0.000036 | 0.000024 | 0.000036 | 0.000036 | 0.000024 | 0.000024 | 0.000024 | 0.000024 |
| **Na** | 3.0 | 0.76 | 0.28 | 0.68 | 0.27 | 0.13 | 1.7 | 0.32 | 0.28 |
| **Sr** | 0.016 | 0.022 | 0.0051 | 0.028 | 0.029 | 0.0041 | 0.013 | 0.021 | 0.0051 |
| **Tl** | 0.0000036 | 0.0000036 | 0.0000024 | 0.0000036 | 0.0000036 | 0.0000024 | 0.0000024 | 0.0000024 | 0.0000024 |
| **Sn** | 0.000057 | 0.000043 | 0.000029 | 0.000043 | 0.000043 | 0.000029 | 0.000056 | 0.000029 | 0.000029 |
| **U** | 0.00030 | 0.00045 | 0.00013 | 0.00020 | 0.00031 | 0.00010 | 0.000022 | 0.000058 | 0.00013 |
| **V** | 0.00080 | 0.00078 | 0.00023 | 0.00052 | 0.00065 | 0.00022 | 0.00037 | 0.00020 | 0.00023 |
| **Zn** | 0.0014 | 0.0014 | 0.00098 | 0.0014 | 0.0014 | 0.00096 | 0.00098 | 0.00096 | 0.00098 |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.

where identifiers 1 through 3 are the different lithology types argillite, greywacke, and marker unit. Waste rock tonnages associated with each of the Goldboro WRSAs and used for the source term model are summarized in Table 5-2.

Empirical and theoretical studies (*e.g.*, Malmström *et al.*, 2000; Kempton, 2012; Andrina *et al.*, 2012; Sapsford *et al.*, 2009; Kirchner & Mattson, 2015; Bornhorst & Logsdon, 2016) have demonstrated that, in most cases, upscaling to the full facility tonnage will often greatly overestimate the geochemical load produced due to the marked differences between laboratory and field conditions. The most notable difference that cause such discrepancies are thought to include water/rock ratio, temperature, particle size distribution, and oxygen availability. To account for these differences and produce more realistic drainage quality predictions, scaling factors are typically applied in the development of geochemical source terms that employ the described humidity cell mass-scaling approach. Without prior knowledge of the geochemical scalability of humidity cells, such factors are approximated using geochemical first principles and/or literature values derived for these types of scaling exercise (*e.g.,* Kempton, 2012), some of which can be associated with a large uncertainty given the site-specific nature of scaling relationships. Further, such scaling factors are commonly applied equally across all geochemical species which ignores relative differences in metal mobility under full-scale conditions.

Lorax has access to kinetic test and operational data for analogue mine sites which allows for the back-calculation of parameter-specific scaling factors in similar geologic environments. Empirical scaling factors are advantageous as they inherently account for all geochemical processes occurring within the WRSAs and considerably reduce the uncertainty associated with humidity cell scaling.

**Table 5-2:**
**WRSA Tonnages Used for the Upscaling of Humidity Cell Loading Rates (in Mt)**

| Class | NPAG + PAG2[1] | | | PAG1 | | | Total |
|---|---|---|---|---|---|---|---|
| Lithology | Greywacke | Argillite | Marker Unit | Greywacke | Argillite | Marker Unit | |
| Southeast WRSA | 20.9 | 7.9 | 1.3 | - | - | - | 30 |
| Northeast WRSA | 11.5 | 4.3 | 0.0 | - | - | - | 16 |
| Northwest WRSA | 16.4 | 5.2 | 2.6 | - | - | - | 24 |
| Backfill into East Pit | 12.3 | 4.9 | 3.9 | - | - | - | 21 |
| PAG1 material in TMF[2] | - | - | - | 0.40 | 0.40 | 0.29 | 1.1 |
| NPAG closure cover in TMF[3] | 3.3E-06 | 1.4E-06 | 2.9E-07 | - | - | - | 5.0E-06 |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
[1] PAG2 material is not expected to be used in the TMF closure cover, however HC6 was conservatively included for source term modelling of this mine component.
[2] The tonnages listed represent the maximum exposed (unsaturated) mass before flooding occurs.
[3] Tonnages represent materials exposed per 1 $m^2$ plan assuming a cover thickness of 2.5 m and a bulk density of 2.0 $t/m^3$.

The method used for the calculation scaling factors is similar to that described in Lorax (2019) and considers kinetic testwork and operational data from representative analogue sites. Base and Upper Case scaling factors for each species i ($SF_i$) were developed by tying humidity cell loading rates to the 75$^{th}$ percentile and maximum observed concentrations from the analogue site water quality monitoring databases, respectively. The resulting empirical scaling factors (Table 5-3) were subsequently implemented into the Goldboro model to calculate a Base and Upper Case Scaled Load ($SL_i$) as follows:

$$SL_i = ML_i * SF_i \quad \text{(Eq. 8)}$$

**Table 5-3:**
**Parameter-specific Scaling Factors (unitless) Used to Adjust Upscaled WRSA Loading Rates**

| Parameter | Base Case | Upper Case |
|---|---|---|
| Sulphate | 0.064 | 0.096 |
| Cl | 0.080 | 0.19 |
| F | 0.0025 | 0.0049 |
| Al | 0.00017 | 0.00044 |
| Sb | 0.0053 | 0.011 |
| As | 0.00095 | 0.0024 |
| Ba | 0.044 | 0.054 |
| Be | 0.21 | 0.42 |
| B | 0.011 | 0.021 |
| Cd | 0.011 | 0.035 |
| Ca | 0.042 | 0.064 |
| Cr | 0.037 | 0.074 |
| Co | 0.034 | 0.042 |
| Cu | 0.0021 | 0.0033 |
| Fe | 0.010 | 0.021 |
| Pb | 0.059 | 0.11 |
| Mg | 0.21 | 0.27 |
| Mn | 0.029 | 0.048 |
| Hg | 0.0019 | 0.0038 |
| Mo | 0.011 | 0.011 |
| Ni | 0.063 | 0.32 |
| K | 0.010 | 0.013 |
| Se | 0.018 | 0.037 |
| Ag | 0.0030 | 0.0059 |
| Na | 0.070 | 0.10 |
| Sr | 0.035 | 0.046 |
| Tl | 0.030 | 0.059 |
| Sn | 0.013 | 0.027 |
| U | 0.018 | 0.030 |
| V | 0.0038 | 0.0075 |
| Zn | 0.0074 | 0.028 |

### 5.1.3 Conversion of Loads to Concentrations

Following the scaling of the humidity cell loading rates for the Goldboro WRSAs, annual geochemical loads (in mg/year) were converted into concentrations using mean annual precipitation and infiltration factors provided by others (Muirhead, pers. comm., 2022) and consistent with assumptions used in the site-wide water balance model. The use of concentrations for source term calculations is advantageous as it allows for direct comparison with field kinetic test data from site or site analogues, as well as regulatory guidelines. Concentrations are also required as input to geochemical modelling software for the evaluation of solubility limits. Water balance parameters utilized for this conversion process in the Goldboro WRSA source term model are summarized in Table 5-4.

**Table 5-4:**
**Water Balance Used for the Conversion of Annual Loads into Concentrations**

| **Facility** | **Footprint ($m^2$)** | **Infiltration (L)** |
|---|---|---|
| Southeast WRSA | 362,000 | 459,618,794 |
| Northeast WRSA | 229,000 | 290,753,325 |
| Northwest WRSA | 409,000 | 519,293,057 |
| Backfill into East Pit | 178,287 | 226,364,795 |
| PAG1 material in TMF | 290,000 | 368,202,901 |
| NPAG closure cover in TMF | 1.0 | 1,270 |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
[1] Infiltration values assume a mean annual precipitation of 1411 mm and an infiltration factor of 90%.
[2] The TMF closure cover source term was based on 1 $m^2$ (plan).

### 5.1.4 Solubility Limits and Model Calibration

ML/ARD management strategies at Goldboro are designed to prevent the occurrence of ARD from WRSAs, and hence neutral pH drainage is expected from these facilities. Under neutral-pH conditions, the mobility of many metals will be limited by solubility constraints. To validate humidity cell scaling and scaling adjustment approach under neutral pH, concentration caps were applied using conservative statistical values calculated from the compiled Goldboro water quality dataset. While the exceedance of concentration caps is not expected for the majority of species and scenarios, this step is considered a valid method to prevent the overestimation of species that may exhibit different scalability at different mine sites. Caps imposed for the WRSA source terms are summarized in Table 5-5 and were derived as follows:

- Base Case
    - Maximum value observed in the combined field barrel leachate and ore (bulk sample) drainage chemistry databases.

- For individual species (Ba, K, and V), the 75th percentile value of the SFE database was found to be higher than the maximum value of the above databases in which case the former was chosen as the Base Case concentration limit. Iron and Al were excluded from this adjustment since these species were found to produce unrealistically high dissolved concentrations in SFE leachates compared with site drainage data available for Goldboro and analogue sites, likely due to colloids passing the filter after prolonged stirring of a crushed sample.

**Table 5-5:
Concentration Caps (in mg/L) Imposed for the Goldboro WRSA Source Term Model Output if Exceeded**

| Parameter | Base Case | Upper Case |
|---|---|---|
| Sulphate | N/A | N/A |
| Cl | 8.5 | 17 |
| F | 0.20 | 0.30 |
| Al | 0.17 | 0.34 |
| Sb | 0.0075 | 0.015 |
| As | 5.8 | 12 |
| Ba | 0.0086 | 0.017 |
| Be | 0.00050 | 0.0010 |
| B | 0.061 | 0.12 |
| Cd | 0.000038 | 0.000076 |
| Ca | 35 | 70 |
| Cr | 0.0010 | 0.0020 |
| Co | 0.0025 | 0.0050 |
| Cu | 0.063 | 0.13 |
| Fe | 0.12 | 0.24 |
| Pb | 0.0011 | 0.0021 |
| Mg | 1.0 | 2.0 |
| Mn | 0.14 | 0.28 |
| Hg | 0.0000065 | 0.000013 |
| Mo | 0.0032 | 0.0064 |
| Ni | 0.031 | 0.062 |
| K | 17 | 34 |
| Se | 0.00050 | 0.0010 |
| Ag | 0.00010 | 0.00020 |
| Na | 30 | 60 |
| Sr | 0.13 | 0.26 |
| Tl | 0.00010 | 0.00020 |
| Sn | 0.0020 | 0.0040 |
| U | 0.0016 | 0.0031 |
| V | 0.014 | 0.028 |
| Zn | 0.029 | 0.058 |

  - Mercury (Hg) and Be have notably low water quality guidelines and were found to fall below the detection limit in all water quality data points available for Goldboro. To avoid the overprediction of these species based on analytical constraints, Base Case limits for these constituents were set to half the detection limit value.
  - The Base Case dissolved F solubility limit was set to 0.2 mg/L based on conservative values from available site analogue databases.
- Upper Case:
  - Two times (2x) the Base Case cap. For Hg and Be, this equates to the detection limit value.
  - The Upper Case dissolved F solubility limit was set to 0.3 mg/L based on conservative values from available site analogue databases.

If the scaled model output concentration exceeded the cap value for the corresponding species, the source term was set to this cap value. Note that no solubility limit was imposed for sulphate.

The speciation code PHREEQC (Parkhurst & Appelo, 1999) was used to calculate solubility limits for gypsum ($CaSO_4$ x 2 $H_2O$), which has well-constrained thermodynamic properties, in WRSA source terms only. Further, the code was used to charge balance the modelled solutions using $SO_4$, to maintain geochemical first principles. Since Goldboro drainage is forecasted to produce relatively low Ca and $SO_4$ concentrations, the gypsum solubility limit was not found to effect output concentrations, but rather $SO_4$ concentrations were increased somewhat by charge balancing.

### 5.1.5 Prediction of WRSA Blast Residue Leaching

#### *5.1.5.1 Operations*

Nitrogen loads for Goldboro WRSAs were estimated using methods developed in Lorax (2021). Similar to the methodology used by Ferguson and Leask (1988), the rates of nitrogen (*i.e.*, ammonia, nitrate and nitrite) loading from waste rock at a site analogue were empirically derived from mining and monitoring data. Average and maximum measured total N concentrations were converted to N loading rates of 1.2 and 2.1 g N/t. The resulting loading rates were then scaled to the Goldboro Project using the ratio of the planned explosives use rate, or powder factor (PF = 0.22 kg/t). The Project N loading rates from mine rock were calculated to be 1.32 and 2.35 g N/t for Base Case and Upper Case, respectively (corresponding to 2.64 and 4.71 g N/$m^3$ of loose rock).

The Project N loading rates were applied to the amount of waste scheduled for annual placement in each WRSA to calculate the annual N loads that are released from each WRSA. The maximum annual WRSA waste volumes shown in Table 5-6 are combined to calculate the maximum annual N load for each facility. The nitrogen load estimates are based on the proposed mine schedule, use of TITAN® XL1000 bulk emulsion explosives (or equivalent), and waste PF of 0.22 kg/t. It is also assumed that industry standard good practices for blasting, explosives use, and nitrogen source control will be implemented for the duration of mine construction and operations. The annual infiltration water volume is estimated to be 90% of the mean annual precipitation for the final footprint of each WRSA. Source term concentrations of N species in mine rock runoff were then predicted by dividing the maximum annual N loads by the predicted infiltration for each WRSA.

Nitrogen species associated with the TMF embankments constructed with waste rock were derived on the basis of site water quality monitoring data from an analogue ditch system similar to the approach described in Lorax (2019). Median and conservative concentration values from representative monitoring stations were used to derive Base Case and Upper Case predictions for the Goldboro Project. This same source term was also applied to the TMF closure cover to be constructed with NPAG mine rock. Nitrogen source terms for PAG1 material in the TMF were conservatively approximated by the lowest concentration value predicted for the mine rock WRSAs.

**Table 5-6:**
**Waste Rock Storage Area (WRSA) Footprint, Estimated Infiltration Volume, Maximum Annual Waste Placement and Predicted N Loads**

| **Term** | **Units** | **Southeast WRSA** | **Northeast WRSA A + B** | **Northwest WRSA** | **East Pit Backfill** |
|---|---|---|---|---|---|
| Footprint EOM | $m^2$ | 362,000 | 229,000 | 409,000 | 178,287 |
| Infiltration Water Volume [1] | $m^3$ | 459,704 | 290,807 | 519,389 | 226,407 |
| Maximum Annual Waste Placement [2] | $m^3$ (loose) | 4,116,579 | 1,701,953 | 2,619,905 | 3,886,276 |
| Maximum Annual N Load (Base Case) | kg N | 10,868 | 6,917 | 10,260 | 11,186 |
| Maximum Annual N Load (Upper Case) | kg N | 19,381 | 12,335 | 18,297 | 19,949 |

**Notes:**
[1] Calculated from Mean Annual Precipitation (MAP; 1411 mm), WRSA infiltration rate (90% of MAP) and the EOM footprint for each WRSA.
[2] Mine year of Maximum Annual Waste Placement: SE Dump (Year 2), NE Dump Areas A and B (Year 5), NW Dump (Year 5) and EP Backfill (Year 9).

#### *5.1.5.2 Closure*

Due to the surficial nature of blast residues, concentrations of nitrogen species related to blasting will decrease over time once the addition of blasted material to a facility has ceased (*e.g.,* Pommen, 1983). The N depletion rates depend on a variety of factors including the amount of reactive rock surfaces as well as flushing rates that are difficult to model. Long-term monitoring of waste rock drainage at the Roman-Trend Mine has shown that nitrate depletion is not linear but rather is expressed as a decay curve (Figure 5-2) with the highest degradation rate observed in the early years after closure (Lorax, 2017). It was found that, in the closure period, nitrogen concentrations were reduced annually by ≥20% of the previous year's concentration up until five years into closure. Conservatively including year 6 after mine closure into the calculation, the decrease of nitrate concentration from ~102 mg/L to 20 mg/L yields an annual nitrogen decay rate of 24%. Waste dump height and precipitation rate are known to represent the dominant controls on nitrogen residue leaching. The height of the Roman-Trend mine WRSA reporting to the water monitoring station from Figure 5-2 is approximately 70 m, not dissimilar from the various Goldboro WRSAs. However, the mean annual precipitation rate at Goldboro is significantly higher than at the Roman-Trend Mine (1,411 mm *versus* 1,000 mm) and therefore nitrogen flushing at Goldboro would be expected to occur faster. Nevertheless, to account for uncertainties around WRSA height and blasting practices, the nitrate degradation rate of 24% calculated for the Trend-Roman mine was adopted directly for Goldboro WRSA drainage quality modelling and applies to all nitrogen species associated with blast residue leaching (ammonia, nitrite, nitrate). This is considered conservative since ammonia and nitrite are known to oxidize to nitrate and should therefore be removed from the system quicker and by means other than just physical flushing of rock surfaces.

Compared with larger scale, higher WRSAs, nitrogen flushing from TMF embankments and the NPAG closure cover in the TMF is expected to occur significantly faster than in the WRSA due to the limited reactive material volume and higher water/rock ratios in these mine components. Nitrate concentrations in analogue site monitoring stations receiving TMF embankment runoff have decreased at high rates providing further evidence of rapid nitrogen flushing in smaller-scale facilities. To maintain conservatism, the annual nitrogen depletion rate applied to all blast-related nitrogen species was set to 80% for both TMF embankments and the TMF closure cover.

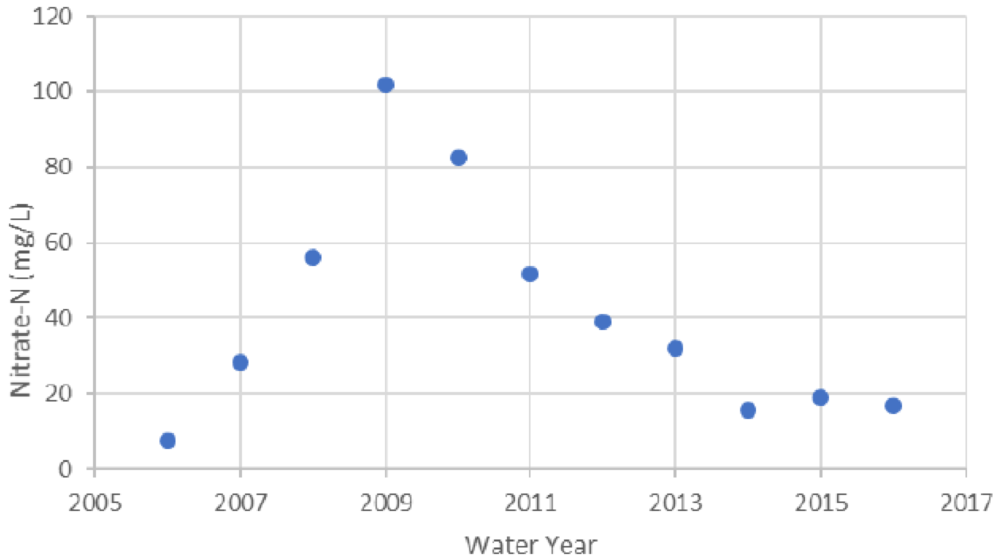



**Figure 5-2: Nitrate concentration trends observed in a waste rock monitoring station at the Roman-Trend mine (from Lorax, 2017)**

### 5.1.6 Results

The geochemical source term model output generated after the processing steps described in Sections 5.1.1 through 5.1.5 is presented in Table 5-7 for selected species. A list of the full model results in provided in Appendix F. By design, WRSA drainage pH is circum-neutral across the mine site. Consistent with the geochemical characterization of Goldboro waste rock, elevated As leaching is expected to occur under these conditions due to the oxidation of arsenopyrite. These results were incorporated into the site-wide surface and groundwater quality models. Due to the low carbonate contents in Goldboro mine rock materials, it was recommended to transition from short-term to long-term predictions after three (3) years of exposure. PAG2 tonnage was estimated to be minimal based on block model results and will be managed (*i.e.*, blended or layered) within NPAG waste rock in the WRSAs. Consequently, the acidification of PAG2 rock within the overwhelmingly NPAG WRSAs is not expected. Effects of acidification, including elevated metal leaching rates, are therefore considered highly unlikely and were not modelled as part of this source term model. Operational management and monitoring, specified in the Goldboro ML/ARD Management Plan (Lorax, 2022) will ensure that these assumptions are validated and implemented.

# Table 5-7:
# Selected Source Term Model Predictions for Goldboro WRSAs

| Location | Phase | Scenario | pH | Sulphate | Al | As | Fe | Zn | Ammonia (as N) | Nitrite (as N) | Nitrate (as N) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg N/L | mg N/L | mg N/L |
| **Southeast WRSA** | Short-term | Base Case | 7.5 | 151 | 0.025 | 0.16 | 0.12 | 0.018 | 0.37 | 0.20 | 23 |
| | | Upper Case | 6.5 | 312 | 0.066 | 0.42 | 0.24 | 0.069 | 0.65 | 0.35 | 41 |
| | Long-term | Base Case | 7.0 | 151 | 0.016 | 0.10 | 0.12 | 0.018 | *Rate* | *Rate* | *Rate* |
| | | Upper Case | 6.0 | 315 | 0.043 | 0.27 | 0.24 | 0.070 | *Rate* | *Rate* | *Rate* |
| **Northeast WRSA** | Short-term | Base Case | 7.5 | 151 | 0.025 | 0.17 | 0.12 | 0.018 | 0.37 | 0.20 | 23 |
| | | Upper Case | 6.5 | 313 | 0.068 | 0.43 | 0.24 | 0.070 | 0.66 | 0.36 | 41 |
| | Long-term | Base Case | 7.0 | 151 | 0.016 | 0.11 | 0.12 | 0.019 | *Rate* | *Rate* | *Rate* |
| | | Upper Case | 6.0 | 316 | 0.044 | 0.27 | 0.24 | 0.071 | *Rate* | *Rate* | *Rate* |
| **Northwest WRSA** | Short-term | Base Case | 7.5 | 151 | 0.024 | 0.15 | 0.12 | 0.018 | 0.31 | 0.17 | 19 |
| | | Upper Case | 6.5 | 311 | 0.064 | 0.39 | 0.24 | 0.067 | 0.55 | 0.30 | 34 |
| | Long-term | Base Case | 7.0 | 151 | 0.015 | 0.099 | 0.12 | 0.018 | *Rate* | *Rate* | *Rate* |
| | | Upper Case | 6.0 | 313 | 0.041 | 0.25 | 0.24 | 0.068 | *Rate* | *Rate* | *Rate* |
| **Backfill to East pit** | Short-term | Base Case | 7.5 | 151 | 0.022 | 0.14 | 0.12 | 0.017 | 0.77 | 0.42 | 48 |
| | | Upper Case | 6.5 | 310 | 0.060 | 0.37 | 0.24 | 0.066 | 1.4 | 0.74 | 86 |
| | Long-term | Base Case | 7.0 | 151 | 0.015 | 0.096 | 0.12 | 0.017 | *Rate* | *Rate* | *Rate* |
| | | Upper Case | 6.0 | 311 | 0.040 | 0.24 | 0.24 | 0.066 | *Rate* | *Rate* | *Rate* |
| **PAG1 in TMF** | Short-term | Base Case | 7.0 | 148 | 0.0091 | 0.44 | 0.18 | 0.012 | 0.31 | 0.17 | 19 |
| | | Upper Case | 6.0 | 298 | 0.024 | 1.4 | 0.37 | 0.047 | 0.55 | 0.30 | 34 |
| **NPAG Cover** | Long-term | Base Case | 7.0 | 140 | 0.013 | 0.075 | 0.12 | 0.012 | 0.050 | 0.011 | 3.0 |
| | | Upper Case | 6.0 | 271 | 0.036 | 0.19 | 0.24 | 0.046 | 0.46 | 0.048 | 8.9 |
| **TMF Embankment[1]** | Short-term | Base Case | 7.5 | 140 | 0.024 | 0.15 | 0.12 | 0.018 | 0.050 | 0.011 | 3.0 |
| | | Upper Case | 6.5 | 282 | 0.064 | 0.39 | 0.24 | 0.067 | 0.46 | 0.048 | 8.9 |
| | Long-term | Base Case | 7.0 | 151 | 0.015 | 0.099 | 0.12 | 0.018 | *Rate* | *Rate* | *Rate* |
| | | Upper Case | 6.0 | 313 | 0.041 | 0.25 | 0.24 | 0.068 | *Rate* | *Rate* | *Rate* |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
[1] TMF Embankment source terms not related to blast residue leaching represent the minimum predicted concentrations from all WRSAs.
"Rate" describes the nitrogen depletion rate in response to surface flushing of blast residue during closure.

## *5.2 Pit Walls*

### 5.2.1 Derivation of Humidity Cell Loading Rate

The pit wall source term model generally relies on the same approach as that described in detail for the WRSA above comprising humidity cell load upscaling, the application of scaling factors, conversion of loads to concentrations, and the capping of the model output (Figure 5-1). The underpinning concepts are therefore not repeated in this chapter but rather, specific model assumptions that are unique to water-rock interactions in the pit walls are outlined.

Pit walls comprise exposures of all three ARD designations (PAG1, PAG2, NPAG) and therefore unique source terms were developed for each of these materials. Humidity cell data was processed in the same manner as described for the WRSA source terms to obtain short and long-term model inputs. Where more than one humidity cell was used for the development of a single material's input loading rate, the humidity cell outputs were averaged. Input data used for the pit wall source term model is summarized in Table 5-8.

### 5.2.2 Scaling of Humidity Cell Loading Rates

The tonnage of reactive pit wall rock contacted per 1 $m^2$ (plan) was constrained on the basis of theoretical assumptions relating to blasting effects on wall rock fracturing and the associated increase of surface areas available to release a chemical load into runoff. In brief, this blast-damaged transition zone comprises a "fractured zone" and an "influenced zone". Consistent with observations discussed in Hustrulid (1999), average thicknesses of 1.0 and 3.0 m were chosen for the blast-fractured and the blast-influenced zones, respectively. Using a bulk density of 2.8 $t/m^3$ and an average pit wall slope angle of 50°, these thicknesses were subsequently used to calculate a rock mass available for geochemical leaching assuming that only 10% of the deeper, blast-influenced zone has a particle size comparable to that of the humidity samples. The resulting reactive rock mass amounts to 5.7 t per plan $m^2$ of pit wall exposed.

As for WRSA source terms, scaling factors ($SF_i$) to adjust $ML_i$ (Eq. 8) were back-calculated using analogue site operational data, however, the calculation parameters were adjusted to better reflect the physical and chemical characteristics specific to pit wall runoff. Water balance considerations and groundwater influence

## Table 5-8:
## Proportioning and Input Loading Rates (in units of mg/kg/wk) Used for the Calculation of Pit Wall Source Terms

| **Class** | **NPAG** | | **PAG1** | | **PAG2** | |
|---|---|---|---|---|---|---|
| **Cells Used** | HC1; HC3 | | HC2; HC4 | | HC5 | |
| **Phase** | Short Term | Long Term | Short Term | Long Term[1] | Short Term | Long Term[1] |
| **Sulphate** | 0.94 | 0.93 | 3.6 | 3.3 | 1.0 | 4.0 |
| **Cl** | 0.92 | 0.46 | 0.94 | 0.47 | 0.50 | 0.51 |
| **F** | 0.028 | 0.028 | 0.029 | 0.028 | 0.030 | 0.030 |
| **Al** | 0.060 | 0.051 | 0.031 | 0.023 | 0.052 | 0.019 |
| **Sb** | 0.00042 | 0.00042 | 0.00043 | 0.00042 | 0.00069 | 0.00069 |
| **As** | 0.067 | 0.052 | 0.016 | 0.016 | 0.073 | 0.037 |
| **Ba** | 0.00048 | 0.00050 | 0.00065 | 0.00078 | 0.00053 | 0.00079 |
| **Be** | 0.0000033 | 0.0000032 | 0.0000033 | 0.0000033 | 0.0000035 | 0.0000035 |
| **B** | 0.0014 | 0.00093 | 0.0014 | 0.00093 | 0.0025 | 0.0010 |
| **Cd** | 0.0000014 | 0.0000028 | 0.0000014 | 0.0000049 | 0.0000015 | 0.0000048 |
| **Ca** | 0.64 | 0.83 | 0.96 | 1.2 | 0.95 | 2.0 |
| **Cr** | 0.000067 | 0.000062 | 0.000039 | 0.000037 | 0.000040 | 0.000041 |
| **Co** | 0.000051 | 0.000061 | 0.000082 | 0.00013 | 0.000070 | 0.00017 |
| **Cu** | 0.000096 | 0.000093 | 0.000097 | 0.00012 | 0.00015 | 0.00010 |
| **Fe** | 0.016 | 0.012 | 0.012 | 0.0100 | 0.0091 | 0.0036 |
| **Pb** | 0.000057 | 0.000042 | 0.000067 | 0.000079 | 0.000045 | 0.000046 |
| **Mg** | 0.10 | 0.13 | 0.17 | 0.21 | 0.13 | 0.25 |
| **Mn** | 0.0051 | 0.0050 | 0.0068 | 0.0085 | 0.0041 | 0.0086 |
| **Hg** | 0.0000047 | 0.0000046 | 0.0000048 | 0.0000047 | 0.0000049 | 0.0000051 |
| **Mo** | 0.00030 | 0.00018 | 0.00026 | 0.00063 | 0.00015 | 0.00015 |
| **Ni** | 0.00013 | 0.00014 | 0.00026 | 0.00037 | 0.000073 | 0.00020 |
| **K** | 0.94 | 1.0 | 0.85 | 0.97 | 1.1 | 1.1 |
| **Se** | 0.000019 | 0.000019 | 0.000019 | 0.000019 | 0.000020 | 0.000020 |
| **Ag** | 0.000023 | 0.000023 | 0.000024 | 0.000023 | 0.000025 | 0.000025 |
| **Na** | 1.3 | 0.32 | 1.0 | 0.34 | 1.1 | 0.30 |
| **Sr** | 0.011 | 0.013 | 0.017 | 0.019 | 0.016 | 0.031 |
| **Tl** | 0.0000023 | 0.0000023 | 0.0000024 | 0.0000029 | 0.0000025 | 0.0000025 |
| **Sn** | 0.000035 | 0.000028 | 0.000042 | 0.000035 | 0.000030 | 0.000030 |
| **U** | 0.00027 | 0.00017 | 0.000040 | 0.000025 | 0.00022 | 0.00017 |
| **V** | 0.00056 | 0.00046 | 0.00029 | 0.00024 | 0.00047 | 0.00026 |
| **Zn** | 0.00094 | 0.00093 | 0.00097 | 0.0014 | 0.00099 | 0.0010 |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
[1] Long-term PAG source terms were not used directly but were multiplied with acid factors discussed below to generate estimated acidic loading rates.

An overview of the back-calculated humidity cell scaling factors for pit wall source terms is presented in Table 5-9. Importantly, none of the Goldboro PAG humidity cells had produced acidic leachate (*i.e.*, $pH \leq 5.5$) such that assumptions had to be made with respect to the long-term drainage chemistry of PAG1 and PAG2 materials which are not actively managed in the pit walls until flooded in closure. Therefore, kinetic test data from multiple acidic PAG humidity cells from analogue sites were used to predict the effects of carbonate depletion and contact water acidification on metal leaching rates at Goldboro. For this assessment, stable loading rates under neutral and acidic conditions for individual PAG humidity cells were compared and processed to derive "acid factors" for a given species i ($AF_i$) as follows:

$$AF_i = L_{Ai}/L_{Ni} \qquad \text{(Eq. 9)}$$

where $L_{Ai}$ is the median loading rate of species i under acidic conditions and $L_{Ni}$ is the median loading rate of species i in neutral conditions. For PAG1 predictions, a humidity cell producing a stable pH of 3.5-4 was utilized for this calculation, while PAG2 acidic loading rates were simulated on the basis of humidity cells with a stable leachate pH of ~5.5. This is consistent with the concept that PAG2 materials will be more mildly acidic when exposed in the pit walls due to their lower sulphur contents. The resulting acid factors (Table 5-9) were then multiplied with the neutral long-term source term for PAG1 and PAG2 (Table 5-8), respectively, to derive loading rates that are representative of acidic conditions. It should be noted that this approach is considered preliminary and geochemical source term model outputs will be updated once acidic drainage from at least one of the Goldboro humidity cells is observed.

### 5.2.3 Conversion of Loads to Concentrations

The scaled pit wall loads were divided by the expected precipitation volume available per $m^2$ plan of pit wall. At Goldboro, a mean annual precipitation of 1,218 mm and pit wall runoff rate of 85% were assumed amounting to 1,035 L of contact water per year from which runoff concentration were calculated.

### 5.2.4 Solubility Limits and Model Calibration

Short-term and long-term NPAG model output concentrations were capped using the same solubility limits listed in Table 5-5 and subsequently processed in PHREEQC. PAG2 material is predicted to generate only mildly acidic (pH 5-6) drainage and the analysis of site monitoring and kinetic test data available to date has not revealed considerably elevated sulphate or metal release rates in response to lowered pH (minimum pH of 6.1 in HC2 and 5.1 in ore stockpile drainage). Therefore, the scaled and acid-corrected model output for long-term PAG2 pit wall runoff was capped at a solubility limit 10x higher than the Base and Upper Case caps applied for the neutral source term output (Table 5-5). PAG1 material runoff concentrations were not limited at all as strongly elevated metal leaching rates are anticipated at the predicted long-term pH of 4.

**Table 5-9:**
**Scaling and Acid Factors Derived for the Pit Wall Source Term Model Using Site Analogue Humidity Cell Data**

| | Scaling Factors | | Acid Factors | |
|---|---|---|---|---|
| **Scenario/Class** | **Base Case** | **Upper Case** | **PAG1** | **PAG2** |
| **Sulphate** | 0.087 | 0.14 | 2.4 | 1.2 |
| **Cl** | 0.27 | 0.72 | 1.0 | 1.0 |
| **F** | 0.026 | 0.042 | 1.0 | 1.0 |
| **Al** | 0.0014 | 0.0020 | 573 | 4.7 |
| **Sb** | 0.27 | 0.39 | 0.98 | 1.0 |
| **As** | 0.019 | 0.044 | 1.7 | 0.90 |
| **Ba** | 0.17 | 0.42 | 33 | 4.5 |
| **Be** | 1.1 | 2.2 | 523 | 11 |
| **B** | 0.11 | 0.22 | 1.6 | 1.9 |
| **Cd** | 0.029 | 0.046 | 34 | 18 |
| **Ca** | 0.068 | 0.093 | 0.29 | 0.91 |
| **Cr** | 0.20 | 0.39 | 3.1 | 1.3 |
| **Co** | 0.49 | 1.2 | 322 | 98 |
| **Cu** | 0.0062 | 0.070 | 388 | 11 |
| **Fe** | 0.11 | 0.13 | 376 | 4.3 |
| **Pb** | 0.16 | 0.31 | 471 | 26 |
| **Mg** | 0.35 | 0.69 | 3.3 | 2.1 |
| **Mn** | 0.14 | 0.36 | 3.9 | 17 |
| **Hg** | 10 | 20 | 0.96 | 1.00 |
| **Mo** | 0.26 | 0.40 | 1.00 | 0.62 |
| **Ni** | 1.9 | 4.1 | 103 | 80 |
| **K** | 0.032 | 0.11 | 1.2 | 0.82 |
| **Se** | 0.19 | 0.33 | 14 | 2.3 |
| **Ag** | 0.016 | 0.031 | 0.98 | 1.0 |
| **Na** | 0.38 | 0.65 | 2.6 | 1.4 |
| **Sr** | 0.17 | 0.41 | 0.68 | 1.3 |
| **Tl** | 0.16 | 0.31 | 8.9 | 2.0 |
| **Sn** | 0.071 | 0.14 | 7.5 | 1.7 |
| **U** | 0.15 | 0.25 | 102 | 4.4 |
| **V** | 0.020 | 0.040 | 0.058 | 0.32 |
| **Zn** | 0.039 | 0.051 | 144 | 26 |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.

## 5.2.5 Prediction of Pit Wall Blast Residue Leaching

### *5.2.5.1 Operations*

The concentrations of ammonia, nitrate and nitrite in pit wall runoff are estimated using methodology developed previously in Lorax (2021) and rely largely on analogue pit sump water quality monitoring as well as assumptions around leachable nitrogen loads caused by blast fragmentation. Concentrations predicted were found to be in the conservative range of operational monitoring databases for other mine sites.

#### *5.2.5.2 Closure*

While pit sump chemistry commonly shows elevated nitrogen concentration during operations in response to blasting activities, limited surface area is available to fix undetonated blast residue. As such, nitrogen species are expected to be flushed from pit wall surfaces relatively rapidly after blasting is terminated at the end of mining. Consistent with information presented for smaller scale mine rock components (TMF embankments and NPAG TMF cover; Section 5.2.5.2), the annual nitrogen depletion rate for pit walls was set to 80% during closure which is considered a conservative estimate.

### 5.2.6 Results

Selected pit wall source term predictions are presented in Table 5-10 for each NPR designation. A list of the full model results in provided in Appendix F. Compositing of the PAG1, PAG2, and NPAG source terms according to pit wall exposures predicted by the block model was done in the site-wide water quality model prepared by others.

**Table 5-10:**
**Selected Source Term Model Predictions for Goldboro Pit Walls**

| **Parameter** | ***Units*** | **NPAG** | | | | **PAG2** | | | | **PAG1** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Short-term | | Long-term | | Short-term | | Long-term | | Short-term | | Long-term | |
| | | Base Case | Upper Case | Base Case | Upper Case | Base Case | Upper Case | Base Case | Upper Case | Base Case | Upper Case | Base Case | Upper Case |
| **pH** | - | 7.5 | 6.5 | 7.0 | 6.0 | 7.5 | 6.5 | 5.5 | 5.0 | 7.0 | 6.0 | 4.0 | 3.5 |
| **Sulphate** | *mg/L* | 80 | 171 | 89 | 167 | 94 | 192 | 124 | 237 | 93 | 186 | 653 | 1075 |
| **Al** | *mg/L* | 0.020 | 0.029 | 0.017 | 0.025 | 0.018 | 0.025 | 0.030 | 0.043 | 0.011 | 0.015 | 4.5 | 6.4 |
| **As** | *mg/L* | 0.31 | 0.73 | 0.24 | 0.57 | 0.33 | 0.80 | 0.15 | 0.37 | 0.073 | 0.17 | 0.13 | 0.31 |
| **Cd** | *mg/L* | 0.000010 | 0.000016 | 0.000020 | 0.000032 | 0.000011 | 0.000017 | 0.000038 | 0.00076 | 0.000010 | 0.000016 | 0.0012 | 0.0019 |
| **Co** | *mg/L* | 0.0025 | 0.0050 | 0.0025 | 0.0050 | 0.0025 | 0.0050 | 0.0025 | 0.050 | 0.0025 | 0.0050 | 5.1 | 12 |
| **Cu** | *mg/L* | 0.00015 | 0.0017 | 0.00014 | 0.0016 | 0.00022 | 0.0025 | 0.0018 | 0.020 | 0.00015 | 0.0017 | 0.069 | 0.78 |
| **Fe** | *mg/L* | 0.12 | 0.24 | 0.12 | 0.24 | 0.12 | 0.24 | 0.42 | 0.48 | 0.12 | 0.24 | 102 | 116 |
| **Pb** | *mg/L* | 0.0011 | 0.0021 | 0.0011 | 0.0021 | 0.0011 | 0.0021 | 0.0011 | 0.021 | 0.0011 | 0.0021 | 1.4 | 2.8 |
| **Mn** | *mg/L* | 0.14 | 0.28 | 0.14 | 0.28 | 0.14 | 0.28 | 0.14 | 2.8 | 0.14 | 0.28 | 1.1 | 2.9 |
| **Ni** | *mg/L* | 0.031 | 0.062 | 0.031 | 0.062 | 0.031 | 0.062 | 0.031 | 0.62 | 0.031 | 0.062 | 18 | 39 |
| **Zn** | *mg/L* | 0.0090 | 0.012 | 0.0090 | 0.012 | 0.0095 | 0.012 | 0.25 | 0.33 | 0.0093 | 0.012 | 1.9 | 2.5 |
| **Ammonia** | *mg N/L* | 3.2 | 16 | *Rate* | *Rate* | 3.2 | 16 | *Rate* | *Rate* | 3.2 | 16 | *Rate* | *Rate* |
| **Nitrite** | *mg N/L* | 0.27 | 2.4 | *Rate* | *Rate* | 0.27 | 2.4 | *Rate* | *Rate* | 0.27 | 2.4 | *Rate* | *Rate* |
| **Nitrate** | *mg N/L* | 5.8 | 15 | *Rate* | *Rate* | 5.8 | 15 | *Rate* | *Rate* | 5.8 | 15 | *Rate* | *Rate* |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non-Potentially Acid Generating; the definition of PAG1, PAG2, and NPAG is discussed in Section 3.1.2.
"Rate" describes the nitrogen depletion rate in response to surface flushing of blast residue during closure.

## 5.3 Tailings Management Facility

### 5.3.1 Approach

The water chemistry associated with tailings discharged into the TMF is expected to differ from mine rock seepage due to the effects of the mill process on contact water chemistry. Key mill activities that affect tailings supernatant chemistry beyond the oxidative, mineral-controlled reactions predicted for blasted mine rock include:

- Crushing and milling of ore drastically increasing the material's surface area;
- Addition of cyanide and other reagents to facilitate the gold extraction process;
- Addition of sodium metabisulfite (Na-MBS) and copper sulphate during cyanide detoxification; and
- In-line addition of ferric sulphate for arsenic treatment.

Bench-scale metallurgical testing is intended to capture the effectiveness of the various mill process steps. Representative tailings materials and associated supernatants underwent extensive environmental testing to allow the prediction of contact water chemistry under a variety of conditions. Two source terms were generated for tailings contact water: First, a process water source term represents the chemistry of water entrained in the tailings slurry as it is discharged into the TMF. Second, a TMF seepage source term considers the long-term contact of pore water and tailings under oxygen-deprived conditions before reporting to local groundwater systems. Anoxic conditions inhibit sulphide oxidation and thus acid production but enhance the solubility of certain species, including Fe and Mn, via reductive dissolution.

Approximately 170 kt of historic tailings will be disturbed during development of the open pit and deposited within the lined TMF footprint during the construction phase and in the early stages of operations. No water is expected to leave the facility during this time and historic tailings will be fully covered with ROM tailings slurry well before any discharge is expected to occur (Blackwell, pers. comm., 2022). It is therefore not expected that historic tailings leaching will impact the chemistry of the water column of the TMF Pond and therefore, no source term for historic tailings was derived.

### 5.3.2 Process water

Process water chemistry was modelled based on the water chemistry results obtained from the 2020 and 2021 master composite tailings supernatant. The Base Case source term was calculated as the average of the two solution compositions, while the Upper Case represents the maximum concentration from the two tests. The accumulation of loads expected for some species in response to recycling of TMF pond water to the mill is not considered in the process water source term since this mechanism is captured conservatively in the TMF water quality model prepared by others.

Note that the 2020 Master Composite tailings supernatant sample exhibited very high total CN concentrations (30 mg/L) even after cyanide detoxification step. Such high values are not expected operationally (Ausenco, pers. comm., 2021) and therefore, cyanide and species known to be strongly affected by cyanide were adjusted in the 2020 Master Composite sample for the calculation of source terms as follows:

- Total CN concentrations were reduced to 2.5 mg/L which represents a conservative achievable concentration operationally (Ausenco, pers. comm., 2022).
- Dissolved Fe forms strong complexes with CN and was found significantly elevated in the 2020 Master Composite sample compared with the 2021 sample. Dissolved Fe was therefore reduced to 1.0 mg/L, proportional to the total CN decrease.
- Ammonia, nitrate, and nitrite were increased stoichiometrically and proportionally as a result of the total CN adjustment as these species are expected to form in response to cyanide degradation.

In order to further support water quality modelling efforts, Lorax provided CN decay rates to be applied to the mixed TMF pond. In a pond environment, CN is known to decay naturally in response to a variety of external factors such as volatilization, photolysis, oxidation, hydrolysis, and sorption. Botz and Mudder (2000), constrained the loss of CN in such environments via computer modelling and calibrated the output against water quality monitoring results from tailings impoundments. It was found that the relative annual decay rate of cyanide remained relatively constant for several years into mine closure independent of the total cyanide concentration (Figure 5-3). Based on these findings, it was proposed to implement an annual CN decay rate of 55% in which all CN would be converted to ammonia. Since ammonia is produced during this process, oxidative (and other) mechanisms that degrade ammonia naturally in the same aqueous system are expected to act somewhat slower. In accordance with this theoretical constraint and in consideration of supporting ammonia data from the closed Equity Silver mine in Northern BC (Price and Aziz, 2012), an annual ammonia decay rate of 30% was implemented for the Goldboro TMF pond after tailings discharge has ceased.

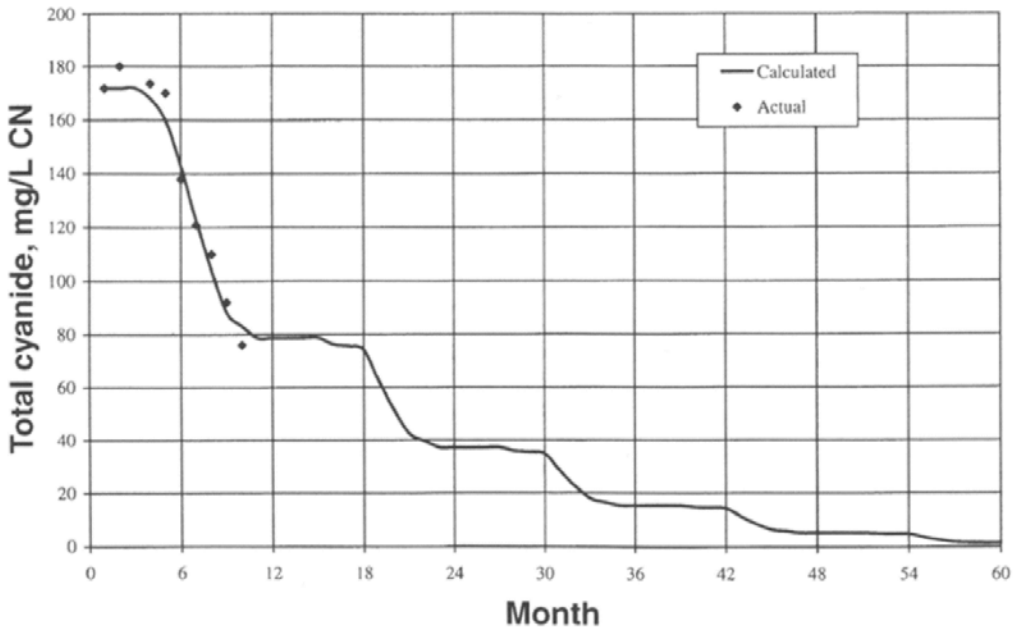



**Figure 5-3: Natural decay of total CN in a North American tailings impoundment (from Botz and Mudder, 2000).**

### 5.3.3 TMF Seepage

Saturated column testing is intended to mimic reactions occurring in the saturated and suboxic pore spaces of sedimented tailings. Leachate from this type of test is therefore considered to represent a viable geochemical proxy when predicting TMF seepage to groundwater and collection ditches. A switch in column influent from the 2020 Master Composite supernatant to the more representative (lower CN) 2021 Master composite sample was undertaken in December 2021. To put more emphasis on leachates produced by the more recent influent but still maintain conservatism with respect to cyanide transport, Base and Upper Case TMF seepage source terms were calculated as follows:

For the Base Case, the median leachate concentration from the last eight saturated column cycles collected between October 2021 and February 2022 were used as the geochemical source term. For species that were exclusively below the analytical detection limit, half of the highest reported detection limit was adopted as the predicted concentration value. Note that the choice of kinetic test cycles employed for this exercise includes four cycles before and four cycles after the introduction of the 2021 Master Composite supernatant as the influent which is considered conservative. The Upper Case scenario was derived as the $90^{th}$ percentile value from the same dataset used for the Base Case. Detection limit values were adopted as such for these predictions.

Due to the fact that the Goldboro saturated column experiments are ongoing and may not have reached fully oxygen-deprived at the time of source term modelling, two adjustments were made to the concentrations of Fe and Mn. These species are known to be significantly more mobile under sub- to anoxic conditions which may be more readily achieved in the field compared with bench-scale experiments. As an approximation, the Fe and Mn concentrations derived using the above calculation methods were multiplied by a factor of five (5) and 100, respectively, to account for the possibility of increased mobility within the full-scale TMF environment. These factors are in accordance with observations from other mine sites where corresponding bench-scale data are available.

### 5.3.4 Results

Selected results of the source term model output for tailings contact water are summarized in Table 5-11. A complete list of the source term model output is given in Appendix F.

**Table 5-11:**
**Selected Source Term Model Predictions for Goldboro Pit Walls**

| Parameter | Units | Process Water | | TMF Seepage | |
|---|---|---|---|---|---|
| | | Operations | | Operations/ Closure | |
| | | Base Case | Upper Case | Base Case | Upper Case |
| **pH** | | 7.4 | 7.2 | 7.8 | 7.7 |
| **Sulphate** | mg/L | 970 | 1553 | 1332 | 1678 |
| **Al** | mg/L | 0.018 | 0.023 | 0.0074 | 0.0095 |
| **As** | mg/L | 0.82 | 1.1 | 1.4 | 1.4 |
| **Cd** | mg/L | 0.000044 | 0.000074 | 0.000010 | 0.000025 |
| **Co** | mg/L | 0.067 | 0.11 | 0.037 | 0.042 |
| **Cu** | mg/L | 0.042 | 0.056 | 0.00035 | 0.00049 |
| **Fe** | mg/L | 0.51 | 1.0 | 1.9 | 4.5 |
| **Pb** | mg/L | 0.000051 | 0.000066 | 0.000020 | 0.00010 |
| **Mn** | mg/L | 0.080 | 0.11 | 19 | 21 |
| **Ni** | mg/L | 0.0014 | 0.0016 | 0.00083 | 0.0010 |
| **Zn** | mg/L | 0.0019 | 0.0025 | 0.0010 | 0.0020 |
| **Ammonia** | mg N/L | 18 | 33 | 7.6 | 11 |
| **Nitrite** | mg N/L | 0.45 | 0.83 | 0.020 | 0.021 |
| **Nitrate** | mg N/L | 0.44 | 0.84 | 0.050 | 0.10 |
| **Cyanide** | mg/L | 1.3 | 2.5 | 0.84 | 2.4 |

## *5.4 Overburden Stockpiles*

### 5.4.1 Approach

Overburden is an umbrella term for organic topsoil as well as underlying glacial till material that will be stripped from several locations without the use of explosives during the construction period to prepare the ground for infrastructure as well as mining operations. These materials are geotechnically and geochemically distinct, devoid of carbonate and will be stored in separate stockpiles during operations. Short-term source terms were developed for both organics and till materials based on the SFE results discussed in Section 3.3. The median values of the till and organics SFE database were used as the geochemical source term for the respective stockpiles. Due to the relatively low sulphur content of overburden in general and the aggressive nature of the SFE test, the resulting source terms are considered a conservative estimate of operational seepage chemistry from these materials and should be considered an Upper Case. Since scaling of kinetic test data was not conducted and the method described herein is based on SFE data alone, no Base Case source term was generated for these material types. Aluminium in the model output was found to be strongly elevated in comparison with baseline concentrations of comparable pH which was attributed in part to colloids bypassing the filter during the SFE tests. To account for experimental artifacts, Al concentrations in overburden materials were set to the 95$^{th}$ percentile value calculated for the 2021 baseline database (0.81 mg/L). Further, Al was subsequently allowed to precipitate during PHREEQC processing in the form of gibbsite ($Al[OH]_3$) to account for its solubility under different pH-regimes.

At closure, both stockpiles will be deconstructed and overburden will be rehandled for reclamation purposes such as the construction of WRSA covers. While the specific design of such covers was not available at the time of preparation of this report, it is assumed that till and topsoil will be co-deposited, compacted, and re-vegetated during site reclamation activities. Therefore, baseline surface water quality from monitoring stations capturing surface runoff from prepared/disturbed ground (stations SW-13-21, SW-14-21, SW-16-21, SW-17-21, SW-18-21, SW-19-21 and SW-20-21) is thought to constitute a good surrogate for long term overburden runoff from reclaimed sites (Muirhead, pers. comm., 2022). Upon review of the water quality data from various monitoring sites, many of which show pH values consistent with the range of SFE leachate results for topsoil and till, 95$^{th}$ percentile values were adopted as the long-term source term predictions for overburden. This approach adds a safety factor for the possibility that baseline data is influenced by diluted waters seasonally. For species where high analytical detection limits in the baseline database were found to result in unrealistic output values (Ag, Be, F, Hg, Sb, Sn), the maximum value of the operational source term derived from SFE data was adopted.

### 5.4.2 Results

Selected results of the source term model output for overburden contact water are summarized in Table 5-12. Refer to Appendix F for a complete list of the source term model output.

## Table 5-12:
## Selected Source Term Model Predictions for Goldboro Pit Walls

| Parameter | Units | Till | Soil | Overburden (Till + Soil) |
|---|---|---|---|---|
| | | Short-term | | Long-term |
| | | Upper Case | Upper Case | Upper Case |
| **pH** | *mg/L* | 5.2 | 3.8 | 4.2 |
| **Sulphate** | *mg/L* | 13 | 7.1 | 14 |
| **Al** | *mg/L* | 0.15 | 0.81 | 0.81 |
| **As** | *mg/L* | 0.0025 | 0.0072 | 0.012 |
| **Cd** | *mg/L* | 0.000038 | 0.00018 | 0.000090 |
| **Co** | *mg/L* | 0.00053 | 0.0012 | 0.0010 |
| **Cu** | *mg/L* | 0.0026 | 0.0079 | 0.0020 |
| **Fe** | *mg/L* | 0.35 | 0.42 | 0.42 |
| **Pb** | *mg/L* | 0.0012 | 0.011 | 0.0017 |
| **Mn** | *mg/L* | 0.022 | 0.092 | 0.36 |
| **Ni** | *mg/L* | 0.0011 | 0.0031 | 0.0020 |
| **Zn** | *mg/L* | 0.033 | 0.16 | 0.013 |
| **Ammonia** | *mg N/L* | 0.30 | 1.4 | 0.050 |
| **Nitrite** | *mg N/L* | 0.030 | 0.030 | 0.050 |
| **Nitrate** | *mg N/L* | 0.35 | 0.62 | 0.050 |

# 6. Conclusions and Recommendations

## 6.1 Conclusions

The most salient conclusions from the geochemical characterization program include:

Mine Rock

- Waste rock and ore ARD characteristics were defined through the NPR designations as follows:
  - PAG1 – NPR < 1 or 1 ≤ NPR ≤ 2 and total S ≥ 0.2 wt. %
  - PAG2 – 1 ≤ NPR ≤ 2 and total S < 0.2 wt. %
  - NPAG – NPR > 2
- Sulphur content generally decreases from PAG1 to PAG2 to NPAG waste rock, while NP shows little variability between the different designations;
- There was limited correlation between sulphur content and lithology. Instead, the sulphur content appears to be controlled structurally with higher PAG proportions occurring within or near the hinges of the geologic anticline;
- Waste rock humidity cells are ongoing. Leachates have remained neutral to date; however, the two PAG1 humidity cells show slightly decreasing pH values (to a minimum pH of 6.14 in HC4 in the most recent sample [week 32]);
- CaNP depletion rates from the PAG humidity cells estimate the time to onset of ARD to be between 2 and 26 years for these humidity cells;
- Arsenic was identified as the main parameter of concern for the Project:
  - Arsenic content was elevated above 3x the AUCCA in the majority (99%) of the waste rock and ore samples and above 10x the AUCCA in 73% of the samples;
  - Arsenic concentrations were above the Tier 1 EQS of 0.005 mg/L in the SFE leachates, field bin leachates, and bulk sample stockpile runoff;
  - Arsenic loading rates were highest in the NPAG humidity cell leachate, indicating that As leaching is not limited to waste rock with high ARD potential;
- Besides As, other metal loading rates from the humidity cells were generally low. However, increased metal leaching would be expected if the PAG humidity cells become acidic;

- Copper, Pb (bulk sample runoff only), and Zn concentrations were occasionally above their respective Tier 1 EQS in field bin leachates and runoff from the bulk sample stockpile, indicating that there is some potential for elevated concentrations in contact water. These parameters will be monitored as part of the site-wide water quality monitoring program.

Tailings:

- All tailings samples were classified as PAG and had elevated As content (>10x AUCCA);
- Arsenic concentrations in SFE leachates were above the Tier 1 EQS in all samples. Other potential parameters of concern identified in the SFE tests included Co, Cu, and Fe which were above their respective Tier 1 EQS in one (Co, Fe) or two (Cu) samples;
- Kinetic tests using the 2020 Master Composite tailings sample included a humidity cell and a saturated column. Both of these kinetic tests are ongoing;
- The humidity cell has remained circumneutral, although pH has shown a slight decrease over time;
- The time to NP depletion for tailings is estimated at approximately one year;
- Following an initial decrease in loading rates, several parameters have shown an increase in loading rates since approximately week 5 (*e.g.*, sulphate, cyanide species, As, Cd, Pb, Mo);
- The saturated column leachate has also remained circumneutral. This column uses tailings supernatant as the influent. Influent 1 was used up to week 22. After this time, the influent was switched to Influent 2 which underwent a more rigorous cyanide detoxication process;
- Sulphate and some metals (*e.g.,* Cd) show decreasing trends which is consistent with rinsing of water-soluble oxidation products and mineral surface bound metals through the initial phase of the experiment. Other metal concentrations are relatively stable (*e.g.*, Mo);
- In contrast, As concentrations increased in the saturated column effluent and stabilized at approximately 1.4 mg/L, which is higher than the As concentration in both influents (<1 mg/L). This elevated concentration indicates that the tailings are releasing As under saturated conditions;
- Total cyanide concentrations remained lower in the effluent relative to Influent 1; however, the total cyanide concentration initially showed an increasing trend to

7.65 mg/L in week 6. These initial results should be considered conservative due to the high cyanide concentration of Influent 1. It is expected that total cyanide concentrations will decrease further following the change to Influent 2.

<u>Historic Tailings:</u>

- The historic tailings samples were generally classified as PAG. The pH of the SFE leachates were acidic and had high metal concentrations. These results indicate that metal leaching from the historic tailings is expected and is in part driven by acidic conditions. Metal leaching will be mitigated by relocating the historic tailings to the lined TMF where they will be covered by fresh ROM tailings and will be saturated in early operations. Therefore, the release of contact water from historic tailings within the TMF is not anticipated.

<u>Overburden:</u>

- Overburden sampling included both soil (n = 12) and till (n = 16). These samples had paste pH values below 5.5 and all soil samples and most till samples (14 of 16 samples) had NPR < 2. As the overburden samples have acidic paste pH values, they may initially generate acidic runoff. However, due to the relatively low sulphur content, the overburden samples are not expected to generate long-term ARD;
- Elements which had median values above 3x AUCCA included Cd, Hg, and Se for the soil samples. No median values were above 3x AUCCA for the till samples. Additional parameters with maximum values above at least 3x AUCCA included Ag, As, Cd (soil only), Hg, Pb (till only), and W (soil only);
- Overburden SFE leachates were slightly acidic (pH < 6.5). Median values for soil samples above the Tier 1 EQS included Al, As, Cd, Cr, Co, Cu, Fe, Pb, and Zn, while median values for till samples above the Tier 1 EQS included Al, Cr, Cu, Fe, Pb, Se, and Zn. These results indicate that there is some metal leaching potential from overburden material under mildly acidic conditions.

<u>Source Terms</u>

- The contact water chemistry was modelled for mine components containing mine rock, overburden or tailings and was largely based on the results from static and kinetic test programs described in this document.
- Where applicable, the scaling of humidity cell data was undertaken with reliance on analogue mine site information for which both kinetic test and operational water quality monitoring data are available. This approach is thought to result in a drastic

increase of model confidence as it relates to parameter-specific humidity cell scaling.

- Nitrogen leaching predictions associated with the flushing of explosives residue from blasted materials are based on the proposed mine schedule, site analogue data as well as explosive type and characteristics.
- With the exception of the temporary release of low-pH pit wall runoff from PAG exposures before pit lake stage elevation is reached, no ARD is predicted to occur from mine rock or tailings during operations and in the long-term. This prediction hinges on the assumption that PAG1 material can be accurately segregated during operations and permanently stored under saturated conditions within the TMF. Further, PAG2 waste rock is expected to be sufficiently low in volume to allow for effective co-mingling and/or layering within the WRSAs to prevent the onset of ARD. ML/ARD management and monitoring guidelines to ensure the validity of these assumptions are provided under separate cover.

## 6.2 Recommendations

Recommendations for additional geochemistry work for the Goldboro Project include:

- Continuation of humidity cells until a minimum of 40 weeks of results are available for all samples. At least one PAG1 cell should be continued longer-term until a better understanding of acidic (pH < 5) metal loading and CaNP depletion rates is obtained;
- Continuation of field bin leachate and ore stockpile drainage sampling;
- Ongoing assessment of As leaching controls under neutral pH (*i.e.*, in NPAG construction areas);
- Re-evaluation of saturated tailings source term once the column leachate reaches stable conditions after switching to Influent 2;
- Re-evaluation of long-term PAG source terms once site-specific acidic leachate becomes available from humidity cell testing;
- Mineralogical and kinetic testing on soil material to assess the source of acidity in these materials; and
- Continuation of implementation of geochemistry data into the block model to refine PAG locations and tonnages.

# 7. Closure

This technical report was prepared by Lorax Environmental Services Ltd. on behalf of Anaconda Mining Inc. Please do not hesitate to contact the undersigned should there have any questions or comments regarding the content of this report.

Sincerely,
**LORAX ENVIRONMENTAL SERVICES LTD.**

***Prepared by:***

**Jennifer Stevenson, M.Sc., P.Geo. (BC)**
Environmental Geoscientist

***Prepared by:***

**Patrick Mueller. B.Sc., P.Chem.**
Environmental Chemist

***Prepared and Reviewed by:***

THE ASSOCIATION OF PROFESSIONAL GEOSCIENTISTS OF NOVA SCOTIA
est. 1997
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Signature:
Date: 2022-05-24

**Timo Kirchner, M.Sc., P.Geo. (BC, NS, ON)**
Environmental Geoscientist

***Reviewed by:***

**Bruce Mattson, M.Sc., P.Geo. (BC, NT)**
Senior Environmental Geoscientist

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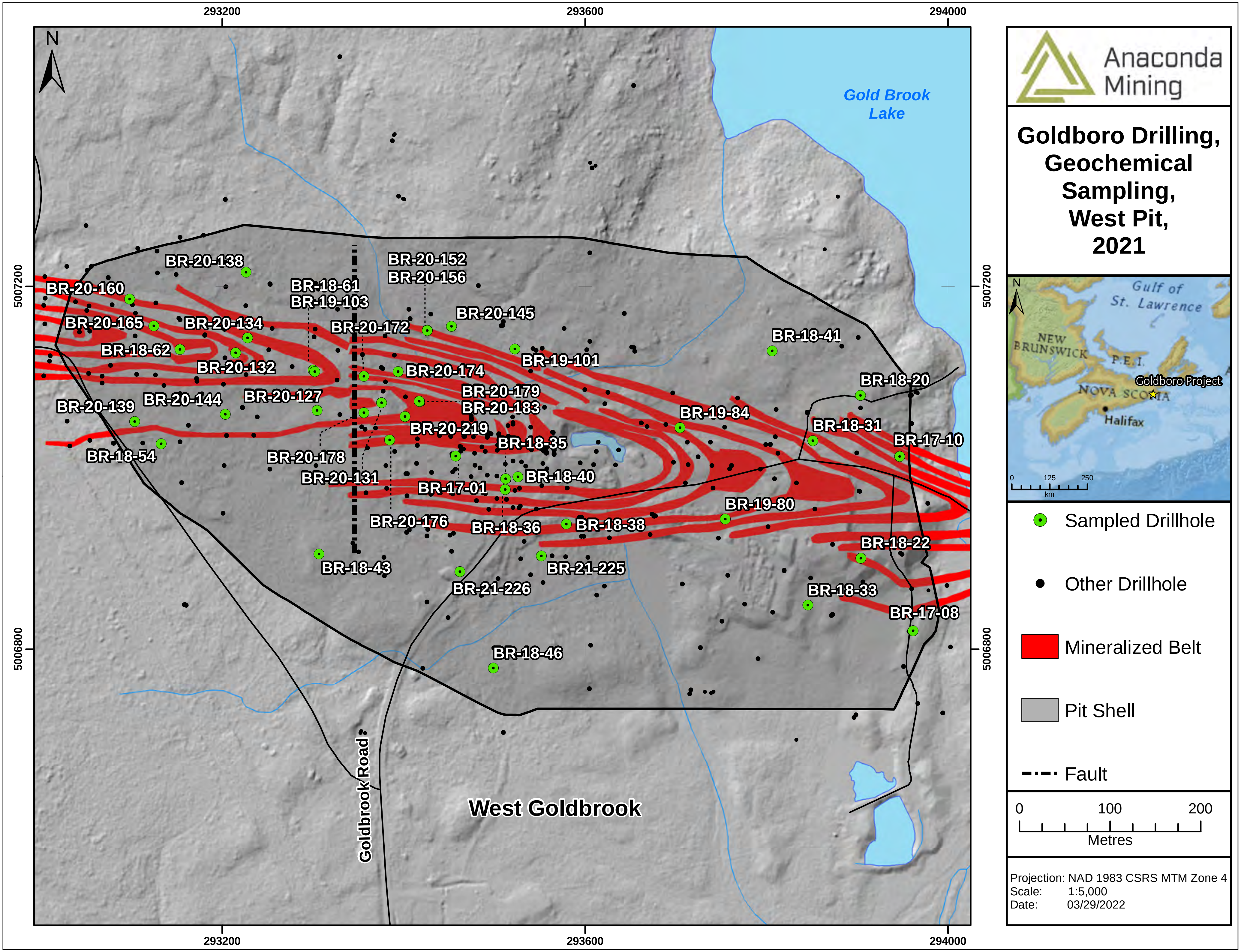
# *Appendix A: Geological Cross-Sections*

Anaconda Mining



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NEW BRUNSWICK
P.E.I.
NOVA SCOTIA
Goldboro Project
Halifax
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Sampled Drillhole
Other Drillhole
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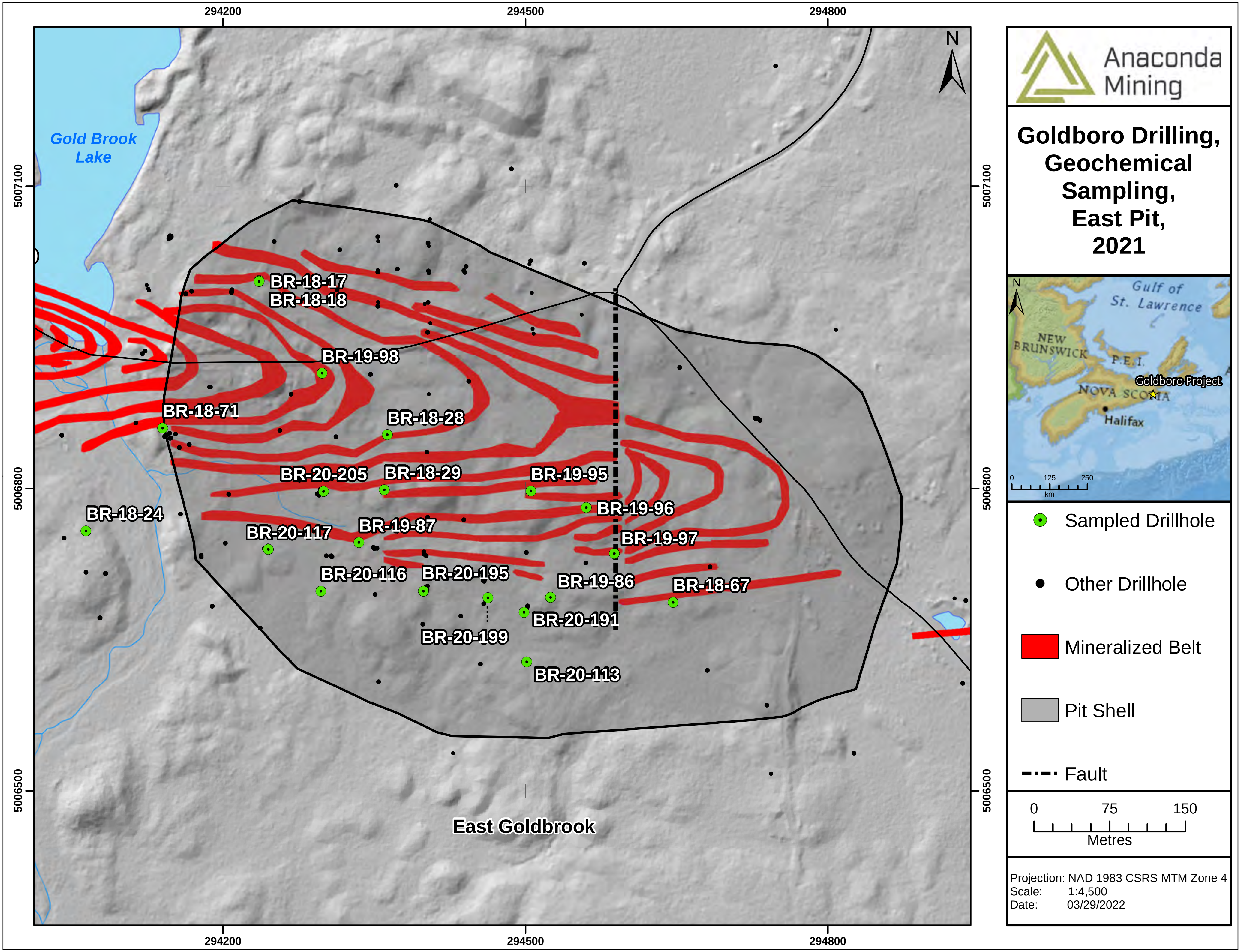

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East Goldbrook
Gulf of St. Lawrence
NEW BRUNSWICK
P.E.I.
NOVA SCOTIA
Goldboro Project
Halifax
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km
Sampled Drillhole
Other Drillhole
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Fault
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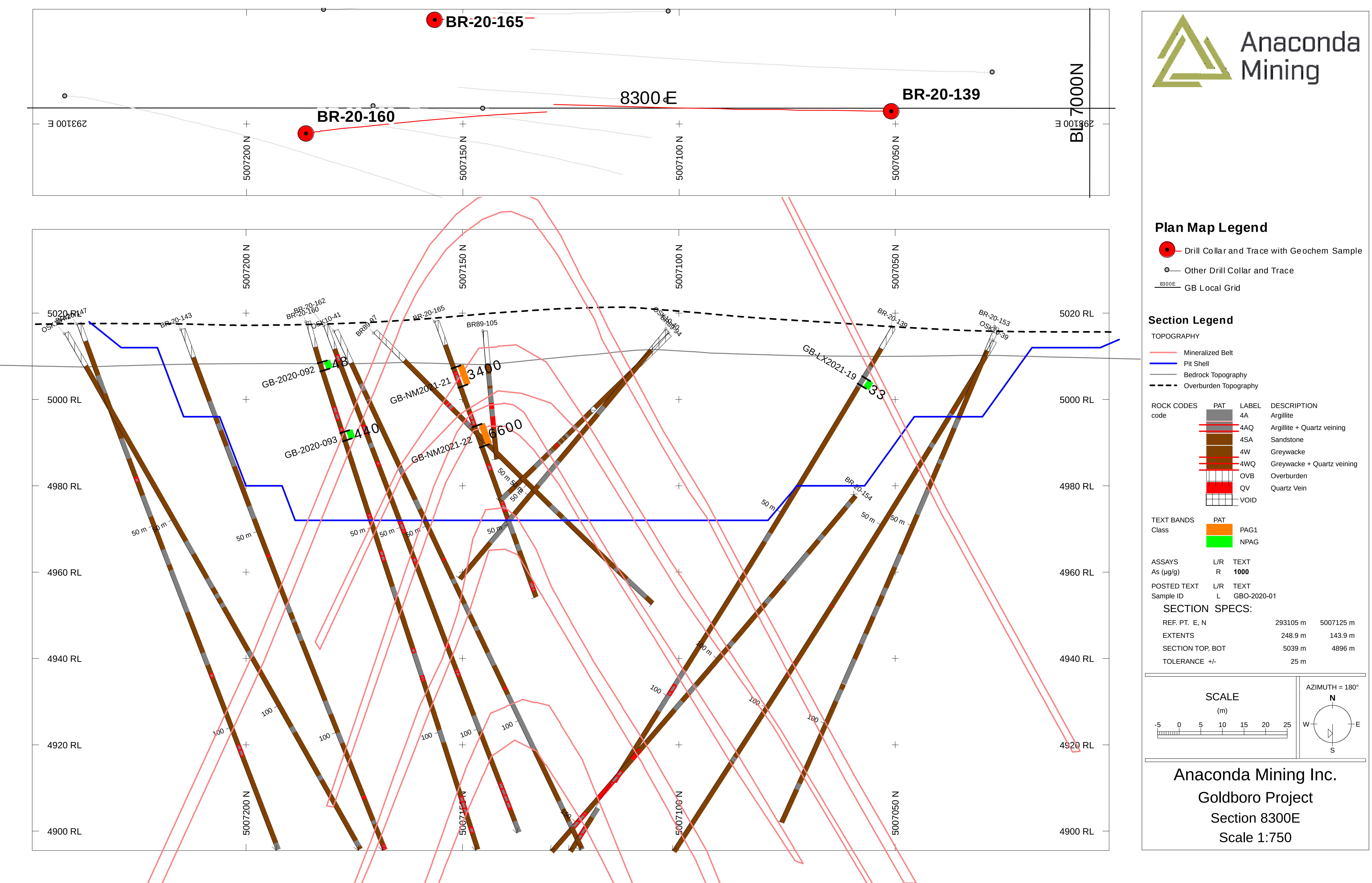

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5000 RL
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6600
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100
Anaconda Mining
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Other Drill Collar and Trace
GB Local Grid
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TOPOGRAPHY
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Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
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LABEL
DESCRIPTION
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4AQ Argillite + Quartz veining
4SA Sandstone
4W Greywacke
4WQ Greywacke + Quartz veining
OVB Overburden
QV Quartz Vein
VOID
TEXT BANDS Class
PAG1
NPAG
ASSAYS As (µg/g) L/R R TEXT 1000
POSTED TEXT Sample ID L/R L TEXT GBO-2020-01
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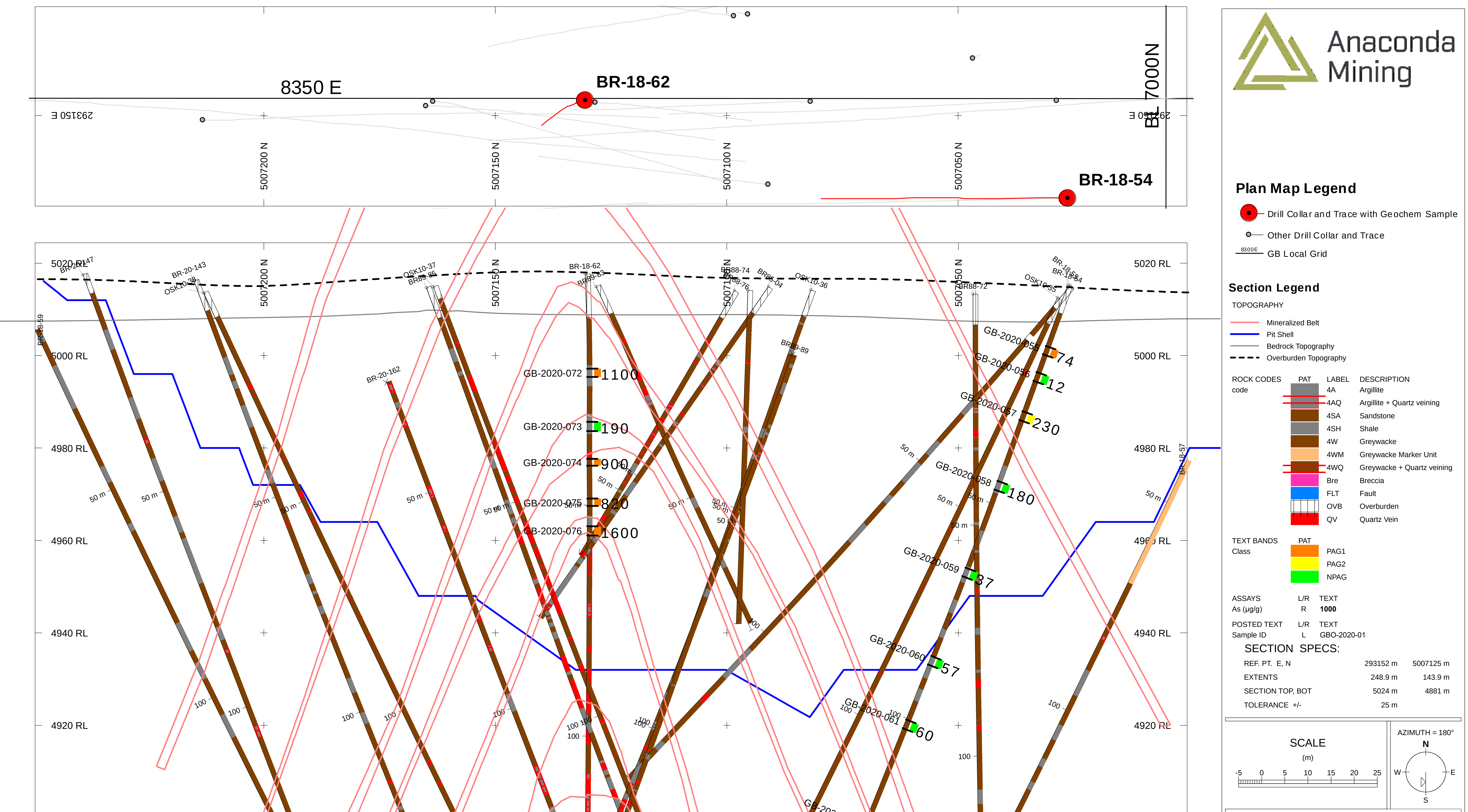
EXTENTS 248.9 m 143.9 m
SECTION TOP, BOT 5039 m 4896 m
TOLERANCE +/- 25 m
SCALE (m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 8300E
Scale 1:750

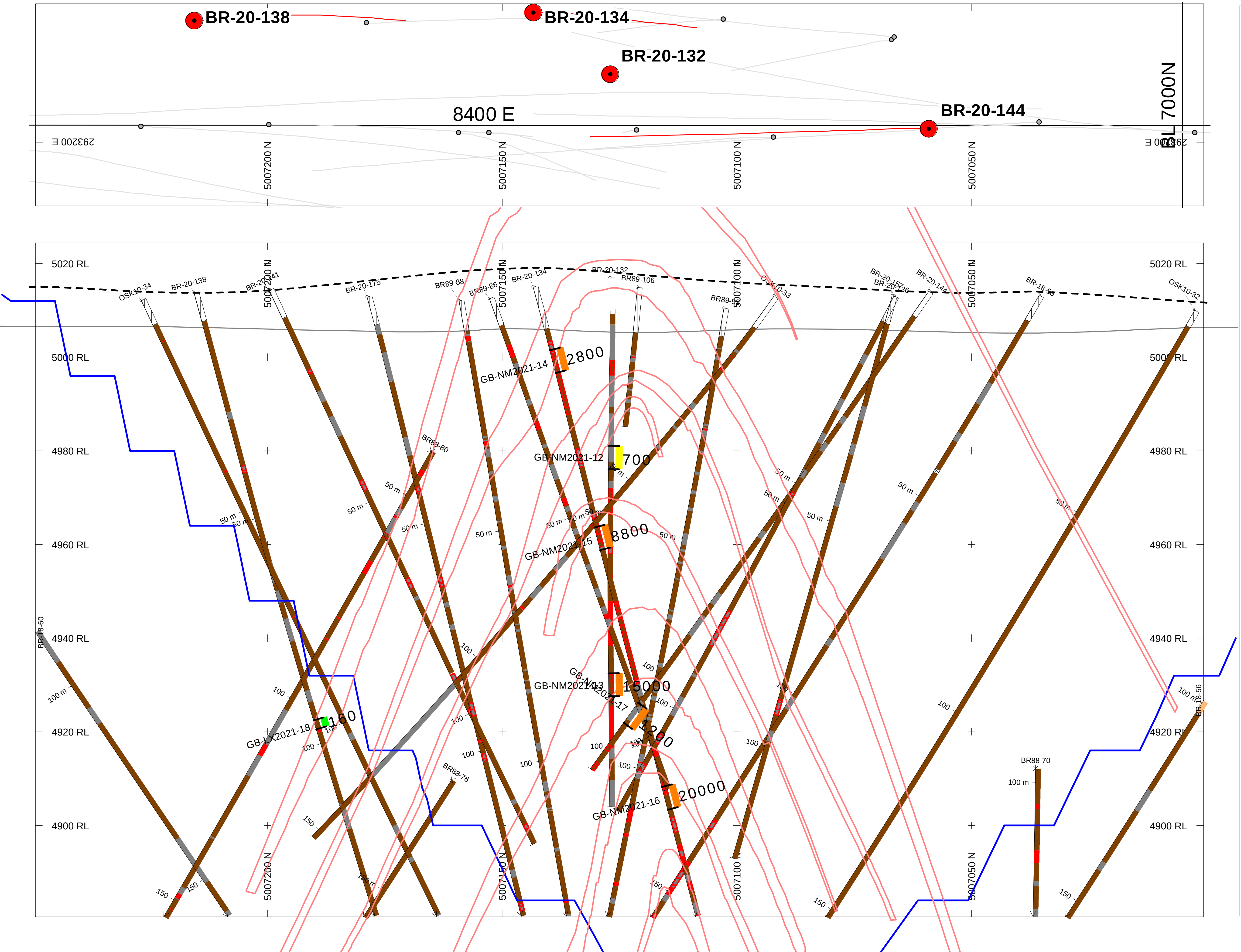



Anaconda Mining Inc.

Goldboro Project

Section 8350E

Scale 1:750




Anaconda Mining

## Plan Map Legend

Drill Collar and Trace with Geochem Sample

Other Drill Collar and Trace

8300E GB Local Grid

## Section Legend

TOPOGRAPHY

Mineralized Belt

Pit Shell

Bedrock Topography

Overburden Topography

| ROCK CODES code | PAT | LABEL | DESCRIPTION |
|---|---|---|---|
| | | 4A | Argillite |
| | | 4AQ | Argillite + Quartz veining |
| | | 4SA | Sandstone |
| | | 4SH | Shale |
| | | 4W | Greywacke |
| | | 4WM | Greywacke Marker Unit |
| | | 4WQ | Greywacke + Quartz veining |
| | | Bre | Breccia |
| | | LC | Lost Core |
| | | OVB | Overburden |
| | | QV | Quartz Vein |

| TEXT BANDS Class | PAT | |
|---|---|---|
| | | PAG1 |
| | | PAG2 |
| | | NPAG |

| | L/R | TEXT |
|---|---|---|
| ASSAYS As (µg/g) | R | **1000** |
| POSTED TEXT Sample ID | L | GBO-2020-01 |

SECTION SPECS:

| | | |
|---|---|---|
| REF. PT. E, N | 293208 m | 5007125 m |
| EXTENTS | 248.9 m | 143.9 m |
| SECTION TOP, BOT | 5024 m | 4881 m |
| TOLERANCE +/- | 25 m | |

SCALE

(m)

-5 0 5 10 15 20 25

AZIMUTH = 180°

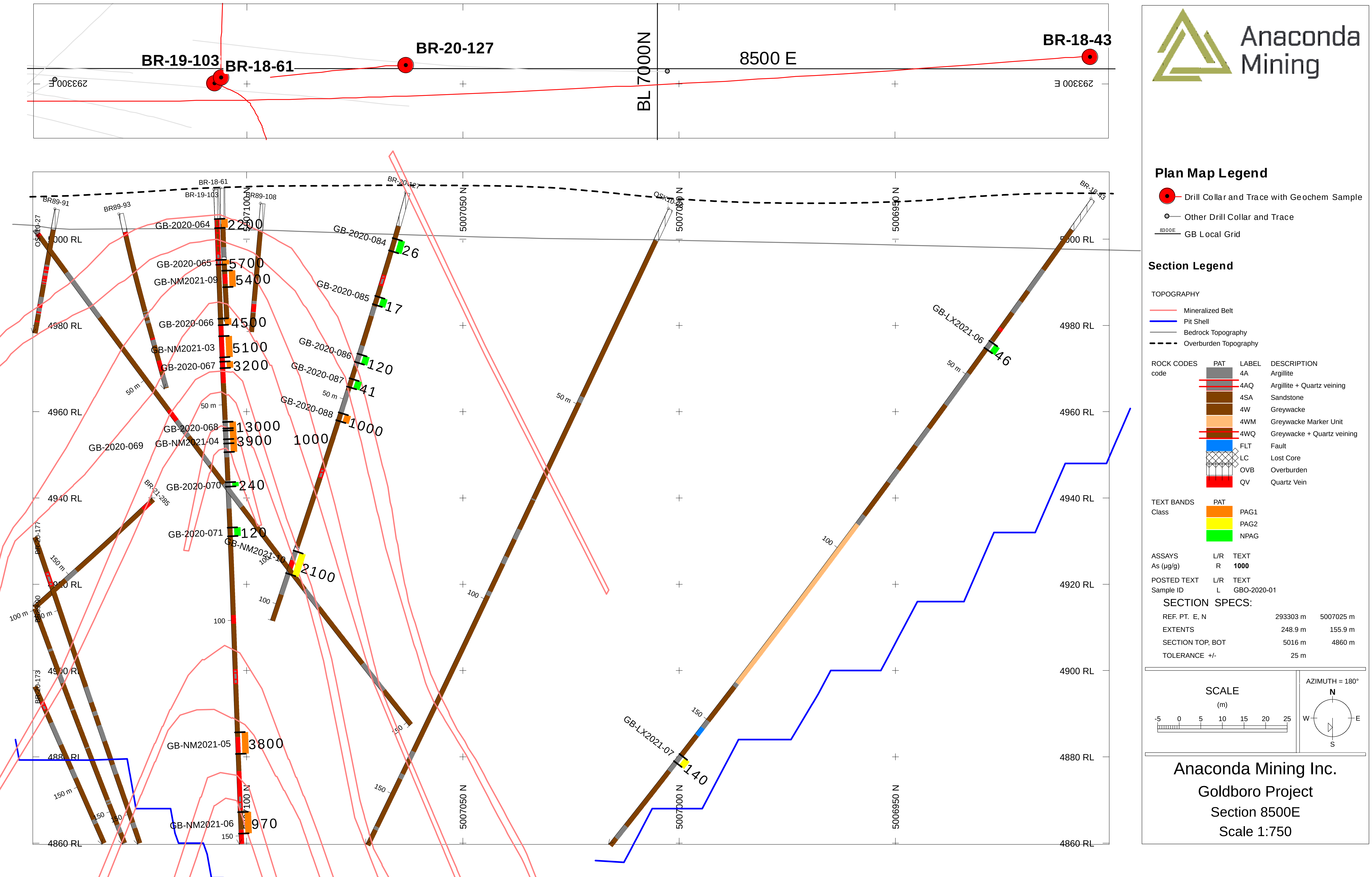
N W E S

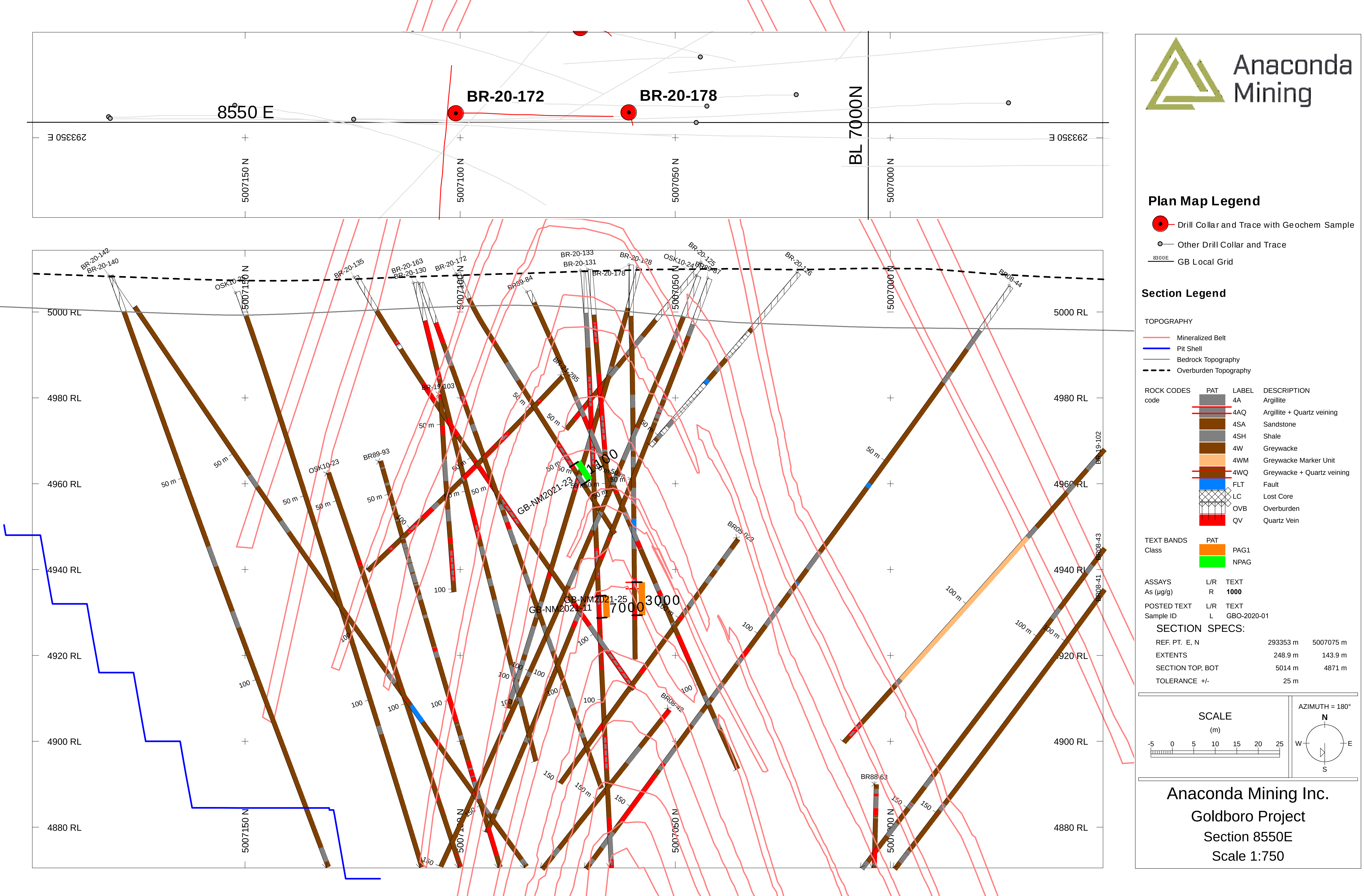
Anaconda Mining Inc.

Goldboro Project

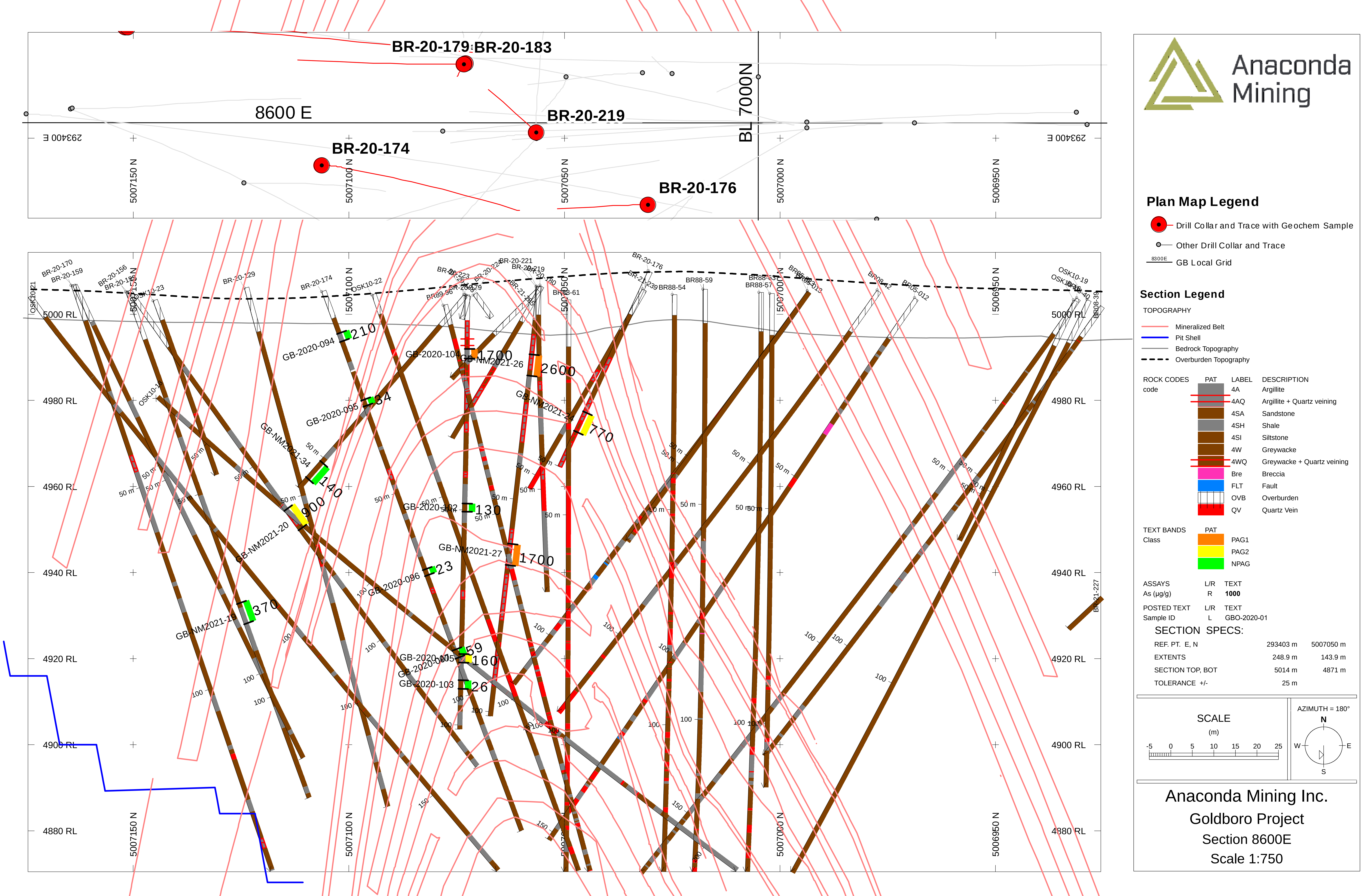
Section 8400E

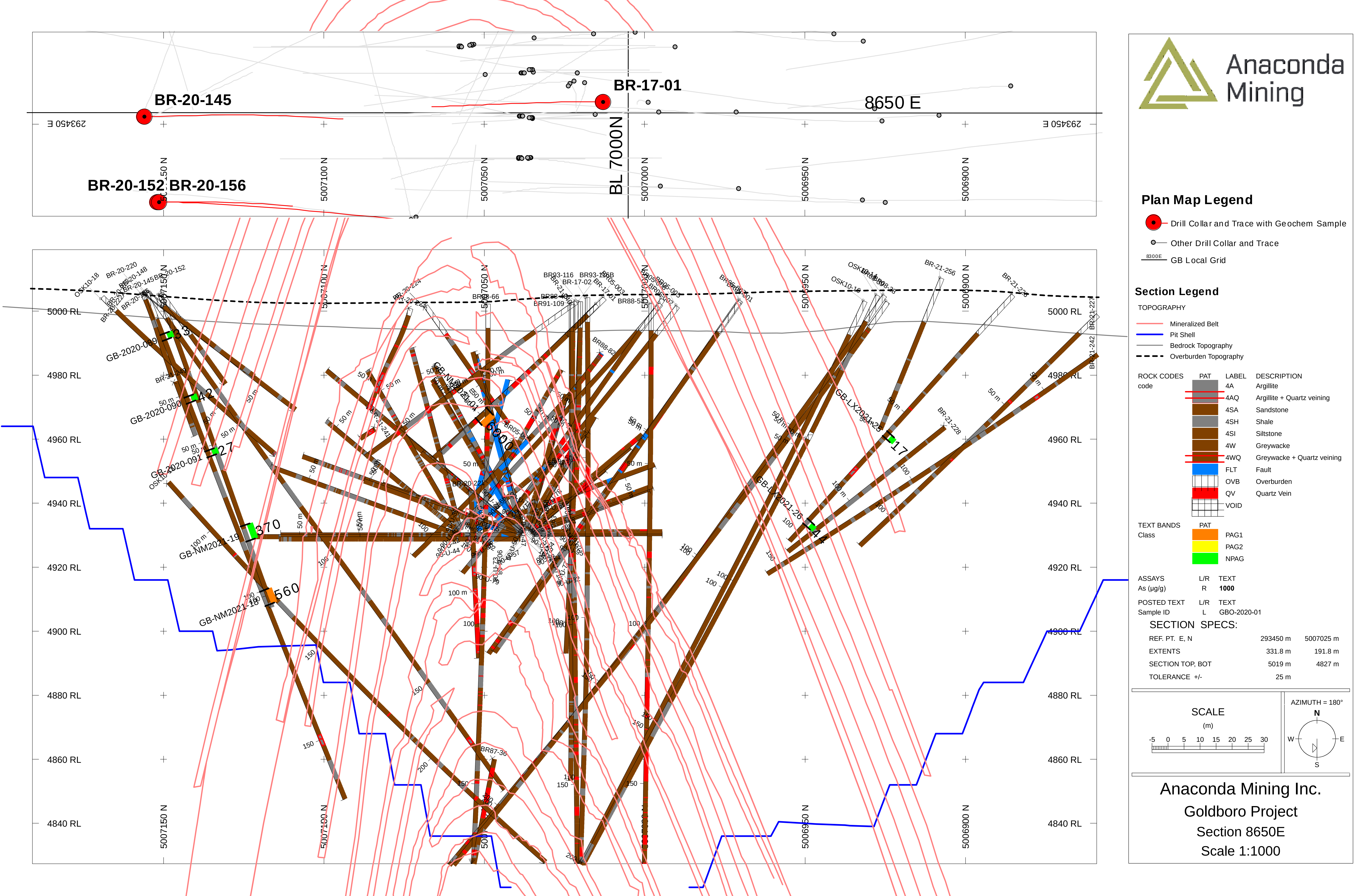
Scale 1:750

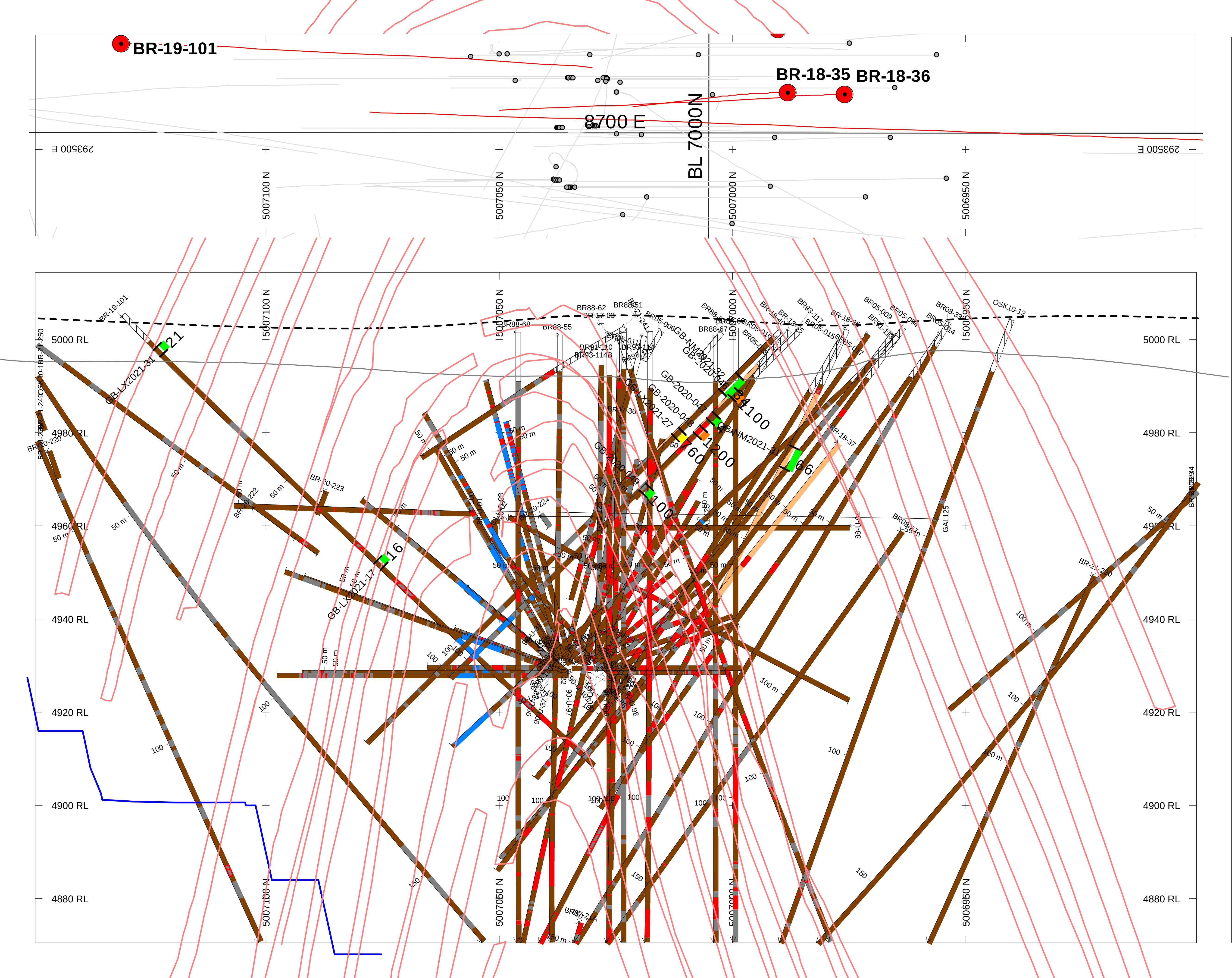

BR-19-103
BR-18-61
BR-20-127
BR-18-43
BL 7000N
8500 E
293300 E
GB-2020-064
2200
GB-2020-065
5700
GB-NM2021-09
5400
GB-2020-066
4500
GB-NM2021-03
5100
GB-2020-067
3200
GB-2020-068
13000
GB-NM2021-04
3900
GB-2020-069
GB-2020-070
240
GB-2020-071
120
GB-NM2021-10
2100
GB-NM2021-05
3800
GB-NM2021-06
970
GB-2020-084
26
GB-2020-085
17
GB-2020-086
120
GB-2020-087
41
GB-2020-088
1000
1000
GB-LX2021-06
46
GB-LX2021-07
140
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
4860 RL
5007050 N
5007000 N
5006950 N
5007100 N
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4W Greywacke
4WM Greywacke Marker Unit
4WQ Greywacke + Quartz veining
FLT Fault
LC Lost Core
OVB Overburden
QV Quartz Vein
TEXT BANDS Class
PAT
PAG1
PAG2
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 293303 m 5007025 m
EXTENTS 248.9 m 155.9 m
SECTION TOP, BOT 5016 m 4860 m
TOLERANCE +/- 25 m
SCALE
(m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N
E
S
W
Anaconda Mining Inc.
Goldboro Project
Section 8500E
Scale 1:750



BR-20-172
BR-20-178
8550 E
293350 E
BL 7000N
5007150 N
5007100 N
5007050 N
5007000 N
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
GB-NM2021-23
GB-NM2021-25
GB-NM2021-11
1100
7000
3000
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code | PAT | LABEL | DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4W Greywacke
4WM Greywacke Marker Unit
4WQ Greywacke + Quartz veining
FLT Fault
LC Lost Core
OVB Overburden
QV Quartz Vein
TEXT BANDS Class | PAT
PAG1
NPAG
ASSAYS As (µg/g) | L/R R | TEXT 1000
POSTED TEXT Sample ID | L/R L | TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 293353 m 5007075 m
EXTENTS 248.9 m 143.9 m
SECTION TOP, BOT 5014 m 4871 m
TOLERANCE +/- 25 m
SCALE (m)
AZIMUTH = 180°
Anaconda Mining Inc.
Goldboro Project
Section 8550E
Scale 1:750


BR-20-179
BR-20-183
BR-20-219
BR-20-174
BR-20-176
8600 E
BL 7000N
293400 E
5007150 N
5007100 N
5007050 N
5007000 N
5006950 N
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
GB-2020-094
210
GB-2020-104
1700
GB-NM2021-26
2600
GB-2020-095
34
GB-NM2021-24
770
GB-NM2021-34
140
GB-NM2021-20
900
GB-2020-102
130
GB-NM2021-27
1700
GB-2020-096
23
GB-NM2021-19
370
GB-2020-105
59
GB-2020-100
160
GB-2020-103
26
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4SI Siltstone
4W Greywacke
4WQ Greywacke + Quartz veining
Bre Breccia
FLT Fault
OVB Overburden
QV Quartz Vein
TEXT BANDS Class
PAG1
PAG2
NPAG
ASSAYS As (µg/g) L/R R TEXT 1000
POSTED TEXT Sample ID L/R L TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 293403 m 5007050 m
EXTENTS 248.9 m 143.9 m
SECTION TOP, BOT 5014 m 4871 m
TOLERANCE +/- 25 m
SCALE (m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 8600E
Scale 1:750


BR-20-145
BR-17-01
8650 E
BL 7000N
BR-20-152 BR-20-156
293450 E
5007150 N
5007100 N
5007050 N
5007000 N
5006950 N
5006900 N
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
4860 RL
4840 RL
GB-2020-089
GB-2020-090
GB-2020-091
GB-NM2021-19
GB-NM2021-18
GB-LX2021-25
GB-LX2021-26
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4SI Siltstone
4W Greywacke
4WQ Greywacke + Quartz veining
FLT Fault
OVB Overburden
QV Quartz Vein
VOID
TEXT BANDS Class
PAG1
PAG2
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 293450 m 5007025 m
EXTENTS 331.8 m 191.8 m
SECTION TOP, BOT 5019 m 4827 m
TOLERANCE +/- 25 m
SCALE (m)
-5 0 5 10 15 20 25 30
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 8650E
Scale 1:1000




Anaconda Mining

## Plan Map Legend

- Drill Collar and Trace with Geochem Sample
- Other Drill Collar and Trace
- 8300E GB Local Grid

## Section Legend

TOPOGRAPHY

- Mineralized Belt
- Pit Shell
- Bedrock Topography
- Overburden Topography

| ROCK CODES code | LABEL | DESCRIPTION |
|---|---|---|
| | 4A | Argillite |
| | 4AQ | Argillite + Quartz veining |
| | 4SA | Sandstone |
| | 4SH | Shale |
| | 4SI | Siltstone |
| | 4W | Greywacke |
| | 4WM | Greywacke Marker Unit |
| | 4WQ | Greywacke + Quartz veining |
| | Bre | Breccia |
| | FLT | Fault |
| | OVB | Overburden |
| | QV | Quartz Vein |
| | VOID | |

| TEXT BANDS Class | PAT |
|---|---|
| | PAG1 |
| | PAG2 |
| | NPAG |

| ASSAYS | L/R | TEXT |
|---|---|---|
| As (µg/g) | R | **1000** |

| POSTED TEXT | L/R | TEXT |
|---|---|---|
| Sample ID | L | GBO-2020-01 |

### SECTION SPECS:

| | | |
|---|---|---|
| REF. PT. E, N | 293503 m | 5007025 m |
| EXTENTS | 248.9 m | 143.9 m |
| SECTION TOP, BOT | 5014 m | 4871 m |
| TOLERANCE +/- | 25 m | |

SCALE (m): -5 0 5 10 15 20 25

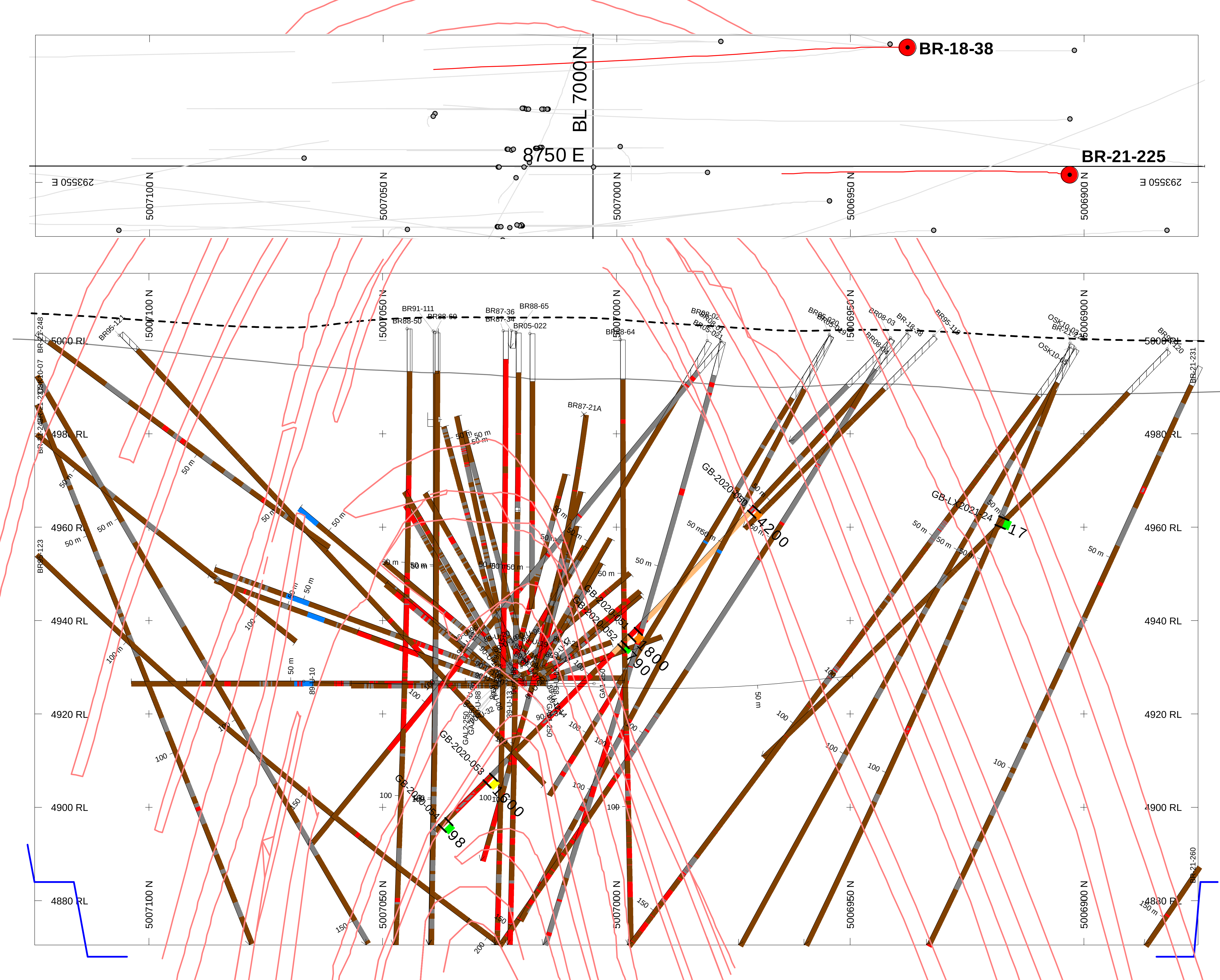
AZIMUTH = 180°

Anaconda Mining Inc.

Goldboro Project

Section 8700E

Scale 1:750




Anaconda Mining

**Plan Map Legend**

- Drill Collar and Trace with Geochem Sample
- Other Drill Collar and Trace
- GB Local Grid

**Section Legend**

TOPOGRAPHY

- Mineralized Belt
- Pit Shell
- Bedrock Topography
- Overburden Topography

| ROCK CODES code | PAT | LABEL | DESCRIPTION |
|---|---|---|---|
| | | 4A | Argillite |
| | | 4AQ | Argillite + Quartz veining |
| | | 4SA | Sandstone |
| | | 4SH | Shale |
| | | 4SI | Siltstone |
| | | 4W | Greywacke |
| | | 4WM | Greywacke Marker Unit |
| | | 4WQ | Greywacke + Quartz veining |
| | | FLT | Fault |
| | | LC | Lost Core |
| | | OVB | Overburden |
| | | QV | Quartz Vein |
| | | VOID | |

| TEXT BANDS Class | PAT | |
|---|---|---|
| | | PAG1 |
| | | PAG2 |
| | | NPAG |

| | L/R | TEXT |
|---|---|---|
| ASSAYS As (µg/g) | R | 1000 |
| POSTED TEXT Sample ID | L | GBO-2020-01 |

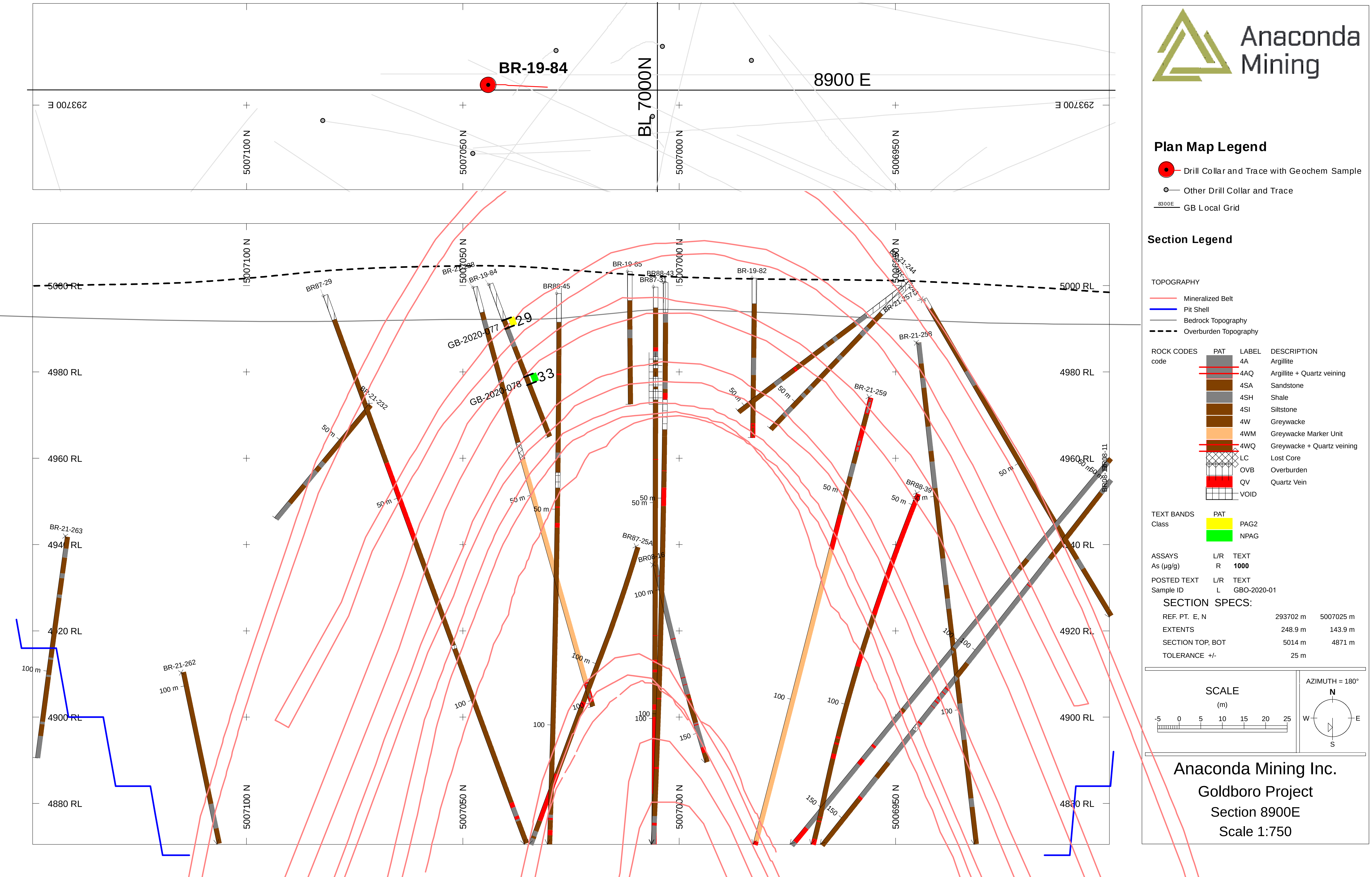
SECTION SPECS:

| | | |
|---|---|---|
| REF. PT. E, N | 293560 m | 5007000 m |
| EXTENTS | 248.9 m | 143.9 m |
| SECTION TOP, BOT | 5014 m | 4871 m |
| TOLERANCE +/- | 25 m | |

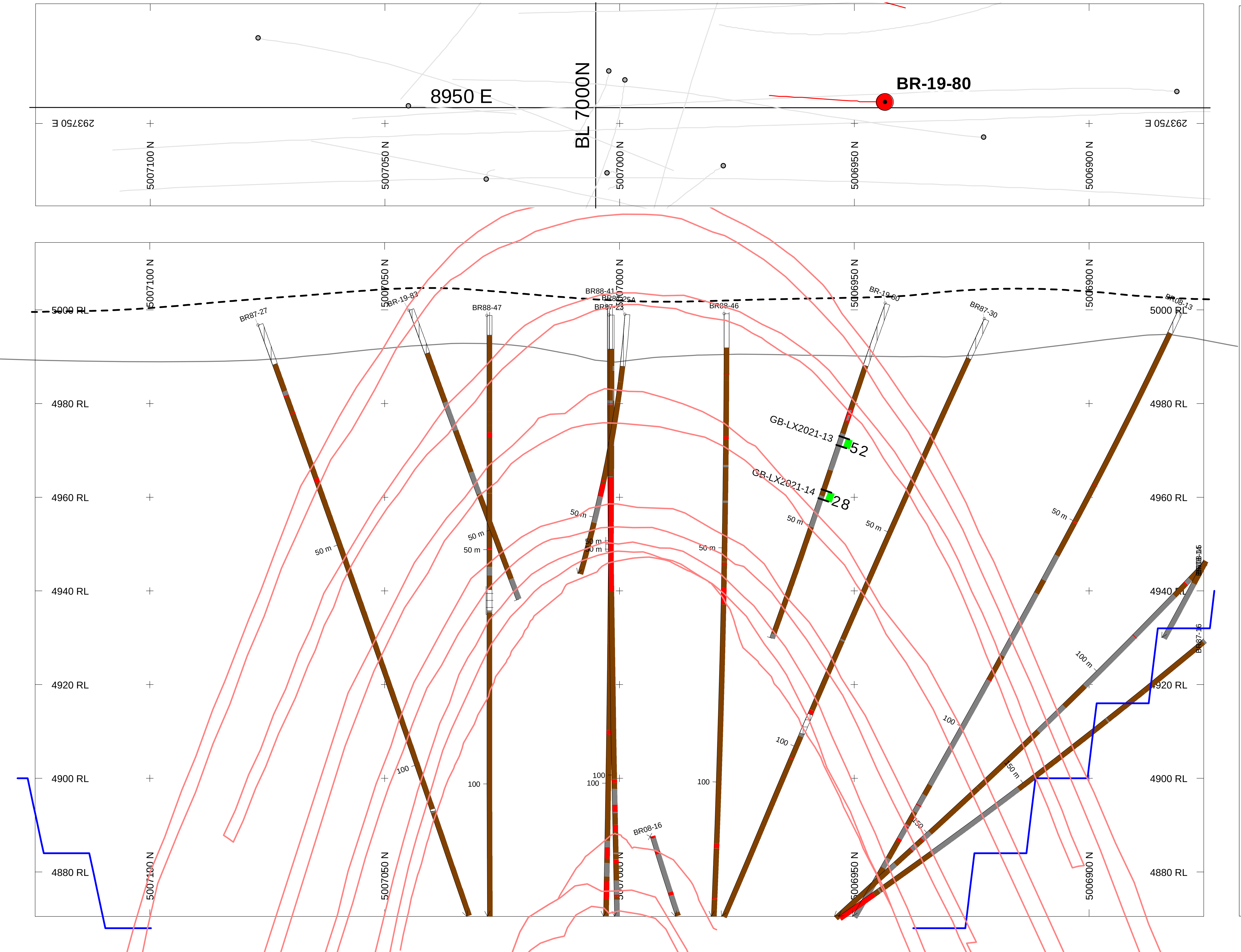
SCALE (m) -5 0 5 10 15 20 25

AZIMUTH = 180°
N W E S

Anaconda Mining Inc.
Goldboro Project
Section 8750E
Scale 1:750



BR-19-84
8900 E
BL 7000N
293700 E
5007100 N
5007050 N
5007000 N
5006950 N
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
GB-2020-077
29
GB-2020-078
33
BR87-29
BR-21-232
BR-21-263
BR-21-262
BR-19-84
BR88-45
BR-19-85
BR88-43
BR87-31
BR-19-82
BR87-25A
BR08-16
BR-21-244
BR-21-257
BR-21-258
BR-21-259
BR88-39
BR08-11
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4SI Siltstone
4W Greywacke
4WM Greywacke Marker Unit
4WQ Greywacke + Quartz veining
LC Lost Core
OVB Overburden
QV Quartz Vein
VOID
TEXT BANDS Class
PAT
PAG2
NPAG
ASSAYS As (µg/g) L/R R TEXT 1000
POSTED TEXT Sample ID L/R L TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 293702 m 5007025 m
EXTENTS 248.9 m 143.9 m
SECTION TOP, BOT 5014 m 4871 m
TOLERANCE +/- 25 m
SCALE (m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 8900E
Scale 1:750




Anaconda Mining

**Plan Map Legend**

Drill Collar and Trace with Geochem Sample

Other Drill Collar and Trace

GB Local Grid

**Section Legend**

TOPOGRAPHY

Mineralized Belt

Pit Shell

Bedrock Topography

Overburden Topography

| ROCK CODES code | PAT | LABEL | DESCRIPTION |
|---|---|---|---|
| | | 4A | Argillite |
| | | 4AQ | Argillite + Quartz veining |
| | | 4SA | Sandstone |
| | | 4SH | Shale |
| | | 4SI | Siltstone |
| | | 4W | Greywacke |
| | | 4WM | Greywacke Marker Unit |
| | | OVB | Overburden |
| | | QV | Quartz Vein |
| | | VOID | |

| TEXT BANDS Class | PAT | |
|---|---|---|
| | | NPAG |

| ASSAYS | L/R | TEXT |
|---|---|---|
| As (µg/g) | R | **1000** |

| POSTED TEXT | L/R | TEXT |
|---|---|---|
| Sample ID | L | GBO-2020-01 |

SECTION SPECS:

| | | |
|---|---|---|
| REF. PT. E, N | 293754 m | 5007000 m |
| EXTENTS | 248.9 m | 143.9 m |
| SECTION TOP, BOT | 5014 m | 4871 m |
| TOLERANCE +/- | 25 m | |

SCALE (m)

-5 0 5 10 15 20 25

AZIMUTH = 180°

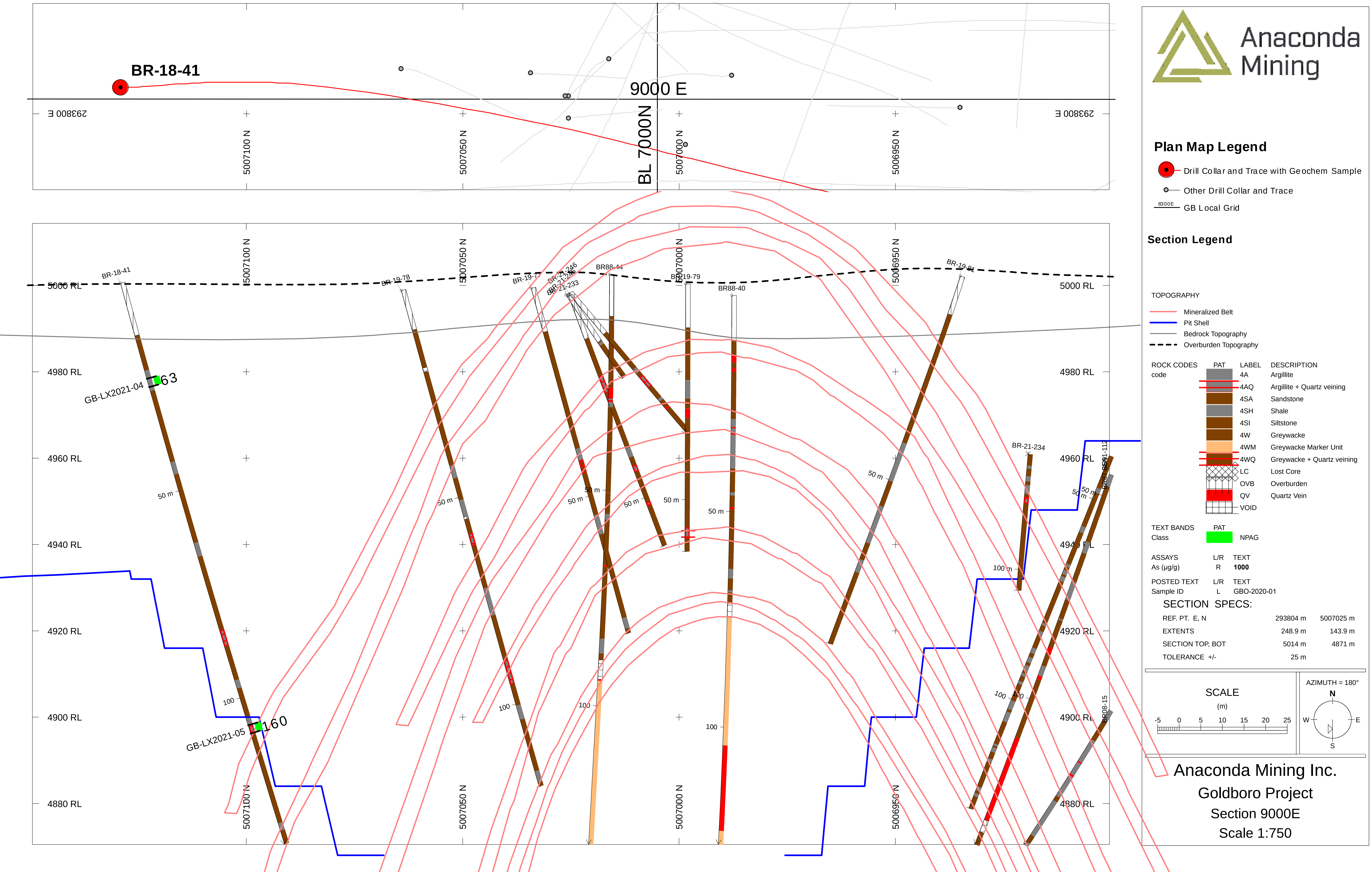
N W E S

Anaconda Mining Inc.

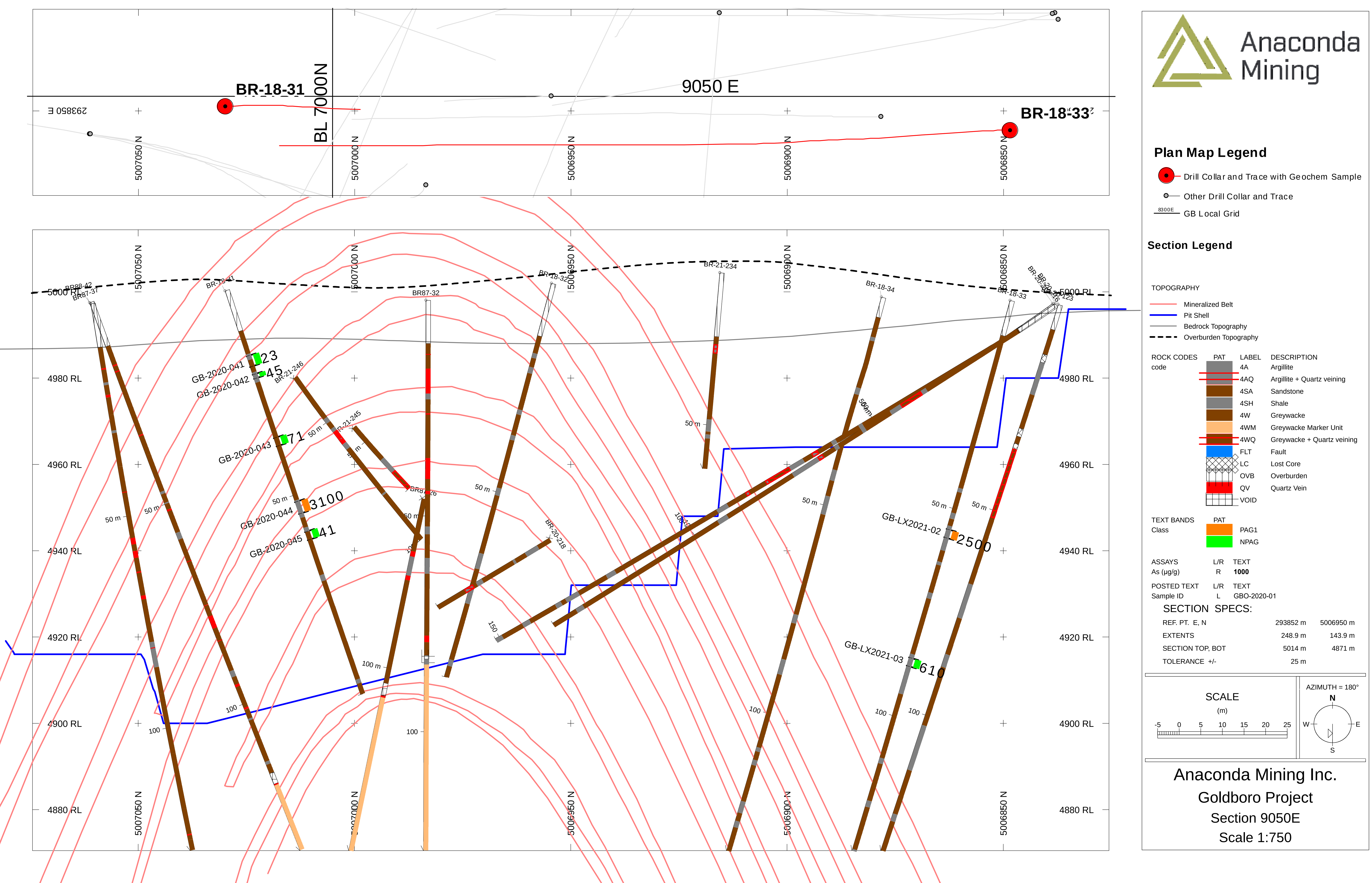
Goldboro Project

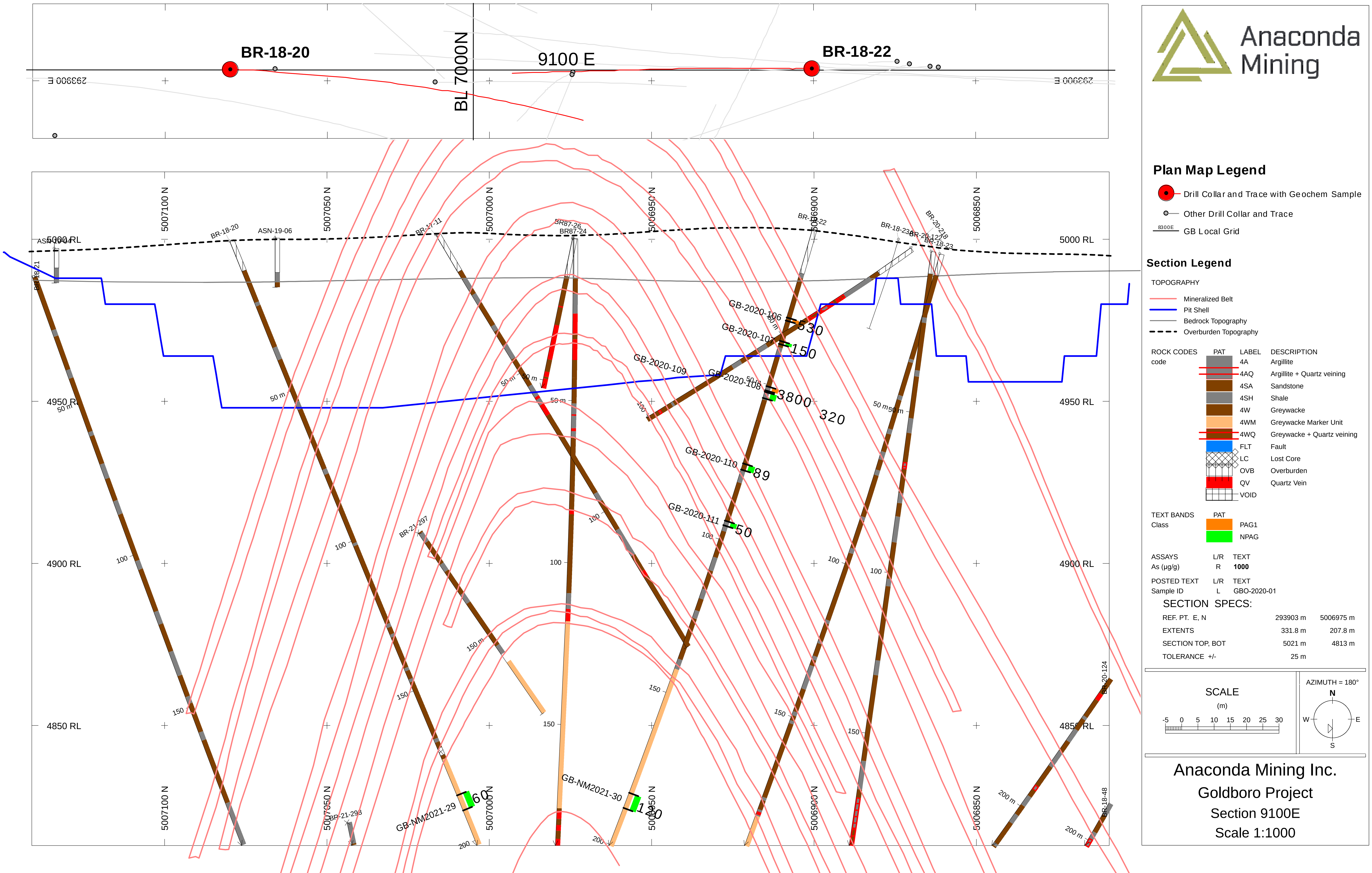
Section 8950E

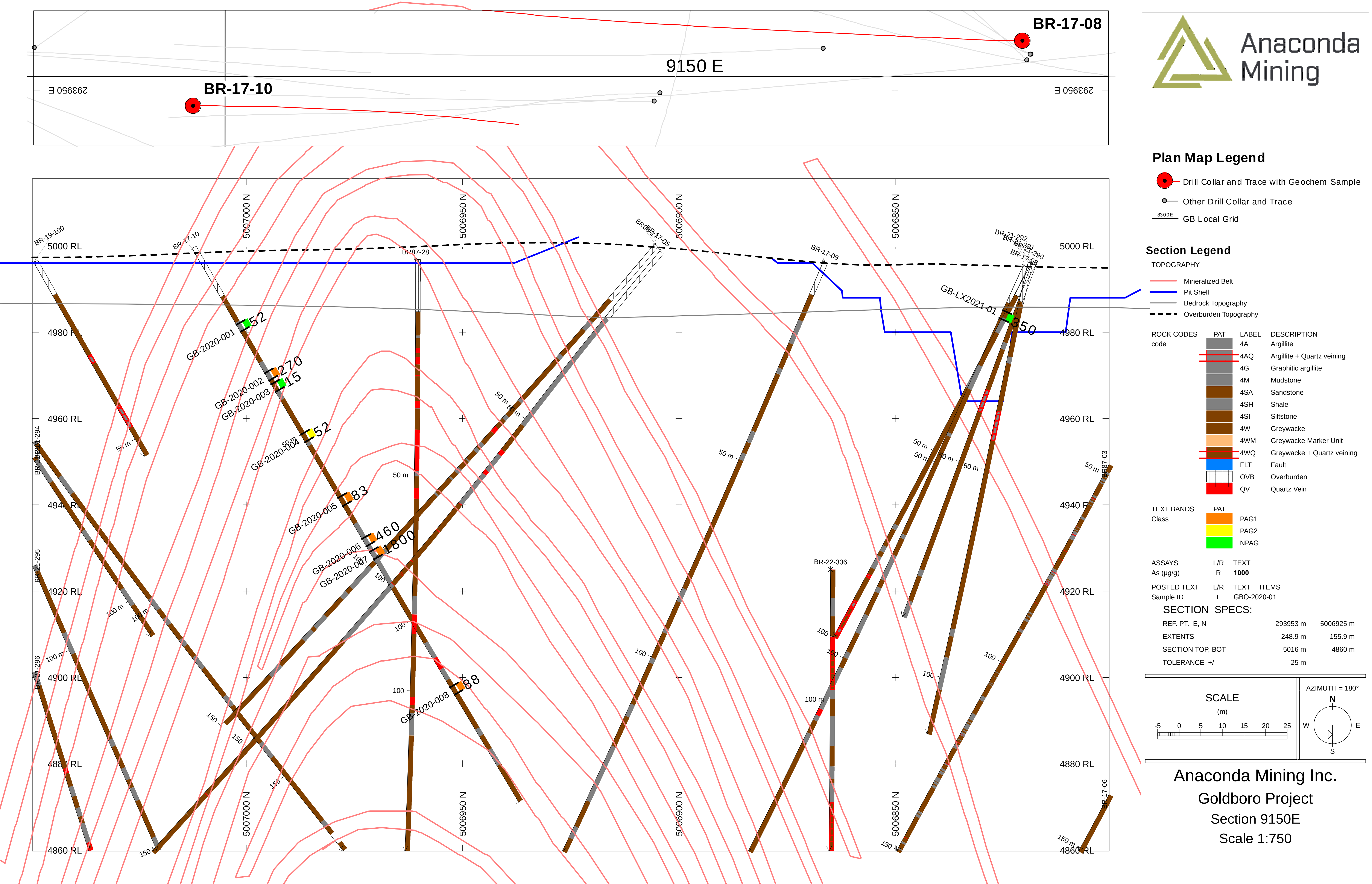
Scale 1:750



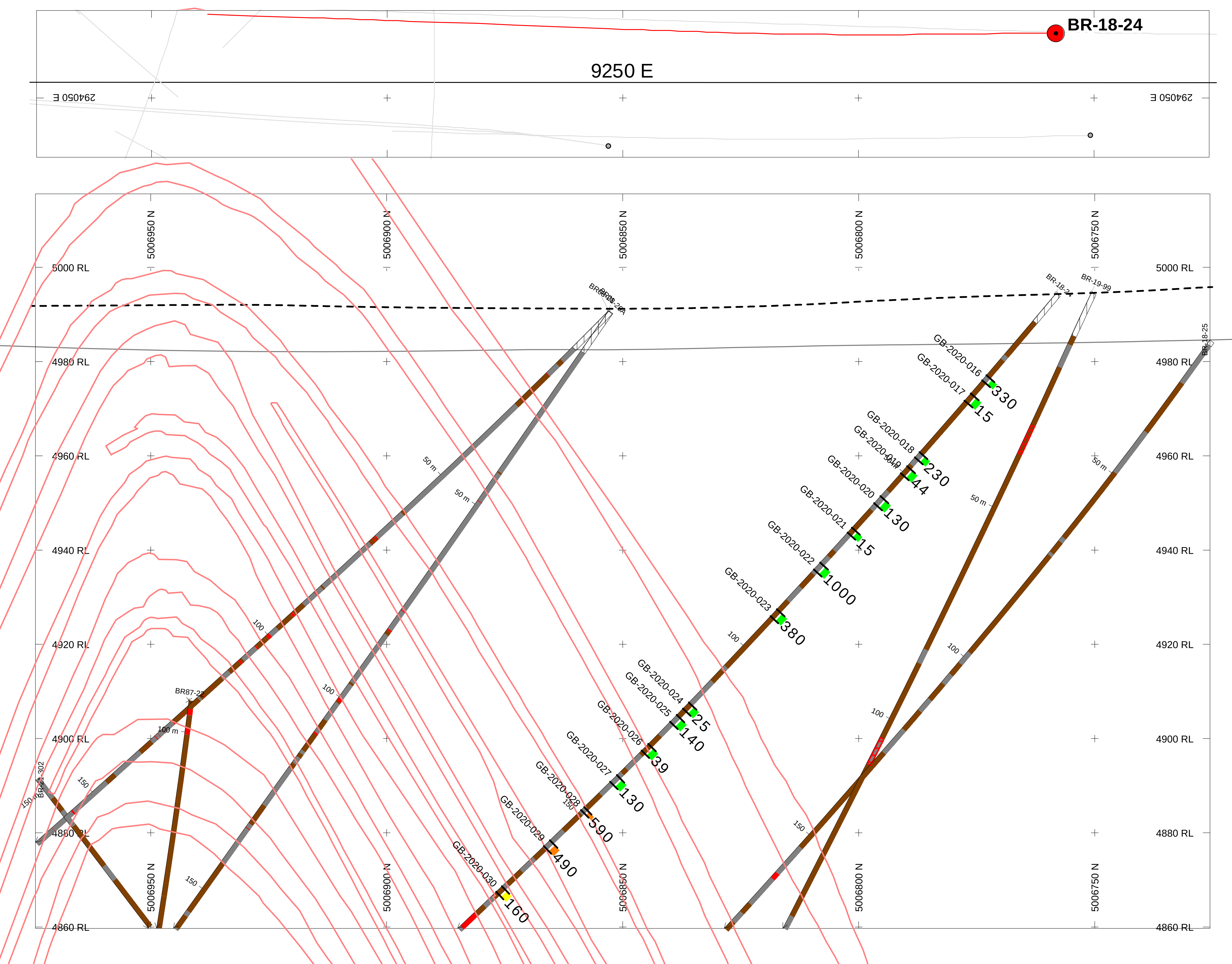

Anaconda Mining Inc.
Goldboro Project
Section 9000E
Scale 1:750


Anaconda Mining
BR-18-31
BL 7000N
9050 E
BR-18-33
293850 E
5007050 N
5007000 N
5006950 N
5006900 N
5006850 N
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4W Greywacke
4WM Greywacke Marker Unit
4WQ Greywacke + Quartz veining
FLT Fault
LC Lost Core
OVB Overburden
QV Quartz Vein
VOID
TEXT BANDS Class
PAG1
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 293852 m 5006950 m
EXTENTS 248.9 m 143.9 m
SECTION TOP, BOT 5014 m 4871 m
TOLERANCE +/- 25 m
SCALE (m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 9050E
Scale 1:750
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
BR88-42
BR87-37
BR-18-31
BR87-32
BR-18-32
BR-21-234
BR-18-34
BR-18-33
BR-21-246
BR-21-245
BR87-26
BR-20-218
GB-2020-041
GB-2020-042
GB-2020-043
GB-2020-044
GB-2020-045
GB-LX2021-02
GB-LX2021-03
23
45
71
3100
41
2500
610
50 m
100 m
100
150


BR-18-20
BR-18-22
9100 E
BL 7000N
293900 E
5000 RL
4950 RL
4900 RL
4850 RL
5007100 N
5007050 N
5007000 N
5006950 N
5006900 N
5006850 N
GB-2020-106
530
GB-2020-107
150
GB-2020-109
GB-2020-108
3800
320
GB-2020-110
89
GB-2020-111
50
GB-NM2021-29
60
GB-NM2021-30
140
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4W Greywacke
4WM Greywacke Marker Unit
4WQ Greywacke + Quartz veining
FLT Fault
LC Lost Core
OVB Overburden
QV Quartz Vein
VOID
TEXT BANDS Class
PAG1
NPAG
ASSAYS As (µg/g) L/R R TEXT 1000
POSTED TEXT Sample ID L/R L TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 293903 m 5006975 m
EXTENTS 331.8 m 207.8 m
SECTION TOP, BOT 5021 m 4813 m
TOLERANCE +/- 25 m
SCALE (m)
AZIMUTH = 180°
Anaconda Mining Inc.
Goldboro Project
Section 9100E
Scale 1:1000



BR-17-08
BR-17-10
9150 E
293950 E
5007000 N
5006950 N
5006900 N
5006850 N
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
4860 RL
BR-19-100
BR87-28
BR-17-09
BR-22-336
GB-LX2021-01
GB-2020-001
GB-2020-002
GB-2020-003
GB-2020-004
GB-2020-005
GB-2020-006
GB-2020-007
GB-2020-008
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4G Graphitic argillite
4M Mudstone
4SA Sandstone
4SH Shale
4SI Siltstone
4W Greywacke
4WM Greywacke Marker Unit
4WQ Greywacke + Quartz veining
FLT Fault
OVB Overburden
QV Quartz Vein
TEXT BANDS Class
PAG1
PAG2
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT ITEMS GBO-2020-01
SECTION SPECS:
REF. PT. E, N 293953 m 5006925 m
EXTENTS 248.9 m 155.9 m
SECTION TOP, BOT 5016 m 4860 m
TOLERANCE +/- 25 m
SCALE (m)
AZIMUTH = 180°
Anaconda Mining Inc.
Goldboro Project
Section 9150E
Scale 1:750




Anaconda Mining

## Plan Map Legend

- Drill Collar and Trace with Geochem Sample
- Other Drill Collar and Trace
- GB Local Grid

## Section Legend

TOPOGRAPHY

- Mineralized Belt
- Pit Shell
- Bedrock Topography
- Overburden Topography

| ROCK CODES code | PAT | LABEL | DESCRIPTION |
|---|---|---|---|
| | | 4A | Argillite |
| | | 4AQ | Argillite + Quartz veining |
| | | 4G | Graphitic argillite |
| | | 4SA | Sandstone |
| | | 4SH | Shale |
| | | 4SI | Siltstone |
| | | 4W | Greywacke |
| | | 4WM | Greywacke Marker Unit |
| | | 4WQ | Greywacke + Quartz veining |
| | | LC | Lost Core |
| | | OVB | Overburden |
| | | QV | Quartz Vein |

| TEXT BANDS Class | PAT | |
|---|---|---|
| | | PAG1 |
| | | PAG2 |
| | | NPAG |

| | L/R | TEXT |
|---|---|---|
| ASSAYS As (µg/g) | R | **1000** |
| POSTED TEXT Sample ID | L | GBO-2020-01 |

SECTION SPECS:

| | | |
|---|---|---|
| REF. PT. E, N | 294053 m | 5006850 m |
| EXTENTS | 248.9 m | 155.9 m |
| SECTION TOP, BOT | 5016 m | 4860 m |
| TOLERANCE +/- | 25 m | |

SCALE (m)

-5 0 5 10 15 20 25

AZIMUTH = 180°

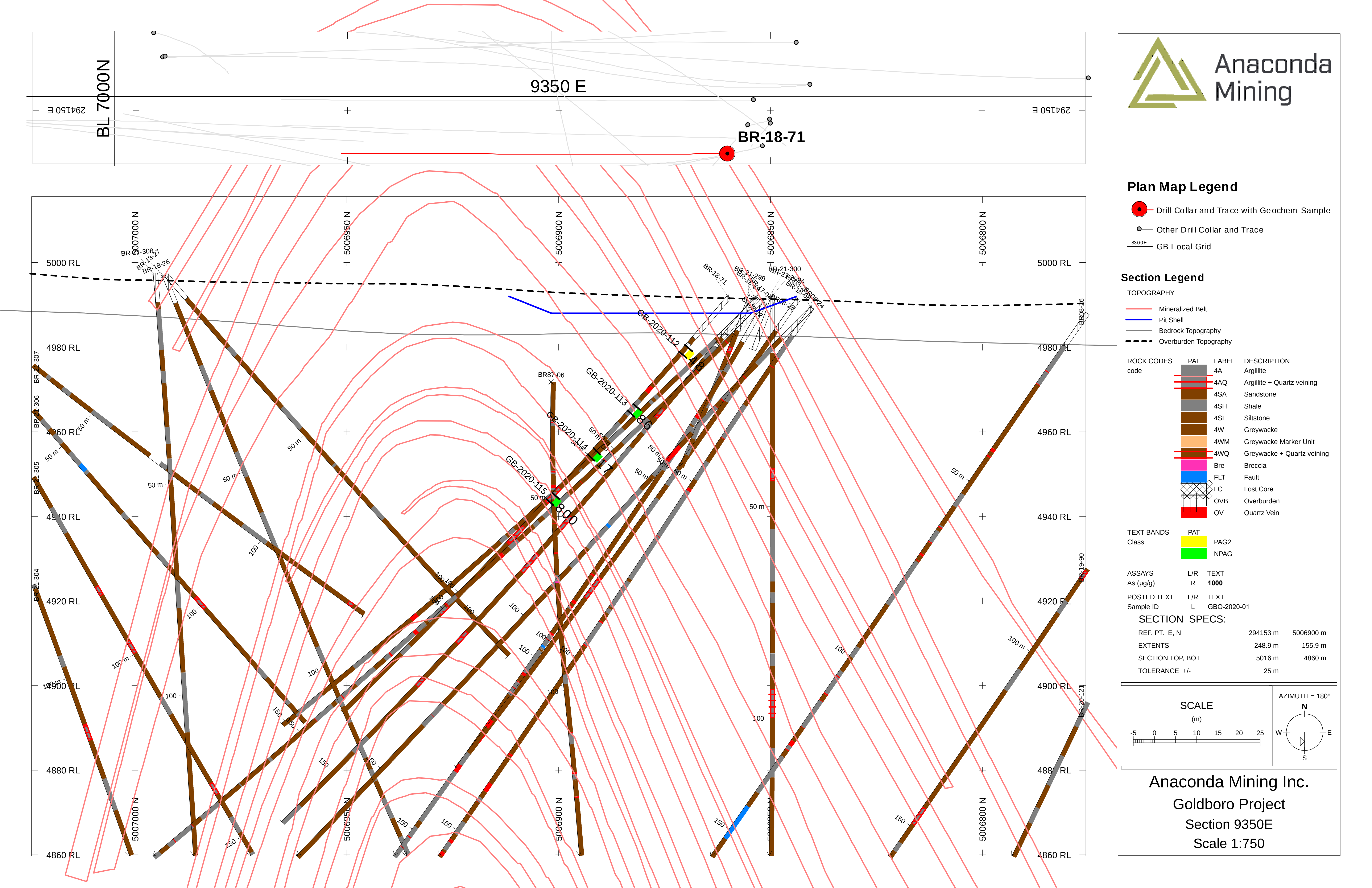
N E S W

Anaconda Mining Inc.

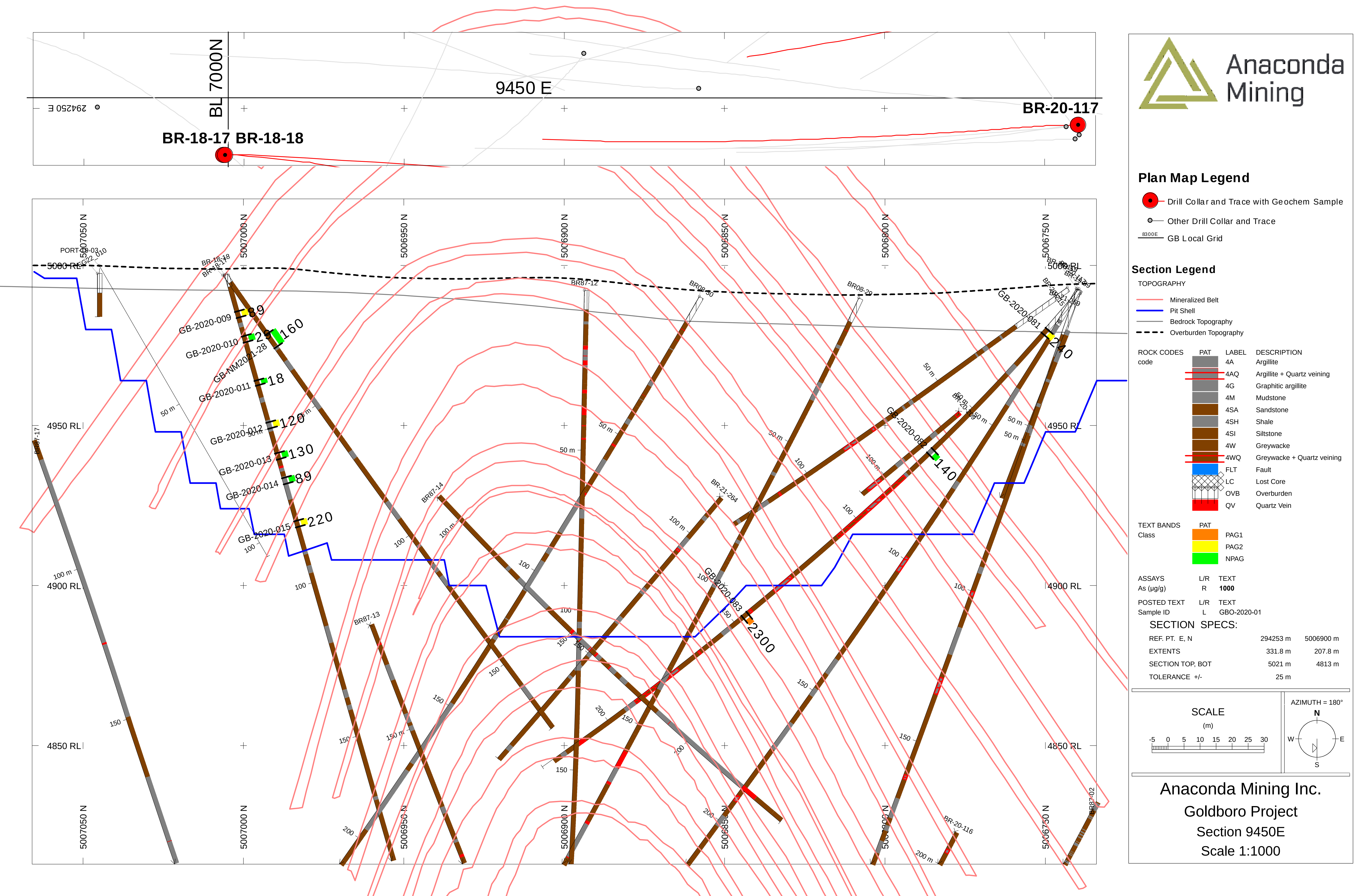
Goldboro Project

Section 9250E

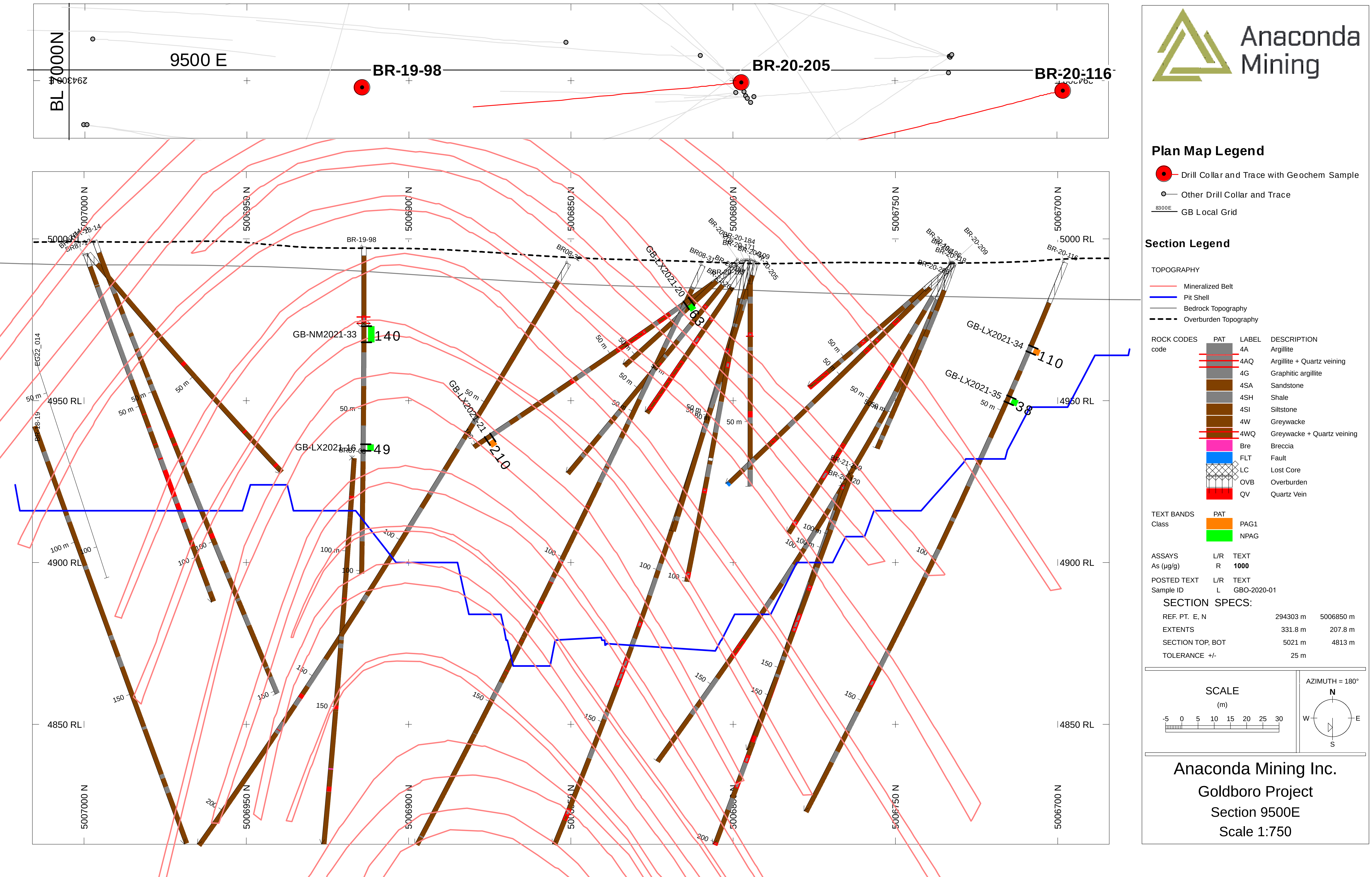
Scale 1:750



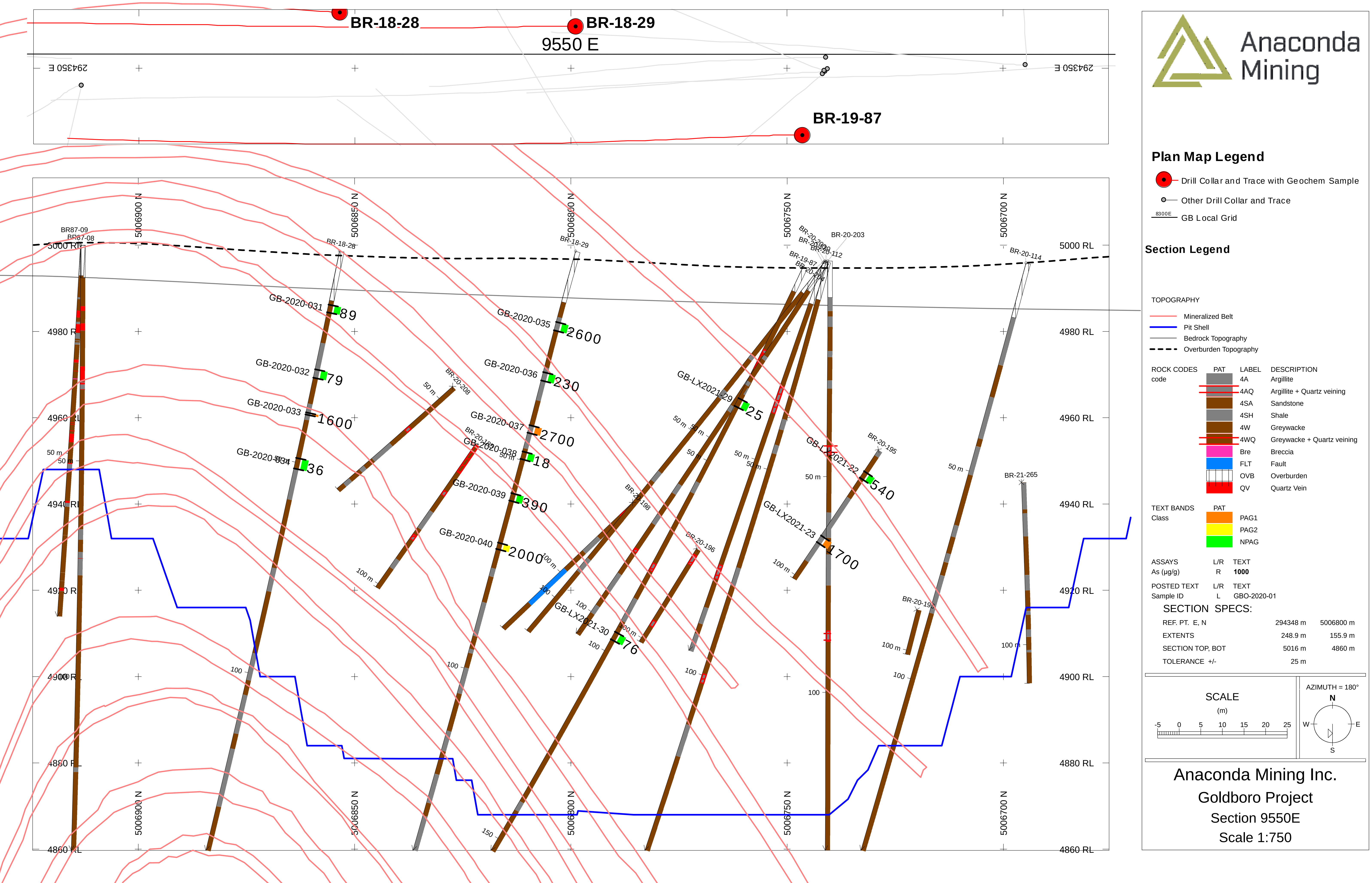
9350 E
BL 7000N
294150 E
BR-18-71
5007000 N
5006950 N
5006900 N
5006850 N
5006800 N
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
4860 RL
GB-2020-112
GB-2020-113
GB-2020-114
GB-2020-115
BR87-06
BR-21-308
BR-18-27
BR-18-26
BR-21-307
BR-21-306
BR-21-305
BR-21-304
BR-21-300
BR-21-299
BR08-16
BR-19-90
BR-20-121
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4SI Siltstone
4W Greywacke
4WM Greywacke Marker Unit
4WQ Greywacke + Quartz veining
Bre Breccia
FLT Fault
LC Lost Core
OVB Overburden
QV Quartz Vein
TEXT BANDS Class
PAT
PAG2
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 294153 m 5006900 m
EXTENTS 248.9 m 155.9 m
SECTION TOP, BOT 5016 m 4860 m
TOLERANCE +/- 25 m
SCALE
(m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 9350E
Scale 1:750

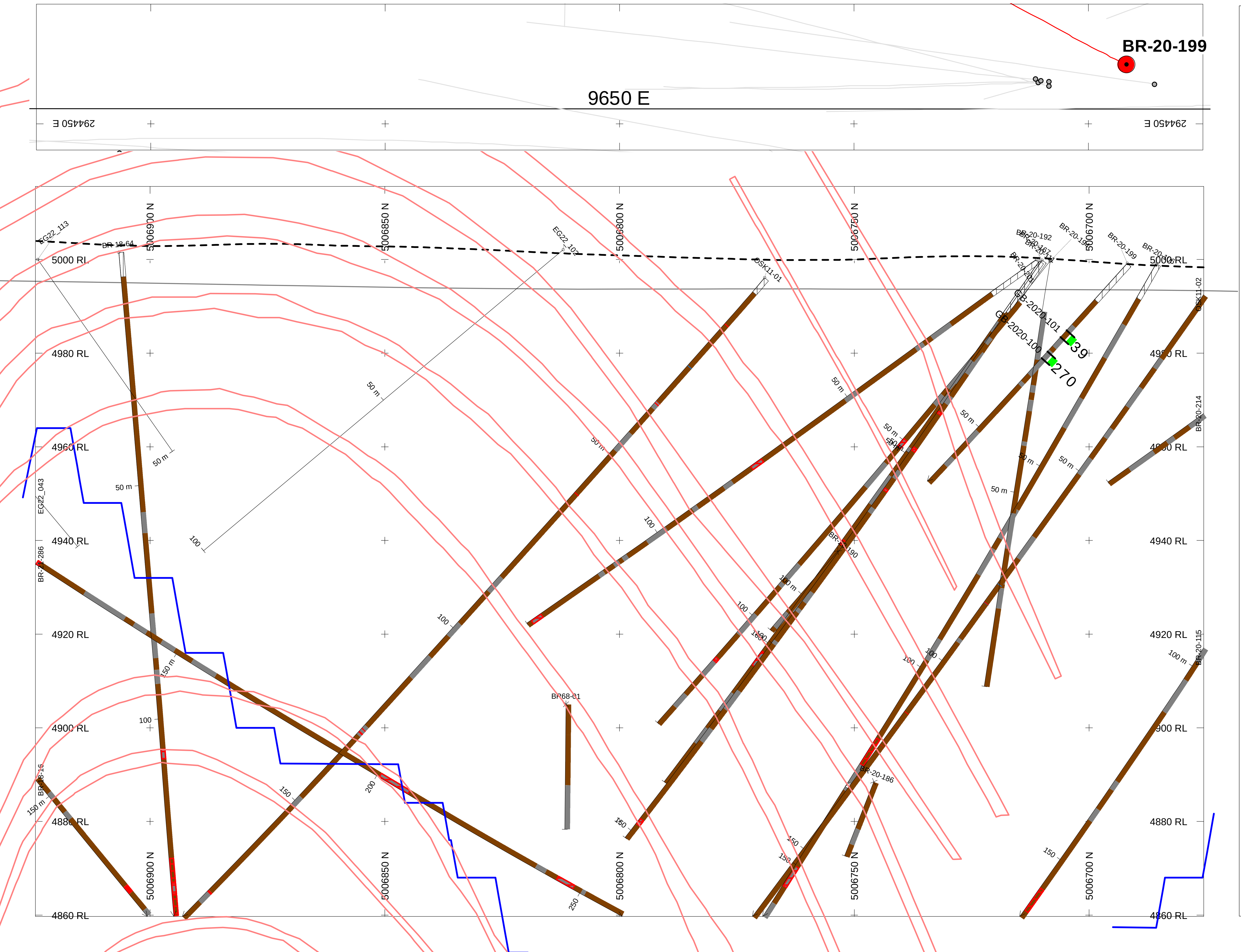


BL 7000N
9450 E
29425O E
BR-18-17 BR-18-18
BR-20-117
5007050 N
5007000 N
5006950 N
5006900 N
5006850 N
5006800 N
5006750 N
5000 RL
4950 RL
4900 RL
4850 RL
PORT-19-03
BR-18-18
BR-18-17
BR87-12
BR08-30
BR08-29
BR87-17
BR87-14
BR87-13
BR-21-264
BR-20-116
BR87-02
GB-2020-009
GB-2020-010
GB-NM2021-28
GB-2020-011
GB-2020-012
GB-2020-013
GB-2020-014
GB-2020-015
GB-2020-081
GB-2020-082
GB-2020-083
89
29
160
18
120
130
89
220
240
140
2300
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4G Graphitic argillite
4M Mudstone
4SA Sandstone
4SH Shale
4SI Siltstone
4W Greywacke
4WQ Greywacke + Quartz veining
FLT Fault
LC Lost Core
OVB Overburden
QV Quartz Vein
TEXT BANDS Class
PAT
PAG1
PAG2
NPAG
ASSAYS As (µg/g) L/R R TEXT 1000
POSTED TEXT Sample ID L/R L TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 294253 m 5006900 m
EXTENTS 331.8 m 207.8 m
SECTION TOP, BOT 5021 m 4813 m
TOLERANCE +/- 25 m
SCALE (m)
-5 0 5 10 15 20 25 30
AZIMUTH = 180°
N
E
S
W
Anaconda Mining Inc.
Goldboro Project
Section 9450E
Scale 1:1000



BL 7000N
9500 E
BR-19-98
BR-20-205
BR-20-116
GB-NM2021-33
140
GB-LX2021-16
49
GB-LX2021-21
210
GB-LX2021-20
63
GB-LX2021-34
110
GB-LX2021-35
38
5000 RL
4950 RL
4900 RL
4850 RL
5007000 N
5006950 N
5006900 N
5006850 N
5006800 N
5006750 N
5006700 N
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4G Graphitic argillite
4SA Sandstone
4SH Shale
4SI Siltstone
4W Greywacke
4WQ Greywacke + Quartz veining
Bre Breccia
FLT Fault
LC Lost Core
OVB Overburden
QV Quartz Vein
TEXT BANDS Class
PAT
PAG1
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 294303 m 5006850 m
EXTENTS 331.8 m 207.8 m
SECTION TOP, BOT 5021 m 4813 m
TOLERANCE +/- 25 m
SCALE
(m)
-5 0 5 10 15 20 25 30
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 9500E
Scale 1:750


BR-18-28
BR-18-29
9550 E
BR-19-87
294350 E
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4W Greywacke
4WQ Greywacke + Quartz veining
Bre Breccia
FLT Fault
OVB Overburden
QV Quartz Vein
TEXT BANDS Class
PAG1
PAG2
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 294348 m 5006800 m
EXTENTS 248.9 m 155.9 m
SECTION TOP, BOT 5016 m 4860 m
TOLERANCE +/- 25 m
SCALE (m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 9550E
Scale 1:750
5006900 N
5006850 N
5006800 N
5006750 N
5006700 N
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
4860 RL
BR87-09
BR87-08
BR-18-28
BR-18-29
BR-20-203
BR-19-87
BR-20-112
BR-20-114
BR-20-208
BR-20-195
BR-20-198
BR-20-196
BR-20-197
BR-21-265
GB-2020-031 89
GB-2020-032 79
GB-2020-033 1600
GB-2020-034 36
GB-2020-035 2600
GB-2020-036 230
GB-2020-037 2700
GB-2020-038 18
GB-2020-039 390
GB-2020-040 2000
GB-LX2021-29 25
GB-LX2021-22 540
GB-LX2021-23 1700
GB-LX2021-30 76
50 m
100 m
100
150




Anaconda Mining

## Plan Map Legend

- Drill Collar and Trace with Geochem Sample
- Other Drill Collar and Trace
- GB Local Grid

## Section Legend

TOPOGRAPHY

- Mineralized Belt
- Pit Shell
- Bedrock Topography
- Overburden Topography

| ROCK CODES code | PAT | LABEL | DESCRIPTION |
|---|---|---|---|
| | | 4A | Argillite |
| | | 4AQ | Argillite + Quartz veining |
| | | 4SA | Sandstone |
| | | 4SH | Shale |
| | | 4W | Greywacke |
| | | 4WM | Greywacke Marker Unit |
| | | 4WQ | Greywacke + Quartz veining |
| | | FLT | Fault |
| | | LC | Lost Core |
| | | OVB | Overburden |
| | | QV | Quartz Vein |

| TEXT BANDS Class | PAT | |
|---|---|---|
| | | NPAG |

| ASSAYS | L/R | TEXT |
|---|---|---|
| As (µg/g) | R | 1000 |

| POSTED TEXT | L/R | TEXT |
|---|---|---|
| Sample ID | L | GB0-2020-01 |

SECTION SPECS:

| | | |
|---|---|---|
| REF. PT. E, N | 294460 m | 5006800 m |
| EXTENTS | 248.9 m | 155.9 m |
| SECTION TOP, BOT | 5016 m | 4860 m |
| TOLERANCE +/- | 25 m | |

SCALE (m) -5 0 5 10 15 20 25

AZIMUTH = 180°

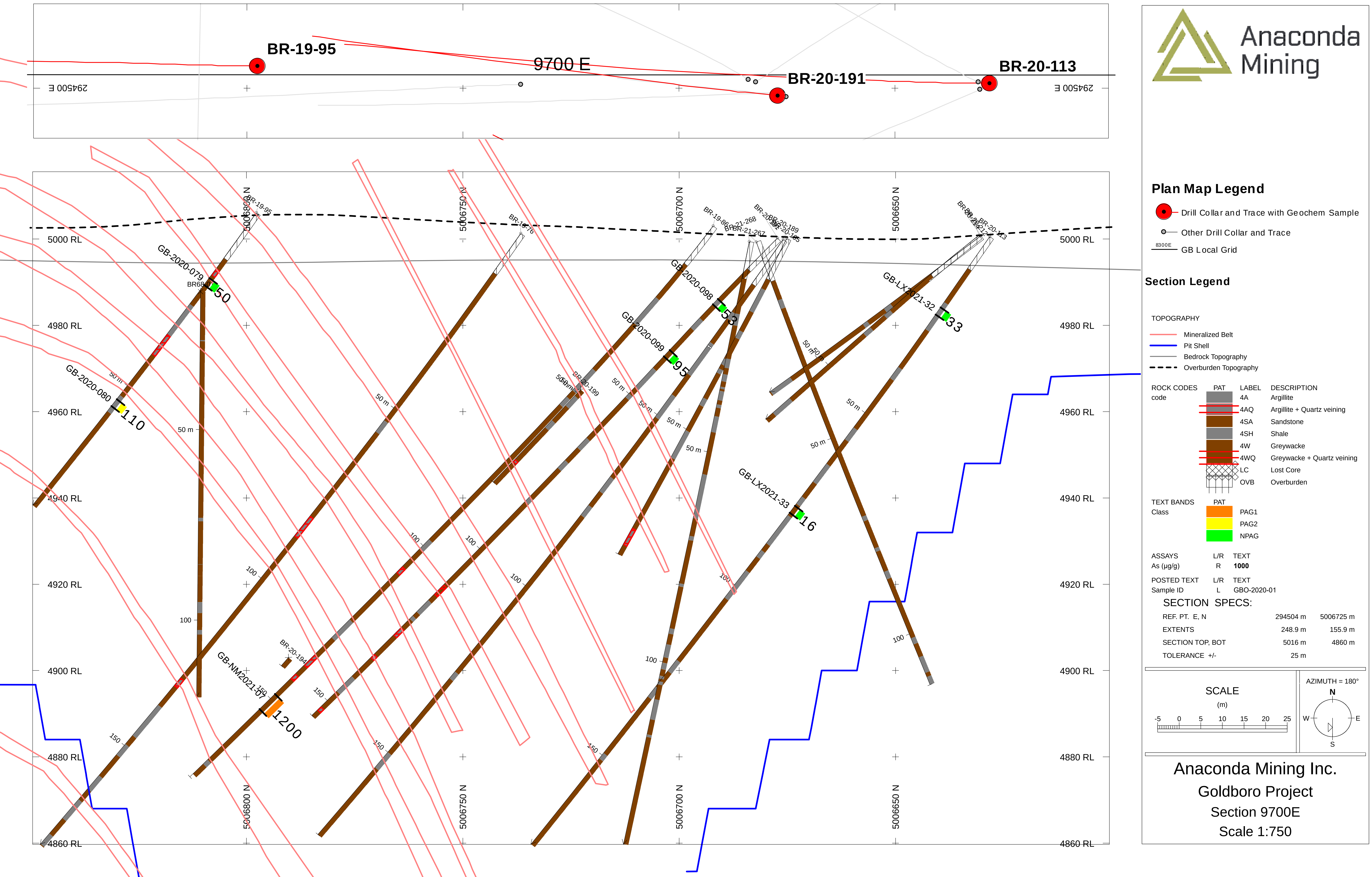
N E S W

Anaconda Mining Inc.

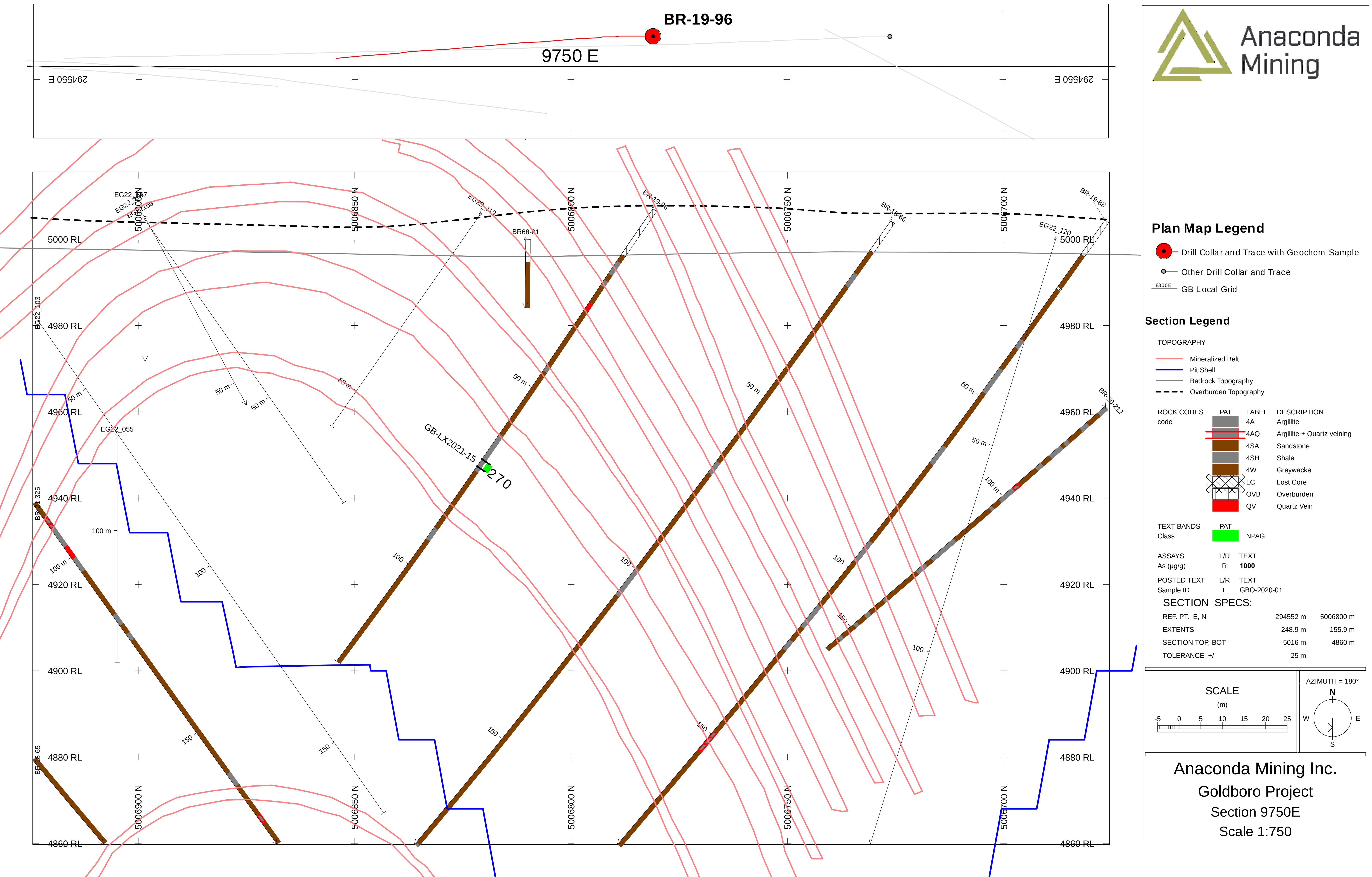
Goldboro Project

Section 9650E

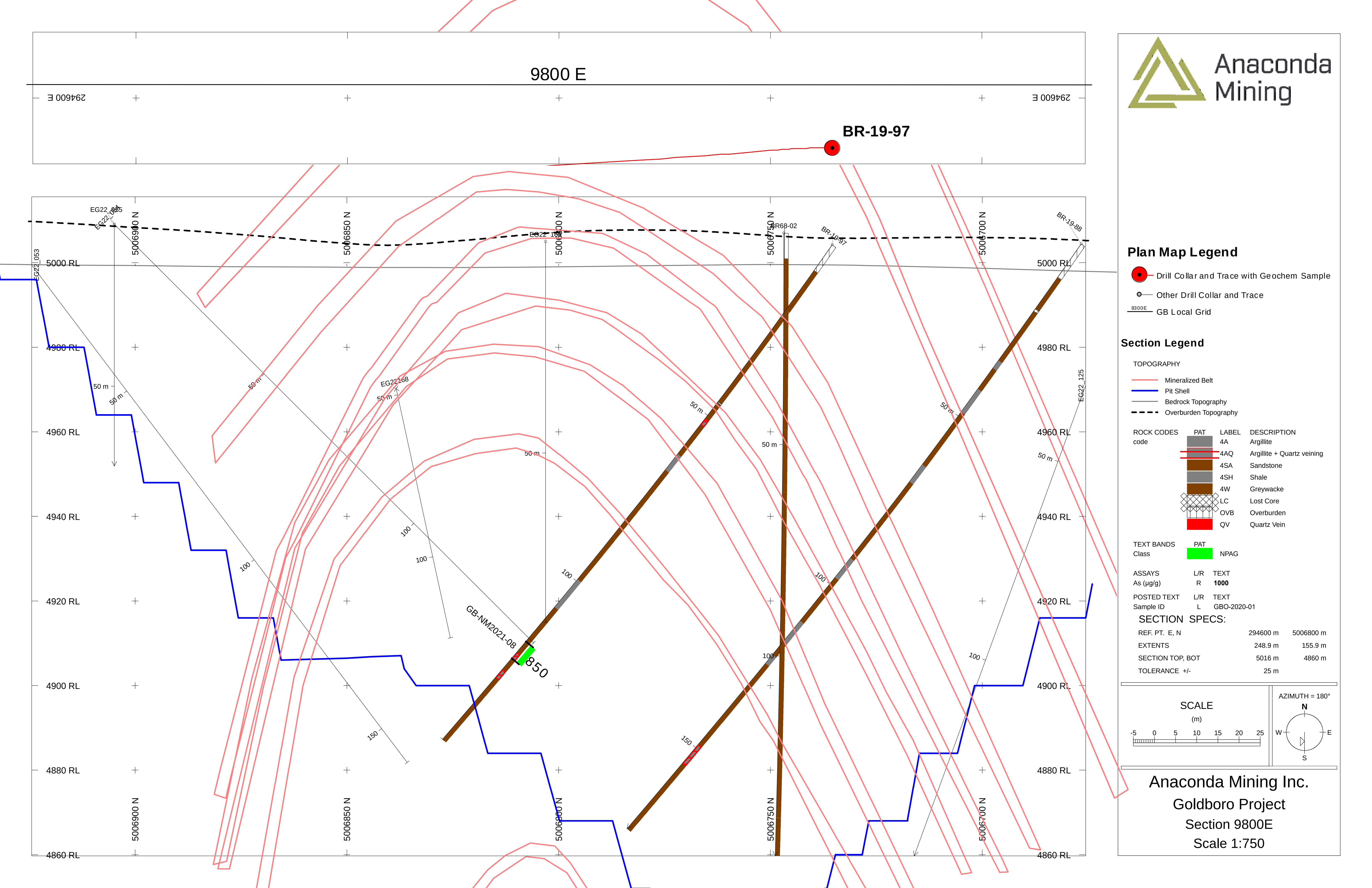
Scale 1:750



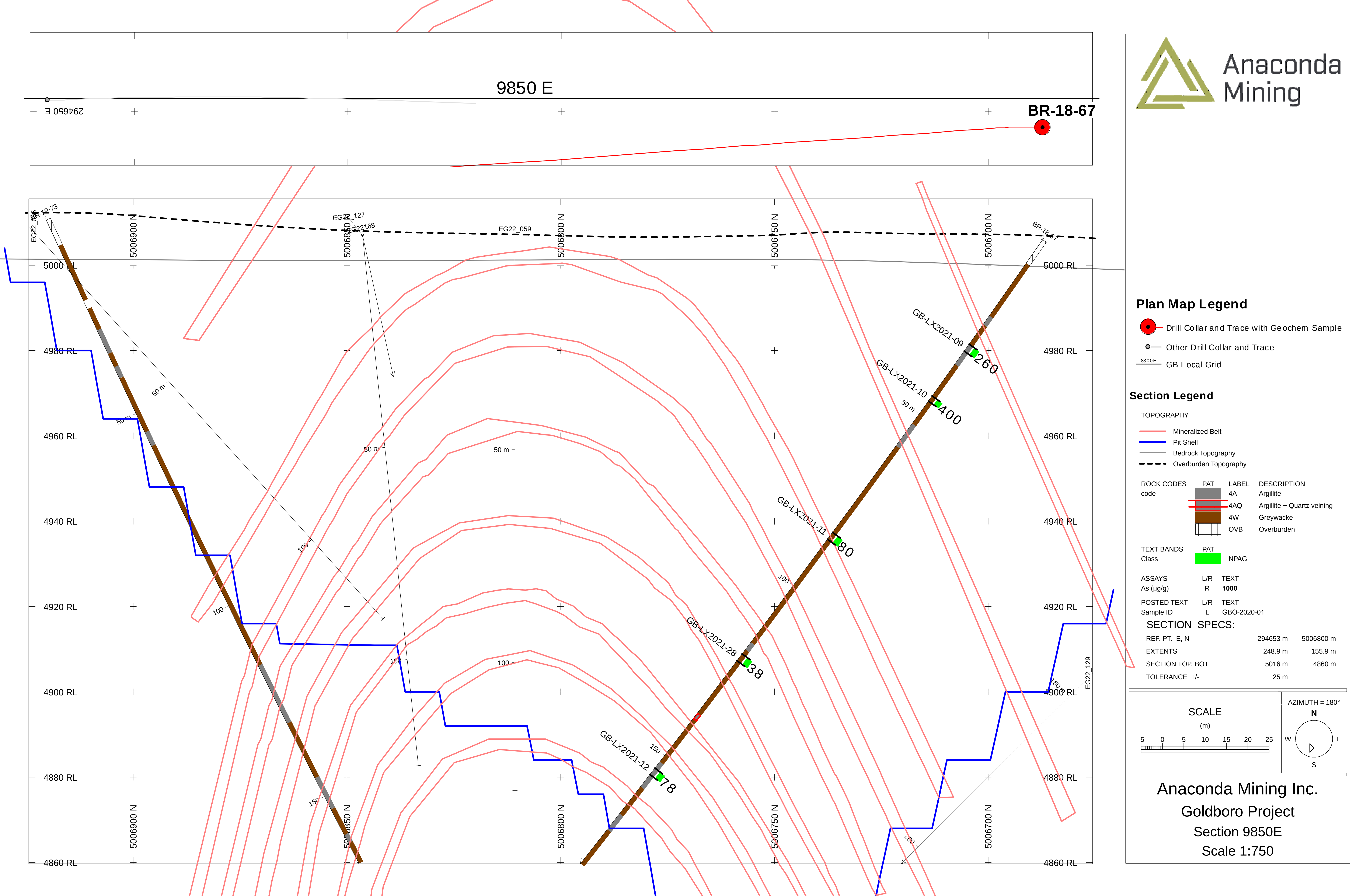
BR-19-95
9700 E
BR-20-191
BR-20-113
294500 E
294500 E
5006800 N
5006750 N
5006700 N
5006650 N
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
4860 RL
GB-2020-079
GB-2020-080
GB-2020-098
GB-2020-099
GB-LX2021-32
GB-LX2021-33
GB-NM2021-07
BR-20-194
BR-20-199
BR-19-76
50
110
53
95
33
16
1200
50 m
100
150
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4W Greywacke
4WQ Greywacke + Quartz veining
LC Lost Core
OVB Overburden
TEXT BANDS Class
PAT
PAG1
PAG2
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 294504 m 5006725 m
EXTENTS 248.9 m 155.9 m
SECTION TOP, BOT 5016 m 4860 m
TOLERANCE +/- 25 m
SCALE
(m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 9700E
Scale 1:750



BR-19-96
9750 E
294550 E
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4W Greywacke
LC Lost Core
OVB Overburden
QV Quartz Vein
TEXT BANDS Class
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 294552 m 5006800 m
EXTENTS 248.9 m 155.9 m
SECTION TOP, BOT 5016 m 4860 m
TOLERANCE +/- 25 m
SCALE (m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N W E S
Anaconda Mining Inc.
Goldboro Project
Section 9750E
Scale 1:750
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
4860 RL
5006900 N
5006850 N
5006800 N
5006750 N
5006700 N
EG22_157
EG22_169
EG22_119
BR68-01
BR-19-96
BR-19-66
BR-19-88
EG22_120
BR-20-212
EG22_103
EG22_055
BR-21-325
BR-18-65
GB-LX2021-15
270
50 m
100 m
100
150



9800 E
294600 E
BR-19-97
GB-NM2021-08
850
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
4860 RL
5006900 N
5006850 N
5006800 N
5006750 N
5006700 N
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4SA Sandstone
4SH Shale
4W Greywacke
LC Lost Core
OVB Overburden
QV Quartz Vein
TEXT BANDS Class
NPAG
ASSAYS As (µg/g)
L/R R
TEXT 1000
POSTED TEXT Sample ID
L/R L
TEXT GBO-2020-01
SECTION SPECS:
REF. PT. E, N 294600 m 5006800 m
EXTENTS 248.9 m 155.9 m
SECTION TOP, BOT 5016 m 4860 m
TOLERANCE +/- 25 m
SCALE
(m)
AZIMUTH = 180°
Anaconda Mining Inc.
Goldboro Project
Section 9800E
Scale 1:750


9850 E
294650 E
BR-18-67
Anaconda Mining
Plan Map Legend
Drill Collar and Trace with Geochem Sample
Other Drill Collar and Trace
GB Local Grid
Section Legend
TOPOGRAPHY
Mineralized Belt
Pit Shell
Bedrock Topography
Overburden Topography
ROCK CODES code
PAT
LABEL
DESCRIPTION
4A Argillite
4AQ Argillite + Quartz veining
4W Greywacke
OVB Overburden
TEXT BANDS Class
NPAG
ASSAYS As (µg/g)
L/R
TEXT
R
1000
POSTED TEXT Sample ID
L
GBO-2020-01
SECTION SPECS:
REF. PT. E, N 294653 m 5006800 m
EXTENTS 248.9 m 155.9 m
SECTION TOP, BOT 5016 m 4860 m
TOLERANCE +/- 25 m
SCALE
(m)
-5 0 5 10 15 20 25
AZIMUTH = 180°
N
W
E
S
Anaconda Mining Inc.
Goldboro Project
Section 9850E
Scale 1:750
5006900 N
5006850 N
5006800 N
5006750 N
5006700 N
5000 RL
4980 RL
4960 RL
4940 RL
4920 RL
4900 RL
4880 RL
4860 RL
BR-19-73
EG22_127
EG22168
EG22_059
EG22_129
GB-LX2021-09
260
GB-LX2021-10
400
GB-LX2021-11
80
GB-LX2021-28
38
GB-LX2021-12
78
50 m
100
150
200

# *Appendix B: Mineralogy*

*Appendix B.1: QEMSCAN Results (Mine Rock)*

*Appendix B.2: TIMA Results (Tailings)*

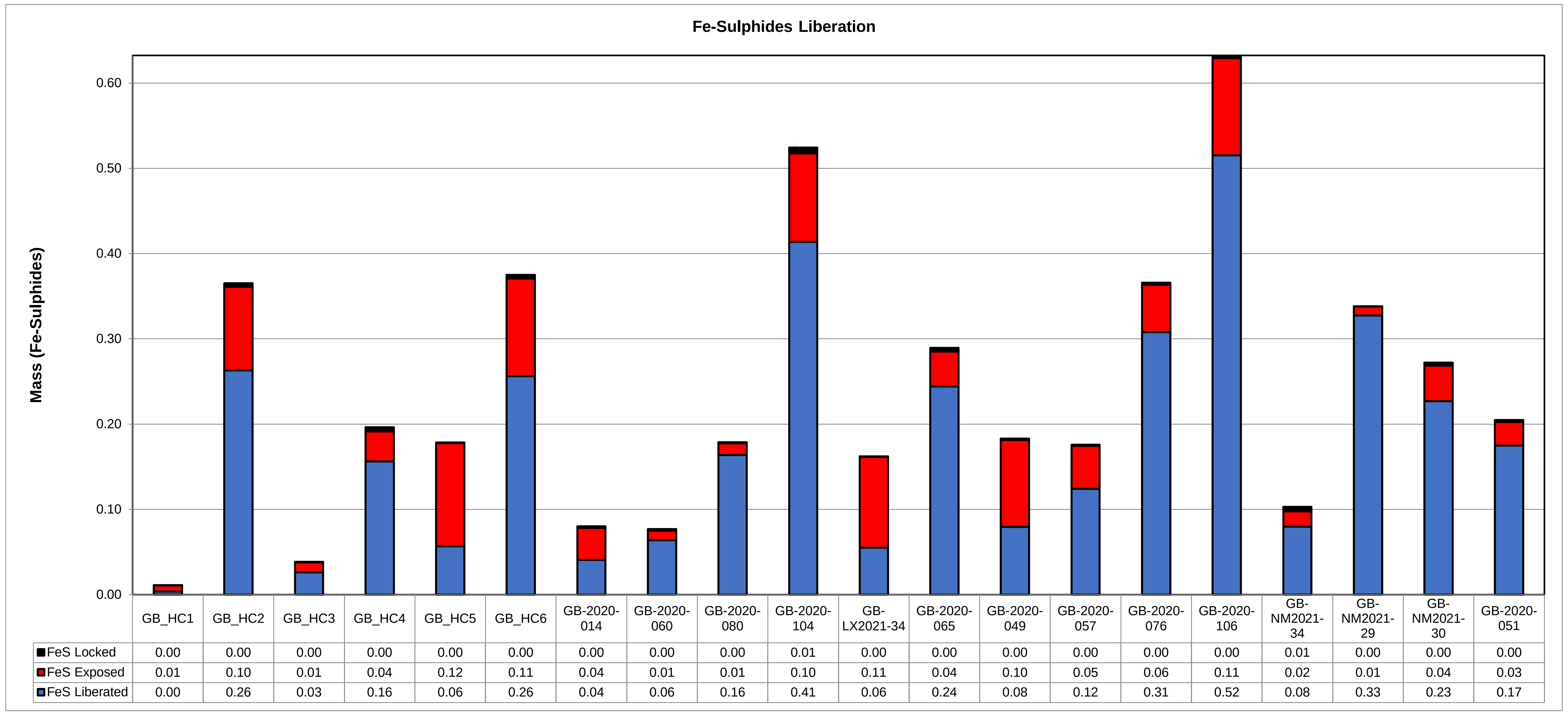
Anaconda Mining

**Appendix B.1 QEMSCAN Results, Table 1 Modals and Particle Size**

| **Sample ID** | GB_HC1 | GB_HC2 | GB_HC3 | GB_HC4 | GB_HC5 | GB_HC6 | GB-2020-014 | GB-2020-060 | GB-2020-080 | GB-2020-104 | GB-LX2021-34 | GB-2020-065 | GB-2020-049 | GB-2020-057 | GB-2020-076 | GB-2020-106 | GB-NM2021-34 | GB-NM2021-29 | GB-NM2021-30 | GB-2020-051 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rock Type | argillite | argillite | greywacke | greywacke | 50% argillite, 50% greywacke | greywacke marker unit | argillite | argillite | argillite | argillite | argillite | argillite + quartz vein | greywacke | greywacke | greywacke | greywacke | greywacke | greywacke marker unit | greywacke marker unit | grywacke + quartz vein |
| Ore/Waste | waste | waste | waste | waste | waste | waste | waste | waste | waste | waste | waste | ore | waste | waste | waste | waste | waste | waste | waste | waste |
| Designation | NPAG | PAG I | NPAG | PAG I | PAG II | PAG I | NPAG | NPAG | PAG II | PAG I | PAG I | PAG I | NPAG | PAG II | PAG I | PAG I | NPAG | NPAG | NPAG | PAG I |
| Calculated ESD Particle Size | 23.73 | 25.5 | 32.31 | 31.47 | 29.44 | 31.47 | 32.2 | 26.03 | 30.07 | 24.54 | 26.47 | 24.38 | 27.24 | 34.81 | 34.63 | 24.99 | 35.15 | 35.15 | 32.39 | 29.96 |
| **Mineral Mass (%)** | | | | | | | | | | | | | | | | | | | | |
| Quartz | 34.72 | 32.32 | 40.58 | 54.26 | 42.31 | 45.22 | 40.07 | 34.91 | 45.08 | 24.62 | 25.3 | 22.58 | 52.08 | 54.74 | 52.3 | 25.17 | 55.34 | 51.23 | 52.92 | 60.99 |
| Plagioclase | 14.25 | 15.37 | 23.15 | 20.3 | 20.97 | 24.45 | 15.95 | 16.96 | 23.31 | 7.38 | 11.01 | 9.36 | 18.07 | 25.76 | 25.44 | 8.34 | 21.24 | 27.81 | 23.18 | 16.63 |
| Muscovite | 22.38 | 23.26 | 13.42 | 8.39 | 13.75 | 9.85 | 19.94 | 21.01 | 11.32 | 34.34 | 30.05 | 40.41 | 11.82 | 6.55 | 7.31 | 32.77 | 7.63 | 5.76 | 7.94 | 9.09 |
| Biotite | 23.11 | 23.36 | 16.45 | 6.09 | 16.48 | 7.19 | 17.92 | 19.05 | 16.91 | 28.7 | 22.96 | 18.58 | 11.03 | 8.29 | 8.71 | 17.38 | 9.6 | 8.99 | 7.89 | 6.54 |
| Chlorite | 1.99 | 2.15 | 2.59 | 5.02 | 2.33 | 3.69 | 3.32 | 4.61 | 0.52 | 1.08 | 6.33 | 2.12 | 1.96 | 1.25 | 1.34 | 6.42 | 1.86 | 2.1 | 1.97 | 1.15 |
| K-Feldspar | 0.84 | 0.57 | 1.18 | 2.87 | 0.75 | 3.79 | 0.55 | 0.64 | 0.5 | 1.05 | 0.48 | 2.81 | 1.33 | 0.52 | 2.06 | 5.6 | 1.7 | 1.4 | 2.92 | 2 |
| Pyrrhotite | 0.01 | 0.33 | 0.03 | 0.16 | 0.17 | 0.26 | 0.04 | 0.07 | 0.16 | 0.48 | 0.16 | 0.18 | 0.16 | 0.17 | 0.35 | 0.38 | 0.05 | 0.33 | 0.23 | 0.19 |
| Pyrite | 0 | 0.04 | 0.01 | 0.03 | 0.01 | 0.12 | 0.04 | 0 | 0.02 | 0.04 | 0 | 0.11 | 0.02 | 0.01 | 0.01 | 0.26 | 0.05 | 0.01 | 0.04 | 0.01 |
| Arsenopyrite | 0.02 | 0.04 | 0 | 0.11 | 0.07 | 0.74 | 0 | 0.01 | 0.11 | 0.35 | 0 | 1.52 | 0.05 | 0.14 | 0.17 | 0.28 | 0.04 | 0.01 | 0.01 | 0.51 |
| Other Sulphides | 0.01 | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 | 0.01 | 0.02 | 0 | 0.02 | 0.01 | 0.02 | 0.01 | 0 | 0.04 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 |
| Calcite | 0.07 | 0.1 | 0.13 | 0.01 | 0.05 | 0.72 | 0.23 | 0.06 | 0.19 | 0.17 | 0.03 | 0 | 0.46 | 0.4 | 0.42 | 0.14 | 0.42 | 0.19 | 0.75 | 0.59 |
| Dolomite | 0.06 | 0 | 0.01 | 0 | 0 | 0.24 | 0.06 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.05 | 0 | 0.01 | 0 | 0.01 |
| Ankerite | 0.19 | 0.11 | 0.11 | 0.08 | 0.08 | 1.11 | 0.31 | 0.11 | 0.07 | 0.11 | 0.11 | 0.12 | 0.13 | 0.1 | 0.09 | 0.35 | 0.14 | 0.1 | 0.15 | 0.13 |
| Other Silicates | 0.98 | 1.04 | 0.74 | 1.32 | 0.93 | 0.95 | 0.55 | 1.11 | 0.92 | 0.91 | 1.64 | 1.09 | 1.75 | 0.76 | 0.74 | 1.47 | 0.74 | 0.65 | 0.72 | 1.39 |
| Ti-Oxides | 0.38 | 0.29 | 0.45 | 0.75 | 0.49 | 0.8 | 0.39 | 0.54 | 0.3 | 0.13 | 0.66 | 0.36 | 0.56 | 0.77 | 0.43 | 0.64 | 0.47 | 0.49 | 0.63 | 0.39 |
| Apatite | 0.32 | 0.33 | 0.29 | 0.22 | 0.26 | 0.26 | 0.35 | 0.32 | 0.24 | 0.39 | 0.42 | 0.45 | 0.36 | 0.25 | 0.34 | 0.4 | 0.28 | 0.3 | 0.22 | 0.25 |
| Epidote | 0.45 | 0.53 | 0.62 | 0.14 | 0.52 | 0.15 | 0.06 | 0.35 | 0.06 | 0.11 | 0.54 | 0.11 | 0.06 | 0.02 | 0.01 | 0.07 | 0.19 | 0.38 | 0.17 | 0.03 |
| Amphibole/Pyroxene | 0.19 | 0.11 | 0.16 | 0.05 | 0.63 | 0.29 | 0.14 | 0.18 | 0.22 | 0.08 | 0.23 | 0.08 | 0.09 | 0.2 | 0.18 | 0.16 | 0.16 | 0.19 | 0.18 | 0.05 |
| Other | 0.01 | 0.03 | 0.01 | 0.03 | 0.09 | 0.1 | 0.02 | 0.01 | 0.02 | 0.03 | 0.01 | 0.08 | 0.02 | 0.03 | 0.01 | 0.05 | 0.03 | 0.01 | 0.04 | 0.02 |
| Talc | 0.02 | 0.01 | 0.02 | 0.05 | 0.04 | 0.03 | 0.02 | 0.02 | 0.02 | 0.01 | 0.04 | 0.01 | 0.02 | 0.02 | 0.02 | 0.05 | 0.02 | 0.02 | 0.02 | 0.02 |
| Fe-Oxides | 0.01 | 0.01 | 0.02 | 0.1 | 0.05 | 0.04 | 0.03 | 0 | 0.03 | 0 | 0 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.02 | 0.02 | 0.01 | 0.01 |
| Total | 100.01 | 100.02 | 99.99 | 99.99 | 100 | 100.01 | 100 | 99.98 | 100 | 100 | 99.98 | 100.01 | 100 | 100 | 99.98 | 100.01 | 100 | 100.01 | 100 | 100.01 |
| | | | | | | | | | | | | | | | | | | | | |
| **Mean Grain Size by Frequency (µm)** | | | | | | | | | | | | | | | | | | | | |
| Pyrrhotite | 6.19 | 17.29 | 11.62 | 15.97 | 20 | 16.66 | 10.13 | 17.13 | 24.83 | 20.38 | 21.53 | 15.23 | 20.64 | 21.7 | 28.9 | 18.64 | 13.44 | 57.36 | 18.47 | 20.7 |
| Pyrite | 9.35 | 9.73 | 10.47 | 15 | 13.4 | 17.26 | 13.86 | 7.43 | 18 | 13.81 | 7.14 | 16.33 | 14.37 | 12.79 | 13.93 | 18.91 | 24.24 | 10.97 | 20.54 | 10.34 |
| Arsenopyrite | 12.06 | 13.83 | 6.55 | 13.22 | 13.59 | 28.72 | 5.61 | 14.59 | 24.62 | 44.74 | 9.35 | 28.37 | 34.21 | 32.72 | 27.79 | 27.36 | 31.92 | 16.4 | 12.54 | 23.45 |
| Other Sulphides | 8.05 | 7.31 | 11.71 | 12.05 | 8.23 | 7.88 | 9.31 | 10.05 | 8.2 | 10.19 | 9.18 | 7.39 | 11.78 | 5.91 | 26.18 | 9.59 | 17.83 | 7.62 | 10.69 | 11.97 |
| Quartz | 21.08 | 20.88 | 25.73 | 28.57 | 25.95 | 27.12 | 32.04 | 24.02 | 24.64 | 26.47 | 15.39 | 28.77 | 27 | 28.81 | 28.63 | 26.42 | 31.62 | 29.21 | 27.91 | 30.61 |
| K-Feldspar | 9.06 | 7.63 | 11.47 | 11.84 | 9.75 | 16.16 | 13.91 | 7.52 | 10.81 | 7.1 | 6.56 | 12.76 | 11.05 | 10.4 | 17.31 | 14.46 | 14.99 | 12.68 | 17.32 | 14.04 |
| Plagioclase | 15.19 | 16.28 | 19.85 | 21.82 | 19.35 | 23.66 | 24.82 | 17.19 | 20.82 | 17.53 | 12.88 | 16.11 | 21.34 | 25.82 | 25.64 | 20.53 | 23.72 | 23.65 | 23.61 | 23.28 |
| Amphibole/Pyroxene | 5.94 | 5.9 | 5.87 | 5.91 | 16.91 | 9.32 | 6.29 | 6.82 | 5.88 | 6.34 | 5.97 | 6 | 6.26 | 6.26 | 6.21 | 7.03 | 6.58 | 6.36 | 6.67 | 6.53 |
| Epidote | 5.97 | 6.11 | 6.12 | 6.08 | 6.12 | 5.94 | 9.05 | 6.11 | 7.58 | 6.45 | 6.07 | 5.89 | 6.23 | 7.48 | 6.97 | 6.38 | 6.11 | 6.15 | 5.96 | 6 |
| Muscovite | 13.31 | 13.53 | 13.19 | 10.92 | 14.67 | 13.89 | 17.2 | 12.5 | 12.91 | 14.41 | 14.01 | 16.28 | 11.7 | 11.9 | 12.68 | 14.26 | 12.87 | 12.58 | 14.42 | 11.97 |
| Biotite | 17.13 | 17.44 | 18.37 | 14.44 | 16.87 | 17.09 | 18.47 | 20.26 | 17.98 | 17.53 | 16.87 | 18.41 | 17.12 | 16.69 | 17.18 | 19.36 | 16.63 | 16.38 | 16.8 | 17.19 |
| Chlorite | 9.57 | 10.31 | 11.84 | 13.08 | 10.5 | 14.19 | 23.77 | 13.41 | 9.64 | 10.79 | 9.82 | 12.54 | 14.37 | 13.55 | 14.82 | 14.53 | 13.57 | 14.42 | 13.64 | 14.42 |
| Talc | 5.68 | 5.8 | 5.9 | 5.76 | 6.08 | 5.84 | 6.65 | 6.12 | 7.87 | 6.79 | 5.73 | 6.09 | 6.27 | 6.5 | 6.1 | 6.23 | 5.92 | 5.75 | 6.15 | 6.33 |
| Other Silicates | 6.06 | 6.02 | 6.11 | 7.92 | 6.56 | 7.55 | 6.29 | 6.58 | 6.37 | 6.75 | 5.93 | 7.39 | 8.26 | 6.15 | 6.5 | 7.15 | 6.78 | 6.74 | 6.74 | 8.67 |
| Ti-Oxides | 12.88 | 12.61 | 14.9 | 13.08 | 13.63 | 13.7 | 16.01 | 22.69 | 10.89 | 10.73 | 15.22 | 11.05 | 12.39 | 18.45 | 12.29 | 11.75 | 13.86 | 13.71 | 15.24 | 13.31 |
| Fe-Oxides | 6.01 | 8.7 | 9 | 14.05 | 23.34 | 21.38 | 12.62 | 6.76 | 11.22 | 7.78 | 5.61 | 8.63 | 9.02 | 14.21 | 7.91 | 8.75 | 9.45 | 8.81 | 8.37 | 7.29 |
| Calcite | 10.42 | 18.59 | 15.83 | 8.06 | 10.12 | 19.74 | 19.4 | 10.77 | 15.13 | 21.12 | 10.95 | 6.61 | 18.85 | 15.82 | 18.54 | 14.01 | 19.44 | 14.71 | 22.93 | 19.38 |
| Dolomite | 8.14 | 5.61 | 6.94 | 9.12 | 5.61 | 7.18 | 10.03 | 5.84 | 6.55 | 11.67 | 5.91 | 5.84 | 7 | 0 | 7.85 | 7.96 | 5.61 | 19.64 | 5.61 | 8.82 |
| Ankerite | 7.78 | 6.27 | 7.01 | 6.46 | 6.31 | 17.19 | 13.21 | 6.82 | 6.48 | 6.91 | 6.53 | 7.16 | 7.24 | 6.89 | 6.95 | 10.83 | 7.17 | 6.84 | 7.33 | 7.18 |
| Apatite | 10.68 | 10.72 | 13.25 | 13.3 | 11.87 | 18.41 | 14.23 | 11.33 | 12.01 | 12.36 | 9.24 | 13.33 | 19.41 | 18.55 | 22.17 | 14.29 | 19.15 | 20.89 | 17.47 | 18.08 |
| Other | 7.34 | 6.28 | 10.61 | 7.37 | 7.98 | 16.94 | 11.41 | 6.15 | 7.48 | 6.56 | 6.06 | 11.29 | 13.08 | 16.43 | 7.54 | 6.59 | 13.31 | 11.61 | 11.45 | 10.37 |
| | | | | | | | | | | | | | | | | | | | | |
| **Sulphides (relative abundance)** | | | | | | | | | | | | | | | | | | | | |
| Pyrrhotite | 25% | 77% | 50% | 52% | 63% | 23% | 44% | 70% | 55% | 54% | 94% | 10% | 67% | 53% | 61% | 40% | 31% | 92% | 79% | 26% |
| Pyrite | 0% | 9% | 17% | 10% | 4% | 11% | 44% | 0% | 7% | 4% | 0% | 6% | 8% | 3% | 2% | 28% | 31% | 3% | 14% | 1% |
| Arsenopyrite | 50% | 9% | 0% | 35% | 26% | 65% | 0% | 10% | 38% | 39% | 0% | 83% | 21% | 44% | 30% | 30% | 25% | 3% | 3% | 71% |
| Other Sulphides | 25% | 5% | 33% | 3% | 7% | 1% | 11% | 20% | 0% | 2% | 6% | 1% | 4% | 0% | 7% | 2% | 13% | 3% | 3% | 1% |
| | | | | | | | | | | | | | | | | | | | | |
| **Carbonates (relative abundance)** | | | | | | | | | | | | | | | | | | | | |
| Calcite | 22% | 48% | 52% | 11% | 38% | 35% | 38% | 35% | 73% | 61% | 21% | 0% | 78% | 80% | 82% | 26% | 75% | 63% | 83% | 81% |
| Dolomite | 19% | 0% | 4% | 0% | 0% | 12% | 10% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 9% | 0% | 3% | 0% | 1% |
| Ankerite | 59% | 52% | 44% | 89% | 62% | 82% | 52% | 65% | 27% | 39% | 79% | 100% | 22% | 20% | 18% | 65% | 25% | 33% | 17% | 18% |

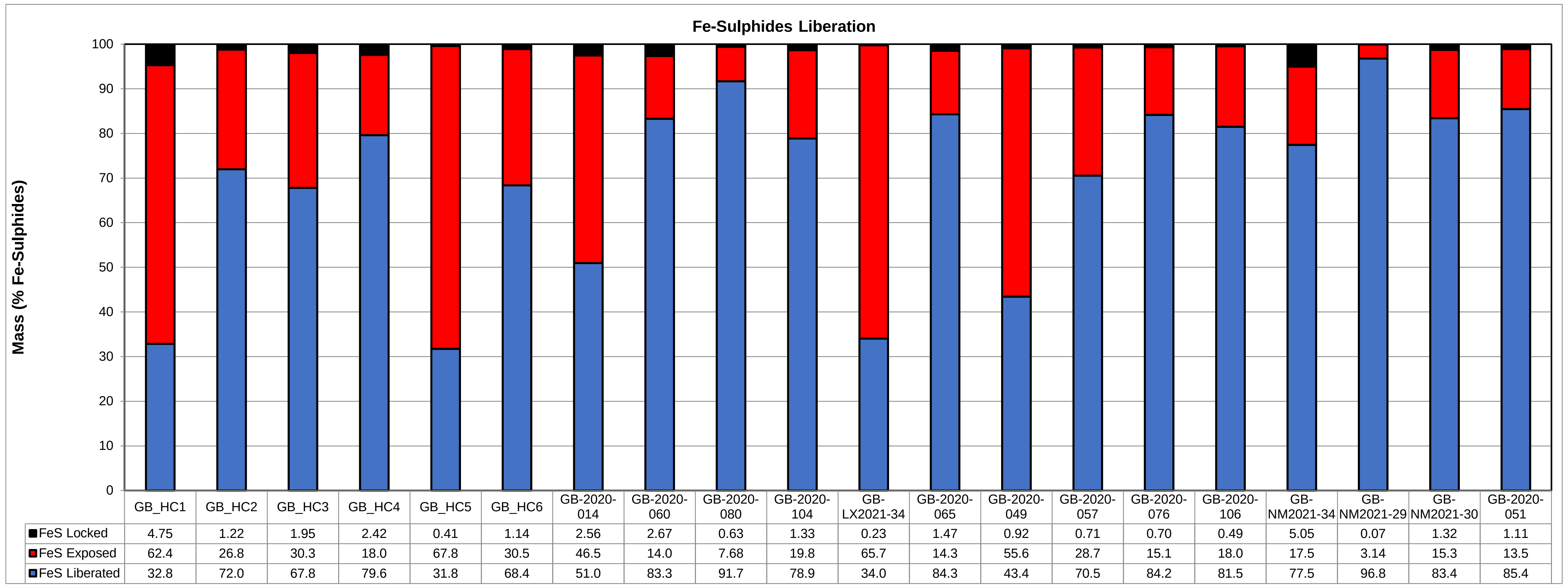
**Appendix B.1 QEMSCAN Results, Table 2 Iron-Sulphide Liberation**

**Fe-Sulphides Liberation**




**Absolute Mass of Fe-Sulphides Across Samples**

| Mineral Name | GB_HC1 | GB_HC2 | GB_HC3 | GB_HC4 | GB_HC5 | GB_HC6 | GB-2020-014 | GB-2020-060 | GB-2020-080 | GB-2020-104 | GB-LX2021-34 | GB-2020-065 | GB-2020-049 | GB-2020-057 | GB-2020-076 | GB-2020-106 | GB-NM2021-34 | GB-NM2021-29 | GB-NM2021-30 | GB-2020-051 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FeS Liberated | 0.00 | 0.26 | 0.03 | 0.16 | 0.06 | 0.26 | 0.04 | 0.06 | 0.16 | 0.41 | 0.06 | 0.24 | 0.08 | 0.12 | 0.31 | 0.52 | 0.08 | 0.33 | 0.23 | 0.17 |
| FeS Exposed | 0.01 | 0.10 | 0.01 | 0.04 | 0.12 | 0.11 | 0.04 | 0.01 | 0.01 | 0.10 | 0.11 | 0.04 | 0.10 | 0.05 | 0.06 | 0.11 | 0.02 | 0.01 | 0.04 | 0.03 |
| FeS Locked | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Total | 0.01 | 0.37 | 0.04 | 0.20 | 0.18 | 0.37 | 0.08 | 0.08 | 0.18 | 0.52 | 0.16 | 0.29 | 0.18 | 0.18 | 0.37 | 0.63 | 0.10 | 0.34 | 0.27 | 0.20 |

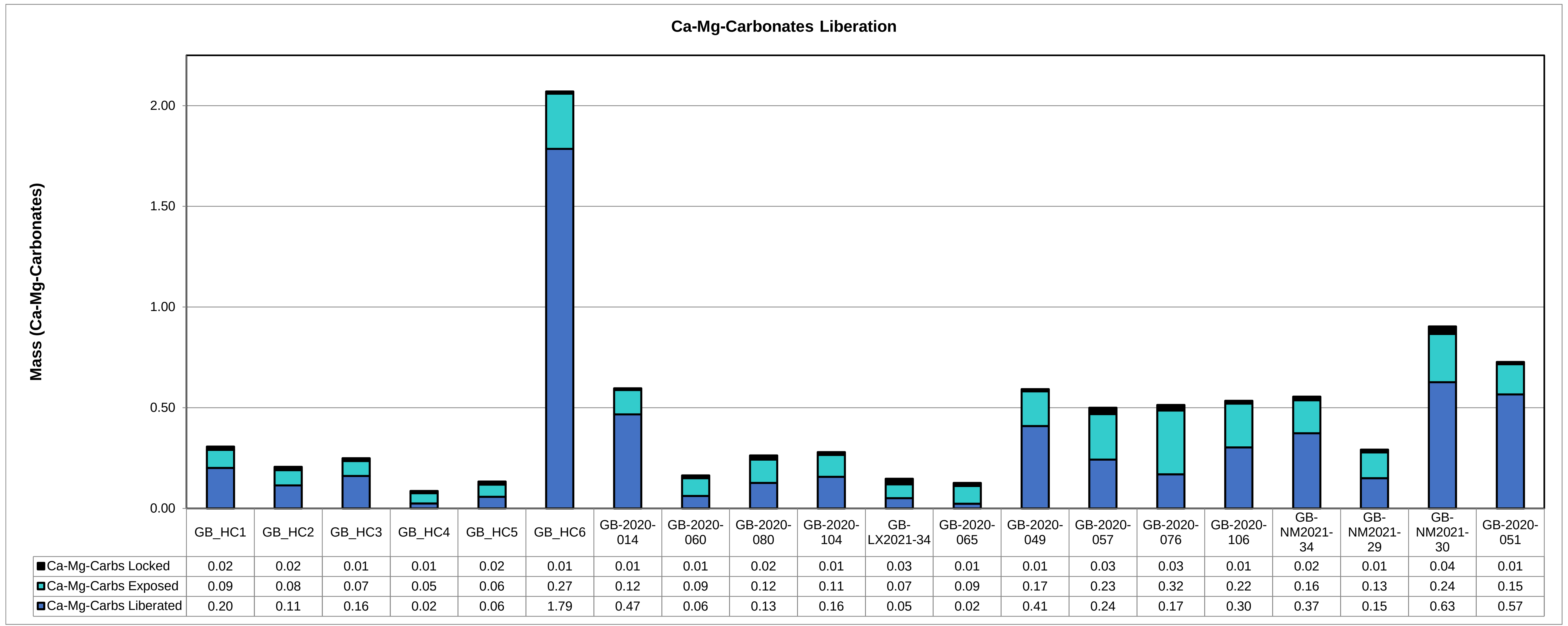



**Normalized Mass of Fe-Sulphides Across Samples**

| Mineral Name | GB_HC1 | GB_HC2 | GB_HC3 | GB_HC4 | GB_HC5 | GB_HC6 | GB-2020-014 | GB-2020-060 | GB-2020-080 | GB-2020-104 | GB-LX2021-34 | GB-2020-065 | GB-2020-049 | GB-2020-057 | GB-2020-076 | GB-2020-106 | GB-NM2021-34 | GB-NM2021-29 | GB-NM2021-30 | GB-2020-051 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FeS Liberated | 32.8 | 72.0 | 67.8 | 79.6 | 31.8 | 68.4 | 51.0 | 83.3 | 91.7 | 78.9 | 34.0 | 84.3 | 43.4 | 70.5 | 84.2 | 81.5 | 77.5 | 96.8 | 83.4 | 85.4 |
| FeS Exposed | 62.4 | 26.8 | 30.3 | 18.0 | 67.8 | 30.5 | 46.5 | 14.0 | 7.68 | 19.8 | 65.7 | 14.3 | 55.6 | 28.7 | 15.1 | 18.0 | 17.5 | 3.14 | 15.3 | 13.5 |
| FeS Locked | 4.75 | 1.22 | 1.95 | 2.42 | 0.41 | 1.14 | 2.56 | 2.67 | 0.63 | 1.33 | 0.23 | 1.47 | 0.92 | 0.71 | 0.70 | 0.49 | 5.05 | 0.07 | 1.32 | 1.11 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

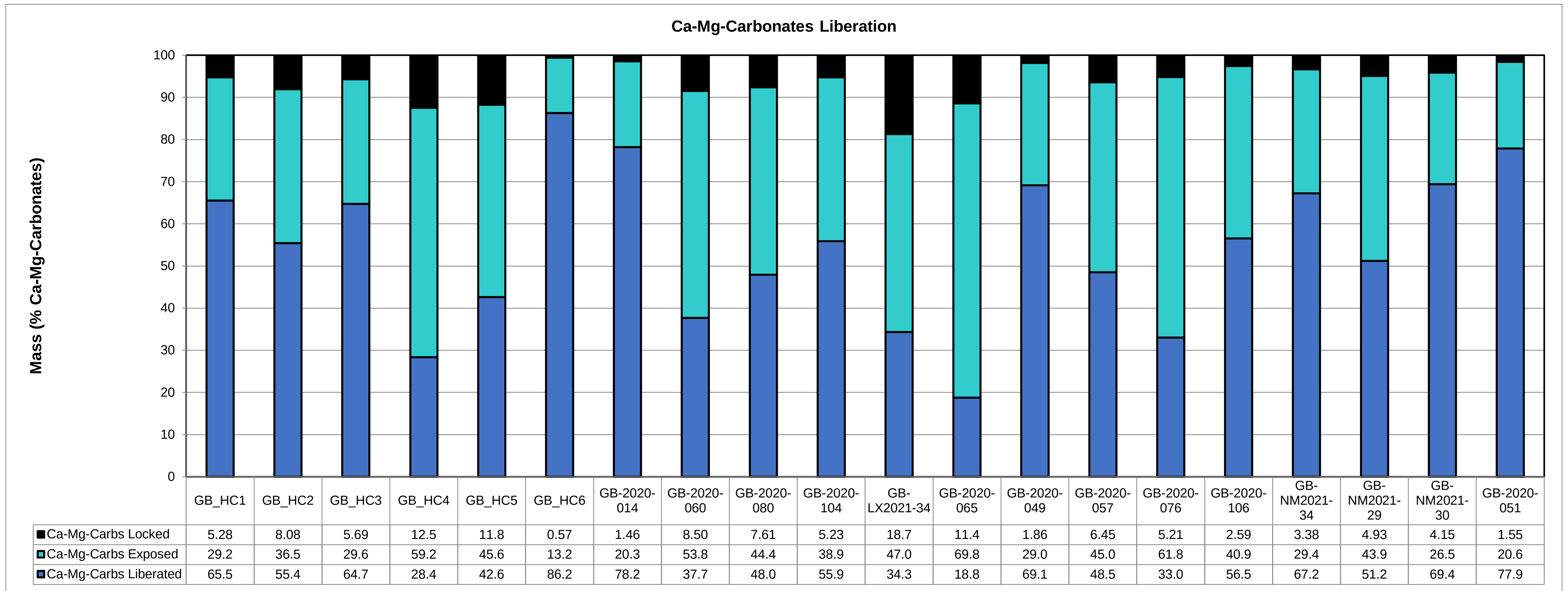
**Appendix B.1 QEMSCAN Results, Table 3 Calcium-Magnesium Carbonates Liberation**

**Ca-Mg-Carbonates Liberation**




**Absolute Mass of Ca-Mg-Carbonates Across Samples**

| Mineral Name | GB_HC1 | GB_HC2 | GB_HC3 | GB_HC4 | GB_HC5 | GB_HC6 | GB-2020-014 | GB-2020-060 | GB-2020-080 | GB-2020-104 | GB-LX2021-34 | GB-2020-065 | GB-2020-049 | GB-2020-057 | GB-2020-076 | GB-2020-106 | GB-NM2021-34 | GB-NM2021-29 | GB-NM2021-30 | GB-2020-051 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ca-Mg-Carbs Liberated** | 0.20 | 0.11 | 0.16 | 0.02 | 0.06 | 1.79 | 0.47 | 0.06 | 0.13 | 0.16 | 0.05 | 0.02 | 0.41 | 0.24 | 0.17 | 0.30 | 0.37 | 0.15 | 0.63 | 0.57 |
| **Ca-Mg-Carbs Exposed** | 0.09 | 0.08 | 0.07 | 0.05 | 0.06 | 0.27 | 0.12 | 0.09 | 0.12 | 0.11 | 0.07 | 0.09 | 0.17 | 0.23 | 0.32 | 0.22 | 0.16 | 0.13 | 0.24 | 0.15 |
| **Ca-Mg-Carbs Locked** | 0.02 | 0.02 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.03 | 0.01 | 0.01 | 0.03 | 0.03 | 0.01 | 0.02 | 0.01 | 0.04 | 0.01 |
| **Total** | 0.31 | 0.21 | 0.25 | 0.09 | 0.13 | 2.07 | 0.60 | 0.16 | 0.26 | 0.28 | 0.15 | 0.13 | 0.59 | 0.50 | 0.51 | 0.54 | 0.56 | 0.29 | 0.90 | 0.73 |




**Normalized Mass of Ca-Mg-Carbonates Across Samples**

| Mineral Name | GB_HC1 | GB_HC2 | GB_HC3 | GB_HC4 | GB_HC5 | GB_HC6 | GB-2020-014 | GB-2020-060 | GB-2020-080 | GB-2020-104 | GB-LX2021-34 | GB-2020-065 | GB-2020-049 | GB-2020-057 | GB-2020-076 | GB-2020-106 | GB-NM2021-34 | GB-NM2021-29 | GB-NM2021-30 | GB-2020-051 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ca-Mg-Carbs Liberated** | 65.5 | 55.4 | 64.7 | 28.4 | 42.6 | 86.2 | 78.2 | 37.7 | 48.0 | 55.9 | 34.3 | 18.8 | 69.1 | 48.5 | 33.0 | 56.5 | 67.2 | 51.2 | 69.4 | 77.9 |
| **Ca-Mg-Carbs Exposed** | 29.2 | 36.5 | 29.6 | 59.2 | 45.6 | 13.2 | 20.3 | 53.8 | 44.4 | 38.9 | 47.0 | 69.8 | 29.0 | 45.0 | 61.8 | 40.9 | 29.4 | 43.9 | 26.5 | 20.6 |
| **Ca-Mg-Carbs Locked** | 5.28 | 8.08 | 5.69 | 12.5 | 11.8 | 0.57 | 1.46 | 8.50 | 7.61 | 5.23 | 18.7 | 11.4 | 1.86 | 6.45 | 5.21 | 2.59 | 3.38 | 4.93 | 4.15 | 1.55 |
| **Total** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

**Appendix B.1 QEMSCAN Results, Table 4 Mineralogical Acid Base Accounting**

| Parameter/Sample | GB-2020-65 | GB-2020-60 | GB-2020-104 | GB-2020-49 | GB-2020-106 | GB-2020-51 | GB_HC1 | GB_HC2 | GB_HC3 | GB_HC4 |
|---|---|---|---|---|---|---|---|---|---|---|
| NP from Ca-Mg Carbonates (tonnes CaCO3/1000 tonnes) | 1.2 | 1.7 | 2.8 | 5.9 | 5.3 | 7.3 | 3.2 | 2.1 | 2.5 | 0.9 |
| AP from Fe-Sulphides (tonnes CaCO3/1000 tonnes) | 4.0 | 0.8 | 6.3 | 2.2 | 8.8 | 2.4 | 0.1 | 4.5 | 0.5 | 2.4 |
| NP/AP | 0.3 | 2.0 | 0.4 | 2.6 | 0.6 | 3.0 | 27.2 | 0.5 | 4.8 | 0.4 |
| Available NP/AP | 0.2 | 1.6 | 0.4 | 2.9 | 0.5 | 2.9 | 23.8 | 0.5 | 4.2 | 0.3 |

| Parameter/Sample | GB-2020-014 | GB-2020-057 | GB-2020-076 | GB-2020-080 | GB_HC5 | GB_HC6 | GB-NM2021-29 | GB-NM2021-30 | GB-NM2021-34 | GB-LX2021-34 |
|---|---|---|---|---|---|---|---|---|---|---|
| NP from Ca-Mg Carbonates (tonnes CaCO3/1000 tonnes) | 6.0 | 5.0 | 5.1 | 2.6 | 1.3 | 20.6 | 3.0 | 9.0 | 5.6 | 1.4 |
| AP from Fe-Sulphides (tonnes CaCO3/1000 tonnes) | 1.1 | 2.2 | 4.3 | 2.2 | 2.2 | 5.1 | 4.0 | 3.4 | 1.4 | 1.9 |
| NP/AP | 5.2 | 2.3 | 1.2 | 1.2 | 0.6 | 4.1 | 0.7 | 2.7 | 3.9 | 0.7 |
| Available NP/AP | 6.9 | 1.4 | 0.6 | 0.7 | 1.0 | 4.3 | 0.5 | 2.4 | 3.4 | 0.8 |

**Notes:**

NP = Neutralization Potential
AP = Acid Generation Potential
"Available NP/AP" takes into account the exposure of Ca-Mg-carbonates and Fe-sulphides

A carbonate/sulphide ratio > 2 indicates probable net neutralizing conditions. Only net acid consuming carbonates (Ca-Mg carbonates) are used for the mineralogical neutralization potential (NP) determination. Only Fe-sulphides are used for the mineralogical acid generation potential (AGP) as they are the main sulphides to contribute to net acidity.

In cases of low carbonate and sulphide abundance (typically <0.5 wt.% of each), values are only semi-quantitative due to low particle statistics for study. More replicate analyses are recommended to properly quantify the NP/AGP potential of these samples.

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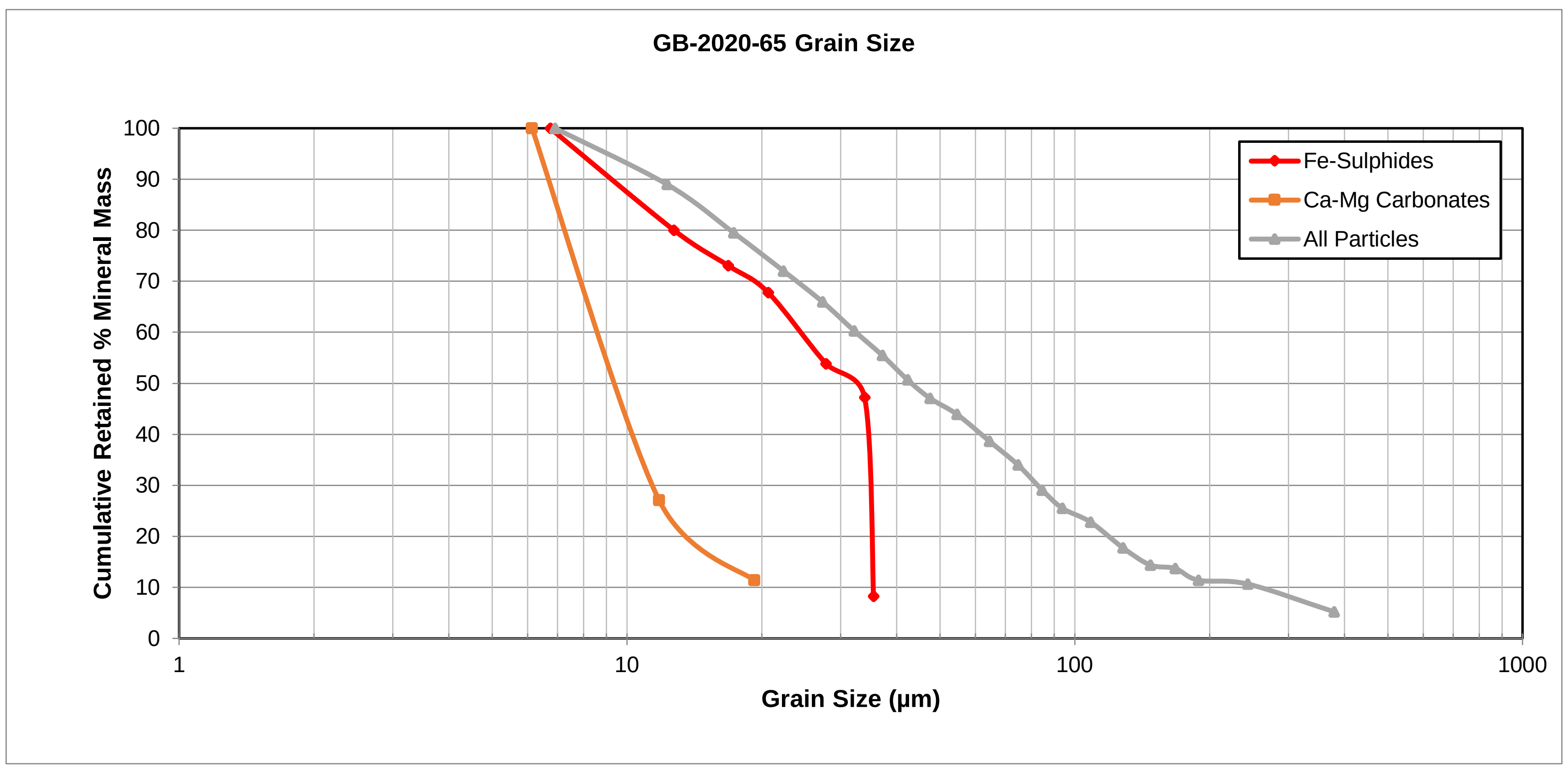
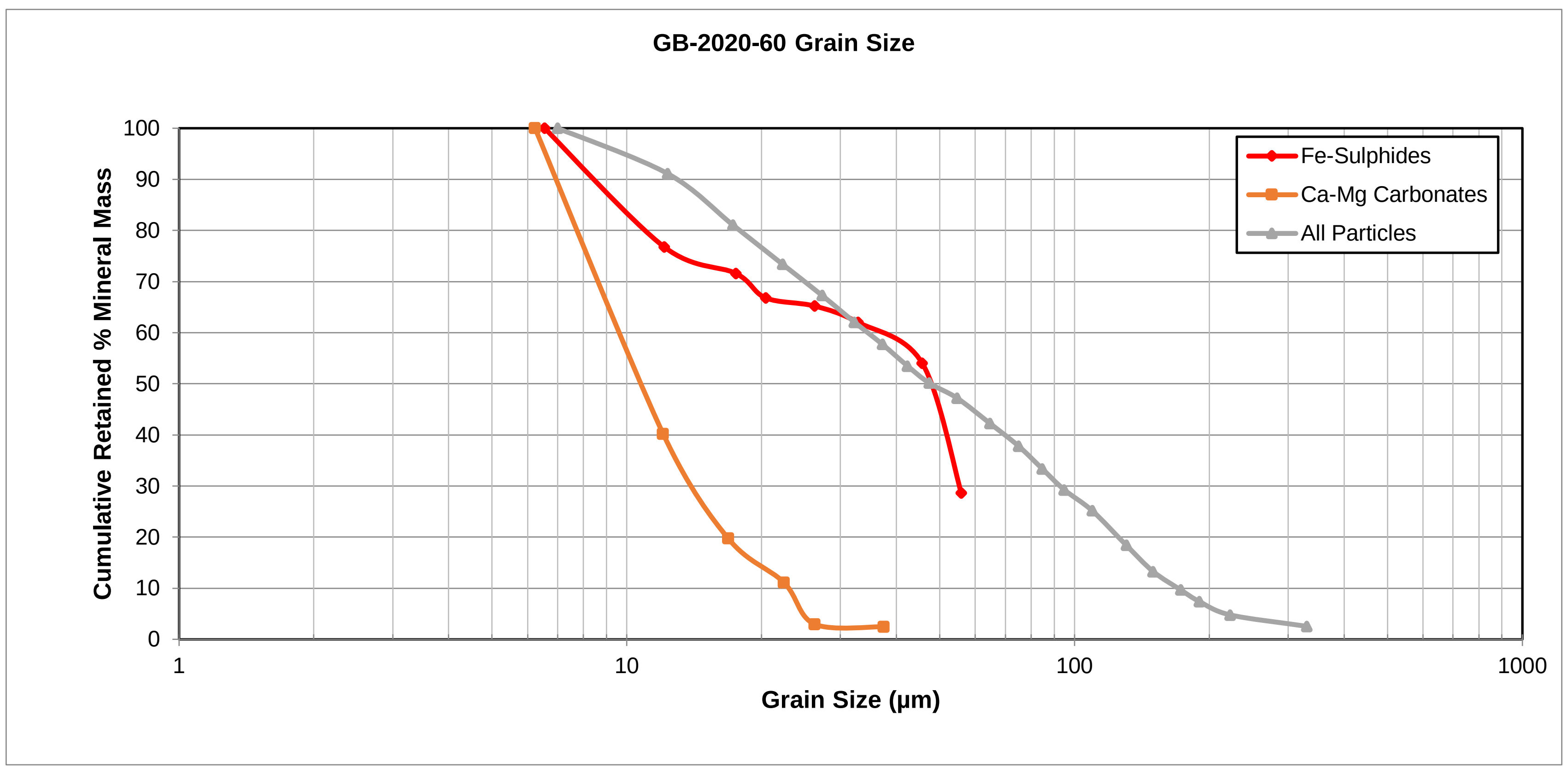
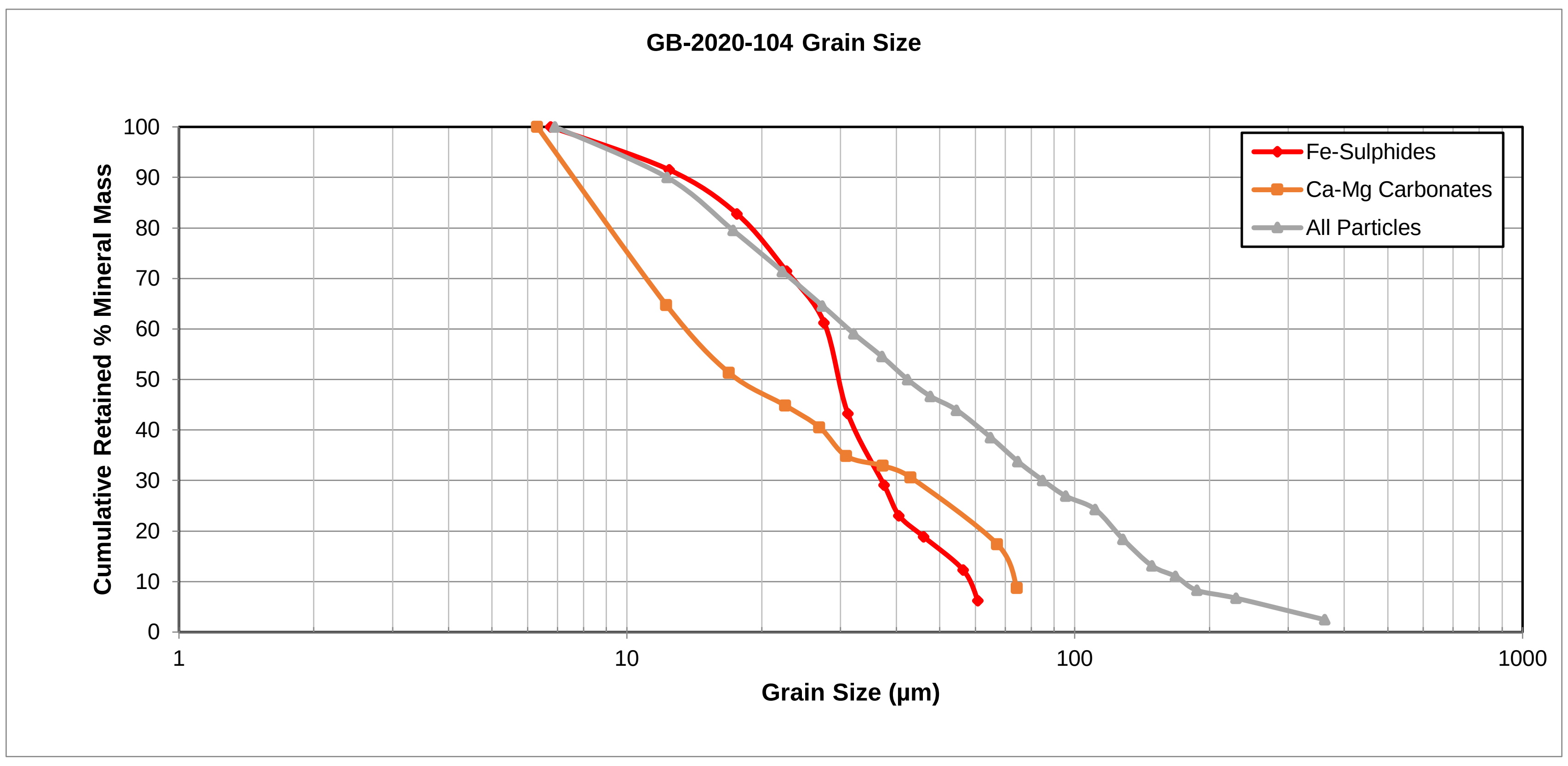
MI5037-SEP21

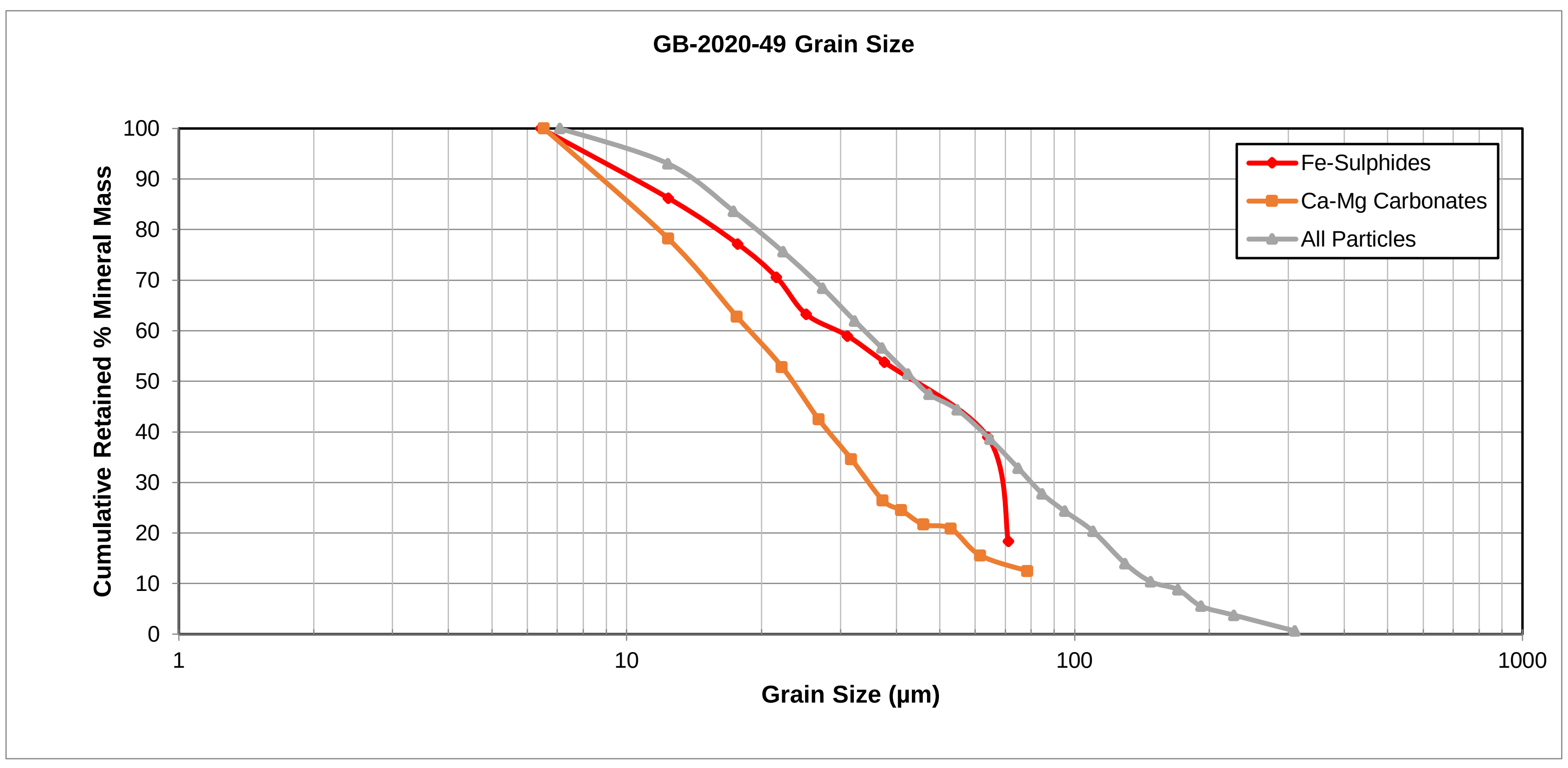
*High Definition Mineralogical Analysis using QEMSCAN (Quantitative Evaluation of Materials by Scanning Electron Microscopy)*

**Cumulative Retained Grain Size Distribution**



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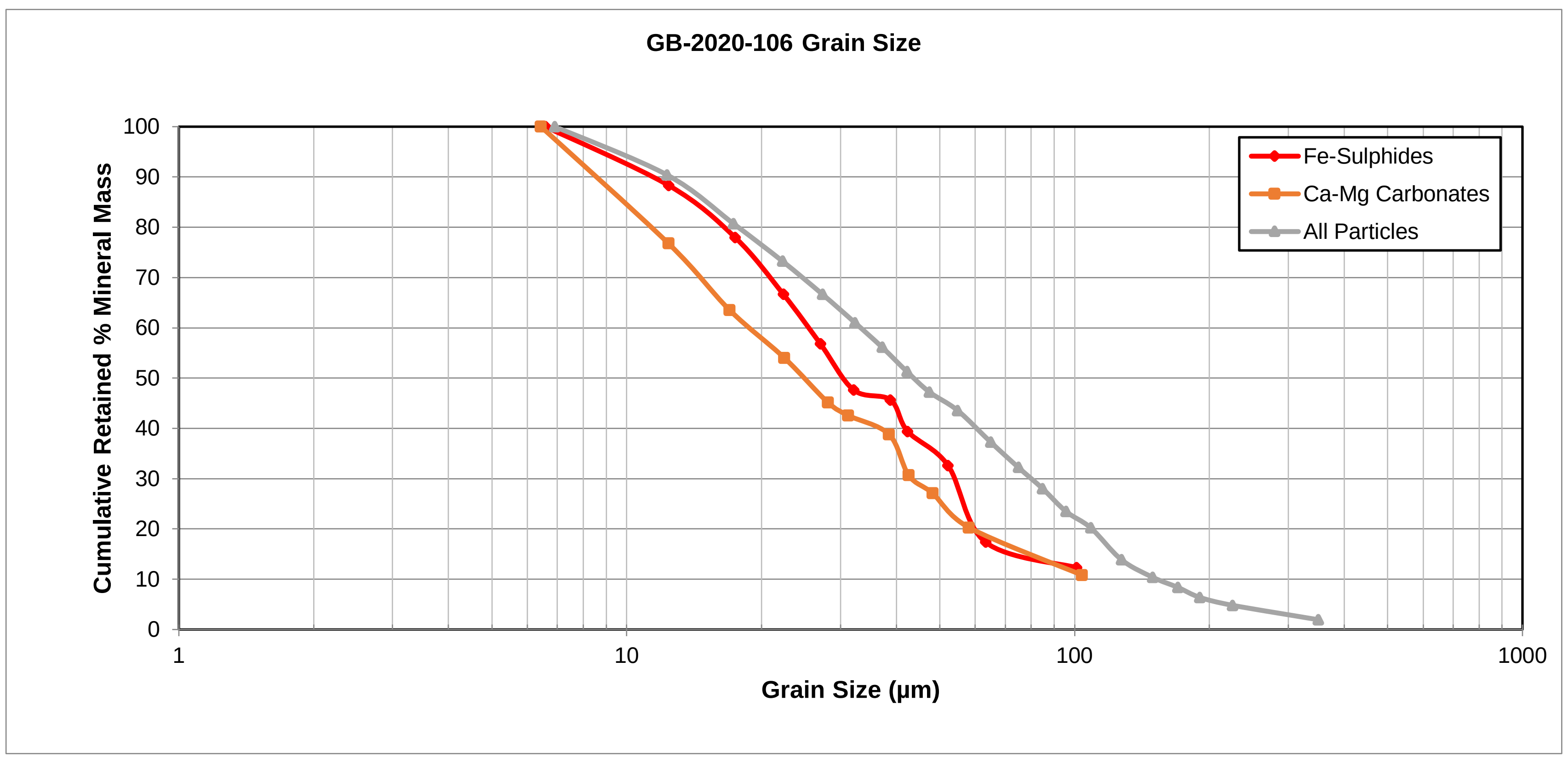
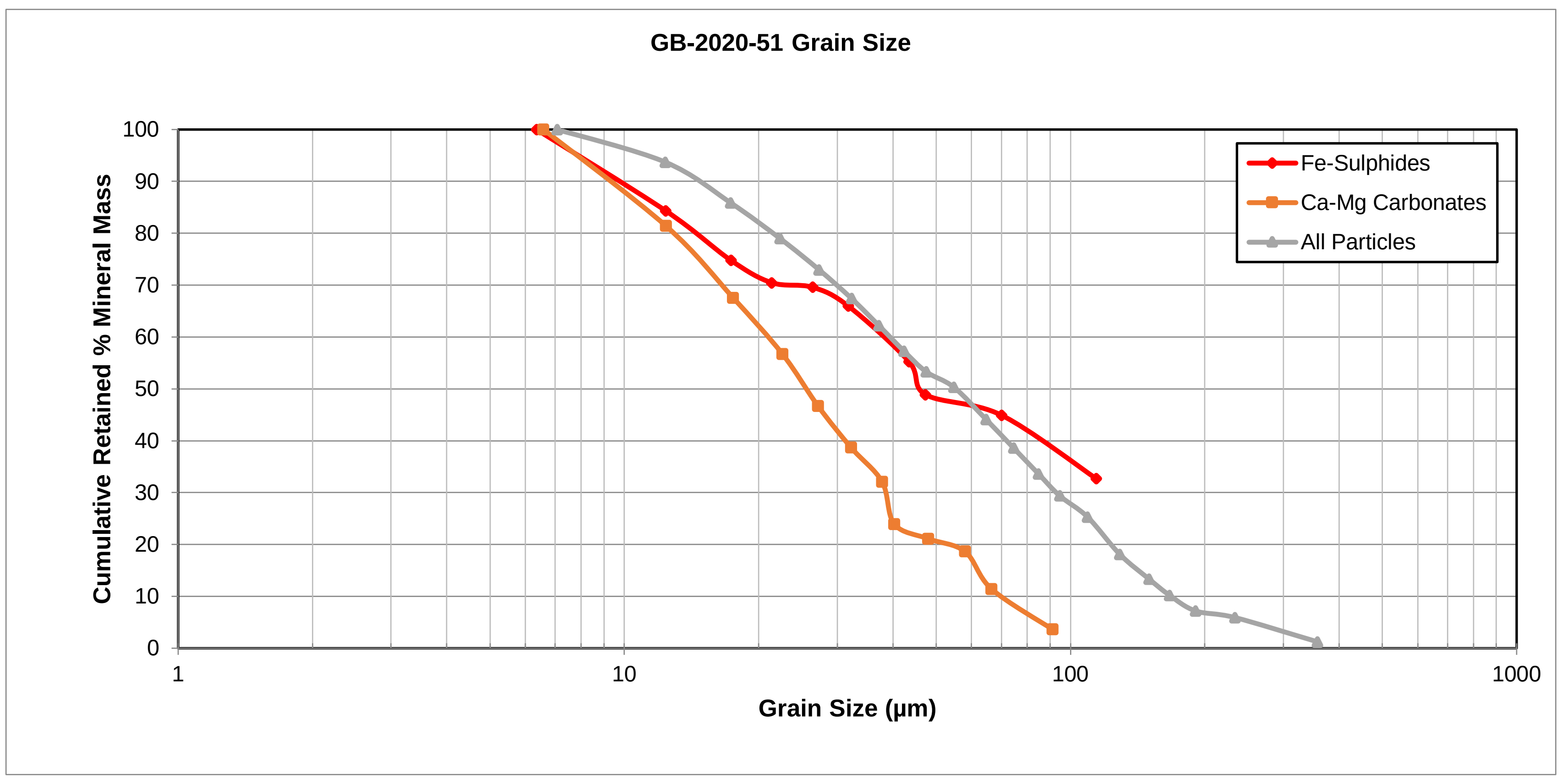
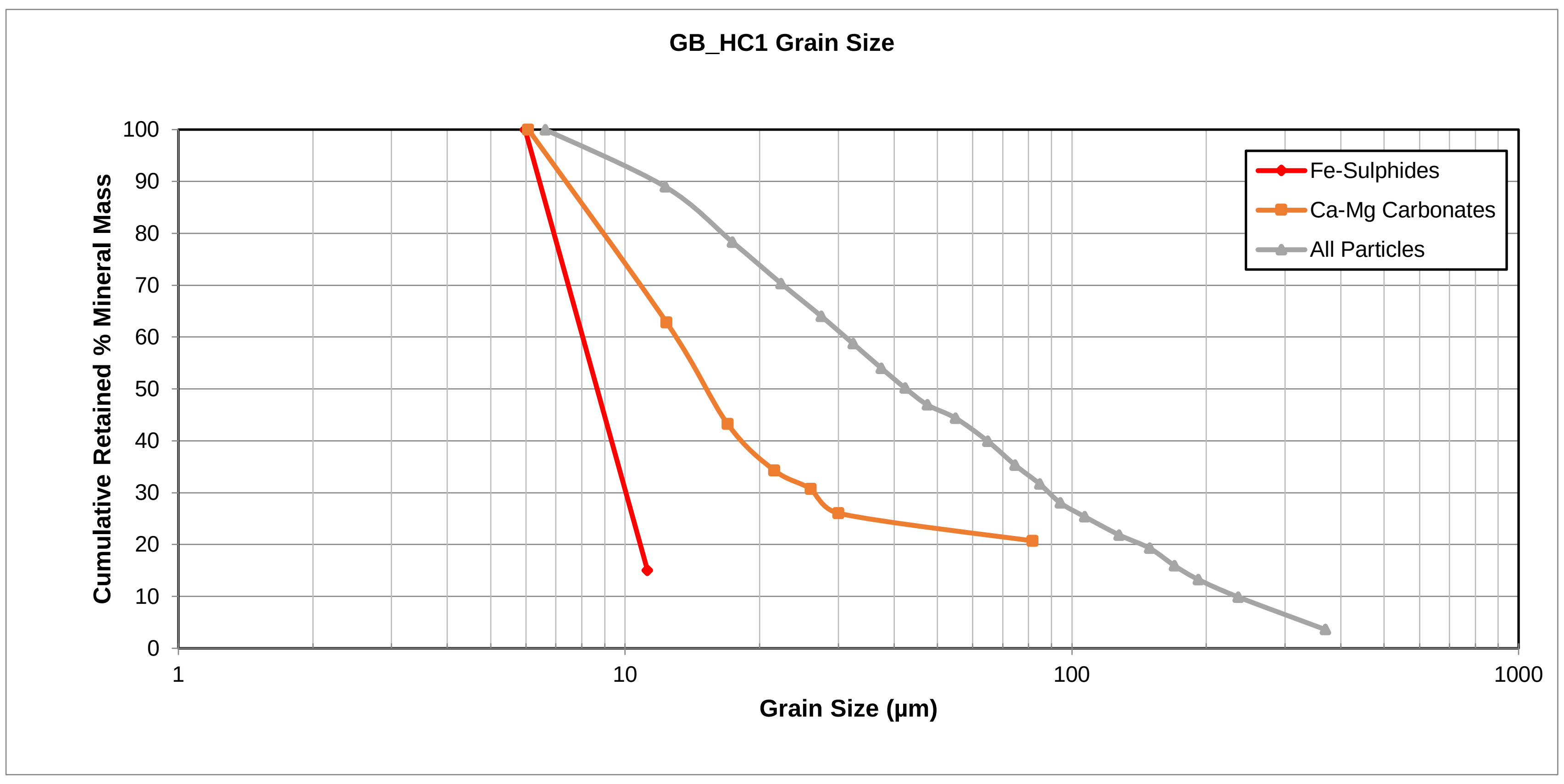
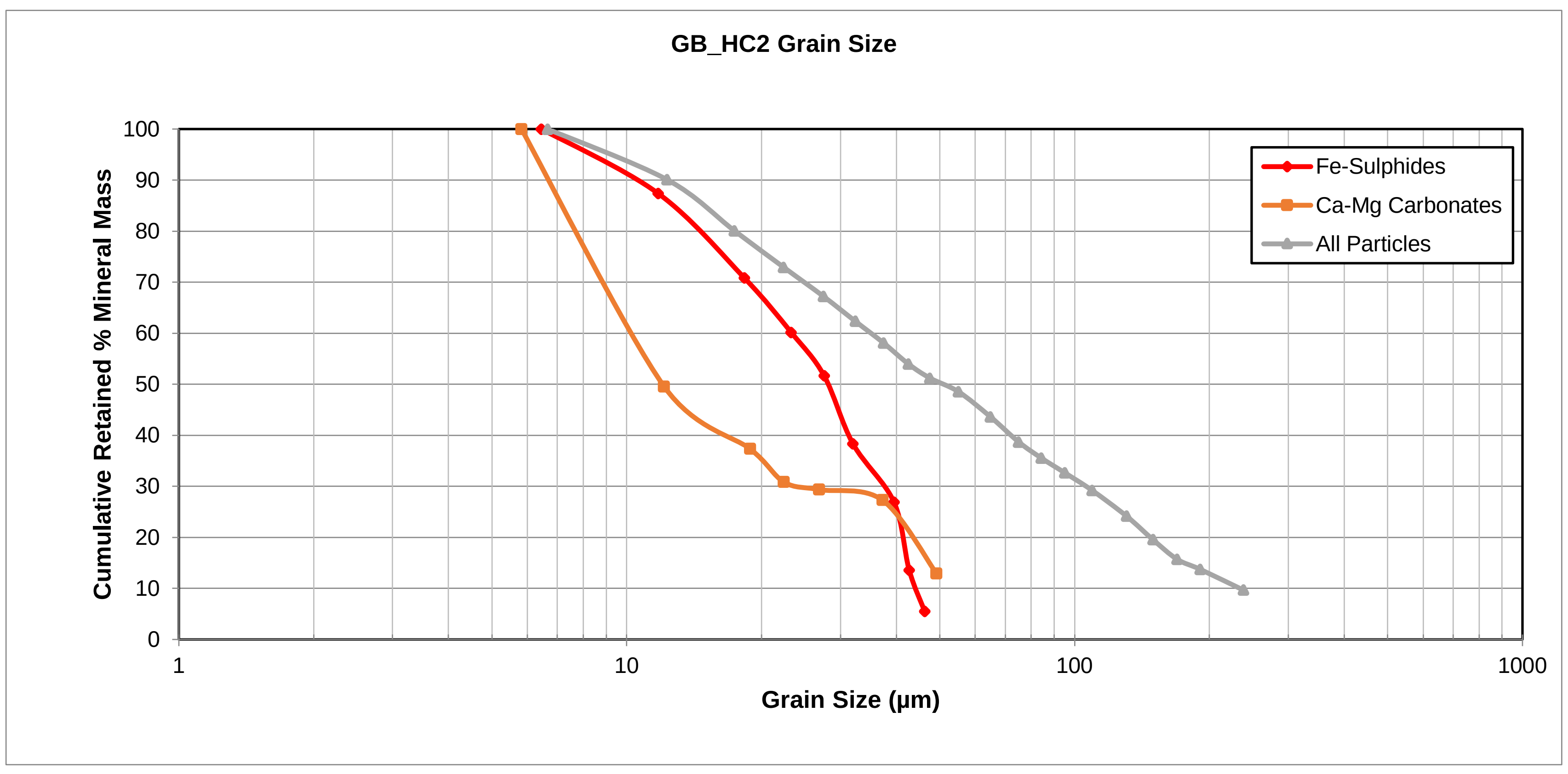
**Cumulative Retained Grain Size Distribution**



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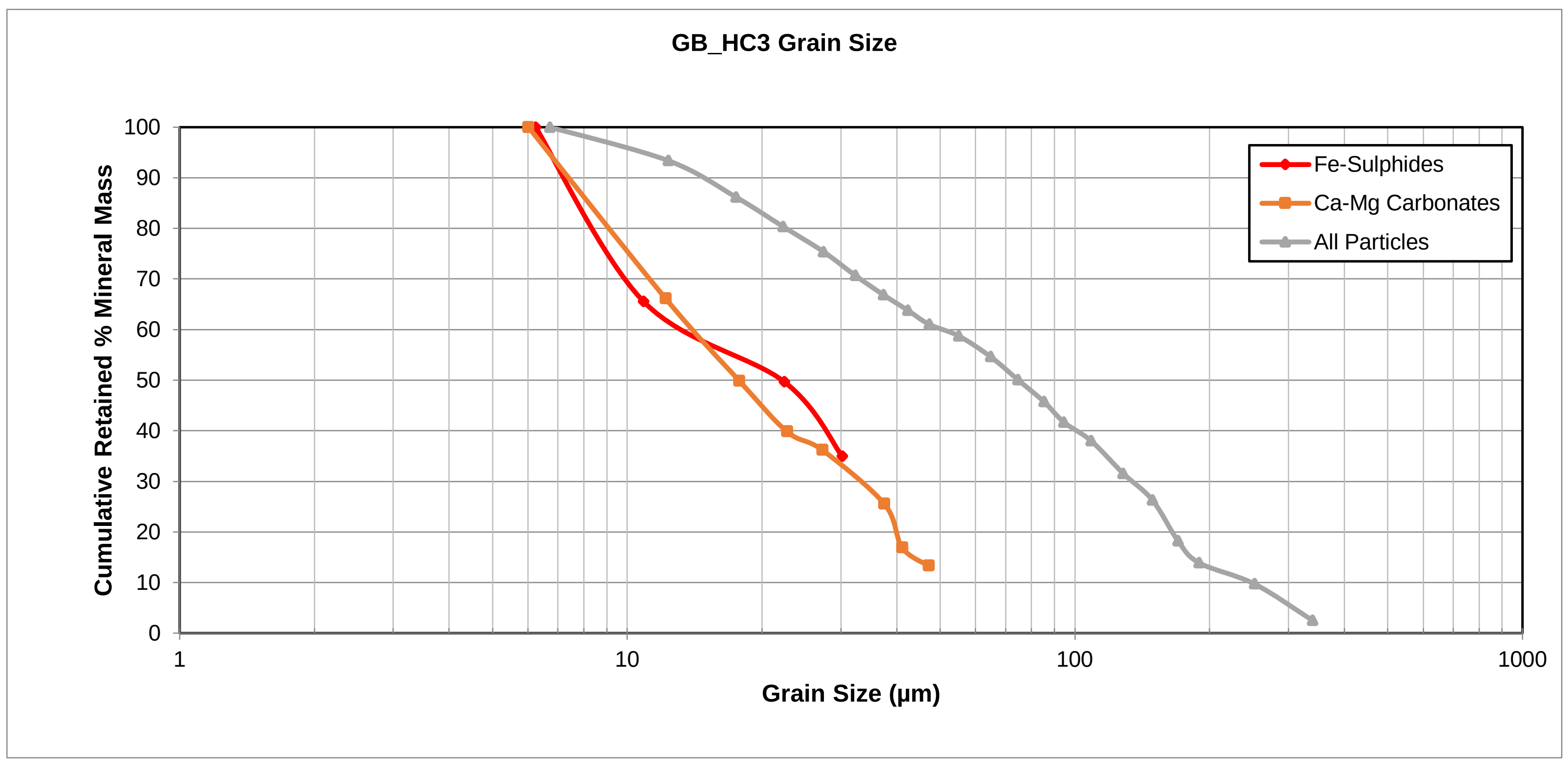
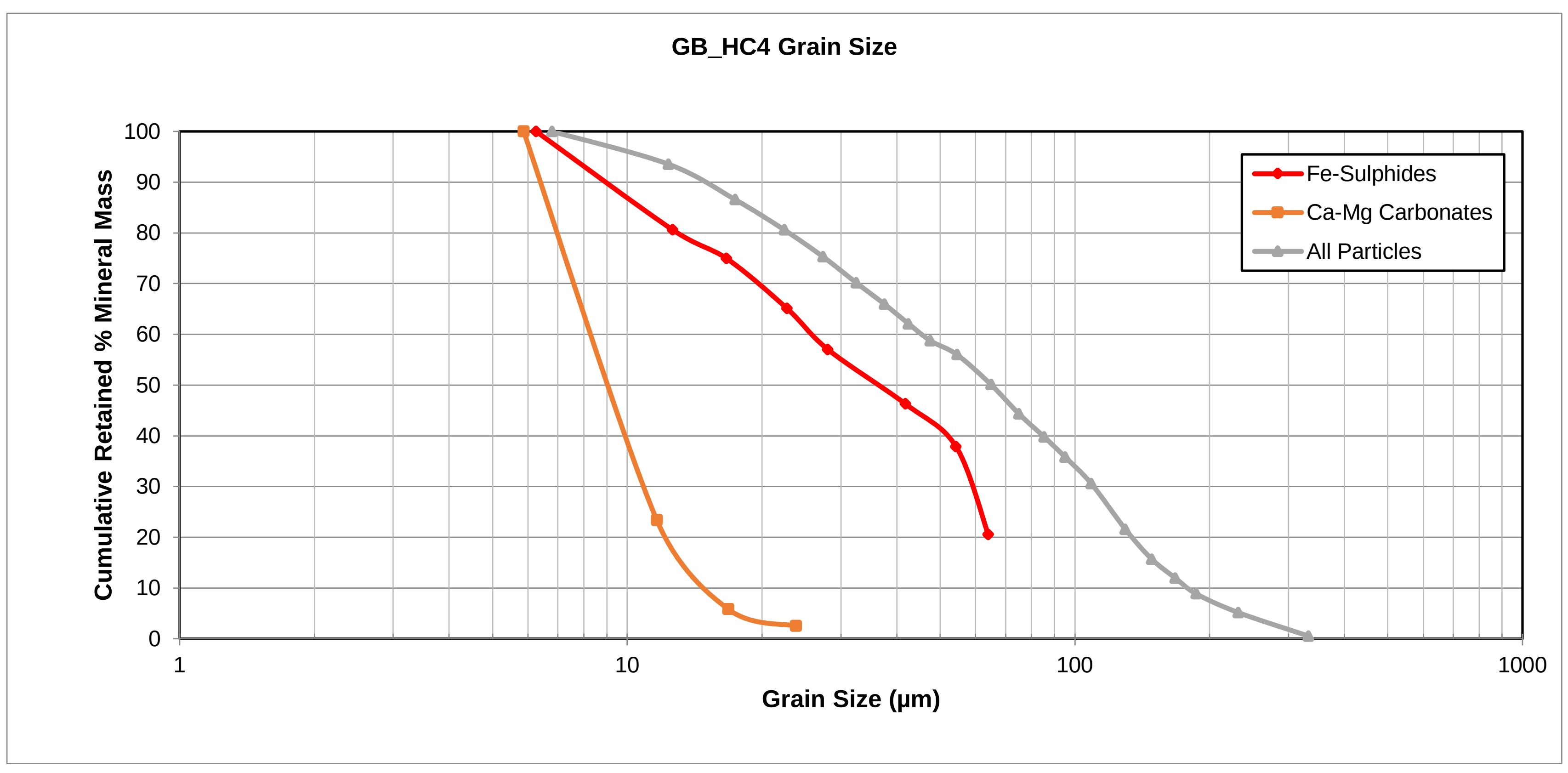
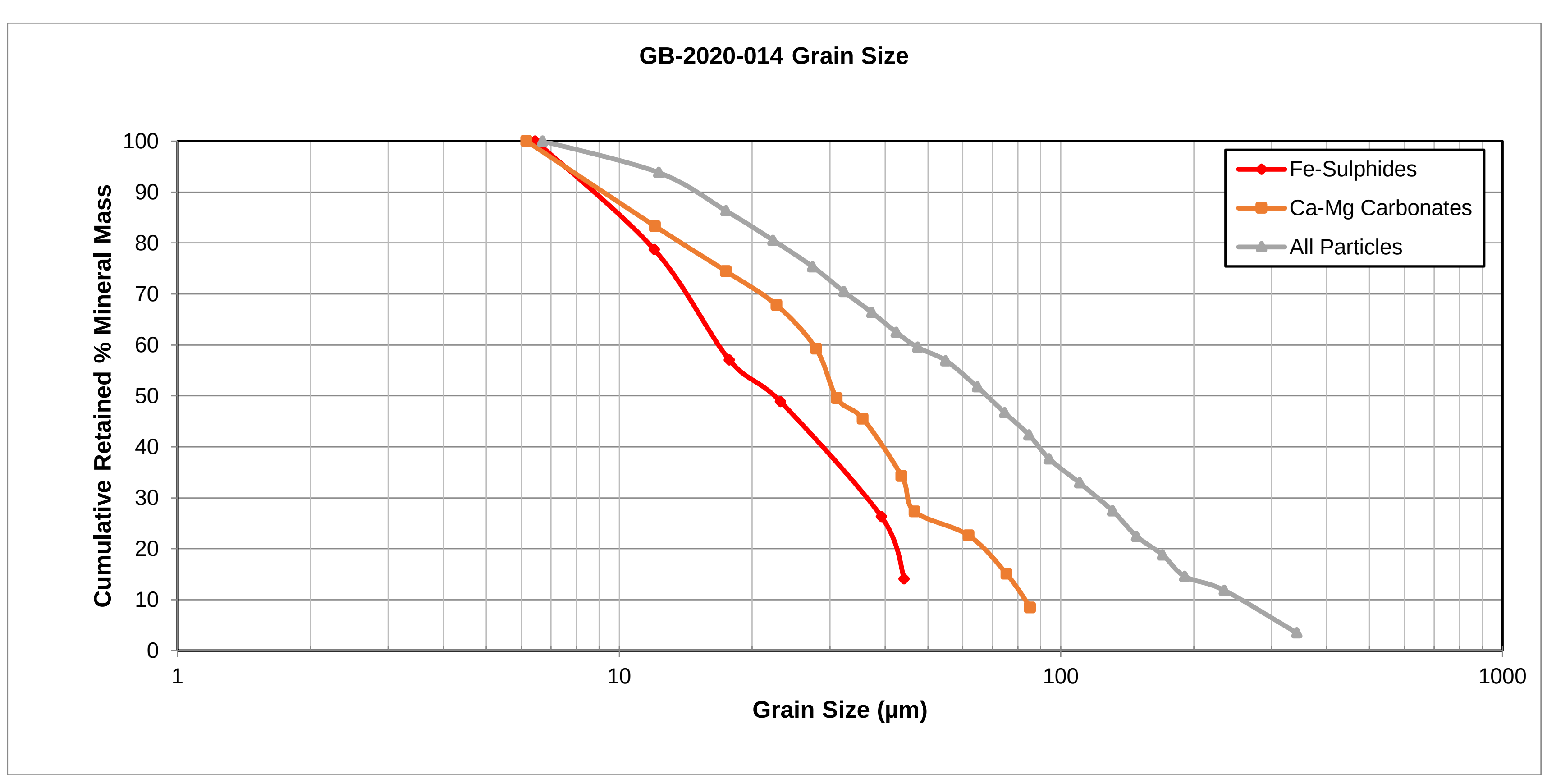
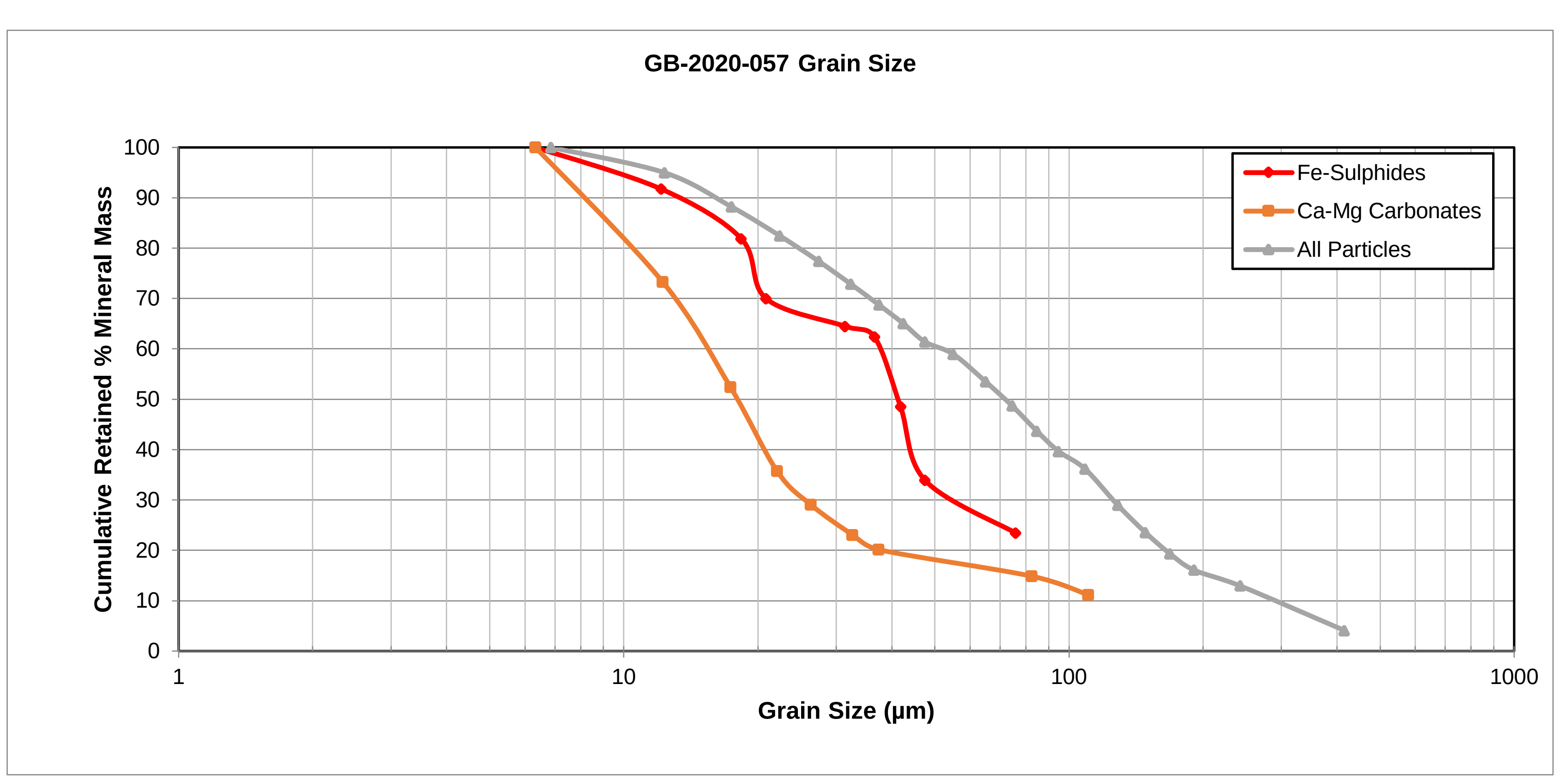
**Cumulative Retained Grain Size Distribution**



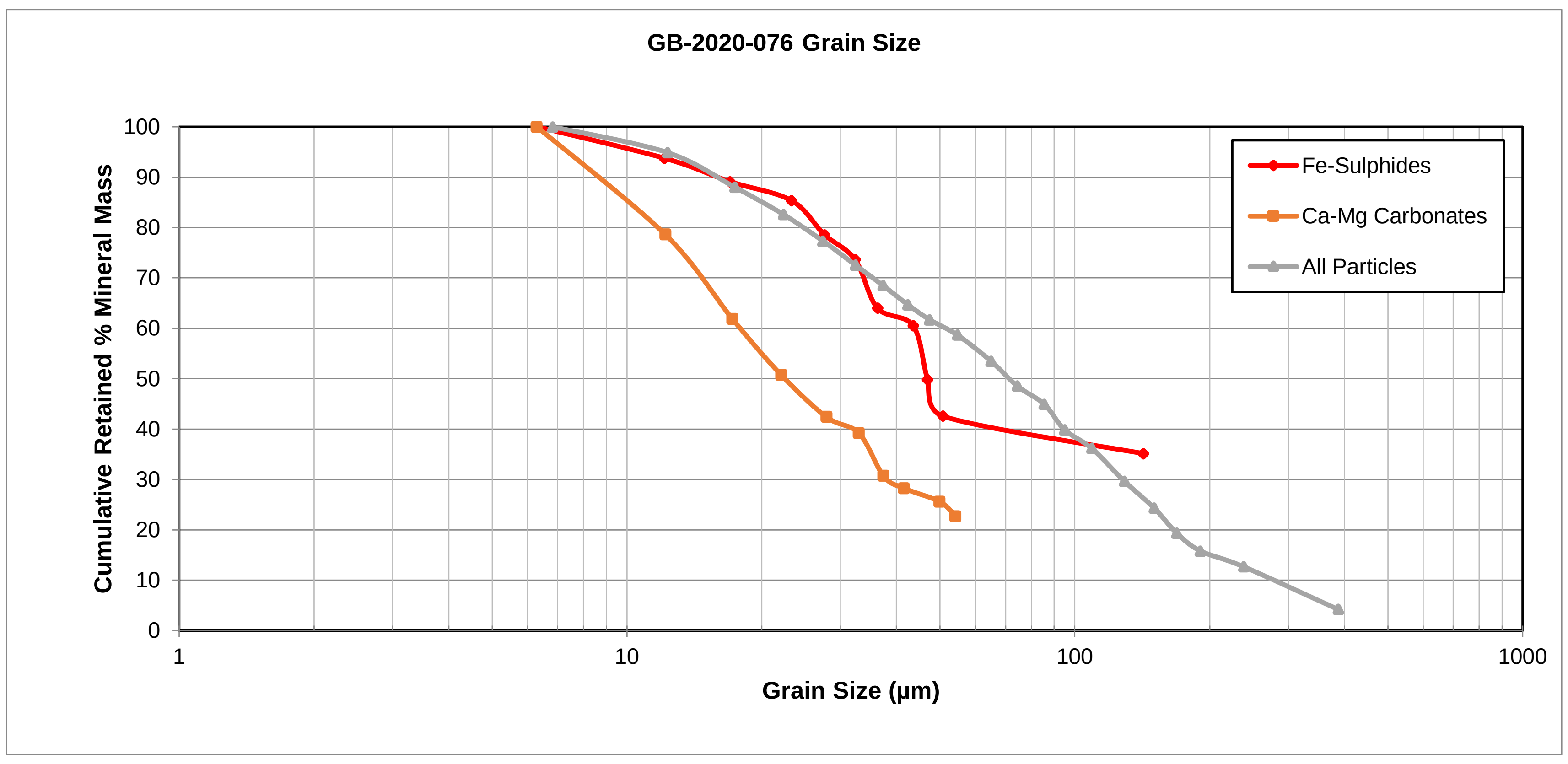



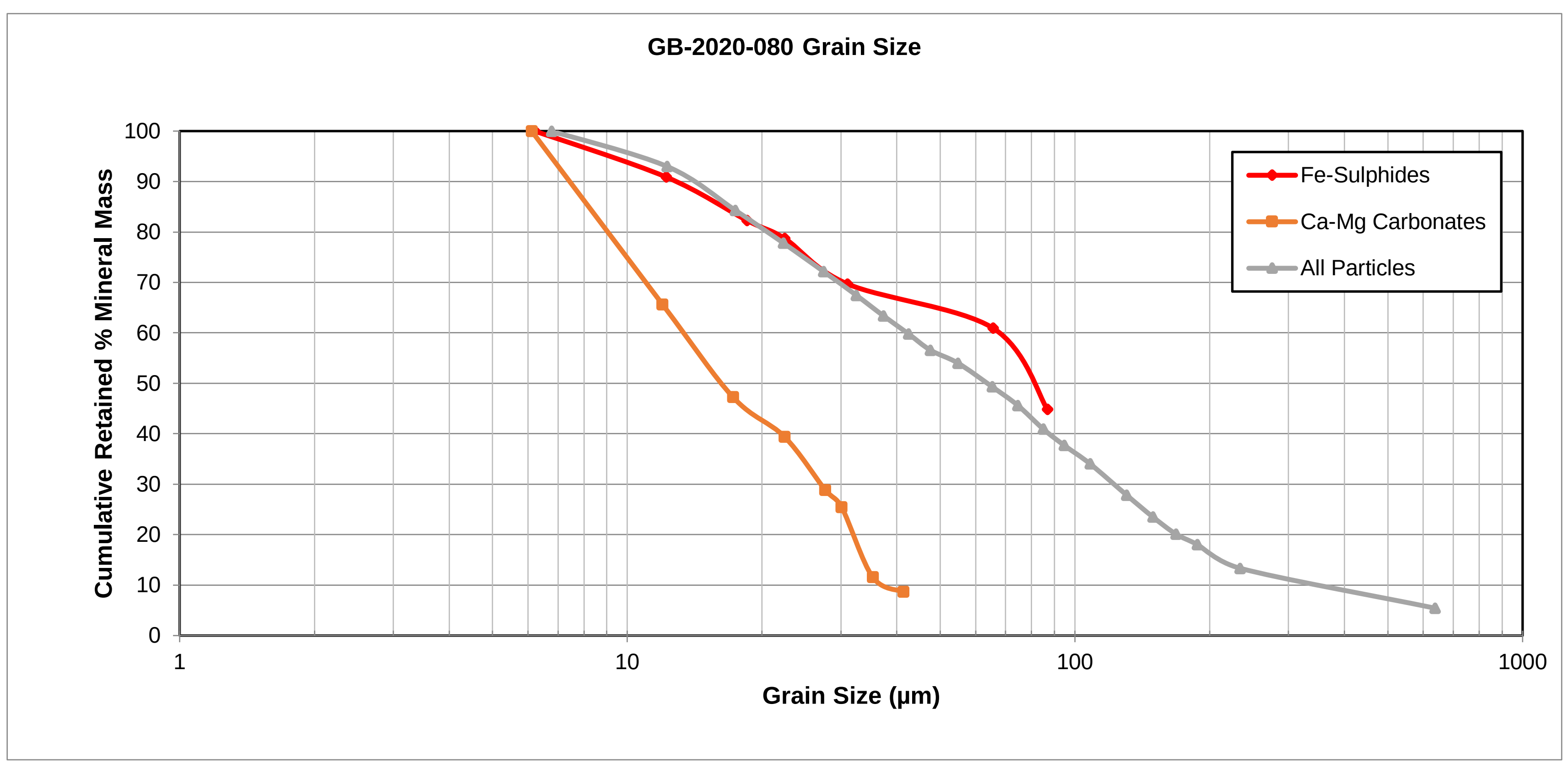



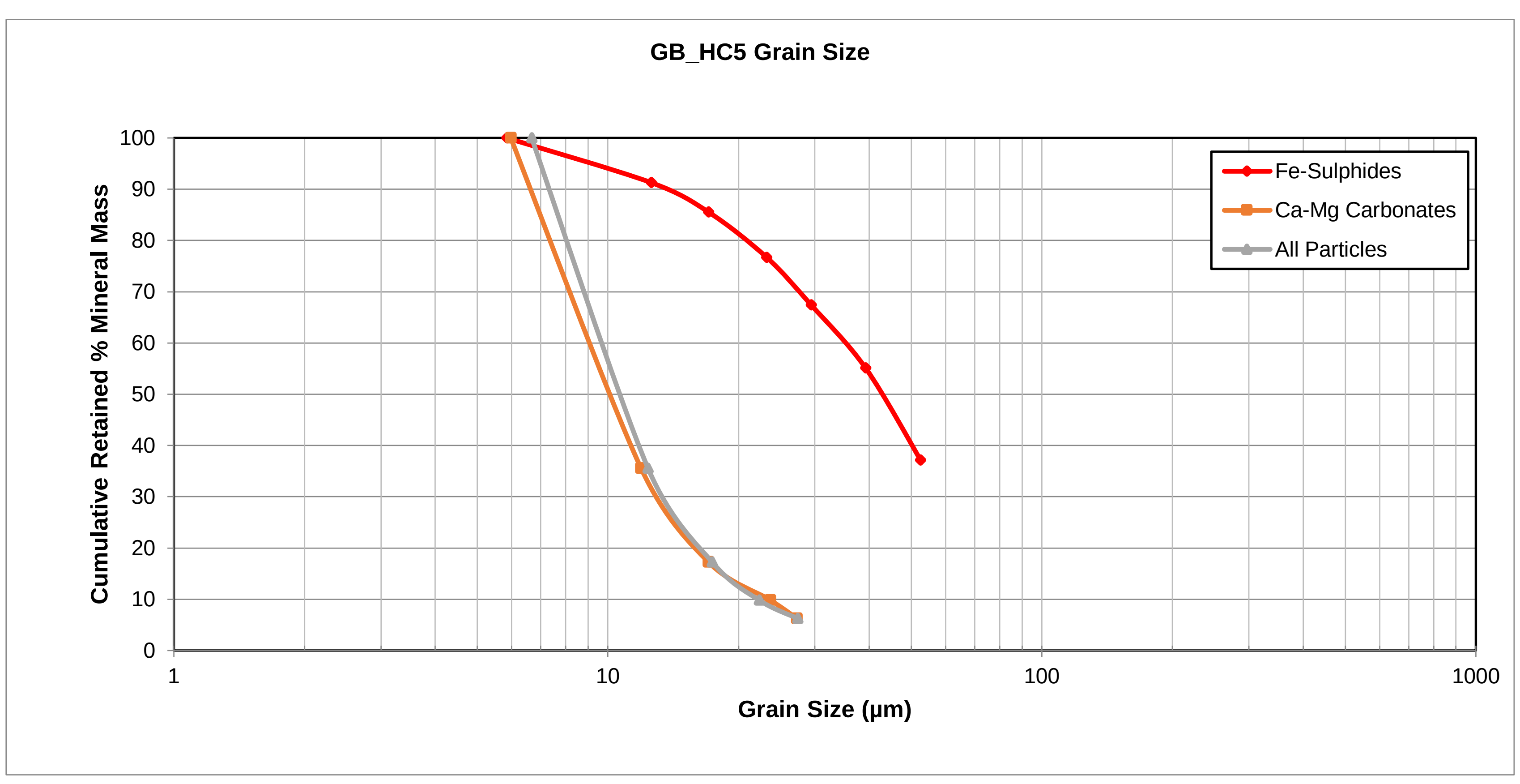
Lorax Environmental Services
Custom-Min
MI5037-SEP21

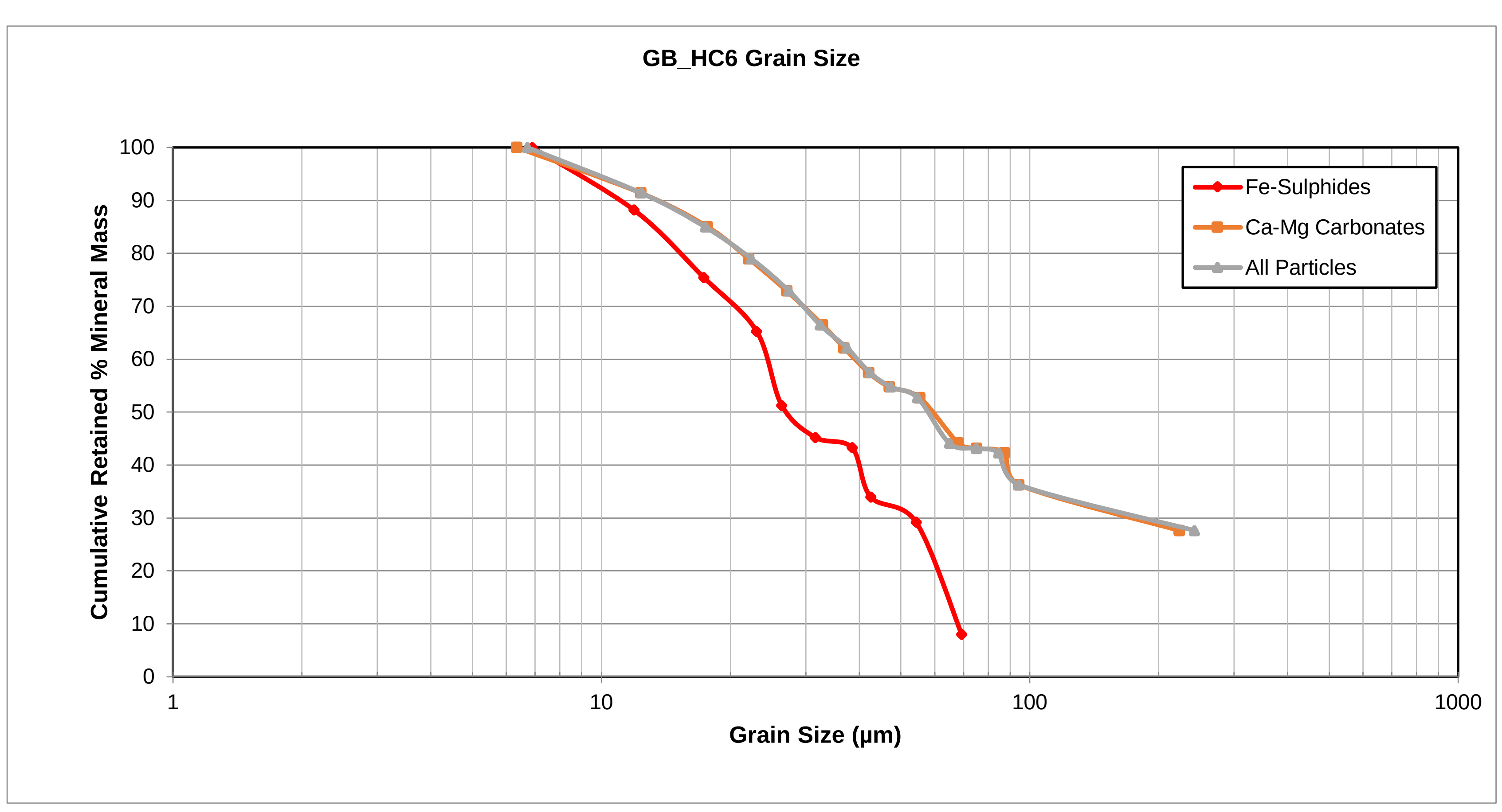
*High Definition Mineralogical Analysis using QEMSCAN (Quantitative Evaluation of Materials by Scanning Electron Microscopy)*

**Cumulative Retained Grain Size Distribution**



Lorax Environmental Services
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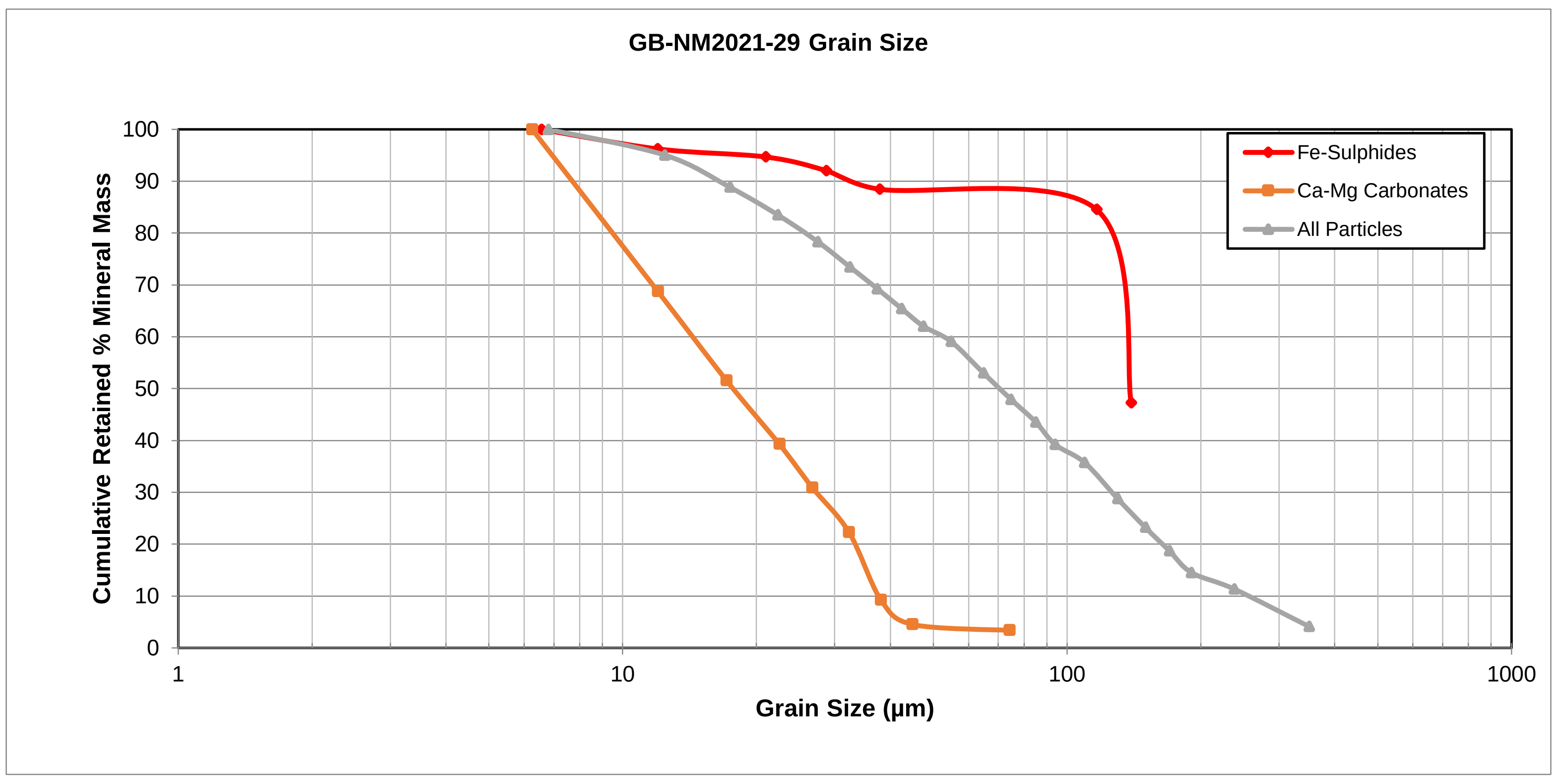
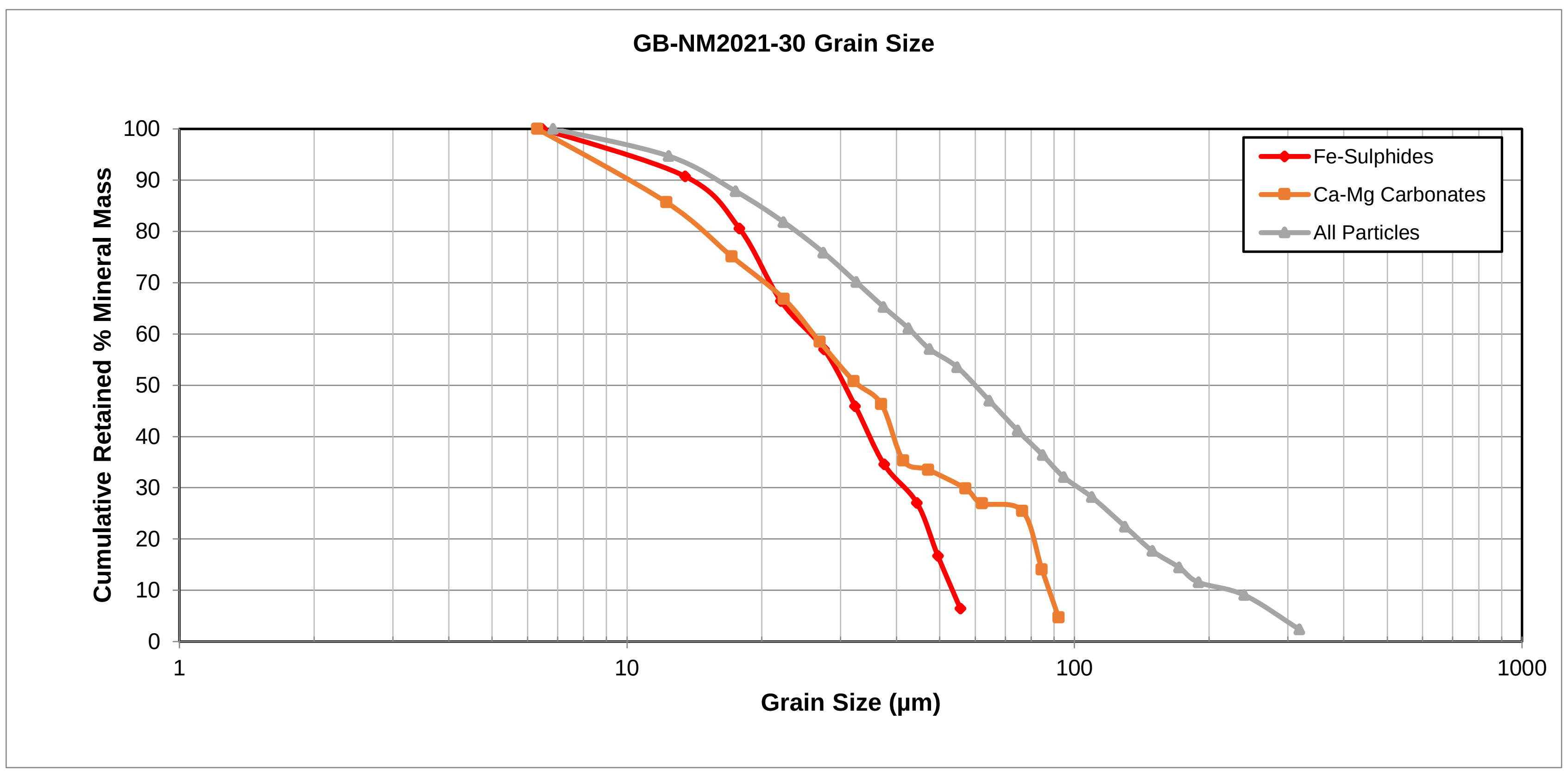
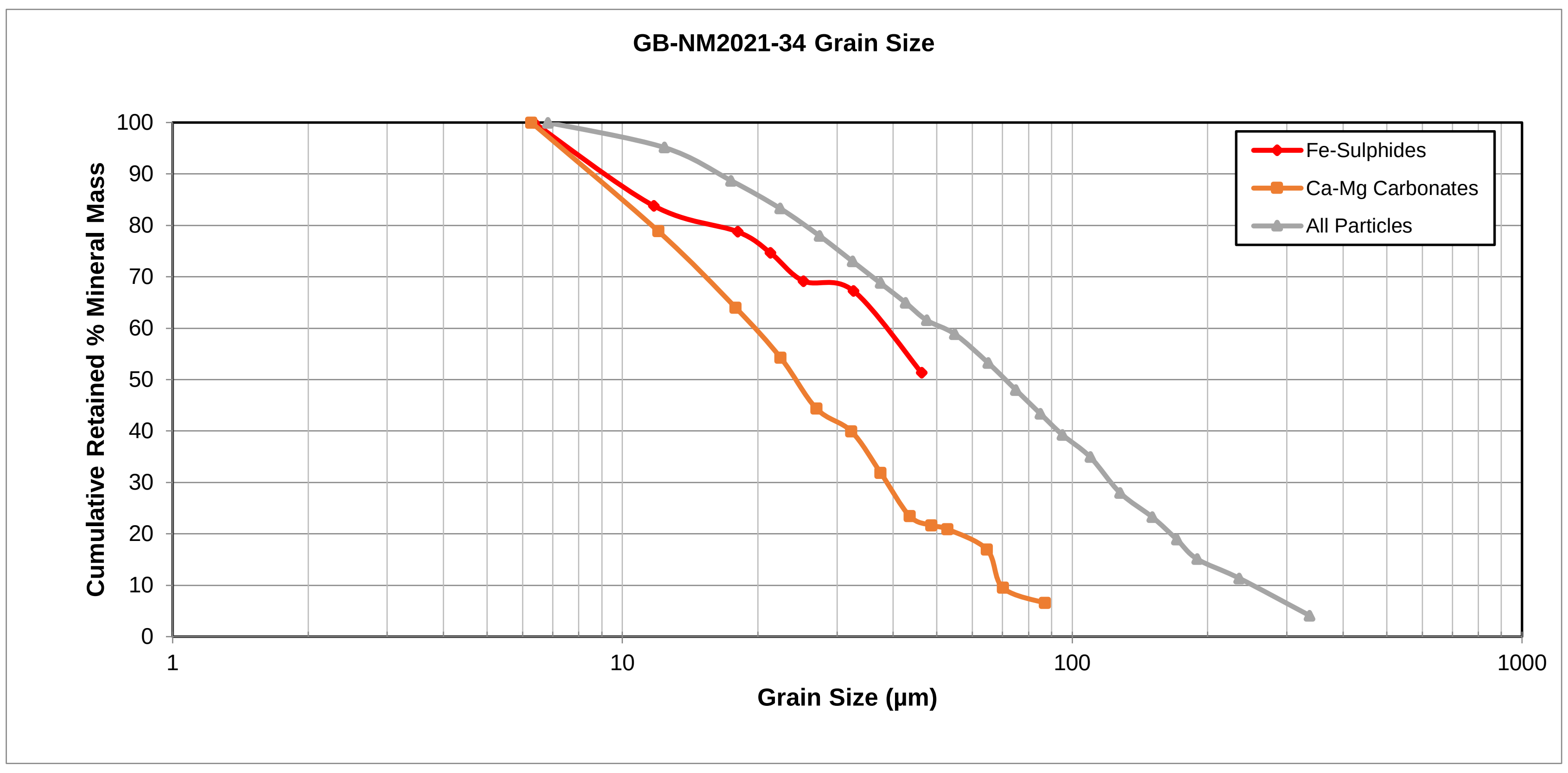
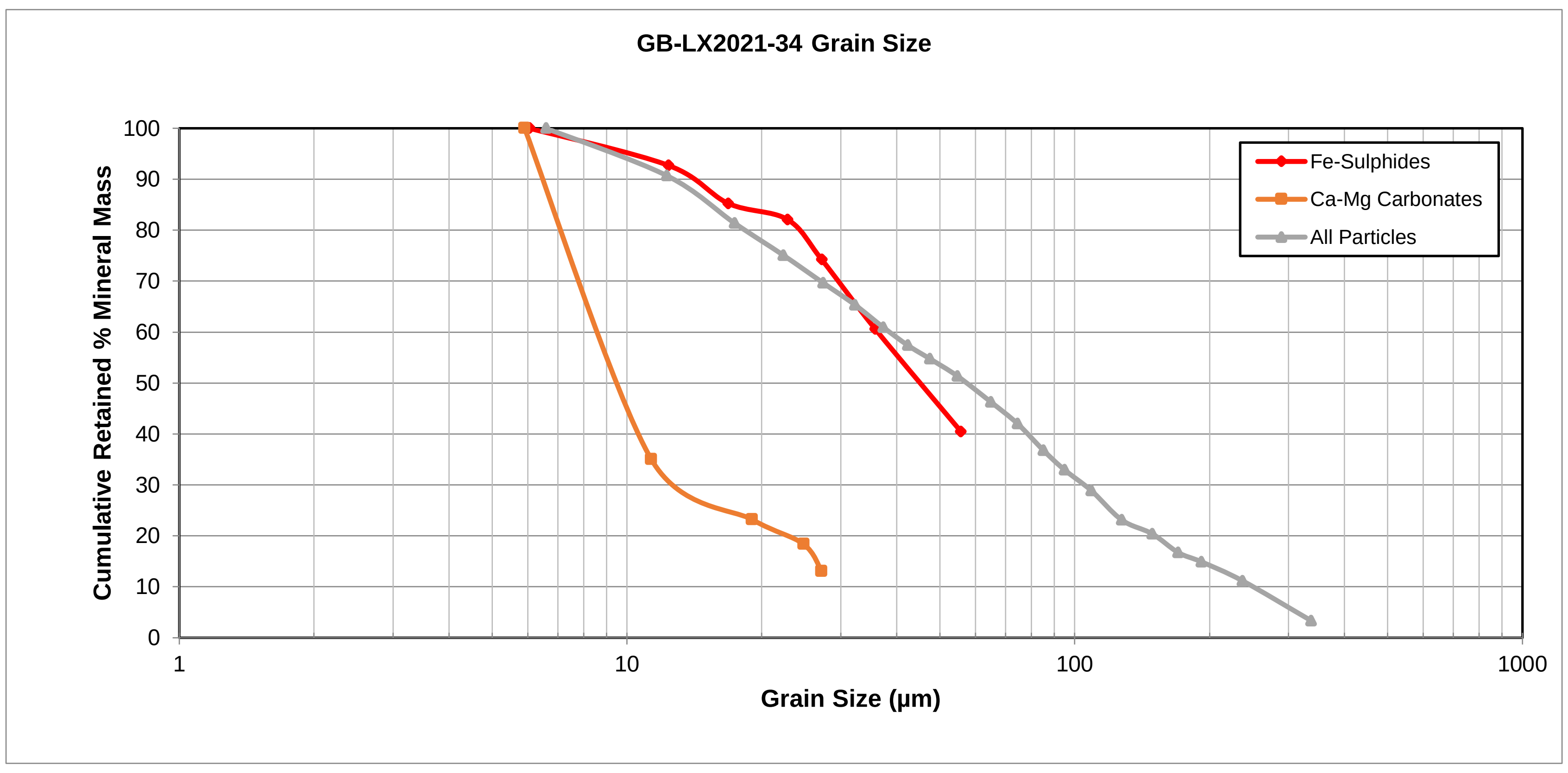
*High Definition Mineralogical Analysis using QEMSCAN (Quantitative Evaluation of Materials by Scanning Electron Microscopy)*

**Cumulative Retained Grain Size Distribution**



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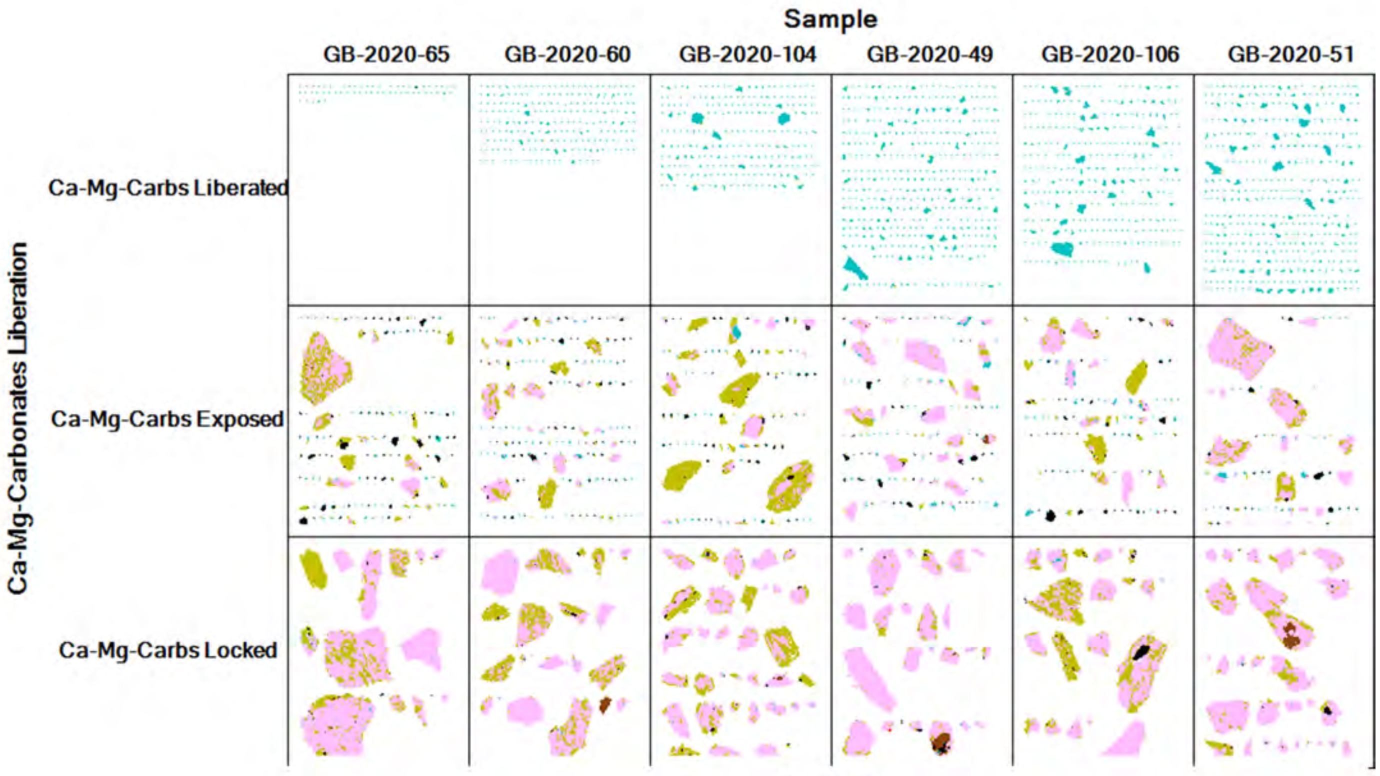
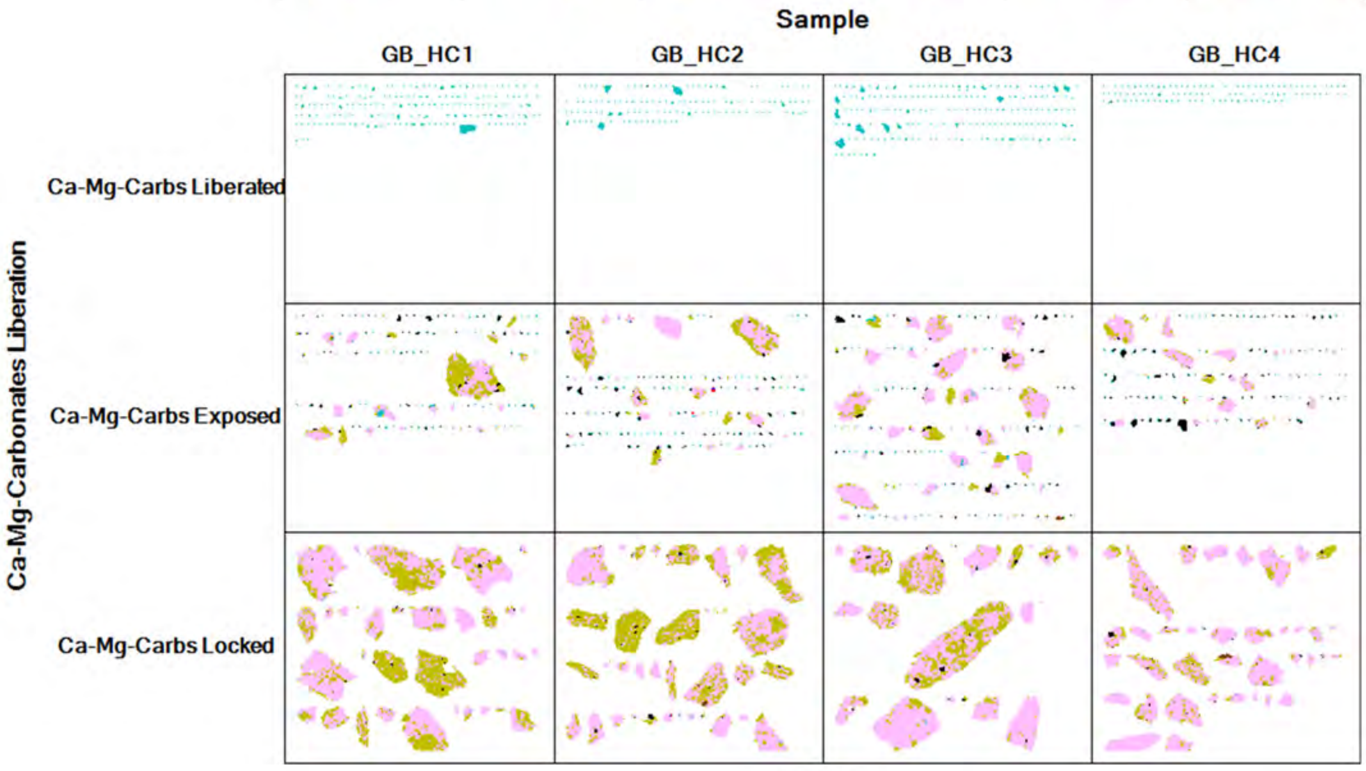
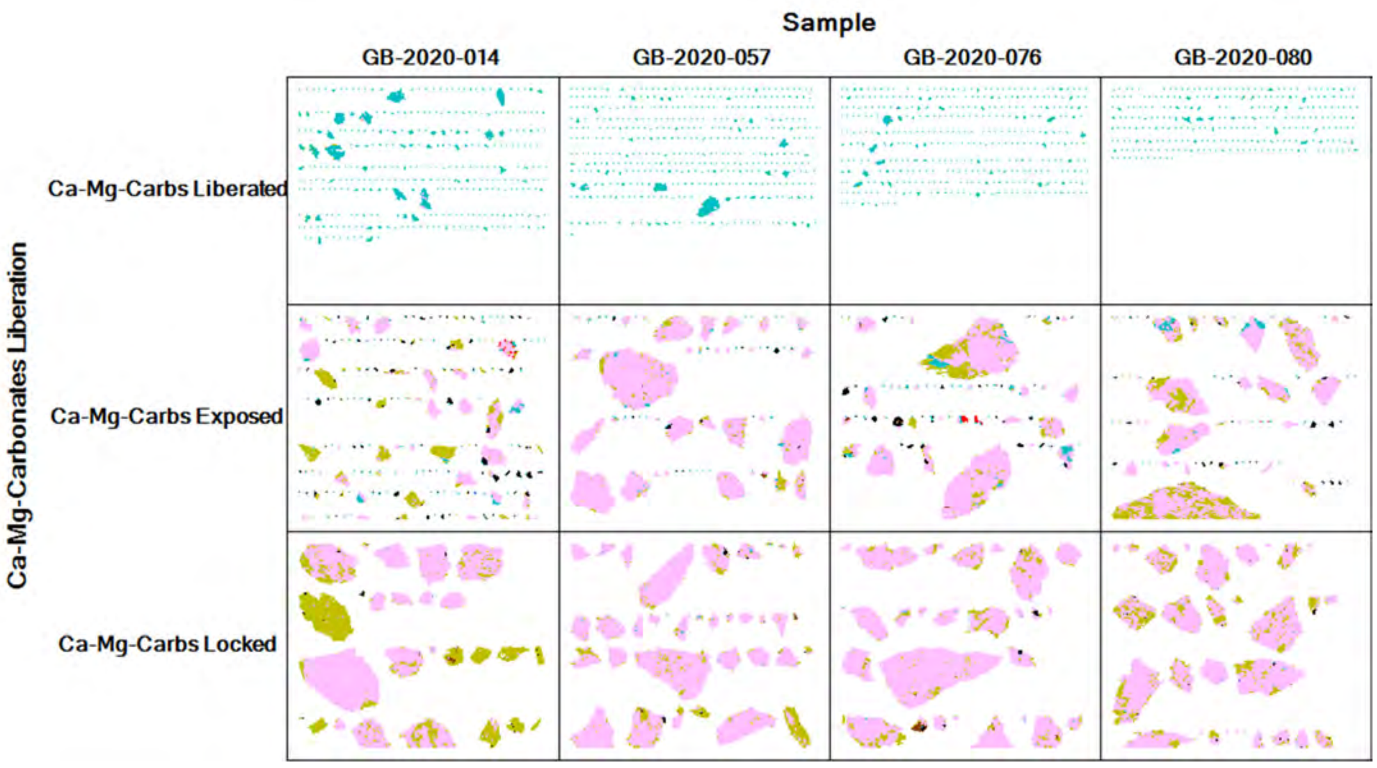
High Definition Mineralogical Analysis using QEMSCAN (Quantitative Evaluation of Materials by Scanning Electron Microscopy)

- Background
- Fe-Sulphides
- Other Sulphides
- Qtz/Feld/Amph
- Micas/Clays
- Ca-Mg-Carbonates
- Oxides
- Other



Lorax Environmental Services
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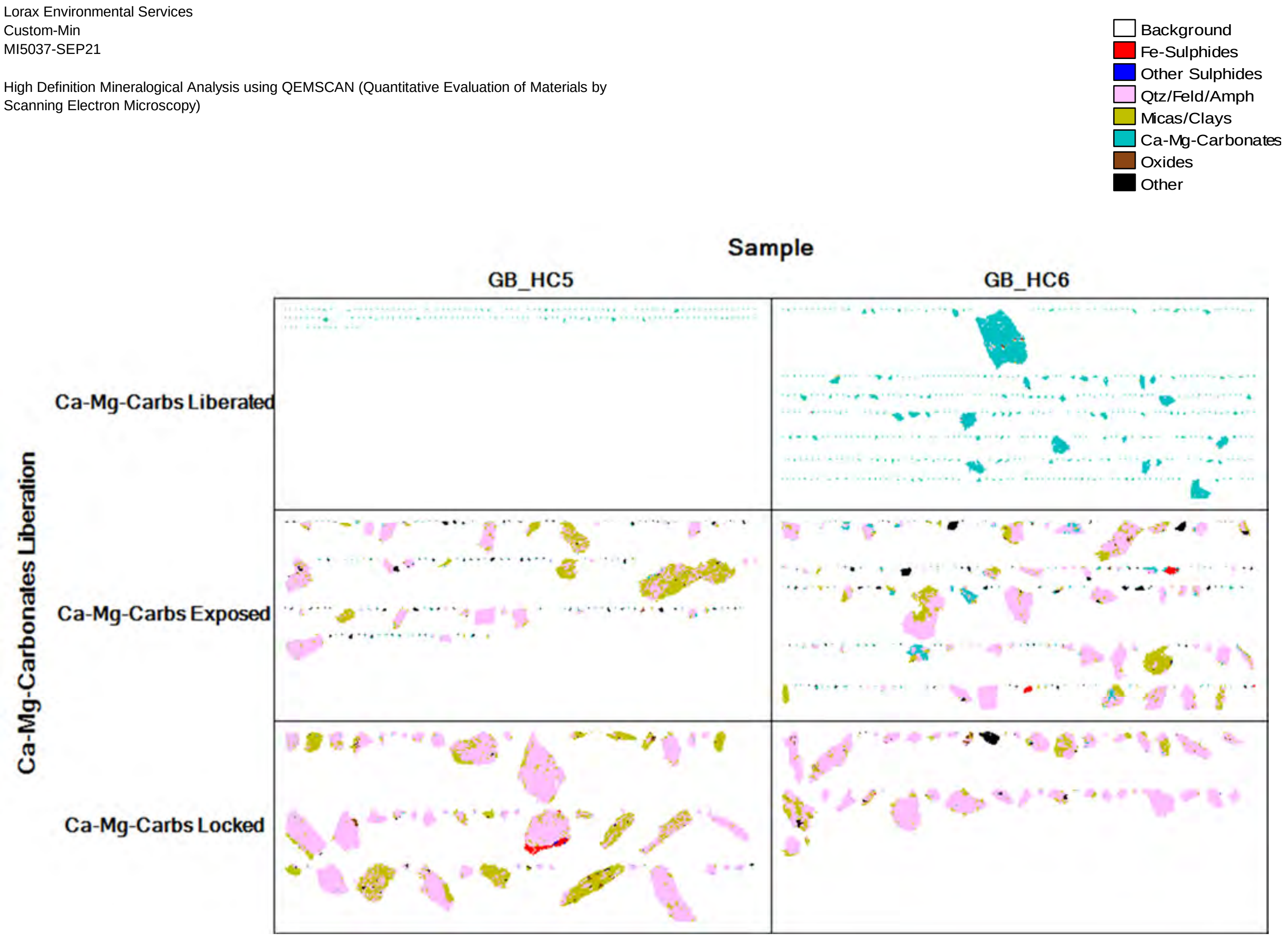
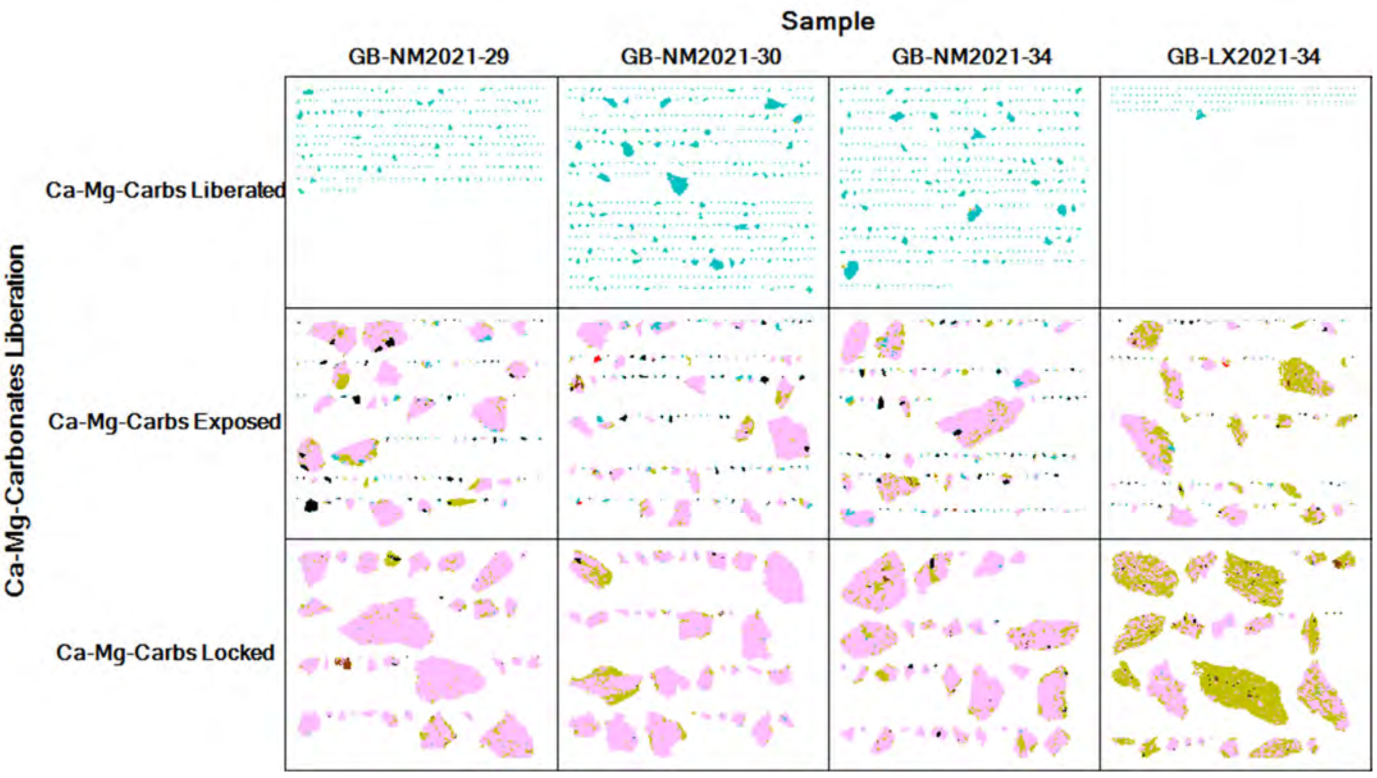
MI5037-SEP21

High Definition Mineralogical Analysis using QEMSCAN (Quantitative Evaluation of Materials by Scanning Electron Microscopy)



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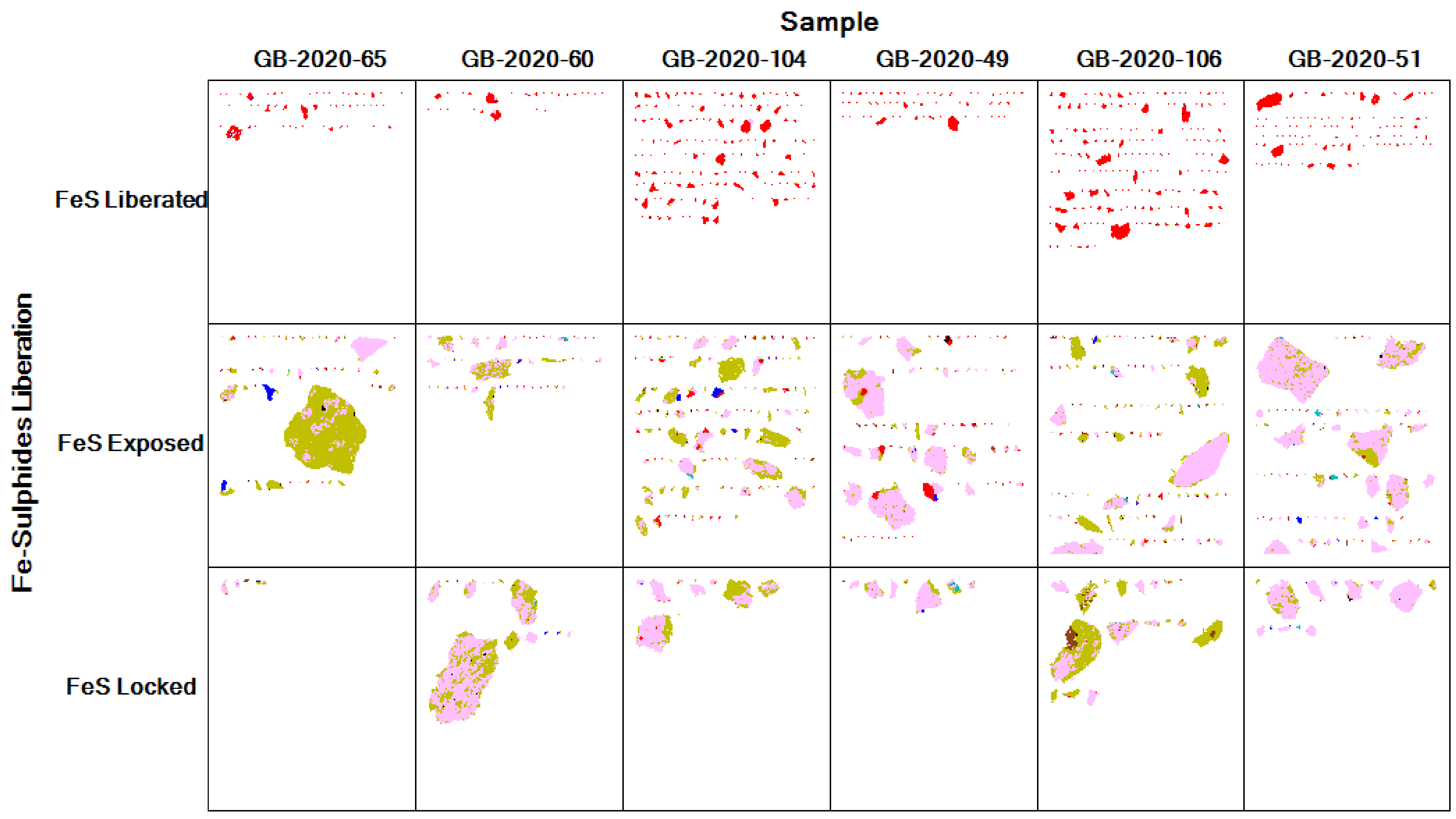
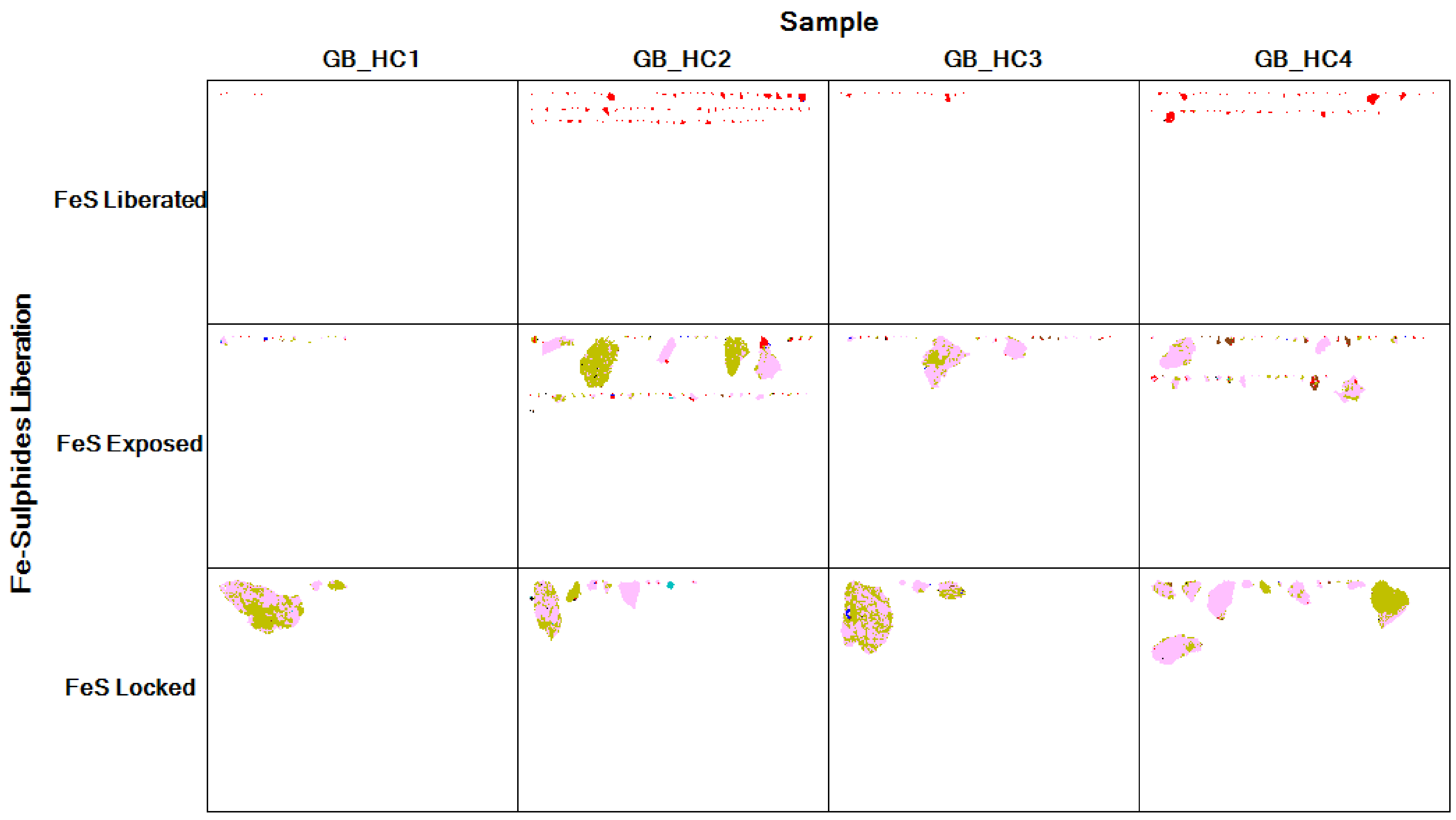
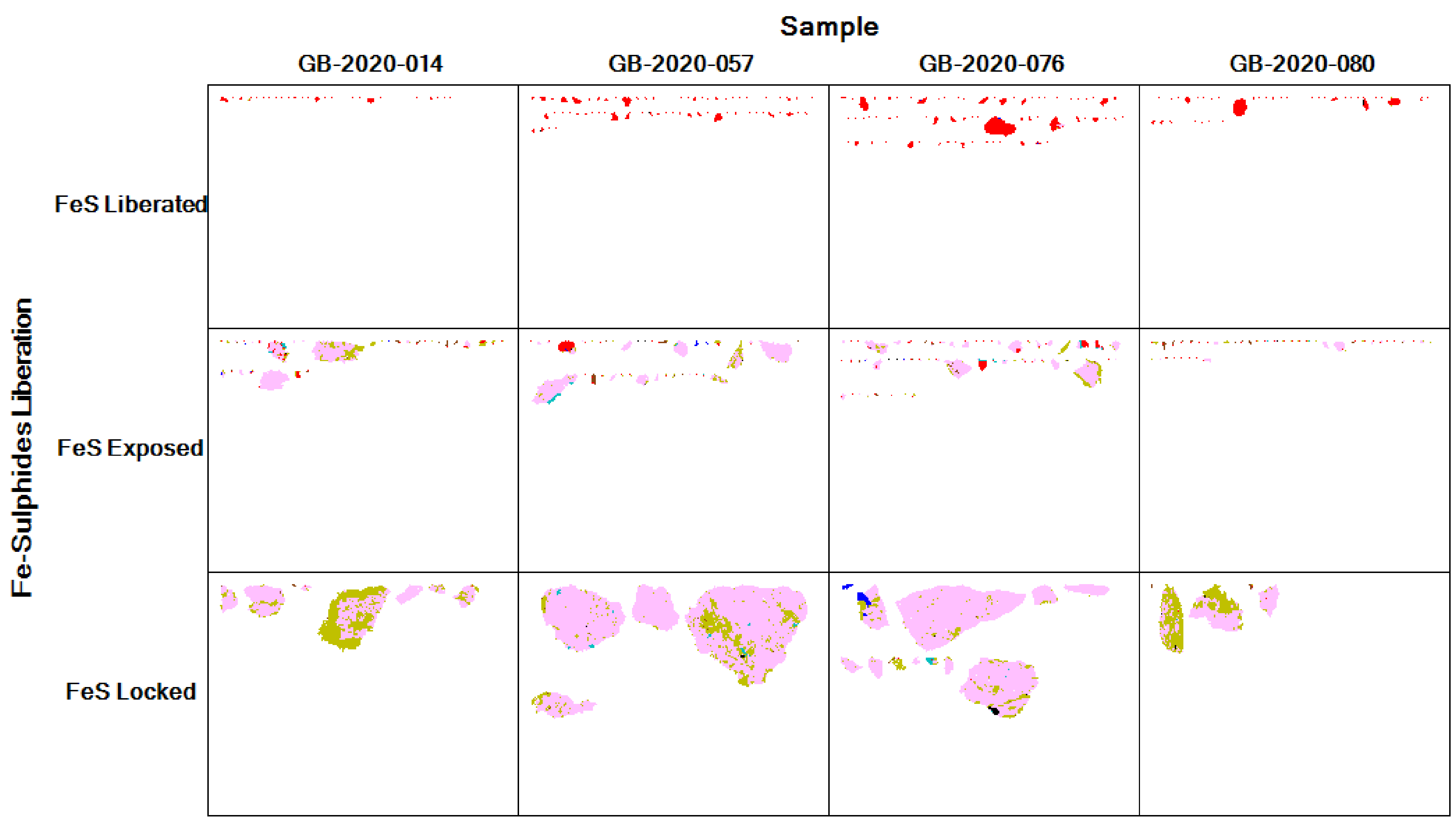
High Definition Mineralogical Analysis using QEMSCAN (Quantitative Evaluation of Materials by Scanning Electron Microscopy)

Lorax Environmental Services
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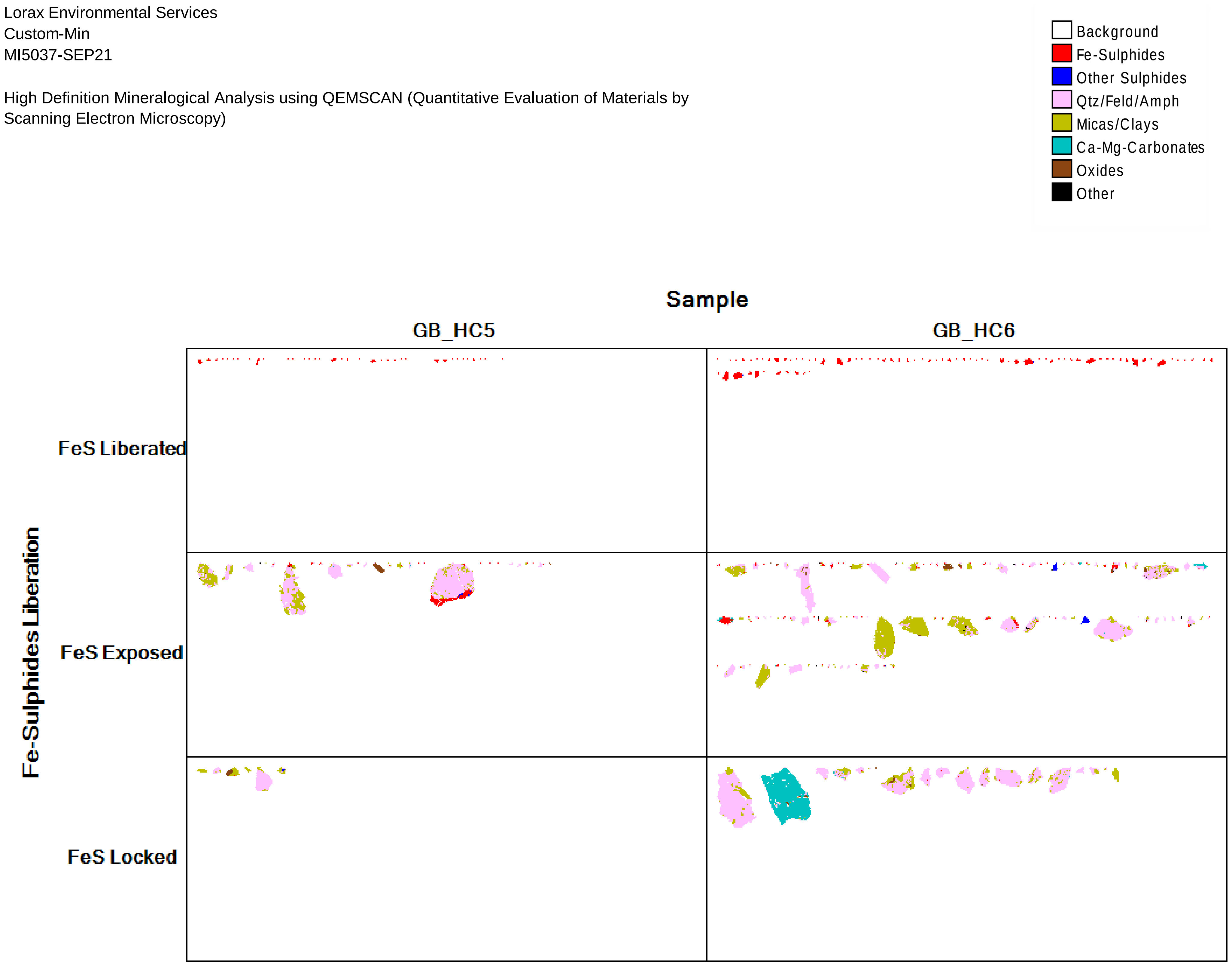
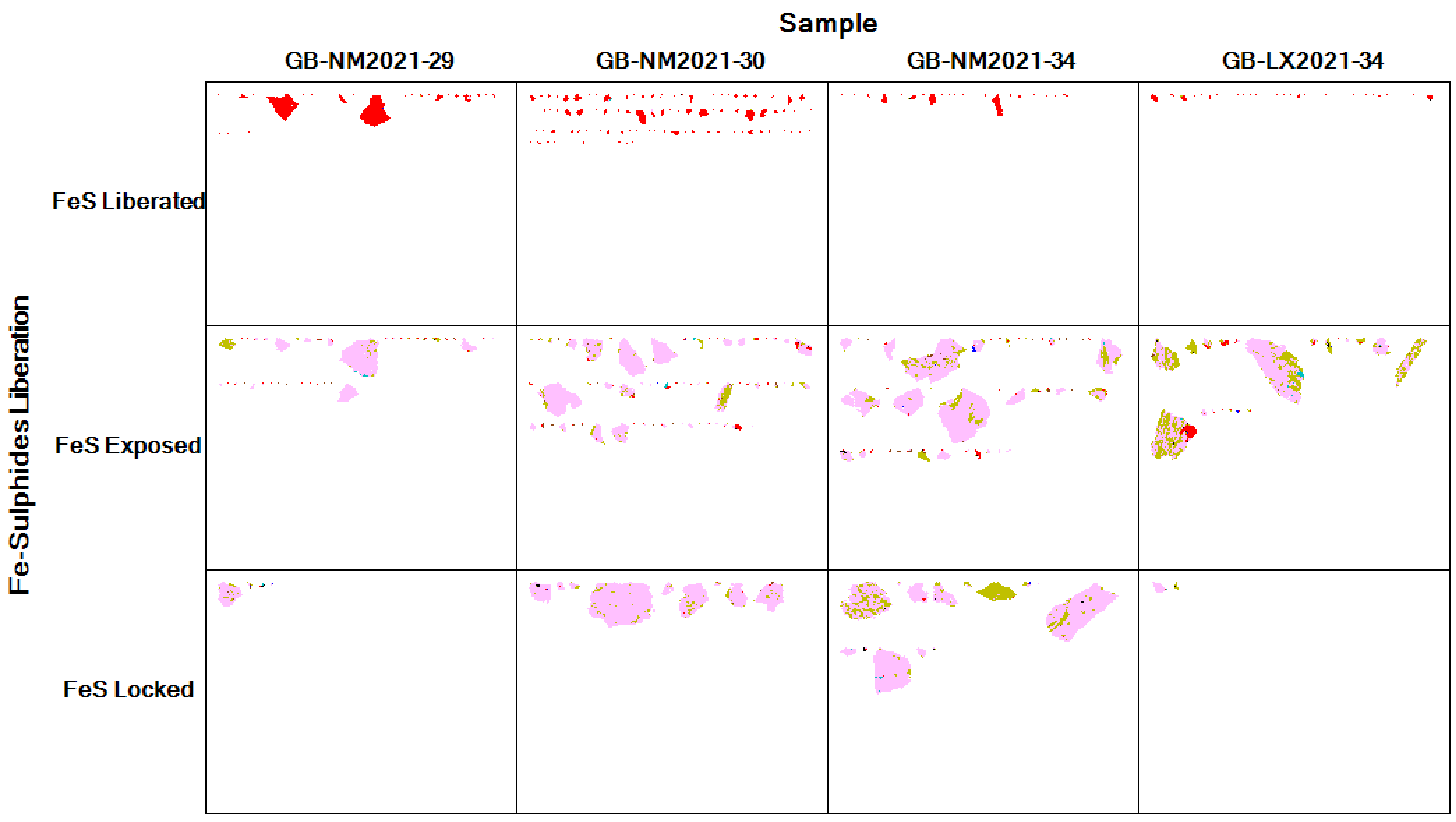
MI5037-SEP21

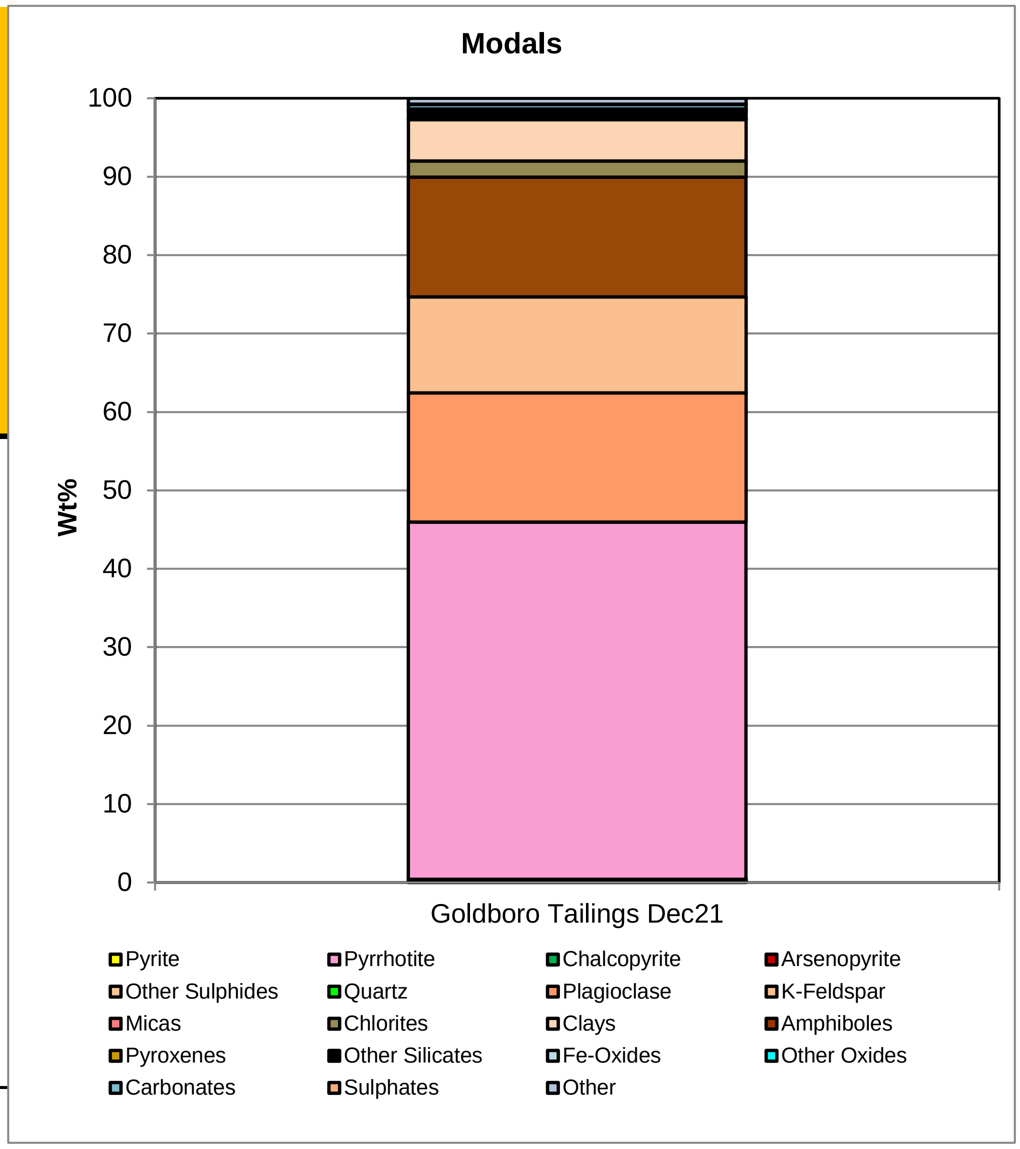
High Definition Mineralogical Analysis using QEMSCAN (Quantitative Evaluation of Materials by Scanning Electron Microscopy)



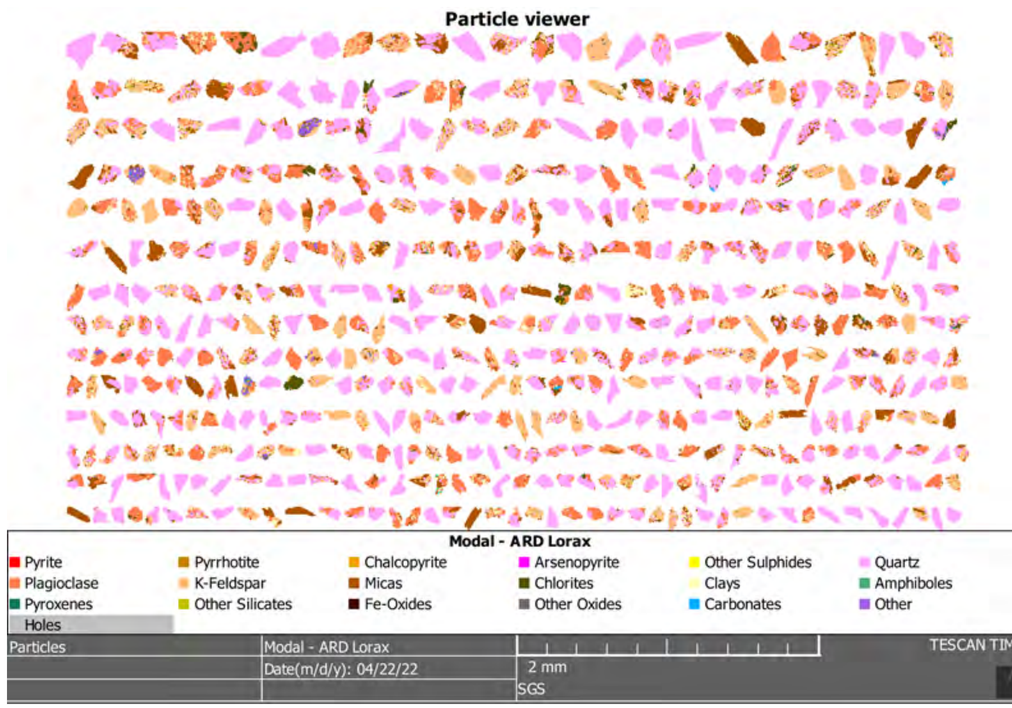
**Appendix B.2 TIMA Results - 2021 Master Composite Tailings, Table 1 Mineralogical Modals**

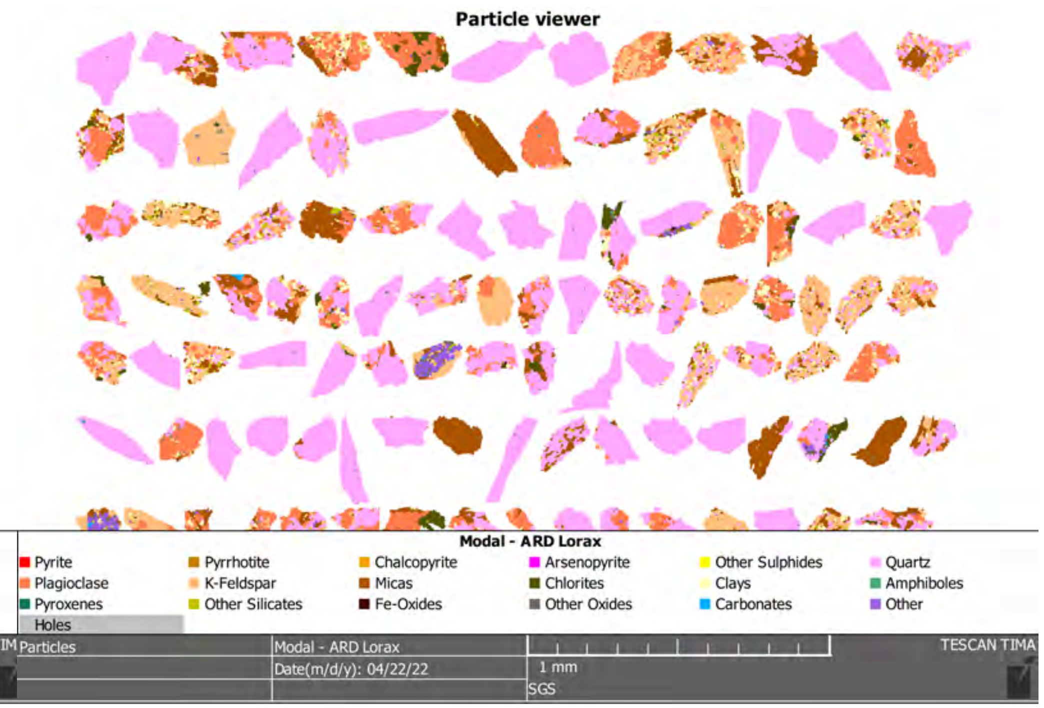
| Mineral (%) | 2021 Master Composite Tailings |
|---|---|
| Pyrite | 0.05 |
| Pyrrhotite | 0.10 |
| Chalcopyrite | 0.03 |
| Arsenopyrite | 0.23 |
| Other Sulphides | 0.01 |
| Quartz | 45.6 |
| Plagioclase | 16.5 |
| K-Feldspar | 12.2 |
| Micas | 15.3 |
| Chlorites | 2.06 |
| Clays | 5.25 |
| Amphiboles | 0.04 |
| Pyroxenes | 0.01 |
| Other Silicates | 0.99 |
| Fe-Oxides | 0.11 |
| Other Oxides | 0.21 |
| Carbonates | 0.59 |
| Sulphates | 0.01 |
| Other | 0.76 |
| Total | 100 |

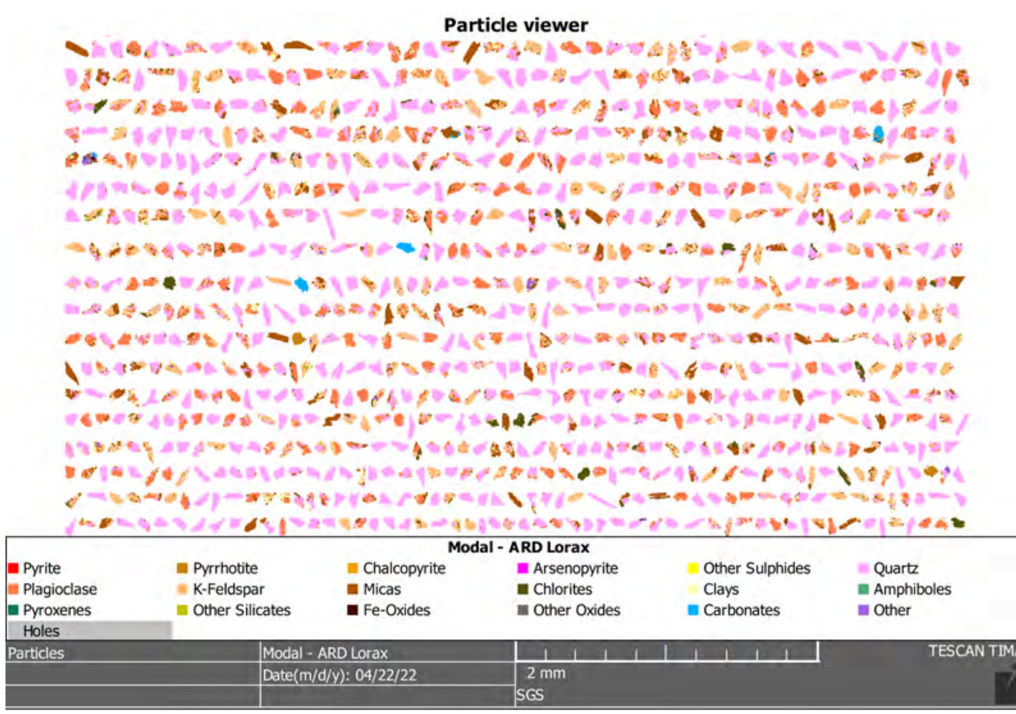


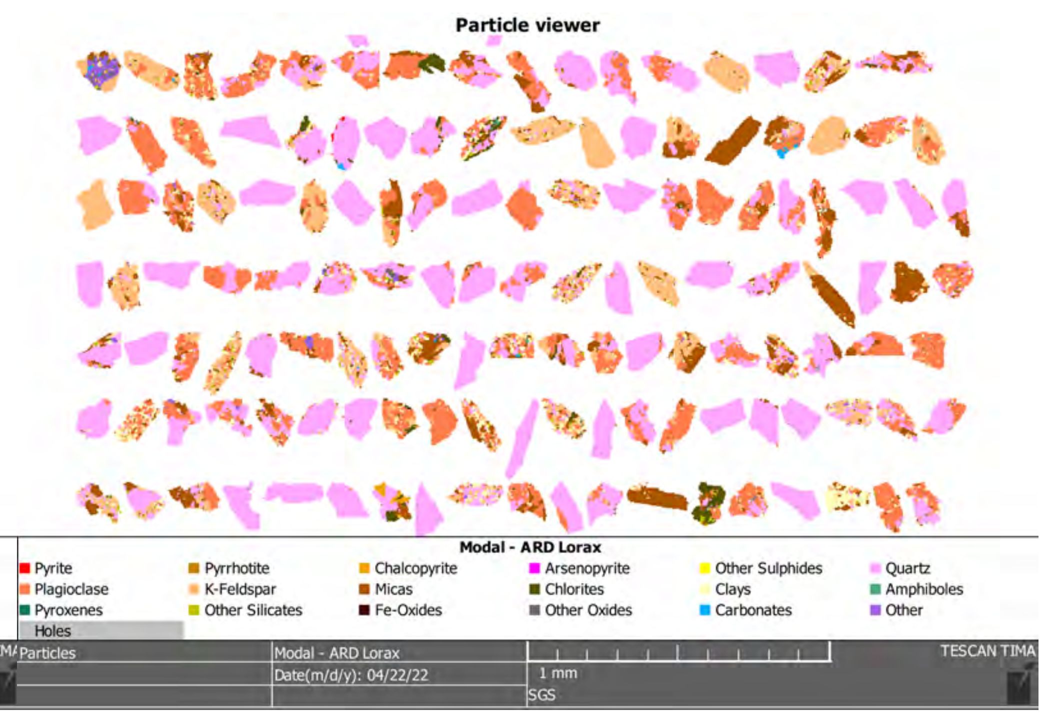
**Appendix B.2 TIMA Results - 2021 Master Composite Tailings, Particle Size Images**

## Particle Images



# *Appendix C: Static Test Results*

*Appendix C.1: Waste Rock and Ore Static Test Results*

*Appendix C.2: Tailings Static Test Results*

*Appendix C.3: Historic Tailings Static Test Results*

*Appendix C.3: Overburden Static Test Results*

Anaconda Mining

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 1: Acid Base Accounting Results**

| Sample ID | Rock Type | Ore/Waste | Phase | Drillhole | Interval | | Paste pH | Total S | Sulphate S (HCl) | Sulphide S | Total Carbon | Carbonate | Inorganic C | Organic C | CaNP | Mod NP | Corrected Mod. NP | CaNP/TAP | Corrected Mod. NP/TAP | Operational NPR | Designation | NAG pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | - | - | - | m | m | - | % | % | % | % | % | % | % | kg $CaCO_3$/t | kg $CaCO_3$/t | kg $CaCO_3$/t | - | - | - | - | - |
| GB-2020-001 | argillite | waste | Phase I | BR-17-10 | 20.5 | 22.4 | 9.27 | <0.005 | <0.04 | <0.04 | 0.074 | 0.210 | 0.042 | 0.032 | 3.50 | 8.2 | 3.2 | 22.42 | 20.48 | 22.42 | NPAG | - |
| GB-2020-002 | argillite | waste | Phase I | BR-17-10 | 33.5 | 35.5 | 9.45 | 0.220 | 0.07 | 0.15 | 0.125 | 0.270 | 0.054 | 0.071 | 4.50 | 8.8 | 3.8 | 0.66 | 0.55 | 0.66 | PAG1 | 4.09 |
| GB-2020-003 | greywacke | waste | Phase I | BR-17-10 | 36.5 | 38.5 | 9.51 | 0.008 | <0.04 | <0.04 | 0.064 | 0.225 | 0.045 | 0.019 | 3.75 | 8.9 | 3.9 | 15.01 | 15.60 | 15.60 | NPAG | - |
| GB-2020-004 | greywacke | waste | Phase I | BR-17-10 | 50.0 | 52.0 | 9.68 | 0.049 | <0.04 | <0.04 | 0.050 | 0.125 | 0.025 | 0.025 | 2.08 | 7.0 | 2.0 | 1.36 | 1.31 | 1.36 | PAG2 | - |
| GB-2020-005 | greywacke | waste | Phase I | BR-17-10 | 67.0 | 69.2 | 9.23 | 0.121 | <0.04 | 0.09 | 0.055 | 0.145 | 0.029 | 0.026 | 2.42 | 8.0 | 3.0 | 0.64 | 0.79 | 0.79 | PAG1 | - |
| GB-2020-006 | argillite | waste | Phase I | BR-17-10 | 78.0 | 80.0 | 9.28 | 0.241 | 0.08 | 0.16 | 0.099 | 0.250 | 0.050 | 0.049 | 4.17 | 7.6 | 2.6 | 0.55 | 0.35 | 0.55 | PAG1 | - |
| GB-2020-007 | argillite | ore | Phase I | BR-17-10 | 81.5 | 83.5 | 9.66 | 0.552 | 0.19 | 0.36 | 0.052 | 0.090 | 0.018 | 0.034 | 1.50 | 6.3 | 1.3 | 0.09 | 0.08 | 0.09 | PAG1 | - |
| GB-2020-008 | greywacke | waste | Phase I | BR-17-10 | 118.0 | 120.0 | 9.84 | 0.116 | 0.06 | 0.06 | 0.035 | 0.050 | 0.010 | 0.025 | 0.83 | 7.3 | 2.3 | 0.23 | 0.63 | 0.63 | PAG1 | - |
| GB-2020-009 | greywacke | waste | Phase I | BR-18-18 | 12.0 | 14.0 | 9.68 | 0.061 | 0.05 | <0.04 | 0.055 | 0.125 | 0.025 | 0.030 | 2.08 | 6.5 | 1.5 | 1.09 | 0.79 | 1.09 | PAG2 | 6.82 |
| GB-2020-010 | greywacke | waste | Phase I | BR-18-18 | 20.0 | 22.0 | 9.75 | 0.018 | <0.04 | <0.04 | 0.056 | 0.175 | 0.035 | 0.021 | 2.92 | 8.5 | 3.5 | 5.19 | 6.22 | 6.22 | NPAG | - |
| GB-2020-011 | greywacke | waste | Phase I | BR-18-18 | 34.4 | 36.0 | 9.71 | 0.010 | <0.04 | <0.04 | 0.076 | 0.240 | 0.048 | 0.028 | 4.00 | 10.3 | 5.3 | 12.81 | 16.96 | 16.96 | NPAG | - |
| GB-2020-012 | argillite | waste | Phase I | BR-18-18 | 48.0 | 50.0 | 9.44 | 0.084 | <0.04 | 0.05 | 0.141 | 0.270 | 0.054 | 0.087 | 4.50 | 7.8 | 2.8 | 1.72 | 1.07 | 1.72 | PAG2 | 6.16 |
| GB-2020-013 | greywacke | waste | Phase I | BR-18-18 | 58.0 | 60.0 | 9.78 | 0.033 | <0.04 | <0.04 | 0.072 | 0.220 | 0.044 | 0.028 | 3.67 | 9.1 | 4.1 | 3.56 | 3.98 | 3.98 | NPAG | - |
| GB-2020-014 | argillite | waste | Phase I | BR-18-18 | 66.0 | 68.0 | 9.45 | 0.032 | <0.04 | <0.04 | 0.107 | 0.190 | 0.038 | 0.069 | 3.17 | 6.9 | 1.9 | 3.17 | 1.90 | 3.17 | NPAG | 7.21 |
| GB-2020-015 | greywacke | waste | Phase I | BR-18-18 | 80.0 | 82.0 | 9.80 | 0.055 | <0.04 | <0.04 | 0.057 | 0.175 | 0.035 | 0.022 | 2.92 | 8.0 | 3.0 | 1.70 | 1.75 | 1.75 | PAG2 | - |
| GB-2020-016 | argillite | waste | Phase I | BR-18-24 | 22.9 | 24.3 | 9.22 | 0.050 | <0.04 | <0.04 | 0.165 | 0.664 | 0.133 | 0.032 | 11.07 | 16.9 | 11.9 | 7.09 | 7.62 | 7.62 | NPAG | - |
| GB-2020-017 | greywacke | waste | Phase I | BR-18-24 | 28.0 | 30.0 | 9.56 | <0.005 | <0.04 | <0.04 | 0.056 | 0.180 | 0.036 | 0.020 | 3.00 | 7.4 | 2.4 | 19.21 | 15.36 | 19.21 | NPAG | - |
| GB-2020-018 | argillite | waste | Phase I | BR-18-24 | 44.5 | 46.0 | 9.49 | 0.030 | <0.04 | <0.04 | 0.185 | 0.769 | 0.154 | 0.031 | 12.83 | 21.1 | 16.1 | 13.68 | 17.17 | 17.17 | NPAG | - |
| GB-2020-019 | greywacke | waste | Phase I | BR-18-24 | 48.5 | 50.5 | 9.61 | 0.042 | <0.04 | <0.04 | 0.111 | 0.375 | 0.075 | 0.036 | 6.25 | 11.8 | 6.8 | 4.77 | 5.18 | 5.18 | NPAG | - |
| GB-2020-020 | argillite | waste | Phase I | BR-18-24 | 57.0 | 59.0 | 9.62 | 0.016 | <0.04 | <0.04 | 0.080 | 0.285 | 0.057 | 0.023 | 4.75 | 10.8 | 5.8 | 9.51 | 11.60 | 11.60 | NPAG | - |
| GB-2020-021 | greywacke | waste | Phase I | BR-18-24 | 66.0 | 67.4 | 9.61 | 0.006 | <0.04 | <0.04 | 0.049 | 0.135 | 0.027 | 0.022 | 2.25 | 7.7 | 2.7 | 12.01 | 14.40 | 14.40 | NPAG | - |
| GB-2020-022 | argillite | waste | Phase I | BR-18-24 | 76.0 | 78.0 | 9.19 | 0.161 | 0.05 | 0.11 | 0.342 | 1.33 | 0.266 | 0.076 | 22.18 | 30.5 | 25.5 | 4.41 | 5.07 | 5.07 | NPAG | - |
| GB-2020-023 | greywacke | waste | Phase I | BR-18-24 | 89.5 | 91.5 | 9.58 | 0.029 | <0.04 | <0.04 | 0.095 | 0.335 | 0.067 | 0.028 | 5.59 | 11.8 | 6.8 | 6.17 | 7.50 | 7.50 | NPAG | - |
| GB-2020-024 | greywacke | waste | Phase I | BR-18-24 | 116.7 | 118.5 | 9.76 | 0.014 | <0.04 | <0.04 | 0.067 | 0.180 | 0.036 | 0.031 | 3.00 | 8.3 | 3.3 | 6.86 | 7.54 | 7.54 | NPAG | - |
| GB-2020-025 | argillite | waste | Phase I | BR-18-24 | 120.4 | 122.4 | 9.73 | 0.029 | <0.04 | <0.04 | 0.074 | 0.215 | 0.043 | 0.031 | 3.59 | 8.8 | 3.8 | 3.96 | 4.19 | 4.19 | NPAG | - |
| GB-2020-026 | greywacke | waste | Phase I | BR-18-24 | 129.0 | 131.0 | 9.72 | 0.056 | <0.04 | <0.04 | 0.117 | 0.405 | 0.081 | 0.036 | 6.76 | 11.8 | 6.8 | 3.86 | 3.89 | 3.89 | NPAG | - |
| GB-2020-027 | argillite | waste | Phase I | BR-18-24 | 138.4 | 140.4 | 9.71 | 0.048 | <0.04 | <0.04 | 0.074 | 0.215 | 0.043 | 0.031 | 3.59 | 8.2 | 3.2 | 2.39 | 2.13 | 2.39 | NPAG | - |
| GB-2020-028 | argillite | ore | Phase I | BR-18-24 | 148.1 | 149.0 | 9.51 | 0.396 | 0.23 | 0.17 | 0.059 | 0.135 | 0.027 | 0.032 | 2.25 | 7.8 | 2.8 | 0.18 | 0.23 | 0.23 | PAG1 | - |
| GB-2020-029 | argillite | waste | Phase I | BR-18-24 | 158.2 | 160.0 | 9.74 | 0.275 | 0.20 | 0.07 | 0.052 | 0.130 | 0.026 | 0.026 | 2.17 | 7.8 | 2.8 | 0.25 | 0.33 | 0.33 | PAG1 | 3.7 |
| GB-2020-030 | greywacke | waste | Phase I | BR-18-24 | 172.3 | 174.0 | 9.90 | 0.092 | 0.07 | <0.04 | 0.053 | 0.160 | 0.032 | 0.021 | 2.67 | 8.4 | 3.4 | 0.93 | 1.18 | 1.18 | PAG2 | 7.39 |
| GB-2020-031 | greywacke | waste | Phase I | BR-18-28 | 12.7 | 14.5 | 9.25 | 0.049 | <0.04 | <0.04 | 0.095 | 0.290 | 0.058 | 0.037 | 4.84 | 10.9 | 5.9 | 3.16 | 3.85 | 3.85 | NPAG | - |
| GB-2020-032 | argillite | waste | Phase I | BR-18-28 | 28.0 | 30.0 | 9.30 | 0.017 | <0.04 | <0.04 | 0.075 | 0.220 | 0.044 | 0.031 | 3.67 | 10.6 | 5.6 | 6.91 | 10.54 | 10.54 | NPAG | - |
| GB-2020-033 | argillite | ore | Phase I | BR-18-28 | 38.2 | 38.7 | 8.97 | 0.257 | 0.12 | 0.14 | 0.162 | 0.445 | 0.089 | 0.073 | 7.42 | 11.5 | 6.5 | 0.92 | 0.81 | 0.92 | PAG1 | - |
| GB-2020-034 | greywacke | waste | Phase I | BR-18-28 | 49.0 | 51.5 | 9.49 | 0.039 | <0.04 | <0.04 | 0.043 | 0.115 | 0.023 | 0.020 | 1.92 | 8.8 | 3.8 | 1.57 | 3.12 | 3.12 | NPAG | - |
| GB-2020-035 | argillite | waste | Phase I | BR-18-29 | 17.0 | 19.0 | 8.68 | 0.320 | 0.13 | 0.19 | 0.295 | 1.26 | 0.252 | 0.043 | 21.02 | 27.9 | 22.9 | 2.10 | 2.29 | 2.29 | NPAG | - |
| GB-2020-036 | argillite | waste | Phase I | BR-18-29 | 29.0 | 31.0 | 9.03 | 0.013 | <0.04 | <0.04 | 0.064 | 0.270 | 0.054 | 0.010 | 4.50 | 9.7 | 4.7 | 11.09 | 11.57 | 11.57 | NPAG | - |
| GB-2020-037 | argillite | waste | Phase I | BR-18-29 | 41.7 | 43.5 | 9.09 | 0.128 | 0.08 | 0.05 | 0.061 | 0.140 | 0.028 | 0.033 | 2.34 | 8.0 | 3.0 | 0.58 | 0.75 | 0.75 | PAG1 | - |
| GB-2020-038 | greywacke | waste | Phase I | BR-18-29 | 48.0 | 49.8 | 9.36 | 0.015 | <0.04 | <0.04 | 0.018 | <0.025 | 0.005 | 0.013 | 0.42 | 6.5 | 1.5 | 0.89 | 3.20 | 3.20 | NPAG | - |
| GB-2020-039 | greywacke | waste | Phase I | BR-18-29 | 58.0 | 59.8 | 8.91 | 0.105 | <0.04 | 0.07 | 0.208 | 0.809 | 0.162 | 0.046 | 13.49 | 20.9 | 15.9 | 4.11 | 4.85 | 4.85 | NPAG | - |
| GB-2020-040 | greywacke | waste | Phase I | BR-18-29 | 69.9 | 71.4 | 9.26 | 0.166 | 0.10 | 0.07 | 0.075 | 0.240 | 0.048 | 0.027 | 4.00 | 10.7 | 5.7 | 0.77 | 1.10 | 1.10 | PAG2 | - |
| GB-2020-041 | greywacke | waste | Phase I | BR-18-31 | 16.0 | 18.6 | 9.55 | <0.005 | <0.04 | <0.04 | 0.048 | 0.130 | 0.026 | 0.022 | 2.17 | 8.6 | 3.6 | 13.88 | 23.04 | 23.04 | NPAG | - |
| GB-2020-042 | argillite | waste | Phase I | BR-18-31 | 20.5 | 21.5 | 9.42 | 0.007 | <0.04 | <0.04 | 0.061 | 0.160 | 0.032 | 0.029 | 2.67 | 8.6 | 3.6 | 12.20 | 16.46 | 16.46 | NPAG | - |
| GB-2020-043 | greywacke | waste | Phase I | BR-18-31 | 36.0 | 38.0 | 9.61 | 0.019 | <0.04 | <0.04 | 0.096 | 0.290 | 0.058 | 0.038 | 4.84 | 11.7 | 6.7 | 8.15 | 11.28 | 11.28 | NPAG | - |
| GB-2020-044 | argillite | ore | Phase I | BR-18-31 | 51.6 | 54.5 | 9.05 | 0.548 | 0.20 | 0.35 | 0.082 | 0.230 | 0.046 | 0.036 | 3.84 | 11.0 | 6.0 | 0.22 | 0.35 | 0.35 | PAG1 | - |
| GB-2020-045 | greywacke | waste | Phase I | BR-18-31 | 58.9 | 60.9 | 9.78 | 0.026 | <0.04 | <0.04 | 0.043 | 0.075 | 0.015 | 0.028 | 1.25 | 7.8 | 2.8 | 1.54 | 3.45 | 3.45 | NPAG | - |
| GB-2020-046 | greywacke marker unit | waste | Phase I | BR-18-35 | 17.0 | 19.0 | 9.58 | 0.212 | 0.12 | 0.09 | 0.072 | 0.200 | 0.040 | 0.032 | 3.34 | 8.0 | 3.0 | 0.50 | 0.45 | 0.50 | PAG1 | - |
| GB-2020-047 | quartz vein | waste | Phase I | BR-18-35 | 24.0 | 25.9 | 8.13 | <0.005 | <0.04 | <0.04 | 0.024 | <0.025 | 0.005 | 0.019 | 0.42 | 2.6 | 0.1 | 2.67 | 0.64 | 2.67 | NPAG | - |
| GB-2020-048 | greywacke marker unit | waste | Phase I | BR-18-35 | 28.0 | 30.0 | 8.54 | 0.302 | 0.10 | 0.20 | 0.132 | 0.440 | 0.088 | 0.044 | 7.34 | 11.9 | 6.9 | 0.78 | 0.73 | 0.78 | PAG1 | - |
| GB-2020-049 | greywacke | waste | Phase I | BR-18-35 | 45.1 | 47.1 | 9.19 | 0.035 | <0.04 | <0.04 | 0.059 | 0.160 | 0.032 | 0.027 | 2.67 | 9.0 | 4.0 | 2.44 | 3.66 | 3.66 | NPAG | - |
| GB-2020-050 | argillite + quartz vein | ore | Phase I | BR-18-38 | 49.6 | 51.1 | 9.32 | 0.299 | 0.15 | 0.15 | 0.125 | 0.380 | 0.076 | 0.049 | 6.34 | 11.3 | 6.3 | 0.68 | 0.67 | 0.68 | PAG1 | - |
| GB-2020-051 | quartz vein | waste | Phase I | BR-18-38 | 86.0 | 88.0 | 9.25 | 0.208 | 0.09 | 0.12 | 0.112 | 0.340 | 0.068 | 0.044 | 5.67 | 11.1 | 6.1 | 0.87 | 0.94 | 0.94 | PAG1 | - |
| GB-2020-052 | greywacke marker unit | waste | Phase I | BR-18-38 | 90.0 | 91.0 | 9.29 | 0.066 | <0.04 | <0.04 | 0.094 | 0.260 | 0.052 | 0.042 | 4.34 | 9.8 | 4.8 | 2.10 | 2.33 | 2.33 | NPAG | - |
| GB-2020-053 | greywacke + quartz vein | waste | Phase I | BR-18-38 | 130.0 | 132.0 | 9.19 | 0.174 | 0.05 | 0.12 | 0.112 | 0.340 | 0.068 | 0.044 | 5.67 | 10.4 | 5.4 | 1.04 | 0.99 | 1.04 | PAG2 | - |
| GB-2020-054 | greywacke | waste | Phase I | BR-18-38 | 143.5 | 145.5 | 9.75 | 0.021 | <0.04 | <0.04 | 0.040 | 0.095 | 0.019 | 0.021 | 1.58 | 7.8 | 2.8 | 2.41 | 4.27 | 4.27 | NPAG | - |
| GB-2020-055 | greywacke | waste | Phase I | BR-18-54 | 14.0 | 15.9 | 8.09 | 0.101 | 0.06 | 0.04 | 0.023 | <0.025 | 0.005 | 0.018 | 0.42 | 5.5 | 0.5 | 0.13 | 0.16 | 0.16 | PAG1 | - |
| GB-2020-056 | greywacke | waste | Phase I | BR-18-54 | 20.0 | 22.0 | 9.44 | 0.005 | <0.04 | <0.04 | 0.028 | 0.045 | 0.009 | 0.019 | 0.75 | 5.6 | 0.6 | 4.80 | 3.84 | 4.80 | NPAG | - |
| GB-2020-057 | greywacke | waste | Phase I | BR-18-54 | 29.0 | 31.0 | 9.75 | 0.080 | 0.06 | <0.04 | 0.067 | 0.195 | 0.039 | 0.028 | 3.25 | 9.3 | 4.3 | 1.30 | 1.72 | 1.72 | PAG2 | 7.58 |
| GB-2020-058 | argillite | waste | Phase I | BR-18-54 | 45.0 | 47.0 | 9.54 | 0.029 | <0.04 | <0.04 | 0.037 | 0.080 | 0.016 | 0.021 | 1.33 | 8.0 | 3.0 | 1.47 | 3.31 | 3.31 | NPAG | - |

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 1: Acid Base Accounting Results**

| Sample ID | Rock Type | Ore/Waste | Phase | Drillhole | Interval | | Paste pH | Total S | Sulphate S (HCl) | Sulphide S | Total Carbon | Carbonate | Inorganic C | Organic C | CaNP | Mod NP | Corrected Mod. NP | CaNP/TAP | Corrected Mod. NP/TAP | Operational NPR | Designation | NAG pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | - | - | - | m | m | - | % | % | % | % | % | % | % | kg $CaCO_3$/t | kg $CaCO_3$/t | kg $CaCO_3$/t | - | - | - | - | - |
| GB-2020-059 | argillite | waste | Phase I | BR-18-54 | 65.0 | 67.0 | 9.82 | 0.008 | <0.04 | <0.04 | 0.090 | 0.285 | 0.057 | 0.033 | 4.75 | 12.7 | 7.7 | 19.01 | 30.80 | 30.80 | NPAG | - |
| GB-2020-060 | argillite | waste | Phase I | BR-18-54 | 85.5 | 87.5 | 9.58 | 0.033 | <0.04 | <0.04 | 0.052 | 0.140 | 0.028 | 0.024 | 2.34 | 9.5 | 4.5 | 2.26 | 4.36 | 4.36 | NPAG | - |
| GB-2020-061 | greywacke | waste | Phase I | BR-18-54 | 100.3 | 102.3 | 9.42 | 0.008 | <0.04 | <0.04 | 0.068 | 0.200 | 0.040 | 0.028 | 3.34 | 10.6 | 5.6 | 13.34 | 22.40 | 22.40 | NPAG | - |
| GB-2020-062 | greywacke | waste | Phase I | BR-18-54 | 124.0 | 126.0 | 9.81 | 0.015 | <0.04 | <0.04 | 0.063 | 0.150 | 0.030 | 0.033 | 2.50 | 10.3 | 5.3 | 5.34 | 11.31 | 11.31 | NPAG | - |
| GB-2020-063 | greywacke | waste | Phase I | BR-18-54 | 140.0 | 142.0 | 9.74 | 0.020 | <0.04 | <0.04 | 0.092 | 0.280 | 0.056 | 0.036 | 4.67 | 12.1 | 7.1 | 7.47 | 11.36 | 11.36 | NPAG | - |
| GB-2020-064 | greywacke + quartz vein | waste | Phase I | BR-18-61 | 6.9 | 9.0 | 9.01 | 0.142 | <0.04 | 0.13 | 0.048 | 0.090 | 0.018 | 0.030 | 1.50 | 4.3 | 0.1 | 0.34 | 0.02 | 0.34 | PAG1 | - |
| GB-2020-065 | argillite + quartz vein | ore | Phase I | BR-18-61 | 16.4 | 17.5 | 8.52 | 0.475 | 0.16 | 0.32 | 0.295 | 0.684 | 0.137 | 0.158 | 11.41 | 5.6 | 0.6 | 0.77 | 0.04 | 0.77 | PAG1 | - |
| GB-2020-066 | greywacke + quartz vein | waste | Phase I | BR-18-61 | 30.0 | 31.5 | 9.31 | 0.374 | 0.08 | 0.29 | 0.051 | 0.120 | 0.024 | 0.027 | 2.00 | 7.0 | 2.0 | 0.17 | 0.17 | 0.17 | PAG1 | - |
| GB-2020-067 | quartz vein | waste | Phase I | BR-18-61 | 40.0 | 41.5 | 9.09 | 0.317 | 0.09 | 0.23 | 0.075 | 0.150 | 0.030 | 0.045 | 2.50 | 5.6 | 0.6 | 0.25 | 0.06 | 0.25 | PAG1 | - |
| GB-2020-068 | argillite | ore | Phase I | BR-18-61 | 54.0 | 56.0 | 9.06 | 0.946 | 0.35 | 0.60 | 0.395 | 0.974 | 0.195 | 0.200 | 16.25 | 6.6 | 1.6 | 0.55 | 0.05 | 0.55 | PAG1 | - |
| GB-2020-069 | argillite | waste | Phase I | BR-18-61 | 58.0 | 59.0 | 9.31 | 0.618 | 0.21 | 0.41 | 0.146 | 0.415 | 0.083 | 0.063 | 6.92 | 8.0 | 3.0 | 0.36 | 0.16 | 0.36 | PAG1 | 2.9 |
| GB-2020-070 | argillite | waste | Phase I | BR-18-61 | 68.0 | 69.0 | 9.43 | 0.041 | <0.04 | <0.04 | 0.105 | 0.305 | 0.061 | 0.044 | 5.09 | 7.9 | 2.9 | 3.97 | 2.26 | 3.97 | NPAG | - |
| GB-2020-071 | greywacke | waste | Phase I | BR-18-61 | 78.5 | 80.5 | 9.65 | 0.050 | <0.04 | <0.04 | 0.084 | 0.245 | 0.049 | 0.035 | 4.09 | 9.1 | 4.1 | 2.62 | 2.62 | 2.62 | NPAG | - |
| GB-2020-072 | argillite | waste | Phase I | BR-18-62 | 20.5 | 22.3 | 8.65 | 0.526 | 0.14 | 0.39 | 0.183 | 0.460 | 0.092 | 0.091 | 7.67 | 9.0 | 4.0 | 0.47 | 0.24 | 0.47 | PAG1 | - |
| GB-2020-073 | argillite | waste | Phase I | BR-18-62 | 32.0 | 34.0 | 9.22 | 0.034 | <0.04 | <0.04 | 0.096 | 0.270 | 0.054 | 0.042 | 4.50 | 7.4 | 2.4 | 4.24 | 2.26 | 4.24 | NPAG | - |
| GB-2020-074 | greywacke | waste | Phase I | BR-18-62 | 40.0 | 41.5 | 9.55 | 0.150 | 0.08 | 0.07 | 0.056 | 0.130 | 0.026 | 0.030 | 2.17 | 7.5 | 2.5 | 0.46 | 0.53 | 0.53 | PAG1 | - |
| GB-2020-075 | greywacke | waste | Phase I | BR-18-62 | 48.6 | 50.2 | 9.56 | 0.172 | 0.09 | 0.08 | 0.054 | 0.160 | 0.032 | 0.022 | 2.67 | 7.9 | 2.9 | 0.50 | 0.54 | 0.54 | PAG1 | - |
| GB-2020-076 | greywacke | waste | Phase I | BR-18-62 | 54.6 | 56.6 | 9.61 | 0.212 | 0.09 | 0.12 | 0.057 | 0.180 | 0.036 | 0.021 | 3.00 | 8.8 | 3.8 | 0.45 | 0.57 | 0.57 | PAG1 | 4.19 |
| GB-2020-077 | greywacke | waste | Phase I | BR-19-84 | 9.0 | 11.0 | 8.90 | 0.032 | <0.04 | <0.04 | 0.027 | <0.025 | 0.005 | 0.022 | 0.42 | 6.7 | 1.7 | 0.42 | 1.70 | 1.70 | PAG2 | - |
| GB-2020-078 | greywacke | waste | Phase I | BR-19-84 | 23.0 | 25.0 | 9.33 | 0.010 | <0.04 | <0.04 | 0.072 | 0.250 | 0.050 | 0.022 | 4.17 | 10.2 | 5.2 | 13.34 | 16.64 | 16.64 | NPAG | - |
| GB-2020-079 | greywacke | waste | Phase I | BR-19-95 | 18.7 | 20.7 | 9.11 | 0.044 | <0.04 | <0.04 | 0.040 | 0.090 | 0.018 | 0.022 | 1.50 | 8.3 | 3.3 | 1.09 | 2.40 | 2.40 | NPAG | - |
| GB-2020-080 | argillite | waste | Phase I | BR-19-95 | 54.0 | 56.0 | 9.38 | 0.086 | <0.04 | 0.05 | 0.073 | 0.225 | 0.045 | 0.028 | 3.75 | 8.2 | 3.2 | 1.40 | 1.19 | 1.40 | PAG2 | 5.94 |
| GB-2020-081 | greywacke | waste | Phase I | BR-20-117 | 16.0 | 18.0 | 9.08 | 0.089 | <0.04 | 0.06 | 0.017 | <0.025 | 0.005 | 0.012 | 0.42 | 8.7 | 3.7 | 0.15 | 1.33 | 1.33 | PAG2 | - |
| GB-2020-082 | argillite | waste | Phase I | BR-20-117 | 67.8 | 69.8 | 9.14 | 0.019 | <0.04 | <0.04 | 0.118 | 0.455 | 0.091 | 0.027 | 7.59 | 14.2 | 9.2 | 12.78 | 15.49 | 15.49 | NPAG | - |
| GB-2020-083 | greywacke | waste | Phase I | BR-20-117 | 145.0 | 147.0 | 9.24 | 0.176 | 0.08 | 0.10 | 0.039 | 0.080 | 0.016 | 0.023 | 1.33 | 6.9 | 1.9 | 0.24 | 0.35 | 0.35 | PAG1 | - |
| GB-2020-084 | greywacke | waste | Phase I | BR-20-127 | 11.0 | 14.0 | 9.31 | 0.008 | <0.04 | <0.04 | 0.050 | 0.145 | 0.029 | 0.021 | 2.42 | 9.8 | 4.8 | 9.67 | 19.20 | 19.20 | NPAG | - |
| GB-2020-085 | greywacke | waste | Phase I | BR-20-127 | 25.0 | 27.0 | 9.77 | 0.009 | <0.04 | <0.04 | 0.033 | 0.065 | 0.013 | 0.020 | 1.08 | 8.1 | 3.1 | 3.85 | 11.02 | 11.02 | NPAG | - |
| GB-2020-086 | argillite | waste | Phase I | BR-20-127 | 39.0 | 41.0 | 9.59 | 0.128 | 0.08 | 0.05 | 0.125 | 0.400 | 0.080 | 0.045 | 6.67 | 14.3 | 9.3 | 1.67 | 2.33 | 2.33 | NPAG | - |
| GB-2020-087 | greywacke | waste | Phase I | BR-20-127 | 45.0 | 47.0 | 9.62 | 0.027 | <0.04 | <0.04 | 0.081 | 0.240 | 0.048 | 0.033 | 4.00 | 11.1 | 6.1 | 4.74 | 7.23 | 7.23 | NPAG | - |
| GB-2020-088 | greywacke | waste | Phase I | BR-20-127 | 53.3 | 55.2 | 9.61 | 0.238 | 0.12 | 0.12 | 0.132 | 0.475 | 0.095 | 0.037 | 7.92 | 17.2 | 12.2 | 1.07 | 1.64 | 1.64 | PAG1 | - |
| GB-2020-089 | greywacke | waste | Phase I | BR-20-145 | 14.0 | 16.0 | 9.19 | 0.033 | <0.04 | <0.04 | 0.038 | 0.045 | 0.009 | 0.029 | 0.75 | 7.8 | 2.8 | 0.73 | 2.72 | 2.72 | NPAG | - |
| GB-2020-090 | greywacke | waste | Phase I | BR-20-145 | 35.0 | 37.0 | 9.33 | 0.006 | <0.04 | <0.04 | 0.062 | 0.165 | 0.033 | 0.029 | 2.75 | 9.2 | 4.2 | 14.68 | 22.40 | 22.40 | NPAG | - |
| GB-2020-091 | greywacke | waste | Phase I | BR-20-145 | 53.0 | 55.0 | 9.68 | 0.006 | <0.04 | <0.04 | 0.042 | 0.085 | 0.017 | 0.025 | 1.42 | 8.9 | 3.9 | 7.56 | 20.80 | 20.80 | NPAG | - |
| GB-2020-092 | greywacke | waste | Phase I | BR-20-160 | 10.0 | 12.0 | 9.59 | 0.043 | <0.04 | <0.04 | 0.105 | 0.370 | 0.074 | 0.031 | 6.17 | 13.2 | 8.2 | 4.59 | 6.10 | 6.10 | NPAG | - |
| GB-2020-093 | greywacke | waste | Phase I | BR-20-160 | 27.0 | 29.0 | 9.66 | 0.052 | 0.05 | <0.04 | 0.092 | 0.345 | 0.069 | 0.023 | 5.75 | 13.0 | 8.0 | 3.54 | 4.92 | 4.92 | NPAG | - |
| GB-2020-094 | argillite | waste | Phase I | BR-20-174 | 10.5 | 12.5 | 9.05 | 0.022 | <0.04 | <0.04 | 0.053 | 0.150 | 0.030 | 0.023 | 2.50 | 8.6 | 3.6 | 3.64 | 5.24 | 5.24 | NPAG | - |
| GB-2020-095 | greywacke | waste | Phase I | BR-20-174 | 27.0 | 28.5 | 8.98 | 0.030 | <0.04 | <0.04 | 0.081 | 0.215 | 0.043 | 0.038 | 3.59 | 9.7 | 4.7 | 3.83 | 5.01 | 5.01 | NPAG | - |
| GB-2020-096 | greywacke | waste | Phase I | BR-20-174 | 69.0 | 70.5 | 9.65 | 0.008 | <0.04 | <0.04 | 0.047 | 0.130 | 0.026 | 0.021 | 2.17 | 9.8 | 4.8 | 8.67 | 19.20 | 19.20 | NPAG | - |
| GB-2020-097 | argillite | waste | Phase I | BR-20-174 | 89.0 | 91.0 | 9.47 | 0.026 | <0.04 | <0.04 | 0.036 | 0.085 | 0.017 | 0.019 | 1.42 | 8.1 | 3.1 | 1.74 | 3.82 | 3.82 | NPAG | - |
| GB-2020-098 | argillite | waste | Phase I | BR-20-191 | 19.8 | 21.5 | 9.04 | 0.020 | <0.04 | <0.04 | 0.055 | 0.250 | 0.050 | 0.005 | 4.17 | 9.8 | 4.8 | 6.67 | 7.68 | 7.68 | NPAG | - |
| GB-2020-099 | greywacke | waste | Phase I | BR-20-191 | 36.1 | 38.1 | 9.25 | 0.070 | 0.06 | <0.04 | 0.206 | 0.839 | 0.168 | 0.038 | 13.99 | 21.1 | 16.1 | 6.40 | 7.36 | 7.36 | NPAG | - |
| GB-2020-100 | argillite | waste | Phase I | BR-20-199 | 26.9 | 28.9 | 8.95 | 0.033 | <0.04 | <0.04 | 0.092 | 0.325 | 0.065 | 0.027 | 5.42 | 10.8 | 5.8 | 5.26 | 5.62 | 5.62 | NPAG | - |
| GB-2020-101 | greywacke | waste | Phase I | BR-20-199 | 20.4 | 22.5 | 9.14 | 0.018 | <0.04 | <0.04 | 0.054 | 0.150 | 0.030 | 0.024 | 2.50 | 7.6 | 2.6 | 4.45 | 4.62 | 4.62 | NPAG | - |
| GB-2020-102 | greywacke | waste | Phase I | BR-20-179 | 48.5 | 50.4 | 9.59 | 0.012 | <0.04 | <0.04 | 0.030 | 0.080 | 0.016 | 0.014 | 1.33 | 6.9 | 1.9 | 3.56 | 5.07 | 5.07 | NPAG | - |
| GB-2020-103 | greywacke | waste | Phase I | BR-20-179 | 89.6 | 91.6 | 9.66 | 0.012 | <0.04 | <0.04 | 0.031 | 0.100 | 0.020 | 0.011 | 1.67 | 7.3 | 2.3 | 4.45 | 6.13 | 6.13 | NPAG | - |
| GB-2020-104 | argillite | waste | Phase I | BR-20-179 | 12.6 | 14.8 | 8.87 | 0.300 | 0.14 | 0.16 | 0.118 | 0.410 | 0.082 | 0.036 | 6.84 | 7.7 | 2.7 | 0.73 | 0.29 | 0.73 | PAG1 | - |
| GB-2020-105 | argillite | waste | Phase I | BR-20-179 | 83.5 | 85.5 | 9.32 | 0.119 | 0.08 | 0.04 | 0.093 | 0.290 | 0.058 | 0.035 | 4.84 | 7.8 | 2.8 | 1.30 | 0.75 | 1.30 | PAG2 | - |
| GB-2020-106 | greywacke | waste | Phase I | BR-18-22 | 28.5 | 29.5 | 8.52 | 0.316 | 0.18 | 0.14 | 0.106 | 0.255 | 0.051 | 0.055 | 4.25 | 10.8 | 5.8 | 0.43 | 0.59 | 0.59 | PAG1 | - |
| GB-2020-107 | greywacke | waste | Phase I | BR-18-22 | 36.0 | 37.0 | 9.01 | 0.056 | 0.05 | <0.04 | 0.103 | 0.370 | 0.074 | 0.029 | 6.17 | 11.3 | 6.3 | 3.53 | 3.60 | 3.60 | NPAG | - |
| GB-2020-108 | argillite | ore | Phase I | BR-18-22 | 50.6 | 51.9 | 8.92 | 0.332 | 0.14 | 0.19 | 0.123 | 0.350 | 0.070 | 0.053 | 5.84 | 10.3 | 5.3 | 0.56 | 0.51 | 0.56 | PAG1 | - |
| GB-2020-109 | argillite | waste | Phase I | BR-18-22 | 52.4 | 54.4 | 9.04 | 0.059 | <0.04 | <0.04 | 0.096 | 0.320 | 0.064 | 0.032 | 5.34 | 7.5 | 2.5 | 2.89 | 1.36 | 2.89 | NPAG | - |
| GB-2020-110 | greywacke | waste | Phase I | BR-18-22 | 75.5 | 77.5 | 9.05 | 0.011 | <0.04 | <0.04 | 0.075 | 0.315 | 0.063 | 0.012 | 5.25 | 11.0 | 6.0 | 15.28 | 17.45 | 17.45 | NPAG | - |
| GB-2020-111 | argillite | waste | Phase I | BR-18-22 | 94.0 | 95.5 | 9.51 | 0.009 | <0.04 | <0.04 | 0.055 | 0.165 | 0.033 | 0.022 | 2.75 | 6.8 | 1.8 | 9.79 | 6.40 | 9.79 | NPAG | - |
| GB-2020-112 | greywacke | waste | Phase I | BR-18-71 | 15.4 | 17.5 | 8.39 | 0.037 | <0.04 | <0.04 | 0.029 | 0.085 | 0.017 | 0.012 | 1.42 | 6.9 | 1.9 | 1.23 | 1.64 | 1.64 | PAG2 | - |
| GB-2020-113 | argillite | waste | Phase I | BR-18-71 | 33.9 | 36.0 | 9.06 | 0.052 | <0.04 | <0.04 | 0.080 | 0.300 | 0.060 | 0.020 | 5.00 | 7.5 | 2.5 | 3.08 | 1.54 | 3.08 | NPAG | - |
| GB-2020-114 | greywacke | waste | Phase I | BR-18-71 | 48.0 | 50.0 | 9.11 | 0.012 | <0.04 | <0.04 | 0.099 | 0.370 | 0.074 | 0.025 | 6.17 | 13.1 | 8.1 | 16.46 | 21.60 | 21.60 | NPAG | - |
| GB-2020-115 | argillite + quartz vein | ore | Phase I | BR-18-71 | 62.3 | 64.3 | 8.72 | 0.164 | 0.08 | 0.08 | 0.370 | 1.02 | 0.204 | 0.166 | 17.01 | 4.6 | 0.1 | 3.32 | 0.02 | 3.32 | NPAG | - |
| GB-LX2021-01 | greywacke | waste | Phase Ib - pulp | BR-17-08 | 11.4 | 13.4 | 8.87 | 0.031 | < 0.04 | 0.04 | 0.060 | 0.125 | 0.025 | 0.035 | 2.08 | 8.6 | 3.6 | 2.15 | 3.72 | 3.72 | NPAG | - |

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 1: Acid Base Accounting Results**

| Sample ID | Rock Type | Ore/Waste | Phase | Drillhole | Interval | | Paste pH | Total S | Sulphate S (HCl) | Sulphide S | Total Carbon | Carbonate | Inorganic C | Organic C | CaNP | Mod NP | Corrected Mod. NP | CaNP/TAP | Corrected Mod. NP/TAP | Operational NPR | Designation | NAG pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | - | - | - | m | m | - | % | % | % | % | % | % | % | kg $CaCO_3$/t | kg $CaCO_3$/t | kg $CaCO_3$/t | - | - | - | - | - |
| GB-LX2021-02 | argillite | waste | Phase Ib - pulp | BR-18-33 | 55.0 | 57.0 | 9.19 | 0.134 | < 0.04 | 0.12 | 0.090 | 0.175 | 0.035 | 0.055 | 2.92 | 8.9 | 3.9 | 0.70 | 0.93 | 0.93 | PAG1 | - |
| GB-LX2021-03 | argillite | waste | Phase Ib - pulp | BR-18-33 | 86.0 | 88.0 | 9.56 | 0.043 | < 0.04 | 0.04 | 0.075 | 0.180 | 0.036 | 0.039 | 3.00 | 9.0 | 4.0 | 2.23 | 2.98 | 2.98 | NPAG | - |
| GB-LX2021-04 | argillite | waste | Phase Ib - pulp | BR-18-41 | 23.0 | 25.0 | 8.52 | 0.015 | <0.04 | < 0.04 | 0.065 | 0.045 | 0.009 | 0.056 | 0.75 | 8.3 | 3.3 | 1.60 | 7.04 | 7.04 | NPAG | - |
| GB-LX2021-05 | argillite + quartz veining | waste | Phase Ib - pulp | BR-18-41 | 106.6 | 108.6 | 8.15 | 0.056 | < 0.04 | 0.05 | 0.167 | 0.310 | 0.062 | 0.105 | 5.17 | 17.5 | 12.5 | 2.95 | 7.14 | 7.14 | NPAG | - |
| GB-LX2021-06 | argillite | waste | Phase Ib - pulp | BR-18-43 | 40.5 | 42.5 | 9.41 | <0.005 | <0.04 | < 0.04 | 0.076 | 0.200 | 0.040 | 0.036 | 3.34 | 10.0 | 5.0 | 21.35 | 32.00 | 32.00 | NPAG | - |
| GB-LX2021-07 | argillite | waste | Phase Ib - pulp | BR-18-43 | 160.2 | 162.3 | 9.43 | 0.058 | < 0.04 | 0.05 | 0.046 | 0.070 | 0.014 | 0.032 | 1.17 | 7.5 | 2.5 | 0.64 | 1.38 | 1.38 | PAG2 | - |
| GB-LX2021-08 | greywacke | waste | Phase Ib - pulp | BR-18-46 | 172.0 | 174.0 | 9.36 | 0.065 | < 0.04 | 0.05 | 0.062 | 0.125 | 0.025 | 0.037 | 2.08 | 9.4 | 4.4 | 1.03 | 2.17 | 2.17 | NPAG | - |
| GB-LX2021-09 | argillite | waste | Phase Ib - pulp | BR-18-67 | 30.0 | 32.0 | 9.07 | 0.083 | < 0.04 | 0.06 | 0.087 | 0.250 | 0.050 | 0.037 | 4.17 | 11.5 | 6.5 | 1.61 | 2.51 | 2.51 | NPAG | - |
| GB-LX2021-10 | greywacke | waste | Phase Ib - pulp | BR-18-67 | 44.9 | 46.4 | 9.31 | 0.034 | <0.04 | < 0.04 | 0.086 | 0.265 | 0.053 | 0.033 | 4.42 | 11.6 | 6.6 | 4.16 | 6.21 | 6.21 | NPAG | - |
| GB-LX2021-11 | greywacke | waste | Phase Ib - pulp | BR-18-67 | 84.5 | 86.5 | 9.26 | 0.008 | <0.04 | < 0.04 | 0.056 | 0.105 | 0.021 | 0.035 | 1.75 | 9.4 | 4.4 | 7.01 | 17.60 | 17.60 | NPAG | - |
| GB-LX2021-12 | argillite | waste | Phase Ib - pulp | BR-18-67 | 153.7 | 155.6 | 9.50 | 0.025 | <0.04 | < 0.04 | 0.091 | 0.230 | 0.046 | 0.045 | 3.84 | 9.2 | 4.2 | 4.91 | 5.38 | 5.38 | NPAG | - |
| GB-LX2021-13 | argillite | waste | Phase Ib - pulp | BR-19-80 | 30.0 | 32.0 | 9.02 | 0.019 | <0.04 | < 0.04 | 0.129 | 0.355 | 0.071 | 0.058 | 5.92 | 13.9 | 8.9 | 9.97 | 14.99 | 14.99 | NPAG | - |
| GB-LX2021-14 | greywacke | waste | Phase Ib - pulp | BR-19-80 | 42.0 | 44.0 | 9.49 | 0.019 | <0.04 | < 0.04 | 0.114 | 0.335 | 0.067 | 0.047 | 5.59 | 13.0 | 8.0 | 9.41 | 13.47 | 13.47 | NPAG | - |
| GB-LX2021-15 | argillite | waste | Phase Ib - pulp | BR-19-96 | 70.3 | 72.3 | 9.36 | 0.092 | < 0.04 | 0.07 | 0.155 | 0.455 | 0.091 | 0.064 | 7.59 | 12.6 | 7.6 | 2.64 | 2.64 | 2.64 | NPAG | - |
| GB-LX2021-16 | argillite | waste | Phase Ib - pulp | BR-19-98 | 61.0 | 63.0 | 9.58 | 0.022 | <0.04 | < 0.04 | 0.100 | 0.260 | 0.052 | 0.048 | 4.34 | 10.2 | 5.2 | 6.31 | 7.56 | 7.56 | NPAG | - |
| GB-LX2021-17 | greywacke | waste | Phase Ib - pulp | BR-19-101 | 75.9 | 77.8 | 9.66 | 0.023 | <0.04 | < 0.04 | 0.081 | 0.145 | 0.029 | 0.052 | 2.42 | 9.8 | 4.8 | 3.36 | 6.68 | 6.68 | NPAG | - |
| GB-LX2021-18 | greywacke | waste | Phase Ib - pulp | BR-20-138 | 94.8 | 96.8 | 9.77 | 0.019 | <0.04 | < 0.04 | 0.055 | 0.120 | 0.024 | 0.031 | 2.00 | 9.0 | 4.0 | 3.37 | 6.74 | 6.74 | NPAG | - |
| GB-LX2021-19 | argillite | waste | Phase Ib - pulp | BR-20-139 | 13.3 | 15.3 | 9.14 | 0.009 | <0.04 | < 0.04 | 0.042 | 0.060 | 0.012 | 0.030 | 1.00 | 6.9 | 1.9 | 3.56 | 6.76 | 6.76 | NPAG | - |
| GB-LX2021-20 | greywacke | waste | Phase Ib - pulp | BR-20-205 | 20.1 | 22.1 | 9.31 | 0.013 | <0.04 | < 0.04 | 0.081 | 0.170 | 0.034 | 0.047 | 2.84 | 9.8 | 4.8 | 6.98 | 11.82 | 11.82 | NPAG | - |
| GB-LX2021-21 | greywacke | waste | Phase Ib - pulp | BR-20-205 | 94.5 | 96.5 | 9.54 | 0.205 | 0.1 | 0.11 | 0.071 | 0.120 | 0.024 | 0.047 | 2.00 | 8.8 | 3.8 | 0.31 | 0.59 | 0.59 | PAG1 | - |
| GB-LX2021-22 | greywacke | waste | Phase Ib - pulp | BR-20-195 | 68.0 | 70.0 | 9.39 | 0.032 | <0.04 | < 0.04 | 0.116 | 0.385 | 0.077 | 0.039 | 6.42 | 16.2 | 11.2 | 6.42 | 11.20 | 11.20 | NPAG | - |
| GB-LX2021-23 | argillite | waste | Phase Ib - pulp | BR-20-195 | 87.9 | 89.9 | 8.80 | 0.188 | <0.05 | 0.14 | 0.018 | <0.025 | 0.005 | 0.013 | 0.42 | 6.4 | 1.4 | 0.07 | 0.24 | 0.24 | PAG1 | - |
| GB-LX2021-24 | greywacke | waste | Phase Ib - pulp | BR-21-225 | 40.0 | 42.0 | 8.83 | 0.016 | <0.04 | < 0.04 | 0.111 | 0.335 | 0.067 | 0.044 | 5.59 | 13.8 | 8.8 | 11.17 | 17.60 | 17.60 | NPAG | - |
| GB-LX2021-25 | greywacke | waste | Phase Ib - pulp | BR-21-226 | 58.0 | 60.0 | 9.47 | 0.030 | <0.04 | < 0.04 | 0.103 | 0.280 | 0.056 | 0.047 | 4.67 | 12.4 | 7.4 | 4.98 | 7.89 | 7.89 | NPAG | - |
| GB-LX2021-26 | argillite | waste | Phase Ib - pulp | BR-21-226 | 95.0 | 97.0 | 9.30 | 0.006 | <0.04 | < 0.04 | 0.071 | 0.160 | 0.032 | 0.039 | 2.67 | 9.1 | 4.1 | 14.23 | 21.87 | 21.87 | NPAG | - |
| GB-LX2021-27 | greywacke marker unit | waste | Phase Ib - core | BR-18-40 | 30.0 | 32.0 | 9.69 | 0.182 | 0.08 | 0.10 | 0.127 | 0.375 | 0.075 | 0.052 | 6.25 | 15.2 | 10.2 | 1.10 | 1.79 | 1.79 | PAG2 | - |
| GB-LX2021-28 | greywacke | waste | Phase Ib - core | BR-18-67 | 120.0 | 122.0 | 9.92 | 0.024 | <0.04 | < 0.04 | 0.114 | 0.290 | 0.058 | 0.056 | 4.84 | 15.0 | 10.0 | 6.45 | 13.33 | 13.33 | NPAG | - |
| GB-LX2021-29 | greywacke | waste | Phase Ib - core | BR-19-87 | 33.8 | 35.8 | 9.81 | 0.031 | <0.04 | < 0.04 | 0.064 | 0.160 | 0.032 | 0.032 | 2.67 | 10.1 | 5.1 | 2.75 | 5.26 | 5.26 | NPAG | - |
| GB-LX2021-30 | greywacke | waste | Phase Ib - core | BR-19-87 | 95.0 | 97.0 | 9.75 | 0.035 | <0.04 | < 0.04 | 0.195 | 0.749 | 0.150 | 0.045 | 12.49 | 22.1 | 17.1 | 11.42 | 15.63 | 15.63 | NPAG | - |
| GB-LX2021-31 | greywacke | waste | Phase Ib - core | BR-19-101 | 10.0 | 12.0 | 9.41 | <0.005 | <0.04 | <0.04 | 0.032 | 0.030 | 0.006 | 0.026 | 0.50 | 7.0 | 2.0 | 3.20 | 12.80 | 12.80 | NPAG | - |
| GB-LX2021-32 | argillite | waste | Phase Ib - core | BR-20-113 | 20.0 | 22.0 | 9.31 | 0.054 | <0.04 | 0.04 | 0.069 | 0.180 | 0.036 | 0.033 | 3.00 | 9.0 | 4.0 | 1.78 | 2.37 | 2.37 | NPAG | - |
| GB-LX2021-33 | greywacke | waste | Phase Ib - core | BR-20-113 | 77.0 | 79.0 | 9.97 | 0.050 | 0.05 | <0.04 | 0.126 | 0.415 | 0.083 | 0.043 | 6.92 | 14.0 | 9.0 | 4.43 | 5.76 | 5.76 | NPAG | - |
| GB-LX2021-34 | argillite | waste | Phase Ib - core | BR-20-116 | 28.0 | 30.0 | 9.66 | 0.083 | <0.04 | 0.04 | 0.049 | 0.080 | 0.016 | 0.033 | 1.33 | 7.5 | 2.5 | 0.51 | 0.96 | 0.96 | PAG1 | 7.92 |
| GB-LX2021-35 | greywacke | waste | Phase Ib - core | BR-20-116 | 45.0 | 47.0 | 9.92 | 0.064 | <0.04 | 0.04 | 0.071 | 0.200 | 0.040 | 0.031 | 3.34 | 10.5 | 5.5 | 1.67 | 2.75 | 2.75 | NPAG | - |
| GB-NM2021-01 | greywacke | waste | Phase II - pulp | BR-17-01 | 50.3 | 55.0 | 9.42 | 0.482 | 0.06 | 0.42 | 0.152 | 0.455 | 0.091 | 0.061 | 7.59 | 13.7 | 8.7 | 0.50 | 0.58 | 0.58 | PAG1 | - |
| GB-NM2021-03 | quartz vein | waste | Phase II - pulp | BR-18-61 | 34.1 | 39.0 | 8.89 | 0.275 | 0.04 | 0.23 | 0.107 | 0.240 | 0.048 | 0.059 | 4.00 | 6.0 | 1.0 | 0.47 | 0.12 | 0.47 | PAG1 | - |
| GB-NM2021-04 | argillite | waste | Phase II - pulp | BR-18-61 | 55.5 | 61.0 | 8.96 | 0.603 | 0.16 | 0.44 | 0.192 | 0.455 | 0.091 | 0.101 | 7.59 | 8.0 | 3.0 | 0.40 | 0.16 | 0.40 | PAG1 | - |
| GB-NM2021-05 | Approx. 30% greywacke, 70% quartz vein | waste | Phase II - pulp | BR-18-61 | 126.0 | 131.0 | 8.79 | 0.531 | 0.16 | 0.37 | 0.096 | 0.195 | 0.039 | 0.057 | 3.25 | 8.4 | 3.4 | 0.20 | 0.20 | 0.20 | PAG1 | - |
| GB-NM2021-06 | Approx. 20% quartz vein, 80% greywacke | waste | Phase II - pulp | BR-18-61 | 144.5 | 149.5 | 9.44 | 0.145 | < 0.04 | 0.16 | 0.077 | 0.150 | 0.030 | 0.047 | 2.50 | 7.4 | 2.4 | 0.55 | 0.53 | 0.55 | PAG1 | - |
| GB-NM2021-07 | greywacke | waste | Phase II - pulp | BR-19-86 | 148.5 | 153.5 | 9.03 | 0.224 | 0.04 | 0.18 | 0.095 | 0.280 | 0.056 | 0.039 | 4.67 | 10.7 | 5.7 | 0.67 | 0.81 | 0.81 | PAG1 | - |
| GB-NM2021-08 | Approx. 60% greywacke, 40% argillite + quartz vein | waste | Phase II - pulp | BR-19-97 | 118.6 | 123.8 | 9.56 | 0.155 | 0.04 | 0.11 | 0.223 | 0.679 | 0.136 | 0.087 | 11.33 | 13.3 | 8.3 | 2.34 | 1.71 | 2.34 | NPAG | - |
| GB-NM2021-09 | Approx. 40% greywacke, 60% quartz vein | waste | Phase II - pulp | BR-19-103 | 25.2 | 30.2 | 9.04 | 0.479 | 0.06 | 0.42 | 0.136 | 0.210 | 0.042 | 0.094 | 3.50 | 4.6 | 0.1 | 0.23 | 0.01 | 0.23 | PAG1 | - |
| GB-NM2021-10 | Approx. 60% argillite, 40% quartz vein | waste | Phase II - pulp | BR-20-127 | 87.0 | 92.5 | 9.27 | 0.174 | < 0.04 | 0.14 | 0.117 | 0.340 | 0.068 | 0.049 | 5.67 | 10.3 | 5.3 | 1.04 | 0.97 | 1.04 | PAG2 | - |
| GB-NM2021-11 | Approx. 40% argillite + quartz veining, 60% quartz vein | waste | Phase II - pulp | BR-20-131 | 75.9 | 81.0 | 9.23 | 0.452 | 0.08 | 0.37 | 0.172 | 0.380 | 0.076 | 0.096 | 6.34 | 8.0 | 3.0 | 0.45 | 0.21 | 0.45 | PAG1 | - |
| GB-NM2021-12 | Approx. 70% argillte, 30% greywacke | waste | Phase II - pulp | BR-20-132 | 35.9 | 40.9 | 9.14 | 0.086 | < 0.04 | 0.07 | 0.120 | 0.295 | 0.059 | 0.061 | 4.92 | 8.8 | 3.8 | 1.83 | 1.41 | 1.83 | PAG2 | - |
| GB-NM2021-13 | greywacke + quartz vein | waste | Phase II - pulp | BR-20-132 | 84.5 | 89.4 | 9.22 | 0.978 | 0.15 | 0.83 | 0.112 | 0.225 | 0.045 | 0.067 | 3.75 | 8.6 | 3.6 | 0.12 | 0.12 | 0.12 | PAG1 | - |
| GB-NM2021-14 | Approx. 20% argillite + quartz veining, 80% greywacke + quartz veining | waste | Phase II - pulp | BR-20-134 | 14.0 | 19.0 | 8.62 | 0.264 | 0.07 | 0.19 | 0.085 | 0.180 | 0.036 | 0.049 | 3.00 | 4.7 | 0.1 | 0.36 | 0.01 | 0.36 | PAG1 | - |
| GB-NM2021-15 | Approx. 90% greywacke + quartz veining, 10% argillite | waste | Phase II - pulp | BR-20-134 | 53.0 | 58.0 | 9.24 | 0.554 | 0.09 | 0.46 | 0.239 | 0.744 | 0.149 | 0.090 | 12.41 | 8.4 | 3.4 | 0.72 | 0.20 | 0.72 | PAG1 | - |
| GB-NM2021-16 | Approx. 40% quartz vein, 60% greywacke | waste | Phase II - pulp | BR-20-134 | 110.3 | 115.3 | 9.14 | 1.720 | 0.22 | 1.50 | 0.125 | 0.245 | 0.049 | 0.076 | 4.09 | 8.5 | 3.5 | 0.08 | 0.07 | 0.08 | PAG1 | - |

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 1: Acid Base Accounting Results**

| Sample ID | Rock Type | Ore/Waste | Phase | Drillhole | Interval | | Paste pH | Total S | Sulphate S (HCl) | Sulphide S | Total Carbon | Carbonate | Inorganic C | Organic C | CaNP | Mod NP | Corrected Mod. NP | CaNP/TAP | Corrected Mod. NP/TAP | Operational NPR | Designation | NAG pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Units** | - | - | - | - | m | m | - | % | % | % | % | % | % | % | kg $CaCO_3$/t | kg $CaCO_3$/t | kg $CaCO_3$/t | - | - | - | - | - |
| GB-NM2021-17 | Approx. 80% argillite, 20% greywacke | waste | Phase II - pulp | BR-20-144 | 107.6 | 112.9 | 9.17 | 0.173 | 0.05 | 0.12 | 0.115 | 0.270 | 0.054 | 0.061 | 4.50 | 9.0 | 4.0 | 0.83 | 0.74 | 0.83 | PAG1 | - |
| GB-NM2021-18 | argillite | waste | Phase II - pulp | BR-20-145 | 100.0 | 104.8 | 9.36 | 0.214 | 0.08 | 0.13 | 0.104 | 0.245 | 0.049 | 0.055 | 4.09 | 10.5 | 5.5 | 0.61 | 0.82 | 0.82 | PAG1 | - |
| GB-NM2021-19 | Approx. 20% greywacke, 80% argillite | waste | Phase II - pulp | BR-20-152 | 77.0 | 82.0 | 9.24 | 0.053 | 0.05 | < 0.04 | 0.075 | 0.180 | 0.036 | 0.039 | 3.00 | 8.9 | 3.9 | 1.81 | 2.35 | 2.35 | NPAG | - |
| GB-NM2021-20 | Approx. 80% argillite + quartz veining, 20% greywacke | waste | Phase II - pulp | BR-20-156 | 62.6 | 68.2 | 9.09 | 0.146 | 0.06 | 0.09 | 0.124 | 0.405 | 0.081 | 0.043 | 6.76 | 12.8 | 7.8 | 1.48 | 1.71 | 1.71 | PAG2 | - |
| GB-NM2021-21 | Approx. 40% greywacke, 60% argillite + quartz veining | waste | Phase II - pulp | BR-20-165 | 11.6 | 16.3 | 7.91 | 0.261 | 0.05 | 0.21 | 0.161 | 0.330 | 0.066 | 0.095 | 5.50 | 5.3 | 0.3 | 0.67 | 0.04 | 0.67 | PAG1 | - |
| GB-NM2021-22 | greywacke | waste | Phase II - pulp | BR-20-165 | 26.0 | 31.0 | 8.92 | 0.408 | < 0.04 | 0.38 | 0.128 | 0.280 | 0.056 | 0.072 | 4.67 | 7.1 | 2.1 | 0.37 | 0.16 | 0.37 | PAG1 | - |
| GB-NM2021-23 | Approx. 15% argillite + quartz veining, 40% greywacke, 45% argillite | waste | Phase II - pulp | BR-20-172 | 52.3 | 57.3 | 8.94 | 0.106 | < 0.04 | 0.11 | 0.208 | 0.679 | 0.136 | 0.072 | 11.33 | 17.3 | 12.3 | 3.42 | 3.71 | 3.71 | NPAG | - |
| GB-NM2021-24 | Approx. 50% argillite + quartz veining, 50% greywacke + quartz veining | waste | Phase II - pulp | BR-20-176 | 36.0 | 41.0 | 8.97 | 0.083 | < 0.04 | 0.07 | 0.087 | 0.255 | 0.051 | 0.036 | 4.25 | 9.5 | 4.5 | 1.64 | 1.73 | 1.73 | PAG2 | - |
| GB-NM2021-25 | Approx. 20% argillite + quartz veining, 40% greywacke, 30% quartz vein | waste | Phase II - pulp | BR-20-178 | 74.0 | 81.7 | 9.61 | 0.318 | 0.07 | 0.25 | 0.206 | 0.570 | 0.114 | 0.092 | 9.51 | 11.9 | 6.9 | 0.96 | 0.69 | 0.96 | PAG1 | - |
| GB-NM2021-26 | Approx. 75% argillite + quartz veining, 25% greywacke | waste | Phase II - pulp | BR-20-219 | 16.0 | 21.0 | 9.06 | 0.218 | < 0.04 | 0.20 | 0.095 | 0.250 | 0.050 | 0.045 | 4.17 | 7.5 | 2.5 | 0.61 | 0.37 | 0.61 | PAG1 | - |
| GB-NM2021-27 | Approx. 80% argillite + quartz veining, 20% greywacke | waste | Phase II - pulp | BR-20-219 | 60.5 | 65.5 | 9.43 | 0.264 | 0.11 | 0.15 | 0.291 | 0.789 | 0.158 | 0.133 | 13.16 | 10.2 | 5.2 | 1.60 | 0.63 | 1.60 | PAG1 | - |
| GB-NM2021-28 | Approx. 90% greywacke, 10% argillite | waste | Phase II - core | BR-18-17 | 23.0 | 28.0 | 9.94 | 0.090 | 0.05 | 0.04 | 0.097 | 0.270 | 0.054 | 0.043 | 4.50 | 24.3 | 19.3 | 1.60 | 6.86 | 6.86 | NPAG | - |
| GB-NM2021-29 | greywacke marker unit | waste | Phase II - core | BR-18-20 | 185.0 | 190.0 | 10.05 | 0.041 | 0.04 | <0.04 | 0.052 | 0.130 | 0.026 | 0.026 | 2.17 | 21.7 | 16.7 | 1.69 | 13.03 | 13.03 | NPAG | - |
| GB-NM2021-30 | greywacke marker unit | waste | Phase II - core | BR-18-22 | 183.0 | 188.0 | 10.00 | 0.124 | 0.05 | 0.07 | 0.095 | 0.285 | 0.057 | 0.038 | 4.75 | 21.9 | 16.9 | 1.23 | 4.36 | 4.36 | NPAG | - |
| GB-NM2021-31 | greywacke marker unit | waste | Phase II - core | BR-18-36 | 27.7 | 32.7 | 9.71 | 0.062 | 0.06 | <0.04 | 0.184 | 0.664 | 0.133 | 0.051 | 11.07 | 28.4 | 23.4 | 5.72 | 12.08 | 12.08 | NPAG | - |
| GB-NM2021-32 | greywacke marker unit | waste | Phase II - core | BR-18-40 | 13.0 | 18.0 | 9.77 | 0.060 | <0.04 | 0.05 | 0.072 | 0.190 | 0.038 | 0.034 | 3.17 | 21.2 | 16.2 | 1.69 | 8.64 | 8.64 | NPAG | - |
| GB-NM2021-33 | greywacke | waste | Phase II - core | BR-19-98 | 24.5 | 29.5 | 9.95 | 0.029 | <0.04 | <0.04 | 0.058 | 0.145 | 0.029 | 0.029 | 2.42 | 20.5 | 15.5 | 2.67 | 17.10 | 17.10 | NPAG | - |
| GB-NM2021-34 | greywacke | waste | Phase II - core | BR-20-183 | 51.0 | 56.0 | 9.66 | 0.044 | <0.04 | 0.05 | 0.070 | 0.190 | 0.038 | 0.032 | 3.17 | 19.4 | 14.4 | 2.30 | 10.47 | 10.47 | NPAG | - |
| 389995 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | 8.91 | 0.863 | 0.14 | 0.72 | 0.269 | 0.714 | 0.143 | 0.126 | 11.91 | 10.8 | 5.8 | 0.44 | 0.22 | 0.44 | PAG1 | - |
| 389996 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | 8.89 | 0.596 | 0.12 | 0.48 | 0.306 | 0.779 | 0.156 | 0.150 | 12.99 | 10.9 | 5.9 | 0.70 | 0.32 | 0.70 | PAG1 | - |
| 389997 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | 8.05 | 0.372 | 0.08 | 0.29 | 0.203 | 0.385 | 0.077 | 0.126 | 6.42 | 7.5 | 2.5 | 0.55 | 0.22 | 0.55 | PAG1 | - |
| 389998 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | 8.81 | 0.654 | 0.13 | 0.52 | 0.333 | 0.869 | 0.174 | 0.159 | 14.49 | 14.0 | 9.0 | 0.71 | 0.44 | 0.71 | PAG1 | - |
| 389999 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | 8.64 | 0.766 | 0.12 | 0.65 | 0.432 | 1.080 | 0.216 | 0.216 | 18.01 | 14.7 | 9.7 | 0.75 | 0.41 | 0.75 | PAG1 | - |
| GB_HC1 | argillite | waste | Humidity Cell | n/a | n/a | n/a | 9.58 | 0.03 | <0.04 | 0.04 | 0.106 | 0.210 | 0.042 | 0.064 | 3.50 | 9.3 | 4.3 | 3.30 | 4.05 | 4.05 | NPAG | - |
| GB_HC2 | argillite | waste | Humidity Cell | n/a | n/a | n/a | 9.34 | 0.224 | 0.05 | 0.17 | 0.110 | 0.230 | 0.046 | 0.064 | 3.84 | 9.1 | 4.1 | 0.55 | 0.59 | 0.59 | PAG I | - |
| GB_HC3 | greywacke | waste | Humidity Cell | n/a | n/a | n/a | 9.94 | 0.032 | <0.04 | 0.04 | 0.055 | 0.100 | 0.020 | 0.035 | 1.67 | 9.6 | 4.6 | 1.67 | 4.60 | 4.60 | NPAG | - |
| GB_HC4 | greywacke | waste | Humidity Cell | n/a | n/a | n/a | 9.16 | 0.220 | 0.04 | 0.18 | 0.024 | <0.025 | 0.005 | 0.019 | 0.42 | 6.7 | 1.7 | 0.06 | 0.25 | 0.25 | PAG I | - |
| GB_HC5 | 50% argillite, 50% greywacke | waste | Humidity Cell | n/a | n/a | n/a | 9.65 | 0.054 | < 0.04 | 0.07 | 0.063 | <0.115 | 0.023 | 0.040 | 1.92 | 7.5 | 2.5 | 1.14 | 1.48 | 1.48 | PAG II | - |
| GB_HC6 | greywacke marker unit | waste | Humidity Cell | n/a | n/a | n/a | 9.29 | 0.206 | 0.05 | 0.16 | 0.133 | <0.385 | 0.077 | 0.056 | 6.42 | 11.8 | 6.8 | 1.00 | 1.06 | 1.06 | PAG I | - |
| FB-1 | Mixed - bulk sample stockpile | ore | Field Bin | n/a | n/a | n/a | 9.46 | 0.456 | 0.09 | 0.37 | 0.329 | 0.994 | 0.199 | 0.130 | 16.58 | 7.4 | 2.4 | 1.16 | 0.17 | 1.16 | PAG I | - |
| FB-2 | PAG1, mixed lithology | waste | Field Bin | n/a | n/a | n/a | 9.77 | 0.020 | <0.04 | < 0.04 | 0.099 | 0.220 | 0.044 | 0.055 | 3.67 | 12.6 | 7.6 | 5.87 | 12.16 | 12.16 | NPAG | - |
| FB-3 | PAG2, greywacke | waste | Field Bin | n/a | n/a | n/a | 9.80 | 0.388 | 0.14 | 0.25 | 0.062 | 0.080 | <0.025 | 0.037 | 2.08 | 9.2 | 4.2 | 0.17 | 0.35 | 0.35 | PAG I | - |
| FB-4 | NPAG, argillite | waste | Field Bin | n/a | n/a | n/a | 9.70 | 0.020 | <0.04 | < 0.04 | 0.073 | 0.170 | 0.034 | 0.039 | 2.83 | 11.2 | 6.2 | 4.53 | 9.92 | 9.92 | NPAG | - |

**Notes:**

S: Sulphur, C: Carbon, CaNP: Carbonate Neutralization Potential, Mod. NP: Modified Neutralization Potential, TAP: Total Acid Potential, equal to Total S x 31.25, NPR: Neutralization Potential Ratio, NAG: Net Acid Generation, n/a: not applicable

Corrected Modified NP is calculated as Modified NP - 5 kg$CaCO_3$/t

Operational NPR is the higher of the NPR calculated as CaNP/TAP and Corrected Modified NP/TAP

Light grey shading indicates an NPR value between 1 and 2

Dark grey shading indicates an NPR value below 1

Designations are defined as:

PAG1: NPR < 1 or 1≤ NPR ≤ 2 and total S ≥ 0.2 wt.%

PAG2: 1≤ NPR ≤ 2 and total S < 0.2 wt.%

NPAG: NPR > 2

PAG: Potentially Acid Generating, NPAG: Non-Potentially Acid Generating, NPR: Neutralization Potential Ratio

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 2: Solid Phase Metal Results**

| Sample ID | Rock Type | Ore/Waste | Phase | Drillhole | Interval | | Ag | Al | As | Ba | Be | Bi | Ca | Cd | Co | Cr | Cu | Fe | K |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | - | - | - | m | m | μg/g | % | μg/g | μg/g | μg/g | μg/g | % | μg/g | μg/g | μg/g | μg/g | % | % |
| *AUCCA (Rudnick and Gao, 2014)* | | | | | | | *0.053* | *8.15* | *4.8* | *628* | *2.1* | *0.16* | *2.57* | *0.09* | *17.3* | *92* | *28* | *3.92* | *2.32* |
| GB-2020-001 | argillite | waste | Phase I | BR-17-10 | 20.5 | 22.4 | <0.5 | 8.1 | 52 | 790 | 2.1 | 0.25 | 0.95 | 0.10 | 14 | 27 | 16 | 3.7 | 3.3 |
| GB-2020-002 | argillite | waste | Phase I | BR-17-10 | 33.5 | 35.5 | <0.5 | 9.6 | 270 | 930 | 3.2 | 0.68 | 0.84 | 0.47 | 21 | 36 | 63 | 5.4 | 4.7 |
| GB-2020-003 | greywacke | waste | Phase I | BR-17-10 | 36.5 | 38.5 | <0.5 | 5.6 | 15 | 400 | 1.3 | <0.09 | 0.95 | 0.060 | 8.2 | 18 | 14 | 2.5 | 1.7 |
| GB-2020-004 | greywacke | waste | Phase I | BR-17-10 | 50.0 | 52.0 | <0.5 | 7.0 | 52 | 590 | 1.9 | <0.09 | 0.94 | 0.11 | 13 | 26 | 24 | 3.4 | 2.5 |
| GB-2020-005 | greywacke | waste | Phase I | BR-17-10 | 67.0 | 69.2 | <0.5 | 6.1 | 83 | 460 | 1.6 | 0.23 | 0.92 | 0.22 | 11 | 31 | 15 | 2.9 | 1.9 |
| GB-2020-006 | argillite | waste | Phase I | BR-17-10 | 78.0 | 80.0 | <0.5 | 8.6 | 460 | 870 | 2.3 | <0.09 | 0.64 | 0.10 | 19 | 50 | 36 | 3.8 | 3.8 |
| GB-2020-007 | argillite | ore | Phase I | BR-17-10 | 81.5 | 83.5 | <0.5 | 11 | 1800 | 1100 | 3.2 | 0.25 | 0.43 | 0.12 | 19 | 94 | 57 | 5.9 | 5.0 |
| GB-2020-008 | greywacke | waste | Phase I | BR-17-10 | 118.0 | 120.0 | <0.5 | 5.5 | 88 | 370 | 1.3 | <0.09 | 0.73 | 0.040 | 7.9 | 24 | 23 | 2.4 | 1.7 |
| GB-2020-009 | greywacke | waste | Phase I | BR-18-18 | 12.0 | 14.0 | <0.5 | 9.0 | 89 | 900 | 2.7 | 0.21 | 0.96 | 0.050 | 18 | 34 | 37 | 4.2 | 3.8 |
| GB-2020-010 | greywacke | waste | Phase I | BR-18-18 | 20.0 | 22.0 | <0.5 | 6.1 | 29 | 440 | 1.5 | <0.09 | 1.0 | 0.030 | 9.4 | 23 | 20 | 2.8 | 2.0 |
| GB-2020-011 | greywacke | waste | Phase I | BR-18-18 | 34.4 | 36.0 | <0.5 | 6.6 | 18 | 440 | 1.5 | 0.13 | 1.1 | 0.12 | 10 | 26 | 9.3 | 2.9 | 2.1 |
| GB-2020-012 | argillite | waste | Phase I | BR-18-18 | 48.0 | 50.0 | <0.5 | 11 | 120 | 1100 | 3.7 | 0.41 | 0.84 | 0.14 | 22 | 43 | 38 | 5.6 | 5.6 |
| GB-2020-013 | greywacke | waste | Phase I | BR-18-18 | 58.0 | 60.0 | <0.5 | 5.1 | 130 | 370 | 1.1 | 0.10 | 0.80 | 0.060 | 6.8 | 24 | 15 | 2.5 | 1.7 |
| GB-2020-014 | argillite | waste | Phase I | BR-18-18 | 66.0 | 68.0 | <0.5 | 11 | 89 | 1300 | 3.0 | 0.27 | 0.53 | 0.070 | 23 | 52 | 28 | 5.0 | 5.5 |
| GB-2020-015 | greywacke | waste | Phase I | BR-18-18 | 80.0 | 82.0 | <0.5 | 6.3 | 220 | 500 | 1.6 | 0.090 | 0.79 | 8.0 | 8.9 | 35 | 15 | 2.5 | 2.3 |
| GB-2020-016 | argillite | waste | Phase I | BR-18-24 | 22.9 | 24.3 | <0.5 | 4.5 | 330 | 430 | 1.5 | 0.24 | 0.93 | 0.040 | 9.2 | 40 | 18 | 2.2 | 2.0 |
| GB-2020-017 | greywacke | waste | Phase I | BR-18-24 | 28.0 | 30.0 | <0.5 | 6.4 | 15 | 530 | 1.8 | <0.09 | 0.86 | 0.12 | 9.9 | 28 | 20 | 2.7 | 2.4 |
| GB-2020-018 | argillite | waste | Phase I | BR-18-24 | 44.5 | 46.0 | <0.5 | 6.9 | 230 | 530 | 2.0 | 0.15 | 1.6 | 0.060 | 15 | 41 | 28 | 4.0 | 2.4 |
| GB-2020-019 | greywacke | waste | Phase I | BR-18-24 | 48.5 | 50.5 | <0.5 | 5.0 | 44 | 370 | 1.2 | 0.11 | 0.74 | 0.030 | 7.5 | 21 | 35 | 2.2 | 1.8 |
| GB-2020-020 | argillite | waste | Phase I | BR-18-24 | 57.0 | 59.0 | <0.5 | 7.4 | 130 | 730 | 2.1 | 0.11 | 1.0 | 0.060 | 13 | 36 | 18 | 3.4 | 3.2 |
| GB-2020-021 | greywacke | waste | Phase I | BR-18-24 | 66.0 | 67.4 | <0.5 | 5.7 | 15 | 430 | 1.4 | <0.09 | 0.67 | 0.040 | 7.9 | 24 | 8.6 | 2.4 | 1.9 |
| GB-2020-022 | argillite | waste | Phase I | BR-18-24 | 76.0 | 78.0 | <0.5 | 6.9 | 1000 | 590 | 2.5 | 0.15 | 1.3 | 0.12 | 14 | 38 | 48 | 4.2 | 2.9 |
| GB-2020-023 | greywacke | waste | Phase I | BR-18-24 | 89.5 | 91.5 | <0.5 | 6.2 | 380 | 440 | 1.6 | 0.090 | 0.90 | 0.030 | 9.7 | 31 | 11 | 2.8 | 2.0 |
| GB-2020-024 | greywacke | waste | Phase I | BR-18-24 | 116.7 | 118.5 | <0.5 | 7.0 | 25 | 540 | 1.9 | 0.18 | 0.89 | 0.030 | 12 | 36 | 17 | 3.5 | 2.6 |
| GB-2020-025 | argillite | waste | Phase I | BR-18-24 | 120.4 | 122.4 | <0.5 | 7.4 | 140 | 620 | 2.1 | 0.27 | 0.91 | 0.070 | 14 | 58 | 17 | 3.5 | 3.0 |
| GB-2020-026 | greywacke | waste | Phase I | BR-18-24 | 129.0 | 131.0 | <0.5 | 6.5 | 39 | 560 | 1.9 | 0.71 | 0.88 | 0.080 | 12 | 36 | 23 | 3.0 | 2.5 |
| GB-2020-027 | argillite | waste | Phase I | BR-18-24 | 138.4 | 140.4 | <0.5 | 7.1 | 130 | 610 | 2.2 | 0.35 | 0.81 | 0.060 | 12 | 40 | 32 | 3.7 | 2.8 |
| GB-2020-028 | argillite | ore | Phase I | BR-18-24 | 148.1 | 149.0 | <0.5 | 8.2 | 590 | 790 | 2.9 | 0.31 | 1.1 | 0.17 | 18 | 46 | 47 | 4.0 | 3.4 |
| GB-2020-029 | argillite | waste | Phase I | BR-18-24 | 158.2 | 160.0 | <0.5 | 6.5 | 490 | 520 | 1.7 | 0.090 | 0.82 | 0.060 | 12 | 32 | 24 | 2.9 | 2.3 |
| GB-2020-030 | greywacke | waste | Phase I | BR-18-24 | 172.3 | 174.0 | <0.5 | 6.1 | 160 | 440 | 1.6 | <0.09 | 1.0 | 0.060 | 8.8 | 30 | 17 | 2.7 | 1.9 |
| GB-2020-031 | greywacke | waste | Phase I | BR-18-28 | 12.7 | 14.5 | <0.5 | 4.2 | 89 | 260 | 1.0 | 0.16 | 0.66 | 0.040 | 5.1 | 22 | 11 | 1.8 | 1.2 |
| GB-2020-032 | argillite | waste | Phase I | BR-18-28 | 28.0 | 30.0 | <0.5 | 7.7 | 79 | 610 | 2.3 | 0.13 | 1.0 | 0.090 | 17 | 46 | 35 | 4.5 | 2.8 |
| GB-2020-033 | argillite | ore | Phase I | BR-18-28 | 38.2 | 38.7 | <0.5 | 8.4 | 1600 | 800 | 2.8 | 0.68 | 0.93 | 0.070 | 16 | 53 | 52 | 4.6 | 3.6 |
| GB-2020-034 | greywacke | waste | Phase I | BR-18-28 | 49.0 | 51.5 | <0.5 | 6.8 | 36 | 610 | 1.8 | <0.09 | 0.65 | 0.090 | 11 | 43 | 19 | 3.4 | 2.5 |
| GB-2020-035 | argillite | waste | Phase I | BR-18-29 | 17.0 | 19.0 | <0.5 | 4.9 | 2600 | 510 | 1.4 | 0.39 | 1.0 | 0.21 | 8.9 | 34 | 20 | 2.5 | 2.2 |
| GB-2020-036 | argillite | waste | Phase I | BR-18-29 | 29.0 | 31.0 | <0.5 | 8.2 | 230 | 860 | 3.0 | 0.14 | 0.74 | 0.10 | 17 | 69 | 22 | 4.7 | 4.2 |
| GB-2020-037 | argillite | waste | Phase I | BR-18-29 | 41.7 | 43.5 | <0.5 | 7.9 | 2700 | 710 | 2.4 | 0.11 | 0.78 | 0.11 | 14 | 43 | 13 | 3.6 | 3.1 |
| GB-2020-038 | greywacke | waste | Phase I | BR-18-29 | 48.0 | 49.8 | <0.5 | 5.2 | 18 | 310 | 1.2 | 0.14 | 0.65 | <0.02 | 6.7 | 24 | 13 | 2.1 | 1.4 |
| GB-2020-039 | greywacke | waste | Phase I | BR-18-29 | 58.0 | 59.8 | <0.5 | 5.2 | 390 | 310 | 1.2 | 0.35 | 0.78 | 0.090 | 6.7 | 27 | 12 | 2.2 | 1.3 |
| GB-2020-040 | greywacke | waste | Phase I | BR-18-29 | 69.9 | 71.4 | <0.5 | 6.0 | 2000 | 450 | 1.4 | 0.12 | 0.82 | 0.020 | 8.9 | 38 | 13 | 2.5 | 1.9 |
| GB-2020-041 | greywacke | waste | Phase I | BR-18-31 | 16.0 | 18.6 | <0.5 | 5.9 | 23 | 460 | 1.3 | <0.09 | 0.87 | <0.02 | 8.7 | 40 | 9.4 | 2.3 | 1.7 |
| GB-2020-042 | argillite | waste | Phase I | BR-18-31 | 20.5 | 21.5 | <0.5 | 8.4 | 45 | 810 | 2.4 | 0.14 | 0.72 | 0.040 | 16 | 33 | 34 | 3.9 | 3.2 |
| GB-2020-043 | greywacke | waste | Phase I | BR-18-31 | 36.0 | 38.0 | <0.5 | 7.9 | 71 | 670 | 2.1 | 0.62 | 1.2 | 0.080 | 15 | 32 | 42 | 3.9 | 2.7 |
| GB-2020-044 | argillite | ore | Phase I | BR-18-31 | 51.6 | 54.5 | 0.50 | 9.6 | 3100 | 930 | 3.4 | 0.18 | 0.95 | 2.0 | 22 | 41 | 57 | 4.4 | 3.8 |
| GB-2020-045 | greywacke | waste | Phase I | BR-18-31 | 58.9 | 60.9 | <0.5 | 6.0 | 41 | 390 | 1.4 | <0.09 | 0.94 | <0.02 | 9.1 | 21 | 9.6 | 2.5 | 1.6 |
| GB-2020-046 | greywacke marker unit | waste | Phase I | BR-18-35 | 17.0 | 19.0 | <0.5 | 5.4 | 1100 | 410 | 1.3 | <0.09 | 0.74 | 0.15 | 7.0 | 22 | 28 | 2.1 | 1.5 |
| GB-2020-047 | quartz vein | waste | Phase I | BR-18-35 | 24.0 | 25.9 | <0.5 | 0.041 | 3.7 | 3.7 | <0.02 | <0.09 | 0.029 | <0.02 | 0.11 | 5.1 | 2.1 | 0.24 | 0.018 |
| GB-2020-048 | greywacke marker unit | waste | Phase I | BR-18-35 | 28.0 | 30.0 | <0.5 | 5.6 | 1200 | 400 | 1.4 | <0.09 | 0.61 | 0.13 | 6.4 | 30 | 21 | 2.0 | 1.5 |
| GB-2020-049 | greywacke | waste | Phase I | BR-18-35 | 45.1 | 47.1 | <0.5 | 5.4 | 100 | 390 | 1.4 | <0.09 | 0.58 | <0.02 | 7.1 | 29 | 14 | 2.1 | 1.7 |
| GB-2020-050 | argillite + quartz vein | ore | Phase I | BR-18-38 | 49.6 | 51.1 | <0.5 | 7.1 | 4200 | 730 | 3.1 | 0.22 | 1.1 | 0.050 | 16 | 67 | 18 | 3.5 | 2.9 |
| GB-2020-051 | quartz vein | waste | Phase I | BR-18-38 | 86.0 | 88.0 | <0.5 | 4.2 | 1800 | 330 | 1.1 | <0.09 | 0.59 | <0.02 | 4.0 | 19 | 6.5 | 1.5 | 1.4 |
| GB-2020-052 | greywacke marker unit | waste | Phase I | BR-18-38 | 90.0 | 91.0 | <0.5 | 1.9 | 790 | 120 | 0.54 | <0.09 | 0.42 | <0.02 | 2.6 | 8.1 | 2.6 | 0.87 | 0.54 |
| GB-2020-053 | greywacke + quartz vein | waste | Phase I | BR-18-38 | 130.0 | 132.0 | <0.5 | 5.8 | 1600 | 430 | 1.9 | <0.09 | 0.60 | 0.080 | 8.4 | 26 | 17 | 2.4 | 2.1 |
| GB-2020-054 | greywacke | waste | Phase I | BR-18-38 | 143.5 | 145.5 | <0.5 | 7.9 | 98 | 630 | 2.3 | <0.09 | 0.95 | <0.02 | 15 | 33 | 12 | 3.7 | 3.0 |

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 2: Solid Phase Metal Results**

| Sample ID | Rock Type | Ore/Waste | Phase | Drillhole | Interval | | Ag | Al | As | Ba | Be | Bi | Ca | Cd | Co | Cr | Cu | Fe | K |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | - | - | - | m | m | µg/g | % | µg/g | µg/g | µg/g | µg/g | % | µg/g | µg/g | µg/g | µg/g | % | % |
| GB-2020-055 | greywacke | waste | Phase I | BR-18-54 | 14.0 | 15.9 | <0.5 | 5.2 | 74 | 340 | 1.1 | <0.09 | 0.39 | <0.02 | 6.4 | 21 | 13 | 2.1 | 1.3 |
| GB-2020-056 | greywacke | waste | Phase I | BR-18-54 | 20.0 | 22.0 | <0.5 | 5.9 | 12 | 430 | 1.5 | <0.09 | 0.66 | <0.02 | 8.1 | 22 | 11 | 2.2 | 1.6 |
| GB-2020-057 | greywacke | waste | Phase I | BR-18-54 | 29.0 | 31.0 | <0.5 | 5.3 | 230 | 350 | 1.2 | <0.09 | 0.78 | <0.02 | 6.7 | 25 | 16 | 2.0 | 1.4 |
| GB-2020-058 | argillite | waste | Phase I | BR-18-54 | 45.0 | 47.0 | <0.5 | 8.5 | 180 | 890 | 2.6 | 0.17 | 0.64 | <0.02 | 22 | 55 | 50 | 4.3 | 3.3 |
| GB-2020-059 | argillite | waste | Phase I | BR-18-54 | 65.0 | 67.0 | <0.5 | 7.6 | 37 | 580 | 2.3 | 0.10 | 1.4 | <0.02 | 16 | 67 | 38 | 3.9 | 2.6 |
| GB-2020-060 | argillite | waste | Phase I | BR-18-54 | 85.5 | 87.5 | <0.5 | 8.7 | 57 | 790 | 3.0 | 0.19 | 0.99 | 0.030 | 18 | 43 | 43 | 4.2 | 3.0 |
| GB-2020-061 | greywacke | waste | Phase I | BR-18-54 | 100.3 | 102.3 | <0.5 | 6.4 | 60 | 500 | 1.7 | <0.09 | 0.83 | <0.02 | 11 | 29 | 14 | 2.8 | 2.0 |
| GB-2020-062 | greywacke | waste | Phase I | BR-18-54 | 124.0 | 126.0 | <0.5 | 6.6 | 26 | 450 | 1.7 | <0.09 | 1.0 | 0.030 | 12 | 32 | 13 | 3.0 | 1.8 |
| GB-2020-063 | greywacke | waste | Phase I | BR-18-54 | 140.0 | 142.0 | <0.5 | 6.2 | 28 | 520 | 1.6 | <0.09 | 0.90 | 0.040 | 10 | 29 | 20 | 2.5 | 2.0 |
| GB-2020-064 | greywacke + quartz vein | waste | Phase I | BR-18-61 | 6.9 | 9.0 | 1.1 | 2.8 | 2200 | 150 | 0.77 | 4.2 | 0.37 | 0.28 | 6.6 | 18 | 3.2 | 1.2 | 0.71 |
| GB-2020-065 | argillite + quartz vein | ore | Phase I | BR-18-61 | 16.4 | 17.5 | 0.70 | 8.0 | 5700 | 750 | 3.4 | 0.45 | 0.64 | 0.34 | 14 | 49 | 40 | 3.3 | 3.5 |
| GB-2020-066 | greywacke + quartz vein | waste | Phase I | BR-18-61 | 30.0 | 31.5 | <0.5 | 5.9 | 4500 | 440 | 1.7 | <0.09 | 0.70 | 0.24 | 7.7 | 31 | 7.4 | 2.3 | 2.1 |
| GB-2020-067 | quartz vein | waste | Phase I | BR-18-61 | 40.0 | 41.5 | <0.5 | 5.1 | 3200 | 380 | 2.0 | <0.09 | 0.57 | 0.30 | 6.1 | 28 | 3.9 | 1.4 | 1.6 |
| GB-2020-068 | argillite | ore | Phase I | BR-18-61 | 54.0 | 56.0 | <0.5 | 9.6 | 13000 | 1100 | 3.5 | 0.47 | 0.64 | 0.24 | 20 | 96 | 34 | 4.8 | 4.5 |
| GB-2020-069 | argillite | waste | Phase I | BR-18-61 | 58.0 | 59.0 | <0.5 | 8.5 | 1000 | 800 | 3.3 | 0.81 | 0.73 | 0.060 | 20 | 49 | 68 | 4.5 | 4.0 |
| GB-2020-070 | argillite | waste | Phase I | BR-18-61 | 68.0 | 69.0 | <0.5 | 8.6 | 240 | 790 | 3.0 | <0.09 | 0.77 | 0.040 | 18 | 51 | 27 | 4.1 | 3.8 |
| GB-2020-071 | greywacke | waste | Phase I | BR-18-61 | 78.5 | 80.5 | <0.5 | 9.0 | 120 | 700 | 2.9 | <0.09 | 1.2 | 0.060 | 19 | 56 | 16 | 4.4 | 3.3 |
| GB-2020-072 | argillite | waste | Phase I | BR-18-62 | 20.5 | 22.3 | <0.5 | 9.8 | 1100 | 1100 | 3.4 | 1.9 | 0.49 | 0.23 | 30 | 60 | 69 | 4.8 | 4.6 |
| GB-2020-073 | argillite | waste | Phase I | BR-18-62 | 32.0 | 34.0 | <0.5 | 8.9 | 190 | 770 | 3.0 | 0.24 | 0.82 | 0.090 | 20 | 48 | 26 | 4.2 | 3.6 |
| GB-2020-074 | greywacke | waste | Phase I | BR-18-62 | 40.0 | 41.5 | <0.5 | 6.3 | 900 | 420 | 2.1 | <0.09 | 0.81 | <0.02 | 8.0 | 30 | 19 | 2.4 | 2.3 |
| GB-2020-075 | greywacke | waste | Phase I | BR-18-62 | 48.6 | 50.2 | <0.5 | 5.9 | 820 | 430 | 1.6 | <0.09 | 0.72 | 0.33 | 8.2 | 29 | 16 | 2.2 | 2.1 |
| GB-2020-076 | greywacke | waste | Phase I | BR-18-62 | 54.6 | 56.6 | <0.5 | 5.7 | 1600 | 420 | 1.5 | <0.09 | 0.65 | 0.16 | 7.6 | 31 | 19 | 2.2 | 1.9 |
| GB-2020-077 | greywacke | waste | Phase I | BR-19-84 | 9.0 | 11.0 | <0.5 | 6.2 | 29 | 440 | 1.5 | 0.21 | 0.69 | <0.02 | 9.8 | 40 | 16 | 2.7 | 1.7 |
| GB-2020-078 | greywacke | waste | Phase I | BR-19-84 | 23.0 | 25.0 | <0.5 | 6.9 | 33 | 580 | 1.9 | <0.09 | 0.89 | <0.02 | 13 | 47 | 14 | 3.1 | 2.3 |
| GB-2020-079 | greywacke | waste | Phase I | BR-19-95 | 18.7 | 20.7 | <0.5 | 5.1 | 50 | 360 | 1.2 | <0.09 | 0.51 | <0.02 | 7.2 | 27 | 16 | 2.1 | 1.5 |
| GB-2020-080 | argillite | waste | Phase I | BR-19-95 | 54.0 | 56.0 | <0.5 | 7.8 | 110 | 750 | 2.4 | 0.13 | 0.94 | 0.24 | 13 | 27 | 23 | 3.4 | 2.9 |
| GB-2020-081 | greywacke | waste | Phase I | BR-20-117 | 16.0 | 18.0 | <0.5 | 6.0 | 240 | 470 | 1.5 | <0.09 | 0.48 | 0.040 | 10 | 17 | 48 | 2.8 | 2.2 |
| GB-2020-082 | argillite | waste | Phase I | BR-20-117 | 67.8 | 69.8 | <0.5 | 7.6 | 140 | 720 | 2.4 | <0.09 | 0.96 | 0.070 | 16 | 27 | 25 | 4.0 | 3.2 |
| GB-2020-083 | greywacke | waste | Phase I | BR-20-117 | 145.0 | 147.0 | <0.5 | 5.8 | 2300 | 500 | 1.6 | 0.16 | 0.32 | 0.030 | 8.6 | 22 | 11 | 2.6 | 2.4 |
| GB-2020-084 | greywacke | waste | Phase I | BR-20-127 | 11.0 | 14.0 | <0.5 | 7.0 | 26 | 540 | 2.0 | <0.09 | 1.0 | 0.050 | 13 | 24 | 13 | 3.6 | 2.3 |
| GB-2020-085 | greywacke | waste | Phase I | BR-20-127 | 25.0 | 27.0 | <0.5 | 6.3 | 17 | 480 | 1.6 | <0.09 | 0.89 | 0.050 | 9.6 | 24 | 16 | 2.7 | 2.0 |
| GB-2020-086 | argillite | waste | Phase I | BR-20-127 | 39.0 | 41.0 | <0.5 | 5.0 | 120 | 320 | 1.4 | <0.09 | 0.94 | 0.050 | 8.5 | 24 | 22 | 2.5 | 1.5 |
| GB-2020-087 | greywacke | waste | Phase I | BR-20-127 | 45.0 | 47.0 | <0.5 | 5.0 | 41 | 310 | 1.1 | <0.09 | 0.71 | 0.090 | 7.6 | 34 | 14 | 2.1 | 1.3 |
| GB-2020-088 | greywacke | waste | Phase I | BR-20-127 | 53.3 | 55.2 | <0.5 | 6.4 | 1000 | 620 | 2.0 | 0.15 | 1.2 | 0.14 | 9.7 | 28 | 42 | 2.9 | 2.5 |
| GB-2020-089 | greywacke | waste | Phase I | BR-20-145 | 14.0 | 16.0 | <0.5 | 7.6 | 33 | 610 | 2.2 | 0.13 | 0.96 | 0.080 | 14 | 30 | 15 | 3.8 | 2.7 |
| GB-2020-090 | greywacke | waste | Phase I | BR-20-145 | 35.0 | 37.0 | <0.5 | 7.1 | 42 | 610 | 1.9 | 0.14 | 0.85 | 0.050 | 13 | 23 | 24 | 3.3 | 2.6 |
| GB-2020-091 | greywacke | waste | Phase I | BR-20-145 | 53.0 | 55.0 | <0.5 | 6.2 | 27 | 500 | 1.6 | 0.10 | 0.79 | 0.030 | 11 | 20 | 12 | 3.0 | 2.2 |
| GB-2020-092 | greywacke | waste | Phase I | BR-20-160 | 10.0 | 12.0 | <0.5 | 4.6 | 48 | 260 | 0.94 | <0.09 | 0.80 | 0.050 | 6.4 | 14 | 9.3 | 1.9 | 1.2 |
| GB-2020-093 | greywacke | waste | Phase I | BR-20-160 | 27.0 | 29.0 | <0.5 | 5.4 | 440 | 330 | 1.2 | <0.09 | 0.80 | 0.070 | 7.9 | 21 | 10 | 2.3 | 1.4 |
| GB-2020-094 | argillite | waste | Phase I | BR-20-174 | 10.5 | 12.5 | <0.5 | 7.9 | 210 | 720 | 2.6 | <0.09 | 0.75 | 0.16 | 16 | 37 | 8.7 | 3.6 | 3.0 |
| GB-2020-095 | greywacke | waste | Phase I | BR-20-174 | 27.0 | 28.5 | <0.5 | 5.4 | 34 | 440 | 1.4 | <0.09 | 0.60 | 0.64 | 8.9 | 25 | 18 | 2.3 | 1.9 |
| GB-2020-096 | greywacke | waste | Phase I | BR-20-174 | 69.0 | 70.5 | <0.5 | 6.5 | 23 | 480 | 1.6 | <0.09 | 0.99 | 0.020 | 11 | 39 | 19 | 3.0 | 2.0 |
| GB-2020-097 | argillite | waste | Phase I | BR-20-174 | 89.0 | 91.0 | <0.5 | 8.7 | 59 | 820 | 2.5 | 0.14 | 0.72 | <0.02 | 16 | 41 | 28 | 4.3 | 2.9 |
| GB-2020-098 | argillite | waste | Phase I | BR-20-191 | 19.8 | 21.5 | <0.5 | 9.4 | 53 | 810 | 2.8 | 0.13 | 0.89 | 0.070 | 22 | 56 | 55 | 5.8 | 3.2 |
| GB-2020-099 | greywacke | waste | Phase I | BR-20-191 | 36.1 | 38.1 | <0.5 | 5.3 | 95 | 360 | 1.1 | 0.12 | 0.99 | 0.15 | 8.1 | 41 | 15 | 2.4 | 1.7 |
| GB-2020-100 | argillite | waste | Phase I | BR-20-199 | 26.9 | 28.9 | <0.5 | 6.7 | 270 | 600 | 2.0 | 0.24 | 0.68 | 0.060 | 12 | 44 | 19 | 3.0 | 2.7 |
| GB-2020-101 | greywacke | waste | Phase I | BR-20-199 | 20.4 | 22.5 | <0.5 | 5.5 | 39 | 380 | 1.2 | 0.10 | 0.59 | 0.060 | 7.9 | 36 | 12 | 2.3 | 1.7 |
| GB-2020-102 | greywacke | waste | Phase I | BR-20-179 | 48.5 | 50.4 | <0.5 | 5.9 | 130 | 420 | 1.4 | <0.09 | 0.76 | 0.030 | 9.2 | 43 | 4.9 | 2.6 | 1.8 |
| GB-2020-103 | greywacke | waste | Phase I | BR-20-179 | 89.6 | 91.6 | <0.5 | 6.4 | 26 | 540 | 1.6 | 0.10 | 0.77 | <0.02 | 9.3 | 44 | 12 | 2.7 | 2.2 |
| GB-2020-104 | argillite | waste | Phase I | BR-20-179 | 12.6 | 14.8 | <0.5 | 9.7 | 1700 | 990 | 2.8 | <0.09 | 0.39 | 0.11 | 18 | 62 | 45 | 4.9 | 3.7 |
| GB-2020-105 | argillite | waste | Phase I | BR-20-179 | 83.5 | 85.5 | <0.5 | 7.9 | 160 | 740 | 2.4 | 0.24 | 0.77 | 0.11 | 17 | 64 | 35 | 4.4 | 2.8 |
| GB-2020-106 | greywacke | waste | Phase I | BR-18-22 | 28.5 | 29.5 | <0.5 | 7.8 | 530 | 730 | 2.2 | 0.11 | 0.53 | 0.040 | 13 | 47 | 26 | 3.8 | 3.2 |
| GB-2020-107 | greywacke | waste | Phase I | BR-18-22 | 36.0 | 37.0 | <0.5 | 5.5 | 150 | 400 | 1.8 | 0.24 | 0.80 | 0.030 | 7.7 | 49 | 17 | 2.7 | 1.8 |
| GB-2020-108 | argillite | ore | Phase I | BR-18-22 | 50.6 | 51.9 | <0.5 | 9.2 | 3800 | 1000 | 3.4 | 0.32 | 0.64 | 0.060 | 19 | 60 | 49 | 4.9 | 3.7 |
| GB-2020-109 | argillite | waste | Phase I | BR-18-22 | 52.4 | 54.4 | <0.5 | 5.5 | 320 | 500 | 1.8 | 0.11 | 0.68 | <0.02 | 13 | 51 | 16 | 2.8 | 2.3 |

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 2: Solid Phase Metal Results**

| Sample ID | Rock Type | Ore/Waste | Phase | Drillhole | Interval | | Ag | Al | As | Ba | Be | Bi | Ca | Cd | Co | Cr | Cu | Fe | K |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | - | - | - | m | m | µg/g | % | µg/g | µg/g | µg/g | µg/g | % | µg/g | µg/g | µg/g | µg/g | % | % |
| GB-2020-110 | greywacke | waste | Phase I | BR-18-22 | 75.5 | 77.5 | <0.5 | 5.7 | 89 | 490 | 1.6 | 0.12 | 0.72 | 0.070 | 9.3 | 34 | 22 | 2.5 | 2.3 |
| GB-2020-111 | argillite | waste | Phase I | BR-18-22 | 94.0 | 95.5 | <0.5 | 7.9 | 50 | 740 | 2.2 | <0.09 | 1.0 | 0.020 | 16 | 50 | 16 | 3.9 | 3.0 |
| GB-2020-112 | greywacke | waste | Phase I | BR-18-71 | 15.4 | 17.5 | <0.5 | 6.4 | 48 | 520 | 1.6 | 0.13 | 0.40 | 0.050 | 11 | 41 | 24 | 3.0 | 2.2 |
| GB-2020-113 | argillite | waste | Phase I | BR-18-71 | 33.9 | 36.0 | <0.5 | 8.0 | 86 | 700 | 2.3 | 0.27 | 0.80 | 0.17 | 16 | 53 | 39 | 4.3 | 2.8 |
| GB-2020-114 | greywacke | waste | Phase I | BR-18-71 | 48.0 | 50.0 | <0.5 | 5.4 | 17 | 370 | 1.2 | <0.09 | 0.83 | 0.050 | 7.7 | 53 | 18 | 2.2 | 1.5 |
| GB-2020-115 | argillite + quartz vein | ore | Phase I | BR-18-71 | 62.3 | 64.3 | <0.5 | 4.7 | 800 | 480 | 1.7 | 0.25 | 0.37 | 0.070 | 7.6 | 95 | 31 | 2.3 | 2.0 |
| GB-LX2021-01 | greywacke | waste | Phase Ib - pulp | BR-17-08 | 11.4 | 13.4 | <0.5 | 10 | 350 | 600 | 2 | 0.09 | 1.5 | 0.08 | 14 | 160 | 21 | 3.6 | 2.1 |
| GB-LX2021-02 | argillite | waste | Phase Ib - pulp | BR-18-33 | 55.0 | 57.0 | <0.5 | 15 | 2500 | 880 | 3 | 0.14 | 1.6 | 0.07 | 17 | 200 | 21 | 4.6 | 1.8 |
| GB-LX2021-03 | argillite | waste | Phase Ib - pulp | BR-18-33 | 86.0 | 88.0 | <0.5 | 13 | 610 | 820 | 3 | 0.26 | 1.4 | 0.07 | 15 | 240 | 35 | 4.2 | 1.7 |
| GB-LX2021-04 | argillite | waste | Phase Ib - pulp | BR-18-41 | 23.0 | 25.0 | <0.5 | 9.4 | 63 | 790 | 3 | 0.43 | 1.1 | 0.08 | 17 | 200 | 39 | 4.4 | 1.6 |
| GB-LX2021-05 | argillite + quartz veining | waste | Phase Ib - pulp | BR-18-41 | 106.6 | 108.6 | <0.5 | 14 | 160 | 750 | 3 | <0.09 | 1.9 | 0.09 | 15 | 190 | 13 | 4.2 | 1.4 |
| GB-LX2021-06 | argillite | waste | Phase Ib - pulp | BR-18-43 | 40.5 | 42.5 | <0.5 | 12 | 46 | 830 | 2 | <0.09 | 1.5 | 0.04 | 16 | 120 | 16 | 4.3 | 1.4 |
| GB-LX2021-07 | argillite | waste | Phase Ib - pulp | BR-18-43 | 160.2 | 162.3 | <0.5 | 12 | 140 | 950 | 3 | 0.45 | 0.95 | 0.11 | 20 | 69 | 45 | 5.4 | 1.5 |
| GB-LX2021-08 | greywacke | waste | Phase Ib - pulp | BR-18-46 | 172.0 | 174.0 | <0.5 | 9.8 | 380 | 750 | 2 | 0.21 | 1 | 0.17 | 15 | 97 | 33 | 4.2 | 1.1 |
| GB-LX2021-09 | argillite | waste | Phase Ib - pulp | BR-18-67 | 30.0 | 32.0 | <0.5 | 10 | 260 | 820 | 3 | 0.31 | 0.98 | 0.1 | 20 | 83 | 42 | 4.9 | 1.7 |
| GB-LX2021-10 | greywacke | waste | Phase Ib - pulp | BR-18-67 | 44.9 | 46.4 | <0.5 | 11 | 400 | 590 | 2 | 0.18 | 1.6 | 0.21 | 14 | 130 | 20 | 3.9 | 1.3 |
| GB-LX2021-11 | greywacke | waste | Phase Ib - pulp | BR-18-67 | 84.5 | 86.5 | <0.5 | 11 | 80 | 750 | 3 | 0.09 | 1.2 | 0.11 | 15 | 78 | 31 | 4.1 | 1.2 |
| GB-LX2021-12 | argillite | waste | Phase Ib - pulp | BR-18-67 | 153.7 | 155.6 | <0.5 | 12 | 78 | 830 | 3 | 0.16 | 1.3 | 0.09 | 16 | 180 | 31 | 4.1 | 1.3 |
| GB-LX2021-13 | argillite | waste | Phase Ib - pulp | BR-19-80 | 30.0 | 32.0 | <0.5 | 6.8 | 52 | 570 | 2 | 0.72 | 1.2 | 0.1 | 14 | 230 | 31 | 3.5 | 1.5 |
| GB-LX2021-14 | greywacke | waste | Phase Ib - pulp | BR-19-80 | 42.0 | 44.0 | <0.5 | 6.3 | 28 | 360 | 1 | 0.1 | 0.94 | 0.06 | 8 | 100 | 14 | 2.6 | 1.3 |
| GB-LX2021-15 | argillite | waste | Phase Ib - pulp | BR-19-96 | 70.3 | 72.3 | <0.5 | 8.2 | 270 | 750 | 2 | 0.19 | 0.67 | 0.15 | 15 | 120 | 24 | 3.5 | 1.3 |
| GB-LX2021-16 | argillite | waste | Phase Ib - pulp | BR-19-98 | 61.0 | 63.0 | <0.5 | 10 | 49 | 800 | 3 | 0.49 | 1.1 | 0.08 | 17 | 77 | 41 | 4.4 | 1.3 |
| GB-LX2021-17 | greywacke | waste | Phase Ib - pulp | BR-19-101 | 75.9 | 77.8 | <0.5 | 5.5 | 16 | 330 | 1 | <0.09 | 0.84 | 0.05 | 7 | 110 | 14 | 2.1 | 0.81 |
| GB-LX2021-18 | greywacke | waste | Phase Ib - pulp | BR-20-138 | 94.8 | 96.8 | <0.5 | 7.7 | 160 | 500 | 2 | <0.09 | 1.4 | 0.06 | 12 | 94 | 16 | 3.3 | 0.86 |
| GB-LX2021-19 | argillite | waste | Phase Ib - pulp | BR-20-139 | 13.3 | 15.3 | <0.5 | 11 | 33 | 780 | 2 | 0.17 | 1.1 | 0.05 | 15 | 110 | 20 | 4.1 | 1.1 |
| GB-LX2021-20 | greywacke | waste | Phase Ib - pulp | BR-20-205 | 20.1 | 22.1 | <0.5 | 6.3 | 63 | 430 | 1 | <0.09 | 0.83 | 0.04 | 8 | 160 | 10 | 2.5 | 0.92 |
| GB-LX2021-21 | greywacke | waste | Phase Ib - pulp | BR-20-205 | 94.5 | 96.5 | <0.5 | 7.5 | 210 | 590 | 2 | 0.74 | 0.9 | 0.06 | 12 | 230 | 20 | 3.1 | 1.3 |
| GB-LX2021-22 | greywacke | waste | Phase Ib - pulp | BR-20-195 | 68.0 | 70.0 | <0.5 | 7.3 | 540 | 490 | 2 | 0.13 | 1.1 | 0.05 | 11 | 250 | 14 | 2.9 | 1.6 |
| GB-LX2021-23 | argillite | waste | Phase Ib - pulp | BR-20-195 | 87.9 | 89.9 | <0.5 | 5.8 | 1700 | 580 | 1 | 0.14 | 0.29 | 0.13 | 13 | 180 | 24 | 3.5 | 1.4 |
| GB-LX2021-24 | greywacke | waste | Phase Ib - pulp | BR-21-225 | 40.0 | 42.0 | <0.5 | 6.5 | 17 | 370 | 1 | <0.09 | 0.98 | 0.02 | 9 | 91 | 11 | 2.6 | 1.1 |
| GB-LX2021-25 | greywacke | waste | Phase Ib - pulp | BR-21-226 | 58.0 | 60.0 | <0.5 | 6.2 | 17 | 390 | 1 | 0.22 | 0.98 | 0.03 | 8 | 87 | 12 | 2.4 | 1.1 |
| GB-LX2021-26 | argillite | waste | Phase Ib - pulp | BR-21-226 | 95.0 | 97.0 | <0.5 | 9.1 | 44 | 860 | 3 | 0.17 | 1 | 0.09 | 18 | 93 | 47 | 4.4 | 1.6 |
| GB-LX2021-27 | greywacke marker unit | waste | Phase Ib - core | BR-18-40 | 30.0 | 32.0 | <0.5 | 4.8 | 760 | 320 | 1.2 | 0.12 | 0.73 | 0.03 | 6 | 18 | 9.9 | 1.9 | 1.4 |
| GB-LX2021-28 | greywacke | waste | Phase Ib - core | BR-18-67 | 120.0 | 122.0 | <0.5 | 7 | 38 | 530 | 2 | 0.17 | 1.2 | 0.05 | 13 | 26 | 16 | 3.6 | 2.3 |
| GB-LX2021-29 | greywacke | waste | Phase Ib - core | BR-19-87 | 33.8 | 35.8 | <0.5 | 5.4 | 25 | 380 | 1.2 | 0.1 | 0.69 | 0.04 | 7 | 16 | 11 | 2.2 | 1.7 |
| GB-LX2021-30 | greywacke | waste | Phase Ib - core | BR-19-87 | 95.0 | 97.0 | <0.5 | 5.8 | 76 | 400 | 1.6 | <0.09 | 1.2 | 0.05 | 9 | 20 | 13 | 2.8 | 2 |
| GB-LX2021-31 | greywacke | waste | Phase Ib - core | BR-19-101 | 10.0 | 12.0 | <0.5 | 5.6 | 21 | 400 | 1.0 | <0.09 | 0.68 | 0.060 | 8 | 23 | 15 | 2.6 | 1.7 |
| GB-LX2021-32 | argillite | waste | Phase Ib - core | BR-20-113 | 20.0 | 22.0 | <0.5 | 7.3 | 33 | 700 | 2.0 | 0.11 | 0.48 | 0.050 | 11 | 29 | 26 | 3.4 | 2.6 |
| GB-LX2021-33 | greywacke | waste | Phase Ib - core | BR-20-113 | 77.0 | 79.0 | <0.5 | 5.8 | 16 | 410 | 1.0 | <0.09 | 0.99 | 0.030 | 9 | 31 | 12 | 2.6 | 1.8 |
| GB-LX2021-34 | argillite | waste | Phase Ib - core | BR-20-116 | 28.0 | 30.0 | <0.5 | 9.1 | 110 | 950 | 3.0 | 0.44 | 0.55 | 0.070 | 25 | 69 | 38 | 4.7 | 2.3 |
| GB-LX2021-35 | greywacke | waste | Phase Ib - core | BR-20-116 | 45.0 | 47.0 | <0.5 | 6.1 | 38 | 440 | 1.0 | 0.16 | 0.83 | 0.150 | 10 | 22 | 15 | 2.8 | 2.1 |
| GB-NM2021-01 | greywacke | waste | Phase II - pulp | BR-17-01 | 50.3 | 55.0 | <0.5 | 4.8 | 6000 | 360 | 1.6 | 1.0 | 0.88 | 0.35 | 8.1 | 210 | 14 | 2.4 | 1.7 |
| GB-NM2021-03 | quartz vein | waste | Phase II - pulp | BR-18-61 | 34.1 | 39.0 | <0.5 | 5.1 | 5100 | 380 | 1.7 | 0.17 | 0.70 | 0.17 | 7.0 | 120 | 5.2 | 2.1 | 2.1 |
| GB-NM2021-04 | argillite | waste | Phase II - pulp | BR-18-61 | 55.5 | 61.0 | <0.5 | 8.9 | 3900 | 830 | 3.3 | 0.92 | 0.86 | 0.25 | 18 | 79 | 50 | 4.7 | 4.2 |
| GB-NM2021-05 | Approx. 30% greywacke, 70% quartz vein | waste | Phase II - pulp | BR-18-61 | 126.0 | 131.0 | <0.5 | 6.6 | 3800 | 590 | 1.9 | 0.92 | 0.71 | 0.24 | 13 | 180 | 34 | 3.5 | 2.9 |
| GB-NM2021-06 | Approx. 20% quartz vein, 80% greywacke | waste | Phase II - pulp | BR-18-61 | 144.5 | 149.5 | <0.5 | 6.0 | 970 | 410 | 1.6 | <0.09 | 0.68 | 0.10 | 8.1 | 130 | 18 | 2.6 | 2.0 |
| GB-NM2021-07 | greywacke | waste | Phase II - pulp | BR-19-86 | 148.5 | 153.5 | <0.5 | 5.9 | 1200 | 400 | 1.4 | 0.19 | 0.88 | 0.050 | 8.8 | 150 | 22 | 2.7 | 1.8 |
| GB-NM2021-08 | Approx. 60% greywacke, 40% argillite + quartz vein | waste | Phase II - pulp | BR-19-97 | 118.6 | 123.8 | <0.5 | 9.3 | 850 | 690 | 2.4 | 0.42 | 1.3 | 0.16 | 14 | 100 | 25 | 4.1 | 2.6 |
| GB-NM2021-09 | Approx. 40% greywacke, 60% quartz vein | waste | Phase II - pulp | BR-19-103 | 25.2 | 30.2 | <0.5 | 3.9 | 5400 | 260 | 1.2 | 0.48 | 0.43 | 0.47 | 7.3 | 150 | 11 | 2.3 | 1.5 |
| GB-NM2021-10 | Approx. 60% argillite, 40% quartz vein | waste | Phase II - pulp | BR-20-127 | 87.0 | 92.5 | <0.5 | 7.6 | 2100 | 640 | 2.4 | 0.22 | 0.85 | 1.2 | 14 | 110 | 26 | 3.9 | 2.5 |
| GB-NM2021-11 | Approx. 40% argillite + quartz veining, 60% quartz vein | waste | Phase II - pulp | BR-20-131 | 75.9 | 81.0 | <0.5 | 2.3 | 7000 | 170 | 0.89 | 0.30 | 0.51 | 3.2 | 4.8 | 170 | 5.0 | 1.6 | 0.95 |
| GB-NM2021-12 | Approx. 70% argillte, 30% greywacke | waste | Phase II - pulp | BR-20-132 | 35.9 | 40.9 | <0.5 | 7.7 | 700 | 600 | 2.2 | 0.16 | 0.89 | 0.53 | 14 | 91 | 21 | 3.6 | 2.9 |
| GB-NM2021-13 | greywacke + quartz vein | waste | Phase II - pulp | BR-20-132 | 84.5 | 89.4 | <0.5 | 4.5 | 15000 | 330 | 1.4 | 0.21 | 0.94 | 0.090 | 6.6 | 170 | 3.6 | 2.8 | 1.8 |
| GB-NM2021-14 | Approx. 20% argillite + quartz veining, 80% greywacke + quartz veining | waste | Phase II - pulp | BR-20-134 | 14.0 | 19.0 | <0.5 | 5.2 | 2800 | 350 | 1.6 | 0.12 | 0.60 | 0.24 | 7.2 | 160 | 9.9 | 2.2 | 1.5 |
| GB-NM2021-15 | Approx. 90% greywacke + quartz veining, 10% argillite | waste | Phase II - pulp | BR-20-134 | 53.0 | 58.0 | <0.5 | 5.1 | 8800 | 450 | 2.00 | 0.57 | 0.79 | 0.23 | 10.0 | 280 | 14.0 | 2.8 | 1.7 |
| GB-NM2021-16 | Approx. 40% quartz vein, 60% greywacke | waste | Phase II - pulp | BR-20-134 | 110.3 | 115.3 | <0.5 | 4.8 | 20000 | 360 | 1.00 | 0.66 | 0.79 | 0.11 | 9.0 | 330 | 9.1 | 3.4 | 1.7 |

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 2: Solid Phase Metal Results**

| Sample ID | Rock Type | Ore/Waste | Phase | Drillhole | Interval | | Ag | Al | As | Ba | Be | Bi | Ca | Cd | Co | Cr | Cu | Fe | K |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | - | - | - | m | m | µg/g | % | µg/g | µg/g | µg/g | µg/g | % | µg/g | µg/g | µg/g | µg/g | % | % |
| GB-NM2021-17 | Approx. 80% argillite, 20% greywacke | waste | Phase II - pulp | BR-20-144 | 107.6 | 112.9 | <0.5 | 9 | 1200 | 660 | 2.4 | 0.24 | 1 | 0.16 | 14 | 100 | 30 | 4 | 2 |
| GB-NM2021-18 | argillite | waste | Phase II - pulp | BR-20-145 | 100.0 | 104.8 | <0.5 | 9 | 560 | 830 | 2.8 | 0.23 | 1 | 0.10 | 17 | 100 | 50 | 5 | 2 |
| GB-NM2021-19 | Approx. 20% greywacke, 80% argillite | waste | Phase II - pulp | BR-20-152 | 77.0 | 82.0 | <0.5 | 8 | 370 | 690 | 2.4 | 0.50 | 1 | 0.080 | 16 | 110 | 32 | 4 | 2 |
| GB-NM2021-20 | Approx. 80% argillite + quartz veining, 20% greywacke | waste | Phase II - pulp | BR-20-156 | 62.6 | 68.2 | <0.5 | 7 | 900 | 560 | 2.3 | 0.24 | 1 | 0.13 | 14 | 150 | 23 | 4 | 2 |
| GB-NM2021-21 | Approx. 40% greywacke, 60% argillite + quartz veining | waste | Phase II - pulp | BR-20-165 | 11.6 | 16.3 | <0.5 | 10 | 3400 | 770 | 2.8 | 0.65 | 1 | 0.31 | 16 | 120 | 44 | 5 | 3 |
| GB-NM2021-22 | greywacke | waste | Phase II - pulp | BR-20-165 | 26.0 | 31.0 | <0.5 | 6 | 6600 | 400 | 1.9 | 0.27 | 1 | 0.44 | 9.6 | 120 | 19 | 3 | 2 |
| GB-NM2021-23 | Approx. 15% argillite + quartz veining, 40% greywacke, 45% argillite | waste | Phase II - pulp | BR-20-172 | 52.3 | 57.3 | <0.5 | 11 | 1100 | 860 | 3.3 | 0.23 | 1 | 1.8 | 17 | 110 | 36 | 5 | 4 |
| GB-NM2021-24 | Approx. 50% argillite + quartz veining, 50% greywacke + quartz veining | waste | Phase II - pulp | BR-20-176 | 36.0 | 41.0 | <0.5 | 7 | 770 | 550 | 1.8 | 0.11 | 1 | 0.11 | 11 | 120 | 20 | 3 | 3 |
| GB-NM2021-25 | Approx. 20% argillite + quartz veining, 40% greywacke, 30% quartz vein | waste | Phase II - pulp | BR-20-178 | 74.0 | 81.7 | <0.5 | 7 | 3000 | 560 | 2.1 | 0.31 | 1 | 0.65 | 12 | 150 | 22 | 4 | 2 |
| GB-NM2021-26 | Approx. 75% argillite + quartz veining, 25% greywacke | waste | Phase II - pulp | BR-20-219 | 16.0 | 21.0 | <0.5 | 10 | 2600 | 720 | 2.8 | 0.17 | 1 | 0.10 | 16 | 130 | 18 | 5 | 3 |
| GB-NM2021-27 | Approx. 80% argillite + quartz veining, 20% greywacke | waste | Phase II - pulp | BR-20-219 | 60.5 | 65.5 | <0.5 | 7 | 1700 | 640 | 2.3 | 0.20 | 1 | 0.25 | 14 | 200 | 27 | 3 | 2 |
| GB-NM2021-28 | Approx. 90% greywacke, 10% argillite | waste | Phase II - core | BR-18-17 | 23.0 | 28.0 | <0.5 | 2 | 160 | 420 | 1.0 | <0.09 | 1 | 0.090 | 10 | 54 | 16 | 3 | 2 |
| GB-NM2021-29 | greywacke marker unit | waste | Phase II - core | BR-18-20 | 185.0 | 190.0 | <0.5 | 5 | 60 | 350 | 1.0 | 0.11 | 1 | 0.030 | 7.0 | 47 | 9.6 | 2 | 1 |
| GB-NM2021-30 | greywacke marker unit | waste | Phase II - core | BR-18-22 | 183.0 | 188.0 | <0.5 | 4 | 120 | 350 | 1.0 | <0.09 | 1 | 0.040 | 6.0 | 37 | 9.8 | 2 | 1 |
| GB-NM2021-31 | greywacke marker unit | waste | Phase II - core | BR-18-36 | 27.7 | 32.7 | <0.5 | 1 | 66 | 400 | 1.0 | <0.09 | 1 | <0.02 | 8.0 | 41 | 12 | 2 | 2 |
| GB-NM2021-32 | greywacke marker unit | waste | Phase II - core | BR-18-40 | 13.0 | 18.0 | <0.5 | 5 | 34 | 370 | 1.0 | 0.11 | 1 | 0.030 | 7.0 | 44 | 13 | 2 | 1 |
| GB-NM2021-33 | greywacke | waste | Phase II - core | BR-19-98 | 24.5 | 29.5 | <0.5 | 5 | 140 | 370 | 1.0 | 0.18 | 1 | 0.050 | 8.0 | 44 | 9.2 | 2 | 2 |
| GB-NM2021-34 | greywacke | waste | Phase II - core | BR-20-183 | 51.0 | 56.0 | <0.5 | 5 | 140 | 330 | 1.0 | <0.09 | 1 | 0.040 | 6.0 | 38 | 16 | 2 | 2 |
| 389995 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | <0.5 | 3.4 | 13000 | 330 | 1.00 | 0.65 | 0.47 | 0.37 | 10.0 | 95 | 14.0 | 2.8 | 1.7 |
| 389996 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | <0.5 | 5.0 | 8400 | 510 | 2.00 | 0.48 | 0.6 | 0.17 | 11.0 | 100 | 13.0 | 2.3 | 2.4 |
| 389997 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | <0.5 | 6.5 | 5800 | 640 | 2.00 | 0.42 | 0.51 | 0.26 | 10.0 | 90 | 21.0 | 3 | 2.9 |
| 389998 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | <0.5 | 5.4 | 8600 | 520 | 2.00 | 0.69 | 0.76 | 0.28 | 10.0 | 110 | 19.0 | 2.7 | 2.6 |
| 389999 | Mixed - bulk sample stockpile | ore | Bulk Sample Stockpile | n/a | n/a | n/a | <0.5 | 5.7 | 12000 | 590 | 2.00 | 0.85 | 0.74 | 0.32 | 11.0 | 150 | 22.0 | 2.9 | 2.7 |
| GB_HC1 | argillite | waste | Humidity Cell | n/a | n/a | n/a | <0.5 | 9.8 | 220 | 730 | 2.00 | 0.10 | 0.930 | 0.07 | 16.0 | 190 | 17.0 | 4.30 | 3.90 |
| GB_HC2 | argillite | waste | Humidity Cell | n/a | n/a | n/a | <0.5 | 12.0 | 540 | 840 | 3.00 | 0.33 | 0.980 | 0.14 | 15.0 | 170 | 39.0 | 4.90 | 4.10 |
| GB_HC3 | greywacke | waste | Humidity Cell | n/a | n/a | n/a | <0.5 | 9.9 | 68 | 570 | 2.00 | <0.09 | 1.400 | 0.20 | 11.0 | 180 | 17.0 | 3.70 | 2.90 |
| GB_HC4 | greywacke | waste | Humidity Cell | n/a | n/a | n/a | <0.5 | 7.0 | 1000 | 420 | 1.00 | 0.17 | 0.520 | 0.07 | 10.0 | 300 | 17.0 | 3.70 | 2.20 |
| GB_HC5 | 50% argillite, 50% greywacke | waste | Humidity Cell | n/a | n/a | n/a | <0.5 | 9.9 | 360 | 650 | 2.00 | 0.20 | 1.10 | 0.16 | 15 | 78 | 20 | 4.1 | 3.3 |
| GB_HC6 | greywacke marker unit | waste | Humidity Cell | n/a | n/a | n/a | <0.5 | 6.8 | 1900 | 420 | 1.00 | 0.11 | 1.00 | 0.13 | 8.0 | 56 | 19 | 2.6 | 1.80 |
| FB-1 | Mixed - bulk sample stockpile | ore | Field Bin | n/a | n/a | n/a | <0.5 | 7.3 | 6400 | 630 | 2.00 | 0.40 | 0.8 | 0.11 | 11.0 | 28 | 20.0 | 3.2 | 3 |
| FB-2 | PAG1, mixed lithology | waste | Field Bin | n/a | n/a | n/a | <0.5 | 6.8 | 80 | 520 | 2.00 | 0.13 | 0.79 | 0.06 | 10.0 | 98 | 15.0 | 2.7 | 2.1 |
| FB-3 | PAG2, greywacke | waste | Field Bin | n/a | n/a | n/a | <0.5 | 6.0 | 3100 | 390 | 2.00 | 0.15 | 0.7 | 0.08 | 9.0 | 146 | 16.0 | 2.6 | 1.7 |
| FB-4 | NPAG, argillite | waste | Field Bin | n/a | n/a | n/a | <0.5 | 7.9 | 190 | 620 | 2.00 | 0.22 | 0.76 | 0.08 | 14.0 | 109 | 22.0 | 3.6 | 2.6 |

**Notes:**
AUCCA - Average Upper Continental Crustal Abundance
Rudnick, R.L. and S. Gao (2014). Composition of the Continental Crust. In: Holland, H. and Turekian, K. (eds). Treatise on Geochemistry 2nd Edition, Vol. 4, pp. 1-51. Oxford, UK, Elsevier Ltd.
Light grey shading indicates a value greater than 3x the AUCCA
Dark grey shading indicates a value greater than 10x the AUCCA

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 2: Solid Phase Metal Results**

| Sample ID | Rock Type | Li | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Se | Sn | Sr | Ti | Tl | U | V | Y | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | µg/g | % | µg/g | µg/g | % | µg/g | % | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g |
| *AUCCA (Rudnick and Gao, 2014)* | | *24* | *1.5* | *774* | *1.1* | *2.43* | *47* | *0.0655* | *17* | *0.4* | *0.09* | *2.1* | *320* | *3840* | *0.9* | *2.7* | *97* | *21* | *67* |
| GB-2020-001 | argillite | 54 | 1.3 | 720 | 0.40 | 1.4 | 35 | 0.060 | 22 | <0.8 | <0.7 | <6 | 170 | 4100 | 0.72 | 1.7 | 78 | 13 | 81 |
| GB-2020-002 | argillite | 73 | 1.7 | 740 | 0.40 | 0.90 | 49 | 0.063 | 150 | <0.8 | <0.7 | <6 | 160 | 4600 | 1.1 | 2.0 | 100 | 19 | 160 |
| GB-2020-003 | greywacke | 36 | 0.86 | 650 | 0.30 | 1.8 | 19 | 0.051 | 15 | <0.8 | <0.7 | <6 | 170 | 2900 | 0.39 | 1.1 | 47 | 11 | 40 |
| GB-2020-004 | greywacke | 46 | 1.2 | 740 | 0.30 | 1.6 | 30 | 0.058 | 24 | <0.8 | <0.7 | <6 | 170 | 3800 | 0.61 | 1.5 | 64 | 13 | 67 |
| GB-2020-005 | greywacke | 43 | 0.95 | 650 | 0.60 | 1.9 | 28 | 0.059 | 27 | <0.8 | <0.7 | <6 | 170 | 3400 | 0.50 | 1.4 | 58 | 12 | 150 |
| GB-2020-006 | argillite | 55 | 1.2 | 640 | 0.30 | 1.3 | 37 | 0.056 | 17 | <0.8 | <0.7 | <6 | 110 | 4300 | 0.84 | 1.7 | 79 | 14 | 72 |
| GB-2020-007 | argillite | 74 | 1.8 | 590 | 0.20 | 1.5 | 48 | 0.066 | 24 | 1.5 | <0.7 | <6 | 97 | 4800 | 1.1 | 1.9 | 100 | 16 | 120 |
| GB-2020-008 | greywacke | 31 | 0.76 | 560 | 0.40 | 1.9 | 18 | 0.059 | 11 | <0.8 | <0.7 | <6 | 150 | 3100 | 0.38 | 1.3 | 45 | 9.7 | 41 |
| GB-2020-009 | greywacke | 58 | 1.4 | 730 | 0.30 | 1.4 | 42 | 0.070 | 18 | <0.8 | <0.7 | <6 | 180 | 4500 | 0.83 | 1.9 | 85 | 17 | 86 |
| GB-2020-010 | greywacke | 39 | 0.91 | 620 | 0.60 | 1.9 | 22 | 0.057 | 13 | <0.8 | <0.7 | <6 | 190 | 3200 | 0.44 | 1.2 | 48 | 12 | 47 |
| GB-2020-011 | greywacke | 41 | 0.93 | 690 | 0.40 | 2.1 | 24 | 0.064 | 30 | <0.8 | <0.7 | <6 | 200 | 3800 | 0.46 | 1.4 | 61 | 12 | 78 |
| GB-2020-012 | argillite | 86 | 1.9 | 930 | 0.20 | 0.73 | 51 | 0.082 | 35 | <0.8 | <0.7 | <6 | 160 | 5400 | 1.3 | 2.3 | 100 | 25 | 130 |
| GB-2020-013 | greywacke | 36 | 0.76 | 650 | 0.70 | 1.7 | 16 | 0.060 | 16 | <0.8 | <0.7 | <6 | 140 | 3700 | 0.38 | 1.4 | 49 | 11 | 45 |
| GB-2020-014 | argillite | 79 | 1.7 | 800 | 0.20 | 0.74 | 51 | 0.066 | 30 | <0.8 | <0.7 | <6 | 110 | 5400 | 1.2 | 2.3 | 100 | 20 | 110 |
| GB-2020-015 | greywacke | 40 | 0.80 | 550 | 0.60 | 1.8 | 22 | 0.055 | 44 | <0.8 | <0.7 | <6 | 160 | 3400 | 0.46 | 1.3 | 51 | 12 | 190 |
| GB-2020-016 | argillite | 29 | 0.74 | 560 | 0.50 | 0.65 | 20 | 0.049 | 20 | 1.9 | <0.7 | <6 | 130 | 2300 | 0.43 | 0.94 | 44 | 11 | 37 |
| GB-2020-017 | greywacke | 33 | 0.91 | 540 | 0.50 | 1.7 | 23 | 0.058 | 11 | <0.8 | <0.7 | <6 | 170 | 3400 | 0.52 | 1.3 | 50 | 13 | 47 |
| GB-2020-018 | argillite | 56 | 1.3 | 870 | 0.30 | 1.6 | 34 | 0.063 | 22 | 1.4 | <0.7 | <6 | 230 | 3900 | 0.67 | 1.6 | 60 | 16 | 70 |
| GB-2020-019 | greywacke | 30 | 0.68 | 450 | 0.60 | 1.6 | 17 | 0.041 | 9.5 | 0.90 | <0.7 | <6 | 130 | 2400 | 0.46 | 0.99 | 37 | 7.9 | 40 |
| GB-2020-020 | argillite | 49 | 1.1 | 640 | 0.40 | 1.6 | 31 | 0.066 | 12 | 1.0 | <0.7 | <6 | 210 | 3900 | 0.72 | 1.6 | 64 | 19 | 72 |
| GB-2020-021 | greywacke | 36 | 0.80 | 590 | 0.70 | 1.6 | 19 | 0.050 | 30 | <0.8 | <0.7 | 9.1 | 140 | 3000 | 0.49 | 1.1 | 44 | 10 | 40 |
| GB-2020-022 | argillite | 61 | 1.6 | 1400 | 0.50 | 0.89 | 33 | 0.044 | 40 | 1.6 | <0.7 | <6 | 180 | 3300 | 0.75 | 1.4 | 63 | 15 | 99 |
| GB-2020-023 | greywacke | 37 | 0.86 | 550 | 0.60 | 1.9 | 23 | 0.056 | 9.5 | 1.4 | <0.7 | <6 | 180 | 3300 | 0.45 | 1.4 | 51 | 12 | 43 |
| GB-2020-024 | greywacke | 52 | 1.2 | 700 | 0.30 | 1.6 | 30 | 0.060 | 17 | <0.8 | <0.7 | <6 | 170 | 3600 | 0.64 | 1.6 | 58 | 13 | 58 |
| GB-2020-025 | argillite | 50 | 1.2 | 760 | 0.40 | 1.5 | 32 | 0.060 | 21 | <0.8 | <0.7 | <6 | 180 | 3900 | 0.69 | 1.5 | 66 | 12 | 70 |
| GB-2020-026 | greywacke | 46 | 1.1 | 800 | 2.3 | 1.3 | 28 | 0.056 | 61 | <0.8 | <0.7 | <6 | 160 | 3400 | 0.64 | 1.4 | 56 | 12 | 81 |
| GB-2020-027 | argillite | 53 | 1.3 | 750 | 0.40 | 1.2 | 30 | 0.053 | 27 | 0.90 | <0.7 | <6 | 170 | 3400 | 0.74 | 1.4 | 59 | 12 | 81 |
| GB-2020-028 | argillite | 61 | 1.4 | 1000 | 0.30 | 1.2 | 39 | 0.064 | 28 | 1.9 | <0.7 | <6 | 220 | 5000 | 0.85 | 1.7 | 74 | 16 | 88 |
| GB-2020-029 | argillite | 41 | 0.94 | 590 | 0.30 | 1.5 | 25 | 0.061 | 10 | 1.1 | <0.7 | <6 | 160 | 3400 | 0.54 | 1.4 | 51 | 12 | 54 |
| GB-2020-030 | greywacke | 39 | 0.85 | 600 | 0.30 | 1.9 | 22 | 0.059 | 13 | <0.8 | <0.7 | <6 | 210 | 3300 | 0.44 | 1.3 | 50 | 10 | 48 |
| GB-2020-031 | greywacke | 27 | 0.58 | 510 | 0.40 | 1.3 | 12 | 0.043 | 18 | <0.8 | <0.7 | <6 | 130 | 2400 | 0.32 | 0.98 | 32 | 8.3 | 35 |
| GB-2020-032 | argillite | 70 | 1.5 | 910 | 0.30 | 1.5 | 38 | 0.063 | 27 | <0.8 | <0.7 | <6 | 200 | 3900 | 0.79 | 1.7 | 68 | 15 | 110 |
| GB-2020-033 | argillite | 78 | 1.6 | 990 | 0.60 | 1.1 | 34 | 0.066 | 32 | 2.2 | <0.7 | <6 | 170 | 4000 | 0.90 | 1.8 | 75 | 19 | 88 |
| GB-2020-034 | greywacke | 54 | 1.2 | 700 | 0.30 | 1.5 | 28 | 0.059 | 11 | <0.8 | <0.7 | <6 | 130 | 3800 | 0.62 | 1.7 | 57 | 12 | 100 |
| GB-2020-035 | argillite | 36 | 0.87 | 960 | 0.40 | 0.43 | 21 | 0.085 | 18 | 6.5 | <0.7 | <6 | 98 | 2800 | 0.49 | 1.2 | 44 | 15 | 69 |
| GB-2020-036 | argillite | 67 | 1.6 | 800 | 0.30 | 0.76 | 43 | 0.066 | 19 | <0.8 | <0.7 | <6 | 160 | 4400 | 1.2 | 2.0 | 76 | 18 | 110 |
| GB-2020-037 | argillite | 48 | 1.2 | 720 | 0.40 | 1.5 | 35 | 0.067 | 23 | 3.5 | <0.7 | <6 | 170 | 3700 | 0.66 | 1.7 | 78 | 15 | 76 |
| GB-2020-038 | greywacke | 30 | 0.63 | 470 | 0.40 | 1.9 | 16 | 0.053 | 12 | <0.8 | <0.7 | <6 | 160 | 2500 | 0.25 | 1.2 | 46 | 10 | 35 |
| GB-2020-039 | greywacke | 32 | 0.80 | 920 | 0.50 | 2.0 | 15 | 0.047 | 97 | <0.8 | <0.7 | <6 | 150 | 2600 | 0.28 | 1.2 | 49 | 13 | 76 |
| GB-2020-040 | greywacke | 37 | 0.80 | 640 | 0.40 | 1.7 | 21 | 0.071 | 13 | 2.4 | <0.7 | <6 | 180 | 2900 | 0.42 | 1.3 | 54 | 14 | 43 |
| GB-2020-041 | greywacke | 37 | 0.78 | 630 | 0.40 | 1.8 | 20 | 0.051 | 5.6 | <0.8 | <0.7 | <6 | 170 | 2500 | 0.36 | 1.1 | 48 | 10 | 39 |
| GB-2020-042 | argillite | 56 | 1.3 | 740 | 0.30 | 1.5 | 37 | 0.063 | 20 | <0.8 | <0.7 | <6 | 150 | 3900 | 0.72 | 1.7 | 75 | 14 | 66 |
| GB-2020-043 | greywacke | 54 | 1.4 | 960 | 0.40 | 1.6 | 38 | 0.067 | 40 | 0.90 | <0.7 | <6 | 220 | 3600 | 0.59 | 1.6 | 74 | 17 | 110 |
| GB-2020-044 | argillite | 64 | 1.5 | 900 | 0.30 | 1.2 | 41 | 0.054 | 170 | 2.6 | <0.7 | <6 | 160 | 4300 | 0.94 | 2.0 | 89 | 16 | 860 |
| GB-2020-045 | greywacke | 38 | 0.80 | 600 | 0.60 | 2.0 | 21 | 0.058 | 5.7 | <0.8 | <0.7 | <6 | 180 | 2800 | 0.34 | 1.2 | 50 | 11 | 36 |
| GB-2020-046 | greywacke marker unit | 27 | 0.61 | 410 | 0.50 | 2.1 | 17 | 0.053 | 10 | <0.8 | <0.7 | <6 | 130 | 2600 | 0.31 | 1.2 | 46 | 9.7 | 41 |
| GB-2020-047 | quartz vein | 2.2 | 0.0038 | 46 | 0.70 | 0.012 | 0.60 | 0.0015 | <0.05 | <0.8 | <0.7 | <6 | 1.0 | 17 | <0.02 | <0.002 | <1 | 0.16 | 0.70 |
| GB-2020-048 | greywacke marker unit | 25 | 0.63 | 670 | 0.50 | 2.2 | 15 | 0.055 | 13 | <0.8 | <0.7 | <6 | 120 | 2400 | 0.32 | 1.2 | 46 | 11 | 40 |
| GB-2020-049 | greywacke | 30 | 0.70 | 530 | 0.50 | 1.7 | 17 | 0.050 | 8.1 | <0.8 | <0.7 | <6 | 120 | 2400 | 0.39 | 1.2 | 44 | 9.6 | 38 |
| GB-2020-050 | argillite + quartz vein | 47 | 1.1 | 660 | 0.60 | 1.3 | 34 | 0.054 | 29 | 2.7 | <0.7 | <6 | 270 | 3300 | 0.70 | 1.6 | 68 | 14 | 56 |
| GB-2020-051 | quartz vein | 19 | 0.44 | 330 | 0.50 | 1.4 | 11 | 0.046 | 14 | 3.7 | <0.7 | <6 | 100 | 1800 | 0.28 | 0.86 | 32 | 8.0 | 23 |
| GB-2020-052 | greywacke marker unit | 11 | 0.24 | 200 | 0.90 | 0.69 | 5.6 | 0.018 | 4.7 | <0.8 | <0.7 | <6 | 48 | 880 | 0.080 | 0.42 | 16 | 3.7 | 14 |
| GB-2020-053 | greywacke + quartz vein | 40 | 0.85 | 620 | 0.40 | 1.3 | 21 | 0.042 | 14 | 1.8 | <0.7 | <6 | 130 | 2500 | 0.49 | 1.3 | 47 | 12 | 70 |
| GB-2020-054 | greywacke | 51 | 1.2 | 740 | 0.20 | 1.4 | 36 | 0.066 | 12 | <0.8 | <0.7 | <6 | 180 | 3500 | 0.70 | 1.7 | 68 | 16 | 68 |

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 2: Solid Phase Metal Results**

| Sample ID | Rock Type | Li | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Se | Sn | Sr | Ti | Tl | U | V | Y | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | µg/g | % | µg/g | µg/g | % | µg/g | % | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g |
| GB-2020-055 | greywacke | 30 | 0.55 | 420 | 0.30 | 1.9 | 15 | 0.052 | 11 | <0.8 | <0.7 | <6 | 130 | 3000 | 0.21 | 1.4 | 49 | 9.3 | 43 |
| GB-2020-056 | greywacke | 33 | 0.71 | 540 | 0.60 | 1.8 | 19 | 0.052 | 12 | <0.8 | <0.7 | <6 | 150 | 2600 | 0.30 | 1.2 | 45 | 7.4 | 41 |
| GB-2020-057 | greywacke | 32 | 0.56 | 470 | 0.30 | 1.9 | 17 | 0.048 | 11 | 2.1 | <0.7 | <6 | 160 | 2400 | 0.29 | 1.2 | 40 | 7.8 | 38 |
| GB-2020-058 | argillite | 67 | 1.5 | 800 | 0.30 | 0.76 | 45 | 0.060 | 17 | 0.80 | <0.7 | <6 | 120 | 3700 | 0.77 | 1.8 | 80 | 10 | 86 |
| GB-2020-059 | argillite | 57 | 1.3 | 960 | 0.30 | 1.5 | 37 | 0.062 | 23 | <0.8 | <0.7 | <6 | 230 | 3300 | 0.64 | 1.6 | 72 | 11 | 76 |
| GB-2020-060 | argillite | 63 | 1.4 | 850 | 0.30 | 1.2 | 42 | 0.069 | 40 | <0.8 | <0.7 | <6 | 190 | 3900 | 0.70 | 1.9 | 80 | 12 | 91 |
| GB-2020-061 | greywacke | 48 | 0.93 | 780 | 0.30 | 1.8 | 23 | 0.059 | 20 | <0.8 | <0.7 | <6 | 180 | 3000 | 0.45 | 1.5 | 53 | 15 | 51 |
| GB-2020-062 | greywacke | 45 | 0.96 | 730 | 0.40 | 1.9 | 25 | 0.061 | 18 | <0.8 | <0.7 | <6 | 180 | 3000 | 0.41 | 1.5 | 56 | 10 | 55 |
| GB-2020-063 | greywacke | 39 | 0.87 | 710 | 0.40 | 1.4 | 24 | 0.053 | 13 | <0.8 | <0.7 | <6 | 170 | 2600 | 0.43 | 1.2 | 49 | 11 | 50 |
| GB-2020-064 | greywacke + quartz vein | 16 | 0.38 | 230 | 0.40 | 1.1 | 13 | 0.035 | 130 | 2.1 | <0.7 | <6 | 84 | 1200 | 0.16 | 0.60 | 21 | 5.7 | 30 |
| GB-2020-065 | argillite + quartz vein | 60 | 1.3 | 660 | 0.30 | 0.87 | 35 | 0.043 | 32 | 3.9 | <0.7 | <6 | 160 | 3200 | 0.85 | 1.7 | 72 | 18 | 88 |
| GB-2020-066 | greywacke + quartz vein | 35 | 0.72 | 590 | 0.50 | 1.5 | 18 | 0.052 | 10 | 7.8 | <0.7 | <6 | 150 | 2400 | 0.42 | 1.2 | 47 | 12 | 37 |
| GB-2020-067 | quartz vein | 25 | 0.48 | 620 | 0.70 | 1.3 | 13 | 0.028 | 19 | 4.8 | <0.7 | <6 | 150 | 1700 | 0.26 | 0.91 | 39 | 10 | 21 |
| GB-2020-068 | argillite | 79 | 1.7 | 940 | 0.60 | 0.74 | 50 | 0.046 | 23 | 9.8 | <0.7 | <6 | 140 | 4200 | 1.1 | 2.2 | 94 | 18 | 110 |
| GB-2020-069 | argillite | 65 | 1.5 | 730 | 0.30 | 0.87 | 49 | 0.067 | 23 | 1.1 | <0.7 | <6 | 140 | 3100 | 0.91 | 1.7 | 79 | 17 | 86 |
| GB-2020-070 | argillite | 59 | 1.4 | 740 | 0.20 | 1.1 | 42 | 0.066 | 14 | <0.8 | <0.7 | <6 | 150 | 3800 | 0.90 | 2.0 | 77 | 15 | 74 |
| GB-2020-071 | greywacke | 61 | 1.5 | 880 | 0.30 | 1.6 | 40 | 0.067 | 22 | <0.8 | <0.7 | <6 | 220 | 3800 | 0.86 | 2.0 | 81 | 18 | 81 |
| GB-2020-072 | argillite | 65 | 1.6 | 690 | 15 | 0.63 | 61 | 0.063 | 23 | 0.80 | <0.7 | <6 | 96 | 3900 | 1.1 | 2.0 | 92 | 18 | 100 |
| GB-2020-073 | argillite | 66 | 1.5 | 870 | 0.40 | 1.3 | 40 | 0.059 | 23 | <0.8 | <0.7 | <6 | 170 | 3800 | 0.86 | 1.9 | 79 | 19 | 85 |
| GB-2020-074 | greywacke | 36 | 0.80 | 530 | 0.30 | 1.5 | 20 | 0.054 | 17 | <0.8 | <0.7 | <6 | 180 | 2800 | 0.47 | 1.3 | 45 | 11 | 51 |
| GB-2020-075 | greywacke | 35 | 0.72 | 510 | 0.20 | 1.5 | 19 | 0.051 | 9.9 | 1.2 | <0.7 | <6 | 140 | 2600 | 0.42 | 1.3 | 44 | 11 | 43 |
| GB-2020-076 | greywacke | 33 | 0.67 | 490 | 0.40 | 1.7 | 18 | 0.051 | 10 | 1.8 | <0.7 | <6 | 130 | 2700 | 0.36 | 1.2 | 43 | 9.9 | 41 |
| GB-2020-077 | greywacke | 40 | 0.87 | 610 | 0.30 | 2.0 | 23 | 0.057 | 26 | <0.8 | <0.7 | <6 | 170 | 3000 | 0.35 | 1.3 | 50 | 10 | 74 |
| GB-2020-078 | greywacke | 48 | 1.1 | 720 | 0.30 | 1.7 | 29 | 0.058 | 17 | <0.8 | <0.7 | <6 | 200 | 3200 | 0.49 | 1.5 | 60 | 11 | 54 |
| GB-2020-079 | greywacke | 38 | 0.66 | 540 | 0.40 | 1.8 | 17 | 0.048 | 21 | <0.8 | <0.7 | <6 | 130 | 2600 | 0.36 | 1.5 | 43 | 11 | 42 |
| GB-2020-080 | argillite | 48 | 1.1 | 650 | 0.20 | 1.2 | 33 | 0.066 | 21 | <0.8 | <0.7 | <6 | 180 | 4400 | 0.73 | 1.8 | 77 | 15 | 67 |
| GB-2020-081 | greywacke | 29 | 0.88 | 460 | 0.30 | 1.6 | 24 | 0.050 | 20 | <0.8 | <0.7 | <6 | 130 | 3300 | 0.51 | 1.3 | 50 | 10 | 53 |
| GB-2020-082 | argillite | 58 | 1.3 | 760 | 0.30 | 1.1 | 36 | 0.066 | 16 | 1.1 | <0.7 | <6 | 160 | 4300 | 0.85 | 1.8 | 72 | 15 | 82 |
| GB-2020-083 | greywacke | 41 | 0.82 | 500 | 0.40 | 1.3 | 20 | 0.050 | 38 | 3.5 | <0.7 | <6 | 110 | 3100 | 0.51 | 1.3 | 49 | 12 | 42 |
| GB-2020-084 | greywacke | 62 | 1.3 | 940 | 0.30 | 1.6 | 31 | 0.058 | 23 | <0.8 | <0.7 | <6 | 220 | 3600 | 0.61 | 1.4 | 61 | 12 | 61 |
| GB-2020-085 | greywacke | 41 | 0.88 | 660 | 0.30 | 1.7 | 23 | 0.060 | 13 | <0.8 | <0.7 | <6 | 170 | 3500 | 0.50 | 1.5 | 55 | 9.3 | 51 |
| GB-2020-086 | argillite | 38 | 0.83 | 690 | 0.30 | 1.4 | 21 | 0.045 | 12 | <0.8 | <0.7 | <6 | 150 | 2600 | 0.38 | 1.1 | 40 | 9.4 | 42 |
| GB-2020-087 | greywacke | 31 | 0.65 | 510 | 0.30 | 1.8 | 17 | 0.052 | 11 | <0.8 | <0.7 | <6 | 140 | 3000 | 0.28 | 1.3 | 45 | 8.5 | 41 |
| GB-2020-088 | greywacke | 40 | 0.98 | 680 | 0.20 | 1.3 | 25 | 0.11 | 21 | <0.8 | <0.7 | <6 | 190 | 3400 | 0.60 | 1.6 | 58 | 15 | 54 |
| GB-2020-089 | greywacke | 52 | 1.2 | 800 | 0.30 | 1.7 | 32 | 0.066 | 34 | 1.1 | <0.7 | <6 | 190 | 4400 | 0.76 | 1.9 | 72 | 12 | 82 |
| GB-2020-090 | greywacke | 44 | 1.1 | 630 | 0.30 | 1.4 | 30 | 0.060 | 15 | <0.8 | <0.7 | <6 | 160 | 3800 | 0.56 | 1.5 | 63 | 11 | 64 |
| GB-2020-091 | greywacke | 40 | 0.92 | 580 | 0.40 | 1.4 | 24 | 0.051 | 12 | <0.8 | <0.7 | <6 | 140 | 3200 | 0.49 | 1.3 | 50 | 9.6 | 54 |
| GB-2020-092 | greywacke | 25 | 0.57 | 410 | 0.30 | 1.7 | 14 | 0.047 | 3.3 | <0.8 | <0.7 | <6 | 140 | 2500 | 0.24 | 0.99 | 37 | 6.9 | 34 |
| GB-2020-093 | greywacke | 30 | 0.71 | 610 | 0.30 | 2.1 | 19 | 0.050 | 5.7 | <0.8 | <0.7 | <6 | 150 | 3000 | 0.33 | 1.2 | 45 | 9.9 | 37 |
| GB-2020-094 | argillite | 52 | 1.3 | 760 | 0.20 | 1.4 | 34 | 0.061 | 37 | <0.8 | <0.7 | <6 | 160 | 4000 | 0.70 | 1.7 | 73 | 12 | 140 |
| GB-2020-095 | greywacke | 35 | 0.79 | 580 | 0.40 | 1.4 | 20 | 0.045 | 100 | <0.8 | <0.7 | <6 | 110 | 2800 | 0.49 | 1.1 | 40 | 10 | 280 |
| GB-2020-096 | greywacke | 40 | 0.98 | 670 | 0.30 | 1.8 | 25 | 0.059 | 11 | <0.8 | <0.7 | <6 | 190 | 3700 | 0.49 | 1.5 | 55 | 10 | 44 |
| GB-2020-097 | argillite | 53 | 1.4 | 680 | 0.10 | 1.3 | 38 | 0.059 | 15 | <0.8 | <0.7 | <6 | 150 | 4400 | 0.73 | 1.8 | 75 | 12 | 71 |
| GB-2020-098 | argillite | 62 | 1.8 | 910 | 0.30 | 1.1 | 51 | 0.065 | 38 | 1.2 | <0.7 | <6 | 160 | 5100 | 0.96 | 2.1 | 89 | 16 | 120 |
| GB-2020-099 | greywacke | 32 | 0.72 | 540 | 0.60 | 1.7 | 19 | 0.048 | 11 | 2.5 | <0.7 | <6 | 130 | 3200 | 0.37 | 1.4 | 46 | 12 | 39 |
| GB-2020-100 | argillite | 40 | 1.0 | 700 | 0.50 | 1.2 | 28 | 0.053 | 20 | 0.90 | <0.7 | <6 | 140 | 3600 | 0.66 | 1.6 | 59 | 13 | 64 |
| GB-2020-101 | greywacke | 32 | 0.71 | 550 | 0.60 | 1.9 | 19 | 0.048 | 33 | <0.8 | <0.7 | <6 | 140 | 3100 | 0.38 | 1.2 | 43 | 8.9 | 56 |
| GB-2020-102 | greywacke | 35 | 0.85 | 610 | 1.0 | 1.9 | 21 | 0.047 | 7.7 | <0.8 | <0.7 | <6 | 160 | 3000 | 0.42 | 1.2 | 42 | 9.7 | 37 |
| GB-2020-103 | greywacke | 39 | 0.90 | 650 | 0.50 | 1.6 | 25 | 0.053 | 9.4 | <0.8 | <0.7 | <6 | 160 | 3300 | 0.50 | 1.3 | 54 | 8.7 | 46 |
| GB-2020-104 | argillite | 76 | 1.7 | 730 | 0.20 | 0.43 | 45 | 0.066 | 44 | 1.0 | <0.7 | <6 | 85 | 5000 | 1.2 | 2.1 | 87 | 18 | 90 |
| GB-2020-105 | argillite | 55 | 1.5 | 630 | 0.90 | 0.83 | 41 | 0.074 | 27 | <0.8 | <0.7 | <6 | 140 | 3800 | 0.76 | 1.7 | 68 | 12 | 100 |
| GB-2020-106 | greywacke | 56 | 1.2 | 740 | 0.40 | 1.1 | 31 | 0.047 | 15 | 1.6 | <0.7 | <6 | 110 | 4000 | 0.92 | 1.6 | 62 | 14 | 62 |
| GB-2020-107 | greywacke | 38 | 0.91 | 620 | 0.70 | 1.4 | 21 | 0.050 | 26 | <0.8 | <0.7 | <6 | 160 | 2900 | 0.52 | 1.2 | 43 | 11 | 46 |
| GB-2020-108 | argillite | 72 | 1.7 | 890 | 0.40 | 0.43 | 44 | 0.066 | 24 | 5.5 | <0.7 | <6 | 140 | 4800 | 1.1 | 2.2 | 90 | 21 | 100 |
| GB-2020-109 | argillite | 39 | 1.0 | 550 | 0.70 | 0.65 | 27 | 0.038 | 19 | 0.90 | <0.7 | <6 | 130 | 2800 | 0.56 | 1.2 | 48 | 12 | 45 |

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 2: Solid Phase Metal Results**

| Sample ID | Rock Type | Li | Mg | Mn | Mo | Na | Ni | P | Pb | Sb | Se | Sn | Sr | Ti | Tl | U | V | Y | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | µg/g | % | µg/g | µg/g | % | µg/g | % | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g |
| GB-2020-110 | greywacke | 39 | 0.92 | 670 | 0.50 | 1.4 | 23 | 0.050 | 29 | <0.8 | <0.7 | <6 | 160 | 2900 | 0.77 | 1.2 | 44 | 12 | 63 |
| GB-2020-111 | argillite | 52 | 1.3 | 850 | 0.40 | 1.4 | 37 | 0.062 | 34 | <0.8 | <0.7 | <6 | 220 | 4400 | 0.79 | 1.8 | 74 | 13 | 65 |
| GB-2020-112 | greywacke | 47 | 0.96 | 560 | 0.50 | 1.4 | 27 | 0.055 | 16 | <0.8 | <0.7 | <6 | 130 | 3400 | 0.53 | 1.4 | 54 | 13 | 56 |
| GB-2020-113 | argillite | 59 | 1.5 | 840 | 0.30 | 1.1 | 39 | 0.065 | 20 | <0.8 | <0.7 | <6 | 170 | 4200 | 0.71 | 1.7 | 72 | 16 | 100 |
| GB-2020-114 | greywacke | 34 | 0.71 | 570 | 0.70 | 1.8 | 19 | 0.050 | 11 | <0.8 | <0.7 | <6 | 170 | 3000 | 0.38 | 1.3 | 39 | 9.9 | 34 |
| GB-2020-115 | argillite + quartz vein | 39 | 0.77 | 430 | 0.90 | 0.33 | 25 | 0.043 | 16 | 0.90 | <0.7 | <6 | 87 | 2600 | 0.40 | 1.1 | 43 | 10 | 53 |
| GB-LX2021-01 | greywacke | 45 | 1.3 | 850 | 0.7 | 1.6 | 32 | 0.066 | 13 | 1.2 | <0.7 | <6 | 220 | 3800 | 0.69 | 1.6 | 70 | 21 | 89 |
| GB-LX2021-02 | argillite | 54 | 1.7 | 1000 | 0.6 | 0.97 | 39 | 0.07 | 18 | 6.6 | <0.7 | <6 | 210 | 4100 | 0.84 | 2 | 87 | 29 | 90 |
| GB-LX2021-03 | argillite | 51 | 1.5 | 910 | 0.6 | 0.98 | 37 | 0.065 | 17 | 1.8 | <0.7 | <6 | 180 | 3700 | 0.75 | 1.7 | 81 | 24 | 77 |
| GB-LX2021-04 | argillite | 54 | 1.5 | 780 | 2 | 1.4 | 40 | 0.069 | 28 | <0.8 | <0.7 | <6 | 170 | 4000 | 0.75 | 1.8 | 93 | 14 | 93 |
| GB-LX2021-05 | argillite + quartz veining | 56 | 1.6 | 1000 | 0.7 | 1.3 | 35 | 0.078 | 25 | <0.8 | <0.7 | <6 | 270 | 4200 | 0.79 | 1.8 | 73 | 25 | 110 |
| GB-LX2021-06 | argillite | 53 | 1.5 | 850 | 0.3 | 1.4 | 38 | 0.073 | 9 | 0.8 | <0.7 | <6 | 210 | 4200 | 0.77 | 1.7 | 80 | 20 | 69 |
| GB-LX2021-07 | argillite | 67 | 1.9 | 960 | 6.6 | 0.97 | 47 | 0.069 | 52 | <0.8 | <0.7 | <6 | 150 | 4400 | 0.85 | 1.9 | 93 | 19 | 110 |
| GB-LX2021-08 | greywacke | 59 | 1.4 | 840 | 0.5 | 1.3 | 36 | 0.064 | 38 | 1.2 | <0.7 | <6 | 170 | 4000 | 0.68 | 1.7 | 77 | 25 | 81 |
| GB-LX2021-09 | argillite | 53 | 1.7 | 980 | 0.4 | 1.2 | 46 | 0.072 | 33 | 1.4 | <0.7 | <6 | 140 | 4400 | 0.87 | 1.9 | 88 | 20 | 100 |
| GB-LX2021-10 | greywacke | 44 | 1.4 | 760 | 0.4 | 1.9 | 33 | 0.073 | 16 | 0.9 | <0.7 | <6 | 210 | 4000 | 0.56 | 1.7 | 72 | 23 | 77 |
| GB-LX2021-11 | greywacke | 52 | 1.5 | 720 | 0.5 | 1.5 | 38 | 0.07 | 22 | <0.8 | <0.7 | <6 | 180 | 4200 | 0.68 | 1.8 | 81 | 14 | 79 |
| GB-LX2021-12 | argillite | 54 | 1.5 | 900 | 0.8 | 1.2 | 37 | 0.071 | 16 | <0.8 | <0.7 | <6 | 190 | 4100 | 0.6 | 1.8 | 86 | 11 | 73 |
| GB-LX2021-13 | argillite | 49 | 1.3 | 860 | 0.4 | 1.4 | 32 | 0.061 | 17 | <0.8 | <0.7 | <6 | 160 | 3500 | 0.57 | 1.5 | 75 | 9 | 75 |
| GB-LX2021-14 | greywacke | 27 | 0.76 | 550 | 0.5 | 2 | 22 | 0.058 | 11 | <0.8 | <0.7 | <6 | 150 | 3100 | 0.39 | 1.2 | 46 | 9 | 40 |
| GB-LX2021-15 | argillite | 47 | 1.3 | 710 | 3.2 | 0.92 | 35 | 0.061 | 28 | <0.8 | <0.7 | <6 | 110 | 3500 | 0.69 | 1.5 | 67 | 13 | 110 |
| GB-LX2021-16 | argillite | 56 | 1.6 | 860 | 0.9 | 1.4 | 40 | 0.07 | 21 | <0.8 | <0.7 | <6 | 170 | 4100 | 0.68 | 1.8 | 78 | 18 | 83 |
| GB-LX2021-17 | greywacke | 26 | 0.73 | 510 | 0.8 | 1.8 | 18 | 0.048 | 8 | <0.8 | <0.7 | <6 | 140 | 2600 | 0.3 | 1.1 | 38 | 9.3 | 35 |
| GB-LX2021-18 | greywacke | 40 | 1.1 | 790 | 0.6 | 2.1 | 28 | 0.068 | 9 | <0.8 | <0.7 | <6 | 200 | 3600 | 0.5 | 1.5 | 60 | 14 | 55 |
| GB-LX2021-19 | argillite | 56 | 1.5 | 930 | 0.9 | 1.1 | 37 | 0.064 | 16 | <0.8 | <0.7 | <6 | 160 | 3700 | 0.68 | 1.6 | 68 | 20 | 69 |
| GB-LX2021-20 | greywacke | 33 | 0.8 | 560 | 0.8 | 1.7 | 21 | 0.051 | 9 | <0.8 | <0.7 | <6 | 150 | 2700 | 0.39 | 1.1 | 42 | 11 | 43 |
| GB-LX2021-21 | greywacke | 41 | 1 | 650 | 36 | 1.4 | 29 | 0.059 | 19 | <0.8 | <0.7 | <6 | 150 | 3200 | 0.51 | 1.3 | 57 | 13 | 55 |
| GB-LX2021-22 | greywacke | 33 | 0.96 | 580 | 0.7 | 1.8 | 27 | 0.053 | 19 | 1.2 | <0.7 | <6 | 180 | 3100 | 0.44 | 1.3 | 61 | 12 | 54 |
| GB-LX2021-23 | argillite | 43 | 1.2 | 500 | 1 | 0.39 | 34 | 0.061 | 67 | 2.7 | <0.7 | <6 | 71 | 3000 | 0.6 | 1.6 | 50 | 17 | 90 |
| GB-LX2021-24 | greywacke | 30 | 0.83 | 630 | 0.9 | 2 | 23 | 0.056 | 6 | <0.8 | <0.7 | <6 | 160 | 3000 | 0.34 | 1.3 | 45 | 13 | 39 |
| GB-LX2021-25 | greywacke | 29 | 0.76 | 620 | 0.7 | 2 | 22 | 0.056 | 11 | <0.8 | <0.7 | <6 | 170 | 3100 | 0.35 | 1.4 | 48 | 10 | 48 |
| GB-LX2021-26 | argillite | 60 | 1.6 | 930 | 0.6 | 1.4 | 43 | 0.069 | 24 | <0.8 | <0.7 | <6 | 180 | 4200 | 0.8 | 1.8 | 80 | 14 | 84 |
| GB-LX2021-27 | greywacke marker unit | 24 | 0.52 | 380 | 0.4 | 1.7 | 15 | 0.049 | 11 | 3.3 | <0.7 | <6 | 120 | 2300 | 0.31 | 1 | 37 | 7.3 | 26 |
| GB-LX2021-28 | greywacke | 54 | 1.2 | 720 | 0.4 | 1.8 | 30 | 0.058 | 19 | <0.8 | <0.7 | <6 | 210 | 3500 | 0.61 | 1.6 | 61 | 15 | 65 |
| GB-LX2021-29 | greywacke | 29 | 0.66 | 500 | 0.6 | 2 | 17 | 0.05 | 24 | <0.8 | <0.7 | <6 | 150 | 2600 | 0.36 | 1.1 | 44 | 8.7 | 42 |
| GB-LX2021-30 | greywacke | 41 | 0.91 | 970 | 0.5 | 1.6 | 22 | 0.054 | 20 | <0.8 | <0.7 | <6 | 150 | 2900 | 0.51 | 1.4 | 51 | 14 | 45 |
| GB-LX2021-31 | greywacke | 38 | 0.8 | 580 | 0.30 | 1.8 | 21 | 0.054 | 11.0 | <0.8 | <0.7 | <6 | 160 | 3300 | 0.44 | 1.3 | 51 | 10.0 | 44 |
| GB-LX2021-32 | argillite | 45 | 1.1 | 570 | 0.20 | 1.2 | 32 | 0.058 | 15.0 | 1.7 | <0.7 | <6 | 93 | 3500 | 0.59 | 1.5 | 66 | 13.0 | 68 |
| GB-LX2021-33 | greywacke | 30 | 0.76 | 560 | 0.40 | 1.8 | 21 | 0.055 | 9.0 | <0.8 | <0.7 | <6 | 160 | 3400 | 0.42 | 1.4 | 53 | 11.0 | 41 |
| GB-LX2021-34 | argillite | 54 | 1.5 | 720 | 0.90 | 0.97 | 55 | 0.064 | 20.0 | 1.5 | <0.7 | <6 | 110 | 4800 | 0.97 | 2.1 | 97 | 13.0 | 92 |
| GB-LX2021-35 | greywacke | 31 | 0.83 | 600 | 0.40 | 1.8 | 23 | 0.067 | 51.0 | <0.8 | <0.7 | <6 | 150 | 3800 | 0.44 | 1.7 | 58 | 12.0 | 130 |
| GB-NM2021-01 | greywacke | 27 | 0.70 | 390 | 1.1 | 1.3 | 22 | 0.054 | 49 | 7.7 | <0.7 | <6 | 140 | 2200 | 0.38 | 0.99 | 38 | 11 | 44 |
| GB-NM2021-03 | quartz vein | 32 | 0.68 | 450 | 0.90 | 1.1 | 18 | 0.052 | 15 | 5.6 | <0.7 | <6 | 130 | 2700 | 0.43 | 1.1 | 45 | 11 | 35 |
| GB-NM2021-04 | argillite | 67 | 1.5 | 790 | 3.3 | 1.0 | 44 | 0.063 | 33 | 4.5 | <0.7 | <6 | 160 | 4000 | 1.0 | 1.8 | 88 | 18 | 94 |
| GB-NM2021-05 | Approx. 30% greywacke, 70% quartz vein | 51 | 1.0 | 640 | 3.1 | 0.93 | 32 | 0.048 | 35 | 6.8 | <0.7 | <6 | 130 | 3600 | 0.65 | 1.5 | 70 | 14 | 74 |
| GB-NM2021-06 | Approx. 20% quartz vein, 80% greywacke | 36 | 0.85 | 610 | 0.60 | 1.6 | 21 | 0.056 | 20 | <0.8 | <0.7 | <6 | 130 | 2700 | 0.43 | 1.2 | 48 | 10 | 52 |
| GB-NM2021-07 | greywacke | 40 | 0.86 | 600 | 0.40 | 1.9 | 22 | 0.061 | 12 | 1.7 | <0.7 | <6 | 160 | 3100 | 0.47 | 1.4 | 54 | 13 | 44 |
| GB-NM2021-08 | Approx. 60% greywacke, 40% argillite + quartz vein | 62 | 1.4 | 880 | 1.5 | 1.3 | 34 | 0.072 | 47 | 1.5 | <0.7 | <6 | 180 | 3800 | 0.76 | 1.8 | 77 | 21 | 140 |
| GB-NM2021-09 | Approx. 40% greywacke, 60% quartz vein | 25 | 0.60 | 410 | 3.0 | 1.1 | 21 | 0.039 | 55 | 7.8 | <0.7 | <6 | 110 | 1800 | 0.33 | 0.86 | 37 | 8.0 | 59 |
| GB-NM2021-10 | Approx. 60% argillite, 40% quartz vein | 63 | 1.4 | 740 | 1.0 | 1.5 | 34 | 0.069 | 56 | 2.2 | <0.7 | <6 | 150 | 3500 | 0.73 | 1.8 | 71 | 15 | 230 |
| GB-NM2021-11 | Approx. 40% argillite + quartz veining, 60% quartz vein | 17 | 0.39 | 290 | 1.2 | 0.46 | 17 | 0.018 | 17 | 6.6 | <0.7 | <6 | 68 | 1100 | 0.20 | 0.52 | 24 | 6.5 | 42 |
| GB-NM2021-12 | Approx. 70% argillte, 30% greywacke | 53 | 1.2 | 790 | 0.90 | 1.5 | 31 | 0.065 | 23 | <0.8 | <0.7 | <6 | 150 | 3500 | 0.68 | 1.6 | 72 | 15 | 70 |
| GB-NM2021-13 | greywacke + quartz vein | 25 | 0.63 | 580 | 1.3 | 1.1 | 17 | 0.046 | 17 | 22 | <0.7 | <6 | 150 | 950 | 0.34 | 0.96 | 39 | 12 | 31 |
| GB-NM2021-14 | Approx. 20% argillite + quartz veining, 80% greywacke + quartz veining | 31 | 0.70 | 520 | 2.3 | 1.3 | 19 | 0.050 | 18 | 4.3 | <0.7 | <6 | 120 | 2300 | 0.44 | 1.1 | 46 | 9.9 | 50 |
| GB-NM2021-15 | Approx. 90% greywacke + quartz veining, 10% argillite | 33 | 0.89 | 670 | 2.4 | 1.7 | 26 | 0.048 | 41 | 8 | <0.7 | <6 | 200 | 2600 | 0.49 | 1.20 | 64 | 9.4 | 56 |
| GB-NM2021-16 | Approx. 40% quartz vein, 60% greywacke | 29 | 0.68 | 560 | 5.5 | 0.8 | 24 | 0.034 | 21 | 32 | <0.7 | <6 | 120 | 2100 | 0.38 | 1.00 | 48 | 15.0 | 33 |

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 2: Solid Phase Metal Results**

| **Sample ID** | **Rock Type** | **Li** | **Mg** | **Mn** | **Mo** | **Na** | **Ni** | **P** | **Pb** | **Sb** | **Se** | **Sn** | **Sr** | **Ti** | **Tl** | **U** | **V** | **Y** | **Zn** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | µg/g | % | µg/g | µg/g | % | µg/g | % | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g |
| GB-NM2021-17 | Approx. 80% argillite, 20% greywacke | 60 | 1 | 790 | 0.40 | 1 | 34 | 0 | 22 | 2.1 | <0.7 | <6 | 200 | 3600 | 0.75 | 1.7 | 74 | 19 | 86 |
| GB-NM2021-18 | argillite | 64 | 2 | 900 | 0.30 | 1 | 42 | 0 | 20 | <0.8 | <0.7 | <6 | 180 | 4000 | 0.81 | 2.0 | 92 | 16 | 100 |
| GB-NM2021-19 | Approx. 20% greywacke, 80% argillite | 63 | 1 | 750 | 0.50 | 1 | 37 | 0 | 17 | <0.8 | <0.7 | <6 | 150 | 3600 | 0.72 | 1.8 | 75 | 14 | 83 |
| GB-NM2021-20 | Approx. 80% argillite + quartz veining, 20% greywacke | 58 | 1 | 740 | 0.50 | 2 | 33 | 0 | 17 | 0.80 | <0.7 | <6 | 180 | 3400 | 0.64 | 1.6 | 70 | 13 | 73 |
| GB-NM2021-21 | Approx. 40% greywacke, 60% argillite + quartz veining | 66 | 2 | 740 | 6.1 | 1 | 35 | 0 | 31 | 1.7 | <0.7 | <6 | 170 | 3900 | 1.4 | 1.9 | 86 | 21 | 87 |
| GB-NM2021-22 | greywacke | 43 | 1 | 890 | 1.7 | 2 | 24 | 0 | 31 | 7.9 | <0.7 | <6 | 170 | 2600 | 0.53 | 1.2 | 51 | 11 | 68 |
| GB-NM2021-23 | Approx. 15% argillite + quartz veining, 40% greywacke, 45% argillite | 97 | 2 | 1500 | 1.6 | 2 | 41 | 0 | 190 | 5.4 | <0.7 | <6 | 250 | 3900 | 0.99 | 2.2 | 96 | 20 | 450 |
| GB-NM2021-24 | Approx. 50% argillite + quartz veining, 50% greywacke + quartz veining | 52 | 1 | 680 | 0.50 | 2 | 28 | 0 | 18 | 1.5 | <0.7 | <6 | 130 | 3500 | 0.61 | 1.5 | 61 | 12 | 78 |
| GB-NM2021-25 | Approx. 20% argillite + quartz veining, 40% greywacke, 30% quartz vein | 55 | 1 | 640 | 0.50 | 1 | 29 | 0 | 80 | 2.0 | <0.7 | <6 | 140 | 3200 | 0.64 | 1.5 | 64 | 16 | 120 |
| GB-NM2021-26 | Approx. 75% argillite + quartz veining, 25% greywacke | 67 | 2 | 970 | 0.50 | 2 | 38 | 0 | 13 | 2.1 | <0.7 | <6 | 180 | 4000 | 0.80 | 1.9 | 79 | 18 | 74 |
| GB-NM2021-27 | Approx. 80% argillite + quartz veining, 20% greywacke | 51 | 1 | 660 | 0.60 | 1 | 35 | 0 | 24 | 0.90 | <0.7 | <6 | 140 | 3300 | 0.70 | 1.7 | 69 | 14 | 79 |
| GB-NM2021-28 | Approx. 90% greywacke, 10% argillite | 29 | 0 | 640 | 0.40 | 2 | 22 | 0 | 15 | <0.8 | <0.7 | <6 | 160 | 3400 | 0.46 | 1.5 | 64 | 1.4 | 51 |
| GB-NM2021-29 | greywacke marker unit | 27 | 1 | 460 | 0.70 | 2 | 17 | 0 | 11 | <0.8 | <0.7 | <6 | 170 | 2900 | 0.34 | 1.3 | 51 | 9.7 | 38 |
| GB-NM2021-30 | greywacke marker unit | 24 | 0 | 440 | 0.40 | 2 | 14 | 0 | 13 | <0.8 | <0.7 | <6 | 130 | 2500 | 0.36 | 1.1 | 44 | 5.1 | 34 |
| GB-NM2021-31 | greywacke marker unit | 22 | 0 | 460 | 0.80 | 2 | 18 | 0 | 12 | <0.8 | <0.7 | <6 | 150 | 2500 | 0.34 | 1.2 | 48 | 0.90 | 35 |
| GB-NM2021-32 | greywacke marker unit | 28 | 1 | 450 | 0.60 | 2 | 16 | 0 | 13 | <0.8 | <0.7 | <6 | 150 | 2800 | 0.32 | 1.2 | 48 | 11 | 34 |
| GB-NM2021-33 | greywacke | 32 | 1 | 620 | 0.80 | 2 | 19 | 0 | 11 | <0.8 | <0.7 | <6 | 170 | 2800 | 0.40 | 1.2 | 51 | 8.4 | 39 |
| GB-NM2021-34 | greywacke | 28 | 1 | 430 | 0.70 | 2 | 15 | 0 | 8.0 | <0.8 | <0.7 | <6 | 130 | 2500 | 0.34 | 1.2 | 44 | 8.6 | 34 |
| 389995 | Mixed - bulk sample stockpile | 30 | 0.72 | 460 | 2.9 | n/a | 27 | n/a | 33 | 6.4 | <0.7 | <6 | 41 | 1400 | 0.43 | 0.97 | 41 | 11.0 | 50 |
| 389996 | Mixed - bulk sample stockpile | 32 | 0.73 | 510 | 3.2 | n/a | 27 | n/a | 30 | 7.6 | <0.7 | <6 | 81 | 2300 | 0.57 | 1.10 | 49 | 13.0 | 43 |
| 389997 | Mixed - bulk sample stockpile | 45 | 0.99 | 640 | 2.0 | n/a | 25 | n/a | 58 | 5.6 | <0.7 | <6 | 97 | 3000 | 0.74 | 1.40 | 63 | 16.0 | 58 |
| 389998 | Mixed - bulk sample stockpile | 35 | 0.84 | 580 | 2.8 | n/a | 26 | n/a | 43 | 7.8 | <0.7 | <6 | 92 | 2400 | 0.64 | 1.20 | 53 | 15.0 | 53 |
| 389999 | Mixed - bulk sample stockpile | 38 | 0.87 | 640 | 3.1 | n/a | 29 | n/a | 44 | 11 | <0.7 | <6 | 86 | 2500 | 0.66 | 1.30 | 57 | 17.0 | 51 |
| GB_HC1 | argillite | 45 | 1.50 | 800 | 4.1 | 1.30 | 37 | 0.072 | 18 | <0.8 | <0.7 | <6 | 160 | 4200 | 0.75 | 1.80 | 95 | 21.0 | 71 |
| GB_HC2 | argillite | 53 | 1.60 | 830 | 2.7 | 1.40 | 39 | 0.066 | 22 | <0.8 | <0.7 | <6 | 170 | 4300 | 0.84 | 1.90 | 99 | 26.0 | 85 |
| GB_HC3 | greywacke | 40 | 1.20 | 870 | 0.5 | 1.80 | 28 | 0.066 | 14 | <0.8 | <0.7 | <6 | 210 | 3800 | 0.52 | 1.50 | 76 | 20.0 | 71 |
| GB_HC4 | greywacke | 37 | 0.94 | 650 | 6.5 | 1.80 | 24 | 0.062 | 30 | 1.5 | <0.7 | <6 | 140 | 3400 | 0.43 | 1.40 | 64 | 18.0 | 59 |
| GB_HC5 | 50% argillite, 50% greywacke | 43 | 1.40 | 810 | 0.60 | 1.50 | 33 | 0.065 | 23 | <0.8 | <0.7 | <6 | 190 | 4000 | 0.63 | 1.60 | 83 | 22.0 | 82 |
| GB_HC6 | greywacke marker unit | 26 | 0.79 | 730 | 0.60 | 2.40 | 18 | 0.058 | 17 | <0.8 | <0.7 | <6 | 160 | 3100 | 0.34 | 1.40 | 57 | 15.0 | 44 |
| FB-1 | Mixed - bulk sample stockpile | 50 | 1.00 | 660 | 0.9 | 0.86 | 32 | 0.040 | 25 | 8.9 | <0.7 | <6 | 140 | 3400 | 0.72 | 1.60 | 67 | 16.0 | 55 |
| FB-2 | PAG1, mixed lithology | 41 | 0.82 | 590 | 0.4 | 1.30 | 25 | 0.049 | 20 | <0.8 | <0.7 | <6 | 150 | 3100 | 0.50 | 1.42 | 52 | 12.0 | 51 |
| FB-3 | PAG2, greywacke | 36 | 0.66 | 500 | 0.6 | 1.30 | 23 | 0.043 | 13 | 6.6 | <0.7 | <6 | 140 | 2700 | 0.40 | 1.21 | 47 | 11.1 | 43 |
| FB-4 | NPAG, argillite | 48 | 1.10 | 690 | 0.5 | 1.10 | 34 | 0.053 | 17 | 0.9 | <0.7 | <6 | 140 | 3400 | 0.63 | 1.55 | 64 | 14.3 | 74 |

**Notes:**
AUCCA - Average Upper Continental Crustal Abundance
Rudnick, R.L. and S. Gao (2014). Composition of the Continental Crust. In: Holland, H. and Turekian, K. (eds). Treatise on Geochemistry 2nd Edition, Vol. 4, pp. 1-51. Oxford, UK, Elsevier Ltd.
Light grey shading indicates a value greater than 3x the AUCCA
Dark grey shading indicates a value greater than 10x the AUCCA

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 3: Shake Flask Extraction Results**

| Sample ID | | Tier 1 EQS | GB-2020-002 | GB-2020-009 | GB-2020-010 | GB-2020-012 | GB-2020-014 | GB-2020-027 | GB-2020-029 | GB-2020-030 | GB-2020-033 | GB-2020-044 | GB-2020-046 | GB-2020-049 | GB-2020-051 | GB-2020-057 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rock Type** | | | argillite | greywacke | greywacke | argillite | argillite | argillite | argillite | greywacke | argillite | argillite | greywacke marker unit | greywacke | quartz vein | greywacke |
| **Ore/Waste** | | | waste | waste | waste | waste | waste | waste | waste | waste | ore | ore | waste | waste | waste | waste |
| **Phase** | | | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I |
| **Designation** | | | PAG1 | PAG2 | NPAG | PAG2 | NPAG | NPAG | PAG1 | PAG2 | PAG1 | PAG1 | PAG1 | NPAG | PAG1 | PAG2 |
| Final pH | no unit | 6.5-9.0 | ***9.74*** | ***9.89*** | ***9.65*** | ***9.87*** | ***9.81*** | ***9.96*** | ***9.83*** | ***10.01*** | ***9.04*** | 8.99 | ***9.27*** | ***9.55*** | ***9.31*** | ***9.69*** |
| pH | No unit | 6.5-9.0 | ***9.77*** | ***9.96*** | 8.91 | ***9.94*** | ***9.76*** | ***9.42*** | ***9.94*** | ***10.12*** | 7.96 | 8.04 | 7.93 | 8.60 | 8.03 | ***9.76*** |
| Conductivity | uS/cm | - | 114 | 100 | 76 | 101 | 113 | 120 | 108 | 138 | 187 | 163 | 87 | 76 | 88 | 77 |
| Alkalinity | mg/L as $CaCO_3$ | - | 41 | 46 | 34 | 45 | 45 | 56 | 50 | 67 | 47 | 38 | 32 | 33 | 31 | 33 |
| Sulphate | mg/L | 128 | 9 | < 2 | <2 | < 2 | 7 | <2 | < 2 | 2 | 21 | 17 | <2 | <2 | <2 | < 2 |
| Mercury | mg/L | 0.000026 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Silver | mg/L | 0.00025 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |
| Aluminum | mg/L | 0.005 | 2.28 | 2.30 | 0.942 | 3.04 | 2.46 | 3.89 | 1.95 | 1.68 | 0.718 | 0.658 | 0.721 | 0.594 | 0.496 | 1.30 |
| Arsenic | mg/L | 0.005 | 0.466 | 0.251 | 0.373 | 0.320 | 0.202 | 0.348 | 1.30 | 0.728 | 2.02 | 1.04 | 3.42 | 0.773 | 3.93 | 1.06 |
| Barium | mg/L | 1 | 0.00828 | 0.00948 | 0.00348 | 0.0114 | 0.00949 | 0.0135 | 0.00993 | 0.00594 | 0.00478 | 0.00334 | 0.00303 | 0.00195 | 0.00224 | 0.00855 |
| Boron | mg/L | 1.5 | 0.017 | 0.011 | 0.012 | 0.019 | 0.016 | 0.027 | 0.028 | 0.022 | 0.035 | 0.020 | 0.012 | 0.017 | 0.013 | 0.007 |
| Beryllium | mg/L | 0.00015 | 0.000052 | 0.000028 | 0.000008 | 0.000056 | 0.000047 | 0.000083 | 0.000036 | 0.000028 | 0.000019 | 0.000009 | 0.000010 | 0.000007 | <0.000007 | 0.000024 |
| Bismuth | mg/L | - | 0.00004 | 0.00002 | <0.000007 | 0.00006 | 0.00002 | 0.000033 | 0.00002 | <0.00001 | 0.000026 | 0.000028 | 0.000013 | <0.000007 | <0.000007 | 0.00002 |
| Calcium | mg/L | - | 1.66 | 1.52 | 2.71 | 1.41 | 1.47 | 0.49 | 1.42 | 0.80 | 6.28 | 8.18 | 4.11 | 4.04 | 6.36 | 2.91 |
| Cadmium | mg/L | 0.00009 | 0.000004 | 0.000004 | <0.000003 | 0.000007 | 0.000004 | <0.000003 | 0.000005 | <0.000003 | <0.000003 | 0.000015 | <0.000003 | <0.000003 | <0.000003 | 0.000007 |
| Cobalt | mg/L | 0.001 | 0.000294 | 0.000462 | 0.000137 | 0.000491 | 0.000378 | 0.000704 | 0.000314 | 0.000253 | 0.000080 | 0.000072 | 0.000059 | 0.000047 | 0.000060 | 0.000219 |
| Chromium | mg/L | 0.001 | 0.00071 | 0.00104 | 0.00050 | 0.00112 | 0.00083 | 0.00140 | 0.00105 | 0.00074 | 0.00015 | 0.00010 | 0.00040 | 0.00013 | 0.00015 | 0.00106 |
| Copper | mg/L | 0.002 | 0.0012 | 0.0007 | 0.0006 | 0.0010 | 0.0012 | 0.0006 | 0.0008 | 0.0010 | 0.0005 | 0.0003 | 0.0005 | 0.0005 | 0.0003 | 0.0010 |
| Iron | mg/L | 0.3 | 0.483 | 0.586 | 0.092 | 0.718 | 0.566 | 0.734 | 0.629 | 0.377 | 0.078 | 0.043 | 0.119 | 0.034 | 0.036 | 0.514 |
| Potassium | mg/L | - | 24.0 | 17.1 | 12.0 | 22.2 | 21.5 | 18.2 | 11.8 | 7.65 | 26.6 | 23.8 | 11.1 | 9.39 | 9.62 | 12.9 |
| Lithium | mg/L | - | 0.0156 | 0.0144 | 0.0108 | 0.0177 | 0.0150 | 0.0117 | 0.0066 | 0.0090 | 0.0194 | 0.0205 | 0.0085 | 0.0062 | 0.0070 | 0.0127 |
| Magnesium | mg/L | - | 0.366 | 0.332 | 0.325 | 0.380 | 0.357 | 0.338 | 0.355 | 0.203 | 1.11 | 1.16 | 0.463 | 0.390 | 0.558 | 0.460 |
| Manganese | mg/L | 0.43 | 0.00763 | 0.0114 | 0.00292 | 0.0154 | 0.0133 | 0.0178 | 0.0132 | 0.0119 | 0.00585 | 0.00780 | 0.00336 | 0.00151 | 0.00298 | 0.0142 |
| Molybdenum | mg/L | 0.073 | 0.00079 | 0.00025 | 0.00012 | 0.00045 | 0.00048 | 0.00014 | 0.00031 | 0.00033 | 0.00139 | 0.00087 | 0.00046 | 0.00041 | 0.00049 | 0.00099 |
| Sodium | mg/L | - | 2.90 | 4.10 | 5.54 | 3.56 | 6.44 | 14.2 | 13.3 | 20.2 | 13.0 | 6.19 | 6.40 | 5.56 | 4.76 | 6.01 |
| Nickel | mg/L | 0.025 | 0.0074 | 0.0080 | 0.0046 | 0.0054 | 0.0035 | 0.0051 | 0.0040 | 0.0046 | 0.0068 | 0.0129 | 0.0086 | 0.0049 | 0.0048 | 0.0008 |
| Lead | mg/L | 0.001 | 0.00287 | 0.00034 | 0.00011 | 0.00164 | 0.00126 | 0.00091 | 0.00044 | 0.00201 | 0.00019 | 0.00044 | 0.00016 | 0.00006 | 0.00007 | 0.00076 |
| Antimony | mg/L | 0.009 | 0.0028 | 0.0027 | 0.0034 | 0.0020 | 0.0039 | 0.0057 | 0.0030 | 0.0021 | 0.0119 | 0.0038 | 0.0025 | 0.0018 | 0.0053 | 0.0042 |
| Selenium | mg/L | 0.001 | 0.00007 | <0.00004 | 0.00034 | 0.00006 | 0.00009 | 0.00034 | <0.00004 | 0.00006 | 0.00067 | 0.00048 | 0.00036 | 0.00032 | 0.00035 | 0.00010 |
| Silicon | mg/L | - | - | - | 5.80 | - | - | 5.78 | - | - | 2.32 | 2.22 | 4.69 | 4.74 | 4.97 | - |
| Tin | mg/L | - | 0.00009 | 0.00010 | 0.00006 | 0.00010 | 0.00011 | 0.00010 | 0.00010 | 0.00011 | 0.00009 | <0.00006 | 0.00009 | <0.00006 | <0.00006 | 0.00008 |
| Strontium | mg/L | 21 | 0.0129 | 0.00784 | 0.0226 | 0.0126 | 0.0120 | 0.00604 | 0.0114 | 0.00892 | 0.123 | 0.0888 | 0.0120 | 0.0430 | 0.0465 | 0.0112 |
| Titanium | mg/L | - | 0.0337 | 0.0394 | 0.0094 | 0.0541 | 0.0414 | 0.0486 | 0.0429 | 0.0294 | 0.00564 | 0.00396 | 0.0110 | 0.00401 | 0.00469 | 0.0450 |
| Thallium | mg/L | 0.0008 | 0.000042 | 0.000020 | 0.000007 | 0.000036 | 0.000022 | 0.000021 | 0.000015 | 0.000007 | 0.000011 | 0.000013 | <0.000005 | <0.000005 | <0.000005 | 0.000018 |
| Uranium | mg/L | 0.015 | 0.000332 | 0.000493 | 0.000328 | 0.000327 | 0.000202 | 0.000256 | 0.000326 | 0.000387 | 0.000313 | 0.000325 | 0.000504 | 0.000322 | 0.000410 | 0.00135 |
| Vanadium | mg/L | 0.12 | 0.0133 | 0.0133 | 0.00979 | 0.0156 | 0.0140 | 0.0204 | 0.0141 | 0.0135 | 0.00755 | 0.00439 | 0.0121 | 0.0120 | 0.00856 | 0.0124 |
| Tungsten | mg/L | - | 0.00471 | 0.00625 | - | 0.00359 | 0.00420 | - | 0.00699 | 0.00464 | - | - | - | - | - | 0.00612 |
| Yttrium | mg/L | - | 0.00031 | 0.00031 | - | 0.00045 | 0.00037 | - | 0.00033 | 0.00023 | - | - | - | - | - | 0.00040 |
| Zinc | mg/L | 0.007 | <0.002 | <0.002 | <0.002 | 0.003 | 0.003 | <0.002 | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |

**Notes:**

Tier 1 EQS: Nova Scotia Tier 1 Environmental Quality Standards

Nova Scotia Environment (NSE) (2021). Table 3 - Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (µg/L). In Notification of Contamination Protocol. Revised September 30, 2021.

Bold italic text indicates a pH outside of the Tier 1 EQS pH range.

Grey shading indicates a concentration above the Tier 1 EQS.

Designations are defined as:

PAG1: NPR < 1 or 1≤ NPR ≤ 2 and total S ≥ 0.2 wt.%

PAG2: 1≤ NPR ≤ 2 and total S < 0.2 wt.%

NPAG: NPR > 2

PAG: Potentially Acid Generating, NPAG: Non-Potentially Acid Generating, NPR: Neutralization Potential Ratio

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 3: Shake Flask Extraction Results**

| **Sample ID** | | **Tier 1 EQS** | **GB-2020-060** | **GB-2020-064** | **GB-2020-065** | **GB-2020-069** | **GB-2020-073** | **GB-2020-076** | **GB-2020-080** | **GB-2020-095** | **GB-2020-099** | **GB-2020-104** | **GB-2020-106** | **GB-LX2021-32** | **GB-LX2021-33** | **GB-LX2021-34** | **GB-NM2021-28** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rock Type** | | | argillite | greywacke + quartz vein | argillite + quartz vein | argillite | argillite | greywacke | argillite | greywacke | greywacke | argillite | greywacke | argillite | greywacke | argillite | Approx. 90% greywacke, 10% argillite |
| **Ore/Waste** | | | waste | waste | ore | waste | waste | waste | waste | waste | waste | waste | waste | waste | waste | waste | waste |
| **Phase** | | | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase I | Phase Ib - core | Phase Ib - core | Phase Ib - core | Phase II - core |
| **Designation** | | | NPAG | PAG1 | PAG1 | PAG1 | NPAG | PAG1 | PAG2 | NPAG | NPAG | PAG1 | PAG1 | NPAG | NPAG | PAG1 | NPAG |
| Final pH | no unit | 6.5-9.0 | ***9.76*** | 8.02 | 8.33 | ***9.70*** | ***9.59*** | ***9.54*** | ***9.72*** | ***9.48*** | ***9.63*** | ***9.40*** | 8.82 | ***9.27*** | ***9.80*** | ***9.86*** | ***9.72*** |
| pH | No unit | 6.5-9.0 | 8.85 | 6.92 | 6.88 | ***9.77*** | 8.50 | ***9.65*** | ***9.8*** | 8.08 | 8.90 | 7.97 | 7.89 | 8.1 | ***9.05*** | 8.98 | 8.95 |
| Conductivity | uS/cm | - | 102 | 43 | 101 | 101 | 89 | 88 | 81 | 88 | 68 | 122 | 223 | 96 | 73 | 95 | 90 |
| Alkalinity | mg/L as $CaCO_3$ | - | 41 | 4 | 4 | 40 | 34 | 34 | 37 | 33 | 30 | 35 | 40 | 31 | 33 | 41 | 34 |
| Sulphate | mg/L | 128 | <2 | 4 | 24 | 2 | <2 | 2 | < 2 | 3 | <2 | 7 | 49 | 10 | <2 | <2 | 3 |
| Mercury | mg/L | 0.000026 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Silver | mg/L | 0.00025 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |
| Aluminum | mg/L | 0.005 | 2.39 | 0.169 | 0.605 | 2.47 | 1.53 | 1.16 | 1.69 | 0.325 | 0.556 | 1.11 | 0.382 | 0.79 | 0.82 | 1.77 | 0.89 |
| Arsenic | mg/L | 0.005 | 0.213 | 4.88 | 1.26 | 1.43 | 0.416 | 2.01 | 1.12 | 0.645 | 0.319 | 1.82 | 0.133 | 0.06 | 0.10 | 0.17 | 0.63 |
| Barium | mg/L | 1 | 0.00756 | 0.00087 | 0.00544 | 0.0112 | 0.00438 | 0.00717 | 0.00913 | 0.00246 | 0.00090 | 0.00456 | 0.00618 | 0.00352 | 0.00357 | 0.00400 | 0.00281 |
| Boron | mg/L | 1.5 | 0.016 | 0.012 | 0.016 | 0.017 | 0.015 | 0.012 | 0.014 | 0.013 | 0.011 | 0.014 | 0.040 | 0.008 | 0.010 | 0.012 | 0.009 |
| Beryllium | mg/L | 0.00015 | 0.000030 | 0.000011 | 0.000050 | 0.000056 | 0.000018 | 0.000031 | 0.000040 | 0.000007 | <0.000007 | 0.000016 | <0.000007 | 0.000015 | <0.000007 | 0.000016 | <0.000007 |
| Bismuth | mg/L | - | 0.000069 | 0.000039 | 0.000018 | 0.00005 | 0.000009 | 0.00001 | 0.00002 | <0.000007 | <0.000007 | 0.000009 | 0.000011 | 0.00002 | <0.00001 | 0.00001 | <0.00001 |
| Calcium | mg/L | - | 1.50 | 0.56 | 0.99 | 2.07 | 2.33 | 3.75 | 2.68 | 5.86 | 4.39 | 3.12 | 16.3 | 6.59 | 2.83 | 1.38 | 3.38 |
| Cadmium | mg/L | 0.00009 | <0.000003 | 0.000026 | 0.000016 | 0.000003 | <0.000003 | 0.000004 | 0.000005 | <0.000003 | <0.000003 | <0.000003 | <0.000003 | <0.000003 | 0.000010 | <0.000003 | <0.000003 |
| Cobalt | mg/L | 0.001 | 0.000251 | 0.000082 | 0.000067 | 0.000382 | 0.000075 | 0.000180 | 0.000370 | 0.000016 | 0.000008 | 0.000041 | 0.000150 | 0.000371 | 0.000210 | 0.000136 | 0.000079 |
| Chromium | mg/L | 0.001 | 0.00098 | 0.00028 | 0.00060 | 0.00105 | 0.00042 | 0.00095 | 0.00107 | 0.00012 | 0.00008 | 0.00032 | 0.00029 | 0.00056 | 0.00021 | 0.00039 | 0.00035 |
| Copper | mg/L | 0.002 | 0.0005 | 0.0009 | 0.0007 | 0.0005 | 0.0002 | 0.0005 | 0.0007 | <0.0002 | <0.0002 | 0.0004 | 0.0003 | 0.0006 | 0.0003 | 0.0004 | 0.0003 |
| Iron | mg/L | 0.3 | 0.520 | 0.128 | 0.236 | 0.575 | 0.177 | 0.376 | 0.676 | 0.023 | 0.016 | 0.125 | <0.007 | 0.359 | 0.054 | 0.186 | 0.123 |
| Potassium | mg/L | - | 21.8 | 4.48 | 20.5 | 20.6 | 18.5 | 10.8 | 14.0 | 10.2 | 5.98 | 27.2 | 30.3 | 10.7 | 9.0 | 19.8 | 14.9 |
| Lithium | mg/L | - | 0.0080 | 0.0030 | 0.0082 | 0.0144 | 0.0130 | 0.0090 | 0.0141 | 0.0109 | 0.0017 | 0.0158 | 0.0171 | 0.0021 | 0.0042 | 0.0060 | 0.0112 |
| Magnesium | mg/L | - | 0.351 | 0.283 | 0.514 | 0.432 | 0.335 | 0.475 | 0.549 | 0.608 | 0.394 | 0.480 | 2.52 | 0.967 | 0.278 | 0.248 | 0.457 |
| Manganese | mg/L | 0.43 | 0.0106 | 0.00646 | 0.0163 | 0.0149 | 0.00522 | 0.00881 | 0.0154 | 0.00449 | 0.00060 | 0.00398 | 0.00876 | 0.0066 | 0.0042 | 0.0043 | 0.0029 |
| Molybdenum | mg/L | 0.073 | 0.00025 | 0.00060 | 0.00078 | 0.00031 | 0.00027 | 0.00028 | 0.00042 | 0.00068 | 0.00045 | 0.00087 | 0.00174 | 0.00077 | 0.00040 | 0.00034 | 0.00049 |
| Sodium | mg/L | - | 4.93 | 4.68 | 3.19 | 3.82 | 3.88 | 5.91 | 5.48 | 4.90 | 5.89 | 2.28 | 3.86 | 4.07 | 6.64 | 4.35 | 5.39 |
| Nickel | mg/L | 0.025 | 0.0009 | 0.0005 | 0.0005 | 0.0019 | 0.0003 | 0.0008 | 0.0012 | 0.0018 | <0.0001 | 0.0006 | 0.0166 | 0.0006 | 0.0004 | 0.0002 | 0.0025 |
| Lead | mg/L | 0.001 | 0.00082 | 0.00089 | 0.00070 | 0.00052 | 0.00026 | 0.00042 | 0.00090 | 0.00158 | 0.00003 | 0.00030 | 0.00002 | 0.00036 | 0.00013 | 0.00098 | 0.00026 |
| Antimony | mg/L | 0.009 | 0.0064 | 0.0054 | 0.0041 | 0.0016 | 0.0011 | 0.0021 | 0.0026 | 0.0074 | 0.0096 | 0.0055 | 0.0061 | 0.0064 | 0.0029 | 0.0097 | 0.0043 |
| Selenium | mg/L | 0.001 | 0.00040 | 0.00054 | 0.00026 | <0.00004 | 0.00024 | <0.00004 | 0.00006 | 0.00023 | 0.00032 | 0.00064 | 0.00030 | 0.00014 | <0.00004 | 0.00004 | 0.00007 |
| Silicon | mg/L | - | 3.35 | 4.54 | 3.92 | - | 3.44 | - | - | 4.10 | 4.90 | 2.32 | 2.05 | 2.78 | 5.06 | 3.31 | 4.19 |
| Tin | mg/L | - | <0.00006 | <0.00006 | <0.00006 | 0.00009 | <0.00006 | 0.00009 | 0.00009 | 0.00010 | <0.00006 | 0.00008 | 0.00007 | <0.00006 | <0.00006 | <0.00006 | <0.00006 |
| Strontium | mg/L | 21 | 0.00994 | 0.00565 | 0.00714 | 0.0173 | 0.0102 | 0.0319 | 0.0466 | 0.0686 | 0.0381 | 0.0159 | 0.208 | 0.0147 | 0.0124 | 0.0112 | 0.0284 |
| Titanium | mg/L | - | 0.0294 | 0.00689 | 0.0221 | 0.0444 | 0.0163 | 0.0378 | 0.0554 | 0.00227 | 0.00247 | 0.0116 | 0.00027 | 0.0056 | 0.0043 | 0.0105 | 0.0096 |
| Thallium | mg/L | 0.0008 | 0.000016 | <0.000005 | 0.000012 | 0.000017 | 0.000009 | 0.000010 | 0.000014 | 0.000009 | <0.000005 | 0.000007 | 0.000017 | 0.000017 | <0.000005 | 0.000009 | 0.000006 |
| Uranium | mg/L | 0.015 | 0.000401 | 0.000024 | 0.000051 | 0.000384 | 0.000386 | 0.000511 | 0.000446 | 0.000578 | 0.000236 | 0.000587 | 0.000196 | 0.000093 | 0.000266 | 0.000157 | 0.000512 |
| Vanadium | mg/L | 0.12 | 0.0158 | 0.00308 | 0.00431 | 0.0152 | 0.0136 | 0.0112 | 0.0141 | 0.00517 | 0.00987 | 0.0114 | 0.00185 | 0.0032 | 0.0082 | 0.0116 | 0.0114 |
| Tungsten | mg/L | - | - | - | - | 0.00483 | - | 0.00458 | 0.00153 | - | - | - | - | - | - | - | - |
| Yttrium | mg/L | - | - | - | - | 0.00052 | - | 0.00038 | 0.00046 | - | - | - | - | - | - | - | - |
| Zinc | mg/L | 0.007 | <0.002 | <0.002 | <0.002 | 0.003 | <0.002 | <0.002 | 0.003 | <0.002 | <0.002 | <0.002 | <0.002 | 0.00500 | 0.00200 | 0.00200 | 0.00300 |

**Notes:**

Tier 1 EQS: Nova Scotia Tier 1 Environmental Quality Standards

Nova Scotia Environment (NSE) (2021). Table 3 - Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (μg/L). In Notification of Contamination Protocol. Revised September 30, 2021.

Bold italic text indicates a pH outside of the Tier 1 EQS pH range.

Grey shading indicates a concentration above the Tier 1 EQS.

Designations are defined as:

PAG1: NPR < 1 or 1≤ NPR ≤ 2 and total S ≥ 0.2 wt.%

PAG2: 1≤ NPR ≤ 2 and total S < 0.2 wt.%

NPAG: NPR > 2

PAG: Potentially Acid Generating, NPAG: Non-Potentially Acid Generating, NPR: Neutralization Potential Ratio

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 3: Shake Flask Extraction Results**

| Sample ID | | Tier 1 EQS | GB-NM2021-29 | GB-NM2021-30 | GB-NM2021-33 | GB-NM2021-34 | 389997 | 389999 | GB_HC1 | GB_HC2 | GB_HC3 | GB_HC4 | GB_HC5 | GB_HC6 | FB-1 | FB-2 | FB-3 | FB-4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rock Type | | | greywacke marker unit | greywacke marker unit | greywacke | greywacke | mixed | mixed | argillite | argillite | greywacke | greywacke | 50% argillite, 50% greywacke | greywacke marker unit | Bulk stockpile | mixed lithology | greywacke | argillite |
| Ore/Waste | | | waste | waste | waste | waste | ore stockpile | ore stockpile | waste | waste | waste | waste | waste | waste | ore | waste | waste | waste |
| Phase | | | Phase II - core | Phase II - core | Phase II - core | Phase II - core | Bulk Sample Stockpile | Bulk Sample Stockpile | Humidity Cell | Humidity Cell | Humidity Cell | Humidity Cell | Humidity Cell | Humidity Cell | Field Bin | Field Bin | Field Bin | Field Bin |
| Designation | | | NPAG | NPAG | NPAG | NPAG | PAG1 | PAG1 | NPAG | PAG1 | NPAG | PAG1 | PAG2 | PAG1 | PAG1 | NPAG | PAG1 | NPAG |
| Final pH | no unit | 6.5-9.0 | ***9.86*** | ***9.79*** | ***9.83*** | ***9.67*** | 7.28 | 8.24 | ***9.69*** | ***9.38*** | ***10.01*** | 9.00 | ***9.73*** | 8.92 | ***9.04*** | ***9.83*** | ***9.79*** | ***9.87*** |
| pH | No unit | 6.5-9.0 | ***9.22*** | ***9.01*** | ***9.06*** | 8.73 | 7.87 | 7.94 | 8.2 | 8.21 | ***9.21*** | 7.81 | ***9.84*** | ***9.17*** | 7.99 | 8.56 | 7.96 | 8.6 |
| Conductivity | uS/cm | - | 86 | 108 | 77 | 80 | 213 | 211 | 86 | 134 | 125 | 150 | 92 | 133 | 128 | 88 | 104 | 98 |
| Alkalinity | mg/L as $CaCO_3$ | - | 36 | 40 | 34 | 33 | 36 | 38 | 38 | 36 | 51 | 33 | 41 | 32 | 34 | 40 | 41 | 44 |
| Sulphate | mg/L | 128 | 3 | 5 | <2 | 2 | 60 | 56 | 2 | 17 | 5 | 32 | < 2 | 23 | 13 | <2 | 2 | <2 |
| Mercury | mg/L | 0.000026 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Silver | mg/L | 0.00025 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |
| Aluminum | mg/L | 0.005 | 0.91 | 0.88 | 0.81 | 0.53 | 0.044 | 0.324 | 0.999 | 0.729 | 1.68 | 0.25 | 2.3 | 0.43 | 0.524 | 0.613 | 0.541 | 0.81 |
| Arsenic | mg/L | 0.005 | 0.17 | 0.60 | 0.44 | 0.47 | 1.91 | 7.49 | 0.968 | 0.559 | 0.667 | 0.356 | 0.579 | 0.78 | 5.54 | 0.436 | 1.7 | 0.472 |
| Barium | mg/L | 1 | 0.00592 | 0.00241 | 0.00303 | 0.00414 | 0.0077 | 0.00416 | 0.00243 | 0.00699 | 0.00369 | 0.00244 | 0.0142 | 0.00518 | 0.00269 | 0.00372 | 0.00281 | 0.00512 |
| Boron | mg/L | 1.5 | 0.011 | 0.015 | 0.011 | 0.016 | 0.028 | 0.017 | 0.02 | 0.021 | 0.021 | 0.019 | 0.019 | 0.01 | 0.013 | 0.014 | 0.018 | 0.014 |
| Beryllium | mg/L | 0.00015 | <0.000007 | <0.000007 | <0.000007 | <0.000007 | <0.000007 | <0.000007 | 0.00001 | <0.000007 | 0.000015 | 0.000007 | 0.000063 | 0.000009 | <0.000007 | 0.000009 | 0.000008 | 0.00001 |
| Bismuth | mg/L | - | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00003 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Calcium | mg/L | - | 2.16 | 2.45 | 2.45 | 3.54 | 23.2 | 29.7 | 3.03 | 5.13 | 1.18 | 4.37 | 1.85 | 10.7 | 10.3 | 1.37 | 1.41 | 1.12 |
| Cadmium | mg/L | 0.00009 | <0.000003 | <0.000003 | <0.000003 | <0.000003 | 0.000028 | 0.000006 | 0.000004 | 0.000007 | 0.000005 | 0.000008 | 0.000005 | 0.000003 | 0.000006 | <0.000003 | <0.000003 | 0.000004 |
| Cobalt | mg/L | 0.001 | 0.000072 | 0.000063 | 0.000063 | 0.000040 | 0.000916 | 0.000057 | 0.000082 | 0.000092 | 0.000291 | 0.000088 | 0.000418 | 0.000132 | 0.000017 | 0.000081 | 0.000096 | 0.000119 |
| Chromium | mg/L | 0.001 | 0.00038 | 0.00029 | 0.00028 | 0.00023 | 0.00013 | <0.00008 | 0.00019 | 0.00016 | 0.00061 | 0.00016 | 0.00164 | 0.00015 | 0.00009 | 0.00037 | 0.00043 | 0.00047 |
| Copper | mg/L | 0.002 | <0.0002 | 0.0004 | <0.0002 | 0.0002 | 0.0016 | 0.0011 | 0.0003 | 0.0003 | 0.0005 | 0.0005 | 0.001 | 0.0021 | 0.0004 | 0.0004 | 0.0002 | 0.0002 |
| Iron | mg/L | 0.3 | 0.131 | 0.128 | 0.086 | 0.071 | 0.008 | <0.007 | 0.069 | 0.052 | 0.209 | 0.036 | 0.8 | 0.054 | 0.031 | 0.159 | 0.136 | 0.169 |
| Potassium | mg/L | - | 9.7 | 10.0 | 11.3 | 8.8 | 24.8 | 17.8 | 20.3 | 24.2 | 13.3 | 11.5 | 16.2 | 13.2 | 17.9 | 7.83 | 6.61 | 9.76 |
| Lithium | mg/L | - | 0.0053 | 0.0056 | 0.0081 | 0.0066 | 0.0049 | 0.0056 | 0.0124 | 0.0148 | 0.0096 | 0.0098 | 0.0117 | 0.0088 | 0.0066 | 0.0023 | 0.0056 | 0.0051 |
| Magnesium | mg/L | - | 0.255 | 0.284 | 0.290 | 0.439 | 2.09 | 1.08 | 0.397 | 0.736 | 0.183 | 0.952 | 0.53 | 1.76 | 0.735 | 0.192 | 0.19 | 0.193 |
| Manganese | mg/L | 0.43 | 0.0026 | 0.0031 | 0.0024 | 0.0029 | 0.232 | 0.01141 | 0.00289 | 0.0031 | 0.00576 | 0.0146 | 0.0173 | 0.0282 | 0.00683 | 0.00372 | 0.00418 | 0.00433 |
| Molybdenum | mg/L | 0.073 | 0.00029 | 0.00059 | 0.00177 | 0.00330 | 0.00291 | 0.00369 | 0.00058 | 0.00318 | 0.00053 | 0.00136 | 0.00087 | 0.00089 | 0.00161 | 0.00022 | 0.00066 | 0.00061 |
| Sodium | mg/L | - | 9.60 | 13.20 | 5.70 | 7.74 | 3.88 | 2.01 | 3.84 | 7.22 | 18.6 | 18.2 | 9.42 | 6.83 | 3.49 | 6.9 | 9.61 | 6.46 |
| Nickel | mg/L | 0.025 | 0.0008 | 0.0023 | 0.0001 | 0.0006 | 0.0032 | 0.0006 | 0.0019 | 0.0045 | 0.0088 | 0.0008 | 0.0046 | 0.0137 | 0.0003 | 0.0003 | 0.0011 | 0.0004 |
| Lead | mg/L | 0.001 | 0.00021 | 0.00018 | 0.00010 | 0.00010 | 0.00035 | <0.00009 | 0.0002 | 0.00012 | 0.00045 | 0.00019 | 0.00151 | 0.00019 | 0.00025 | 0.00044 | 0.00031 | 0.00057 |
| Antimony | mg/L | 0.009 | 0.0013 | 0.0016 | 0.0016 | 0.0019 | 0.0093 | 0.0092 | 0.0048 | 0.0033 | 0.004 | 0.0059 | 0.0044 | 0.0023 | 0.0073 | 0.0046 | 0.0031 | 0.0058 |
| Selenium | mg/L | 0.001 | 0.00005 | <0.00004 | <0.00004 | 0.00005 | 0.00037 | 0.00026 | <0.00004 | 0.00007 | 0.00006 | 0.00022 | 0.00009 | 0.00007 | 0.00014 | 0.00005 | <0.00004 | 0.00005 |
| Silicon | mg/L | - | 5.2 | 5.38 | 5.16 | 4.94 | 5.86 | 3.04 | 3.52 | 2.6 | 5.07 | 4.04 | - | - | <0.00006 | 2.41 | 2.36 | 1.92 |
| Tin | mg/L | - | <0.00006 | <0.00006 | <0.00006 | 0.00008 | <0.00006 | <0.00006 | <0.00006 | <0.00006 | 0.00007 | <0.00006 | 0.00011 | <0.00006 | <0.0435 | <0.00006 | <0.00006 | <0.00006 |
| Strontium | mg/L | 21 | 0.0131 | 0.0174 | 0.0239 | 0.0392 | 0.0482 | 0.0931 | 0.0335 | 0.056 | 0.016 | 0.0666 | <0.024 | <0.0307 | <0.00258 | <0.0156 | <0.0203 | <0.019 |
| Titanium | mg/L | - | 0.0106 | 0.0100 | 0.0070 | 0.0058 | 0.00038 | 0.00017 | 0.00604 | 0.00359 | 0.01694 | 0.0025 | 0.0734 | 0.00681 | 0.000006 | 0.0111 | 0.0137 | 0.0139 |
| Thallium | mg/L | 0.0008 | 0.000005 | <0.000005 | 0.000006 | 0.000006 | 0.000033 | 0.000018 | 0.000009 | 0.000007 | 0.000009 | 0.000006 | 0.000024 | 0.000009 | 0.000351 | 0.000006 | 0.000006 | 0.000009 |
| Uranium | mg/L | 0.015 | 0.000194 | 0.000250 | 0.000346 | 0.000382 | 0.000129 | 0.000385 | 0.000672 | 0.000327 | 0.000557 | 0.000112 | 0.000479 | 0.000297 | 0.00573 | 0.00037 | 0.000267 | 0.000268 |
| Vanadium | mg/L | 0.12 | 0.0099 | 0.0118 | 0.0096 | 0.0109 | 0.0013 | 0.00287 | 0.01414 | 0.00779 | 0.01797 | 0.00351 | 0.0169 | 0.00413 | - | 0.00943 | 0.0088 | 0.01036 |
| Tungsten | mg/L | - | - | - | - | - | - | - | - | - | - | - | 0.00277 | 0.0128 | - | - | - | - |
| Yttrium | mg/L | - | - | - | - | - | - | - | - | - | - | - | 0.00064 | 0.00011 | - | - | - | - |
| Zinc | mg/L | 0.007 | <0.002 | <0.002 | <0.002 | 0.00200 | <0.002 | <0.002 | 0.003 | <0.002 | <0.002 | 0.004 | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |

**Notes:**
Tier 1 EQS: Nova Scotia Tier 1 Environmental Quality Standards
Nova Scotia Environment (NSE) (2021). Table 3 - Nova Scotia Tier 1 Enviro
Bold italic text indicates a pH outside of the Tier 1 EQS pH range.
Grey shading indicates a concentration above the Tier 1 EQS.
Designations are defined as:
PAG1: NPR < 1 or 1≤ NPR ≤ 2 and total S ≥ 0.2 wt.%
PAG2: 1≤ NPR ≤ 2 and total S < 0.2 wt.%
NPAG: NPR > 2
PAG: Potentially Acid Generating, NPAG: Non-Potentially Acid Generating,

**Appendix C.1: Waste Rock and Ore Static Test Results, Table 4: Quality Assurance/Quality Control Results**

| Sample ID | Rock Type | Ore/Waste | Drillhole | Paste pH | Mod. NP | AP | Net NP | NPR | Sulphur (total) | Sulphate S (HCl) | Sulphide S | Carbon (total) | Carbonate | Inorganic C | Organic C | CaNP | Silver | Arsenic | Aluminum | Barium | Beryllium | Bismuth | Calcium | Cadmium | Cobalt |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | | | | no unit | kg $CaCO_3$/t | kg $CaCO_3$/t | kg $CaCO_3$/t | - | % | % | % | % | % | % | % | kg $CaCO_3$/t | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g |
| GB-2020-98 | argillite | waste | BR-20-191 | 9.04 | 9.8 | 1.25 | 8.55 | 7.84 | 0.020 | <0.04 | <0.04 | 0.055 | 0.250 | 0.050 | - | 4.17 | <1 | 74 | 29000 | 160 | 0.70 | 0.16 | 3000 | 0.10 | 23 |
| GB-2020-116 | argillite | waste | BR-20-191 | 9.16 | 9.6 | 1.25 | 8.35 | 7.68 | 0.055 | <0.04 | <0.04 | 0.081 | 0.275 | 0.055 | - | 4.59 | <1 | 51 | 28000 | 180 | 0.55 | 0.19 | 3600 | 0.02 | 22 |
| **RPD** | | | | 1% | 2% | 0% | 2% | 2% | ***93%*** | 0% | 0% | 38% | 10% | 10% | - | 10% | 0% | 37% | 4% | 12% | 24% | 17% | 18% | ***133%*** | 4% |
| GB-2020-19 | greywacke | waste | BR-18-24 | 9.61 | 11.8 | 1.25 | 10.6 | 9.44 | 0.042 | <0.04 | <0.04 | 0.111 | 0.375 | 0.075 | - | 6.25 | <1 | 78 | 12000 | 83 | 0.27 | 0.09 | 4200 | 0.03 | 7.5 |
| GB-2020-117 | greywacke | waste | BR-18-24 | 9.62 | 8.1 | 1.25 | 6.85 | 6.48 | <0.005 | <0.04 | <0.04 | 0.068 | 0.260 | 0.052 | - | 4.34 | <1 | 24 | 14000 | 90 | 0.23 | <0.09 | 3000 | <0.02 | 9.8 |
| **RPD** | | | | 0% | 37% | 0% | 43% | 37% | ***157%*** | 0% | 0% | 48% | 36% | 36% | - | 36% | 0% | ***106%*** | 15% | 8% | 16% | 0% | 33% | 40% | 27% |
| GB-2020-36 | argillite | waste | BR-18-29 | 9.03 | 9.7 | 1.25 | 8.45 | 7.76 | 0.013 | <0.04 | <0.04 | 0.064 | 0.270 | 0.054 | - | 4.50 | <1 | 310 | 26000 | 160 | 0.93 | 0.14 | 3300 | 0.11 | 18 |
| GB-2020-118 | argillite | waste | BR-18-29 | 9.11 | 8.2 | 1.25 | 6.95 | 6.56 | 0.088 | 0.07 | <0.04 | 0.060 | 0.230 | 0.046 | - | 3.84 | <1 | 1300 | 23000 | 130 | 0.78 | 0.29 | 3200 | 0.08 | 17 |
| **RPD** | | | | 1% | 17% | 0% | 19% | 17% | ***149%*** | ***55%*** | 0% | 6% | 16% | 16% | - | 16% | 0% | ***123%*** | 12% | 21% | 18% | ***70%*** | 3% | 32% | 6% |
| GB-2020-54 | greywacke | waste | BR-18-38 | 9.75 | 7.8 | 1.25 | 6.55 | 6.24 | 0.021 | <0.04 | <0.04 | 0.040 | 0.095 | 0.019 | - | 1.58 | <1 | 95 | 22000 | 160 | 0.23 | <0.09 | 2000 | 0.04 | 16 |
| GB-2020-119 | greywacke | waste | BR-18-38 | 9.69 | 7.7 | 1.25 | 6.45 | 6.16 | 0.029 | <0.04 | <0.04 | 0.048 | 0.130 | 0.026 | - | 2.17 | <1 | 66 | 21000 | 150 | 0.25 | 0.23 | 1900 | 0.16 | 16 |
| **RPD** | | | | 1% | 1% | 0% | 2% | 1% | 32% | 0% | 0% | 18% | 31% | 31% | - | 31% | 0% | 36% | 5% | 6% | 8% | ***88%*** | 5% | ***120%*** | 0% |
| GB-2020-76 | greywacke | waste | BR-18-62 | 9.61 | 8.8 | 3.75 | 5.05 | 2.35 | 0.212 | 0.09 | 0.12 | 0.057 | 0.180 | 0.036 | - | 3.00 | <1 | 1800 | 11000 | 74 | 0.22 | 0.11 | 2700 | 0.22 | 7.7 |
| GB-2020-120 | greywacke | waste | BR-18-62 | 9.51 | 6.3 | 1.25 | 5.05 | 5.04 | 0.095 | 0.08 | <0.04 | 0.049 | 0.200 | 0.040 | - | 3.34 | <1 | 290 | 9900 | 58 | 0.16 | 0.44 | 2200 | 0.29 | 6.5 |
| **RPD** | | | | 1% | 33% | ***100%*** | 0% | ***73%*** | ***76%*** | 12% | ***100%*** | 15% | 11% | 11% | - | 11% | 0% | ***144%*** | 11% | 24% | 32% | ***120%*** | 20% | 27% | 17% |
| GB-LX2021-04 | argillite | waste | BR-18-41 | 8.52 | 8.3 | 1.250 | 7.050 | 6.640 | 0.015 | <0.04 | <0.04 | 0.065 | 0.045 | 0.009 | 0.056 | 0.75 | <0.5 | 63 | 9.4 | 790 | 3 | 0.43 | 1.1 | 0.08 | 17 |
| Dup of -04 | argillite | waste | BR-18-41 | 8.43 | 7.5 | 1.250 | 6.250 | 6.000 | 0.015 | <0.04 | <0.04 | 0.070 | 0.055 | 0.011 | 0.059 | 0.92 | <0.5 | 58 | 6.9 | 710 | 3 | 0.44 | 0.8 | 0.07 | 17 |
| **RPD** | | | | 1% | 10% | 0% | 12% | 10% | 0% | 0% | 0% | 7% | 20% | 20% | 5% | 20% | 0% | 8% | 31% | 11% | 0% | 2% | 32% | 13% | 0% |
| GB-LX2021-27 | greywacke marker unit | waste | BR-18-40 | 9.69 | 15.2 | 3.120 | 12.100 | 4.872 | 0.182 | 0.08 | 0.10 | 0.127 | 0.375 | 0.075 | 0.052 | 6.25 | <0.5 | 760 | 4.8 | 320 | 1.2 | 0.12 | 0.73 | 0.03 | 6 |
| GB-LX2021-36 | greywacke marker unit | waste | BR-18-40 | 9.76 | 12.5 | 2.810 | 9.690 | 4.448 | 0.140 | <0.05 | 0.09 | 0.115 | 0.340 | 0.068 | 0.047 | 5.67 | <0.5 | 960 | 5 | 340 | 1.3 | <0.09 | 0.7 | 0.040 | 6 |
| **RPD** | | | | 1% | 19% | 10% | 22% | 9% | 26% | 46% | 11% | 10% | 10% | 10% | 10% | 10% | 0% | 23% | 4% | 6% | 8% | 29% | 4% | 29% | 0% |

**Notes:**

S: Sulphur, C: Carbon, CaNP: Carbonate Neutralization Potential, Mod. NP: Modified Neutralization Potential, AP: Acid Potential, equal to Total S x 31.25, NPR: Neutralization Potential Ratio.

RPD: Relative Percent Difference.

RPD = |Result A - Result B| / ((Result A + Result B)/2) x 100%.

Bold red italic text indicates an RPD > 50%.

**Appendix C.1: Waste Rock and Ore**

| **Sample ID** | **Rock Type** | **Chromium** | **Copper** | **Iron** | **Potassium** | **Lithium** | **Magnesium** | **Manganese** | **Molybdenum** | **Sodium** | **Nickel** | **Phosphorus** | **Lead** | **Antimony** | **Selenium** | **Tin** | **Strontium** | **Titanium** | **Thallium** | **Uranium** | **Vanadium** | **Yttrium** | **Zinc** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g | µg/g |
| GB-2020-98 | argillite | 64 | 60 | 50000 | 15000 | 51 | 14000 | 700 | 0.2 | 320 | 52 | 630 | 18 | <6 | <0.7 | 0.6 | 19 | 2200 | 0.61 | 0.71 | 56 | 7.4 | 120 |
| GB-2020-116 | argillite | 60 | 48 | 47000 | 17000 | 47 | 13000 | 680 | 0.2 | 350 | 52 | 590 | 7.4 | <6 | <0.7 | 0.6 | 19 | 2200 | 0.68 | 0.67 | 51 | 6.4 | 99 |
| **RPD** | | 6% | 22% | 6% | 13% | 8% | 7% | 3% | 0% | 9% | 0% | 7% | ***83%*** | 0% | 0% | 0% | 0% | 0% | 11% | 6% | 9% | 14% | 19% |
| GB-2020-19 | greywacke | 24 | 38 | 19000 | 7300 | 21 | 5200 | 370 | 0.6 | 780 | 18 | 390 | 5.0 | <6 | <0.7 | <0.5 | 17 | 1300 | 0.35 | 0.54 | 27 | 5.2 | 39 |
| GB-2020-117 | greywacke | 51 | 17 | 22000 | 9100 | 28 | 6200 | 410 | 0.4 | 350 | 23 | 520 | 3.4 | <6 | <0.7 | <0.5 | 15 | 1700 | 0.39 | 0.65 | 31 | 5.9 | 40 |
| **RPD** | | ***72%*** | ***76%*** | 15% | 22% | 29% | 18% | 10% | 40% | ***76%*** | 24% | 29% | 38% | 0% | 0% | 0% | 13% | 27% | 11% | 18% | 14% | 13% | 3% |
| GB-2020-36 | argillite | 41 | 25 | 41000 | 17000 | 49 | 13000 | 660 | 0.3 | 280 | 45 | 700 | 11 | <6 | <0.7 | <0.5 | 38 | 2300 | 0.83 | 1.0 | 43 | 13 | 110 |
| GB-2020-118 | argillite | 60 | 24 | 39000 | 13000 | 50 | 12000 | 650 | 0.6 | 250 | 39 | 670 | 9.2 | <6 | <0.7 | <0.5 | 29 | 1800 | 0.69 | 0.77 | 42 | 13 | 72 |
| **RPD** | | 38% | 4% | 5% | 27% | 2% | 8% | 2% | ***67%*** | 11% | 14% | 4% | 18% | 0% | 0% | 0% | 27% | 24% | 18% | 26% | 2% | 0% | 42% |
| GB-2020-54 | greywacke | 41 | 12 | 35000 | 15000 | 40 | 10000 | 600 | 0.3 | 440 | 38 | 640 | 3.1 | <6 | <0.7 | <0.5 | 14 | 2400 | 0.57 | 0.82 | 43 | 12 | 67 |
| GB-2020-119 | greywacke | 52 | 40 | 34000 | 14000 | 45 | 11000 | 630 | 0.3 | 280 | 38 | 630 | 2.6 | <6 | <0.7 | <0.5 | 14 | 2300 | 0.61 | 0.85 | 43 | 11 | 90 |
| **RPD** | | 24% | ***108%*** | 3% | 7% | 12% | 10% | 5% | 0% | 44% | 0% | 2% | 18% | 0% | 0% | 0% | 0% | 4% | 7% | 4% | 0% | 9% | 29% |
| GB-2020-76 | greywacke | 26 | 19 | 20000 | 7300 | 25 | 5400 | 330 | 0.4 | 690 | 19 | 490 | 5.6 | <6 | <0.7 | <0.5 | 14 | 1300 | 0.28 | 0.61 | 29 | 7.1 | 38 |
| GB-2020-120 | greywacke | 61 | 12 | 17000 | 6600 | 25 | 4900 | 350 | 0.6 | 290 | 17 | 450 | 46 | <6 | <0.7 | <0.5 | 9.8 | 1200 | 0.27 | 0.47 | 25 | 6.1 | 35 |
| **RPD** | | ***80%*** | 45% | 16% | 10% | 0% | 10% | 6% | 40% | ***82%*** | 11% | 9% | ***157%*** | 0% | 0% | 0% | 35% | 8% | 4% | 26% | 15% | 15% | 8% |
| GB-LX2021-04 | argillite | 200 | 39 | 4.4 | 1.6 | 54 | 1.5 | 780 | 2 | 1.4 | 40 | 0.069 | 28 | <0.8 | <0.7 | <6 | 170 | 4000 | 0.75 | 1.8 | 93 | 14 | 93 |
| Dup of -04 | argillite | 180 | 38 | 4.2 | 1.3 | 54 | 1.4 | 730 | 1.8 | 1.3 | 40 | 0.064 | 28 | <0.8 | <0.7 | <6 | 140 | 4000 | 0.71 | 1.5 | 94 | 10 | 91 |
| **RPD** | | 11% | 3% | 5% | 21% | 0% | 7% | 7% | 11% | 7% | 0% | 8% | 0% | 0% | 0% | 0% | 19% | 0% | 5% | 18% | 1% | 33% | 2% |
| GB-LX2021-27 | greywacke marker unit | 18 | 9.9 | 1.9 | 1.4 | 24 | 0.52 | 380 | 0.4 | 1.7 | 15 | 0.049 | 11 | 3.3 | <0.7 | <6 | 120 | 2300 | 0.31 | 1 | 37 | 7.3 | 26 |
| GB-LX2021-36 | greywacke marker unit | 18 | 9 | 1.9 | 1.5 | 25 | 0.52 | 380 | 0.50 | 1.8 | 12 | 0.05 | 11.0 | 2.6 | <0.7 | <6 | 120 | 2400 | 0.32 | 1.1 | 41 | 7.8 | 29 |
| **RPD** | | 0% | 7% | 0% | 7% | 4% | 0% | 0% | 22% | 6% | 22% | 2% | 0% | 24% | 0% | 0% | 0% | 4% | 3% | 10% | 10% | 7% | 11% |

**Notes:**

S: Sulphur, C: Carbon, CaNP: Carbonate Neutralization Potential, Mod. NP: Modified Neutralization Potential, AP: Acid Potential, equal to Total S x 31.25, NPR: Neutralization Potential Ratio.

RPD: Relative Percent Difference.

RPD = |Result A - Result B| / ((Result A + Result B)/2) x 100%.

Bold red italic text indicates an RPD > 50%.

**Appendix C.2: Tailings Static Test Results, Table 1: Acid Base Accouting Results**

| Sample ID | Paste pH | $CO_2$ | TIC | CaNP | Total S | Sulphate S | Sulphide S | TAP | Mod. NP | Corrected Mod. NP | CaNP/TAP | Corrected Mod. NP/TAP | Operational NPR | Fizz Rating | NAG pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | - | wt% | wt% | kg $CaCO_3$/t | wt% | wt% | wt% | kg $CaCO_3$/t | kg $CaCO_3$/t | kg $CaCO_3$/t | - | - | - | - | - |
| 2020 Master Composite (CN-Detox) | 8.38 | 0.11 | - | 2.50 | 0.41 | 0.04 | 0.37 | 12.8 | 8.50 | 3.50 | 0.2 | 0.3 | 0.3 | NONE | - |
| 2021 Master Composite (CN-Detox) | 8.43 | - | 0.09 | 7.50 | 0.22 | <0.01 | 0.22 | 6.8 | 11.10 | 6.10 | 1.1 | 0.9 | 1.1 | NONE | 5.90 |
| BP1 | 8.83 | 0.17 | - | 3.86 | 0.57 | - | - | 17.8 | 9.80 | 4.80 | 0.2 | 0.3 | 0.3 | SLIGHT | 2.97 |
| BP2 | 8.81 | 0.14 | - | 3.18 | 0.22 | - | - | 6.9 | 8.30 | 3.30 | 0.5 | 0.5 | 0.5 | SLIGHT | 4.90 |
| BP3 | 8.63 | 0.17 | - | 3.86 | 0.29 | - | - | 9.1 | 9.30 | 4.30 | 0.4 | 0.5 | 0.5 | SLIGHT | 4.16 |
| LGHP1 | 8.86 | 0.15 | - | 3.41 | 0.24 | - | - | 7.5 | 9.50 | 4.50 | 0.5 | 0.6 | 0.6 | SLIGHT | 4.18 |
| LGHP2 | 8.73 | 0.11 | - | 2.50 | 0.16 | - | - | 5.0 | 8.00 | 3.00 | 0.5 | 0.6 | 0.6 | SLIGHT | 5.87 |
| LGHP3 | 8.70 | 0.17 | - | 3.86 | 0.31 | - | - | 9.7 | 10.00 | 5.00 | 0.4 | 0.5 | 0.5 | SLIGHT | 5.85 |

**Notes:**

S: Sulphur, C: Carbon, $CO_2$: Carbone dioxide, TIC: Total Inorganic Carbon

CaNP: Carbonate Neutralization Potential, Mod. NP: Modified Neutralization Potential, TAP: Total Acid Potential, equal to Total S x 31.25, NPR: Neutralization Potential Ratio, NAG: Net Acid Generation

Corrected Modified NP is calculated as Modified NP - 5 kg$CaCO_3$/t

Operational NPR is the higher of the NPR calculated as CaNP/TAP and Corrected Modified NP/TAP

Light grey shading indicates an NPR value between 1 and 2

Dark grey shading indicates an NPR value below 1

**Appendix C.2: Tailings Static Test Results, Table 2: Solid Phase Metals Results**

| Sample ID | Ag | Al | As | Au | B | Ba | Be | Bi | Ca | Cd | Ce | Co | Cr | Cs | Cu | Fe | Ga | Ge | Hf | Hg | In | K | Ti | Tl | U | V | W | Y | Yb | Zn | Zr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | ppm | % | ppm | ppb | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | ppm | % | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| *AUCCA (Rudnick and Gao, 2014)* | *0.053* | *8.15* | *4.8* | - | - | *628* | *2.1* | *0.16* | *2.57* | *0.09* | *63* | *17.3* | *92* | *4.9* | *28* | *3.92* | *17.5* | *1.4* | *5.3* | *0.05* | *0.056* | *2.32* | *0.384* | *0.9* | *2.7* | *97* | *1.9* | *21* | *2* | *67* | *193* |
| 2020 Master Composite (CN-Detox) | 0.3 | 1.50 | 5040 | 159 | <20 | 95 | - | 0.4 | 0.33 | 0.4 | - | 12.5 | 208 | - | 74.3 | 3.12 | 5 | - | - | 0.03 | - | 0.90 | 0.123 | 0.3 | 0.7 | 33 | 3.6 | - | - | 128 | - |
| 2021 Master Composite (CN-Detox) | 0.36 | 1.76 | 1589 | - | - | 108 | 0.60 | 0.40 | 0.50 | 0.24 | 41.88 | 9.1 | 45 | 3.33 | 247 | 3.4 | 6.4 | 0.20 | 0.72 | 0.75 | 0.02 | 0.99 | 0.15 | 0.41 | 1.02 | 35 | 0.8 | 9.98 | 0.9 | 128 | 25.2 |
| BP1 | 0.20 | 1.56 | 8080 | 303 | <20 | 94 | - | 0.50 | 0.42 | 0.50 | - | 14.1 | 204 | - | 36.1 | 3.3 | 5 | - | - | 0.01 | - | 0.93 | 0.135 | 0.4 | 0.8 | 33 | 2.6 | - | - | 110 | - |
| BP2 | <0.1 | 1.88 | 1440 | 36.6 | <20 | 124 | - | 0.20 | 0.36 | 0.10 | - | 14.9 | 177 | - | 41 | 3.48 | 7 | - | - | 0.01 | - | 1.03 | 0.164 | 0.4 | 0.8 | 40 | 0.9 | - | - | 95 | - |
| BP3 | <0.1 | 1.73 | 2020 | 15.5 | <20 | 97 | - | 0.40 | 0.42 | 0.20 | - | 13.8 | 185 | - | 40.7 | 3.31 | 6 | - | - | 0.01 | - | 0.96 | 0.15 | 0.4 | 0.8 | 35 | 0.7 | - | - | 97 | - |
| LGHP1 | <0.1 | 1.74 | 2050 | 11.3 | <20 | 105 | - | 0.30 | 0.42 | 0.20 | - | 12 | 194 | - | 36.7 | 3.24 | 6 | - | - | <0.01 | - | 1.00 | 0.156 | 0.4 | 0.8 | 37 | 1.7 | - | - | 109 | - |
| LGHP2 | <0.1 | 2.12 | 953 | 6.2 | <20 | 161 | - | 0.30 | 0.33 | 0.50 | - | 15.6 | 169 | - | 35.8 | 3.65 | 8 | - | - | 0.03 | - | 1.33 | 0.183 | 0.5 | 0.9 | 45 | 1 | - | - | 84 | - |
| LGHP3 | <0.1 | 1.62 | 2800 | 61.7 | <20 | 85 | - | 0.30 | 0.50 | 0.10 | - | 13.7 | 171 | - | 33.6 | 3.18 | 6 | - | - | 0.02 | - | 0.83 | 0.124 | 0.3 | 0.7 | 32 | 0.7 | - | - | 107 | - |

| Sample ID | La | Li | Lu | Mg | Mn | Mo | Na | Nb | Ni | P | Pb | Rb | S | Sb | Sc | Se | Sn | Sr | Ta | Tb | Te | Th |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | ppm | ppm | ppm | % | ppm | ppm | % | ppm | ppm | % | ppm | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| *AUCCA (Rudnick and Gao, 2014)* | *31* | *24* | *0.31* | *1.5* | *774* | *1.1* | *2.43* | *12* | *47* | *0.0655* | *17* | *84* | - | *0.4* | *14* | *0.09* | *2.1* | *320* | *0.9* | *0.9* | - | *10.5* |
| 2020 Master Composite (CN-Detox) | 19 | - | - | 0.87 | 505 | 7.0 | 0.030 | - | 105 | 0.064 | 40.3 | - | 0.39 | 3.7 | 3.5 | <0.5 | - | 18 | - | - | <0.2 | 7.0 |
| 2021 Master Composite (CN-Detox) | 21.2 | 36.00 | 0.14 | 0.99 | 565 | 0.81 | 0.03 | 1.02 | 27 | 0.06 | 35.6 | 67.20 | 0.23 | 3.37 | 4.00 | <1 | 0.70 | 21.8 | <0.05 | 0.41 | 0.14 | 6.6 |
| BP1 | 19 | - | - | 0.94 | 557 | 6.90 | 0.01 | - | 123 | 0.06 | 31.6 | - | 0.52 | 4.80 | 3.30 | <0.5 | - | 18 | - | - | 0.30 | 6.9 |
| BP2 | 20 | - | - | 1.10 | 598 | 5.70 | 0.01 | - | 109 | 0.07 | 18.9 | - | 0.22 | 0.70 | 4.10 | <0.5 | - | 18 | - | - | <0.2 | 7.2 |
| BP3 | 23 | - | - | 1.01 | 576 | 5.80 | 0.01 | - | 110 | 0.07 | 26.4 | - | 0.29 | 1.40 | 3.60 | <0.5 | - | 21 | - | - | <0.2 | 6.7 |
| LGHP1 | 22 | - | - | 1.03 | 611 | 5.90 | 0.01 | - | 113 | 0.07 | 55.1 | - | 0.26 | 1.00 | 3.70 | <0.5 | - | 18 | - | - | <0.2 | 6.9 |
| LGHP2 | 22 | - | - | 1.20 | 642 | 5.00 | 0.02 | - | 98.8 | 0.07 | 11.8 | - | 0.16 | 0.50 | 5.10 | <0.5 | - | 17 | - | - | <0.2 | 8 |
| LGHP3 | 21 | - | - | 0.96 | 593 | 6.40 | 0.01 | - | 99.5 | 0.07 | 34.4 | - | 0.31 | 2.20 | 3.30 | <0.5 | - | 20 | - | - | <0.2 | 6.3 |

**Notes:**
AUCCA - Average Upper Continental Crustal Abundance
Rudnick, R.L. and S. Gao (2014). Composition of the Continental Crust. In: Holland, H. and Turekian, K. (eds). Treatise on Geochemistry 2nd Edition, Vol. 4, pp. 1-51. Oxford, UK, Elsevier Ltd.
Light grey shading indicates a value greater than 3x the AUCCA
Dark grey shading indicates a value greater than 10x the AUCCA

**Appendix C.2: Tailings Static Test Results, Table 3: Shake Flask Extraction Results**

| Sample ID | Units | Tier 1 EQS | 2020 Master Composite (CN-Detox) | 2021 Master Composite (CN-Detox) | BP1+BP2 COMPOSITE | LGHP 1 + LGHP 2 COMPOSITE |
|---|---|---|---|---|---|---|
| pH | pH Units | 6.5-9.0 | 8.9 | 8.25 | ***9.2*** | ***9.3*** |
| Conductivity | µS/cm | - | 173 | 249.3 | 87 | 76 |
| Sulphate | mg/L | 128 | 44 | 56.2 | 12 | 11 |
| Br | mg/L | - | - | < 0.3 | - | - |
| Cl | mg/L | - | - | 7 | - | - |
| F | mg/L | - | - | 0.47 | - | - |
| Acidity to pH4.5 | mg/L | - | <0.5 | 0 | <0.5 | <0.5 |
| Acidity to pH8.3 | mg/L | - | <0.5 | 1.58 | 0.70 | <0.5 |
| Total Alkalinity | mg/L | - | 27 | 46.68 | 22 | 18 |
| Bicarbonate | mg/L | - | 33 | - | 26 | 22 |
| Carbonate | mg/L | - | <0.5 | - | <0.5 | <0.5 |
| Hydroxide | mg/L | - | <0.5 | - | <0.5 | <0.5 |
| Nitrate | mg/L | 13 | <0.2 | < 0.06 | - | - |
| Nitrite | mg/L | 0.06 | 0.090 | < 0.03 | - | - |
| Total Ammonia | mg/L | 5.7 | 0.65 | 0.5 | - | - |
| DOC | mg/L | - | - | 3 | - | - |
| Phosphorus (total reactive) | mg/L | - | - | 0.07 | - | - |
| Free Cyanide | µg/L | 5 | 4.1 | - | - | - |
| SAD Cyanide | mg/L | - | 1.8 | - | - | - |
| WAD Cyanide | mg/L | - | 0.0074 | - | - | - |
| Hardness $CaCO_3$ | mg/L | - | 21 | 75.3 | 27 | 23 |
| Al | mg/L | 0.005 | 0.44 | 0.16 | 0.40 | 0.47 |
| Sb | mg/L | 0.009 | 0.0076 | 0.0073 | 0.0048 | 0.0029 |
| As | mg/L | 0.005 | 1.8 | 0.375 | 2.2 | 0.88 |
| Ba | mg/L | 1 | 0.0018 | 0.00927 | 0.0015 | 0.0016 |
| Be | mg/L | 0.00015 | <0.000050 | < 0.000007 | <0.000050 | <0.000020 |
| Bi | mg/L | - | <0.000025 | < 0.00001 | <0.000025 | <0.000010 |
| B | mg/L | 1.5 | <0.25 | 0.016 | <0.25 | <0.10 |
| Cs | mg/L | - | <0.00025 | - | <0.00025 | <0.00010 |
| Cd | mg/L | 0.00009 | <0.000025 | 0.000011 | <0.000025 | <0.000010 |
| Ca | mg/L | - | 8.1 | 26.8 | 11 | 9.1 |
| Cr | mg/L | 0.001 | <0.00050 | 0.0002 | <0.00050 | 0.00040 |
| Co | mg/L | 0.001 | 0.0020 | 0.000712 | 0.00075 | 0.00053 |
| Cu | mg/L | 0.002 | 0.0071 | 0.0032 | <0.00025 | 0.00035 |
| La | mg/L | - | <0.00025 | - | <0.00025 | 0.00011 |
| Fe | mg/L | 0.3 | 0.59 | 0.013 | 0.050 | 0.074 |
| Pb | mg/L | 0.001 | 0.00051 | 0.00013 | 0.00018 | 0.00045 |
| Li | mg/L | - | 0.0035 | 0.0149 | 0.0040 | 0.0047 |
| Mg | mg/L | - | 0.26 | 2.02 | <0.25 | 0.15 |
| Mn | mg/L | 0.43 | 0.0036 | 0.0116 | 0.0010 | 0.0015 |
| P | mg/L | - | 0.015 | 0.007 | 0.070 | 0.046 |
| Mo | mg/L | 0.073 | 0.00095 | 0.0057 | 0.0012 | 0.00083 |
| Ni | mg/L | 0.025 | 0.00057 | 0.0003 | 0.00030 | 0.00022 |
| K | mg/L | - | 4.6 | 9.59 | 3.5 | 3.5 |
| Rb | mg/L | - | 0.0016 | - | 0.0039 | 0.0034 |
| Se | mg/L | 0.001 | <0.00020 | 0.00028 | <0.00020 | 0.00020 |
| Si | mg/L | - | 1.5 | 1.78 | 2.2 | 2.1 |
| Ag | mg/L | 0.00025 | <0.000025 | < 0.00005 | <0.000025 | 0.000040 |
| Na | mg/L | - | 19 | 12.8 | 2.2 | 2.1 |
| Sr | mg/L | 21 | 0.048 | 0.172 | 0.067 | 0.052 |
| S | mg/L | - | <50 | 25 | <50 | <20 |
| Te | mg/L | - | <0.00010 | - | <0.00010 | <0.000040 |
| Tl | mg/L | 0.0008 | <0.000010 | 0.00003 | <0.000010 | 0.000013 |
| Th | mg/L | - | <0.000025 | - | <0.000025 | <0.000010 |
| Sn | mg/L | - | <0.0010 | < 0.00006 | <0.0010 | <0.00040 |
| Ti | mg/L | - | <0.0025 | 0.00006 | <0.0025 | 0.0023 |
| W | mg/L | - | 0.00078 | - | 0.00072 | 0.00079 |
| U | mg/L | 0.015 | 0.00015 | 0.000206 | 0.00019 | 0.00018 |
| V | mg/L | 0.12 | 0.0010 | 0.00091 | 0.0018 | 0.0020 |
| Zn | mg/L | 0.007 | 0.0022 | < 0.002 | <0.00050 | 0.00045 |
| Zr | mg/L | - | <0.00050 | < 0.002 | <0.00050 | <0.00020 |
| Hg | mg/L | 0.000026 | <0.00025 | <0.00001 | <0.00025 | <0.00010 |

**Notes:**

DOC: Dissolved Organic Carbon, SAD: Stong Acid Dissociable, WAD: Weak Acid Dissociable

Tier 1 EQS: Nova Scotia Tier 1 Environmental Quality Standards

Nova Scotia Environment (NSE) (2021). Table 3 - Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (µg/L). In Notification of Contamination Protocol. Revised September 30, 2021

Bold italic text indicates a pH outside of the Tier 1 EQS pH range.

Grey shading indicates a concentration above the Tier 1 EQS.

**Appendix C.3: Historical Tailings Static Test Results, Table 1: Acid Base Accouting Results**

| Sample ID | Paste pH | Total S | Sulphate S | Sulphide S (by difference) | TAP | SAP | Mod. NP | Net NP | NPR | Fizz Rating |
|---|---|---|---|---|---|---|---|---|---|---|
| **Units** | **pH Units** | **wt%** | **wt%** | **wt%** | **kg $CaCO_3$/t** | **kg $CaCO_3$/t** | **kg $CaCO_3$/t** | **kg $CaCO_3$/t** | **-** | **-** |
| ANX-A3B | 5.18 | 0.27 | 0.05 | 0.22 | 8.44 | 6.9 | -6.90 | -13.8 | -0.82 | NONE |
| ANX-A2A-M | 5.29 | 0.27 | 0.08 | 0.19 | 8.44 | 5.9 | -5.40 | -11.3 | -0.64 | NONE |
| ANX-D4A-M | 4.26 | 0.47 | 0.13 | 0.34 | 14.7 | 10.6 | -5.30 | -15.9 | -0.36 | NONE |
| ANX-D8A-M | 6.44 | 0.02 | 0.06 | <0.02 | 0.63 | <0.6 | 2.70 | 2.70 | 4.32 | NONE |
| ANX-D3A-M | 4.76 | 0.31 | 0.07 | 0.24 | 9.69 | 7.5 | -2.00 | -9.50 | -0.21 | NONE |
| ANX-D5A-M | 4.68 | 0.48 | 0.04 | 0.44 | 15.0 | 13.8 | -2.00 | -15.8 | -0.13 | NONE |

**Notes:**

TAP: Total Acid Potential, equal to Total S x 31.25, SAP: Sulphide Acid Potential, equal to Sulphide S x 31.25; Mod. NP: Modified Neutralization Potential

NPR: Net Potential Ratio (Mod. NP/TAP)

**Appendix C.3: Historical Tailings Static Test Results, Table 2: Shake Flask Extraction Results**

| Sample ID | Units | Tier 1 EQS | ANX-D4A-M | ANX-D8A-M | ANX-D3A-M | ANX-D5A-M |
|---|---|---|---|---|---|---|
| Sample Weight | g | n/a | 101 | 100 | 100 | 99.43 |
| Volume Used | ml | n/a | 300 | 300 | 300 | 300 |
| pH | pH Units | 6.5 - 9.0 | ***3.64*** | ***5.84*** | ***4.23*** | ***4.21*** |
| Conductivity | µS/cm | - | 662 | 40 | 277 | 258 |
| Sulphate | mg/L | 128 | 332 | 8 | 111 | 95 |
| Total Alkalinity | mg/L | - | <0.5 | 0.6 | <0.5 | <0.5 |
| Bicarbonate | mg/L | - | <0.5 | 0.7 | <0.5 | <0.5 |
| Carbonate | mg/L | - | <0.5 | <0.5 | <0.5 | <0.5 |
| Hydroxide | mg/L | - | <0.5 | <0.5 | <0.5 | <0.5 |
| Fluoride | mg/L | 0.12 | 0.11 | 0.06 | 0.11 | 0.13 |
| Dissolved Chloride | mg/L | 120 | 2.2 | 2.4 | 1.1 | 2.3 |
| Nitrate-N | mg/L | 5.7 | <0.2 | <0.2 | <0.2 | <0.2 |
| Nitrite-N | mg/L | 13 | <0.05 | <0.05 | <0.05 | <0.05 |
| Dissolved Organic Carbon | mg/L | 0.06 | 7.2 | 20 | 11 | 29 |
| Total Dissolved Phosphorus (P) | mg/L | - | 1.1 | 0.13 | 0.55 | 1.2 |
| Ammonia (N) | mg/L | - | 0.71 | 0.94 | 0.56 | 1 |
| Bromide (Br) | mg/L | - | 0.043 | - | 0.026 | 0.087 |
| Hardness $CaCO_3$ | mg/L | - | 47.7 | 1.99 | 33.9 | 43.4 |
| Dissolved Aluminum (Al) | mg/L | 0.005 | 15.7 | 0.38 | 0.67 | 1.43 |
| Dissolved Antimony (Sb) | mg/L | 0.009 | 0.0056 | 0.00366 | 0.00691 | 0.0201 |
| Dissolved Arsenic (As) | mg/L | 0.005 | 16.8 | 1.38 | 7.83 | 15.7 |
| Dissolved Barium (Ba) | mg/L | 1 | <0.0004 | 0.00233 | 0.0917 | 0.0802 |
| Dissolved Beryllium (Be) | mg/L | 0.00015 | 0.00399 | 0.000048 | 0.00073 | 0.0009 |
| Dissolved Bismuth (Bi) | mg/L | - | <0.0001 | 0.000035 | <0.00005 | <0.0001 |
| Dissolved Boron (B) | mg/L | 1.5 | <1 | <0.1 | <0.5 | <1 |
| Dissolved Cesium (Cs) | mg/L | - | <0.001 | 0.00017 | 0.00069 | 0.0012 |
| Dissolved Cadmium (Cd) | mg/L | 0.00009 | 0.0113 | 0.000046 | 0.00363 | 0.00359 |
| Dissolved Calcium (Ca) | mg/L | - | 13 | 0.51 | 10.6 | 11.1 |
| Dissolved Chromium (Cr) | mg/L | 0.001 | 0.0048 | 0.00109 | <0.001 | 0.0022 |
| Dissolved Cobalt (Co) | mg/L | 0.001 | 1.12 | 0.000788 | 0.283 | 0.321 |
| Dissolved Copper (Cu) | mg/L | 0.002 | 0.292 | 0.00737 | 0.0121 | 0.0108 |
| Dissolved Lanthanum (La) | mg/L | - | 0.12 | 0.00125 | 0.0037 | 0.0032 |
| Dissolved Iron (Fe) | mg/L | 0.3 | 79.2 | 0.481 | 24.1 | 12.8 |
| Dissolved Lead (Pb) | mg/L | 0.001 | 0.00729 | 0.00233 | 0.00559 | 0.019 |
| Dissolved Lithium (Li) | mg/L | - | 0.036 | <0.001 | 0.0174 | 0.014 |
| Dissolved Magnesium (Mg) | mg/L | - | 3.7 | 0.18 | 1.79 | 3.8 |
| Dissolved Manganese (Mn) | mg/L | 0.43 | 1.38 | 0.0293 | 1.18 | 0.801 |
| Dissolved Phosphorus (P) | mg/L | - | 0.076 | 0.0509 | 0.059 | 0.09 |
| Dissolved Molybdenum (Mo) | mg/L | 0.073 | <0.001 | 0.00059 | <0.0005 | <0.001 |
| Dissolved Nickel (Ni) | mg/L | 0.025 | 1.95 | 0.00264 | 0.512 | 0.482 |
| Dissolved Potassium (K) | mg/L | - | 3.4 | 2.83 | 3.83 | 3.4 |
| Dissolved Rubidium (Rb) | mg/L | - | 0.0101 | 0.0127 | 0.0394 | 0.0245 |
| Dissolved Selenium (Se) | mg/L | 0.001 | 0.00107 | 0.000274 | <0.0004 | <0.0008 |
| Dissolved Silicon (Si) | mg/L | - | 6.3 | 2.48 | 5 | 3.2 |
| Dissolved Silver (Ag) | mg/L | 0.00025 | <0.0001 | 0.000018 | <0.00005 | <0.0001 |
| Dissolved Sodium (Na) | mg/L | - | 7.2 | 3.61 | 2.47 | 3.9 |
| Dissolved Strontium (Sr) | mg/L | 21 | 0.12 | 0.00549 | 0.153 | 0.0922 |
| Dissolved Sulphur (S) | mg/L | - | <200 | <20 | <100 | <200 |
| Dissolved Tellurium (Te) | mg/L | - | 0.00045 | 0.000046 | <0.0002 | <0.0004 |
| Dissolved Thallium (Tl) | mg/L | 0.0008 | <0.00004 | 0.0000374 | 0.000296 | 0.000669 |
| Dissolved Thorium (Th) | mg/L | - | 0.00063 | 0.000894 | 0.000066 | <0.0001 |
| Dissolved Tin (Sn) | mg/L | - | <0.004 | <0.0004 | <0.002 | <0.004 |
| Dissolved Titanium (Ti) | mg/L | - | <0.01 | 0.01 | <0.005 | <0.01 |
| Dissolved Tungsten (W) | mg/L | - | <0.0002 | 0.000098 | <0.0001 | <0.0002 |
| Dissolved Uranium (U) | mg/L | 0.015 | 0.000331 | 0.000112 | 0.00002 | <0.00004 |
| Dissolved Vanadium (V) | mg/L | 0.12 | <0.004 | 0.00136 | <0.002 | <0.004 |
| Dissolved Zinc (Zn) | mg/L | 0.007 | 4.76 | 0.0042 | 1.65 | 1.84 |
| Dissolved Zirconium (Zr) | mg/L | - | <0.002 | 0.00079 | <0.001 | <0.002 |
| Dissolved Mercury (Hg) | mg/L | 0.000026 | <0.001 | 0.0001 | <0.0005 | <0.001 |
| | | | | | | |
| Anion Sum | n/a | n/a | 6.98 | 0.25 | 2.35 | 2.05 |
| Cation Sum | n/a | n/a | 6.37 | 0.33 | 1.97 | 1.89 |
| Balance % | n/a | n/a | -4.60 | 14.20 | -8.78 | -4.08 |

**Notes:**
Tier 1 EQS: Nova Scotia Tier 1 Environmental Quality Standards
Nova Scotia Environment (NSE) (2021). Table 3 - Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (µg/L). In Notification of Contamination Protocol. Revised September 30, 2021.
Bold italic text indicates a pH outside of the Tier 1 EQS pH range.
Grey shading indicates a concentration above the Tier 1 EQS.
n/a: not applicable

**Appendix C.4: Overburden Static Test Results, Table 1: Acid Base Accounting Results**

| **Sample ID** | **Material** | **Easting** | **Northing** | **Location** | **Paste pH** | **TIC** | **CaNP** | **Total C** | **Total S** | **Sulphate S** | **Sulphide S** | **SAP** | **Modified NP** | **NPR** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | | | | | | % | kg $CaCO_3$/t | % | % | % | % | kg $CaCO_3$/t | kg $CaCO_3$/t | - |
| LXGB-EGOVB-2021-01S | Soil | 294226 | 5006977 | East Pit | 4.53 | <0.01 | <0.8 | 17.368 | 0.137 | 0.03 | 0.11 | 3.3 | -19.3 | -5.8 |
| LXGB-EGOVB-2021-02S | Soil | 294441 | 5006810 | East Pit | 3.44 | <0.01 | <0.8 | 49.65 | 0.224 | 0.05 | 0.17 | 5.4 | -61.7 | -11.4 |
| LXGB-EGOVB-2021-03S | Soil | 294524 | 5006675 | East Pit | 3.83 | <0.01 | <0.8 | 35.75 | 0.168 | 0.04 | 0.13 | 4.0 | -34.0 | -8.5 |
| LXGB-EGOVB-2021-04S | Soil | 294726 | 5006718 | East Pit | 3.32 | <0.01 | <0.8 | 57.95 | 0.241 | 0.05 | 0.19 | 6.0 | -66.7 | -11.2 |
| LXGB-2021-TMFOB-01s | Soil | 294739 | 5009047 | TMF | 3.18 | <0.01 | <0.8 | >30.000 | 0.041 | 0.05 | <0.01 | 0.3 | -54.9 | -175.6 |
| LXGB-2021-TMFOB-02s | Soil | 295280 | 5008849 | TMF | 3.72 | <0.01 | <0.8 | >30.000 | 0.058 | 0.05 | <0.01 | 0.3 | -35.2 | -112.5 |
| LXGB-2021-TMFOB-03s | Soil | 294931 | 5008502 | TMF | 3.21 | <0.01 | <0.8 | >30.000 | 0.058 | 0.05 | <0.01 | 0.3 | -52.7 | -168.8 |
| TP21-137S | Soil | 295524 | 5008462 | TMF | 4.49 | <0.01 | <0.8 | 0.281 | 0.020 | <0.01 | <0.01 | 0.3 | -28.7 | -91.8 |
| LXGB-WGOVB-2021-01S | Soil | 293256 | 5007096 | West Pit | 3.56 | <0.01 | <0.8 | 44.4 | 0.244 | 0.07 | 0.17 | 5.4 | -49.0 | -9.0 |
| LXGB-WGOVB-2021-02S | Soil | 293485 | 5007017 | West Pit | 4.43 | <0.01 | <0.8 | 5.727 | 0.058 | 0.02 | 0.04 | 1.2 | -6.1 | -5.1 |
| LXGB-WGOVB-2021-03S | Soil | 293542 | 5007139 | West Pit | 5.72 | 0.01 | 0.8 | 4.532 | 0.056 | 0.03 | 0.03 | 0.8 | -10.6 | -13.0 |
| LXGB-WGOVB-2021-04S | Soil | 293817 | 5007086 | West Pit | 3.51 | <0.01 | <0.8 | 50.38 | 0.231 | 0.06 | 0.17 | 5.3 | -50.2 | -9.4 |
| LXGB-EGOVB-2021-01T | Till | 294226 | 5006977 | East Pit | 5.25 | <0.01 | <0.8 | 4.018 | 0.037 | 0.01 | 0.03 | 0.8 | -8.3 | -9.8 |
| LXGB-EGOVB-2021-02T | Till | 294441 | 5006810 | East Pit | 5.32 | <0.01 | <0.8 | 2.649 | 0.034 | 0.01 | 0.02 | 0.8 | -5.1 | -6.8 |
| LXGB-EGOVB-2021-03T | Till | 294524 | 5006675 | East Pit | 5.46 | 0.01 | 0.8 | 2.79 | 0.034 | 0.02 | 0.01 | 0.4 | -11.3 | -25.9 |
| LXGB-EGOVB-2021-04T | Till | 294726 | 5006718 | East Pit | 5.25 | <0.01 | <0.8 | 2.232 | 0.033 | <0.01 | <0.01 | 0.3 | -5.2 | -16.8 |
| TP21-A09T | Till | 293125 | 5008255 | NW WRSA | 7.17 | <0.01 | <0.8 | 0.096 | 0.011 | <0.01 | <0.01 | 0.3 | 1.7 | 5.6 |
| GBLX-Portal-OB | Till | N/A | N/A | Portal | 5.96 | <0.01 | <0.8 | 0.594 | 0.017 | <0.01 | <0.01 | 0.3 | 0.6 | 2.0 |
| LXGB-2021-TMFOB-01t | Till | 294739 | 5009047 | TMF | 5.03 | <0.01 | <0.8 | 2.540 | <0.005 | 0.01 | <0.01 | 0.3 | -4.6 | -14.8 |
| LXGB-2021-TMFOB-02t | Till | 295280 | 5008849 | TMF | 5.04 | <0.01 | <0.8 | 1.808 | 0.006 | <0.01 | <0.01 | 0.3 | -3.9 | -12.4 |
| LXGB-2021-TMFOB-03t | Till | 294931 | 5008502 | TMF | 4.83 | <0.01 | <0.8 | 2.125 | 0.009 | 0.01 | <0.01 | 0.3 | -5.4 | -17.2 |
| TMF Till composite | Till | N/A | N/A | TMF | 5.09 | <0.01 | <0.8 | 2.111 | 0.029 | 0.01 | 0.02 | 0.6 | -4.8 | -8.1 |
| TP21-131T | Till | 294882 | 5008243 | TMF | 6.86 | <0.01 | <0.8 | 0.163 | 0.017 | <0.01 | <0.01 | 0.3 | 1.1 | 3.6 |
| TP21-137T | Till | 295524 | 5008462 | TMF | 6.86 | <0.01 | <0.8 | 21.496 | 0.341 | 0.05 | 0.29 | 9.1 | 0.9 | 0.1 |
| LXGB-WGOVB-2021-01T | Till | 293256 | 5007096 | West Pit | 5.18 | 0.01 | 0.8 | 4.554 | 0.047 | 0.02 | 0.03 | 0.8 | -13.2 | -15.7 |
| LXGB-WGOVB-2021-02T | Till | 293485 | 5007017 | West Pit | 4.78 | <0.01 | <0.8 | 2.904 | 0.039 | 0.01 | 0.03 | 0.9 | -3.9 | -4.3 |
| LXGB-WGOVB-2021-03T | Till | 293542 | 5007139 | West Pit | 5.66 | 0.01 | 0.8 | 2.398 | 0.039 | 0.03 | 0.01 | 0.3 | -10.8 | -38.6 |
| LXGB-WGOVB-2021-04T | Till | 293817 | 5007086 | West Pit | 5.12 | 0.02 | 1.7 | 5.242 | 0.069 | 0.03 | 0.04 | 1.2 | -18.7 | -15.3 |

**Notes:**
S: Sulphur, C: Carbon, TIC: Total Inorganic Carbon
CaNP: Carbonate Neutralization Potential, Modified NP: Modified Neutralization Potential, SAP: Sulphide Acid Potential, equal to Sulphide S x 31.25, NPR: Neutralization Potential Ratio
NPR is calculated as Modified NP/SAP
Light grey shading indicates an NPR value between 1 and 2
Dark grey shading indicates an NPR value below 1

**Appendix C.4: Overburden Static Test Results, Table 2: Solid Phase Metals Results**

| **Sample ID** | **Material** | **Easting** | **Northing** | **Location** | **Ag** | **Al** | **As** | **Ba** | **Be** | **Bi** | **Ca** | **Cd** | **Ce** | **Co** | **Cr** | **Cs** | **Cu** | **Fe** | **Ga** | **Ge** | **Hf** | **Hg** | **In** | **K** | **La** | **Li** | **Lu** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | | | | | mg/kg | % | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm |
| *AUCCA (Rudnick and Gao, 2014)* | | | | | *0.053* | *8.15* | *4.8* | *628* | *2.1* | *0.16* | *2.57* | *0.09* | *63* | *17.3* | *92* | *4.9* | *28* | *3.92* | *17.5* | *1.4* | *5.3* | *0.05* | *0.056* | *2.32* | *31* | *24* | *0.31* |
| LXGB-EGOVB-2021-01S | Soil | 294226 | 5006977 | East Pit | 0.10 | 0.62 | 21 | 28 | <0.1 | 0.13 | 0.09 | 0.18 | 17.83 | 1.3 | 10 | 0.82 | 4.5 | 1.46 | 3.8 | <0.1 | <0.05 | 0.13 | <0.02 | 0.07 | 8.6 | 4 | 0.02 |
| LXGB-EGOVB-2021-02S | Soil | 294441 | 5006810 | East Pit | 0.09 | 0.14 | 14 | 21 | <0.1 | 0.05 | 0.23 | 0.35 | 3.94 | 0.5 | 1 | 0.25 | 6.1 | 0.27 | 0.7 | <0.1 | <0.05 | 0.18 | <0.02 | 0.03 | 2 | <1 | <0.01 |
| LXGB-EGOVB-2021-03S | Soil | 294524 | 5006675 | East Pit | 0.13 | 0.26 | 7 | 45 | <0.1 | 0.11 | 0.31 | 0.31 | 8.63 | 0.6 | 4 | 0.56 | 5.3 | 0.49 | 1.1 | <0.1 | <0.05 | 0.24 | <0.02 | 0.05 | 4.4 | 2 | <0.01 |
| LXGB-EGOVB-2021-04S | Soil | 294726 | 5006718 | East Pit | 0.11 | 0.13 | 6 | 14 | <0.1 | 0.13 | 0.09 | 0.29 | 1.77 | 0.6 | 1 | 0.14 | 7.2 | 0.11 | 0.5 | <0.1 | <0.05 | 0.17 | <0.02 | 0.03 | 0.9 | <1 | <0.01 |
| LXGB-2021-TMFOB-01s | Soil | 294739 | 5009047 | TMF | 0.22 | 0.14 | 3 | 18 | <0.1 | 0.07 | 0.03 | 0.38 | 4.22 | 0.3 | 2 | 0.23 | 5.0 | 0.16 | 0.5 | <0.1 | <0.05 | 0.12 | <0.02 | 0.04 | 2.3 | <1 | <0.01 |
| LXGB-2021-TMFOB-02s | Soil | 295280 | 5008849 | TMF | 0.14 | 0.15 | 2 | 49 | <0.1 | 0.08 | 0.26 | 0.4 | 4.92 | 0.5 | 2 | 0.46 | 9.4 | 0.27 | 0.7 | <0.1 | <0.05 | 0.2 | <0.02 | 0.08 | 2.6 | <1 | <0.01 |
| LXGB-2021-TMFOB-03s | Soil | 294931 | 5008502 | TMF | 0.12 | 0.09 | 2 | 22 | <0.1 | 0.12 | 0.13 | 0.44 | 1.75 | 0.4 | 1 | 0.15 | 3.2 | 0.13 | 0.4 | <0.1 | <0.05 | 0.4 | <0.02 | 0.05 | 0.9 | <1 | <0.01 |
| TP21-137S | Soil | 295524 | 5008462 | TMF | 0.02 | 1.39 | 8 | 68 | 0.4 | 0.14 | 0.11 | 0.02 | 87.71 | 9.9 | 23 | 2.28 | 26.2 | 2.22 | 4.6 | <0.1 | 0.09 | <0.01 | <0.02 | 0.43 | 33.1 | 25 | 0.09 |
| LXGB-WGOVB-2021-01S | Soil | 293256 | 5007096 | West Pit | 0.18 | 0.15 | 2 | 35 | <0.1 | 0.15 | 0.10 | 0.2 | 3.85 | 0.4 | 2 | 0.26 | 6.7 | 0.33 | 0.9 | <0.1 | <0.05 | 0.23 | <0.02 | 0.03 | 1.9 | <1 | <0.01 |
| LXGB-WGOVB-2021-02S | Soil | 293485 | 5007017 | West Pit | 0.07 | 0.93 | 98 | 48 | 0.1 | 0.16 | 0.02 | 0.03 | 16.61 | 2.5 | 18 | 1.61 | 9.9 | 2.12 | 6.6 | <0.1 | 0.11 | 0.16 | <0.02 | 0.16 | 7.6 | 8 | 0.04 |
| LXGB-WGOVB-2021-03S | Soil | 293542 | 5007139 | West Pit | 3.35 | 2.03 | 44 | 40 | 0.4 | 0.15 | 0.05 | 0.06 | 27.7 | 3.7 | 24 | 2.1 | 12 | 2.7 | 7 | <0.1 | 0.06 | 0.09 | <0.02 | 0.17 | 12.3 | 16 | 0.04 |
| LXGB-WGOVB-2021-04S | Soil | 293817 | 5007086 | West Pit | 0.25 | 0.18 | 9 | 48 | <0.1 | 0.17 | 0.08 | 0.28 | 4.54 | 0.5 | 2 | 0.67 | 6.3 | 0.3 | 0.9 | <0.1 | <0.05 | 0.33 | <0.02 | 0.06 | 2.3 | <1 | <0.01 |
| LXGB-EGOVB-2021-01T | Till | 294226 | 5006977 | East Pit | 0.03 | 0.93 | 13 | 28 | 0.1 | 0.09 | 0.02 | 0.04 | 24.87 | 1.4 | 12 | 0.91 | 3.5 | 1.4 | 4 | <0.1 | 0.07 | 0.03 | <0.02 | 0.09 | 12.1 | 5 | 0.03 |
| LXGB-EGOVB-2021-02T | Till | 294441 | 5006810 | East Pit | <0.01 | 0.84 | 8 | 21 | 0.1 | 0.1 | 0.01 | 0.02 | 24.26 | 0.9 | 11 | 0.8 | 2.9 | 1.75 | 4.7 | <0.1 | 0.06 | 0.04 | <0.02 | 0.06 | 11.7 | 5 | 0.03 |
| LXGB-EGOVB-2021-03T | Till | 294524 | 5006675 | East Pit | 0.02 | 1.62 | 10 | 25 | 0.2 | 0.11 | 0.02 | 0.03 | 29.94 | 2.2 | 17 | 1.02 | 5.3 | 1.94 | 5.2 | <0.1 | <0.05 | 0.07 | <0.02 | 0.08 | 14.4 | 8 | 0.03 |
| LXGB-EGOVB-2021-04T | Till | 294726 | 5006718 | East Pit | <0.01 | 0.96 | 6 | 21 | 0.2 | 0.09 | 0.01 | 0.01 | 29.14 | 1.7 | 13 | 0.87 | 3.8 | 1.36 | 3.5 | <0.1 | <0.05 | 0.03 | <0.02 | 0.09 | 14.3 | 7 | 0.03 |
| TP21-A09T | Till | 293125 | 5008255 | NW WRSA | <0.01 | 0.67 | 6 | 43 | 0.3 | 0.12 | 0.11 | 0.02 | 48.22 | 3.7 | 12 | 1.24 | 7.5 | 1.31 | 2.3 | <0.1 | 0.09 | <0.01 | <0.02 | 0.2 | 23.3 | 14 | 0.05 |
| GBLX-Portal-OB | Till | N/A | N/A | Portal | 0.06 | 1.53 | 1278 | 90 | 0.6 | 0.32 | 0.1 | 0.08 | 47.15 | 9.6 | 24 | 2.37 | 17.4 | 2.54 | 5 | <0.1 | 0.1 | 0.03 | <0.02 | 0.45 | 24 | 26 | 0.07 |
| LXGB-2021-TMFOB-01t | Till | 294739 | 5009047 | TMF | <0.01 | 0.85 | 3 | 19 | <0.1 | 0.09 | <0.01 | 0.01 | 36.5 | 0.9 | 11 | 0.67 | 1.2 | 1.29 | 4.5 | <0.1 | <0.05 | 0.03 | <0.02 | 0.07 | 19.1 | 3 | 0.02 |
| LXGB-2021-TMFOB-02t | Till | 295280 | 5008849 | TMF | 0.01 | 0.63 | 5 | 20 | <0.1 | 0.12 | 0.01 | 0.02 | 50.43 | 1.2 | 12 | 0.83 | 1.8 | 1.61 | 5.3 | <0.1 | <0.05 | 0.04 | <0.02 | 0.08 | 25.3 | 3 | 0.02 |
| LXGB-2021-TMFOB-03t | Till | 294931 | 5008502 | TMF | 0.03 | 0.96 | 4 | 20 | 0.1 | 0.14 | <0.01 | 0.02 | 29.49 | 1.2 | 14 | 1.06 | 1.5 | 2.06 | 7.3 | <0.1 | <0.05 | 0.06 | <0.02 | 0.07 | 14.9 | 3 | 0.02 |
| TMF Till composite | Till | N/A | N/A | TMF | 0.02 | 0.82 | 6 | 20 | <0.1 | 0.11 | <0.01 | 0.01 | 35.05 | 1.1 | 12 | 0.85 | 1.9 | 1.75 | 5.6 | <0.1 | <0.05 | <0.01 | <0.02 | 0.07 | 17.5 | 3 | 0.02 |
| TP21-131T | Till | 294882 | 5008243 | TMF | 0.02 | 0.95 | 6 | 60 | 0.3 | 0.18 | 0.10 | 0.02 | 52.67 | 5.7 | 16 | 1.49 | 12 | 1.62 | 3.2 | <0.1 | 0.08 | <0.01 | <0.02 | 0.29 | 25.1 | 17 | 0.06 |
| TP21-137T | Till | 295524 | 5008462 | TMF | 0.28 | 1.36 | 3 | 37 | 0.4 | 0.18 | 0.05 | 0.11 | 51.09 | 2.2 | 12 | 1.73 | 7.5 | 1.01 | 4.3 | <0.1 | <0.05 | 0.23 | <0.02 | 0.12 | 32.2 | 9 | 0.05 |
| LXGB-WGOVB-2021-01T | Till | 293256 | 5007096 | West Pit | 0.05 | 1.67 | 15 | 24 | 0.3 | 0.18 | 0.01 | 0.03 | 29.76 | 1.7 | 17 | 1.43 | 5.5 | 2.51 | 8.4 | <0.1 | 0.08 | 0.1 | <0.02 | 0.08 | 14.3 | 7 | 0.04 |
| LXGB-WGOVB-2021-02T | Till | 293485 | 5007017 | West Pit | 0.05 | 0.77 | 44 | 39 | 0.1 | 0.14 | 0.01 | 0.02 | 23.69 | 1.6 | 15 | 1.65 | 5 | 1.89 | 7.2 | <0.1 | 0.07 | 0.1 | <0.02 | 0.14 | 11.7 | 6 | 0.04 |
| LXGB-WGOVB-2021-03T | Till | 293542 | 5007139 | West Pit | 0.05 | 2.04 | 26 | 31 | 0.4 | 0.14 | 0.02 | 0.02 | 35.21 | 3.1 | 21 | 2.06 | 8.2 | 2.5 | 6.8 | <0.1 | 0.07 | 0.09 | <0.02 | 0.12 | 15.9 | 15 | 0.04 |
| LXGB-WGOVB-2021-04T | Till | 293817 | 5007086 | West Pit | 0.06 | 2.15 | 33 | 32 | 0.4 | 0.2 | 0.02 | 0.03 | 38.59 | 3 | 26 | 2.77 | 10.5 | 3.37 | 9.3 | <0.1 | 0.06 | 0.11 | <0.02 | 0.14 | 18.1 | 15 | 0.05 |

**Notes:**
AUCCA - Average Upper Continental Crustal Abundance
Rudnick, R.L. and S. Gao (2014). Composition of the Continental Crust. In: Holland, H. and Turekian, K. (eds). Treatise on Geochemistry 2nd Edition, Vol. 4, pp. 1-51. Oxford, UK, Elsevier Ltd.
Light grey shading indicates a value greater than 3x the AUCCA
Dark grey shading indicates a value greater than 10x the AUCCA

**Appendix C.4: Overburden Static Test Results, Table 2: Solid Phase Metals Results**

| Sample ID | Mg | Mn | Mo | Na | Nb | Ni | P | Pb | Rb | S | Sb | Sc | Se | Sn | Sr | Ta | Tb | Te | Th | Ti | Tl | U | V | W | Y | Yb | Zn | Zr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | % | ppm | ppm | % | ppm | ppm | % | ppm | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm |
| *AUCCA (Rudnick and Gao, 2014)* | *1.5* | *774* | *1.1* | *2.43* | *12* | *47* | *0.0655* | *17* | *84* | *0.0621* | *0.4* | *14* | *0.09* | *2.1* | *320* | *0.9* | *0.9* | *-* | *10.5* | *0.384* | *0.9* | *2.7* | *97* | *1.9* | *21* | *2* | *67* | *193* |
| LXGB-EGOVB-2021-01S | 0.13 | 110 | 0.5 | 0.01 | 1.84 | 4 | 0.03 | 13.2 | 4.5 | 0.06 | 0.25 | 0.8 | 1 | 0.7 | 18.9 | <0.05 | 0.13 | <0.05 | 2.2 | 0.05 | 0.06 | 0.41 | 17 | 0.8 | 1.66 | 0.1 | 16 | 3.3 |
| LXGB-EGOVB-2021-02S | 0.14 | 30 | 0.28 | 0.02 | 0.33 | 2 | 0.04 | 7.1 | 1.7 | 0.12 | 0.28 | 0.2 | 2 | 0.3 | 46.2 | <0.05 | 0.03 | <0.05 | 0.2 | <0.01 | 0.03 | 0.1 | 4 | 0.5 | 0.41 | <0.1 | 23 | 1.4 |
| LXGB-EGOVB-2021-03S | 0.06 | 169 | 0.43 | 0.01 | 0.58 | 2 | 0.04 | 27.1 | 3.5 | 0.09 | 0.4 | 0.4 | 1 | 0.9 | 25.9 | <0.05 | 0.06 | <0.05 | 0.7 | 0.02 | 0.06 | 0.19 | 7 | 0.4 | 0.85 | <0.1 | 44 | 1.7 |
| LXGB-EGOVB-2021-04S | 0.1 | 10 | 0.35 | 0.04 | 0.16 | 2 | 0.04 | 32.5 | 1.7 | 0.13 | 0.5 | 0.1 | 2 | 0.9 | 21.1 | <0.05 | <0.02 | <0.05 | <0.1 | <0.01 | 0.05 | 0.06 | 3 | 0.3 | 0.36 | <0.1 | 10 | <0.5 |
| LXGB-2021-TMFOB-01s | 0.10 | 16 | 0.29 | 0.04 | 0.37 | 5 | 0.03 | 14.1 | 2.2 | 0.11 | 0.24 | 0.2 | 4 | 0.4 | 15.7 | 0.07 | 0.03 | <0.05 | <0.1 | <0.01 | 0.06 | 0.13 | 3 | <0.1 | 0.44 | <0.1 | 9 | <0.5 |
| LXGB-2021-TMFOB-02s | 0.10 | 110 | 0.18 | 0.02 | 0.41 | 3 | 0.06 | 16.6 | 3.8 | 0.13 | 0.2 | 0.3 | 2 | 0.4 | 40.7 | 0.06 | 0.03 | <0.05 | 0.4 | <0.01 | 0.08 | 0.12 | 5 | <0.1 | 0.49 | <0.1 | 48 | <0.5 |
| LXGB-2021-TMFOB-03s | 0.16 | 24 | 0.24 | 0.05 | 0.25 | 4 | 0.04 | 42.8 | 2.1 | 0.14 | 0.43 | 0.2 | 3 | 0.7 | 27.5 | 0.06 | <0.02 | <0.05 | <0.1 | <0.01 | 0.05 | 0.05 | 4 | <0.1 | 0.29 | <0.1 | 33 | <0.5 |
| TP21-137S | 0.5 | 371 | 0.55 | 0.02 | 1.89 | 19 | 0.06 | 7.7 | 32.4 | <0.01 | <0.05 | 3.1 | <1 | 0.5 | 5.1 | <0.05 | 0.64 | <0.05 | 9 | 0.1 | 0.23 | 1.15 | 24 | 0.2 | 8.86 | 0.7 | 42 | 5.5 |
| LXGB-WGOVB-2021-01S | 0.11 | 29 | 0.42 | 0.02 | 0.34 | 3 | 0.05 | 29.3 | 1.4 | 0.15 | 0.5 | 0.3 | 2 | 1.1 | 37.7 | <0.05 | 0.03 | <0.05 | 0.3 | <0.01 | 0.03 | 0.13 | 5 | 0.3 | 0.44 | <0.1 | 15 | 1.9 |
| LXGB-WGOVB-2021-02S | 0.28 | 189 | 0.76 | 0.02 | 2.87 | 9 | 0.02 | 39.7 | 10.1 | 0.03 | 0.45 | 1.8 | <1 | 3 | 3.2 | <0.05 | 0.12 | <0.05 | 1.6 | 0.1 | 0.1 | 0.57 | 29 | 1.5 | 2.29 | 0.3 | 23 | 6.9 |
| LXGB-WGOVB-2021-03S | 0.29 | 195 | 0.64 | 0.02 | 3.51 | 11 | 0.03 | 16.6 | 11.9 | 0.03 | 0.72 | 2.3 | 2 | 1 | 4.9 | <0.05 | 0.19 | <0.05 | 3.8 | 0.1 | 0.11 | 0.63 | 33 | 8.1 | 2.99 | 0.3 | 32 | 4.2 |
| LXGB-WGOVB-2021-04S | 0.12 | 19 | 0.64 | 0.02 | 0.38 | 3 | 0.06 | 43 | 5.1 | 0.14 | 0.54 | 0.4 | 2 | 1.3 | 31.5 | <0.05 | 0.03 | <0.05 | 0.3 | 0.01 | 0.05 | 0.14 | 6 | 0.3 | 0.54 | <0.1 | 19 | 1.9 |
| LXGB-EGOVB-2021-01T | 0.12 | 143 | 0.43 | 0.02 | 1.83 | 4 | 0.02 | 5.3 | 5.2 | 0.02 | 0.09 | 1 | <1 | 0.5 | 4.7 | <0.05 | 0.17 | <0.05 | 3.6 | 0.06 | 0.06 | 0.58 | 18 | 0.3 | 2.33 | 0.2 | 10 | 4.4 |
| LXGB-EGOVB-2021-02T | 0.07 | 130 | 0.43 | 0.02 | 2.11 | 3 | 0.01 | 4.7 | 3.1 | 0.01 | 0.09 | 0.8 | <1 | 0.5 | 2.5 | <0.05 | 0.16 | <0.05 | 3.8 | 0.06 | 0.05 | 0.54 | 20 | 0.2 | 2.03 | 0.2 | 7 | 3.8 |
| LXGB-EGOVB-2021-03T | 0.17 | 150 | 0.47 | 0.02 | 2.3 | 6 | 0.02 | 6.5 | 5.1 | 0.02 | 0.11 | 1.6 | 1 | 0.6 | 3.2 | <0.05 | 0.23 | <0.05 | 4.6 | 0.07 | 0.06 | 0.65 | 23 | 0.2 | 2.99 | 0.2 | 17 | 2.5 |
| LXGB-EGOVB-2021-04T | 0.15 | 142 | 0.43 | 0.02 | 1.67 | 5 | 0.01 | 4.4 | 5.4 | 0.01 | 0.06 | 1.1 | 1 | 0.4 | 2.4 | <0.05 | 0.2 | <0.05 | 3.7 | 0.06 | 0.06 | 0.56 | 17 | 0.2 | 2.59 | 0.2 | 10 | 1.4 |
| TP21-A09T | 0.25 | 260 | 0.28 | 0.03 | 0.95 | 9 | 0.06 | 3 | 14 | <0.01 | <0.05 | 1.5 | <1 | 0.3 | 4.9 | <0.05 | 0.41 | <0.05 | 6.5 | 0.06 | 0.09 | 0.94 | 13 | 0.2 | 5.86 | 0.4 | 18 | 4.1 |
| GBLX-Portal-OB | 0.57 | 440 | 0.38 | 0.03 | 1.57 | 21 | 0.05 | 19 | 32.6 | 0.03 | 0.66 | 3.1 | <1 | 0.7 | 8.1 | <0.05 | 0.37 | 0.08 | 5.4 | 0.09 | 0.22 | 0.92 | 28 | 0.2 | 7.13 | 0.5 | 46 | 5.3 |
| LXGB-2021-TMFOB-01t | 0.06 | 104 | 0.28 | 0.02 | 2.26 | 3 | 0.01 | 4.1 | 3.7 | 0.01 | <0.05 | 1 | 1 | 0.5 | 2 | <0.05 | 0.23 | <0.05 | 4.7 | 0.07 | 0.05 | 0.75 | 18 | <0.1 | 2.89 | 0.2 | 5 | 0.9 |
| LXGB-2021-TMFOB-02t | 0.10 | 146 | 0.38 | 0.02 | 2 | 4 | 0.02 | 5 | 4.6 | <0.01 | 0.05 | 1.1 | <1 | 0.7 | 2.1 | <0.05 | 0.31 | <0.05 | 6.1 | 0.07 | 0.06 | 0.94 | 27 | <0.1 | 3.49 | 0.2 | 7 | 0.8 |
| LXGB-2021-TMFOB-03t | 0.09 | 142 | 0.35 | 0.02 | 3.34 | 5 | 0.01 | 7.1 | 4.8 | 0.02 | 0.05 | 1.1 | 1 | 0.6 | 1.9 | <0.05 | 0.19 | <0.05 | 4.7 | 0.1 | 0.05 | 0.74 | 31 | <0.1 | 2.66 | 0.2 | 7 | 1.7 |
| TMF Till composite | 0.08 | 109 | 0.37 | 0.02 | 2.23 | 3 | 0.01 | 5.3 | 3.9 | 0.01 | <0.05 | 0.9 | 1 | 0.5 | 2 | <0.05 | 0.21 | <0.05 | 4.7 | 0.08 | 0.04 | 0.62 | 25 | <0.1 | 2.59 | 0.1 | 8 | 1.2 |
| TP21-131T | 0.33 | 331 | 0.27 | 0.03 | 1.41 | 12 | 0.05 | 4.8 | 21.5 | <0.01 | <0.05 | 2.1 | <1 | 0.3 | 4.8 | <0.05 | 0.43 | <0.05 | 7.2 | 0.08 | 0.15 | 0.84 | 17 | 0.2 | 6.16 | 0.4 | 25 | 4.1 |
| TP21-137T | 0.16 | 99 | 0.74 | 0.02 | 1.58 | 7 | 0.06 | 18.9 | 10.5 | 0.17 | 0.28 | 0.8 | 4 | 1 | 7.1 | <0.05 | 0.43 | <0.05 | 0.4 | 0.04 | 0.1 | 1.16 | 13 | 0.2 | 5.93 | 0.4 | 16 | 1.9 |
| LXGB-WGOVB-2021-01T | 0.14 | 135 | 0.45 | 0.01 | 3.43 | 5 | 0.03 | 8.2 | 5.8 | 0.03 | 0.19 | 1.7 | 1 | 0.8 | 3.7 | <0.05 | 0.23 | <0.05 | 4.3 | 0.09 | 0.08 | 0.74 | 38 | 0.5 | 2.78 | 0.3 | 13 | 4.9 |
| LXGB-WGOVB-2021-02T | 0.15 | 171 | 0.55 | 0.02 | 3.02 | 5 | 0.01 | 112 | 8.8 | 0.02 | 0.32 | 1.4 | <1 | 2 | 2.7 | <0.05 | 0.16 | <0.05 | 3 | 0.11 | 0.09 | 0.65 | 30 | 0.6 | 2.53 | 0.3 | 14 | 5.8 |
| LXGB-WGOVB-2021-03T | 0.25 | 171 | 0.45 | 0.02 | 3.39 | 9 | 0.02 | 9.8 | 9.1 | 0.03 | 0.17 | 2.3 | 1 | 0.8 | 2.8 | <0.05 | 0.24 | <0.05 | 5.3 | 0.1 | 0.09 | 0.76 | 32 | 1 | 3.32 | 0.3 | 23 | 4.5 |
| LXGB-WGOVB-2021-04T | 0.28 | 184 | 0.62 | 0.02 | 4.14 | 9 | 0.03 | 13.8 | 10.2 | 0.03 | 0.22 | 2.4 | 2 | 1 | 2.9 | <0.05 | 0.3 | <0.05 | 4.5 | 0.11 | 0.1 | 0.95 | 41 | 0.3 | 4.07 | 0.3 | 23 | 4.8 |

**Notes:**
AUCCA - Average Upper Continental Crustal Abundance
Rudnick, R.L. and S. Gao (2014). Composition of the Continental Crust. In: Holland, H. and Turekian, K. (eds). Treatise on Geochemistry 2nd Edition, Vol. 4, pp. 1-51. Oxford, UK, Elsevier Ltd.
Light grey shading indicates a value greater than 3x the AUCCA
Dark grey shading indicates a value greater than 10x the AUCCA

**Appendix C.4: Overburden Static Test Results, Table 3: Shake Flask Extraction Results**

| Sample ID | Units | Tier 1 EQS | LXGB-EGOVB-2021-02S | LXGB-2021-TMFOB-01s | LXGB-2021-TMFOB-02s | LXGB-2021-TMFOB-03s | LXGB-WGOVB-2021-02S | LXGB-EGOVB-2021-02T | LXGB-EGOVB-2021-03T | GBLX-Portal-OB | LXGB-2021-TMFOB-01t | LXGB-2021-TMFOB-02t | LXGB-2021-TMFOB-03t | TMF Till composite | LXGB-WGOVB-2021-02T | LXGB-WGOVB-2021-04T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Material* | | | *Soil* | *Soil* | *Soil* | *Soil* | *Soil* | *Till* | *Till* | *Till* | *Till* | *Till* | *Till* | *Till* | *Till* | *Till* |
| *Location* | | | *East Pit* | *TMF* | *TMF* | *TMF* | *West Pit* | *East Pit* | *East Pit* | *Portal* | *TMF* | *TMF* | *TMF* | *TMF* | *West Pit* | *West Pit* |
| Volume Nanopure Water | mL | - | 900 | 850 | 1550 | 1750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 | 750 |
| Sample Weight | g | - | 100 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| pH | - | 6.5-9.0 | ***3.80*** | ***3.48*** | ***4.28*** | ***3.32*** | ***4.76*** | ***4.98*** | ***6.06*** | ***4.05*** | ***4.28*** | ***5.49*** | ***4.18*** | ***6.31*** | ***5.77*** | ***4.91*** |
| Redox | mV | - | 386 | - | - | - | 297 | 301 | 271 | - | - | - | - | - | 207 | 357 |
| Conductivity | µS/cm | - | 256 | 737 | 341 | 618 | 78 | 35 | 37 | 234 | 268 | 39 | 323 | 44 | 81 | 82 |
| Acidity (to pH 4.5) | mg $CaCO_3$/L | - | 15.0 | 48.4 | 2.3 | 47.3 | 0.0 | 0.0 | 0.0 | 6.2 | 9.1 | 0.0 | 11.7 | 0.0 | 0.0 | 0.0 |
| Total Acidity (to pH 8.3) | mg $CaCO_3$/L | - | 44.6 | 119.3 | 51.4 | 94.6 | 14.5 | 8.7 | 4.9 | 44.4 | 50.7 | 8.9 | 62.5 | 10.5 | 13.9 | 14.0 |
| Alkalinity | mg $CaCO_3$/L | - | 0.0 | 0.0 | 0.0 | 0.0 | 1.7 | 2.8 | 4.2 | 0.0 | 0.0 | 5.4 | 0.0 | 7.1 | 5.2 | 2.6 |
| Bromide | mg/L | - | <0.3 | <0.3 | <0.3 | 0.4 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 | <0.3 |
| Chloride | mg/L | 120 | 56 | 190 | 61 | 120 | 4 | 5 | 5 | 56 | 64 | 5 | 80 | 6 | 6 | 25 |
| Fluoride | mg/L | 0.12 | 0.13 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 | <0.06 |
| Nitrate (N) | mg/L | 13 | 0.62 | 1.36 | 0.26 | 0.32 | 4.55 | <0.06 | 0.08 | 0.82 | 0.79 | 0.33 | 0.81 | 0.18 | 5.32 | 0.37 |
| Nitrite (N) | mg/L | 0.06 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| Ammonia (N) | mg/L | 5.7 | 0.5 | 3.0 | 10.3 | 1.4 | 1.0 | 0.2 | 0.3 | <0.1 | 0.2 | 0.5 | 0.3 | 0.4 | 0.6 | 0.2 |
| Dissolved Organic Carbon | mg/L | - | 103 | 48 | 180 | 138 | 40 | 37 | 32 | 6 | 35 | 36 | 42 | 38 | 23 | 59 |
| Phosphorus (total reactive) | mg/L | - | 0.42 | 0.09 | 4.40 | 4.97 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | NSS | <0.03 |
| Sulphate | mg/L | 128 | 9.8 | 14.5 | 29 | 20.5 | 3.1 | 2 | 3.4 | 9.6 | 9.2 | 1.9 | 3.6 | 2.6 | 1.8 | 1.8 |
| **Ion Balance** | | | | | | | | | | | | | | | | |
| Major Anions | meq/L | - | 1.829 | 5.745 | 2.329 | 3.822 | 0.535 | 0.238 | 0.301 | 1.832 | 2.047 | 0.310 | 2.385 | 0.38 | 0.690 | 0.820 |
| Major Cations | meq/L | - | 2.31 | 4.666 | 3.047 | 4.339 | 0.84 | 0.56 | 0.48 | 1.713 | 2.202 | 0.520 | 2.761 | 0.57 | 0.71 | 0.89 |
| Difference | meq/L | - | -0.481 | 1.0789 | -0.7182 | -0.5177 | -0.3009 | -0.3260 | -0.1754 | 0.1194 | -0.155 | -0.2093 | -0.3758 | -20% | -0.0166 | -0.0669 |
| Balance (%) | % | - | -12% | 10% | -13% | -6% | -22% | -41% | -23% | 3% | -4% | -25% | -7% | -21% | -1% | -4% |
| **Dissolved Metals** | | | | | | | | | | | | | | | | |
| Hardness | mg/L | - | 46.6 | 57.9 | 42.3 | 65.6 | 15.5 | 9.08 | 8.74 | 27.3 | 32.8 | 6.3 | 35.8 | 8.5 | 16.1 | 15.4 |
| Aluminum | mg/L | 0.005 | 6.27 | 18.6 | 2.88 | 10.3 | 1.65 | 1.59 | 0.955 | 7.97 | 10.6 | 1.54 | 14.1 | 1.49 | 1.49 | 2.58 |
| Antimony | mg/L | 0.009 | <0.0009 | <0.0009 | <0.0009 | <0.0009 | 0.0052 | <0.0009 | <0.0009 | <0.0009 | <0.0009 | <0.0009 | <0.0009 | <0.0009 | <0.0009 | <0.0009 |
| Arsenic | mg/L | 0.005 | 0.0122 | 0.0045 | 0.0072 | 0.0069 | 0.0188 | 0.0033 | 0.0031 | 0.0170 | 0.0007 | 0.0011 | 0.0025 | 0.0007 | 0.0055 | 0.0025 |
| Barium | mg/L | 1 | 0.0339 | 0.348 | 0.0691 | 0.0328 | 0.0380 | 0.00852 | 0.00611 | 0.00471 | 0.0112 | 0.0101 | 0.207 | 0.00893 | 0.0433 | 0.0249 |
| Beryllium | mg/L | 0.00015 | 0.000120 | 0.000330 | 0.000110 | 0.000375 | 0.000070 | 0.000040 | 0.000020 | 0.000113 | 0.000144 | 0.000021 | 0.000181 | 0.000020 | 0.000064 | 0.000043 |
| Bismuth | mg/L | - | 0.00002 | 0.00003 | 0.00005 | 0.00002 | 0.00001 | 0.00001 | 0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 | <0.00001 |
| Boron | mg/L | 1.5 | 0.036 | 0.100 | 0.092 | 0.129 | 0.052 | 0.037 | 0.033 | 0.020 | 0.024 | 0.013 | 0.030 | 0.021 | 0.023 | 0.017 |
| Cadmium | mg/L | 0.00009 | 0.000130 | 0.000180 | 0.000640 | 0.000560 | 0.000130 | 0.000030 | 0.000030 | 0.000112 | 0.000111 | 0.000029 | 0.000073 | 0.000022 | 0.000228 | 0.000046 |
| Calcium | mg/L | - | 10.8 | 19.0 | 10.5 | 14.6 | 3.08 | 1.97 | 2.10 | 7.45 | 8.72 | 1.49 | 12.3 | 2.00 | 3.20 | 3.57 |
| Chromium | mg/L | 0.001 | 0.00177 | 0.00093 | 0.00333 | 0.00209 | 0.00217 | 0.00253 | 0.00319 | 0.00074 | 0.00377 | 0.00242 | 0.00373 | 0.00313 | 0.00178 | 0.00191 |
| Cobalt | mg/L | 0.001 | 0.00118 | 0.00109 | 0.00158 | 0.00145 | 0.000940 | 0.000210 | 0.000230 | 0.000808 | 0.000831 | 0.000336 | 0.000634 | 0.000692 | 0.000851 | 0.000429 |
| Copper | mg/L | 0.002 | 0.0054 | 0.0042 | 0.0105 | 0.0105 | 0.0079 | 0.0023 | 0.0020 | 0.0031 | 0.0041 | 0.0021 | 0.0034 | 0.0025 | 0.0034 | 0.0027 |
| Iron | mg/L | 0.3 | 0.190 | 0.150 | 0.530 | 0.420 | 0.810 | 0.670 | 0.260 | 0.049 | 0.243 | 0.502 | 0.301 | 0.524 | 0.404 | 0.134 |
| Lead | mg/L | 0.001 | 0.00330 | 0.0123 | 0.0114 | 0.0168 | 0.00344 | 0.00059 | 0.00052 | 0.00129 | 0.00156 | 0.00132 | 0.00397 | 0.00108 | 0.0139 | 0.00075 |
| Lithium | mg/L | - | 0.0094 | 0.0162 | 0.0083 | 0.0180 | 0.0057 | 0.0012 | 0.0011 | 0.0100 | 0.0121 | 0.0009 | 0.0108 | 0.0011 | 0.0016 | 0.0030 |
| Magnesium | mg/L | - | 4.77 | 2.54 | 3.88 | 7.12 | 1.89 | 1.01 | 0.850 | 2.11 | 2.68 | 0.628 | 1.25 | 0.845 | 1.97 | 1.58 |
| Manganese | mg/L | 0.43 | 0.0454 | 0.0176 | 0.175 | 0.0923 | 0.102 | 0.0105 | 0.0295 | 0.0800 | 0.0519 | 0.00650 | 0.0274 | 0.00933 | 0.239 | 0.0165 |
| Mercury | ug/L | 0.026 | 0.02 | 0.01 | 0.04 | 0.03 | 0.01 | 0.01 | 0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Molybdenum | mg/L | 0.073 | 0.00572 | 0.00150 | 0.00198 | 0.00859 | 0.00835 | 0.00314 | 0.0116 | 0.00068 | 0.00110 | 0.00015 | 0.00054 | 0.00009 | 0.00039 | 0.00079 |
| Nickel | mg/L | 0.025 | 0.0030 | 0.0037 | 0.0014 | 0.0043 | 0.0031 | 0.0005 | 0.0007 | 0.0022 | 0.0023 | 0.0007 | 0.0025 | 0.0008 | 0.0020 | 0.0013 |
| Phosphorus | mg/L | - | 0.930 | 0.060 | 4.93 | 6.14 | 0.100 | 0.030 | 0.050 | 0.003 | 0.011 | 0.026 | 0.017 | 0.021 | 0.048 | 0.031 |
| Potassium | mg/L | - | 4.48 | 6.22 | 20.4 | 11.8 | 2.93 | 1.42 | 2.12 | 1.65 | 2.16 | 1.10 | 2.15 | 1.08 | 2.88 | 1.46 |
| Selenium | mg/L | 0.001 | 0.00155 | 0.00010 | 0.00097 | 0.00048 | 0.00182 | 0.00100 | 0.00116 | 0.00033 | 0.00070 | 0.00150 | 0.00125 | 0.00143 | 0.00080 | 0.00167 |
| Silicon | mg/L | - | 1.37 | 2.61 | 4.00 | 2.03 | 1.63 | 3.99 | 6.44 | 2.08 | 6.05 | 2.68 | 4.19 | 5.47 | 2.04 | 3.02 |
| Silver | mg/L | 0.00025 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 | <0.00005 |
| Sodium | mg/L | - | 8.16 | 16.0 | 11.9 | 21.6 | 3.10 | 2.52 | 2.29 | 3.26 | 5.21 | 2.86 | 7.06 | 3.63 | 1.83 | 5.01 |
| Strontium | mg/L | 21 | 0.0612 | 0.163 | 0.0944 | 0.101 | 0.0152 | 0.00969 | 0.00767 | 0.0554 | 0.0645 | 0.0103 | 0.114 | 0.0142 | 0.0222 | 0.0173 |
| Sulfur | mg/L | - | 10 | 9 | 4 | 22 | 3 | 6 | 6 | 3 | 3 | <1 | 1 | <1 | 2 | 2 |
| Thallium | mg/L | 0.0008 | 0.000070 | 0.000210 | 0.000270 | 0.000220 | 0.000150 | 0.000030 | 0.000050 | 0.000008 | 0.000032 | 0.000037 | 0.000017 | 0.000020 | 0.000107 | 0.000025 |
| Tin | mg/L | - | 0.00106 | 0.00032 | 0.00061 | 0.00036 | 0.00038 | 0.00183 | 0.0147 | <0.00006 | 0.00026 | 0.00027 | 0.00017 | 0.00021 | 0.00067 | 0.00032 |
| Titanium | mg/L | - | 0.00433 | <0.00005 | 0.0131 | 0.00142 | 0.0159 | 0.0218 | 0.0131 | 0.00093 | 0.00340 | 0.0268 | 0.00211 | 0.0422 | 0.0133 | 0.00251 |
| Uranium | mg/L | 0.015 | 0.000300 | 0.000100 | 0.000130 | 0.000210 | 0.000440 | 0.000260 | 0.00152 | 0.000109 | 0.000129 | 0.000099 | 0.000136 | 0.000089 | 0.000062 | 0.000085 |
| Vanadium | mg/L | 0.12 | 0.00490 | 0.00197 | 0.00357 | 0.00411 | 0.00274 | 0.00267 | 0.00305 | 0.00039 | 0.00100 | 0.00148 | 0.00082 | 0.00151 | 0.00106 | 0.00175 |
| Zinc | mg/L | 0.007 | 0.173 | 0.164 | 0.108 | 0.305 | 0.048 | 0.027 | 0.027 | 0.150 | 0.184 | 0.004 | 0.090 | 0.005 | 0.039 | 0.054 |
| Zirconium | mg/L | - | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |

**Notes:**
Tier 1 EQS: Nova Scotia Tier 1 Environmental Quality Standards
Nova Scotia Environment (NSE) (2021). Table 3 - Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (µg/L). In Notification of Contamination Protocol. Revised September 30, 2021
Bold italic text indicates a pH outside of the Tier 1 EQS pH range.
Grey shading indicates a concentration above the Tier 1 EQS.

# *Appendix D: Kinetic Test Results*

*Appendix D.1: Waste Rock Humidity Cell Results*

*Appendix D.2: Field Bin Results*

*Appendix D.3: Tailings Humidity Cell Results*

*Appendix D.4: Saturated Tailings Column Results*

Anaconda Mining

**Appendix D.1: Waste Rock Humidity Cell Results, Table 1: Cell Description**

| Cell No. | Sample ID | Sample Type | Method Reference | Column Dimensions | | Column Packing | | | Total Volume of Initial Flushings | Flushing Rate/Weekly Input* | Temp | Sampling Frequency | Start-up Date | Sampling Day | Operation Procedure | Sample Prep for Flushings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Inner Diameter (cm) | Length (cm) | Dry Wt. of Sample (kg) | Other Materials Used | Column Material | (mL) | (mL) | (°C) | | **2021** | | | |
| GB_HC1 | NPAG Argillite | Waste Rock | MEND | 10.20 | 25.50 | 1.00 | Plexiglas perforated disk & nylon mesh | Plexiglas | 500 | 500 | 20-22 °C | Weekly | 30-Jun | Wednesday | Flood Leach | None |
| GB_HC2 | PAG1 Argillite | Waste Rock | MEND | 10.20 | 25.50 | 1.00 | Plexiglas perforated disk & nylon mesh | Plexiglas | 500 | 500 | 20-22 °C | Weekly | 30-Jun | Wednesday | Flood Leach | None |
| GB_HC3 | NPAG Greywacke | Waste Rock | MEND | 10.20 | 25.50 | 1.00 | Plexiglas perforated disk & nylon mesh | Plexiglas | 500 | 500 | 20-22 °C | Weekly | 30-Jun | Wednesday | Flood Leach | None |
| GB_HC4 | PAG1 Greywacke | Waste Rock | MEND | 10.20 | 25.50 | 1.00 | Plexiglas perforated disk & nylon mesh | Plexiglas | 500 | 500 | 20-22 °C | Weekly | 30-Jun | Wednesday | Flood Leach | None |
| GB_HC5 | PAG2 Mixed | Waste Rock | MEND | 10.20 | 25.50 | 1.00 | Plexiglas perforated disk & nylon mesh | Plexiglas | 500 | 500 | 20-22 °C | Weekly | 27-Jul | Tuesday | Flood Leach | None |
| GB_HC6 | Marker Unit | Waste Rock | MEND | 10.20 | 25.50 | 1.00 | Plexiglas perforated disk & nylon mesh | Plexiglas | 500 | 500 | 20-22 °C | Weekly | 27-Jul | Tuesday | Flood Leach | None |

**Appendix D.1: Waste Rock Humidity Cell Results, Table 2: HC1 Results**
**GB_HC1**
**NPAG Argillite**

| Date | Cycle No | Volume mL | | pH | Cond. | Acidity | Alkalinity | Sulphate | Chloride | Fluoride | Al | Sb | As | Ba | Be | Bi | B | Cd | Ca | Cr | Co | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Input | Output | | | (pH 8.3) | | | | | | | | | | | | | | | | |
| | | | | | umhos/cm | mgCaCO$_3$/L | mgCaCO$_3$/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 30-Jun-21 | 0 | 1000 | 864 | 8.7 | 31 | *<1* | 9.0 | *<1* | *<1* | *<0.03* | 0.12 | *<0.00045* | 0.068 | 0.00074 | *<0.0000035* | *<0.000005* | 0.0030 | *<0.0000015* | 2.1 | *<0.00004* | 0.00014 | 0.00030 |
| 07-Jul-21 | 1 | 1000 | 924 | 7.8 | 21 | *<1* | 16.0 | *<1* | *<1* | *<0.03* | 0.079 | 0.0010 | 0.074 | 0.00062 | *<0.0000035* | *<0.000005* | 0.0050 | *<0.0000015* | 1.7 | *<0.00004* | 0.000091 | *<0.0001* |
| 14-Jul-21 | 2 | 1000 | 944 | 7.1 | 16 | *<1* | 6.0 | *<1* | *<1* | *<0.03* | 0.087 | *<0.00045* | 0.068 | 0.00058 | *<0.0000035* | *<0.000005* | 0.0020 | *<0.0000015* | 1.2 | *<0.00004* | 0.000051 | *<0.0001* |
| 21-Jul-21 | 3 | 1000 | 939 | 7.4 | 15 | *<1* | 6.0 | *<1* | *<1* | *<0.03* | 0.089 | *<0.00045* | 0.075 | 0.00070 | *<0.0000035* | *<0.000005* | 0.0050 | 0.0000030 | 0.99 | *<0.00004* | 0.000057 | *<0.0001* |
| 27-Jul-21 | 4 | 1000 | 950 | 8.3 | 14 | | | *<1* | | | | | | | | | | | | | | |
| 04-Aug-21 | 5 | 1000 | 942 | 7.2 | 17 | *<1* | 5.0 | *<1* | *<1* | *<0.03* | 0.057 | *<0.00045* | 0.074 | 0.00052 | *<0.0000035* | *<0.000005* | 0.002 | *<0.0000015* | 0.95 | *<0.00004* | 0.000045 | *<0.0001* |
| 11-Aug-21 | 6 | 1000 | 947 | 7.2 | 12 | | | *<1* | | | | | | | | | | | | | | |
| 18-Aug-21 | 7 | 1000 | 949 | 7.3 | 10 | *<1* | 4.0 | *<1* | *<1* | *<0.03* | 0.053 | *<0.00045* | 0.069 | 0.00036 | *<0.0000035* | *<0.000005* | *<0.001* | 0.0000040 | 0.76 | 0.000090 | 0.000040 | *<0.0001* |
| 25-Aug-21 | 8 | 1000 | 909 | 7.6 | 15 | | | *<1* | | | | | | | | | | | | | | |
| 01-Sep-21 | 9 | 1000 | 1032 | 7.2 | 13 | *<1* | 6.0 | *<1* | *<1* | *<0.03* | 0.031 | 0.0014 | 0.090 | 0.00073 | *<0.0000035* | *<0.000005* | 0.030 | 0.0000090 | 1.5 | *<0.00004* | 0.000079 | *<0.0001* |
| 08-Sep-21 | 10 | 1000 | 968 | 7.2 | 10 | | | *<1* | | | | | | | | | | | | | | |
| 15-Sep-21 | 11 | 1000 | 939 | 7.0 | 7.0 | *<1* | 3.0 | *<1* | *<1* | *<0.03* | 0.075 | *<0.00045* | 0.076 | 0.00056 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.85 | *<0.00004* | 0.000058 | *<0.0001* |
| 22-Sep-21 | 12 | 1000 | 950 | 7.0 | 10 | | | | | | | | | | | | | | | | | |
| 29-Sep-21 | 13 | 1000 | 917 | 7.0 | 8.0 | *<1* | 5.0 | *<1* | *<0.5* | *<0.03* | 0.065 | *<0.00045* | 0.076 | 0.00064 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.84 | *<0.00004* | 0.000048 | *<0.0001* |
| 06-Oct-21 | 14 | 1000 | 947 | 7.0 | 10.0 | | | *<1* | | | | | | | | | | | | | | |
| 13-Oct-21 | 15 | 1000 | 941 | 7.2 | 10.0 | *<1* | 3.0 | *<1* | *<0.5* | *<0.03* | 0.055 | *<0.00045* | 0.058 | 0.00044 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.72 | *<0.00004* | 0.000011 | 0.00080 |
| 20-Oct-21 | 16 | 1000 | 956 | 6.9 | 10.0 | | | *<1* | | | | | | | | | | | | | | |
| 27-Oct-21 | 17 | 1000 | 933 | 7.2 | 13.0 | *<1* | 5.0 | *<1* | *<0.5* | *<0.03* | 0.120 | *<0.00045* | 0.079 | 0.00088 | 0.000007 | *<0.000005* | *<0.001* | 0.0000040 | 1.18 | 0.000100 | 0.000089 | *<0.0001* |
| 03-Nov-21 | 18 | 1000 | 926 | 7.1 | 10.0 | | | *<1* | | | | | | | | | | | | | | |
| 10-Nov-21 | 19 | 1000 | 942 | 6.91 | 8 | *<1* | 4 | *<1* | *<0.5* | *<0.03* | 0.062 | *<0.00045* | 0.077 | 0.00064 | *<0.0000035* | 0.00002 | *<0.001* | *<0.0000015* | 0.95 | 0.00013 | 0.000063 | *<0.0001* |
| 17-Nov-21 | 20 | 1000 | 913 | 7.08 | 10 | | | *<1* | | | | | | | | | | | | | | |
| 24-Nov-21 | 21 | 1000 | 938 | 7.05 | 8 | *<1* | 4 | *<1* | *<0.5* | *<0.03* | 0.063 | *<0.00045* | 0.0678 | 0.00066 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000008 | 0.91 | 0.00009 | 0.000077 | *<0.0001* |
| 01-Dec-21 | 22 | 1000 | 942 | 6.94 | 9 | | | *<1* | | | | | | | | | | | | | | |
| 08-Dec-21 | 23 | 1000 | 937 | 7.11 | 11 | *<1* | 4 | *<1* | *<0.5* | *<0.03* | 0.065 | *<0.00045* | 0.0699 | 0.00056 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000004 | 0.94 | *<0.00004* | 0.000057 | *<0.0001* |
| 15-Dec-21 | 24 | 1000 | 916 | 7.36 | 23 | | | *<1* | | | | | | | | | | | | | | |
| 22-Dec-21 | 25 | 1000 | 927 | 6.9 | 11 | *<1* | 5 | *<1* | *<0.5* | *<0.03* | 0.046 | *<0.00045* | 0.0711 | 0.00069 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.99 | *<0.00004* | 0.000084 | 0.0002 |
| 29-Dec-21 | 26 | 1000 | 913 | 6.81 | 7 | | | *<1* | | | | | | | | | | | | | | |
| 05-Jan-21 | 27 | 1000 | 939 | 6.8 | 12.0 | *<1* | 3.0 | *<1* | *<0.5* | *<0.03* | 0.050 | *<0.00045* | 0.064 | 0.00062 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.90 | *<0.00004* | 0.000051 | *<0.0001* |
| 12-Jan-22 | 28 | 1000 | 934 | 6.9 | 10.0 | | | *<1* | | | | | | | | | | | | | | |
| 19-Jan-22 | 29 | 1000 | 920 | 7.2 | 7.0 | *<1* | 3.0 | *<1* | *<0.5* | *<0.03* | 0.051 | *<0.00045* | 0.059 | 0.00042 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000003 | 0.85 | *<0.00004* | 0.000052 | *<0.0001* |
| 26-Jan-22 | 30 | 1000 | 921 | 6.7 | 13.0 | | | *<1* | | | | | | | | | | | | | | |
| 02-Feb-22 | 31 | 1000 | 935 | 7.0 | 8.0 | *<1* | 3.0 | *<1* | *<0.5* | *<0.03* | 0.043 | *<0.00045* | 0.059 | 0.00047 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.93 | *<0.00004* | 0.000061 | *<0.0001* |
| 09-Feb-22 | 32 | 1000 | 934 | 6.9 | 9.0 | | | *<1* | | | | | | | | | | | | | | |

**Notes:**
Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 2: HC1 Results**
**GB_HC1**
**NPAG Argillite**

| Date | Cycle No | Fe | Pb | Li | Mg | Mn | Hg | Mo | Ni | K | Se | Ag | Na | Sr | Tl | Sn | Ti | U | V | W | Y | Zn | SGS File # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | |
| 30-Jun-21 | 0 | 0.011 | *<0.000045* | 0.0028 | 0.32 | 0.016 | *<0.000005* | 0.00041 | 0.00030 | 3.7 | 0.000040 | *<0.000025* | 1.7 | 0.029 | 0.0000050 | 0.00012 | 0.00086 | 0.00011 | 0.0010 | 0.0012 | 0.000040 | 0.0020 | CA10066-JUN21 |
| 07-Jul-21 | 1 | 0.015 | *<0.000045* | 0.0022 | 0.24 | 0.013 | *<0.000005* | 0.00052 | 0.00020 | 2.4 | *<0.00002* | *<0.000025* | 1.3 | 0.024 | *<0.0000025* | *<0.00003* | 0.0011 | 0.00032 | 0.00091 | 0.0016 | 0.000070 | *<0.001* | CA10038-JUL21 |
| 14-Jul-21 | 2 | 0.015 | *<0.000045* | 0.0021 | 0.19 | 0.011 | *<0.000005* | 0.00034 | 0.00010 | 1.9 | *<0.00002* | *<0.000025* | 1.1 | 0.015 | *<0.0000025* | *<0.00003* | 0.0016 | 0.00035 | 0.00086 | 0.0012 | 0.000060 | *<0.001* | CA10069-JUL21 |
| 21-Jul-21 | 3 | 0.023 | 0.00015 | 0.0028 | 0.18 | 0.010 | *<0.000005* | 0.00027 | *<0.00005* | 1.4 | *<0.00002* | *<0.000025* | 0.98 | 0.016 | *<0.0000025* | *<0.00003* | 0.0023 | 0.00032 | 0.00090 | 0.0012 | 0.000080 | *<0.001* | CA10170-JUL21 |
| 27-Jul-21 | 4 | | | | | | | | | | | | | | | | | | | | | | CA10229-JUL21 |
| 04-Aug-21 | 5 | 0.013 | *<0.000045* | 0.0011 | 0.154 | 0.00956 | *<0.000005* | 0.00015 | 0.0009 | 1.46 | *<0.00002* | *<0.000025* | 0.55 | 0.0155 | *<0.0000025* | *<0.00003* | 0.00074 | 0.00034 | 0.00078 | 0.00059 | 0.000040 | *<0.001* | CA10034-AUG21 |
| 11-Aug-21 | 6 | | | | | | | | | | | | | | | | | | | | | | CA10072-AUG21 |
| 18-Aug-21 | 7 | 0.010 | 0.00014 | 0.00090 | 0.15 | 0.0080 | *<0.000005* | 0.0066 | 0.00010 | 1.2 | *<0.00002* | *<0.000025* | 0.36 | 0.015 | *<0.0000025* | *<0.00003* | 0.00073 | 0.00034 | 0.00061 | 0.00040 | 0.000030 | *<0.001* | CA10107-AUG21 |
| 25-Aug-21 | 8 | | | | | | | | | | | | | | | | | | | | | | CA10240-AUG21 |
| 01-Sep-21 | 9 | *<0.0035* | *<0.000045* | 0.0019 | 0.27 | 0.017 | *<0.000005* | 0.00075 | *<0.00005* | 1.4 | *<0.00002* | *<0.000025* | 0.20 | 0.025 | *<0.0000025* | *<0.00003* | 0.00058 | 0.00089 | 0.00062 | 0.0014 | 0.000020 | 0.0020 | CA10011-SEP21 |
| 08-Sep-21 | 10 | | | | | | | | | | | | | | | | | | | | | | CA10043-SEP21 |
| 15-Sep-21 | 11 | 0.020 | *<0.000045* | 0.0011 | 0.16 | 0.0081 | *<0.000005* | 0.00011 | *<0.00005* | 1.1 | *<0.00002* | *<0.000025* | 0.22 | 0.013 | *<0.0000025* | *<0.00003* | 0.0013 | 0.00039 | 0.00055 | 0.00023 | 0.000040 | *<0.001* | CA10083-SEP21 |
| 22-Sep-21 | 12 | | | | | | | | | | | | | | | | | | | | | | CA10135-SEP21 |
| 29-Sep-21 | 13 | 0.012 | *<0.000045* | 0.0010 | 0.16 | 0.0077 | 0.000010 | 0.000080 | *<0.00005* | 1.2 | *<0.00002* | *<0.000025* | 0.18 | 0.015 | *<0.0000025* | *<0.00003* | 0.0011 | 0.00040 | 0.00057 | 0.00026 | 0.000030 | *<0.001* | CA10201-SEP21 |
| 06-Oct-21 | 14 | | | | | | | | | | | | | | | | | | | | | | CA10030-OCT21 |
| 13-Oct-21 | 15 | 0.012 | *<0.000045* | 0.0010 | 0.15 | 0.0067 | *<0.000005* | 0.001180 | 0.00020 | 1.2 | *<0.00002* | *<0.000025* | 0.14 | 0.013 | *<0.0000025* | *<0.00003* | 0.0007 | 0.00030 | 0.00048 | 0.00018 | 0.000020 | *<0.001* | CA10061-OCT21 |
| 20-Oct-21 | 16 | | | | | | | | | | | | | | | | | | | | | | CA10095-OCT21 |
| 27-Oct-21 | 17 | 0.026 | 0.00011 | 0.0015 | 0.22 | 0.0135 | *<0.000005* | 0.005760 | 0.00010 | 1.5 | *<0.00002* | *<0.000025* | 0.13 | 0.018 | *<0.0000025* | *<0.00003* | 0.0024 | 0.00029 | 0.00062 | 0.00063 | 0.000090 | *<0.001* | CA10131-OCT21 |
| 03-Nov-21 | 18 | | | | | | | | | | | | | | | | | | | | | | CA10030-NOV21 |
| 10-Nov-21 | 19 | 0.016 | 0.00024 | 0.0019 | 0.176 | 0.00721 | *<0.000005* | 0.00008 | 0.0001 | 1.35 | *<0.00002* | *<0.000025* | 0.13 | 0.015 | *<0.0000025* | *<0.00003* | 0.00119 | 0.00034 | 0.00057 | 0.00025 | 0.00003 | *<0.001* | CA10081-NOV21 |
| 17-Nov-21 | 20 | | | | | | | | | | | | | | | | | | | | | | CA10130-NOV21 |
| 24-Nov-21 | 21 | 0.014 | *<0.000045* | 0.001 | 0.168 | 0.00751 | *<0.000005* | 0.0122 | 0.0001 | 1.27 | *<0.00002* | *<0.000025* | 0.13 | 0.014 | *<0.0000025* | *<0.00003* | 0.00141 | 0.000223 | 0.00053 | 0.0002 | 0.00003 | *<0.001* | CA10202-NOV21 |
| 01-Dec-21 | 22 | | | | | | | | | | | | | | | | | | | | | | CA10008-DEC21 |
| 08-Dec-21 | 23 | 0.014 | *<0.000045* | 0.001 | 0.162 | 0.00583 | *<0.000005* | 0.00015 | 0.0001 | 1.22 | *<0.00002* | *<0.000025* | 0.45 | 0.0145 | *<0.0000025* | *<0.00003* | 0.00123 | 0.000256 | 0.00059 | 0.00016 | 0.00003 | *<0.001* | CA10041-DEC21 |
| 15-Dec-21 | 24 | | | | | | | | | | | | | | | | | | | | | | CA10110-DEC21 |
| 22-Dec-21 | 25 | 0.012 | *<0.000045* | 0.0013 | 0.192 | 0.00649 | *<0.000005* | 0.0002 | 0.0001 | 1.2 | *<0.00002* | *<0.000025* | 0.09 | 0.0166 | *<0.0000025* | *<0.00003* | 0.00086 | 0.000229 | 0.00055 | 0.00025 | 0.00002 | *<0.001* | CA10162-DEC21 |
| 29-Dec-21 | 26 | | | | | | | | | | | | | | | | | | | | | | CA10218-DEC21 |
| 05-Jan-21 | 27 | 0.008 | *<0.000045* | 0.0010 | 0.17 | 0.0070 | *<0.000005* | 0.000070 | 0.0001 | 1.0 | *<0.00002* | *<0.000025* | 0.07 | 0.014 | *<0.0000025* | *<0.00003* | 0.0009 | 0.00024 | 0.00040 | 0.00011 | *<0.00001* | *<0.001* | CA10033-JAN22 |
| 12-Jan-22 | 28 | | | | | | | | | | | | | | | | | | | | | | CA10070-JAN22 |
| 19-Jan-22 | 29 | 0.009 | *<0.000045* | 0.0010 | 0.16 | 0.0048 | *<0.000005* | 0.000120 | 0.0001 | 1.2 | *<0.00002* | *<0.000025* | 0.27 | 0.014 | *<0.0000025* | *<0.00003* | 0.0008 | 0.00018 | 0.00042 | 0.00014 | *<0.00001* | *<0.001* | CA10131-JAN-22 |
| 26-Jan-22 | 30 | | | | | | | | | | | | | | | | | | | | | | CA10166-JAN22 |
| 02-Feb-22 | 31 | 0.010 | *<0.000045* | 0.0012 | 0.16 | 0.0056 | *<0.000005* | 0.000130 | 0.0001 | 1.0 | *<0.00002* | *<0.000025* | 0.07 | 0.015 | 0.000005 | *<0.00003* | 0.0008 | 0.00020 | 0.00039 | 0.00015 | *<0.00001* | *<0.001* | CA10031-FEB22 |
| 09-Feb-22 | 32 | | | | | | | | | | | | | | | | | | | | | | CA10066-FEB22 |

**Notes:**
Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 3: HC2 Results**
**GB_HC2**
**PAG1 argillite**

| Date | Cycle No | Volume mL | | pH | Cond. | Acidity | Alkalinity | Sulphate | Chloride | Fluoride | Al | Sb | As | Ba | Be | Bi | B | Cd | Ca | Cr | Co | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Input | Output | | | (pH 8.3) | | | | | | | | | | | | | | | | |
| | | | | | umhos/cm | $mgCaCO_3/L$ | $mgCaCO_3/L$ | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 30-Jun-21 | 0 | 1000 | 870 | 8.06 | 67 | *<1* | 12 | 14 | 2.0 | 0.060 | 0.12 | *<0.00045* | 0.0075 | 0.0026 | *<0.0000035* | *<0.000005* | 0.0030 | 0.0000040 | 4.6 | 0.00043 | 0.00021 | 0.0068 |
| 07-Jul-21 | 1 | 1000 | 968 | 7.30 | 67 | *<1* | 5.0 | 20 | *<1* | *<0.03* | 0.051 | *<0.00045* | 0.010 | 0.0020 | *<0.0000035* | *<0.000005* | 0.0050 | 0.000013 | 5.1 | *<0.00004* | 0.00017 | *<0.0001* |
| 14-Jul-21 | 2 | 1000 | 938 | 6.71 | 48 | *<1* | 6.0 | 17 | *<1* | *<0.03* | 0.062 | *<0.00045* | 0.0086 | 0.0019 | *<0.0000035* | *<0.000005* | 0.0030 | 0.0000050 | 4.3 | *<0.00004* | 0.000089 | *<0.0001* |
| 21-Jul-21 | 3 | 1000 | 940 | 7.28 | 35 | *<1* | 5.0 | 11 | *<1* | *<0.03* | 0.060 | *<0.00045* | 0.010 | 0.0013 | *<0.0000035* | *<0.000005* | 0.0050 | 0.0000050 | 2.6 | *<0.00004* | 0.000068 | 0.00050 |
| 27-Jul-21 | 4 | 1000 | 932 | 7.44 | 30 | | | 8.0 | | | | | | | | | | | | | | |
| 04-Aug-21 | 5 | 1000 | 935 | 7.09 | 26 | *<1* | 4 | 6.0 | *<1* | *<0.03* | 0.041 | *<0.00045* | 0.0090 | 0.001 | *<0.0000035* | *<0.000005* | 0.002 | *<0.0000015* | 1.76 | *<0.00004* | 0.000047 | *<0.0001* |
| 11-Aug-21 | 6 | 1000 | 942 | 6.94 | 22 | | | 6.0 | | | | | | | | | | | | | | |
| 18-Aug-21 | 7 | 1000 | 962 | 6.58 | 18 | *<1* | 2.0 | 5.0 | *<1* | *<0.03* | 0.030 | *<0.00045* | 0.0095 | 0.00073 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 1.3 | *<0.00004* | 0.000053 | 0.00030 |
| 25-Aug-21 | 8 | 1000 | 925 | 7.21 | 24 | | | 6.0 | | | | | | | | | | | | | | |
| 01-Sep-21 | 9 | 1000 | 1009 | 6.97 | 19 | *<1* | 4.0 | 3.0 | *<1* | *<0.03* | 0.021 | *<0.00045* | 0.012 | 0.0011 | *<0.0000035* | *<0.000005* | 0.028 | 0.0000090 | 1.7 | 0.000080 | 0.000088 | *<0.0001* |
| 08-Sep-21 | 10 | 1000 | 986 | 6.89 | 15 | | | 3.0 | | | | | | | | | | | | | | |
| 15-Sep-21 | 11 | 1000 | 974 | 6.65 | 12 | *<1* | 2.0 | 3.0 | *<1* | *<0.03* | 0.034 | *<0.00045* | 0.012 | 0.0013 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 1.4 | 0.00010 | 0.000097 | *<0.0001* |
| 22-Sep-21 | 12 | 1000 | 951 | 6.66 | 14 | | | | | | | | | | | | | | | | | |
| 29-Sep-21 | 13 | 1000 | 937 | 6.92 | 13 | *<1* | 2.0 | 3.0 | *<0.5* | *<0.03* | 0.028 | *<0.00045* | 0.011 | 0.00073 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 1.1 | *<0.00004* | 0.000045 | *<0.0001* |
| 06-Oct-21 | 14 | 1000 | 921 | 6.34 | 28 | | | 3.0 | | | | | | | | | | | | | | |
| 13-Oct-21 | 15 | 1000 | 955 | 6.64 | 14 | *<1* | 3.0 | 4.0 | *<0.5* | *<0.03* | 0.025 | *<0.00045* | 0.009 | 0.00077 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 1.2 | *<0.00004* | 0.000061 | 0.00030 |
| 20-Oct-21 | 16 | 1000 | 952 | 6.68 | 15 | | | 4.0 | | | | | | | | | | | | | | |
| 27-Oct-21 | 17 | 1000 | 933 | 6.74 | 18 | *<1* | 3.0 | 4.0 | *<0.5* | *<0.03* | 0.072 | *<0.00045* | 0.014 | 0.00116 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 1.6 | 0.00009 | 0.000088 | *<0.0001* |
| 03-Nov-21 | 18 | 1000 | 938 | 6.74 | 17 | | | 4.0 | | | | | | | | | | | | | | |
| 10-Nov-21 | 19 | 1000 | 938 | 6.63 | 16 | *<1* | 2 | 3 | *<0.5* | *<0.03* | 0.033 | *<0.00045* | 0.0114 | 0.00109 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000005 | 1.84 | *<0.00004* | 0.00007 | *<0.0001* |
| 17-Nov-21 | 20 | 1000 | 916 | 6.74 | 16 | | | 4 | | | | | | | | | | | | | | |
| 24-Nov-21 | 21 | 1000 | 933 | 6.71 | 15 | *<1* | 2 | 4 | *<0.5* | *<0.03* | 0.026 | *<0.00045* | 0.0111 | 0.0011 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000003 | 1.73 | *<0.00004* | 0.000106 | *<0.0001* |
| 01-Dec-21 | 22 | 1000 | 928 | 6.72 | 17 | | | 5 | | | | | | | | | | | | | | |
| 08-Dec-21 | 23 | 1000 | 930 | 6.69 | 15 | *<1* | 2 | 4 | *<0.5* | *<0.03* | 0.026 | *<0.00045* | 0.0107 | 0.00102 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000003 | 1.75 | *<0.00004* | 0.000041 | *<0.0001* |
| 15-Dec-21 | 24 | 1000 | 925 | 6.58 | 19 | | | 5 | | | | | | | | | | | | | | |
| 22-Dec-21 | 25 | 1000 | 945 | 6.51 | 19 | *<1* | 2 | 5 | *<0.5* | *<0.03* | 0.03 | *<0.00045* | 0.0126 | 0.00113 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000008 | 1.83 | *<0.00004* | 0.000077 | *<0.0001* |
| 29-Dec-21 | 26 | 1000 | 939 | 6.56 | 13 | | | 3 | | | | | | | | | | | | | | |
| 05-Jan-21 | 27 | 1000 | 956 | 6.58 | 13 | *<1* | 2.0 | 4.0 | *<0.5* | *<0.03* | 0.018 | *<0.00045* | 0.011 | 0.00113 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 1.6 | *<0.00004* | 0.000075 | *<0.0001* |
| 12-Jan-22 | 28 | 1000 | 924 | 6.66 | 16 | | | 4.0 | | | | | | | | | | | | | | |
| 19-Jan-22 | 29 | 1000 | 916 | 6.59 | 17 | *<1* | 2.0 | 5.0 | *<0.5* | *<0.03* | 0.024 | *<0.00045* | 0.012 | 0.00117 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 2.0 | *<0.00004* | 0.000101 | *<0.0001* |
| 26-Jan-22 | 30 | 1000 | 937 | 6.32 | 19 | | | 5 | | | | | | | | | | | | | | |
| 02-Feb-22 | 31 | 1000 | 932 | 6.52 | 18 | *<1* | *<1* | 6 | *<0.5* | *<0.03* | 0.018 | *<0.00045* | 0.0101 | 0.00138 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000006 | 2.16 | 0.00012 | 0.000085 | *<0.0001* |
| 09-Feb-22 | 32 | 1000 | 952 | 6.57 | 18 | | | 5 | | | | | | | | | | | | | | |

**Notes:**
Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 3: HC2 Results**
**GB_HC2**
**PAG1 argillite**

| Date | Cycle No | Fe | Pb | Li | Mg | Mn | Hg | Mo | Ni | K | Se | Ag | Na | Sr | Tl | Sn | Ti | U | V | W | Y | Zn | SGS File # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | |
| 30-Jun-21 | 0 | 0.040 | 0.0015 | 0.0049 | 0.59 | 0.016 | *<0.000005* | 0.0010 | 0.0038 | 4.9 | 0.000050 | *<0.000025* | 4.6 | 0.049 | 0.000011 | 0.00020 | 0.0013 | 0.000050 | 0.00042 | 0.00064 | 0.000040 | 0.037 | CA10066-JUN21 |
| 07-Jul-21 | 1 | *<0.0035* | 0.00016 | 0.0032 | 0.66 | 0.022 | *<0.000005* | 0.0012 | 0.0052 | 3.6 | 0.000060 | *<0.000025* | 3.9 | 0.072 | 0.0000060 | *<0.00003* | 0.00055 | 0.00014 | 0.00024 | 0.00078 | 0.000050 | *<0.001* | CA10038-JUL21 |
| 14-Jul-21 | 2 | 0.012 | *<0.000045* | 0.0031 | 0.50 | 0.016 | *<0.000005* | 0.00055 | 0.0017 | 2.9 | *<0.00002* | *<0.000025* | 2.8 | 0.054 | 0.0000060 | *<0.00003* | 0.0013 | 0.00011 | 0.00029 | 0.00068 | 0.000050 | *<0.001* | CA10069-JUL21 |
| 21-Jul-21 | 3 | 0.021 | *<0.000045* | 0.0032 | 0.33 | 0.011 | *<0.000005* | 0.0016 | 0.0010 | 1.9 | *<0.00002* | *<0.000025* | 2.3 | 0.039 | *<0.0000025* | *<0.00003* | 0.0013 | 0.000074 | 0.00030 | 0.00066 | 0.000040 | *<0.001* | CA10170-JUL21 |
| 27-Jul-21 | 4 | | | | | | | | | | | | | | | | | | | | | | CA10229-JUL21 |
| 04-Aug-21 | 5 | 0.011 | *<0.000045* | 0.0013 | 0.218 | 0.00899 | *<0.000005* | 0.0005 | 0.0013 | 1.59 | *<0.00002* | *<0.000025* | 1.2 | 0.026 | *<0.0000025* | *<0.00003* | 0.00073 | 0.000077 | 0.00027 | 0.00043 | 0.000030 | *<0.001* | CA10034-AUG21 |
| 11-Aug-21 | 6 | | | | | | | | | | | | | | | | | | | | | | CA10072-AUG21 |
| 18-Aug-21 | 7 | 0.0070 | *<0.000045* | 0.00090 | 0.22 | 0.0082 | *<0.000005* | 0.00037 | 0.00030 | 1.3 | *<0.00002* | *<0.000025* | 0.67 | 0.024 | *<0.0000025* | *<0.00003* | 0.00051 | 0.000064 | 0.00021 | 0.00025 | *<0.00001* | *<0.001* | CA10107-AUG21 |
| 25-Aug-21 | 8 | | | | | | | | | | | | | | | | | | | | | | CA10240-AUG21 |
| 01-Sep-21 | 9 | 0.010 | 0.00013 | 0.0016 | 0.29 | 0.013 | *<0.000005* | 0.00064 | *<0.00005* | 1.3 | *<0.00002* | *<0.000025* | 0.34 | 0.025 | *<0.0000025* | *<0.00003* | 0.00034 | 0.00015 | 0.00021 | 0.00056 | 0.000020 | 0.0030 | CA10011-SEP21 |
| 08-Sep-21 | 10 | | | | | | | | | | | | | | | | | | | | | | CA10043-SEP21 |
| 15-Sep-21 | 11 | 0.012 | *<0.000045* | 0.0011 | 0.22 | 0.0094 | *<0.000005* | 0.00022 | 0.00020 | 1.1 | *<0.00002* | *<0.000025* | 0.31 | 0.019 | *<0.0000025* | *<0.00003* | 0.00098 | 0.000055 | 0.00021 | 0.00013 | 0.000030 | *<0.001* | CA10083-SEP21 |
| 22-Sep-21 | 12 | | | | | | | | | | | | | | | | | | | | | | CA10135-SEP21 |
| 29-Sep-21 | 13 | 0.0080 | *<0.000045* | 0.0010 | 0.21 | 0.0069 | 0.000020 | 0.00024 | *<0.00005* | 1.1 | *<0.00002* | *<0.000025* | 0.28 | 0.018 | *<0.0000025* | *<0.00003* | 0.00083 | 0.000030 | 0.00012 | 0.000090 | 0.000020 | *<0.001* | CA10201-SEP21 |
| 06-Oct-21 | 14 | | | | | | | | | | | | | | | | | | | | | | CA10030-OCT21 |
| 13-Oct-21 | 15 | 0.0120 | *<0.000045* | 0.0011 | 0.21 | 0.0076 | *<0.000005* | 0.00021 | 0.00020 | 1.1 | *<0.00002* | *<0.000025* | 0.21 | 0.020 | *<0.0000025* | *<0.00003* | 0.00164 | 0.000046 | 0.00017 | 0.000110 | *<0.00001* | *<0.001* | CA10061-OCT21 |
| 20-Oct-21 | 16 | | | | | | | | | | | | | | | | | | | | | | CA10095-OCT21 |
| 27-Oct-21 | 17 | 0.0200 | 0.00010 | 0.0016 | 0.26 | 0.0125 | *<0.000005* | 0.00055 | 0.00030 | 1.4 | *<0.00002* | *<0.000025* | 0.18 | 0.023 | 0.000005 | *<0.00003* | 0.00167 | 0.000053 | 0.00026 | 0.000230 | 0.000040 | *<0.001* | CA10131-OCT21 |
| 03-Nov-21 | 18 | | | | | | | | | | | | | | | | | | | | | | CA10030-NOV21 |
| 10-Nov-21 | 19 | 0.011 | *<0.000045* | 0.0015 | 0.283 | 0.0092 | *<0.000005* | 0.00353 | 0.0002 | 1.33 | *<0.00002* | *<0.000025* | 0.19 | 0.0256 | *<0.0000025* | *<0.00003* | 0.00057 | 0.000056 | 0.0002 | 0.00011 | 0.00003 | *<0.001* | CA10081-NOV21 |
| 17-Nov-21 | 20 | | | | | | | | | | | | | | | | | | | | | | CA10130-NOV21 |
| 24-Nov-21 | 21 | 0.008 | *<0.000045* | 0.001 | 0.277 | 0.00851 | *<0.000005* | 0.00046 | 0.0002 | 1.32 | *<0.00002* | *<0.000025* | 0.17 | 0.0228 | 0.000006 | *<0.00003* | 0.00062 | 0.000048 | 0.00022 | 0.00013 | 0.00003 | *<0.001* | CA10202-NOV21 |
| 01-Dec-21 | 22 | | | | | | | | | | | | | | | | | | | | | | CA10008-DEC21 |
| 08-Dec-21 | 23 | 0.009 | *<0.000045* | 0.0012 | 0.247 | 0.00731 | *<0.000005* | 0.00034 | 0.0002 | 1.18 | *<0.00002* | *<0.000025* | 1.04 | 0.0229 | 0.000005 | *<0.00003* | 0.00044 | 0.000042 | 0.00037 | 0.00012 | 0.00005 | 0.002 | CA10041-DEC21 |
| 15-Dec-21 | 24 | | | | | | | | | | | | | | | | | | | | | | CA10110-DEC21 |
| 22-Dec-21 | 25 | 0.013 | 0.00019 | 0.0013 | 0.291 | 0.00941 | *<0.000005* | 0.00079 | 0.0002 | 1.21 | *<0.00002* | *<0.000025* | 0.14 | 0.0266 | *<0.0000025* | *<0.00003* | 0.00064 | 0.000038 | 0.00021 | 0.00022 | 0.00003 | 0.002 | CA10162-DEC21 |
| 29-Dec-21 | 26 | | | | | | | | | | | | | | | | | | | | | | CA10218-DEC21 |
| 05-Jan-21 | 27 | *<0.0035* | *<0.000045* | 0.0012 | 0.23 | 0.0084 | *<0.000005* | 0.00037 | 0.0003 | 1.0 | *<0.00002* | *<0.000025* | 0.10 | 0.021 | *<0.0000025* | *<0.00003* | 0.00032 | 0.000040 | 0.00015 | 0.000060 | 0.000020 | *<0.001* | CA10033-JAN22 |
| 12-Jan-22 | 28 | | | | | | | | | | | | | | | | | | | | | | CA10070-JAN22 |
| 19-Jan-22 | 29 | *<0.0035* | *<0.000045* | 0.0013 | 0.30 | 0.0080 | *<0.000005* | 0.00052 | 0.0003 | 1.4 | *<0.00002* | *<0.000025* | 0.23 | 0.028 | *<0.0000025* | *<0.00003* | 0.00041 | 0.000049 | 0.00019 | 0.000090 | 0.000030 | *<0.001* | CA10131-JAN-22 |
| 26-Jan-22 | 30 | | | | | | | | | | | | | | | | | | | | | | CA10166-JAN22 |
| 02-Feb-22 | 31 | 0.007 | *<0.000045* | 0.0016 | 0.311 | 0.00925 | *<0.000005* | 0.00833 | 0.0004 | 1.13 | *<0.00002* | *<0.000025* | 0.14 | 0.0289 | 0.000009 | *<0.00003* | 0.00053 | 0.000035 | 0.00015 | 0.00008 | 0.00003 | *<0.001* | CA10031-FEB22 |
| 09-Feb-22 | 32 | | | | | | | | | | | | | | | | | | | | | | CA10066-FEB22 |

**Notes:**
Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 4: HC3 Results**
**GB_HC3**
**NPAG greywacke**

| Date | Cycle No | Volume mL | | pH | Cond. | Acidity | Alkalinity | Sulphate | Chloride | Fluoride | Al | Sb | As | Ba | Be | Bi | B | Cd | Ca | Cr | Co | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Input | Output | | | (pH 8.3) | | | | | | | | | | | | | | | | |
| | | | | | umhos/cm | mgCaCO$_3$/L | mgCaCO$_3$/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 30-Jun-21 | 0 | 1000 | 860 | 9.51 | 58 | < 2 | 26 | 4.0 | *<1* | *<0.03* | 0.18 | 0.0010 | 0.033 | 0.00050 | *<0.0000035* | *<0.000005* | 0.0050 | *<0.0000015* | 1.2 | *<0.00004* | 0.00047 | 0.0023 |
| 07-Jul-21 | 1 | 1000 | 927 | 9.15 | 44 | < 2 | 14 | 4.0 | *<1* | *<0.03* | 0.18 | 0.0018 | 0.078 | 0.00052 | 0.0000070 | *<0.000005* | 0.0060 | 0.000010 | 0.39 | 0.00018 | 0.00023 | 0.00060 |
| 14-Jul-21 | 2 | 1000 | 919 | 8.45 | 34 | < 2 | 14 | 3.0 | *<1* | *<0.03* | 0.18 | 0.0014 | 0.084 | 0.00057 | *<0.0000035* | *<0.000005* | 0.0050 | *<0.0000015* | 0.34 | *<0.00004* | 0.00016 | 0.00040 |
| 21-Jul-21 | 3 | 1000 | 925 | 9.31 | 34 | < 2 | 13 | 2.0 | *<1* | *<0.03* | 0.18 | 0.0013 | 0.11 | 0.00059 | 0.0000080 | *<0.000005* | 0.0070 | 0.0000060 | 0.30 | 0.00012 | 0.00016 | 0.0065 |
| 27-Jul-21 | 4 | 1000 | 922 | 9.4 | 29 | | | 2.0 | | | | | | | | | | | | | | |
| 04-Aug-21 | 5 | 1000 | 920 | 8.13 | 29 | < 2 | 10 | *<1* | *<1* | *<0.03* | 0.12 | 0.0009 | 0.11 | 0.00056 | *<0.0000035* | *<0.000005* | 0.003 | *<0.0000015* | 0.27 | *<0.00004* | 0.000097 | *<0.0001* |
| 11-Aug-21 | 6 | 1000 | 935 | 7.78 | 24 | | | *<1* | | | | | | | | | | | | | | |
| 18-Aug-21 | 7 | 1000 | 880 | 8.5 | 18 | < 2 | 8.0 | *<1* | *<1* | *<0.03* | 0.089 | *<0.00045* | 0.083 | 0.00033 | *<0.0000035* | *<0.000005* | 0.0030 | *<0.0000015* | 0.21 | 0.00011 | 0.000062 | *<0.0001* |
| 25-Aug-21 | 8 | 1000 | 901 | 8.88 | 22 | | | *<1* | | | | | | | | | | | | | | |
| 01-Sep-21 | 9 | 1000 | 1042 | 7.38 | 20 | < 2 | 11 | *<1* | *<1* | *<0.03* | 0.060 | 0.0015 | 0.081 | 0.00056 | *<0.0000035* | *<0.000005* | 0.043 | 0.0000030 | 0.70 | 0.00011 | 0.000075 | *<0.0001* |
| 08-Sep-21 | 10 | 1000 | 952 | 7.26 | 13 | | | *<1* | | | | | | | | | | | | | | |
| 15-Sep-21 | 11 | 1000 | 942 | 7.08 | 11 | < 2 | 5.0 | *<1* | *<1* | *<0.03* | 0.075 | *<0.00045* | 0.060 | 0.0010 | *<0.0000035* | *<0.000005* | *<0.001* | 0.0000030 | 0.53 | 0.00010 | 0.000066 | 0.00030 |
| 22-Sep-21 | 12 | 1000 | 931 | 7.11 | 12 | | | | | | | | | | | | | | | | | |
| 29-Sep-21 | 13 | 1000 | 913 | 7.38 | 10 | < 2 | 5.0 | *<1* | *<0.5* | *<0.03* | 0.066 | *<0.00045* | 0.055 | 0.00042 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.54 | *<0.00004* | 0.000057 | *<0.0001* |
| 06-Oct-21 | 14 | 1000 | 927 | 7.32 | 16 | | | *<1* | | | | | | | | | | | | | | |
| 13-Oct-21 | 15 | 1000 | 938 | 7.07 | 10 | *<1* | 5.0 | *<1* | *<0.5* | *<0.03* | 0.060 | *<0.00045* | 0.042 | 0.00030 | 0.000007 | *<0.000005* | *<0.001* | *<0.0000015* | 0.56 | 0.00012 | 0.000043 | 0.00030 |
| 20-Oct-21 | 16 | 1000 | 934 | 7.39 | 13 | | | *<1* | | | | | | | | | | | | | | |
| 27-Oct-21 | 17 | 1000 | 906 | 6.96 | 9 | *<1* | 3.0 | *<1* | *<0.5* | *<0.03* | 0.050 | *<0.00045* | 0.040 | 0.00033 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.65 | *<0.00004* | 0.000075 | 0.00020 |
| 03-Nov-21 | 18 | 1000 | 941 | 7.07 | 10 | | | *<1* | | | | | | | | | | | | | | |
| 10-Nov-21 | 19 | 1000 | 911 | 6.94 | 8 | *<1* | 3 | *<1* | *<0.5* | *<0.03* | 0.054 | *<0.00045* | 0.0472 | 0.00039 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.8 | 0.0001 | 0.000062 | *<0.0001* |
| 17-Nov-21 | 20 | 1000 | 919 | 7.33 | 9 | | | *<1* | | | | | | | | | | | | | | |
| 24-Nov-21 | 21 | 1000 | 920 | 6.9 | 8 | *<1* | 3 | *<1* | *<0.5* | *<0.03* | 0.041 | *<0.00045* | 0.0412 | 0.00043 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.76 | *<0.00004* | 0.000067 | *<0.0001* |
| 01-Dec-21 | 22 | 1000 | 927 | 6.92 | 10 | | | *<1* | | | | | | | | | | | | | | |
| 08-Dec-21 | 23 | 1000 | 933 | 6.98 | 8 | *<1* | 3 | *<1* | *<0.5* | *<0.03* | 0.054 | *<0.00045* | 0.0434 | 0.0004 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000005 | 0.87 | 0.00035 | 0.000048 | *<0.0001* |
| 15-Dec-21 | 24 | 1000 | 936 | 7.06 | 9 | | | *<1* | | | | | | | | | | | | | | |
| 22-Dec-21 | 25 | 1000 | 918 | 6.7 | 11 | *<1* | 3 | *<1* | *<0.5* | *<0.03* | 0.038 | *<0.00045* | 0.0413 | 0.00048 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000009 | 0.89 | *<0.00004* | 0.000062 | 0.0002 |
| 29-Dec-21 | 26 | 1000 | 924 | 6.64 | 6 | | | *<1* | | | | | | | | | | | | | | |
| 05-Jan-21 | 27 | 1000 | 948 | 6.99 | 6 | *<1* | 3.0 | *<1* | *<0.5* | *<0.03* | 0.039 | *<0.00045* | 0.037 | 0.00042 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.83 | *<0.00004* | 0.000040 | *<0.0001* |
| 12-Jan-22 | 28 | 1000 | 909 | 6.82 | 11 | | | *<1* | | | | | | | | | | | | | | |
| 19-Jan-22 | 29 | 1000 | 910 | 7.11 | 8 | *<1* | 3.0 | *<1* | *<0.5* | *<0.03* | 0.044 | *<0.00045* | 0.035 | 0.00047 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000006 | 0.89 | *<0.00004* | 0.000059 | *<0.0001* |
| 26-Jan-22 | 30 | 1000 | 929 | 6.85 | 10 | | | *<1* | | | | | | | | | | | | | | |
| 02-Feb-22 | 31 | 1000 | 928 | 6.85 | 7 | *<1* | 3 | *<1* | *<0.5* | *<0.03* | 0.035 | *<0.00045* | 0.0335 | 0.00053 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000006 | 0.98 | *<0.00004* | 0.000071 | *<0.0001* |
| 09-Feb-22 | 32 | 1000 | 930 | 6.71 | 9 | | | *<1* | | | | | | | | | | | | | | |

**Notes:**
Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 3: HC2 Results**
**GB_HC2**
**PAG1 argillite**

| Date | Cycle No | Fe | Pb | Li | Mg | Mn | Hg | Mo | Ni | K | Se | Ag | Na | Sr | Tl | Sn | Ti | U | V | W | Y | Zn | SGS File # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | |
| 30-Jun-21 | 0 | 0.019 | *<0.000045* | 0.0024 | 0.10 | 0.0038 | *<0.000005* | 0.00039 | 0.0038 | 2.0 | 0.000050 | *<0.000025* | 9.9 | 0.013 | *<0.0000025* | 0.00016 | 0.0014 | 0.000046 | 0.0018 | 0.0016 | 0.00011 | 0.0020 | CA10066-JUN21 |
| 07-Jul-21 | 1 | 0.026 | 0.00022 | 0.0016 | 0.054 | 0.0019 | *<0.000005* | 0.0018 | 0.0096 | 1.0 | *<0.00002* | *<0.000025* | 8.1 | 0.0054 | *<0.0000025* | 0.00016 | 0.0017 | 0.00021 | 0.0019 | 0.0020 | 0.000080 | 0.0020 | CA10038-JUL21 |
| 14-Jul-21 | 2 | 0.024 | *<0.000045* | 0.0016 | 0.048 | 0.0018 | *<0.000005* | 0.00070 | 0.0047 | 0.76 | *<0.00002* | *<0.000025* | 7.8 | 0.0040 | *<0.0000025* | 0.00011 | 0.0020 | 0.00023 | 0.0018 | 0.0013 | 0.000090 | *<0.001* | CA10069-JUL21 |
| 21-Jul-21 | 3 | 0.046 | 0.00054 | 0.0019 | 0.049 | 0.0026 | *<0.000005* | 0.00024 | 0.0028 | 0.46 | *<0.00002* | *<0.000025* | 7.2 | 0.0043 | *<0.0000025* | 0.00022 | 0.0030 | 0.00021 | 0.0018 | 0.0010 | 0.00015 | *<0.001* | CA10170-JUL21 |
| 27-Jul-21 | 4 | | | | | | | | | | | | | | | | | | | | | | CA10229-JUL21 |
| 04-Aug-21 | 5 | 0.027 | 0.00011 | 0.0009 | 0.035 | 0.00213 | *<0.000005* | 0.00011 | 0.0016 | 0.639 | *<0.00002* | *<0.000025* | 4.96 | 0.00376 | *<0.0000025* | 0.000060 | 0.0020 | 0.00022 | 0.0013 | 0.00047 | 0.000070 | *<0.001* | CA10034-AUG21 |
| 11-Aug-21 | 6 | | | | | | | | | | | | | | | | | | | | | | CA10072-AUG21 |
| 18-Aug-21 | 7 | 0.017 | *<0.000045* | 0.00090 | 0.034 | 0.0016 | *<0.000005* | 0.000080 | 0.00030 | 0.54 | *<0.00002* | *<0.000025* | 3.6 | 0.0036 | *<0.0000025* | *<0.00003* | 0.0013 | 0.00022 | 0.00088 | 0.00031 | 0.000030 | *<0.001* | CA10107-AUG21 |
| 25-Aug-21 | 8 | | | | | | | | | | | | | | | | | | | | | | CA10240-AUG21 |
| 01-Sep-21 | 9 | 0.044 | 0.00017 | 0.0022 | 0.081 | 0.0065 | *<0.000005* | 0.00035 | 0.00010 | 0.87 | *<0.00002* | *<0.000025* | 2.9 | 0.012 | *<0.0000025* | 0.000070 | 0.00046 | 0.00042 | 0.00059 | 0.00043 | *<0.00001* | 0.0020 | CA10011-SEP21 |
| 08-Sep-21 | 10 | | | | | | | | | | | | | | | | | | | | | | CA10043-SEP21 |
| 15-Sep-21 | 11 | 0.030 | 0.00022 | 0.0013 | 0.069 | 0.0043 | *<0.000005* | 0.00025 | 0.00020 | 0.79 | *<0.00002* | *<0.000025* | 1.9 | 0.0072 | *<0.0000025* | 0.000070 | 0.0012 | 0.00019 | 0.00054 | 0.00010 | 0.000020 | *<0.001* | CA10083-SEP21 |
| 22-Sep-21 | 12 | | | | | | | | | | | | | | | | | | | | | | CA10135-SEP21 |
| 29-Sep-21 | 13 | 0.015 | *<0.000045* | 0.0014 | 0.062 | 0.0031 | 0.000010 | 0.00021 | 0.00020 | 0.82 | *<0.00002* | *<0.000025* | 1.4 | 0.010 | *<0.0000025* | *<0.00003* | 0.0011 | 0.00019 | 0.00050 | 0.00015 | 0.000020 | *<0.001* | CA10201-SEP21 |
| 06-Oct-21 | 14 | | | | | | | | | | | | | | | | | | | | | | CA10030-OCT21 |
| 13-Oct-21 | 15 | 0.011 | *<0.000045* | 0.0014 | 0.079 | 0.0027 | *<0.000005* | 0.00008 | 0.00020 | 0.92 | *<0.00002* | *<0.000025* | 1.0 | 0.011 | *<0.0000025* | *<0.00003* | 0.0009 | 0.00016 | 0.00051 | 0.00017 | 0.000020 | *<0.001* | CA10061-OCT21 |
| 20-Oct-21 | 16 | | | | | | | | | | | | | | | | | | | | | | CA10095-OCT21 |
| 27-Oct-21 | 17 | 0.011 | *<0.000045* | 0.0012 | 0.085 | 0.0036 | *<0.000005* | 0.00020 | 0.00020 | 0.87 | *<0.00002* | *<0.000025* | 0.7 | 0.011 | *<0.0000025* | *<0.00003* | 0.0009 | 0.00012 | 0.00040 | 0.00023 | 0.000020 | *<0.001* | CA10131-OCT21 |
| 03-Nov-21 | 18 | | | | | | | | | | | | | | | | | | | | | | CA10030-NOV21 |
| 10-Nov-21 | 19 | 0.013 | *<0.000045* | 0.0017 | 0.106 | 0.00381 | *<0.000005* | 0.00013 | 0.0002 | 1.04 | *<0.00002* | *<0.000025* | 0.67 | 0.0137 | *<0.0000025* | *<0.00003* | 0.00082 | 0.000153 | 0.00045 | 0.00013 | 0.00002 | *<0.001* | CA10081-NOV21 |
| 17-Nov-21 | 20 | | | | | | | | | | | | | | | | | | | | | | CA10130-NOV21 |
| 24-Nov-21 | 21 | 0.008 | *<0.000045* | 0.001 | 0.1 | 0.00401 | *<0.000005* | 0.00016 | 0.0002 | 0.922 | *<0.00002* | *<0.000025* | 0.48 | 0.012 | *<0.0000025* | *<0.00003* | 0.00064 | 0.000094 | 0.00041 | 0.00012 | *<0.00001* | *<0.001* | CA10202-NOV21 |
| 01-Dec-21 | 22 | | | | | | | | | | | | | | | | | | | | | | CA10008-DEC21 |
| 08-Dec-21 | 23 | 0.035 | *<0.000045* | 0.0012 | 0.107 | 0.139 | *<0.000005* | 0.00026 | 0.0001 | 0.963 | *<0.00002* | *<0.000025* | 0.88 | 0.014 | 0.000005 | 0.0001 | 0.00095 | 0.000125 | 0.00072 | 0.00011 | *<0.00001* | *<0.001* | CA10041-DEC21 |
| 15-Dec-21 | 24 | | | | | | | | | | | | | | | | | | | | | | CA10110-DEC21 |
| 22-Dec-21 | 25 | 0.012 | *<0.000045* | 0.0013 | 0.126 | 0.004 | *<0.000005* | 0.00099 | 0.0002 | 0.905 | *<0.00002* | *<0.000025* | 0.37 | 0.0152 | *<0.0000025* | *<0.00003* | 0.00045 | 0.000125 | 0.00038 | 0.00061 | *<0.00001* | 0.002 | CA10162-DEC21 |
| 29-Dec-21 | 26 | | | | | | | | | | | | | | | | | | | | | | CA10218-DEC21 |
| 05-Jan-21 | 27 | *<0.0035* | *<0.000045* | 0.0009 | 0.106 | 0.0038 | *<0.000005* | 0.00026 | 0.00010 | 0.76 | *<0.00002* | *<0.000025* | 0.3 | 0.013 | *<0.0000025* | *<0.00003* | 0.0004 | 0.00010 | 0.00031 | 0.00011 | *<0.00001* | *<0.001* | CA10033-JAN22 |
| 12-Jan-22 | 28 | | | | | | | | | | | | | | | | | | | | | | CA10070-JAN22 |
| 19-Jan-22 | 29 | 0.009 | *<0.000045* | 0.0011 | 0.131 | 0.0039 | *<0.000005* | 0.00015 | 0.00020 | 0.98 | *<0.00002* | *<0.000025* | 0.5 | 0.015 | 0.000005 | *<0.00003* | 0.0005 | 0.00009 | 0.00036 | 0.00009 | 0.000030 | *<0.001* | CA10131-JAN-22 |
| 26-Jan-22 | 30 | | | | | | | | | | | | | | | | | | | | | | CA10166-JAN22 |
| 02-Feb-22 | 31 | 0.011 | *<0.000045* | 0.0011 | 0.132 | 0.00517 | *<0.000005* | 0.00663 | 0.0002 | 0.831 | *<0.00002* | *<0.000025* | 0.25 | 0.016 | *<0.0000025* | *<0.00003* | 0.00051 | 0.000087 | 0.0003 | 0.00009 | *<0.00001* | *<0.001* | CA10031-FEB22 |
| 09-Feb-22 | 32 | | | | | | | | | | | | | | | | | | | | | | CA10066-FEB22 |

**Notes:**
Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 5: HC4 Results**

**GB_HC4**

**PAG1 greywacke**

| Date | Cycle No | Volume mL | | pH | Cond. | Acidity | Alkalinity | Sulphate | Chloride | Fluoride | Al | Sb | As | Ba | Be | Bi | B | Cd | Ca | Cr | Co | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Input | Output | | | (pH 8.3) | | | | | | | | | | | | | | | | |
| | | | | | umhos/cm | $mgCaCO_3/L$ | $mgCaCO_3/L$ | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 30-Jun-21 | 0 | 1000 | 836 | 7.42 | 70 | <1 | 9.0 | 21 | <1 | <0.03 | 0.053 | <0.00045 | 0.014 | 0.00055 | <0.0000035 | <0.000005 | 0.0040 | 0.0000050 | 1.2 | <0.00004 | 0.00042 | 0.0012 |
| 07-Jul-21 | 1 | 1000 | 956 | 6.58 | 72 | <1 | 2.0 | 28 | <1 | <0.03 | 0.027 | <0.00045 | 0.018 | 0.00093 | <0.0000035 | <0.000005 | 0.0060 | 0.000012 | 1.9 | <0.00004 | 0.00087 | <0.0001 |
| 14-Jul-21 | 2 | 1000 | 924 | 6.48 | 61 | 2.0 | 2.0 | 25 | <1 | <0.03 | 0.061 | <0.00045 | 0.018 | 0.0011 | <0.0000035 | <0.000005 | 0.0030 | <0.0000015 | 2.5 | <0.00004 | 0.00044 | <0.0001 |
| 21-Jul-21 | 3 | 1000 | 928 | 6.67 | 42 | <1 | 2.0 | 16 | <1 | <0.03 | 0.070 | <0.00045 | 0.025 | 0.00064 | <0.0000035 | <0.000005 | 0.0060 | <0.0000015 | 1.2 | <0.00004 | 0.00022 | 0.0071 |
| 27-Jul-21 | 4 | 1000 | 898 | 7.56 | 32 | | | 10 | | | | | | | | | | | | | | |
| 04-Aug-21 | 5 | 1000 | 908 | 6.54 | 26 | <1 | 2.0 | 8.0 | <1 | <0.03 | 0.047 | <0.00045 | 0.024 | 0.00045 | <0.0000035 | <0.000005 | 0.0030 | 0.0000030 | 0.48 | <0.00004 | 0.00013 | <0.0001 |
| 11-Aug-21 | 6 | 1000 | 950 | 7.26 | 29 | | | 7.0 | | | | | | | | | | | | | | |
| 18-Aug-21 | 7 | 1000 | 951 | 6.84 | 17 | <1 | 2.0 | 5.0 | <1 | <0.03 | 0.047 | <0.00045 | 0.026 | 0.00030 | <0.0000035 | <0.000005 | 0.0030 | 0.0000030 | 0.46 | 0.000090 | 0.00011 | <0.0001 |
| 25-Aug-21 | 8 | 1000 | 923 | 7.19 | 23 | | | 7.0 | | | | | | | | | | | | | | |
| 01-Sep-21 | 9 | 1000 | 999 | 6.9 | 17 | <1 | 3.0 | 4.0 | <1 | <0.03 | 0.017 | <0.00045 | 0.024 | 0.00059 | <0.0000035 | <0.000005 | 0.045 | <0.0000015 | 0.80 | <0.00004 | 0.00015 | <0.0001 |
| 08-Sep-21 | 10 | 1000 | 953 | 6.88 | 14 | | | 3.0 | | | | | | | | | | | | | | |
| 15-Sep-21 | 11 | 1000 | 948 | 6.67 | 12 | 2.0 | <1 | 3.0 | <1 | <0.03 | 0.038 | <0.00045 | 0.024 | 0.00056 | <0.0000035 | <0.000005 | <0.001 | <0.0000015 | 0.66 | <0.00004 | 0.00016 | <0.0001 |
| 22-Sep-21 | 12 | 1000 | 941 | 6.66 | 12 | | | | | | | | | | | | | | | | | |
| 29-Sep-21 | 13 | 1000 | 890 | 6.77 | 14 | <1 | 2.0 | 4.0 | <0.5 | <0.03 | 0.037 | <0.00045 | 0.022 | 0.00058 | <0.0000035 | <0.000005 | <0.001 | <0.0000015 | 0.70 | 0.000090 | 0.00012 | <0.0001 |
| 06-Oct-21 | 14 | 1000 | 926 | 6.53 | 13 | | | 3.0 | | | | | | | | | | | | | | |
| 13-Oct-21 | 15 | 1000 | 938 | 6.61 | 11 | <1 | <1 | 4.0 | <0.5 | <0.03 | 0.030 | <0.00045 | 0.019 | 0.00039 | <0.0000035 | <0.000005 | <0.001 | <0.0000015 | 0.68 | <0.00004 | 0.00008 | 0.00020 |
| 20-Oct-21 | 16 | 1000 | 932 | 6.5 | 12 | | | 4.0 | | | | | | | | | | | | | | |
| 27-Oct-21 | 17 | 1000 | 936 | 6.89 | 12 | <1 | 2.0 | 3.0 | <0.5 | <0.03 | 0.046 | <0.00045 | 0.025 | 0.00056 | 0.000007 | <0.000005 | <0.001 | 0.0000030 | 0.58 | <0.00004 | 0.00023 | <0.0001 |
| 03-Nov-21 | 18 | 1000 | 932 | 6.38 | 16 | | | 3.0 | | | | | | | | | | | | | | |
| 10-Nov-21 | 19 | 1000 | 933 | 6.4 | 9 | 3 | <1 | <1 | <0.5 | <0.03 | 0.033 | <0.00045 | 0.0231 | 0.00056 | <0.0000035 | <0.000005 | <0.001 | 0.000006 | 0.81 | 0.00012 | 0.000184 | <0.0001 |
| 17-Nov-21 | 20 | 1000 | 913 | 6.9 | 12 | | | 3 | | | | | | | | | | | | | | |
| 24-Nov-21 | 21 | 1000 | 926 | 6.28 | 9 | 2 | <1 | 3 | <0.5 | <0.03 | 0.021 | <0.00045 | 0.0218 | 0.00058 | <0.0000035 | <0.000005 | <0.001 | 0.000011 | 0.83 | <0.00004 | 0.000223 | <0.0001 |
| 01-Dec-21 | 22 | 1000 | 951 | 6.26 | 11 | | | 3 | | | | | | | | | | | | | | |
| 08-Dec-21 | 23 | 1000 | 930 | 6.24 | 10 | <1 | <1 | 3 | <0.5 | <0.03 | 0.022 | <0.00045 | 0.0243 | 0.00056 | <0.0000035 | <0.000005 | <0.001 | 0.000004 | 0.84 | <0.00004 | 0.000192 | 0.0003 |
| 15-Dec-21 | 24 | 1000 | 919 | 6.7 | 13 | | | 3 | | | | | | | | | | | | | | |
| 22-Dec-21 | 25 | 1000 | 918 | 6.17 | 16 | 3 | <1 | 4 | <0.5 | <0.03 | 0.018 | <0.00045 | 0.0291 | 0.00085 | <0.0000035 | <0.000005 | <0.001 | 0.000007 | 1.31 | <0.00004 | 0.000221 | 0.0002 |
| 29-Dec-21 | 26 | 1000 | 918 | 6.26 | 9 | | | 3 | | | | | | | | | | | | | | |
| 05-Jan-21 | 27 | 1000 | 952 | 6.65 | 11 | 3 | <1 | 3.0 | <0.5 | <0.03 | 0.012 | <0.00045 | 0.022 | 0.00052 | <0.0000035 | <0.000005 | <0.001 | <0.0000015 | 0.80 | <0.00004 | 0.00022 | <0.0001 |
| 12-Jan-22 | 28 | 1000 | 920 | 6.33 | 12 | | | 3.0 | | | | | | | | | | | | | | |
| 19-Jan-22 | 29 | 1000 | 930 | 6.32 | 11 | 2 | <1 | 4.0 | <0.5 | <0.03 | 0.022 | <0.00045 | 0.026 | 0.00066 | <0.0000035 | <0.000005 | <0.002 | <0.000003 | 1.05 | <0.00004 | 0.00029 | 0.0004 |
| 26-Jan-22 | 30 | 1000 | 933 | 6.35 | 13 | | | 3 | | | | | | | | | | | | | | |
| 02-Feb-22 | 31 | 1000 | 937 | 6.59 | 9 | <1 | <1 | 4 | <0.5 | <0.03 | 0.016 | <0.00045 | 0.0265 | 0.00073 | <0.0000035 | <0.000005 | <0.001 | <0.0000015 | 1.03 | 0.00012 | 0.000327 | <0.0001 |
| 09-Feb-22 | 32 | 1000 | 934 | 6.14 | 13 | | | 4 | | | | | | | | | | | | | | |

**Notes:**

Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 5: HC4 Results**
**GB_HC4**
**PAG1 greywacke**

| Date | Cycle No | Fe | Pb | Li | Mg | Mn | Hg | Mo | Ni | K | Se | Ag | Na | Sr | Tl | Sn | Ti | U | V | W | Y | Zn | SGS File # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | |
| 30-Jun-21 | 0 | 0.012 | *<0.000045* | 0.0039 | 0.34 | 0.030 | *<0.000005* | 0.0011 | 0.0028 | 2.1 | 0.00013 | *<0.000025* | 11 | 0.022 | *<0.0000025* | 0.00023 | 0.00079 | 0.000038 | 0.00052 | 0.00042 | 0.000030 | 0.0020 | CA10066-JUN21 |
| 07-Jul-21 | 1 | 0.0080 | 0.00013 | 0.0024 | 0.43 | 0.039 | *<0.000005* | 0.00032 | 0.0032 | 1.5 | 0.00015 | *<0.000025* | 9.8 | 0.041 | *<0.0000025* | 0.00010 | 0.00067 | 0.000018 | 0.00043 | 0.00023 | 0.000030 | *<0.001* | CA10038-JUL21 |
| 14-Jul-21 | 2 | 0.019 | *<0.000045* | 0.0021 | 0.42 | 0.028 | 0.000010 | 0.00036 | 0.0018 | 1.4 | 0.000090 | *<0.000025* | 8.6 | 0.045 | *<0.0000025* | 0.000070 | 0.0022 | 0.000023 | 0.00047 | 0.00015 | 0.000040 | *<0.001* | CA10069-JUL21 |
| 21-Jul-21 | 3 | 0.026 | 0.00037 | 0.0019 | 0.20 | 0.013 | *<0.000005* | 0.00033 | 0.00080 | 0.67 | 0.000070 | *<0.000025* | 6.4 | 0.025 | *<0.0000025* | 0.000070 | 0.0024 | 0.000017 | 0.00057 | 0.00029 | 0.000060 | 0.0050 | CA10170-JUL21 |
| 27-Jul-21 | 4 | | | | | | | | | | | | | | | | | | | | | | CA10229-JUL21 |
| 04-Aug-21 | 5 | 0.024 | 0.00026 | 0.00070 | 0.088 | 0.0062 | *<0.000005* | 0.00022 | 0.0014 | 0.59 | 0.000040 | *<0.000025* | 3.6 | 0.0092 | *<0.0000025* | 0.000060 | 0.0010 | 0.000021 | 0.00053 | 0.00021 | 0.000060 | 0.0020 | CA10034-AUG21 |
| 11-Aug-21 | 6 | | | | | | | | | | | | | | | | | | | | | | CA10072-AUG21 |
| 18-Aug-21 | 7 | 0.017 | *<0.000045* | 0.00070 | 0.092 | 0.0045 | *<0.000005* | 0.00081 | 0.00030 | 0.56 | *<0.00002* | *<0.000025* | 2.7 | 0.011 | *<0.0000025* | 0.000070 | 0.00085 | 0.000030 | 0.00044 | 0.00018 | 0.000040 | *<0.001* | CA10107-AUG21 |
| 25-Aug-21 | 8 | | | | | | | | | | | | | | | | | | | | | | CA10240-AUG21 |
| 01-Sep-21 | 9 | 0.0070 | 0.00017 | 0.0011 | 0.19 | 0.012 | *<0.000005* | 0.00052 | 0.00020 | 0.72 | *<0.00002* | *<0.000025* | 2.1 | 0.018 | *<0.0000025* | *<0.00003* | 0.00050 | 0.000027 | 0.00039 | 0.00047 | *<0.00001* | *<0.001* | CA10011-SEP21 |
| 08-Sep-21 | 10 | | | | | | | | | | | | | | | | | | | | | | CA10043-SEP21 |
| 15-Sep-21 | 11 | 0.018 | 0.000090 | 0.00080 | 0.13 | 0.0066 | *<0.000005* | 0.000060 | 0.00040 | 0.61 | *<0.00002* | *<0.000025* | 1.4 | 0.013 | *<0.0000025* | 0.000060 | 0.0012 | 0.000024 | 0.00037 | 0.000080 | 0.000040 | *<0.001* | CA10083-SEP21 |
| 22-Sep-21 | 12 | | | | | | | | | | | | | | | | | | | | | | CA10135-SEP21 |
| 29-Sep-21 | 13 | 0.015 | 0.00010 | 0.00070 | 0.14 | 0.0061 | *<0.000005* | 0.00030 | 0.00040 | 0.63 | *<0.00002* | *<0.000025* | 1.1 | 0.015 | *<0.0000025* | 0.000070 | 0.0011 | 0.000024 | 0.00035 | 0.00022 | 0.000040 | 0.0020 | CA10201-SEP21 |
| 06-Oct-21 | 14 | | | | | | | | | | | | | | | | | | | | | | CA10030-OCT21 |
| 13-Oct-21 | 15 | 0.011 | 0.00010 | 0.00090 | 0.14 | 0.0052 | *<0.000005* | 0.00013 | 0.00030 | 0.68 | *<0.00002* | *<0.000025* | 0.8 | 0.014 | *<0.0000025* | *<0.00003* | 0.0006 | 0.000019 | 0.00028 | 0.00009 | 0.000020 | *<0.001* | CA10061-OCT21 |
| 20-Oct-21 | 16 | | | | | | | | | | | | | | | | | | | | | | CA10095-OCT21 |
| 27-Oct-21 | 17 | 0.021 | 0.00014 | 0.00140 | 0.14 | 0.0122 | *<0.000005* | 0.00102 | 0.00070 | 0.82 | *<0.00002* | *<0.000025* | 0.7 | 0.012 | *<0.0000025* | *<0.00003* | 0.0022 | 0.000011 | 0.00041 | 0.00043 | 0.000070 | *<0.001* | CA10131-OCT21 |
| 03-Nov-21 | 18 | | | | | | | | | | | | | | | | | | | | | | CA10030-NOV21 |
| 10-Nov-21 | 19 | 0.017 | 0.00012 | 0.0014 | 0.167 | 0.00863 | *<0.000005* | 0.00004 | 0.0006 | 0.788 | *<0.00002* | *<0.000025* | 0.59 | 0.0153 | *<0.0000025* | *<0.00003* | 0.00083 | 0.00001 | 0.00031 | 0.00008 | 0.00004 | *<0.001* | CA10081-NOV21 |
| 17-Nov-21 | 20 | | | | | | | | | | | | | | | | | | | | | | CA10130-NOV21 |
| 24-Nov-21 | 21 | 0.009 | 0.00013 | 0.0009 | 0.182 | 0.00928 | *<0.000005* | 0.00316 | 0.0006 | 0.817 | *<0.00002* | *<0.000025* | 0.52 | 0.0155 | *<0.0000025* | 0.00006 | 0.00084 | 0.000009 | 0.0003 | 0.00007 | 0.00003 | *<0.001* | CA10202-NOV21 |
| 01-Dec-21 | 22 | | | | | | | | | | | | | | | | | | | | | | CA10008-DEC21 |
| 08-Dec-21 | 23 | 0.009 | 0.00016 | 0.0011 | 0.177 | 0.00941 | *<0.000005* | 0.00017 | 0.0005 | 0.77 | *<0.00002* | *<0.000025* | 0.71 | 0.0157 | 0.000005 | *<0.00003* | 0.00071 | 0.000008 | 0.00042 | 0.00007 | 0.00002 | 0.002 | CA10041-DEC21 |
| 15-Dec-21 | 24 | | | | | | | | | | | | | | | | | | | | | | CA10110-DEC21 |
| 22-Dec-21 | 25 | 0.014 | 0.00012 | 0.0013 | 0.238 | 0.0103 | *<0.000005* | 0.0013 | 0.0006 | 0.847 | *<0.00002* | *<0.000025* | 0.42 | 0.0258 | *<0.0000025* | 0.00006 | 0.00062 | 0.00001 | 0.00031 | 0.00036 | 0.00003 | 0.004 | CA10162-DEC21 |
| 29-Dec-21 | 26 | | | | | | | | | | | | | | | | | | | | | | CA10218-DEC21 |
| 05-Jan-21 | 27 | *<0.0035* | *<0.000045* | 0.00100 | 0.17 | 0.0097 | *<0.000005* | 0.00171 | 0.00070 | 0.64 | *<0.00002* | *<0.000025* | 0.3 | 0.014 | *<0.0000025* | *<0.00003* | 0.0005 | 0.000007 | 0.00021 | 0.00005 | *<0.00001* | *<0.001* | CA10033-JAN22 |
| 12-Jan-22 | 28 | | | | | | | | | | | | | | | | | | | | | | CA10070-JAN22 |
| 19-Jan-22 | 29 | 0.008 | *<0.000045* | 0.00130 | 0.22 | 0.0109 | *<0.000005* | 0.00016 | 0.00080 | 0.95 | *<0.00002* | *<0.000025* | 0.6 | 0.021 | *<0.0000025* | *<0.00003* | 0.0005 | 0.000008 | 0.00026 | 0.00009 | 0.000020 | 0.0030 | CA10131-JAN-22 |
| 26-Jan-22 | 30 | | | | | | | | | | | | | | | | | | | | | | CA10166-JAN22 |
| 02-Feb-22 | 31 | 0.012 | *<0.000045* | 0.0014 | 0.223 | 0.0132 | *<0.000005* | 0.0001 | 0.001 | 0.802 | *<0.00002* | *<0.000025* | 0.25 | 0.021 | 0.000005 | *<0.00003* | 0.00069 | 0.000006 | 0.00024 | 0.00006 | 0.00003 | 0.002 | CA10031-FEB22 |
| 09-Feb-22 | 32 | | | | | | | | | | | | | | | | | | | | | | CA10066-FEB22 |

**Notes:**
Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 6: HC5 Results**
**GB_HC5**
**PAG2 mix**

| Date | Cycle No | Volume mL | | pH | Cond. | Acidity | Alkalinity | Sulphate | Chloride | Fluoride | Al | Sb | As | Ba | Be | Bi | B | Cd | Ca | Cr | Co | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Input | Output | | | (pH 8.3) | | | | | | | | | | | | | | | | |
| | | | | | umhos/cm | mgCaCO$_3$/L | mgCaCO$_3$/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 27-Jul-21 | 0 | 1000 | 870 | 8.92 | 34 | *<1* | 15 | 2.0 | *<1* | *<0.03* | 0.13 | *<0.00045* | 0.028 | 0.00058 | 0.0000090 | *<0.000005* | 0.0040 | 0.0000090 | 1.7 | 0.00060 | 0.000098 | 0.0014 |
| 03-Aug-21 | 1 | 1000 | 946 | 8.17 | 22 | *<1* | 9.0 | 2.0 | *<1* | *<0.03* | 0.12 | 0.0014 | 0.043 | 0.00055 | 0.0000070 | *<0.000005* | 0.0050 | *<0.0000015* | 0.64 | *<0.00004* | 0.000056 | 0.00050 |
| 10-Aug-21 | 2 | 1000 | 970 | 8.12 | 21 | *<1* | 9.0 | *<1* | *<1* | *<0.03* | 0.085 | *<0.00045* | 0.042 | 0.00042 | *<0.0000035* | *<0.000005* | 0.014 | 0.0000040 | 0.46 | 0.000090 | 0.0011 | 0.00030 |
| 17-Aug-21 | 3 | 1000 | 1019 | 7.29 | 24 | *<1* | 13 | 3.0 | *<1* | *<0.03* | 0.035 | 0.0019 | 0.062 | 0.00030 | *<0.0000035* | *<0.000005* | 0.0050 | *<0.0000015* | 0.55 | *<0.00004* | 0.00028 | *<0.0001* |
| 24-Aug-21 | 4 | 1000 | 966 | 7.3 | 19 | | | 3.0 | | | | | | | | | | | | | | |
| 31-Aug-21 | 5 | 1000 | 990 | 7.26 | 17 | *<1* | 7.0 | 2.0 | *<1* | *<0.03* | 0.051 | 0.0020 | 0.10 | 0.00079 | *<0.0000035* | *<0.000005* | 0.015 | *<0.0000015* | 0.95 | *<0.00004* | 0.00089 | 0.00030 |
| 07-Sep-21 | 6 | 1000 | 998 | 6.92 | 20 | | | *<1* | | | | | | | | | | | | | | |
| 14-Sep-21 | 7 | 1000 | 1004 | 7.1 | 17 | *<1* | 6.0 | *<1* | *<0.5* | *<0.03* | 0.030 | 0.0013 | 0.085 | 0.00050 | *<0.0000035* | *<0.000005* | 0.0030 | 0.0000040 | 1.1 | 0.000090 | 0.000080 | *<0.0001* |
| 21-Sep-21 | 8 | 1000 | 1002 | 6.95 | 11 | | | *<1* | | | | | | | | | | | | | | |
| 28-Sep-21 | 9 | 1000 | 997 | 7.14 | 19 | *<1* | 4.0 | *<1* | *<0.5* | *<0.03* | 0.061 | *<0.00045* | 0.084 | 0.00043 | *<0.0000035* | *<0.000005* | 0.0020 | *<0.0000015* | 0.49 | 0.00011 | 0.000059 | *<0.0001* |
| 05-Oct-21 | 10 | 1000 | 1004 | 7.04 | 14 | | | *<1* | | | | | | | | | | | | | | |
| 12-Oct-21 | 11 | 1000 | 987 | 6.75 | 10 | *<1* | 3 | *<1* | *<0.5* | *<0.03* | 0.042 | *<0.00045* | 0.063 | 0.00029 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 0.56 | *<0.00004* | 0.00006 | *<0.0001* |
| 19-Oct-21 | 12 | 1000 | 1014 | 6.73 | 13 | | | *<1* | | | | | | | | | | | | | | |
| 26-Oct-21 | 13 | 1000 | 962 | 6.92 | 14 | *<1* | 3 | 3.0 | *<0.5* | *<0.03* | 0.055 | *<0.00045* | 0.055 | 0.00058 | *<0.0000035* | *<0.000005* | 0.0040 | *<0.0000015* | 1.00 | *<0.00004* | 0.000052 | 0.00020 |
| 02-Nov-21 | 14 | 1000 | 979 | 6.88 | 17 | | | 4.0 | | | | | | | | | | | | | | |
| 09-Nov-21 | 15 | 1000 | 928 | 6.76 | 17 | *<1* | 3 | 3 | *<0.5* | *<0.03* | 0.058 | 0.001 | 0.0506 | 0.00072 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000013 | 1.35 | *<0.00004* | 0.00013 | 0.0007 |
| 16-Nov-21 | 16 | 1000 | 969 | 6.8 | 14 | | | 2 | | | | | | | | | | | | | | |
| 23-Nov-21 | 17 | 1000 | 975 | 6.81 | 13 | *<1* | 3 | 3 | *<0.5* | *<0.03* | 0.022 | 0.0011 | 0.0554 | 0.00072 | *<0.0000035* | *<0.000005* | 0.004 | *<0.0000015* | 1.55 | 0.00013 | 0.000131 | *<0.0001* |
| 30-Nov-21 | 18 | 1000 | 972 | 7.13 | 17 | | | 4 | | | | | | | | | | | | | | |
| 07-Dec-21 | 19 | 1000 | 1010 | 6.71 | 19 | *<1* | 3 | 4 | *<0.5* | *<0.03* | 0.018 | 0.0011 | 0.0438 | 0.0008 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 1.8 | 0.00011 | 0.000125 | *<0.0001* |
| 14-Dec-21 | 20 | 1000 | 1009 | 7.16 | 19 | | | 4 | | | | | | | | | | | | | | |
| 21-Dec-21 | 21 | 1000 | 1015 | 6.67 | 19 | *<1* | 3 | 4 | *<0.5* | *<0.03* | 0.019 | 0.0009 | 0.0367 | 0.00102 | *<0.0000035* | *<0.000005* | 0.009 | *<0.0000015* | 1.96 | *<0.00004* | 0.00015 | *<0.0001* |
| 28-Dec-21 | 22 | 1000 | 961 | 6.79 | 18 | | | 4 | | | | | | | | | | | | | | |
| 04-Jan-22 | 23 | 1000 | 1004 | 6.74 | 18 | *<1* | 2 | 4 | *<0.5* | *<0.03* | 0.035 | *<0.00045* | 0.037 | 0.00077 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000008 | 2.13 | *<0.00004* | 0.000274 | *<0.0001* |
| 11-Jan-22 | 24 | 1000 | 995 | 6.87 | 18 | | | 4 | | | | | | | | | | | | | | |
| 18-Jan-22 | 25 | 1000 | 1034 | 6.85 | 17 | *<1* | 3 | 4 | *<0.5* | *<0.03* | 0.018 | *<0.00045* | 0.033 | 0.00069 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000008 | 1.91 | *<0.00004* | 0.000179 | *<0.0001* |
| 25-Jan-22 | 26 | 1000 | 1013 | 6.97 | 17 | | | 2 | | | | | | | | | | | | | | |
| 01-Feb-22 | 27 | 1000 | 947 | 6.82 | 19 | *<1* | 4 | 3 | *<0.5* | *<0.03* | 0.02 | *<0.00045* | 0.0359 | 0.00088 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000003 | 2.08 | *<0.00004* | 0.000177 | *<0.0001* |
| 08-Feb-22 | 28 | 1000 | 1013 | 6.83 | 18 | | | 3 | | | | | | | | | | | | | | |

**Notes:**

Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 6: HC5 Results**
**GB_HC5**
**PAG2 mix**

| Date | Cycle No | Fe | Pb | Li | Mg | Mn | Hg | Mo | Ni | K | Se | Ag | Na | Sr | Tl | Sn | Ti | U | V | W | Y | Zn | SGS File # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | |
| 27-Jul-21 | 0 | 0.055 | 0.00013 | 0.0022 | 0.16 | 0.0076 | *<0.000005* | 0.00030 | 0.0021 | 1.9 | *<0.00002* | *<0.000025* | 3.5 | 0.018 | 0.000011 | 0.00029 | 0.0020 | 0.000068 | 0.0014 | 0.00053 | 0.000070 | 0.0040 | CA10217-JUL21 |
| 03-Aug-21 | 1 | 0.018 | *<0.000045* | 0.0020 | 0.083 | 0.0035 | *<0.000005* | 0.00026 | 0.0019 | 1.3 | 0.000040 | *<0.000025* | 3.9 | 0.0094 | *<0.0000025* | 0.00013 | 0.0020 | 0.00018 | 0.0013 | 0.00057 | 0.000080 | *<0.001* | CA10021-AUG21 |
| 10-Aug-21 | 2 | 0.021 | *<0.000045* | 0.0041 | 0.064 | 0.0031 | 0.000010 | 0.0025 | 0.0011 | 1.0 | *<0.00002* | *<0.000025* | 3.4 | 0.0065 | *<0.0000025* | 0.000090 | 0.0018 | 0.00018 | 0.0012 | 0.00042 | 0.000050 | *<0.001* | CA10060-AUG21 |
| 17-Aug-21 | 3 | *<0.0035* | *<0.000045* | 0.0018 | 0.079 | 0.0038 | *<0.000005* | 0.00068 | 0.00090 | 0.83 | *<0.00002* | *<0.000025* | 3.2 | 0.011 | *<0.0000025* | *<0.00003* | 0.00036 | 0.00065 | 0.00065 | 0.00094 | *<0.00001* | *<0.001* | CA10096-AUG21 |
| 24-Aug-21 | 4 | | | | | | | | | | | | | | | | | | | | | | CA10227-AUG21 |
| 31-Aug-21 | 5 | 0.0080 | 0.00032 | 0.0022 | 0.14 | 0.0063 | *<0.000005* | 0.0012 | *<0.00005* | 1.2 | *<0.00002* | *<0.000025* | 2.8 | 0.015 | 0.0000060 | *<0.00003* | 0.00091 | 0.00069 | 0.00086 | 0.00056 | 0.000030 | *<0.001* | CA10295-AUG21 |
| 07-Sep-21 | 6 | | | | | | | | | | | | | | | | | | | | | | CA10032-SEP21 |
| 14-Sep-21 | 7 | *<0.0035* | *<0.000045* | 0.0019 | 0.13 | 0.0051 | 0.000010 | 0.000080 | 0.00020 | 1.1 | *<0.00002* | *<0.000025* | 1.8 | 0.017 | *<0.0000025* | *<0.00003* | 0.000090 | 0.00041 | 0.00048 | 0.00029 | *<0.00001* | *<0.001* | CA10072-SEP21 |
| 21-Sep-21 | 8 | | | | | | | | | | | | | | | | | | | | | | CA10122-SEP21 |
| 28-Sep-21 | 9 | 0.015 | *<0.000045* | 0.0012 | 0.087 | 0.0031 | *<0.000005* | 0.00014 | *<0.00005* | 0.95 | *<0.00002* | *<0.000025* | 1.3 | 0.0082 | *<0.0000025* | *<0.00003* | 0.0015 | 0.00025 | 0.00067 | 0.00020 | 0.000030 | *<0.001* | CA10188-SEP21 |
| 05-Oct-21 | 10 | | | | | | | | | | | | | | | | | | | | | | CA10019-OCT21 |
| 12-Oct-21 | 11 | *<0.0035* | *<0.000045* | 0.0013 | 0.09600 | 0.00325 | *<0.000005* | 0.00017 | *<0.00005* | 0.957 | 0.000080 | *<0.000025* | 0.96 | 0.01000 | *<0.0000025* | 0.00006 | 0.0009 | 0.000198 | 0.00046 | 0.00013 | *<0.00001* | *<0.001* | CA10051-OCT21 |
| 19-Oct-21 | 12 | | | | | | | | | | | | | | | | | | | | | | CA10082-OCT21 |
| 26-Oct-21 | 13 | 0.012 | *<0.000045* | 0.0016 | 0.15200 | 0.00399 | *<0.000005* | 0.00007 | *<0.0001* | 1.120 | *<0.00002* | *<0.000025* | 0.94 | 0.01730 | *<0.0000025* | *<0.00003* | 0.0008 | 0.00017 | 0.00030 | 0.00007 | 0.000240 | *<0.001* | CA10119-OCT21 |
| 02-Nov-21 | 14 | | | | | | | | | | | | | | | | | | | | | | CA10019-NOV21 |
| 09-Nov-21 | 15 | 0.011 | 0.00013 | 0.0019 | 0.193 | 0.00472 | *<0.000005* | 0.00394 | 0.0005 | 1.14 | 0.00004 | *<0.000025* | 0.54 | 0.0242 | *<0.0000025* | 0.00007 | 0.00063 | 0.000147 | 0.00032 | 0.00007 | *<0.00001* | *<0.001* | CA10070-NOV21 |
| 16-Nov-21 | 16 | | | | | | | | | | | | | | | | | | | | | | CA10116-NOV21 |
| 23-Nov-21 | 17 | *<0.0035* | *<0.000045* | 0.0017 | 0.225 | 0.00675 | *<0.000005* | 0.00725 | 0.0002 | 1.14 | *<0.00002* | *<0.000025* | 0.55 | 0.0251 | *<0.0000025* | 0.0001 | 0.00029 | 0.000215 | 0.00039 | 0.00012 | *<0.00001* | *<0.001* | CA10188-NOV21 |
| 30-Nov-21 | 18 | | | | | | | | | | | | | | | | | | | | | | CA10239-NOV21 |
| 07-Dec-21 | 19 | *<0.0035* | 0.00013 | 0.0016 | 0.239 | 0.00771 | *<0.000005* | 0.00019 | 0.0002 | 1.06 | *<0.00002* | *<0.000025* | 0.31 | 0.0301 | *<0.0000025* | *<0.00003* | 0.00033 | 0.000189 | 0.00028 | 0.0001 | *<0.00001* | *<0.001* | CA10028-DEC21 |
| 14-Dec-21 | 20 | | | | | | | | | | | | | | | | | | | | | | CA10094-DEC21 |
| 21-Dec-21 | 21 | *<0.0035* | *<0.000045* | 0.002 | 0.257 | 0.00772 | *<0.000005* | 0.0003 | 0.0002 | 1.07 | *<0.00002* | *<0.000025* | 0.6 | 0.0316 | *<0.0000025* | *<0.00003* | 0.0001 | 0.000179 | 0.00024 | 0.0001 | *<0.00001* | 0.002 | CA10146-DEC21 |
| 28-Dec-21 | 22 | | | | | | | | | | | | | | | | | | | | | | CA10204-DEC21 |
| 04-Jan-22 | 23 | 0.01 | *<0.000045* | 0.0017 | 0.25200 | 0.01050 | *<0.000005* | 0.00007 | 0.0006 | 1.170 | *<0.00002* | *<0.000025* | 0.29 | 0.03100 | *<0.0000025* | *<0.00003* | 0.00 | 0.000133 | 0.00 | 0.00006 | *<0.00001* | *<0.001* | CA10016-JAN22 |
| 11-Jan-22 | 24 | | | | | | | | | | | | | | | | | | | | | | CA10054-JAN22 |
| 18-Jan-22 | 25 | *<0.0035* | *<0.000045* | 0.0015 | 0.23600 | 0.00903 | *<0.000005* | 0.00011 | 0.0002 | 0.956 | *<0.00002* | *<0.000025* | 0.21 | 0.03000 | *<0.0000025* | *<0.00003* | 0.00 | 0.000151 | 0.00 | 0.00006 | *<0.00001* | *<0.001* | CA10116-JAN33 |
| 25-Jan-22 | 26 | | | | | | | | | | | | | | | | | | | | | | CA10151-JAN22 |
| 01-Feb-22 | 27 | 0.008 | *<0.000045* | 0.0015 | 0.259 | 0.0097 | *<0.000005* | 0.00008 | 0.0002 | 1.04 | *<0.00002* | *<0.000025* | 0.2 | 0.03057 | *<0.0000025* | *<0.00003* | 0.00014 | 0.000127 | 0.00028 | 0.00007 | *<0.00001* | *<0.001* | CA10014-FEB22 |
| 08-Feb-22 | 28 | | | | | | | | | | | | | | | | | | | | | | CA10050-FEB22 |

**Notes:**
Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 7: HC6 Results**

**GB_HC6**

**Marker Unit**

| **Date** | **Cycle No** | **Volume mL** | | **pH** | **Cond.** | **Acidity** | **Alkalinity** | **Sulphate** | **Chloride** | **Fluoride** | **Al** | **Sb** | **As** | **Ba** | **Be** | **Bi** | **B** | **Cd** | **Ca** | **Cr** | **Co** | **Cu** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Input | Output | | | (pH 8.3) | | | | | | | | | | | | | | | | |
| | | | | | umhos/cm | mg$CaCO_3$/L | mg$CaCO_3$/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 27-Jul-21 | 0 | 1000 | 879 | 7.66 | 74 | *<1* | 10 | 21 | *<1* | *<0.03* | 0.056 | *<0.00045* | 0.039 | 0.0012 | 0.0000090 | *<0.000005* | 0.0020 | 0.0000070 | 7.2 | 0.000080 | 0.00043 | 0.0032 |
| 03-Aug-21 | 1 | 1000 | 969 | 6.76 | 69 | *<1* | 5 | 27 | *<1* | *<0.03* | 0.037 | *<0.00045* | 0.035 | 0.0020 | *<0.0000035* | *<0.000005* | 0.0020 | 0.0000040 | 8.3 | *<0.00004* | 0.00017 | 0.0010 |
| 10-Aug-21 | 2 | 1000 | 1000 | 7.24 | 56 | *<1* | 5 | 18 | *<1* | *<0.03* | 0.028 | *<0.00045* | 0.037 | 0.0017 | *<0.0000035* | *<0.000005* | 0.0040 | 0.0000070 | 5.8 | *<0.00004* | 0.00061 | 0.00090 |
| 17-Aug-21 | 3 | 1000 | 974 | 7.16 | 36 | *<1* | 5 | 10 | *<1* | *<0.03* | 0.026 | *<0.00045* | 0.022 | 0.0011 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 3.2 | *<0.00004* | 0.000074 | 0.00020 |
| 24-Aug-21 | 4 | 1000 | 968 | 7.23 | 32 | | | 8.0 | | | | | | | | | | | | | | |
| 31-Aug-21 | 5 | 1000 | 976 | 7.22 | 23 | *<1* | 5 | 5.0 | *<1* | *<0.03* | 0.037 | *<0.00045* | 0.0274 | 0.00087 | *<0.0000035* | *<0.000005* | 0.004 | 0.000018 | 2.59 | *<0.00004* | 0.000079 | *<0.0001* |
| 07-Sep-21 | 6 | 1000 | 958 | 7.18 | 23 | | | 5.0 | | | | | | | | | | | | | | |
| 14-Sep-21 | 7 | 1000 | 1023 | 7.09 | 24 | *<1* | 5 | 4.0 | *<0.5* | *<0.03* | 0.023 | *<0.00045* | 0.021 | 0.00064 | *<0.0000035* | *<0.000005* | 0.0020 | *<0.0000015* | 2.5 | *<0.00004* | 0.000043 | *<0.0001* |
| 21-Sep-21 | 8 | 1000 | 968 | 7.1 | 17 | | | 3.0 | | | | | | | | | | | | | | |
| 28-Sep-21 | 9 | 1000 | 969 | 7.01 | 17 | *<1* | 4 | 3.0 | *<0.5* | *<0.03* | 0.033 | *<0.00045* | 0.022 | 0.00052 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 1.9 | 0.00014 | 0.000039 | *<0.0001* |
| 05-Oct-21 | 10 | 1000 | 977 | 7.09 | 18 | | | 3.0 | | | | | | | | | | | | | | |
| 12-Oct-21 | 11 | 1000 | 978 | 6.81 | 16 | *<1* | 4 | 3 | 7 | *<0.03* | 0.034 | *<0.00045* | 0.0165 | 0.00065 | 0.000007 | *<0.000005* | *<0.001* | *<0.0000015* | 1.46 | *<0.00004* | 0.000017 | *<0.0001* |
| 19-Oct-21 | 12 | 1000 | 984 | 7.14 | 14 | | | 3 | | | | | | | | | | | | | | |
| 26-Oct-21 | 13 | 1000 | 956 | 6.88 | 14 | *<1* | 4 | 3 | *<0.5* | *<0.03* | 0.037 | *<0.00045* | 0.0225 | 0.00061 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000005 | 1.58 | *<0.00004* | 0.00004 | *<0.0001* |
| 02-Nov-21 | 14 | 1000 | 964 | 6.95 | 19 | | | 3 | | | | | | | | | | | | | | |
| 09-Nov-21 | 15 | 1000 | 892 | 6.79 | 15 | *<1* | 3 | *<1* | *<0.5* | *<0.03* | 0.037 | *<0.00045* | 0.0262 | 0.00061 | *<0.0000035* | *<0.000005* | 0.005 | 0.000003 | 1.69 | *<0.00004* | 0.000004 | 0.0003 |
| 16-Nov-21 | 16 | 1000 | 955 | 6.72 | 15 | | | 2 | | | | | | | | | | | | | | |
| 23-Nov-21 | 17 | 1000 | 958 | 6.88 | 12 | *<1* | 3 | 2 | *<0.5* | *<0.03* | 0.03 | *<0.00045* | 0.0263 | 0.00054 | *<0.0000035* | *<0.000005* | 0.004 | *<0.0000015* | 1.68 | 0.00009 | 0.000059 | *<0.0001* |
| 30-Nov-21 | 18 | 1000 | 958 | 7.11 | 17 | | | 3 | | | | | | | | | | | | | | |
| 07-Dec-21 | 19 | 1000 | 965 | 6.56 | 16 | *<1* | 2 | 3 | *<0.5* | *<0.03* | 0.028 | *<0.00045* | 0.0213 | 0.00053 | 0.00001 | *<0.000005* | *<0.001* | 0.000008 | 1.91 | *<0.00004* | 0.000036 | *<0.0001* |
| 14-Dec-21 | 20 | 1000 | 940 | 7.41 | 27 | | | 4 | | | | | | | | | | | | | | |
| 21-Dec-21 | 21 | 1000 | 935 | 6.96 | 15 | *<1* | 3 | 3 | 1 | *<0.03* | 0.031 | *<0.00045* | 0.0256 | 0.00058 | *<0.0000035* | *<0.000005* | 0.004 | *<0.0000015* | 1.66 | *<0.00004* | 0.000037 | *<0.0001* |
| 28-Dec-21 | 22 | 1000 | 931 | 6.46 | 17 | | | 3 | | | | | | | | | | | | | | |
| 04-Jan-22 | 23 | 1000 | 992 | 6.83 | 13 | *<1* | 4 | *<1* | *<0.5* | *<0.03* | 0.019 | *<0.00045* | 0.0283 | 0.00052 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000004 | 1.68 | *<0.00004* | 0.000042 | *<0.0001* |
| 11-Jan-22 | 24 | 1000 | 983 | 6.97 | 14 | | | 2 | | | | | | | | | | | | | | |
| 18-Jan-22 | 25 | 1000 | 962 | 6.83 | 13 | *<1* | 3 | 2 | *<0.5* | *<0.03* | 0.028 | *<0.00045* | 0.0289 | 0.00056 | *<0.0000035* | *<0.000005* | *<0.001* | 0.000006 | 1.56 | *<0.00004* | 0.000072 | *<0.0001* |
| 25-Jan-22 | 26 | 1000 | 960 | 7.08 | 16 | | | 2 | | | | | | | | | | | | | | |
| 01-Feb-22 | 27 | 1000 | 949 | 7.02 | 12 | *<1* | 4 | *<1* | *<0.5* | *<0.03* | 0.025 | *<0.00045* | 0.032 | 0.00073 | *<0.0000035* | *<0.000005* | *<0.001* | *<0.0000015* | 1.57 | 0.00009 | 0.00007 | *<0.0001* |
| 08-Feb-22 | 28 | 1000 | 967 | 6.91 | 16 | | | 2 | | | | | | | | | | | | | | |

**Notes:**

Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.1: Waste Rock Humidity Cell Results, Table 7: HC6 Results**
**GB_HC6**
**Marker Unit**

| Date | Cycle No | Fe | Pb | Li | Mg | Mn | Hg | Mo | Ni | K | Se | Ag | Na | Sr | Tl | Sn | Ti | U | V | W | Y | Zn | SGS File # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | |
| 27-Jul-21 | 0 | 0.080 | *<0.000045* | 0.0027 | 1.0 | 0.15 | *<0.000005* | 0.00027 | 0.0093 | 2.8 | 0.000040 | *<0.000025* | 2.4 | 0.023 | 0.000013 | 0.00037 | 0.00027 | 0.000082 | 0.00030 | 0.0015 | 0.00013 | *<0.001* | CA10217-JUL21 |
| 03-Aug-21 | 1 | *<0.0035* | *<0.000045* | 0.0022 | 0.91 | 0.11 | *<0.000005* | 0.00023 | 0.0074 | 2.4 | *<0.00002* | *<0.000025* | 1.9 | 0.026 | *<0.0000025* | 0.00030 | 0.00037 | 0.00017 | 0.00028 | 0.0014 | 0.000040 | *<0.001* | CA10021-AUG21 |
| 10-Aug-21 | 2 | *<0.0035* | 0.00010 | 0.0027 | 0.70 | 0.089 | *<0.000005* | 0.00094 | 0.0079 | 1.9 | 0.000050 | *<0.000025* | 1.8 | 0.019 | 0.0000060 | 0.00012 | 0.00016 | 0.00016 | 0.00028 | 0.0012 | 0.000020 | *<0.001* | CA10060-AUG21 |
| 17-Aug-21 | 3 | *<0.0035* | *<0.000045* | 0.0011 | 0.43 | 0.060 | *<0.000005* | 0.00044 | 0.0031 | 1.0 | *<0.00002* | *<0.000025* | 0.84 | 0.012 | *<0.0000025* | 0.000070 | 0.00017 | 0.00015 | 0.00020 | 0.00083 | *<0.00001* | *<0.001* | CA10096-AUG21 |
| 24-Aug-21 | 4 | | | | | | | | | | | | | | | | | | | | | | CA10227-AUG21 |
| 31-Aug-21 | 5 | 0.011 | 0.00066 | 0.0011 | 0.377 | 0.053 | *<0.000005* | 0.00028 | 0.0009 | 1.13 | *<0.00002* | *<0.000025* | 0.57 | 0.0078 | 0.0000070 | *<0.00003* | 0.00050 | 0.00015 | 0.00033 | 0.00098 | 0.000020 | *<0.001* | CA10295-AUG21 |
| 07-Sep-21 | 6 | | | | | | | | | | | | | | | | | | | | | | CA10032-SEP21 |
| 14-Sep-21 | 7 | *<0.0035* | *<0.000045* | 0.00090 | 0.35 | 0.053 | 0.000010 | 0.00012 | 0.00060 | 0.89 | *<0.00002* | *<0.000025* | 0.43 | 0.0071 | *<0.0000025* | *<0.00003* | 0.00048 | 0.00022 | 0.00018 | 0.00086 | *<0.00001* | *<0.001* | CA10072-SEP21 |
| 21-Sep-21 | 8 | | | | | | | | | | | | | | | | | | | | | | CA10122-SEP21 |
| 28-Sep-21 | 9 | *<0.0035* | *<0.000045* | 0.00070 | 0.26 | 0.041 | *<0.000005* | 0.00017 | 0.00020 | 0.84 | *<0.00002* | *<0.000025* | 0.28 | 0.0052 | *<0.0000025* | *<0.00003* | 0.00033 | 0.00013 | 0.00026 | 0.00052 | 0.000020 | 0.0020 | CA10188-SEP21 |
| 05-Oct-21 | 10 | | | | | | | | | | | | | | | | | | | | | | CA10019-OCT21 |
| 12-Oct-21 | 11 | *<0.0035* | *<0.000045* | 0.0007 | 0.249 | 0.039 | *<0.000005* | 0.00011 | 0.0002 | 0.773 | *<0.00002* | *<0.000025* | 0.21 | 0.00524 | *<0.0000025* | 0.00008 | 0.00042 | 0.000132 | 0.00021 | 0.00045 | *<0.00001* | *<0.001* | CA10051-OCT21 |
| 19-Oct-21 | 12 | | | | | | | | | | | | | | | | | | | | | | CA10082-OCT21 |
| 26-Oct-21 | 13 | *<0.0035* | *<0.000045* | 0.0006 | 0.248 | 0.0351 | *<0.000005* | 0.00008 | 0.0002 | 0.738 | *<0.00002* | *<0.000025* | 0.31 | 0.00476 | *<0.0000025* | *<0.00003* | 0.00053 | 0.000123 | 0.00027 | 0.00044 | *<0.00001* | *<0.001* | CA10119-OCT21 |
| 02-Nov-21 | 14 | | | | | | | | | | | | | | | | | | | | | | CA10019-NOV21 |
| 09-Nov-21 | 15 | *<0.0035* | *<0.000045* | 0.0006 | 0.24 | 0.0333 | *<0.000005* | 0.00007 | 0.0004 | 0.724 | 0.00005 | *<0.000025* | 0.14 | 0.00531 | *<0.0000025* | *<0.00003* | 0.00022 | 0.000121 | 0.00022 | 0.00036 | 0.00003 | *<0.001* | CA10070-NOV21 |
| 16-Nov-21 | 16 | | | | | | | | | | | | | | | | | | | | | | CA10116-NOV21 |
| 23-Nov-21 | 17 | *<0.0035* | *<0.000045* | 0.0006 | 0.233 | 0.0363 | *<0.000005* | 0.00077 | 0.0003 | 0.7 | *<0.00002* | *<0.000025* | 0.27 | 0.00467 | *<0.0000025* | *<0.00003* | 0.00019 | 0.000104 | 0.00028 | 0.00031 | 0.00003 | *<0.001* | CA10188-NOV21 |
| 30-Nov-21 | 18 | | | | | | | | | | | | | | | | | | | | | | CA10239-NOV21 |
| 07-Dec-21 | 19 | *<0.0035* | *<0.000045* | 0.0005 | 0.22 | 0.0381 | *<0.000005* | 0.00142 | 0.0002 | 0.617 | *<0.00002* | *<0.000025* | 0.13 | 0.00456 | *<0.0000025* | *<0.00003* | 0.00022 | 0.000097 | 0.00019 | 0.00025 | *<0.00001* | *<0.001* | CA10028-DEC21 |
| 14-Dec-21 | 20 | | | | | | | | | | | | | | | | | | | | | | CA10094-DEC21 |
| 21-Dec-21 | 21 | *<0.0035* | *<0.000045* | 0.0007 | 0.217 | 0.0267 | *<0.000005* | 0.00059 | 0.0001 | 0.646 | *<0.00002* | *<0.000025* | 0.28 | 0.00453 | *<0.0000025* | *<0.00003* | 0.00037 | 0.000094 | 0.00021 | 0.00028 | 0.00002 | *<0.001* | CA10146-DEC21 |
| 28-Dec-21 | 22 | | | | | | | | | | | | | | | | | | | | | | CA10204-DEC21 |
| 04-Jan-22 | 23 | *<0.0035* | *<0.000045* | 0.0006 | 0.201 | 0.0344 | *<0.000005* | 0.00143 | 0.0005 | 0.675 | *<0.00002* | *<0.000025* | 0.13 | 0.00407 | *<0.0000025* | *<0.00003* | *<0.000025* | 0.000142 | 0.00024 | 0.0003 | *<0.00001* | *<0.001* | CA10016-JAN22 |
| 11-Jan-22 | 24 | | | | | | | | | | | | | | | | | | | | | | CA10054-JAN22 |
| 18-Jan-22 | 25 | *<0.0035* | *<0.000045* | 0.0005 | 0.197 | 0.0306 | *<0.000005* | 0.00012 | 0.0001 | 0.598 | *<0.00002* | *<0.000025* | 0.14 | 0.00404 | *<0.0000025* | *<0.00003* | 0.00014 | 0.000111 | 0.00025 | 0.00024 | *<0.00001* | *<0.001* | CA10116-JAN33 |
| 25-Jan-22 | 26 | | | | | | | | | | | | | | | | | | | | | | CA10151-JAN22 |
| 01-Feb-22 | 27 | *<0.0035* | *<0.000045* | 0.0006 | 0.199 | 0.0349 | *<0.000005* | 0.00006 | 0.0002 | 0.609 | *<0.00002* | *<0.000025* | 0.11 | 0.00404 | 0.000005 | *<0.00003* | 0.00027 | 0.000114 | 0.00028 | 0.0003 | *<0.00001* | *<0.001* | CA10014-FEB22 |
| 08-Feb-22 | 28 | | | | | | | | | | | | | | | | | | | | | | CA10050-FEB22 |

**Notes:**
Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.2: Field Bin Results, Table 1 Field Bin Leachate Results**

| BV Labs ID | | Tier 1 EQS | PTL621 | PZA628 | QFL452 | QMD276 | QTE592 | RAG726 | RGZ691 | RIG677 | QFL453 | QMD277 | QTE593 | RAG727 | RGZ692 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | | 2021-06-03 15:43 | 2021-06-28 10:42 | 2021-07-27 11:42 | 2021-08-23 | 2021-09-20 13:30 | 2021-10-20 12:15 | 2021-11-18 12:53 | 2021-12-08 12:07 | 2021-07-27 12:02 | 2021-08-23 | 2021-09-20 13:40 | 2021-10-20 12:45 | 2021-11-18 13:06 |
| | **UNITS** | | **FB-1** | **FB-1** | **FB-1** | **FB-1** | **FB-1** | **FB-1** | **FB-1** | **FB-1** | **FB-2** | **FB-2** | **FB-2** | **FB-2** | **FB-2** |
| Field pH | - | 6.5-9.0 | 7.66 | 7.4 | 7.45 | pH meter error | 6.73 | 8.26 | 8 | 6.72 | 8.1 | pH meter error | 7.34 | 7.77 | 7.83 |
| Field Temperature | °C | - | 26.6 | 22 | 18.6 | 21 | 19.64 | 12.5 | 3.22 | 3.27 | 18.7 | 22.4 | 19.98 | 11.83 | 3.52 |
| Field Conductivity | µS/cm | - | 282 | 340 | 126 | 547 | 74 | 114 | 101 | 52 | 44 | 122 | 59 | 57 | 70 |
| Total Volume | L | - | 6 | 10 | 4 | - | 18 | 20 | 20 | 20 | 2.5 | - | 15 | 7 | 20 |
| Hardness (CaCO3) | mg/L | - | 92 | 54 | 23 | 9.0 | 24 | 9.5 | 9.2 | 11 | 5.9 | 19 | 14 | 12 | 15 |
| Acidity | mg/L | - | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Total Alkalinity (Total as CaCO3) | mg/L | - | 25 | 19 | 6.1 | 6.5 | 5.1 | 7.4 | 7.6 | 15 | 11 | 29 | 20 | 15 | 16 |
| Dissolved Chloride (Cl-) | mg/L | 120 | 2 | 2.6 | <1 | 1.7 | 1.6 | 1.4 | 2.7 | 6.6 | <1 | 4.1 | 3.2 | 2.4 | 6.3 |
| pH | pH | 6.5-9.0 | 7.57 | 7.2 | 6.7 | 6.6 | 7.1 | 7.08 | 6.93 | 7.21 | 7.1 | 7.4 | 7.5 | 7.35 | 7.11 |
| Ammonia N | mg/L | 5.7 | - | - | - | - | - | - | - | <0.05 | - | - | - | - | - |
| Nitrate (N) | mg/L | 13 | - | - | - | - | - | - | - | 0.086 | - | - | - | - | - |
| Nitrite (N) | mg/L | 0.06 | - | - | - | - | - | - | - | <0.01 | - | - | - | - | - |
| Total Phosphorus (P) | mg/L | - | - | - | - | - | - | 0.026 | 0.036 | - | - | - | - | <0.02 | <0.02 |
| Dissolved Phosphorus (P) | mg/L | - | 0.28 | 0.064 | <0.1 | 0.011 | 0.017 | 0.007 | 0.009 | 0.007 | 0.11 | 0.10 | 0.030 | 0.005 | <0.004 |
| Orthophosphate (P) | mg/L | - | - | - | - | - | - | - | - | <0.2 | - | - | - | - | - |
| Dissolved Sulphate (SO4) | mg/L | 128 | 75 | 45 | 19 | 7.9 | 17 | 3.9 | 3.3 | 3.4 | 2.1 | 7.3 | 3.7 | 2.6 | 3.9 |
| Conductivity | µS/cm | - | 220 | 150 | 59 | 28 | 82 | 34 | 35 | 46 | 34 | 80 | 62 | 46 | 67 |
| TOC | mg/L | - | - | - | - | - | - | - | - | 0.72 | - | - | - | - | - |
| Turbidity | NTU | - | - | - | - | - | - | - | - | 1.2 | - | - | - | - | - |
| Calculated TDS | mg/L | - | - | - | - | - | - | - | - | 25 | - | - | - | - | - |
| Dissolved Mercury (Hg) | µg/L | 0.026 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | |
| Dissolved Aluminum (Al) | µg/L | 5 | 31 | 9.8 | <5 | <5 | 7.3 | 9.6 | 6 | <5 | 47 | 60 | 35 | 12.5 | 13.1 |
| Dissolved Antimony (Sb) | µg/L | 9 | 5.1 | 2.2 | <1 | <1 | <1 | 1.1 | <1 | <1 | 1.7 | 4.5 | 3.3 | 2.2 | <2 |
| Dissolved Arsenic (As) | µg/L | 5 | 5800 | 2830 | 920 | 500 | 1680 | 444 | 551 | 298 | 14 | 44 | 45 | 37.3 | 35.6 |
| Dissolved Barium (Ba) | µg/L | 1000 | 2.6 | 3.0 | 1.9 | <1 | 1.2 | 1.1 | <1 | 1.1 | <1 | 2.7 | 1.8 | 1.5 | 2 |
| Dissolved Beryllium (Be) | µg/L | 0.15 | <1 | <1 | <1 | <1 | <1 | <0.1 | <0.1 | <0.1 | <1 | <1 | <1 | <0.1 | <0.1 |
| Dissolved Bismuth (Bi) | µg/L | - | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Boron (B) | µg/L | 1500 | <50 | 61 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Dissolved Cadmium (Cd) | µg/L | 0.09 | <0.01 | 0.029 | 0.016 | <0.01 | <0.01 | <0.01 | <0.01 | 0.016 | 0.012 | 0.016 | 0.016 | <0.01 | 0.011 |
| Dissolved Calcium (Ca) | µg/L | - | 35000 | 20600 | 8700 | 3300 | 8730 | 3220 | 3070 | 3490 | 1900 | 5900 | 4280 | 3920 | 4800 |
| Dissolved Chromium (Cr) | µg/L | 1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Dissolved Cobalt (Co) | µg/L | 10 | <0.4 | 0.42 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 2.5 | 0.60 | 0.60 | <0.4 | <0.4 |
| Dissolved Copper (Cu) | µg/L | 2 | 0.9 | 35 | 63 | 14 | 9.6 | 6.72 | 3.13 | 4.8 | 28 | 34 | 16 | 3.98 | 9.39 |
| Dissolved Iron (Fe) | µg/L | 300 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | 66 | 61 | 61 | <50 | <50 |
| Dissolved Lead (Pb) | µg/L | 1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dissolved Magnesium (Mg) | µg/L | - | 860 | 700 | 260 | 170 | 410 | 360 | 360 | 530 | 300 | 1000 | 690 | 540 | 790 |
| Dissolved Manganese (Mn) | µg/L | 430 | 3 | 85 | 14 | 4.9 | 11 | 14.6 | 16.6 | 24.7 | 50 | 29 | 31 | 2.5 | 40.3 |
| Dissolved Molybdenum (Mo) | µg/L | 73 | 3.2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Nickel (Ni) | µg/L | 25 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 2.2 | 3.1 | 3.1 | <2 | <2 |
| Dissolved Phosphorus (P) | µg/L | - | <100 | 100 | <100 | <100 | <100 | <100 | <100 | <100 | 110 | 180 | 180 | <100 | <100 |
| Dissolved Potassium (K) | µg/L | - | 5500 | 2750 | 1600 | 370 | 960 | 860 | 690 | 850 | 1300 | 2800 | 2070 | 1590 | 1630 |
| Dissolved Selenium (Se) | µg/L | 1 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dissolved Silver (Ag) | µg/L | 0.25 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Dissolved Sodium (Na) | µg/L | - | 2300 | 2800 | 380 | 850 | 1700 | 2230 | 2660 | 4370 | 4600 | 8200 | 5590 | 4080 | 6410 |
| Dissolved Strontium (Sr) | µg/L | - | 130 | 77 | 30 | 15 | 40 | 32.4 | 30.9 | 43.5 | 23 | 100 | 75 | 64.3 | 79.1 |
| Dissolved Thallium (Tl) | µg/L | 0.8 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Dissolved Tin (Sn) | µg/L | - | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Titanium (Ti) | µg/L | - | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Uranium (U) | µg/L | 15 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.12 | 0.26 | 0.41 | 0.78 | 0.41 | 0.16 | 0.55 |
| Dissolved Vanadium (V) | µg/L | 120 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Zinc (Zn) | µg/L | 7 | <5 | 19 | 14 | 68 | 40 | 15.9 | 50.4 | 23.8 | <5 | 29 | 16 | <5 | 26.3 |

**Notes:**

Tier 1 EQS: Nova Scotia Tier 1 Environmental Quality Standards

Nova Scotia Environment (NSE) (2021). Table 3 - Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (µg/L). In Notification of Contamination Protocol. Revised September 30, 2021

Ammonia guideline assumes pH 7.0 and temperature of 15°C

Bold italic text indicates a pH outside of the Tier 1 EQS pH range.

Grey shading indicates a concentration above the Tier 1 EQS.

**Appendix D.2: Field Bin Results, Table 1 Field Bin Leachate Results**

| BV Labs ID | | RIG678 | QFL454 | QMD278 | QTE594 | RAG728 | RGZ693 | RIG679 | QFL455 | QMD279 | QTE595 | RAG729 | RGZ694 | RIG680 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021-12-08 12:28 | 2021-07-27 11:45 | 2021-08-23 | 2021-09-20 13:50 | 2021-10-20 16:36 | 2021-11-18 13:19 | 2021-12-08 12:40 | 2021-07-27 11:54 | 2021-08-23 | 2021-09-20 14:06 | 2021-10-20 12:35 | 2021-11-18 13:27 | 2021-12-08 12:50 |
| | **UNITS** | **FB-2** | **FB-3** | **FB-3** | **FB-3** | **FB-3** | **FB-3** | **FB-3** | **FB-4** | **FB-4** | **FB-4** | **FB-4** | **FB-4** | **FB-4** |
| Field pH | - | 7.16 | 7.68 | pH meter error | 7.52 | Insufficient sample for field parameters | 8.16 | 7.65 | 7.92 | pH meter error | 7.56 | 8.14 | 8.17 | 7.72 |
| Field Temperature | °C | 2.18 | 18.3 | 22 | 20.01 | | 3.08 | 2.87 | 18.3 | 21.2 | 20.2 | 12.15 | 3.25 | 2.67 |
| Field Conductivity | µS/cm | 66 | 176 | 127 | 95 | | 94 | 78 | 131 | 87 | 72 | 76 | 86 | 90 |
| Total Volume | L | 10 | 4 | - | 18 | | 20 | 20 | 4 | - | 20 | 20 | 20 | 10 |
| Hardness (CaCO3) | mg/L | 15 | 9.7 | 5.2 | 5.9 | 4 | 9.4 | 9.3 | 6.0 | 4.5 | 4.8 | 6.1 | 7.4 | 8.9 |
| Acidity | mg/L | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Total Alkalinity (Total as CaCO3) | mg/L | 21 | 36 | 26 | 26 | 14 | 26 | 21 | 41 | 29 | 27 | 25 | 25 | 27 |
| Dissolved Chloride (Cl-) | mg/L | 7.9 | 8.5 | 6.9 | 6.3 | 3.3 | 5.9 | 8.3 | 2.7 | 2.1 | 2.3 | 2.9 | 5.1 | 7.1 |
| pH | pH | 7.43 | 7.7 | 7.4 | 7.6 | 7.34 | 7.4 | 7.51 | 7.6 | 7.5 | 7.6 | 7.51 | 7.35 | 7.63 |
| Ammonia N | mg/L | <0.05 | - | - | - | - | - | <0.05 | - | - | - | - | - | <0.05 |
| Nitrate (N) | mg/L | 0.12 | - | - | - | - | - | 0.11 | - | - | - | - | - | 0.14 |
| Nitrite (N) | mg/L | <0.01 | - | - | - | - | - | <0.01 | - | - | - | - | - | <0.01 |
| Total Phosphorus (P) | mg/L | - | - | - | - | 0.57 | <0.02 | - | - | - | - | <0.02 | <0.02 | - |
| Dissolved Phosphorus (P) | mg/L | 0.005 | <0.1 | 0.0011 | <0.004 | <0.004 | <0.004 | <0.004 | <0.1 | 0.0027 | <0.004 | <0.004 | <0.004 | <0.004 |
| Orthophosphate (P) | mg/L | <0.01 | - | - | - | - | - | 0.01 | - | - | - | - | - | <0.05 |
| Dissolved Sulphate (SO4) | mg/L | 3.9 | 21 | 11 | 11 | 8.3 | 13 | 6.2 | 9.5 | 6.2 | 4.8 | 6.1 | 8.3 | 7.5 |
| Conductivity | µS/cm | 65 | 150 | 92 | 100 | 58 | 96 | 72 | 110 | 64 | 70 | 70 | 82 | 84 |
| TOC | mg/L | 1.5 | - | - | - | - | - | 1 | - | - | - | - | - | 2.1 |
| Turbidity | NTU | 2.3 | - | - | - | - | - | 4.7 | - | - | - | - | - | 4.2 |
| Calculated TDS | mg/L | 37 | - | - | - | - | - | 41 | - | - | - | - | - | 51 |
| Dissolved Mercury (Hg) | µg/L | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 |
| Dissolved Aluminum (Al) | µg/L | 7.3 | 90 | 99 | 77 | 90.7 | 31.7 | 15.2 | 170 | 50 | 37 | 25.6 | 16.9 | 22.2 |
| Dissolved Antimony (Sb) | µg/L | 1.8 | 1.9 | 1.6 | 1.6 | <1 | <1 | <1 | 7.5 | 4.4 | 5.1 | 4.9 | 4.6 | 4.6 |
| Dissolved Arsenic (As) | µg/L | 29.6 | 91 | 61 | 68 | 37.3 | 46.6 | 32.1 | 110 | 74 | 93 | 88.8 | 88.2 | 79.9 |
| Dissolved Barium (Ba) | µg/L | 1.9 | 1.8 | <1 | <1 | <1 | 1 | <1 | 2.2 | <1 | <1 | <1 | <1 | 1.2 |
| Dissolved Beryllium (Be) | µg/L | <0.1 | <1 | <1 | <1 | <0.1 | <0.1 | <0.1 | <1 | <1 | <1 | <0.1 | <0.1 | <0.1 |
| Dissolved Bismuth (Bi) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Boron (B) | µg/L | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Dissolved Cadmium (Cd) | µg/L | 0.018 | 0.010 | <0.01 | <0.01 | <0.01 | <0.01 | 0.012 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.012 |
| Dissolved Calcium (Ca) | µg/L | 4660 | 3100 | 1700 | 1970 | 1330 | 3180 | 3100 | 1900 | 1500 | 1590 | 2030 | 2440 | 2880 |
| Dissolved Chromium (Cr) | µg/L | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Dissolved Cobalt (Co) | µg/L | <0.4 | 1.7 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 0.78 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 |
| Dissolved Copper (Cu) | µg/L | 5.91 | 37 | 14 | 12 | 11.4 | 4.6 | 5.21 | 41 | 14 | 8.4 | 3.36 | 13.4 | 21.8 |
| Dissolved Iron (Fe) | µg/L | <50 | <50 | <50 | <50 | <50 | <50 | <50 | 120 | <50 | <50 | <50 | <50 | <50 |
| Dissolved Lead (Pb) | µg/L | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0.51 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dissolved Magnesium (Mg) | µg/L | 840 | 460 | 220 | 250 | 160 | 370 | 380 | 300 | 200 | 200 | 240 | 320 | 410 |
| Dissolved Manganese (Mn) | µg/L | 34.1 | 140 | 42 | 39 | 26.5 | 66.5 | 75 | 26 | 8.2 | 8.2 | <2 | 8.6 | 22 |
| Dissolved Molybdenum (Mo) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Nickel (Ni) | µg/L | <2 | 6.5 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Phosphorus (P) | µg/L | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |
| Dissolved Potassium (K) | µg/L | 1390 | 2800 | 1600 | 1650 | 1090 | 1460 | 1090 | 2400 | 1400 | 1470 | 1490 | 1390 | 1580 |
| Dissolved Selenium (Se) | µg/L | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 |
| Dissolved Silver (Ag) | µg/L | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Dissolved Sodium (Na) | µg/L | 6530 | 30000 | 17000 | 17400 | 10400 | 16000 | 10900 | 24000 | 12000 | 13000 | 12700 | 14100 | 14200 |
| Dissolved Strontium (Sr) | µg/L | 75.9 | 67 | 35 | 39 | 26.4 | 60.9 | 54 | 34 | 23 | 25 | 32.7 | 39.7 | 46 |
| Dissolved Thallium (Tl) | µg/L | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Dissolved Tin (Sn) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Titanium (Ti) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 6.8 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Uranium (U) | µg/L | 1.1 | 0.93 | 0.47 | 0.44 | 0.16 | 0.55 | 0.33 | 1.4 | 0.65 | 0.61 | 0.6 | 1.04 | 1.57 |
| Dissolved Vanadium (V) | µg/L | <2 | 2.6 | <2 | <2 | <2 | <2 | <2 | 2.5 | <2 | <2 | <2 | <2 | <2 |
| Dissolved Zinc (Zn) | µg/L | 12.8 | <5 | 7.7 | 7.7 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |

**Notes:**

Tier 1 EQS: Nova Scotia Tier 1 Environmental Quality Standards

Nova Scotia Environment (NSE) (2021). Table 3 - Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (µg/L). In Notification of Contamination Protocol. Revised September 30, 2021

Ammonia guideline assumes pH 7.0 and temperature of 15°C

Bold italic text indicates a pH outside of the Tier 1 EQS pH range.

Grey shading indicates a concentration above the Tier 1 EQS.

**Appendix D.2: Field Bin Results, Table 2 Quality Assurance/Quality Control**

| BV Labs ID | | QFL457 | QMD281 | QTE597 | RAG731 | RGZ696 | RIG682 | QFL453 | QFL456 | **RPD** | QMD276 | QMD280 | **RPD** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021-07-27 | 2021-08-23 | 2021-09-20 14:15 | 2021-10-20 | 2021-11-18 | 2021-12-08 | 2021-07-27 12:02 | 2021-07-27 12:00 | | 2021-08-23 | 2021-08-23 | |
| | **UNITS** | **FIELD BLANK** | **FIELD BLANK** | **Field Blank** | **Field Blank** | **Field Blank** | **Field Blank** | **FB-2** | **FB-DUP** | | **FB-1** | **FB-DUP** | |
| Hardness (CaCO3) | mg/L | <1 | <1 | <1 | <1 | <1 | <1 | 5.9 | 5.8 | 2% | 9.0 | 9.1 | 1% |
| Acidity | mg/L | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 0% | <5 | <5 | 0% |
| Total Alkalinity (Total as CaCO3) | mg/L | <5 | <5 | <1 | <1 | <1 | <5 | 11 | 11 | 0% | 6.5 | <5 | ***<5xRDL*** |
| Dissolved Chloride (Cl-) | mg/L | <1 | <1 | <1 | <1 | <1 | 1 | <1 | - | - | 1.7 | <1.3 | ***<5xRDL*** |
| pH | pH | 6.33 | 6.2 | 6.12 | 6.59 | 5.71 | 6.18 | 7.1 | - | - | 6.6 | 6.5 | 2% |
| Ammonia N | mg/L | 0.055 | - | - | - | - | <0.05 | 0.1 | 0.1 | 9% | - | - | - |
| Nitrate (N) | mg/L | <0.05 | - | - | - | - | <0.05 | 0.1 | 0.1 | 5% | - | - | - |
| Nitrite (N) | mg/L | <0.01 | - | - | - | - | <0.01 | 0.0 | 0.0 | 0% | - | - | - |
| Total Phosphorus (P) | mg/L | - | - | - | <0.02 | <0.02 | - | - | - | - | - | - | - |
| Dissolved Phosphorus (P) | mg/L | <0.001 | 0.0075 | <0.004 | <0.004 | <0.004 | <0.004 | 0.11 | 0.09 | ***23%*** | 0.011 | <0.001 | ***<5xRDL*** |
| Orthophosphate (P) | mg/L | <0.01 | - | - | - | - | <0.01 | <0.01 | <0.01 | 0% | - | - | - |
| Dissolved Sulphate (SO4) | mg/L | <2 | <2 | <1 | <1 | <1 | <2 | 2.1 | 2.4 | 13% | 7.9 | 7.5 | 5% |
| Conductivity | µS/cm | ***2.1*** | <1 | <1 | <1 | 1.1 | <1 | 34 | 34 | 0% | 28 | 27 | 4% |
| TOC | mg/L | <0.5 | - | - | - | - | <0.5 | 7 | 7 | 0% | - | - | - |
| Turbidity | NTU | ***0.83*** | - | - | - | - | 0.11 | 120 | 150 | ***22%*** | - | - | - |
| Calculated TDS | mg/L | <1 | - | - | - | - | 1 | 18 | 18 | 0% | - | - | - |
| Dissolved Mercury (Hg) | µg/L | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | <0.013 | 0% | <0.013 | <0.013 | 0% |
| Dissolved Aluminum (Al) | µg/L | <5 | <5 | <5 | <5 | <5 | <5 | 47 | 47 | 0% | <5 | <5 | 0% |
| Dissolved Antimony (Sb) | µg/L | <1 | <1 | <1 | <1 | <1 | <1 | 1.7 | 1.7 | 0% | <1 | <1 | 0% |
| Dissolved Arsenic (As) | µg/L | <1 | <1 | <1 | <1 | <1 | <1 | 14 | 14 | 0% | 500 | 500 | 0% |
| Dissolved Barium (Ba) | µg/L | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 1 | 0% | <1 | <1 | 0% |
| Dissolved Beryllium (Be) | µg/L | <1 | <1 | <0.1 | <0.1 | <0.1 | <0.1 | <1 | <1 | 0% | <1 | <1 | 0% |
| Dissolved Bismuth (Bi) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Boron (B) | µg/L | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | 0% | <50 | <50 | 0% |
| Dissolved Cadmium (Cd) | µg/L | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.012 | <0.01 | 18% | <0.01 | 0.01 | 0% |
| Dissolved Calcium (Ca) | µg/L | <100 | <100 | <100 | <100 | <100 | <100 | 1900 | 1800 | 5% | 3300 | 3300 | 0% |
| Dissolved Chromium (Cr) | µg/L | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | 0% | <1 | <1 | 0% |
| Dissolved Cobalt (Co) | µg/L | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | <0.4 | 2.5 | 2.5 | 0% | <0.4 | <0.4 | 0% |
| Dissolved Copper (Cu) | µg/L | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 28 | 28 | 0% | 14 | 15 | 7% |
| Dissolved Iron (Fe) | µg/L | <50 | <50 | <50 | <50 | <50 | <50 | 66 | 66 | 0% | <50 | <50 | 0% |
| Dissolved Lead (Pb) | µg/L | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0% | <0.5 | <0.5 | 0% |
| Dissolved Magnesium (Mg) | µg/L | <100 | <100 | <100 | <100 | <100 | <100 | 300 | 300 | 0% | 170 | 170 | 0% |
| Dissolved Manganese (Mn) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | 50 | 51 | 2% | 4.9 | 4.8 | 2% |
| Dissolved Molybdenum (Mo) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Nickel (Ni) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | 2.2 | 2.2 | 0% | <2 | <2 | 0% |
| Dissolved Phosphorus (P) | µg/L | <100 | <100 | <100 | <100 | <100 | <100 | 110 | 110 | 0% | <100 | <100 | 0% |
| Dissolved Potassium (K) | µg/L | <100 | <100 | <100 | <100 | <100 | <100 | 1300 | 1200 | 8% | 370 | 400 | 8% |
| Dissolved Selenium (Se) | µg/L | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | 0% | <0.5 | <0.5 | 0% |
| Dissolved Silver (Ag) | µg/L | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% |
| Dissolved Sodium (Na) | µg/L | ***350*** | 160 | <100 | 190 | <100 | 140 | 4600 | 4400 | 4% | 850 | 860 | 1% |
| Dissolved Strontium (Sr) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | 23 | 22 | 4% | 15 | 15 | 0% |
| Dissolved Thallium (Tl) | µg/L | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% |
| Dissolved Tin (Sn) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Titanium (Ti) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Uranium (U) | µg/L | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.41 | 0.38 | 8% | <0.1 | <0.1 | 0% |
| Dissolved Vanadium (V) | µg/L | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Zinc (Zn) | µg/L | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 0% | 68 | 71 | 4% |

**Notes:**
Relative Percent Difference (RPD) is equal to |Result A - Result B| / ((Result A + Result B)/2) x 100%
TOC: Total Organic Carbon, TDS: Total Dissolved Solids, RDL: Reporting Detection Limit
Blue bold italic indicates a concentration in a field blank that's above 2x the RDL
Red bold italic indicates an RPD >20%, where both values are above 5x the RDL

**Appendix D.2: Field Bin Results, Table 2 Quality Assurance/Quality Control**

| BV Labs ID | | QTE592 | QTE596 | | RAG726 | RAG730 | | RGZ691 | RGZ695 | | RIG677 | RIG683 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2021-09-20 13:30 | 2021-09-20 14:06 | **RPD** | 2021-10-20 12:15 | 2021-10-20 12:00 | **RPD** | 2021-11-18 12:53 | 2021-11-18 12:00 | **RPD** | 2021-12-08 12:07 | 2021-12-08 12:00 | **RPD** |
| | **UNITS** | **FB-1** | **FB-DUP** | | **FB-1** | **FB-DUP** | | **FB-1** | **FB-DUP** | | **FB-1** | **FB DUP** | |
| Hardness (CaCO3) | mg/L | 24 | 24 | 0% | 9.5 | 9.6 | 1% | 9.2 | 9.3 | 1% | 11 | 11 | 0% |
| Acidity | mg/L | <5 | <5 | 0% | <5 | <5 | 0% | <5 | <5 | 0% | <5 | <5 | 0% |
| Total Alkalinity (Total as CaCO3) | mg/L | 5.1 | 4.8 | 6% | 7.4 | 6.9 | 7% | 7.6 | 7.2 | 5% | 15 | 13 | 14% |
| Dissolved Chloride (Cl-) | mg/L | 1.6 | 1.7 | 6% | 1.4 | 1.6 | 13% | 2.7 | 2.7 | 0% | 6.6 | 6 | 10% |
| pH | pH | 7.1 | 6.9 | 2% | 7.08 | 7.1 | 0% | 6.93 | 6.92 | 0% | 7.21 | 7.22 | 0% |
| Ammonia N | mg/L | - | - | - | - | - | - | - | - | - | <0.05 | <0.05 | 0% |
| Nitrate (N) | mg/L | - | - | - | - | - | - | - | - | - | 0.086 | 0.085 | 1% |
| Nitrite (N) | mg/L | - | - | - | - | - | - | - | - | - | <0.01 | <0.01 | 0% |
| Total Phosphorus (P) | mg/L | - | - | - | 0.026 | 0.027 | 4% | 0.036 | 0.036 | 0% | - | - | - |
| Dissolved Phosphorus (P) | mg/L | 0.017 | 0.018 | 6% | 0.007 | 0.007 | 0% | 0.009 | 0.008 | 12% | 0.007 | 0.007 | 0% |
| Orthophosphate (P) | mg/L | - | - | - | - | - | - | - | - | - | <0.2 | 0.1 | ***<5xRDL*** |
| Dissolved Sulphate (SO4) | mg/L | 17 | 17 | 0% | 3.9 | 3.8 | 3% | 3.3 | 3.2 | 3% | 3.4 | 3.9 | 14% |
| Conductivity | µS/cm | 82 | 67 | ***20%*** | 34 | 33 | 3% | 35 | 35 | 0% | 46 | 45 | 2% |
| TOC | mg/L | - | - | - | - | - | - | - | - | - | 0.72 | 0.75 | 4% |
| Turbidity | NTU | - | - | - | - | - | - | - | - | - | 1.2 | 1.1 | 9% |
| Calculated TDS | mg/L | - | - | - | - | - | - | - | - | - | 25 | 25 | 0% |
| Dissolved Mercury (Hg) | µg/L | <0.013 | <0.013 | 0% | <0.013 | <0.013 | 0% | <0.013 | <0.013 | 0% | <0.013 | <0.013 | 0% |
| Dissolved Aluminum (Al) | µg/L | 7.3 | 10.1 | ***<5xRDL*** | 9.6 | 9.2 | 4% | 6 | 6 | 0% | <5 | <5 | 0% |
| Dissolved Antimony (Sb) | µg/L | <1 | <1 | 0% | 1.1 | 1 | 10% | <1 | <1 | 0% | <1 | <1 | 0% |
| Dissolved Arsenic (As) | µg/L | 1680 | 1680 | 0% | 444 | 442 | 0% | 551 | 543 | 1% | 298 | 297 | 0% |
| Dissolved Barium (Ba) | µg/L | 1.2 | 1.3 | 8% | 1.1 | 1.1 | 0% | <1 | <1 | 0% | 1.1 | 1.1 | 0% |
| Dissolved Beryllium (Be) | µg/L | <0.1 | <0.1 | ***<5xRDL*** | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% |
| Dissolved Bismuth (Bi) | µg/L | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Boron (B) | µg/L | <50 | <50 | 0% | <50 | <50 | 0% | <50 | <50 | 0% | <50 | <50 | 0% |
| Dissolved Cadmium (Cd) | µg/L | <0.01 | <0.01 | 0% | <0.01 | <0.01 | 0% | <0.01 | <0.01 | 0% | 0.016 | <0.01 | ***<5xRDL*** |
| Dissolved Calcium (Ca) | µg/L | 8730 | 8840 | 1% | 3220 | 3260 | 1% | 3070 | 3130 | 2% | 3490 | 3520 | 1% |
| Dissolved Chromium (Cr) | µg/L | <1 | <1 | 0% | <1 | <1 | 0% | <1 | <1 | 0% | <1 | <1 | 0% |
| Dissolved Cobalt (Co) | µg/L | <0.4 | <0.4 | 0% | <0.4 | <0.4 | 0% | <0.4 | <0.4 | 0% | <0.4 | <0.4 | 0% |
| Dissolved Copper (Cu) | µg/L | 9.6 | 9.55 | 0% | 6.72 | 6.54 | 3% | 3.13 | 3.74 | 18% | 4.8 | 4.92 | 2% |
| Dissolved Iron (Fe) | µg/L | <50 | <50 | 0% | <50 | <50 | 0% | <50 | <50 | 0% | <50 | <50 | 0% |
| Dissolved Lead (Pb) | µg/L | <0.5 | <0.5 | 0% | <0.5 | <0.5 | 0% | <0.5 | <0.5 | 0% | <0.5 | <0.5 | 0% |
| Dissolved Magnesium (Mg) | µg/L | 410 | 420 | 2% | 360 | 340 | 6% | 360 | 370 | 3% | 530 | 540 | 2% |
| Dissolved Manganese (Mn) | µg/L | 11 | 10.8 | 2% | 14.6 | 14.5 | 1% | 16.6 | 17.2 | 4% | 24.7 | 25.5 | 3% |
| Dissolved Molybdenum (Mo) | µg/L | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Nickel (Ni) | µg/L | <2 | <2 | 0% | <2 | <2 | 0% | <2 | 3.5 | ***<5xRDL*** | <2 | <2 | 0% |
| Dissolved Phosphorus (P) | µg/L | <100 | <100 | 0% | <100 | <100 | 0% | <100 | <100 | 0% | <100 | <100 | 0% |
| Dissolved Potassium (K) | µg/L | 960 | 990 | 3% | 860 | 850 | 1% | 690 | 720 | 4% | 850 | 870 | 2% |
| Dissolved Selenium (Se) | µg/L | <0.5 | <0.5 | 0% | <0.5 | <0.5 | 0% | <0.5 | <0.5 | 0% | <0.5 | <0.5 | 0% |
| Dissolved Silver (Ag) | µg/L | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% |
| Dissolved Sodium (Na) | µg/L | 1700 | 1730 | 2% | 2230 | 2150 | 4% | 2660 | 2660 | 0% | 4370 | 4460 | 2% |
| Dissolved Strontium (Sr) | µg/L | 40 | 40.5 | 1% | 32.4 | 32.5 | 0% | 30.9 | 31.1 | 1% | 43.5 | 43.3 | 0% |
| Dissolved Thallium (Tl) | µg/L | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% |
| Dissolved Tin (Sn) | µg/L | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Titanium (Ti) | µg/L | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Uranium (U) | µg/L | <0.1 | <0.1 | 0% | <0.1 | <0.1 | 0% | 0.12 | 0.12 | 0% | 0.26 | 0.28 | 7% |
| Dissolved Vanadium (V) | µg/L | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% | <2 | <2 | 0% |
| Dissolved Zinc (Zn) | µg/L | 40 | 41.3 | 2% | 15.9 | 16.3 | 2% | 50.4 | 52.5 | 4% | 23.8 | 23.5 | 1% |

**Notes:**
Relative Percent Difference (RPD) is equal to |Result A - Result B| / ((Result A + Result B)/2) x 100%
TOC: Total Organic Carbon, TDS: Total Dissolved Solids, RDL: Reporting Detection Limit
Blue bold italic indicates a concentration in a field blank that's above 2x the RDL
Red bold italic indicates an RPD >20%, where both values are above 5x the RDL

**Appendix D.3: Tailings Humidity Cell Results, Table 1: Cell Description**

| **Cell No.** | **Sample ID** | **Sample Type** | **Method Reference** | **Column Dimensions** | | **Column Packing** | | | **Total Volume of Initial Flushings** | **Flushing Rate/Weekly Input*** | **Temp** | **Sampling Frequency** | **Start-up Date** | **Sampling Day** | **Operation Procedure** | **Sample Prep for Flushings** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Inner Diameter (cm) | Length (cm) | Dry Wt. of Sample (kg) | Other Materials Used | Column Material | (mL) | (mL) | (°C) | | **2021** | | | |
| T1 | Goldboro CN-Detox tailings | Tailings | MEND | 20.00 | 10.00 | 1.00 | Plexiglas perforated disk & nylon mesh | Plexiglas | 750 | 500 | 20-22 °C | Weekly | 26-Aug | Thursday | Flood Leach | Stirred |

**Appendix D.3: Tailings Humidity Cell Results, Table 2: T1 Results**

**T1**

**Sample = Goldboro CN-Detox tailings**

| **Date** | **Cycle** | **Volume mL** | | **pH** | **Cond.** | **Total** | **Sulphate** | **Total** | **WAD CN** | **Free CN** | **Ammonia** | **Nitrate** | **Nitrite** | **Chloride** | **Fluoride** | **Hardness** | **Al** | **Sb** | **As** | **Ba** | **Be** | **Bi** | **B** | **Cd** | **Ca** | **Cr** | **Co** | **Cu** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Input | Output | | | Alkalinity | | CN | | | as | as | as | | | $CaCO_3$ | | | | | | | | | | | | |
| | | | | | µmhos/cm | mg$CaCO_3$/L | mg/L | mg/L | mg/L | mg/L | Nmg/L | Nmg/L | Nmg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| 26-Aug-21 | 0 | 750 | 415 | 8.01 | 1895 | 99.1 | 798 | 1.58 | 0.02 | 0.019 | 6.9 | *<0.3* | 0.72 | 12 | 0.36 | 347 | 0.04 | 0.021 | 0.739 | 0.0256 | *<0.0000035* | *<0.000005* | 0.19 | 0.00006 | 129 | *<0.00004* | 0.0229 | 0.094 |
| 02-Sep-21 | 1 | 500 | 465 | 7.57 | 398 | 87.0 | 141 | 3.11 | 0.02 | 0.021 | 2.0 | 0.35 | *<0.3* | *<1* | 0.26 | 94.3 | 0.057 | 0.0382 | 1.98 | 0.00591 | *<0.0000035* | *<0.000005* | 0.051 | 0.000021 | 34.8 | *<0.00004* | 0.0115 | 0.0083 |
| 09-Sep-21 | 2 | 500 | 450 | 8.09 | 246 | 81.5 | 68 | 2.03 | | | 0.7 | *<0.3* | *<0.15* | *<1* | 0.22 | 71.8 | 0.046 | 0.0204 | 2.01 | 0.00498 | *<0.0000035* | 0.00006 | 0.031 | 0.000015 | 26.2 | *<0.00004* | 0.00753 | 0.0040 |
| 16-Sep-21 | 3 | 500 | 480 | 8.07 | 241 | 63.9 | 47 | 1.08 | | | 0.5 | *<0.03* | 0.05 | *<1* | 0.14 | 79.2 | 0.056 | 0.0165 | 1.94 | 0.00415 | *<0.0000035* | *<0.000005* | 0.020 | 0.000033 | 29.0 | 0.00008 | 0.00452 | 0.0021 |
| 23-Sep-21 | 4 | 500 | 390 | 8.06 | 377 | 55.1 | 110 | | | | | | | | | | | | | | | | | | | | | |
| 30-Sep-21 | 5 | 500 | 465 | 8.09 | 380 | 62.6 | 101 | 0.14 | 0.01 | 0.013 | 0.2 | *<0.3* | *<0.15* | *<1* | 0.11 | 155 | 0.043 | 0.0129 | 1.05 | 0.00975 | *<0.0000035* | *<0.000005* | 0.018 | 0.000019 | 57.2 | *<0.00004* | 0.00288 | 0.0011 |
| 07-Oct-21 | 6 | 500 | 450 | 8.08 | 379 | 60.0 | 111 | | | | | | | | | | | | | | | | | | | | | |
| 14-Oct-21 | 7 | 500 | 435 | 8.02 | 395 | 58.0 | 119 | 0.18 | 0.03 | 0.033 | 0.1 | *<0.3* | *<0.15* | *<1* | 0.09 | 178 | 0.038 | 0.0112 | 1.15 | 0.00890 | *<0.0000035* | *<0.000005* | 0.010 | 0.000033 | 66.6 | *<0.00004* | 0.00253 | 0.0012 |
| 21-Oct-21 | 8 | 500 | 410 | 8.05 | 411 | 58.6 | 120 | | | | | | | | | | | | | | | | | | | | | |
| 28-Oct-21 | 9 | 500 | 425 | 8.04 | 418 | 61.3 | 118 | 0.37 | 0.033 | 0.03 | NSS | *<0.3* | *<0.15* | *<1* | *<0.03* | 172 | 0.033 | 0.0093 | 1.53 | 0.00936 | *<0.0000035* | *<0.000005* | 0.006 | 0.000042 | 64.4 | 0.00012 | 0.00244 | 0.0012 |
| 04-Nov-21 | 10 | 500 | 440 | 7.92 | 581 | 57.4 | 130 | | | | | | | | | | | | | | | | | | | | | |
| 11-Nov-21 | 11 | 500 | 415 | 7.96 | 483 | 63.1 | 148 | 0.52 | 0.04 | 0.04 | *<0.05* | *<0.3* | 0.67 | *<1* | *<0.03* | 187 | 0.039 | 0.0096 | 2.57 | 0.0135 | *<0.0000035* | *<0.000005* | 0.013 | 0.00005 | 70.4 | 0.00048 | 0.0029 | 0.0016 |
| 18-Nov-21 | 12 | 500 | 485 | 8.02 | 461 | 65.2 | 137 | | | | | | | | | | | | | | | | | | | | | |
| 25-Nov-21 | 13 | 500 | 465 | 7.9 | 439 | 59.9 | 124 | 0.79 | 0.021 | 0.02 | *<0.05* | *<0.3* | *<0.15* | 8.5 | *<0.03* | 142 | 0.02 | 0.0087 | 2.85 | 0.0104 | *<0.0000035* | *<0.000005* | 0.003 | 0.000046 | 54 | 0.00027 | 0.0019 | 0.0012 |
| 02-Dec-21 | 14 | 500 | 435 | 7.87 | 424.8 | 51.8 | 130 | | | | | | | | | | | | | | | | | | | | | |
| 09-Dec-21 | 15 | 500 | 455 | 7.86 | 461.2 | 53.25 | 148 | 1.16 | 0.04 | 0.042 | *<0.05* | *<0.3* | *<0.15* | *<1* | *<0.03* | 186 | 0.034 | 0.0091 | 3.63 | 0.0138 | *<0.0000035* | *<0.000005* | 0.006 | 0.000054 | 71.4 | 0.00056 | 0.00228 | 0.0022 |
| 16-Dec-21 | 16 | 500 | 440 | 7.9 | 479.5 | 62.57 | 127 | | | | | | | | | | | | | | | | | | | | | |
| 23-Dec-21 | 17 | 500 | 495 | 7.89 | 433.9 | 60.05 | 118 | 1.04 | 0.05 | 0.046 | *<0.05* | *<0.3* | *<0.15* | *<1* | *<0.03* | 178 | 0.025 | 0.0094 | 3.36 | 0.0128 | 0.000011 | *<0.000005* | 0.006 | 0.000035 | 68.3 | 0.00072 | 0.00241 | 0.0017 |
| 30-Dec-21 | 18 | 500 | 420 | 7.89 | 434 | 53.2 | 159 | | | | | | | | | | | | | | | | | | | | | |
| 06-Jan-22 | 19 | 500 | 450 | 7.68 | 433.8 | 47.58 | 143 | 1.49 | 0.14 | 0.142 | *<0.05* | *<0.3* | *<0.15* | *<1* | *<0.03* | 176 | 0.03 | 0.0065 | 3.85 | 0.0105 | *<0.0000035* | *<0.000005* | 0.004 | 0.000044 | 68 | 0.00078 | 0.00202 | 0.0013 |
| 13-Jan-22 | 20 | 500 | 410 | 7.85 | 449.6 | 44.53 | 150 | | | | | | | | | | | | | | | | | | | | | |
| 20-Jan-22 | 21 | 500 | 495 | 7.85 | 426.7 | 52.03 | 129 | | | | | | | | | | | | | | | | | | | | | |
| 27-Jan-22 | 22 | 500 | 435 | 7.83 | 421 | 47.4 | 151 | | | | | | | | | | | | | | | | | | | | | |

**Notes:**

Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.3: Tailings Humidity Cell Results, Table 2: T1 Results**

**T1**

**Sample = Goldboro CN-Detox tailings**

| Date | Cycle | Fe | Pb | Li | Mg | Mn | Hg | Mo | Ni | P | K | Se | Si | Ag | Na | Sr | S | Tl | Sn | Ti | U | V | Zn | Zr | | Major | Major | Diff | Diff |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | | | | | | | | | | | | | | | | | | | | | | | | SGS File # | Anions | Cations | | (%) |
| | | mg/L | mg/L | mg/L | mg/L | mg/L | ug/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | | | | | |
| 26-Aug-21 | 0 | 0.96 | *<0.000045* | 0.021 | 5.66 | 0.0592 | *<0.005* | 0.0175 | 0.004 | 0.48 | 36.1 | 0.0021 | 3.60 | 0.0083 | 292 | 0.789 | 290 | *<0.000025* | 0.0116 | *<0.000025* | 0.00199 | 0.0005 | *<0.001* | *<0.001* | CA15553-AUG21 | 19.12 | 20.68 | 1.56 | 3.9% |
| 02-Sep-21 | 1 | 1.58 | *<0.000045* | 0.0174 | 1.79 | 0.0198 | *<0.005* | 0.00698 | 0.0008 | 0.019 | 13.8 | 0.00059 | 5.70 | *<0.000025* | 37.2 | 0.202 | 29 | 0.000011 | 0.0194 | *<0.000025* | 0.00190 | 0.00074 | *<0.001* | *<0.001* | CA15101-SEP21 | 4.81 | 4.05 | -0.77 | -8.7% |
| 09-Sep-21 | 2 | 1.07 | 0.00010 | 0.0092 | 1.54 | 0.0239 | *<0.005* | 0.00361 | 0.0007 | 0.007 | 10.2 | 0.00030 | 5.94 | *<0.000025* | 12.6 | 0.154 | 9 | 0.000007 | 0.0234 | 0.00014 | 0.00120 | 0.00077 | *<0.001* | *<0.001* | | 3.14 | 2.40 | -0.74 | -13.3% |
| 16-Sep-21 | 3 | 0.456 | 0.00009 | 0.0127 | 1.62 | 0.0209 | *<0.005* | 0.00180 | 0.0005 | 0.004 | 8.90 | 0.00018 | 5.50 | *<0.000025* | 6.91 | 0.151 | 17 | *<0.000025* | 0.0201 | *<0.000025* | 0.000651 | 0.00071 | *<0.001* | *<0.001* | | 2.31 | 2.23 | -0.08 | -1.8% |
| 23-Sep-21 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-Sep-21 | 5 | 0.070 | *<0.000045* | 0.0187 | 2.91 | 0.0616 | *<0.005* | 0.00388 | 0.0004 | *<0.0015* | 10.0 | 0.00016 | 6.02 | *<0.000025* | 2.99 | 0.274 | 39 | 0.000006 | 0.0258 | 0.00006 | 0.000625 | 0.00042 | *<0.001* | *<0.001* | CA15165-OCT21 | 3.37 | 3.54 | 0.18 | 2.5% |
| 07-Oct-21 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14-Oct-21 | 7 | 0.130 | *<0.000045* | 0.0166 | 2.99 | 0.0804 | *<0.005* | 0.00850 | 0.0013 | *<0.0015* | 11.3 | 0.00011 | 5.60 | *<0.000025* | 2.01 | 0.287 | 44 | *<0.000025* | 0.0264 | 0.00010 | 0.000482 | 0.00052 | *<0.001* | *<0.001* | CA15526-OCT21 | 3.65 | 4.01 | 0.36 | 4.7% |
| 21-Oct-21 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28-Oct-21 | 9 | 0.172 | *<0.000045* | 0.0171 | 2.68 | 0.0888 | *<0.005* | 0.0191 | 0.0013 | 0.004 | 10.3 | 0.00018 | 5.51 | *<0.000025* | 1.30 | 0.281 | 45 | *<2.5E-06* | 0.0217 | 0.00006 | 0.000457 | 0.00061 | *<0.001* | *<0.001* | CA14063-OCT21 | 3.70 | 3.84 | 0.14 | 1.8% |
| 04-Nov-21 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11-Nov-21 | 11 | 0.3 | *<0.000045* | 0.0161 | 2.63 | 0.0988 | *<0.005* | 0.0366 | 0.0018 | *<0.0015* | 12.8 | 0.00054 | 5.23 | *<0.000025* | 0.92 | 0.283 | 57 | *<2.5E-06* | 0.024 | 0.00192 | 0.000422 | 0.00095 | 0.003 | *<0.001* | CA15335-NOV21 | 4.37 | 4.23 | -0.13 | -1.6% |
| 18-Nov-21 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25-Nov-21 | 13 | 0.292 | 0.00013 | 0.0134 | 1.62 | 0.069 | *<0.005* | 0.038 | 0.0012 | *<0.0015* | 10.8 | 0.00063 | 5.07 | *<0.000025* | 0.66 | 0.21 | 36 | 0.000007 | 0.0218 | *<0.000025* | 0.000358 | 0.00054 | *<0.001* | *<0.001* | CA15540-NOV21 | 4.05 | 3.27 | -0.78 | -10.6% |
| 02-Dec-21 | 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 09-Dec-21 | 15 | 0.487 | 0.00024 | 0.0103 | 1.97 | 0.0752 | *<0.005* | 0.0627 | 0.0017 | *<0.0015* | 15 | 0.00031 | 4.06 | *<0.000025* | 0.92 | 0.215 | 52 | 0.000005 | 0.0211 | 0.00013 | 0.000285 | 0.00063 | 0.009 | *<0.001* | CA15316-DEC21 | 4.19 | 4.33 | 0.14 | 1.6% |
| 16-Dec-21 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23-Dec-21 | 17 | 0.486 | 0.00028 | 0.0122 | 1.9 | 0.0867 | *<0.005* | 0.0499 | 0.0022 | 0.003 | 13.7 | 0.00099 | 4.45 | *<0.000025* | 1.98 | 0.206 | 44 | 0.000024 | 0.0198 | 0.00025 | 0.000302 | 0.00071 | 0.003 | *<0.001* | CA15621-DEC21 | 3.70 | 4.17 | 0.47 | 6.0% |
| 30-Dec-21 | 18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 06-Jan-22 | 19 | 0.678 | 0.00019 | 0.0097 | 1.43 | 0.0421 | *<0.005* | 0.0457 | 0.0015 | *<0.0015* | 12.2 | 0.00036 | 4.61 | *<0.000025* | 0.75 | 0.192 | 50 | *<2.5E-06* | 0.0185 | 0.00006 | 0.000244 | 0.00062 | *<0.001* | *<0.001* | CA15125-JAN22 | 3.99 | 4.06 | 0.07 | 0.8% |
| 13-Jan-22 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20-Jan-22 | 21 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27-Jan-22 | 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Notes:**

Red italic text indicates a value below the detection limit. The value has been set at 0.5 x the detection limit.

**Appendix D.4: Saturated Tailings Column Results**

| Stn.Code | Sample No. | Collect Date/Time | Vol-Leachate-LE | Vol-Eff-LE | pH-LE | Cond-LE | T-Alk-LE | DOC | NH3 | NO2-N | NO3-N | CN-WAD | T-CN | SO4 | D-Br | D-Cl | D-F | D-Ag | D-Al | D-As | D-B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | | | mL | mL | pH | uS/cm | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| GB_Tailings_INF | VA21B3979-002 | 2021-07-08 11:30 | 200 | | 7.79 | 3030 | 255 | 28.5 | 26.4 | 0.0386 | <0.100 | <1.00 | 33.4 | 1350 | <1.00 | 11.2 | <0.400 | 0.0000224 | 0.0124 | 0.994 | 0.0448 |
| GB_Tailings_INF2 | VA21C8551-003 | 2021-12-20 15:30 | 200 | | 7.24 | 1392 | 109 | 5.61 | 3.85 | 0.0588 | 0.0486 | <0.0050 | 0.0151 | 588 | <0.250 | 10.3 | 0.191 | 0.0000653 | 0.0117 | 0.529 | 0.0463 |
| GB_Tailings | VA21B3979-001 | 2021-07-08 11:30 | 258 | 7 | 7.59 | 3940 | 118 | 5.25 | 13.3 | <0.0200 | <0.100 | <0.0200 | 0.526 | 2270 | <1.00 | 11.7 | <0.400 | 0.0000945 | 0.0165 | 0.388 | 0.0719 |
| GB_Tailings | VA21B5142-001 | 2021-07-22 11:30 | 240 | | 7.57 | 3930 | 129 | 5.74 | 12.8 | <0.0200 | <0.100 | <0.0050 | 1.18 | 2330 | <1.00 | 11.9 | <0.400 | 0.0000905 | 0.0174 | 0.897 | 0.0839 |
| GB_Tailings | VA21B6347-001 | 2021-08-05 11:00 | 235 | 7 | 7.63 | 3940 | 139 | 8.64 | 11.5 | <0.0200 | <0.100 | 0.0098 | 3.60 | 2210 | <1.00 | 12.0 | <0.400 | 0.0000607 | 0.0101 | 1.12 | 0.0867 |
| GB_Tailings | VA21B7647-001 | 2021-08-19 11:00 | 216 | | 7.63 | 3890 | 133 | 11.3 | 11.0 | <0.0200 | <0.100 | 0.0075 | 7.65 | 2120 | <1.00 | 11.8 | <0.400 | <0.0000250 | 0.0094 | 1.21 | 0.0842 |
| GB_Tailings | VA21B8977-001 | 2021-09-02 11:54 | 235 | | 7.71 | 3720 | 124 | 12.4 | 3.91 | <0.0200 | <0.100 | <0.0400 | 5.96 | 2050 | <1.00 | 11.6 | <0.400 | <0.0000250 | 0.0064 | 1.27 | 0.0828 |
| GB_Tailings | VA21C0303-001 | 2021-09-16 10:30 | 229 | | 7.64 | 3550 | 164 | 12.0 | 8.49 | 0.0525 | <0.100 | <0.0400 | 4.72 | 1880 | <1.00 | 11.9 | <0.400 | <0.0000250 | 0.0071 | 1.41 | 0.0895 |
| GB_Tailings | VA21C1475-001 | 2021-09-29 11:00 | 237 | | 7.70 | 3360 | 180 | 11.3 | 1.66 | <0.0200 | <0.100 | <0.200 | 4.68 | 1760 | <1.00 | 12.0 | <0.400 | <0.0000100 | 0.0087 | 1.41 | 0.0862 |
| GB_Tailings | VA21C2814-001 | 2021-10-14 12:30 | 239 | | 7.74 | 3230 | 195 | 10.9 | 7.21 | <0.0200 | <0.100 | <0.0400 | 3.37 | 1680 | <1.00 | 11.8 | <0.400 | <0.0000100 | 0.0064 | 1.45 | 0.0808 |
| GB_Tailings | VA21C4087-001 | 2021-10-28 10:30 | 246 | | 7.76 | 3120 | 196 | 10.3 | 6.84 | <0.0200 | <0.100 | <0.0400 | 2.37 | 1640 | <1.00 | 12.4 | <0.400 | <0.0000100 | 0.0074 | 1.40 | 0.0770 |
| GB_Tailings | VA21C5259-001 | 2021-11-10 10:30 | 223 | | 7.67 | 3040 | 202 | 9.44 | 6.94 | 0.0211 | <0.100 | <0.0400 | 1.71 | 1490 | <1.00 | 12.8 | <0.400 | <0.0000100 | 0.0069 | 1.32 | 0.0749 |
| GB_Tailings | VA21C6328-002 | 2021-11-25 10:30 | 169 | | 7.75 | 2960 | 194 | 8.89 | 7.04 | <0.0200 | <0.100 | <0.0400 | 1.20 | 1470 | <1.00 | 11.6 | <0.400 | <0.000020 | 0.0095 | 1.37 | 0.071 |
| GB_Tailings | VA21C7559-002 | 2021-12-09 10:30 | 174 | | 7.81 | 2922 | 184 | 7.23 | 7.28 | <0.0200 | <0.100 | <0.0400 | 0.957 | 1460 | <1.00 | 11.6 | <0.400 | <0.000020 | 0.0081 | 1.44 | 0.064 |
| GB_Tailings | VA21C8551-002 | 2021-12-22 11:00 | 171 | | 7.84 | 2904 | 178 | 6.20 | 7.96 | <0.0200 | <0.100 | <0.0400 | 0.729 | 1480 | <1.00 | 11.4 | <0.400 | <0.0000100 | 0.0065 | 1.23 | 0.0582 |
| GB_Tailings | VA22A0212-002 | 2022-01-06 10:30 | 175 | | 8.09 | 2903 | 174 | 6.08 | 8.90 | <0.0200 | <0.100 | <0.0400 | 0.503 | 1400 | <1.00 | 11.6 | <0.400 | <0.000020 | 0.0094 | 1.36 | 0.060 |
| GB_Tailings | VA22A1125-002 | 2022-01-20 9:30 | 183 | | 7.79 | 2851 | 175 | 4.16 | 9.83 | <0.0200 | <0.100 | <0.0400 | 0.395 | 1380 | <1.00 | 11.4 | <0.400 | <0.0000100 | 0.0065 | 1.34 | 0.0540 |
| GB_Tailings | VA22A2231-002 | 2022-02-03 10:00 | 182 | | 7.80 | 2606 | 162 | 5.68 | 11 | <0.0200 | <0.100 | <0.100 | 0.334 | 1240 | <1.00 | 11.3 | 0.508 | <0.0000100 | 0.0074 | 1.35 | 0.0574 |

**Appendix D.4: Saturated Tailings Column Results**

| Stn.Code | Sample No. | Collect Date/Time | D-Ba | D-Be | D-Bi | D-Ca | D-Cd | D-Co | D-Cr | D-Cs | D-Cu | D-Fe | D-Hg | D-K | D-Li | D-Mg | D-Mn | D-Mo | D-Na | D-Ni | D-P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| GB_Tailings_INF | VA21B3979-002 | 2021-07-08 11:30 | 0.0537 | <0.0000100 | <0.0000100 | 199 | <0.0000100 | 0.0990 | <0.00020 | <0.0000100 | 0.000565 | 11.1 | <0.0000050 | 44.6 | 0.0200 | 5.79 | 0.0139 | 0.0334 | 437 | 0.000754 | <0.100 |
| GB_Tailings_INF2 | VA21C8551-003 | 2021-12-20 15:30 | 0.0359 | <0.0000050 | <0.0000050 | 104 | <0.0000150 | 0.0269 | <0.00010 | 0.000213 | 0.0561 | <0.0010 | <0.0000050 | 45.7 | 0.0378 | 4.14 | 0.0503 | 0.0285 | 147 | 0.00159 | <0.050 |
| GB_Tailings | VA21B3979-001 | 2021-07-08 11:30 | 0.0406 | <0.0000250 | <0.0000250 | 408 | 0.000260 | 0.0239 | <0.00050 | <0.0000250 | 0.00363 | 0.232 | 0.0000511 | 74.1 | 0.0565 | 30.5 | 0.471 | 0.0538 | 483 | 0.00371 | <0.250 |
| GB_Tailings | VA21B5142-001 | 2021-07-22 11:30 | 0.0426 | <0.0000250 | <0.0000250 | 445 | 0.0000650 | 0.0256 | <0.00050 | 0.0000374 | 0.00336 | 0.664 | 0.0000285 | 85.1 | 0.0516 | 35.3 | 0.593 | 0.0556 | 544 | 0.00539 | <0.250 |
| GB_Tailings | VA21B6347-001 | 2021-08-05 11:00 | 0.0393 | <0.0000250 | <0.0000250 | 432 | <0.0000300 | 0.0262 | <0.00050 | <0.0000250 | 0.00299 | 1.92 | 0.0000187 | 72.7 | 0.0429 | 32.3 | 0.570 | 0.0518 | 479 | 0.00473 | <0.250 |
| GB_Tailings | VA21B7647-001 | 2021-08-19 11:00 | 0.0339 | <0.0000250 | <0.0000250 | 372 | <0.0000250 | 0.0263 | <0.00050 | <0.0000250 | <0.000250 | 1.91 | 0.0000070 | 66.3 | 0.0374 | 30.8 | 0.499 | 0.0432 | 439 | 0.00248 | <0.250 |
| GB_Tailings | VA21B8977-001 | 2021-09-02 11:54 | 0.0316 | <0.0000250 | <0.0000250 | 358 | <0.0000300 | 0.0278 | <0.00050 | <0.0000250 | 0.000887 | 2.49 | <0.0000050 | 62.6 | 0.0375 | 29.5 | 0.350 | 0.0480 | 448 | 0.00203 | <0.250 |
| GB_Tailings | VA21C0303-001 | 2021-09-16 10:30 | 0.0299 | <0.0000250 | <0.0000250 | 337 | <0.0000250 | 0.0310 | <0.00050 | <0.0000250 | 0.000409 | 1.94 | <0.000100 | 60.4 | 0.0345 | 28.5 | 0.256 | 0.0509 | 463 | 0.00146 | <0.250 |
| GB_Tailings | VA21C1475-001 | 2021-09-29 11:00 | 0.0265 | <0.0000100 | <0.0000100 | 316 | <0.0000200 | 0.0311 | <0.00020 | <0.0000100 | 0.000793 | 1.53 | <0.0000050 | 56.4 | 0.0342 | 25.2 | 0.210 | 0.0494 | 464 | 0.00135 | <0.100 |
| GB_Tailings | VA21C2814-001 | 2021-10-14 12:30 | 0.0255 | <0.0000100 | <0.0000100 | 284 | <0.0000150 | 0.0357 | <0.00020 | <0.0000100 | 0.000727 | 1.23 | <0.0000050 | 55.9 | 0.0298 | 26.0 | 0.191 | 0.0477 | 463 | 0.00100 | <0.100 |
| GB_Tailings | VA21C4087-001 | 2021-10-28 10:30 | 0.0242 | <0.0000100 | <0.0000100 | 268 | <0.0000150 | 0.0377 | <0.00020 | <0.0000100 | 0.000488 | 0.897 | <0.0000050 | 52.3 | 0.0309 | 23.4 | 0.185 | 0.0500 | 447 | 0.000831 | <0.100 |
| GB_Tailings | VA21C5259-001 | 2021-11-10 10:30 | 0.0221 | <0.0000100 | <0.0000100 | 242 | <0.0000100 | 0.0369 | <0.00020 | <0.0000100 | 0.000293 | 0.677 | <0.0000050 | 49.7 | 0.0276 | 20.0 | 0.176 | 0.0460 | 412 | 0.000812 | <0.100 |
| GB_Tailings | VA21C6328-002 | 2021-11-25 10:30 | 0.0202 | <0.000040 | <0.000100 | 224 | <0.0000250 | 0.0388 | <0.00100 | <0.000020 | <0.00040 | 0.539 | <0.000100 | 44.8 | 0.0266 | 18.5 | 0.177 | 0.0446 | 407 | <0.00100 | <0.100 |
| GB_Tailings | VA21C7559-002 | 2021-12-09 10:30 | 0.0208 | <0.000040 | <0.000100 | 206 | <0.0000100 | 0.0422 | <0.00100 | <0.000020 | <0.00040 | 0.435 | <0.0000050 | 47.8 | 0.0238 | 18.5 | 0.191 | 0.0458 | 404 | <0.00100 | <0.100 |
| GB_Tailings | VA21C8551-002 | 2021-12-22 11:00 | 0.0186 | <0.0000100 | <0.0000100 | 181 | <0.0000100 | 0.0370 | <0.00020 | <0.0000100 | 0.000142 | 0.338 | <0.0000050 | 42.1 | 0.0230 | 16.2 | 0.179 | 0.0430 | 405 | 0.000386 | <0.100 |
| GB_Tailings | VA22A0212-002 | 2022-01-06 10:30 | 0.0201 | <0.000040 | <0.000100 | 185 | <0.0000100 | 0.0378 | <0.00100 | <0.000020 | <0.00040 | 0.292 | <0.0000050 | 46.1 | 0.0237 | 16.0 | 0.210 | 0.0455 | 482 | <0.00100 | <0.100 |
| GB_Tailings | VA22A1125-002 | 2022-01-20 9:30 | 0.0193 | <0.0000100 | <0.0000100 | 167 | <0.0000150 | 0.0338 | <0.00020 | 0.0000104 | <0.000100 | 0.231 | <0.0000050 | 45.2 | 0.0223 | 15.9 | 0.209 | 0.0466 | 426 | 0.000392 | <0.100 |
| GB_Tailings | VA22A2231-002 | 2022-02-03 10:00 | 0.0194 | <0.0000100 | <0.0000100 | 160 | <0.0000100 | 0.0277 | <0.00020 | <0.0000100 | <0.000100 | 0.176 | <0.0000050 | 43.8 | 0.0212 | 12.8 | 0.2 | 0.0481 | 416 | 0.000416 | <0.100 |

**Appendix D.4: Saturated Tailings Column Results**

| Stn.Code | Sample No. | Collect Date/Time | D-Pb | D-Rb | D-S | D-Sb | D-Se | D-Si | D-Sn | D-Sr | D-Te | D-Th | D-Ti | D-Tl | D-U | D-V | D-W | D-Zn | D-Zr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Units | | | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| GB_Tailings_INF | VA21B3979-002 | 2021-07-08 11:30 | 0.000022 | 0.00964 | 522 | 0.0406 | 0.00138 | 4.47 | 0.00151 | 1.52 | 0.000101 | <0.0000100 | <0.000100 | 0.0000122 | 0.00908 | 0.000325 | 0.00320 | <0.00100 | <0.000020 |
| GB_Tailings_INF2 | VA21C8551-003 | 2021-12-20 15:30 | 0.000036 | 0.0213 | 203 | 0.0362 | 0.000940 | 2.76 | 0.000330 | 0.953 | <0.000020 | <0.0000050 | <0.000100 | 0.0000756 | 0.000462 | 0.000298 | 0.00235 | 0.00139 | <0.000010 |
| GB_Tailings | VA21B3979-001 | 2021-07-08 11:30 | 0.000094 | 0.0197 | 843 | 0.0162 | 0.000695 | 5.47 | 0.000159 | 2.50 | 0.000143 | <0.0000250 | <0.000250 | 0.0000916 | 0.00186 | 0.000255 | 0.00119 | 0.00666 | <0.000050 |
| GB_Tailings | VA21B5142-001 | 2021-07-22 11:30 | 0.000089 | 0.0218 | 969 | 0.0138 | 0.00119 | 7.03 | 0.000310 | 2.86 | 0.000212 | <0.0000250 | <0.000250 | 0.0000548 | 0.00112 | 0.000466 | 0.000981 | <0.00250 | <0.000050 |
| GB_Tailings | VA21B6347-001 | 2021-08-05 11:00 | 0.000088 | 0.0191 | 781 | 0.0123 | 0.000719 | 6.29 | 0.000560 | 2.62 | 0.000101 | <0.0000250 | <0.000250 | 0.0000313 | 0.00110 | 0.000404 | 0.000799 | <0.00250 | <0.000050 |
| GB_Tailings | VA21B7647-001 | 2021-08-19 11:00 | <0.000050 | 0.0138 | 808 | 0.0116 | 0.000451 | 6.87 | 0.000777 | 2.45 | 0.000141 | 0.0000306 | <0.000250 | <0.0000250 | 0.00113 | 0.000312 | 0.000595 | <0.00250 | <0.000050 |
| GB_Tailings | VA21B8977-001 | 2021-09-02 11:54 | <0.000050 | 0.0110 | 717 | 0.0106 | 0.000712 | 6.78 | 0.000809 | 2.29 | <0.000100 | <0.0000250 | <0.000250 | <0.0000250 | 0.00130 | 0.000400 | 0.000697 | <0.00250 | <0.000050 |
| GB_Tailings | VA21C0303-001 | 2021-09-16 10:30 | <0.000050 | 0.00834 | 653 | 0.0104 | 0.000505 | 6.80 | 0.000985 | 2.14 | 0.000118 | <0.0000250 | <0.000250 | <0.0000250 | 0.00135 | 0.000416 | 0.000833 | <0.00250 | <0.000050 |
| GB_Tailings | VA21C1475-001 | 2021-09-29 11:00 | <0.000020 | 0.00604 | 682 | 0.00956 | 0.000300 | 7.25 | 0.000985 | 1.98 | 0.000139 | <0.0000100 | 0.000117 | <0.0000100 | 0.00150 | 0.000433 | 0.000654 | <0.00100 | <0.000020 |
| GB_Tailings | VA21C2814-001 | 2021-10-14 12:30 | <0.000020 | 0.00529 | 647 | 0.00824 | 0.000224 | 7.73 | 0.000908 | 1.76 | 0.000074 | <0.0000100 | <0.000100 | <0.0000100 | 0.00149 | 0.000413 | 0.000631 | <0.00100 | <0.000020 |
| GB_Tailings | VA21C4087-001 | 2021-10-28 10:30 | <0.000020 | 0.00474 | 598 | 0.00826 | 0.000172 | 7.02 | 0.00100 | 1.66 | 0.000075 | <0.0000100 | <0.000100 | <0.0000100 | 0.00157 | 0.000370 | 0.000666 | <0.00100 | <0.000020 |
| GB_Tailings | VA21C5259-001 | 2021-11-10 10:30 | <0.000020 | 0.00431 | 598 | 0.00728 | 0.000127 | 7.10 | 0.000954 | 1.60 | 0.000073 | <0.0000100 | <0.000100 | <0.0000100 | 0.00142 | 0.000333 | 0.000646 | <0.00100 | <0.000020 |
| GB_Tailings | VA21C6328-002 | 2021-11-25 10:30 | <0.000100 | 0.00420 | 512 | 0.00690 | 0.000108 | 6.24 | 0.00094 | 1.36 | <0.00040 | <0.00020 | <0.00060 | <0.000020 | 0.00126 | <0.00100 | 0.00055 | <0.0020 | <0.00060 |
| GB_Tailings | VA21C7559-002 | 2021-12-09 10:30 | <0.000100 | 0.00419 | 531 | 0.00606 | <0.000100 | 6.33 | 0.00098 | 1.36 | <0.00040 | <0.00020 | <0.00060 | <0.000020 | 0.00114 | <0.00100 | 0.00063 | <0.0020 | <0.00060 |
| GB_Tailings | VA21C8551-002 | 2021-12-22 11:00 | <0.000020 | 0.00408 | 462 | 0.00560 | 0.000094 | 6.47 | 0.000810 | 1.21 | <0.000040 | <0.0000100 | <0.000100 | <0.0000100 | 0.000934 | 0.000275 | 0.000658 | <0.00100 | <0.000020 |
| GB_Tailings | VA22A0212-002 | 2022-01-06 10:30 | <0.000100 | 0.00472 | 524 | 0.00562 | 0.000145 | 6.63 | 0.00100 | 1.26 | <0.00040 | <0.00020 | <0.00060 | <0.000020 | 0.000959 | <0.00100 | 0.00075 | <0.0020 | <0.00060 |
| GB_Tailings | VA22A1125-002 | 2022-01-20 9:30 | <0.000020 | 0.00503 | 512 | 0.0053 | 0.000093 | 6.55 | 0.000933 | 1.2 | 0.000066 | <0.0000100 | <0.000100 | <0.0000100 | 0.00067 | 0.000217 | 0.000764 | <0.00100 | <0.000020 |
| GB_Tailings | VA22A2231-002 | 2022-02-03 10:00 | <0.000020 | 0.00501 | 492 | 0.00546 | <0.000080 | 6.29 | 0.000875 | 1.06 | <0.000040 | <0.0000100 | <0.000100 | <0.0000100 | 0.000604 | 0.000201 | 0.000845 | <0.00100 | <0.000020 |

# *Appendix E: 2021 Bulk Sample Stockpile Runoff Water Quality*

Anaconda Mining

**Appendix E: 2021 Bulk Sample Stockpile Runoff Water Quality**

| Bureau Veritas ID | | | PZA627 | QFL451 | QMD282 | RAG732 | RGZ697 | RIG681 |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | Tier 1 EQS | 2021-06-28 11:00 | 2021-07-27 11:30 | 2021-08-23 | 2021-10-20 | 2021-11-18 13:30 | 2021-12-08 13:06 |
| | **UNITS** | | **DRAINAGE FROM ORE** | **DRAINAGE FROM ORE** | **DRAINAGE FROM ORE** | **DRAINAGE FROM ORE** | **DRAINAGE FROM ORE** | **DRAINAGE FROM ONE** |
| **Calculated Parameters** | | | | | | | | |
| Field pH | | 6.5-9.0 | - | - | - | 7.61 | 7.77 | 7.35 |
| Field Temperature | C | - | - | - | - | 13.66 | 3.04 | 3.72 |
| Field Conductivity | µS/cm | - | - | - | - | 46 | 29 | 90 |
| Anion Sum | me/L | - | - | 0.12 | - | - | - | 0.7 |
| Bicarb. Alkalinity (calc. as CaCO3) | mg/L | - | - | 5.5 | - | - | - | 4.8 |
| Calculated TDS | mg/L | - | - | 6 | - | - | - | 52 |
| Carb. Alkalinity (calc. as CaCO3) | mg/L | - | - | <1 | - | - | - | <1 |
| Cation Sum | me/L | - | - | 0.1 | - | - | - | 0.74 |
| Hardness (CaCO3) | mg/L | - | - | 2.7 | 35 | 15 | 6 | 30 |
| Ion Balance (% Difference) | % | - | - | 9.09 | - | - | - | 2.78 |
| Langelier Index (@ 20C) | N/A | - | - | -3.88 | - | - | - | -2.84 |
| Langelier Index (@ 4C) | N/A | - | - | -4.13 | - | - | - | -3.09 |
| Nitrate (N) | mg/L | 13 | - | 0.16 | - | - | - | 0.28 |
| Saturation pH (@ 20C) | N/A | - | - | 10.5 | - | - | - | 9.59 |
| Saturation pH (@ 4C) | N/A | - | - | 10.7 | - | - | - | 9.84 |
| **Inorganics** | | | | | | | | |
| Acidity | mg/L | | - | - | <5 | <5 | - | <5 |
| Total Alkalinity (Total as CaCO3) | mg/L | - | - | 5.5 | 8.3 | - | - | 9.5 |
| Dissolved Chloride (Cl-) | mg/L | 120 | - | <1 | <1 | 1.2 | - | 5 |
| Colour | TCU | - | - | <5 | - | - | - | 8.6 |
| Nitrate + Nitrite (N) | mg/L | - | - | 0.17 | - | - | - | 0.28 |
| Nitrite (N) | mg/L | 0.06 | - | 0.011 | - | - | - | <0.01 |
| Nitrogen (Ammonia Nitrogen) | mg/L | 5.7 | - | 0.16 | - | - | - | <0.05 |
| Total Organic Carbon (C) | mg/L | - | - | 2.4 | - | - | - | 1.7 |
| Orthophosphate (P) | mg/L | - | - | <0.01 | - | - | - | <2 |
| pH | pH | 6.5-9.0 | - | 6.61 | 6.41 | 6.54 | - | 6.75 |
| Dissolved Phosphorus | mg/L | - | - | - | 0.031 | 0.014 | - | 0.19 |
| Total Phosphorus | mg/L | - | - | - | - | 0.053 | - | - |
| Reactive Silica (SiO2) | mg/L | - | - | <0.5 | - | - | - | 5.8 |
| Dissolved Sulphate (SO4) | mg/L | 128 | - | <2 | 29 | 12 | - | 20 |
| Turbidity | NTU | - | - | 2 | - | - | - | 15 |
| Alkalinity (Total as CaCO3) | mg/L | - | - | - | - | 1.3 | - | 4.9 |
| Conductivity | µS/cm | - | - | 8.3 | 83 | 42 | - | 80 |
| Total Suspended Solids | mg/L | - | - | - | - | - | - | - |
| Dissolved Mercury (Hg) | µg/L | 0.026 | - | - | <0.013 | <0.013 | <0.013 | <0.013 |
| Dissolved Aluminum (Al) | mg/L | 0.005 | 0.1 | 0.011 | 0.021 | 0.0056 | 0.0053 | 0.0249 |
| Dissolved Antimony (Sb) | mg/L | 0.009 | <0.001 | <0.001 | 0.0013 | <0.001 | <0.001 | 0.0018 |
| Dissolved Arsenic (As) | mg/L | 0.005 | 0.247 | 0.02 | 1.2 | 0.75 | 0.517 | 3.38 |
| Dissolved Barium (Ba) | mg/L | 1 | 0.0019 | 0.001 | 0.004 | 0.0011 | 0.001 | 0.0015 |
| Dissolved Beryllium (Be) | mg/L | 0.00015 | <0.001 | <0.001 | <0.001 | <0.0001 | <0.0001 | <0.0001 |
| Dissolved Bismuth (Bi) | mg/L | - | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Dissolved Boron (B) | mg/L | 1.5 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Dissolved Cadmium (Cd) | mg/L | 0.00009 | 0.000034 | 0.000025 | 0.000031 | 0.000014 | 0.000017 | 0.000038 |
| Dissolved Calcium (Ca) | mg/L | - | 1.59 | 1.1 | 13 | 5.3 | 2.02 | 10.9 |
| Dissolved Chromium (Cr) | mg/L | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Dissolved Cobalt (Co) | mg/L | 0.01 | <0.0004 | <0.0004 | <0.0004 | <0.0004 | <0.0004 | <0.0004 |
| Dissolved Copper (Cu) | mg/L | 0.002 | 0.00317 | 0.00065 | 0.0026 | <0.0005 | <0.0005 | 0.00131 |
| Dissolved Iron (Fe) | mg/L | 0.3 | 0.056 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| Dissolved Lead (Pb) | mg/L | 0.001 | 0.00106 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Dissolved Magnesium (Mg) | mg/L | - | 0.25 | <0.1 | 0.5 | 0.31 | 0.23 | 0.71 |
| Dissolved Manganese (Mn) | mg/L | 0.43 | 0.0201 | 0.0093 | 0.0032 | 0.014 | 0.0092 | 0.023 |
| Dissolved Molybdenum (Mo) | mg/L | 0.073 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Dissolved Nickel (Ni) | mg/L | 0.025 | <0.002 | <0.002 | 0.0025 | <0.002 | <0.002 | 0.0053 |
| Dissolved Phosphorus (P) | mg/L | - | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Dissolved Potassium (K) | mg/L | - | 0.65 | 0.12 | 1.4 | 0.64 | 0.36 | 1.27 |
| Dissolved Selenium (Se) | mg/L | 0.001 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Dissolved Silver (Ag) | mg/L | 0.00025 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Dissolved Sodium (Na) | mg/L | - | 1.79 | 0.61 | 0.62 | 0.98 | 1.53 | 2.4 |
| Dissolved Strontium (Sr) | mg/L | - | 0.0046 | <0.002 | 0.04 | 0.016 | 0.0065 | 0.0423 |
| Dissolved Thallium (Tl) | mg/L | 0.0008 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Dissolved Tin (Sn) | mg/L | - | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Dissolved Titanium (Ti) | mg/L | - | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Dissolved Uranium (U) | mg/L | 0.015 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Dissolved Vanadium (V) | mg/L | 0.12 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Dissolved Zinc (Zn) | mg/L | 0.007 | 0.0086 | 0.0097 | 0.013 | 0.0051 | <0.005 | 0.0092 |

**Notes:**
Tier 1 EQS: Nova Scotia Tier 1 Environmental Quality Standards
Nova Scotia Environment (NSE) (2021). Table 3 - Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (µg/L). In Notification of Contamination Protocol. Revised September 30, 2021
Ammonia guideline assumes pH 7.0 and temperature of 15°C
Bold italic text indicates a pH outside of the Tier 1 EQS pH range.
Grey shading indicates a concentration above the Tier 1 EQS.

# *Appendix F: Source Terms*

Anaconda Mining

| Location | Time | Scenario | pH | Alkalinity | Sulphate | Cl | F | Al | Sb | As | Ba | Be | B | Cd | Ca | Cr | Co | Cu | Fe | Pb | Mg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *mg/L* | *mg CaCO3/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* |
| **SE Dump** | Short-term | Base Case | 7.5 | 10.0 | 151 | 8.5 | 0.18 | 0.025 | 0.0069 | 0.16 | 0.0086 | 0.00050 | 0.051 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00062 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.5 | 5.0 | 312 | 17 | 0.30 | 0.066 | 0.014 | 0.42 | 0.017 | 0.0010 | 0.10 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00095 | 0.24 | 0.0021 | 2.0 |
| | Long-term | Base Case | 7.0 | 10.0 | 151 | 8.5 | 0.18 | 0.016 | 0.0069 | 0.10 | 0.0086 | 0.00050 | 0.026 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00052 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.0 | 5.0 | 315 | 17 | 0.30 | 0.043 | 0.014 | 0.27 | 0.017 | 0.0010 | 0.053 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00081 | 0.24 | 0.0021 | 2.0 |
| **NE Dump** | Short-term | Base Case | 7.5 | 10.0 | 151 | 8.5 | 0.18 | 0.025 | 0.0071 | 0.17 | 0.0086 | 0.00050 | 0.052 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00063 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.5 | 5.0 | 313 | 17 | 0.30 | 0.068 | 0.014 | 0.43 | 0.017 | 0.0010 | 0.10 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00097 | 0.24 | 0.0021 | 2.0 |
| | Long-term | Base Case | 7.0 | 10.0 | 151 | 8.5 | 0.18 | 0.016 | 0.0070 | 0.11 | 0.0086 | 0.00050 | 0.027 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00053 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.0 | 5.0 | 316 | 17 | 0.30 | 0.044 | 0.014 | 0.27 | 0.017 | 0.0010 | 0.053 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00082 | 0.24 | 0.0021 | 2.0 |
| **NW Dump** | Short-term | Base Case | 7.5 | 10.0 | 151 | 8.5 | 0.18 | 0.024 | 0.0067 | 0.15 | 0.0086 | 0.00050 | 0.050 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00060 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.5 | 5.0 | 311 | 17 | 0.30 | 0.064 | 0.014 | 0.39 | 0.017 | 0.0010 | 0.10 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00093 | 0.24 | 0.0021 | 2.0 |
| | Long-term | Base Case | 7.0 | 10.0 | 151 | 8.5 | 0.18 | 0.015 | 0.0067 | 0.099 | 0.0086 | 0.00050 | 0.026 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00051 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.0 | 5.0 | 313 | 17 | 0.30 | 0.041 | 0.013 | 0.25 | 0.017 | 0.0010 | 0.051 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00079 | 0.24 | 0.0021 | 2.0 |
| **Backfill** | Short-term | Base Case | 7.5 | 10.0 | 151 | 8.5 | 0.17 | 0.022 | 0.0065 | 0.14 | 0.0086 | 0.00050 | 0.048 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00058 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.5 | 5.0 | 310 | 17 | 0.30 | 0.060 | 0.013 | 0.37 | 0.017 | 0.0010 | 0.095 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00089 | 0.24 | 0.0021 | 2.0 |
| | Long-term | Base Case | 7.0 | 10.0 | 151 | 8.5 | 0.17 | 0.015 | 0.0065 | 0.096 | 0.0086 | 0.00050 | 0.025 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00050 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.0 | 5.0 | 311 | 17 | 0.30 | 0.040 | 0.013 | 0.24 | 0.017 | 0.0010 | 0.050 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00077 | 0.24 | 0.0021 | 2.0 |
| **Pit Wall - NPAG** | Short-term | Base Case | 7.5 | 10.0 | 80 | 8.5 | 0.18 | 0.020 | 0.0075 | 0.31 | 0.0086 | 0.00050 | 0.038 | 0.0000100 | 10.8 | 0.0010 | 0.0025 | 0.00015 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.5 | 5.0 | 171 | 17 | 0.29 | 0.029 | 0.015 | 0.73 | 0.017 | 0.0010 | 0.075 | 0.000016 | 15 | 0.0020 | 0.0050 | 0.0017 | 0.24 | 0.0021 | 2.0 |
| | Long-term | Base Case | 7.0 | 10.0 | 89 | 8.5 | 0.18 | 0.017 | 0.0075 | 0.24 | 0.0086 | 0.00050 | 0.026 | 0.000020 | 14 | 0.0010 | 0.0025 | 0.00014 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.0 | 5.0 | 167 | 17 | 0.28 | 0.025 | 0.015 | 0.57 | 0.017 | 0.0010 | 0.051 | 0.000032 | 19 | 0.0020 | 0.0050 | 0.0016 | 0.24 | 0.0021 | 2.0 |
| **Pit Wall - PAG2** | Short-term | Base Case | 7.5 | 10.0 | 94 | 8.5 | 0.19 | 0.018 | 0.0075 | 0.33 | 0.0086 | 0.00050 | 0.061 | 0.0000110 | 16 | 0.0010 | 0.0025 | 0.00022 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.5 | 5.0 | 192 | 17 | 0.30 | 0.025 | 0.015 | 0.80 | 0.017 | 0.0010 | 0.12 | 0.000017 | 22 | 0.0020 | 0.0050 | 0.0025 | 0.24 | 0.0021 | 2.0 |
| | Long-term | Base Case | 5.5 | -0.17 | 124 | 33 | 0.19 | 0.030 | 0.046 | 0.15 | 0.0086 | 0.00050 | 0.053 | 0.000038 | 30 | 0.0026 | 0.0025 | 0.0018 | 0.42 | 0.0011 | 1.0 |
| | | Upper Case | 5.0 | -0.60 | 237 | 89 | 0.31 | 0.043 | 0.065 | 0.37 | 0.17 | 0.010 | 0.104 | 0.00076 | 41 | 0.0053 | 0.050 | 0.020 | 0.48 | 0.021 | 20 |
| **Pit Wall - PAG1** | Short-term | Base Case | 7.0 | 10.0 | 93 | 8.5 | 0.18 | 0.0105 | 0.0075 | 0.073 | 0.0086 | 0.00050 | 0.039 | 0.0000100 | 16 | 0.0010 | 0.0025 | 0.00015 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.0 | 5.0 | 186 | 17 | 0.29 | 0.015 | 0.015 | 0.17 | 0.017 | 0.0010 | 0.077 | 0.000016 | 22 | 0.0020 | 0.0050 | 0.0017 | 0.24 | 0.0021 | 2.0 |
| | Long-term | Base Case | 4.0 | -6.6 | 653 | 30 | 0.18 | 4.5 | 0.028 | 0.13 | 1.07 | 0.47 | 0.042 | 0.0012 | 6.0 | 0.0055 | 5.1 | 0.069 | 102 | 1.4 | 61 |
| | | Upper Case | 3.5 | -23 | 1075 | 82 | 0.29 | 6.4 | 0.039 | 0.31 | 2.6 | 0.93 | 0.084 | 0.0019 | 8.1 | 0.0110 | 12 | 0.78 | 116 | 2.8 | 119 |
| **PAG1 in TMF** | Short-term | Base Case | 7.0 | 10.0 | 148 | 8.5 | 0.10 | 0.0091 | 0.0040 | 0.44 | 0.0070 | 0.0010 | 0.027 | 0.000032 | 35 | 0.0010 | 0.0025 | 0.00036 | 0.18 | 0.0011 | 1.1 |
| | | Upper Case | 6.0 | 5.0 | 298 | 17 | 0.20 | 0.024 | 0.0079 | 1.4 | 0.014 | 0.0020 | 0.053 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00055 | 0.37 | 0.0021 | 2.2 |
| **NPAG Cover** | Long-term | Base Case | 7.0 | 10.0 | 140 | 8.5 | 0.12 | 0.013 | 0.0038 | 0.075 | 0.0086 | 0.00050 | 0.017 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00035 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.0 | 5.0 | 271 | 17 | 0.24 | 0.036 | 0.0077 | 0.19 | 0.017 | 0.0010 | 0.034 | 0.000076 | 70 | 0.0020 | 0.0042 | 0.00053 | 0.24 | 0.0021 | 2.0 |
| **TMF Dam** | Short-term | Base Case | 7.5 | 10.0 | 140 | 8.5 | 0.18 | 0.024 | 0.0067 | 0.15 | 0.0086 | 0.00050 | 0.050 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00060 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.5 | 5.0 | 282 | 17 | 0.30 | 0.064 | 0.014 | 0.39 | 0.017 | 0.0010 | 0.10 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00093 | 0.24 | 0.0021 | 2.0 |
| | Long-term | Base Case | 7.0 | 10.0 | 151 | 8.5 | 0.18 | 0.015 | 0.0067 | 0.099 | 0.0086 | 0.00050 | 0.026 | 0.000038 | 35 | 0.0010 | 0.0025 | 0.00051 | 0.12 | 0.0011 | 1.0 |
| | | Upper Case | 6.0 | 5.0 | 313 | 17 | 0.30 | 0.041 | 0.013 | 0.25 | 0.017 | 0.0010 | 0.051 | 0.000076 | 70 | 0.0020 | 0.0050 | 0.00079 | 0.24 | 0.0021 | 2.0 |
| **Till Stockpile** | Short-term | Upper Case | 5.2 | 1.9 | 13 | 6.0 | 0.060 | 0.15 | 0.00090 | 0.0025 | 0.011 | 0.000042 | 0.024 | 0.000038 | 2.7 | 0.0028 | 0.00053 | 0.0026 | 0.35 | 0.0012 | 1.1 |
| **Organics Stockpile** | | Upper Case | 3.8 | -8.4 | 7.1 | 61 | 0.060 | 0.81 | 0.00090 | 0.0072 | 0.038 | 0.00012 | 0.092 | 0.00018 | 11 | 0.0021 | 0.0012 | 0.0079 | 0.42 | 0.011 | 3.9 |
| **Overburden** | Long-term | Upper Case | 4.2 | -3.2 | 14 | 8.5 | 0.060 | 0.81 | 0.00090 | 0.012 | 0.0050 | 0.00012 | 0.050 | 0.000090 | 1.1 | 0.0010 | 0.0010 | 0.0020 | 0.42 | 0.0017 | 0.83 |
| **Process Water** | Short-term | Base Case | 7.4 | 179 | 970 | 11 | 0.30 | 0.018 | 0.038 | 0.82 | 0.051 | 0.000015 | 0.047 | 0.000044 | 168 | 0.00030 | 0.067 | 0.042 | 0.51 | 0.000051 | 5.2 |
| | | Upper Case | 7.2 | 106 | 1553 | 11 | 0.40 | 0.023 | 0.040 | 1.1 | 0.066 | 0.000025 | 0.047 | 0.000074 | 231 | 0.00050 | 0.11 | 0.056 | 1.0 | 0.000066 | 6.3 |
| **TMF Seepage** | - | Base Case | 7.8 | 181 | 1332 | 12 | 0.40 | 0.0074 | 0.0061 | 1.4 | 0.020 | 0.000010 | 0.062 | 0.000010 | 196 | 0.00020 | 0.037 | 0.00035 | 1.9 | 0.000020 | 19 |
| | | Upper Case | 7.7 | 203 | 1678 | 13 | 0.51 | 0.0095 | 0.0083 | 1.4 | 0.024 | 0.000040 | 0.077 | 0.000025 | 269 | 0.0010 | 0.042 | 0.00049 | 4.5 | 0.00010 | 23 |

**Notes:** "PAG1 in TMF" source terms were applied for ROM Ore Stockpile during operations

| Location | Time | Mn | Hg | Mo | Ni | K | Se | Ag | Na | Sr | Tl | Sn | U | V | Zn | Ammonia (as N) | Nitrite (as N) | Nitrate (as N) | Cyanide |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg/L* | *mg N/L* | *mg N/L* | *mg N/L* | *mg/L* |
| **SE Dump** | Short-term | 0.14 | 0.0000070 | 0.0032 | 0.021 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.0012 | 0.0016 | 0.0050 | 0.018 | 0.37 | 0.20 | 23 | |
| | | 0.28 | 0.000013 | 0.0059 | 0.062 | 31 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0024 | 0.0031 | 0.010 | 0.069 | 0.65 | 0.35 | 41 | - |
| | Long-term | 0.14 | 0.0000070 | 0.0032 | 0.028 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.00098 | 0.0016 | 0.0035 | 0.018 | - | - | - | - |
| | | 0.28 | 0.000013 | 0.0058 | 0.062 | 33 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0020 | 0.0031 | 0.0071 | 0.070 | - | - | - | - |
| **NE Dump** | Short-term | 0.14 | 0.0000070 | 0.0032 | 0.021 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.0012 | 0.0016 | 0.0052 | 0.018 | 0.37 | 0.20 | 23 | - |
| | | 0.28 | 0.000013 | 0.0061 | 0.062 | 32 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0025 | 0.0031 | 0.010 | 0.070 | 0.66 | 0.36 | 41 | - |
| | Long-term | 0.14 | 0.0000070 | 0.0032 | 0.029 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.00100 | 0.0016 | 0.0036 | 0.019 | - | - | - | - |
| | | 0.28 | 0.000013 | 0.0052 | 0.062 | 34 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0020 | 0.0031 | 0.0073 | 0.071 | - | - | - | - |
| **NW Dump** | Short-term | 0.14 | 0.0000070 | 0.0032 | 0.022 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.0012 | 0.0016 | 0.0048 | 0.018 | 0.31 | 0.17 | 19 | - |
| | | 0.28 | 0.000013 | 0.0055 | 0.062 | 30 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0024 | 0.0031 | 0.0096 | 0.067 | 0.55 | 0.30 | 34 | - |
| | Long-term | 0.14 | 0.0000070 | 0.0032 | 0.027 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.00096 | 0.0016 | 0.0034 | 0.018 | - | - | - | - |
| | | 0.28 | 0.000013 | 0.0064 | 0.062 | 32 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0019 | 0.0031 | 0.0068 | 0.068 | - | - | - | - |
| **Backfill** | Short-term | 0.14 | 0.0000070 | 0.0032 | 0.023 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.0011 | 0.0016 | 0.0045 | 0.017 | 0.77 | 0.42 | 48 | - |
| | | 0.28 | 0.000013 | 0.0054 | 0.062 | 29 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0023 | 0.0031 | 0.0090 | 0.066 | 1.4 | 0.74 | 86 | - |
| | Long-term | 0.14 | 0.0000070 | 0.0032 | 0.026 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.00094 | 0.0016 | 0.0032 | 0.017 | - | - | - | - |
| | | 0.28 | 0.000013 | 0.0064 | 0.062 | 30 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0019 | 0.0031 | 0.0065 | 0.066 | - | - | - | - |
| **Pit Wall - NPAG** | Short-term | 0.14 | 0.0000070 | 0.0032 | 0.031 | 7.3 | 0.00050 | 0.000090 | 30 | 0.13 | 0.000089 | 0.00061 | 0.0016 | 0.0027 | 0.0090 | 3.2 | 0.27 | 5.8 | - |
| | | 0.28 | 0.000013 | 0.0064 | 0.062 | 24 | 0.0010 | 0.00018 | 60 | 0.26 | 0.00018 | 0.0012 | 0.0031 | 0.0054 | 0.0117 | 16 | 2.4 | 15 | - |
| | Long-term | 0.14 | 0.0000070 | 0.0032 | 0.031 | 8.0 | 0.00050 | 0.000089 | 30 | 0.13 | 0.000089 | 0.00048 | 0.0016 | 0.0022 | 0.0090 | - | - | - | - |
| | | 0.28 | 0.000013 | 0.0064 | 0.062 | 27 | 0.0010 | 0.00018 | 52 | 0.26 | 0.00018 | 0.00097 | 0.0031 | 0.0045 | 0.0116 | - | - | - | - |
| **Pit Wall - PAG2** | Short-term | 0.14 | 0.0000070 | 0.0032 | 0.031 | 8.3 | 0.00050 | 0.000095 | 30 | 0.13 | 0.000095 | 0.00052 | 0.0016 | 0.0023 | 0.0095 | 3.2 | 0.27 | 5.8 | - |
| | | 0.28 | 0.000013 | 0.0064 | 0.062 | 28 | 0.0010 | 0.00019 | 60 | 0.26 | 0.00019 | 0.00104 | 0.0031 | 0.0046 | 0.012 | 16 | 2.4 | 15 | - |
| | Long-term | 0.14 | 0.000013 | 0.0060 | 0.031 | 6.9 | 0.0023 | 0.000098 | 40 | 0.13 | 0.00020 | 0.00091 | 0.0016 | 0.00040 | 0.25 | - | - | - | - |
| | | 2.8 | 0.000025 | 0.0093 | 0.62 | 23 | 0.0039 | 0.00020 | 68 | 2.6 | 0.00039 | 0.0018 | 0.031 | 0.00079 | 0.33 | - | - | - | - |
| **Pit Wall - PAG1** | Short-term | 0.14 | 0.0000070 | 0.0032 | 0.031 | 6.7 | 0.00050 | 0.000091 | 30 | 0.13 | 0.000091 | 0.00073 | 0.0014 | 0.0014 | 0.0093 | 3.2 | 0.27 | 5.8 | - |
| | | 0.28 | 0.000013 | 0.0064 | 0.062 | 22 | 0.0010 | 0.00018 | 60 | 0.26 | 0.00018 | 0.0015 | 0.0024 | 0.0028 | 0.012 | 16 | 2.4 | 15 | - |
| | Long-term | 1.12 | 0.0000110 | 0.040 | 18 | 9.4 | 0.012 | 0.000087 | 83 | 0.52 | 0.00099 | 0.0045 | 0.093 | 0.000069 | 1.9 | - | - | - | - |
| | | 2.9 | 0.000022 | 0.062 | 39 | 31 | 0.021 | 0.00018 | 141 | 1.3 | 0.0020 | 0.0091 | 0.16 | 0.00014 | 2.5 | - | - | - | - |
| **PAG1 in TMF** | Short-term | 0.14 | 0.000013 | 0.0032 | 0.0070 | 15 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.00090 | 0.0016 | 0.0018 | 0.012 | - | - | - | - |
| | | 0.28 | 0.000026 | 0.0044 | 0.014 | 19 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0018 | 0.0031 | 0.0035 | 0.047 | - | - | - | - |
| **NPAG Cover** | Long-term | 0.14 | 0.0000070 | 0.0032 | 0.017 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.00065 | 0.0016 | 0.0027 | 0.012 | 0.050 | 0.011 | 3.0 | - |
| | | 0.28 | 0.000013 | 0.0045 | 0.062 | 21 | 0.0010 | 0.00020 | 62 | 0.26 | 0.00020 | 0.0013 | 0.0031 | 0.0055 | 0.046 | 0.46 | 0.048 | 8.9 | - |
| **TMF Dam** | Short-term | 0.14 | 0.0000070 | 0.0032 | 0.021 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.0012 | 0.0016 | 0.0048 | 0.018 | 0.050 | 0.011 | 3.0 | - |
| | | 0.28 | 0.000013 | 0.0055 | 0.062 | 30 | 0.0010 | 0.00020 | 62 | 0.26 | 0.00020 | 0.0024 | 0.0031 | 0.0096 | 0.067 | 0.46 | 0.048 | 8.9 | - |
| | Long-term | 0.14 | 0.0000070 | 0.0032 | 0.027 | 17 | 0.00050 | 0.00010 | 30 | 0.13 | 0.00010 | 0.00096 | 0.0016 | 0.0034 | 0.018 | - | - | - | - |
| | | 0.28 | 0.000013 | 0.0052 | 0.062 | 32 | 0.0010 | 0.00020 | 60 | 0.26 | 0.00020 | 0.0019 | 0.0031 | 0.0068 | 0.068 | - | - | - | - |
| **Till Stockpile** | Short-term | 0.022 | 0.000010 | 0.00067 | 0.0011 | 1.8 | 0.0012 | 0.000050 | 4.7 | 0.016 | 0.000031 | 0.00030 | 0.00011 | 0.0015 | 0.033 | 0.30 | 0.030 | 0.35 | - |
| **Organics Stockpile** | | 0.092 | 0.000020 | 0.0057 | 0.0031 | 6.2 | 0.00097 | 0.000050 | 13 | 0.094 | 0.00021 | 0.00038 | 0.00021 | 0.0036 | 0.16 | 1.4 | 0.030 | 0.62 | - |
| **Overburden** | Long-term | 0.36 | 0.000020 | 0.0020 | 0.0020 | 0.50 | 0.0010 | 0.000050 | 5.4 | 0.013 | 0.00010 | 0.00038 | 0.00010 | 0.0020 | 0.013 | 0.050 | 0.050 | 0.050 | - |
| **Process Water** | Short-term | 0.080 | 0.0000060 | 0.031 | 0.0014 | 47 | 0.0014 | 0.00013 | 295 | 1.2 | 0.000062 | 0.0012 | 0.0054 | 0.00035 | 0.0019 | 18 | 0.45 | 0.44 | 1.3 |
| | | 0.11 | 0.0000070 | 0.033 | 0.0016 | 48 | 0.0018 | 0.00019 | 443 | 1.5 | 0.000076 | 0.0020 | 0.010 | 0.00041 | 0.0025 | 33 | 0.83 | 0.84 | 2.5 |
| **TMF Seepage** | - | 19 | 0.0000050 | 0.046 | 0.00083 | 46 | 0.00011 | 0.000010 | 413 | 1.4 | 0.000010 | 0.00096 | 0.0011 | 0.00037 | 0.0010 | 7.6 | 0.020 | 0.050 | 0.84 |
| | | 21 | 0.00010 | 0.050 | 0.0010 | 52 | 0.00017 | 0.000020 | 484 | 1.7 | 0.000020 | 0.0010 | 0.0016 | 0.0010 | 0.0020 | 11 | 0.021 | 0.10 | 2.4 |

**Notes:** "PAG1 in TMF" source terms were applied for ROM Ore Stockpile during operations

# Appendix E.4

## Mine Rock Management Plan

# Goldboro Project -
# ML/ARD Management Plan

**Prepared for:**
**Signal Gold Inc.**
**20 Adelaide St. East, Suite 915**
**Toronto, Ontario, Canada M5C 2T6**


**Prepared by:**
**Lorax Environmental Services Ltd.**
**2289 Burrard St.**
**Vancouver, BC, V6J 3H9**



**May 27, 2022**

**Project No. A606-2**

# *Document Revision Record*

| Date | Nature of Change | Page Inserted, Replaced, Revised or Cancelled | Signature |
|---|---|---|---|
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# 1. Introduction

## 1.1 Scope and Objective

The scope of this metal leaching and acid rock drainage (ML/ARD) management plan (the Plan) is to define practical handling and monitoring strategies for geologic materials produced throughout construction and operations of the Goldboro Gold Project (the Project). For the purpose of this document, the term ‘geologic materials’ encompasses waste rock, ore, overburden, and tailings. The Plan also outlines relevant aspects associated with the implementation of these practices, such as the definition of roles and responsibilities, as well as record keeping and reporting procedures.

The primary objective of the Plan is the minimization of detrimental geochemical effects associated with ML/ARD on water quality in the receiving environment downgradient of the Project site. Strategies to achieve this objective and outlined herein are based on the site-specific geochemical understanding of the Project materials discussed in the Goldboro Geochemistry Report (Lorax, 2022). It is important to note that this Plan is considered a “living” document that will be continuously refined as additional geochemical data and mine plan information become available.

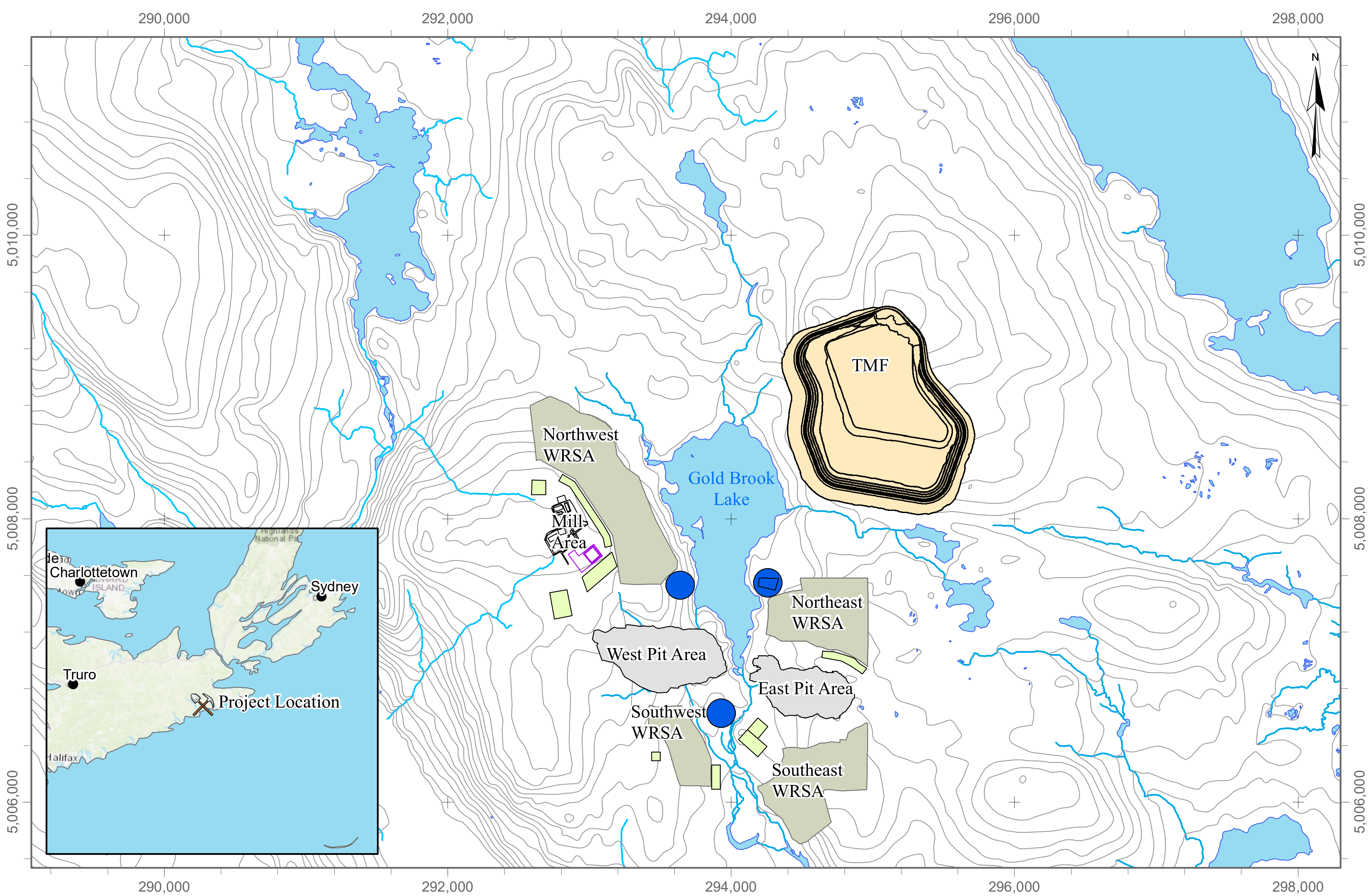
## 1.2 Project Understanding

The Project, owned by Signal Gold Inc. (Signal Gold), is located on the eastern shore of Nova Scotia, approximately 175 km northeast of the city of Halifax and 60 km southeast of the town of Antigonish. The Project target is a turbidite-hosted gold deposit which formed in a unique structural setting defined by the Upper Seal Harbour Anticline. The primary host rock lithologies are variably-altered and interbedded greywacke and argillite. Gold and sulphide mineralization has occurred preferentially in or near the hinges of the anticline and is associated with both wall rock and quartz veining. Argillites contain diagenetic and secondary (hydrothermal) pyrite, pyrrhotite, and arsenopyrite (Nordmin, 2022).

Open pit mining is currently proposed over a 11-year mine life. Project infrastructure considered for the purpose of this Plan include the following components:

- One tailings management facility (TMF).
- Two open pits (West Pit and the East Pit).
- Four waste rock storage areas (WRSA); *note: the southwest WRSA contains stripped till rather than waste rock.*
- Segregated till and organics (topsoil) stockpiles.

An overview of the proposed site layout is given in Figure 1-1.




## LEGEND

- Watercourse
- Waterbody
- Organic Stockpile
- Pit
- Potential Settling Pond Area
- ROM Area
- TMF
- WRSA

| | |
|---|---|
| DATE SAVED: | May 11, 2022 |
| DRAWN BY: | GM |
| REVIEWED: | JO |
| VERSION: | 1 |

**Coordinate System:** *NAD 1983 CSRS MTM 4*
**Projection:** *Transverse Mercator*
**Datum:** *North American 1983 CSRS*
**Units:** *Meter*

**1:36,000**

0 400 800 Meters

*CLIENT:*

LORAX ENVIRONMENTAL

*PROJECT:*

**Goldboro Project**

*TITLE:*

Planned General Arrangement

*PROJECT #:* A606 *FIGURE:* 1-1

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# 2. Roles and Responsibilities

A summary of the roles and responsibilities for the ML/ARD monitoring programs is provided in Table 2-1. Waste rock sample collection should be undertaken by the Mine Geologist. Tailings sampling will be conducted by the metallurgists or other mill personnel at site. The Mine Operations team is responsible for the implementation of ML/ARD management strategies with guidance from the Environmental department who manages, reviews, and reports any geochemical data produced as part of this program. Chemical analyses, including total sulphur (S) and carbon (C) will be conducted by onsite laboratory staff.

**Table 2-1:**
**Summary of Roles and Responsibilities**

| Department/Title | Roles and Responsibilities |
|---|---|
| *Mine Rock ML/ARD Monitoring and Management* | |
| Mine Geologist or designate | • Generate ML/ARD sampling SOP<br>• Collect grade control or blast samples<br>• Communicate with Mine Operations and Environment<br>• Transfer samples to onsite laboratory or Environment for (external) duplicates |
| Mine Operations | • Plan blasting and oversee blasting activities<br>• Implement material handling for PAG and NPAG material |
| Environment | • Review blast materials sampling procedure in SOP<br>• Ship samples to external lab for appropriate testing<br>• Review and manage ML/ARD sampling results<br>• Provide guidance to Geology and Mine Operations regarding sampling frequency requirements and material handling |
| *Tailings ML/ARD Monitoring and Management* | |
| Metallurgist | • Review and update tailings sampling SOP<br>• Facilitate availability of sampling equipment and access to the sampling location |
| Metallurgical Technician | • Perform tailings solid sampling as per SOP<br>• Transfer samples to onsite laboratory or Environment for (external) duplicates |
| Environment | • Review tailings sampling procedure in SOP<br>• Ship samples to external lab for appropriate testing<br>• Review and manage ML/ARD sampling results<br>• Provide guidance to Geology and Mine Operations regarding sampling frequency requirements and material handling |

**Notes:** SOP = Standard Operating Procedure; PAG = Potentially Acid Generating; NPAG = Non Potentially Acid Generating.

# 3. Material Characteristics and Balance

The ARD potential of geologic materials is determined by acid base accounting (ABA) testwork, which measures a variety of parameters relating to the ratio of acid generating to acid neutralizing minerals. The likelihood of a sample to generate acidity can be quantified by the comparison of the neutralization potential (NP) and acid potential (AP). In general, NP is primarily related to the carbonate content of a sample, while AP is calculated from the sulphur content of a sample. The net potential ratio (NPR = NP/AP) represents a measure that is commonly used to identify whether a sample is potentially acid generating (PAG) or non PAG (NPAG).

Metal leaching potential can be assessed using a variety of testing, including solid phase elemental abundance, shake flask extraction (SFE), and kinetic testwork. While the solid phase elemental contents, compared with average crustal abundance, can provide a screening tool as to which elements are naturally enriched in geological materials and to what extent, leach testing such as SFE or humidity cells is generally recommended at a minimum to assess the metal mobility under neutral and acidic conditions.

A comprehensive ML/ARD sampling program was initiated in 2020 to support the Project's Feasibility Study and Environmental Assessment Registration Document required for provincial permitting. This program included static testing for waste rock (n = 174), ore (n = 14), tailings (n = 8), and overburden (soil and till; n = 28) (Lorax, 2022). All samples were submitted for ABA and solid phase metals analysis, while a subset of samples underwent more advanced geochemical (*e.g.*, SFE and kinetic testing) and mineralogical analyses.

## 3.1 Waste Rock

The ARD characteristics of the Project waste rock and ore were defined in Lorax (2022) on the basis of the NPR as follows:

- PAG1 – NPR < 1 or 1 ≤ NPR ≤ 2 and total S ≥ 0.2 wt. %
- PAG2 – 1 ≤ NPR ≤ 2 and total S < 0.2 wt. %
- NPAG – NPR > 2

This classification scheme is in agreement with recommendations made in Price (2009) and provides increased resolution on PAG risk where PAG1 materials are considered more likely to generate low-pH drainage in the long-term than the PAG2 designation.

Static geochemical testing revealed that waste rock had relatively low total S content with 90$^{th}$ percentile values for all three ARD designations falling below 0.55 wt.%. In general, total S contents increase from NPAG to PAG2 to PAG1 (Table 3-1). In the static testing database, waste rock is dominantly NPAG (63%), with lesser PAG1 (26%) and PAG2 (11%). It is important to note however, that geochemical proxies based on results from the geochemical characterization (Lorax, 2022) were imported into the geological block model (prepared by others) to more accurately constrain tonnages of PAG1, PAG2, and NPAG rock produced over the life of mine based on the full assay database. The resulting estimates for waste rock using the block model approach are 9% PAG1, <1% PAG2, and 91% NPAG (Table 3-2). A plan view of the modeled distribution of the different material types across the two open pits is given in Figure 3-1.

The time to onset of acidic conditions for PAG material was constrained using the NP depletion rates from four humidity cell tests (Lorax, 2022). The results of this exercise showed that it will take approximately 9 years for 25% of all PAG samples to turn acidic and around 25 years for 75% of PAG samples to become acidic should these materials be exposed in isolation and under oxidizing conditions. For water quality modelling purposes it was recommended that, considering the information at hand to date, ARD onset be conservatively modelled to occur at 5 (five) years after material exposure for PAG materials (Lorax, 2022).

**Table 3-1:**
**Summary of Total Sulphur and Arsenic Contents of Goldboro Waste Rock ARD Designations**

| **Parameter** | **Total S** | **As** |
|---|---|---|
| **Units** | **wt.%** | **µg/g** |
| **Waste Rock (n = 174)** | | |
| *NPAG (n = 110)* | | |
| Median | 0.029 | 62 |
| 90$^{th}$ Percentile | 0.066 | 380 |
| Maximum | 0.32 | 2,600 |
| *PAG1 (n = 45)* | | |
| Median | 0.24 | 1,700 |
| 90$^{th}$ Percentile | 0.54 | 6,360 |
| Maximum | 1.7 | 20,000 |
| *PAG2 (n = 19)* | | |
| Median | 0.086 | 220 |
| 90$^{th}$ Percentile | 0.17 | 1,680 |
| Maximum | 0.18 | 2,100 |

**Notes:**
PAG: Potentially Acid Generating; NPAG: Non Potentially Acid Generating.

**Table 3-2:**
**Waste Rock Tonnages for the Different ARD Designations Estimated by Block Modelling Over the Life of Mine**

| Material Type | Units | Tonnage | Percentage |
|---|---|---|---|
| NPAG | kt | 107,539 | 91% |
| PAG1 | kt | 10,721 | 9% |
| PAG2 | kt | 227 | 0.2% |

**Notes:**
NPAG: Non Potentially Acid Generating; PAG: Potentially Acid Generating.

Arsenic was identified to be the main element of concern exceeding 10x the average upper continental crustal abundance (AUCCA; Rudnick and Gao, 2014) in 73% of analyzed waste rock samples. Arsenic concentrations were also generally elevated in the waste rock SFE test leachates (Lorax, 2022). All samples had As values above the Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water (NSECC, 2021). This result indicates that As is a parameter of concern for the site even under neutral drainage conditions. This is further confirmed by As leaching results from the humidity cells tests which indicate that elevated As concentrations are not limited to waste rock with a high ARD risk. Nevertheless, As has been shown to be largely hosted in sulphides (arsenopyrite, pyrite, pyrrhotite) and a positive relationship exists between solid-phase As and S contents (Table 3-1). Therefore, it is believed that, ambient water chemistry conditions being the same, As leaching would occur at higher rates from waste rock with higher solid phase As content. Early field kinetic test results confirm this hypothesis (Lorax, 2022). The distribution of solid phase As derived through block modelling is given in Figure 3-2.

Waste rock humidity cell and field bin tests have shown relatively low metal leaching rates with respect to dissolved species other than As (Lorax, 2022). It should however be noted that leachate has remained circumneutral in leach tests conducted to date and increased metal loading rates are anticipated from PAG materials once acidic conditions are established.

In total, approximately 118 Mt of waste rock will be excavated over the life of mine (Table 3-3). NPAG waste rock excavated from the East and West Pits will be used for construction, stored within one of the WRSAs, or backfilled in the pit.

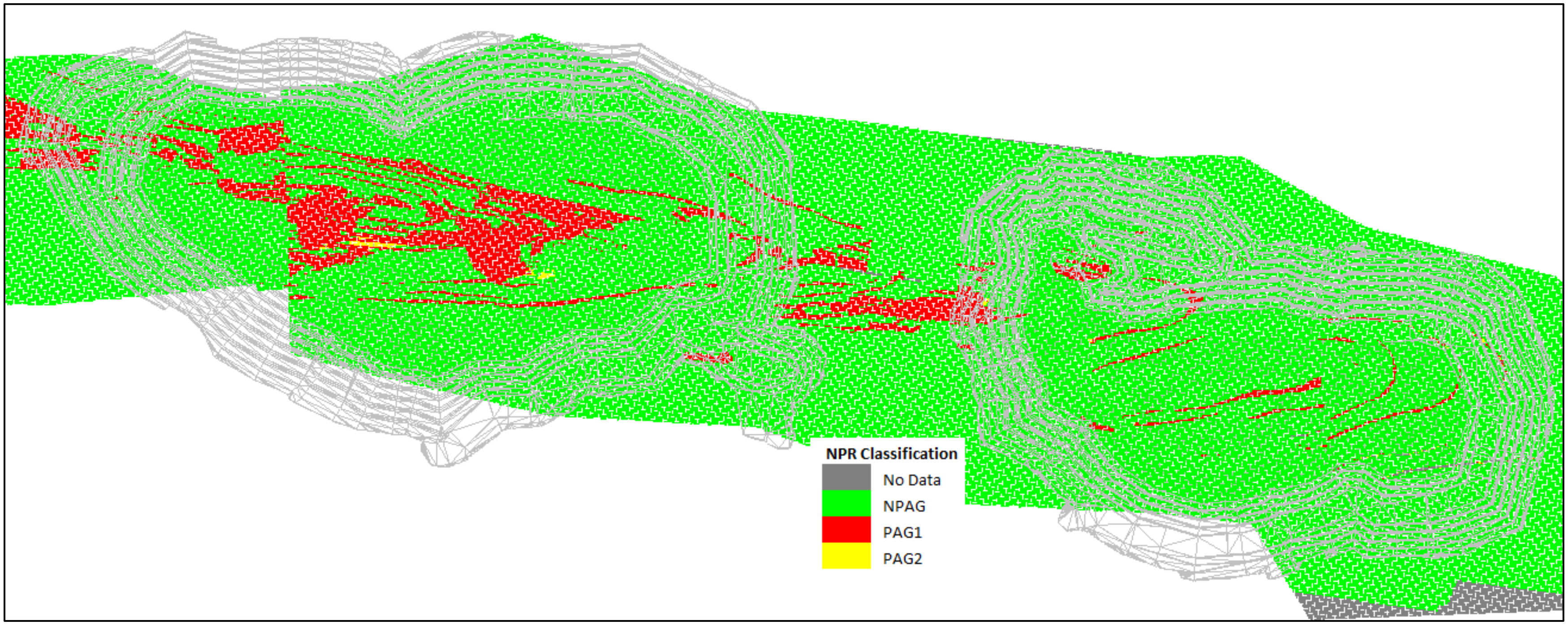


**Figure 3-1: Distribution of ARD designations determined by the geo-environmental block model.**

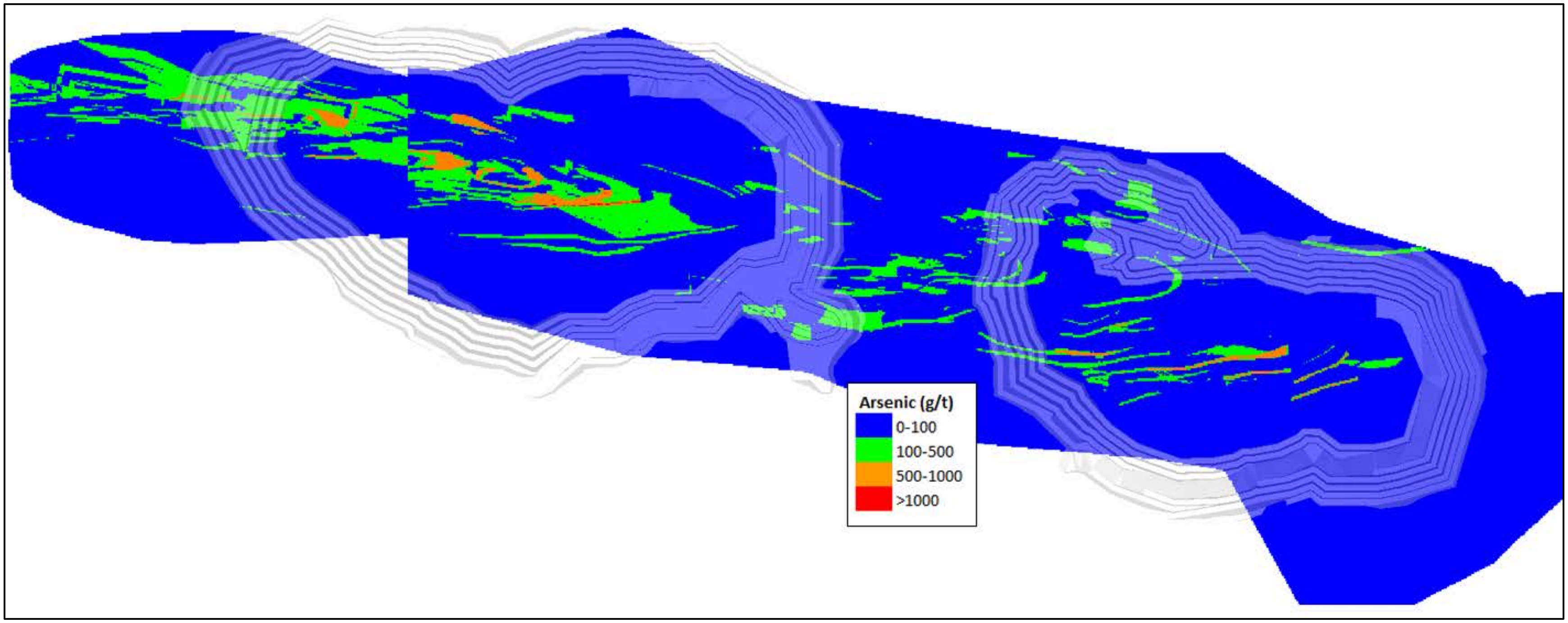


**Figure 3-2: Distribution of solid phase arsenic determined by the geo-environmental block model.**

**Table 3-3:**
**Waste Rock Production Schedule (in kt) Over the Life of Mine**

| Year | East Pit | | | West Pit | | | Total |
|---|---|---|---|---|---|---|---|
| | NPAG | PAG1 | PAG2 | NPAG | PAG1 | PAG2 | |
| -2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| -1 | 2,161 | 67 | 1 | 0 | 0 | 0 | 2,229 |
| 1 | 5,533 | 97 | 1 | 1,352 | 676 | 12 | 7,671 |
| 2 | 7,132 | 72 | 1 | 3,176 | 721 | 36 | 11,139 |
| 3 | 6,265 | 101 | 2 | 3,007 | 694 | 23 | 10,093 |
| 4 | 4,281 | 71 | 4 | 8,729 | 1,110 | 22 | 14,217 |
| 5 | 7,820 | 144 | 4 | 8,132 | 1,334 | 29 | 17,464 |
| 6 | 7,186 | 137 | 3 | 1,397 | 402 | 9 | 9,134 |
| 7 | 3,542 | 82 | 0 | 5,196 | 648 | 21 | 9,489 |
| 8 | 103 | 1 | 0 | 15,296 | 1,151 | 36 | 16,588 |
| 9 | 0 | 0 | 0 | 10,550 | 1,657 | 22 | 12,229 |
| 10 | 0 | 0 | 0 | 5,557 | 1,316 | 7 | 6,880 |
| 11 | 0 | 0 | 0 | 1,123 | 238 | 0 | 1,361 |
| Total | 44,023 | 773 | 17 | 63,516 | 9,948 | 217 | 118,494 |

**Notes:**
NPAG: Non Potentially Acid Generating; PAG: Potentially Acid Generating.

## *3.2 Ore*

The ML/ARD classification described above for waste rock also applies to ore. Ore material is overall classified as PAG1 (93%), based on the ore samples included in the ML/ARD database (Lorax, 2022).

Ore is expected to have a similar or higher ML potential relative to waste rock. In general, the ore samples show total S and solid phase metal contents comparable to or higher than those recorded for PAG1 waste rock and also showed elevated As in SFE leachates. Parameters of potential concern identified in field bin and the bulk sample stockpile drainage include As, Cu, Pb, and Zn despite circum-neutral conditions (Lorax, 2022).

Ore from the East and West Pits transported from the mine to the process plant area by haul trucks for primary crushing. It is expected that stockpiled, crushed ore will be rehandled for processing very shortly after placement. The mill feed system is designed to maintain an ore feed of 181 t/h into the ball mill via conveyors (Nordmin, 2022). A total of almost 16 Mt of ore will be excavated over the life of mine (Table 3-4).

**Table 3-4:**
**Ore Production Schedule (in kt) Over the Life of Mine**

| Year | East Pit | West Pit | Total |
|---|---|---|---|
| -2 | 0 | 0 | 0 |
| -1 | 221 | 0 | 221 |
| 1 | 705 | 343 | 1,048 |
| 2 | 910 | 550 | 1,460 |
| 3 | 863 | 597 | 1,460 |
| 4 | 144 | 1,316 | 1,460 |
| 5 | 532 | 928 | 1,460 |
| 6 | 1,174 | 286 | 1,460 |
| 7 | 875 | 585 | 1,460 |
| 8 | 44 | 1,416 | 1,460 |
| 9 | 0 | 1,600 | 1,600 |
| 10 | 0 | 1,960 | 1,960 |
| 11 | 0 | 750 | 750 |
| Total | 5,468 | 10,331 | 15,799 |

## *3.3 Overburden*

Overburden material representing organic substrate (*i.e.*, soil) and till will be stripped in various Project site areas during the construction phase. The overburden samples collected as part of the geochemical characterization program (Lorax, 2022) generally had total S content of less than 0.2 wt.% and lacked NP. All soil samples and most till samples (88%) were considered PAG with NPR values below 2.0.

In general, metal contents are lower in the overburden samples in comparison to waste rock, with Se being an exception. Selenium contents were below the detection limit (<0.70 ppm) in all waste rock samples but was measured at concentrations as high as 4.0 ppm in the overburden samples.

The overburden SFE leachates were mildly acidic (pH < 6.5) and several metals showed elevated concentrations in the leachate for both the soil and till samples. Further geochemical characterization of the soil material was recommended to assess the source of acidity in these materials and longer-term ML potential.

The largest volume of overburden is expected to be disturbed and removed in the footprint of the open pits. Organics and till will be segregated and stored in temporary stockpiles during operations for later use in the construction of infrastructure (*e.g.*, TMF embankment) and WRSA reclamation covers. The total estimated soil tonnage for the Project is 0.6 Mt. The till production and storage schedule is provided in Table 3-5**.** and includes a total of 7.5 Mt of till. A detailed soil production schedule was not available at the time of preparation of this Plan; it is expected that soil will be excavated alongside till at proportionally lower tonnages.

**Table 3-5:**
**Annual Till Production Schedule (in kt) Over the Life of Mine**

| Year | East Pit | West Pit | Total |
|---|---|---|---|
| -2 | 0 | 0 | 0 |
| -1 | 1,398 | 0 | 1,398 |
| 1 | 1,069 | 1,545 | 2,614 |
| 2 | 253 | 1,608 | 1,861 |
| 3 | 36 | 154 | 190 |
| 4 | 0 | 4 | 4 |
| 5 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 |
| 7 | 0 | 1,456 | 1,456 |
| 8 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 |
| Total | 2,756 | 4,767 | 7,523 |

## *3.4 Tailings*

The tailings samples included in the geochemical characterization program (Lorax, 2022) had total S contents between 0.16 and 0.57 wt.%. All tailings samples were classified as PAG1, with NPR less than or close to 1. Time to onset of ARD has not been estimated based on current humidity cell results to date; however, under current mine plan considerations, tailings will not be exposed to unsaturated conditions (Nordmin, 2022) and therefore acidic drainage within the TMF is not expected.

All tailings samples showed As contents above 10x the AUCCA, consistent with findings for mine rock. Arsenic was also identified as the primary parameter of concern for leaching from tailings, as indicated by various leach tests. Tailings humidity cell results indicate that metal loading rates from tailings are consistently higher than those measured in mine rock humidity cells. This can be explained by the finer grain size of the tailings as well as the dissolution of labile, metal-bearing oxidation products that are formed in the mill environment.

All tailings will be deposited within the TMF. An estimated 16.2 Mt of tailings is expected to be produced over the life of mine.

# 4. ML/ARD Management

## 4.1 Mine Rock

Material handling practices for mine rock, referring to waste rock and ore, were designed to minimize the risk of water quality impacts and degradation through operational segregation and strategic placement of waste rock into the three ARD designations defined above (*i.e.*, NPAG, PAG1, PAG2). The following sections outline the key management strategies with respect to ML/ARD considerations.

### 4.1.1 Waste Rock Storage Areas

The WRSAs including East Pit backfill will store excess NPAG waste rock and overburden not required for construction. The limited amounts of PAG2 waste rock (<1 Mt; Figure 3-1) produced during the life of mine will be interlayered with NPAG waste rock operationally in the various WRSAs. Based on the low sulphur content of these materials (<0.2%), the geochemical knowledge gained from kinetic testing (Lorax, 2022), and the understanding of the production schedule of NPAG and PAG2 waste rock, it is not currently expected that prescriptive interlayering specifications (*e.g.*, maximum PAG2 thicknesses) are required. Rather, the low volumes of PAG2 waste rock will be intermixed with NPAG rock sufficiently to prevent the onset of acidic conditions. In general, the exposure of PAG2 material in the uppermost lifts and outermost lift faces of the final WRSA configurations is to be avoided.

Aside from the knowledge gained from geo-environmental block modelling, the designation and volume of the different waste rock classes will be validated through operational monitoring (Section 5.1). The sequence of work steps informing waste rock handling decisions is given in Figure 4-1**.**. Should unexpectedly large tonnages of PAG2 material be identified during operational monitoring, this material may need to be temporarily stockpiled to allow for the encapsulation of PAG2 layers of limited thickness within NPAG rock to prevent ARD onset (see Section 6). This thickness would be based on geochemical first principles and should rely on site-specific kinetic testing. Alternatively, PAG2 material may be backfilled into the East Pit where it will ultimately be flooded.

At closure, reclamation covers constructed with stockpiled overburden materials will be placed on all WRSAs containing waste rock (*i.e.,* exclusive of the SE WRSA). These covers will be re-vegetated and are intended to limit infiltration and exposure of waste rock in the long-term (GHD, 2022a). Note that these covers were not assumed to act as an oxygen barrier for geochemical modelling purposes (Lorax, 2022).

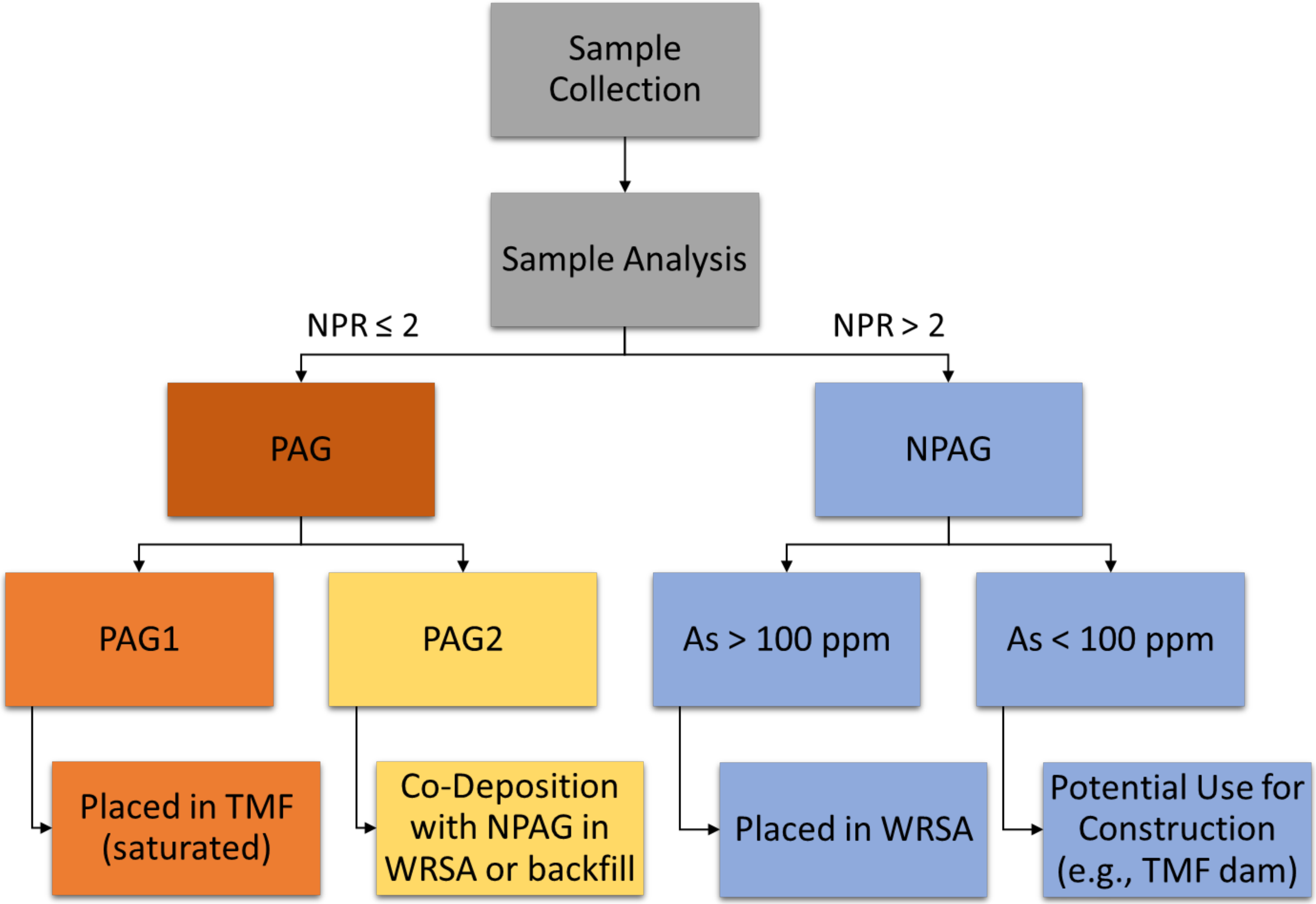


**Figure 4-1: Flow Chart Illustrating the Decision Sequence and ML/ARD Management Strategies to be Employed for Waste Rock**

### 4.1.2 PAG1 Waste Rock

All PAG1 waste rock produced during operations will be co-deposited with tailings in the TMF (Figure 4-1) and will be inundated by the tailings slurry and the associated water cover within three (3) years of exposure (Blackwell, pers. comm., 2022) to inhibit sulphide oxidation. This timeline will prevent the onset of ARD from these materials. The deposition of PAG materials under saturated conditions is considered an industry best practice for the prevention of ARD (MEND, 2001). Further, the TMF will be fully lined to minimize pore water seepage from this facility into the receiving environment.

At mine closure, the water cover will be drained, and a dry cover constructed with NPAG waste rock will be implemented. In this configuration, all PAG1 waste rock will be encapsulated by tailings and remain shielded from oxygen ingress in the long-term.

### 4.1.3 Construction Material

Waste rock will be used for the construction of selected site infrastructure including laydown areas/pads, roads, and the TMF embankments/cover. Of these, the latter will contain the largest amounts of waste rock (18.9 Mt). All construction sites outside of the WRSAs will exclusively utilize NPAG waste rock to prevent the formation of ARD. Further, low-As waste rock will be targeted for these facilities. The geochemical assessment demonstrated a weak but non-negligible positive relationship of solid phase As content and As leachate data (SFE testing) (Figure 4-2). Based on this relationship, a solid phase As concentration of 100 ppm is proposed as a preliminary cut-off to use for waste rock for construction since samples with lower As contents generally had lower SFE As concentrations. This solid phase As value falls between the median and 75$^{th}$ percentile values for the NPAG waste rock population (Lorax, 2022). The distribution of low As contents in NPAG waste rock was constrained using the block model and will be confirmed through operational monitoring (Figure 4-1). The pre-mine understanding suggests that As contents are generally significantly lower in the peripheral zones of the open pits with zones containing <100 ppm being relatively abundant within the NPAG domains (Figure 3-2). While the precise mechanisms of As leaching are affected by a variety of geochemical controls, this material handling strategy is believed to reduce the risk for As leaching across the mine site.

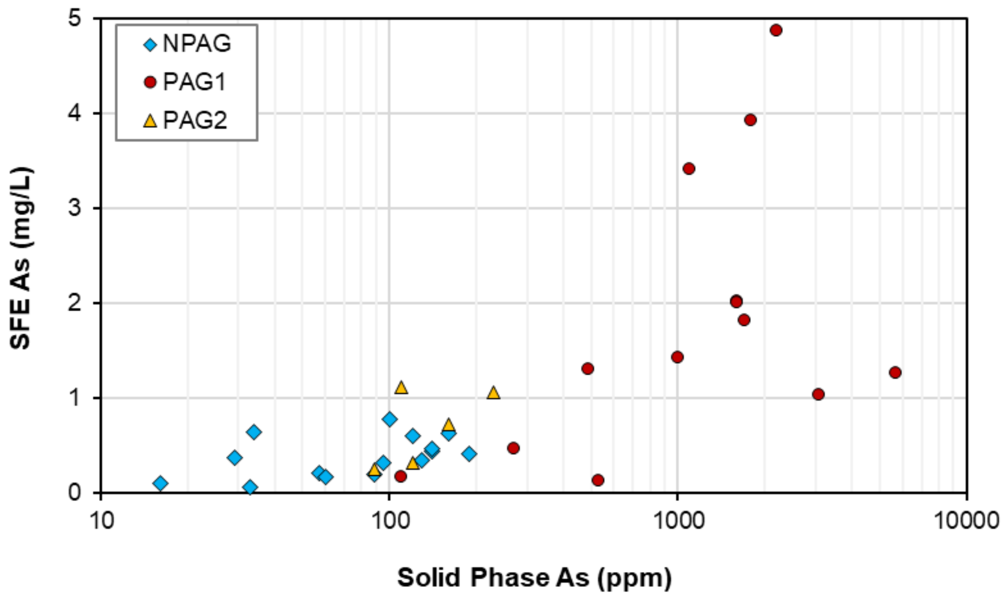


**Figure 4-2: Leachable arsenic *versus* solid phase arsenic for the different waste rock ARD designations**

### 4.1.4 Open Pits

The excavation of the open pits will expose mine rock material in the pit walls. During operations, pit wall runoff will be captured in the pit sump and sent to the water treatment plant as required. It is expected that exposures of all mine rock material types, including PAG1, PAG2, and NPAG will be available to react with precipitation and produce a geochemical load that, along with groundwater inflows, contributes to the pit sump chemistry. Due to the transient nature of the open pit resulting from active mining, it is not expected that large surface areas of PAG rock will be exposed for extended periods of time. Therefore, no specific ML/ARD management strategies have been developed for pit wall exposures during operations.

When pit dewatering is terminated at the end of mining, the groundwater level will rebound naturally, thereby flooding large portions of the pit walls. West Pit filling is further accelerated by decanting of the TMF water cover. Flooding of PAG pit walls will effectively mitigate ARD from submerged PAG pit wall exposures.

### 4.1.5 ROM ore Stockpile

While ore can largely be classified as PAG1, this material will only be stockpiled temporarily near the mill site before being processed. Further, this area will be covered (Nordmin, 2022) and ingress of precipitation can be expected to be minimal. Therefore, onset of ARD is not expected to occur between ore production and processing. Should a portion of the ore be deemed uneconomical due to unforeseen market adjustments, this material would be transported to the TMF or backfilled into the East Pit at the end of operations.

## *4.2 Tailings*

All tailings will be deposited in slurry form in the TMF which is lined by a geomembrane to minimize seepage losses from the facility. The current mine plan assumes that the tailings solids will be saturated throughout operations, thereby inhibiting sulphide oxidation, ARD onset, and minimize associated ML. Specifically, a 2m water cover will be maintained over the tailings throughout operations (Nordmin, 2022).

The water cover will be partially drained to allow for the placement of a dry cover constructed with NPAG waste rock and overburden. Hydrological modelling has determined that tailings will remain saturated in the long-term.

## *4.3 Overburden*

Overburden comprises till and soil materials which will be segregated and selectively used for construction (*e.g.*, TMF embankments). Excess material will be temporarily stored in designated stockpiles. Till will make up the entire SW WRSA and a portion of the NE WRSA footprint. Soils will be deposited in organics stockpiles across the site (Figure 1-1**)**.. No specific material handling strategies are proposed for these materials during operations. Over the 12-year mine life for which overburden is stockpiled, geochemical effects will be mitigated through water management and treatment as necessary. It is understood that seepage volumes from these stockpiles are minimal as a result of the physical properties (*i.e.,* fine grain size) of these materials (GHD, 2022b).

At the end of mining, all overburden stockpiles will be consumed for use in WRSA and TMF reclamation covers. While largely deemed PAG, overburden geochemical behaviour is considered significantly different than that of waste rock where pore water acidity from soil material in particular is thought to be produced by organic substrate rather than sulphide oxidation.

# 5. ML/ARD Monitoring

The overarching objective of the ML/ARD monitoring program is to generate a high density of representative waste rock, ore, overburden, and tailings samples in order to enhance and validate the current (pre-mining) geochemical databases. An overview of the minimum sample frequency for the different material types is given in Table 5-1.

**Table 5-1:**
**Sampling Frequency for the Different Material Types During Operational Monitoring**

| Sample Type | Sampling Frequency |
|---|---|
| Waste Rock | 1 sample per 50,000 t |
| Ore | 1 sample per 100,000 t |
| Tailings/Supernatant | 5 samples per quarter |
| Overburden | 1 sample per 100,000 t (per material type) |
| Verification (WRSAs, TMF Embankments) | 1 sample per 200,000 t for each facility |
| Verification (ROM ore stockpile) | 1 sample per month |
| QA/QC (external laboratory) | 1 duplicate per 10 samples |

**Notes:**
WRSA: Waste Rock Stockpile Area; TMF: Tailings Management Facility; QA/QC: Quality Assurance/Quality Control.

## 5.1 Pre-Blast Mine Rock Monitoring

Waste rock and ore will be monitored by collecting grade control drill cuttings from within the mine pit with subsequent analysis at the onsite laboratory. If grade control sampling does not adequately cover waste rock domains within the open pit, blast hole sampling may need to be conducted. To allow for material handling flexibility, grade control sampling is preferable since the relevant geochemical data would be produced well before material movement occurs allowing for the integration into the geological block model and increased operational flexibility.

The overall sampling frequency for waste rock will be a minimum of one (1) sample per 50,000 tonnes of material blasted. This would result in approximately 2,370 samples over the life of mine. Materials falling within the projected ore zones will require a lower sampling frequency since ore will only be stored temporarily in a covered ROM stockpile and therefore the environmental impact during operations and in the long term will be significantly reduced compared with waste rock. The definition of ore and waste zones for this purpose will rely on the geological block modelling results.

Geochemical data obtained from the ML/ARD monitoring program will be incorporated in the mine plan ahead of mining. The evolving geo-environmental model will continuously be compared against the pre-mine understanding of PAG and NPAG mine rock distribution and adjustments to the material movement schedules will be made as necessary.

### 5.2 Overburden Monitoring

Soil and till materials will be monitored by collecting composite samples from test pits or active excavation areas as it is being excavated. One (1) composite soil and till sample is to be collected for every 100,000 t of each material type disturbed. This equates to approximately 6 samples of soil and 75 samples of till. The reduced sampling frequency with respect to waste rock is justified by the well-established geochemical character and the fact that no specific material management is considered for overburden. All samples should be analyzed for ABA parameters at the onsite laboratory. In total, a minimum of five (5) composite soil samples and 20 composite till samples should additionally be submitted to an external laboratory for a larger suite of geochemical analyses including SFE testing or similar. These results will help confirm the validity of geochemical source terms that are currently based on SFE result.

### 5.3 Tailings Monitoring

The tailings slurry will be sampled at a frequency of five (5) samples per quarter. This sampling frequency may be reduced after two years if the initial results show low variability. The slurry will be filtered and the tailings solids will be submitted for analysis at the onsite laboratory. Supernatant (process water) associated with the tailings slurry should undergo water analysis at the same frequency. Given the proposed 11 year mine life over which tailings production will occur, this sampling frequency will result in approximately 240 tailings solid and supernatant samples in total, assuming the sampling frequency is not reduced after two years.

### 5.4 Verification (Post-Deposition) Monitoring

A verification monitoring program will be initiated for selected facilities to confirm the geochemical character of deposited materials and the effectiveness of segregation ML/ARD management practices. This secondary monitoring program will also help validate assumptions made for geochemical source terms. Verification monitoring will apply to:

- WRSAs
- TMF Embankments

- ROM ore pile

The verification monitoring program samples will be collected *in situ* from the *versus* stockpiles and embankments. The program will be implemented at a sampling frequency of one (1) sample per 200,000 t for waste rock facilities (WRSA and TMF Embankments) and one (1) sample per month for the ROM ore stockpile. These samples will comprise relatively large (> 5 kg) composite samples collected along ~10-20 m long transects in the respective facilities to ensure that a lift or other target deposit zone is adequately captured. All TMF embankment samples will be submitted to an external laboratory for additional testing to assess the As content of this material.

### *5.5 QA/QC Sampling*

In order to maintain quality assurance and quality control (QA/QC) of the monitoring data, duplicate samples will be collected and submitted to an accredited external laboratory. One in every 10 samples analyzed for a limited parameter suite by the onsite laboratory shall be submitted to an external laboratory for full ABA testwork and solid phase metals. These results will be compared to the onsite analyses to ensure that the results are in good agreement. Note that this QA/QC frequency will only apply to mine rock and tailings. Additional, external testing for overburden samples is specified in Section 5.2.

### *5.6 Analytical Techniques*

Onsite testing is expected to include total S and total C by using a combustion furnace (LECO® or similar). An in-depth geochemical evaluation using the static test database available to date has demonstrated a strong positive correlation between the operational NPR and the ratio of total C and total S (Total C / Total S; Figure 5-1). This relationship shows that the NPR can be approximated via linear regression with an $r^2$ value of 0.92. This relationship is even stronger in the lower NPR range where the accuracy of the calculation method is the most critical. Effectively, the slope of the linear regression represents the factor by which [Total C / Total S] is multiplied to yield the predicted NPR value. On this basis, a statistical analysis was conducted juxtaposing measured and predicted ARD designations (*i.e.*, NPAG, PAG1, PAG2) in an effort to identify the regression slope with the most reliable outcome. It was found that the highest accuracy was achieved by the following relationship:

$$NPR = 1.85 * [Total\ C / Total\ S]$$

Using this calculation method yielded an ARD designation match of 92% and therefore 8% of samples were misclassified. Of these, the majority (5%) where misclassified conservatively, meaning that the predicted ARD designation represents a less favorable class (PAG1 or PAG2) than measured. Conversely, only 3% of all samples were predicted to fall in a more favorable category than measured by geochemical testing. It is therefore concluded that routine utilization of total S and total C measurements constitutes a reliable method for the rapid onsite determination of mine rock ARD potential.

The QA/QC samples described in Section 5.5 should additionally undergo a more comprehensive analytical suite at an external laboratory comprising:

- Total S;
- Sulphate S by HCl digestion;
- Total Inorganic Carbon;
- Modified NP; and
- Solid phase elemental analysis.

All TMF embankment verification samples will be submitted to an external laboratory for the full suite of analyses. If the sample has high As (>100 ppm), SFE testing will additionally be conducted to provide an indication of the As leaching potential.

The external laboratory results will be used to validate the onsite measurements and NPR proxy calculation methods will be reviewed and improved continuously as needed.

Further, laboratory QA/QC procedures (e.g., analysis of standard reference materials and internal duplicates) will be conducted by the laboratory to ensure analytical precision and replicability.

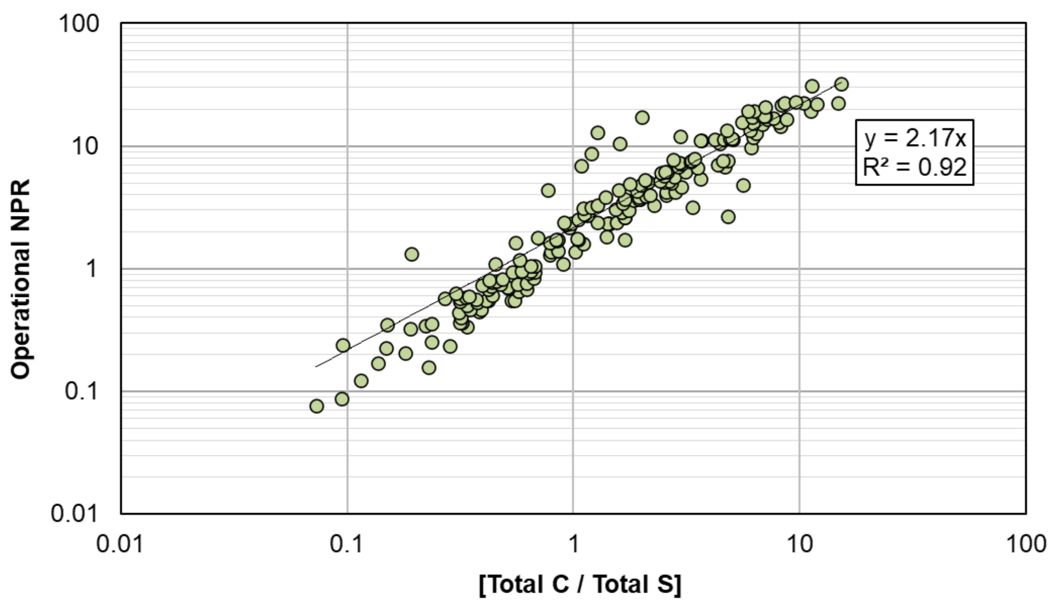


**Figure 5-1: Linear regression of measured operational NPR *versus* [Total C / Total S] for the development of environmental proxies**

### 5.7 Seep Surveys

Along with the operational water quality monitoring program discussed under separate cover, a contact water seep survey should be carried out on a semi-regular basis. Monitoring seep water quality can provide an early indication of increasing metal leaching or acidification of porewater. Where possible, seep monitoring should occur as close to the contact zone (*e.g.,* toe of a stockpile) as possible to minimize dilution and attenuation effects in the target water source. The data produced will be valuable for the confirmation and refinement of geochemical source terms and help improve future water quality modelling iterations. Potential monitoring locations include:

- Toes of the WRSAs;
- Toe of the ROM ore stockpile;
- Toes of the till and organics (topsoil) stockpiles;
- TMF ditch systems

Seep water quality monitoring is expected to be more irregular than other contact water quality monitoring due to changes in site hydrology but should be conducted opportunistically and on a quarterly basis at a minimum. The analytical suite should mirror the suite of parameters of the regular water quality monitoring program.

# 6. Contingency Management

The ML/ARD management strategies and monitoring program described in the previous chapters are expected to effectively monitor and minimize the geochemical impacts of mine rock and tailings on mine-affected water quality. However, should operational monitoring indicate that PAG classification, segregation, and other geochemical conditions (*i.e.*, As leaching) are significantly different from the targeted outcomes, or that portions of the mine design cannot be effectively achieved, a number of contingency measures may be triggered to further mitigate potential ML/ARD risk of the Project. These are summarized in Table 6-1. Within each conditions described, the corresponding actions are sorted from more proactive to more reactive. Due to the proactive nature of the primary ML/ARD management strategies (Section 4), such corrective measures are not generally anticipated.

**Table 6-1:**
**Overview of Potential ML/ARD Contingency Measures**

| Condition | Contingency Measure |
|---|---|
| Higher than expected PAG1/PAG2 proportions | Adjustment of assay proxies |
| | Redefinition of block model using ML/ARD monitoring results |
| | Redesign of PAG1 storage facilities in TMF/ Adjustment of mine plan |
| | Re-evaluation of maximum PAG2 thickness within WRSAs |
| | Revisit source term assumptions and water quality models |
| Misplaced PAG1 material (WRSAs) or high-As NPAG rock (construction sites) | Delineation of misplaced rock zones via additional sampling |
| | Rehandling of misplaced material as necessary |
| | Quantification of effect on source term and water quality models |
| | Adjustment of water management and/or treatment capacities |
| Failure to submerge PAG rock and tailings within prescribed time frame in TMF | Increase water quality monitoring frequency at location of interest to assess pH stability |
| | Optimize tailings spigot placement to ensure unsaturated beaches are covered prior to onset of ARD |
| | Adjust water management/sourcing to accelerate flooding of PAG materials |
| | Add lime to tailings ponds or tailings discharge line to stabilize decreasing pH as necessary |

**Notes:**
NPAG: Non Potentially Acid Generating; PAG: Potentially Acid Generating; WRSA: Waste Rock Storage Areas; TMF: Tailings Management Facility.

# 7. Implementation and Reporting

## 7.1 Communication and Operational Protocols

The Environmental Manager or designate is responsible for the implementation of the ML/ARD Management Plan with support from Mine Engineering, Geology, and Mill personnel. Currently, the staffing and associated organizational structure for aspects relating to operational management have not been formalized. Once these components are finalized, more detail with respect to communication protocols will be added to this Plan.

## 7.2 Record Keeping and Tracking

Geochemical test results will be reviewed by the Environmental Manager or designate with support from a Qualified Person (QP) for geochemistry as needed. All onsite and external lab test results will be compiled into an electronic database. The Environmental Manager or designate is responsible to ensure the maintenance of the original records and databases. Parameters of concern will also be tracked graphically and reviewed periodically to identify geochemical trends.

Investigation and corrective action will be undertaken with the guidance from a QP if monitoring data indicate that observed geochemical characteristics are significantly different from the geochemical understanding obtained to date.

## 7.3 Reporting

Results of the ML/ARD monitoring program will be reviewed and summarized in external reports as needed. This is anticipated to include, at a minimum, an operational ML/ARD monitoring memorandum to support annual reporting. A discussion of the new sampling results along with the effectiveness of ML/ARD management should be included and any notable deviations from previous years should be discussed. Non-compliance as identified by verification ML/ARD monitoring as well as any required corrective actions is to be reported to the regulatory agencies immediately.

# 8. Closure

This document was prepared by Lorax Environmental Services Ltd. for the exclusive use of Signal Gold Inc. This initial plan has been developed to outline ML/ARD monitoring measures and management options that can be considered for the Goldboro Gold Project. Please contact the undersigned should you have any questions or comments or require additional information.

Sincerely,
**LORAX ENVIRONMENTAL SERVICES LTD.**

**Prepared by:**

Signature:
Date: 2022-05-27

**Jennifer Stevenson, M.Sc., P.Geo. (BC)**
Environmental Geoscientist

**Timo Kirchner, M.Sc., P.Geo. (BC, NS, ON)**
Environmental Geoscientist

**Reviewed by:**

**Bruce Mattson, M.Sc., P.Geo. (BC, NWT/NU)**
Senior Environmental Geoscientist

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