*Plate 33: One of six abandoned and unrecorded mine entrances in the west mining area, looking southwest.*

*Plate 34: One of the six abandoned and unrecorded mine entrances in the west mining area, showing the remains of a warning sign, looking south.*

*Plate 35: A large floating bog that makes up the western extents of the west mining area. Looking southwest.*

*Plate 36: Barely visible through dense regrowth is an abandoned and unmarked mine entrance in the north dump area. Looking south.*

***Plate 37: A second probable abandoned mine entrance or exploratory trench in the north dump area, looking north.***

**APPENDIX A: HERITAGE RESEARCH PERMIT**

NOVA SCOTIA

# Heritage Research Permit (Archaeology)

***Special Places Protection Act*** 1989

(Original becomes Permit when approved by Communities, Culture and Heritage)

**Office Use Only**
Permit Number:
A2017NS043

*Greyed out fields will be made publically available. Please choose your project name accordingly*

| | |
|---|---|
| Surname de Boer | First Name Laura |

Project Name: Goldboro Gold Mine

Name of Organization: Davis MacIntyre & Associates Ltd.

Representing (if applicable): Anaconda Mining

| | |
|---|---|
| Permit Start Date 5 July 2017 | Permit End Date 30 July 2017 |

**General Location**: Goldboro, Guysborough County

**Specific Location**: *(cite Borden numbers and UTM designations where appropriate and as described separately in accordance with the attached Project Description. Please refer to the appropriate Archaeological Heritage Research Permit Guidelines for the appropriate Project Description format)*

South end of Gold Brook Lake

**Permit Category**:
Please choose one

- ☐ Category A – Archaeological Reconnaissance
- ☐ Category B – Archaeological Research
- ☑ Category C – Archaeological Resource Impact Assessment
- ☑ I certify that I am familiar with the provisions of the *Special Places Protection Act* of Nova Scotia and that I have read, understand and will abide by the terms and conditions listed in the Heritage Research Permit Guidelines for the above noted category.

| | |
|---|---|
| Signature of applicant | Date 21 June 2017 |
| Approved by Executive Director | Date June 26-17 |

DocuSign Envelope ID: ED38D5ED-232E-48CF-A858-25375157E959

**ExxonMobil Canada Properties**
1701 Hollis Street
Halifax, Nova Scotia B3J 3M8
Tel. (902) 490-9700
Fax (902) 490-9702

Submitted Electronically

March 29, 2018

Sheri Young
Secretary of the Board
National Energy Board
Suite 210, 517 Tenth Avenue S.W.
Calgary, Alberta T2R 0A8

**Re: ExxonMobil Canada Ltd. – Sable Offshore Energy Project**
**Leave to Abandon Application for the Goldboro Gas Plant and 26" Gathering Pipeline**

Dear Ms. Young:

ExxonMobil Canada Ltd., Managing Partner of ExxonMobil Canada Properties, is submitting the enclosed Leave to Abandon Application for the following:

- Leave to Abandon the 26" Gathering Pipeline pursuant to Section 74(1)(d) of the NEB Act and Section 50 of the NEB Onshore Pipeline Regulations; and
- Leave to Abandon the Goldboro Gas Plant pursuant to Section 74(1)(d) of the NEB Act and Section 43.1 of the NEB Processing Plant Regulations.

Please contact the undersigned if you have any questions regarding the enclosed.

Regards,

DocuSigned by:
Friedrich Krispin
9022414DA2CB434...

Friedrich Krispin
Sable Asset and Decommissioning Manager

OREX

**THIS AGREEMENT** made this 26 day of September, 1995.

**BETWEEN:**

**HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF NOVA SCOTIA**, represented by The Minister Responsible for the Economic Renewal Agency,

(hereinafter called *"Her Majesty"*)

OF THE ONE PART

- and -

**EXPLORATION OREX INC.**, a body corporate, incorporated under the laws of the Province of Quebec

OF THE SECOND PART

**WHEREAS** Exploration Orex Inc. ("Orex") is the holder of certain mineral rights in Guysborough County in the Province of Nova Scotia as more particularly described in Schedule "A" (the "Mineral Rights");

**AND WHEREAS** Placer Dome Canada Limited ("Placer Dome") has agreed to perform work on the Mineral Rights and Orex has agreed to transfer registered title to the Mineral Rights to Placer Dome Canada Limited (the "Agreement");

**AND WHEREAS** the Agreement is, subject *inter alia* to the condition precedent that Her Majesty agree to indemnify Orex and its officers, directors, contractors and related companies (hereinafter collectively called "Orex") in respect of certain potential liabilities associated with existing environmental conditions and Her Majesty has agreed to execute and deliver this Indemnity Agreement to Orex;

**NOW THEREFORE**, in consideration of the mutual covenants hereinafter set forth and other good and valuable consideration, the receipt and sufficiency whereof is hereby acknowledged, the parties hereto covenant and agree as follows:

1. **DEFINITIONS**

1.1. In this Agreement:

(a) ***"Claims"*** includes, but is not limited to, any claims, demands, actions, causes of action, damages, losses, costs, fines, penalties, monetary sanctions, liabilities or expenses of any and every kind whatsoever whether arising under any Law, Order, Permit, Regulation, statute, common law, contract or otherwise;

(b) ***"Closing Date"*** means the date of this Agreement;

(c) ***"Closure Period"*** means any period commencing immediately following a longterm or permanent cessation of mining and production activites at the Site and continuing until all reclamation obligations in respect of the Site have been completed in full and the claims have been returned to Her Majesty;

(d) ***"Excepted Claims"*** means Claims which Her Majesty establishes are incurred by, asserted against or paid by Orex as a direct consequence of and primarily due to:

(i) any exploration, development or mining operations conducted by Placer Dome or Orex at the Site subsequent to the Closing Date and which are not related to any Hazardous Substance which is present on the Site on the Closing Date; or

(ii) any exploration, development or mining operations conducted by Orex at the Site following acquisition by Orex of the Mineral Rights and prior to the Closing Date;

*(e)* ***"Hazardous Substance"*** includes, but is not limited to, any contaminants, pollutants, dangerous substances, liquid or solid wastes, industrial wastes, hauled liquid wastes, toxic substances, hazardous wastes, hazardous materials, or hazardous substances as defined in or pursuant to any Laws, Regulations, Orders or any Permit;

(f) ***"Laws"*** shall mean all applicable present or future international treaties, federal, provincial, municipal, or local laws, statutes, or orders relating to the environment or the protection of the environment, including, without limitation, the Environmental Protection Act (Canada), the Fisheries Act (Canada), the Transportation of Dangerous Goods Act (Nova Scotia), the

Environment Act (Nova Scotia) and any other applicable laws relating to the environment;

(g) *"Orders"* shall include, but is not limited to, all applicable orders, directions, requirements, decisions, or the like granted or issued by any court, ministry, department or administrative or regulatory agency pursuant to any Laws, Regulations or Permit;

(h) *"Permit"* shall mean any permit, approval, or other authorization issued or granted pursuant to any Laws or Regulations;

(i) *"Regulations"* shall include all rules, regulations or the like propagated under or pursuant to any Laws;

(j) *"Release"* includes, but is not limited to, releasing, spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, disposing, or dumping;

(k) *"Relevant Period"* means the period commencing with the Closing Date and concluding at the end of the Closure Period; and

(l) *"Site"* shall mean those lands, including wetlands, bodies of water and watercourses which overlie the Mineral Rights.

## 2. INDEMNITY

2.1. Her Majesty agrees that it shall and does hereby indemnify and save harmless Orex, its successors and assigns, from and against all Claims (with the exception of Claims which relate solely to Excepted Claims) which may (subject to clause 2.3), at any time, or from time to time, be incurred by, asserted against, paid by or suffered by Orex with respect to or as a direct or indirect result of the presence in, on or under, or the Release in, onto or from the Site of any Hazardous Substance, including without limiting the generality of the foregoing, any such presence or Release relating to any tailings, abandoned mine works or structures on the Site on, into or upon any land, groundwater, the atmosphere or any water course, body of water or wetland, if such presence or Release existed or occurred on or before the Closing Date.

2.2. The indemnity hereby constituted shall apply to all Claims (other than Claims which relate solely to Excepted Claims), including without limitation:

(a) Claims in respect of or in any manner relating to tailings on the Site;

(b) costs of and claims for clean-up, rehabilitation, or restoration of the natural environment;

(c) fines based on the breach of, or on savings accruing from non-compliance with, any Laws, Regulations, Permits or Orders;

(d) the cost of complying with any Laws, Regulations, Permits or Orders in respect of environmental remediation;

(e) the cost of defending and/or counterclaiming or claiming over and against third parties in respect of any action, proceeding or matter raised in connection with the actual or alleged environmental contamination or rehabilitation of the Site or any lands or waters which are in any way affected or impacted by any Release; and

(f) any costs, liability or damage arising out of any action or legal proceeding relating to environmental contamination or rehabilitation of the Site including areas affected thereby and affecting Orex or arising out of the settlement of any such action entered into by Orex.

2.3. The Indemnity hereby constituted shall continue in force throughout the Relevant Period and after completion of the Relevant Period shall continue in force with respect to any Claims (other than Excepted Claims):

(a) made during, or which arose prior to or during, the Relevant Period;

(b) which relate to matters which occurred or arose prior to or during the Relevant Period; or

(c) which are based upon the ownership of Orex and/or Placer Dome during the Relevant Period;

provided however that such indemnity shall exclude the direct costs of clean-up incurred by Orex of Hazardous Substances, if any, within the perimeter of the mine boundary as defined in the mining plan prepared in respect of the mining activities of Placer Dome and/or Orex on the Site, if and only to the extent that Orex and/or Placer Dome come into contact with such Hazardous Substances during the course of implementation of the mining activities referred to in such mining plan.

2.4. Should Orex undertake mining activities on the Site and have the option of conducting such activities in more than one manner or at more than one location on the Site, it shall choose that method of conducting the activities which has a more positive or a less negative impact on the environment than the alternatives, if such method will, in Orex's opinion based on the information available at such time, reasonably exercised, achieve the same or better net results for Orex by incurring the same or less cost to carry out the activities.

3. **GENERAL**

3.1. This Agreement shall be construed in accordance with the Laws of the Province of Nova Scotia and the parties irrevocably attorn to the Courts of the Province of Nova Scotia.

3.2. This Agreement shall be binding upon the parties hereto and their respective successors and assigns.

3.3. If anything is specified to be done, take place, happen, or expire in this Agreement on any date which is a Sunday, or a Dominion or Provincial Statutory Holiday, then such date shall be deemed to be extended to the next business date immediately following each Sunday or Dominion or Provincial Statutory Holiday.

3.4. Any written notice or communication to be given by any party to another party shall be deemed to be duly given to such other party when delivered by courier or sent by telefax to the following address:

**The Minister Responsible for the**
**Economic Renewal Agency**
6th Floor, World Trade & Convention Centre
1800 Argyle Street, P. O. Box 519
Halifax, NS B3J 2R7
Tel: 1-902-424-5790
Fax: 1-902-424-0514

- with a copy to -

Mr. Terry Degen
Solicitor
**Department of Economic Renewal**
7th Floor, World Trade & Convention Centre
1800 Argyle Street, P. O. Box 519
Halifax, NS B3J 2R7
Tel: 1-902-424-5790
Fax: 1-902-424-0514

- and -

Corporate Secretary
**Exploration Orex Inc.**
Suite 200
101-A Principale Avenue
Rouyn-Noranda PQ J9X 4P1
Tel: 1-819-797-4354
Fax: 1-819-797-2454

- with a copy to -

G. David N. Covert
**Stewart McKelvey Stirling Scales**
P. O. Box 997, 1959 Upper Water Street
8th Floor, Purdy's Wharf Tower One
Halifax, NS B3J 2X2
Tel: 1-902-420-3200
Fax: 1-902-420-1417

Any party may, at any time, give notice in writing to the other parties of any change of address of the party giving such notice, the address therein specified shall be deemed to be the address of such party for the giving of notice hereunder.

4. **EXECUTION**

4.1. **IN WITNESS WHEREOF** the parties hereto have caused these presents to be duly executed as of the day and year first above written.

**SIGNED, SEALED AND DELIVERED** in the presence of:

Witness

**HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF NOVA SCOTIA** represented by The Minister Responsible for the Economic Renewal Agency:

Per: _____

**EXPLORATION OREX INC.**

Per: _____ c/s

Per: _____ c/s

Schedule "A"

E.1

Nova Scotia
Department of
Natural Resources

No. 00502

# Exploration Licence

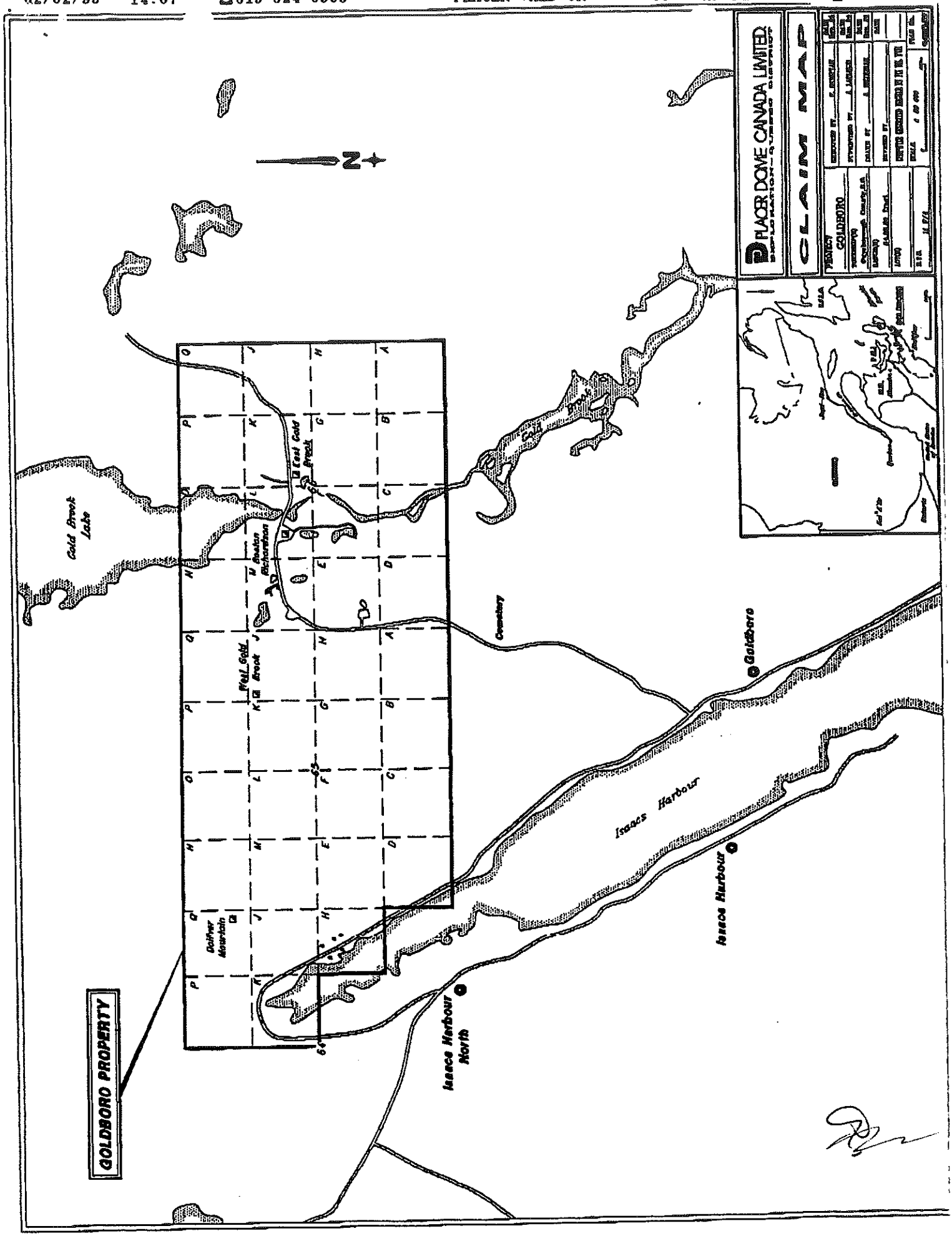
This Exploration Licence is hereby issued to Exploration Orex Inc.

of Rouyn-Noranda in the Province of Quebec

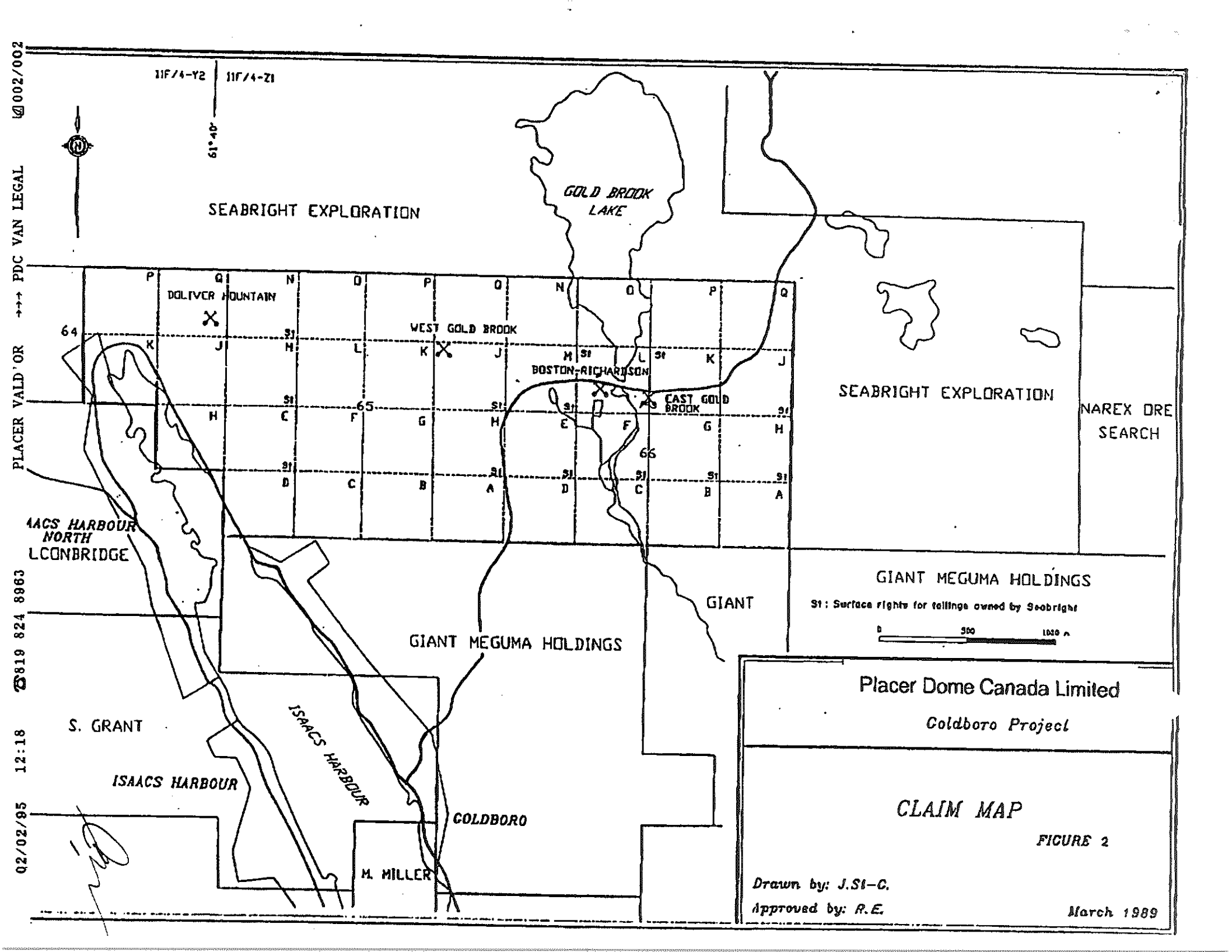
to exercise the right to search and prospect for ALL MINERALS SAVING AND EXCEPTING coal, salt, potash and uranium, and to apply for a mining lease for all or part of the area held under this exploration licence, for a period not exceeding twelve months from the date hereof, within that area of ground situated at or near Goldboro

In the County of Guysborough as described as follows:

| | | |
|---|---|---|
| Claims HJKP Q | Tract 64 | Reference Map 11 F 4 D |
| All Claims | Tract 65 | Reference Map 11 F 4 D |
| All Claims | Tract 66 | Reference Map 11 F 4 D |


PLACER DOME CANADA LIMITED
CLAIM MAP
GOLDBORO
GOLDBORO PROPERTY
Gold Brook Lake
Gold Brook
East Gold Brook
West Gold Brook
Boston Richardson
Cemetery
Goldboro
Isaacs Harbour
Isaacs Harbour North
Isaacs Harbour
Gulfver Mountain

002/002 PDC VAN LEGAL +++ PLACER VALD'OR 819 824 8963 12:18 02/02/95



DATED day of September, 1995

**BETWEEN:**

**HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF NOVA SCOTIA**, represented by The Minister Responsible for the Economic Renewal Agency,

(hereinafter called *"Her Majesty"*)

OF THE ONE PART

- and -

**EXPLORATION OREX INC.**, a body corporate, incorporated under the laws of the Province of Quebec

OF THE SECOND PART

---

# INDEMNITY AGREEMENT

---

Stewart McKelvey Stirling Scales
800-1959 Upper Water Street
P.O. Box 997
Halifax, NS B3J 2X2

GEMTEC
www.gemtec.ca

# Preliminary Metal Leaching & Acid Rock Drainage Characterization Goldboro Deposit,

## Draft Report_rev1

Goldboro, Nova Scotia

GEMTEC
www.gemtec.ca

Submitted to:

Anaconda Mining Inc.
238 Highway 410
Baie Verte, NL
A0K 1B0

# Preliminary Metal Leaching & Acid Rock Drainage Characterization Goldboro Deposit,

## Draft Report_rev1

Goldboro, Nova Scotia

March 26, 2018
Project: 80016.08

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# 1.0 INTRODUCTION

## 1.1 Background

Anaconda Mining Inc. (Anaconda) is proposing to extract gold from its Goldboro deposit, located approximately 175 km northeast of the city of Halifax, 60 km southeast of the town of Antigonish, and 1.6 km north of the village of Goldboro, in Guysborough County, Nova Scotia, Canada (see Figure 1). GEMTEC Consulting Engineers and Scientist Limited (GEMTEC) was retained by Anaconda to review results of sampling and laboratory testing programs to characterize the potential for metal leaching and acid rock drainage (ML/ARD) for the project. This report provides the preliminary results of the ML/ARD sampling and testing completed to date for the deposit, as well as recommendations for mine project planning and further ML/ARD testing, and is understood that it will be a supporting document for the Project Environmental Assessment registration.

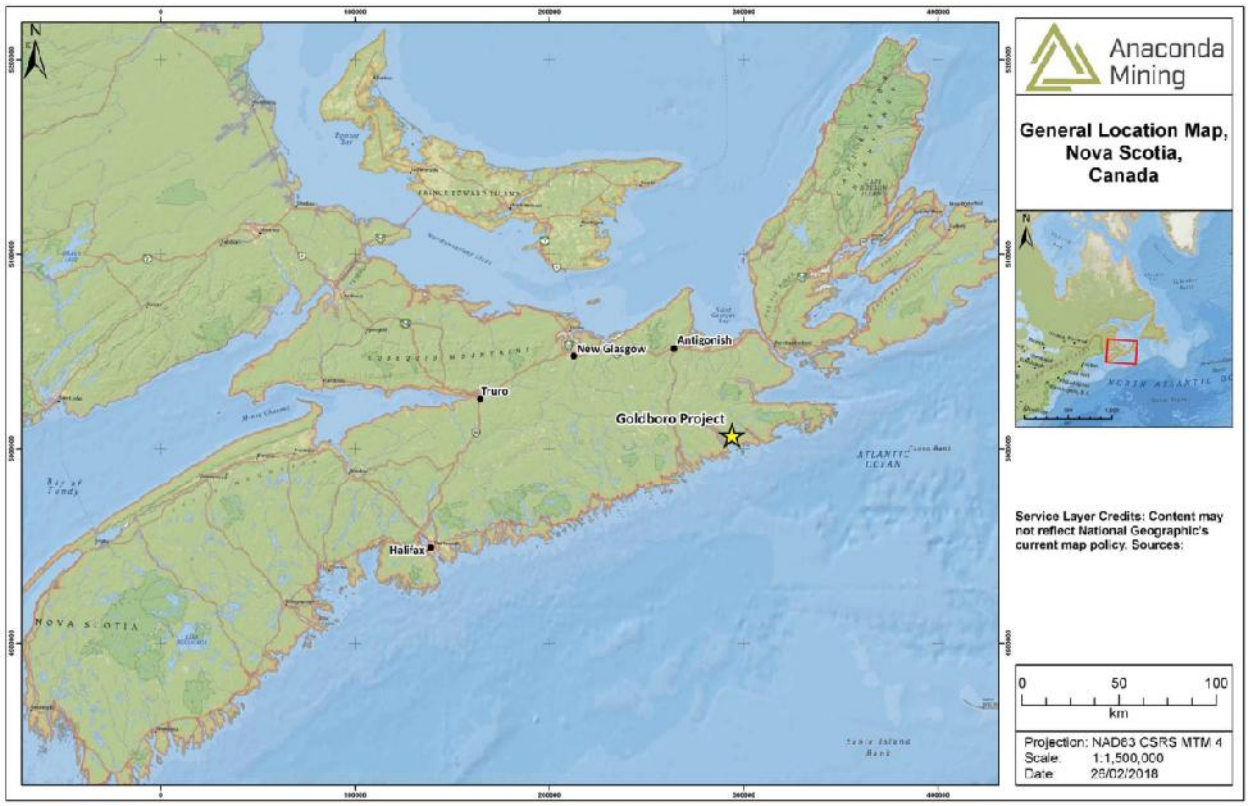


**Figure 1 Site Location Map, Goldboro Project (taken from WSP, 2018)**

## 1.2 General Geology and Mine Components

The following summary of the property geology is taken from the Canadian National Instrument 43-101 Technical Report, Preliminary Economic Assessment on the Goldboro Project (WSP, 2018).

The Goldboro Property is underlain by folded sedimentary rocks of the Cambro-Ordovician Goldenville Group of the Meguma Supergroup. This group consists of interbedded meta-greywacke, meta-arenite, and meta-siltstone (slate or argillite) that are affected by the east-west trending, upright, Upper Seal Harbour anticline. Quartz vein systems associated with the hinge zone of the moderately east-plunging Upper Seal Harbour anticline are the most important hosts for gold on the property, but gold mineralization is also present in hosting slate units in association with disseminated sulphides and adjacent to some vein contacts. Mineral resources associated with the Goldboro deposit occur in three broad, spatially contiguous systems along the Upper Seal Harbour anticline, including the East Goldbrook, Boston-Richardson, and West Goldbrook systems. Each system is characterized by stacked, gold-bearing quartz-veined stratigraphic intervals that can be correlated both along strike and down dip, and vary in thickness from less than a metre up to 20 metres. The East Goldbrook and Boston-Richardson systems are separated by a thick greywacke sequence (the Boston-Richardson Marker), with the East Goldbrook system above the greywacke and the Boston-Richardson system below. The West Goldbrook system is separated from the Boston-Richardson system by a fault zone, but is generally the continuation of the Boston-Richardson system on the west side of the fault. The current Project involves gold extraction from the Boston-Richardson system.

Based on provided information, it is understood that no mineralogical data is available for the deposit, and the mineral speciation and abundance of sulphide and carbonate minerals is not known. However it was noted in Piercy (2017) that the deposit contains sulphide mineralization dominated by arsenopyrite along with varying amounts of galena, and much lesser pyrite, chalcopyrite, and sphalerite. Carbonate alteration mineral assemblages were noted in WSP (2018) but no specific carbonate mineral information was provided.

It is understood by GEMTEC that the primary lithological units identified by Anaconda for the deposit are as follows:

- Un-mineralized greywacke; containing <0.4 g/t Au
- Un-mineralized Argillite and quartz veins; containing <0.4 g/t Au
- Marginal-grade Ore (all lithologies); containing 0.4 - 0.8 g/t Au
- Ore (all lithologies); containing >0.8 g/t Au

The Goldboro Project will involve ore extraction from a pit located in the western portion of the Project area, in the vicinity of the former West Goldbrook Mine, waste rock disposed in a waste

rock pile, and tailings disposal in a tailings storage facility. A temporary stockpile will also be used to store marginal grade ore for later processing following the completion of pit extraction.

The lithological units associated with the deposit, and with different characteristics with respect to ARD and metal leaching potential, will be exposed, excavated, deposited sub-aqueously or in stockpiles, and/or used for construction as part of the Goldboro Project, and will make up the various mine components (i.e., mill/tailings, waste rock, temporary stockpiles, and pit wall rock).

Table 1 summarizes the major lithological units for the Goldboro Project along with their constituent rock types, relating mine components, and preliminary estimated percentage of total material to be excavated from the pit.

Based on information provided by Anaconda, the waste rock that will be generated during the Project is estimated to represent 87% of the pit volume, and will be dominantly comprised of the un-mineralized greywacke (84% of waste rock and 73% of total pit). The un-mineralized quartz vein material is mainly associated with the argillite, and is grouped with this lithological unit, and will make up approximately 16% of the waste rock and 14% of the pit. The ore is classified as mineralized host rock material (predominantly argillite, but also greywacke) and quartz veins containing gold concentrations with a cut-off grade of 0.8 g/t, and represents 11% of the pit volume. A marginal grade ore is also classified that represents mineralized host rock material and quartz veins with gold grades between 0.4 and 0.8 g/t, and represents 2% of the pit volume.

**Table 1 Summary of Major Lithological Units for Goldboro Project**

| Lithological Unit | Lithocode (Block Model) | Constituent Rock Type | Mine Component | % Total Pit Volume |
|---|---|---|---|---|
| Un-mineralized Greywacke | 4SA/4SI/4W | Greywacke, sandstone, siltstone | Waste rock / pit wall rock | 73 |
| Un-mineralized Argillite & Quartz Veins | 4A/4G/4M/4SH/Qv | Argillite, graphitic argillite, mudstone, shale, and quartz veins | Waste rock / pit wall rock | 14 |
| | | | **Waste Rock Total** | **87** |
| Marginal-grade Ore | | All lithologies | Temporary stockpile / pit wall rock | 2 |
| Ore | | All lithologies | Ore & tailings / pit wall rock | 11 |
| | | | **Pit Volume Total** | **100** |

## 2.0 ML/ARD SAMPLING PROGRAMS

Two rounds (Round 1 and Round 2) of sampling and static testing for ML/ARD have been completed for the Goldboro Project. Sample selection for both Round 1 and Round 2 laboratory testing was carried by Anaconda based on exploration and mine planning information for the Project. GEMTEC was not involved in the selection of samples for ML/ARD testing for these programs.

Based on information provided by Anaconda, samples were selected for the initial round of static testing (Round 1) to provide an overall characterization of ML/ARD potential in ore and waste rock material across the mineralized belt of the property. Samples were selected for the second round of static testing (Round 2) based on the results of the initial round and focused on providing more data on the major lithological units and the various mine project components (i.e., tailings, waste rock, and pit walls), as well as improving spatial and volumetric representation within the pit.

Figure 2 provides a site plan showing the locations of the drill holes sampled as part of the Round 1 and Round 2 sampling programs. Representative longitudinal and cross sections showing geological and deposit data for the sampled drill holes were provided by Anaconda and are provided in Appendix A.

The Round 1 samples were collected from two drill holes, including BR-17-MET2 located within the pit in the western portion of the Project area, and BR-17-MET4, located outside of the pit along the mineralized belt in the eastern portion of the Project area (refer to Goldboro Project Plan in Appendix A). It is understood that Anaconda selected the samples so that they were spaced vertically within each borehole to provide a reasonable representation of the major lithological units at each location. For the most part, the samples collected as part of the Round 1 sampling program represent material classified as either ore, marginal ore or waste rock. With the exception of one (1) sample collected from BR-17-MET2, no other samples were collected from the area of the pit walls as part of the Round 1 program.

The second round of samples (Round 2) were selected from four (4) historical drill holes (OSK-10-18, OSK-10-21, OSK-10-24, and OSK-10-25) drilled in 2010 from within the footprint of the pit, and further represent major lithological units and waste rock, marginal ore and ore mine components. No samples were collected from the area of the pit walls as part of the Round 2 program.

In total 42 samples were collected for the Goldboro project for ML/ARD laboratory testing, as further described below.

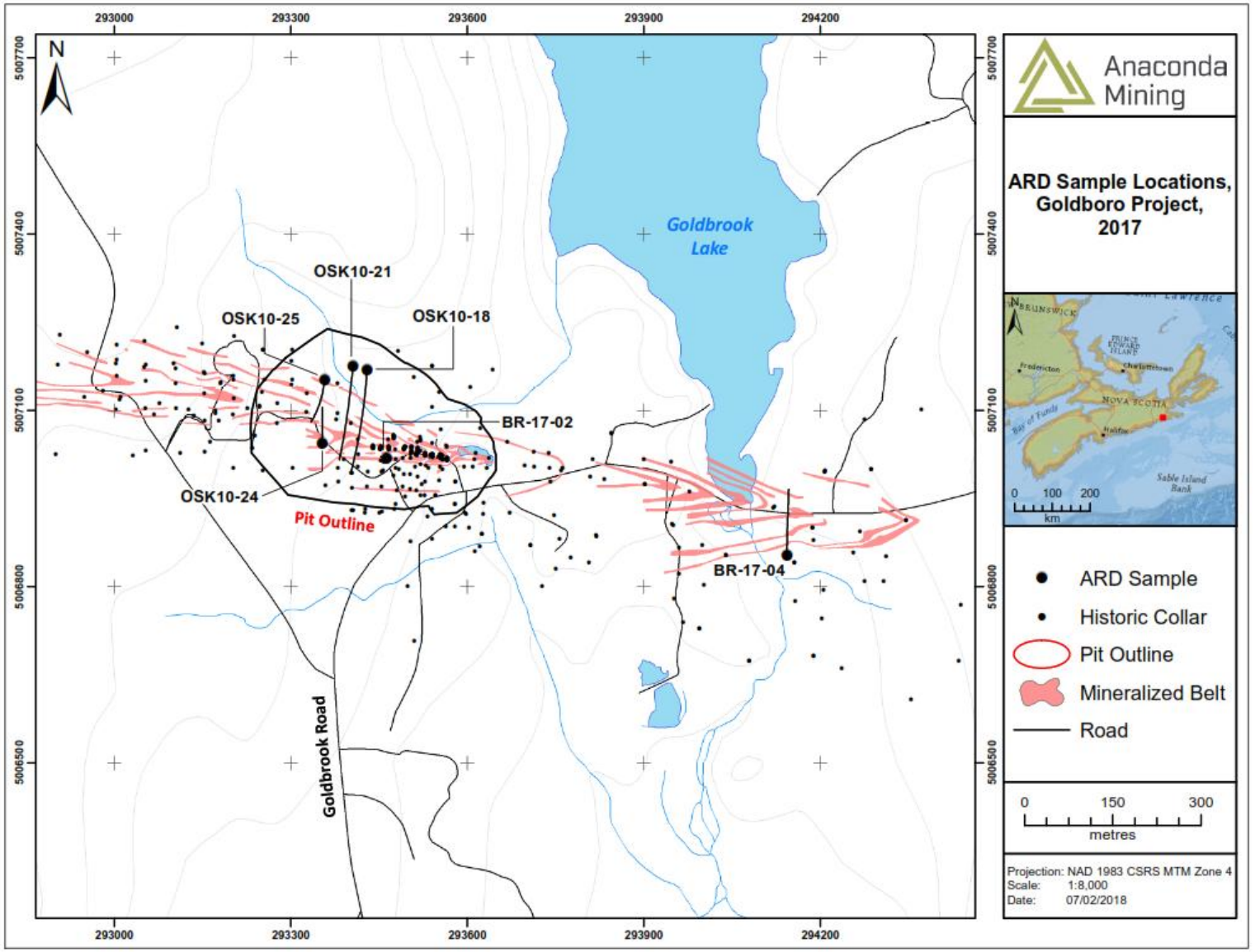


**Figure 2 Site Plan showing the location of drill holes sampled during the Round 1 and Round 2 sampling programs (provided by Anaconda, 2018)**

*Ore Samples*

A total of 10 ore samples were sent for laboratory analysis and are detailed in Table 2; including:

- Pit - six (6) samples collected from drill hole BR-17-MET2 as part of Round 1 sampling and two (2) samples collected from historical drill holes OSK-10-21 and OSK-10-25 as part of Round 2 sampling. These samples are located within the pit and represent the ore material that would be transported to the mill for processing. Drill hole BR-17-MET2 is a vertical hole located in the center of the pit. Samples from this drill hole were selected from the various intercepted mineralized zones to provide some variation in the geological and mineralization characteristics vertically within the pit.

- Outlying Project area - two (2) samples that represent ore material from the location of BR-17-MET4, along the mineralized belt in the eastern portion of the Project area.

**Table 2 Ore samples selected for ML/ARD characterization**

| Sampling Round | Drill hole ID | Sample Number | Mine Component | Au (g/t) |
|---|---|---|---|---|
| 1 | BR-17-MET2 | I951403 | ORE | 1.061 |
| | BR-17-MET2 | I951404 | ORE | 3.659 |
| | BR-17-MET2 | I951407 | ORE | 6.626 |
| | BR-17-MET2 | I951408 | ORE | 2.775 |
| | BR-17-MET2 | I951411 | ORE | 1.188 |
| | BR-17-MET2 | I951412 | ORE | 3.148 |
| | BR-17-MET4 | I951418 | ORE | 4.378 |
| | BR-17-MET4 | I951419 | ORE | 2.332 |
| 2 | OSK-10-21 | Sample 5 *(948711 / 948712)* | ORE | 1.246 |
| | OSK-10-25 | Sample 13 *(948727 / 948728)* | ORE | 3.445 |

*Marginal Ore Samples*

A total of four (4) marginal ore samples were sent for laboratory analysis and are detailed in Table 3; including:

- Pit - one (1) sample collected from drill hole BR-17-MET2 as part of Round 1 sampling, and two (2) samples collected from historical drill holes OSK-10-18 and OSK-10-24 as part of Round 2 sampling that are located within the pit and represent the marginal grade ore that will be stored in a temporary stockpile for later processing following the completion of pit extraction,

- Outlying Project area - one (1) sample that represents marginal ore material from the location of BR-17-MET4, along the mineralized belt in the eastern portion of the Project area.

**Table 3 Marginal Ore samples selected for ML/ARD characterization**

| Sampling Round | Drill Hole ID | Sample Number | Mine Component | Au (g/t) |
|---|---|---|---|---|
| 1 | BR-17-MET2 | I951413 | MARGINAL_ORE | 0.431 |
| | BR-17-MET4 | I951415 | MARGINAL_ORE | 0.471 |
| 2 | OSK-10-18 | Sample 3 *(948704 / 948705 / 948706)* | MARGINAL_ORE | 0.692 |
| | OSK-10-24 | Sample 19 *(948737 / 948738)* | MARGINAL_ORE | 0.532 |

*Waste Rock Samples*

A total of 28 waste rock samples were collected and sent for laboratory analysis during the Round 1 and Round 2 sampling programs. These are detailed in Table 4, and include:

- Pit - 12 samples of un-mineralized greywacke, two (2) samples of un-mineralized argillite, and seven (7) mixed samples comprising varying percentages of un-mineralized greywacke, argillite and quartz vein material from within the pit that will be stored on waste rock piles

- Outlying Project area – seven (7) samples of un-mineralized greywacke from BR-17-MET-04, located outside the pit along the mineralized belt in the eastern portion of the Project area.

**Table 4 Waste Rock samples selected for ML/ARD characterization**

| Sampling Round | Drill Hole ID | Sample No. | Geological Material | Au (g/tonne) |
|---|---|---|---|---|
| 1 | BR-17-MET2 | I951401 | WASTE_GREYWACKE | 0.231 |
| | BR-17-MET2 | I951402 | WASTE_GREYWACKE | 0.063 |
| | BR-17-MET2 | I951406 | WASTE_GREYWACKE | 0.080 |
| | BR-17-MET2 | I951409 | WASTE_GREYWACKE | 0.014 |
| | BR-17-MET4 | I951414 | WASTE_GREYWACKE | 0.038 |
| | BR-17-MET4 | I951416 | WASTE_GREYWACKE | 0.120 |
| | BR-17-MET4 | I951417 | WASTE_GREYWACKE | 0.018 |
| | BR-17-MET4 | I951420 | WASTE_GREYWACKE | 0.010 |
| | BR-17-MET4 | I951421 | WASTE_GREYWACKE | 0.031 |
| | BR-17-MET4 | I951422 | WASTE_GREYWACKE | 0.100 |
| | BR-17-MET4 | I951423 | WASTE_GREYWACKE | 0.013 |
| | BR-17-MET2 | I951410 | WASTE_MIXED | 0.219 |
| | BR-17-MET2 | I951405 | WASTE_ARGILLITE | 0.008 |
| 2 | OSK-10-25 | Sample 12 *(948726)* | WASTE_ARGILLITE | 0.066 |
| | OSK-10-18 | Sample 2 *(948703)* | WASTE_GREYWACKE | 0.022 |
| | OSK-10-21 | Sample 7 *(948715 / 948716)* | WASTE_GREYWACKE | 0.018 |
| | OSK-10-25 | Sample 9 *(948721 / 948722)* | WASTE_GREYWACKE | 0.016 |
| | OSK-10-25 | Sample 10 *(948723 / 948724)* | WASTE_GREYWACKE | 0.022 |
| | OSK-10-25 | Sample 11 *(948725)* | WASTE_GREYWACKE | 0.012 |
| | OSK-10-24 | Sample 14 *(948729)* | WASTE_GREYWACKE | 0.022 |
| | OSK-10-24 | Sample 16 *(948734)* | WASTE_GREYWACKE | 0.012 |
| | OSK-10-24 | Sample 18 *(948736)* | WASTE_GREYWACKE | 0.006 |
| | OSK-10-18 | Sample 1 *(948701/948702)* | WASTE_MIXED | 0.118 |
| | OSK-10-18 | Sample 4 *(948707/948708/ 948709/948710)* | WASTE_MIXED | 0.022 |
| | OSK-10-21 | Sample 6 *(948713 948714)* | WASTE_MIXED | 0.012 |
| | OSK-10-21 | Sample 8 *(948717/948718 / 948719/948720)* | WASTE_MIXED | 0.024 |
| | OSK-10-24 | Sample 15 *(948730/948731/ 948732/948733)* | WASTE_MIXED | 0.026 |
| | OSK-10-24 | Sample 17 *(948735)* | WASTE_MIXED | 0.014 |

*Pit Wall Rock Samples*

Only (1) one waste rock sample (I951408) was collected in BR-17-MET2 in the general vicinity of the base of the pit. No other samples were collected in the pit wall rock material as part of the Round 1 and Round 2 programs. However, based on provided geological and deposit data, it is expected that the ore, marginal ore and waste rock lithologies sampled during the Round 1 and Round 2 sampling programs extend to the limits of the pit, and can be used to characterize similar geological materials along the pit walls.

## 3.0 STATIC ML/ARD TESTING

All 42 samples collected by Anaconda during the Round 1 and the Round 2 sampling programs were submitted to RPC Science and Engineering (RPC) in Fredericton, New Brunswick for the following laboratory analysis.

- Total sulphur and sulphate sulphur speciation analysis to determine sulphide sulphur content, by the difference between the two;
- Total inorganic carbon analysis to determine carbonate content;
- Whole rock analysis by XRF;
- Acid Base Accounting (ABA) using the Modified Sobek method; and,
- Multi-element (trace metals) analysis by ICP-OES scan.

### 3.1 ARD/ML Assessment Methodology

ARD potential for the major lithological units and mine components for the Project was evaluated using Acid-Base Accounting (ABA) by the modified Sobek method and the total sulphur analysis. The ability of the rock to generate acid is a function of the balance between the potentially acid producing (sulphide) minerals and the potential acid consuming minerals. As such ABA analysis is based on the neutralization potential (NP) of a rock assuming the neutralizing minerals react like calcium carbonate, and the acid potential (AP) of a rock assuming all sulphide minerals react like pyrite.

The net neutralization potential (NNP), or acid/base account is determined by subtracting the AP from the NP (NNP = NP - AP). A ratio of NP to AP (NPR) is also used. An NNP of 0 is equivalent to an NP/AP ratio of 1. Units for static test results (AP, NP, NPR and NNP) are expressed in mass (kg) of calcium carbonate ($CaCO_3$ ) per tonne. The criteria of NP/AP <1 and NNP <-20 are commonly applied to classify a rock material as potentially acid generating (PAG); the criteria at 1<NP/AP<2 and –20<NNP<20 is applied to classify a rock material as uncertain with respect to acid generation potential; and the criteria of NP/AP>2 and NNP>20 is applied to classify a rock material as non-acid generating (NAG) (MEND, 2009).

Further, the Nova Scotia Sulphide-Bearing Material Disposal Regulations (Nova Scotia Environment Act, 1995), consider rock material with sulphide sulphur content <0.4 wt% as not a hazardous ARD material.

## 3.2 Results

The results of the static testing for both rounds of sampling are summarized in Table 5, and the detailed analytical results are provided in Tables B.1 through Table B.3 in Appendix B. The RPC laboratory reports are provided in Appendix C. The results for all of the samples analyzed as part of the sampling programs are presented below; however particular emphasis is placed on the analysis and interpretation of results for samples collected from within the pit as these directly relate to the potential for ML/ARD issues associated with the Project.

### 3.2.1 Sulphur Abundance and Speciation

The results of the total sulphur and sulphate sulphur speciation analysis are summarized by lithological unit and mine component in Table 5, and detailed results are presented in Table B.1 in Appendix B. The concentration of total sulfur in the samples analyzed were relatively low, ranging from <0.005% to 2.55%. A comparison of the total sulphur concentrations in the pit samples with the analytical results for sulphur speciation indicates that the dominant sulphur species is sulphide, with sulfide typically representing approximately 92% of the total sulphur content in the samples. Based on provided geological and deposit data, arsenopyrite is the dominant sulphide mineral with varying amounts of galena, and much lesser pyrite, chalcopyrite, and sphalerite (Piercy, 2017). The measured total sulphur content in the samples was used to define its AP value in the ABA analysis, and assumes that sulphide is the dominant sulphur species, and that oxidation of pyrite is the primary acid-generating source. Depending on the actual composition and abundance of the sulphide mineralogy associated with the various lithological units and mine components, the actual AP for the rock materials may differ from that determined based on sulphur analysis since other sulphide mineral components will have different magnitudes of acid generation as compared to pyrite.

At low sulphide sulphur concentrations, interpretation of ARD potential using NPR and NNP may not be meaningful because oxidation of small concentrations of sulphide produces low amounts of acid that may be neutralized by other mineral components in addition to carbonate. For this assessment, the Nova Scotia Sulphide-Bearing Material Disposal threshold of 0.4 wt% sulphide sulphur is used as the threshold criterion for classification of ARD potential; and samples with sulphide sulphur contents below this criterion were classified as “uncertain” even if the NPR and NNP value indicated PAG conditions. This criterion affected 10 samples (24% of the dataset), including five (5) waste rock samples (I951401, I951406, I951421, Sample 1, Sample 2), two (2) marginal ore samples (I951413, Sample 3), and three (3) ore samples (I951408, Sample 5, Sample 13), that were classified as PAG using NPR and NNP but had less than 0.4% sulphide sulphur. However, while low sulphide sulphur content may limit the potential for acid generation in a rock, MEND (2009) protocol dictates that low sulphide content alone cannot be used to fully

**Table 5 Summary of Acid-Base Accounting Data and Metals Concentrations for the Goldboro Project**

| Lithology | Mine Component | Statistic | Au (g/tonne) | Paste pH | Total Sulphur (Wt.%) | Total Inorganic Carbon (Wt.%) | Acid Production Potential (AP) | Neutralizing Potential (NP) | Net NP (NNP) | NP/AP (NPR) | ARD Classification | Ag | As | Cd | Cr | Cu | Fe | Mo | Ni | Pb | Se | Tl | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Un-mineralized Greywacke (n=12) | Waste Rock/ Pit Wall | Min | 0.01 | 8.0 | 0.02 | 0.01 | 0.56 | 4.71 | -3.07 | 0.61 | - | <0.2 | 10 | <5 | 47 | 6 | 19,574 | 1.0 | 10.2 | 8.9 | <5 | <5 | 31 |
| | | Median | 0.02 | 9.0 | 0.09 | 0.03 | 2.70 | 9.95 | 6.90 | 3.89 | NAG | **0.50** | **111** | <5 | **158** | 20 | 26,589 | 1.0 | 20.0 | 26.7 | <50 | <50 | 95 |
| | | Max | 0.23 | 9.3 | 0.39 | 0.10 | 12.30 | 16.30 | 12.20 | 22.61 | - | **1.60** | **1,565** | <5 | **1,217** | 47 | 50,336 | **11.2** | 34.8 | **719.9** | <50 | <50 | **356** |
| Un-mineralized Argillite / QTZ Vein | Waste Rock/ Pit Wall | Min | 0.01 | 8.9 | 0.01 | 0.01 | 0.20 | 2.20 | 2.00 | 1.70 | - | <0.2 | 7 | <5 | 76 | 6 | 4,645 | 1.0 | 4.1 | 9.4 | <5 | <5 | 10 |
| | | Median | 0.04 | 9.1 | 0.06 | 0.02 | 1.90 | 4.20 | 2.30 | 6.35 | NAG | <0.35 | **259** | <5 | 77 | 22 | 21,693 | **5.5** | 20.3 | 38.5 | <50 | <50 | 89 |
| | | Max | 0.07 | 9.2 | 0.12 | 0.03 | 3.60 | 6.20 | 2.60 | 11.00 | - | <0.5 | **510** | <5 | 78 | 38 | 38,740 | <10 | 36.5 | 67.7 | <50 | <50 | 168 |
| Un-mineralized mixed lithologies (n=7) | Waste Rock/ Pit Wall | Min | 0.01 | 8.2 | 0.03 | 0.01 | 0.80 | 5.20 | -11.50 | 0.30 | - | <0.2 | 21 | <0.5 | 62 | 12 | 29,297 | <1 | 26.7 | 9.1 | <5 | <5 | 58 |
| | | Median | 0.02 | 9.0 | 0.10 | 0.04 | 3.09 | 7.70 | 6.50 | 3.12 | NAG | **0.5** | **44** | <0.5 | 73 | 22 | 37,118 | **10.0** | 30.8 | 54.2 | <50 | <50 | 104 |
| | | Max | 0.22 | 9.4 | 0.56 | 0.11 | 17.40 | 24.20 | 23.40 | 30.90 | - | **2.645** | **492** | <0.5 | 149 | 53 | 46,954 | **11.9** | 41.0 | **863.3** | <50 | <50 | **474** |
| All un-mineralized lithologies (total) (n=21) | Waste Rock/ Pit Wall | Min | 0.01 | 8.0 | 0.02 | 0.01 | 0.56 | 2.20 | -11.50 | 0.30 | - | <0.2 | 7 | <5 | 47 | 6 | 4,645 | <1 | 4.1 | 8.9 | <5 | <5 | 10 |
| | | Median | 0.02 | 9.0 | 0.09 | 0.03 | 2.95 | 7.90 | 6.40 | 3.55 | NAG | **0.5** | **63** | <5 | 79 | 22 | 30,583 | **10.0** | 24.5 | **28.2** | <50 | <50 | 98 |
| | | Max | 0.23 | 9.4 | 0.56 | 0.11 | 17.40 | 24.20 | 23.40 | 30.90 | - | **2.645** | **1,565** | <5 | **1,217** | 53 | 50,336 | **11.9** | 41.0 | **863.3** | <50 | <50 | **474** |
| Marginal Grade Ore (n=3) | Temporary Stockpile / Pit Wall | Min | 0.43 | 8.1 | 0.18 | 0.04 | 5.50 | 6.10 | -8.60 | 0.60 | - | <0.2 | **34** | <5 | 67 | 22 | 20,562 | <1 | 11.9 | 10.3 | <5 | <5 | 56 |
| | | Median | 0.53 | 8.9 | 0.38 | 0.05 | 12.00 | 8.97 | -3.03 | 0.75 | PAG | **0.35** | **774** | <5 | 108 | 30 | 33,114 | <5.5 | 25.8 | **144.6** | <27.5 | <27.5 | 216 |
| | | Max | 0.69 | 9.0 | 0.76 | 0.05 | 23.70 | 15.10 | 0.60 | 1.10 | - | **0.961** | **3,897** | <5 | 179 | 42 | 48,844 | <10 | 49.6 | **356.8** | <50 | <50 | **414** |
| Ore (n=8) | Mill & Tailings / Pit Wall | Min | 1.06 | 7.9 | 0.04 | 0.01 | 1.28 | 5.00 | -71.0 | 0.1 | - | <0.2 | **33** | <5 | 79 | 14 | 9,815 | <1 | 9.4 | <5 | <5 | <5 | 33 |
| | | Median | 2.96 | 8.6 | 0.44 | 0.02 | 13.60 | 6.37 | -8.0 | 0.4 | PAG | 0.255 | **1,122** | <5 | 190 | 31 | 45,537 | 1.0 | 35.7 | 23.8 | <5 | <5 | 95 |
| | | Max | 6.63 | 9.1 | 2.46 | 0.05 | 76.88 | 14.37 | 9.1 | 8.1 | - | **3.57** | **10,454** | <5 | 355 | 64 | 64,650 | <10 | 50.8 | **1,307.0** | <50 | <50 | **1,289** |

Notes:
Elements greater than 5XCA are bolded
Elements with Reportable Detection Limits greater than 5XCA are underlined

classify the ARD potential of a rock particularly for material with low AP and NP values, since minor variations in mineralogy and associated relative rates and magnitude of acid generation and neutralization can significantly alter the predicted and resulting drainage chemistry.

### 3.2.2 Total Inorganic Carbon Analysis and Whole Rock Analysis

The results of the total inorganic carbon analysis are summarized by lithological unit and mine component in Table 5, and detailed results are presented in Table B.1 in Appendix B. The analyses indicated that the inorganic carbon content was low, ranging from <0.01% to 0.11%.

The measured total inorganic carbon concentrations can also be used to calculate a neutralizing capacity for the the samples (Total Carbon NP), and can be compared to the determined Modified Sobek NP to better understand the mineralogy contributing to the NP of the rock. A scatterplot of Total Carbon NP (converted to the same units $CaCO_3$ kg/t) and Modified Sobek NP provided in Figure 2 shows that the Modified Sobek NP is greater than the Total Carbon NP for all the lithological units suggesting that non-carbonate minerals may also be contributing to the neutralization capacity of the samples.

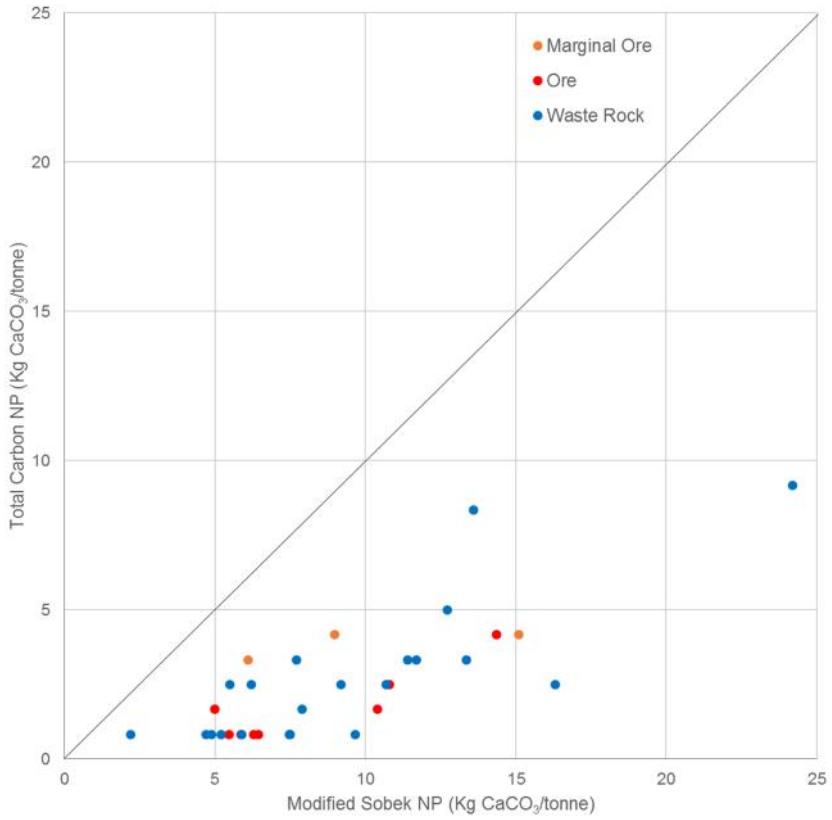


Figure 3 Scatter plot showing Total Carbon NP versus Modified Sobek NP for the pit samples.

The results of the whole rock analysis by sample are presented in Table B.2 in Appendix B. Whole rock analyses confirmed the bulk composition of the lithological units and suggests that aluminosilicates are likely the most prominent source of NP in all lithologies, with Ca and Mg carbonates occurring in relatively minor quantities. However, whole rock geochemical analysis on its own does not allow for a detailed analysis of the composition and relative abundance of minerals, and mineralogical analysis is required to better understand the mineral constituents influencing the AP and NP of the rocks.

### 3.2.3 Acid – Base Accounting (ABA Results)

The results of the ABA analysis, including calculated NPR ratios and NNP values, are summarized by lithological unit and mine component in Table 5, and complete results by sample are presented in Table B.1 in Appendix B.

The measured paste pH values for all of the samples were above 7 indicating that all of the lithological units are currently non-acidic, returning values ranging from 7.3 to 9.4 and a median paste pH of 8.8.

An estimation of the potential future net acid drainage of the presently alkaline geological material in the Project area, and more specifically within the pit, was predicted using the ABA results.

For all of the samples, the ABA results show NPR ratios ranging from 0.1 to 30.9, and NNP values ranging from -71.4 to 23.4.

Specifically with respect to the pit samples, the ore had a median NPR of 0.4 and NNP of -8.0, which indicates a likely potential for acid generation. The marginal ore had similar results, returning a median NPR of 0.75 and NNP of -3.03. Based on the ABA results, as a whole both the ore and marginal ore materials for the Project are considered to be PAG. However, a number of samples had low sulfide sulphur contents (<0.4 wt%) that may constrain their acid generating potential, and although ABA testing indicates PAG conditions, these samples have been classified as “uncertain”. Further, one (1) sample of ore (I951408) and one (1) sample of marginal ore (Sample 3) had NPR values between 1 and 2 and NNP values between >-20 and <20, and were further evaluated using Net Acid Generation (NAG) testing. The NAG pH for both samples was below 4.5, returning values of 3.0 and 3.4, respectively (see Table B.1 in Appendix B), and therefore both these samples remain classified as “uncertain”.

The waste rock material had a median NPR of 3.55, which suggests that as a whole this material has low potential for acid generation. Further, the NPR results did not vary significantly between the different waste rock lithological units. Based on the ABA results, the waste rock materials are generally considered NAG. However, four (4) of the waste rock samples (I951401, I951406, Sample 1, and Sample 2) returned NPR values less than 1.0, but had low sulfide sulphur contents (<0.04 wt%) and are therefore classified as “uncertain”. Two (2) samples (Sample 6 and Sample 12) had NPR values between 1 and 2 and were further evaluated using NAG testing. The NAG

pH for both samples was above 4.5, returning values of 6.2 and 7.3, respectively (see Table B.1 in Appendix B), and are therefore classified as NAG.

The NNP values for the waste rock material ranged from -11.50 to 23.4 and with a median of 6.4 suggesting that the material is only mildly alkaline and has the potential to either become acidic or remain neutral.

Only one (1) sample (I951408 in BR-17-MET2) was collected from the pit wall material and returned a NP/AP value of 1.2, and a NAG value of 3.0 and is therefore classified as “uncertain”.

### 3.2.4 Multi-Element ICP-OES Analysis

The purpose of this analysis is to determine the concentrations of a suite of metals that may provide an indication of the leaching potential of the lithological units present in the pit and associated with the various mine project components. Concentrations of metals can be compared to average crustal abundances of these elements to highlight potential enriched metal concentrations that may be a ML concern as a result of in-situ weathering of the rock. In order to determine potential metals enrichment and ML concerns for the Project, the analytical results for the Canadian Counsel of Ministers of the Environment (CCME) regulated metals (arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), iron (Fe), lead (Pb), molybdenum (Mo), Nickel (Ni), selenium (Se), silver (Ag), thallium (Tl) and zinc (Zn)) were compared to five (5) times their normal crustal abundance. Note mercury (Hg) is also a regulated metals parameter but was not analyzed as part of the Round 1 and Round 2 testing programs.

The results of the multi-element analysis for the above CCME regulated metals are summarized by lithological unit and mine component in Table 5, and complete results by sample are presented in Table B.3 in Appendix B. The bold numbers in the tables indicate values that are greater than five (5) times the concentration in typical crustal rock. For all of the lithologic units, As had mean concentrations that exceeded five (5) times crustal concentrations. In addition, exceedances in Ag, Cr, Mo, Pb, and Zn were also noted in a number of individual samples from the various lithological units.

The reported detection limits were greater than the five (5) times crustal concentration values for Cd, Se, and TI, and therefore the ML potential for these metals could not be assessed.

## 4.0 CONCLUSIONS

Based on the static ML/ARD test work completed to date, GEMTEC provides the following conclusions:

- Ore and marginal ore should be treated as PAG. Permanent subaqueous disposal is the preferred ARD prevention option for long term storage of the ore tailings. Design of the marginal ore stockpiles should account for management of PAG rock to prevent any acid generation, and potential poor quality drainage.

- Waste rock is generally considered NAG. However, there were a number of samples within the dataset representing all the waste rock lithological units that were classified as uncertain due to their low NPR and NNP values, and despite having associated low sulphide contents (<0.4%) have the potential to generate acid where the corresponding NP values are low. As such, without further testing, planning should account for management of PAG rock within the waste dump to prevent any acid generation.

- Pit wall exposures are expected to be a mix of PAG and NAG rock, and management of the drainage in and out of the pit will be required, at least during operations. Given the relatively short life of the deposit, post closure flooding will prevent any acid generation if the flood level is expected to be at or near the crest. If sufficient flooding to cover the exposed PAG wall rock is not expected, long term drainage issues will need to be addressed.

- ML potential is primarily for As, Ag, Cr, Mo, Pb, and Zn based on the observed enrichment of these elements in the various lithological units. Segregation and management of ARD potential will result in a level of control of ML potential in the various pit rock materials as well; although ML generation can also be associated with neutral conditions and other weathering processes besides sulphide oxidation.

## 5.0 RECOMMENDATIONS FOR ADDITIONAL ML/ARD ASSESSMENT

- The test work completed to date is generally considered preliminary, and based on the results it is anticipated that if the lithological units mined from the Godboro deposit are exposed to weathering (oxygen and water) that at least a portion of the resulting drainage effluent could be poor quality (low pH and high metals concentrations). In the extreme case, Anaconda may choose to treat all materials, including the waste rock, as PAG and plan to employ appropriate engineered preventative measures (subaqueous disposal, covers, etc.). Alternatively, further ML/ARD sampling and testing can be carried out on the rock material to better characterize and define the spatial distribution and volumes of the PAG and NAG waste rock materials in the pit. This additional work will determine the complexity of the ML/ARD management requirements and determine if less rigorous and costly measures can be employed to prevent poor quality effluent drainage from the open pit and waste deposits during operations and post-closure.

- It is recommended that additional ML/ARD test work for the waste rock include kinetic testing (e.g. humidity cell testing or other appropriate methods) to determine such kinetic issues such as rates of reaction, time to onset of ARD and approximate length of time for ARD generation, as well as leachate quality.

- Further, it is recommended that in conjunction with kinetic testing, mineralogical analysis be completed for the Project's lithological units to determine the major sulphide and silicate

and carbonate minerals and their abundances. This mineralogical data is necessary to be able to qualify rates and extent of acid producing and neutralizing reactions determined through kinetic testing, and only indicated in a gross sense by the existing static test analytical data.

- GEMTEC can work with Anaconda's geological staff and engineering staff to provide additional recommendations for carrying out future sampling, testing and analysis programs at Anaconda's request. To assist in sample selection, it is recommended that the ABA test results from this sampling program be incorporated into the mine block model. This will allow for better quantification of PAG and NAG rock materials, as well as overall ML/ARD potential associated with the project, and highlight any lithologic and/or mine component rock materials that require further spatial and geochemical characterization as part of future sampling programs.

## 6.0 CLOSURE

We trust this preliminary report meets your present requirements. Should any additional information be required, please do not hesitate to contact our office at your convenience.

Sincerely,

GEMTEC Limited

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Carolyn Anstey-Moore, M.Sc., M.A.Sc., P.Geo.
Senior Environmental Geoscientist

## 7.0 REFERENCES

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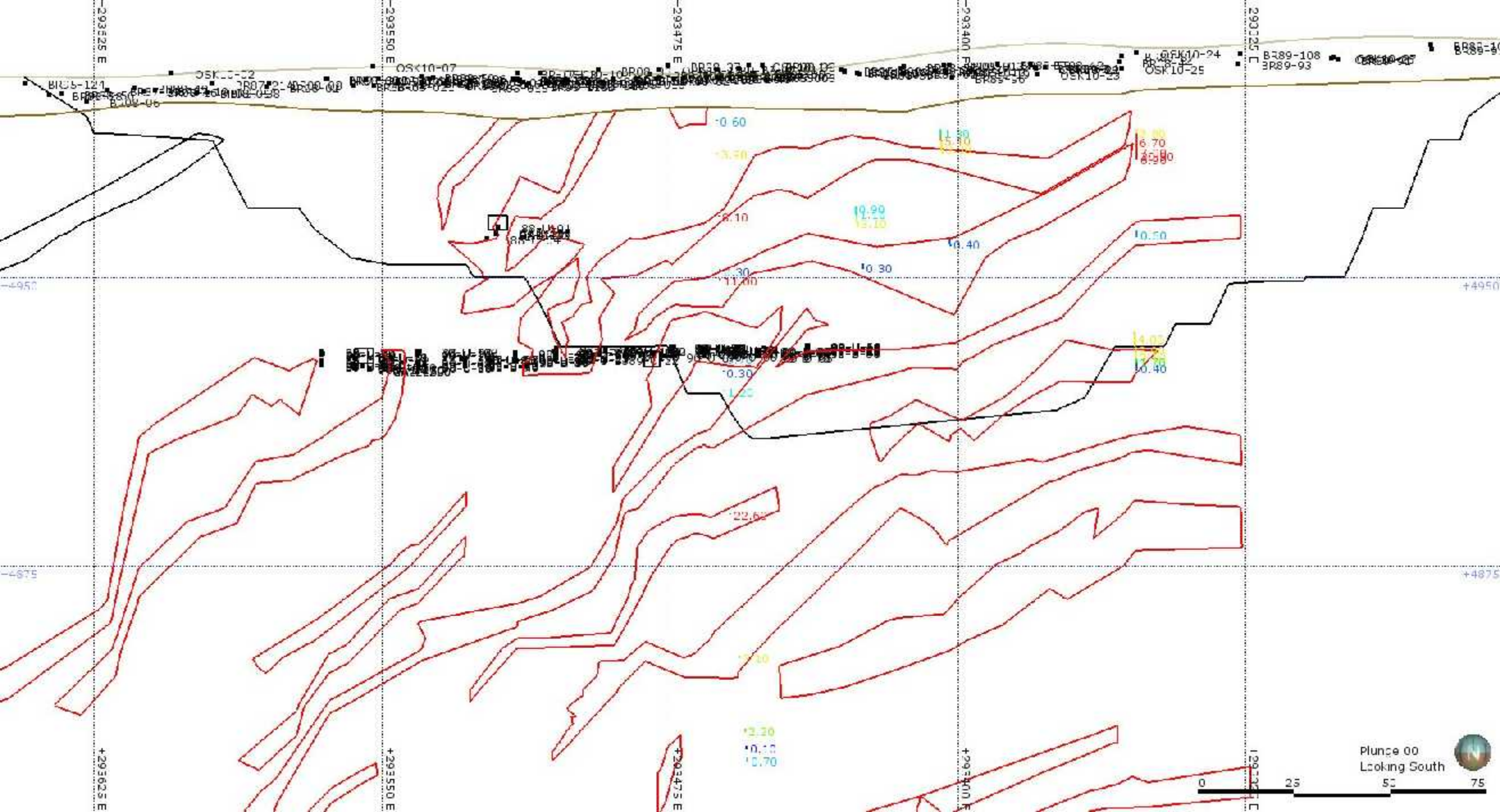
# APPENDIX A

Client Provided Drill Hole Sections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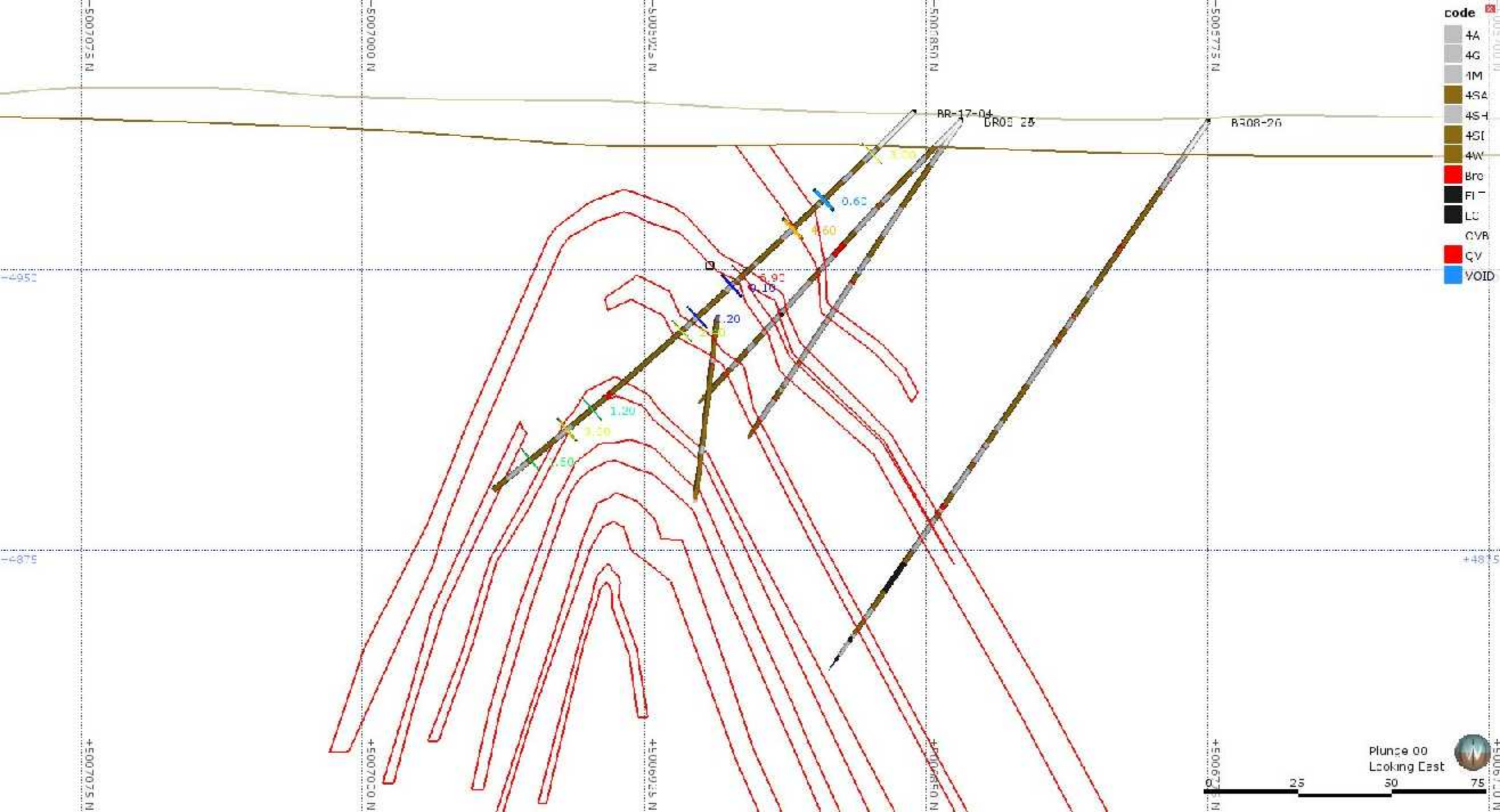

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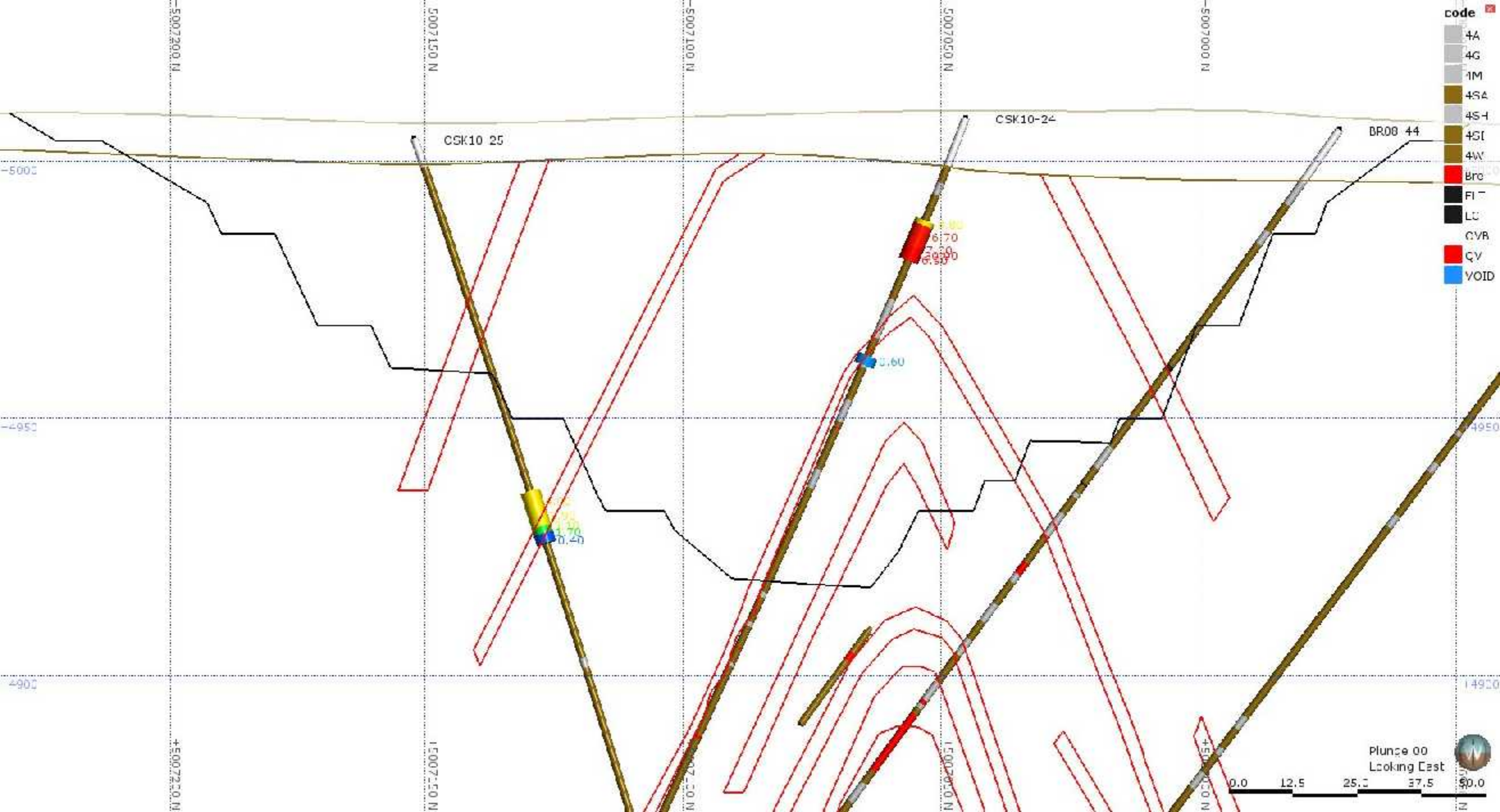

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12.5
25.0
37.5
50.0

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4M
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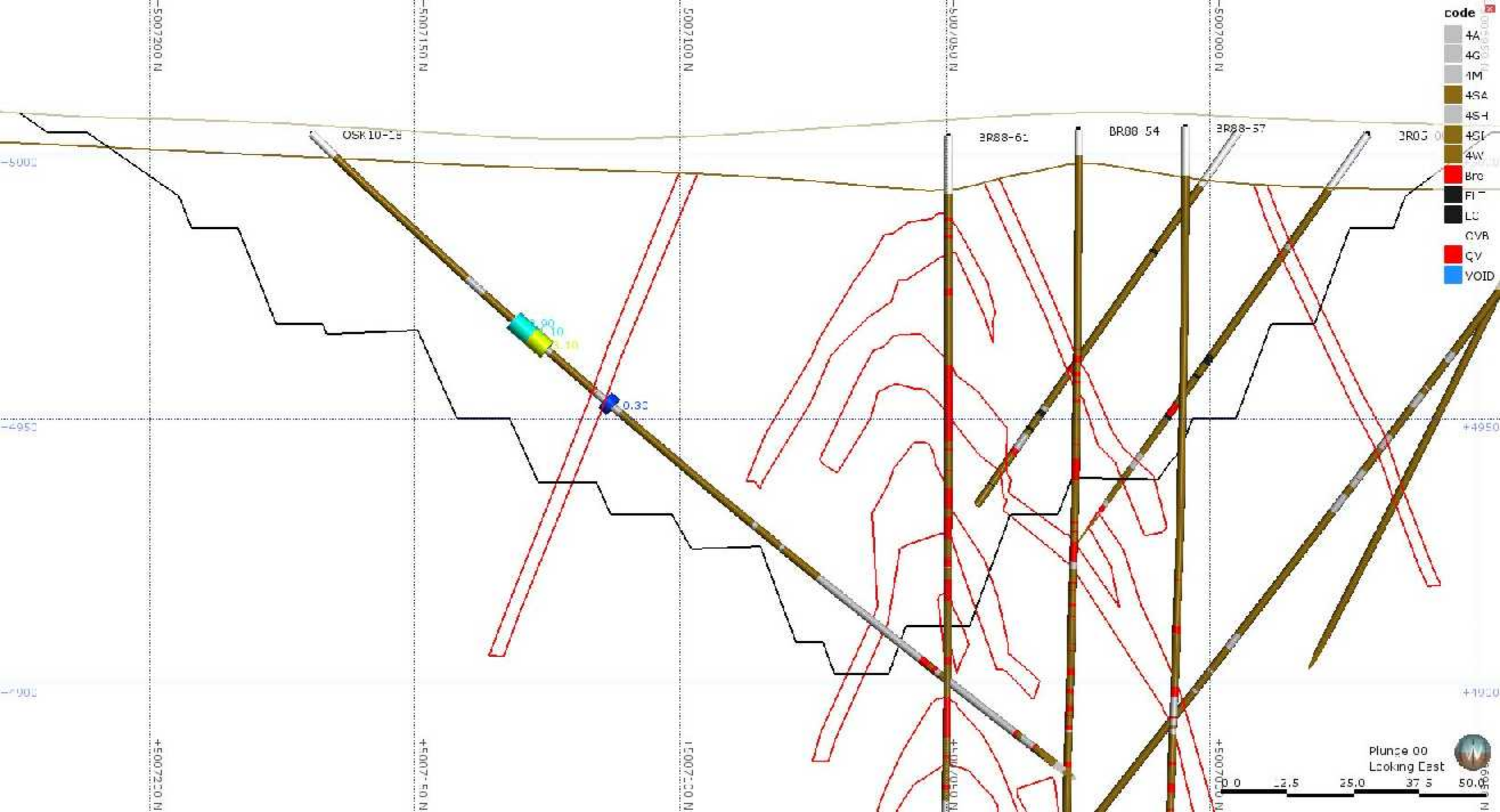
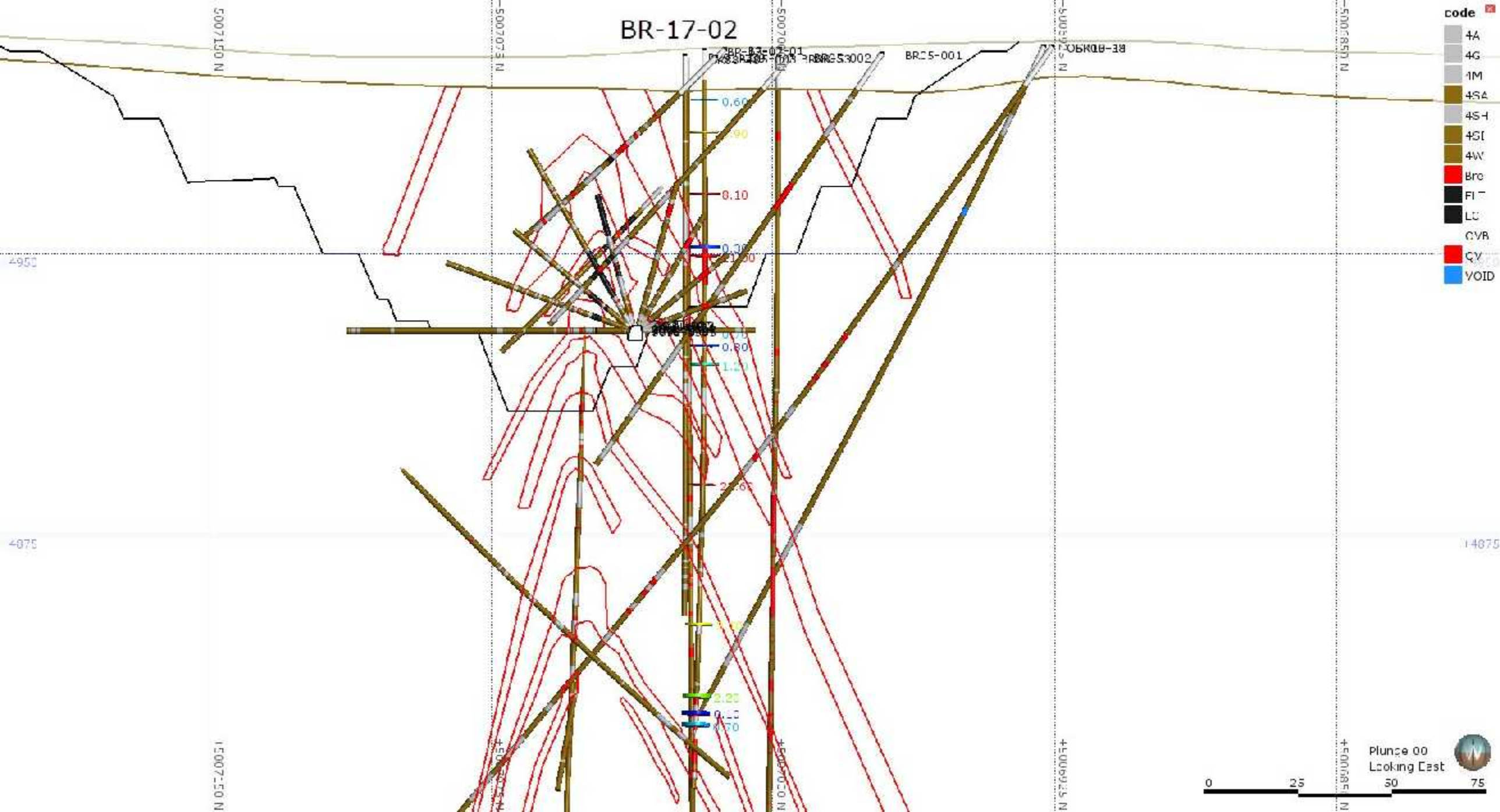
50.0



code
4A
4G
4M
4SA
4SH
4SI
4W
Bre
FLT
LS
CVB
QV
VOID
OSK10-18
BR88-61
BR88-54
BR88-57
0.30
Plunge 00
Looking East
0.0
12.5
25.0
37.5
50.0


BR-17-02
code
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4G
4M
4SA
4SH
4SI
4W
Bre
FLT
LC
CVB
CV
VOID
0.60
0.90
8.10
0.30
0.80
1.20
2.20
0.10
0.70
4950
4875
Plunge 00
Looking East
0
25
50
75

# APPENDIX B

Summary of Laboratory Results – Static Testing

**Table B.1 ABA and NAG Results (All Samples)**

| Sampling Round | Drill Hole ID | Sample No. | Laboratory ID | Depth (m) | | | Sample Description | Geological Material | Results | | | | | | | | | | | | ARD Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | From | To | Interval | | | Au (g/tonne) | Paste pH | Total Sulphur (Wt.%) | Sulphate S (Wt %) | Sulphate (Wt%) | Sulphide (Wt%) | Total Inorganic Carbon | Acid Production Potential | Neutralizing Potential | Net NP (NNP) | NP/AP (NPR) | NAG pH | |
| 1 | BR-17-MET2 | I951401 | 244613-01 | 13 | 13.3 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 0.231 | 8 | 0.249 | 0.241 | 0.005 | 0.236 | < 0.01 | 7.8 | 4.7 | -3.1 | 0.606 | - | uncertian |
| | BR-17-MET2 | I951402 | 244613-02 | 21.7 | 22 | 0.3 | Greywacke - High S (waste) - 2-4% disseminated Aspy, Py | WASTE_GREYWACKE | 0.063 | 8.7 | 0.11 | 0.256 | 0.001 | 0.255 | 0.04 | 3.4 | 13.4 | 9.9 | 3.884 | - | NAG |
| | BR-17-MET2 | I951403 | 244613-03 | 38 | 38.3 | 0.3 | Greywacke - Low S (ore) | ORE | 1.061 | 8.5 | 0.041 | 0.057 | 0.001 | 0.056 | 0.02 | 1.3 | 10.4 | 9.1 | 8.120 | - | NAG |
| | BR-17-MET2 | I951404 | 244613-04 | 52 | 53 | 1 | Argilite - High S (ore) - Aspy, Qtz-Cal veins | ORE | 3.659 | 8.5 | 1.17 | 0.943 | 0.002 | 0.941 | 0.03 | 36.6 | 10.8 | -25.8 | 0.295 | - | PAG |
| | BR-17-MET2 | I951405 | 244613-05 | 54.5 | 55 | 0.5 | Quartz Vein - Low S (ore?), Bull quartz | WASTE_QTZ_VEIN | 0.008 | 8.9 | < 0.005 | 0.006 | 0.003 | 0.003 | < 0.01 | < 0.2 | 2.2 | 2.2 | - | - | NAG |
| | BR-17-MET2 | I951406 | 244613-06 | 75 | 75.3 | 0.3 | Greywacke - Low S (waste), Minor Py, Aspy veinlet | WASTE_GREYWACKE | 0.080 | 8.5 | 0.325 | 0.297 | 0.003 | 0.294 | 0.01 | 10.2 | 7.5 | -2.7 | 0.737 | - | uncertain |
| | BR-17-MET2 | I951407 | 244613-07 | 78.5 | 79 | 0.5 | Argillite - High S (ore), Qtz-Cal veined, abundant Aspy, Py | ORE | 6.626 | 8.6 | 1.32 | 0.626 | 0.003 | 0.623 | 0.05 | 41.3 | 14.4 | -26.9 | 0.348 | - | PAG |
| | BR-17-MET2 | I951408 | 244613-08 | 83.3 | 84 | 0.7 | Greywacke - High S (ore) - 2-4% disseminated Aspy, Py | ORE | 2.775 | 8.9 | 0.144 | 0.394 | 0.002 | 0.391 | < 0.01 | 4.5 | 5.5 | 1.0 | 1.216 | 3.0 | uncertain |
| | BR-17-MET2 | I951409 | 244613-09 | 115.7 | 116 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 0.014 | 9.3 | 0.018 | 0.030 | 0.002 | 0.028 | 0.06 | 0.6 | 12.7 | 12.2 | 22.611 | - | NAG |
| | BR-17-MET2 | I951410 | 244613-10 | 153 | 153.5 | 0.5 | Argillite and Greywacke - Low S (waste) - minor quartz veins | WASTE_MIXED | 0.219 | 9.4 | 0.099 | 0.113 | 0.002 | 0.111 | 0.01 | 3.1 | 9.7 | 6.6 | 3.123 | - | NAG |
| | BR-17-MET2 | I951411 | 244613-11 | 171.9 | 172.9 | 1 | Quartz Vein - High S (ore), 2-4% Aspy, Py | ORE | 1.188 | 8.7 | 0.092 | 0.134 | 0.000 | 0.133 | 0.01 | 2.9 | 6.4 | 3.6 | 2.241 | - | NAG |
| | BR-17-MET2 | I951412 | 244613-12 | 176.4 | 177.4 | 1 | Argillite - High S (ore), 5% Aspy, Py | ORE | 3.148 | 9.1 | 2.46 | 1.261 | 0.001 | 1.259 | < 0.01 | 76.9 | 5.9 | -71.0 | 0.076 | - | PAG |
| | BR-17-MET2 | I951413 | 244613-13 | 179.6 | 180.6 | 1 | Quartz Vein - High S (ore?), 4-5% Aspy, Py and visible gold | MARGINAL_ORE | 0.431 | 9 | 0.384 | 0.313 | 0.003 | 0.310 | 0.05 | 12.0 | 9.0 | -3.0 | 0.747 | - | uncertain |
| | BR-17-MET4 | I951414 | 244613-14 | 15.6 | 15.9 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 0.038 | 8.5 | 0.085 | 0.094 | 0.002 | 0.092 | < 0.01 | 2.7 | 8.1 | 5.4 | 3.048 | - | NAG |
| | BR-17-MET4 | I951415 | 244613-15 | 33.1 | 34.1 | 1 | Argillite and Quartz Veins - High S (ore), 1-3% Aspy, Py, Visible gold | MARGINAL_ORE | 0.471 | 8.4 | 0.366 | 0.409 | 0.004 | 0.405 | < 0.01 | 11.4 | 6.4 | -5.0 | 0.560 | - | uncertain |
| | BR-17-MET4 | I951416 | 244613-16 | 44.5 | 45.4 | 0.9 | Siltstone - Mod S (waste/ore), disseminated Aspy, Py, Minor Quartz Veins | WASTE_GREYWACKE | 0.120 | 9 | 0.059 | 0.078 | 0.001 | 0.078 | 0.01 | 1.8 | 8.4 | 6.6 | 4.553 | - | NAG |
| | BR-17-MET4 | I951417 | 244613-17 | 63.2 | 63.5 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 0.018 | 8.8 | 0.03 | 0.046 | 0.001 | 0.045 | 0.02 | 0.9 | 6.4 | 5.5 | 6.876 | - | NAG |
| | BR-17-MET4 | I951418 | 244613-18 | 66.9 | 67.5 | 0.6 | Argillite and Quartz Veins - High S (ore), 1-3% Aspy, Py | ORE | 4.378 | 9.1 | 2.55 | 0.745 | 0.003 | 0.742 | 0.01 | 79.7 | 8.2 | -71.4 | 0.103 | - | PAG |
| | BR-17-MET4 | I951419 | 244613-19 | 79.4 | 79.9 | 0.5 | Argillite and Quartz Veins - High S (ore), 4-5% Aspy, Py | ORE | 2.332 | 8.6 | 1.36 | 0.595 | 0.005 | 0.590 | 0.02 | 42.5 | 9.6 | -32.9 | 0.227 | - | PAG |
| | BR-17-MET4 | I951420 | 244613-20 | 85 | 85.3 | 0.3 | Greywacke - Low S (waste) - altered, minor calcite | WASTE_GREYWACKE | 0.010 | 8.8 | 0.04 | 0.032 | 0.002 | 0.031 | < 0.01 | 1.3 | 3.0 | 1.7 | 2.384 | - | NAG |
| | BR-17-MET4 | I951421 | 244613-21 | 116.7 | 117 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 0.031 | 7.3 | 0.155 | 0.152 | 0.009 | 0.143 | < 0.01 | 4.8 | 6.0 | 1.1 | 1.233 | 3.1 | uncertain |
| | BR-17-MET4 | I951422 | 244613-22 | 125.3 | 125.8 | 0.5 | Siltstone - Mod S (possible ore) with quartz veins, 1-3% Aspy, Py | WASTE_GREYWACKE | 0.100 | 9.4 | 0.155 | 0.121 | 0.002 | 0.119 | 0.01 | 4.8 | 14.4 | 9.6 | 2.980 | - | NAG |
| | BR-17-MET4 | I951423 | 244613-23 | 138 | 138.3 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 0.013 | 8.3 | 0.107 | 0.096 | 0.008 | 0.089 | < 0.01 | 3.3 | 5.4 | 2.1 | 1.626 | 5.3 | NAG |
| 2 | OSK-10-18 | Sample 1 *(948701 / 948702)* | 258909-01 | 75 | 77 | 2 | Arg/greywacke; tr po, tr-0.5 aspy (ore?) | WASTE_MIXED | 0.118 | 8.2 | 0.557 | 0.351 | 0.036 | 0.315 | < 0.01 | 17.4 | 5.9 | -11.5 | 0.300 | - | uncertain |
| | OSK-10-18 | Sample 2 *(948703)* | 258909-02 | 52 | 53 | 1 | 90% greywacke: 10% QV; tr aspy (waste) | WASTE_GREYWACKE | 0.022 | 8 | 0.393 | 0.188 | 0.024 | 0.164 | 0.04 | 12.3 | 11.4 | -0.9 | 0.900 | - | uncertain |
| | OSK-10-18 | Sample 3 *(948704 / 948705 / 948706)* | 258909-03 | 53 | 56.5 | 3.5 | Greywacke; no sulphide (waste?) | MARGINAL_ORE | 0.692 | 8.1 | 0.177 | 0.152 | 0.020 | 0.132 | 0.04 | 5.5 | 6.1 | 0.6 | 1.100 | 3.4 | uncertian |
| | OSK-10-18 | Sample 4 *(948707 / 948708 / 948709 / 948710)* | 258909-04 | 56.5 | 60.5 | 4 | 40 - 70% greywacke: up to 40% arg and 20%QV; ranging from no sulphide to up to 3% po + tr cpy, aspy (waste) | WASTE_MIXED | 0.022 | 8.6 | 0.119 | 0.109 | 0.021 | 0.087 | 0.04 | 3.7 | 11.7 | 8 | 3.100 | - | NAG |
| | OSK-10-21 | Sample 5 *(948711 / 948712)* | 258909-05 | 57 | 59 | 2 | 80 - 90% arg; up to 15% greywacke and 10% QV, up to 1% py + tr aspy (ore) | ORE | 1.246 | 7.9 | 0.456 | 0.293 | 0.035 | 0.259 | 0.01 | 14.3 | 6.3 | -7.9 | 0.400 | - | uncertain |
| | OSK-10-21 | Sample 6 *(948713 / 948714)* | 258909-06 | 19.5 | 22 | 2.5 | 85 - 100% greywacke; up to 10% arg, 5% QV; no sulphide (waste) | WASTE_MIXED | 0.012 | 9 | 0.131 | 0.032 | 0.005 | 0.027 | 0.03 | 4.1 | 5.5 | 1.4 | 1.300 | 6.2 | NAG |
| | OSK-10-21 | Sample 7 *(948715 / 948716)* | 258909-07 | 22 | 24 | 2 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 0.018 | 8.9 | 0.058 | 0.033 | 0.007 | 0.026 | 0.03 | 1.8 | 9.2 | 7.4 | 5.100 | - | NAG |
| | OSK-10-21 | Sample 8 *(948717 / 948718 / 948719 / 948720)* | 258909-08 | 24 | 28 | 4 | 90 - 100% greywacke, up to 10% arg; no sulphide (waste) | WASTE_MIXED | 0.024 | 8.8 | 0.051 | 0.080 | 0.011 | 0.069 | 0.01 | 1.6 | 5.2 | 3.6 | 3.300 | - | NAG |
| | OSK-10-25 | Sample 9 *(948721 / 948722)* | 258909-09 | 72.4 | 75.4 | 3 | Sil alt greywacke; no sulphide (waste) | WASTE_GREYWACKE | 0.016 | 8.7 | 0.131 | 0.094 | 0.025 | 0.069 | 0.03 | 4.1 | 16.3 | 12.2 | 4.000 | - | NAG |
| | OSK-10-25 | Sample 10 *(948723 / 948724)* | 258909-10 | 75.4 | 78.4 | 3 | 95 - 100% greywacke, up to 5% QV; up to 5% po-cp (waste) | WASTE_GREYWACKE | 0.022 | 9 | 0.088 | 0.058 | 0.016 | 0.042 | 0.03 | 2.8 | 10.7 | 7.9 | 3.900 | - | NAG |
| | OSK-10-25 | Sample 11 *(948725)* | 258909-11 | 78.4 | 79.65 | 1.25 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 0.012 | 9.1 | 0.082 | 0.066 | 0.014 | 0.053 | 0.02 | 2.6 | 7.9 | 5.3 | 3.100 | - | NAG |
| | OSK-10-25 | Sample 12 *(948726)* | 258909-12 | 79.65 | 81 | 1.35 | 80% arg: 20% QV; 0.5% aspy in host (waste) | WASTE_ARGILLITE | 0.066 | 9.2 | 0.115 | 0.206 | 0.018 | 0.188 | 0.03 | 3.6 | 6.2 | 2.6 | 1.700 | 7.3 | NAG |
| | OSK-10-25 | Sample 13 *(948727 / 948728)* | 258909-13 | 81 | 83 | 2 | 90 - 95% arg; up to 1% po + 0.5-5% aspy; 5 - 10 % QV up to 5% po-cp + 1 - 2% aspy (ore) | ORE | 3.445 | 8.5 | 0.414 | 0.336 | 0.018 | 0.318 | 0.02 | 12.9 | 5 | -8 | 0.400 | - | uncertain |
| | OSK-10-24 | Sample 14 *(948729)* | 258909-14 | 21.5 | 22.5 | 1 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 0.022 | 9.1 | 0.041 | 0.017 | 0.009 | 0.007 | 0.01 | 1.3 | 4.9 | 3.6 | 3.800 | - | NAG |
| | OSK-10-24 | Sample 15 *(948730 / 948731 / 948732 / 948733)* | 258909-15 | 22.4 | 27 | 4.5 | 60 - 90 % greywacke: 10 - 35% arg; up to 5% QV, no sulphide (waste) | WASTE_MIXED | 0.026 | 9.1 | 0.037 | 0.016 | 0.007 | 0.009 | 0.04 | 1.2 | 7.7 | 6.5 | 6.700 | - | NAG |
| | OSK-10-24 | Sample 16 *(948734)* | 258909-16 | 27 | 28 | 1 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 0.012 | 9.3 | 0.034 | 0.024 | 0.003 | 0.021 | < 0.01 | 1.1 | 7.5 | 6.4 | 7.000 | - | NAG |
| | OSK-10-24 | Sample 17 *(948735)* | 258909-17 | 28 | 29 | 1 | 95% greywacke: 5% arg; no sulphide (waste) | WASTE_MIXED | 0.014 | 9.2 | 0.025 | 0.050 | 0.013 | 0.037 | 0.11 | 0.8 | 24.2 | 23.4 | 30.900 | - | NAG |
| | OSK-10-24 | Sample 18 *(948736)* | 258909-18 | 29 | 30 | 1 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 0.006 | 9.2 | 0.063 | 0.031 | 0.008 | 0.023 | 0.1 | 2 | 13.6 | 11.6 | 6.900 | - | NAG |
| | OSK-10-24 | Sample 19 *(948737 / 948738)* | 258909-19 | 50 | 52 | 2 | Up to 90% greywacke and up to 95% arg; tr - 2% aspy: 5 - 10% QV; up to 0.5% aspy (ore) | MARGINAL_ORE | 0.532 | 8.9 | 0.758 | 0.443 | 0.018 | 0.426 | 0.05 | 23.7 | 15.1 | -8.6 | 0.600 | - | PAG |

## Table B.2 Whole Rock Analysis Results (All Samples)

| Sampling Round | Drill Hole ID | Sample No. | Laboratory ID | Depth (m) | | | Sample Description | Geological Material | Al2O3 | BaO | CaO | Cr2O3 | Fe2O3 | K2O | MgO | MnO | Na2O | P2O5 | SiO2 | SrO | TiO2 | V2O5 | ZrO2 | LOI | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | From | To | Interval | | | | | | | | | | | | | | | | | | | |
| 1 | BR-17-MET2 | I951401 | 244613-01 | 13 | 13.3 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 9.78 | 0.04 | 0.88 | 0.02 | 3.80 | 1.62 | 1.20 | 0.07 | 2.43 | 0.14 | 77.93 | 0.02 | 0.63 | 0.02 | 0.04 | 0.91 | 99.54 |
| | BR-17-MET2 | I951402 | 244613-02 | 21.7 | 22 | 0.3 | Greywacke - High S (waste) - 2-4% disseminated Aspy, Py | WASTE_GREYWACKE | 12.50 | 0.04 | 1.18 | 0.02 | 3.36 | 1.56 | 1.28 | 0.07 | 3.97 | 0.18 | 73.21 | 0.02 | 0.60 | 0.02 | 0.03 | 1.44 | 99.47 |
| | BR-17-MET2 | I951403 | 244613-03 | 38 | 38.3 | 0.3 | Greywacke - Low S (ore) | ORE | 9.70 | 0.05 | 0.74 | 0.05 | 3.09 | 1.72 | 1.24 | 0.06 | 2.14 | 0.12 | 79.05 | 0.01 | 0.47 | 0.01 | 0.03 | 1.27 | 99.76 |
| | BR-17-MET2 | I951404 | 244613-04 | 52 | 53 | 1 | Argilite - High S (ore) - Aspy, Qtz-Cal veins | ORE | 21.14 | 0.13 | 1.17 | 0.02 | 7.53 | 5.51 | 3.14 | 0.13 | 0.81 | 0.16 | 52.62 | 0.02 | 0.91 | 0.03 | 0.03 | 5.46 | 98.81 |
| | BR-17-MET2 | I951405 | 244613-05 | 54.5 | 55 | 0.5 | Quartz Vein - Low S (ore?), Bull quartz | WASTE_QTZ_VEIN | 0.58 | <0.01 | 0.21 | 0.01 | 0.68 | 0.21 | 0.13 | 0.01 | 0.15 | 0.01 | 97.75 | <0.01 | 0.02 | <0.01 | <0.01 | 0.16 | 99.92 |
| | BR-17-MET2 | I951406 | 244613-06 | 75 | 75.3 | 0.3 | Greywacke - Low S (waste), Minor Py, Aspy veinlet | WASTE_GREYWACKE | 9.65 | 0.04 | 0.83 | 0.03 | 3.29 | 1.77 | 1.11 | 0.06 | 2.19 | 0.12 | 78.98 | 0.01 | 0.50 | 0.02 | 0.03 | 0.98 | 99.61 |
| | BR-17-MET2 | I951407 | 244613-07 | 78.5 | 79 | 0.5 | Argillite - High S (ore), Qtz-Cal veined, abundant Aspy, Py | ORE | 17.32 | 0.10 | 2.02 | 0.02 | 7.71 | 4.23 | 3.16 | 0.15 | 1.77 | 0.23 | 59.36 | 0.03 | 0.80 | 0.03 | 0.03 | 2.38 | 99.35 |
| | BR-17-MET2 | I951408 | 244613-08 | 83.3 | 84 | 0.7 | Greywacke - High S (ore) - 2-4% disseminated Aspy, Py | ORE | 10.41 | 0.04 | 1.17 | 0.03 | 4.11 | 1.60 | 1.25 | 0.08 | 2.53 | 0.12 | 76.69 | 0.02 | 0.49 | 0.01 | 0.03 | 0.86 | 99.44 |
| | BR-17-MET2 | I951409 | 244613-09 | 115.7 | 116 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 13.54 | 0.06 | 1.51 | 0.02 | 4.43 | 2.76 | 1.89 | 0.10 | 2.41 | 0.14 | 70.77 | 0.02 | 0.55 | 0.02 | 0.02 | 1.70 | 99.95 |
| | BR-17-MET2 | I951410 | 244613-10 | 153 | 153.5 | 0.5 | Argillite and Greywacke - Low S (waste) - minor quartz veins | WASTE_MIXED | 17.99 | 0.11 | 1.54 | 0.02 | 6.87 | 4.04 | 3.02 | 0.15 | 1.97 | 0.18 | 61.08 | 0.02 | 0.77 | 0.03 | 0.02 | 2.09 | 99.90 |
| | BR-17-MET2 | I951411 | 244613-11 | 171.9 | 172.9 | 1 | Quartz Vein - High S (ore), 2-4% Aspy, Py | ORE | 2.56 | 0.01 | 0.43 | 0.04 | 1.39 | 0.78 | 0.52 | 0.02 | 0.35 | 0.07 | 92.97 | <0.01 | 0.09 | <0.01 | <0.01 | 0.50 | 99.73 |
| | BR-17-MET2 | I951412 | 244613-12 | 176.4 | 177.4 | 1 | Argillite - High S (ore), 5% Aspy, Py | ORE | 27.03 | 0.19 | 0.40 | 0.03 | 9.57 | 7.90 | 3.32 | 0.10 | 0.31 | 0.20 | 42.52 | <0.01 | 1.07 | 0.04 | 0.02 | 5.74 | 98.44 |
| | BR-17-MET2 | I951413 | 244613-13 | 179.6 | 180.6 | 1 | Quartz Vein - High S (ore?), 4-5% Aspy, Py and visible gold | MARGINAL_ORE | 6.27 | 0.02 | 1.20 | 0.02 | 2.96 | 1.39 | 1.19 | 0.05 | 1.02 | 0.11 | 84.09 | 0.02 | 0.25 | <0.01 | 0.01 | 0.96 | 99.57 |
| | BR-17-MET4 | I951414 | 244613-14 | 15.6 | 15.9 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 12.74 | 0.06 | 1.12 | 0.03 | 5.61 | 3.00 | 2.29 | 0.12 | 1.77 | 0.15 | 70.74 | 0.02 | 0.63 | 0.02 | 0.03 | 1.45 | 99.78 |
| | BR-17-MET4 | I951415 | 244613-15 | 33.1 | 34.1 | 1 | Argillite and Quartz Veins - High S (ore), 1-3% Aspy, Py, Visible gold | MARGINAL_ORE | 16.45 | 0.10 | 0.84 | 0.03 | 5.95 | 4.46 | 2.28 | 0.10 | 0.95 | 0.17 | 65.18 | 0.02 | 0.75 | 0.03 | 0.03 | 2.10 | 99.43 |
| | BR-17-MET4 | I951416 | 244613-16 | 44.5 | 45.4 | 0.9 | Siltstone - Mod S (waste/ore), disseminated Aspy, Py, Minor Quartz Veins | WASTE_GREYWACKE | 17.44 | 0.09 | 1.32 | 0.03 | 7.32 | 3.99 | 2.87 | 0.12 | 1.40 | 0.17 | 62.16 | 0.02 | 0.73 | 0.03 | 0.02 | 2.17 | 99.87 |
| | BR-17-MET4 | I951417 | 244613-17 | 63.2 | 63.5 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 11.82 | 0.05 | 1.01 | 0.04 | 3.86 | 2.15 | 1.61 | 0.09 | 2.64 | 0.15 | 74.34 | 0.02 | 0.55 | 0.02 | 0.03 | 1.52 | 99.89 |
| | BR-17-MET4 | I951418 | 244613-18 | 66.9 | 67.5 | 0.6 | Argillite and Quartz Veins - High S (ore), 1-3% Aspy, Py | ORE | 13.13 | 0.08 | 0.74 | 0.03 | 6.21 | 3.62 | 2.06 | 0.07 | 0.78 | 0.12 | 68.70 | 0.01 | 0.60 | 0.02 | 0.02 | 2.87 | 99.07 |
| | BR-17-MET4 | I951419 | 244613-19 | 79.4 | 79.9 | 0.5 | Argillite and Quartz Veins - High S (ore), 4-5% Aspy, Py | ORE | 21.84 | 0.13 | 1.62 | 0.05 | 8.16 | 5.65 | 3.23 | 0.12 | 1.56 | 0.18 | 52.79 | 0.03 | 0.92 | 0.03 | 0.02 | 2.95 | 99.30 |
| | BR-17-MET4 | I951420 | 244613-20 | 85 | 85.3 | 0.3 | Greywacke - Low S (waste) - altered, minor calcite | WASTE_GREYWACKE | 9.73 | 0.04 | 0.61 | 0.09 | 3.42 | 1.72 | 1.22 | 0.08 | 2.40 | 0.12 | 78.83 | 0.01 | 0.51 | 0.02 | 0.03 | 1.13 | 99.95 |
| | BR-17-MET4 | I951421 | 244613-21 | 116.7 | 117 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 10.80 | 0.04 | 0.91 | 0.07 | 3.72 | 1.88 | 1.34 | 0.07 | 2.55 | 0.11 | 76.62 | 0.02 | 0.51 | 0.02 | 0.03 | 1.07 | 99.77 |
| | BR-17-MET4 | I951422 | 244613-22 | 125.3 | 125.8 | 0.5 | Siltstone - Mod S (possible ore) with quartz veins, 1-3% Aspy, Py | WASTE_GREYWACKE | 15.65 | 0.08 | 1.37 | 0.04 | 6.81 | 3.58 | 2.76 | 0.12 | 1.64 | 0.15 | 64.81 | 0.02 | 0.67 | 0.03 | 0.02 | 1.95 | 99.69 |
| | BR-17-MET4 | I951423 | 244613-23 | 138 | 138.3 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | 11.50 | 0.06 | 0.96 | 0.18 | 4.55 | 2.41 | 1.81 | 0.09 | 2.04 | 0.12 | 74.23 | 0.02 | 0.44 | 0.01 | 0.02 | 1.41 | 99.87 |
| 2 | OSK-10-18 | Sample 1 *(948701 / 948702)* | 258909-01 | 75 | 77 | 2 | Arg/greywacke; tr po, tr-0.5 aspy (ore?) | WASTE_MIXED | 18.99 | 0.10 | 1.30 | 0.01 | 6.65 | 5.27 | 2.61 | 0.11 | 1.92 | 0.17 | 59.80 | 0.02 | 0.76 | 0.02 | 0.02 | 2.18 | 99.94 |
| | OSK-10-18 | Sample 2 *(948703)* | 258909-02 | 52 | 53 | 1 | 90% greywacke: 10% QV; tr aspy (waste) | WASTE_GREYWACKE | 9.01 | 0.03 | 1.16 | <0.01 | 2.97 | 2.10 | 1.16 | 0.09 | 2.32 | 0.13 | 79.39 | 0.02 | 0.40 | <0.01 | 0.02 | 1.04 | 99.85 |
| | OSK-10-18 | Sample 3 *(948704 / 948705 / 948706)* | 258909-03 | 53 | 56.5 | 3.5 | Greywacke; no sulphide (waste?) | MARGINAL_ORE | 11.37 | 0.04 | 1.14 | 0.01 | 3.81 | 2.57 | 1.44 | 0.09 | 2.41 | 0.15 | 74.90 | 0.02 | 0.52 | 0.01 | 0.03 | 1.35 | 99.86 |
| | OSK-10-18 | Sample 4 *(948707 / 948708 / 948709 / 948710)* | 258909-04 | 56.5 | 60.5 | 4 | 40 - 70% greywacke: up to 40% arg and 20%QV; ranging from no sulphide to up to 3% po + tr cpy, aspy (waste) | WASTE_MIXED | 17.04 | 0.08 | 1.48 | 0.02 | 6.34 | 4.46 | 2.54 | 0.12 | 1.77 | 0.18 | 62.91 | 0.02 | 0.74 | 0.02 | 0.02 | 2.06 | 99.81 |
| | OSK-10-21 | Sample 5 *(948711 / 948712)* | 258909-05 | 57 | 59 | 2 | 80 - 90% arg; up to 15% greywacke and 10% QV, up to 1% py + tr aspy (ore) | ORE | 20.24 | 0.10 | 1.16 | 0.02 | 7.86 | 5.28 | 3.27 | 0.12 | 1.46 | 0.19 | 56.42 | 0.02 | 0.81 | 0.02 | 0.02 | 2.90 | 99.90 |
| | OSK-10-21 | Sample 6 *(948713 / 948714)* | 258909-06 | 19.5 | 22 | 2.5 | 85 - 100% greywacke; up to 10% arg, 5% QV; no sulphide (waste) | WASTE_MIXED | 16.28 | 0.08 | 1.27 | 0.01 | 5.70 | 4.00 | 2.34 | 0.10 | 1.96 | 0.17 | 65.17 | 0.02 | 0.69 | 0.02 | 0.02 | 2.09 | 99.91 |
| | OSK-10-21 | Sample 7 *(948715 / 948716)* | 258909-07 | 22 | 24 | 2 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 12.72 | 0.05 | 1.13 | 0.01 | 4.42 | 2.82 | 1.79 | 0.09 | 2.40 | 0.15 | 72.13 | 0.02 | 0.58 | 0.01 | 0.03 | 1.49 | 99.83 |
| | OSK-10-21 | Sample 8 *(948717 / 948718 / 948719 / 948720)* | 258909-08 | 24 | 28 | 4 | 90 - 100% greywacke, up to 10% arg; no sulphide (waste) | WASTE_MIXED | 13.00 | 0.05 | 1.19 | 0.01 | 4.42 | 2.89 | 1.71 | 0.09 | 2.39 | 0.17 | 71.91 | 0.02 | 0.58 | 0.01 | 0.03 | 1.45 | 99.91 |
| | OSK-10-25 | Sample 9 *(948721 / 948722)* | 258909-09 | 72.4 | 75.4 | 3 | Sil alt greywacke; no sulphide (waste) | WASTE_GREYWACKE | 11.63 | 0.04 | 1.29 | 0.01 | 3.58 | 2.11 | 1.50 | 0.12 | 3.01 | 0.16 | 74.30 | 0.02 | 0.54 | <0.01 | 0.02 | 1.62 | 99.93 |
| | OSK-10-25 | Sample 10 *(948723 / 948724)* | 258909-10 | 75.4 | 78.4 | 3 | 95 - 100% greywacke, up to 5% QV; up to 5% po-cp (waste) | WASTE_GREYWACKE | 11.94 | 0.04 | 1.03 | 0.01 | 3.87 | 2.36 | 1.52 | 0.10 | 2.78 | 0.16 | 74.03 | 0.02 | 0.55 | 0.01 | 0.02 | 1.46 | 99.92 |
| | OSK-10-25 | Sample 11 *(948725)* | 258909-11 | 78.4 | 79.65 | 1.25 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 11.62 | 0.03 | 0.85 | 0.01 | 3.60 | 1.98 | 1.38 | 0.08 | 3.43 | 0.16 | 75.04 | 0.02 | 0.54 | <0.01 | 0.03 | 1.11 | 99.87 |
| | OSK-10-25 | Sample 12 *(948726)* | 258909-12 | 79.65 | 81 | 1.35 | 80% arg: 20% QV; 0.5% aspy in host (waste) | WASTE_ARGILLITE | 17.21 | 0.07 | 1.49 | 0.02 | 5.96 | 4.06 | 2.54 | 0.12 | 2.53 | 0.15 | 62.91 | 0.03 | 0.73 | 0.02 | 0.02 | 2.04 | 99.90 |
| | OSK-10-25 | Sample 13 *(948727 / 948728)* | 258909-13 | 81 | 83 | 2 | 90 - 95% arg; up to 1% po + 0.5-5% aspy; 5 - 10 % QV up to 5% po-cp + 1 - 2% aspy (ore) | ORE | 19.59 | 0.10 | 1.56 | 0.01 | 6.70 | 5.05 | 2.78 | 0.12 | 1.98 | 0.15 | 58.63 | 0.02 | 0.75 | 0.02 | 0.02 | 2.32 | 99.81 |
| | OSK-10-24 | Sample 14 *(948729)* | 258909-14 | 21.5 | 22.5 | 1 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 15.15 | 0.07 | 1.19 | 0.01 | 5.36 | 3.54 | 2.23 | 0.11 | 2.00 | 0.17 | 67.34 | 0.02 | 0.68 | 0.02 | 0.02 | 1.96 | 99.87 |
| | OSK-10-24 | Sample 15 *(948730 / 948731 / 948732 / 948733)* | 258909-15 | 22.4 | 27 | 4.5 | 60 - 90 % greywacke: 10 - 35% arg; up to 5% QV, no sulphide (waste) | WASTE_MIXED | 15.03 | 0.07 | 1.12 | 0.01 | 5.39 | 3.43 | 2.18 | 0.10 | 1.97 | 0.17 | 67.70 | 0.02 | 0.65 | 0.01 | 0.02 | 1.96 | 99.82 |
| | OSK-10-24 | Sample 16 *(948734)* | 258909-16 | 27 | 28 | 1 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 15.70 | 0.07 | 1.26 | 0.01 | 5.65 | 3.67 | 2.38 | 0.12 | 1.87 | 0.18 | 66.11 | 0.02 | 0.68 | 0.02 | 0.02 | 2.11 | 99.87 |
| | OSK-10-24 | Sample 17 *(948735)* | 258909-17 | 28 | 29 | 1 | 95% greywacke: 5% arg; no sulphide (waste) | WASTE_MIXED | 13.55 | 0.06 | 1.73 | 0.01 | 4.99 | 2.99 | 2.04 | 0.14 | 2.07 | 0.17 | 69.06 | 0.02 | 0.63 | 0.01 | 0.03 | 2.47 | 99.95 |
| | OSK-10-24 | Sample 18 *(948736)* | 258909-18 | 29 | 30 | 1 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | 12.62 | 0.05 | 1.82 | 0.01 | 4.73 | 2.65 | 1.95 | 0.14 | 2.09 | 0.19 | 70.64 | 0.02 | 0.62 | 0.01 | 0.03 | 2.32 | 99.92 |
| | OSK-10-24 | Sample 19 *(948737 / 948738)* | 258909-19 | 50 | 52 | 2 | Up to 90% greywacke and up to 95% arg; tr - 2% aspy: 5 - 10% QV; up to 0.5% aspy (ore) | MARGINAL_ORE | 19.63 | 0.08 | 1.91 | 0.02 | 7.77 | 4.64 | 3.58 | 0.19 | 1.72 | 0.26 | 56.07 | 0.03 | 0.82 | 0.02 | 0.02 | 3.11 | 99.87 |

## Table B.3  ICP Multi Element Analyses Results (All Samples)

| Sampling Round | Drill Hole ID | Sample No. | Laboratory ID | Depth (m) | | | Sample Description | Geological Material | Results (mg/kg) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | From | To | Interval | | | Ag | Al | As | Ba | Be | Bi | Ca | Cd | Ce | Co | Cr | Cu | Fe | Ga | Ge | In | K | La | Li | Mg | Mn | Mo | Na | Nb | Ni | P | Pb | S | Sb | Se | Sn | Sr | Ta | Te | Ti | Tl | V | W | Zn | Zr |
| 1 | BR-17-MET2 | I951401 | 244613-01 | 13 | 13.3 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | <0.2 | 49,071 | **584** | 361 | 1.3 | <5 | 5,990 | <5 | 68 | 9 | 158 | 10 | 25,192 | 8 | <10 | <5 | 12,753 | 24 | 25 | 6,865 | 512 | <1 | 17,085 | 17 | 10 | 586 | 13 | **1,940** | **11** | <5 | <2 | 131 | <5 | <10 | 3,586 | <5 | 94 | 5 | 31 | 290 |
| | BR-17-MET2 | I951402 | 244613-02 | 21.7 | 22 | 0.3 | Greywacke - High S (waste) - 2-4% disseminated Aspy, Py | WASTE_GREYWACKE | **0.63** | 63,129 | **1,565** | 375 | 1.6 | <5 | 8,031 | <5 | 58 | 9 | 161 | 11 | 22,421 | 9 | <10 | **6** | 12,383 | 20 | 21 | 7,363 | 503 | <1 | 28,043 | 16 | 13 | 737 | 19 | **2,330** | <10 | <5 | <2 | 190 | <5 | <10 | 3,418 | <5 | 98 | **12** | 49 | 233 |
| | BR-17-MET2 | I951403 | 244613-03 | 38 | 38.3 | 0.3 | Greywacke - Low S (ore) | ORE | <0.2 | 48,986 | **33** | 390 | 1.4 | <5 | 5,062 | <5 | 57 | 9 | 355 | 14 | 20,622 | 8 | <10 | <5 | 13,650 | 20 | 24 | 7,151 | 424 | <1 | 15,154 | 13 | 13 | 493 | 10 | **434** | <10 | <5 | <2 | 90 | <5 | <10 | 2,664 | <5 | 82 | 4 | 39 | 203 |
| | BR-17-MET2 | I951404 | 244613-04 | 52 | 53 | 1 | Argilite - High S (ore) - Aspy, Qtz-Cal veins | ORE | **0.36** | 103,815 | **5,653** | 1,112 | 3.9 | <5 | 7,752 | <5 | 85 | 24 | 117 | 23 | 48,891 | 19 | <10 | **10** | 42,441 | 25 | 53 | 17,600 | 966 | <1 | 5,585 | 29 | 39 | 628 | 16 | **9,761** | **19** | <5 | <2 | 138 | **7** | 16 | 5,040 | <5 | 168 | **12** | 90 | 177 |
| | BR-17-MET2 | I951405 | 244613-05 | 54.5 | 55 | 0.5 | Quartz Vein - Low S (ore?), Bull quartz | WASTE_QTZ_VEIN | <0.2 | 2,983 | 7 | 22 | 0.1 | <5 | 1,426 | <5 | <10 | <1 | 76 | 6 | 4,645 | <5 | <10 | <5 | 1,701 | <1 | 3 | 765 | 78 | 0.95 | 1,099 | <5 | 4 | 34 | 9 | 158 | <10 | <5 | <2 | 11 | <5 | <10 | 128 | <5 | 5 | <2 | 10 | <5 |
| | BR-17-MET2 | I951406 | 244613-06 | 75 | 75.3 | 0.3 | Greywacke - Low S (waste), Minor Py, Aspy veinlet | WASTE_GREYWACKE | <0.2 | 50,296 | **143** | 333 | 1.5 | <5 | 5,820 | <5 | 57 | 9 | 218 | 26 | 22,659 | 6 | <10 | <5 | 14,492 | 19 | 22 | 6,612 | 492 | <1 | 15,958 | 13 | 13 | 507 | 9 | **2,677** | <10 | <5 | <2 | 109 | <5 | <10 | 2,946 | <5 | 79 | 7 | 35 | 224 |
| | BR-17-MET2 | I951407 | 244613-07 | 78.5 | 79 | 0.5 | Argillite - High S (ore), Qtz-Cal veined, abundant Aspy, Py | ORE | <0.2 | 88,970 | **1,343** | 879 | 4.2 | <5 | 14,034 | <5 | 92 | 19 | 140 | 64 | 52,338 | 14 | <10 | **8** | 34,107 | 30 | 54 | 18,495 | 1,133 | <1 | 12,732 | 24 | 33 | 961 | 22 | **5,888** | <10 | <5 | <2 | 278 | **7** | 13 | 4,669 | <5 | 141 | 4 | 100 | 189 |
| | BR-17-MET2 | I951408 | 244613-08 | 83.3 | 84 | 0.7 | Greywacke - High S (ore) - 2-4% disseminated Aspy, Py | ORE | **1.07** | 54,393 | **91** | 335 | 1.4 | <5 | 8,255 | <5 | 60 | 9 | 207 | 40 | 28,414 | 5 | <10 | <5 | 13,142 | 20 | 25 | 7,428 | 611 | <1 | 18,528 | 13 | 12 | 515 | 9 | **3,051** | **11** | <5 | <2 | 155 | <5 | <10 | 2,871 | <5 | 81 | 7 | 33 | 204 |
| | BR-17-MET2 | I951409 | 244613-09 | 115.7 | 116 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | <0.2 | 70,248 | 20 | 565 | 2.1 | <5 | 10,575 | <5 | 62 | 12 | 114 | 6 | 30,361 | 9 | <10 | **7** | 22,458 | 21 | 34 | 11,191 | 779 | <1 | 17,536 | 17 | 18 | 612 | 9 | 151 | <10 | <5 | <2 | 192 | <5 | <10 | 3,242 | <5 | 103 | 7 | 43 | 150 |
| | BR-17-MET2 | I951410 | 244613-10 | 153 | 153.5 | 0.5 | Argillite and Greywacke - Low S (waste) - minor quartz veins | WASTE_MIXED | <0.2 | 93,084 | **196** | 949 | 3.3 | <5 | 10,780 | <5 | 75 | 18 | 149 | 22 | 46,954 | 13 | <10 | **10** | 32,799 | 24 | 51 | 17,792 | 1,157 | <1 | 14,252 | 24 | 29 | 765 | 9 | **844** | <10 | <5 | <2 | 203 | **8** | 12 | 4,521 | <5 | 146 | 7 | 58 | 167 |
| | BR-17-MET2 | I951411 | 244613-11 | 171.9 | 172.9 | 1 | Quartz Vein - High S (ore), 2-4% Aspy, Py | ORE | **3.57** | 13,672 | **213** | 111 | 0.7 | <5 | 3,120 | <5 | 16 | 4 | 280 | 19 | 9,815 | <5 | <10 | <5 | 6,538 | 5 | 11 | 3,191 | 173 | <1 | 2,602 | <5 | 9 | 309 | 33 | **1,741** | <10 | <5 | <2 | 51 | <5 | <10 | 570 | <5 | 21 | 3 | 39 | 15 |
| | BR-17-MET2 | I951412 | 244613-12 | 176.4 | 177.4 | 1 | Argillite - High S (ore), 5% Aspy, Py | ORE | <0.2 | 138,191 | **6,926** | 1,645 | 2.7 | <5 | 2,745 | <5 | 114 | 33 | 172 | 36 | 64,650 | 25 | <10 | **11** | 63,327 | 34 | 57 | 19,322 | 749 | <1 | 2,192 | 36 | 51 | 848 | <5 | **13,920** | **17** | <5 | <2 | 57 | **12** | 19 | 6,196 | <5 | 215 | **12** | 109 | 169 |
| | BR-17-MET2 | I951413 | 244613-13 | 179.6 | 180.6 | 1 | Quartz Vein - High S (ore?), 4-5% Aspy, Py and visible gold | MARGINAL_ORE | <0.2 | 32,915 | **447** | 169 | 2.5 | <5 | 8,521 | <5 | 43 | 7 | 127 | 26 | 20,562 | <5 | <10 | <5 | 11,429 | 14 | 21 | 7,143 | 414 | <1 | 7,512 | 7 | 12 | 473 | 15 | **3,723** | <10 | <5 | <2 | 161 | <5 | <10 | 1,489 | <5 | 47 | **10** | 56 | 89 |
| | BR-17-MET4 | I951414 | 244613-14 | 15.6 | 15.9 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | **0.41** | 66,087 | **436** | 507 | 2.1 | <5 | 7,834 | <5 | 70 | 14 | 223 | 14 | 38,486 | 10 | <10 | **7** | 24,404 | 22 | 39 | 13,566 | 920 | <1 | 12,884 | 17 | 20 | 655 | 15 | **738** | <10 | <5 | <2 | 154 | **5** | <10 | 3,689 | <5 | 100 | 6 | 95 | 203 |
| | BR-17-MET4 | I951415 | 244613-15 | 33.1 | 34.1 | 1 | Argillite and Quartz Veins - High S (ore), 1-3% Aspy, Py, Visible gold | MARGINAL_ORE | <0.2 | 85,352 | **1,102** | 842 | 2.8 | <5 | 5,884 | <5 | 78 | 18 | 179 | 34 | 40,790 | 13 | <10 | **9** | 36,289 | 25 | 38 | 13,492 | 794 | <1 | 6,895 | 24 | 28 | 726 | 10 | **4,204** | **12** | <5 | <2 | 133 | **7** | 12 | 4,418 | <5 | 141 | **10** | 59 | 196 |
| | BR-17-MET4 | I951416 | 244613-16 | 44.5 | 45.4 | 0.9 | Siltstone - Mod S (waste/ore), disseminated Aspy, Py, Minor Quartz Veins | WASTE_GREYWACKE | <0.2 | 90,685 | **122** | 814 | 3.2 | <5 | 9,244 | <5 | 98 | 20 | 185 | 47 | 50,336 | 14 | <10 | **8** | 32,508 | 31 | 46 | 17,013 | 938 | <1 | 10,171 | 23 | 34 | 710 | 28 | **1,028** | **10** | <5 | <2 | 180 | **5** | 11 | 4,288 | <5 | 142 | **445** | 120 | 134 |
| | BR-17-MET4 | I951417 | 244613-17 | 63.2 | 63.5 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | **0.86** | 61,677 | **111** | 430 | 1.9 | <5 | 7,111 | <5 | 60 | 10 | 277 | 18 | 26,589 | 8 | <10 | <5 | 17,593 | 19 | 35 | 9,591 | 718 | <1 | 19,251 | 16 | 16 | 663 | 29 | **353** | <10 | <5 | <2 | 167 | <5 | <10 | 3,239 | <5 | 96 | 6 | 46 | 191 |
| | BR-17-MET4 | I951418 | 244613-18 | 66.9 | 67.5 | 0.6 | Argillite and Quartz Veins - High S (ore), 1-3% Aspy, Py | ORE | **0.31** | 67,114 | **10,454** | 703 | 2.5 | <5 | 5,107 | <5 | 73 | 17 | 230 | 20 | 41,959 | 11 | <10 | **9** | 29,061 | 21 | 31 | 12,024 | 541 | <1 | 5,598 | 18 | 30 | 494 | 25 | **9,002** | **28** | <5 | <2 | 101 | <5 | 11 | 3,460 | <5 | 109 | 7 | 85 | 117 |
| | BR-17-MET4 | I951419 | 244613-19 | 79.4 | 79.9 | 0.5 | Argillite and Quartz Veins - High S (ore), 4-5% Aspy, Py | ORE | <0.2 | 111,760 | **2,732** | 1,152 | 4.2 | <5 | 11,185 | <5 | 101 | 23 | 327 | 31 | 55,155 | 18 | <10 | **11** | 45,368 | 31 | 52 | 18,868 | 922 | <1 | 11,168 | 31 | 38 | 759 | 35 | **6,281** | **18** | <5 | <2 | 231 | **9** | 15 | 5,333 | <5 | 178 | 7 | 114 | 179 |
| | BR-17-MET4 | I951420 | 244613-20 | 85 | 85.3 | 0.3 | Greywacke - Low S (waste) - altered, minor calcite | WASTE_GREYWACKE | **0.36** | 50,337 | 22 | 318 | 1.2 | <5 | 4,290 | <5 | 58 | 8 | **595** | 11 | 23,404 | 8 | <10 | <5 | 13,965 | 20 | 27 | 7,200 | 588 | <1 | 17,411 | 14 | 12 | 508 | 11 | 226 | **23** | <5 | <2 | 123 | <5 | <10 | 2,958 | <5 | 84 | 4 | 33 | 211 |
| | BR-17-MET4 | I951421 | 244613-21 | 116.7 | 117 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | <0.2 | 57,264 | **42** | 333 | 1.3 | <5 | 6,541 | <5 | 52 | 9 | **504** | 25 | 26,051 | 7 | <10 | <5 | 15,661 | 18 | 27 | 8,119 | 536 | <1 | 18,961 | 14 | 14 | 478 | 25 | **1,230** | **17** | <5 | <2 | 140 | **5** | <10 | 3,076 | <5 | 87 | 6 | 77 | 192 |
| | BR-17-MET4 | I951422 | 244613-22 | 125.3 | 125.8 | 0.5 | Siltstone - Mod S (possible ore) with quartz veins, 1-3% Aspy, Py | WASTE_GREYWACKE | 0.26 | 81,975 | **112** | 685 | 3.0 | <5 | 9,668 | <5 | 76 | 18 | 253 | 40 | 47,182 | 14 | <10 | **9** | 29,429 | 24 | 46 | 16,508 | 903 | <1 | 11,999 | 21 | 30 | 653 | 26 | **1,045** | **12** | <5 | <2 | 196 | **5** | <10 | 3,943 | <5 | 129 | 4 | 146 | 141 |
| | BR-17-MET4 | I951423 | 244613-23 | 138 | 138.3 | 0.3 | Greywacke - Low S (waste) | WASTE_GREYWACKE | <0.2 | 58,935 | **29** | 487 | 1.5 | <5 | 6,675 | <5 | 51 | 12 | **1,217** | 20 | 30,804 | 9 | <10 | <5 | 19,408 | 16 | 33 | 10,583 | 685 | <1 | 14,626 | 11 | 23 | 495 | 27 | **905** | **28** | <5 | <2 | 136 | <5 | <10 | 2,569 | <5 | 79 | 3 | 80 | 150 |
| 2 | OSK-10-18 | Sample 1 *(948701 / 948702)* | 258909-01 | 75 | 77 | 2 | Arg/greywacke; tr po, tr-0.5 aspy (ore?) | WASTE_MIXED | <0.5 | 91,148 | **492** | 826 | 3.1 | <25 | 8,657 | <5 | 64 | 29 | 80 | 53 | 42,929 | <25 | <50 | <100 | 42,362 | 29 | **150** | 14,772 | 731 | <10 | 11,392 | <25 | 41 | 645 | **164** | **4,526** | <50 | <50 | <50 | 186 | <50 | <50 | 4,515 | <50 | 92 | <50 | **474** | 100 |
| | OSK-10-18 | Sample 2 *(948703)* | 258909-02 | 52 | 53 | 1 | 90% greywacke: 10% QV; tr aspy (waste) | WASTE_GREYWACKE | **1.60** | 42,441 | **211** | 277 | 1.1 | <25 | 7,679 | <5 | <25 | 13 | 47 | 41 | 19,574 | <25 | <50 | <100 | 14,152 | 13 | 79 | 6,720 | 629 | <10 | 14,721 | <25 | 17 | 480 | **241** | **2,479** | <50 | <50 | <50 | 141 | <50 | <50 | 2,467 | <50 | 40 | <50 | **356** | 51 |
| | OSK-10-18 | Sample 3 *(948704 / 948705 / 948706)* | 258909-03 | 53 | 56.5 | 3.5 | Greywacke; no sulphide (waste?) | MARGINAL_ORE | <0.5 | 54,986 | **34** | 372 | 1.3 | <25 | 7,399 | <5 | 52 | 16 | 67 | 42 | 25,439 | <25 | <50 | <100 | 19,167 | 20 | 90 | 8,219 | 624 | <10 | 15,368 | <25 | 24 | 580 | **357** | **1,925** | <50 | <50 | <50 | 134 | <50 | <50 | 3,209 | <50 | 48 | <50 | **374** | 65 |
| | OSK-10-18 | Sample 4 *(948707 / 948708 / 948709 / 948710)* | 258909-04 | 56.5 | 60.5 | 4 | 40 - 70% greywacke: up to 40% arg and 20%QV; ranging from no sulphide to up to 3% po + tr cpy, aspy (waste) | WASTE_MIXED | <0.5 | 82,158 | **55** | 678 | 2.4 | <25 | 9,971 | <5 | 87 | 22 | 77 | 28 | 40,954 | <25 | <50 | <100 | 36,409 | 26 | **128** | 14,354 | 793 | <10 | 10,622 | <25 | 41 | 687 | 54 | **1,491** | <50 | <50 | <50 | 173 | <50 | <50 | 4,406 | <50 | 81 | <50 | 223 | 91 |
| | OSK-10-21 | Sample 5 *(948711 / 948712)* | 258909-05 | 57 | 59 | 2 | 80 - 90% arg; up to 15% greywacke and 10% QV, up to 1% py + tr aspy (ore) | ORE | **1.73** | 95,680 | **165** | 860 | 3.0 | <25 | 7,630 | <5 | 100 | 24 | 84 | 48 | 50,172 | <25 | <50 | <100 | 43,700 | 39 | **132** | 18,167 | 804 | <10 | 8,494 | <25 | 46 | 746 | **1,307** | **3,491** | <50 | <50 | <50 | 148 | <50 | <50 | 4,691 | <50 | 96 | <50 | **1,289** | 101 |
| | OSK-10-21 | Sample 6 *(948713 / 948714)* | 258909-06 | 19.5 | 22 | 2.5 | 85 - 100% greywacke; up to 10% arg, 5% QV; no sulphide (waste) | WASTE_MIXED | <0.5 | 78,125 | 21 | 639 | 2.1 | <25 | 8,699 | <5 | 62 | 21 | 71 | 22 | 37,118 | <25 | <50 | <100 | 32,673 | 25 | 101 | 13,087 | 661 | <10 | 12,072 | <25 | 34 | 659 | <25 | **494** | <50 | <50 | <50 | 159 | <50 | <50 | 4,119 | <50 | 76 | <50 | 97 | 80 |
| | OSK-10-21 | Sample 7 *(948715 / 948716)* | 258909-07 | 22 | 24 | 2 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | <0.5 | 62,233 | 21 | 423 | 1.5 | <25 | 7,726 | <5 | 33 | 17 | 63 | 20 | 29,116 | <25 | <50 | <100 | 22,656 | 22 | 77 | 10,194 | 618 | <10 | 15,387 | <25 | 26 | 598 | 26 | **514** | <50 | <50 | <50 | 145 | <50 | <50 | 3,496 | <50 | 54 | <50 | 117 | 75 |
| | OSK-10-21 | Sample 8 *(948717 / 948718 / 948719 / 948720)* | 258909-08 | 24 | 28 | 4 | 90 - 100% greywacke, up to 10% arg; no sulphide (waste) | WASTE_MIXED | **2.65** | 64,118 | **44** | 451 | 1.6 | <25 | 8,184 | <5 | 34 | 18 | 62 | 12 | 29,297 | <25 | <50 | <100 | 23,872 | 21 | 77 | 9,769 | 605 | **11.86** | 15,293 | <25 | 30 | 621 | 32 | **1,094** | <50 | <50 | <50 | 166 | <50 | <50 | 3,533 | <50 | 60 | <50 | 84 | 71 |
| | OSK-10-25 | Sample 9 *(948721 / 948722)* | 258909-09 | 72.4 | 75.4 | 3 | Sil alt greywacke; no sulphide (waste) | WASTE_GREYWACKE | <0.5 | 56,238 | **126** | 308 | 1.1 | <25 | 8,530 | <5 | 44 | 14 | 57 | 14 | 23,050 | <25 | <50 | <100 | 16,270 | 20 | 61 | 8,279 | 835 | <10 | 19,302 | <25 | 20 | 627 | 36 | **1,260** | <50 | <50 | <50 | 136 | <50 | <50 | 3,145 | <50 | 50 | <50 | 101 | 64 |
| | OSK-10-25 | Sample 10 *(948723 / 948724)* | 258909-10 | 75.4 | 78.4 | 3 | 95 - 100% greywacke, up to 5% QV; up to 5% po-cp (waste) | WASTE_GREYWACKE | <0.5 | 58,168 | **72** | 354 | 1.4 | <25 | 7,013 | <5 | 52 | 14 | 62 | 26 | 25,313 | <25 | <50 | <100 | 19,344 | 19 | 60 | 8,537 | 676 | <10 | 17,976 | <25 | 23 | 674 | 34 | **896** | <50 | <50 | <50 | 141 | <50 | <50 | 3,278 | <50 | 51 | <50 | 108 | 67 |
| | OSK-10-25 | Sample 11 *(948725)* | 258909-11 | 78.4 | 79.65 | 1.25 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | <0.5 | 57,481 | **195** | 301 | 1.3 | <25 | 6,038 | <5 | 62 | 14 | 59 | 22 | 24,096 | <25 | <50 | <100 | 16,417 | 22 | 60 | 7,942 | 580 | <10 | 22,593 | <25 | 19 | 629 | 33 | **903** | <50 | <50 | <50 | 127 | <50 | <50 | 3,295 | <50 | 49 | <50 | 78 | 80 |
| | OSK-10-25 | Sample 12 *(948726)* | 258909-12 | 79.65 | 81 | 1.35 | 80% arg: 20% QV; 0.5% aspy in host (waste) | WASTE_ARGILLITE | <0.5 | 82,889 | **510** | 628 | 2.7 | <25 | 10,240 | <5 | 77 | 22 | 78 | 38 | 38,740 | <25 | <50 | <100 | 34,460 | 27 | 93 | 14,288 | 836 | <10 | 15,959 | <25 | 36 | 629 | 68 | **2,611** | <50 | <50 | <50 | 207 | <50 | <50 | 4,329 | <50 | 86 | <50 | 168 | 91 |
| | OSK-10-25 | Sample 13 *(948727 / 948728)* | 258909-13 | 81 | 83 | 2 | 90 - 95% arg; up to 1% po + 0.5-5% aspy; 5 - 10 % QV up to 5% po-cp + 1 - 2% aspy (ore) | ORE | <0.5 | 91,880 | **901** | 780 | 3.4 | <25 | 10,046 | <5 | 102 | 23 | 79 | 31 | 42,183 | <25 | <50 | <100 | 42,434 | 31 | 99 | 15,145 | 759 | <10 | 11,975 | <25 | 39 | 562 | **100** | **4,127** | <50 | <50 | <50 | 198 | <50 | <50 | 4,373 | <50 | 89 | <50 | 132 | 91 |
| | OSK-10-24 | Sample 14 *(948729)* | 258909-14 | 21.5 | 22.5 | 1 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | **0.85** | 73,547 | **29** | 581 | 1.9 | <25 | 8,101 | <5 | 87 | 20 | 68 | 15 | 34,931 | <25 | <50 | <100 | 30,091 | 23 | 82 | 12,629 | 739 | **11.24** | 12,450 | <25 | 35 | 682 | 55 | **392** | <50 | <50 | <50 | 157 | <50 | <50 | 4,065 | <50 | 72 | <50 | 99 | 83 |
| | OSK-10-24 | Sample 15 *(948730 / 948731 / 948732 / 948733)* | 258909-15 | 22.4 | 27 | 4.5 | 60 - 90 % greywacke: 10 - 35% arg; up to 5% QV, no sulphide (waste) | WASTE_MIXED | <0.5 | 72,188 | **29** | 549 | 1.9 | <25 | 7,704 | <5 | 101 | 20 | 73 | 18 | 34,967 | <25 | <50 | <100 | 29,104 | 21 | 80 | 12,329 | 684 | **10.24** | 12,131 | <25 | 31 | 658 | 56 | **424** | <50 | <50 | <50 | 152 | <50 | <50 | 3,831 | <50 | 67 | <50 | 104 | 83 |
| | OSK-10-24 | Sample 16 *(948734)* | 258909-16 | 27 | 28 | 1 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | <0.5 | 75,115 | **26** | 597 | 2.0 | <25 | 8,496 | <5 | 60 | 19 | 79 | 33 | 36,205 | <25 | <50 | <100 | 31,320 | 22 | 80 | 13,025 | 793 | <10 | 11,643 | <25 | 33 | 665 | **220** | **419** | <50 | <50 | <50 | 163 | <50 | <50 | 3,979 | <50 | 73 | <50 | 129 | 82 |
| | OSK-10-24 | Sample 17 *(948735)* | 258909-17 | 28 | 29 | 1 | 95% greywacke: 5% arg; no sulphide (waste) | WASTE_MIXED | <0.5 | 65,054 | **29** | 481 | 1.6 | <25 | 11,328 | <5 | 105 | 16 | 69 | 32 | 31,894 | <25 | <50 | <100 | 25,074 | 31 | 67 | 11,102 | 971 | <10 | 12,952 | <25 | 27 | 662 | **863** | **783** | <50 | <50 | <50 | 155 | <50 | <50 | 3,692 | <50 | 61 | <50 | 168 | 86 |
| | OSK-10-24 | Sample 18 *(948736)* | 258909-18 | 29 | 30 | 1 | Greywacke; no sulphide (waste) | WASTE_GREYWACKE | <0.5 | 61,290 | <10 | 464 | 1.5 | <25 | 12,565 | <5 | 146 | 17 | 68 | 23 | 30,957 | <25 | <50 | <100 | 22,622 | 50 | 67 | 10,938 | 1,018 | <10 | 13,467 | <25 | 30 | 718 | **720** | **583** | <50 | <50 | <50 | 166 | <50 | <50 | 3,728 | <50 | 59 | <50 | 111 | 80 |
| | OSK-10-24 | Sample 19 *(948737 / 948738)* | 258909-19 | 50 | 52 | 2 | Up to 90% greywacke and up to 95% arg; tr - 2% aspy: 5 - 10% QV; up to 0.5% aspy (ore) | MARGINAL_ORE | **0.96** | 91,841 | **3,897** | 741 | 4.4 | <25 | 12,663 | <5 | 97 | 27 | 88 | 22 | 48,844 | <25 | <50 | <100 | 39,570 | 26 | 118 | 19,363 | 1,249 | <10 | 10,320 | <25 | 50 | 1,011 | **275** | **5,415** | <50 | <50 | <50 | 258 | <50 | <50 | 4,698 | <50 | 91 | <50 | **414** | 109 |

**Results that exceed the 5XCA are bolded and shaded.**

# APPENDIX C

RPC Science and Engineering Final Reports

**Final Report**

# ARD Testing of Goldboro Ore and Tailings; Anaconda Mining Inc.

**Reference No.: MIS-J2042**

Prepared for:

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## INTRODUCTION

Anaconda Mining Inc. initiated a study at RPC to conduct static Acid Rock Drainage (ARD) test work. The Goldboro ore and tailings are being investigated by Anaconda Mining Inc. in conjunction with RPC to look at ways of expanding current operations.

RPC was thus contacted to conduct static testing as follows:

- Acid Base Accounting (ABA by Sobek method)
- Total S analysis
- Sulphate S analysis
- Total inorganic carbon analysis
- Whole rock analysis
- Multi-element ICP-OES analysis
- Au by Fire Assay

This report serves to summarize the findings as well as recommendations for the way forward.

## PROGRAM RESULTS

### Sample Preparation

Two batches of samples were received in preparation for the static testing. Each of these samples were respectively dried, crushed to -¼", homogenized and split into sub samples for ABA, Total S, Total Inorganic Carbon, whole rock, Au by Fire Assay and multi-element ICP analyses. The two batches of samples were ore and tailings respectively. The ore samples were as laid out in Table 1 (23 samples) while the tails samples were blended to form the three respective samples detailed in Table 2 (see RPC Report Reference: MIS-J2041)

**Table 1**
**Goldboro Ore Samples Subjected to ARD Analysis**

| Sample # | Received Mass (kg) |
|---|---|
| I951401 | 1.98 |
| I951402 | 1.98 |
| I951403 | 1.52 |
| I951404 | 1.20 |
| I951405 | 0.88 |
| I951406 | 2.08 |
| I951407 | 1.14 |
| I951408 | 1.22 |
| I951409 | 2.68 |
| I951410 | 1.52 |
| I951411 | 1.28 |
| I951412 | 1.58 |
| I951413 | 1.22 |
| I951414 | 1.88 |
| I951415 | 1.26 |
| I951416 | 1.20 |
| I951417 | 1.96 |
| I951418 | 1.44 |
| I951419 | 0.96 |
| I951420 | 2.16 |
| I951421 | 2.02 |
| I951422 | 0.94 |
| I951423 | 2.50 |

**Table 2**
**Goldboro Tailings Blending Ratios**

| Sample 1 | | Sample 2 | | Sample 3 | |
|---|---|---|---|---|---|
| ID | Mass (kg) | ID | Mass (kg) | ID | Mass (kg) |
| 242001 | 2.90 | 242021 | 4.06 | 242040 | 3.66 |
| 242002 | 3.18 | 242022 | 4.06 | 242041 | 5.04 |
| 242003 | 4.38 | 242023 | 4.34 | 242042 | 3.92 |
| 242004 | 4.24 | 242024 | 4.44 | 242043 | 4.44 |
| 242005 | 4.58 | 242025 | 4.02 | 242044 | 4.92 |
| 242007 | 4.30 | 242026 | 4.58 | 242045 | 5.10 |
| 242008 | 4.68 | 242027 | 4.04 | 242046 | 4.12 |
| 242009 | 4.48 | 242028 | 6.12 | 242047 | 4.68 |
| 242010 | 3.38 | 242029 | 5.22 | 242048 | 3.52 |
| 242011 | 3.92 | 242030 | 3.18 | 242049 | 4.90 |
| 242012 | 4.16 | 242031 | 3.66 | 242050 | 4.38 |
| 242013 | 4.22 | 242032 | 4.06 | 242051 | 3.34 |
| 242014 | 4.20 | 242033 | 4.20 | 242052 | 4.72 |
| 242015 | 4.82 | 242034 | 3.14 | 242053 | 5.22 |
| 242016 | 4.68 | 242035 | 2.38 | 242054 | 3.96 |
| 242017 | 3.72 | 242036 | 3.48 | 242055 | 4.46 |
| 242018 | 3.36 | 242037 | 3.04 | 242056 | 4.38 |
| 242019 | 4.38 | 242038 | 4.28 | 242057 | 4.88 |
| 242020 | 3.60 | 242039 | 4.44 | 242063 | 4.14 |
| | | | | 242064 | 4.44 |
| | | | | 242065 | 5.34 |
| | | | | 242066 | 4.12 |

## Acid Rock Drainage (ARD) Static Analyses Results

The results from Total Inorganic Carbon analyses and acid-base accounting (utilizing the Sobek method) on the 26 samples submitted (see Table 1 and Table 2) are given in Table 3 to Table 6.

**Table 3**
**Total Inorganic Carbon Analyses on Goldboro Ore Samples**

| Client ID | Total Inorganic Carbon |
|---|---|
| | % |
| I951401 | < 0.01 |
| I951402 | 0.04 |
| I951403 | 0.02 |
| I951404 | 0.03 |
| I951405 | < 0.01 |
| I951406 | 0.01 |
| I951407 | 0.05 |
| I951408 | < 0.01 |
| I951409 | 0.06 |
| I951410 | 0.01 |
| I951411 | 0.01 |
| I951412 | < 0.01 |
| I951413 | 0.05 |
| I951414 | < 0.01 |
| I951415 | < 0.01 |
| I951416 | 0.01 |
| I951417 | 0.02 |
| I951418 | 0.01 |
| I951419 | 0.02 |
| I951420 | < 0.01 |
| I951421 | < 0.01 |
| I951422 | 0.01 |
| I951423 | < 0.01 |

**Table 4**
**Total Inorganic Carbon Analyses on Goldboro Tails Samples**

| Client ID | Total Inorganic Carbon |
|---|---|
| | % |
| Sample 1 | < 0.01 |
| Sample 2 | < 0.01 |
| Sample 3 | < 0.01 |

**Table 5**
**Acid Base Accounting Results on Goldboro Ore Samples**

| Client ID | Paste pH | Total Sulfur | Acid Production Potential | Neutralizing Potential pH 8.3 | Net NP pH 8.3 | NP/AP |
|---|---|---|---|---|---|---|
| | | % | Kg $CaCO_3$/tonne | | | |
| I951401 | 8.0 | 0.249 | 7.8 | 4.7 | -3.1 | 0.6 |
| I951402 | 8.7 | 0.110 | 3.4 | 13.4 | 9.9 | 3.9 |
| I951403 | 8.5 | 0.041 | 1.3 | 10.4 | 9.1 | 8.1 |
| I951404 | 8.5 | 1.170 | 36.6 | 10.8 | -25.8 | 0.3 |
| I951405 | 8.9 | < 0.005 | < 0.2 | 2.2 | 2.2 | - |
| I951406 | 8.5 | 0.325 | 10.2 | 7.5 | -2.7 | 0.7 |
| I951407 | 8.6 | 1.320 | 41.3 | 14.4 | -26.9 | 0.3 |
| I951408 | 8.9 | 0.144 | 4.5 | 5.5 | 1.0 | 1.2 |
| I951409 | 9.3 | 0.018 | 0.6 | 12.7 | 12.2 | 22.6 |
| I951410 | 9.4 | 0.099 | 3.1 | 9.7 | 6.6 | 3.1 |
| I951411 | 8.7 | 0.092 | 2.9 | 6.4 | 3.6 | 2.2 |
| I951412 | 9.1 | 2.460 | 76.9 | 5.9 | -71.0 | 0.1 |
| I951413 | 9.0 | 0.384 | 12.0 | 9.0 | -3.0 | 0.7 |
| I951414 | 8.5 | 0.085 | 2.7 | 8.1 | 5.4 | 3.0 |
| I951415 | 8.4 | 0.366 | 11.4 | 6.4 | -5.0 | 0.6 |
| I951416 | 9.0 | 0.059 | 1.8 | 8.4 | 6.6 | 4.6 |
| I951417 | 8.8 | 0.030 | 0.9 | 6.4 | 5.5 | 6.9 |
| I951418 | 9.1 | 2.550 | 79.7 | 8.2 | -71.4 | 0.1 |
| I951419 | 8.6 | 1.360 | 42.5 | 9.6 | -32.9 | 0.2 |
| I951420 | 8.8 | 0.040 | 1.3 | 3.0 | 1.7 | 2.4 |
| I951421 | 7.3 | 0.155 | 4.8 | 6.0 | 1.1 | 1.2 |
| I951422 | 9.4 | 0.155 | 4.8 | 14.4 | 9.6 | 3.0 |
| I951423 | 8.3 | 0.107 | 3.3 | 5.4 | 2.1 | 1.6 |

**Table 6**
**Acid Base Accounting Results on Goldboro Tails Samples**

| Client ID | Paste pH | Total Sulfur | Acid Production Potential | Neutralizing Potential pH 8.3 | Net NP pH 8.3 | NP/AP |
|---|---|---|---|---|---|---|
| | | % | Kg $CaCO_3$/tonne | | | |
| Sample 1 | 4.7 | 0.553 | 17.3 | 3.4 | -13.9 | 0.2 |
| Sample 2 | 4.6 | 0.890 | 27.8 | 3.4 | -24.4 | 0.1 |
| Sample 3 | 4.6 | 0.203 | 6.3 | 2.2 | -4.2 | 0.3 |

The Total Inorganic Carbon analyses seen in Table 3 and Table 4 for the two batches indicated that the inorganic carbon content was low over all 26 samples (ranging from <0.01 % to 0.06 % in the Goldboro ore samples while the Goldboro tails samples were all <0.01 %). In addition, the Total Sulfur contents of the 26 samples were also relatively low (see Table 5 and Table 6), ranging from <0.005 % to 2.550 % in Goldboro ore Sample # I951418.

As seen from Table 5 and Table 6, ten of the Goldboro ore samples obtained positive Net Neutralizing Potential values with NP/AP ratio values (ratio between Neutralizing Potential and Acid Production Potential) above 2.0. This indicated that these specific samples were not net acid producers. On 9 Goldboro ore samples and all 3 Goldboro tails samples, the Net Neutralizing Potential values were negative and the NP/AP ratio was less than 1.0, indicating that these were potentially acid producing. These samples were as follows:

- Goldboro Ore Sample # I951401
- Goldboro Ore Sample #I951404
- Goldboro Ore Sample #I951406
- Goldboro Ore Sample #I951407
- Goldboro Ore Sample #I951412
- Goldboro Ore Sample #I951413
- Goldboro Ore Sample #I951415
- Goldboro Ore Sample #I951418
- Goldboro Ore Sample #I951419
- Goldboro Tails Sample 1
- Goldboro Tails Sample 2
- Goldboro Tails Sample 3

Three Goldboro ore samples obtained NP/AP ratio values between 2.0 and 1.0 and were thus classified as “uncertain”. These samples were as follows:

- Goldboro Ore Sample #I951408
- Goldboro Ore Sample #I951421
- Goldboro Ore Sample #I951423

It is recommended that a specialized consultant be contacted for the full MEND Report 1.20.1 analysis and interpretation prior to follow up with the regulatory agent.

The sulphate sulfur contents of the 26 samples were also determined and whole rock analyses as well as ICP multi-element analyses and Au Fire Assay analyses were conducted with the results reported in Table 7 to Table 15.

**Table 7**
**Goldboro Ore Samples Sulphate S Analyses Results**

| Sample | Wt. % | |
|---|---|---|
| | S (Total) | as $SO_4$ |
| I951401 | 0.241 | 0.014 |
| I951402 | 0.256 | 0.004 |
| I951403 | 0.057 | 0.003 |
| I951404 | 0.943 | 0.006 |
| I951405 | 0.006 | 0.009 |
| I951406 | 0.297 | 0.008 |
| I951407 | 0.626 | 0.008 |
| I951408 | 0.394 | 0.006 |
| I951409 | 0.030 | 0.005 |
| I951410 | 0.113 | 0.007 |
| I951411 | 0.134 | 0.001 |
| I951412 | 1.261 | 0.004 |
| I951413 | 0.313 | 0.008 |
| I951414 | 0.094 | 0.005 |
| I951415 | 0.409 | 0.011 |
| I951416 | 0.078 | 0.002 |
| I951417 | 0.046 | 0.003 |
| I951418 | 0.745 | 0.010 |
| I951419 | 0.595 | 0.014 |
| I951420 | 0.032 | 0.005 |
| I951421 | 0.152 | 0.028 |
| I951422 | 0.121 | 0.006 |
| I951423 | 0.096 | 0.023 |

**Table 8**
**Goldboro Tails Samples Sulphate S Analyses Results**

| Sample | Wt. % | |
|---|---|---|
| | S (Total) | as $SO_4$ |
| Sample 1 | 0.437 | 0.018 |
| Sample 2 | 0.719 | 0.046 |
| Sample 3 | 0.169 | 0.001 |

**Table 9**
**ICP Multi-Element Analyses Results on Goldboro Ore Samples # I951401 – I951412**

| Sample ID | I951401 | I951402 | I951403 | I951404 | I951405 | I951406 | I951407 | I951408 | I951409 | I951410 | I951411 | I951412 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| Ag | <0.2 | 0.634 | <0.2 | 0.359 | <0.2 | <0.2 | <0.2 | 1.065 | <0.2 | <0.2 | 3.57 | <0.2 |
| Al | 49071 | 63129 | 48986 | 103815 | 2983 | 50296 | 88970 | 54393 | 70248 | 93084 | 13672 | 138191 |
| As | 584 | 1565 | 33 | 5653 | 7 | 143 | 1343 | 91 | 20 | 196 | 213 | 6926 |
| Ba | 361 | 375 | 390 | 1112 | 22 | 333 | 879 | 335 | 565 | 949 | 111 | 1645 |
| Be | 1.3 | 1.6 | 1.4 | 3.9 | 0.1 | 1.5 | 4.2 | 1.4 | 2.1 | 3.3 | 0.7 | 2.7 |
| Bi | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Ca | 5990 | 8031 | 5062 | 7752 | 1426 | 5820 | 14034 | 8255 | 10575 | 10780 | 3120 | 2745 |
| Cd | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Ce | 68 | 58 | 57 | 85 | <10 | 57 | 92 | 60 | 62 | 75 | 16 | 114 |
| Co | 9 | 9 | 9 | 24 | <1 | 9 | 19 | 9 | 12 | 18 | 4 | 33 |
| Cr | 158 | 161 | 355 | 117 | 76 | 218 | 140 | 207 | 114 | 149 | 280 | 172 |
| Cu | 10 | 11 | 14 | 23 | 6 | 26 | 64 | 40 | 6 | 22 | 19 | 36 |
| Fe | 25192 | 22421 | 20622 | 48891 | 4645 | 22659 | 52338 | 28414 | 30361 | 46954 | 9815 | 64650 |
| Ga | 8 | 9 | 8 | 19 | <5 | 6 | 14 | 5 | 9 | 13 | <5 | 25 |
| Ge | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| In | <5 | 6 | <5 | 10 | <5 | <5 | 8 | <5 | 7 | 10 | <5 | 11 |
| K | 12753 | 12383 | 13650 | 42441 | 1701 | 14492 | 34107 | 13142 | 22458 | 32799 | 6538 | 63327 |
| La | 24 | 20 | 20 | 25 | <1 | 19 | 30 | 20 | 21 | 24 | 5 | 34 |
| Li | 25 | 21 | 24 | 53 | 3 | 22 | 54 | 25 | 34 | 51 | 11 | 57 |
| Mg | 6865 | 7363 | 7151 | 17600 | 765 | 6612 | 18495 | 7428 | 11191 | 17792 | 3191 | 19322 |
| Mn | 512 | 503 | 424 | 966 | 78 | 492 | 1133 | 611 | 779 | 1157 | 173 | 749 |
| Mo | <1 | <1 | <1 | <1 | 0.951 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Na | 17085 | 28043 | 15154 | 5585 | 1099 | 15958 | 12732 | 18528 | 17536 | 14252 | 2602 | 2192 |
| Nb | 17 | 16 | 13 | 29 | <5 | 13 | 24 | 13 | 17 | 24 | <5 | 36 |
| Ni | 10 | 13 | 13 | 39 | 4 | 13 | 33 | 12 | 18 | 29 | 9 | 51 |
| P | 586 | 737 | 493 | 628 | 34 | 507 | 961 | 515 | 612 | 765 | 309 | 848 |
| Pb | 13 | 19 | 10 | 16 | 9 | 9 | 22 | 9 | 9 | 9 | 33 | <5 |
| S | 1940 | 2330 | 434 | 9761 | 158 | 2677 | 5888 | 3051 | 151 | 844 | 1741 | 13920 |
| Sb | 11 | <10 | <10 | 19 | <10 | <10 | <10 | 11 | <10 | <10 | <10 | 17 |
| Se | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Sn | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Sr | 131 | 190 | 90 | 138 | 11 | 109 | 278 | 155 | 192 | 203 | 51 | 57 |
| Ta | <5 | <5 | <5 | 7 | <5 | <5 | 7 | <5 | <5 | 8 | <5 | 12 |
| Te | <10 | <10 | <10 | 16 | <10 | <10 | 13 | <10 | <10 | 12 | <10 | 19 |
| Ti | 3586 | 3418 | 2664 | 5040 | 128 | 2946 | 4669 | 2871 | 3242 | 4521 | 570 | 6196 |
| Tl | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| V | 94 | 98 | 82 | 168 | 5 | 79 | 141 | 81 | 103 | 146 | 21 | 215 |
| W | 5 | 12 | 4 | 12 | <2 | 7 | 4 | 7 | 7 | 7 | 3 | 12 |
| Zn | 31 | 49 | 39 | 90 | 10 | 35 | 100 | 33 | 43 | 58 | 39 | 109 |
| Zr | 290 | 233 | 203 | 177 | <5 | 224 | 189 | 204 | 150 | 167 | 15 | 169 |

**Table 10**
**ICP Multi-Element Analyses Results on Goldboro Ore Samples # I951413 – I951423**

| Sample ID | I951413 | I951414 | I951415 | I951416 | I951417 | I951418 | I951419 | I951420 | I951421 | I951422 | I951423 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| Ag | <0.2 | 0.407 | <0.2 | <0.2 | 0.855 | 0.31 | <0.2 | 0.357 | <0.2 | 0.259 | <0.2 |
| Al | 32915 | 66087 | 85352 | 90685 | 61677 | 67114 | 111760 | 50337 | 57264 | 81975 | 58935 |
| As | 447 | 436 | 1102 | 122 | 111 | 10454 | 2732 | 22 | 42 | 112 | 29 |
| Ba | 169 | 507 | 842 | 814 | 430 | 703 | 1152 | 318 | 333 | 685 | 487 |
| Be | 2.5 | 2.1 | 2.8 | 3.2 | 1.9 | 2.5 | 4.2 | 1.2 | 1.3 | 3.0 | 1.5 |
| Bi | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Ca | 8521 | 7834 | 5884 | 9244 | 7111 | 5107 | 11185 | 4290 | 6541 | 9668 | 6675 |
| Cd | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Ce | 43 | 70 | 78 | 98 | 60 | 73 | 101 | 58 | 52 | 76 | 51 |
| Co | 7 | 14 | 18 | 20 | 10 | 17 | 23 | 8 | 9 | 18 | 12 |
| Cr | 127 | 223 | 179 | 185 | 277 | 230 | 327 | 595 | 504 | 253 | 1217 |
| Cu | 26 | 14 | 34 | 47 | 18 | 20 | 31 | 11 | 25 | 40 | 20 |
| Fe | 20562 | 38486 | 40790 | 50336 | 26589 | 41959 | 55155 | 23404 | 26051 | 47182 | 30804 |
| Ga | <5 | 10 | 13 | 14 | 8 | 11 | 18 | 8 | 7 | 14 | 9 |
| Ge | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| In | <5 | 7 | 9 | 8 | <5 | 9 | 11 | <5 | <5 | 8.507 | <5 |
| K | 11429 | 24404 | 36289 | 32508 | 17593 | 29061 | 45368 | 13965 | 15661 | 29429 | 19408 |
| La | 14 | 22 | 25 | 31 | 19 | 21 | 31 | 20 | 18 | 24 | 16 |
| Li | 21 | 39 | 38 | 46 | 35 | 31 | 52 | 27 | 27 | 46 | 33 |
| Mg | 7143 | 13566 | 13492 | 17013 | 9591 | 12024 | 18868 | 7200 | 8119 | 16508 | 10583 |
| Mn | 414 | 920 | 794 | 938 | 718 | 541 | 922 | 588 | 536 | 903 | 685 |
| Mo | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 | <1 |
| Na | 7512 | 12884 | 6895 | 10171 | 19251 | 5598 | 11168 | 17411 | 18961 | 11999 | 14626 |
| Nb | 7 | 17 | 24 | 23 | 16 | 18 | 31 | 14 | 14 | 21 | 11 |
| Ni | 12 | 20 | 28 | 34 | 16 | 30 | 38 | 12 | 14 | 30 | 23 |
| P | 473 | 655 | 726 | 710 | 663 | 494 | 759 | 508 | 478 | 653 | 495 |
| Pb | 15 | 15 | 10 | 28 | 29 | 25 | 35 | 11 | 25 | 26 | 27 |
| S | 3723 | 738 | 4204 | 1028 | 353 | 9002 | 6281 | 226 | 1230 | 1045 | 905 |
| Sb | <10 | <10 | 12 | 10 | <10 | 28 | 18 | 23 | 17 | 12 | 28 |
| Se | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Sn | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 | <2 |
| Sr | 161 | 154 | 133 | 180 | 167 | 101 | 231 | 123 | 140 | 196 | 136 |
| Ta | <5 | 5 | 7 | 5 | <5 | <5 | 9 | <5 | 5 | 5 | <5 |
| Te | <10 | <10 | 12 | 11 | <10 | 11 | 15 | <10 | <10 | <10 | <10 |
| Ti | 1489 | 3689 | 4418 | 4288 | 3239 | 3460 | 5333 | 2958 | 3076 | 3943 | 2569 |
| Tl | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| V | 47 | 100 | 141 | 142 | 96 | 109 | 178 | 84 | 87 | 129 | 79 |
| W | 10 | 6 | 10 | 445 | 6 | 7 | 7 | 4 | 6 | 4 | 3 |
| Zn | 56 | 95 | 59 | 120 | 46 | 85 | 114 | 33 | 77 | 146 | 80 |
| Zr | 89 | 203 | 196 | 134 | 191 | 117 | 179 | 211 | 192 | 141 | 150 |

**Table 11**
**ICP Multi-Element Analyses Results on Goldboro Tails Samples**

| Sample ID | Sample 1 | Sample 2 | Sample 3 |
|---|---|---|---|
| Unit | mg/kg | mg/kg | mg/kg |
| Ag | <1 | <1 | <1 |
| Al | 65899 | 65343 | 67702 |
| As | 3885 | 8121 | 7203 |
| Ba | 526 | 522 | 541 |
| Be | 2.5 | 2.5 | 2.6 |
| Bi | <10 | <10 | <10 |
| Ca | 5189 | 5445 | 5233 |
| Cd | <5 | <5 | <5 |
| Ce | <50 | <50 | <50 |
| Co | 18 | 26 | 13 |
| Cr | 59 | 60 | 59 |
| Cu | 27 | 32 | 30 |
| Fe | 36036 | 42501 | 37945 |
| Ga | <50 | <50 | <50 |
| Ge | <50 | <50 | <50 |
| In | <50 | <50 | <50 |
| K | 29590 | 29896 | 29007 |
| La | 24 | 22 | 23 |
| Li | 42 | 44 | 42 |
| Mg | 12809 | 13910 | 11298 |
| Mn | 608 | 615 | 557 |
| Mo | <10 | <10 | <10 |
| Na | 6995 | 6615 | 7252 |
| Nb | 14 | 15 | 17 |
| Ni | 31 | 43 | 21 |
| P | 590 | 642 | 670 |
| Pb | 43 | 70 | 68 |
| S | 4842 | 8238 | 1931 |
| Sb | <50 | <50 | <50 |
| Se | <50 | <50 | <50 |
| Sn | <50 | <50 | <50 |
| Sr | 116 | 120 | 123 |
| Ta | <50 | <50 | <50 |
| Te | <50 | <50 | <50 |
| Ti | 3183 | 3471 | 3565 |
| Tl | <50 | <50 | <50 |
| V | 58 | 59 | 60 |
| W | 18 | <10 | 14 |
| Zn | 125 | 240 | 101 |
| Zr | 68 | 70 | 74 |

**Table 12**
**Goldboro Ore Samples Whole Rock Analyses Results**

| Sample | Wt. % | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $Al_2O_3$ | BaO | CaO | $Cr_2O_3$ | $Fe_2O_3$ | $K_2O$ | MgO | MnO | $Na_2O$ | $P_2O_5$ | $SiO_2$ | $TiO_2$ | $V_2O_5$ | $ZrO_2$ | LOI 1000°C | Total |
| I951401 | 9.78 | 0.04 | 0.88 | 0.02 | 3.80 | 1.62 | 1.20 | 0.07 | 2.43 | 0.14 | 77.93 | 0.63 | 0.02 | 0.04 | 0.91 | 99.54 |
| I951402 | 12.50 | 0.04 | 1.18 | 0.02 | 3.36 | 1.56 | 1.28 | 0.07 | 3.97 | 0.18 | 73.21 | 0.60 | 0.02 | 0.03 | 1.44 | 99.47 |
| I951403 | 9.70 | 0.05 | 0.74 | 0.05 | 3.09 | 1.72 | 1.24 | 0.06 | 2.14 | 0.12 | 79.05 | 0.47 | 0.01 | 0.03 | 1.27 | 99.76 |
| I951404 | 21.14 | 0.13 | 1.17 | 0.02 | 7.53 | 5.51 | 3.14 | 0.13 | 0.81 | 0.16 | 52.62 | 0.91 | 0.03 | 0.03 | 5.46 | 98.81 |
| I951405 | 0.58 | <0.01 | 0.21 | 0.01 | 0.68 | 0.21 | 0.13 | 0.01 | 0.15 | 0.01 | 97.75 | 0.02 | <0.01 | <0.01 | 0.16 | 99.92 |
| I951406 | 9.65 | 0.04 | 0.83 | 0.03 | 3.29 | 1.77 | 1.11 | 0.06 | 2.19 | 0.12 | 78.98 | 0.50 | 0.02 | 0.03 | 0.98 | 99.61 |
| I951407 | 17.32 | 0.10 | 2.02 | 0.02 | 7.71 | 4.23 | 3.16 | 0.15 | 1.77 | 0.23 | 59.36 | 0.80 | 0.03 | 0.03 | 2.38 | 99.35 |
| I951408 | 10.41 | 0.04 | 1.17 | 0.03 | 4.11 | 1.60 | 1.25 | 0.08 | 2.53 | 0.12 | 76.69 | 0.49 | 0.01 | 0.03 | 0.86 | 99.44 |
| I951409 | 13.54 | 0.06 | 1.51 | 0.02 | 4.43 | 2.76 | 1.89 | 0.10 | 2.41 | 0.14 | 70.77 | 0.55 | 0.02 | 0.02 | 1.70 | 99.95 |
| I951410 | 17.99 | 0.11 | 1.54 | 0.02 | 6.87 | 4.04 | 3.02 | 0.15 | 1.97 | 0.18 | 61.08 | 0.77 | 0.03 | 0.02 | 2.09 | 99.90 |
| I951411 | 2.56 | 0.01 | 0.43 | 0.04 | 1.39 | 0.78 | 0.52 | 0.02 | 0.35 | 0.07 | 92.97 | 0.09 | <0.01 | <0.01 | 0.50 | 99.73 |
| I951412 | 27.03 | 0.19 | 0.40 | 0.03 | 9.57 | 7.90 | 3.32 | 0.10 | 0.31 | 0.20 | 42.52 | 1.07 | 0.04 | 0.02 | 5.74 | 98.44 |
| I951413 | 6.27 | 0.02 | 1.20 | 0.02 | 2.96 | 1.39 | 1.19 | 0.05 | 1.02 | 0.11 | 84.09 | 0.25 | <0.01 | 0.01 | 0.96 | 99.57 |
| I951414 | 12.74 | 0.06 | 1.12 | 0.03 | 5.61 | 3.00 | 2.29 | 0.12 | 1.77 | 0.15 | 70.74 | 0.63 | 0.02 | 0.03 | 1.45 | 99.78 |
| I951415 | 16.45 | 0.10 | 0.84 | 0.03 | 5.95 | 4.46 | 2.28 | 0.10 | 0.95 | 0.17 | 65.18 | 0.75 | 0.03 | 0.03 | 2.10 | 99.43 |
| I951416 | 17.44 | 0.09 | 1.32 | 0.03 | 7.32 | 3.99 | 2.87 | 0.12 | 1.40 | 0.17 | 62.16 | 0.73 | 0.03 | 0.02 | 2.17 | 99.87 |
| I951417 | 11.82 | 0.05 | 1.01 | 0.04 | 3.86 | 2.15 | 1.61 | 0.09 | 2.64 | 0.15 | 74.34 | 0.55 | 0.02 | 0.03 | 1.52 | 99.89 |
| I951418 | 13.13 | 0.08 | 0.74 | 0.03 | 6.21 | 3.62 | 2.06 | 0.07 | 0.78 | 0.12 | 68.70 | 0.60 | 0.02 | 0.02 | 2.87 | 99.07 |
| I951419 | 21.84 | 0.13 | 1.62 | 0.05 | 8.16 | 5.65 | 3.23 | 0.12 | 1.56 | 0.18 | 52.79 | 0.92 | 0.03 | 0.02 | 2.95 | 99.30 |
| I951420 | 9.73 | 0.04 | 0.61 | 0.09 | 3.42 | 1.72 | 1.22 | 0.08 | 2.40 | 0.12 | 78.83 | 0.51 | 0.02 | 0.03 | 1.13 | 99.95 |
| I951421 | 10.80 | 0.04 | 0.91 | 0.07 | 3.72 | 1.88 | 1.34 | 0.07 | 2.55 | 0.11 | 76.62 | 0.51 | 0.02 | 0.03 | 1.07 | 99.77 |
| I951422 | 15.65 | 0.08 | 1.37 | 0.04 | 6.81 | 3.58 | 2.76 | 0.12 | 1.64 | 0.15 | 64.81 | 0.67 | 0.03 | 0.02 | 1.95 | 99.69 |
| I951423 | 11.50 | 0.06 | 0.96 | 0.18 | 4.55 | 2.41 | 1.81 | 0.09 | 2.04 | 0.12 | 74.23 | 0.44 | 0.01 | 0.02 | 1.41 | 99.87 |

**Table 13**
**Goldboro Tails Samples Whole Rock Analyses Results**

| Sample | Wt. % | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $Al_2O_3$ | BaO | CaO | $Cr_2O_3$ | $Fe_2O_3$ | $K_2O$ | MgO | MnO | $Na_2O$ | $P_2O_5$ | $SiO_2$ | $TiO_2$ | $V_2O_5$ | $ZrO_2$ | LOI 1000°C | Total |
| Sample 1 | 12.04 | 0.07 | 0.76 | 0.01 | 4.86 | 3.48 | 1.88 | 0.08 | 0.97 | 0.12 | 72.37 | 0.56 | 0.02 | 0.02 | 2.10 | 99.36 |
| Sample 2 | 11.92 | 0.07 | 0.78 | 0.01 | 5.88 | 3.52 | 2.04 | 0.08 | 0.91 | 0.11 | 70.35 | 0.61 | 0.02 | 0.02 | 2.79 | 99.13 |
| Sample 3 | 12.47 | 0.07 | 0.80 | 0.01 | 5.40 | 3.50 | 1.69 | 0.08 | 1.01 | 0.12 | 70.36 | 0.64 | 0.02 | 0.02 | 3.49 | 99.70 |

**Table 14**
**Goldboro Ore Samples Au Fire Assay Analyses Results**

| Sample | Grade |
|---|---|
| | Au (mg/kg) |
| I951401 | 0.231 |
| I951402 | 0.063 |
| I951403 | 1.061 |
| I951404 | 3.659 |
| I951405 | 0.008 |
| I951406 | 0.080 |
| I951407 | 6.626 |
| I951408 | 2.775 |
| I951409 | 0.014 |
| I951410 | 0.219 |
| I951411 | 1.188 |
| I951412 | 3.148 |
| I951413 | 0.431 |
| I951414 | 0.038 |
| I951415 | 0.471 |
| I951416 | 0.120 |
| I951417 | 0.018 |
| I951418 | 4.378 |
| I951419 | 2.332 |
| I951420 | 0.010 |
| I951421 | 0.031 |
| I951422 | 0.100 |
| I951423 | 0.013 |

**Table 15**
**Goldboro Tails Samples Au Fire Assay Analyses Results**

| Sample | Grade |
|---|---|
| | Au (mg/kg) |
| Sample 1 | 1.518 |
| Sample 2 | 1.284 |
| Sample 3 | 1.322 |

## CONCLUSIONS AND RECOMMENDATIONS

Note that all results were only as representative as the sample received. All data obtained were in good agreement with each other and showed that:

- Of the 23 Goldboro ore samples subjected to static Acid Rock Drainage (ARD) testing, 9 were found to be potentially acid producing and 3 obtained NP/AP ratio values between 2.0 and 1.0.
- All 3 of the Goldboro tails samples subjected to static ARD testing were found to be potentially acid producing.
- It was recommended that a specialized consultant be contacted for the full MEND Report 1.20.1 analysis and interpretation prior to follow up with the regulatory agent.

**Final Report**

# Additional ARD Testing of Goldboro Ore; Anaconda Mining Inc.

**Reference No.: MIS-J2061**

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## INTRODUCTION

Anaconda Mining Inc. initiated a study at RPC to conduct static Acid Rock Drainage (ARD) test work. The Goldboro ore is being investigated by Anaconda Mining Inc. in conjunction with RPC to look at ways of expanding current operations.

RPC was thus contacted to conduct static testing as follows:

- Acid Base Accounting (ABA by Sobek method)
- Total S analysis
- Sulphate S analysis
- Total inorganic carbon analysis
- Whole rock analysis
- Multi-element ICP-OES analysis
- Au by Fire Assay

This report serves to summarize the findings as well as recommendations for the way forward.

## PROGRAM RESULTS

### Sample Preparation

Four buckets of samples were received in preparation for the static testing and are listed in Table 1 (38 samples). The samples were blended to form the 19 samples detailed in Table 2 and then each of the 19 samples were dried, crushed to -¼", homogenized and split into sub samples for ABA, Total S, Total Inorganic Carbon, whole rock, Au by Fire Assay and multi-element ICP analyses.

**Table 1**
**Goldboro Ore Samples Received**

| Sample ID | Received Mass (kg) |
|---|---|
| 948701 | 1.28 |
| 948702 | 1.00 |
| 948703 | 0.88 |
| 948704 | 0.94 |
| 948705 | 0.88 |
| 948706 | 1.32 |
| 948707 | 0.92 |
| 948708 | 1.50 |
| 948709 | 1.66 |
| 948710 | 1.36 |
| 948711 | 0.88 |
| 948712 | 0.96 |
| 948713 | 1.44 |
| 948714 | 1.10 |
| 948715 | 1.02 |
| 948716 | 1.16 |
| 948717 | 1.32 |
| 948718 | 0.82 |
| 948719 | 0.8 |
| 948720 | 0.90 |
| 948721 | 1.46 |
| 948722 | 1.74 |
| 948723 | 1.4 |
| 948724 | 1.30 |
| 948725 | 1.10 |
| 948726 | 1.36 |
| 948727 | 1.00 |
| 948728 | 0.96 |
| 948729 | 0.92 |
| 948730 | 1.22 |
| 948731 | 1.12 |
| 948732 | 1.80 |
| 948733 | 0.92 |
| 948734 | 0.90 |
| 948735 | 0.70 |
| 948736 | 0.72 |
| 948737 | 0.94 |
| 948738 | 0.90 |

**Table 2**
**Goldboro Blending Ratios**

| Blended Sample # | Sample ID | Received Mass (kg) |
|---|---|---|
| 1 | 948701 | 1.28 |
| | 948702 | 1.00 |
| 2 | 948703 | 0.88 |
| 3 | 948704 | 0.94 |
| | 948705 | 0.88 |
| | 948706 | 1.32 |
| 4 | 948707 | 0.92 |
| | 948708 | 1.50 |
| | 948709 | 1.66 |
| | 948710 | 1.36 |
| 5 | 948711 | 0.88 |
| | 948712 | 0.96 |
| 6 | 948713 | 1.44 |
| | 948714 | 1.10 |
| 7 | 948715 | 1.02 |
| | 948716 | 1.16 |
| 8 | 948717 | 1.32 |
| | 948718 | 0.82 |
| | 948719 | 0.8 |
| | 948720 | 0.90 |
| 9 | 948721 | 1.46 |
| | 948722 | 1.74 |
| 10 | 948723 | 1.4 |
| | 948724 | 1.30 |
| 11 | 948725 | 1.10 |
| 12 | 948726 | 1.36 |
| 13 | 948727 | 1.00 |
| | 948728 | 0.96 |
| 14 | 948729 | 0.92 |
| 15 | 948730 | 1.22 |
| | 948731 | 1.12 |
| | 948732 | 1.80 |
| | 948733 | 0.92 |
| 16 | 948734 | 0.90 |
| 17 | 948735 | 0.70 |
| 18 | 948736 | 0.72 |
| 19 | 948737 | 0.94 |
| | 948738 | 0.90 |

## Acid Rock Drainage (ARD) Static Analyses Results

The results from Total Inorganic Carbon analyses and acid-base accounting (utilizing the Sobek method) on the 19 blended samples (see Table 12) are given in Table 3 and 4.

**Table 3**
**Total Inorganic Carbon Analyses on Goldboro Ore Blended Samples**

| Blended Sample # | Total Inorganic Carbon |
|---|---|
| | % |
| Sample 1 | <0.01 |
| Sample 2 | 0.04 |
| Sample 3 | 0.04 |
| Sample 4 | 0.04 |
| Sample 5 | 0.01 |
| Sample 6 | 0.03 |
| Sample 7 | 0.03 |
| Sample 8 | 0.01 |
| Sample 9 | 0.03 |
| Sample 10 | 0.03 |
| Sample 11 | 0.02 |
| Sample 12 | 0.03 |
| Sample 13 | 0.02 |
| Sample 14 | 0.01 |
| Sample 15 | 0.04 |
| Sample 16 | <0.01 |
| Sample 17 | 0.11 |
| Sample 18 | 0.10 |
| Sample 19 | 0.05 |

**Table 4**
**Acid Base Accounting Results on Goldboro Ore Blended Samples**

| Blended Sample # | Paste pH | Total Sulfur | Acid Production Potential | Neutralizing Potential pH 8.3 | Net NP pH 8.3 | NP/AP |
|---|---|---|---|---|---|---|
| | | % | Kg $CaCO_3$/tonne | | | |
| Sample 1 | 8.2 | 0.557 | 17.4 | 5.9 | -11.5 | 0.3 |
| Sample 2 | 8.0 | 0.393 | 12.3 | 11.4 | -0.9 | 0.9 |
| Sample 3 | 8.1 | 0.177 | 5.5 | 6.1 | 0.6 | 1.1 |
| Sample 4 | 8.6 | 0.119 | 3.7 | 11.7 | 8.0 | 3.1 |
| Sample 5 | 7.9 | 0.456 | 14.3 | 6.3 | -7.9 | 0.4 |
| Sample 6 | 9.0 | 0.131 | 4.1 | 5.5 | 1.4 | 1.3 |
| Sample 7 | 8.9 | 0.058 | 1.8 | 9.2 | 7.4 | 5.1 |
| Sample 8 | 8.8 | 0.051 | 1.6 | 5.2 | 3.6 | 3.3 |
| Sample 9 | 8.7 | 0.131 | 4.1 | 16.3 | 12.2 | 4.0 |
| Sample 10 | 9.0 | 0.088 | 2.8 | 10.7 | 7.9 | 3.9 |
| Sample 11 | 9.1 | 0.082 | 2.6 | 7.9 | 5.3 | 3.1 |
| Sample 12 | 9.2 | 0.115 | 3.6 | 6.2 | 2.6 | 1.7 |
| Sample 13 | 8.5 | 0.414 | 12.9 | 5.0 | -8.0 | 0.4 |
| Sample 14 | 9.1 | 0.041 | 1.3 | 4.9 | 3.6 | 3.8 |
| Sample 15 | 9.1 | 0.037 | 1.2 | 7.7 | 6.5 | 6.7 |
| Sample 16 | 9.3 | 0.034 | 1.1 | 7.5 | 6.4 | 7.0 |
| Sample 17 | 9.2 | 0.025 | 0.8 | 24.2 | 23.4 | 30.9 |
| Sample 18 | 9.2 | 0.063 | 2.0 | 13.6 | 11.6 | 6.9 |
| Sample 19 | 8.9 | 0.758 | 23.7 | 15.1 | -8.6 | 0.6 |

The Total Inorganic Carbon analyses seen in Table 3 indicated that the inorganic carbon content was low over all 19 blended samples (ranging from <0.01 % to 0.11 % in the Goldboro Ore samples). In addition, the Total Sulfur contents of the 19 blended samples were also relatively low (see Table 4), ranging from <0.025 % to 0.758 % in Goldboro Ore Blended Sample # 19.

As seen from Table 4, eleven of the Goldboro Ore Blended samples obtained positive Net Neutralizing Potential values with NP/AP ratio values (ratio between Neutralizing Potential and Acid Production Potential) above 2.0. This indicated that these specific samples were not net acid producers. On five Goldboro Ore Blended samples the Net Neutralizing Potential values were negative, and the NP/AP ratio was less than 1.0, indicating that these were potentially acid producing. These samples were as follows:

- Goldboro Ore Sample Blended Sample # 1
- Goldboro Ore Sample Blended Sample # 2
- Goldboro Ore Sample Blended Sample # 5
- Goldboro Ore Sample Blended Sample # 13
- Goldboro Ore Sample Blended Sample # 19

Three Goldboro Ore Blended samples obtained NP/AP ratio values between 2.0 and 1.0 and were thus classified as “uncertain”. Single addition NAG (Net Acid Generation) tests were thus conducted on these samples. These samples were as follows:

- Goldboro Ore Sample Blended Sample # 3
- Goldboro Ore Sample Blended Sample # 6
- Goldboro Ore Sample Blended Sample # 12

The resulting NAG pH values are provided in Table 5.

**Table 5**
**NAG Results**

| **Analytes:** | **NAG pH** | **NAG (pH 4.5)** | **NAG (pH 7.0)** |
|---|---|---|---|
| **Units:** | **(units)** | **kg $H_2SO_4$/tonne** | |
| **Client Sample ID** | | | |
| Sample 3 | 3.4 | 1.4 | 5.0 |
| Sample 6 | 6.2 | - | - |
| Sample 12 | 7.3 | - | - |

Table 5 indicated that the NAG pH values of Sample 6 and Sample 12 were above 4.5, indicating that these samples were not potentially acid generating. The NAG pH of Sample 3 was however below 4.5 at 3.4 and it thus remains “uncertain”.

It is recommended that a specialized consultant be contacted for the full MEND Report 1.20.1 analysis and interpretation prior to follow up with the regulatory agent.

The sulphate sulfur contents of the 19 samples were also determined and whole rock analyses as well as ICP multi-element analyses and Au Fire Assay analyses were conducted with the results reported in Table 6 to 10.

**Table 6**
**Goldboro Ore Blended Samples Sulphate S Analyses Results**

| Sample | Wt. % | |
|---|---|---|
| | S (Total) | as $SO_4$ |
| Sample 1 | 0.351 | 0.036 |
| Sample 2 | 0.188 | 0.024 |
| Sample 3 | 0.152 | 0.020 |
| Sample 4 | 0.109 | 0.021 |
| Sample 5 | 0.293 | 0.035 |
| Sample 6 | 0.032 | 0.005 |
| Sample 7 | 0.033 | 0.007 |
| Sample 8 | 0.080 | 0.011 |
| Sample 9 | 0.094 | 0.025 |
| Sample 10 | 0.058 | 0.016 |
| Sample 11 | 0.066 | 0.014 |
| Sample 12 | 0.206 | 0.018 |
| Sample 13 | 0.336 | 0.018 |
| Sample 14 | 0.017 | 0.009 |
| Sample 15 | 0.016 | 0.007 |
| Sample 16 | 0.024 | 0.003 |
| Sample 17 | 0.050 | 0.013 |
| Sample 18 | 0.031 | 0.008 |
| Sample 19 | 0.443 | 0.018 |

**Table 7**
**ICP Multi-Element Analyses Results on Goldboro Ore Blended Samples #1 - #10**

| Sample ID | Sample 1 | Sample 2 | Sample 3 | Sample 4 | Sample 5 | Sample 6 | Sample 7 | Sample 8 | Sample 9 | Sample 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Unit | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| Ag | <0.5 | 1.601 | <0.5 | <0.5 | 1.727 | <0.5 | <0.5 | 2.645 | <0.5 | <0.5 |
| Al | 91148 | 42441 | 54986 | 82158 | 95680 | 78125 | 62233 | 64118 | 56238 | 58168 |
| As | 492 | 211 | 34 | 55 | 165 | 21 | 21 | 44 | 126 | 72 |
| Ba | 826 | 277 | 372 | 678 | 860 | 639 | 423 | 451 | 308 | 354 |
| Be | 3.1 | 1.1 | 1.3 | 2.4 | 3.0 | 2.1 | 1.5 | 1.6 | 1.1 | 1.4 |
| Bi | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 |
| Ca | 8657 | 7679 | 7399 | 9971 | 7630 | 8699 | 7726 | 8184 | 8530 | 7013 |
| Cd | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Ce | 64 | <25 | 52 | 87 | 100 | 62 | 33 | 34 | 44 | 52 |
| Co | 29 | 13 | 16 | 22 | 24 | 21 | 17 | 18 | 14 | 14 |
| Cr | 80 | 47 | 67 | 77 | 84 | 71 | 63 | 62 | 57 | 62 |
| Cu | 53 | 41 | 42 | 28 | 48 | 22 | 20 | 12 | 14 | 26 |
| Fe | 42929 | 19574 | 25439 | 40954 | 50172 | 37118 | 29116 | 29297 | 23050 | 25313 |
| Ga | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 |
| Ge | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| In | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |
| K | 42362 | 14152 | 19167 | 36409 | 43700 | 32673 | 22656 | 23872 | 16270 | 19344 |
| La | 29 | 13 | 20 | 26 | 39 | 25 | 22 | 21 | 20 | 19 |
| Li | 150 | 79 | 90 | 128 | 132 | 101 | 77 | 77 | 61 | 60 |
| Mg | 14772 | 6720 | 8219 | 14354 | 18167 | 13087 | 10194 | 9769 | 8279 | 8537 |
| Mn | 731 | 629 | 624 | 793 | 804 | 661 | 618 | 605 | 835 | 676 |
| Mo | <10 | <10 | <10 | <10 | <10 | <10 | <10 | 11.857 | <10 | <10 |
| Na | 11392 | 14721 | 15368 | 10622 | 8494 | 12072 | 15387 | 15293 | 19302 | 17976 |
| Nb | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 |
| Ni | 41 | 17 | 24 | 41 | 46 | 34 | 26 | 30 | 20 | 23 |
| P | 645 | 480 | 580 | 687 | 746 | 659 | 598 | 621 | 627 | 674 |
| Pb | 164 | 241 | 357 | 54 | 1307 | <25 | 26 | 32 | 36 | 34 |
| S | 4526 | 2479 | 1925 | 1491 | 3491 | 494 | 514 | 1094 | 1260 | 896 |
| Sb | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Se | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Sn | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Sr | 186 | 141 | 134 | 173 | 148 | 159 | 145 | 166 | 136 | 141 |
| Ta | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Te | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Ti | 4515 | 2467 | 3209 | 4406 | 4691 | 4119 | 3496 | 3533 | 3145 | 3278 |
| Tl | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| V | 92 | 40 | 48 | 81 | 96 | 76 | 54 | 60 | 50 | 51 |
| W | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Zn | 474 | 356 | 374 | 223 | 1289 | 97 | 117 | 84 | 101 | 108 |
| Zr | 100 | 51 | 65 | 91 | 101 | 80 | 75 | 71 | 64 | 67 |

**Table 8**
**ICP Multi-Element Analyses Results on Goldboro Ore Blended Samples # 11 - 19**

| Sample ID | Sample 11 | Sample 12 | Sample 13 | Sample 14 | Sample 15 | Sample 16 | Sample 17 | Sample 18 | Sample 19 |
|---|---|---|---|---|---|---|---|---|---|
| Unit | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| Ag | <0.5 | <0.5 | <0.5 | 0.852 | <0.5 | <0.5 | <0.5 | <0.5 | 0.961 |
| Al | 57481 | 82889 | 91880 | 73547 | 72188 | 75115 | 65054 | 61290 | 91841 |
| As | 195 | 510 | 901 | 29 | 29 | 26 | 29 | <10 | 3897 |
| Ba | 301 | 628 | 780 | 581 | 549 | 597 | 481 | 464 | 741 |
| Be | 1.3 | 2.7 | 3.4 | 1.9 | 1.9 | 2.0 | 1.6 | 1.5 | 4.4 |
| Bi | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 |
| Ca | 6038 | 10240 | 10046 | 8101 | 7704 | 8496 | 11328 | 12565 | 12663 |
| Cd | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 |
| Ce | 62 | 77 | 102 | 87 | 101 | 60 | 105 | 146 | 97 |
| Co | 14 | 22 | 23 | 20 | 20 | 19 | 16 | 17 | 27 |
| Cr | 59 | 78 | 79 | 68 | 73 | 79 | 69 | 68 | 88 |
| Cu | 22 | 38 | 31 | 15 | 18 | 33 | 32 | 23 | 22 |
| Fe | 24096 | 38740 | 42183 | 34931 | 34967 | 36205 | 31894 | 30957 | 48844 |
| Ga | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 |
| Ge | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| In | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 | <100 |
| K | 16417 | 34460 | 42434 | 30091 | 29104 | 31320 | 25074 | 22622 | 39570 |
| La | 22 | 27 | 31 | 23 | 21 | 22 | 31 | 50 | 26 |
| Li | 60 | 93 | 99 | 82 | 80 | 80 | 67 | 67 | 118 |
| Mg | 7942 | 14288 | 15145 | 12629 | 12329 | 13025 | 11102 | 10938 | 19363 |
| Mn | 580 | 836 | 759 | 739 | 684 | 793 | 971 | 1018 | 1249 |
| Mo | <10 | <10 | <10 | 11.235 | 10.24 | <10 | <10 | <10 | <10 |
| Na | 22593 | 15959 | 11975 | 12450 | 12131 | 11643 | 12952 | 13467 | 10320 |
| Nb | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 | <25 |
| Ni | 19 | 36 | 39 | 35 | 31 | 33 | 27 | 30 | 50 |
| P | 629 | 629 | 562 | 682 | 658 | 665 | 662 | 718 | 1011 |
| Pb | 33 | 68 | 100 | 55 | 56 | 220 | 863 | 720 | 275 |
| S | 903 | 2611 | 4127 | 392 | 424 | 419 | 783 | 583 | 5415 |
| Sb | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Se | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Sn | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Sr | 127 | 207 | 198 | 157 | 152 | 163 | 155 | 166 | 258 |
| Ta | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Te | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Ti | 3295 | 4329 | 4373 | 4065 | 3831 | 3979 | 3692 | 3728 | 4698 |
| Tl | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| V | 49 | 86 | 89 | 72 | 67 | 73 | 61 | 59 | 91 |
| W | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 | <50 |
| Zn | 78 | 168 | 132 | 99 | 104 | 129 | 168 | 111 | 414 |
| Zr | 80 | 91 | 91 | 83 | 83 | 82 | 86 | 80 | 109 |

**Table 9**
**Goldboro Ore Blended Samples Whole Rock Analyses Results**

| Sample | Wt. % | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $Al_2O_3$ | BaO | CaO | $Cr_2O_3$ | $Fe_2O_3$ | $K_2O$ | MgO | MnO | $Na_2O$ | $P_2O_5$ | $SiO_2$ | SrO | $TiO_2$ | $V_2O_5$ | $ZrO_2$ | LOI 1000°C | Total |
| Sample 1 | 18.99 | 0.10 | 1.30 | 0.01 | 6.65 | 5.27 | 2.61 | 0.11 | 1.92 | 0.17 | 59.80 | 0.02 | 0.76 | 0.02 | 0.02 | 2.18 | 99.94 |
| Sample 2 | 9.01 | 0.03 | 1.16 | <0.01 | 2.97 | 2.10 | 1.16 | 0.09 | 2.32 | 0.13 | 79.39 | 0.02 | 0.40 | <0.01 | 0.02 | 1.04 | 99.85 |
| Sample 3 | 11.37 | 0.04 | 1.14 | 0.01 | 3.81 | 2.57 | 1.44 | 0.09 | 2.41 | 0.15 | 74.90 | 0.02 | 0.52 | 0.01 | 0.03 | 1.35 | 99.86 |
| Sample 4 | 17.04 | 0.08 | 1.48 | 0.02 | 6.34 | 4.46 | 2.54 | 0.12 | 1.77 | 0.18 | 62.91 | 0.02 | 0.74 | 0.02 | 0.02 | 2.06 | 99.81 |
| Sample 5 | 20.24 | 0.10 | 1.16 | 0.02 | 7.86 | 5.28 | 3.27 | 0.12 | 1.46 | 0.19 | 56.42 | 0.02 | 0.81 | 0.02 | 0.02 | 2.90 | 99.90 |
| Sample 6 | 16.28 | 0.08 | 1.27 | 0.01 | 5.70 | 4.00 | 2.34 | 0.10 | 1.96 | 0.17 | 65.17 | 0.02 | 0.69 | 0.02 | 0.02 | 2.09 | 99.91 |
| Sample 7 | 12.72 | 0.05 | 1.13 | 0.01 | 4.42 | 2.82 | 1.79 | 0.09 | 2.40 | 0.15 | 72.13 | 0.02 | 0.58 | 0.01 | 0.03 | 1.49 | 99.83 |
| Sample 8 | 13.00 | 0.05 | 1.19 | 0.01 | 4.42 | 2.89 | 1.71 | 0.09 | 2.39 | 0.17 | 71.91 | 0.02 | 0.58 | 0.01 | 0.03 | 1.45 | 99.91 |
| Sample 9 | 11.63 | 0.04 | 1.29 | 0.01 | 3.58 | 2.11 | 1.50 | 0.12 | 3.01 | 0.16 | 74.30 | 0.02 | 0.54 | <0.01 | 0.02 | 1.62 | 99.93 |
| Sample 10 | 11.94 | 0.04 | 1.03 | 0.01 | 3.87 | 2.36 | 1.52 | 0.10 | 2.78 | 0.16 | 74.03 | 0.02 | 0.55 | 0.01 | 0.02 | 1.46 | 99.92 |
| Sample 11 | 11.62 | 0.03 | 0.85 | 0.01 | 3.60 | 1.98 | 1.38 | 0.08 | 3.43 | 0.16 | 75.04 | 0.02 | 0.54 | <0.01 | 0.03 | 1.11 | 99.87 |
| Sample 12 | 17.21 | 0.07 | 1.49 | 0.02 | 5.96 | 4.06 | 2.54 | 0.12 | 2.53 | 0.15 | 62.91 | 0.03 | 0.73 | 0.02 | 0.02 | 2.04 | 99.90 |
| Sample 13 | 19.59 | 0.10 | 1.56 | 0.01 | 6.70 | 5.05 | 2.78 | 0.12 | 1.98 | 0.15 | 58.63 | 0.02 | 0.75 | 0.02 | 0.02 | 2.32 | 99.81 |
| Sample 14 | 15.15 | 0.07 | 1.19 | 0.01 | 5.36 | 3.54 | 2.23 | 0.11 | 2.00 | 0.17 | 67.34 | 0.02 | 0.68 | 0.02 | 0.02 | 1.96 | 99.87 |
| Sample 15 | 15.03 | 0.07 | 1.12 | 0.01 | 5.39 | 3.43 | 2.18 | 0.10 | 1.97 | 0.17 | 67.70 | 0.02 | 0.65 | 0.01 | 0.02 | 1.96 | 99.82 |
| Sample 16 | 15.70 | 0.07 | 1.26 | 0.01 | 5.65 | 3.67 | 2.38 | 0.12 | 1.87 | 0.18 | 66.11 | 0.02 | 0.68 | 0.02 | 0.02 | 2.11 | 99.87 |
| Sample 17 | 13.55 | 0.06 | 1.73 | 0.01 | 4.99 | 2.99 | 2.04 | 0.14 | 2.07 | 0.17 | 69.06 | 0.02 | 0.63 | 0.01 | 0.03 | 2.47 | 99.95 |
| Sample 18 | 12.62 | 0.05 | 1.82 | 0.01 | 4.73 | 2.65 | 1.95 | 0.14 | 2.09 | 0.19 | 70.64 | 0.02 | 0.62 | 0.01 | 0.03 | 2.32 | 99.92 |
| Sample 19 | 19.63 | 0.08 | 1.91 | 0.02 | 7.77 | 4.64 | 3.58 | 0.19 | 1.72 | 0.26 | 56.07 | 0.03 | 0.82 | 0.02 | 0.02 | 3.11 | 99.87 |

**Table 10**
**Goldboro Ore Blended Samples Au Fire Assay Analyses Results**

| Sample | Grade |
|---|---|
| | Au (mg/kg) |
| Sample 1 | 0.118 |
| Sample 2 | 0.022 |
| Sample 3 | 0.692 |
| Sample 4 | 0.022 |
| Sample 5 | 1.246 |
| Sample 6 | 0.012 |
| Sample 7 | 0.018 |
| Sample 8 | 0.024 |
| Sample 9 | 0.016 |
| Sample 10 | 0.022 |
| Sample 11 | 0.012 |
| Sample 12 | 0.066 |
| Sample 13 | 3.445 |
| Sample 14 | 0.022 |
| Sample 15 | 0.026 |
| Sample 16 | 0.012 |
| Sample 17 | 0.014 |
| Sample 18 | 0.006 |
| Sample 19 | 0.532 |

## CONCLUSIONS AND RECOMMENDATIONS

Note that all results were only as representative as the sample received. All data obtained were in good agreement with each other and showed that:

- Of the 19 Goldboro ore blended samples subjected to static Acid Rock Drainage (ARD) testing, 5 were found to be potentially acid producing and 3 obtained NP/AP ratio values between 2.0 and 1.0. Single addition NAG (Net Acid Generation) tests were thus conducted on these samples and two of them were found to be not potentially acid producing.
- It was recommended that a specialized consultant be contacted for the full MEND Report 1.20.1 analysis and interpretation prior to follow up with the regulatory agent.

# APPENDIX

DALHOUSIE UNIVERSITY
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17-Jan-18

Research and Productivity Council,
921 College Hill Rd.,
Fredericton, N.B.,
E3B 6Z9 **PO 99621**
Attention: Neri Botha

Re: Results of analysis on submitted samples. Major elements by Li-borate fusion, ICP OES finish. Major elements expressed as oxides.

| | Wt. % | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample | Al2O3 | BaO | CaO | Cr2O3 | Fe2O3 | K2O | MgO | MnO | Na2O | P2O5 | SiO2 | SrO | TiO2 | V2O5 | ZrO2 | LOI 1000°C | Total |
| J2061 S-1 | 18.99 | 0.10 | 1.30 | 0.015 | 6.65 | 5.27 | 2.61 | 0.11 | 1.92 | 0.17 | 59.80 | 0.02 | 0.76 | 0.021 | 0.02 | 2.18 | 99.94 |
| J2061 S-2 | 9.01 | 0.03 | 1.16 | <0.01 | 2.97 | 2.10 | 1.16 | 0.09 | 2.32 | 0.13 | 79.39 | 0.02 | 0.40 | <0.01 | 0.02 | 1.04 | 99.85 |
| J2061 S-3 | 11.37 | 0.04 | 1.14 | 0.014 | 3.81 | 2.57 | 1.44 | 0.09 | 2.41 | 0.15 | 74.90 | 0.02 | 0.52 | 0.012 | 0.03 | 1.35 | 99.86 |
| J2061 S-4 | 17.04 | 0.08 | 1.48 | 0.016 | 6.34 | 4.46 | 2.54 | 0.12 | 1.77 | 0.18 | 62.91 | 0.02 | 0.74 | 0.017 | 0.02 | 2.06 | 99.81 |
| J2061 S-5 | 20.24 | 0.10 | 1.16 | 0.018 | 7.86 | 5.28 | 3.27 | 0.12 | 1.46 | 0.19 | 56.42 | 0.02 | 0.81 | 0.020 | 0.02 | 2.90 | 99.90 |
| J2061 S-6 | 16.28 | 0.08 | 1.27 | 0.013 | 5.70 | 4.00 | 2.34 | 0.10 | 1.96 | 0.17 | 65.17 | 0.02 | 0.69 | 0.017 | 0.02 | 2.09 | 99.91 |
| J2061 S-7 | 12.72 | 0.05 | 1.13 | 0.011 | 4.42 | 2.82 | 1.79 | 0.09 | 2.40 | 0.15 | 72.13 | 0.02 | 0.58 | 0.013 | 0.03 | 1.49 | 99.83 |
| J2061 S-8 | 13.00 | 0.05 | 1.19 | 0.010 | 4.42 | 2.89 | 1.71 | 0.09 | 2.39 | 0.17 | 71.91 | 0.02 | 0.58 | 0.014 | 0.03 | 1.45 | 99.91 |
| J2061 S-9 | 11.63 | 0.04 | 1.29 | 0.011 | 3.58 | 2.11 | 1.50 | 0.12 | 3.01 | 0.16 | 74.30 | 0.02 | 0.54 | <0.01 | 0.02 | 1.62 | 99.93 |
| J2061 S-10 | 11.94 | 0.04 | 1.03 | 0.010 | 3.87 | 2.36 | 1.52 | 0.10 | 2.78 | 0.16 | 74.03 | 0.02 | 0.55 | 0.010 | 0.02 | 1.46 | 99.92 |
| J2061 S-11 | 11.62 | 0.03 | 0.85 | 0.012 | 3.60 | 1.98 | 1.38 | 0.08 | 3.43 | 0.16 | 75.04 | 0.02 | 0.54 | <0.01 | 0.03 | 1.11 | 99.87 |
| J2061 S-12 | 17.21 | 0.07 | 1.49 | 0.015 | 5.96 | 4.06 | 2.54 | 0.12 | 2.53 | 0.15 | 62.91 | 0.03 | 0.73 | 0.017 | 0.02 | 2.04 | 99.90 |
| J2061 S-13 | 19.59 | 0.10 | 1.56 | 0.014 | 6.70 | 5.05 | 2.78 | 0.12 | 1.98 | 0.15 | 58.63 | 0.02 | 0.75 | 0.018 | 0.02 | 2.32 | 99.81 |
| J2061 S-14 | 15.15 | 0.07 | 1.19 | 0.012 | 5.36 | 3.54 | 2.23 | 0.11 | 2.00 | 0.17 | 67.34 | 0.02 | 0.68 | 0.015 | 0.02 | 1.96 | 99.87 |
| J2061 S-15 | 15.03 | 0.07 | 1.12 | 0.013 | 5.39 | 3.43 | 2.18 | 0.10 | 1.97 | 0.17 | 67.70 | 0.02 | 0.65 | 0.013 | 0.02 | 1.96 | 99.82 |
| J2061 S-16 | 15.70 | 0.07 | 1.26 | 0.014 | 5.65 | 3.67 | 2.38 | 0.12 | 1.87 | 0.18 | 66.11 | 0.02 | 0.68 | 0.016 | 0.02 | 2.11 | 99.87 |
| J2061 S-17 | 13.55 | 0.06 | 1.73 | 0.011 | 4.99 | 2.99 | 2.04 | 0.14 | 2.07 | 0.17 | 69.06 | 0.02 | 0.63 | 0.012 | 0.03 | 2.47 | 99.95 |
| J2061 S-18 | 12.62 | 0.05 | 1.82 | 0.013 | 4.73 | 2.65 | 1.95 | 0.14 | 2.09 | 0.19 | 70.64 | 0.02 | 0.62 | 0.012 | 0.03 | 2.32 | 99.92 |
| J2061 S-19 | 19.63 | 0.08 | 1.91 | 0.022 | 7.77 | 4.64 | 3.58 | 0.19 | 1.72 | 0.26 | 56.07 | 0.03 | 0.82 | 0.020 | 0.02 | 3.11 | 99.87 |

Daniel Chevalier, MASc
Manager, Minerals Engineering Centre

QA/QC Results

| | Wt. % (Measured) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample | Al2O3 | BaO | CaO | Cr2O3 | Fe2O3 | K2O | MgO | MnO | Na2O | P2O5 | SiO2 | SrO | TiO2 | V2O5 | ZrO2 |
| SY-4 | 20.80 | 0.035 | 8.04 | <0.01 | 6.22 | 1.57 | 0.53 | 0.11 | 6.94 | 0.13 | 49.96 | 0.139 | 0.294 | <0.01 | 0.07 |
| Till-2 | 15.72 | 0.053 | 1.30 | 0.01 | 5.39 | 3.09 | 1.85 | 0.10 | 2.44 | 0.19 | 60.75 | 0.017 | 0.879 | 0.01 | 0.05 |

| | Wt. % (Expected) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample | Al2O3 | BaO | CaO | Cr2O3 | Fe2O3 | K2O | MgO | MnO | Na2O | P2O5 | SiO2 | SrO | TiO2 | V2O5 | ZrO2 |
| SY-4 | 20.69 | 0.038 | 8.05 | 0.002 | 6.21 | 1.66 | 0.54 | 0.108 | 7.10 | 0.131 | 49.90 | 0.141 | 0.287 | 0.001 | 0.070 |
| Till-2 | 16 | 0.06 | 1.27 | 0.0108 | 5.39 | 3.07 | 1.83 | 0.10 | 2.19 | 0.17 | 60.80 | 0.0171 | 0.88 | 0.0137 | 0.053 |

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24-Jan-18

Research and Productivity Council,
921 College Hill Rd.,
Fredericton, N.B.,
E3B 6Z9
Attention: Leo Cheung

**P0 99621**

Near total acid digestion, ICP OES finish. Some refractory elements may only be partially digested. Some volatile elements may be partially lost.

| Sample ID | mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| | Ag | Al | As | Ba | Be | Bi | Ca |
| MP-1b | 46 | 16127 | 4413 | 8 | 0.3 | 737 | 26501 |
| CZN-4 | 42 | 811 | 12 | 5 | <0.1 | <25 | 456 |
| J2061 Sample-1 | <0.5 | 91148 | 492 | 826 | 3.1 | <25 | 8657 |
| J2061 Sample-2 | 1.6 | 42441 | 211 | 277 | 1.1 | <25 | 7679 |
| J2061 Sample-3 | <0.5 | 54986 | 34 | 372 | 1.3 | <25 | 7399 |
| J2061 Sample-4 | <0.5 | 82158 | 55 | 678 | 2.4 | <25 | 9971 |
| J2061 Sample-5 | 1.7 | 95680 | 165 | 860 | 3.0 | <25 | 7630 |
| J2061 Sample-6 | <0.5 | 78125 | 21 | 639 | 2.1 | <25 | 8699 |
| J2061 Sample-7 | <0.5 | 62233 | 21 | 423 | 1.5 | <25 | 7726 |
| J2061 Sample-8 | 2.6 | 64118 | 44 | 451 | 1.6 | <25 | 8184 |
| J2061 Sample-9 | <0.5 | 56238 | 126 | 308 | 1.1 | <25 | 8530 |
| J2061 Sample-10 | <0.5 | 58168 | 72 | 354 | 1.4 | <25 | 7013 |
| J2061 Sample-11 | <0.5 | 57481 | 195 | 301 | 1.3 | <25 | 6038 |
| J2061 Sample-12 | <0.5 | 82889 | 510 | 628 | 2.7 | <25 | 10240 |
| J2061 Sample-13 | <0.5 | 91880 | 901 | 780 | 3.4 | <25 | 10046 |
| J2061 Sample-14 | 0.9 | 73547 | 29 | 581 | 1.9 | <25 | 8101 |
| J2061 Sample-15 | <0.5 | 72188 | 29 | 549 | 1.9 | <25 | 7704 |
| J2061 Sample-16 | <0.5 | 75115 | 26 | 597 | 2.0 | <25 | 8496 |
| J2061 Sample-17 | <0.5 | 65054 | 29 | 481 | 1.6 | <25 | 11328 |
| J2061 Sample-18 | <0.5 | 61290 | <10 | 464 | 1.5 | <25 | 12565 |
| J2061 Sample-19 | 1.0 | 91841 | 3897 | 741 | 4.4 | <25 | 12663 |

| Sample ID | mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| | Cd | Ce | Co | Cr | Cu | Fe | Ga |
| MP-1b | 542 | 189 | 5 | 6 | 30493 | 80379 | 90 |
| CZN-4 | 2641 | <25 | 93 | 3 | 4099 | 90819 | <25 |
| J2061 Sample-1 | <5 | 64 | 29 | 80 | 53 | 42929 | <25 |
| J2061 Sample-2 | <5 | <25 | 13 | 47 | 41 | 19574 | <25 |
| J2061 Sample-3 | <5 | 52 | 16 | 67 | 42 | 25439 | <25 |
| J2061 Sample-4 | <5 | 87 | 22 | 77 | 28 | 40954 | <25 |
| J2061 Sample-5 | <5 | 100 | 24 | 84 | 48 | 50172 | <25 |
| J2061 Sample-6 | <5 | 62 | 21 | 71 | 22 | 37118 | <25 |
| J2061 Sample-7 | <5 | 33 | 17 | 63 | 20 | 29116 | <25 |
| J2061 Sample-8 | <5 | 34 | 18 | 62 | 12 | 29297 | <25 |
| J2061 Sample-9 | <5 | 44 | 14 | 57 | 14 | 23050 | <25 |
| J2061 Sample-10 | <5 | 52 | 14 | 62 | 26 | 25313 | <25 |
| J2061 Sample-11 | <5 | 62 | 14 | 59 | 22 | 24096 | <25 |
| J2061 Sample-12 | <5 | 77 | 22 | 78 | 38 | 38740 | <25 |
| J2061 Sample-13 | <5 | 102 | 23 | 79 | 31 | 42183 | <25 |
| J2061 Sample-14 | <5 | 87 | 20 | 68 | 15 | 34931 | <25 |
| J2061 Sample-15 | <5 | 101 | 20 | 73 | 18 | 34967 | <25 |
| J2061 Sample-16 | <5 | 60 | 19 | 79 | 33 | 36205 | <25 |
| J2061 Sample-17 | <5 | 105 | 16 | 69 | 32 | 31894 | <25 |
| J2061 Sample-18 | <5 | 146 | 17 | 68 | 23 | 30957 | <25 |
| J2061 Sample-19 | <5 | 97 | 27 | 88 | 22 | 48844 | <25 |

| Sample ID | mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| | Ge | In | K | La | Li | Mg | Mn |
| MP-1b | <50 | 582 | 2280 | 66 | 126 | 282 | 506 |
| CZN-4 | <50 | 205 | 352 | <5 | 78 | 376 | 89 |
| J2061 Sample-1 | <50 | <100 | 42362 | 29 | 150 | 14772 | 731 |
| J2061 Sample-2 | <50 | <100 | 14152 | 13 | 79 | 6720 | 629 |
| J2061 Sample-3 | <50 | <100 | 19167 | 20 | 90 | 8219 | 624 |
| J2061 Sample-4 | <50 | <100 | 36409 | 26 | 128 | 14354 | 793 |
| J2061 Sample-5 | <50 | <100 | 43700 | 39 | 132 | 18167 | 804 |
| J2061 Sample-6 | <50 | <100 | 32673 | 25 | 101 | 13087 | 661 |
| J2061 Sample-7 | <50 | <100 | 22656 | 22 | 77 | 10194 | 618 |
| J2061 Sample-8 | <50 | <100 | 23872 | 21 | 77 | 9769 | 605 |
| J2061 Sample-9 | <50 | <100 | 16270 | 20 | 61 | 8279 | 835 |
| J2061 Sample-10 | <50 | <100 | 19344 | 19 | 60 | 8537 | 676 |
| J2061 Sample-11 | <50 | <100 | 16417 | 22 | 60 | 7942 | 580 |
| J2061 Sample-12 | <50 | <100 | 34460 | 27 | 93 | 14288 | 836 |
| J2061 Sample-13 | <50 | <100 | 42434 | 31 | 99 | 15145 | 759 |
| J2061 Sample-14 | <50 | <100 | 30091 | 23 | 82 | 12629 | 739 |
| J2061 Sample-15 | <50 | <100 | 29104 | 21 | 80 | 12329 | 684 |
| J2061 Sample-16 | <50 | <100 | 31320 | 22 | 80 | 13025 | 793 |
| J2061 Sample-17 | <50 | <100 | 25074 | 31 | 67 | 11102 | 971 |
| J2061 Sample-18 | <50 | <100 | 22622 | 50 | 67 | 10938 | 1018 |
| J2061 Sample-19 | <50 | <100 | 39570 | 26 | 118 | 19363 | 1249 |

| Sample ID | mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| | Mo | Na | Nb | Ni | P | Pb | S |
| MP-1b | 301 | 338 | <25 | 9 | 76 | 20755 | 135368 |
| CZN-4 | 13 | 262 | <25 | 12 | 149 | 1826 | 303308 |
| J2061 Sample-1 | <10 | 11392 | <25 | 41 | 645 | 164 | 4526 |
| J2061 Sample-2 | <10 | 14721 | <25 | 17 | 480 | 241 | 2479 |
| J2061 Sample-3 | <10 | 15368 | <25 | 24 | 580 | 357 | 1925 |
| J2061 Sample-4 | <10 | 10622 | <25 | 41 | 687 | 54 | 1491 |
| J2061 Sample-5 | <10 | 8494 | <25 | 46 | 746 | 1307 | 3491 |
| J2061 Sample-6 | <10 | 12072 | <25 | 34 | 659 | <25 | 494 |
| J2061 Sample-7 | <10 | 15387 | <25 | 26 | 598 | 26 | 514 |
| J2061 Sample-8 | 12 | 15293 | <25 | 30 | 621 | 32 | 1094 |
| J2061 Sample-9 | <10 | 19302 | <25 | 20 | 627 | 36 | 1260 |
| J2061 Sample-10 | <10 | 17976 | <25 | 23 | 674 | 34 | 896 |
| J2061 Sample-11 | <10 | 22593 | <25 | 19 | 629 | 33 | 903 |
| J2061 Sample-12 | <10 | 15959 | <25 | 36 | 629 | 68 | 2611 |
| J2061 Sample-13 | <10 | 11975 | <25 | 39 | 562 | 100 | 4127 |
| J2061 Sample-14 | 11 | 12450 | <25 | 35 | 682 | 55 | 392 |
| J2061 Sample-15 | 10 | 12131 | <25 | 31 | 658 | 56 | 424 |
| J2061 Sample-16 | <10 | 11643 | <25 | 33 | 665 | 220 | 419 |
| J2061 Sample-17 | <10 | 12952 | <25 | 27 | 662 | 863 | 783 |
| J2061 Sample-18 | <10 | 13467 | <25 | 30 | 718 | 720 | 583 |
| J2061 Sample-19 | <10 | 10320 | <25 | 50 | 1011 | 275 | 5415 |

| Sample ID | mg/kg | | | | | | |
|---|---|---|---|---|---|---|---|
| | Sb | Se | Sn | Sr | Ta | Te | Ti |
| MP-1b | 50 | <50 | 3427 | 8 | <50 | <50 | 568 |
| CZN-4 | <50 | 101 | <50 | 1 | <50 | <50 | 33 |
| J2061 Sample-1 | <50 | <50 | <50 | 186 | <50 | <50 | 4515 |
| J2061 Sample-2 | <50 | <50 | <50 | 141 | <50 | <50 | 2467 |
| J2061 Sample-3 | <50 | <50 | <50 | 134 | <50 | <50 | 3209 |
| J2061 Sample-4 | <50 | <50 | <50 | 173 | <50 | <50 | 4406 |
| J2061 Sample-5 | <50 | <50 | <50 | 148 | <50 | <50 | 4691 |
| J2061 Sample-6 | <50 | <50 | <50 | 159 | <50 | <50 | 4119 |
| J2061 Sample-7 | <50 | <50 | <50 | 145 | <50 | <50 | 3496 |
| J2061 Sample-8 | <50 | <50 | <50 | 166 | <50 | <50 | 3533 |
| J2061 Sample-9 | <50 | <50 | <50 | 136 | <50 | <50 | 3145 |
| J2061 Sample-10 | <50 | <50 | <50 | 141 | <50 | <50 | 3278 |
| J2061 Sample-11 | <50 | <50 | <50 | 127 | <50 | <50 | 3295 |
| J2061 Sample-12 | <50 | <50 | <50 | 207 | <50 | <50 | 4329 |
| J2061 Sample-13 | <50 | <50 | <50 | 198 | <50 | <50 | 4373 |
| J2061 Sample-14 | <50 | <50 | <50 | 157 | <50 | <50 | 4065 |
| J2061 Sample-15 | <50 | <50 | <50 | 152 | <50 | <50 | 3831 |
| J2061 Sample-16 | <50 | <50 | <50 | 163 | <50 | <50 | 3979 |
| J2061 Sample-17 | <50 | <50 | <50 | 155 | <50 | <50 | 3692 |
| J2061 Sample-18 | <50 | <50 | <50 | 166 | <50 | <50 | 3728 |
| J2061 Sample-19 | <50 | <50 | <50 | 258 | <50 | <50 | 4698 |

| Sample ID | mg/kg | | | | |
|---|---|---|---|---|---|
| | Tl | V | W | Zn | Zr |
| MP-1b | <50 | 8 | 1058 | 165163 | 98 |
| CZN-4 | <50 | 8 | 51 | 553299 | 15 |
| J2061 Sample-1 | <50 | 92 | <50 | 474 | 100 |
| J2061 Sample-2 | <50 | 40 | <50 | 356 | 51 |
| J2061 Sample-3 | <50 | 48 | <50 | 374 | 65 |
| J2061 Sample-4 | <50 | 81 | <50 | 223 | 91 |
| J2061 Sample-5 | <50 | 96 | <50 | 1289 | 101 |
| J2061 Sample-6 | <50 | 76 | <50 | 97 | 80 |
| J2061 Sample-7 | <50 | 54 | <50 | 117 | 75 |
| J2061 Sample-8 | <50 | 60 | <50 | 84 | 71 |
| J2061 Sample-9 | <50 | 50 | <50 | 101 | 64 |
| J2061 Sample-10 | <50 | 51 | <50 | 108 | 67 |
| J2061 Sample-11 | <50 | 49 | <50 | 78 | 80 |
| J2061 Sample-12 | <50 | 86 | <50 | 168 | 91 |
| J2061 Sample-13 | <50 | 89 | <50 | 132 | 91 |
| J2061 Sample-14 | <50 | 72 | <50 | 99 | 83 |
| J2061 Sample-15 | <50 | 67 | <50 | 104 | 83 |
| J2061 Sample-16 | <50 | 73 | <50 | 129 | 82 |
| J2061 Sample-17 | <50 | 61 | <50 | 168 | 86 |
| J2061 Sample-18 | <50 | 59 | <50 | 111 | 80 |
| J2061 Sample-19 | <50 | 91 | <50 | 414 | 109 |

Daniel Chevalier, MASc
Manager, Minerals Engineering Centre

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Inspiring Minds

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11-Jan-18

Research and Productivity Council,
921 College Hill Rd.,
Fredericton, N.B.,
E3B 6Z9
Attention: Neri Botha

Re: results of Au analysis using up to 30g fire assay, lead collection, AAS finish.

| Solids: | mg/kg |
|---|---|
| Sample | Au |
| **RPC PO 99621** | |
| J2061 Sample #1 | 0.118 |
| J2061 Sample #2 | 0.022 |
| J2061 Sample #3 | 0.692 |
| J2061 Sample #4 | 0.022 |
| J2061 Sample #5 | 1.246 |
| J2061 Sample #6 | 0.012 |
| J2061 Sample #7 | 0.018 |
| J2061 Sample #8 | 0.024 |
| J2061 Sample #9 | 0.016 |
| J2061 Sample #10 | 0.022 |
| J2061 Sample #11 | 0.012 |
| J2061 Sample #12 | 0.066 |
| J2061 Sample #13 | 3.445 |
| J2061 Sample #14 | 0.022 |
| J2061 Sample #15 | 0.026 |
| J2061 Sample #16 | 0.012 |
| J2061 Sample #17 | 0.014 |
| J2061 Sample #18 | 0.006 |
| J2061 Sample #19 | 0.527 |
| J2061 Sample #19 Dup. | 0.537 |

| Reference Standards | mg/kg Au |
|---|---|
| OxJ120 (2.365±0.017) | 2.357 |
| OxD107 (0.452±0.004) | 0.454 |
| OxQ115 (25.22±0.18) | 25.34 |

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12-Jan-18

Research and Productivity Council,
921 College Hill Rd.,
Fredericton, N.B.,
E3B 6Z9
Attention: Neri Botha

Re: Analysis on submitted solid samples.
Sulphate sulphur analysis using HCl leach, gravimetric BaSO4 precipitation finish.

**PO 99621**

| Sample | Wt. % | Wt. % Sulphate | | |
|---|---|---|---|---|
| | S (Total) | as S | as SO3 | as SO4 |
| J2061 Sample 1 | 0.351 | 0.012 | 0.030 | 0.036 |
| J2061 Sample 2 | 0.188 | 0.008 | 0.020 | 0.024 |
| J2061 Sample 3 | 0.152 | 0.007 | 0.017 | 0.020 |
| J2061 Sample 4 | 0.109 | 0.007 | 0.018 | 0.021 |
| J2061 Sample 5 | 0.293 | 0.012 | 0.029 | 0.035 |
| J2061 Sample 6 | 0.032 | 0.002 | 0.004 | 0.005 |
| J2061 Sample 7 | 0.033 | 0.002 | 0.006 | 0.007 |
| J2061 Sample 8 | 0.080 | 0.004 | 0.009 | 0.011 |
| J2061 Sample 9 | 0.094 | 0.008 | 0.021 | 0.025 |
| J2061 Sample 10 | 0.058 | 0.006 | 0.014 | 0.016 |
| J2061 Sample 11 | 0.066 | 0.005 | 0.011 | 0.014 |
| J2061 Sample 12 | 0.206 | 0.006 | 0.015 | 0.018 |
| J2061 Sample 13 | 0.336 | 0.006 | 0.015 | 0.018 |
| J2061 Sample 14 | 0.017 | 0.003 | 0.008 | 0.009 |
| J2061 Sample 15 | 0.016 | 0.002 | 0.006 | 0.007 |
| J2061 Sample 16 | 0.024 | 0.001 | 0.003 | 0.003 |
| J2061 Sample 17 | 0.050 | 0.004 | 0.011 | 0.013 |
| J2061 Sample 18 | 0.031 | 0.003 | 0.007 | 0.008 |
| J2061 Sample 19 | 0.443 | 0.006 | 0.015 | 0.018 |
| J2061 Sample 19-DUP | 0.427 | | | |
| NBM-1 | 0.276 | | | |

Daniel Chevalier, MASc
Manager, Minerals Engineering Centre

Report ID: 260218-IAS
Report Date: 15-Jan-18
Date Received: 09-Jan-18

# CERTIFICATE OF ANALYSIS
for
RPC-MIS DEPARTMENT

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Fax: 506.452.0594
www.rpc.ca

Attention: Neri Botha
**Project #: MIS-J2061**

## Analysis of Samples

| **Analytes:** | | NAG pH | NAG (pH 4.5) | NAG (pH 7.0) |
|---|---|---|---|---|
| **Units:** | | (units) | kg H2SO4/tonne | |
| **RL:** | | - | - | - |
| **RPC Sample ID** | **Client Sample ID** | | | |
| 260218-1 | J2061 sample 3 | 3.4 | 1.4 | 5.0 |
| 260218-2 | J2061 sample 6 | 6.2 | - | - |
| 260218-3 | J2061 sample 12 | 7.3 | - | - |

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Analyses were performed according to Section 15.2 of the *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (MEND 1.20.1).*

Ross Kean

A. Ross Kean, M.Sc.
Department Head
Inorganic Analytical Chemistry



Peter Crowhurst, B.Sc., C.Chem.
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 251040-IAS
Report Date: 24-Oct-17
Date Received: 29-Sep-17

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Attention: Neri Botha
**Project #: MIS-J2042**

## Analysis of Samples

| **Analytes:** | | NAG pH | NAG (pH 4.5) | NAG (pH 7.0) |
|---|---|---|---|---|
| **Units:** | | (units) | kg H2SO4/tonne | |
| **RL:** | | - | - | - |
| **RPC Sample ID** | **Client Sample ID** | | | |
| 251040-1 | I951408 | 3.0 | 3.9 | 5.4 |
| 251040-2 | I951421 | 3.1 | 3.4 | 4.8 |
| 251040-3 | I951423 | 5.3 | - | - |

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Analyses were performed according to Section 15.2 of the *Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (MEND 1.20.1).*

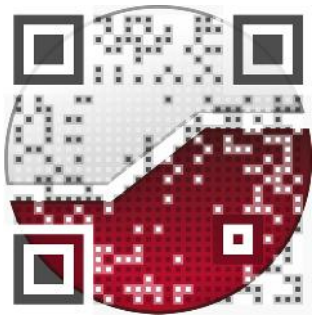
Ross Kean

A. Ross Kean, M.Sc.
Department Head
Inorganic Analytical Chemistry



Peter Crowhurst, B.Sc., C.Chem.
Analytical Chemist
Inorganic Analytical Chemistry

experience • knowledge • integrity



| | |
|---|---|
| civil | civil |
| geotechnical | géotechnique |
| environmental | environnementale |
| field services | surveillance de chantier |
| materials testing | service de laboratoire des matériaux |

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ANACONDA MINING INC.

# GOLDBORO MINING SITE

## HYDROGEOLOGY INVESTIGATION

### GOLDBORO, NOVA SCOTIA

WSP REF.: 171-16980-00

DATE : 28 MARCH 2018

CONFIDENTIAL

ANACONDA MINING INC.

# GOLDBORO MINING SITE

## HYDROGEOLOGY INVESTIGATION

### GOLDBORO, NOVA SCOTIA

CONFIDENTIAL

WSP REF.: 171-16980-00
DATE : 28 MARCH 2018

REPORT (PRELIMINARY VERSION)

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| VERSION | DATE | DESCRIPTION |
|---|---|---|
| 01 | March 28, 2018 | Preliminary version |
| | | |
| | | |
| | | |
| | | |
| | | |

# SIGNATURES

PREPARED BY

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Senior hydrogeologist

REVIEWED BY

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Principal Mining Engineer

This report was prepared by WSP for the account of Anaconda Mining Inc., in accordance with the professional services agreement. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP's best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

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**Reference to mention:**

WSP. 2018. *Goldboro Mining site, Hydrogeology Investigation, Goldboro, Nova Scotia*, report produced for Anaconda Mining Inc.. WSP Ref.: 171-16980-00. 53 pages and appendices.

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# 1 INTRODUCTION

WSP Canada Inc. (“WSP”) was commissioned by Anaconda Mining Inc. (Anaconda) in December 2017 to undertake a preliminary hydrological and hydrogeological investigation study on their Goldboro project site, located in Nova Scotia, Canada. This report presents WSP’s hydrogeological assessment of the Goldboro site, with a focus on groundwater components that may affect mining operations and the surrounding groundwater regime.

## 1.1 OBJECTIVES

The primary focus of this program was to characterise hydrogeological conditions surrounding and/or influencing the mining developments for the purpose of providing information for use in the preliminary design for the Goldboro mine, to Pre-feasibility levels. Within the framework of this program, the following objectives have been satisfied:

- Establish baseline conditions on site with respect to groundwater levels and quality;
- Develop a hydrogeological conceptual model;
- Identify and evaluate water management issues that could impact the project, such as mine dewatering and water supply, as well as other environmental aspects that could impact Goldbrook Lake.

## 1.2 SCOPE OF WORK

The scope of the preliminary hydrogeological characterization involved the following tasks:

- Review of existing geotechnical data;
- Estimate preliminary hydraulic conductivity values from bedrock metallurgical HQ boreholes through packer testing and short pump testing (packer testing in two existing vertical metallurgical boreholes and short pump tests in four existing vertical or angled HQ boreholes);
- Drilling three (3) boreholes in the site area overburden and perform material logging and sampling;
- Complete each borehole as a monitoring well;
- Perform permeability testing in shallow monitoring wells;
- Perform groundwater surface water sampling and analysis;
- Establish piezometry in the overburden and bedrock;
- Perform a chemical analysis of groundwater and surface water samples;
- Perform data interpretation;
- Develop a preliminary hydrogeological conceptual model; and
- Identify and evaluate water management issues and risks.
- The initial scope of work was slightly modified during the field work, as described in the following Methodology section.

# 2 METHODOLOGY

Field work associated with the bedrock included packer testing, piezometry, short term pumping tests and groundwater sampling as detailed below:

- Packer testing in two existing vertical boreholes of 195 m and 72 m depths;
- Short term pumping tests in 2 vertical and 2 inclined boreholes.
- Measurement of the water level in existing boreholes to determine the piezometry of the bedrock;
- Groundwater sampling after pumping and chemical analysis.

Field work associated with the overburden had the objective to collect data on stratigraphy, geotechnical properties and hydraulic conductivity of the soil that can be used for multiple studies (hydrogeologic baseline, EIA, geotechnical study) and give some preliminary indications on the existence of hydraulic connections between Gold Brook Lake and the future mine pit.

The field work for the overburden and surface included the following activities:

- Drilling, sampling of 4 boreholes, three of which were drilled down to the bedrock at a depth of 7 to 10 m. The forth borehole was added at the end of the drilling campaign for the installation of a shallow monitoring well in the till in order to obtain the hydraulic conductivity of the till;
- Installation of four (4) monitoring wells at each borehole location into the more conductive strata;
- Monitoring well development, groundwater sampling and chemical analysis, sieve analysis of soil samples,
- Hydraulic conductivity testing and water level measurement.
- Surface water sampling (2 samples) in order to evaluate the surface water ground water interactions.

Monitoring well locations were chosen to provide preliminary hydrogeologic conditions near the future pit, the proposed tailing storage facility (TSF),

The location of the monitoring wells were chosen in the field, during the site reconnaissance. Each location was chosen to represent areas of interest on the property, as follows:

- Proximity of the proposed pit and TSF;
- The polishing/settling pond
- The lower end of the Gold Brook Lake area, and near the southeast end of an existing pond overflow ditch.

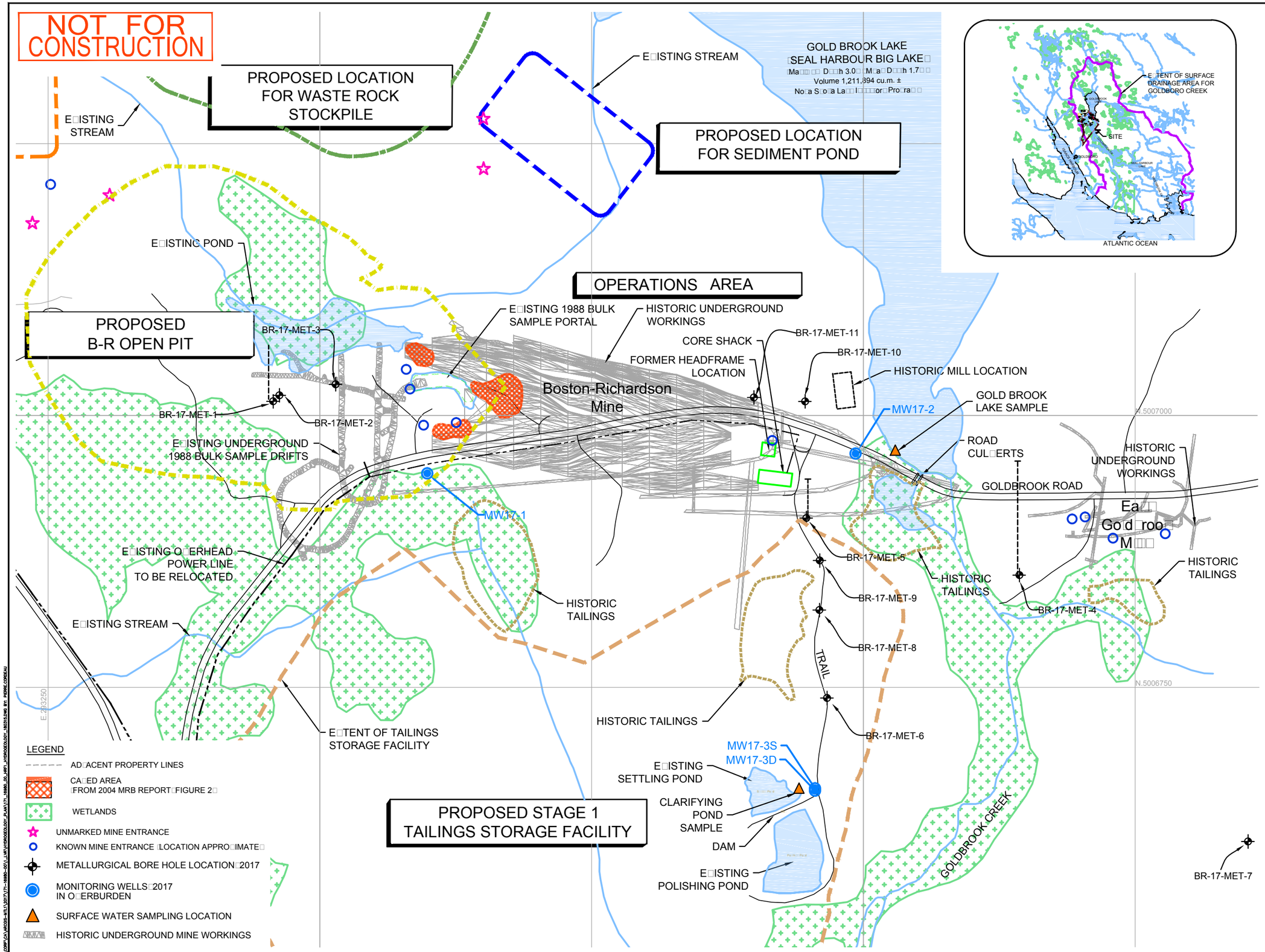
Field work summary is presented in Table 1 and a location map on Figure 1 below.

The hydrogeological assessment includes the synthesis of existing geological and structural information, piezometric survey, hydraulic conductivity results based on packer testing, short-term pumping tests and permeability testing, water circulation zones in bedrock, preliminary hydrogeological conceptual model and anticipated environmental impact considerations.

**Table 1 Goldboro Mine Hydrogeological Investigation Program**

| Borehole/ Monitoring Well ID | Northing (m) | Easting (m) | Ground Elevation | Overburden thickness (m) | Drilling Length (along angle) (m) | Depth (vertical correction) (m) | Dip | Packer testing | Pump testing | Piezometry | Ground water sampling | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BR-17-MET-1 | 5007012,97 | 293457,11 | 64,93 | 7,07 | 73 | 52 | -45 | | X | X | X | open hole in bedrock |
| BR-17-MET-2 | 5007018,54 | 293462,91 | 64,69 | 7,80 | 195 | 195 | -90 | X | X | X | X | open hole in bedrock |
| BR-17-MET-3 | 5007028,63 | 293514,67 | 65,76 | 9,00 | 72 | 72 | -90 | X | X | X | X | open hole in bedrock |
| BR-17-MET-4 | 5006853,25 | 294143,60 | 51,65 | 9,40 | 151 | 107 | -45 | | | X | | open hole in bedrock |
| BR-17-MET-5 | 5006905,68 | 293947,65 | 59,88 | 12,64 | 150 | 115 | -50 | | X | X | X | open hole in bedrock |
| BR-17-MET-6 | 5006740,19 | 293966,71 | 54,37 | 6,00 | 549 | 505 | -67 | | | X | | open hole in bedrock |
| BR-17-MET-7 | 5006608,27 | 294354,05 | 54,06 | 11,80 | 624 | 574 | -67 | | | X | | open hole in bedrock |
| BR-17-MET-8 | 5006821,02 | 293959,77 | 56,00 | 9,40 | 402 | 366 | -65,5 | | | X | | open hole in bedrock |
| BR-17-MET-9 | 5006866,59 | 293959,93 | 56,09 | 8,30 | 350 | 322 | -67 | | | X | | open hole in bedrock |
| BR-17-MET-10 | 5007012,92 | 293946,49 | 58,98 | 13,20 | 149 | 129 | -60 | | | X | | open hole in bedrock |
| BR-17-MET-11 | 5007016,56 | 293899,40 | 61,81 | 13,50 | 149 | 129 | -60 | | | X | | open hole in bedrock |
| MW17-01 | 5006946,75 | 293598,89 | 59,99 | 7,20 | | 7,5 | n/a | | | X | X | overburden / top of bedrock |
| MW17-02 | 5006964,94 | 293992,91 | 55,56 | 6,20 | | 7,4 | n/a | | | X | X | overburden / top of bedrock |
| MW17-03D | 5006655,03 | 293955,61 | 52,37 | 9,00 | | 10,5 | n/a | | | X | X | overburden / top of bedrock |
| MW17-03S | 5006657,01 | 293955,85 | 52,67 | - | | 5,4 | n/a | | | X | X | overburden |

Notes: MW- monitoring well, BR-17-MET-metallurgical drill hole
DATUM MTM Zone 4




CLIENT:

Anaconda Mining GOLDBORO PROJECT

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ELEVATION VALUES ARE IN METERS.

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FIGURE 1 –

HYDROGEOLOGICAL FIELD WORK

DOCUMENT NUMBER: 171-16980-00

SHEET #: 1 OF 1

ISSUE: HYDROGEOLOGICAL REPORT

DATE OF: MARCH 15, 2018

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LAST EDITED: 3/15/2018 9:33

## 2.1 SITE RECONNAISSANCE AND PREPARATION

A site reconnaissance visit was conducted on December 6th, 2017. The following activities were completed during site reconnaissance :

- WSP personnel recorded general site conditions and location of existing boreholes accompanied by an Anaconda representative;
- Organize site clearing and site access activities;
- Validate proposed monitoring wells locations on site, , and
- Assess the presence of underground utilities with Anaconda personnel.

Access to the existing borehole locations chosen for the pumping tests and packer tests was problematic due to heavy rain during the time of the visit. A soft soil wetland was present between the access road to boreholes BR-17-1, BR-17-2 and BR-17-3. Logan Drilling had timber swamp mats available at the site and an excavator to place them.

Site preparation for the monitoring well locations included trimming of alders and small trees to allow for sufficient work space around the drill rig. Site and access preparation caused some delays in the work program.

## 2.2 PACKER TESTING

Packer testing was conducted in existing exploration boreholes drilled earlier in 2017. The packer testing equipment consisted of a series of Bimbar packer bladders with perforated pipe installed between packer bladders. The pump for water injection is a Bean Buckhorn pump model Bean 420, with the capability of producing a maximum flowrate of 20 gpm and developing 1000 psi pressure.

The packer system from top to bottom is as follows:

- Top packer sits on the landing shoulder of the core barrel and is used to seal the core barrel;
- Middle packer sits below the coring bit and is used to seal the upper portion of the borehole;
- Perforated steel pipe located between the middle packer and the lower packer, used to inject water in the desired zone;
  - A testing zone length of 2.225m was used in the first packer test from BR-17-03 after which the perforated pipe was adjusted to 3.40m,
  - A testing zone length of 3.40m was used for the remaining tested zones.
- Bottom packer sits below the perforated pipe and is used to seal the borehole at the bottom of the test zone

The three packers are connected with inflation hose and are inflated simultaneously from the surface using nitrogen.

The packer testing system uses the core barrel to inject water to the desired test zone and requires the coring barrel to be seated above the test zone. The packer testing system is lowered through the core barrel and rods to the desired testing zone where it is seated on the landing shoulder. The packers are inflated with nitrogen to isolate the testing zone. The zone is then injected with water from the surface at varying levels of pressure. The flow of water over time is monitored and noted for each pressure level.

The targeted zones in existing boreholes BR-17-MET-2 and BR-17-MET-3 were determined using available acoustic and televiewer data survey completed by DGI Geoscience Inc. (DGI) in 2017 as well as geotechnical borehole logs (WSP 2017). The zones were generally chosen based on the depth of open joints or fractures and borehole diameter enlargement indicated by caliper and acoustic survey results.

The packer testing program was successful with the exception of those tests attempted in zones deeper than approximately 115m and 134m in BR-17-MET-2. The failure of these tests was attributed to the injection water bypassing through the uneven surface on the rock wall in the borehole resulting in a failure of the test methodology and no hydraulic conductivity test data for those particular stratigraphic zones.

## 2.3 DRILLING, INSTALLATION AND DEVELOPMENT OF MONITORING WELLS

Drilling for the installation of the monitoring wells was conducted using a CME-75 mounted on a wheel based carrier, supplied by Logan Geotechnical Drilling. Initially, hollow stem augers were to be used to advance the boreholes, however due to the frequent presence of boulder and cobbles sized particles in the boreholes, it was determined that hollow stem augers would not be adequate. The holes were advance using HQ diamond core drilling whenever cobbles and boulders were encountered. Sampling was conducted using a split-spoon sampler in the soil matrix of the boreholes as often as practical with varying levels of success. Sample recovery was not successful where boulders or cobble sized particles caused refusal to advancement of the split spoon. In monitoring wells MW17-02 and MW17-03D, cobble and boulders were abundant and did not allow for significant sampling of the soil matrix. While sampling was attempted at several depths during the advancement of the borehole, minimal samples were retrieved and the quality of the samples was impacted due to the injection of water necessary for the coring operation.

The well locations are shown Figure 1. Monitoring well construction details are displayed in the borehole logs in Appendix B.

Four (4) monitoring wells were installed on the subject site in December 2017 as part of this study. The program included the construction of three wells encased a short depth into the bedrock (MW17-01, MW17-02, MW17-03D) and one shallow well encased within the till overburden (MW17-03S). All monitoring wells except MW17-03S, were constructed with a portion of the screened section embedded within the bedrock and the remaining section within the soil just above the bedrock. The shallow monitoring well was constructed within the till overburden soil unit. The groundwater monitoring well network was constructed to evaluate groundwater levels, predict horizontal and vertical groundwater flow direction and to identify groundwater/surface water interaction.

All monitoring well were constructed with 50 millimetres (mm) diameter Schedule 40 polyvinyl chloride (PVC) risers and slotted screen (0.020” slot width). The base of the monitoring well was covered with a solid push-in style PVC well point to prevent the influx of groundwater and sediment from the base of the monitoring well. Silica sand was placed in the annular space as a filter pack for the well screen and was continued up to approximately 0.3 to 0.6 m above the top of the screen. A bentonite seal was installed in the annular space above the silica sand filter pack to seal and isolate the well from surface water and shallow groundwater infiltration. The bentonite seal was installed to generally correspond with the soil and bedrock interface or to isolate the hydrogeological zone of interest within the borehole profile. All monitoring wells were completed with steel above grade lockable protective casings.

Once installed, the wells MW17-03D and MW17-03S were developed manually, and MW17-01 and MW17-02 were developed using a surface pump. The materials used during the manual development of the monitoring wells included monitoring well dedicated Waterra (5/8”) tubing equipped with a foot valve. The monitoring wells MW-1 and MW17-02 were developed using the “Power fist 1”, a gas powered mechanical pump as well as monitoring well dedicated poly pipe equipped with a foot valve.

## 2.4 LOCATION AND ELEVATION SURVEY

The elevation and coordinates survey was performed by Anaconda Mining Inc. employees. It should be noted that the survey was completed prior to the installation of the monitoring wells MW17-02 and MW17-03D.

Therefore, ground elevations provided for those wells represent the general elevation of the area where the monitoring wells were located and can be expected to be within one metre of the actual ground coordinates. Monitoring well MW17-03S located at a 2 m distance north of MW17-03D will be surveyed soon, therefore approximate coordinates were used for this report.

## 2.5 HYDRAULIC TESTING

Hydraulic testing was conducted in all the installed monitoring well locations in the form of rising head and falling head tests. The tests were monitored using Diver Water Level Dataloggers and with manual measurements from the surface using a Waterra Water Level Meter. The Diver Water Level Dataloggers were installed near the bottom of the wells, and fixed using polyester string, water was subsequently removed or added rapidly from/to the wells for the rising head and falling head test, respectively.

Pump testing was also conducted in several existing boreholes, including BR-17-01, BR-17-02, BR-17-03 and BR-17-05. The materials used for the pump testing included a Grundfos submersible water pump, IPEX poly pipe (1" dia.), flow meter apparatus and a portable gas generator to supply power to the submersible pump. The pump testing consisted of pumping water from existing boreholes. While monitoring the water level in the well being pumped, the water level in nearby wells is also monitored using Diver Water Level Dataloggers. Water flow rate to the well being tested was monitored using an in-line flow meter installed between the pump and discharge conduit.

## 2.6 GROUNDWATER AND SURFACE WATER SAMPLING

Water samples were collected for analysis at several location throughout the site. Groundwater samples were taken from the four (4) installed monitoring wells. The monitoring well water samples were taken after the wells were developed with plastic disposable bailer. New bailers were used for each monitoring well. The bailers were left in the monitoring wells for future use.

Groundwater samples were also taken from the four (4) existing boreholes in which pump testing was conducted. The samples were taken at the end of the pump testing from a sampling valve installed on the flow meter apparatus.

Surface water samples were also collected at two (2) locations at the site (Figure 1). This included one sample from the Goldbrook Lake and one sample from the polishing pond. The samples were taken from the edge of the water bodies using clean jars and transferred to the sample bottles.

# 3 SITE CONDITIONS

## 3.1 REFERENCES

The description of the site conditions is based on previous property owner or consultant reports and publically available literature. These sources are listed in chronological order of their production or in the case of the Nova Scotia Groundwater atlas, the date it was most recently updated.

- Exploration Orex Inc., Environmental Assessment Report for a Proposed Gold Mine Project at Goldboro, Guysborough County, Nova Scotia,1990 (Orex, 1990)
- Nova Scotia Department of Natural Resources (Gavin W. Kennedy, John Drage ), Hydrogeologic characterization of Nova Scotia's groundwater regions , 2009 (Kennedy and Drage, 2009)
- AECOM Canada Inc., Environmental Assessment Report (Class 2 Undertaking), Goldboro LNG – Natural Gas Liquefaction Plant and Marine Terminal, 2013 (AECOM, 2013)
- Minetech International Ltd., Preliminary Economic Assessment Report on the Goldboro Propery, Goldboro, Nova Scotia, 2014 (Minetech, 2014)
- W.G. Shaw & Associates Ltd., Goldbrook Lake, Goldboro, Guysborough County, Nova Scotia, Technical Report to Accompany an Application for a Water Withdrawal Approval, 2018 (W.G. Shaw & Assoc., 2018)
- WSP Canada Inc., Goldboro Project Preliminary Economic Assessment, 2018 (WSP, 2018)
- Nova Scotia Online Groundwater Atlas, online resource. (NSGW Atlas, 2014)

Full report references can be found at the end of this report.

## 3.2 TOPOGRAPHY AND SURFACE DRAINAGE

The site is located within the Goldbrook Lake watershed as shown on Figures 1 and 8. Its catchment area is approximately 9.8 $km^2$. The Goldbrook Lake is approximately 75 hectares (W.G. Shaw & Associates Ltd., 2018). The region surrounding the project area is characterized by hilly terrain expressed through mild topographic highs and lows that can vary between 55 and 85 m above sea level and that transition with gentle slopes. From the project area, a very gentle slope descends towards the south (W.G. Shaw & Associates Ltd., 2018).

The topography of the site provides a series of valleys which produce wetlands within the site, the natural overland drainage path flows from the northwest side to the southeast property line with an approximate high point of 70 m and a low point of 45 m resulting in an overall grade change of 2.2%. Runoff from the site currently flows overland or is conveyed through one of the six existing culverts before discharge into Goldbrook Creek, on through Seal Harbour Lake and ultimately to the Atlantic Ocean. The property also receives external runoff flows from the west (Preliminary Hydrology Study, WSP 2018).

Locally the ground surface is considered hummocky, with dry topographic highs and moist topographic lows (W.G. Shaw & Associates Ltd., 2018). There are a number of soil types in the area that are a product of variable drainage within the glacial till. Drainage patterns can develop based on topography as well as silt content and compaction of the material among other factors. Significant peat deposits have developed on the northwest shore of Gold Brook Lake where topographic depressions with poor drainage characteristics are present as well as within the flood plain zone of Gold Brook (Orex, 1990).

Drainage within the study area has been influenced by previous mining activity. The area located on the southwest shore of Goldbrook was historically occupied by the original gold mill. Two tailing ponds are located south of the

lake. These ponds were historically used for the disposal of arsenic and cyanide waste (Orex, 1990). A small pond of probable anthropogenic origin is located west of Goldbrook Lake and discharges into Goldbrook Lake by means of a small stream (Figure 1). Goldbrook Lake drains out by means of the Goldbrook which extends south 8 km to the Atlantic Ocean. (W.G. Shaw & Assoc., 2018).

Monthly precipitation data for Years 2004 to 2014 obtained from the local Environment Canada station located at Malay Falls indicates a total average yearly precipitation over this ten year period of 1452 mm (W.G. Shaw & Assoc., 2018).

# 3.3 GEOLOGY

## *3.3.1 SURFICIAL GEOLOGY*

### REGIONAL SURFICIAL GEOLOGY

The Nova Scotia Groundwater Atlas identifies the surficial geology of the area to be composed of 6 units: bedrock, hummocky ground morraine, glacial fluvial deposits (kame fields and esker systems), organic deposits, silty drumlin, stony till plain (ground moraine). These are described briefly as follows and their location is shown on the Figure 2 below:

- Bedrock: this unit is expressed as basins and knobs with a thin till cover. The surficial map of Nova Scotia does not identify any within the region however previous consultant reports the structure of the underlying bedrock is expressed, although not often (Orex, 1990).
- Hummocky ground morraine: there is a significant source of this unit located approximately 8 km to the north west of the Goldbrook Lake. This till material is composed of a mixture of gravel, sand, and mud often sandy and stony; loose, with inclusions of waterlain sediments. Characteristics notable for agricultural development include stoniness, rapid drainage, and erodibility. Factors important to consider for construction include shallow depth, stoniness and high water table; poor buffering capacity for acid rain.
- Glacial fluvial deposits (kame fields and esker systems): these are located around the perimeter of Isaac's Harbour. They are composed of gravel, sand and silt, diamicton layers, poorly to well bedded, horizontal to angular beds, faulting and collapse features are common.
- Organic deposits: there are many organic deposits identified on the surficial geology map in the region. Although not identified on the Nova Scotia atlas, are organic deposits observed around the north limit of Goldbrook Lake. These areas are generally described as bogs and swamps filled with sphagnum moss, peat, gyttja and clay.
- Silty drumlin: this unit is composed of siltier till, a higher percentage of distant source material including red clay. This material generally provides the best agricultural land in the region. It is characterized by moderate drainage and stoniness; as well as moderate to good buffering capacity for acid rain because of transported calcareous bedrock components. There is a small silty drumlin deposit located approximately 7 km west of the site on the western shore of Country Harbour.
- Stony till plain (ground moraine): the site is located on this geological unit which is described as stony, sandy matrix, material derived from local bedrock sources. Thickness is reported between 2 and 20 m. The origin of the material is proposed to be released from the base of ice sheets during melting. The atlas reports the significance of this material to have moderate limitations to crop use due to stoniness, rapid drainage and erodibility. Factors that may affect construction are a high water table and poor buffering capacity for acid rain.