Appendix D-2

2022 Waste Rock, Quarry and Tailings Monitoring Report, Doris and Madrid Mines, Hope Bay Project

AGNICO EAGLE

FINAL

2022 Annual Geochemistry Monitoring Report

Hope Bay Mine, NU

Agnico Eagle Mines Ltd.

SRK Consulting (Canada) Inc. ▪ CAPR002393 ▪ March 2023

FINAL

2022 Annual Geochemistry Monitoring Report

Hope Bay Mine, NU

Prepared for:
Agnico Eagle Mines Ltd.
145 King Street East, Suite 400
Toronto, ON, M5C 2Y7
Canada

+1 416 947 1212
www.agnicoeagle.com

Prepared by:
SRK Consulting (Canada) Inc.
2600-320 Granville Street
Vancouver, BC V6C 1S9
Canada

+1 604 681 4196
www.srk.com

Reg. No.: EGBC 1003655

Lead Author: Melanie Cox, FGS; Brooklyn Derry, EIT (SK); Jessica Evans; CGeol; Jocelyne Plourde, PEng (BC) **Initials:** JP/MC/JE/BD

Reviewer: Lisa Barazzuol, PGeo (NT/NU) **Initials:** LB

File Name:
HB_2022AnnualReport_CAPR002393_FINAL_20230316.docx

Suggested Citation:
SRK Consulting (Canada) Inc. 2023. 2022 Annual Geochemistry Monitoring Report. FINAL. Prepared for Agnico Eagle Mines Ltd.: . Project number: CAPR002393. Issued March. 2023.

Cover Image(s):
Pad T, Hope Bay 2022

Contents

Tables

Figures

Appendices

Useful Definitions

This list contains definitions of symbols, units, abbreviations, and terminology that may be unfamiliar to the reader.

ABA	Acid base accounting
ARD	Acid rock drainage
BV	Bureau Veritas Laboratories
CPR	Crown Pillar Recovery
CPRT	Crown Pillar Recovery Trench
CRM	Certified reference materials
DQO	Data Quality Objective
DTMF	Dissolved concentration exceeds Total for Field-filtered Metals sample
EC	Electrical conductivity
HCT	Humidity cell test
LOD	Limit of detection
LOR	Limit of Reporting
ML	Metal leaching
NP	Neutralization potential
ORP	Oxidation reduction potential
PCP	Pollution control pond
QA/QC	Quality assurance/quality control
SFE	Shake flask extraction
SGS	SGS Canada Inc.
TIA	Tailings impoundment area
TDS	Total dissolved solids
TSS	Total suspended solids
WRP	Waste rock pile

Executive Summary

Agnico Eagle Mines Ltd. (AEM) retained SRK Consulting (Canada) Inc. (SRK) to prepare a report documenting the metal leaching and acid rock drainage (ML/ARD) monitoring programs carried out in 2022 at the Doris and North Madrid mines at the Hope Bay project. These activities are required as part of AEM's Water Licence 2AM-DOH1335 Amendment No. 2 (the Water Licence; NWB 2018) and materials management plans, including the *Waste Rock, Ore and Mine Backfill Management Plan, Hope Bay Project, Nunavut* [WROMP] (AEM 2022a) and *Quarry Management Plan* [QMP] (AEM 2022b). In 2022, Agnico executed the required geochemical monitoring programs for according to the permit requirements outlined in the Water Licence. This interpretive report fulfills the regulatory requirements for the geochemical monitoring programs executed by Agnico for waste rock, tailings, quarry rock and construction rock. Recommendations for future geochemical monitoring are provided.

Summary of Mining Activities

In 2022, the following activities occurred:

- Doris mine produced 142,509 t of waste rock, of which 15,423 t remained underground and used as backfill, and 127,086 t was placed in the surface waste rock stockpile on Pad T.
- Quarrying activities included three blasts at Quarry 2.
- Infrastructure construction included using 48,606 t of waste rock from Pad T to build the aqua dam (July 2022) and the start of the interim dike construction (December 2022), both of which are within the Doris TIA Pond.
- Infrastructure construction using quarry rock from Quarry 2 included construction of the core storage pad at Doris and Sump 4 downstream of the Madrid North Waste Rock Storage Area (WRSA).
- Freshet seepage monitoring of construction rock and waste rock at Madrid North and Doris; the Overburden Stockpile and reclaimed Madrid North portal pad at Madrid North.
- Undergroud seepage monitoring of backfilled stopes in Doris mine.
- There were no tailings produced in 2022 and no mining activities at Madrid North.

Doris Waste Rock

Conclusions from the Doris waste rock monitoring program are summarized as follows:

- Underground workings in 2022 were geologically described as 80% mafic volcanics with trace sulphide and 2-5% quartz-carbonate veining; 5% sericite altered mafic volcanics with up to 2% sulphide and 5-10% quartz-carbonate veining; and `5% diabase dyke with trace sulphide and trace quartz-carbonate veining. The geological inspection of the underground mine and surface stockpile on Pad T were consistent except for the minor amounts of light brown felsic dyke observed in the Pad T stockpile.

- SRK collected four samples of mafic metavolcanics (1a), one sample of altered mafic metavolcanics (1as) and three samples of diabase dyke (11c) from the surface stockpile on Pad T. All samples were classified as non-PAG on the basis of TIC/AP and NP/AP.
- SFE tests indicated alkaline pH (8.4 to 9.9). Nitrate concentrations and chloride values ranged from 0.6 to 59 mg/L and 12 to 240 mg/L, respectively and are indicative of blasting residuals present on waste rock surfaces. High chloride values previously indicated the presence of residual drilling brines however brines were not used undgeround in 2022 and represent naturally saline groundwater that is present in areas of the mine.

Conclusions from the freshet seepage monitoring at Doris waste rock (referred to as the Doris waste rock influenced area) are:

- Seepage at the Doris waste rock influenced area was characterized according to three groups:
  - Group 1 – at the toe of the access road (waste rock influence with high EC of ~20,000 µS/cm).
  - Group 2 – downstream toe of the waste rock/ore stockpile on Pad I (waste rock influence with lower EC of ~10,000 µS/cm). One sample was collected from standing water and is not interpreted to be seepage.
  - Group 3 – southwest toe of the Doris camp pad (quarry rock with EC of ~470 µS/cm).
- A summary of seepage chemistry for theses groups is as follows:
  - pH for all seepage samples was non-acidic (7.8 to 8.0).
  - The major ion chemistry differed between the Group 1 and Group 2 samples and is summarized as follows:
  - Group 1: Cation chemistry was dominated by sodium (3,000 to 3,100 mg/L) and calcium (450 to 480 mg/L), while major anion chemistry was dominated by chloride (5,900 mg/L for all) and sulphate (720 and 730 mg/L).
  - Group 2: Major cation chemistry was dominated by sodium (990 and 310 mg/L) and calcium (700 and 170 mg/L), while major anion chemistry was dominated by chloride (3,100 and 510 mg/L) and sulphate (250 and 430 mg/L).
  - Group 3: Cations were dominated by calcium (49 to 60 mg/L) and sodium (14 to 16 mg/L) and anion chemistry was dominated by alkalinity (69 to 71 mg/L as $CaCO_3$) and chloride (69 to 93 mg/L).
  - Prior to 2020, seepage at the toe of the road had the chemical signature of waste rock and was more dilute that waste rock contact water the seepage was mixed with other flows. Since 2020, the higher chloride and ammonia concentrations in the road seepage samples suggests a loading source other than waste rock that has been postulated to be detoxified tailings. In 2022 nitrate concentrations were lower in the access road samples than in the stockpile samples.
  - Concentrations of trace elements in the stockpile and access road samples were roughly equivalent or within an order of magnitude of difference. Access road samples had marginally higher concentrations of arsenic (0.0025 to 0.0032 mg/L), cadmium (0.00037 to 0.00045 mg/L), and nickel (0.0095 to 0.010 mg/L) and the stockpile seepage sample (PCP-02) had higher concentrations of aluminum (0.043 mg/L), iron (0.81 mg/L), cobalt (0.015 mg/L), and selenium (0.0032 mg/L).
  - Dissolved metals concentrations for Group 3 samples were roughly equivalent to reference seepage samples except for manganese (0.0087 to 0.018 mg/L) and molybdenum (0.023 to 0.024 mg/L)

  - Trends for all parameters waste rock influenced samples (Group1 and Group 2) were either decreasing or stable.

- All drainage from the Doris camp pad, including seepage captured in the collection sumps downstream of the toe of the access road, is pumped to the sediment control pond (SCP) prior to transfer to the TIA. In 2022, water from the SCP accounted for 1.4% of total inflow volumes entering the TIA and 0.4% of the total volume stored in the TIA.

Madrid Waste Rock

The 2022 sample set representing waste rock influenced water quality included two freshet seepage samples from the downstream toe of Madrid North WRSA contact water pond (CWP) berm and monthly water quality samples from the CWP, Sump 1, Sump 2, Sump 3, and Sump 4. Conclusions from waster quality monitoring at the Madrid North WRSA are:

- All samples were non-acidic and EC values ranged from 340 to 4,000 µS/cm.
- The major cation chemistry for all Madrid WRSA samples was dominated by sodium (29 to 610 mg/L) and calcium (13 to 170 mg/L), except for Sump 2 which was dominated by magnesium (33 to 130 mg/L) and calcium (23 to 76 mg/L. Anion chemistry for all samples was dominated by chloride (35 to 980 mg/L) and alkalinity (47 to 250 mg/L as $CaCO_3$). Select samples (MMS1-N, Sump 1, and the seepage from the downstream toe of the CWP berm) also contained elevated sulphate concentrations (67 to 470 mg/L). Concentrations of all major ions were variable with time.
- High chloride concentrations indicate residual drilling brine from underground waste rock. Lower chloride concentrations at Sump 1, Sump 2 and Sump 3 compared to the Madrid CWP and the placement location of underground waste rock at the Madrid WRSA, suggesting that the increasing chloride concentrations in the Madrid CWP are a result of evapoconcentration within the water collection ponds.
- Nitrogen concentrations are indicative of residual explosives present on the surfaces of underground waste rock. Ammonia (0.029 to 0.60 mg/L) and nitrate (0.86 to 3.5 mg/L) concentrations have decreased over time and in 2022 were highest at Sump 1 and Sump 3, suggesting contact water from underground waste rock is draining to these sumps. Concentrations at other locations varied, ranging from 0.0096 to 0.21 mg/L as N for ammonia (except for the July Sump 4 sample, 0.71 mg/L as N) and from <0.025 to 2.3 mg/L as N for nitrate.

Quarry Rock

Conclusions from the quarry monitoring program are:

- Geological inspections of the active quarry faces as Quarry 2 indicated that the rock was mafic metavolcanics (1a). Fibrous actinolite was not present.
- Quarry 2 ROQ rock samples were classified as non-PAG. Metals content were below the screening criterion suggesting no appreciable enrichment. SFE results reported pH ranging between 8.8 to 9.4 and low soluble metals concentrations. The sample results of the geochemical monitoring program of Quarry 2 indicate that the quarry rock has a low risk of ML/ARD.

Construction Rock

Conclusions from the as-built construction monitoring program are:

- Quarry 2 rock used to construct the Doris core storage pad and Sump 4 was mafic metavolcanics (1a) and waste rock sourced from Pad T to construct the aqua dam within the Doris TIA pond was a mixture of mafic metavolcanics and altered mafic metavolcanics (1a/1as).
- All samples were classified as non-PAG. Metals content were below the screening criterion suggesting no appreciable enrichment. SFE results indicate leachate pH between 8.8-9.4 with low soluble metals concentrations.
- The sample results of the geochemical monitoring program of as-built construction rock indicate that the construction rock placed has a low risk of ML/ARD.

Conclusions from freshet seepage monitoring of construction rock at Doris (core storage pad and road to the vent raise) and Madrid North (Sump 4 downstream of the Madrid North WRSA) are:

- Field pH was 8.6 and field EC was 180 µS/cm. Cation chemistry was dominated by calcium (15 mg/L) and sodium (11 mg/L) and anion chemistry dominated by alkalinity (49 mg/L as $CaCO_3$) and sulphate (16 mg/L).
- Concentrations of nitrogen species and sulphate were near equivalent to Group 3 (quarry rock) samples from the Doris camp pad. Trace metal levels were low. Results indicate a low risk of ML.
- Sump 4 intercepts contact water from Madrid waste rock. Water quality results for Sump 4 are presented in the Marid North waste rock section.
- There was no seepage observed along the access road to the Doris vent raise.

Tailings

As no tailings were produced in 2022, the scope of the tailing monitoring program was limited to the seepage surveys of underground backfilled stopes (TL-11).

Conclusions from the underground seepage monitoring program are:

- pH ranged between 7.4 and 8.4. EC ranged from 8,600 to 18,000 µS/cm for all samples except for two samples (4900 Fresh Air Raise and Level 54 samples collected in June), which had EC values of 220 and 1,200 µS/cm, respectively. Since 2020, EC values have been up to five times lower than seepage samples collected from 2017 to 2019.
- All 2022 underground seepage samples except for the two low EC samples had the major ion composition characteristic of seawater indicating saline groundwater; however, concentrations were more dilute than seawater.
- The decrease in EC from 2020 onwards coincides with a decrease in concentrations of a number of key parameters including dissolved boron, chromium, cadmium, cobalt, copper, nickel, silver, selenium and zinc. This suggests dilution by saline groundwater as indicated by the major ion chemistry.

- Sulphate concentrations were lowest in the 4900 Fresh Air Raise and Level 54 samples (17 and 180 mg/L). Sulphate in all other samples was higher (450 to 1,300 mg/L) and equivalent to the historic sample set, however the saline groundwater is a source of sulphate for the 2022 seepage samples.
- The results suggest that seepage samples collected between 2017 and 2019 represent contact water of detoxified tailings whereas samples collected since 2020 are likely contact water mixed with saline groundwater.

Madrid North Overburden Stockpile and Portal Pad

Freshet seepage monitoring of the Madrid North overburden stockpile and portal pad has been conducted annual annually since 2020 when high saline seepage drained from each of these facilities.

An investigation of the loading sources from the overburden stockpile concluded that seepage chemistry was likely a result of the thawing of saline interstitial porewater that had the chemical signature of seawater with localized pockets having concentrations higher than seawater that were conceptually due to cryoconcentration (SRK 2021e). In addition, overburden porewater was characterized by elevated concentrations of dissolved iron, cobalt, manganese, and nickel. Conclusions from seepage monitoring at the Madrid North overburden stockpile are:

- All seepage observed was non-acidic.
- Overall, seepage from the Overburden Stockpile in 2022 indicated that concentrations of major ions, ammonia, nitrate, nitrite were roughly equivalent to concentrations in 2021 and lower concentrations than 2020. The major ion chemistry indicates saline water with a seawater composition continues to drain from the southern toe of the stockpile porewater.
- Concentrations of cadmium, cobalt, manganese, nickel, selenium, and zinc in seepage samples from 2021 and 2022 were roughly equivalent and one or two orders of magnitude lower than 2020. Notably, arsenic concentrations were roughly equivalent for all stations and since 2020.
- The significant decrease in concentrations of major ions and trace elements in seepage within two year validates the conceptual geochemical model that the source loading to seepage chemistry in 2020 was the thawing and draining of frozen saline porewater from the Overburden Stockpile and that loadings have subsequently decreased.

An investigation of the loading sources from the portal pad concluded that conceptually the source loads were not due to weathering of waste rock but accelerated rates of metal leaching in the presence of high ionic strength drilling brine (SRK 2021b). Prior to the 2021 seepage surveys, AEM remediated the portal pad by removing areas of the pad that were saline with disposal within the Naartok East Crown Pillar Recovery at Madrid North. Accordingly, the results of the 2021 and 2022 seepage survey are an indicator of the reclamation activities. Conclusions from 2022seepage monitoring at the Madrid North reclaimed portal pad are:

- All seepage observed was non-acidic.

- Concentrations of calcium (38 to 150 mg/L) and chloride (64 to 310 mg/L) were lower by one order of magnitude compared to 2020. Sulphate concentrations (16 to 30 mg/L), which are an indicator of sulphide oxidation, were lower than 2021 and 2020 values.
- Nitrogen nutrients, which are present in or residuals of explosives, were roughly equivalent to 2021 concentrations and all values were significantly lower than 2020 concentrations, including ammonia (two orders of magnitude lower), nitrate (three to five orders of magnitude lower) and nitrite (up to two orders of magnitude lower).
- Trace element concentrations were roughly equivalent to 2021 concentrations and all values were lower than 2020 concentrations including dissolved cadmium (one to two orders of magnitude), cobalt (two orders of magnitude), iron (three to four orders of magnitude), manganese (one order of magnitude), nickel (one order of magnitude), selenium (one order of magnitude) and zinc (one order of magnitude).

Recommendations

Freshet seepage monitoring can be discontinued at the following stations:

- Madrid North portal pad: the results of the seepage survey indicat that reclamation activities have improved seepage chemistry.
- Access road to Doris vent raise: a seepage survey has been conducted since 2019 and seepage has never been observed.

1 Introduction

Agnico Eagle Mines Ltd. (AEM) retained SRK Consulting (Canada) Inc. (SRK) to prepare a report that documents the metal leaching and acid rock drainage (ML/ARD) monitoring conducted in 2022 at Doris and Madrid, Hope Bay Project. The geochemical monitoring programs are documented in Water Licence 2AM-DOH1335 Amendment No. 2 (the Water Licence; NWB 2018) and materials management plans, including the *Waste Rock, Ore and Mine Backfill Management Plan, Hope Bay Project, Nunavut* [WROMP] (AEM 2022a) and *Quarry Management Plan* [QMP] (AEM 2022b). The geochemical monitoring requirements outlined in the Water Licence and management plans are summarized in Table 2-1 to Table 2-4 in Section 2.

This document was prepared by SRK as a stand-alone report to be appended to AEM's 2022 NWB Annual Report. It was prepared using information and data obtained by AEM and SRK.

The report is organized as follows:

- **Section 2 – Monitoring Requirements and Conformity Assessment:** An overview of commitments in the Water Licence and management plans is presented along with an assessment of compliance in 2022.
- **Section 3 - Summary of Material Management:** An overview of materials movement and management in 2022.
- **Section 4 – Methods and QA/QC**: An overview of sample collection, analytical test work and data interpretation methods used to assess ML/ARD and quality assurance and quality control (QA/QC) measures employed during sample collection, lab testing and data analysis.
- **Section 5 – Doris Waste Rock Monitoring**: A summary of the monitoring program and assessment of ML/ARD potential of waste rock from Doris mine.
- **Section 6 – Madrid North Waste Rock Monitoring:** A summary of the monitoring program and assessment of ML/ARD potential of waste rock from Madrid North mine.
- **Section 7 – Quarry and Construction Rock Monitoring:** A summary of the monitoring program and assessment of ML/ARD potential of blasted quarry rock from Quarries 2 and as-built construction rock.
- **Section 8 – Tailings and Process Water Monitoring:** A summary of geochemical monitoring of flotation tailings detoxified tailings supernatant and solids and seepage from dewatered detoxified tailings placed as backfill in stopes of the Doris mine.
- **Section 9 – Seepage Monitoring:** A summary of monitoring and results from the seepage survey of Doris and Madrid waste rock and selected as-built construction rock.

2 Monitoring Requirements and Conformity Assessment

2.1 Waste Rock

2.1.1 Doris Mine

Monitoring plans for Doris waste rock are provided in the WROMP (AEM 2022a), which is a part of the Water Licence (NWB 2018). The program includes geological inspection and geochemical monitoring of the waste rock from the underground mine and crown pillar recovery (CPR), routine monitoring of the Doris Contact Water Pond 1 (CWP1) and annual seepage survey of waste rock temporarily stored on surface.

A summary of the requirements of AEM (2022a) is summarized in Table 2-1.

Table 2-1:Doris Waste Rock Monitoring Requirements and 2022 Monitoring Summary

Monitoring Reference	Monitoring Item	Report Section	2022 Monitoring Summary
AEM (2022a)	Conduct waste rock geological inspections: i) underground at the blast face by AEM qualified geologists, with internal record keeping and ii) surface waste rock stockpile (Pad T);	Section 3.1 - Mine Backfill Monitoring; Table 3-1 – Overview of Mine Backfill Monitoring Programs and Objectives for Doris, Madrid North, Madrid South and Boston	Surface inspection completed. Refer to Section 5.
AEM (2022a)	Geochemical sampling program for CPR waste rock to confirm that it is suitable for use as construction rock: sampling frequency of one sample for every 20,000 tonnes;	Section 3.2 - Use of Waste Rock for Construction	Not applicable. CPR reclaimed with placement backfill and cover.
AEM (2022a), NWB (2018)	Monitoring and recording the volumes of waste rock mined, waste rock management designations (mineralized and non-mineralized) and placement locations, including any waste rock that is approved and used for construction (pending confirmatory test work and approval from NWB); to be reported monthly;	Section 3.1 - Mine Backfill Monitoring; Table 3-1 – Overview of Mine Backfill Monitoring Programs and Objectives for Doris, Madrid North, Madrid South and Boston	Completed. Refer to Section 5. All waste rock managed as mineralized.
NWB (2018)	Annual water quality monitoring will be carried out at a surveillance monitoring station ST-2 located in the Doris Contact Water Pond 1; parameters include pH, TSS, total ammonia, nitrate, nitrite, total sulphate, total cyanide, total oil and grease, alkalinity, chloride, and total metals by ICP-MS;	Schedule I – Conditions Applying to General and Aquatic Effects Monitoring; Table 3 –Monitoring Program	Completed. Refer to Appendix D of the Hope Bay Project 2022 Nunavut Water Board Annual Report.
AEM (2022a)	Annual inspections by a qualified geochemist of the designated nonmineralized areas of the waste rock pile to confirm that there are no areas	Section 3.1.3 – Annual Inspections and Geochemical Characterization of Waste	Completed. Eight samples geochemically characterized from Pad

Monitoring Reference	Monitoring Item	Report Section	2022 Monitoring Summary
	with elevated amounts of sulphide mineralization, and inspections of the designated mineralized areas of the pile to look for signs of weathering and oxidation of the sulphides; representative sample set of waste rock to be collected;	Rock; Table 3-1 – Overview of Mine Backfill Monitoring Programs and Objectives for Doris, Madrid North, Madrid South and Boston	T. Refer to Section 5 and Appendix A.
AEM (2022a)	Seep surveys along the down-gradient toe of the waste rock pile and below the Doris Contact Water Pond 1 and access road throughout operations. The seep survey will be completed at the same time and will follow the same procedures as used for the seep survey around other infrastructure areas. However, given the increased importance of obtaining samples from this area, all distinct seeps in the immediate vicinity of the waste rock pile (i.e., any seeps spaced more than 50 metres apart) will be tested for a full suite of laboratory parameters; and	Section 3.1.4 – Seep Survey	Completed. Refer to Section 9.
AEM (2022a), NWB (2018)	An annual waste rock monitoring report, including the results and an interpretation of the geochemical data and a summary of all mitigation activities undertaken as a result of monitoring will be prepared and submitted to the NWB by March 31 of the year following sample collection (i.e., within 6 months of collecting the final quarry samples).	AEM (2022a): Section 3.3 - Documentation and Reporting NWB (2018): Part F - Conditions Applying to Waste Deposit and Management	Completed. Refer to Section 5.

Sources: This document.

2.1.2 Madrid North Mine

Except for waste rock from the Naartok East CPR, waste rock monitoring at Madrid North is outlined in the WROMP (AEM 2022a), which is a part of the Water Licence (NWB 2018). Geochemical monitoring of waste rock from NE CPR is documented in *Classification of Waste Rock in Support of Segregating Construction Rock from Naartok East Crown Pillar Recovery, Madrid North, Hope Bay* (SRK 2019). SRK (2019) documents a site-based geochemical classification method to identify waste rock from NE CPR with a low risk of ML/ARD (non-PAG and with low potential for neutral pH arsenic leaching) and recommendations for operational implementation of a program to classify and segregate waste rock as suitable for use as construction rock.

A summary of the requirements for Madrid North waste rock monitoring as outlined in SRK (2019) and AEM (2022a) is summarized in Table 2-2.

Table 2-2:Madrid North Waste Rock Monitoring Requirements and 2022 Monitoring Summary

Monitoring Reference	Monitoring Item	Report Section	2022 Monitoring Summary
AEM (2022a)	Conduct waste rock geological inspection at underground blast face by AEM geologists, with internal record keeping.	Section 3.1 - Mine Backfill Monitoring; Table 3-1 – Overview of Mine Backfill Monitoring Programs and Objectives for Doris, Madrid North, Madrid South and Boston	Not applicable. Refer to Section 6.
SRK (2019)	Geological inspection and pXRF analysis of Naartok East Crown Pillar Recovery (NE CPR) drill cuttings for geochemical classification of waste rock to determine suitability of waste rock as construction rock.	Section 5 – Field Classification of Construction Rock	Not applicable.
TMAC (now AEM) program documented in SRK (2020)	Operational application of field based geochemical classification program of NE CPR waste rock (SRK 2019) to identify and segregate run-of-mine waste rock geochemically suitable as construction rock.	Section 3.1.1 – Field-Based Classification of Waste Rock as Construction Rock	Not applicable in 2022.
AEM (2022a), NWB (2018)	Monitoring and recording the volumes of waste rock mined and placement locations, including waste rock that is approved for use in construction (pending confirmatory test work and approval from NWB); to be reported monthly.	Section 3.1 - Mine Backfill Monitoring; Table 3-1 – Overview of Mine Backfill Monitoring Programs and Objectives for Doris, Madrid North, Madrid South and Boston	Not applicable. Refer to Section 6.
AEM (2022a)	Annual inspections by a qualified geochemist of Madrid North WRSA to confirm that there are no areas with elevated amounts of sulphide mineralization, and inspections of the designated mineralized areas of the pile to look for signs of weathering and oxidation of the sulphides; representative sample set of waste rock to be collected.	Section 3.1.3 - Annual Inspections and Geochemical Characterization of Waste Rock; Table 3-1 – Overview of Mine Backfill Monitoring Programs and Objectives for Doris, Madrid North, Madrid South and Boston	Not applicable. Refer to Section 6.
Refer to footnotes[1]	Geochemical verification sampling program of underground waste rock with samples collected from underground mine. Sample frequency of one sample for every 20,000 t as per underground sampling program for underground mines.	--	Sample not collected because no waste rock was mined. Refer to Section 6.
AEM (2022a)	Seep surveys along the down-gradient toe of the Madrid North WRSA and below the CWP and access road throughout operations and for at least 2 years following mining and backfilling activities. The seep survey will be completed at the same time and will follow the same procedures as used for the seep survey	Section 3.1.4 – Seep Survey	Completed. Refer to Section 9.

Monitoring Reference	Monitoring Item	Report Section	2022 Monitoring Summary
	around other infrastructure areas. However, given the increased importance of obtaining samples from this area, all distinct seeps in the immediate vicinity of the waste rock pile (i.e., any seeps spaced more than 50 meters apart) will be tested for a full suite of laboratory parameters.		
NWB (2018)	Routine water quality monitoring (sampled twice annually, weekly water levels) will be carried out at a surveillance monitoring station MMS-1, located at the Madrid North CWP.	Schedule I - Conditions Applying to General and Aquatic Effects Monitoring; Table 3 –Monitoring Program	Completed. Refer to Appendix D of the Hope Bay Project 2022 Nunavut Water Board Annual Report.
AEM (2022a), NWB (2018)	An annual waste rock monitoring report, including the results and an interpretation of the geochemical data will be prepared and submitted to the NWB by March 31 of the year following sample collection (i.e., within 6 months of collecting the final quarry samples).	AEM (2022a): Section 3.3 - Documentation and Reporting NWB (2018): Part F - Conditions Applying to Waste Deposit and Management	Not applicable. Refer to Section 6.

Sources: This document.

Notes:

[1] Not in AEM (2022a). Executed monitoring based on advice of SRK.

2.2 Quarry and Construction Rock

Details on the monitoring program for quarries and as-built construction rock for Doris and Madrid infrastructure are provided in the QMP (AEM 2022b). A summary of the requirements is provided in Table 2-3.

Table 2-3:Quarry and Construction Rock Monitoring Requirements and 2022 Monitoring Summary

Monitoring Item	Report Section	2022 Monitoring Summary
Visual inspections and sampling at the quarry face by site geologist or geochemist at least once per week when the quarries are in active use.	Section 3.1.1- Quarry Visual Inspection	Completed. Refer to Section 7.
Collection and testing of two samples per year from each active quarry for total sulphur analysis, and, if the sulphur content exceeds 0.1%, the samples would be subjected to full ABA tests. A subset of samples will be subjected to shake flask extraction tests. The ABA tests would be done on the whole sample and on the -2mm size fraction to determine whether there is any concentration of sulphides in the fine component of the rock.	Section 3.1.3 – Quarry Rock Sampling	Completed for Quarry 2.

Monitoring Item	Report Section	2022 Monitoring Summary
Quarry sumps will be monitored as described under the routine site water quality monitoring program.	Section 3.1.4 – Quarry Sump Monitoring	Quarry sump monitoring was not required in 2022 because it was not necessary to discharge water from Quarry 2.
Visual inspection of each mined-out quarry will be completed at least once per year in order to ensure that the site remains safe, and no environmental or public health and safety concerns have developed. If potentially acid generating (PAG) waste rock has been placed in the quarries, the area will be inspected to ensure that the 2 m cover remains intact, and no seeps are evident.	Section 3.3.1	Completed. PAG rock has not been placed in the quarries.
After construction of roads and other infrastructure components that were constructed using the quarry or waste rock since the previous inspection will be inspected by a qualified geologist or geochemist to verify that the rock used in construction was suitable for that purpose. During the inspection, samples (<1" and -2 mm fractions, when available) will be collected for total sulphur analysis. If the sulphur content exceeds 0.1%, the samples will be subjected to full ABA tests. A subset of samples will be subjected to shake flask extraction tests.	Section 3.3.2	Completed. Refer to Section 7.
A seep survey will be conducted around all infrastructure components that have been constructed or modified within the previous year. Field pH, electrical conductivity (EC), Eh, and temperature readings will be collected. A water sample will be collected from a minimum of 10% of the identified ephemeral seeps and will be submitted for laboratory analyses, as detailed in Quarry Management Plan (AEM 2022b). Established reference stations will also be monitored to provide basis for comparing this to waters that are not influenced by the development activities.	Section 3.3.2	Completed. Refer to Section 9.
An annual quarry monitoring report, including the results and an interpretation of the geochemical data will be prepared and submitted to the NWB by March 31 of the year following sample collection (i.e. within 6 months of collecting the final quarry samples).	Section 4 – Documentation and Reporting	Completed. Refer to Section 7.

Sources: This document.

Notes:

[1] Monitoring program outlined in AEM (2022b).

2.3 Tailings

The geochemical monitoring program for flotation tailings slurry and detoxified tailings are specified in Schedule I, Tables 1 to 3 of the Water Licence (NWB 2018) and includes the following monitoring stations: process plant tailings water discharge (TL-5), flotation tailings solids (TL-6), detoxified tailings solids[1] (TL-7A), detoxified tailings supernatant (TL-7B) and seepage from underground backfilled stopes (TL-11). Station TL-7B was added to the Water Licence (NWB 2018) and monitoring commenced in 2019. A summary of the monitoring requirements is presented in Table 2-4.

[1] Detoxified tailings are referred to as cyanide leach residue in the Water Licence. Station TL-7A supercedes station TL-7.

Table 2-4:Tailings Monitoring Requirements and 2022 Monitoring Summary

Monitoring Item	Report Section	2022 Monitoring Summary
Sampling of the supernatant from flotation tailings slurry discharge (TL-5) once per month for the analysis of pH, TSS, ammonia, nitrate, nitrite, sulphate, cyanide (WAD, free and total), and total metals by ICP-MS. Cyanate and thiocyanate should be analyzed quarterly.	Schedule I – Conditions Applying to General and Aquatic Effects Monitoring; Table 3 – Monitoring Program	Not applicable, processing plant not operational in 2022.
Maintain monthly records of tonnages and locations of disposal for flotation tailings (TL-6) discharged into the TIA and detoxified tailings (TL-7A) placed in the underground mine in stopes as backfill.	Schedule I – Conditions Applying to General and Aquatic Effects Monitoring; Table 3 – Monitoring Program	Not applicable, processing plant not operational in 2022.
Analysis of a homogenized monthly composite sample of flotation tailings solids (TL-6), from equal amounts of weekly samples, for total sulphur, sulphate sulphur, TIC, and trace element content.	Schedule I – Conditions Applying to General and Aquatic Effects Monitoring; Table 3 – Monitoring Program	Not applicable, processing plant not operational in 2022.
Monthly sampling and analysis of detoxified tailings solids (TL-7A) for moisture content.	Schedule I – Conditions Applying to General and Aquatic Effects Monitoring; Table 3 – Monitoring Program	Not applicable, processing plant not operational in 2022.
Monthly sampling and analysis of detoxified tailings filtrate (TL-7B) for total metals by ICP-MS (including sulphur), TIC, WAD cyanide, cyanate and thiocyanate.	Schedule I – Conditions Applying to General and Aquatic Effects Monitoring; Table 3 – Monitoring Program	Not applicable, processing plant not operational in 2022.
Bi-annual seepage surveys of underground backfilled stopes with opportunistic sampling of seepage (TL-11) for the analysis of pH, electrical conductivity (EC), trace metals by ICP-MS, alkalinity, acidity, sulphate, cyanide (WAD, free, and total), total ammonia, nitrate and nitrite.	Schedule I – Conditions Applying to General and Aquatic Effects Monitoring; Table 3 – Monitoring Program	Completed*. Refer to Section 8.
Preparation of an annual tailings monitoring report to be submitted to the NWB by March 31 of the year following sample collection and including the results and interpretation of the geochemical data for tailings solids (TL-6, TL-7A, TL-7B), and results and interpretation of seepage data from the bi-annual underground seepage survey of backfilled stopes (TL-11).	Schedule B – General Conditions	Completed. Refer to Section 8.

Sources: This document.

Notes:

* Cyanide (WAD, free and total) was omitted from the chain of custody form and therefore not analyzed during the June 2022 seepage survey.

3 Summary of Material Production and Management

3.1 Waste Rock

3.1.1 Doris

In April 2015, underground mining was re-initiated at Doris, with placement of waste rock on surface commencing in October 2015. In 2022, a total of 142,509 t of waste rock was produced from mining activities in the Doris mine, of which 15,423 t remained underground and used as backfill and 127,086 t was placed in the surface waste rock stockpile on Pad T. In addition, approximately 48,606 t of waste rock was hauled from the surface waste rock stockpile on Pad T and used to construct the aqua dam (July 2022) and an access dike (December 2022), both of which are within the Doris TIA Pond (Table 3-1). No waste rock was removed from Pad T to be used as backfill in the underground mine.

Table 3-1:Summary of 2022 Waste Rock Placement Locations and Volume, Doris Mine

Doris Mine	Source Location	Placement Location	Volume (t)	Total (t)
Underground	Underground	Backfill in Stopes	15,423	142,509
		Pad T	127,086	
	Pad T	Backfill in Stopes	0	48,606
		Surface Construction	48,606	

Sources: AEM 'UG Waste Production 2022 (002).xlsx'.

3.1.2 Madrid North

In 2019, mining was initiated at Madrid North with the development of the Naartok East Crown Pillar Recovery (NE CPR) in July and then the decline for the underground mine in December. Mining at Madrid North was halted at the end of March 2020 due to the Covid-19 global pandemic. Mining activities at Madrid North briefly restarted between January and February 2021, with the development of the underground decline.

In 2022, no mining activities at Madrid North occurred.

3.2 Quarry Development

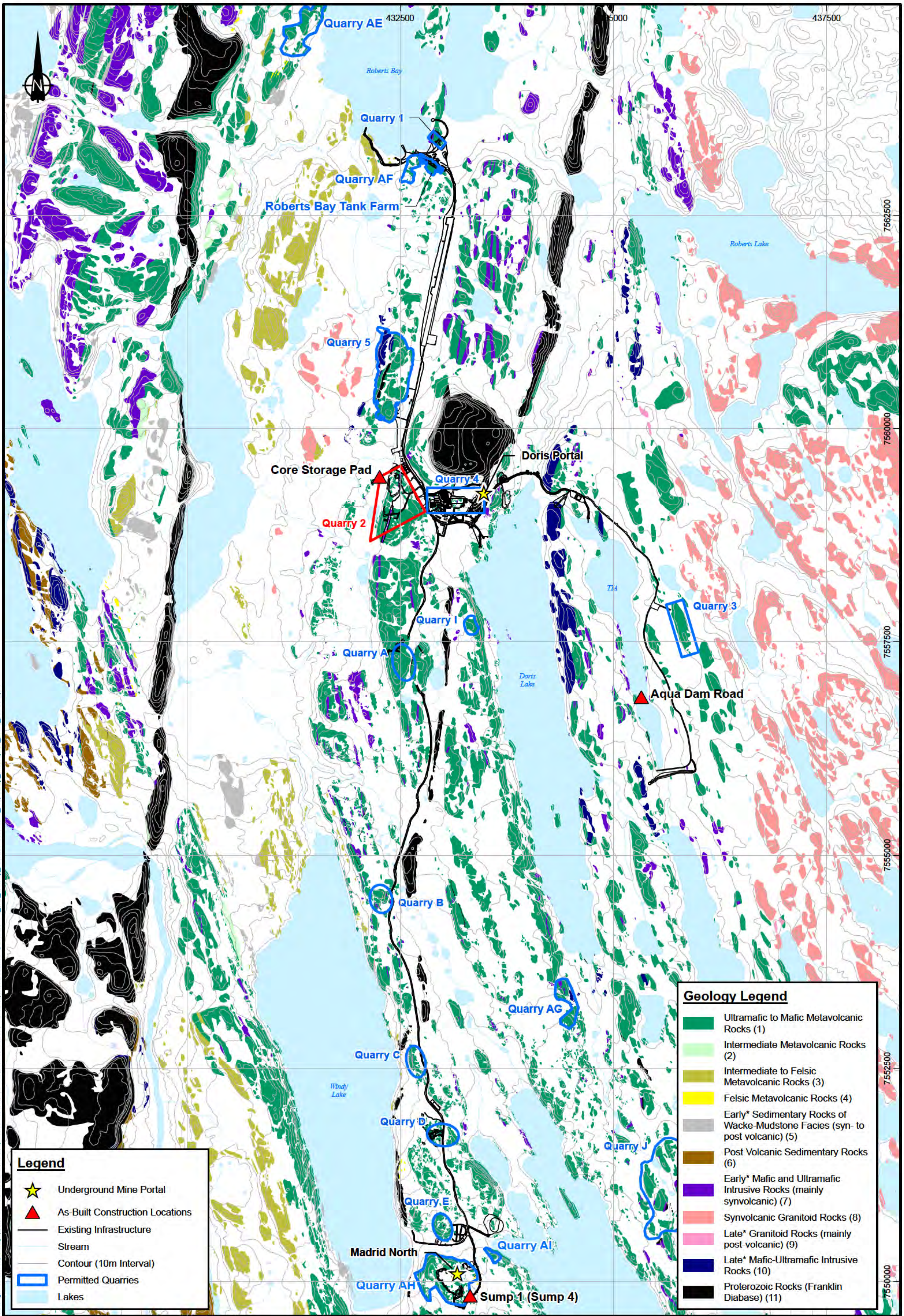
In 2022, there were three blasts at Quarry 2 (Figure 3-1).

3.3 Construction Rock

Between August 2021 and August 2022, rock was utilized for construction and subsequently monitored in August 2022. Rock was sourced from Quarry 2 to construct the core storge area at Doris and Sump 4 located downstream of the Madrid North Contact Water Pond (CWP), and the waste rock was stockpile on Pad T at Doris to construct the aqua dam within the TIA pond (Figure 3-1)

3.4 Tailings

The process plant has been in care and maintenance since mid-October 2021 and did not operate in 2022.



C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\ACAD Vancouver\GIS\FIGURES (mxd document)\20220601_HB_Quarry_AK\CAPR002393_HopeBay_QuarryAK_2023_rev01.aprx

0 250 500 750 1000
Meters

Notes:
1. Coordinate System: NAD 1983 UTM Zone 13N
2. Base Topo Data: CanVec, Natural Resources Canada

srk consulting

SRK JOB NO.: CAPR002393

LAYOUT: Active Quarries

AGNICO EAGLE

HOPE BAY

2022 Quarry and As-Built Construction Monitoring Locations

DATE:	APPROVED:	FIGURE:
Mar 2023	JP	3-1

4 Methods and QA/QC

Geochemical monitoring programs include geological inspections and laboratory analysis. Geological inspections and analytical field tests (Sections 4.1 and 4.2.1) are completed by either SRK or AEM. Laboratory analysis is carried out by external commercial labs (Section 4.2.2). Data interpretation (Section 4.4) is completed by SRK. In this report, all laboratory results have been rounded to two significant figures to account for analytical uncertainty.

4.1 Inspections

4.1.1 Geological Inspections

Geological inspections are completed as part of the geochemical monitoring programs for waste rock, as-built construction rock and run-of mine (ROM) quarry rock. The inspections include documentation of the lithology according to the Hope Bay geological logging codes, sulphide content (type, quantity and habit), carbonate content (type, quantity and fizz test with 10% HCl), evidence of oxidation and for ROM quarry rock the presence or absence of fibrous actinolite. Each sample collected for geochemical characterization is also geologically described.

4.1.1.1 Waste Rock

The Waste Rock, Ore, and Mine Backfill Management Plan (AEM 2022a) outlines the two methods of geological inspection for waste rock, which are summarized as follows:

- Underground: Routine underground geological inspections are completed at the blast face by AEM site geologists, who inspect and document the fronts and back at the blast face and maintain internal records.
- Surface: Annual inspection of the surface waste rock stockpile on Pad T.

4.1.1.2 Quarry and As-Built Construction Rock

The Hope Bay Project Quarry Management Plan (QMP; AEM 2022b) outlines two types of geological inspection:

- Active quarries: During periods of active blasting, a visual geological inspection is completed by an AEM geologist at least once per week to verify geological characteristics match the expected rock types and the absence of fibrous forms of actinolite.
- Post-Construction: Following the construction of infrastructure or roads, a geological inspection is conducted of as-built construction rock to confirm the geological characteristics of the placed rock.

Protocols for geological inspections are documented in AEM (2022b).

4.1.2 Seepage Survey

4.1.2.1 Waste Rock

The scope of the waste rock seepage survey is documented in the Waste Rock, Ore, and Mine Backfill Management Plan (AEM 2022a). In summary, the freshet survey involves walking the toe of all waste rock stockpiles. At locations where seepage is flowing from waste rock, field measurements are documented and a water sample collected for analysis (Sections 4.2.1.2 and 4.2.2.2, respectively).

4.1.2.2 Construction Rock

The scope of the construction rock seepage survey is documented in the Hope Bay Project Quarry Management Plan (QMP; AEM 2022b). In summary, the freshet survey involves walking the toe of all infrastructure, roadways, and berms that were constructed the previous year. Seepage stations are established where water is flowing into and out of construction rock material. At each seepage station, samples and field measurements are collected as per Section 4.1.2.1. As per the QMP, the construction seepage survey is conducted once following construction.

4.1.2.3 Underground Mine Stopes

The scope of the underground seepage survey of detoxified tailings placed as backfill in underground mine stopes is defined by the Waste Rock, Ore, and Mine Backfill Management Plan (AEM 2022a). In summary, the underground seepage survey involves inspecting the base of underground stopes that are safe to access walking the toe of all infrastructure, roadways, and berms that were constructed the previous year. Seepage stations are established where water is flowing into and out of construction rock material. At each seepage station, samples and field measurements are collected as per Section 4.1.2.1. As per the QMP, the construction seepage survey is conducted once following construction.

For waste rock

At all sample locations, a sample is collected for water quality analysis and field measurements of electrical conductivity (EC), pH, temperature, oxidation-reduction potential (ORP), and flow rates (where possible) recorded.

4.2 Analytical Methods

4.2.1 Field Test Work

Test work conducted in the field is conducted when samples are collected.

4.2.1.1 Solids Samples

Rinse tests completed on sieved fine fractions (-2 mm) of samples and involved mixing a 1 to 1 ratio of distilled water and solids and measuring the resulting pH and electrical conductivity (EC).

4.2.1.2 Seepage Samples

Field measurements of pH, conductivity, temperature and oxidation reduction potential are determined using handheld meters that are calibrated daily. Seepage flow rates were measured in the field by measuring intercepted flow and stopwatch.

4.2.2 Laboratory Test Work

4.2.2.1 Solids Samples

Solids testing for waste rock, as-built construction samples, and quarry[2] samples was completed at Bureau Veritas (BV) in Burnaby, BC, methods included:

- Acid Base Accounting (ABA):
  - Paste pH (Sobek et al. 1978).
  - Total sulphur by Leco.
  - Sulphate sulphur by hydrochloric (HCl) acid leach based on a modified version of ASTM Method D 2492-02.
  - Total inorganic carbon (TIC) where the sample is reacted with HCl and the evolved CO_2 is measured by Leco.
  - Fizz test and modified neutralization potential (MEND 1991).
- Metals analysis by aqua regia digest followed by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) multi-element scan of 8 major elements (e.g., aluminum, calcium, magnesium, sodium, potassium, iron, sulphur) and 29 trace elements (e.g., arsenic, zinc, copper, cadmium, lead).
- Shake flask extraction (SFE) tests on the as-received and sieved -2 mm fraction using deionized water with a 3:1 liquid to solid ratio and a 24-hour shaking period (MEND 2009). Leachates from the SFE tests are analyzed for pH, conductivity, total dissolved solids (TDS), total alkalinity, sulphate, chloride, nitrate, ammonia, acidity and dissolved metals (including mercury and selenium).

4.2.2.2 Water Samples

Routine water quality monitoring samples from the sumps and contact water pond downstream of the Madrid North WRSA, freshet seepage samples (Sections 4.1.2.1 and 4.1.2.2) and underground seepage samples (Section 4.1.2.3) were submitted to ALS Laboratory, in Yellowknife, NT for the analysis of the following parameters:

[2] All quarry samples are submitted for total sulphur by Leco analysis. If results return a total sulphur value greater than 0.1%, additional testwork outlined is completed on a representative subset of sieved sample (-2 mm).

- Physical parameters: pH, hardness, EC, total suspended solids (TSS), total dissolved solids (TDS, freshet seepage only).
- Major anions: alkalinity, acidity, chloride, sulphate.
- Nutrients: ammonia, nitrite, nitrate and phosphorus (freshet seepage only).
- Total metals by ICP-MS (Madrid North WRSA routine samples only).
- Dissolved metals by ICP-MS. Samples were filtered and preserved at the time of sampling in the field (seepage samples only).
- Free, total and WAD cyanide (underground seepage only).
- Total cyanide (Madrid North WRSA routine samples only).

4.3 QA/QC

A number of QA/QC programs were executed as part of the geochemical monitoring programs at Hope Bay and are summarized as follows:

- AEM (2022c): AEM executed this Quality Assurance and Quality Control Plan (2022c) during collection of quarry rock and seepage water quality samples (Sections 7 to 9). SRK has not reviewed AEM (2022c).

SRK (Vancouver_Geochem_QC_Guidance_rtc_rev14: SRK's QAQC program includes an assessment of field sampling procedures, evaluation of laboratory inhouse QAQC methods and overall data review:

- Field and travel blanks are analyzed to identify any potential contamination within samples.
- A comparison of field and laboratory measurements is undertaken to assess potential changes in composition during storage and transit or identify any issues attributed to field equipment or the recording of field results.
- Field duplicate samples are submitted blindly for analysis and results are assessed to determine the reproducibility of the data.
- SRK reviews in-house laboratory QAQC data including results of method blank samples, laboratory split duplicates and standard/certified reference materials.
- An ion balance is calculated on all water samples to determine the balance between positively charged cations and negatively charged anions.
- Where total and dissolved metals are reported, SRK reviews the data to ensure that total metals are consistently reported higher than dissolved metals.
- For acid base accounting data, SRK compares total sulphur with sulphate sulphur results and sulphur determined by ICP to sulphur determined by Leco furnace. Neutralization potential data is compared with paste pH, fizz test results and total inorganic carbon to ensure a reasonable correlation.

SRK conducts QC checks for all data received that are documented in the QA/QC section for each monitoring program, e.g. Sections 5.2.1 and 7.2.1.

4.4 Data Interpretation

4.4.1 ARD Classification

Sulphide sulphur is calculated as the difference between total sulphur and sulphate. Acid potential (AP) was calculated using total sulphur.

The ratio of TIC to AP provides a measure of the ARD potential of the sample with ARD classification summarized as follows:

- Non-potentially ARD generating (non-PAG): TIC/AP > 3 or total sulphur ≤ 0.1%.
- Uncertain: 1 ≤ TIC/AP < 3 and total sulphur > 0.1%.
- PAG: TIC/AP < 1 and total sulphur > 0.1%.

For samples with Modified NP, interpretations of values of NP/AP were the same as TIC to AP. The criteria for TIC/AP and NP/AP values follows guidance from MEND (2009) and the sulphur criterion is based on Day and Kennedy (2015), which takes into consideration ability of acid-consuming silicate minerals to neutralize weak acidity. Samples with a total sulphur content <0.1% are classified as non-PAG regardless of the TIC/AP ratio.

4.4.2 ML Potential

Trace element data for solid samples were compared to ten times average crustal abundance (CA) for basalt (Price 1997) as an indicator of enrichment. Selenium could not be assessed because concentrations were below the detection limit or within the range of analytical error.

5 Waste Rock from Doris Mine

The purpose of the monitoring program is to geochemically characterize waste rock stored on surface and compare that the geochemical characteristics with the baseline geochemical characterization program (SRK 2015a).

5.1 Methods

5.1.1 Geological Inspection

Underground

Based on underground geological mapping by AEM, waste rock intersected by the Doris underground workings in 2022 was geologically described as 80% mafic volcanics with trace sulphide and 2 to 5% quartz-carbonate veining; 5% sericite altered mafic volcanics with up to %2 sulphide and 5 to 10% quartz-carbonate veining; and 15% diabase dyke with trace sulphide and trace quartz-carbonate veining.

Stockpile

In August 2022, SRK geochemist Nady Kao, MSc, completed a geological inspection of waste rock placed on Pad T as per the methods in Section 4.1.1.1. SRK's inspection included areas of the stockpile on Pad T indicated by AEM to contain waste rock placed since August 2021, which included the upper lift of the waste rock stockpile as denoted in yellow in Figure 5-1. The inspection was carried out by walking over the area of the stockpile examining rock types and the presence of sulphide and carbonate content (Appendix A1).

Figure 5-1: Area of Inspection on Pad T Waste Rock Stockpile showing the Low-Grade Ore Stockpile (Photo taken in 2022)

5.1.2 Sample Collection and Geochemical Test Work Program

SRK collected eight samples plus one duplicate (Table 5-1) from the waste rock stockpile on Pad T. The sample set is geologically representative of waste rock mined since August 2021 and spatially representative of the inspected areas. The geological distribution of the sample set was based on the geological inspections of the waste rock stockpile and underground mine (Section 5.2.1). One field duplicate was collected from the stockpile for QA/QC (Section 5.2.1).

Each sample consisted of a sieved coarse fraction (screened to -1 cm) and a finer fraction (screened to -2 mm). As per methods in Section 4.1.1.1, SRK geologically described each samples for rock type, sulphide content (quantity, type, and occurrence) and carbonates (fizz test with 10% HCl, type, and occurrence) and measured values of rinse pH and EC.

SRK shipped samples to the laboratory for analysis of ABA and elemental analysis on the -1 cm fraction (Section 4.2). Three samples were selected by SRK for SFE tests based on rock type and to represent a range of rinse EC values.

Table 5-1:Pad T Waste Rock Monitoring Samples Collected and Associated Test Program

Rock Type[1]	ABA & Elemental Analysis	SFE	Rinse Test (pH and EC)
1a	4	1	4
11c	3	1	3
1as[2]	1	1	1
Total Number of Tests	8	3	8

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]

Notes:

[1] 1a = mafic metavolcanic, 1as = altered mafic metavolcanics, 11c = diabase

[2] Logged by AEM geologist as 1ay = 1a with sericite banding (1as). Interpreted as 1as.

5.2 Results and Discussion

5.2.1 QA/QC

Table 5-2 presents a summary of the QC checks for the waste rock samples collected from Pad T (n=8) and placed construction material (n=5) (Section 7.2.3) by SRK, including the assessment of duplicate (n=1) and blank samples and standard reference materials. All data passed SRK's QC checks. SRK determined all data to be acceptable.

Table 5-2:Doris Waste Rock QAQC Summary

QC Test	SRK QC Criteria	Results
Paste pH		
Pulp Duplicate	For any samples, +/- 0.5 difference pH unit	Passed (n=1)
Split Duplicate	For any samples, +/- 0.5 difference pH unit	Passed (n=1)
Standard Reference Material	Within specified tolerance ranges.	Passed (n=1)
TIC		
Method Blank	Minimum criteria is <2X DL. But other labs will accept <5X DL.	Passed (n=1) for TIC
Pulp Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-20%	Passed (n=1) for TIC
Split Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-30%	Passed (n=1) for TIC
Standard Reference Material	Within specified tolerance ranges.	Passed (n=1) for TIC
Total S & Total Sulphate		
Method Blank	Minimum criteria is <2X DL. But other labs will accept <5X DL.	Passed (n=1) for Total S
Sulphur balance (Total S > Sulphate S)	For samples > 10X the detection limit (DL), Total Sulphur should be greater than Total Sulphate, if not the % difference should be within +/-20%	All passed (n=8)
Pulp Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-20%	All Passed (n=1) for Total S and (n=1) for SO_4
Split Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-30%	All Passed (n=1) for Total S and (n=1) for SO_4
Standard Reference Material	Within specified tolerance ranges.	Passed (n=1) for Total S
Modified NP		
NP consistent with paste pH	Negative NP has paste pH <= 5	All passed (n=8)
Pulp Duplicate	% RPD better than +/-15% for NP>20 kg/t, % RPD better than +/-20% for NP>10 kg/t, Difference within +/-5kg/t for NP<10 kg/t. Fizz test rating is the same.	All passed (n=1) for NP and (n=1) for Fizz Rating
Split Duplicate	% RPD better than +/-15% for NP>20 kg/t, % RPD better than +/-20% for NP>10 kg/t, Difference within +/-5kg/t for NP<10 kg/t. Fizz test rating is the same.	All passed (n=1) for Fizz Rating and (n=1) for NP
Fizz test rating with NP	Max NP does not exceed fizz test rating	All passed (n=8)
Standard Reference Material	Within specified tolerance ranges.	All passed (n=1) for NP and (n=1) for Fizz Rating

QC Test	SRK QC Criteria	Results
Modified NP and TIC		
Comparison between Modified NP and TIC	Check for trends/correlation	(n=8) NP generally higher than TIC
Total S-Leco and S-ICP		
Comparison between Total S-Leco and S-ICP	For samples >10X detection limit (DL), % RPD within +/-30%	All passed (n=8)
Total Metals by ICPMS		
Method Blank	Minimum criteria is <2X DL. But other labs will accept <5X DL.	All passed (n=1)
Pulp Duplicate	For samples >10X detection limit (DL), % RPD within +/-20%, For ICP metal scan, it is acceptable for 10% of parameters to be outside of this criterion.	All passed (n=1)
Split Duplicate	For samples >10X detection limit (DL), % RPD within +/-30%, For ICP metal scan, it is acceptable for 10% of parameters to be outside of this criterion.	All passed (n=1)
Standard Reference Material	Within specified tolerance ranges.	All passed (n=2)
MEND Shake Flask Extraction		
Method Blank	<5X Detection Limit	All passed (n=1)
Ion Balance	If EC>100uS/cm, ion balance should be within +/-10%	All passed (n=3)
Lab Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-20%	All passed (n=1)

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]

5.2.2 Geological Inspections

Based on underground geological mapping by AEM, waste rock intersected by the Doris underground mine was geologically described as i) 80% mafic volcanics (1a) with trace sulphide and 2 to 5% quartz-carbonate veining; ii) 5% sericite altered mafic volcanics (1as) with up to 2% sulphide and 5 to 10% quartz-carbonate veining (12q); and iii) 15% diabase dyke (11c) with trace sulphide and trace quartz-carbonate veining.

SRK's inspection of the uppermost lift of Pad T (Figure 5-1) indicated that waste rock was a mixture of approximately 80% chloritic dark gray/green mafic metavolcanics (1a), 20% dark gray to black diabase (11c), trace (<1%) light tan colored sericite altered mafic metavolcanics (1as) and trace (<1%) white quartz veins (12q). There was relatively less sericite altered mafic metavolcanics (1as) than mined in 2022 and also compared to the overall waste rock stockpile on Pad T.

The mafic metavolcanics (1a; Figure 5-2) consisted of unoxidized dark gray/green mafic metavolcanics with no fizz on the groundmass, moderate to strong fizz on 2% to 3% carbonate veining and trace (<1%) to 2% matrix fine grain disseminated pyrite. Samples had rare hematite staining on fractures (excluding SRK22-PadT-02).

Altered mafic metavolcanics (1as; Figure 5-3) were comprised of gray to tan (banded) mafic metavolcanics which were moderately sericite altered, with no fizz on the groundmass, moderate fizz on trace carbonate veinlets and trace sulphide (pyrite).

Diabase (11c; Figure 5-4) was dark gray to black with no fizz on groundmass, no carbonate veining and trace very fine grain sulphide disseminations.

Figure 5-2: SRK22-PadT-07; showing dark gray mafic metavolcanics (1a) with carbonate veining

Figure 5-3: SRK22-PadT-08; showing tan sericite altered mafic metavolcanics (1as)

Figure 5-4: SRK22-PadT-06; showing dark gray diabase (11c)

5.2.3 Rinse Tests

Rinse tests on the sieved -2 mm fraction indicated pH and EC values ranging from 7.5 to 9.4 and 362 to 11,880 µS/cm, respectively (Table 5-3).

Table 5-3: Rinse Test Results, Pad T Waste Rock

Rock Type[1]	Sample ID	Rinse pH	Rinse EC
		s.u.	µS/cm
1a	SRK22_PADT_02	7.7	8,620
	SRK22_PADT_04	7.5	11,880
	SRK22_PADT_05	7.8	7,530
	SRK22_PADT_07	8.0	2,660
1as	SRK22_PADT_08	7.8	6,780
11c	SRK22_PADT_01	8.6	1,981
	SRK22_PADT_03	9.2	740
	SRK22_PADT_06	9.4	362

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]

Note:

[1] 1a = mafic metavolcanic, 1as = altered mafic metavolcanics, 11c = diabase

5.2.4 Acid Base Accounting

A summary of ABA data are presented in Table 5-4 and Figure 5-5 to Figure 5-8. Complete results are presented in Appendix A2.

Values of paste pH for all rock types ranged from 7.9 to 9.5.

Total sulphur for the mafic metavolcanics (1a) ranged from 0.08% to 0.11% with a median of 0.095%. The samples with 0.11% total sulphur contained trace to 1-2% visible sulphides. By comparison, total sulphur content for the altered mafic metavolcanics (1as) sample was 0.32% and the diabase dyke (11c) samples ranged from 0.03% to 0.05%. Sulphate content was at or near the analytical detection limit (0.01%) and ranged from 0% to 0.07%. Sulphide sulphur was at near parity with total sulphur except for two samples that had relatively high levels of sulphate (Figure 5-5).

For mafic metavolcanics (1a), values of Modified NP ranged from 136 to 168 kg $CaCO_3$/t compared to 184 kg $CaCO_3$/t for the altered mafic metavolcanics (1as) sample and 16 to 21 kg $CaCO_3$/t for the diabase dyke (11c) samples. TIC ranged from 113 to 149 kg $CaCO_3$/t in the mafic metavolcanics (1a) samples compared to 213 kg $CaCO_3$/t in the altered mafic metavolcanics (1as) sample and 2.1 to 6.4 kg $CaCO_3$/t in the diabase (11c) samples. Modified NP content was uniformly greater than TIC suggesting the occurrence of silicates measured by the NP method except for the sample of mafic metavolcanics (1as) (Figure 5-6). NP content for diabase (11c) samples were 3.3 to 8.2 times higher than TIC. All samples were classified as non-PAG on the basis of NP/AP,TIC/AP and sulphur criterion (Figure 5-7).

Table 5-4: Summary of ABA Analyses for Pad T Waste Rock Samples

Rock Type[1]	Sample ID	Paste pH	Total S	SO_4	AP	TIC	Modified NP	TIC/AP	NP/AP
		s.u.	%	%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	-	-
1a	SRK22-PADT-02	7.9	0.08	0.07	0.3	143	168	475	560
	SRK22-PADT-04	7.9	0.11	0.02	2.8	149	163	53	58
	SRK22-PADT-05	8.0	0.08	0.05	0.9	113	151	125	167
	SRK22-PADT-07	8.3	0.11	0.01	3.1	114	136	37	44
1as	SRK22-PADT-08	8.1	0.32	0.03	9.1	213	184	23	20
11c	SRK22-PADT-01	9.1	0.05	<0.01	1.6	6.4	21	4.0	13
	SRK22-PADT-03	9.1	0.04	<0.01	1.3	2.1	16	1.6	13
	SRK22-PADT-06	9.5	0.03	<0.01	0.9	2.3	19	2.5	21

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]

Notes

[1] 1a = mafic metavolcanic, 1as = altered mafic metavolcanics; 11c = diabase

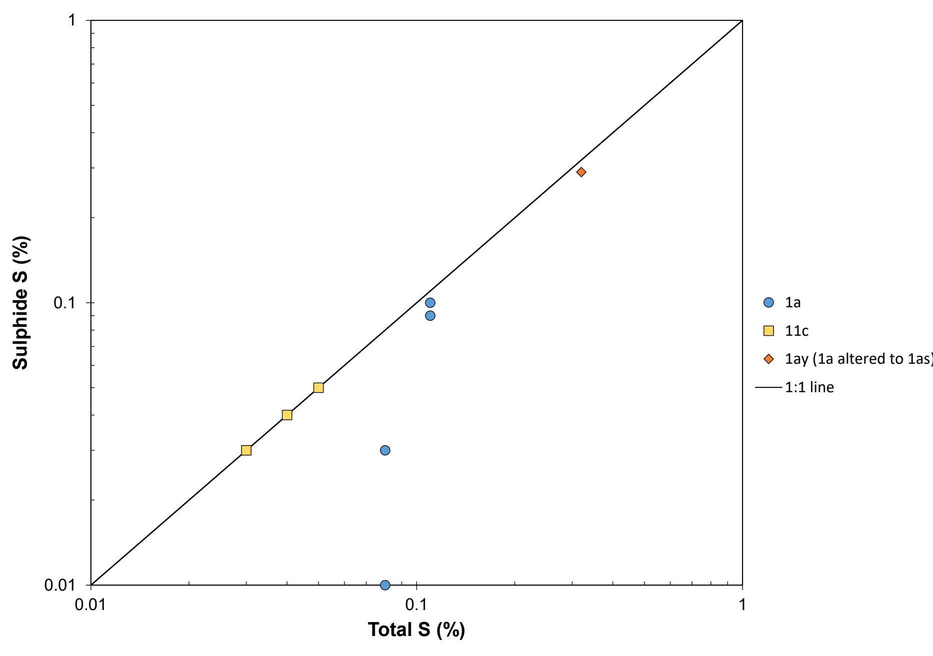


Figure 5-5: Comparison of Total Sulphur versus Sulphide, Pad T Waste Rock

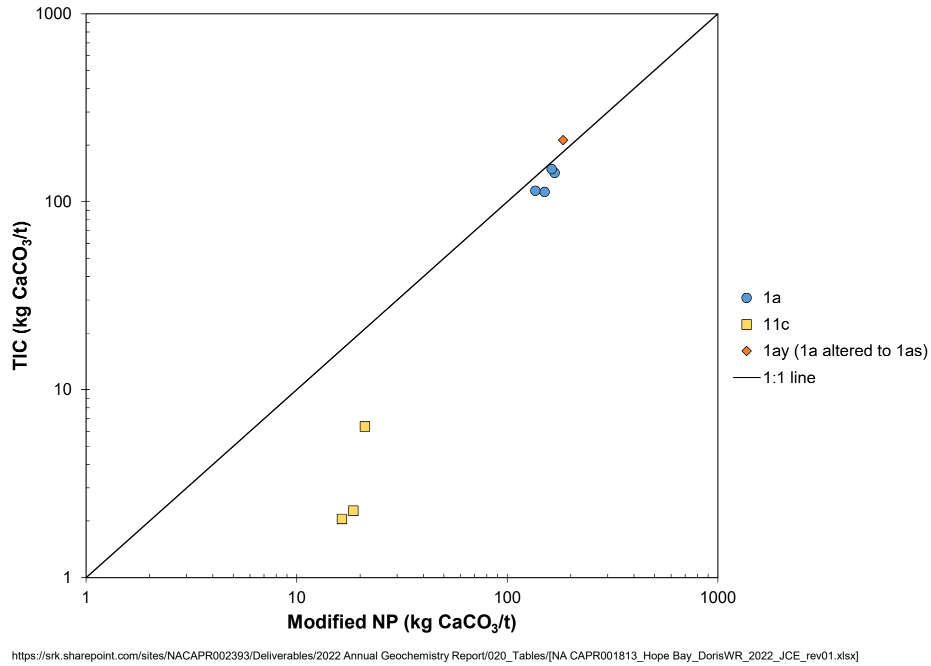


Figure 5-6: Comparison of Modified NP versus TIC, Pad T Waste Rock

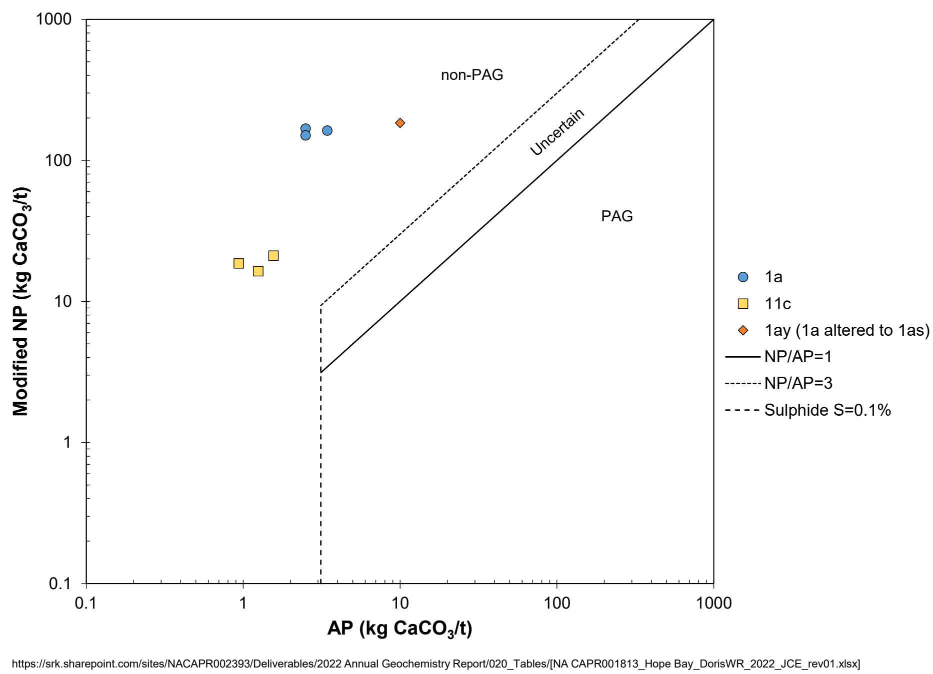


Figure 5-7: ARD Classifications by NP/AP, Pad T Waste Rock

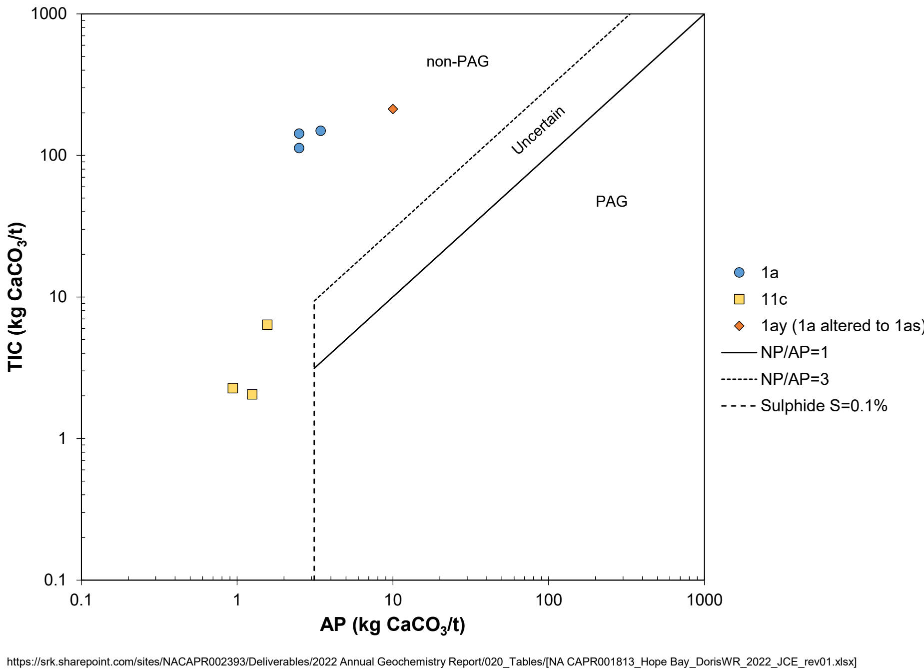


Figure 5-8: ARD Classifications by TIC/AP, Pad T Waste Rock

5.2.5 Trace Element Analysis

The trace element content for the sample set is presented in Table 5-5 by rock type with complete laboratory results presented in Appendix A3. All parameters were less than ten times the average crustal abundance for basalt indicating no appreciable enrichment.

Table 5-5: Summary of Elemental Analyses for Pad T Waste Rock

Parameter	Unit	Detection Limit	1a				1ay	11c			10x Average Crustal Abundance *
			SRK22_PADT_02	SRK22_PADT_04	SRK22_PADT_05	SRK22_PADT_07	SRK22_PADT_08	SRK22_PADT_01	SRK22_PADT_03	SRK22_PADT_06	
Ag	ppb	<2	40	54	16	64	565	80	59	62	1100
As	ppm	0.1	2.6	3.8	2.2	2.2	9.8	0.90	0.60	0.60	20
Ba	ppm	0.5	29	16	19	6	39	71	86	55	3300
Ca	%	0.01	6.1	5.8	5.8	5.2	5.3	2.7	2.7	2.6	76
Cd	ppm	0.01	0.030	0.030	0.020	0.020	0.13	0.070	0.060	0.040	2.2
Co	ppm	0.1	46	47	49	49	35	18	18	17	480
Cr	ppm	0.5	102	111	132	139	65	129	105	102	1700
Cu	ppm	0.01	134	125	141	129	84	149	154	168	870
Fe	%	0.01	8.3	8.1	8.9	8.3	8.6	3.1	3.0	3.1	87
Hg	ppb	5	8	6	*<5*	21	*<5*	*<5*	*<5*	*<5*	90
Mg	%	0.01	2.6	2.9	3.1	4.0	1.9	1.1	1.1	1.1	46
Mn	ppm	1	1332	1367	1358	1320	1673	276	208	251	15000
Mo	ppm	0.01	0.41	0.34	0.28	0.25	0.9	1.1	0.50	0.36	15
Ni	ppm	0.1	51	68	68	96	11	44	42	40	1300
P	%	0.001	0.033	0.033	0.031	0.023	0.089	0.047	0.047	0.043	1
Pb	ppm	0.01	2.6	34	3.7	2.4	3.4	7.9	7.5	2.1	60
S	%	0.02	0.08	0.12	0.09	0.11	0.31	0.04	0.03	0.03	0.3
Sb	ppm	0.02	*<0.02*	0.3	0.03	*<0.02*	0.03	0.03	0.02	*<0.02*	2
Sr	ppm	0.5	26	28	26	27	69	73	78	72	4650
U	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.30	0.40	0.20	10
V	ppm	2	173	177	203	220	66	156	158	165	2500
W	ppm	0.1	*<0.1*	*<0.1*	*<0.1*	*<0.1*	0.10	0.10	*<0.1*	*<0.1*	7
Zn	ppm	0.1	86	87	93	84	118	44	41	37	1050

Source: https://srk.sharepoint.com/sites/NACAPR001813/Deliverables/2022 Doris Madrid Annual Report/Working Files/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]

Notes:

Values in italics represent values below the detection limit.

* Numbers bolded and underlined exceed 10 times the average crustal abundance for basaltic rocks from Price (1997)

[1] 1a = mafic metavolcanic, 1as = altered mafic metavolcanics; 11c = diabase

5.2.6 SFE Tests

A summary of results for key SFE parameters is presented in Table 5-6 and complete results are included in Appendix A4.

All SFE tests had alkaline pH ranging from 8.4 to 9.9. Values of EC ranged from 129 to 1,267 µS/cm. Major cation chemistry was dominated by sodium (25 to 117 mg/L) and calcium (1.6 to 96 mg/L). Major anion chemistry in the mafic metavolcanics (1a) and altered mafic metavolcanics (1as) was dominated by chloride (224 to 240 mg/L) and sulphate (48 to 101 mg/L) whereas cations were characterized by sodium (110 to 117 mg/L) and calcium (71 to 96 mg/L). Major anion chemistry in the diabase (11c) was dominated by alkalinity (44 mg/L as $CaCO_3$) and chloride (12 mg/L) whereas cations were characterized by sodium (25 mg/L) and potassium (3 mg/L). High chloride values previously indicated the presence of residual drilling brines however brines were not used undground in 2022. As indicated by SFE tests for waste rock used for construction (Section 8.2.3) and the underground seepage monitoring program (Section 9), the major ion chemistry suggests that the source of high chloride for unaltered and altered mafic metavolcanic (1a/1as) is lnaturally saline groundwater that intercepted by the the underground mine (figure not shown). Concentrations of ammonia and nitrate ranged from 0.19 to 1.3 mg/L and 0.6 to 59 mg/L, respectively. The source of nitrate and ammonia are explosives residues. Trace element concentrations overall were low.

Table 5-6: Shake Flask Extraction Results, 2022 Pad T Waste Rock Samples

Sample ID	Unit	Detection Limit	1a	11c	1as
			SRK22-PadT-04	SRK22-PadT-06	SRK22-PadT-08
pH	pH Units	N/A	8.4	9.9	8.5
EC	uS/cm	1	1267	129	1121
Total Alkalinity	mg/L	0.5	12	44	23
SO_4	mg/L	0.5	48	2.9	101
Cl	mg/L	0.5	240	12	224
Ca	mg/L	0.05	96	1.6	71
Mg	mg/L	0.05	14	0.23	18
K	mg/L	0.05	8.2	3.0	8.5
Na	mg/L	0.05	117	25	110
NO_3	mg/L as N	0.02	59	0.6	22
NO_2	mg/L as N	0.005	<0.05	<0.05	<0.05
NH_3	mg/L as N	0.005	1.3	0.19	0.52
Al	mg/L	0.0005	0.076	0.59	0.073
Sb	mg/L	0.00002	0.00022	0.00015	0.00013
As	mg/L	0.00002	0.00017	0.0013	0.00049
Ba	mg/L	0.00002	0.011	0.00054	0.012
B	mg/L	0.05	0.12	0.066	0.084
Cs	mg/L	0.00005	0.00089	0.000061	0.00016
Cd	mg/L	0.000005	<0.000005	<0.000005	<0.000005
Cr	mg/L	0.0001	<0.0001	0.00024	<0.0001
Co	mg/L	0.000005	0.00022	0.000044	0.00031
Cu	mg/L	0.00005	0.00026	0.00013	0.0013

Sample ID	Unit	Detection Limit	1a	11c	1as
			SRK22-PadT-04	SRK22-PadT-06	SRK22-PadT-08
Fe	mg/L	0.001	0.003	0.062	0.026
La	mg/L	0.00005	<0.000050	<0.000050	<0.000050
Pb	mg/L	0.000005	<0.0000050	0.0000596	0.0000093
Li	mg/L	0.0005	0.0063	0.0035	0.0095
Mn	mg/L	0.00005	0.032	0.00089	0.052
Hg	mg/L	0.00005	<0.00005	<0.00005	<0.00005
Mo	mg/L	0.00005	0.0012	0.00050	0.0014
Ni	mg/L	0.00002	0.00016	0.00013	0.00032
Se	mg/L	0.00004	0.00034	0.0004	0.00055
Sr	mg/L	0.00005	0.35	0.0051	0.33
S	mg/L	10	13	<10	31
Tl	mg/L	0.000002	0.000012	0.0000052	0.0000027
U	mg/L	0.000002	<0.000002	0.0000087	0.0000034
V	mg/L	0.0002	<0.0002	0.0125	<0.0002
Zn	mg/L	0.0001	0.0010	0.00020	0.00032

Source: https://srk.sharepoint.com/sites/NACAPR001813/Deliverables/2022 Doris Madrid Annual Report/Working Files/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]

Notes:

All element concentrations are given as dissolved; SFE tests do not represent natural waters.

Values in italics represent values below the detection limit.

5.2.7 Comparison to Previous Waste Rock Geochemical Characterization Results

This section compares data from the 2022 waste rock monitoring samples to previous sample sets. Specifically, waste rock samples are presented according to rock type and the following samples sets:

1. Waste rock characterized as part of the Water Licence amendment application (SRK 2015);
2. Underground mine operational waste rock monitoring samples collected prior to 2022;
3. Doris Crown Pillar Recovery (CPR) operational waste rock monitoring samples (2018 to 2019); and
4. Underground mine operational waste rock monitoring samples collected in 2022.

Table 5-7 summarizes the differences in geological logging codes and sample types for the sample sets. The mafic metavolcanic waste rock samples that were geochemically characterized as part of the Type A Doris water licence amendment application (SRK 2015) were geologically logged as part of the exploration drilling program, at which time the lithology code 1as (altered mafic metavolcanics) was not used. Based on the geochemistry and spatial coverage of the ABA sample set, SRK assumes that altered mafic metavolcanics (1as) is represented in SRK (2015).

Figure 5-9 to Figure 5-11 compares by rock type the geochemical results from the 2022 waste rock monitoring program to the other sample sets presented in Table 5-7. The results are discussed in subsequent sections.

Table 5-7: Overview of Waste Rock Geochemical Sample Sets

Rock Type	Sample Set and Source[1]		Geology Code[2]	Geology Codes for Samples[3]	Comment
Mafic Metavolcanics	2022 Operational Monitoring	Pad T	1a,1ad	1a,1as	
	Pre-2022 Operational Monitoring	Pad T	1a, 1as	1a, 1as	
		ROM from Underground	1a, 1as	1a, 1as	
		ROM from CPR	1a	1a	
	Type A	Drill core	1	1, 1a, 1ay, 1p and 1u	Logging code 1as (altered basalt) is not documented in SRK (2015) because this code was not used during the exploration logging program. Based on the geochemistry and spatial coverage of the ABA sample set, SRK assumes that rock type 1as is represented in the sample set.
Diabase	2022 Operational Monitoring	Pad T	11c	11c	
	Pre-2022 Operational Monitoring	ROM from Underground	11c	11c	
	Type A	Drill core	11c	11c	
Quartz Vein	2019 Operational Monitoring	Pad T	12q	12q	
	Pre-2019 Operational Monitoring	ROM from Underground	12q	12q	
	Type A	Drill core	12q	12q, 12 (mixed)	

Notes:

[1]All operational monitoring samples are run-of-mine (ROM) waste rock samples; in 2019 waste rock from 2019 was sampled from the blasted pile underground and the Pad T stockpile

[2]For data interpretation and figures. For the Type A sample set, the sample set is as presented in SRK (2015).

[3] 1a = mafic metavolcanic, 1as = altered mafic metavolcanics; 12q = quartz vein

5.2.7.1 Mafic Metavolcanics (1a)

For mafic metavolcanics (1a), the median sulphur content for the 2022 waste rock samples (0.095%, n=4) was lower than the CPR sample set (0.22%) and the Type A sample set (0.15%), and underground waste rock samples collected prior to 2022 (0.13%).

The median NP (157 kg $CaCO_3$/t) and TIC (128 kg $CaCO_3$/t) values for the mafic metavolcanic waste rock samples were roughly equivalent to the sample set for underground waste rock samples collected prior to 2022 (137 kg $CaCO_3$/t and 155 kg $CaCO_3$/t), and notably lower than the median NP and TIC values in the Type A (175 kg $CaCO_3$/t and 258 kg $CaCO_3$/t, respectively) and CPR (175 kg $CaCO_3$/t and 276 kg $CaCO_3$/t, respectively) sample sets.

All samples of mafic metavolcanic (1a) collected from Pad T in 2022 were classified as non-PAG on the basis of TIC/AP and NP/AP. This classification was consistent with the majority of the Type A and operational monitoring mafic metavolcanic (1a) samples (Figure 5-10 and Figure 5-11).

Solid-phase arsenic content can be elevated in Hope Bay waste rock and can be mobile at neutral pH, though seepage monitoring of Doris waste rock does not indicate neutral pH arsenic leaching (Section 9.2.3). The median arsenic value (2.4 ppm, n=4) for the mafic metavolcanic (1a) samples collected from Pad T in 2022 were comparable to the underground waste rock samples collected prior to 2022 (median=3.1 ppm).

ABA characteristics and arsenic content for the 2022 mafic metavolcanic (1a) are represented by the Type A waste rock sample set.

5.2.7.2 Altered Mafic Metavolcanics (1as)

Total sulphur content for the 2022 altered mafic metavolcanic (1as) sample (0.32%) was slightly higher than the median values of the operational waste rock samples (0.20%) and CPR samples (0.28%) and was roughly equivalent to the 75th percentile value of the Type A sample set 0.31%.

TIC and NP content for the 2022 altered mafic metavolcanic sample (213 and 184 kg $CaCO_3$/t, respectively) were equivalent to the 75th percentile values for the previous sample sets (283 to 327 kg $CaCO_3$/t and 179 to 214 kg $CaCO_3$/t, respectively).

The non-PAG classification of the altered mafic metavolcanic (1as) sample was consistent with the Type A and underground waste rock samples of altered mafic metavolcanic (1as).

The one 2022 altered mafic metavolcanic (1as) sample reported an arsenic concentration (9.8 ppm) that was within the range of operational monitoring (25th and 75th percentile levels of 6 and 32 ppm, respectively) and Type A sample sets(25th and 75th percentile levels of 1.9 and 30 ppm, respectively).

The ABA characteristics and arsenic content for the 2022 altered mafic metavolcanic (1as) were represented by the Type A waste rock sample set.

5.2.7.3 Diabase (11c)

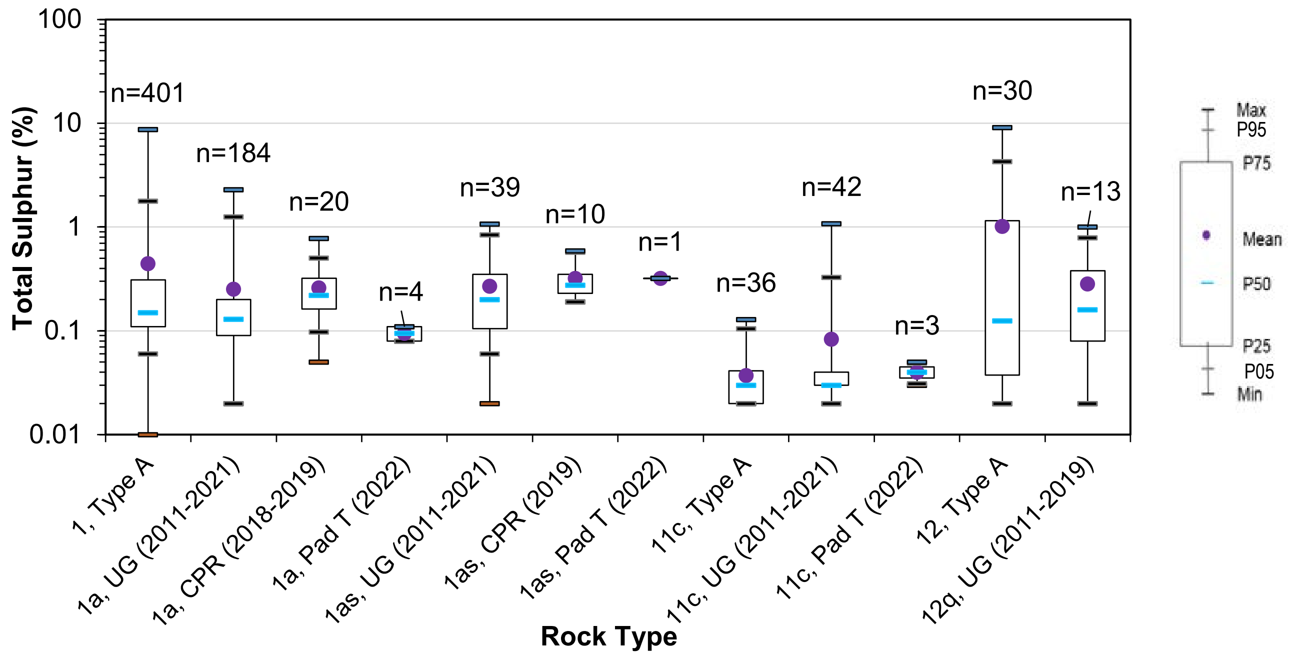
For diabase (11c), the median sulphur content for the 2022 waste rock samples (0.04%, n=3) was equivalent to the 75th percentile of the operational waste rock samples (0.041%) and the Type A sample set (0.04%).

Median TIC content for the 2022 diabase samples (2.3 kg $CaCO_3$/t) was equivalent to the 75th percentile of the Type A sample set (2.5 kg $CaCO_3$/t) and the median for the underground waste rock samples (2.0 kg $CaCO_3$/t). NP (19 kg $CaCO_3$/t) was also consistent with the median values for the datasets (13 kg $CaCO_3$/t).

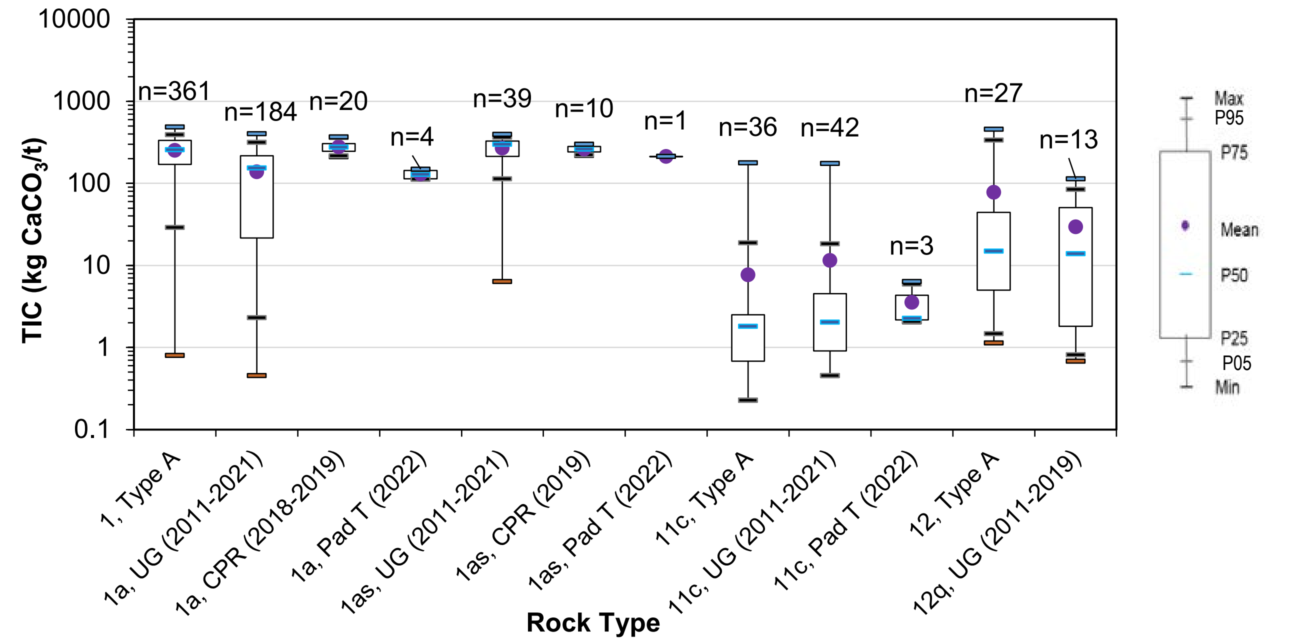
The 2022 diabase (11c) samples were classified as non-PAG on the basis of sulphur criterion; meaning the 2022 samples were consistent with the majority of the Type A and operational monitoring of diabase (11c).

The 2022 diabase (11c) samples reported a median arsenic concentration (0.6 ppm) that was between the median and 75th percentile concentrations in the underground operational sampling Type A sample sets (0.5 to 0.7 ppm).

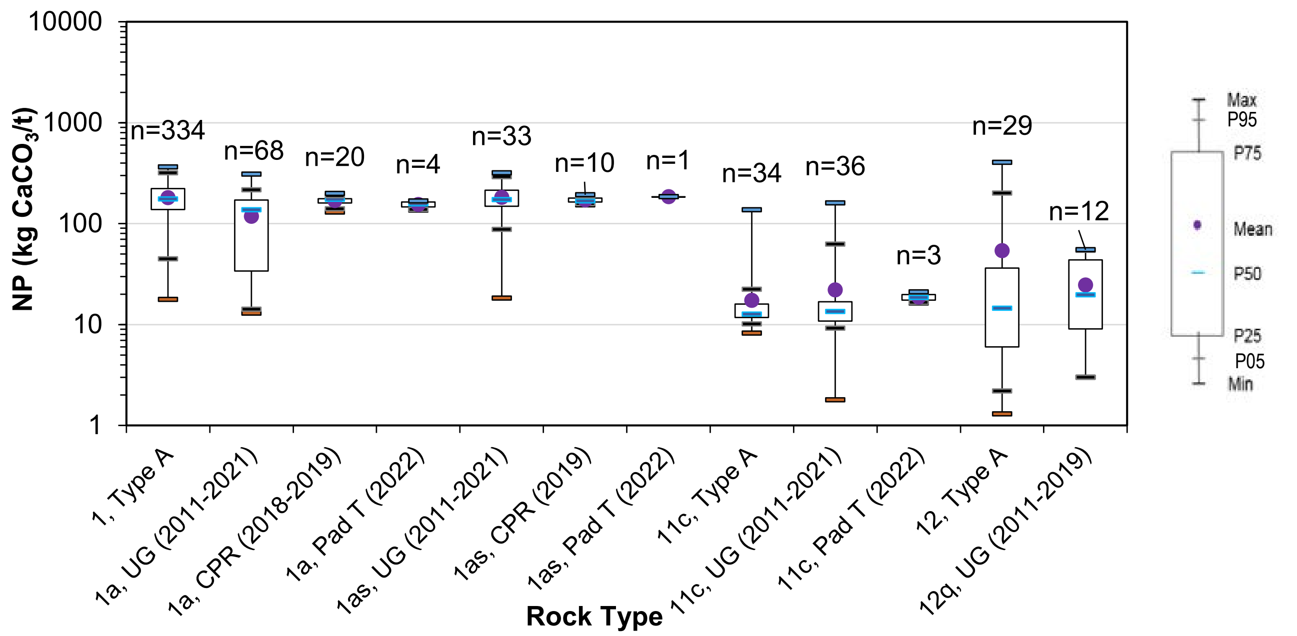
Geochemical characteristics of diabase (11c) collected in 2022 were consistent with previous sample sets except for TIC. TIC was equivalent to previous underground waste rock samples and higher than Type A sample set. NP values equivalent to all previous sample sets.



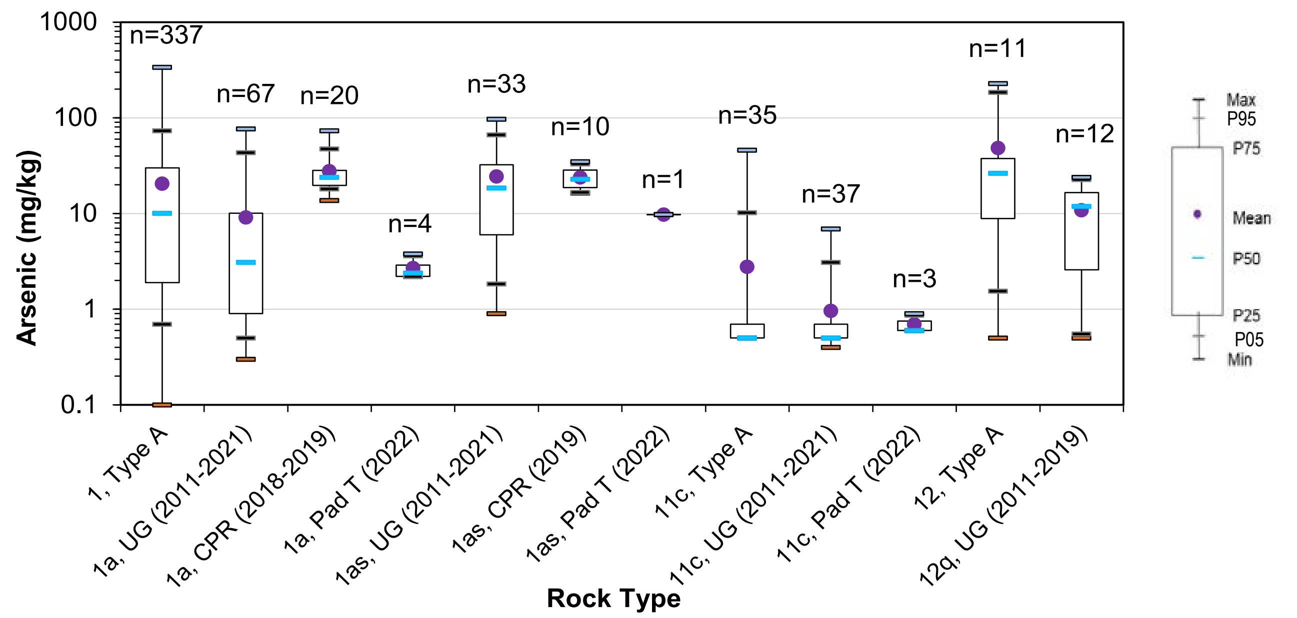
https://srk.sharepoint.com/sites/NACAPR001813/Deliverables/2022 Doris Madrid Annual Report/Working Files/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]



https://srk.sharepoint.com/sites/NACAPR001813/Deliverables/2022 Doris Madrid Annual Report/Working Files/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]



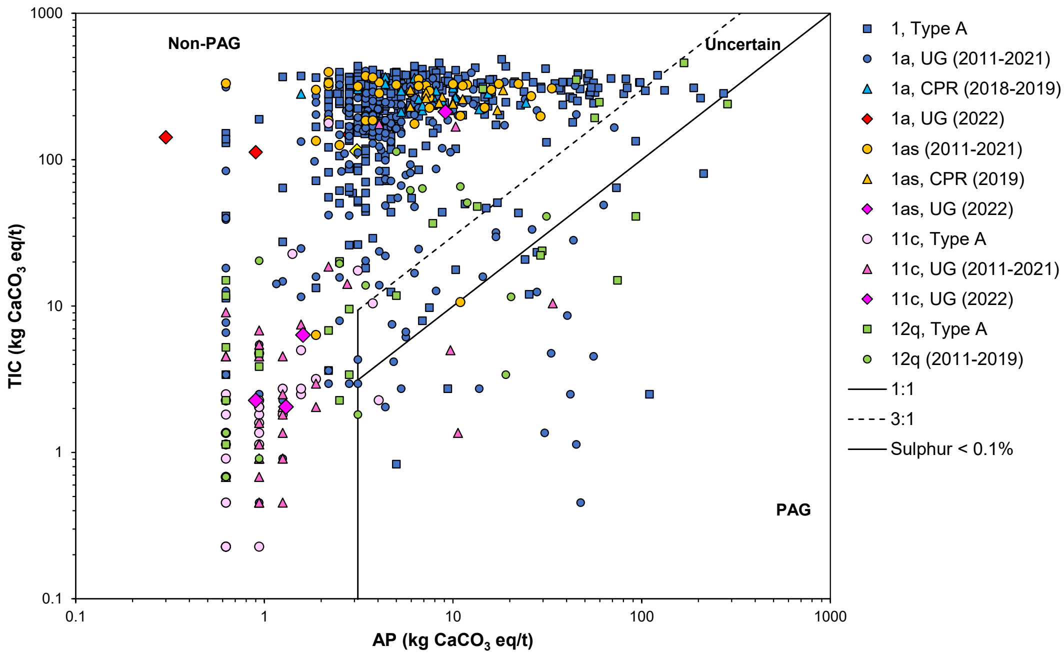
https://srk.sharepoint.com/sites/NACAPR001813/Deliverables/2022 Doris Madrid Annual Report/Working Files/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]



https://srk.sharepoint.com/sites/NACAPR001813/Deliverables/2022 Doris Madrid Annual Report/Working Files/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]

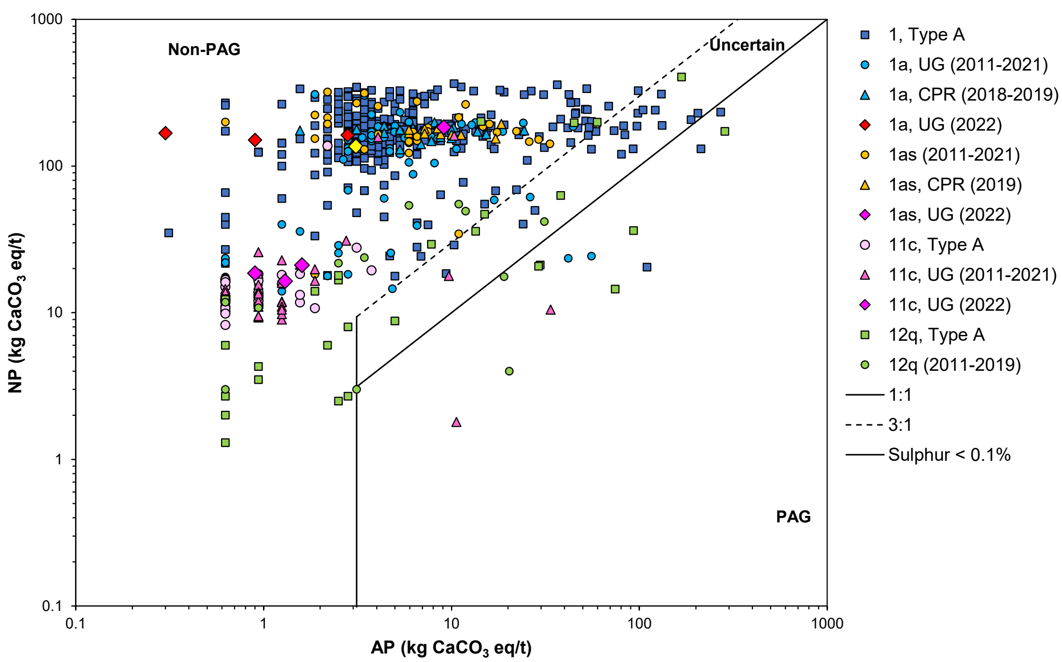
Figure 5-9: Box and Whisker Plots of S, TIC, NP and Arsenic – Comparison of 2022 Doris Waste Rock Monitoring Samples to Other Waste Rock Sample Sets

Notes: (These plots are conventional box and whisker graphs, with the upper and lower extremes showing the minimum and maximum values, tick marks outside of the box showing the 5th and 95th percentiles, outer margins of the box showing the 25th and 75th percentiles and central division in the box showing the median value)



https://srk.sharepoint.com/sites/NACAPR001813/Deliverables/2022 Doris Madrid Annual Report/Working Files/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]

Figure 5-10: ARD Classifications by TIC/AP, Doris Waste Rock Samples



https://srk.sharepoint.com/sites/NACAPR001813/Deliverables/2022 Doris Madrid Annual Report/Working Files/[NA CAPR001813_Hope Bay_DorisWR_2022_JCE_rev01.xlsx]

Figure 5-11: ARD Classifications by NP/AP, Doris Waste Rock Samples

6 Waste Rock from Madrid North Mine

In 2022, the Madrid North Mine was in care and maintenance. Subsequently there were no waste rock produced for the monitoring program.

7 Quarry and As-Built Construction Rock

Monitoring requirements for quarries and quarry rock associated with Hope Bay are specified in Water Licence (NWB 2018), Water Licence 2BE-HOP1232 (NWB 2022), the Framework Agreement signed between TMAC and the Kitikemeot Inuit Association (KIA) for belt wide land tenure and the QMP (AEM 2022b).

7.1 Methods

7.1.1 Quarry Monitoring

Quarry activities in 2022 included three blasts at Quarry 2. As per QMP (AEM 2022b), AEM geologists conducted geological inspections of the active quarry face at least once per week as per the methods in Section 4.1.1.2 and sample collection of ROQ rock for geochemical characterization twice per year as per the methods in Section 3.1.3 of the QMP (AEM 2022b). A summary of monitoring activities is presented in Table 7-1.

Table 7-1: Summary of Quarry Inspections and Samples Collected

Location	Blast Date	Inspection Date	Samples Collected
Quarry 2	31-Oct-2022	1-Nov-2022	2
	17-Nov-2022	24-Nov-2022	2
	27-Nov-2022	29-Nov-2022	2

Sources: This document.

AEM collected ROQ rock samples for geochemical characterization that included two size fractions: a sieved coarse fraction (screened to -1 cm) and a finer fraction (screened to -2 mm). Attachment B1 includes the quarry inspection records, sample descriptions and photos. The sieved coarse fraction sampled was analyzed for total sulphur. If total sulphur was greater or equal to 0.1%, the coarse fraction was analyzed for ABA and metals while the finer fraction was analyzed for ABA, metals and SFE testing, as summarized in Section 4.2.

7.1.2 As-Built Construction Monitoring

In August 2022, SRK geochemist Nady Kao, MSc., conducted the geological inspection and geochemical sampling program of as-built construction rock placed between August 2021 and August 2022. Construction locations included the core storage pad at Doris, aqua dam within the TIA pond (“aqua dam road”) and Sump 4 downstream of the Madrid Contact Water Pond Figure 7-1 to Figure 7-3). Rock from Quarry 2 was used to construct the core storage pad and Sump 4, and Doris waste rock from Pad T was used for the construction of the aqua dam road . The geological inspection entailed walking around the periphery of the infrastructure to confirm that the geological characteristics were consistent with the construction source per the methods in Section 4.1.1.2.

Five samples of construction rock were collected as follows: one from the core storage pad (Figure 7-1); one from Sump 4 (Figure 7-2); and three from the aqua dam road (Figure 7-3). At each sample location, the following samples were collected: 1 to 2 kilograms (kg) of sample to generate sieved -1 cm and -2 mm fractions. The sample trowel and sieved were rinsed with deionized water and wiped clean with new paper towel between each sample. At each sample location, a geological inspection and rinse tests where conducted in accordance to Sections 4.1 and 4.2.1 SRK submitted samples to BV in Burnaby, BC, for analysis. All samples were analyzed for ABA and metals analyses as described in Section 4.2, while three samples were selected based on field rinse test results for SFE testing as per Section 4.2.

Legend

- Construction Monitoring Sample
- Camp Layout Infrastructure

srk consulting

SRK JOB NO.: CAPR001813

FILE NAME: CAPR002393_HopeBay_CoreStoragePad_Rev00

AGNICO EAGLE

Hope Bay Gold Project

As-Built Construction Monitoring

Core Storage Pad
Sample Location, Doris

DATE:	APPROVED:	FIGURE:
Mar 2023	BDD	7-1

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\!ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR002393_figures_RPT\CAPR002393_HopeBay_CoreStoragePad_Rev00.aprx

Legend

- Construction Monitoring Sample
- 2019 Surveyed Areas
- Camp Layout Infrastructure

srk consulting

SRK JOB NO.: CAPR001813

FILE NAME: CAPR002393_HopeBay_Sump4_Rev00

AGNICO EAGLE

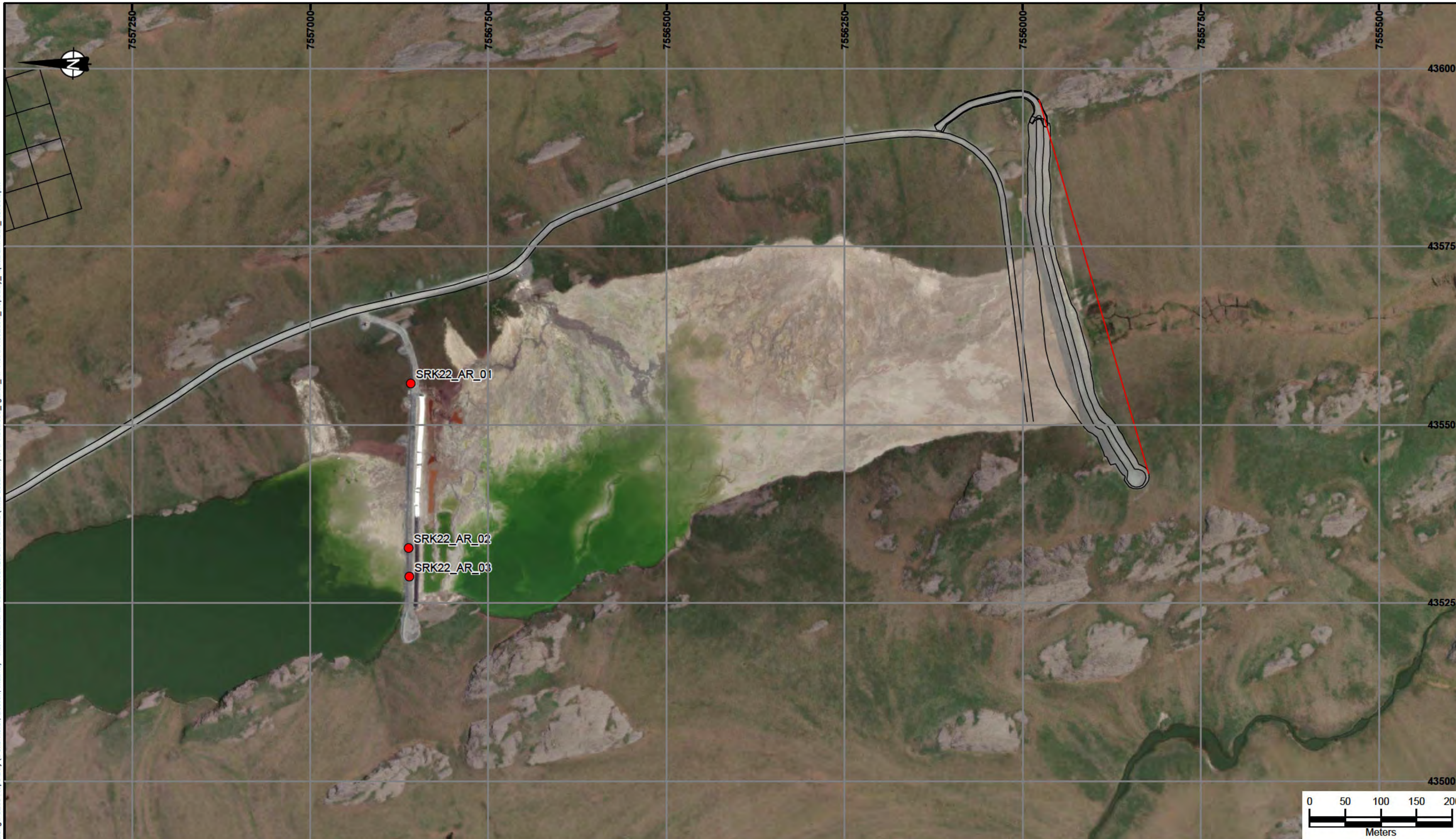
Hope Bay Gold Project

As-Built Construction Monitoring

Sump 4 Location,
Madrid North WRSA

DATE:	APPROVED:	FIGURE:
Mar 2023	JD / LNB	7-2

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR002393_figures_RPT\CAPR002393_HopeBay_Sump4_Rev00.aprx



Legend

- Construction Monitoring Sample
- 2019 Surveyed Areas
- Camp Layout Infrastructure

srk consulting

SRK JOB NO.: CAPR001813

FILE NAME: CAPR002393_HopeBay_AquaDamRoad_Rev00

AGNICO EAGLE

Hope Bay Gold Project

As-Built Construction Monitoring

Aqua Dam Road Sample Locations, Doris TIA

DATE:	APPROVED:	FIGURE:
Mar 2023	BDD	7-3

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\!ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR002393_figures_RPT\CAPR002393_HopeBay_AquaDamRoad_Rev00.aprx

7.2 Results and Discussion

7.2.1 QA/QC

The QA/QC program executed by the analytical laboratories and SRK is described in Section 4.3. Table 7-2 presents a summary of the QC checks for samples of quarry rock collected by AEM and Table 7-3 present the QAQC summary for the construction rock sample set collected by SRK. All data passed QC checks, however sulphate content were anomalously high for one sample (and two size fractions) collected from the quarry and two samples from the as-built construction sample set. At the request of SRK, samples are being re-anlyzed by lab and the data have not been included in this report. In the absence of sulphate data, the sulphur speciation has not been assessed and accordingly AP has conservatively been calculated from total sulphur.

Table 7-2: Quarry Rock QAQC Summary

QC Test	SRK QC Criteria	Results
Paste pH		
Pulp Duplicate	For any samples, +/- 0.5 difference pH unit	Passed (n=2)
Split Duplicate	For any samples, +/- 0.5 difference pH unit	Passed (n=2)
Standard Reference Material	Within specified tolerance ranges.	Passed (n=2)
TIC		
Method Blank	Minimum criteria is <2X DL. But other labs will accept <5X DL.	All Passed (n=3) for TIC
Pulp Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-20%	All Passed (n=3) for TIC
Split Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-30%	Passed (n=2) for TIC
Standard Reference Material	Within specified tolerance ranges.	All Passed (n=6) for TIC
Total S & Total Sulphate		
Method Blank	Minimum criteria is <2X DL. But other labs will accept <5X DL.	Passed (n=2) for Total S and (n=2) for SO4
Sulphur balance (Total S > Sulphate S)	For samples > 10X the detection limit (DL), Total Sulphur should be greater than Total Sulphate, if not the % difference should be within +/-20%	All Passed (n=6). High sulphate values being confirmed.
Pulp Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-20%	All Passed (n=1) for Total S and (n=2) for SO4
Split Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-30%	All Passed (n=2) for Total S and (n=2) for SO4
Standard Reference Material	Within specified tolerance ranges.	All Passed (n=4) for Total S and (n=2) for SO4
Modified NP		

QC Test	SRK QC Criteria	Results
Method Blank	Accept <5X DL	Passed (n=2) for NP
NP consistent with paste pH	Negative NP has paste pH <= 5	All passed (n=6)
Pulp Duplicate	% RPD better than +/-15% for NP>20 kg/t, % RPD better than +/-20% for NP>10 kg/t, Difference within +/-5kg/t for NP<10 kg/t. Fizz test rating is the same.	All passed (n=2) for NP and (n=2) for Fizz Rating
Split Duplicate	% RPD better than +/-15% for NP>20 kg/t, % RPD better than +/-20% for NP>10 kg/t, Difference within +/-5kg/t for NP<10 kg/t. Fizz test rating is the same.	All passed (n=2) for Fizz Rating and (n=2) for NP
Fizz test rating with NP	Max NP does not exceed fizz test rating	All passed (n=6)
Standard Reference Material	Within specified tolerance ranges.	All passed (n=2) for NP
Modified NP and TIC		
Comparison between Modified NP and TIC	Check for trends/correlation	(n=6) NP higher than TIC
Total S-Leco and S-ICP		
Comparison between Total S-Leco and S-ICP	For samples >10X detection limit (DL), % RPD within +/-30%	(n=6). QUARRY2-11022022-2 (BHD211) - Total S and S-ICP has 39% RPD, Total S >10X DL but S-ICP <10X DL.
Total Metals by ICPMS		
Method Blank	Minimum criteria is <2X DL. But other labs will accept <5X DL.	All passed (n=2)
Pulp Duplicate	For samples >10X detection limit (DL), % RPD within +/- 20%, For ICP metal scan, it is acceptable for 10% of parameters to be outside of this criterion.	All passed (n=2)
Split Duplicate	For samples >10X detection limit (DL), % RPD within +/- 30%, For ICP metal scan, it is acceptable for 10% of parameters to be outside of this criterion.	All passed (n=2)
Standard Reference Material	Within specified tolerance ranges.	All passed (n=4)
MEND Shake Flask Extraction		
Method Blank	<5X Detection Limit	All passed (n=2)
Ion Balance	If EC>100uS/cm, ion balance should be within +/-10%	(n=3) QUARRY2-11022022-2 (BHD211) Failed - ion imbalance at -29% (cations > anions)
Lab Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-20%	All passed (n=2)

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[HopeBay_Quarry_Table_CAPR002393_Rev00_JDP.xlsx]

Table 7-3: Construction Rock QAQC Summary

QC Test	SRK QC Criteria	Results
paste pH		
Pulp Duplicate	For any samples, +/- 0.5 difference pH unit	Passed (n=1)
Split Duplicate	For any samples, +/- 0.5 difference pH unit	#N/A
Standard Reference Material	Within specified tolerance ranges.	Passed (n=1)
TIC		
Method Blank	Minimum criteria is <2X DL. But other labs will accept <5X DL.	Passed (n=1) for TIC
Pulp Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-20%	Passed (n=1) for TIC
Split Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-30%	#N/A
Standard Reference Material	Within specified tolerance ranges.	Passed (n=1) for TIC
Total S & Total Sulphate		
Method Blank	Minimum criteria is <2X DL. But other labs will accept <5X DL.	Passed (n=1) for SO4
Sulphur balance (Total S > Sulphate S)	For samples > 10X the detection limit (DL), Total Sulphur should be greater than Total Sulphate, if not the % difference should be within +/-20%	All passed (n=5) SRK22-CSP-01 (BBA953) - high SO4 values being confirmed.
Pulp Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-20%	Passed (n=1) for SO4
Split Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-30%	#N/A
Standard Reference Material	Within specified tolerance ranges.	Passed (n=1) for SO4
Modified NP		

NP consistent with paste pH	Negative NP has paste pH <= 5	All passed (n=5)
Pulp Duplicate	% RPD better than +/-15% for NP>20 kg/t, % RPD better than +/-20% for NP>10 kg/t, Difference within +/-5kg/t for NP<10 kg/t. Fizz test rating is the same.	All passed (n=1) for NP and (n=1) for Fizz Rating
Split Duplicate	% RPD better than +/-15% for NP>20 kg/t, % RPD better than +/-20% for NP>10 kg/t, Difference within +/-5kg/t for NP<10 kg/t. Fizz test rating is the same.	#N/A
Fizz test rating with NP	Max NP does not exceed fizz test rating	All passed (n=5)
Standard Reference Material	Within specified tolerance ranges.	Passed (n=1) for NP
Modified NP and TIC		
Comparison between Modified NP and TIC	Check for trends/correlation	(n=5) NP generally higher than TIC
Total S-Leco and S-ICP		
Comparison between Total S-Leco and S-ICP	For samples >10X detection limit (DL), % RPD within +/-30%	(n=5) Two samples failed: BBA954 (SRK22-AR-01) and BBA957 (SRK22-SUMP4-01) where both Total S and S-ICP are >10X DL.
Total Metals by ICPMS		
Method Blank	Minimum criteria is <2X DL. But other labs will accept <5X DL.	#N/A
Pulp Duplicate	For samples >10X detection limit (DL), % RPD within +/- 20%, For ICP metal scan, it is acceptable for 10% of parameters to be outside of this criterion.	#N/A
Split Duplicate	For samples >10X detection limit (DL), % RPD within +/- 30%, For ICP metal scan, it is acceptable for 10% of parameters to be outside of this criterion.	#N/A
Standard Reference Material	Within specified tolerance ranges.	All passed (n=2)
MEND Shake Flask Extraction		
Method Blank	<5X Detection Limit	All passed (n=1)

Ion Balance	If EC>100uS/cm, Ion balance should be within +/-10%	All passed (n=3)
Lab Duplicate	For samples > 10X the detection limit (DL), % RPD within +/-20%	All passed (n=1)

7.2.2 Quarry Monitoring

7.2.2.1 Quarry Face Inspections

In 2022, AEM conducted three quarry inspections after blasting at Quarry 2 in November. Inspection forms are included in Attachment B1.

At Quarry 2, the geological inspections indicated the presence of medium grained mafic metavolcanics (1a) with trace hematite, epidote and chlorite alteration. None to trace amounts (2%) of quartz-carbonate veinlets were observed, and none to locally trace sulphides were observed. The absence of fibrous actinolite was noted for all inspections.

7.2.2.2 Acid Base Accounting (ABA)

A summary of ABA data is presented in Table 7-4 and Figure 7-4 to Figure 7-6. Complete results are presented in Attachment B2.

Values of paste pH for -2mm rock and +1cm fractions ranged from 8.3 to 8.7 and 8.6 to 8.9, respectively.

For the -2mm rock fraction, total sulphur ranged from 0.17% to 0.37% with a median of 0.24%. By comparison to the +1cm rock fraction total sulphur ranged from 0.10% to 0.18%. In the absence of sulphate data for all samples, AP was calculated from total suphur

For the -2mm rock fraction, values of Modified NP and TIC ranged from 92 to 210 kg $CaCO_3$/t and 84 to 190 kg $CaCO_3$/t, respectively whereas values for the +1 cm rock fraction ranged from 44 to 170 kg $CaCO_3$/t and 33 to 150 kg $CaCO_3$/t, respectively. Modified NP content was uniformly greater than TIC both rock fractions suggesting the occurrence of silicates measured by the NP method (Figure 7-4). All samples were classified as non-PAG on the basis of NP/AP and TIC/AP (Figure 7-5 and Figure 7-6, respectively).

Table 7-4: Summary of ABA Analyses for Quarry 2 ROQ Samples

Rock Type[1]	Sample ID	Paste pH		Total S		SO_4		AP[3]		TIC		Modified NP		TIC/AP		NP/AP	
		s.u.		%		%		kg $CaCO_3$/t		kg $CaCO_3$/t		kg $CaCO_3$/t		-		-	
		-2mm	+1cm	-2mm	+1cm	-2mm	+1cm	-2mm	+1cm	-2mm	+1cm	-2mm	+1cm	-2mm	1cm	-2mm	+1cm
1a	QUARRY2-11022022	8.3	8.7	0.37	0.12	0.02	0.03	12	3.8	84	33	92	44	7.3	8.7	7.9	12
	QUARRY2-11242022	8.7	8.6	0.24	0.18	0.21	0.18	7.5	5.6	140	150	180	170	19	27	24	30
	QUARRY2-11292022	8.7	8.9	0.17	0.1	0.17	0.06	5.3	3.1	190	110	210	120	36	36	39	38

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[HopeBay_Quarry_Table_CAPR002393_Rev00_JDP.xlsx

Notes

[1] 1a = mafic metavolcanic

[1] Sulphate being re-analyzed

[2] In the absence of sulphate data, AP calculated from total sulphur

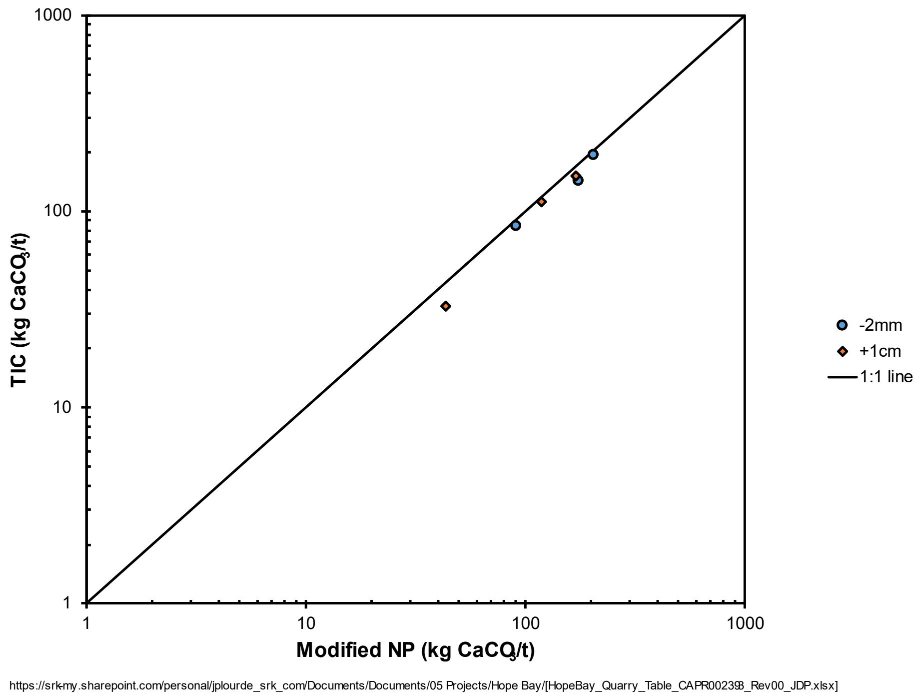


Figure 7-4: Comparison of Modified NP and TIC, Quarry 2

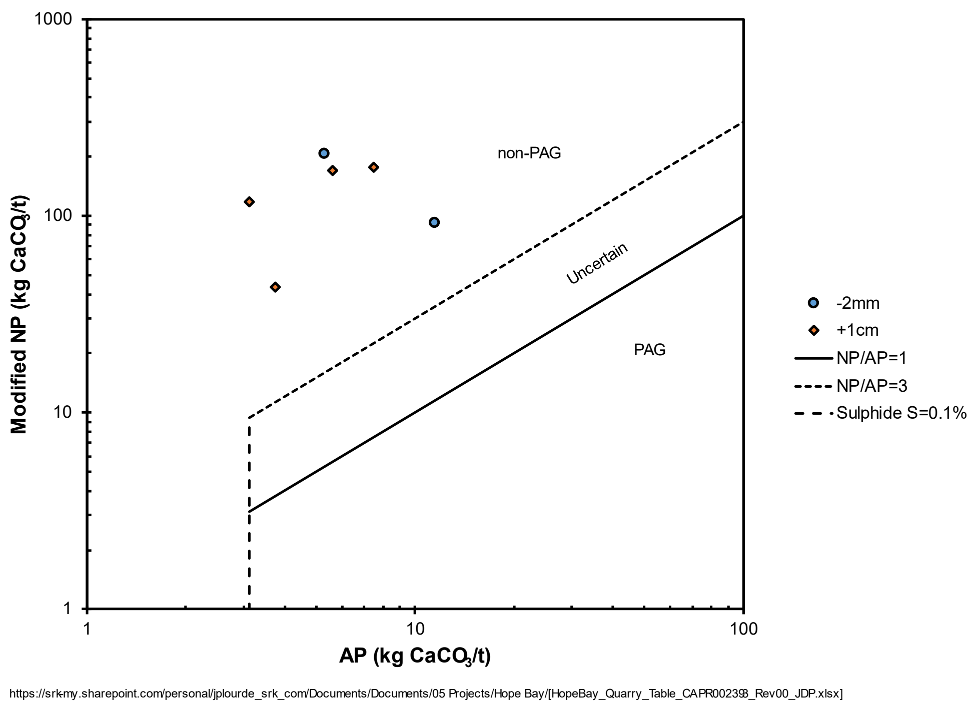
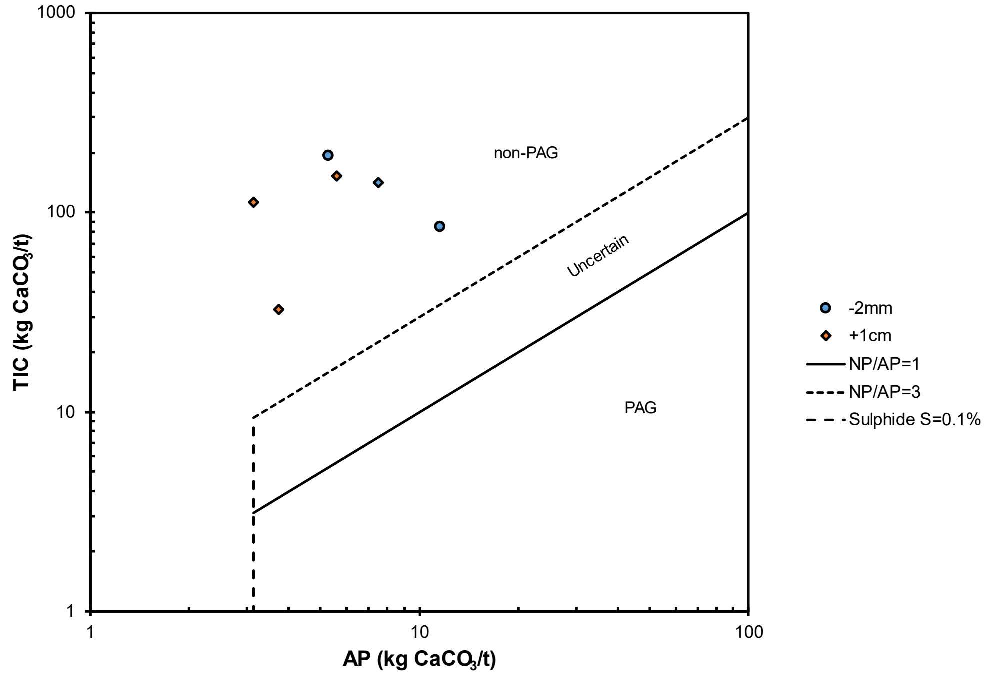


Figure 7-5: ARD Classifications by NP/AP, Quarry 2



https://srk-my.sharepoint.com/personal/jplourde_srk_com/Documents/Documents/05 Projects/Hope Bay/[HopeBay_Quarry_Table_CAPR002398_Rev00_JDP.xlsx]

Figure 7-6: ARD Classifications by TIC/AP, Quarry 2

7.2.2.3 Elemental Analyses

The trace element content for the sample set is presented in Table 7-5 by rock type with complete laboratory results presented in Attachment B3. All parameters were less than ten times the average crustal abundance for basalt indicating no appreciable enrichment.

Table 7-5: Summary of Elemental Analyses for Quarry 2

Parameter	Unit	Detection Limit	QUARRY2-11022022		QUARRY2-11242022		QUARRY2-11292022		10x Average Crustal Abundance*
			-2 mm	+1 cm	-2 mm	+1 cm	-2 mm	+1 cm	
Ag	ppb	2	0.20	<0.1	<0.1	<0.1	<0.1	<0.1	1100
As	ppm	0.1	13	5.5	0.8	<0.5	1.1	<0.5	20
Ba	ppm	0.5	12	3.0	4.0	5.0	5.0	3	3300
Ca	%	0.01	4.3	2.7	7.7	7.3	7.9	5.6	76
Cd	ppm	0.01	0.70	0.20	0.30	0.20	0.30	0.10	2.2
Co	ppm	0.1	48	32	41	37	45	41	480
Cr	ppm	0.5	170	170	160	160	170	180	1700
Cu	ppm	0.01	270	160	140	140	150	150	870
Fe	%	0.01	4.8	4.7	5.4	5.4	6.6	6.3	87
Hg	ppb	5	0.020	<0.01	<0.01	<0.01	<0.01	<0.01	90
Mg	%	0.01	1.7	1.9	1.9	2.1	3.0	2.7	46
Mn	ppm	1	850	850	1200	1200	1500	1300	15000
Mo	ppm	0.01	0.50	0.20	0.30	0.20	0.40	0.20	15
Ni	ppm	0.1	54	52	66	61	71	72	1300
P	%	0.001	0.024	0.028	0.022	0.021	0.024	0.024	1
Pb	ppm	0.01	4.0	1.2	8.4	1.8	4.9	1.0	60
S	%	0.02	0.31	0.11	0.23	0.15	0.17	0.07	0.3
Sb	ppm	0.02	0.30	0.10	<0.1	<0.1	<0.1	<0.1	2
Sr	ppm	0.5	28	34	30	32	28	21	4650
U	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10
V	ppm	2	96	110	110	120	150	150	2500
W	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7
Zn	ppm	0.1	97	63	98	78	97	85	1050

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[HopeBay_Quarry_Table_CAPR002393_Rev00_JDP.xlsx

Notes:

Values in italics represent values below the detection limit.

* Numbers bolded and underlined exceed 10 times the average crustal abundance for basaltic rocks from Price (1997)

7.2.2.4 SFE Tests

A summary of results for key SFE parameters is presented in Table 7-6 and complete results are included in Attachment B4.

All SFE tests had alkaline pH ranging from 8.8 to 9.4. Values of EC ranged from 140 to 300 µS/cm. Major cation chemistry was dominated by sodium (16 to 18 mg/L) and calcium (7.3 to 19 mg/L), while major anion chemistry was dominated by alkalinity (24 to 29 mg/L as $CaCO_3$), sulphate (9.0 to 13 mg/L), and chloride (12 to 25 mg/L). Concentrations of ammonia and nitrate ranged from 0.30 to 9.0 mg/L and 0.30 to 1.9 mg/L, respectively. The source of nitrate and ammonia are explosives residues. Trace metal concentrations overall were low.

Table 7-6: Shake Flask Extraction Results, Quarry 2

Sample ID	Unit	Detection Limit	QUARRY2-11022022	QUARRY2-11242022	QUARRY2-11292022
			-2mm	-2mm	-2mm
pH	pH Units	N/A	8.8	9.4	9.4
EC	uS/cm	1	300	160	140
Total Alkalinity	mg/L	0.5	29	24	27
SO_4	mg/L	0.5	9.0	13	7.3
Cl	mg/L	0.5	12	25	19
Ca	mg/L	0.05	19	7.9	7.3
Mg	mg/L	0.05	3.2	1.1	1.0
K	mg/L	0.05	2.9	1.3	1.5
Na	mg/L	0.05	16	18	18
NO_3	mg/L as N	0.02	-	0.30	1.9
NO_2	mg/L as N	0.005	-	<0.05	<0.05
NH_3	mg/L as N	0.005	9.0	0.30	0.70
Al	mg/L	0.0005	0.17	0.34	0.31
Sb	mg/L	0.00002	0.00018	0.00033	0.00032
As	mg/L	0.00002	0.00059	0.00014	0.00023
Ba	mg/L	0.00002	0.0036	0.0018	0.0012
B	mg/L	0.05	0.27	0.14	0.16
Cs	mg/L	0.00005	0.00041	0.00009	0.00007
Cd	mg/L	0.000005	0.000023	0.000005	0.000007
Cr	mg/L	0.0001	<0.00010	<0.00010	0.00
Co	mg/L	0.000005	0.0014	0.0001	0.0002
Cu	mg/L	0.00005	0.0034	0.0002	0.0003
Fe	mg/L	0.001	0.009	0.008	0.006

Sample ID	Unit	Detection Limit	QUARRY2-11022022	QUARRY2-11242022	QUARRY2-11292022
			-2mm	-2mm	-2mm
La	mg/L	0.00005	<0.000050	<0.000050	<0.000050
Pb	mg/L	0.000005	0.00003	0.00020	0.00004
Li	mg/L	0.0005	0.0030	0.0006	0.0011
Mn	mg/L	0.00005	0.0110	0.0010	0.0006
Hg	mg/L	0.00005	<0.000050	<0.000050	<0.000050
Mo	mg/L	0.00005	0.0020	0.0012	0.0020
Ni	mg/L	0.00002	0.00038	0.00008	0.00006
Se	mg/L	0.00004	0.00029	0.00052	0.00042
Sr	mg/L	0.00005	0.032	0.023	0.032
S	mg/L	10	<10	<10	<10
Tl	mg/L	0.000002	0.000052	0.000021	0.000006
U	mg/L	0.000002	0.000004	0.000004	0.000008
V	mg/L	0.0002	0.0008	0.0020	0.0025
Zn	mg/L	0.0001	0.0002	0.0002	0.0007

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[HopeBay_Construction_Table_CAPR002393_Rev02_JDP.xlsx

Notes:

All element concentrations are given as dissolved; SFE tests do not represent natural waters.

Values in italics represent values below the detection limit.

7.2.3 As-Built Construction Monitoring

7.2.3.1 Geological Inspection

All construction rock from Quarry 2 and waste rock from Pad T was mafic metavolcanic (1a) except for a minor amount of altered mafic metavolcanics (1as) sourced from Pad T that was used to construct the aqua dam road. Inspections of construction rock are summarized as follows:

- Core storage pad (Figure 7-7): rock was fine grained, dark grey to greenish mafic metavolcanics (1a) with no fizz on the groundmass, moderate fizz on 1-2% white quartz/carbonate veining and with trace (<1%) disseminated pyrite. Trace (<1%) hematite staining was observed on fracture surfaces of the sample. These observations are consistent with the geological inspections of Quarry 2.
- Sump 4 (Figure 7-8): rock was fine grained, greenish grey mafic metavolcanics (1a) with no fizz on the groundmass, weak to moderate fizz on 1% carbonate veining and trace (<1%) disseminated pyrite. There was no hematite staining present. These observations are consistent with the geological inspections of Quarry 2.

- Aqua dam road: rock was 95% mafic metavolcanic (1a; Figure 7-9a) and 5% altered mafic metavolcanics (1as; Figure 7-9b). The mafic metavolcanics were fine grained, dark greenish grey to grey in colour with no fizz on the groundmass, moderate fizz on 1% white carbonate on fracture surfaces and trace (<1%) disseminated very fine grained pyrite with rare fine grain blebs. The altered mafic metavolcanics (1as) were fine grained, very light grey to tan colour indicative of sericite alteration with no fizz on the groundmass, moderate fizz on 1% carbonate on fracture surfaces and trace <0.1% disseminated pyrite. No signs of weathering were observed in either the mafic metavolcanics or the altered mafic metavolcanics. These observations are consistent with the geological inspections of waste rock from Pad T.

Figure 7-7: Mafic metavolcanics (1a) with carbonate veining from Quarry 2 (SRK22-CSP-01)

Figure 7-8: Mafic metavolcanics (1a) with carbonate veining, Quarry 2 (SRK22-Sump4-01)

(a) **(b)**

Figure 7-9: (a) Mafic Metavolcanics (1a), Pad T Waste Rock (SRK22-AR-01) and (b) Sericite altered mafic metavolcanics (1as), Pad T Waste Rock (SRK22-AR-03)

7.2.3.2 Rinse Tests

Rinse tests on the sieved -2 mm fraction indicated pH values ranging from 8.1 to 8.7 (Table 7-7). Rinse EC values for construction rock sourced from Quarry 2 (220 and 240 µS/cm) were lower than waste rock from Pad T (820 to 3,700 µS/cm).

Table 7-7: Rinse Test Results, As-Built Construction Rock

Rock Source	Sample Location	Sample ID	Rock Type[1]	Rinse pH	Rinse EC
				s.u.	µS/cm
Quarry 2	Core Storage Pad	SRK22-CSP-01	1a	8.7	240
	Sump 4	SRK22-SUMP4-01	1a	8.3	220
Pad T	Aqua Dam Road	SRK22-AR-01	1a	8.7	820
		SRK22-AR-02	1a	8.1	3700
		SRK22-AR-03	1as	8.2	1900

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[HopeBay_Construction_Table_CAPR002393_Rev02_JDP.xlsx

Note:

[1] 1a = mafic metavolcanic, 1as = altered mafic metavolcanics

7.2.3.3 Acid Base Accounting

A summary of ABA data are presented inTable 7-5 and Figure 7-10 to Figure 7-12. Complete results are presented in Attachment B2.

Values of paste pH for all rock types ranged from 8.1 to 9.2.

Total sulphur for construction rock from Quarry 2 rock was 0.15 and 0.29%. Total sulphur from the aqua dam road, which used Pad T rock, ranged between 0.15% to 0.43%. The sample with 0.43% total sulphur contained 1-2% visible sulphides. In the absence of sulphate data for all samples, AP was calculated from total sulphur.

For samples sourced from Quarry 2, modified NP and TIC ranged from 120 to 140 kg $CaCO_3$/t. For waste rock sourced from Pad T, values of Modified NP and TIC ranged from 120 to 240 kg $CaCO_3$/t and 130 to 330 kg $CaCO_3$/t, respectively. Modified NP content was uniformly greater than TIC for mafic metavolcanics (1a) from both Quarry 2 and Pad T sources suggesting the occurrence of silicates measured by the NP method (Figure 7-10). Conversely, the TIC was higher than NP for altered mafic metavolcanics (1as) from Pad T source indicating the presence of iron and manganese carbonates that are pH neutral. All samples were classified as non-PAG on the basis of NP/AP and TIC/AP (Figure 7-11 and Figure 7-12, respectively).

Table 7-8: Summary of ABA Analyses for Construction Waste Rock Samples

Sample Source	Sample ID	Rock Type[1]	Paste pH	Total S	SO_4	AP	TIC	Modified NP	TIC/AP	NP/AP
			s.u.	%	%	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	-	-
Quarry 2	SRK22-CSP-01	1a	8.8	0.15	--[2]	4.7	120	120	25	26
	SRK22-SUMP4-01	1a	8.6	0.29	0.13	9.1	140	140	15	15
Pad T	SRK22-AR-01	1a	9.1	0.43	--[2]	14	130	120	10	9
	SRK22-AR-02	1a	8.1	0.16	0.04	5.0	140	130	28	26
	SRK22-AR-03	1as	9.2	0.15	0.01	4.7	330	240	71	50

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[HopeBay_Construction_Table_CAPR002393_Rev02_JDP.xlsx

Notes

[1] 1a = mafic metavolcanic, 1as = altered mafic metavolcanics

[2] Sulphate being re-analyzed

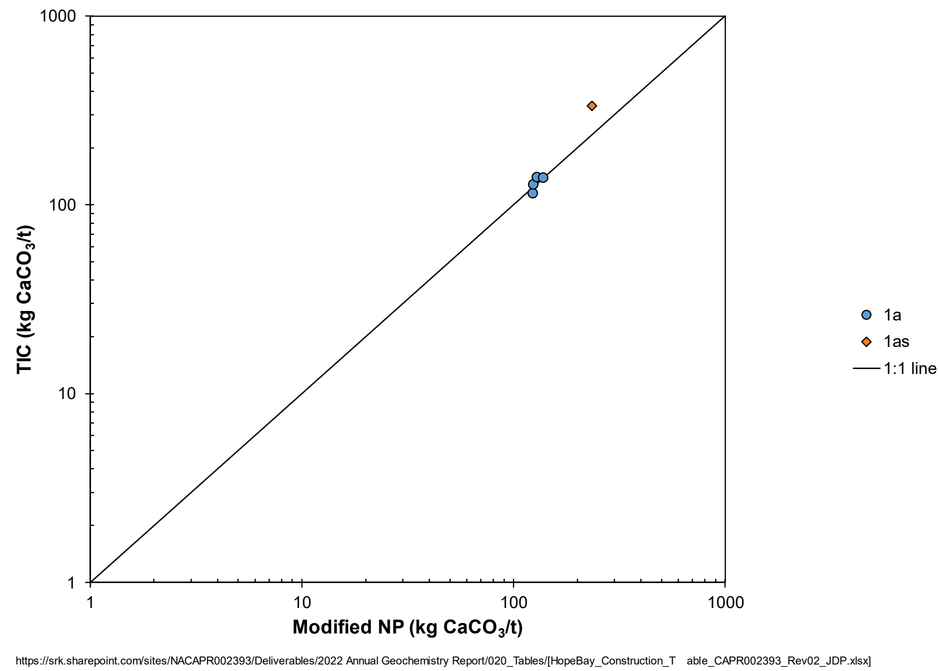


Figure 7-10: Comparison of Modified NP and TIC, Construction Rock

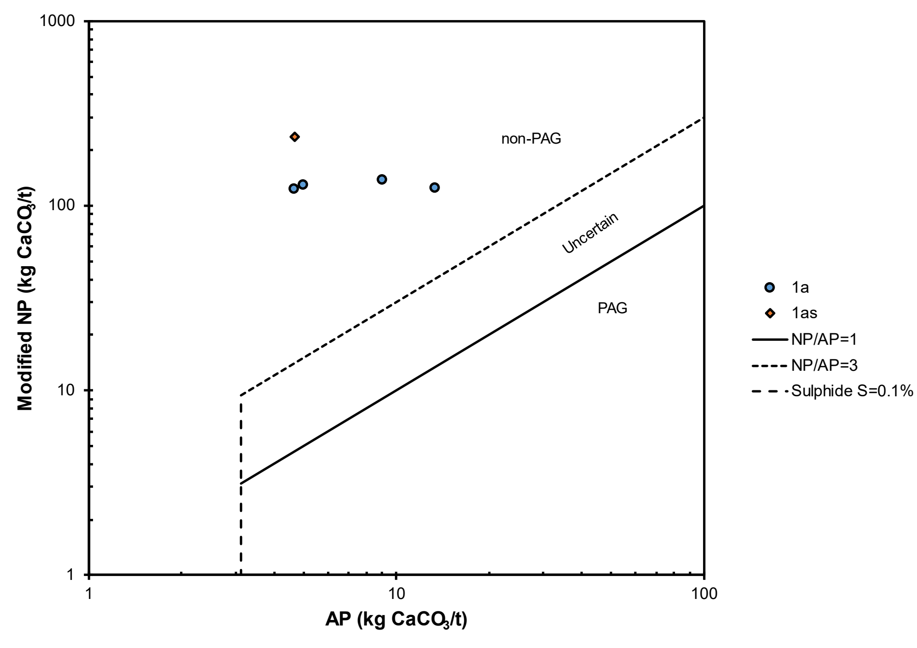
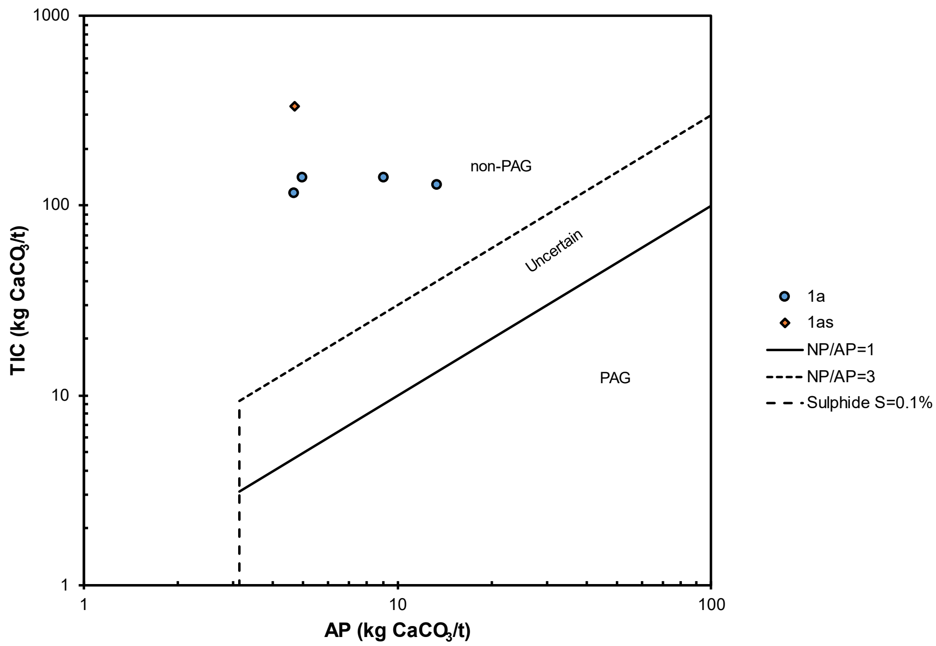


Figure 7-11: ARD Classifications by NP/AP, Construction Rock



https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[HopeBay_Construction_Table_CAPR002393_Rev02_JDP.xlsx]

Figure 7-12: ARD Classifications by TIC/AP, Construction Rock

7.2.3.4 Elemental Analyses

The trace element content for the sample set is presented in Table 7-9 by rock type with complete laboratory results presented in Attachment B3. All parameters were less than ten times the average crustal abundance for basalt indicating no appreciable enrichment.

Table 7-9: Summary of Elemental Analyses for Construction Rock

Parameter	Unit	Detection Limit	Quarry 2		Pad T			10x Average Crustal Abundance*
			SRK22-CSP-01	SRK22-SUMP4-01	SRK22-AR-01	SRK22-AR-02	SRK22-AR-03	
			1a	1a	1a	1a	1as	
Ag	ppb	<2	50	29	130	43	17	1100
As	ppm	0.1	2.3	5.8	8.4	3.3	5.3	20
Ba	ppm	0.5	3.6	9.0	5.1	13	12	3300
Ca	%	0.01	4.8	3.7	5.1	4.8	6.7	76
Cd	ppm	0.01	0.10	0.03	0.26	0.05	0.09	2.2
Co	ppm	0.1	38	41	37	31	22	480
Cr	ppm	0.5	150	76	140	68	27	1700
Cu	ppm	0.01	130	130	130	56	31	870
Fe	%	0.01	6.0	8.0	6.0	8.8	8.1	87
Hg	ppb	5	<5	<5	<5	<5	<5	90
Mg	%	0.01	2.4	3.2	2.1	1.8	1.8	46
Mn	ppm	1	1200	1400	1200	1400	2300	15000
Mo	ppm	0.01	0.22	0.25	0.28	0.48	0.35	15
Ni	ppm	0.1	57	42	53	21	2.4	1300
P	%	0.001	0.028	0.040	0.032	0.078	0.10	1
Pb	ppm	0.01	1.1	0.9	2.1	2.9	1.0	60
S	%	0.02	0.14	0.25	0.37	0.14	0.14	0.3
Sb	ppm	0.02	0.04	0.06	0.05	0.05	0.04	2
Sr	ppm	0.5	19.0	14.0	19.0	49.0	41.0	4650
U	ppm	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10
V	ppm	2	140	210	110	79	22	2500
W	ppm	0.1	<0.1	<0.2	<0.3	<0.4	<0.5	7
Zn	ppm	0.1	76	95	90	98	82	1050

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[HopeBay_Construction_Table_CAPR002393_Rev02_JDP.xlsx

Notes:

Values in italics represent values below the detection limit.

* Numbers bolded and underlined exceed 10 times the average crustal abundance for basaltic rocks from Price (1997)

[1] 1a = mafic metavolcanic, 1as = altered mafic metavolcanics

7.2.3.5 SFE Tests

A summary of results for key SFE parameters is presented in Table 7-10 and complete results are included in Attachment B4.

All SFE tests had alkaline pH ranging from 8.8 to 9.4. Values of EC ranged from 100 to 590 µS/cm. Major cation chemistry was dominated by sodium (8 to 74 mg/L) and calcium (8.4 to 33 mg/L), while major anion chemistry was dominated by sulphate (19 to 35 mg/L), chloride (6.1 to 130 mg/L), and nitrate (0.30 to 22 mg/l). High chloride values in waste rock previously indicated the presence of residual drilling brines however brines were not used underground in 2022. As indicated by SFE tests for Doris waste rock from Pad T (Section 5.2.6) and the underground seepage monitoring program (Section 9), the major ion chemistry suggests that the source of high chloride is naturally saline groundwater intercepted by the underground mine. Concentrations of ammonia from 0.11 to 0.30 mg/L. The source of nitrate and ammonia are explosives residues. Trace element concentrations overall were low.

Table 7-10: Shake Flask Extraction Results, 2022 Construction Rock Samples

Sample ID	Unit	Detection Limit	Quarry 2	Pad T	
			SRK22-CSP-01	SRK22-AR-02	SRK22-AR-03
			1a	1a	1as
pH	pH Units	N/A	9.4	8.8	9.0
EC	uS/cm	1	100	590	290
Total Alkalinity	mg/L	0.5	22	20	23
SO_4	mg/L	0.5	19	35	31
Cl	mg/L	0.5	6.1	130	48
Ca	mg/L	0.05	8.4	33	19
Mg	mg/L	0.05	1.6	7.4	4.1
K	mg/L	0.05	1.4	3.7	3.4
Na	mg/L	0.05	8.0	74	34
NO_3	mg/L as N	0.02	0.30	22	7.5
NO_2	mg/L as N	0.005	<0.05	<0.05	<0.05
NH_3	mg/L as N	0.005	0.11	0.30	0.18
Al	mg/L	0.0005	0.22	0.11	0.21
Sb	mg/L	0.00002	0.00012	0.00014	0.00013
As	mg/L	0.00002	0.00079	0.00021	0.00039
Ba	mg/L	0.00002	0.00057	0.0050	0.00094
B	mg/L	0.05	0.061	0.079	0.10
Cs	mg/L	0.00005	<0.00005	0.00034	0.00006
Cd	mg/L	0.000005	<0.000005	<0.000005	<0.000005
Cr	mg/L	0.0001	<0.0001	<0.0001	<0.0001

Sample ID	Unit	Detection Limit	Quarry 2	Pad T	
			SRK22-CSP-01	SRK22-AR-02	SRK22-AR-03
			1a	1a	1as
Co	mg/L	0.000005	0.00005	0.00015	0.00008
Cu	mg/L	0.00005	0.00041	0.00035	0.00015
Fe	mg/L	0.001	0.0048	0.0026	0.0028
La	mg/L	0.00005	<0.00005	<0.00005	<0.00005
Pb	mg/L	0.000005	<0.000005	<0.000005	0.000057
Li	mg/L	0.0005	0.0011	0.0042	0.0021
Mn	mg/L	0.00005	0.0010	0.017	0.012
Hg	mg/L	0.00005	<0.00005	<0.00005	<0.00005
Mo	mg/L	0.00005	0.0010	0.0010	0.0010
Ni	mg/L	0.00002	<0.00002	0.000028	0.000064
Se	mg/L	0.00004	0.00032	0.00025	0.00010
Sr	mg/L	0.00005	0.013	0.16	0.060
S	mg/L	10	<10	10	<10
Tl	mg/L	0.000002	0.000004	0.000007	0.000010
U	mg/L	0.000002	<0.000002	<0.000002	0.00002
V	mg/L	0.0002	0.0016	<0.0002	<0.0002
Zn	mg/L	0.0001	0.0001	<0.0001	0.0004

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[HopeBay_Construction_Table_CAPR002393_Rev02_JDP.xlsx

Notes:

All element concentrations are given as dissolved; SFE tests do not represent natural waters.

Values in italics represent values below the detection limit.

8 Tailings

8.1 Background

In the processing plant, there are two sections: the concentrate lines (CL1 and CL2) and the Concentrate Treatment Plant (CTP). Cyanide is a reagent used exclusively in the CTP to dissolve gold from the solid concentrate which is then captured by resin. The concentrate lines (CL) react poorly to the presence of cyanide and so this side must be kept free of cyanide for the process to perform well. The final stage of the CTP is cyanide destruction. Cyanide is destroyed using the INCO SO_2 process. The detoxified slurry is filtered, and the solids (TL-7A) are combined with waste rock and placed underground as permanent backfill. Seepage surveys of the backfilled detoxified tailings (TL-11) are conducted bi-annually. The detoxified tailings filtrate (TL-7B) is pumped to the tailings thickener where it is combined with the flotation tailings slurry. Tailings slurry supernatant (TL-5) and solids (TL-6) are discharged to the TIA. The detoxification circuit is run to produce a total cyanide level of less than one part per million (1 ppm).

When the process plant is operational, the solution from the detoxification circuit and final detoxified tailings are routinely analyzed for weak acid dissociable (WAD) and total cyanide species by mill personnel to monitor the performance of the cyanide detoxification circuit.

Hope Bay initiated ore processing at the Doris mill and commenced deposition of flotation tailings in the Doris tailings impoundment area (TIA) in January 2017 and placement of detoxified tailings as backfill in stopes of the Doris Mine in February 2017. The geochemical monitoring of tailings commenced in February 2017. In October 2019, ore processing started from Madrid North (Naartok East Crown Pillar Recovery, NE CPR) at the Doris mill. Ore from the NE CPR is blended with Doris ore for processing at a target ratio of a maximum 25% Naartok East ore to 75% Doris ore.

8.2 Methods

As discussed in Section 3.4, the process plant was in care and maintenance throughout 2022 and accordingly the scope of tailings monitoring was limited to the underground seepage monitoring program.

8.2.1 Sample Collection and Analysis

8.2.1.1 Seepage Survey of Underground Backfilled Stopes (TL-11)

Schedule I (Table 3) of the Water Licence specifies bi-annual seepage surveys of underground backfilled stopes with opportunistic sampling of seepage for the analysis according to Section 4.2.2.2.

AEM completed underground seepage inspections of backfilled stopes in June and December 2022. Visual surveys were limited to all backfilled stopes that could be accessed safely at the time of the survey. Three seepage locations were sampled in June and four locations were sampled in December.

During the June sampling survey, AEM collected three seepage samples. AEM only sample seepage where there was active flow. Flow rates were not recorded. Seepage that was reported to be clear was collected from the following locations:

- 4990 Fresh Air Raise
- Level 134, Long Hole
- Level 54, Backfill Seep

In December, AEM collected four samples from the following locations:

- Level 110, Extension 1 (EXT 1). A seepage sample was collected 9 m from the base of the stope. AEM described the sample as clear.
- Level 134. A seepage sample plus duplicate was collected 30 m from the base of the stope. AEM reported the water color as clear but the filtrate generated in the field was noted by the sampler as brown.
- Level 114, Main Access. A seepage sample was collected 12 m from the base of the stope. AEM described the water as clear, but the filtrate generated in the field was noted by the sampler as brown.
- Level 120, East Lane, near to the 96 fan vent raise (ELN 96). A seepage sample was collected 6 m from the base of the stope. AEM described the sample as brown.

At each seepage station, AEM collected field measurements and collected samples for the test work program outlined in Section 4.2.2.2. The one exception was total, free and WAD cyanide were not analyzed for the June seepage samples.

8.3 Results and Discussion

8.3.1 QA/QC

A summary of the results of SRK's QC checks for the underground stope seepage samples (TL-11) is presented in Table 8-1. All data passed the QC checks except for the following:

- Six laboratory duplicate pairs failed the ALS internal QA/QC criteria for sulphate. SRK requested a re-run of these samples on the basis of this RPD failure, but the laboratory had already re-analyzed the samples due to a separate ion balance failure within the same batch of samples. The sample re-run failed to include re-analysis of the sulphate duplicate due to a laboratory error, so a revised laboratory report was issued with the sulphate duplicate results omitted. .
- Three out of seven seepage samples failed SRK ion balance QC checks . There was an excess of anions to cations in two of the failures and an excess of cations in the third failure. In all instances, the samples required dilution prior to analysis due to the elevated conductivity.

SRK do not consider the above failures to have a material impact on the overall conclusions made on the laboratory data. All data were accepted as received.

Table 8-1: QA/QC Summary Backfilled Stope Seepage Samples (TL-11)

QC Test	SRK QC Criteria	TL-11 Results
Physical Test[1]		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1)
Travel Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1)
Method Blank	<2X DL	All passed. TDS & TSS (n=7); Total alkalinity, acidity (as $CaCO_3$) & EC (n=8)
Field Duplicate	For samples >10X DL should be within +/-30% RPD	All passed (n=2)
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	All passed. TDS & TSS (n=7); Total alkalinity, acidity (as $CaCO_3$) & EC (n=8)
Field pH vs. Lab pH	Difference should not be greater than 1 pH unit	All Passed (n=7)
Field EC vs Lab EC	For samples > 10X the detection limit (DL), % RPD should be within +/-30%	All Passed (n=7)
Standard Reference Materials	Within specified tolerance ranges.	All passed. TDS & TSS (n=7); Total alkalinity, acidity (as $CaCO_3$) & EC (n=8)
Anions and Nutrients[2]		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1)
Travel Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1)
Method Blank	<2X DL	All passed. Total Ammonia (n=7), Total P, Br, Cl, F (n=1); NO_3, NO_2, SO_4 (n=8)
Field Duplicate	For samples >10X DL should be within +/-30% RPD	All passed (n=2)
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	Total Ammonia, NO_3, NO_2, Passed (n=6), Total P Passed (n=1), F, Br, SO_4 and Cl Passed (n=2). SO_4 failed the ALS data quality objectives (n=6). The laboratory undertook re-analyses of the duplicate sample but SO4 was not re-analyzed in the duplicate.
Ion Balance	EC>100 uS/cm, % difference should be within +/-10%	(n=7) 3 Failed (EO2211202, EO2211203, EO2211207). Ion imbalance >10% Laboratory confirmed dilution was required due to elevated EC.
Standard Reference Materials	Within specified tolerance ranges.	All passed. Total Ammonia (n=7), Total P, Br, Cl, F (n=1); NO_3, NO_2, SO_4 (n=8)
Cyanide Species[3]		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1)

Method Blank	<2X DL	All passed. Cyanide, free, Cyanide, WAD and Cyanide, Total (n=6)
Field Duplicate	For samples >10X DL should be within +/-30% RPD	All passed (n=1)
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	All passed. Cyanide, free, Cyanide, WAD and Cyanide, Total (n=6)
Standard Reference Materials	Within specified tolerance ranges.	All passed. Cyanide, free, Cyanide, WAD and Cyanide, Total (n=6)
Trace Metals by ICP-MS		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1) for Dissolved
Travel Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1) for Total and (n=1) for Dissolved
Method Blank	<2X DL	All passed. (n=7) for Dissolved Metals and (n=2) for Total Metals
Field Duplicate	For samples >10X DL should be within +/-30% RPD	All passed (n=1) for Total and (n=2) for Dissolved
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	All passed. (n=7) for Dissolved Metals and (n=1) for Total Metals, (n=2) for Total Ca, Mg, Mn and Sr (for WO# YL2200789).
Total vs Dissolved Metals	Total Metals>Dissolved metals. Total Metals should be greater than Dissolved Metals, if not the % difference should be within +/-20%. ALS would use 10X DL, Maxxam would use 5X DL	All passed. (n=3). (EO2211202, EO2211203, EO2211205, EO2211206, EO2211207 didn't have Total Metals analysis)
Laboratory Control Sample and Certified Reference Material	Within specified tolerance ranges.	All passed. (n=7) for Dissolved Metals and (n=2) for Total Metals
Hg-CVAAS		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1) for Dissolved
Travel Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1) for Total and (n=1) for Dissolved
Method Blank	<2X DL	All Passed. (n=7) for Dissolved Hg and (n=1) for Total Hg
Field Duplicate	For samples >10X DL should be within +/-30% RPD	All passed (n=1) for Total and (n=2) for Dissolved
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	All Passed. (n=7) for Dissolved Hg and (n=1) for Total Hg
Standard Reference Materials	Within specified tolerance ranges.	All Passed. (n=7) for Dissolved Hg and (n=1) for Total Hg

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NACAPR001813_HopeBay_TailingsMonitoringData_2022_Summary QAQC_Rev04.xlsx]

Notes:

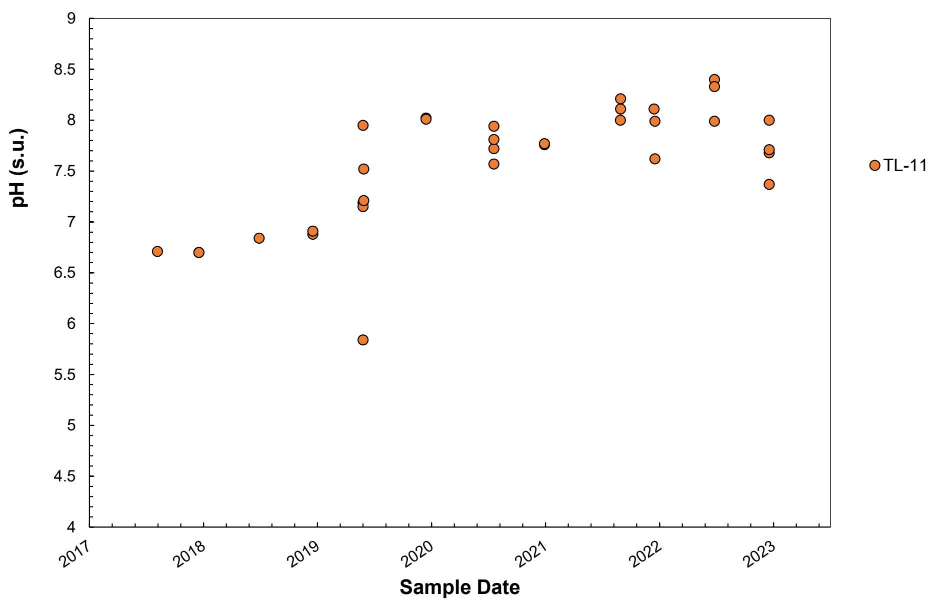
1. Conductivity, pH, total alkalinity (as $CaCO_3$), total suspended solids, total dissolved solids, acidity (as $CaCO_3$)
2. Total ammonia, NO_3, NO_2, SO_4
3. Total, free and WAD cyanide

TDS = Total Dissolve Solids, TSS = Total Suspended Solids, EC = electrical conductivity, P = phosphorous, Br = bromide, Cl = chloride, F = fluoride, NO_3 = nitrate, NO_2 = nitrite, SO_4 = sulphate, Hg - mercury

8.3.2 Seepage Monitoring of Backfilled Stopes (TL-11)

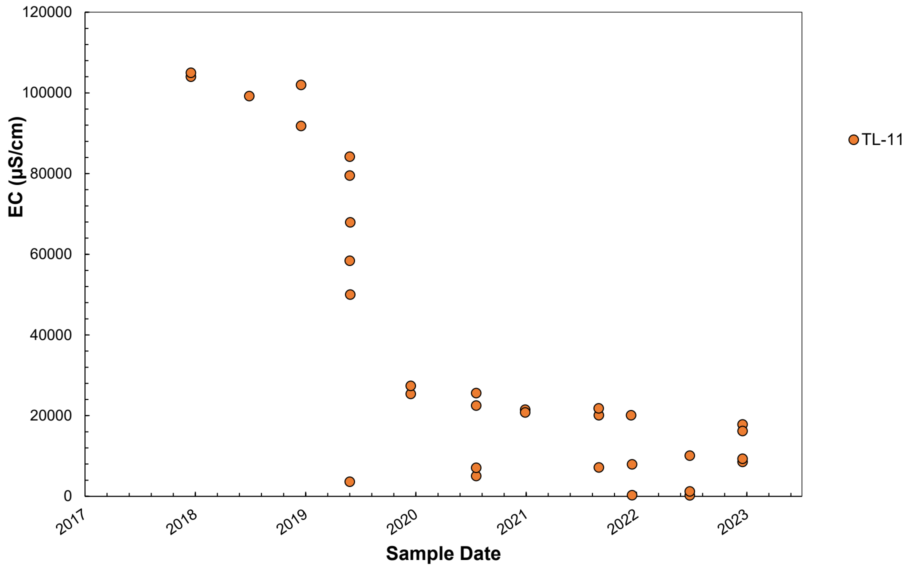
Selected water quality analyses of the seepage monitoring samples collected in the vicinity of the underground stopes are provided in Table 8-2 and full results are included in Appendix C1. The results are compared to median and 5th and 95th percentile concentrations reported in the previous TL-11 monitoring surveys (2017 to 2021).

pH ranged between 7.4 and 8.4 in all samples and was within range of previous TL-11 seepage data (Figure 8-1). EC ranged from 8,600 and 18,000 µS/cm for all samples except for two samples (4900 Fresh Air Raise and Level 54 samples collected in June), which had EC values of 220 and 1,200 µS/cm, respectively (herein referred to as the two low EC samples). EC was highest in the samples collected from Level 110 and Level 120 in December. Since 2020, EC values have been up to five times lower than seepage samples collected from 2017 to 2019 (Figure 8-2).



https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_HopeBay_TailingsMonitoringData_2022_TL7B & TL11_Charts_mlt_jce_rev06.xlsx]

Figure 8-1: pH timeseries plot for underground seepage (TL-11)



https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_HopeBay_TailingsMonitoringData_2022_TL7B & TL11_Charts_mlt_jce_rev06.xlsx]

Figure 8-2: EC timeseries plot for underground seepage (TL-11

Table 8-2: Summary of Underground Stope Seepage and Ponded Water Samples (TL-11)

Sample ID		June			December				Historical Statistics (2017-2021)		
ALS ID		4990 Fresh Air Raise	Level 54 Backfill	Level 134 Long Hole	Level 110 Extension 1	Level 134	Level 120 East Lane (96 fan vent raise)	Level 114 Main Access			
Date Sampled		26/06/2022 13:45	26/06/2022 14:20	26/06/2022 14:25	18/12/2022 15:30	18/12/2022 16:00	18/12/2022 16:30	18/12/2022 15:05	P05	P50	P95
Parameter	**Units**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**n=26**	**n=26**	**n=26**
Flow Rate	L/s	**Not Recorded**	**Not Recorded**	**Not Recorded**	**Too Low to Measure**	**0.089**	**0.038**	**Too Low to Measure**			
pH	pH	8	8.4	8.3	7.7	7.4	7.7	8.0	6.7	7.7	8.1
EC	uS/cm	220	1200	10000	18000	8600	16000	9300	3900	25000	100000
TSS	mg/L	95	46	*3.0*	70	27	58	59	3.1	39	980
TDS	mg/L	180	740	7100	12000	5500	10000	5800	2700	18000	82000
SO_4	mg/L	17	180	660	1300	660	450	520	160	920	1300
Alkalinity as $CaCO_3$	mg/L	66	170	230	240	240	210	250	41	150	260
Cl	mg/L	18	180	3000	7200	3200	3700	3700	920	9000	48000
Ca	mg/L	23	64	230	350	220	230	150	130	530	16000
Mg	mg/L	3.9	26	240	410	200	360	210	54	590	1700
K	mg/L	1.5	5.0	55	100	49	100	62	39	140	570
Na	mg/L	14	140	1700	3100	1400	3100	1600	480	4600	12000
Total CN	mg/L	--	--	--	0.0072	0.0074	*0.0050*	0.023	0.0068	0.05	0.31
WAD CN	mg/L	--	--	--	*0.0050*	*0.0050*	*0.0050*	*0.0050*	0.0050	0.0050	0.025
Free CN	mg/L	--	--	--	*0.0050*	*0.0050*	*0.0050*	*0.0050*	0.0050	0.0054	0.023
NH3	mg/L	0.0093	0.88	0.47	2.7	0.27	0.15	1.1	1.2	31	370
NO3	mg/L	0.34	0.28	7.2	19	5.9	3.2	0.97	1.8	35	570
NO2	mg/L	0.0013	0.029	0.50	1.3	0.31	0.067	0.17	0.12	1.6	17
Al	mg/L	0.052	0.0019	0.0093	*0.020*	*0.0050*	*0.020*	*0.0050*	0.0083	0.020	0.10
Ag	mg/L	*0.000010*	*0.000010*	0.000078	*0.00020*	0.000071	*0.00020*	*0.000050*	0.000050	0.00024	0.049
As	mg/L	0.0010	0.00098	0.0015	*0.0020*	0.0013	0.0025	0.0057	0.0011	0.0050	0.010
B	mg/L	0.030	0.17	1.1	2.2	1.1	1.8	1.5	0.21	2.4	3.6
Ba	mg/L	0.0053	0.0037	0.021	0.030	0.021	0.027	0.035	0.022	0.042	0.59
Cd	mg/L	0.000046	0.000016	0.00028	0.00023	0.00024	*0.00010*	0.000028	0.000014	0.00051	0.034
Co	mg/L	0.00015	0.0051	0.027	0.030	0.020	0.011	0.0044	0.0039	0.047	0.22
Cr	mg/L	0.00068	*0.00050*	*0.00050*	--	--	--	--	0.00060	0.0050	0.010
Cu	mg/L	0.018	0.0040	0.020	0.012	0.016	0.0093	0.0035	0.011	0.059	0.62
Fe	mg/L	0.047	0.14	*0.050*	*0.20*	*0.050*	*0.20*	*0.050*	0.021	0.20	1.0
Mn	mg/L	0.0055	0.44	1.1	0.99	0.77	0.62	0.18	0.095	2.2	9.9
Mo	mg/L	0.00038	0.0014	0.0021	0.0046	0.0017	0.0039	0.0041	0.0030	0.0083	0.046
Ni	mg/L	0.00099	0.0068	0.047	0.046	0.035	0.019	0.0030	0.0035	0.14	0.43
Pb	mg/L	0.00019	*0.000050*	*0.00025*	*0.0010*	*0.00025*	*0.0010*	*0.00025*	0.00010	0.0010	0.15
S	mg/L	6.0	68	250	400	210	240	160	70	440	600
Sb	mg/L	0.00035	0.00022	0.00057	*0.0020*	0.00051	*0.0020*	0.0011	0.00045	0.0027	0.010
Se	mg/L	0.00022	0.00028	0.0024	0.0027	0.0018	*0.0010*	0.00034	0.00051	0.0039	0.020
Sr	mg/L	0.054	0.16	2.0	3.7	1.7	3.0	1.8	0.89	5.8	34
Zn	mg/L	0.13	0.0077	0.038	0.025	0.034	*0.020*	0.015	0.010	0.10	1.8

Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_HopeBay_TailingsMonitoringData_TL-11_2022_jce_mc_rev11.xlsx]

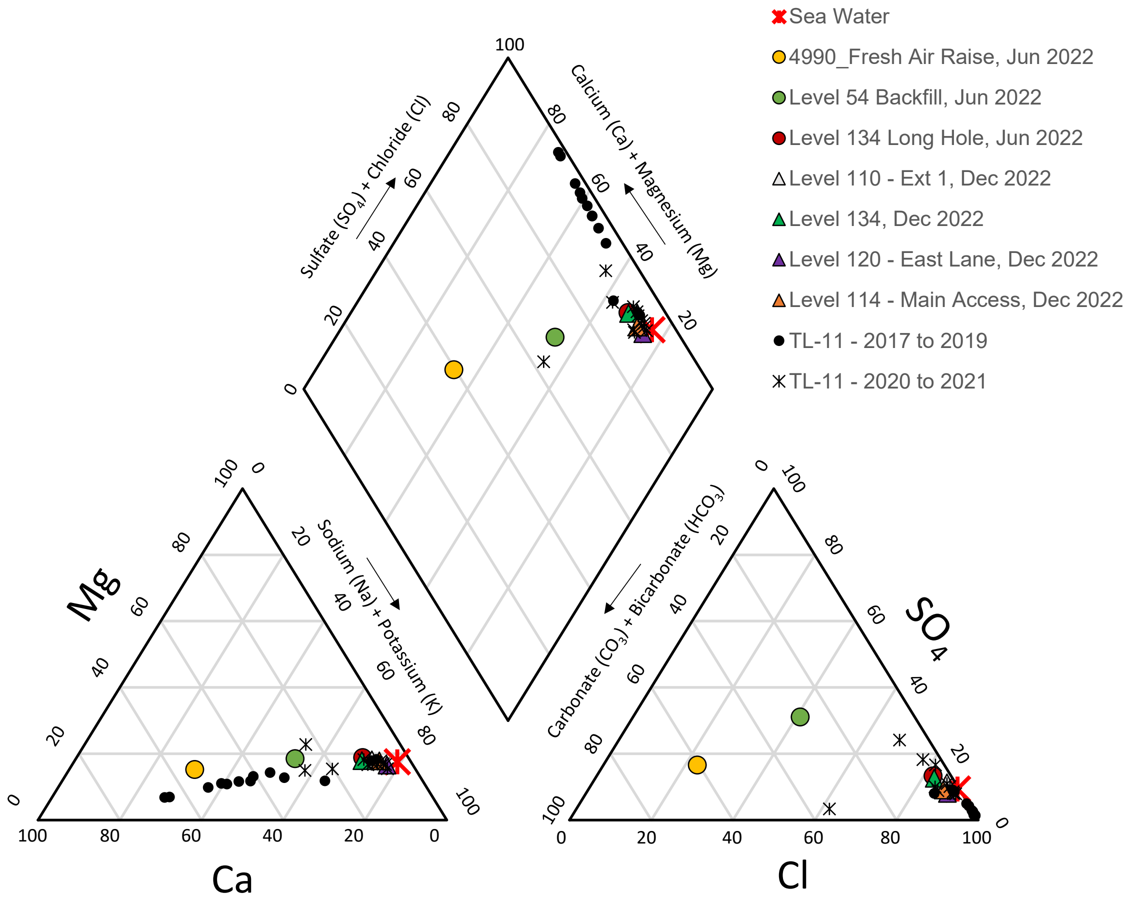
Notes: *Blue italics* = Value less than laboratory detection limit. Detection limit shown.

Metal(loid) concentrations are reported as dissolved. Total WAD and Free CN not analyzed in June 2022. Dissolved chromium not analyzed in December 2022.

Potential sources of the major ions include i) process reagents (sodium), ii) sulphide oxidation with resulting carbonate dissolution from waste rock and detoxified tailings (sulphate, calcium and magnesium) and iii) saline groundwater (seawater composition).

All 2022 seepage samples except for the two low EC samples have major anion chemistry dominated by chloride (3,000 to 7,200 mg/L) and major cation chemistry dominated by sodium (1,400 to 3,100 mg/L). Major ion chemistry for the two low EC samples was variable. In the 4900 Fresh Air Raise sample, the dominant anions are alkalinity and the dominant cation is calcium. In the Level 54 Backfill sample, the dominant anion is chloride, but the sample also contained significant proportions of alkalinity and sulphate, and the dominant cation is sodium.

Figure 8-3 illustrates the major ion chemistry for the underground seepage samples collected in 2022, previous TL-11 seepage samples (2017 to 2021) and typical seawater composition. All 2022 underground seepage samples except for the two low EC samples had the major ion composition characteristic of seawater indicating saline groundwater, though seepage concentrations were more dilute than seawater. The two low EC samples plot in separate areas of the Figure 8-3. The major ion composition of the Level 54 sample was equivalent to a historic sample characterized as contact water from underground mine wall rock. Figure 8-3 suggests that since 2020, the majority of underground seepage samples were influenced by saline groundwater influence whereas the majority of samples collected between 2017 to 2019 did not.



Source: https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[CAPR001813_Hope Bay_TailingsMonitoringData_TL-11 PiperPlot_mc_Rev1.xlsx]

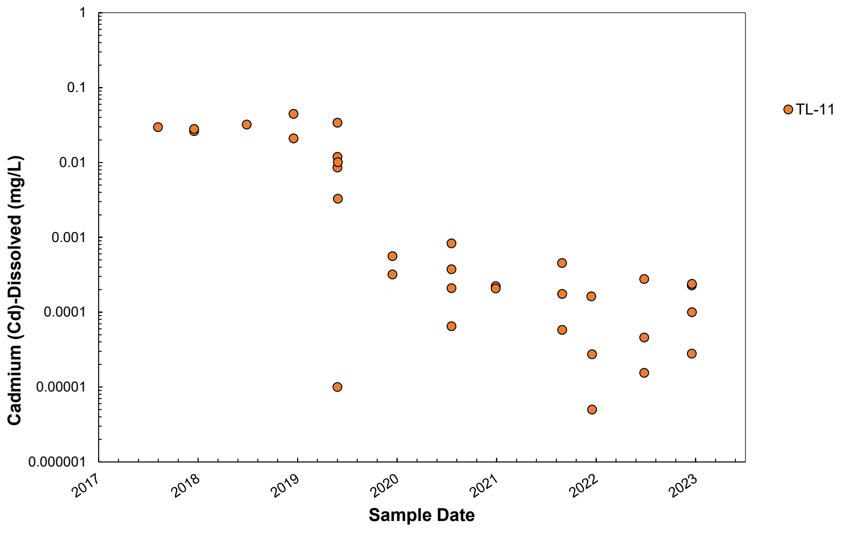
Figure 8-3: Major Ion Composition for Seepage from Underground Stopes (TL-11)

Figure 8-4 to Figure 8-13 presents the TL-11 monitoring sample collected since 2017 for key parameters. The results of the June and December 2022 seepage surveys are summarized as follows:

- TSS ranged from 3.0 to 95 mg/L and was highest in the 4990 Fresh Air Raise sample. The higher TSS values coincided with elevated metals described further below. The 4900 Fresh Air Raise sample reported total trace element concentrations above the 50th percentile from the historical sample set for a number of parameters including total aluminum, arsenic, chromium, iron, lead, silicon, titanium, vanadium and zinc. Only dissolved aluminum and dissolved zinc were above the 50th percentile from the historical sample set in the 4900 Fresh Air Raise filtered sample (0.052 and 0.13 mg/L respectively).
- The decrease in EC from 2020 onwards coincides with a decrease in concentrations of a number of key parameters including dissolved boron, chromium, cadmium,

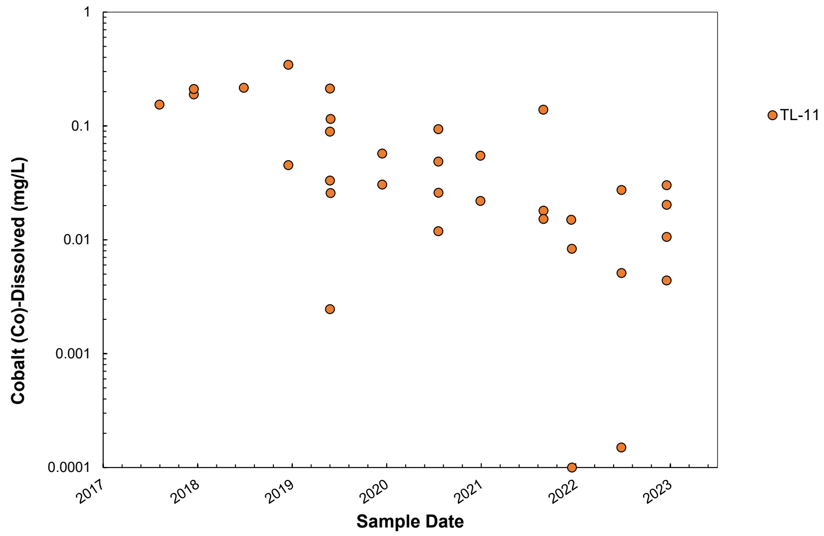
cobalt, copper, nickel, silver, selenium and zinc. This suggests dilution by saline groundwater as indicated by the major ion chemistry. These trends continued through 2022 and all of these parameters reported concentrations below the 50th percentile from the historical sample set in all samples.

- Sulphate concentrations were lowest in the 4900 Fresh Air Raise and Level 54 samples (17 and 180 mg/L). Sulphate in all other samples was higher (450 to 1,300 mg/L) and equivalent to the historic sample set, however the source of sulphate is likely saline groundwater.
- Total alkalinity timeseries data is plotted in; concentrations were between the 50th and 95th percentile from the historical sample set in all samples (170 to 250 mg/L) but lower in the 4900 Fresh Air Raise sample (66 mg/L as $CaCO_3$).
- Chloride was below the 50th percentile from the historical sample set in all samples but notably lower in the 4900 Fresh Air Raise and Level 54 samples (18 and 180 mg/L respectively) (Figure 8-12).
- Dissolved arsenic was above the 50th percentile from the historical sample set in the seepage sample from Level 114 Main Access (0.0057 mg/L) but lower in all other samples ranging between (0.001 and 0.003 mg/L) (Figure 8-13).
- Levels of ammonia, nitrate and nitrite were below the 50th percentile from the historical sample set in all of the seepage samples but notably lower in the low EC samples (4900 Fresh Air Raise and Level 54).
- Total, free and WAD cyanide analyses were all below the 50th percentile from the historical sample set for the seepage samples collected in December and were not analyzed in June.
- The results suggest that seepage samples collected between 2017 and 2019 represent contact water of detoxified tailings whereas samples collected since 2020 are likely contact water mixed with saline groundwater.



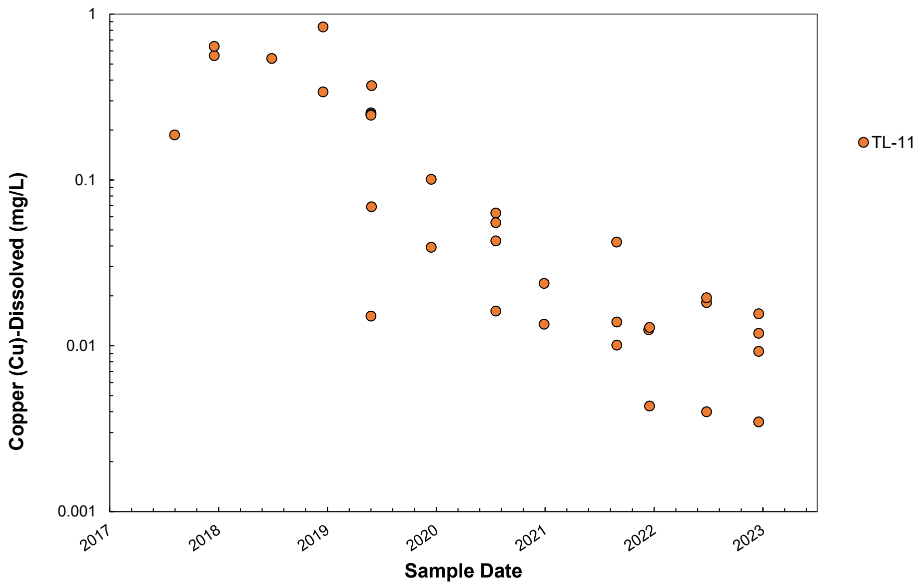
https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_HopeBay_TailingsMonitoringData_2022_TL7B & TL11_Charts_mlt_jce_rev06.xlsx]

Figure 8-4: Cadmium timeseries plot for underground seepage (TL-11)



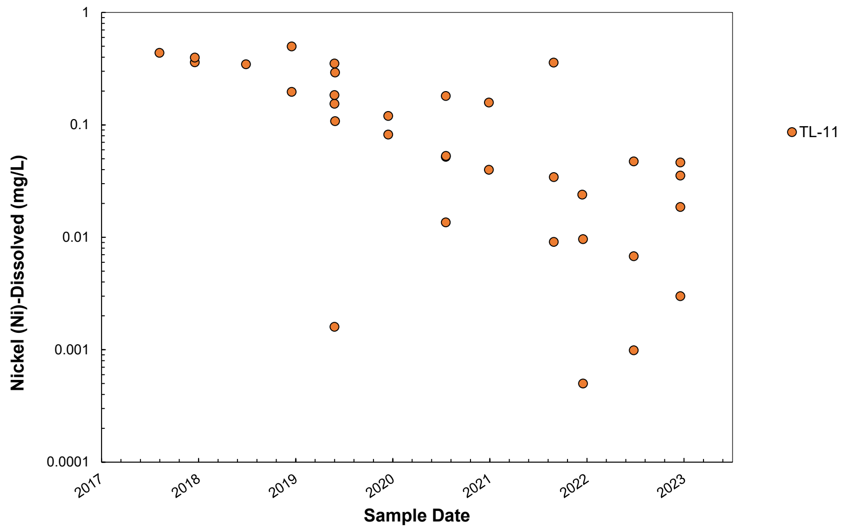
https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_HopeBay_TailingsMonitoringData_2022_TL7B & TL11_Charts_mlt_jce_rev06.xlsx]

Figure 8-5: Cobalt timeseries plot for underground seepage (TL-11)



https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_HopeBay_TailingsMonitoringData_2022_TL7B & TL11_Charts_mlt_jce_rev06.xlsx]

Figure 8-6: Copper timeseries plot for underground seepage (TL-11)



https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_HopeBay_TailingsMonitoringData_2022_TL7B & TL11_Charts_mlt_jce_rev06.xlsx]

Figure 8-7: Nickel timeseries plot for underground seepage (TL-11)

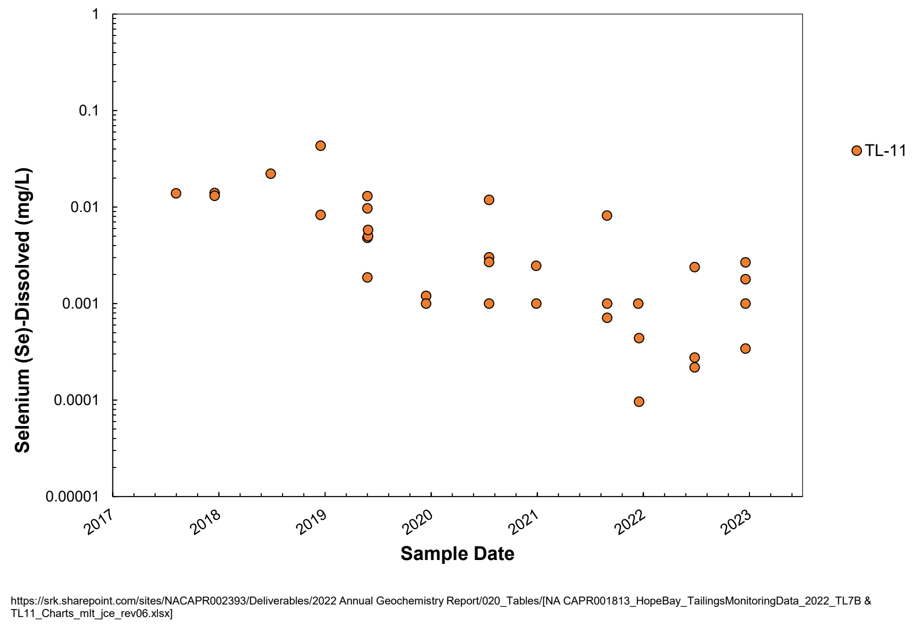


Figure 8-8: Selenium timeseries plot for underground seepage (TL-11)

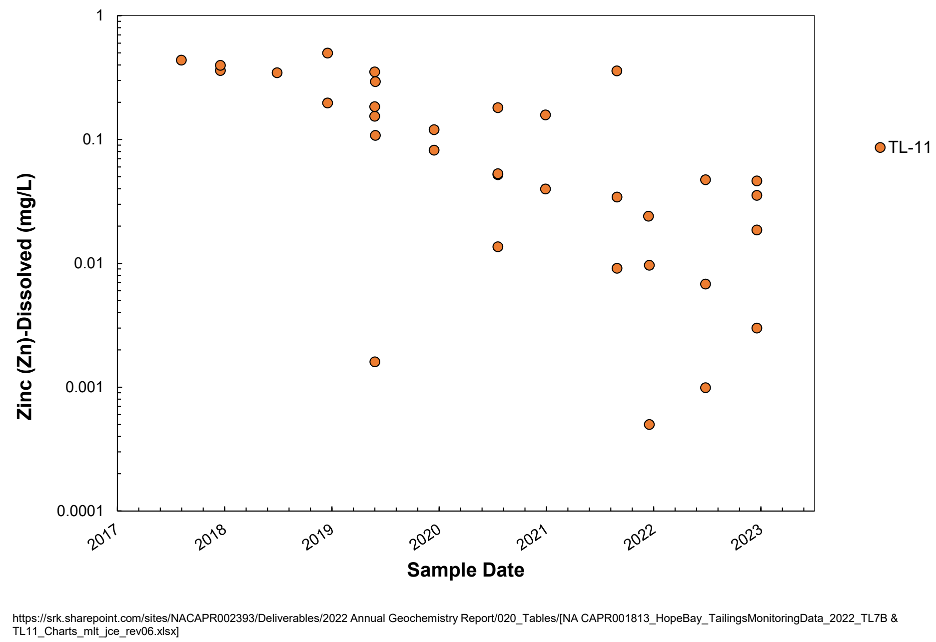


Figure 8-9: Zinc timeseries plot for underground seepage (TL-11)

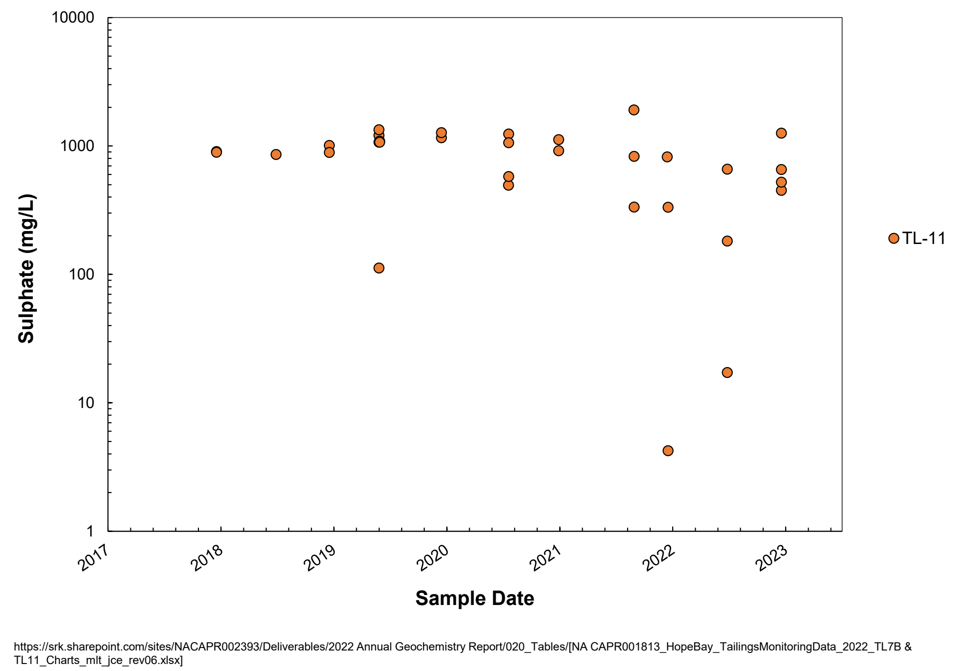


Figure 8-10: Sulphate timeseries plot for underground seepage (TL-11)

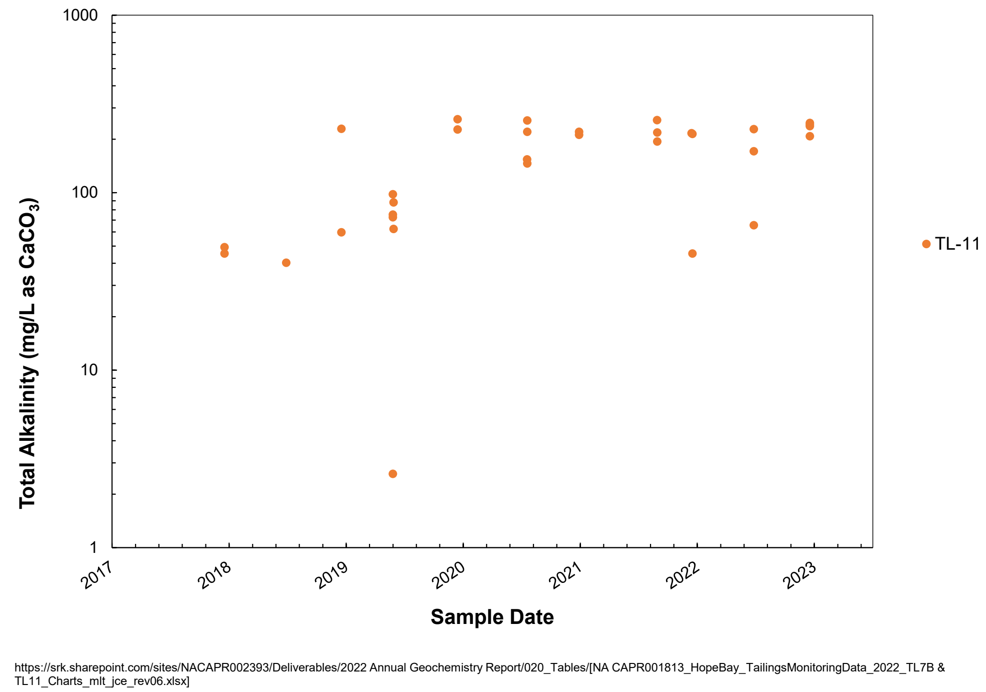
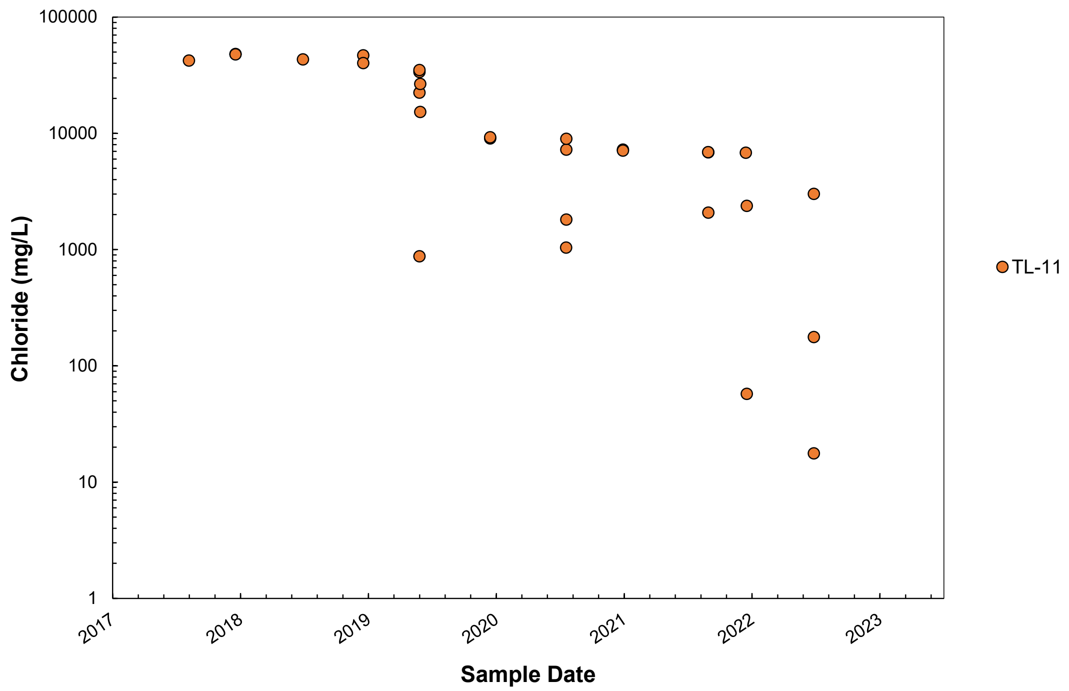
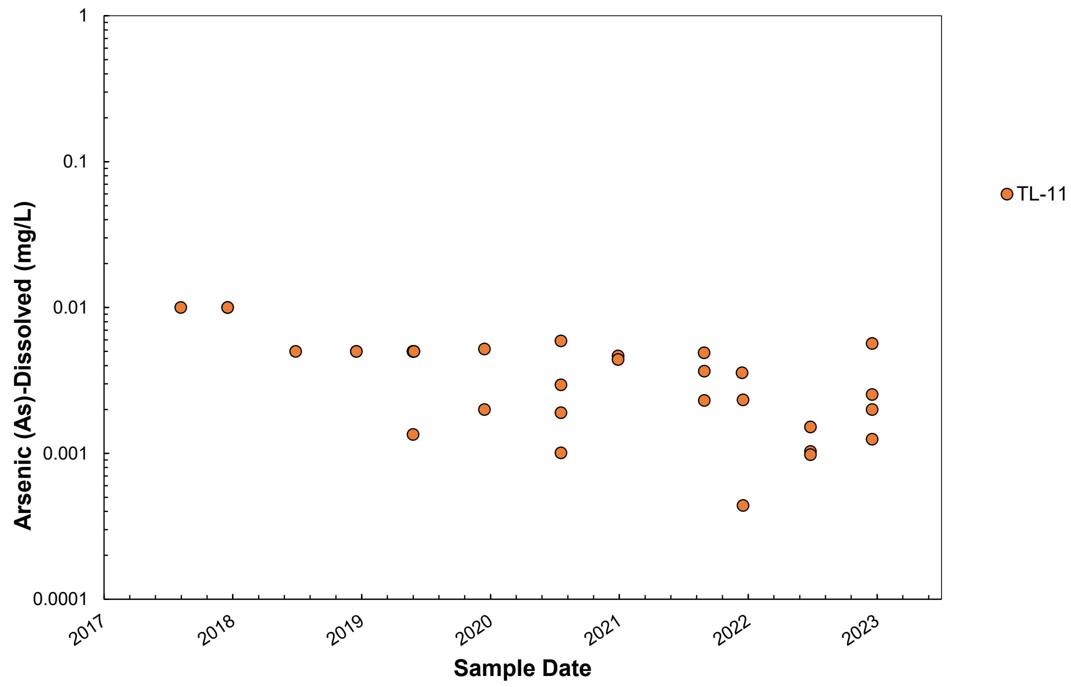


Figure 8-11: Total alkalinity timeseries plot for underground seepage (TL-11)



https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_HopeBay_TailingsMonitoringData_2022_TL7B & TL11_Charts_mlt_jce_rev06.xlsx]

Figure 8-12: Chloride timeseries plot for underground seepage (TL-11)



https://srk.sharepoint.com/sites/NACAPR002393/Deliverables/2022 Annual Geochemistry Report/020_Tables/[NA CAPR001813_HopeBay_TailingsMonitoringData_2022_TL7B & TL11_Charts_mlt_jce_rev06.xlsx]

Figure 8-13: Arsenic timeseries plot for underground seepage (TL-11)

9 Seepage Survey

9.1 Methods

9.1.1 Sample Collection and Analysis

AEM conducted the 2022 construction and waste rock freshet seepage survey from May 27th to June 28th and monthly sampling of water in the Madrid North Waste Rock Storage Area (WRSA) Contact Water Pond (CWP) and Sumps on June 16th, July 11th, August 18th, and September 12th (Table 9-1, Figure 9-1 to Figure 9-9). Water samples from the Madrid CWP and Sumps are waste rock drainage from the Madrid North WRSA. There was no seepage observed along the access road to the Doris vent raise.

AEM collected a total of 43 samples as detailed in Table 9-1. Three duplicate samples and one field blank were also collected and submitted to ALS Environmental Labs in Burnaby, BC for laboratory analysis as part of SRK's recommended quality assurance/quality control (QA/QC) program. At each station, AEM collected field measurements and collected a sample for laboratory analysis (outlined in Section 4.2.2.2)

All samples were analyzed for pH, EC, alkalinity, ammonia, bromide, chloride, fluoride, nitrate, nitrite, phosphorus, sulphate, and total suspended solids (TSS). For Doris, Madrid North Overburden Stockpile, Portal Pad, and Madrid WRSA freshet seepage samples (CWP-01, and CWP-02) total dissolved solids (TDS), acidity, and dissolved metals were also analyzed. Total metals were also analyzed for Doris and Madrid Seepage samples collected between June 11th and June 20th. For the Madrid CWP and Sump samples, total metals were analyzed as per the Water Licence. Cyanide was analyzed for Madrid North Sump samples and CWP samples (MMS1-N, MMS1-S). All samples were filtered and preserved in the field, as required.

Table 9-1: Summary of 2022 seepage survey locations

Mine Area	Material Source	Sample Area	No. of Samples[6]
Reference	Background	Reference (Doris-Windy Road)	3
Doris	Waste Rock Stockpiles (Pad T)[1]	Toe of the waste rock stockpiles on Pad T	0
		Embankment immediately downstream of the waste rock and ore stockpile on Pad I and upstream of the Doris Contact Water Pond 1	2
		Toe of the access roads located down-gradient of the Doris waste rock stockpiles	3
	Quarry 2	Toe of the access roads along the western edge of the Doris camp pad[2]	4
		Doris Core Box Pad	1
		Access road to Doris Vent Raise	0
Madrid North	Overburden from NE CPR[3]	Overburden Stockpile	3
	Waste Rock from NE CPR	Portal Pad	3
	Waste Rock Stockpiles (at WRSA)	WRSA Pad Seepage	0
		Outside CWP Berm	2
		Inside CWP Berm	0
		Sump 1, 2 3, and 4[4]	14
		Contact Water Pond (CWP)[4,5]	8

Sources: Compiled in text

Notes:

[1] Referred to as Waste Rock Influenced Area (WRIA) in text.

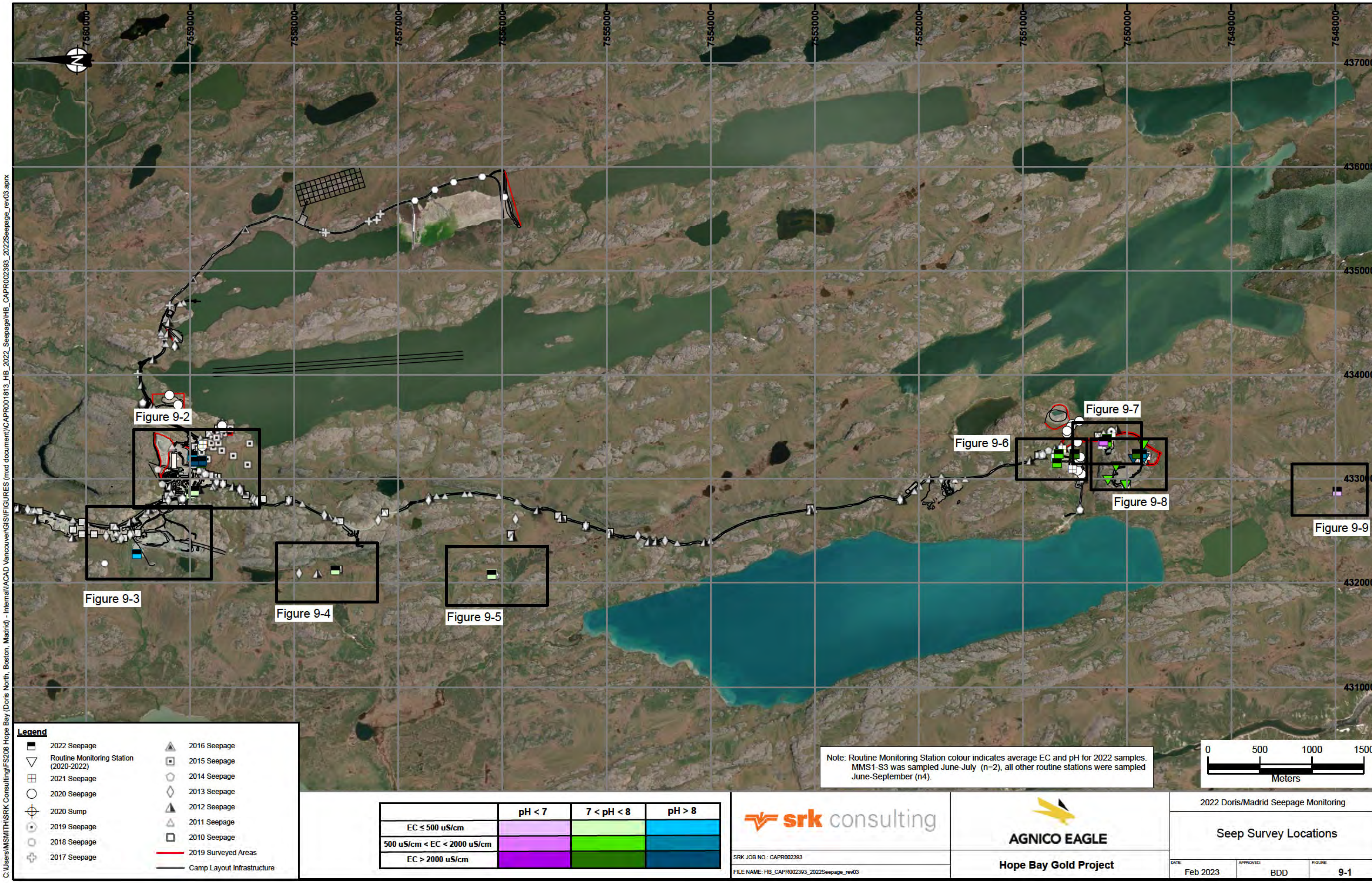
[2] Samples collected from this area are not subject to waste rock influence

[3] Stockpile also contains minor amounts of rock from Quarry D & NE CPR that was used for construction

[4] Routine water quality samples.

[5] Collected from stations MMS1-N and MMS1-S (figure 9-8)

[6] Areas with no samples collected were surveyed but no seepage was observed



7560000
7559000
7558000
7557000
7556000
7555000
7554000
7553000
7552000
7551000
7550000
7549000
7548000
437000
436000
435000
434000
433000
432000
431000
N
Figure 9-2
Figure 9-3
Figure 9-4
Figure 9-5
Figure 9-6
Figure 9-7
Figure 9-8
Figure 9-9
Legend
2022 Seepage
Routine Monitoring Station (2020-2022)
2021 Seepage
2020 Seepage
2020 Sump
2019 Seepage
2018 Seepage
2017 Seepage
2016 Seepage
2015 Seepage
2014 Seepage
2013 Seepage
2012 Seepage
2011 Seepage
2010 Seepage
2019 Surveyed Areas
Camp Layout Infrastructure
pH < 7
7 < pH < 8
pH > 8
EC ≤ 500 uS/cm
500 uS/cm < EC < 2000 uS/cm
EC > 2000 uS/cm
Note: Routine Monitoring Station colour indicates average EC and pH for 2022 samples. MMS1-S3 was sampled June-July (n=2), all other routine stations were sampled June-September (n4).
0
500
1000
1500
Meters
srk consulting
SRK JOB NO.: CAPR002393
FILE NAME: HB_CAPR002393_2022Seepage_rev03
AGNICO EAGLE
Hope Bay Gold Project
2022 Doris/Madrid Seepage Monitoring
Seep Survey Locations
DATE: Feb 2023
APPROVED: BDD
FIGURE: 9-1
C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\!ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR001813_HB_2022_Seepage\HB_CAPR002393_2022Seepage_rev03.aprx

Legend

- 2022 Seepage
- Routine Monitoring Station (2020-2022)
- 2021 Seepage
- 2020 Seepage
- 2020 Sump
- 2019 Seepage
- 2018 Seepage
- 2017 Seepage
- 2016 Seepage
- 2015 Seepage
- 2014 Seepage
- 2013 Seepage
- 2012 Seepage
- 2011 Seepage
- 2010 Seepage
- 2019 Surveyed Areas
- Camp Layout Infrastructure

	pH < 7	7 < pH < 8	pH > 8
EC ≤ 500 uS/cm			
500 uS/cm < EC < 2000 uS/cm			
EC > 2000 uS/cm			

srk consulting

SRK JOB NO.: CAPR002393

FILE NAME: HB_CAPR002393_2022Seepage_rev02

AGNICO EAGLE

Hope Bay Gold Project

2022 Doris/Madrid Seepage Monitoring

Doris Seep Survey Locations

DATE:	APPROVED:	FIGURE:
Feb 2023	BDD	9-2

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR001813_HB_2022_Seepage\HB_CAPR002393_2022Seepage_rev02.aprx

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\!ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR001813_HB_2022_Seepage\HB_CAPR002393_2022Seepage_rev02.aprx

Legend

- 2022 Seepage
- Routine Monitoring Station (2020-2022)
- 2021 Seepage
- 2020 Seepage
- 2020 Sump
- 2019 Seepage
- 2018 Seepage
- 2017 Seepage
- 2016 Seepage
- 2015 Seepage
- 2014 Seepage
- 2013 Seepage
- 2012 Seepage
- 2011 Seepage
- 2010 Seepage
- 2019 Surveyed Areas
- Camp Layout Infrastructure

	pH < 7	7 < pH < 8	pH > 8
EC ≤ 500 uS/cm			
500 uS/cm < EC < 2000 uS/cm			
EC > 2000 uS/cm			

srk consulting

SRK JOB NO.: CAPR002393

FILE NAME: HB_CAPR002393_2022Seepage_rev02

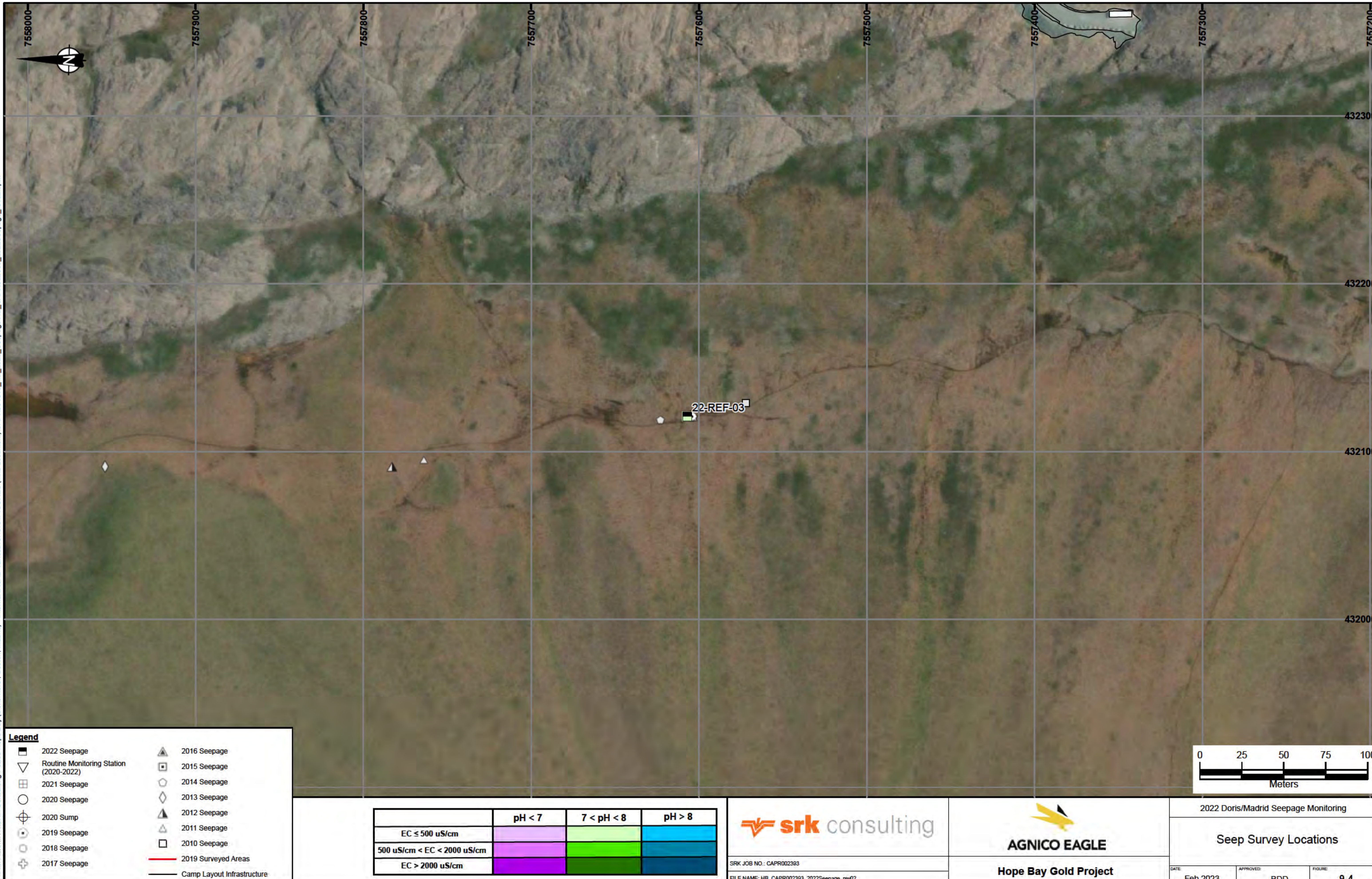
AGNICO EAGLE

Hope Bay Gold Project

2022 Doris/Madrid Seepage Monitoring

Seep Survey Locations

DATE:	APPROVED:	FIGURE:
Feb 2023	BDD	9-3



C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\!ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR001813_HB_2022_Seepage\HB_CAPR002393_2022Seepage_rev02.aprx

Legend

- 2022 Seepage
- Routine Monitoring Station (2020-2022)
- 2021 Seepage
- 2020 Seepage
- 2020 Sump
- 2019 Seepage
- 2018 Seepage
- 2017 Seepage
- 2016 Seepage
- 2015 Seepage
- 2014 Seepage
- 2013 Seepage
- 2012 Seepage
- 2011 Seepage
- 2010 Seepage
- 2019 Surveyed Areas
- Camp Layout Infrastructure

	pH < 7	7 < pH < 8	pH > 8
EC ≤ 500 uS/cm			
500 uS/cm < EC < 2000 uS/cm			
EC > 2000 uS/cm			

srk consulting

SRK JOB NO.: CAPR002393

FILE NAME: HB_CAPR002393_2022Seepage_rev02

AGNICO EAGLE

Hope Bay Gold Project

2022 Doris/Madrid Seepage Monitoring

Seep Survey Locations

DATE:	APPROVED:	FIGURE:
Feb 2023	BDD	9-5

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\!ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR001813_HB_2022_Seepage\HB_CAPR002393_2022Seepage_rev02.aprx

Legend

- 2022 Seepage
- Routine Monitoring Station (2020-2022)
- 2021 Seepage
- 2020 Seepage
- 2020 Sump
- 2019 Seepage
- 2018 Seepage
- 2017 Seepage
- 2016 Seepage
- 2015 Seepage
- 2014 Seepage
- 2013 Seepage
- 2012 Seepage
- 2011 Seepage
- 2010 Seepage
- 2019 Surveyed Areas
- Camp Layout Infrastructure

	pH < 7	7 < pH < 8	pH > 8
EC ≤ 500 uS/cm			
500 uS/cm < EC < 2000 uS/cm			
EC > 2000 uS/cm			

srk consulting

SRK JOB NO.: CAPR002393

FILE NAME: HB_CAPR002393_2022Seepage_rev02

AGNICO EAGLE

Hope Bay Gold Project

2022 Doris/Madrid Seepage Monitoring

Madrid North Overburden Stockpile Seep Survey Locations

DATE:	APPROVED:	FIGURE:
Feb 2023	BDD	9-6

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR001813_HB_2022_Seepage\HB_CAPR002393_2022Seepage_rev02.aprx

Legend

- 2022 Seepage
- Routine Monitoring Station (2020-2022)
- 2021 Seepage
- 2020 Seepage
- 2020 Sump
- 2019 Seepage
- 2018 Seepage
- 2017 Seepage
- 2016 Seepage
- 2015 Seepage
- 2014 Seepage
- 2013 Seepage
- 2012 Seepage
- 2011 Seepage
- 2010 Seepage
- 2019 Surveyed Areas
- Camp Layout Infrastructure

	pH < 7	7 < pH < 8	pH > 8
EC ≤ 500 uS/cm			
500 uS/cm < EC < 2000 uS/cm			
EC > 2000 uS/cm			

srk consulting

SRK JOB NO.: CAPR002393

FILE NAME: HB_CAPR002393_2022Seepage_rev02

AGNICO EAGLE

Hope Bay Gold Project

2022 Doris/Madrid Seepage Monitoring

Madrid North Portal Pad
Seep Survey Locations

DATE:	APPROVED:	FIGURE:
Feb 2023	BDD	9-7

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR001813_HB_2022_Seepage\HB_CAPR002393_2022Seepage_rev02.aprx

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\!ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR001813_HB_2022_Seepage\HB_CAPR002393_2022Seepage_rev02.aprx

Legend

- 2022 Seepage
- Routine Monitoring Station (2020-2022)
- 2021 Seepage
- 2020 Seepage
- 2020 Sump
- 2019 Seepage
- 2018 Seepage
- 2017 Seepage
- 2016 Seepage
- 2015 Seepage
- 2014 Seepage
- 2013 Seepage
- 2012 Seepage
- 2011 Seepage
- 2010 Seepage
- 2019 Surveyed Areas
- Camp Layout Infrastructure

	pH < 7	7 < pH < 8	pH > 8
EC ≤ 500 uS/cm			
500 uS/cm < EC < 2000 uS/cm			
EC > 2000 uS/cm			

srk consulting

SRK JOB NO.: CAPR002393

FILE NAME: HB_CAPR002393_2022Seepage_rev02

AGNICO EAGLE

Hope Bay Gold Project

2022 Doris/Madrid Seepage Monitoring

Seep Survey Locations

DATE:	APPROVED:	FIGURE:
Feb 2023	BDD	9-8

	pH < 7	7 < pH < 8	pH > 8
EC ≤ 500 uS/cm			
500 uS/cm < EC < 2000 uS/cm			
EC > 2000 uS/cm			

srk consulting

SRK JOB NO.: CAPR002393

FILE NAME: HB_CAPR002393_2022Seepage_rev03

AGNICO EAGLE

Hope Bay Gold Project

2022 Doris/Madrid Seepage Monitoring

Seep Survey Locations

DATE: Feb 2023 | APPROVED: BDD | FIGURE: 9-9

C:\Users\MSMITH\SRK Consulting\FS208 Hope Bay (Doris North, Boston, Madrid) - Internal\!ACAD Vancouver\GIS\FIGURES (mxd document)\CAPR001813_HB_2022_Seepage\HB_CAPR002393_2022Seepage_rev03.aprx

9.2 Results and Discussion

Figure 9-1 to Figure 9-9 present location maps of the seepage samples, surveyed areas, and of the as-built alignment of the Doris and Madrid mine areas. A complete set of field observations and measurements is provided in Appendix D1 Field observations. Appendix D2 Laboratory Data contains the laboratory water chemistry results.

9.2.1 Quality Assurance and Quality Control

Section 4.3 outlines QA/QC program criteria for water samples. A summary of QA/QC results for seepage samples is provided in Table 9-2.

Results are summarized as follows:

- One sample (22-MAD-01) failed on field EC vs. lab EC with a relative percent difference of 39%
- One duplicate failed on total phosphorus with a relative percent difference of 69%, however, the parent sample was <10 times the detection limit.
- The Sump 1 sample from September failed on total vs. dissolved metals for tin but the dissolved sample had a lab qualifier.

Overall, all samples were deemed to be acceptable based on the QA/QC review.

Table 9-2: QA/QC summary for seepage samples

QC Test	SRK QC Criteria	Results
Physical Test[1]		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1)
Method Blank	<2X DL	All passed. Total Dissolved Solids (n=5) and Total Suspended Solids (n=9), Conductivity (n=9); Total Alkalinity (n=9), Acidity (n=4)
Field Duplicate	For samples >10X DL should be within +/-30% RPD	All passed (n=2)
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	All passed. Total Dissolved Solids (n=5) and Total Suspended Solids (n=9), Conductivity (n=9), Total Alkalinity (n=9), Acidity (n=4)
Field pH vs. Lab pH	Difference should not be greater than 1 pH unit	All Passed. (n=40)
Field EC vs Lab EC	For samples > 10X the detection limit (DL), % RPD should be within +/-30%	All passed (n=40) except for: 22-MAD-01 (YL2200660-001) failed - 39% RPD. Field technician confirmed the field EC value. 22-CWP-02 field EC not recorded.

QC Test	SRK QC Criteria	Results
Laboratory Control Sample and Certified Reference Material	Within specified tolerance ranges.	All passed. Total Dissolved Solids (n=5) and Total Suspended Solids (n=9), Conductivity (n=9), Total Alkalinity (n=9), Acidity (n=4)
Anions and Nutrients[2]		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1)
Method Blank	<2X DL	All passed. Total Ammonia (n=8) and Sulfate (n=9), Total Phosphorus (n=4), Nitrate, Nitrite, Fluoride, Bromide and Chloride (n=9). Nitrate (as N) didn't meet the lab quality objective but has a lab qualifier B.
Field Duplicate	For samples >10X DL should be within +/-30% RPD	All passed (n=2) except for Doris Seep - 1 (DC-01)and Doris Seep - 1-DUP - 69% RPD, dup sample >10X DL but parent sample <10X DL for Total Phosphorus.
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	All passed. Total Ammonia (n=8) and Sulfate (n=10), Total Phosphorus (n=4), Nitrate, Nitrite, Fluoride, Bromide and Chloride (n=10).
Ion Balance	EC>100 uS/cm, % difference should be within +/-10%	All Passed. (n=24)
Laboratory Control Sample and Certified Reference Material	Within specified tolerance ranges.	All passed. Total Ammonia (n=9) and Sulfate (n=10), Total Phosphorus (n=4), Nitrate, Nitrite, Fluoride, Bromide and Chloride (n=9).
Cyanides[3]		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	Not applicable (n=0)
Method Blank	<2X DL	All passed (n=7)
Field Duplicate	For samples >10X DL should be within +/- 30% RPD	Not applicable (n=0)
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	All passed (n=7)
Laboratory Control Sample and Certified Reference Material	Within specified tolerance ranges	All passed (n=7)
Trace Metals by ICP-MS		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	All passed (n=1) for Dissolved
Method Blank	<2X DL	All passed. Dissolved (n=10) and Total (n=6). Ag and Na failed ALS's lab quality objective but both have lab qualifier RRV (Report result verified) by repeat analysis. Total Sn failed but has a lab qualifier MBRR (Method Blank Re-Run). Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect

QC Test	SRK QC Criteria	Results
		results were reported and are defensible). Diss. W failed but has a lab qualifier MB-LOR (Method Blank Limits of Reporting) exceeds ALS DQO (Data Quality Objective). LOR have been adjusted for samples with positive hits below 5x blank level).
Field Duplicate	For samples >10X DL should be within +/-30% RPD	All passed (n=2) for Dissolved and (n=1) for Total Metals.
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	All passed (n=5) for Dissolved and (n=7) for Total
Total vs Dissolved Metals	Total Metals>Dissolved metals. Total Metals should be greater than Dissolved Metals, if not the % difference should be within +/-30%. ALS would use 10X DL, Maxxam would use 5X DL	All passed (n=16) except: MMS1-S1 (September) – Total vs. Diss. Sn has 178% RPD, but okay as Diss. Sn has a DTMF (Dissolved concentration exceeds Total for Field-filtered Metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration. qualifiers (Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration). Other samples have no Dissolved Metals analysis
Laboratory Control Sample and Certified Reference Material	Within specified tolerance ranges.	All passed (n=5) for Dissolved and (n=7) for Total
Hg-CVAAS		
Field Blank	Minimum criteria is <2X DL, will accept <5X DL	Passed. Dissolved (n=1)
Method Blank	<2X DL	All Passed. Dissolved (n=4) and Total (n=8)
Field Duplicate	For samples >10X DL should be within +/-30% RPD	All Passed. Dissolved (n=2) and Total (n=1)
Lab Duplicate	For samples >10X DL should be within +/-20% RPD	All Passed. Dissolved (n=4) and Total (n=8)
Laboratory Control Sample and Certified Reference Material	Within specified tolerance ranges.	All Passed. Dissolved (n=4) and Total (n=8)

Sources: https://srk.sharepoint.com/sites/NACAPR001813/Internal/!020_Project_Data/030_Subcontractor/ALS/[CAPR001813_Hope Bay 2022_Doris-MadridSeep_Compiled Summary QAQC Results_20230131_mlt.xlsx]2022_Compiled_Summary QAQC

Notes:

[3] Conductivity, pH, Hardness (as CaCO3), Alkalinity, Total (as CaCO3), Total Suspended Solids

[4] Total Ammonia, Cl, NO3, NO2, SO4

[5] Total Cyanide

9.2.2 Reference Stations

As with previous years, three reference samples were taken from established stations in undisturbed tundra along the along the Doris-Windy Road area located that are not subject to mine influence. Reference seep locations are shown in Figure 9-4, Figure 9-5, and Figure 9-9.

Field Data

Table 9-3 presents field results for the reference seepage samples.

Field pH was circumneutral, ranging from 6.6 to 7.4 pH units. Field EC values ranged from 30 µS/cm to 160 µS/cm.

Table 9-3: Summary of field results for 2022 reference seepage samples

Sample ID	Date	pH	EC	ORP	Temperature	Flow
		s.u.	*µS/cm*	*RmV*[1]	*°C*	*L/s*
22-REF-01	14-Jun-22	6.6	30	150	6.8	0.35
22-REF-02	14-Jun-22	7.4	160	120	5.6	0.38
22-REF-03	14-Jun-22	7.3	77	110	7.2	0.66

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Notes:

[1] Field calibrated ORP measurements

Laboratory Data

Table 9-4 and Table 9-5 present the analytical data for the reference seepage samples.

The laboratory pH values ranged from 7.0 to 7.9 and laboratory EC values were between 30 and 160 µS/cm.

Major cation chemistry was dominated by sodium (1.9 to 7.9 mg/L) and calcium (2.1 to 17 mg/L), while major anion chemistry was dominated by alkalinity (9.3 to 62 mg/L as $CaCO_3$) and chloride (2.6 to 12 mg/L). Ammonia, nitrite and nitrate values were below the detection limit (<0.0010 mg/L as N or <0.0050 mg/L as N) except 22-REF-02 (e.g. ammonia of 0.012 mg/L as N). Concentrations of dissolved metals were low and were generally below or within ten times the detection limit.

Table 9-4: Summary of physical parameters and major ions for 2022 reference seepage samples

Sample ID	Date	pH	EC	TDS	Total Alkalinity	Total Ammonia	Cl	NO_3	NO_2	SO_4	Ca	Mg	K	Na
		s.u.	*µS/cm*	*mg/L*	*mg/L as $CaCO_3$*	*mg/L as N*	*mg/L*	*mg/L as N*	*mg/L as N*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
22-REF-01	14-Jun-22	7.0	30	36	9.3	<0.0050	2.6	<0.0050	<0.0010	<0.30	2.1	1.6	0.62	1.9
22-REF-02	14-Jun-22	7.9	160	120	62	0.012	12	0.0076	<0.0010	0.36	17	5.3	1.1	7.9
22-REF-03	14-Jun-22	7.5	81	55	28	<0.0050	6.9	<0.0050	<0.0010	1.7	8.5	1.9	0.46	4.3

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Table 9-5: Summary of dissolved metals for 2022 reference seepage samples

Sample ID	Date	Al	As	Cd	Co	Cu	Fe	Mn	Mo	Ni	Se	Zn
		mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
22-REF-01	14-Jun-22	0.056	0.00010	<0.0000050	<0.00010	0.0015	0.083	0.00025	0.000081	0.0014	<0.000050	0.0023
22-REF-02	14-Jun-22	0.022	0.00024	<0.0000050	<0.00010	0.0017	0.063	0.00042	0.00014	0.0023	0.000059	0.0020
22-REF-03	14-Jun-22	0.013	<0.00010	<0.0000050	<0.00010	0.00096	0.029	0.0013	<0.000050	<0.00050	<0.000050	<0.0010

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

9.2.3 Doris Waste Rock Influenced Area

Locations of seepage samples collected from the Doris Camp Pad are shown in Figure 9-2

Field Data

Table 9-6 presents field results for the Doris seepage samples.

Field pH ranged from 7.6 to 8.1 pH units for all seepage locations. Field EC ranged from 400 to 20,000 µS/cm. Based on the results of the 2020 and 2021 seepage programs, samples collected from the Doris camp pad area can be categorized into the following three groups:

- Group 1 (waste rock influenced with higher EC): Field EC ranged from 19,000 to 20,000 µS/cm for samples collected along the downstream toe of the access road (22-DC-05 to 22-DC-07).
- Group 2 (waste rock influenced with lower EC): Field EC ranged from 3,000 to 10,000 µS/cm for samples collected immediately downstream of waste rock and ore on Pad I at the upstream embankment of the Doris Contact Water Pond 1 (sample IDs 22-PCP-01 and 22-PCP-02). As noted in Table 9-6, 22-PCP-01 was collected from a pool of standing water and is therefore not flowing seepage. Results for PCP-01 are presented herein for completeness but are excluded from data interpretation.
- Group 3 (quarry rock with no waste rock influence): Field EC ranged from 400 to 490 µS/cm for samples collected along south-west edge of the camp pad (22-DC-01 to 22-DC-04). Results from these samples are used as a comparison to waste rock influenced seeps.

Table 9-6: Summary of field results for 2022 Doris WRIA seepage samples

Group[1]	Sample ID	Date	pH	EC	ORP	Temperature	Flow
			s.u.	*µS/cm*	*mV*[2]	*°C*	*L/s*
1	22-DC-05	27-May-22	7.8	19,000	240	3.1	-[3]
	22-DC-06	27-May-22	7.9	19,000	210	1.9	0.58
	22-DC-07	27-May-22	7.9	20,000	140	3.5	0.38
2	22-PCP-01[4]	20-Jun-22	8.1	10,000	140	15	-[4]
	22-PCP-02	20-Jun-22	8.0	3,000	150	11	-[5]
3	22-DC-01	27-May-22	7.6	490	200	7.6	-[3]
	22-DC-02	27-May-22	7.7	460	140	9.7	-[3]
	22-DC-03	27-May-22	7.8	490	120	7.2	0.55
	22-DC-04	27-May-22	7.9	400	120	6.9	0.20

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Notes:

[1] Groups are defined as follows:
1 – Waste rock influence with higher EC
2 – Waste rock influence with lower EC
3 – Quarry rock with no waste rock influence
[2] Field calibrated ORP measurements
[3] Unable to measure due to slow, pooling flow
[4] Pooling water with no measurable flow and therefore not defined as a seepage sample. Sample included for completeness.
[5] Unable to measure due to shallow, diffuse flow

Laboratory Data

Table 9-7 and Table 9-8 present the analytical data for the Doris WRIA seepage samples.

The laboratory pH values ranged from 7.8 to 8.1 and laboratory EC values were roughly equivalent to field values.

Sulphate concentrations in samples from the toe of the access road (Group 1, waste rock influenced with high EC), ranged from 720 to 730 mg/L, which were higher than those collected from upstream at the toe of Pad I (Group 2, waste rock influenced with low EC; 250 and 430 mg/L). Sulphate concentrations in Group 3 samples (quarry rock) were relatively low, ranging from 10 to 13 mg/L.

For the Group 2 samples (PCP-01 and PCP-02), major cation chemistry was dominated by sodium (990 and 310 mg/L) and calcium (700 and 170 mg/L) and anion chemistry was dominated by chloride (3,100 and 510 mg/L) and sulphate (250 and 430 mg/L). Similarly, for Group 1 samples (DC-05, DC-06, and DC-07), cation chemistry was dominated sodium (3,000 to 3,100 mg/L) and calcium (450 to 480 mg/L), while major anion chemistry was dominated by chloride (5,900 mg/L for all) and sulphate (720 to 730 mg/L). Sodium and chloride concentrations in Group 1 samples were two to three times higher than sample PCP-01 and 10 times higher than PCP-02. As noted in the flow observations (Table 9-6), PCP-01 was collected from pooled water that may have been stagnant and thus not classified as a seepage sample. Group 1 samples also had higher concentrations of magnesium (~360 mg/L) and sulphate (~720 mg/L). Group 3 samples had lower concentrations of major ions than waste rock contact water. Cations were dominated by calcium (49 to 60 mg/L) and sodium (14 to 16 mg/L) and anion chemistry was dominated by alkalinity (69 to 71 mg/L as $CaCO_3$) and chloride (69 to 93 mg/L).

Since 2020, the downstream access road samples (i.e., Group 1) had higher concentrations of chloride, ammonia, and nitrate than samples collected at the toe of Pad I (i.e., Group 2) which suggested an additional loading source other than waste rock (SRK 2021). In the 2022 seepage samples, access road samples (Group 1) continued to have higher concentrations of ammonia (2.7 mg/L as N for all samples) compared to PCP-02 (2.1 mg/L), however, nitrate concentrations were lower in Group 1 samples (5.5 to 5.9 mg/L as N) compared to PCP-02 (18 mg/L as N). For Group 3 samples, concentrations of ammonia (0.021 to 0.038 mg/L) and nitrate (0.17 to 0.21 mg/L), as well as sulphate and chloride (as discussed above) were elevated compared to the reference seepage samples but concentrations were one to two orders of magnitude lower than Group 1 and 2 samples.

Samples at the toe of the road (Group 1) had higher concentrations of arsenic (0.0025 to 0.0032 mg/L), cadmium (0.00037 to 0.00045 mg/L), and nickel (0.0095 to 0.010 mg/L) compared to Group 2 samples by less than an order of magnitude. Both groups had roughly equivalent concentrations for cobalt (~10^{-2} mg/L) and selenium (10^{-3} mg/L). Dissolved metals concentrations for Group 3 samples were roughly equivalent to reference seepage samples except for manganese (0.0087 to 0.018 mg/L) and molybdenum (0.023 to 0.024 mg/L), which were both around one order of magnitude greater than reference concentrations.

All contact water from waste rock and at toe of the road is intercepted by water management collection systems and pumped to the Tailings Impoundment Area.

Table 9-7: Summary of physical parameters and major ions for 2022 Doris WRIA seepage samples

Group[1]	Sample ID	Date	pH	EC	TDS	Total Alkalinity	Total Ammonia	Cl	NO_3	NO_2	SO_4	Ca	Mg	K	Na
			s.u.	*µS/cm*	*mg/L*	*mg/L as $CaCO_3$*	*mg/L as N*	*mg/L*	*mg/L as N*	*mg/L as N*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
1	22-DC-05	27-May-22	8.1	18,000	13,000	150	2.7	5,900	5.6	0.32	730	450	350	88	3,000
	22-DC-06	27-May-22	8.1	18,000	13,000	140	2.7	5,900	5.5	0.28	720	480	360	90	3,000
	22-DC-07	27-May-22	8.1	18,000	13,000	140	2.7	5,900	5.5	0.32	720	470	370	90	3,100
2	22-PCP-01[2]	20-Jun-22	7.8	9,500	6,900	75	2.6	3,100	5.6	0.20	250	700	120	35	990
	22-PCP-02	20-Jun-22	8.1	2,800	1,800	110	2.1	510	18	0.44	430	170	55	21	310
3	22-DC-01	27-May-22	8.0	470	410	69	0.021	93	0.17	0.0055	10	60	7.0	2.2	14
	22-DC-02	27-May-22	8.0	450	370	70	0.032	86	0.20	0.0075	12	58	7.0	2.1	15
	22-DC-03	27-May-22	8.0	470	400	71	0.034	91	0.20	0.0076	12	60	7.2	2.2	15
	22-DC-04	27-May-22	8.0	400	330	71	0.038	69	0.21	0.0075	13	49	6.4	2.1	16

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Notes:

[6] Groups are defined as follows:

1 – Waste rock influence with higher EC

2 – Waste rock influence with lower EC

3 – Quarry rock with no waste rock influence

[7] Pooling water with no measurable flow and therefore not defined as a seepage sample. Sample included for completeness.

Table 9-8: Summary of dissolved metals for 2022 Doris WRIA seepage samples

Group[1]	Sample ID	Date	Al	As	Cd	Co	Cu	Fe	Mn	Mo	Ni	Se	Zn
			mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
1	22-DC-05	27-May-22	<0.010	0.0030	0.00045	0.0057	0.0090	<0.10	0.41	0.0076	0.0095	0.0012	0.010
	22-DC-06	27-May-22	<0.010	0.0032	0.00043	0.0067	0.010	<0.10	0.44	0.0079	0.011	0.0015	0.012
	22-DC-07	27-May-22	0.012	0.0025	0.00037	0.0061	0.011	<0.10	0.45	0.0080	0.010	0.0017	<0.010
2	22-PCP-01[2]	20-Jun-22	0.031	0.0015	0.00027	0.0046	0.021	0.13	1.0	0.0067	0.0048	0.00058	<0.0050
	22-PCP-02	20-Jun-22	0.043	0.00098	0.000051	0.015	0.018	0.81	0.26	0.0078	0.0042	0.0032	<0.0010
3	22-DC-01	27-May-22	0.016	0.00036	<0.0000050	<0.00010	0.0051	0.027	0.0087	0.0024	0.00054	0.000092	0.0011
	22-DC-02	27-May-22	0.013	0.00040	0.0000097	<0.00010	0.0052	0.028	0.017	0.0023	0.00064	0.000093	<0.0010
	22-DC-03	27-May-22	0.012	0.00040	0.0000090	0.00010	0.0051	0.029	0.018	0.0023	0.00064	0.000096	<0.0010
	22-DC-04	27-May-22	0.015	0.00047	0.0000081	0.00011	0.0063	0.035	0.018	0.0023	0.00069	0.00011	<0.0010

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Notes:

[8] Groups are defined as follows:

1 – Waste rock influence with higher EC

2 – Waste rock influence with lower EC

3 – Quarry rock with no waste rock influence

[9] Pooling water with no measurable flow and therefore not defined as a seepage sample. Sample included for completeness.

9.2.4 Doris Infrastructure

One seepage sample, 22-CBP-01, was collected from the toe of the Doris Core Storage Pad, which was constructed in June 2022 using Quarry 2 ROQ rock (Figure 9-3).

Field Data

Table 9-9 presents field results for the Doris infrastructure seepage sample. Field pH at 22-CBP-01 was 8.6 pH units and field EC was 180 µS/cm.

Table 9-9: Summary of field results for 2022 Doris infrastructure seepage sample

Sample ID	Date	pH	EC	ORP	Temperature	Flow
		s.u.	*µS/cm*	*RmV*[1]	*°C*	*L/s*
22-CBP-01	12-Jun-22	8.6	180	200	0.60	0.46

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Notes:

[1] Field calibrated ORP measurements

9.2.4.1 Laboratory Data

Table 9-10 and Table 9-11 present the analytical data for the Doris infrastructure seepage samples.

Major cation chemistry was dominated by calcium (15 mg/L) and sodium (11 mg/L) and anion chemistry dominated by alkalinity (49 mg/L as $CaCO_3$) and sulphate (16 mg/L). Concentrations of sulphate, nitrate (0.53 mg/L), nitrite (0.0072 mg/L), and ammonia (0.16 mg/L) were near equivalent to Group 3 (quarry rock) samples from the Doris camp pad (Section 9.2.3) and chloride concentrations (13 mg/L) were near equivalent to reference seepage concentrations (Section 9.2.2).

Dissolved metals concentrations were equivalent to or less than those observed in the Group 3 seepage samples from the Doris camp pad.

Table 9-10: Summary of physical parameters and major ions for 2022 Doris infrastructure seepage sample

Sample ID	Date	pH	EC	TDS	Total Alkalinity	Total Ammonia	Cl	NO_3	NO_2	SO_4	Ca	Mg	K	Na
		s.u.	*µS/cm*	*mg/L*	*mg/L as $CaCO_3$*	*mg/L as N*	*mg/L*	*mg/L as N*	*mg/L as N*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
22-CBP-01	12-Jun-22	7.8	180	100	49	0.16	13	0.53	0.0072	16	15	3.3	1.4	11

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Table 9-11: Summary of dissolved metals for 2022 Doris infrastructure seepage sample

Sample ID	Date	Al	As	Cd	Co	Cu	Fe	Mn	Mo	Ni	Se	Zn
		mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
22-CBP-01	12-Jun-22	0.027	0.00035	<0.0000050	<0.00010	0.00069	0.016	0.017	0.0015	<0.00050	0.00017	<0.0010

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

9.2.5 Madrid Waste Rock Storage Area

Routine monitoring stations and freshet seepage survey locations are shown in Figure 9-8.

The freshet seepage survey included two samples collected from the downstream toe of the CWP berm (22-CWP-01 and 22-CWP-02). No seepage at the toe of the waste rock stockpiles or Madrid WRSA pad was observed. Monthly monitoring stations included the two stations within the CWP and Sumps 1 to 4, all of which are referred to as routine stations. Four monthly samples (June to September) were collected from all routine stations except Sump 3, for which samples were collected in June and July only. There was no waste rock placed on the Madrid WRSA in 2022.

9.2.5.1 Background

Waste Rock Management

Of the 101,126 t of waste rock present at WRSA, most waste rock originated from NE CPR (83,968 t). Approximately, 17,158 t of waste rock from the decline of the Madrid North underground mine was also placed at the WRSA. A small volume of briny waste rock from the Madrid North portal pad was also placed on the WRSA in 2020. Waste rock at the WRSA was geochemically classified as non-PAG and placed in two stockpiles (SRK 2021c). The stockpiles at the WRSA include:

1. A smaller stockpile located directly upstream of the contact water pond (CWP) that contains oxide rock. The oxide rock is ore hosted in mafic volcanics with sediments (1aj) from NE CPR that could not operationally be segregated from waste rock.
2. A larger stockpile located adjacent to Sumps 1 to 3 that contains a mixture of waste rock from NE CPR and the underground mine (the latter as indicated by rinse tests).

Water Management

Water management at the Madrid North WRSA includes four water collection sumps and the Madrid North contact water pond. Sump 1 to Sump 3 collect drainage from the WRSA that does not report directly to the CWP. The fourth sump was installed in 2022 and is located downstream of the CWP to collect seepage that has been bypassing the liner at the downstream berm of the CWP since 2020 and could not be remediated with the placement of overburden in 2021. Runoff/seepage water from the WRSA or CWP that reports to the sumps is transferred to the CWP, therefore water chemistry at the CWP is influenced by waste rock seepage draining to CWP and the collection sumps. Discharge of effluent onto the tundra from the CWP is in accordance with the effluent quality limits provided in the Water License. Water that does not meet these criteria is transferred to the TIA via water truck.

9.2.5.2 Field Data

Table 9-12 presents a summary of the field results for seepage samples and monthly routine monitoring data at the Madrid North WRSA.

Field results are summarized as follows:

- Seepage at the downstream toe of the CWP berm: Field pH for CWP-01 and CWP-02 was 8.3 and 7.7, respectively. Field EC at CWP-01 was 800 µS/cm and field EC at CWP-02 was not recorded.
- Madrid CWP: Field pH was highest in the CWP, ranging from 8.1 to 8.6. Field EC values were higher at MMS1-N (860 to 4,000 µS/cm) compared to MMS1-S (340 to 790 µS/cm) and values peaked in August at both locations.
- Sump 1 to 4: Field pH ranged from 6.8 to 8.0. Field EC values ranged from 440 to 1,800 µS/cm peaking in August to September for all stations except Sump 3, which peaked in June and was dry in August and September. All sumps had EC values > 1,000 µS/cm.

Table 9-12: Summary of field results for 2022 Madrid North WRSA seepage and routine monitoring samples

Monitoring Program	Area	Sample ID	Date	pH	EC	ORP	Temperature	Flow
				s.u.	*µS/cm*	*RmV*[1]	*°C*	*L/s*
Freshet Seepage	**D/S Toe of CWP Berm**	22-CWP-01	28-Jun-22	8.3	800	120	1.7	0.0071
		22-CWP-02	28-Jun-22	7.7	-	130	1.5	0.0084
Routine Monitoring	**Madrid CWP**	MMS1-N	16-Jun-22	8.3	860	74	12	-
		MMS1-N	11-Jul-22	8.4	3,600	65	19	-
		MMS1-N	18-Aug-22	8.3	4,000	16	100	-
		MMS1-N	12-Sep-22	8.1	3,000	5.5	210	-
		MMS1-S	16-Jun-22	8.1	340	74	14	-
		MMS1-S	11-Jul-22	8.6	530	37	19	-
		MMS1-S	18-Aug-22	8.1	790	14	100	-
		MMS1-S	12-Sep-22	8.2	420	4.5	200	-
	Sump 1	MMS1-S1	16-Jun-22	7.6	820	58	5.4	-
		MMS1-S1	11-Jul-22	8.0	690	110	14	-
		MMS1-S1	18-Aug-22	6.8	1,800	11	58	-
		MMS1-S1	12-Sep-22	7.5	1,400	2.5	250	-
	Sump 2	MMS1-S2	16-Jun-22	7.4	520	82	4.8	-
		MMS1-S2	11-Jul-22	7.8	1,000	120	10	-
		MMS1-S2	18-Aug-22	7.1	1,700	13	120	-
		MMS1-S2	12-Sep-22	7.2	1,800	2.7	210	-
	Sump 3	MMS1-S3	16-Jun-22	7.4	1,100	85	7.1	-
		MMS1-S3	11-Jul-22	8.0	780	72	15	-
	Sump 4	MMS1-S4	16-Jun-22	7.9	440	64	7.2	-
		MMS1-S4	11-Jul-22	7.2	810	-	7.4	-
		MMS1-S4	18-Aug-22	7.9	1,000	14	130	-
		MMS1-S4	12-Sep-22	7.8	910	3.1	190	-

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Notes: "-" denotes data not available

[1] Field calibrated ORP measurements

9.2.5.3 Laboratory Data

Table 9-13 and Table 9-14 present the analytical data for the Madrid WRSA samples.

Table 9-13: Summary of physical parameters and major ions for 2022 Madrid North WRSA seepage and routine monitoring samples

Monitoring Program	Area	Sample ID	Date	pH	EC	TDS	Total Alkalinity	Total Ammonia	Cl	NO_3	NO_2	SO_4	Ca	Mg	K	Na
				s.u.	*μS/cm*	*mg/L*	*mg/L as $CaCO_3$*	*mg/L as N*	*mg/L*	*mg/L as N*	*mg/L as N*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
Freshet Seepage	**CWP Berm (Downstream)**	22-CWP-01[1]	28-Jun-22	8.2	720	7.4	110	0.12	92	3.5	0.011	110	43	11	6.4	80
		22-CWP-02[1]	28-Jun-22	8.2	2400	3	170	0.058	530	1.8	0.02	310	110	45	17	310
Routine Monitoring	**Madrid CWP**	MMS1-N	16-Jun-22	8.1	840	-	77	0.21	150	1	0.011	78	43	15	6.8	98
		MMS1-N	11-Jul-22	8.2	3400	-	160	0.1	800	0.46	0.02	430	150	77	30	570
		MMS1-N	18-Aug-22	8.2	4200	-	250	0.022	980	0.97	0.029	470	170	99	34	610
		MMS1-N	12-Sep-22	8.4	2800	-	210	0.064	560	2.3	0.025	440	120	67	26	420
		MMS1-S	16-Jun-22	8	300	-	53	0.045	35	0.78	0.0058	31	24	3.8	2.9	30
		MMS1-S	11-Jul-22	8.2	510	-	90	0.028	69	0.69	0.0071	63	39	7.3	5	63
		MMS1-S	18-Aug-22	8.1	800	-	110	0.043	130	0.15	0.005	77	50	15	5.4	87
		MMS1-S	12-Sep-22	8	400	-	59	0.032	55	0.39	0.0034	48	28	8.2	2.8	38
	Sump 1	MMS1-S1	16-Jun-22	8.2	790	-	130	0.12	100	1.9	0.0059	92	42	13	6	100
		MMS1-S1	11-Jul-22	8.2	620	-	140	0.029	75	0.86	0.0029	67	33	12	5.7	91
		MMS1-S1	18-Aug-22	7.3	1800	-	200	0.33	330	0.96	0.069	230	140	41	9.8	180
		MMS1-S1	12-Sep-22	8.3	1300	-	170	0.6	200	2.7	0.015	180	69	25	11	160
	Sump 2	MMS1-S2	16-Jun-22	7.8	490	-	130	0.05	100	0.04	0.001	16	23	33	2.6	17
		MMS1-S2	11-Jul-22	7.9	950	-	100	0.17	240	0.052	0.005	26	41	72	3.9	33
		MMS1-S2	18-Aug-22	7.5	1800	-	120	0.17	480	0.05	0.01	40	76	130	5.1	43
		MMS1-S2	12-Sep-22	7.7	1600	-	43	0.0096	450	0.05	0.01	80	52	120	4.9	54
	Sump 3	MMS1-S3	16-Jun-22	8.2	1100	-	60	0.24	180	1.7	0.0053	96	30	21	10	140
		MMS1-S3	11-Jul-22	8.3	750	-	210	0.088	69	3.5	0.007	69	13	14	10	160
	Sump 4	MMS1-S4	16-Jun-22	8	420	-	170	0.026	73	0.023	0.001	23	39	6.1	1.8	29
		MMS1-S4	11-Jul-22	7.8	750	-	130	0.71	140	0.077	0.005	35	81	18	5.2	42
		MMS1-S4	18-Aug-22	7.9	1100	-	110	0.068	220	0.089	0.005	84	100	18	3.8	82
		MMS1-S4	12-Sep-22	7.8	850	-	47	0.052	210	0.025	0.005	39	90	16	2.3	49

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Notes: "-" denotes data not available

[2] Dissolved results presented for Ca, Mg, K, Na

Table 9-14: Summary of total metals for 2022 Madrid North WRSA seepage and routine monitoring samples

Monitoring Program	Area	Sample ID	Date	Al	As	Cd	Co	Cu	Fe	Mn	Mo	Ni	Se	Zn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Freshet Seepage	CWP Berm (Downstream)	22-CWP-01[1]	28-Jun-22	0.024	0.0081	<0.0000050	0.00046	0.0040	<0.010	0.018	0.0027	0.0066	0.0020	<0.0010
		22-CWP-02[1]	28-Jun-22	0.009	0.021	0.000018	0.00084	0.0064	0.014	0.12	0.0056	0.0082	0.0027	<0.0010
Routine Monitoring	Madrid CWP	MMS1-N	16-Jun-22	1.8	0.14	0.000025	0.0023	0.0065	2.0	0.11	0.0028	0.014	0.0011	0.0060
		MMS1-N	11-Jul-22	0.18	0.055	0.000016	0.0017	0.0087	0.22	0.27	0.011	0.019	0.0040	<0.0060
		MMS1-N	18-Aug-22	0.039	0.17	<0.000025	0.0022	0.0071	<0.05	0.27	0.0094	0.045	0.0051	<0.015
		MMS1-N	12-Sep-22	0.20	0.11	0.000031	0.0029	0.0079	0.24	0.53	0.0070	0.039	0.0045	<0.0060
		MMS1-S	16-Jun-22	1.1	0.018	0.000010	0.0011	0.0063	1.1	0.021	0.0014	0.0042	0.00082	0.015
		MMS1-S	11-Jul-22	0.34	0.022	0.0000093	0.00037	0.0065	0.28	0.0068	0.0023	0.0024	0.0012	0.0099
		MMS1-S	18-Aug-22	0.23	0.012	0.000010	0.00028	0.0053	0.14	0.015	0.0022	0.0028	0.00060	<0.0030
		MMS1-S	12-Sep-22	0.49	0.0095	0.0000092	0.00038	0.0038	0.37	0.0098	0.0015	0.0021	0.00023	<0.0030
	Sump 1	MMS1-S1	16-Jun-22	0.30	0.0087	0.000055	0.0016	0.015	0.47	0.17	0.0018	0.0025	0.0013	1.7
		MMS1-S1	11-Jul-22	0.29	0.021	0.000013	0.00064	0.0070	0.41	0.021	0.0029	0.0017	0.0016	1.0
		MMS1-S1	18-Aug-22	0.13	0.011	0.00018	0.0051	0.016	0.77	1.8	0.0012	0.0062	0.0029	5.8
		MMS1-S1	12-Sep-22	0.18	0.036	0.000035	0.00095	0.010	0.32	0.12	0.0035	0.0028	0.0034	2.5
	Sump 2	MMS1-S2	16-Jun-22	0.55	0.0012	0.000011	0.0016	0.018	0.66	0.13	0.00038	0.0044	0.00016	2.2
		MMS1-S2	11-Jul-22	0.10	0.00094	<0.000025	0.0043	0.017	0.19	0.39	0.00077	0.0042	<0.00025	13
		MMS1-S2	18-Aug-22	0.051	0.0020	0.000029	0.0039	0.019	0.39	0.36	0.00044	0.0053	0.00021	8.9
		MMS1-S2	12-Sep-22	0.11	0.00083	0.000021	0.0011	0.011	0.23	0.12	0.00011	0.0042	0.00022	2.2
	Sump 3	MMS1-S3	16-Jun-22	0.78	0.088	0.000022	0.0029	0.029	0.86	0.15	0.0039	0.011	0.00072	4.4
		MMS1-S3	11-Jul-22	5.5	0.40	0.000017	0.0063	0.030	7.0	0.090	0.0078	0.024	0.0027	1.4
	Sump 4	MMS1-S4	16-Jun-22	0.43	0.00096	0.000010	0.00071	0.0061	0.53	0.025	0.00019	0.0018	0.000099	1.0
		MMS1-S4	11-Jul-22	0.96	0.0022	0.000017	0.0032	0.013	2.0	0.26	0.0015	0.0042	0.00016	4.2
		MMS1-S4	18-Aug-22	0.40	0.0018	0.000022	0.0018	0.012	0.73	0.11	0.00094	0.0031	0.00022	2.5
		MMS1-S4	12-Sep-22	0.11	0.00095	0.000021	0.0012	0.0075	0.29	0.083	0.00026	0.0025	0.000069	3.0

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Notes:

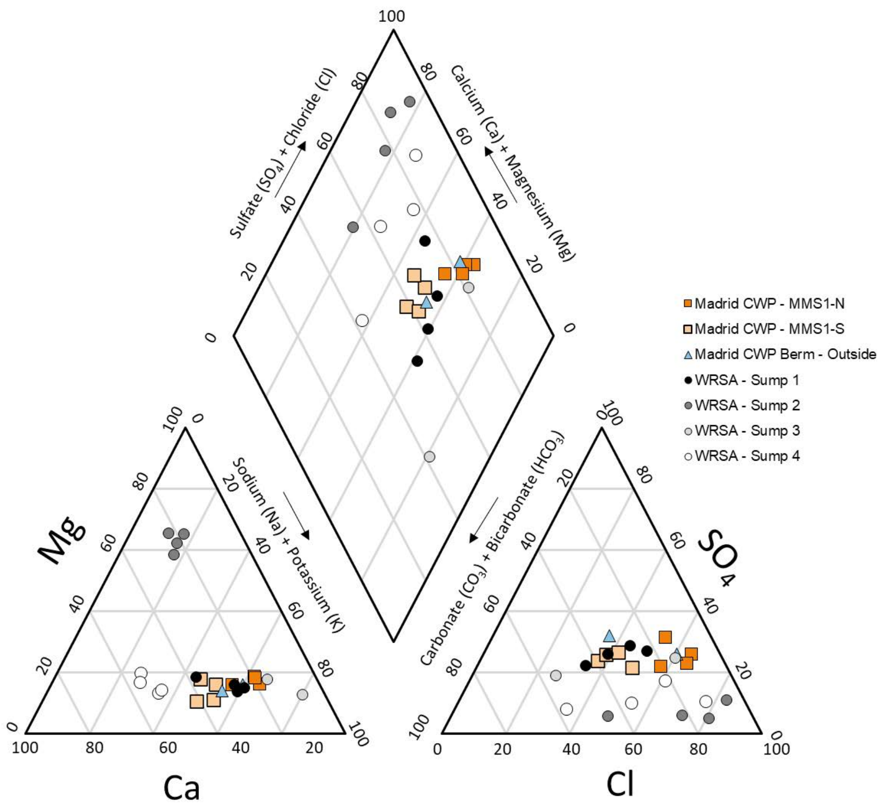
[3] Dissolved metals results presented

Laboratory pH for all Madrid WRSA samples ranged from 7.3 to 8.4. Lab and field EC values were near parity. For the CWP-02 sample that did not have a recorded field EC value, lab EC was 2,400 µS/cm.

Table 9-10 presents a Piper plot of the major ion chemistry for the Madrid North WRSA samples and is summarized as follows:

- Seepage downstream of the berm of the CWP: Major cation chemistry was dominated by sodium (80 and 310 mg/L) with lesser calcium (43 and 110 mg/L). Major anion chemistry in CWP-02 was dominated primarily by chloride (530 mg/L) with lesser sulphate and alkalinity (310 and 170 mg/L as $CaCO_3$, respectively) and in CWP-01 was dominated by alkalinity (110 mg/L as $CaCO_3$), chloride (92 mg/L), and sulphate (110 mg/L).
- Madrid CWP: Concentrations of major ions were generally higher at MMS1-N than MMS1-S. At both stations, major cations were dominated primarily by sodium (98 to 610 mg/L and 30 to 87 mg/L at MMS1-N and MMS1-S, respectively) with lesser calcium (43 to 170 mg/L and 24 to 50 mg/L at MMS1-N and MMS1-S, respectively). At MMS1-N anions were dominated primarily by chloride (150 to 980 mg/L) with lesser sulphate (78 to 470 mg/L). At MMS1-S, anions were dominated by chloride (35 to 130 mg/L) and alkalinity (53 to 110 mg/L as $CaCO_3$) with lesser sulphate (31 to 77 mg/L).
- The sump samples are summarized as follows:
  - Sump 1: Major cations were dominated by sodium (91 to 180 mg/L) with lesser calcium (33 to 140 mg/L), while major anions were dominated by chloride (75 to 330 mg/L), total alkalinity (130 to 200 mg/L as $CaCO_3$), and sulphate (67 to 230 mg/L).
  - Sump 2: Major cations were dominated by magnesium (33 to 130 mg/L) with lesser calcium (23 to 76 mg/L) and sodium (17 and 54 mg/L), while major anions were dominated by chloride (100 to 480 mg/L) with lesser total alkalinity (43 to 130 mg/L as $CaCO_3$).
  - Sump 3: Major cations were dominated by sodium (140 and 160 mg/L) with lesser calcium (30 and 13 mg/L), while major anions were dominated by chloride (180 mg/L) and sulphate (96 mg/L) in the June sample and total alkalinity (210 mg/L as $CaCO_3$), sulphate (69 mg/L), and chloride (69 mg/L) in the July sample.
  - Sump 4: Major cations were dominated by calcium (39 to 100 mg/L) and sodium (29 to 82 mg/L), and major anions were dominated by chloride (73 to 220 mg/L) and total alkalinity (47 to 170 mg/L as $CaCO_3$).
  - The highest chloride concentrations were observed at Sump 2 (480 mg/L) and Sump 1 (330 mg/L).
- The high chloride concentrations are indicative of residual drilling brine from underground waste rock. The lower chloride concentrations at Sump 1, Sump 2 and Sump 3 compared to the Madrid CWP and the placement location of underground waste rock at the Madrid WRSA (Section 9.2.5.1) suggest that the increasing chloride concentrations in the Madrid CWP are a result of evapoconcentration.

Figure 9-10: Piper plot of 2022 Madrid North WRSA water quality samples



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Nitrogen concentrations can be an indicator of residual explosives present on the surfaces of underground waste rock (SRK 2021c). Results for ammonia and nitrate at the Sumps are summarized as follows:

- Sump 1 and 3: Ammonia concentrations were highest at Sump 1 (0.029 to 0.60 mg/L as N) and at Sump 3 (0.088 to 0.24 mg/L as N). Nitrate concentrations were similar for both sumps and ranged from 0.86 to 3.5 mg/L as N. Elevated chloride, ammonia, and nitrate concentrations suggest contact water from underground waste rock is draining to Sump 1, Sump 2, and Sump 3.
- Sumps 2 and 4: Ammonia concentrations varied, ranging from 0.0096 to 0.17 mg/L as N for all except the Sump 4 July sample (0.71 mg/L as N). Concentrations of nitrate were low compared to other Madrid WRSA samples (<0.025 to 0.089 mg/L as N).
- CWP routine samples: Ammonia concentrations at MMS1-N and MMS1-S ranged from 0.022 to 0.21 mg/L as N and nitrate concentrations ranged from 0.15 to 2.3 mg/L as N. Consistent with chloride, concentrations were generally lower at MMS1-S compared to MMS1-N.

- Freshet seepage at the downstream toe of CWP berm: Concentrations of ammonia and nitrate were higher at CWP-01 (0.12 and 3.5 mg/L as N, respectively) compared to CWP-02 (0.058 and 1.8 mg/L as N, respectively).

Geochemical monitoring of waste rock in stockpiles at the WRSA confirmed the relationship between neutral pH arsenic leaching and solid phase arsenic content and possibly the trace mineral gersdorffite (SRK 2017a and 2021c). Sulphate, arsenic, cobalt, and/or nickel[3] are neutral pH metal leaching parameters identified at Madrid North and are summarized as follows:

- Sulphate is an indicator of overall sulphide oxidation. Concentrations are summarized as follows:
  - Sump 2, Sump 4, and MMS1-S: Sulphate concentrations were all <80 mg/L.
  - MMS1-N, Sump 1, Sump 3, and the seepage samples downstream of the CWP berm: Sulphate concentrations were typically >100 mg/L and were highest for MMS1-N samples (430 to 470 mg/L except for June when concentrations were 78 mg/L), which were higher than Sumps 1 and 3 (67 to 230 mg/L) which were higher than the seepage samples (110 and 310 mg/L). The higher sulphate concentrations suggest contact water from NE CPR waste rock with higher sulphide content are draining to Sumps 1 and 3 and the northern extent of the Madrid CWP (MMS1-N). NE CPR waste rock overall has higher sulphide content than the waste rock from the underground decline (SRK 2017a).
- Arsenic concentrations are summarized as follows (in decreasing order):
  - Sump 3 and MMS1-N: Sump 3 had the highest arsenic concentration (0.088 and 0.4 mg/L). Arsenic was also elevated at MMS1-N compared to other stations, ranging from 0.055 to 0.17 mg/L.
  - CWP berm seepage, MMS1-S, and Sump 1: Arsenic concentrations were stable and ranged from 0.0081 to 0.036 mg/L
  - Sumps 2 and 4: Concentrations were relatively low, ranging from 0.00083 to 0.0022 mg/L.
- Cobalt concentrations are summarized as follows (in decreasing order):
  - MMS1-N, Sump 1, 2, 3, and 4: concentrations ranged from 0.00064 to 0.0063 mg/L.
  - MMS1-S and seepage downstream of CWP berm: concentrations were lower with values ranging from 0.00028 to 0.00084 mg/L except for the June sample from MMS1-S (0.0011 mg/L).
- Nickel concentrations are summarized as follows (in decreasing order):
  - MMS1-N: concentrations ranged from 0.014 to 0.045 mg/L.
  - CWP berm seepage, Sumps 2 and 3: Nickel concentrations varied, ranging from 0.0042 to 0.024 mg/L.

[3] For the Madrid WRSA sample set, data are dissolved metals for stations CWP-01 and CWP-02 and total metals for all other stations.

  - MMS1-S, Sumps 1 and 4: Concentrations were generally lower, ranging from 0.0017 to 0.0062 mg/L.
- Manganese concentrations were roughly equivalent for all locations (0.018 to 0.53 mg/L), except for the maximum concentration of total manganese observed in July at Sump 1 (1.8 mg/L) and lower concentrations of manganese at MMS1-S (0.0068 to 0.021 mg/L).
- Selenium concentrations are summarized as follows:
  - MMS1-N, Sump 1, Sump 3, and CWP berm seepage: concentrations ranged from 0.00023 to 0.0051 mg/L.
  - Sump 2 and Sump 4: concentrations were lower with values ranging from 0.000069 to 0.00025 mg/L.
- Zinc concentrations are summarized as follows:
  - Sump 1, 2, 3, and 4: total zinc concentrations ranged from 1.0 to 13 mg/L, with an average of 3.8 mg/L.
  - MMS1-N, MMS1-S, and CWP Berm seepage: Zinc concentrations were near or below the detection limit, which ranged from <0.001 mg/L to <0.015 mg/L.

9.2.6 Madrid Infrastructure and Roads

Three seepage samples were collected downstream of the Overburden Stockpile (Figure 9-6) and three samples downstream of the Portal Pad (Figure 9-7).

Field Data

Table 9-15 presents field results for the Madrid North Overburden Stockpile and Portal Pad seepage samples.

Field parameters are summarized as follows:

- Overburden Stockpile: field pH ranged from 7.4 to 7.8. Field EC values were lower (780 to 1,300 µS/cm) along the northern toe of the stockpile (OVB-01 May and OVB-02) compared to the south-eastern toe (12,000 µS/cm at OVB-01 June).
- Portal Pad: field pH ranged from 6.8 to 7.6 and EC values ranged from 520 to 1,300 µS/cm.

Table 9-15: Summary of field results for 2022 Madrid North infrastructure and roads seepage samples

Sample ID	Date	pH	EC	ORP	Temperature	Flow
		s.u.	*μS/cm*	*RmV*[3]	*°C*	*L/s*
22-OVB-01[1]	27-May-22	7.7	780	100	3.4	-
22-OVB-01[2]	16-Jun-22	7.8	12,000	140	16	-
22-OVB-02	16-Jun-22	7.4	1,300	71	12	-
22-MAD-01	11-Jun-22	7.6	640	45	7.3	0.65
22-MAD-02	13-Jun-22	7.2	520	13	14	0.011
22-MAD-03	19-Jun-22	6.8	1,300	22	7	-

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes:

[1] Sample collected in May was from the northern toe of the Overburden Stockpile (Figure 9-6)

[2] Sample collected in June was from the south-eastern toe of the Overburden Stockpile (Figure 9-6)

[3] Field calibrated ORP measurements

Laboratory Data

Table 9-16 and Table 9-17 present the analytical data for the Overburden Stockpile and Portal Pad seepage samples.

The seepage samples had notably different chemistry depending on the area:

- South - OVB-01 (June) was collected from the area along the south-east edge of the stockpile where a flush of previously frozen interstitial marine water from the stockpile was previously observed.
- North - OVB-01 (May) and OVB-02 were collected from the northern edge of the stockpile and indicated generally lower concentrations of dissolved ions and select metals compared to the South.

Overburden Stockpile seepage chemistry in 2022 is summarized as follows:

- Laboratory pH ranged from 7.9 to 8.2 for all samples. Laboratory EC values were highest in the sample from the southern toe (12,000 µS/cm) compared to those from the northern toe (710 and 1,600 µS/cm).
- The sample from the southern toe of the pad had notably higher concentrations of all major ions. The major cation chemistry in OVB-01-June and OVB-02 was dominated primarily by sodium (2,000 mg/L and 230 mg/L, respectively) with lesser calcium (260 and 51 mg/L, respectively) and for OVB-01-May by both calcium (68 mg/L) and sodium (48 mg/L). Major anions in all samples were dominated by chloride (160 to 3,700 mg/L) and sulphate (34 to 810 mg/L).
- For all Overburden Stockpile seepage samples, ammonia concentrations ranged from 0.15 to 2.3 mg/L as N and nitrate concentrations ranged from 0.39 to 1.9 mg/L as N. Nitrite concentrations

the north samples were 0.0106 and 0.0092 mg/L, and nitrite in the south sample was below the detection limit (<0.050 mg/L), which was raised due to high dissolved solids and EC.

- Concentrations of select dissolved metals were elevated in the south sample compared to the north samples, including cobalt (0.0068 mg/L), manganese (2.1 mg/L), molybdenum (0.0080 mg/L), nickel (0.010 mg/L), and selenium (0.00086 mg/L).

Portal Pad seepage chemistry is summarized as follows:

- Laboratory pH ranged from 7.7 to 8.2 for all samples. EC values were 430 and 480 µS/cm for MAD-01 and MAD-02, respectively, and 1,300 µS/cm for MAD-03.
- The major cation chemistry was dominated by calcium (38 to 150 mg/L) and sodium (21 to 38 mg/L) while major anions were dominated by chloride (64 to 310 mg/L) and total alkalinity (83 to 130 mg/L as $CaCO_3$). Chloride concentrations were notably higher at MAD-03 (310 mg/L) compared to the other seepage stations (maximum 65 mg/L)
- Seepage at MAD-03 had the highest concentrations of ammonia (3.1 mg/L as N). Nitrate concentrations for the other samples ranged from 0.063 to 0.25 mg/L as N and nitrite concentrations ranged from 0.0072 to 0.010 mg/L as N.
- Concentrations of dissolved metals were notably high in MAD-03 including arsenic (0.0043 mg/L), cobalt (0.013 mg/L), iron (9.1 mg/L), manganese (1.5 mg/L), nickel (0.0082 mg/L), selenium (0.00016 mg/L), and zinc (0.0026 mg/L). Elevated TSS (65 mg/L), dissolved iron and dissolved manganese concentrations suggest this samples likely contains particulates. Compared to MAD-03, concentrations at the other Portal Pad seepage stations were roughly equivalent for arsenic, nickel and zinc (0.015 and 0.0016 mg/L; 0.0024 and 0.0048 mg/L; and 0.0012 and 0.0018 mg/L, respectively), lower for cobalt and selenium (0.00035 and 0.0032 mg/L and 0.000082 mg/L, respectively), and lower for iron and manganese (0.13 and 0.72 mg/L and 0.036 and 0.53 mg/L, respectively) .

Table 9-16: Summary of physical parameters and major ions for 2022 Madrid North infrastructure and roads seepage samples

Sample ID	Date	pH	EC	TDS	Total Alkalinity	Total Ammonia	Cl	NO_3	NO_2	SO_4	Ca	Mg	K	Na
		s.u.	*µS/cm*	*mg/L*	*mg/L as $CaCO_3$*	*mg/L as N*	*mg/L*	*mg/L as N*	*mg/L as N*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
OVB-01	27-May-22	7.9	710	610	64	0.15	160	0.39	0.0092	34	68	9.8	4.0	48
22-OVB-01	16-Jun-22	8.2	12,000	7,700	200	2.3	3,700	1.9	<0.050	810	260	290	70	2,000
22-OVB-02	16-Jun-22	8.0	1,600	960	100	0.22	300	1.4	0.011	220	54	33	10	230
22-MAD-01	11-Jun-22	8.0	430	280	83	0.048	64	0.25	0.0090	30	38	8.5	2.9	32
22-MAD-02	13-Jun-22	8.2	480	320	130	0.53	65	0.094	0.010	16	56	10	3.7	21
22-MAD-03	19-Jun-22	7.7	1,300	1,200	85	3.1	310	0.063	0.0072	17	150	17	7.6	38

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Table 9-17: Summary of dissolved metals for 2022 Madrid North infrastructure and roads seepage samples

Sample ID	Date	Al	As	Cd	Co	Cu	Fe	Mn	Mo	Ni	Se	Zn
		mg/L	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
OVB-01	27-May-22	0.074	0.0075	0.000024	0.00039	0.0045	0.056	0.081	0.0016	0.0037	0.00014	0.0017
22-OVB-01	16-Jun-22	<0.010	0.0022	0.000058	0.0068	0.0050	0.16	2.1	0.0080	0.010	0.00086	<0.010
22-OVB-02	16-Jun-22	0.055	0.0011	0.0000088	0.00058	0.0033	0.13	0.21	0.0012	0.0021	0.00074	0.0022
22-MAD-01	11-Jun-22	0.021	0.0016	<0.0000050	0.00035	0.0036	0.13	0.036	0.00042	0.0024	0.00012	0.0012
22-MAD-02	13-Jun-22	0.027	0.0015	0.0000083	0.0032	0.0030	0.72	0.53	0.0018	0.0048	0.000082	0.0018
22-MAD-03	19-Jun-22	0.011	0.0043	0.0000062	0.013	0.0013	9.1	1.5	0.00065	0.0082	0.00016	0.0026

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

9.2.7 Comparison to Previous Surveys

Doris Waste Rock Influenced Area

As noted in Section 3.1.1, the stockpile on Pad I is composed of Doris ore mined by AEM placed on top of a waste rock stockpile. Waste rock mined by AEM has been placed on Pad T since 2015.

Table 9-18 compares the results of samples collected in 2022 from the waste rock influenced area at Doris with a statistical summary of historical seepage samples collected from the WRIA between 2011 and 2021. Table 9-18 presents the historical data as 5^{th}, 50^{th}, and 95^{th} percentile statistics, with concentrations below the detection limit assumed to be equal to the detection limit.

Table 9-18: Comparison of analytical results between 2021 survey data and 5th, 50th, and 90th percentile of 2011 to 2020 survey data

Area	Sample ID	Field pH	Lab pH	Field EC	Lab EC	Total Hardness	TDS	Total Ammonia	Cl	NO_3	SO_4	Al	As	Cd	Co	Cu	Fe	Mn	Ni	Se	Zn
		s.u.	*s.u.*	*μS/cm*	*μS/cm*	*mg $CaCO_3$/L*	*mg/L*	*mg N/L*	*mg/L*	*mg N/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
Waste Rock Influenced Area	22-DC-01	7.6	8	490	470	180	410	0.021	93	0.17	10	0.016	0.00036	<0.000005	<0.0001	0.0051	0.027	0.0087	0.00054	0.000092	0.0011
	22-DC-02	7.7	8	460	450	170	370	0.032	86	0.2	12	0.013	0.0004	0.0000097	<0.0001	0.0052	0.028	0.017	0.00064	0.000093	<0.001
	22-DC-03	7.8	8	490	470	180	400	0.034	91	0.2	12	0.012	0.0004	0.000009	0.0001	0.0051	0.029	0.018	0.00064	0.000096	<0.001
	22-DC-04	7.9	8	400	400	150	330	0.038	69	0.21	13	0.015	0.00047	0.0000081	0.00011	0.0063	0.035	0.018	0.00069	0.00011	<0.001
	22-DC-05	7.8	8.1	19000	18000	2600	13000	2.7	5900	5.6	730	<0.01	0.003	0.00045	0.0057	0.009	<0.1	0.41	0.0095	0.0012	0.01
	22-DC-06	7.9	8.1	19000	18000	2700	13000	2.7	5900	5.5	720	<0.01	0.0032	0.00043	0.0067	0.01	<0.1	0.44	0.011	0.0015	0.012
	22-DC-07	7.9	8.1	20000	18000	2700	13000	2.7	5900	5.5	720	0.012	0.0025	0.00037	0.0061	0.011	<0.1	0.45	0.01	0.0017	<0.01
	22-PCP-01[1]	8.1	7.8	10	9500	2200	6900	2.6	3100	5.6	250	0.031	0.0015	0.00027	0.0046	0.021	0.13	1	0.0048	0.00058	<0.005
	22-PCP-02	8	8.1	30000	2800	660	1800	2.1	510	18	430	0.043	0.00098	0.000051	0.015	0.018	0.81	0.26	0.0042	0.0032	<0.001
	Historic Sample Set (2011-2021)																				
	P5	7.1	7.5	560	450	130	240	0.92	70	2.5	17	0.0059	0.00082	0.0000099	0.00018	0.0039	0.01	0.019	0.00062	0.00025	0.001
	P50	8	7.9	2200	2300	480	1600	9.2	480	23	150	0.0094	0.0023	0.000063	0.002	0.011	0.042	0.11	0.0037	0.0018	0.002
	P95	8.3	8.1	8300	12000	3700	10000	69	3400	200	530	0.021	0.0072	0.003	0.042	3.5	6.6	2.1	0.08	0.0049	0.012
	n	35	40	34	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Reference	22-REF-01	6.6	7	30	30	12	36	<0.005	2.6	<0.005	<0.3	0.056	0.0001	<0.000005	<0.0001	0.0015	0.083	0.00025	0.0014	<0.00005	0.0023
	22-REF-02	7.4	7.9	160	160	64	120	0.012	12	0.0076	0.36	0.022	0.00024	<0.000005	<0.0001	0.0017	0.063	0.00042	0.0023	0.000059	0.002
	22-REF-03	7.3	7.5	77	81	29	55	<0.005	6.9	<0.005	1.7	0.013	<0.0001	<0.000005	<0.0001	0.00096	0.029	0.0013	<0.0005	<0.00005	<0.001
	Historic Sample Set (2011-2021)																				
	P5	6.6	6.9	41	46	17	34	0.005	3.3	0.005	0.3	0.0061	0.0001	0.000005	0.0001	0.00087	0.03	0.00023	0.0005	0.00005	0.001
	P50	7.3	7.5	81	77	24	60	0.0063	6.4	0.005	0.77	0.02	0.00015	0.000005	0.0001	0.0013	0.062	0.0013	0.0019	0.000071	0.0031
	P95	7.7	8	270	190	68	120	0.02	25	0.005	4.7	0.062	0.00026	0.00005	0.0001	0.0025	0.18	0.014	0.0027	0.001	0.005
	n	18	28	18	24	28	28	25	28	28	28	28	28	28	28	28	28	28	28	28	28

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev0_bdd.xlsx]

Notes: Concentrations below the detection limit for historical data are assumed to be equal to the detection limit.

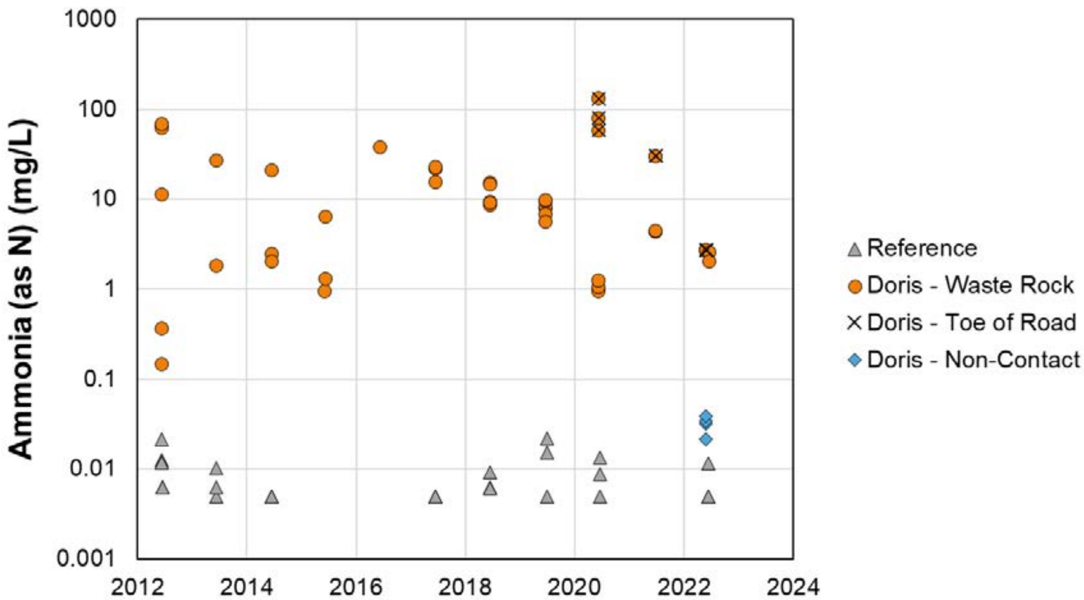
[4] Pooling water with no measurable flow and therefore not defined as a seepage sample. Sample included for completeness.

Ammonia, Nitrate, and Chloride

Trends in ammonia, nitrate and chloride are indicative of flushing of residual salts from drilling brines (chloride) and explosives (ammonia, nitrate, and nitrite) from the surfaces of waste rock in the stockpile on Pad I (Figure 9-11 to Figure 9-13). A summary of the seepage data is summarized as follows:

- 2012 to 2015: the peak in concentrations represents the initiation of mining at Doris with subsequent decrease in concentrations corresponding to the flush of soluble products during a period of no mining.
- 2016: increase in concentrations coincides with the re-initiation of mining and recontouring of the waste rock stockpile, the latter which resulted in a flush of existing residual drilling brine and explosives from the stockpile. After 2015, concentrations of residual salts and explosives decreased representing continued flushing of waste rock. Flushing of new material (ore) placed on Pad I had a short residence time and is hypothesized to not have contributed to loadings in seepage.
- 2012 to 2019: seepage chemistry at the toe of Pad I indicated waste rock contact water while the seepage at the toe of the access road had a waste rock signature that was more dilute than seepage samples collected from the toe of Pad I.
- 2020: seepage chemistry along the toe of the access road contained higher levels of chloride, ammonia and nitrate suggesting that a loading source that was not waste rock. Madrid ore placed on Pad I was exclusively sourced from Madrid NECPR was concluded to not be the source because the surface mining methods do not use drilling brines and have a lower powder factor than underground mining.
- 2021:
  - Toe of the access road: ammonia, nitrate and chloride concentrations continued to be higher than seepage at the toe of Pad I but lower than samples from the toe of the road collected in 2020. This trend suggests the continued presence of an additional loading source.
  - Waste rock contact water at the toe of Pad I: ammonia and nitrate exhibited decreasing trends between 2015 and 2020 with an increase observed in 2021. Chloride concentrations decreased between 2015 and 2021.
- 2022: Concentrations of ammonia, nitrate, and chloride were roughly equivalent between samples collected at the toe of Pad I and the toe of the road except for nitrate in one of the Pad I samples, though this sample had a similar concentration to those observed in 2021.Concentrations in nitrate and ammonia in the waste rock seepage samples have been stable since 2020 and have been decreasing in the road samples in the same time period. Chloride concentrations in the road seepage samples remain elevated compared to the waste rock seeps.

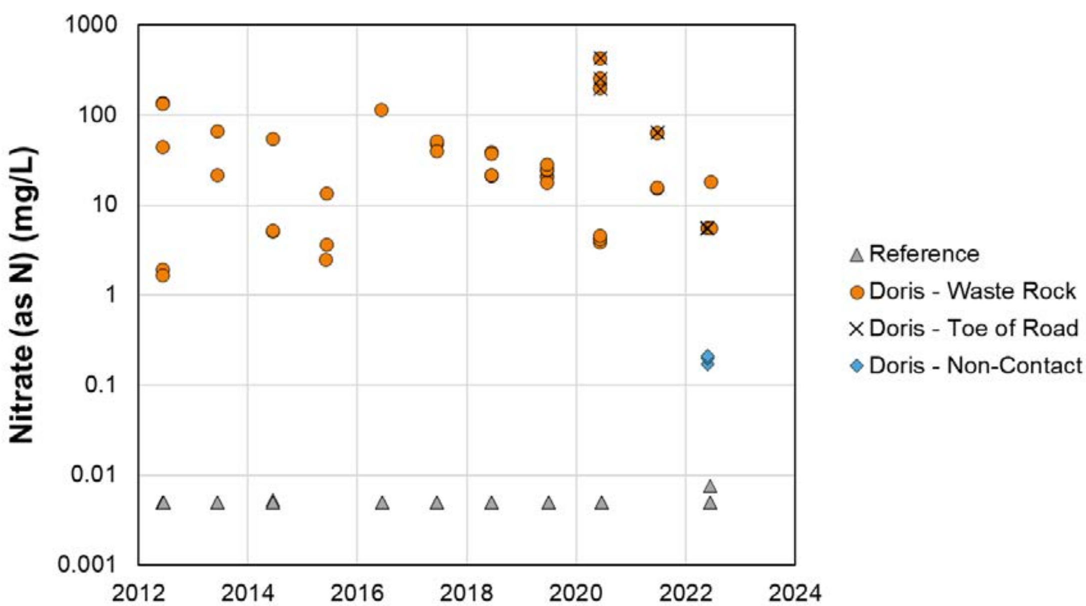
Figure 9-11: Ammonia concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

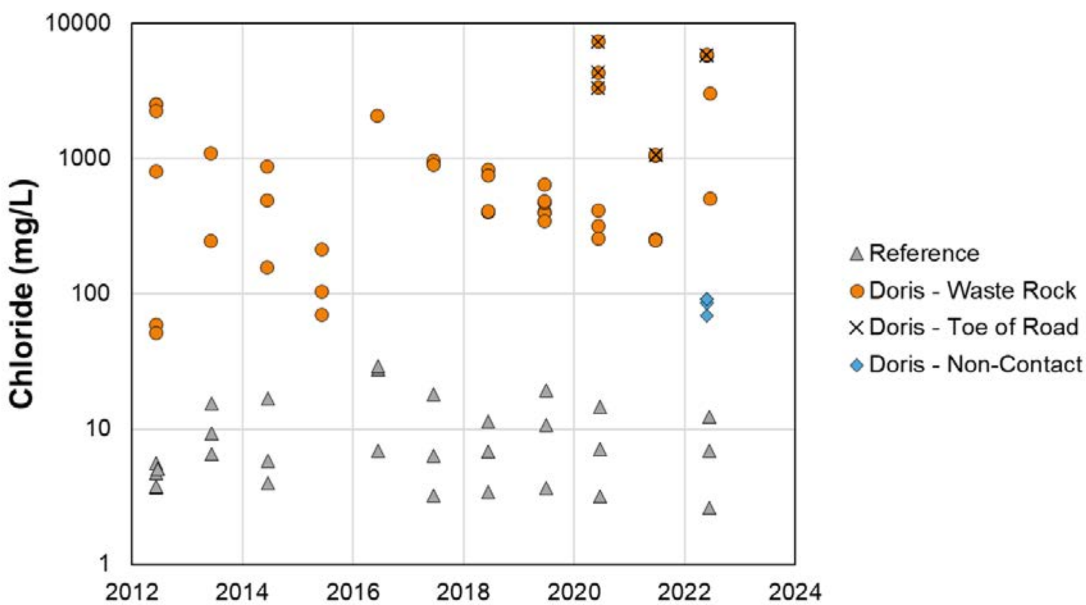
Figure 9-12: Nitrate concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

Figure 9-13: Chloride concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

Sulphate and Trace Elements

Figure 9-11 to Figure 9-13 present temporal trends of sulphate, arsenic, cobalt, nickel, cadmium, copper, iron, manganese, and zinc. Sulphate is presented in the context of sulphide oxidation. Arsenic, cobalt, and nickel are presented in the context of neutral pH metal leaching parameters for Madrid North rock. Manganese, cadmium, and zinc are discussed because concentrations at the toe of the road have been higher than at the toe of Pad I, suggesting a source other than waste rock. Copper and iron are discussed because concentrations in the seepage at the toe of the stockpile of Pad I were noted to have increased in previous reporting.

Historically, sulphate concentrations in seepage at the toe of the road have been lower than at the toe of the stockpile on Pad I, except for selected samples from 2012, 2013, 2020 and 2022. Both waste rock and road seepage samples have exhibited an increasing trend in sulphate between 2015 and 2019 after which concentrations have been relatively stable (Figure 9-5). Pad I was initially used as the waste rock stockpile until 2015 when Doris ore was placed which was enriched in sulphide with higher release rates compared to Doris waste rock (SRK 2015a, SRK 2021). Additionally, increases in sulphate may be related to the placement of Madrid ore at Doris camp beginning in Fall 2019. Madrid ore is stockpiled on the west side of Pad T and then moved to Pad I to be processed through the mill with Doris ore. Madrid and Doris ore have an average sulphur concentration of 1.5% and 1.0%, respectively (SRK 2017a and 201). SRK's humidity cell test program demonstrated that sulphate leaching rates were higher for samples of Madrid ore (average stable rate of 13 mg/kg/week, n=3; SRK 2015a) compared to Doris ore (average stable rate of 3.2 mg/kg/week, n=4; SRK 2015b).

Arsenic, cobalt, and nickel concentrations at the toe of Pad I have been stable or decreasing since 2016 and have historically been higher than seepage from the toe of the access road. In 2020 and 2022, arsenic and nickel concentrations were higher in the access road seepage samples than in the upstream waste rock seepage samples. Cobalt concentrations were also higher in the road seeps in 2020 but roughly equivalent to the waste rock seeps in 2022.

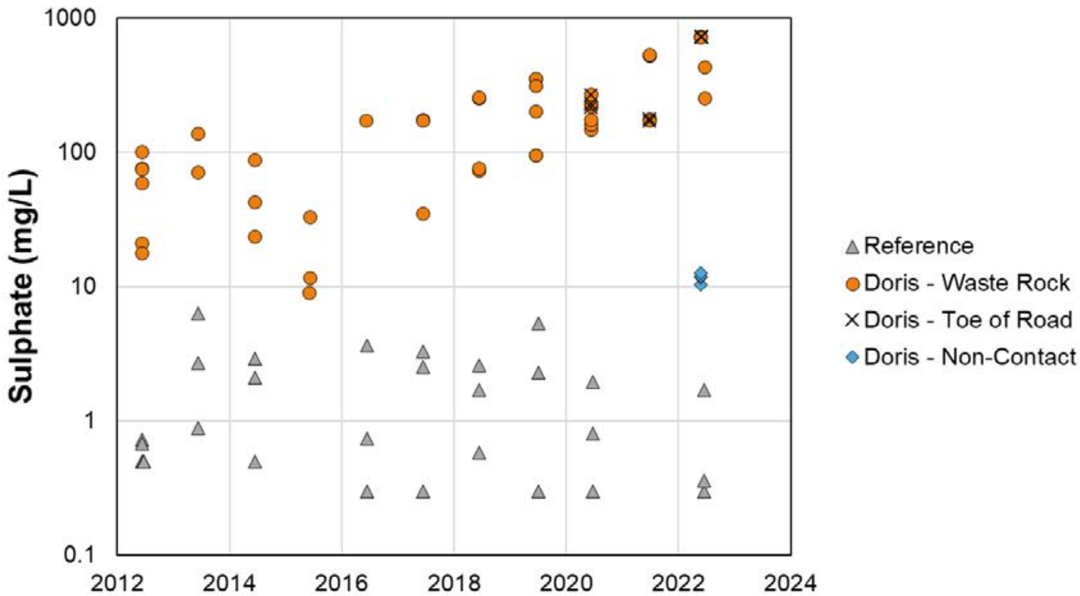
Since 2020, manganese and cadmium concentrations at the toe of the access road have been higher than Pad I seepage samples suggesting a source of leaching other than waste rock (Figure 9-20). Sources of manganese leaching at Doris pad could include ore and/or detoxified tailings. A review of humidity cell test (HCT) data indicated that selected samples of ore from Doris Central (HC-36, HC-45, HC-52 and HC-54) and Madrid (Naartok East) (HC-26) had maximum manganese loading rates (0.014 to 0.038 mg/kg/week) that were higher than other Doris and Madrid waste rock and ore HCTs but that overall stable rates were roughly equivalent for all HCT samples (SRK 2017a and 2015b). Detoxified tailings are temporarily stored at the Doris pad. HCT data indicated higher stable manganese loading rates for Doris and Madrid detoxified tailings, with stable rates of 0.091 and 0.26 mg/kg/week, respectively. Assuming 1,000 tonnes of detoxified tailings and using the base case source term inputs documented in SRK (2017b), contact water estimates for sulphate and manganese are 326 and 0.22 mg/L, respectively, which are within the range of concentrations indicated by the 2022 seepage samples (TL-11, Section 8.3.2) that represent contact water from detoxified tailings placed as backfill in underground stopes (SRK 2022).

Zinc and cadmium concentrations increased at the toe of the access road in 2020 and zinc concentrations increased at the toe of Pad I in 2021. Since this time, zinc has decreased in the Pad I seepage samples and has been relatively stable at the toe of the access road. Cadmium concentrations have also decreased from 2020 values in the access road samples and concentrations in Pad I samples have remained within the range of historical values.(Figure 9-13). HCT data for cadmium and zinc were below or within levels of analytical detection for all waste rock and ore samples (SRK 2017a and 2015b). Barrel tests, which are primarily samples of waste rock with selected samples of mixed ore and waste rock, indicated a higher initial flush with higher concentrations ranging from 0.0001 to 0.0002 mg/L for waste rock types intersected at NE CPR followed by a decreasing trend with concentrations currently <0.0001 mg/L. Barrel zinc concentrations have oscillated between approximately 0.001 and 0.01 mg/L over the 11-year period operation, with no evident trends. The underground seepage survey has indicated 5^{th} to 95^{th} percentile concentrations of cadmium and zinc of 0.00001 to 0.034 mg/L and 0.01 to 1.8 mg/L, respectively (Section 8.3.2).

Copper and iron concentrations were previously noted to be increasing in the samples collected from to toe of Pad I, though concentrations appear to have stabilized or decreased since 2019. Variability in concentrations may be attributable to colloids or TSS within the samples.

All drainage from the Doris camp pad, including seepage captured in the collection sumps downstream of the toe of the access road, is pumped to the sediment control pond (SCP) prior to transfer to the TIA. In 2022, water from the SCP accounted for 6.1% of total inflow volumes entering the TIA and 1.5% of the total volume stored in the TIA.

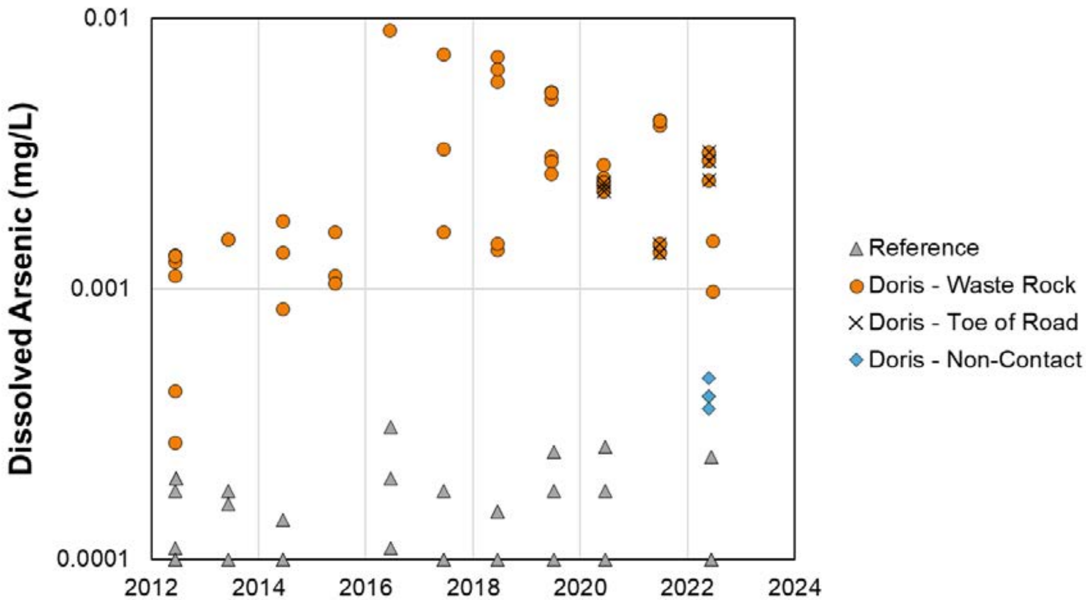
Figure 9-14: Sulphate concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

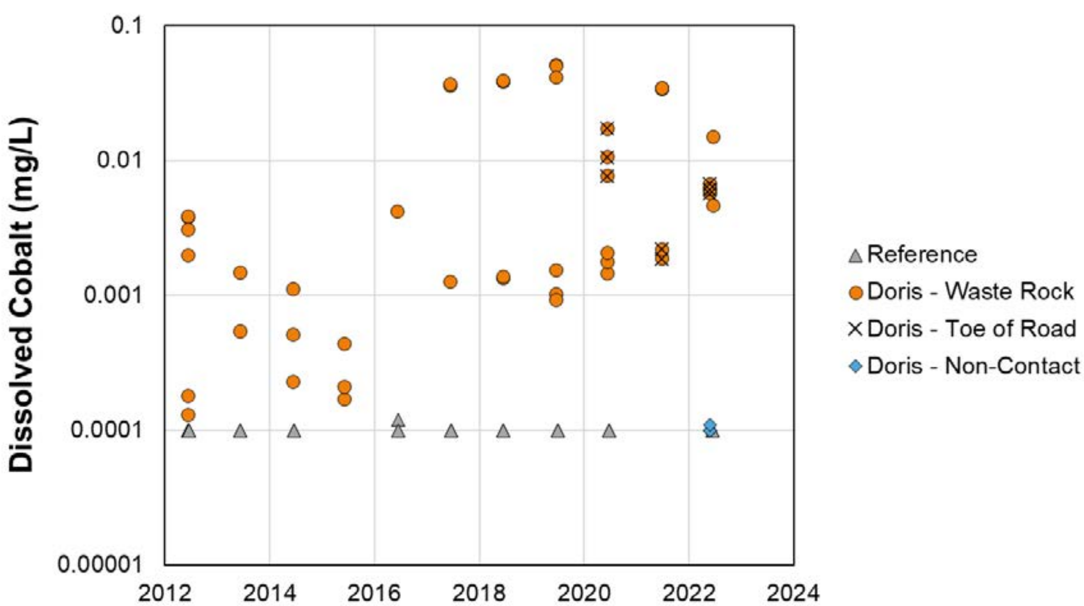
Figure 9-15: Dissolved arsenic concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

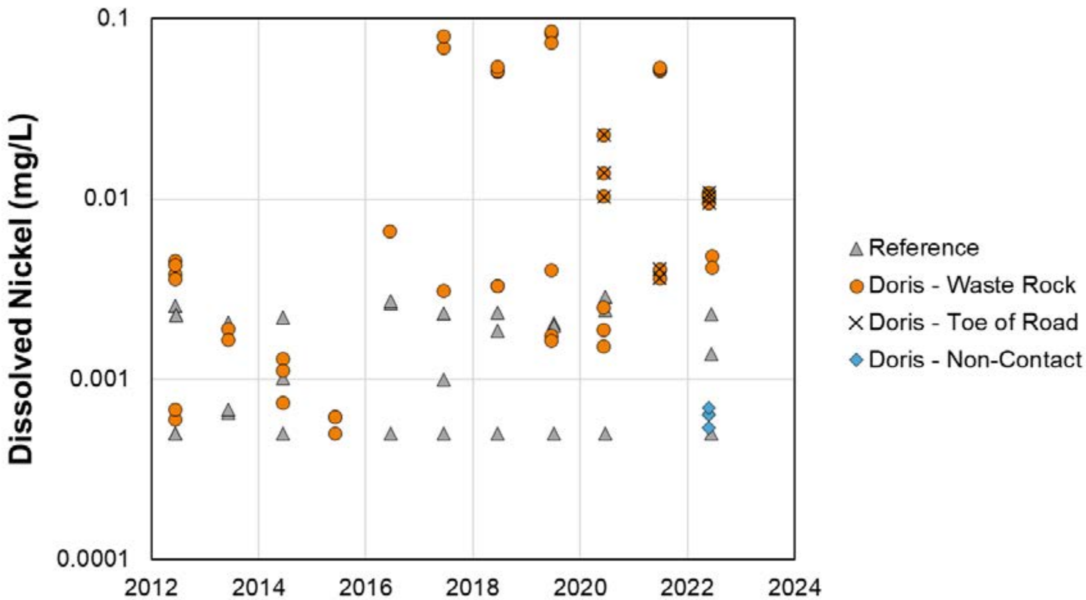
Figure 9-16: Dissolved cobalt concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

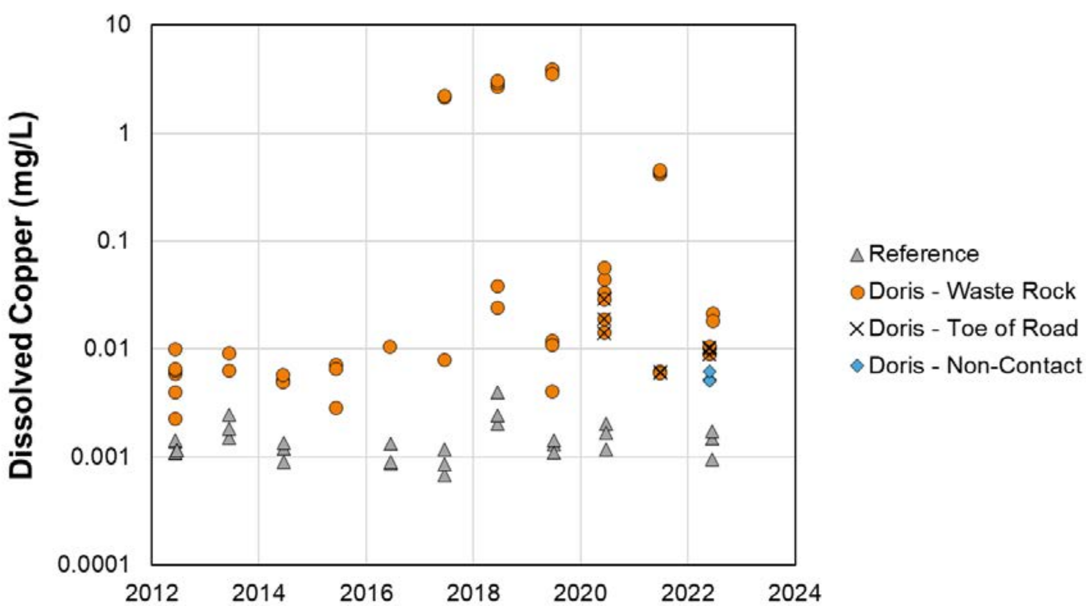
Figure 9-17: Dissolved nickel concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

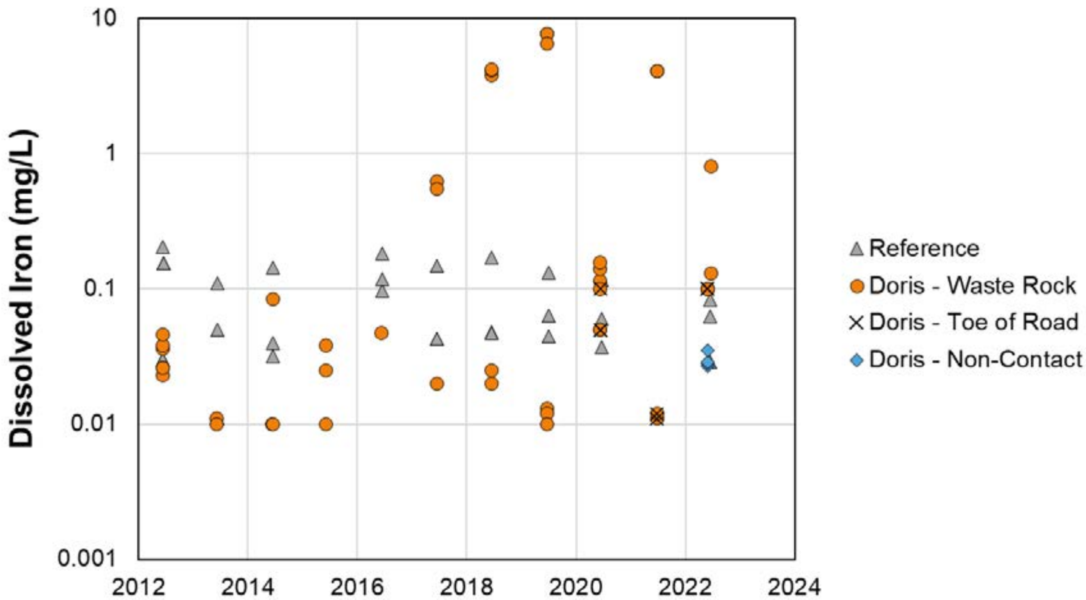
Figure 9-18: Dissolved copper concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

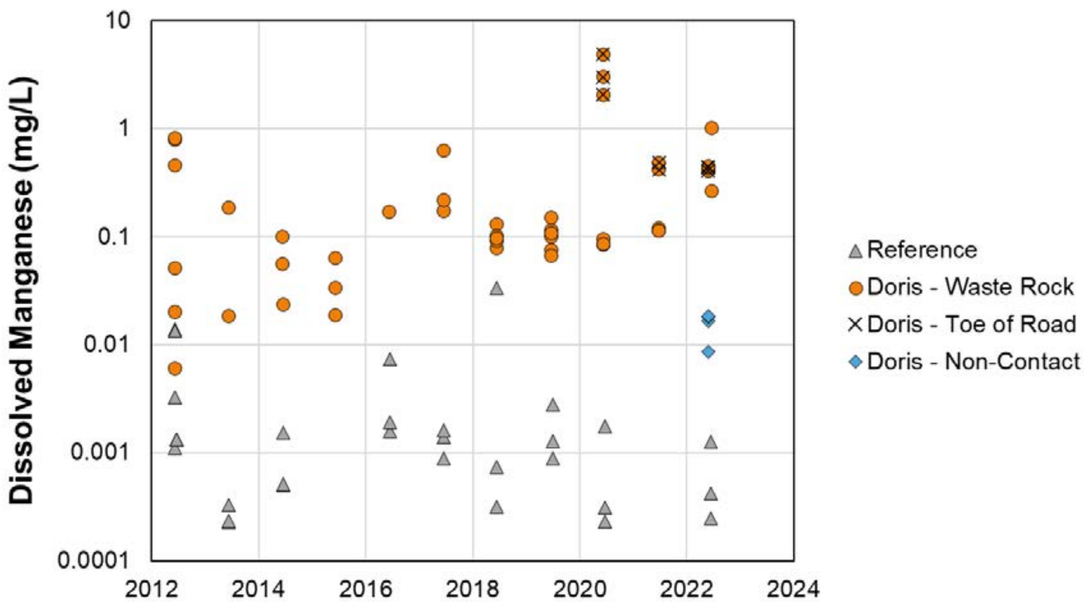
Figure 9-19: Dissolved iron concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

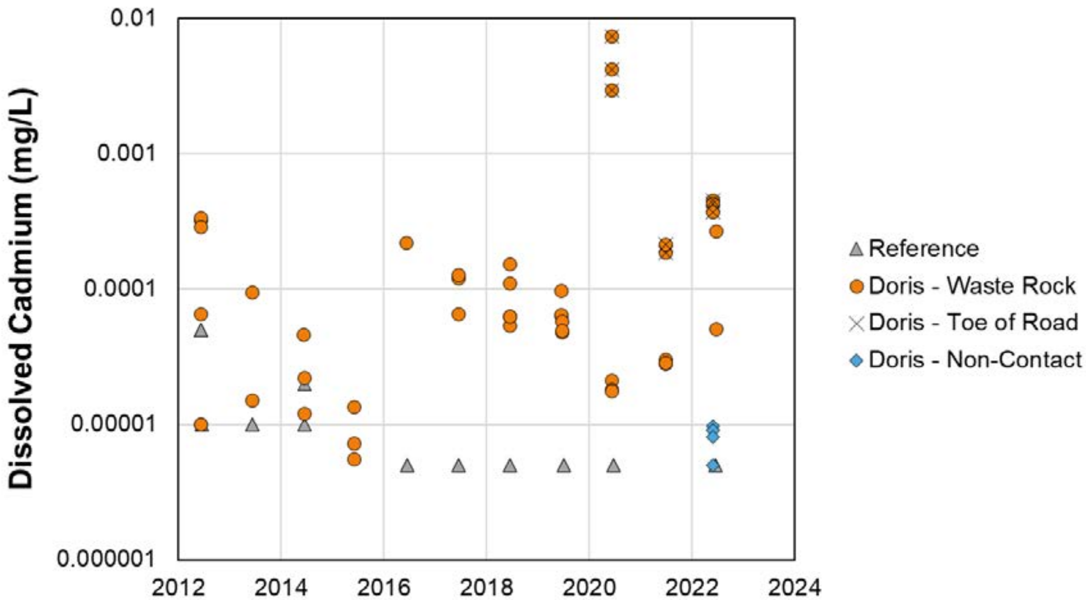
Figure 9-20: Dissolved manganese concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

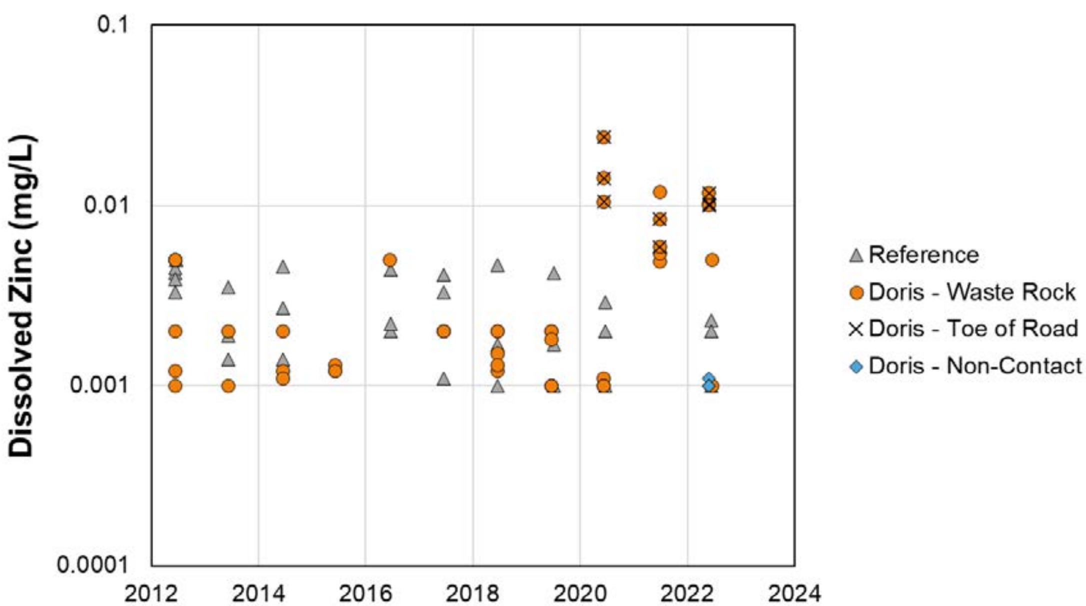
Figure 9-21: Dissolved nickel concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

Figure 9-22 Dissolved zinc concentrations for Doris WRIA and reference seeps



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Toe of access road samples only identified since 2020.

Madrid Waste Rock Storage Area

Figure 9-23 and Figure 9-24 provides a comparison of selected parameters for Madrid North WRSA samples from 2020 to 2022.

A summary of the Madrid North WRSA results from 2020 to 2022 is as follows:

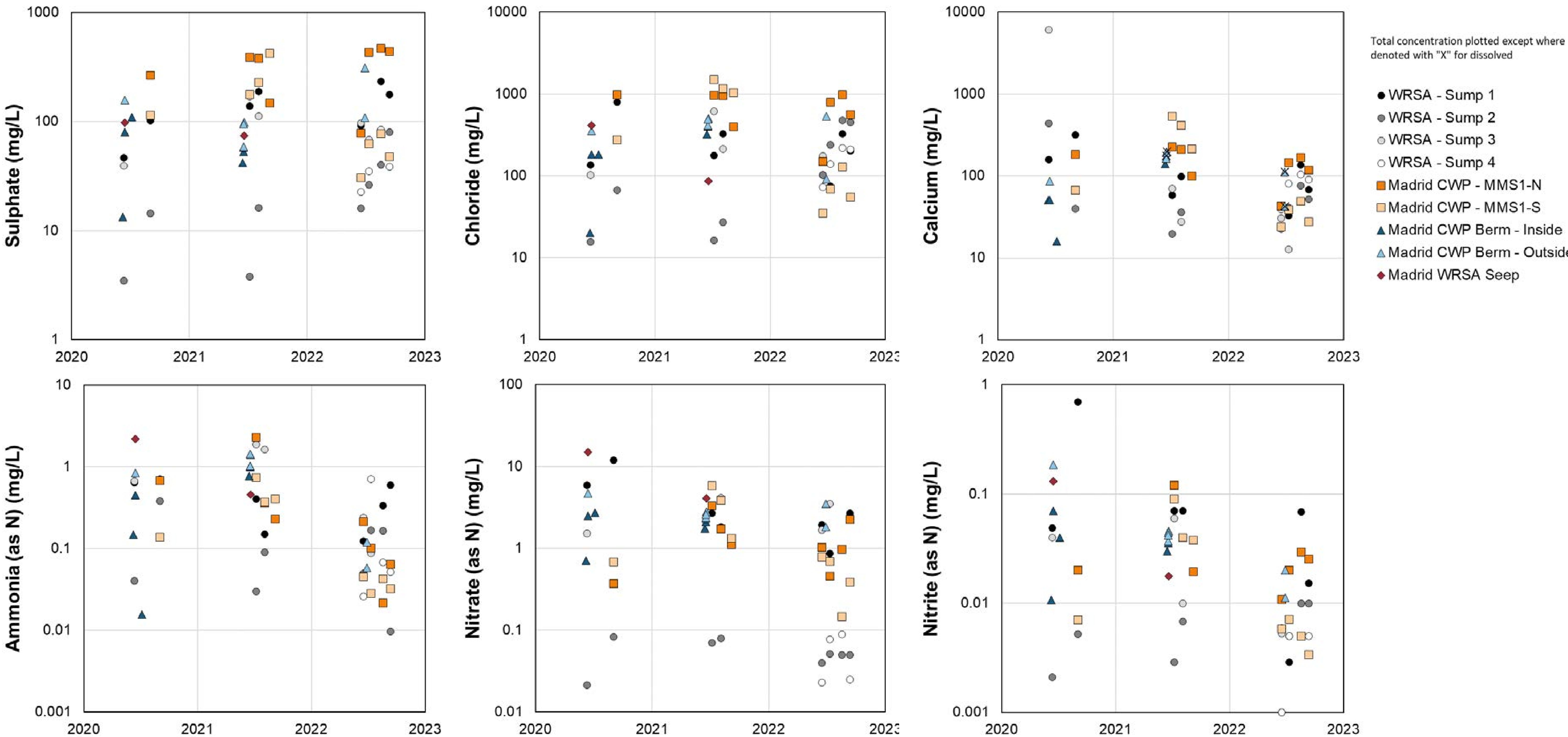
- Field pH values were roughly equivalent to previous years except for in the Madrid CWP. Field pH at MMS1-N and MMS1-S was higher in 2022 compared to previous years, ranging from 8.1 to 8.6 in 2022 compared to 7.4 to 8.1 in previous years.
- Concentrations of calcium and sodium in the sumps have generally been decreasing since 2020 and have stayed relatively stable at other locations except for the 2022 samples from MMS1-S Compared to previous years, sulphate and chloride concentrations increased at Sump 2 and decreased at MMS1-S. Concentrations of these parameters at other locations were within the range of historical concentrations. Major ion concentrations at MMS1-S were generally lower than observed in previous years.
- Arsenic concentrations in Sump 1, Sump 3, and MMS1-N have increased since 2020 while concentrations at other locations have remained stable.
- Cobalt and manganese concentrations appear to be decreasing at all monitoring stations.
- Nickel concentrations at Sumps 1, 2 and 3 have decreased since 2020 and remain stable at most other locations. MMS1-S samples from 2022 had lower nickel concentrations compared to previous years.
- Selenium concentrations have remained relatively stable for all locations.
- Nitrogen nutrients have decreased at all stations.

There were no other notable trends in seepage chemistry that suggested preferential drainage of contact water from the underground and NE CPR waste rock to the sumps.

Madrid Infrastructure and Roads

Figure 9-25 and Figure 9-26 provide a comparison of selected parameters for Overburden Stockpile and Portal Pad seepage samples from 2020 to 2022.

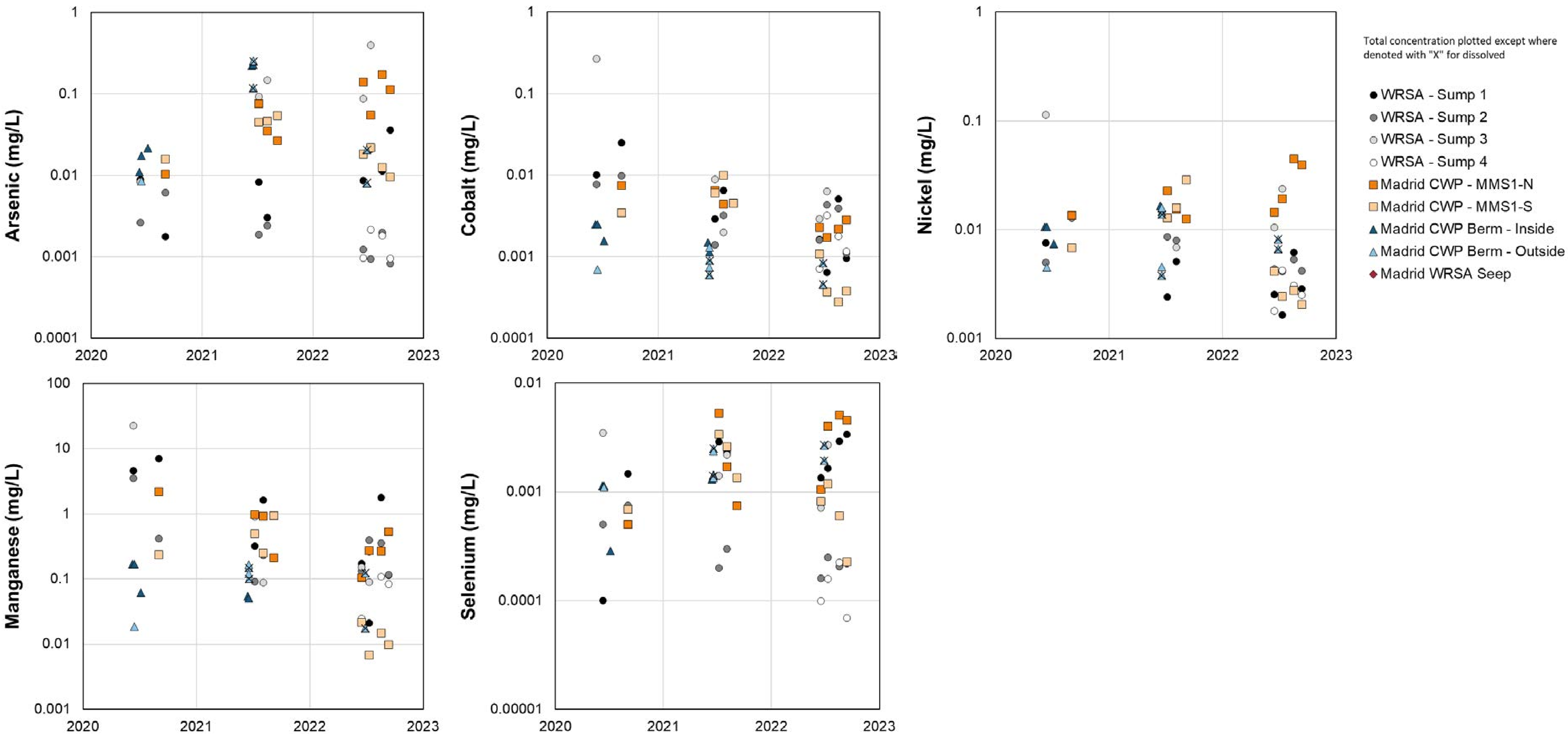
Figure 9-23: Times series plot of sulphate, chloride, calcium, ammonia, nitrate, and nitrite for Madrid North WRSA seepage and routine monitoring samples



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Notes: Total concentrations are plotted except where denoted with "X"

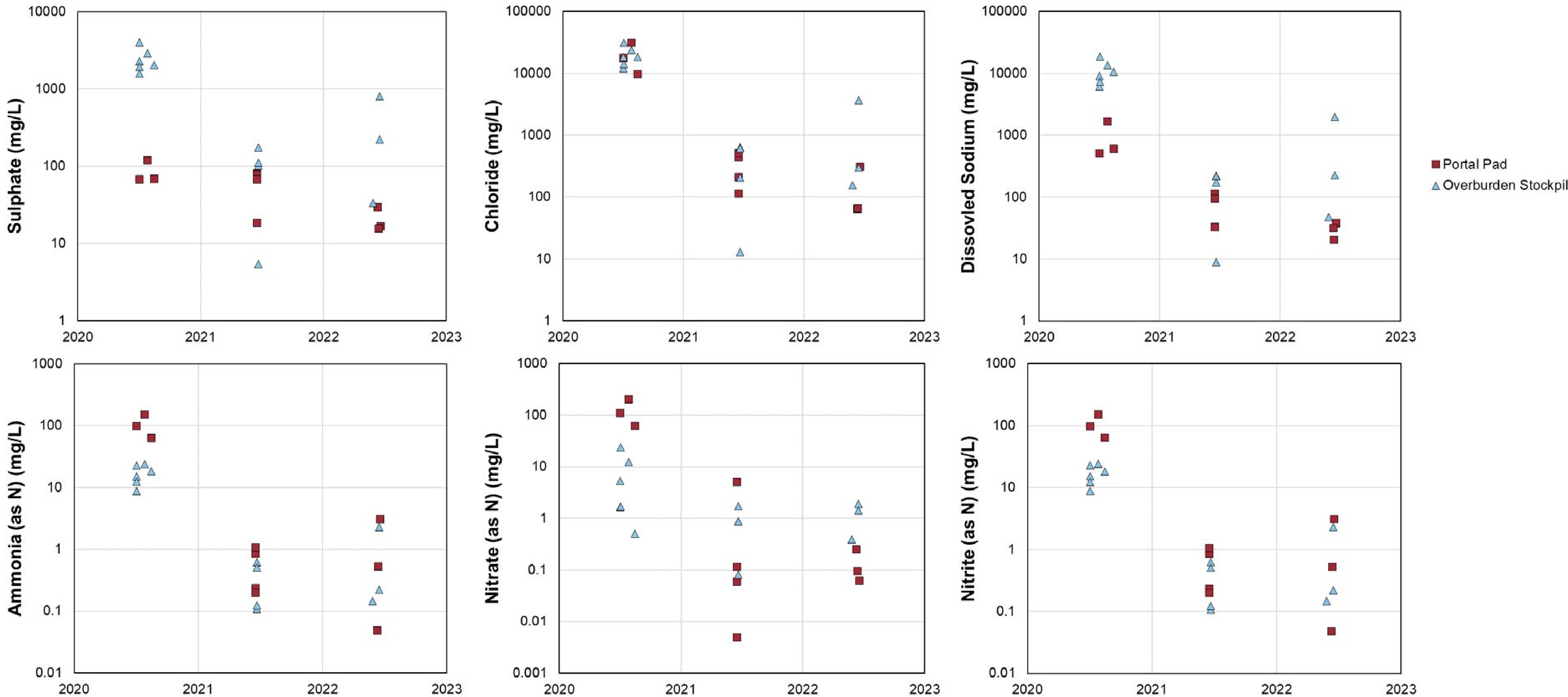
Figure 9-24: Time series plots of arsenic, cobalt, nickel, manganese, and selenium for Madrid North WRSA seepage and routine monitoring samples



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

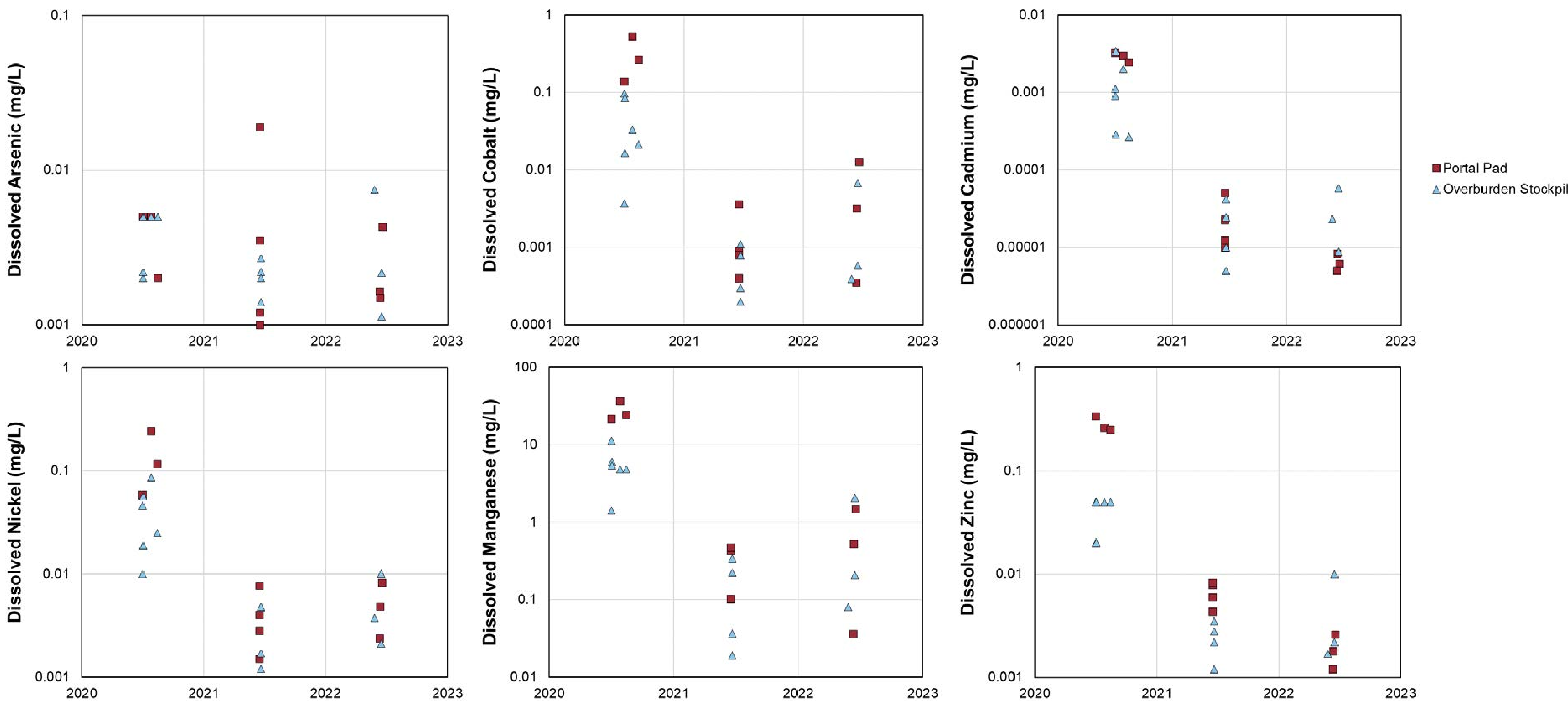
Notes: Total concentrations are plotted except where denoted with “X”

Figure 9-25: Time series plots for sulphate, chloride, sodium, ammonia, nitrate, and nitrite for Madrid North infrastructure and road seepage samples



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Figure 9-26: Times series plots of arsenic, cobalt, cadmium, nickel, manganese, and zinc for Madrid North infrastructure and roads seepage samples



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]

Overburden Stockpile

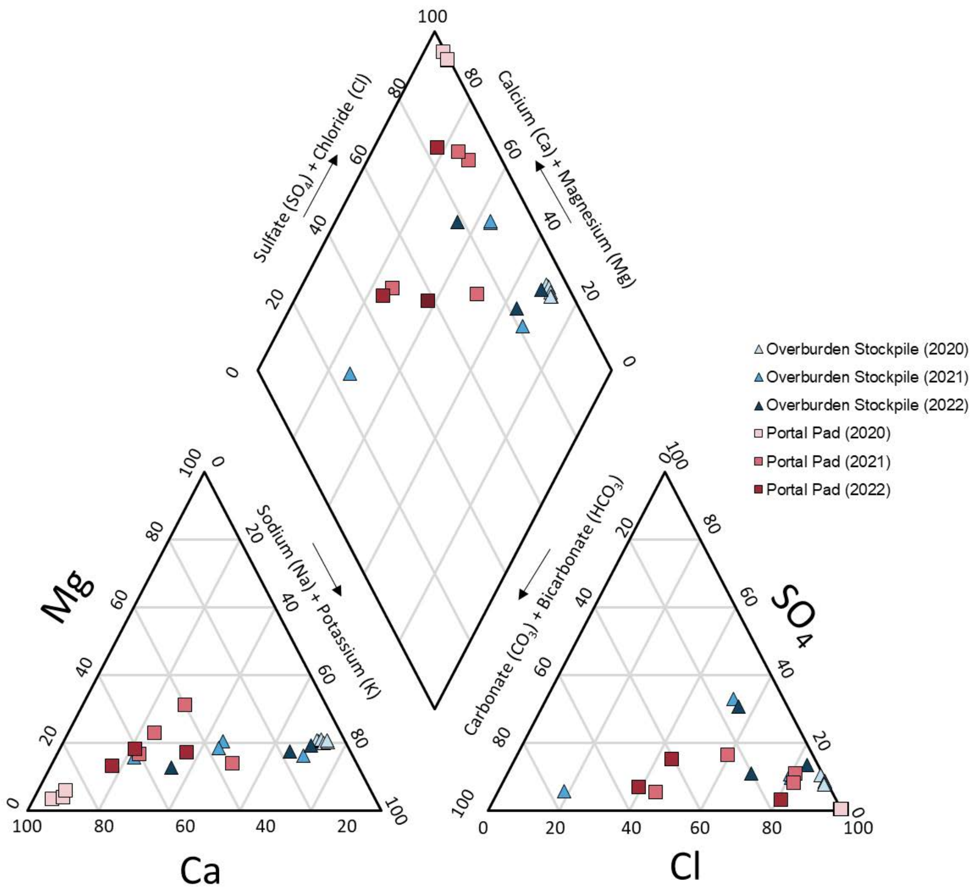
In 2020 seepage samples from the Overburden Stockpile indicated elevated EC, major ions, ammonia, cobalt, manganese, nickel, and zinc. An investigation of the potential source of loadings from the Overburden Stockpile concluded that seepage chemistry was likely a result of the thawing of saline interstitial porewater that had the chemical signature of seawater with localized pockets having concentrations higher than seawater that were conceptually due to cryoconcentration. In addition, overburden porewater was characterized by elevated concentrations of dissolved iron, cobalt, manganese, and nickel (SRK 2021e).

Overall, seepage from the Overburden Stockpile in 2022 was characterized by similar concentrations to 2021 and lower concentrations than 2020. Trends are summarized as follows:

- Seepage samples from the Overburden Stockpile in 2021 and 2022 were characterized by lower concentrations of major ions than the samples collected in 2020 from the southern toe of the pad, however the major ion chemistry indicates porewater of seawater composition continues to drain to the southern toe of the stockpile (Figure 9-27: Piper plot of Madrid North Overburden Stockpile and Portal Pad water quality samples (2020 to 2022)Figure 9-27).
- Ammonia, nitrate and nitrite concentrations for 2021 and 2022 samples were roughly equivalent and one to two orders of magnitude lower than 2020 samples.
- Concentrations of dissolved trace elements were lower in 2021 and 2022 northern toe samples with levels one or two orders of magnitude lower for cadmium, cobalt, manganese, nickel, selenium, and zinc. Notably, arsenic concentrations were roughly equivalent for all stations and since 2020.

The significant decrease in concentrations of major ions and trace elements in seepage within two year validates the conceptual geochemical model that the source loading to seepage chemistry in 2020 was the thawing and draining of frozen saline porewater from the Overburden Stockpile and that loadings have subsequently decreased.

Figure 9-27: Piper plot of Madrid North Overburden Stockpile and Portal Pad water quality samples (2020 to 2022)



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Seepage/Doris-Madrid seepage compilation/[DorisMadridSeep_WQData_CAPR002393_2022_rev1.xlsx]Mad

Portal Pad

The 2020 seepage survey of the Portal Pad indicated saline seepage (EC >35,000 µS/cm) dominated by calcium and chloride (Figure 9-27: Piper plot of Madrid North Overburden Stockpile and Portal Pad water quality samples (2020 to 2022)Figure 9-27), elevated concentrations of cadmium (0.0025 to 0.0032 mg/L), cobalt (0.14 to 0.53 mg/L), manganese (210 to 460 mg/L), nickel (0.058 to 0.24 mg/L), and zinc (0.25 and 0.33 mg/L) and for one sample, a pH of 4.9 (SRK 2021e). Notably zinc was never identified as a metal leaching concern in geochemical baseline studies of waste rock. An investigation of the portal pad concluded that conceptually the source loads were not due to weathering of waste rock but accelerated rates of metal leaching in the presence of high ionic strength drilling brine (SRK 2021b). Furthermore, the acidic pH was attributed to organic acids in the active layer and/or release of acidity from ion exchange between seepage and tundra.

Between the 2020 and 2021 seepage surveys, AEM remediated the Portal Pad by removing areas of the Pad that were saline with disposal within the NE CPR. Accordingly, the results of the 2021 and 2022 seepage survey are an indicator of the reclamation activities. The 2022 Portal Pad seepage chemistry in the context of reclamation activities is summarized as follows:

- All seepage observed in 2022 was non-acidic.
- Concentrations of calcium (38 to 150 mg/L) and chloride (64 to 310 mg/L) were lower by one order of magnitude compared to 2020. Sulphate concentrations (16 to 30 mg/L), which are an indicator of sulphide oxidation, were lower than 2021 and 2020 values.
- Nitrogen nutrients, which are present in or residuals of explosives, were roughly equivalent to 2021 concentrations and all values were significantly lower than 2020 concentrations, including ammonia (two orders of magnitude lower), nitrate (three to five orders of magnitude lower) and nitrite (up to two orders of magnitude lower).
- Trace element concentrations were roughly equivalent to 2021 concentrations and all values were lower than 2020 concentrations including dissolved cadmium (one to two orders of magnitude), cobalt (two orders of magnitude), iron (three to four orders of magnitude), manganese (one order of magnitude), nickel (one order of magnitude), selenium (one order of magnitude) and zinc (one order of magnitude).

The results of the 2022 Portal Pad seepage survey indicates that reclamation activities have improved seepage chemistry.

10 Summary and Conclusions

10.1 Material Production and Management

In 2022, material production at Doris and Madrid is summarized as follows:

- Doris mine: a total of 142,509 t of waste rock was produced from the underground mine, of which 15,423 t was used as backfill underground and 127,086 t was placed in the surface waste rock stockpile on Pad T. Approximately 48,606 t of waste rock was hauled from the surface waste rock stockpile on Pad T and used for construction. No waste rock was removed from Pad T to be used as backfill in the underground mine.
- Madrid mine: there was no mining at Madrid.
- Tailings: the process plant has been in care and maintenance and has not produced tailings since mid-October 2021.
- Quarries: there were three blasts at Quarry 2 (Figure 3-1).
- Construction Rock
  - Waste rock from Pad T was used to construct the aqua dam within the TIA (July 2022) and an access dike (December 2022), both of which are within the Doris TIA footprint.
  - Quarry 2 rock was used to construct the core storage pad at Doris and Sump 4 located downstream of the Madrid North Contact Water Pond..

10.2 Monitoring requirements and Conformity Assessment

In 2022, Agnico executed the required geochemical monitoring programs for waste rock, tailings, quarry rock and construction rock according to the permit requirements outlined in the Water Licence.

10.3 Geochemical Monitoring

10.3.1 Doris Waste Rock

Doris underground workings in 2022 was geologically described as 80% mafic volcanics with trace sulphide and 2-5% quartz-carbonate veining; 5% sericite altered mafic volcanics with up to 2% sulphide and 5-10% quartz-carbonate veining; and 5% diabase dyke with trace sulphide and trace quartz-carbonate veining. The results geological inspection of the underground mine and surface stockpile on Pad T were consistent except for the minor amounts of light brown felsic dyke observed in the stockpile.

In accordance with the WROMP *(*AEM 2022a), SRK collected eight samples of waste rock from the surface stockpile on Pad T including four samples of mafic metavolcanics (1a), one sample of altered mafic metavolcanics (1as) and three samples of diabase dyke (11c). The results are summarized as follows:

- All samples were classified as non-PAG on the basis of TIC/AP and NP/AP.
- SFE tests on a sample each of mafic metavolcanics (1a), altered mafic metavolcanics (1as), and diabase (11c) had alkaline pH (8.4 to 9.9). Nitrate concentrations and chloride values ranged from 0.6 to 59 mg/L and 12 to 240 mg/L, respectively and are indicative of blasting residuals present on waste rock surfaces, and possibly naturally saline groundwater that is present in areas of the mine.
- The geochemical characteristics of the Type A sample set represented the characteristics of the following waste rock samples collected in 2022: four mafic volcanic (1a), one altered mafic metavolcanic (1as) and three diabase (11c) samples except for TIC content in the diabase. The 2022 diabase samples had higher TIC content than the Type A diabase samples and equivalent values to the operational monitoring sample set.

The geological and geochemical inventory of waste rock on Pad T precludes a long-term assessment of the anticipated geochemical behaviour of the waste rock on Pad T with respect to metal leaching and acid rock drainage (ML/ARD). The geochemical behaviour of the waste rock is monitored through the annual seep survey along the downgradient toe of the waste rock and ore stockpile area and routine monitoring of the Doris Contact Water Pond 1. The results of the seepage survey are reported in Section 9, while results of the routine monitoring program are included in monthly water quality reports prepared by AEM and submitted to the Nunavut Water Board.

10.3.2 Madrid North Waste Rock

In 2022, the Madrid North Mine was in care and maintenance. Subsequently there were no waste rock produced for the monitoring program.

10.3.3 Quarry Monitoring

The results of the quarry monitoring program in 2022 are summarized as follows:

- Geological inspections of the active quarry faces as Quarry 2 indicated that the rock was mafic metavolcanics (1a). Fibrous actinolite was not present.
- Quarry 2 ROQ rock had total sulphur content ranging from 0.10% to 0.37% and TIC and Modified NP ranging from 33 to 190 kgCaCO3/t and 44 to 210 kgCaCO3/t . All samples were classified as non-PAG on the basis of NP/AP and TIC/AP, where AP was calculated using total sulphur values. No metals identified with appreciable enrichment. SFE results reported pH ranging between 8.8-9.4 and low soluble metals concentrations.
- The sample results of the geochemical monitoring program of Quarry 2 indicate that the quarry rock has a low risk of ML/ARD.

10.3.4 As-Built Construction Rock Monitoring

The 2022 as-built construction rock monitoring program in 2022 included geochemical characterization of Quarry 2 rock used to construct the core storage pad at Doris and Sump 4 downstream of the Madrid North Contact Water Pond and waste rock from Pad T used to construct the aqua dam within the Doris TIA pond. Results are summarized as follows:

- Construction rock at the core storage pad and Sump 4 was mafic metavolcanics (1a) and mafic metavolcanics (1a) and altered mafic metavolcanics (1a/1as) at the aqua dam.
- All samples were classified as non-PAG on the basis of NP/AP and TIC/AP where AP was calculated using total sulphur. For all samples, elemental analysis showed no appreciable enrichment compared to the screening criteria, and SFE results reported pH ranging between 8.8-9.4 and low soluble metals concentrations.

The sample results of the geochemical monitoring program of as-built construction rock indicate that the construction rock placed in 2022 has a low risk of ML/ARD.

10.3.5 Tailings

Underground Seepage Survey (TL-11)

The results of the opportunistic seepage sampling from underground backfilled stopes (TL-11) are summarized as follows:

- pH ranged between 7.4 and 8.4 in all samples and was within range of previous TL-11 seepage data (Figure 8-1)
- EC ranged from 8,600 and 18,000 µS/cm for all samples except for two samples (4900 Fresh Air Raise and Level 54 samples collected in June), which had EC values of 220 and 1,200 µS/cm, respectively. EC values for seepage samples collected since 2020 have been up to five times lower than seepage samples collected from 2017 to 2019.
- All 2022 underground seepage samples except for the two low EC samples had the major ion composition characteristic of seawater indicating saline groundwater, however concentrations were more dilute than seawater.
- The decrease in EC from 2020 onwards coincides with a decrease in concentrations of a number of key parameters including dissolved boron, chromium, cadmium, cobalt, copper, nickel, silver, selenium and zinc. This suggests that dilution by saline groundwater as indicated by the major ion chemistry.
- Sulphate concentrations were lowest in the 4900 Fresh Air Raise and Level 54 samples (17 and 180 mg/L). Sulphate in all other samples was higher (450 to 1,300 mg/L) and equivalent to the historic sample set, however the source of sulphate is likely saline groundwater.

- The results suggest that seepage samples collected between 2017 and 2019 represent contact water of detoxified tailings whereas samples collected since 2020 are likely contact water mixed with saline groundwater.

10.3.6 Seepage

The scope of the 2022 seepage survey included waste rock stockpiles at Doris and Madrid, infrastructure constructed between Fall 2021 and Summer 2022 (Doris Core Storage Pad), areas from the 2021 survey where subsequent monitoring was recommended (access road to the Doris vent raise, Madrid Overburden Stockpile and Madrid portal pad) (SRK 2022) and three reference sites, located in the undisturbed tundra and not subject to mine influences.

Doris

Waste Rock Influenced Area

Seepage at the waste rock influenced area was characterized according to three groups:

- Group 1 – toe of the access road (waste rock influence with high EC)
- Group 2 – downstream toe of the waste rock/ore stockpile on Pad I (waste rock influence with low EC)
- Group 3 – southwest toe of the Doris camp pad (quarry rock)

One of the Group 2 samples was collected from a standing water and is not interpreted to be seepage. A summary of seepage chemistry for theses groups is as follows:

- pH for all seepage samples was non-acidic (7.8 to 8.0). EC values were ~10,000 µS/cm at the toe of the stockpile (Group 2), ~20,000 µS/cm for samples at the toe of the access road (Group 1), and ~470 µS/cm in Group 3 samples.
- The major ion chemistry differed between the group 1 and Group 2 samples. The differences in major ion chemistry are summarized as follows:
  - Group 1: Cation chemistry was dominated by sodium (3000 to 3100 mg/L) and calcium (450 to 480 mg/L), while major anion chemistry was dominated by chloride (5,900 mg/L for all) and sulphate (720 and 730 mg/L).
  - Group 2: Major cation chemistry was dominated by sodium (990 and 310 mg/L) and calcium (700 and 170 mg/L), while major anion chemistry was dominated by chloride (3,100 and 510 mg/L) and sulphate (250 and 430 mg/L).
  - Group 3: Cations were dominated by calcium (49 to 60 mg/L) and sodium (14 to 16 mg/L) and anion chemistry was dominated by alkalinity (69 to 71 mg/L as $CaCO_3$) and chloride (69 to 93 mg/L).
- Prior to 2020, seepage at the toe of the road had the chemical signature of waste rock and was more dilute that waste rock contact water the seepage was mixed with other flows. Since 2020, the

higher chloride and ammonia concentrations in the road seepage samples suggests a loading source other than waste rock, such as detoxified tailings which are temporarily stored at the Doris pad. In 2022 nitrate concentrations were lower in the access road samples than in the stockpile samples.

- Concentrations of trace elements in the stockpile and access road samples were roughly equivalent or within an order of magnitude of difference. Access road samples had marginally higher concentrations of arsenic (0.0025 to 0.0032 mg/L), cadmium (0.00037 to 0.00045 mg/L), and nickel (0.0095 to 0.010 mg/L) and the stockpile seepage sample (PCP-02) had higher concentrations of aluminum (0.043 mg/L), iron (0.81 mg/L), cobalt (0.015 mg/L), and selenium (0.0032 mg/L).
- Dissolved metals concentrations for Group 3 samples were roughly equivalent to reference seepage samples except for manganese (0.0087 to 0.018 mg/L) and molybdenum (0.023 to 0.024 mg/L)
- Trends for all parameters waste rock influenced samples (Group1 and Group 2) were either decreasing or stable.

All drainage from the Doris camp pad, including seepage captured in the collection sumps downstream of the toe of the access road, is pumped to the sediment control pond (SCP) prior to transfer to the TIA. In 2022, water from the SCP accounted for 6.1% of total inflow volumes entering the TIA and 1.5% of the total volume stored in the TIA.

Infrastructure

One seepage sample was collected from the toe of the Doris Core Storage Pad, which was constructed in 2022 using Quarry 2 ROQ rock. Results are summarized as follows:

- Field pH was 8.6 and field EC was 180 µS/cm.
- Cation chemistry was dominated by calcium (15 mg/L) and sodium (11 mg/L) and anion chemistry dominated by alkalinity (49 mg/L as $CaCO_3$) and sulphate (16 mg/L).
- Concentrations of nitrogen species and sulphate were near equivalent to Group 3 (quarry rock) samples from the Doris camp pad. Trace metal level were low.

The access road to the Doris Vent Raise has been surveyed annually since 2019 with no seepage observed. Seepage in the area may be reporting to the underground mine. SRK recommends that the seepage survey at the Doris Vent Raise be removed from the program.

Madrid North

Waste Rock Storage Area

The water quality sample set in 2022 included i) two freshet seepage samples collected from the downstream toe of the CWP berm, and ii) monthly water quality samples from the contact water pond (CWP), Sump 1, Sump 2, Sump 3, and Sump 4. Sump 4 was installed in 2022 to collect seepage that has been bypassing the liner at the downstream berm of the CWP since 2020 and could not be remediated with the placement of overburden in 2021. All drainage from the Waste Rock Storage Area is captured by downstream sumps and pumped back to the CWP.

A summary of the results are as follows:

- All waste rock drainage samples were non-acidic and EC values ranged form 340 to 4,000 μS/cm).
- The major ion chemistry for the Madrid North WRSA samples is illustrated in Figure 3-1. As with EC, concentrations of all major ions were variable with time. The major cation chemistry for all Madrid WRSA samples except Sump 2 was dominated by sodium (29 to 610 mg/L) and calcium (13 to 170 mg/L) except for Sump 2 which was dominated by magnesium (33 to 130 mg/L) and calcium (23 to 76 mg/L. Anion chemistry for all samples was dominated by chloride (35 to 980 mg/L) and alkalinity (47 to 250 mg/L as $CaCO_3$). Select samples (MMS1-N, Sump 1, and the seepage from the downstream toe of the CWP berm) also contained elevated sulphate concentrations (67 to 470 mg/L).
- High chloride concentrations are indicative of residual drilling brine from underground waste rock. The lower chloride concentrations at Sump 1, Sump 2 and Sump 3 compared to the Madrid CWP and the placement location of underground waste rock at the Madrid WRSA suggest that the increasing chloride concentrations in the Madrid CWP are a result of evapoconcentration.
- Nitrogen concentrations are indicative of residual explosives present on the surfaces of underground waste rock. Ammonia (0.029 to 0.60 mg/L) and nitrate (0.86 to 3.5 mg/L) concentrations have decreased over time and in 2022 were highest at Sump 1 and Sump 3, suggesting contact water from underground waste rock is draining to these sumps. Concentrations at other locations varied, ranging from 0.0096 to 0.21 mg/L as N for ammonia (except for the July Sump 4 sample, 0.71 mg/L as N) and from <0.025 to 2.3 mg/L as N for nitrate.

Overburden Stockpile and Madrid Portal Pad

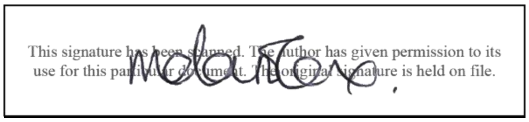
Seepage stations were established at the Portal Pad and Overburden Stockpile. A summary of the seepage chemistry is as follows:

- Field pH ranged from 6.8 to 7.8 for all samples. EC values ranged from 520 to 1,300 μS/cm except for one Overburden Stockpile sample (OVB-01-June) with a value of 12,000 μS/cm.
- The major cation chemistry for most samples was dominated by calcium (54 to 260 mg/L and 38 to 150 mg/L for Overburden Stockpile and Portal Pad samples, respectively) and sodium (48 to 2,000 mg/L and 21 to 38 mg/L, respectively). Major anions were dominated by chloride (64 to 3,700 mg/L) for all samples, and total alkalinity (83 to 130 mg/L as $CaCO_3$) for Portal Pad samples and sulphate for Overburden Stockpile samples (34 to 810 mg/L)
- Concentrations of major ions were notably higher in one of the overburden stockpile samples collected from the southern toe of the pad, though concentrations were lower than observed in 2020 when a flush of water with elevated EC, major ions, ammonia, cobalt, manganese, nickel, and zinc was observed. 2021 samples and 2022 samples from the northern toe of the pad had roughly equivalent concentrations for most parameters.

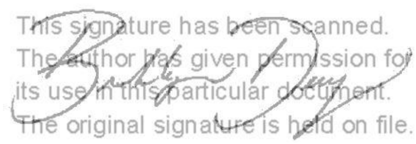
  - For all Overburden Stockpile seepage samples, ammonia concentrations ranged from 0.15 to 2.3 mg/L as N as N and nitrate concentrations ranged from 0.39 to 1.9 mg/L as N.
  - Nutrient concentrations ranged from 0.048 to 3.1 mg/L as N (ammonia) and 0.063 to 1.9 mg/L (nitrate) with no consistent differences between the two areas. These nitrogen concentrations are not indicative of blast residues from underground waste rock.
  - Concentrations of select dissolved metals were elevated in the south Overburden Stockpile sample compared to the north Overburden Stockpile samples, including cobalt (0.0068 mg/L), manganese (2.1 mg/L), molybdenum (0.0080 mg/L), nickel (0.010 mg/L), and selenium (0.00086 mg/L).
- Overall, major ion and dissolved metal concentrations for both the Overburden Stockpile and Portal Pad samples were significantly lower than concentrations quantified in 2020 . The results of the 2022 Portal Pad seepage survey indicates that reclamation activities have improved seepage chemistry. The significant decrease in concentrations of major ions and trace elements in seepage within two year validates the conceptual geochemical model that the source loading to seepage chemistry in 2020 was the thawing and draining of frozen saline porewater from the Overburden Stockpile and that loadings have subsequently decreased.

Closure

This report, 2022 Annual Geochemistry Monitoring Report, was prepared by

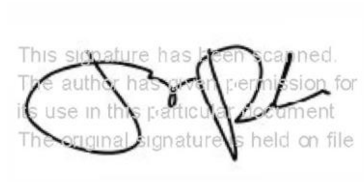


Melanie Cox
Consultant (Geochemistry)



Brooklyn Derry, EIT (SK)
Consultant (Water Management)

Jessica Evans
Senior Consultant (Geochemistry)



Jocelyne Plourde, PEng (BC)
Consultant (Geochemistry)

and reviewed by

Lisa Barazzuol, PGeo (NT/NU)
Principal Consultant (Geochemistry)

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

References

AEM 2022a. Waste Rock, Ore and Mine Backfill Management Plan, Hope Bay Project, Nunavut.June 2022.

AEM 2022b. Quarry Management Plan, Hope Bay, Nunavut. September 2022.

AEM 2022c Quality Assurance and Quality Control Plan, Hope Bay March 2022

Day, S.J. and Kennedy, C.B. 2015. Setting ARD management criteria for mine wastes with low sulfide content. Proceedings of the 10th International Conference on Acid Rock Drainage, Santiago, Chile, April 20 to 25, 2015.

MEND 1991. Acid Rock Drainage Prediction Manual. Mine Environment Neutral Drainage Program. Report 1.16.1b.

MEND 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. Mine Environment Drainage Program. Report 1.20.1

Nunavut Water Board 2018. Water Licence No. 2AM-DOH1335 – Amendment No. 2. Issued on December 7, 2018.

Nunavut Water Board 2022.Water Licence No: 2BE-HOP1232 Issued on June 30 2022

Price, W.A. 1997. DRAFT Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. BC Ministry of Employment and Investment, Energy and Minerals Division. 151pp

SRK Consulting (Canada) Inc., 2015a. Static Testing and Mineralogical Characterization of Waste Rock and Ore from the Doris Deposit, Hope Bay. Report prepared for TMAC Resources by SRK Consulting, June 2012.

SRK Consulting (Canada) Inc. 2015b. Geochemical Characterization of Tailings from the Doris Deposits, Hope Bay. Report prepared for TMAC Resources Inc. Project no 1CT022.002. June 2015.

SRK Consulting (Canada) Inc., 2017. Geochemical Characterization of Waste Rock and Ore, Madrid North Deposit, Hope Bay Project. Prepared for TMAC Resources Inc. SRK Project No. 1CT022.004. June 2017.

SRK Consulting (Canada) Inc., 2019. Classification of Waste Rock in Support of Segregating Construction Rock from Naartok East Crown Pillar Recovery Trench, Madrid North, Hope Bay Project - DRAFT. Prepared for TMAC Resources Inc. SRK Project Number. 1CT022.037. June 2020.

SRK Consulting (Canada) Inc., 2019. Expectations for Laboratory Geochemical Data Quality. Internal Memo.

TMAC Resources Inc., 2019. Waste Rock, Ore and Mine Backfill Management Plan, Hope Bay Project, Nunavut. Report prepared for the Nunavut Water Board by TMAC Resources, March 2019.

Appendix A Doris North Waste Rock (Pad T Stockpile) Monitoring

Appendix A1 Geological Inspection

Doris Waste Rock - Field Notes

Sample ID	Sample Location	Sample Date	Rock Type	Easting	Northing	Sulphide type	Sulphide %	Sulphide texture	Fizz Test (ground mass)	Fizz test on Carbonate/QTZ veins	Carbonate Colour	Carbonate Occurrence	Weathering Intensity	Alteration1	Alteration1 Intensity	Alteration1 Texture
SRK22_PADT_01	Pad T	8/15/2022	11c	433396	7559301	pyrite	trace	matrix dessiminated	None	na	na	na	None	na	na	na
SRK22_PADT_02	Pad T	8/15/2022	1a	433398	7559293	pyrite	1	matrix dessiminated	None	Weak to moderate	white	Veins	None	na	na	na
SRK22_PADT_03	Pad T	8/15/2022	11c	433378	7559268	pyrite	trace	matrix dessiminated	None	na	na	na	None	na	na	na
SRK22_PADT_04	Pad T	8/15/2022	1a	433343	7559242	pyrite	1-2	matrix dessiminated	None	Moderate	white	Veins	Weak (occasional hematite staining on fracture surfaces)	na	na	na
SRK22_PADT_05	Pad T	8/15/2022	1a	433333	7559245	pyrite	1	matrix dessiminated	None	Moderate	white to reddish	Veins	Weak (occasional hematite staining on fracture surfaces)	Chlorite	Moderate to pervasive	fine grained massive
SRK22_PADT_06	Pad T	8/15/2022	11c	433322	7559259	pyrite	trace	matrix dessiminated	None	na	na	na	None	na	na	na
SRK22_PADT_07	Pad T	8/15/2022	1a	433326	7559279	pyrite	trace	matrix dessiminated	None	Moderate to strong	white	Veins	Weak (occasional hematite staining on fracture surfaces)	na	na	na
SRK22_PADT_08	Pad T	8/15/2022	1ay (1a altered to 1as)	433346	7559295	pyrite	trace	matrix dessiminated	None	weak	white	veins	na	Sericite	Moderate	foliated

Sample ID	Sample Location	Sample Date	Rock Type	Color of -2mm Fraction	Lith Texture/fabric	Geological description
SRK22_PADT_01	Pad T	8/15/2022	11c	Light gray	medium grained, massive, equigranular	Medium grained, dark gray to black diabase, massive, no fizz on ground mass, no carbonate veining, trace sulphide matrix dessiminated, no signs of weathering, magnetic
SRK22_PADT_02	Pad T	8/15/2022	1a	Greenish gray	Fine grained, equigranular, lightly foliated	Fine grained, lightly foliated, dark greenish gray mafic meta volcanics (1a), no fizz on groundmass , 3-4% carbonate veins with weak to moderate fizz, ~1% sulphide matrix dessiminated, no signs of weathering
SRK22_PADT_03	Pad T	8/15/2022	11c	Light gray	medium grained, massive, equigranular	Medium grained, dark gray to black diabase, massive, no fizz on ground mass, no carbonate veining, trace sulphide specs matrix dessiminated, no signs of weathering, magnetic
SRK22_PADT_04	Pad T	8/15/2022	1a	Greenish gray	Fine grained, equigranular, lightly foliated	Fine grained, lightly foliated, dark greenish gray mafic meta volcanics (1a), no fizz on groundmass , 2-3% carbonate veins with weak to moderate fizz, 1-2% sulphide matrix dessiminated, no signs of weathering
SRK22_PADT_05	Pad T	8/15/2022	1a	Greenish gray	Fine grained, equigranular, massive	Fine grained, dark gray to green, massive mafic meta volcanics, no fizz on groundmass, 2-3% carbonate veins with moderate fizz, 1% sulphide matrix dessiminated, occasional hematite on fracture surfaces
SRK22_PADT_06	Pad T	8/15/2022	11c	Light gray	medium grained, massive, equigranular	Medium grained, gray to dark gray diabase, massive, no fizz on ground mass, no carbonate veining, trace sulphide specs matrix dessiminated, no signs of weathering, magnetic
SRK22_PADT_07	Pad T	8/15/2022	1a	Greenish gray	Fine grained, equigranular, massive	Fine grained, dark greenish gray, massive mafic meta volcanics (1a), weak fizz on ground mass, 2-3% carbonate veins with moderate to strong fizz, trace sulphide, occasional hematite staining on fracture surfaces
SRK22_PADT_08	Pad T	8/15/2022	1ay (1a altered to 1as)	Gray	Fine grained, equigranular, lightly foliated	Fine grained, gray to tan banding, foliated, moderately sericite altered 1a (1ay), no fizz on groundmass, 1% carbonate veins with weak fizz, trace sulphide.

Appendix A2 ABA Data

Doris Waste Rock - Acid Base Accounting Results

Sample ID	Rock Type	Paste pH	Fizz Rating	S(T)	$S(SO_4)$	S(S-2)	AP from S(T)	AP - from S(S-2)	CO_2	TIC	Mod NP	TIC/AP_S(T)	NP/AP_S(T)	TIC/AP_S(S-2)	NP/AP_S(S-2)
		pH Units	-	wt%	wt%	wt%	kg $CaCO_3$/t	kg $CaCO_3$/t	wt%	kg $CaCO_3$/t	kg $CaCO_3$/t	-	-	-	-
		#N/A	#N/A	0.02	0.01	Calc.	0.6		0.08	1.8	#N/A	#N/A	#N/A	#N/A	#N/A
SRK22-PADT-01	11c	9.1	SLIGHT	0.05	<0.01	0.05	1.6	1.6	0.3	6.36	21.1	4.1	14	4.1	14
SRK22-PADT-02	1a	7.9	STRONG	0.08	0.07	0.01	2.5	0.31	6.3	143	168	57	67	456	537
SRK22-PADT-03	11c	9.1	NONE	0.04	<0.01	0.04	1.3	1.3	0.09	2.05	16.4	1.6	13	1.6	13
SRK22-PADT-04	1a	7.9	STRONG	0.11	0.02	0.09	3.4	2.8	6.6	149	163	43	47	53	58
SRK22-PADT-05	1a	8.0	STRONG	0.08	0.05	0.03	2.5	0.94	5.0	113	151	45	60	120	161
SRK22-PADT-06	11c	9.5	NONE	0.03	<0.01	0.03	0.94	0.94	0.1	2.27	18.6	2.4	20	2.4	20
SRK22-PADT-07	1a	8.27	STRONG	0.11	0.01	0.1	3.4	3.1	5.0	114	136	33	40	37	44
SRK22-PADT-08	1ay (1a altered to 1as)	8.07	STRONG	0.32	0.03	0.29	10	9.1	9.4	213	184	21	18	23	20

Appendix A3 Aqua Regia Metals Data

Doris Waste Rock - Trace Element Analysis Results

Sample ID	Rock Type	Ag	Al	As	Au	B	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mn
		ppb	%	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppb	%	ppm	%	ppm
		2	0.01	0.1	0.2	20	0.5	0.02	0.01	0.01	0.1	0.5	0.01	0.01	0.1	5	0.01	0.5	0.01	1
SRK22-PADT-01	11c	80	3.7	0.9	8.1	<20	71	<0.02	2.7	0.07	18	129	149	3.1	10	<5	0.31	6.9	1.1	276
SRK22-PADT-02	1a	40	4.2	2.6	7.5	<20	29	<0.02	6.1	0.03	46	102	134	8.3	12	8	0.14	3.3	2.6	1332
SRK22-PADT-03	11c	59	4.0	0.6	4.3	<20	86	<0.02	2.7	0.06	18	105	154	3.0	9.9	<5	0.36	6.9	1.1	208
SRK22-PADT-04	1a	54	4.1	3.8	24.9	<20	16	<0.02	5.8	0.03	47	111	125	8.1	11	6	0.08	2.3	2.9	1367
SRK22-PADT-05	1a	16	4.6	2.2	2.2	<20	19	<0.02	5.8	0.02	49	132	141	8.9	13	<5	0.09	2.7	3.1	1358
SRK22-PADT-05-FIELD DUP	1a	18	4.6	2.2	3.5	<20	17	<0.02	5.9	0.02	48	116	126	8.7	12	6	0.09	2.6	3.1	1340
SRK22-PADT-06	11c	62	4.0	0.6	12.2	<20	55	<0.02	2.6	0.04	17	102	168	3.1	9.7	<5	0.29	5	1.1	251
SRK22-PADT-07	1a	64	4.9	2.2	0	<20	5.5	0.05	5.2	0.02	49	139	129	8.3	14	21	0.03	2.8	4.0	1320
SRK22-PADT-08	1ay (1a altered to 1as)	565	2.3	9.8	2540	<20	39	0.07	5.3	0.13	35	65	84	8.6	10	<5	0.13	4.7	1.9	1673

Sample ID	Rock Type	Mo	Na	Ni	P	Pb	S	Sb	Sc	Se	Sr	Te	Th	Ti	Tl	U	V	W	Zn
		ppm	%	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		0.01	0.001	0.1	0.001	0.01	0.02	0.02	0.1	0.1	0.5	0.02	0.1	0.001	0.02	0.1	2	0.1	0.1
SRK22-PADT-01	11c	1.1	0.51	44	0.047	7.9	0.04	0.03	4.1	0.3	73	0.02	1.9	0.19	0.08	0.3	156	0.1	44
SRK22-PADT-02	1a	0.41	0.079	51	0.033	2.6	0.08	<0.02	17	0.4	26	0.02	0.4	0.17	<0.02	<0.1	173	<0.1	86
SRK22-PADT-03	11c	0.50	0.55	42	0.047	7.5	0.03	0.02	3.8	0.3	78	<0.02	2.3	0.18	0.09	0.4	158	<0.1	41
SRK22-PADT-04	1a	0.34	0.068	68	0.033	34	0.12	0.3	20	0.5	28	0.04	0.3	0.18	<0.02	<0.1	177	<0.1	87
SRK22-PADT-05	1a	0.28	0.057	68	0.031	3.7	0.09	0.03	22	0.4	26	<0.02	0.2	0.18	<0.02	<0.1	203	<0.1	93
SRK22-PADT-05-FIELD DUP	1a	0.31	0.054	66	0.029	3.2	0.07	0.03	21	0.5	28	<0.02	0.2	0.19	<0.02	<0.1	199	<0.1	93
SRK22-PADT-06	11c	0.36	0.57	40	0.043	2.1	0.03	<0.02	3.6	0.2	72	<0.02	1.2	0.17	0.07	0.2	165	<0.1	37
SRK22-PADT-07	1a	0.25	0.031	96	0.023	2.4	0.11	<0.02	30.9	0.4	27	0.06	0.4	0.12	<0.02	<0.1	220	<0.1	84
SRK22-PADT-08	1ay (1a altered to 1as)	0.93	0.12	11	0.089	3.4	0.31	0.03	15	0.6	69	0.03	0.6	0.033	0.03	<0.1	66	0.1	118

Appendix A4 SFE Test Data

Doris Waste Rock - Shake Flask Extraction Results

Parameter	Units	LOD	SRK22_PadT_04	SRK22_PadT_06	SRK22_PadT_08
			1a	11c	1ay (1a altered to 1as)
pH	pH Units	N/A	8.40	9.94	8.49
EC	uS/cm	1	1267	129	1121
SO4	mg/L	0.5	48.4	2.9	101
Acidity to pH4.5	mg/L	0.5	<0.5	<0.5	<0.5
Acidity to pH8.3	mg/L	0.5	0.8	<0.5	<0.5
Total Alkalinity	mg/L	0.5	12	44	23
Bicarbonate	mg/L	0.5	14	48	28
Carbonate	mg/L	0.5	<0.5	2.8	<0.5
Hydroxide	mg/L	0.5	<0.5	<0.5	<0.5
Dissolved Chloride	mg/L	0.5	240	11.5	224
Total Ammonia (N)	mg/L	0.005	59	0.6	22.0
Nitrate-N	mg/L	0.02	<0.05	<0.05	<0.05
Nitrite-N	mg/L	0.005	1.25	0.188	0.522
Total Dissolved Solids	mg/L	10	1000	110	700
Hardness CaCO3	mg/L	0.5	297	4.93	250
Dissolved Aluminum (Al)	mg/L	0.0005	0.0762	0.591	0.0731
Dissolved Antimony (Sb)	mg/L	0.00002	0.000217	0.000154	0.000129
Dissolved Arsenic (As)	mg/L	0.00002	0.000168	0.00127	0.000487
Dissolved Barium (Ba)	mg/L	0.00002	0.0113	0.000539	0.0117
Dissolved Beryllium (Be)	mg/L	0.00001	<0.00001	<0.00001	<0.00001
Dissolved Bismuth (Bi)	mg/L	0.000005	<0.000005	<0.000005	<0.000005
Dissolved Boron (B)	mg/L	0.05	0.116	0.066	0.084
Dissolved Cesium (Cs)	mg/L	0.00005	0.000888	0.000061	0.000155
Dissolved Cadmium (Cd)	mg/L	0.000005	<0.000005	<0.000005	<0.000005
Dissolved Calcium (Ca)	mg/L	0.05	96.1	1.60	70.8
Dissolved Chromium (Cr)	mg/L	0.0001	<0.0001	0.00024	<0.0001
Dissolved Cobalt (Co)	mg/L	0.000005	0.000220	0.0000438	0.000305
Dissolved Copper (Cu)	mg/L	0.00005	0.000257	0.000125	0.00133
Dissolved Lanthanum (La)	mg/L	0.00005	<0.00005	<0.00005	<0.00005
Dissolved Iron (Fe)	mg/L	0.001	0.0030	0.0617	0.0259
Dissolved Lead (Pb)	mg/L	0.000005	<0.000005	0.0000596	0.0000093
Dissolved Lithium (Li)	mg/L	0.0005	0.00629	0.00350	0.00952
Dissolved Magnesium (Mg)	mg/L	0.05	13.8	0.230	17.8
Dissolved Manganese (Mn)	mg/L	0.00005	0.0319	0.000891	0.0523
Dissolved Phosphorus (P)	mg/L	0.002	0.0042	0.0242	0.0056
Dissolved Molybdenum (Mo)	mg/L	0.00005	0.00120	0.000498	0.00139
Dissolved Nickel (Ni)	mg/L	0.00002	0.000156	0.000127	0.000324
Dissolved Potassium (K)	mg/L	0.05	8.16	2.95	8.50
Dissolved Rubidium (Rb)	mg/L	0.00005	0.0155	0.00491	0.00409
Dissolved Selenium (Se)	mg/L	0.00004	0.000338	0.000400	0.000545
Dissolved Silicon (Si)	mg/L	0.1	0.37	3.00	0.36
Dissolved Silver (Ag)	mg/L	0.000005	<0.000005	<0.000005	0.0000857
Dissolved Sodium (Na)	mg/L	0.05	117	24.5	110
Dissolved Strontium (Sr)	mg/L	0.00005	0.350	0.00513	0.327
Dissolved Sulphur (S)	mg/L	10	13	<10	31
Dissolved Tellurium (Te)	mg/L	0.00002	<0.00002	<0.00002	<0.00002
Dissolved Thallium (Tl)	mg/L	0.000002	0.0000124	0.0000052	0.0000027
Dissolved Thorium (Th)	mg/L	0.000005	<0.00005	<0.00005	<0.00005
Dissolved Tin (Sn)	mg/L	0.0002	<0.0002	<0.0002	<0.0002
Dissolved Titanium (Ti)	mg/L	0.0005	<0.0005	0.00306	<0.0005
Dissolved Tungsten (W)	mg/L	0.00001	0.000527	0.000366	0.000397
Dissolved Uranium (U)	mg/L	0.000002	<0.000002	0.0000087	0.0000034
Dissolved Vanadium (V)	mg/L	0.0002	<0.0002	0.0125	<0.0002
Dissolved Zinc (Zn)	mg/L	0.0001	0.00104	0.00020	0.00032
Dissolved Zirconium (Zr)	mg/L	0.0001	<0.0001	0.00019	<0.0001
Dissolved Mercury (Hg)	mg/L	0.00005	<0.00005	<0.00005	<0.00005

Appendix B Quarry and Construcion Rock Monitoring

Appendix B1 Geological Inspection Records

AGNICO EAGLE
HOPE BAY

Quarry Inspection

Inspection Date:	24-Nov-22	Blast Date:	
Geologist:	Matthew Melchiorre & Sarah Dunn		
Quarry Location:	Quarry #2		

General Visual Inspection

Rock Type	Mafic Volcanics	Description: Massive blocky, medium grained mafic volcanics with 2% hematite fracture filling on joint surfaces. Weak chlorite alteration
Vein	Y/**N**	If yes, describe (min, %, size):
Sulphides	Y/**N**	If yes: Disseminated/Vein/Stringer/Other Percentage: none to locally trace disseminated
Fibrous Actinolite	Y/**N**	If yes, describe (min, %, size):
If anomalous rock types/significant sulphides:	TAGGED: Y/**N**	South East corner face contains a moderate-strong chlorite alteration intensity due to a steep easterly dipping fault plane.
UTM (only needed if anomalous)**: N/A**		

Inspection at 100m intervals

Rock Characteristics	
Interval:	**Description**

Quarry Rock Sampling (to be done at two different stages of quarry development per year**)**

Whole Rock Sample (-1cm): Minimum 1 kg
Sample ID: ____________________
Description: Massive blocky, medium grained mafic volcanics with 2% hematite fracture filling on joint surfaces. Weak chlorite alteration
Screen sample (-2mm): Same Material as Whole Rock Sample (Between 1-2 kg)
Sample ID: ____________________
Description: Massive blocky, medium grained mafic volcanics with 2% hematite fracture filling on joint surfaces. Weak chlorite alteration

Contingency - Identification of Inappropriate Quarry Rock

In the unlikely event that the visual inspection identifies PAG rock, the geologist will 'tag' the material for avoidance or removal. If the material is excavated, it will be transported to a waste rock storage area for disposal underground. If this is not possible at the time, the PAG rock will be buried in an active or previously mined out quarry. If the PAG material is buried, it will be covered with a min of 2m of rock material that is approved for construction and will be clearly marked as inappropriate for use as construction material.
In the unlikely event that the visual inspection identifies fibrous actinolite, the geologist will 'tag' the material for avoidance or removal. If the materical is excavated, it will be transported to a waste storage area for disposal underground. If this is not possible at the time, the material will be buried in one of the previously mined-out quarries and covered with a 1m layer of benign rock and a record of the location maintained. *Pg 16: Quarry Management and Monitoring Plan - Revision 02 SRK Consulting*

AGNICO EAGLE
HOPE BAY

Quarry Inspection

Inspection Date: 29-Nov-22	Blast Date: 27-Nov-22
Geologist: Matthew Melchiorre & Sarah Dunn	
Quarry Location: Quarry #2	

General Visual Inspection

Rock Type	Mafic Volcanics	Description: Massive blocky, medium grained mafic volcanics with 2% hematite fracture filling on joint surfaces. Weak chlorite alteration
Vein	Y/**N**	If yes, describe (min, %, size):
Sulphides	Y/**N**	If yes: Disseminated/Vein/Stringer/Other Percentage: none to locally trace disseminated
Fibrous Actinolite	Y/**N**	If yes, describe (min, %, size):
If anomalous rock types/significant sulphides:	TAGGED: Y/**N**	
UTM (only needed if anomalous)**: N/A**		

Inspection at 100m intervals

Rock Characteristics	
Interval:	**Description**

Quarry Rock Sampling (to be done at two different stages of quarry development per year**)**

Whole Rock Sample (-1cm): Minimum 1 kg
Sample ID: ____________________
Description: Massive blocky, medium grained mafic volcanics with 2% hematite fracture filling on joint surfaces. Weak chlorite alteration
Screen sample (-2mm): Same Material as Whole Rock Sample (Between 1-2 kg)
Sample ID: ____________________
Description: Massive blocky, medium grained mafic volcanics with 2% hematite fracture filling on joint surfaces. Weak chlorite alteration

Contingency - Identification of Inappropriate Quarry Rock

In the unlikely event that the visual inspection identifies PAG rock, the geologist will 'tag' the material for avoidance or removal. If the material is excavated, it will be transported to a waste rock storage area for disposal underground. If this is not possible at the time, the PAG rock will be buried in an active or previously mined out quarry. If the PAG material is buried, it will be covered with a min of 2m of rock material that is approved for construction and will be clearly marked as inappropriate for use as construction material.
In the unlikely event that the visual inspection identifies fibrous actinolite, the geologist will 'tag' the material for avoidance or removal. If the materical is excavated, it will be transported to a waste storage area for disposal underground. If this is not possible at the time, the material will be buried in one of the previously mined-out quarries and covered with a 1m layer of benign rock and a record of the location maintained. *Pg 16: Quarry Management and Monitoring Plan - Revision 02 SRK Consulting*

Sample ID	Sample Location	Sample Date	Rock Type	Easting	Northing	Sulphide type	Sulphide %	Sulphide texture	Fizz Test (ground mass)	Fizz test on Carbonate/QTZ veins	Carbonate Colour	Carbonate Occurrence	Weathering Intensity	Alteration1	Alteration1 Intensity
SRK22_CSP_01	Core Storage Pad	8/14/2022	1a	432258	7559447	pyrite	trace	matrix dessiminated	None	Moderate	White	Veins	Weak (occasional hematite staining on fracture surfaces)	na	na
SRK22_AR_01	Access road	8/14/2022	1a	435558	7556859	pyrite	trace	matrix dessiminated	None	Moderate	White	Veins or fracture surfaces	None	na	na
SRK22_AR_02	Access road	8/14/2022	1a	435327	7556862	pyrite	trace	matrix dessiminated	None	Moderate	White	Veins or fracture surfaces	None	na	na
SRK22_AR_03	Access road	8/14/2022	1as	435287	7556861	pyrite	2	matrix dessiminated	None	Weak	White	Fracture surfaces	None	Sericite	Strong
SRK22_SUMP4_01	Sump 4	8/14/2022	1a	433320	7549841	pyrite	trace	matrix dessiminated	None	Weak to moderate	white	veins	na	na	na

Sample ID	Sample Location	Sample Date	Rock Type	Alteration1 Texture	Color of -2mm Fraction	Lith Texture/fabric	Geological description
SRK22_CSP_01	Core Storage Pad	8/14/2022	1a	na	Light gray/brown	fine grained, equigranular	Fine grained dark gray to greenish mafic meta volcanics, 1-2% carbonate/qtz veining with moderate fizz, no fizz on groundmass, trace sulphide matrix dessiminated, occasional hematite staining
SRK22_AR_01	Access road	8/14/2022	1a	na	Light gray	fine grained, equigranular	Fine grained, gray, massive mafic metavolcanics, trace sulphide (<0.1%) matrix dessiminated, 1-2% carbonate veins or on fracture surfaces with moderate fizz, no fizz on groundmass.
SRK22_AR_02	Access road	8/14/2022	1a	na	Gray	Fine grained, equigranular, lightly foliated	Fine grained, dark gray/greenish mafic metavolcanics, trace (~0.1%) matrix dessiminated sulphide with occasional larger specs (~1mm), 1-2% carbonate veins or on fracture surfaces with moderate fizz, no fizz on groundmass, no signs of weathering
SRK22_AR_03	Access road	8/14/2022	1as	Foliated	Very light gray	Fine grained, foliated	Fine grained, very light gray to tan sericite altered mafic meta-volcanics, 2% sulphide matrix dessiminated, 2% carbonates on fracture surfaces with weak fizz, no fizz on ground mass, no signs of weathering
SRK22_SUMP4_01	Sump 4	8/14/2022	1a	na	Dark greenish gray	Fine grained, equigranular, massive	Fine grained, greenish gray, mafic metavolcanics (1a), massive, no fizz on groundmass, 1% carbonate veins with weak to moderate fizz, trace sulphide matrix dessiminated, no signs of weathering

Appendix B2 ABA Data

Sample ID	Sieve Size	Paste pH	Fizz Rating	S(T)	SO_4	S(S-2)	AP from S(T)	AP - from S(S-2)	CO_2	TIC	Mod NP	TIC/AP_S(T)	NP/AP_S(T)	TIC/AP_S(S-2)	NP/AP_S(S-2)
		pH Units	-	wt%	wt%	wt%	kg $CaCO_3$/t	kg $CaCO_3$/t	wt%	kg $CaCO_3$/t	kg $CaCO_3$/t	-	-	-	-
		#N/A	#N/A	0.02		Calc.	0.6	#N/A	0.08	1.8	#N/A	#N/A	#N/A	#N/A	#N/A
QUARRY2-11022022-1	-1cm	8.7	MODERATE	0.1	0.03	0.09	3.8	2.8	1.4	32.7	43.6	8.7	12	11.6	16
QUARRY2-11022022-2	-2mm	8.3	MODERATE	0.4	0.02	0.35	11.6	10.94	3.7	83.9	91.8	7	8	8	8
QUARRY2-11242022-1	-1cm	8.7	STRONG	0.2	-	<0.02	5.6	0.6	6.7	152.1	170.0	27.0	30	243.4	272
QUARRY2-11242022-2	-2mm	8.6	STRONG	0.2	-	0.03	7.5	0.9	6.2	141.8	177.0	19	24	151	189
QUARRY2-11292022-1	-1cm	8.9	STRONG	0.1	0.06	0.04	3.1	1.25	4.9	112.1	118.0	36	38	90	94
QUARRY2-11292022-2	-2mm	8.7	STRONG	0.2	-	<0.02	5.3	0.6	8.5	192.5	206.0	36	39	308	330

		Paste pH	Fizz Rating	Total S	HCl Extractable Sulphur	Sulphide Sulphur (by diff.)			CO2	CaCO3 Equiv.	Mod. ABA Neutralization Potential				
Sample ID	**Rock Type**	**Paste pH**	**Fizz Rating**	**S(T)**	**$S(SO_4)$**	**S(S-2)**	**AP from S(T)**	**AP - from S(S-2)**	**CO_2**	**TIC**	**Mod NP**	**TIC/AP_S(T)**	**NP/AP_S(T)**	**TIC/AP_S(S-2)**	**NP/AP_S(S-2)**
		pH Units	**-**	**wt%**	**wt%**	**wt%**	**kg $CaCO_3$/t**	**kg $CaCO_3$/t**	**wt%**	**kg $CaCO_3$/t**	**kg $CaCO_3$/t**	**-**	**-**	**-**	**-**
		#N/A	#N/A	0.02	0.01	Calc.	0.6		0.08	1.8	#N/A	#N/A	#N/A	#N/A	#N/A
SRK22-CSP-01	1a	8.8	STRONG	0.2	-	-	4.7	-	5.1	115.5	123.0	24.6	26	-	-
SRK22-AR-01	1a	9.1	STRONG	0.4	-	0.3	13.4	7.81	5.6	128.2	124.0	10	9	16	16
SRK22-AR-02	1a	8.1	STRONG	0.2	0.0	0.1	5.0	3.8	6.2	140.2	129.0	28.0	26	37.4	34
SRK22-AR-03	1as	9.2	STRONG	0.2	0.0	0.1	4.7	4.4	14.7	333.9	235.0	71	50	76	54
SRK22-SUMP4-01	1a	8.6	STRONG	0.3	0.1	0.2	9.1	5.00	6.1	139.1	138.0	15	15	28	28

Appendix B3 Aqua Regia Metals Data

Sample ID	Rock Type	Ag	Al	As	Au	B	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mn
		ppb	%	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppb	%	ppm	%	ppm
		2	0.01	0.1	0.2	20	0.5	0.02	0.01	0.01	0.1	0.5	0.01	0.01	0.1	5	0.01	0.5	0.01	1
QUARRY2-11022022-1	1a	<0.1	2.75	5.5	<0.5	<20	3	<0.1	2.69	0.2	32	174	156	4.72	6	<0.01	0.04	2	1.9	845
QUARRY2-11022022-2	1a	0.2	2.4	12.7	11	<20	12	<0.1	4.28	0.7	47.9	168	273	4.79	5	0.02	0.04	1	1.74	849
QUARRY2-11242022-1	1a	<0.1	3.02	<0.5	3.8	29	5	<0.1	7.34	0.2	37.1	160	137	5.42	6	<0.01	0.02	<1	2.07	1230
QUARRY2-11242022-2	1a	<0.1	2.92	0.8	1.3	48	4	<0.1	7.73	0.3	40.9	157	137	5.39	5	<0.01	0.02	<1	1.94	1190
QUARRY2-11292022-1	1as	<0.1	3.51	<0.5	1	<20	3	<0.1	5.64	0.1	41.2	184	147	6.25	7	<0.01	0.03	1	2.74	1300
QUARRY2-11292022-2	1a	<0.1	3.7	1.1	1.1	<20	5	<0.1	7.89	0.3	44.5	173	154	6.64	8	<0.01	0.03	2	2.97	1520

Sample ID	Rock Type	Mo	Na	Ni	P	Pb	S	Sb	Sc	Se	Sr	Te	Th	Ti	Tl	U	V	W	Zn
		ppm	%	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		0.01	0.001	0.1	0.001	0.01	0.02	0.02	0.1	0.1	0.5	0.02	0.1	0.001	0.02	0.1	2	0.1	0.1
QUARRY2-11022022-1	1a	0.2	0.065	51.5	0.028	1.2	0.11	0.1	7.6	0.6	34	<0.2	0.1	0.296	<0.1	<0.1	106	<0.1	63
QUARRY2-11022022-2	1a	0.5	0.055	54.4	0.024	4	0.31	0.3	6	1.3	28	<0.2	0.1	0.231	<0.1	<0.1	96	<0.1	97
QUARRY2-11242022-1	1a	0.2	0.037	60.6	0.021	1.8	0.15	<0.1	5.9	0.7	32	<0.2	<0.1	0.403	<0.1	<0.1	120	<0.1	78
QUARRY2-11242022-2	1a	0.3	0.037	65.6	0.022	8.4	0.23	<0.1	5.7	1.1	30	<0.2	<0.1	0.429	<0.1	<0.1	114	<0.1	98
QUARRY2-11292022-1	1as	0.2	0.035	72.2	0.024	1	0.07	<0.1	8.5	0.6	21	<0.2	<0.1	0.392	<0.1	<0.1	145	<0.1	85
QUARRY2-11292022-2	1a	0.4	0.036	71.1	0.024	4.9	0.17	<0.1	9.9	0.9	28	<0.2	0.1	0.357	<0.1	<0.1	154	<0.1	97

Sample ID	Rock Type	Ag	Al	As	Au	B	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	La	Mg	Mn
		ppb	%	ppm	ppb	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppb	%	ppm	%	ppm
		2	0.01	0.1	0.2	20	0.5	0.02	0.01	0.01	0.1	0.5	0.01	0.01	0.1	5	0.01	0.5	0.01	1
SRK22-CSP-01	1a	50	3.06	2.3	5.6	<20	3.6	0.03	4.84	0.1	37.8	154	134	5.98	6.6	<5	0.02	1.3	2.43	1200
SRK22-AR-01	1a	127	2.73	8.4	256	20	5.1	0.04	5.06	0.26	36.8	144	132	6.04	6	<5	0.03	1.1	2.08	1150
SRK22-AR-02	1a	43	3.06	3.3	6.7	<20	12.9	<0.02	4.75	0.05	30.5	67.9	55.5	8.83	12.6	<5	0.05	3.5	1.83	1380
SRK22-AR-03	1as	17	1.02	5.3	3.7	<20	11.8	<0.02	6.7	0.09	21.6	26.9	31	8.07	3.8	<5	0.09	2.5	1.75	2270
SRK22-SUMP4-01	1a	29	3.65	5.8	1.7	<20	9	0.07	3.67	0.03	40.6	76.4	130	8.02	11.4	<5	0.09	2.6	3.18	1410

Sample ID	Rock Type	Mo	Na	Ni	P	Pb	S	Sb	Sc	Se	Sr	Te	Th	Ti	Tl	U	V	W	Zn
		ppm	%	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
		0.01	0.001	0.1	0.001	0.01	0.02	0.02	0.1	0.1	0.5	0.02	0.1	0.001	0.02	0.1	2	0.1	0.1
SRK22-CSP-01	1a	0.22	0.017	57	0.028	1.1	0.14	0.04	7.9	0.4	18.9	0.02	0.2	0.296	0.02	<0.1	137	<0.1	75.8
SRK22-AR-01	1a	0.28	0.035	52.8	0.032	2.08	0.37	0.05	6.6	0.6	18.9	0.04	0.1	0.284	0.03	<0.1	107	0.2	90.4
SRK22-AR-02	1a	0.48	0.056	20.9	0.078	2.87	0.14	0.05	18.3	0.3	48.7	<0.02	0.3	0.085	<0.02	<0.1	79	<0.1	98.3
SRK22-AR-03	1as	0.35	0.13	2.4	0.1	0.95	0.14	0.04	10.6	0.3	40.6	<0.02	0.3	0.004	<0.02	<0.1	22	<0.1	82
SRK22-SUMP4-01	1a	0.25	0.004	41.6	0.04	0.91	0.25	0.06	20.4	0.6	13.8	0.03	0.2	0.099	0.02	<0.1	206	<0.1	94.5

Appendix B4 SFE Test Data

Parameter	Units	LOD	QUARRY2-11022022-2	QUARRY2-11242022-2	QUARRY2-11292022-2
			1a	1a	1a
pH	pH Units	N/A	8.76	9.43	9.36
EC	uS/cm	1	299	164	141
SO4	mg/L	0.5	9	13	7
Acidity to pH4.5	mg/L	0.5	<0.5	<0.5	<0.5
Acidity to pH8.3	mg/L	0.5	<0.5	<0.5	<0.5
Total Alkalinity	mg/L	0.5	29	24	27
Bicarbonate	mg/L	0.5	36	30	33
Carbonate	mg/L	0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	0.5	<0.5	<0.5	<0.5
Dissolved Chloride	mg/L	0.5	12	25	19
Total Ammonia	mg/L	0.005	9.0	0.3	0.7
Nitrate-N	mg/L	0.02	0	0.3	1.9
Nitrite-N	mg/L	0.005	0.000	<0.05	<0.05
Total Dissolved Solids	mg/L	10	0	96	98
Hardness CaCO3	mg/L	0.5	60	25	22
Dissolved Aluminum (Al)	mg/L	0.0005	0.1670	0.3420	0.3110
Dissolved Antimony (Sb)	mg/L	0.00002	0.000184	0.000334	0.000318
Dissolved Arsenic (As)	mg/L	0.00002	0.000591	0.000140	0.000231
Dissolved Barium (Ba)	mg/L	0.00002	0.0036	0.0018	0.0012
Dissolved Beryllium (Be)	mg/L	0.00001	<0.000010	<0.000010	<0.000010
Dissolved Bismuth (Bi)	mg/L	0.000005	<0.0000050	<0.0000050	<0.0000050
Dissolved Boron (B)	mg/L	0.05	0.266	0.138	0.158
Dissolved Cesium (Cs)	mg/L	0.00005	0.000407	0.000090	0.000067
Dissolved Cadmium (Cd)	mg/L	0.000005	0.0000227	0.0000051	0.000007
Dissolved Calcium (Ca)	mg/L	0.05	18.8	7.9	7.3
Dissolved Chromium (Cr)	mg/L	0.0001	<0.00010	<0.00010	0.00013
Dissolved Cobalt (Co)	mg/L	0.000005	0.001430	0.000099	0.000172
Dissolved Copper (Cu)	mg/L	0.00005	0.00339	0.00018	0.00033
Dissolved Lanthanum (La)	mg/L	0.00005	<0.000050	<0.000050	<0.000050
Dissolved Iron (Fe)	mg/L	0.001	0.0091	0.0082	0.0062
Dissolved Lead (Pb)	mg/L	0.000005	0.0000272	0.0001950	0.0000425
Dissolved Lithium (Li)	mg/L	0.0005	0.00304	0.00059	0.00113
Dissolved Magnesium (Mg)	mg/L	0.05	3.2	1.1	1.0
Dissolved Manganese (Mn)	mg/L	0.00005	0.0110	0.0010	0.0006
Dissolved Phosphorus (P)	mg/L	0.002	0.0068	0.0058	0.0076
Dissolved Molybdenum (Mo)	mg/L	0.00005	0.00203	0.00124	0.00204
Dissolved Nickel (Ni)	mg/L	0.00002	0.000381	0.000083	0.000062
Dissolved Potassium (K)	mg/L	0.05	2.88	1.31	1.48
Dissolved Rubidium (Rb)	mg/L	0.00005	0.00521	0.00170	0.00143
Dissolved Selenium (Se)	mg/L	0.00004	0.000287	0.000516	0.000416
Dissolved Silicon (Si)	mg/L	0.1	0.63	0.86	0.78
Dissolved Silver (Ag)	mg/L	0.000005	<0.0000050	<0.0000050	<0.0000050
Dissolved Sodium (Na)	mg/L	0.05	16	18	18
Dissolved Strontium (Sr)	mg/L	0.00005	0.032	0.023	0.032
Dissolved Sulphur (S)	mg/L	10	-10	<10	<10
Dissolved Tellurium (Te)	mg/L	0.00002	0.000022	<0.000020	0.00003
Dissolved Thallium (Tl)	mg/L	0.000002	0.0000519	0.0000207	0.0000058
Dissolved Thorium (Th)	mg/L	0.000005	-0.00005	<0.000050	<0.000050
Dissolved Tin (Sn)	mg/L	0.0002	-0.0002	<0.00020	<0.00020
Dissolved Titanium (Ti)	mg/L	0.0005	-0.0005	<0.00050	<0.00050
Dissolved Tungsten (W)	mg/L	0.00001	0.000066	0.000318	0.000256
Dissolved Uranium (U)	mg/L	0.000002	0.0000037	0.0000042	0.0000077
Dissolved Vanadium (V)	mg/L	0.0002	0.00078	0.00202	0.00254
Dissolved Zinc (Zn)	mg/L	0.0001	0.00019	0.00019	0.00070
Dissolved Zirconium (Zr)	mg/L	0.0001	-0.0001	<0.00010	<0.00010
Dissolved Mercury (Hg)	mg/L	0.00005	-0.00005	<0.000050	<0.000050

Parameter	Units	LOD	SRK22-CSP-01	SRK22-AR-02	SRK22-AR-03
			1a	1a	1as
pH	pH Units	N/A	9.36	8.81	9.01
EC	uS/cm	1	104	592	287
SO4	mg/L	0.5	19	35	31
Acidity to pH4.5	mg/L	0.5	<0.5	<0.5	<0.5
Acidity to pH8.3	mg/L	0.5	<0.5	<0.5	<0.5
Total Alkalinity	mg/L	0.5	22	20	23
Bicarbonate	mg/L	0.5	27	25	28
Carbonate	mg/L	0.5	<0.5	<0.5	<0.5
Hydroxide	mg/L	0.5	<0.5	<0.5	<0.5
Dissolved Chloride	mg/L	0.5	6	132	48
Total Ammonia	mg/L	0.005	0.1	0.3	0.2
Nitrate-N	mg/L	0.02	0.3	21.6	7.5
Nitrite-N	mg/L	0.005	<0.05	<0.05	<0.05
Total Dissolved Solids	mg/L	10	92	410	200
Hardness CaCO3	mg/L	0.5	27	114	64
Dissolved Aluminum (Al)	mg/L	0.0005	0.2210	0.1070	0.2130
Dissolved Antimony (Sb)	mg/L	0.00002	0.000116	0.000135	0.000129
Dissolved Arsenic (As)	mg/L	0.00002	0.000789	0.000208	0.000394
Dissolved Barium (Ba)	mg/L	0.00002	0.0006	0.0050	0.0009
Dissolved Beryllium (Be)	mg/L	0.00001	<0.00001	<0.00001	<0.00001
Dissolved Bismuth (Bi)	mg/L	0.000005	<0.000005	<0.000005	<0.000005
Dissolved Boron (B)	mg/L	0.05	0.061	0.079	0.104
Dissolved Cesium (Cs)	mg/L	0.00005	<0.00005	0.000335	0.000057
Dissolved Cadmium (Cd)	mg/L	0.000005	<0.000005	<0.000005	0.0000158
Dissolved Calcium (Ca)	mg/L	0.05	8.4	33.4	18.8
Dissolved Chromium (Cr)	mg/L	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Cobalt (Co)	mg/L	0.000005	0.000046	0.000148	0.000078
Dissolved Copper (Cu)	mg/L	0.00005	0.00041	0.00035	0.00015
Dissolved Lanthanum (La)	mg/L	0.00005	<0.00005	<0.00005	<0.00005
Dissolved Iron (Fe)	mg/L	0.001	0.0048	0.0026	0.0028
Dissolved Lead (Pb)	mg/L	0.000005	<0.000005	<0.000005	0.0000574
Dissolved Lithium (Li)	mg/L	0.0005	0.00105	0.00423	0.00209
Dissolved Magnesium (Mg)	mg/L	0.05	1.6	7.4	4.1
Dissolved Manganese (Mn)	mg/L	0.00005	0.0010	0.0173	0.0120
Dissolved Phosphorus (P)	mg/L	0.002	0.0065	0.0053	0.0262
Dissolved Molybdenum (Mo)	mg/L	0.00005	0.00099	0.00104	0.00099
Dissolved Nickel (Ni)	mg/L	0.00002	<0.00002	0.000028	0.000064
Dissolved Potassium (K)	mg/L	0.05	1.36	3.72	3.40
Dissolved Rubidium (Rb)	mg/L	0.00005	0.00092	0.00520	0.00347
Dissolved Selenium (Se)	mg/L	0.00004	0.000320	0.000250	0.000098
Dissolved Silicon (Si)	mg/L	0.1	0.61	0.34	0.41
Dissolved Silver (Ag)	mg/L	0.000005	<0.000005	<0.000005	<0.000005
Dissolved Sodium (Na)	mg/L	0.05	8	74	34
Dissolved Strontium (Sr)	mg/L	0.00005	0.013	0.156	0.060
Dissolved Sulphur (S)	mg/L	10	<10	10	<10
Dissolved Tellurium (Te)	mg/L	0.00002	<0.00002	<0.00002	<0.00002
Dissolved Thallium (Tl)	mg/L	0.000002	0.0000044	0.0000068	0.0000101
Dissolved Thorium (Th)	mg/L	0.000005	<0.00005	<0.00005	<0.00005
Dissolved Tin (Sn)	mg/L	0.0002	<0.0002	<0.0002	<0.0002
Dissolved Titanium (Ti)	mg/L	0.0005	<0.0005	<0.0005	<0.0005
Dissolved Tungsten (W)	mg/L	0.00001	0.000042	0.000319	0.000189
Dissolved Uranium (U)	mg/L	0.000002	<0.000002	<0.000002	0.0000202
Dissolved Vanadium (V)	mg/L	0.0002	0.00158	<0.0002	<0.0002
Dissolved Zinc (Zn)	mg/L	0.0001	0.00012	<0.0001	0.00038
Dissolved Zirconium (Zr)	mg/L	0.0001	<0.0001	<0.0001	<0.0001
Dissolved Mercury (Hg)	mg/L	0.00005	<0.00005	<0.00005	<0.00005

Appendix C Tailings Monitoring

Appendix C1 Seepage Monitoring Data (TL-11)

Seepage Monitoring of Backfilled Stopes

Seepage Monitoring of Backfilled Stopes (TL-11)	Sample ID	TL11_4990 Fresh Air Raise	TL11_Level 54 Backfill	TL11_Level 134 Long Hole	TL11_Level 110 Extension 1	TL11_Level 134	TL11_Level 120 East Lane (near 96 fan vent raise)	TL11_Level 114 Main Access
	ALS ID	YL2200789-001	YL2200789-002	YL2200789-003	EO2211207-001	EO2211206-001	EO2211203-001	EO2211202-001
	Date Sampled	6/26/2022 13:45	6/26/2022 14:20	6/26/2022 14:25	12/18/2022 15:30	12/18/2022 16:00	12/18/2022 16:30	12/18/2022 15:05
Parameter	**Units**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**
Conductivity	uS/cm	222	1230	10100	17800	8560	16200	9330
Hardness (as CaCO3)	mg/L	73.3	265	1570	2570	1350	2030	1220
pH	pH	7.99	8.4	8.33	7.68	7.37	7.71	8
Total Suspended Solids	mg/L	177	735	7050	70.2	27.2	58.2	58.8
Total Dissolved Solids	mg/L	95	46	3	11500	5450	10400	5780
Acidity (as CaCO3)	mg/L	2	2	2.3	11.7	13.4	9.6	6.1
Alkalinity, Total (as CaCO3)	mg/L	65.5	171	228	237	242	208	247
Ammonia, Total (as N)	mg/L	0.0093	0.879	0.472	2.73	0.274	0.151	1.13
Chloride (Cl)	mg/L	17.7	177	3020	7190	3190	3680	3710
Nitrate (as N)	mg/L	0.339	0.279	7.22	19.3	5.85	3.22	0.97
Nitrite (as N)	mg/L	0.0013	0.0293	0.504	1.26	0.306	0.0666	0.173
Sulfate (SO4)	mg/L	17.2	182	659	1260	656	451	523
Cyanide, Weak Acid Diss	mg/L	--	--	--	0.0072	0.0074	<0.0050	0.0227
Cyanide, Total	mg/L	--	--	--	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Free	mg/L	--	--	--	<0.0050	<0.0050	<0.0050	<0.0050
Aluminum (Al)-Total	mg/L	5.02	0.0702	0.0386	--	--	--	--
Antimony (Sb)-Total	mg/L	0.00049	0.00026	<0.001	--	--	--	--
Arsenic (As)-Total	mg/L	0.0274	0.00345	0.00184	--	--	--	--
Barium (Ba)-Total	mg/L	0.0151	0.00396	0.0219	--	--	--	--
Beryllium (Be)-Total	mg/L	<0.0001	<0.0001	<0.001	--	--	--	--
Bismuth (Bi)-Total	mg/L	0.000129	<0.0001	<0.0005	--	--	--	--
Boron (B)-Total	mg/L	0.037	0.182	1.11	--	--	--	--
Cadmium (Cd)-Total	mg/L	0.000174	0.0000213	0.000289	--	--	--	--
Calcium (Ca)-Total	mg/L	33	60.8	226	--	--	--	--
Cesium (Cs)-Total	mg/L	0.000147	<0.00001	0.000101	--	--	--	--
Chromium (Cr)-Total	mg/L	0.00912	0.00073	<0.005	--	--	--	--
Cobalt (Co)-Total	mg/L	0.0118	0.00626	0.0271	--	--	--	--
Copper (Cu)-Total	mg/L	0.168	0.0164	0.0213	--	--	--	--
Iron (Fe)-Total	mg/L	22.4	1.06	0.186	--	--	--	--
Lead (Pb)-Total	mg/L	0.0067	0.000297	<0.0005	--	--	--	--
Lithium (Li)-Total	mg/L	0.0052	0.006	0.0375	--	--	--	--
Magnesium (Mg)-Total	mg/L	7.89	24.9	220	--	--	--	--
Manganese (Mn)-Total	mg/L	0.391	0.472	1.13	--	--	--	--
Mercury (Hg)-Total	mg/L	0.391	0.472	1.13	--	--	--	--
Molybdenum (Mo)-Total	mg/L	0.000699	0.00148	0.00225	--	--	--	--
Nickel (Ni)-Total	mg/L	0.0146	0.0079	0.0468	--	--	--	--
Phosphorus (P)-Total	mg/L	0.24	<0.05	<0.5	--	--	--	--
Potassium (K)-Total	mg/L	1.8	5.08	54.4	--	--	--	--
Rubidium (Rb)-Total	mg/L	0.00305	<0.0002	0.017	--	--	--	--
Selenium (Se)-Total	mg/L	0.000518	0.000332	0.00205	--	--	--	--

Seepage Monitoring of Backfilled Stopes (TL-11)	Sample ID	TL11_4990 Fresh Air Raise	TL11_Level 54 Backfill	TL11_Level 134 Long Hole	TL11_Level 110 Extension 1	TL11_Level 134	TL11_Level 120 East Lane (near 96 fan vent raise)	TL11_Level 114 Main Access
	ALS ID	YL2200789-001	YL2200789-002	YL2200789-003	EO2211207-001	EO2211206-001	EO2211203-001	EO2211202-001
	Date Sampled	6/26/2022 13:45	6/26/2022 14:20	6/26/2022 14:25	12/18/2022 15:30	12/18/2022 16:00	12/18/2022 16:30	12/18/2022 15:05
Parameter	Units	Water	Water	Water	Water	Water	Water	Water
Silicon (Si)-Total	mg/L	9.33	1.82	2.72	--	--	--	--
Silver (Ag)-Total	mg/L	0.000557	0.00005	<0.0001	--	--	--	--
Sodium (Na)-Total	mg/L	14.2	141	1620	--	--	--	--
Strontium (Sr)-Total	mg/L	0.0692	0.169	2.03	--	--	--	--
Sulfur (S)-Total	mg/L	8.43	67.8	242	--	--	--	--
Tellurium (Te)-Total	mg/L	<0.0002	<0.0002	<0.002	--	--	--	--
Thallium (Tl)-Total	mg/L	0.000012	<0.00001	<0.0001	--	--	--	--
Thorium (Th)-Total	mg/L	0.0002	<0.0001	<0.001	--	--	--	--
Tin (Sn)-Total	mg/L	<0.0001	<0.0001	<0.001	--	--	--	--
Titanium (Ti)-Total	mg/L	0.0891	0.001	<0.003	--	--	--	--
Tungsten (W)-Total	mg/L	0.00073	<0.0001	<0.001	--	--	--	--
Uranium (U)-Total	mg/L	0.000184	0.000032	0.000297	--	--	--	--
Vanadium (V)-Total	mg/L	0.0185	<0.0005	<0.005	--	--	--	--
Zinc (Zn)-Total	mg/L	0.293	0.0121	0.0452	--	--	--	--
Zirconium (Zr)-Total	mg/L	0.00058	<0.0002	<0.002	--	--	--	--
Aluminum (Al)-Dissolved	mg/L	0.0522	0.0019	0.0093	<0.0200	<0.0050	<0.0200	<0.0050
Antimony (Sb)-Dissolved	mg/L	0.00035	0.00022	0.00057	<0.00200	0.00051	<0.00200	0.00111
Arsenic (As)-Dissolved	mg/L	0.00103	0.00098	0.00152	<0.00200	0.00125	0.00253	0.00567
Barium (Ba)-Dissolved	mg/L	0.00532	0.00374	0.0214	0.0303	0.0205	0.0271	0.0348
Beryllium (Be)-Dissolved	mg/L	<0.0001	<0.0001	<0.0001	<0.000400	<0.000100	<0.000400	<0.000100
Bismuth (Bi)-Dissolved	mg/L	<0.00005	<0.00005	<0.00025	<0.00100	<0.000250	<0.00100	<0.000250
Boron (B)-Dissolved	mg/L	0.03	0.173	1.07	2.15	1.08	1.84	1.52
Cadmium (Cd)-Dissolved	mg/L	0.0000458	0.0000155	0.000278	0.000228	0.000239	<0.000100	0.000028
Calcium (Ca)-Dissolved	mg/L	22.9	63.8	233	347	215	226	146
Cesium (Cs)-Dissolved	mg/L	<0.00001	<0.00001	0.000074	<0.000200	0.000071	0.00046	0.000239
Chromium (Cr)-Dissolved	mg/L	0.00068	<0.0005	<0.0005	#N/A	#N/A	#N/A	#N/A
Cobalt (Co)-Dissolved	mg/L	0.00015	0.00511	0.0274	0.0302	0.0203	0.0106	0.00439
Copper (Cu)-Dissolved	mg/L	0.0182	0.004	0.0195	0.0119	0.0156	0.00925	0.00348
Iron (Fe)-Dissolved	mg/L	0.047	0.141	<0.05	<0.200	<0.050	<0.200	<0.050
Lead (Pb)-Dissolved	mg/L	0.000188	<0.00005	<0.00025	<0.00100	<0.000250	<0.00100	<0.000250
Lithium (Li)-Dissolved	mg/L	0.0017	0.0062	0.0381	0.0685	0.0342	0.0481	0.0443
Magnesium (Mg)-Dissolved	mg/L	3.91	25.6	239	414	198	357	208
Manganese (Mn)-Dissolved	mg/L	0.00545	0.444	1.14	0.994	0.772	0.622	0.178
Mercury (Hg)-Dissolved	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.000377	0.0014	0.0021	0.00458	0.00168	0.00393	0.00409
Nickel (Ni)-Dissolved	mg/L	0.00099	0.0068	0.0473	0.0463	0.0354	0.0186	0.003
Phosphorus (P)-Dissolved	mg/L	<0.050	<0.050	<0.25	<1.00	<0.250	<1.00	<0.250
Potassium (K)-Dissolved	mg/L	1.46	5	55.4	101	48.6	102	62.1
Rubidium (Rb)-Dissolved	mg/L	0.0007	<0.0002	0.0176	0.0368	0.017	0.0527	0.028
Selenium (Se)-Dissolved	mg/L	0.000218	0.000276	0.00239	0.00267	0.00179	<0.00100	0.000342

Seepage Monitoring of Backfilled Stopes (TL-11)	Sample ID	TL11_4990 Fresh Air Raise	TL11_Level 54 Backfill	TL11_Level 134 Long Hole	TL11_Level 110 Extension 1	TL11_Level 134	TL11_Level 120 East Lane (near 96 fan vent raise)	TL11_Level 114 Main Access
	ALS ID	YL2200789-001	YL2200789-002	YL2200789-003	EO2211207-001	EO2211206-001	EO2211203-001	EO2211202-001
	Date Sampled	6/26/2022 13:45	6/26/2022 14:20	6/26/2022 14:25	12/18/2022 15:30	12/18/2022 16:00	12/18/2022 16:30	12/18/2022 15:05
Parameter	Units	Water	Water	Water	Water	Water	Water	Water
Silicon (Si)-Dissolved	mg/L	3.13	1.68	2.56	2.95	2.41	3.58	3.58
Silver (Ag)-Dissolved	mg/L	<0.00001	<0.00001	0.000078	<0.000200	0.000071	<0.000200	<0.000050
Sodium (Na)-Dissolved	mg/L	14.1	138	1650	3070	1440	3090	1610
Strontium (Sr)-Dissolved	mg/L	0.0544	0.164	1.96	3.67	1.65	2.96	1.84
Sulfur (S)-Dissolved	mg/L	5.96	67.5	248	398	209	242	156
Tellurium (Te)-Dissolved	mg/L	<0.0002	<0.0002	<0.001	<0.00400	<0.00100	<0.00400	<0.00100
Thallium (Tl)-Dissolved	mg/L	<0.00001	<0.00001	<0.00005	<0.000200	<0.000050	<0.000200	<0.000050
Thorium (Th)-Dissolved	mg/L	<0.0001	<0.0001	<0.0005	<0.00200	<0.00050	<0.00200	<0.00050
Tin (Sn)-Dissolved	mg/L	<0.0001	<0.0001	<0.0005	<0.00200	<0.00050	<0.00200	<0.00050
Titanium (Ti)-Dissolved	mg/L	0.00088	<0.0003	<0.0015	<0.00600	<0.00150	<0.00600	<0.00150
Tungsten (W)-Dissolved	mg/L	0.00035	<0.0001	<0.0005	<0.00200	<0.00050	<0.00200	0.0005
Uranium (U)-Dissolved	mg/L	0.000159	0.00003	0.000287	0.000381	0.000228	<0.000200	0.001
Vanadium (V)-Dissolved	mg/L	0.00097	<0.0005	<0.0025	<0.0100	<0.00250	<0.0100	<0.00250
Zinc (Zn)-Dissolved	mg/L	0.13	0.0077	0.0382	0.0252	0.0338	<0.0200	0.0148
Zirconium (Zr)-Dissolved	mg/L	<0.0002	<0.0002	<0.001	<0.00600	<0.00150	<0.00600	<0.00150

Appendix D Construction and Waste Rock Water Quality Monitoring

Appendix D1 Field Observations, Freshet Seepage Monitoting

Sample ID	Sampled Date	Start Time	Coordinates (UTM Zone 13W)		Field Measurements pH	EC	ORP	Temperature	Salt	Flow	Observations
			Easting	Northing	s.u.	µ S/cm	RmV	°C	ppt	L/s	
22-REF-01	14-Jun-2022	13:35	432877	7547983	6.61	29.7	150	6.8	-	0.35	Narrow channel; flow evident
22-REF-02	14-Jun-2022	14:25	432078	7556105	7.4	158.7	120	5.6	-	0.38	Narrow channel; flow evident
22-REF-03	14-Jun-2022	14:55	432121	7557607	7.32	77.1	105	7.2	-	0.66	Wider, more difuse flow; flow evident
22-DC-01	27-May-2022	13:23	432855	7558996	7.55	488	196	7.6	0.2	-	Seepage from camp pad, unable to measure due to low flow
22-DC-02	27-May-2022	16:33	432870	7558972	7.74	460	142	9.7	0.2	-	Contained in rock berm; pool not stagnant; unable to measure flow
22-DC-03	27-May-2022	16:58	432874	7558965	7.83	486	121	7.2	0.2	0.55	Sample taken as close to rock as possible; channel created to assist
22-DC-04	27-May-2022	17:28	432884	7558959	7.89	401	122	6.9	0.2	0.20	-
22-DC-05	27-May-2022	14:12	433155	7558892	7.79	19470	236	3.1	OR	-	Unable to determine flow
22-DC-06	27-May-2022	14:47	433164	7558893	7.86	19130	210	1.9	OR	0.58	-
22-DC-07	27-May-2022	15:33	433170	7558890	7.9	19590	141	3.5	OR	0.38	-
22-PCP-01	20-Jun-2022	10:40	433223	7558977	8.11	10030	144	15.1	-	-	Pooled water, no sump; historic location where elevated levels noted; some staining; no odor, surface film on parts of ponded area
22-PCP-02	20-Jun-2022	17:05	433167	7558962	8.04	2950	147	11.4	-	-	Flow diffuse and shallow; no flow measurement possible; seep water pooled
22-CBP-01	12-Jun-2022	13:30	432278	7559513	8.6	177.2	195	0.6	0.0	0.46	Estimated 1.7km from Glen Lake; seep eminates from rock pad recently constructed
OVB-01	27-May-2022	13:40	433237	7550658	7.7	784	104	3.4	0.4	-	Channeled down the crest of the face of the berm; unable to calculate flow; too maysappeat with small diameters
22-OVB-01	16-Jun-2022	14:20	433237	7550503	7.83	12270	138	16.4	-	-	Between OVB Stockpile and Windy Rd; iron staining prevalent throughout; flow not measureable
22-OVB-02	16-Jun-2022	15:00	433149	7550674	7.39	1309	71	11.9	-	-	No measureable flow
22-MAD-01	11-Jun-2022	15:55	433382	7550195	7.63	638	45	7.3	-	0.65	Adjacent to roadway (Windy Rd); 500 m from lake; iron staining evident at seep; flow evident
22-MAD-02	13-Jun-2022	16:25	433350	7550196	7.18	523	13	14.4	0.2	0.01	Lake location ~500m east of portal pad; flow diffuse over area (sloped); iron staining evident throughout
22-MAD-03	19-Jun-2022	15:05	433358	7550228	6.83	1319	22	7	-	-	Flow diffuse across sampled area; staining (iron) and oily sheen noticeable throughout; no flow recorded
22-CWP-01	28-Jun-2022	11:35	433236	7549857	8.28	800	120	1.7	-	0.01	Running perpendicular to CWP; running parallel to sump 4 pipe
22-CWP-02	28-Jun-2022	11:55	433239	7549909	7.66	-	129	1.5	-	0.01	Perpendicular from CWP; 6m from south rock cap'6m from north rock cap
MMS1-N	16-Jun-2022	16:25	433181	7549940	8.31	864	74	11.8	0.5	-	-
MMS1-N	11-Jul-2022	09:15	433181	7549940	8.38	3550	65	18.7	2.1	-	-
MMS1-N	18-Aug-2022	15:00	433181	7549940	8.33	4040	15.7	103	2.6	-	-
MMS1-N	12-Sep-2022	13:10	433181	7549940	8.07	3030	5.5	214	1.6	-	-
MMS1-S	16-Jun-2022	16:05	433190	7549837	8.13	336	74	13.7	0.2	-	-
MMS1-S	11-Jul-2022	09:30	433190	7549837	8.62	533	37	18.8	0.3	-	-
MMS1-S	18-Aug-2022	15:00	433190	7549837	8.11	785	14.4	100	0.5	-	-
MMS1-S	12-Sep-2022	13:35	433190	7549837	8.18	417	4.5	197	0.2	-	-
MMS1-S1	16-Jun-2022	17:25	432935	7550015	7.6	820	58	5.4	0.4	-	-
MMS1-S1	11-Jul-2022	11:30	432935	7550015	7.96	691	105	14	0.4	-	-
MMS1-S1	18-Aug-2022	15:00	432935	7550015	6.82	1759	11.4	58	-	-	-
MMS1-S1	12-Sep-2022	14:05	432935	7550015	7.45	1403	2.5	245	0.7	-	-
MMS1-S2	16-Jun-2022	16:25	432980	7550185	7.44	519	82	4.8	0.3	-	-
MMS1-S2	11-Jul-2022	11:00	432980	7550185	7.78	1042	122	10	0.6	-	-
MMS1-S2	18-Aug-2022	15:00	432980	7550185	7.05	1733	12.8	123	1	-	-
MMS1-S2	12-Sep-2022	14:30	432980	7550185	7.22	1774	2.7	211	0.9	-	-
MMS1-S3	16-Jun-2022	16:55	433110	7550107	7.4	1119	85	7.1	0.6	-	-
MMS1-S3	11-Jul-2022	10:20	433110	7550107	7.95	784	72	14.7	0.4	-	-
MMS1-S4	16-Jun-2022	15:55	433319	7549842	7.91	443	64	7.2	0.2	-	-
MMS1-S4	11-Jul-2022	11:45	433319	7549842	7.23	812	-20	7.4	0.4	-	-
MMS1-S4	18-Aug-2022	15:00	433319	7549842	7.87	1042	13.9	125	0.6	-	-
MMS1-S4	12-Sep-2022	15:00	433319	7549842	7.83	905	3.1	185	0.4	-	-

Appendix D2 Lab Data, Freshet Seepage Monitoring

Sample ID	Sampled Date	Start Time	Physical Tests (Water) EC	Hardness (as CaCO3)	pH	TSS	TDS
			µ S/cm	mg/L	s.u.	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	30.4	11.6	7.01	3	36
22-REF-02	14-Jun-2022	14:25	162	64.2	7.92	3.4	119
22-REF-03	14-Jun-2022	14:55	80.7	29	7.5	3	55
22-DC-01	27-May-2022	13:23	465	180	7.97	3	414
22-DC-02	27-May-2022	16:33	450	173	8	3	368
22-DC-03	27-May-2022	16:58	467	179	8	3	398
22-DC-04	27-May-2022	17:28	398	149	8	6.1	333
22-DC-05	27-May-2022	14:12	18000	2590	8.09	30.5	13200
22-DC-06	27-May-2022	14:47	17900	2680	8.06	26.9	13200
22-DC-07	27-May-2022	15:33	17900	2690	8.05	80.3	13300
22-PCP-01	20-Jun-2022	10:40	9450	2230	7.84	4.8	6920
22-PCP-02	20-Jun-2022	17:05	2750	658	8.11	3	1760
22-CBP-01	12-Jun-2022	13:30	179	51.4	7.82	35	102
OVB-01	27-May-2022	13:40	713	209	7.89	18.1	613
22-OVB-01	16-Jun-2022	14:20	12100	1860	8.23	12.6	7670
22-OVB-02	16-Jun-2022	15:00	1580	270	8.03	13.6	956
22-MAD-01	11-Jun-2022	15:55	430	129	7.96	4.4	280
22-MAD-02	13-Jun-2022	16:25	482	182	8.15	4.8	322
22-MAD-03	19-Jun-2022	15:05	1250	439	7.65	65	1240
22-CWP-01	28-Jun-2022	11:35	723	153	8.15	454	7.4
22-CWP-02	28-Jun-2022	11:55	2400	464	8.22	1540	3
MMS1-N	16-Jun-2022	16:25	837	170	8.08	13.2	-
MMS1-N	11-Jul-2022	09:15	3370	684	8.18	7	-
MMS1-N	18-Aug-2022	15:00	4220	825	8.16	6.2	-
MMS1-N	12-Sep-2022	13:10	2760	539	8.39	3	-
MMS1-S	16-Jun-2022	16:05	301	75.4	7.95	4	-
MMS1-S	11-Jul-2022	09:30	512	127	8.19	3	-
MMS1-S	18-Aug-2022	15:00	797	184	8.08	3	-
MMS1-S	12-Sep-2022	13:35	396	100	8	3	-
MMS1-S1	16-Jun-2022	17:25	788	156	8.22	3	-
MMS1-S1	11-Jul-2022	11:30	619	132	8.17	4.4	-
MMS1-S1	18-Aug-2022	15:00	1800	510	7.25	3	-
MMS1-S1	12-Sep-2022	14:05	1270	277	8.28	3	-
MMS1-S2	16-Jun-2022	16:25	485	192	7.81	6.2	-
MMS1-S2	11-Jul-2022	11:00	954	400	7.9	3	-
MMS1-S2	18-Aug-2022	15:00	1750	742	7.51	4.4	-
MMS1-S2	12-Sep-2022	14:30	1600	639	7.69	3	-
MMS1-S3	16-Jun-2022	16:55	1090	161	8.23	5.4	-
MMS1-S3	11-Jul-2022	10:20	749	88.8	8.26	5.6	-
MMS1-S4	16-Jun-2022	15:55	417	123	7.96	3	-
MMS1-S4	11-Jul-2022	11:45	745	276	7.77	20	-
MMS1-S4	18-Aug-2022	15:00	1090	333	7.85	3	-
MMS1-S4	12-Sep-2022	15:00	854	284	7.8	3	-

			Anions and Nutrients (Water)											
Sample ID	Sampled Date	Start Time	Acidity (as CaCO3)	Alkalinity, Total (as CaCO3)	Ammonia (as N)	Br	Cl	F	Nitrate (as N)	Nitrite (as N)	Total Phosphorus	SO4	Cyanide, Total
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	2.6	9.3	0.005	0.05	2.62	0.04	0.005	0.001	0.0098	0.3	-
22-REF-02	14-Jun-2022	14:25	2	61.5	0.0116	0.05	12.3	0.078	0.0076	0.001	0.0585	0.36	-
22-REF-03	14-Jun-2022	14:55	2	28.2	0.005	0.05	6.88	0.02	0.005	0.001	0.0037	1.7	-
22-DC-01	27-May-2022	13:23	2	68.7	0.0213	0.115	92.5	0.035	0.173	0.0055	0.0179	10.4	-
22-DC-02	27-May-2022	16:33	2	70.3	0.0318	0.125	85.9	0.035	0.197	0.0075	0.0528	11.7	-
22-DC-03	27-May-2022	16:58	2	70.7	0.0344	0.127	91.4	0.034	0.2	0.0076	0.0194	11.9	-
22-DC-04	27-May-2022	17:28	2	71.4	0.0383	0.119	69.3	0.034	0.212	0.0075	0.0256	12.7	-
22-DC-05	27-May-2022	14:12	9.4	146	2.74	23.2	5870	2	5.56	0.324	0.0212	732	-
22-DC-06	27-May-2022	14:47	9.5	142	2.7	23.3	5880	2	5.48	0.278	0.0132	721	-
22-DC-07	27-May-2022	15:33	9	143	2.72	23.7	5910	2	5.52	0.319	0.206	718	-
22-PCP-01	20-Jun-2022	10:40	7.4	75	2.58	6.64	3050	1	5.55	0.199	0.0348	252	-
22-PCP-02	20-Jun-2022	17:05	3.1	108	2.05	1.28	507	0.4	18.2	0.442	0.0726	434	-
22-CBP-01	12-Jun-2022	13:30	2	48.8	0.156	0.05	13	0.022	0.532	0.0072	0.0263	16	-
OVB-01	27-May-2022	13:40	3.3	63.7	0.146	0.331	155	0.1	0.394	0.0092	0.0661	33.6	-
22-OVB-01	16-Jun-2022	14:20	3.6	202	2.3	12.2	3680	1	1.9	0.05	0.0364	805	-
22-OVB-02	16-Jun-2022	15:00	2	104	0.221	0.786	296	0.2	1.44	0.0106	0.0629	221	-
22-MAD-01	11-Jun-2022	15:55	2.2	82.9	0.0483	0.111	63.9	0.042	0.253	0.009	0.0353	29.6	-
22-MAD-02	13-Jun-2022	16:25	2	127	0.525	0.112	65	0.063	0.0943	0.0104	0.075	15.7	-
22-MAD-03	19-Jun-2022	15:05	4.7	84.7	3.09	0.337	311	0.1	0.0625	0.0072	0.153	16.8	-
22-CWP-01	28-Jun-2022	11:35	2	113	0.12	0.25	91.9	0.1	3.5	0.0112	0.0096	109	-
22-CWP-02	28-Jun-2022	11:55	109	169	0.058	1.47	534	0.4	1.82	0.02	0.0434	311	-
MMS1-N	16-Jun-2022	16:25	-	76.5	0.212	0.44	151	0.101	1.02	0.0108	-	78	0.005
MMS1-N	11-Jul-2022	09:15	-	158	0.1	2.27	796	0.4	0.461	0.02	-	429	0.005
MMS1-N	18-Aug-2022	15:00	-	254	0.0215	2.91	982	0.4	0.966	0.0294	-	471	0.01
MMS1-N	12-Sep-2022	13:10	-	212	0.0641	1.46	558	0.4	2.27	0.0252	-	442	0.005
MMS1-S	16-Jun-2022	16:05	-	53.1	0.0453	0.084	35.2	0.051	0.779	0.0058	-	30.6	0.005
MMS1-S	11-Jul-2022	09:30	-	90	0.0283	0.133	68.7	0.089	0.687	0.0071	-	62.7	0.005
MMS1-S	18-Aug-2022	15:00	-	111	0.0425	0.25	128	0.1	0.146	0.005	-	77.4	0.005
MMS1-S	12-Sep-2022	13:35	-	59.4	0.0319	0.104	55.4	0.043	0.385	0.0034	-	47.6	0.005
MMS1-S1	16-Jun-2022	17:25	-	130	0.123	0.25	102	0.1	1.93	0.0059	-	91.6	0.005
MMS1-S1	11-Jul-2022	11:30	-	138	0.0285	0.188	75	0.098	0.862	0.0029	-	66.5	0.005
MMS1-S1	18-Aug-2022	15:00	-	204	0.334	0.793	325	0.2	0.964	0.0687	-	234	0.005
MMS1-S1	12-Sep-2022	14:05	-	172	0.597	0.411	202	0.1	2.68	0.0153	-	176	0.005
MMS1-S2	16-Jun-2022	16:25	-	133	0.0497	0.05	102	0.123	0.0398	0.001	-	16	0.005
MMS1-S2	11-Jul-2022	11:00	-	103	0.168	0.25	239	0.1	0.0515	0.005	-	26.3	0.005
MMS1-S2	18-Aug-2022	15:00	-	118	0.166	0.512	476	0.2	0.05	0.01	-	40	0.005
MMS1-S2	12-Sep-2022	14:30	-	43.3	0.0096	0.538	450	0.2	0.05	0.01	-	80.1	0.005
MMS1-S3	16-Jun-2022	16:55	-	60.3	0.24	0.357	175	0.143	1.69	0.0053	-	96.2	0.005
MMS1-S3	11-Jul-2022	10:20	-	206	0.0877	0.25	69.1	0.359	3.51	0.007	-	68.5	0.005
MMS1-S4	16-Jun-2022	15:55	-	169	0.0261	0.072	73.4	0.034	0.0228	0.001	-	22.6	0.005
MMS1-S4	11-Jul-2022	11:45	-	130	0.707	0.25	140	0.1	0.0772	0.005	-	34.9	0.005
MMS1-S4	18-Aug-2022	15:00	-	109	0.0679	0.25	220	0.1	0.0887	0.005	-	83.9	0.005
MMS1-S4	12-Sep-2022	15:00	-	47	0.0517	0.25	210	0.1	0.025	0.005	-	38.6	0.005

			Dissolved Metals (Water)									
Sample ID	Sampled Date	Start Time	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cs
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	0.0562	0.0001	0.0001	0.00117	0.0001	0.00005	0.01	0.000005	2.06	0.00001
22-REF-02	14-Jun-2022	14:25	0.0217	0.0001	0.00024	0.00317	0.0001	0.00005	0.01	0.000005	16.9	0.00001
22-REF-03	14-Jun-2022	14:55	0.013	0.0001	0.0001	0.00203	0.0001	0.00005	0.01	0.000005	8.52	0.00001
22-DC-01	27-May-2022	13:23	0.0155	0.0001	0.00036	0.00965	0.0001	0.00005	0.034	0.000005	60.4	0.00001
22-DC-02	27-May-2022	16:33	0.0128	0.0001	0.0004	0.00904	0.0001	0.00005	0.029	0.0000097	58	0.00001
22-DC-03	27-May-2022	16:58	0.0116	0.0001	0.0004	0.0097	0.0001	0.00005	0.028	0.000009	59.8	0.00001
22-DC-04	27-May-2022	17:28	0.0154	0.0001	0.00047	0.00782	0.0001	0.00005	0.028	0.0000081	49.1	0.00001
22-DC-05	27-May-2022	14:12	0.01	0.001	0.00298	0.114	0.001	0.0005	1.62	0.000453	454	0.00032
22-DC-06	27-May-2022	14:47	0.01	0.001	0.00321	0.117	0.001	0.0005	1.79	0.000429	478	0.000373
22-DC-07	27-May-2022	15:33	0.0123	0.001	0.00252	0.123	0.001	0.0005	1.72	0.00037	469	0.000418
22-PCP-01	20-Jun-2022	10:40	0.0307	0.0005	0.0015	0.114	0.0001	0.00025	0.506	0.000267	696	0.00005
22-PCP-02	20-Jun-2022	17:05	0.0431	0.00066	0.00098	0.0237	0.0001	0.00005	0.384	0.0000511	173	0.00001
22-CBP-01	12-Jun-2022	13:30	0.0269	0.0001	0.00035	0.00263	0.0001	0.00005	0.045	0.000005	15.2	0.00001
OVB-01	27-May-2022	13:40	0.0743	0.00017	0.00748	0.0146	0.0001	0.00005	0.063	0.0000235	67.6	0.00001
22-OVB-01	16-Jun-2022	14:20	0.01	0.001	0.00217	0.0877	0.0002	0.0005	0.584	0.0000584	263	0.0001
22-OVB-02	16-Jun-2022	15:00	0.0547	0.0001	0.00113	0.0258	0.0001	0.00005	0.197	0.0000088	53.6	0.00001
22-MAD-01	11-Jun-2022	15:55	0.0214	0.0001	0.00163	0.0123	0.0001	0.00005	0.021	0.000005	37.9	0.00001
22-MAD-02	13-Jun-2022	16:25	0.0267	0.0001	0.00149	0.0199	0.0001	0.00005	0.07	0.0000083	56.2	0.00001
22-MAD-03	19-Jun-2022	15:05	0.0114	0.0001	0.00427	0.0485	0.0001	0.00005	0.075	0.0000062	148	0.000017
22-CWP-01	28-Jun-2022	11:35	0.0242	0.00049	0.00808	0.00989	0.0001	0.00005	0.176	0.000005	42.8	0.000025
22-CWP-02	28-Jun-2022	11:55	0.009	0.00177	0.0206	0.041	0.0001	0.00005	0.211	0.0000182	112	0.000029
MMS1-N	16-Jun-2022	16:25	-	-	-	-	-	-	-	-	-	-
MMS1-N	11-Jul-2022	09:15	-	-	-	-	-	-	-	-	-	-
MMS1-N	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-N	12-Sep-2022	13:10	0.0124	0.00222	0.0965	0.0304	0.0001	0.0001	0.282	0.000031	114	0.00002
MMS1-S	16-Jun-2022	16:05	-	-	-	-	-	-	-	-	-	-
MMS1-S	11-Jul-2022	09:30	-	-	-	-	-	-	-	-	-	-
MMS1-S	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S	12-Sep-2022	13:35	0.0478	0.00012	0.0071	0.00592	0.0001	0.00005	0.051	0.0000068	27.7	0.00001
MMS1-S1	16-Jun-2022	17:25	-	-	-	-	-	-	-	-	-	-
MMS1-S1	11-Jul-2022	11:30	-	-	-	-	-	-	-	-	-	-
MMS1-S1	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S1	12-Sep-2022	14:05	0.0186	0.00104	0.031	0.0161	0.0001	0.00005	0.162	0.0000424	70.4	0.000018
MMS1-S2	16-Jun-2022	16:25	-	-	-	-	-	-	-	-	-	-
MMS1-S2	11-Jul-2022	11:00	-	-	-	-	-	-	-	-	-	-
MMS1-S2	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S2	12-Sep-2022	14:30	0.0179	0.0001	0.00084	0.0473	0.0001	0.00005	0.022	0.000028	58.1	0.00001
MMS1-S3	16-Jun-2022	16:55	-	-	-	-	-	-	-	-	-	-
MMS1-S3	11-Jul-2022	10:20	-	-	-	-	-	-	-	-	-	-
MMS1-S4	16-Jun-2022	15:55	-	-	-	-	-	-	-	-	-	-
MMS1-S4	11-Jul-2022	11:45	-	-	-	-	-	-	-	-	-	-
MMS1-S4	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S4	12-Sep-2022	15:00	0.0117	0.0001	0.00099	0.0189	0.0001	0.00005	0.015	0.0000132	86.7	0.00001

			Dissolved Metals (Water) - Continued									
Sample ID	Sampled Date	Start Time	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	0.0005	0.0001	0.00148	0.083	0.00005	0.0026	1.56	0.00025	0.0000067	0.000081
22-REF-02	14-Jun-2022	14:25	0.0005	0.0001	0.00174	0.063	0.00005	0.0031	5.34	0.00042	0.000005	0.000139
22-REF-03	14-Jun-2022	14:55	0.0005	0.0001	0.00096	0.029	0.00005	0.0011	1.88	0.00126	0.000005	0.00005
22-DC-01	27-May-2022	13:23	0.0005	0.0001	0.0051	0.027	0.00005	0.0018	7.03	0.0087	0.000005	0.0024
22-DC-02	27-May-2022	16:33	0.0005	0.0001	0.0052	0.028	0.00005	0.0016	6.96	0.0165	0.000005	0.0023
22-DC-03	27-May-2022	16:58	0.0005	0.0001	0.00511	0.029	0.00005	0.0017	7.17	0.0181	0.000005	0.00227
22-DC-04	27-May-2022	17:28	0.0005	0.00011	0.00625	0.035	0.00005	0.0016	6.43	0.0183	0.000005	0.00227
22-DC-05	27-May-2022	14:12	0.005	0.0057	0.00896	0.1	0.0005	0.0384	354	0.408	0.000005	0.00763
22-DC-06	27-May-2022	14:47	0.005	0.0067	0.0101	0.1	0.0005	0.0417	362	0.438	0.000005	0.0079
22-DC-07	27-May-2022	15:33	0.005	0.00611	0.0105	0.1	0.0005	0.0413	368	0.449	0.000005	0.00795
22-PCP-01	20-Jun-2022	10:40	0.0005	0.00461	0.0212	0.131	0.00025	0.028	119	1.01	0.000005	0.00673
22-PCP-02	20-Jun-2022	17:05	0.00078	0.0149	0.0181	0.81	0.00005	0.0123	54.8	0.264	0.000005	0.0078
22-CBP-01	12-Jun-2022	13:30	0.0005	0.0001	0.00069	0.016	0.00005	0.0016	3.26	0.0173	0.000005	0.00146
OVB-01	27-May-2022	13:40	0.0005	0.00039	0.00453	0.056	0.000236	0.0036	9.81	0.0807	0.000005	0.00156
22-OVB-01	16-Jun-2022	14:20	0.001	0.00683	0.00499	0.158	0.0005	0.0236	293	2.08	0.000005	0.00804
22-OVB-02	16-Jun-2022	15:00	0.0005	0.00058	0.00325	0.126	0.00005	0.007	33	0.209	0.000005	0.00123
22-MAD-01	11-Jun-2022	15:55	0.0005	0.00035	0.00364	0.13	0.00005	0.0037	8.45	0.036	0.000005	0.000418
22-MAD-02	13-Jun-2022	16:25	0.00069	0.00317	0.00298	0.715	0.000053	0.0038	10.2	0.525	0.000005	0.00176
22-MAD-03	19-Jun-2022	15:05	0.0005	0.0127	0.00126	9.12	0.00005	0.0043	16.8	1.47	0.0000108	0.000649
22-CWP-01	28-Jun-2022	11:35	0.0005	0.00046	0.00402	0.01	0.00005	0.002	11.3	0.0175	0.000005	0.0027
22-CWP-02	28-Jun-2022	11:55	0.0005	0.00084	0.00635	0.014	0.00005	0.0073	44.8	0.124	0.000005	0.0056
MMS1-N	16-Jun-2022	16:25	-	-	-	-	-	-	-	-	-	-
MMS1-N	11-Jul-2022	09:15	-	-	-	-	-	-	-	-	-	-
MMS1-N	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-N	12-Sep-2022	13:10	0.0005	0.00252	0.00672	0.027	0.0001	0.0073	61.7	0.458	0.000005	0.00679
MMS1-S	16-Jun-2022	16:05	-	-	-	-	-	-	-	-	-	-
MMS1-S	11-Jul-2022	09:30	-	-	-	-	-	-	-	-	-	-
MMS1-S	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S	12-Sep-2022	13:35	0.0005	0.00011	0.00302	0.021	0.00005	0.0014	7.61	0.00533	0.000005	0.00142
MMS1-S1	16-Jun-2022	17:25	-	-	-	-	-	-	-	-	-	-
MMS1-S1	11-Jul-2022	11:30	-	-	-	-	-	-	-	-	-	-
MMS1-S1	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S1	12-Sep-2022	14:05	0.0005	0.00086	0.00872	0.066	0.00005	0.0043	24.5	0.144	0.000005	0.00322
MMS1-S2	16-Jun-2022	16:25	-	-	-	-	-	-	-	-	-	-
MMS1-S2	11-Jul-2022	11:00	-	-	-	-	-	-	-	-	-	-
MMS1-S2	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S2	12-Sep-2022	14:30	0.00067	0.00091	0.0106	0.049	0.00005	0.0333	120	0.112	0.000005	0.000104
MMS1-S3	16-Jun-2022	16:55	-	-	-	-	-	-	-	-	-	-
MMS1-S3	11-Jul-2022	10:20	-	-	-	-	-	-	-	-	-	-
MMS1-S4	16-Jun-2022	15:55	-	-	-	-	-	-	-	-	-	-
MMS1-S4	11-Jul-2022	11:45	-	-	-	-	-	-	-	-	-	-
MMS1-S4	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S4	12-Sep-2022	15:00	0.0005	0.00116	0.00791	0.117	0.00005	0.0029	16.5	0.0863	0.000005	0.00023

Sample ID	Sampled Date	Start Time	Dissolved Metals (Water) - Continued Ni	P	K	Rb	Se	Si	Ag	Na	Sr	S
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	0.00138	0.05	0.616	0.00037	0.00005	0.794	0.00001	1.85	0.00545	0.5
22-REF-02	14-Jun-2022	14:25	0.0023	0.05	1.08	0.00062	0.000059	3.57	0.00001	7.91	0.0672	0.5
22-REF-03	14-Jun-2022	14:55	0.0005	0.05	0.456	0.00039	0.00005	0.808	0.00001	4.31	0.0136	0.59
22-DC-01	27-May-2022	13:23	0.00054	0.05	2.2	0.00087	0.000092	1.29	0.00001	14.3	0.137	3.66
22-DC-02	27-May-2022	16:33	0.00064	0.05	2.07	0.00091	0.000093	1.17	0.00001	14.8	0.123	4.07
22-DC-03	27-May-2022	16:58	0.00064	0.05	2.15	0.00092	0.000096	1.16	0.00001	15.3	0.129	4.46
22-DC-04	27-May-2022	17:28	0.00069	0.05	2.07	0.0009	0.000108	1.19	0.00001	16.2	0.103	4.72
22-DC-05	27-May-2022	14:12	0.00952	0.5	88.2	0.0534	0.00124	3.14	0.0001	3020	4.64	281
22-DC-06	27-May-2022	14:47	0.0108	0.5	89.5	0.054	0.00146	3.23	0.0001	3040	4.82	288
22-DC-07	27-May-2022	15:33	0.0103	0.5	90.2	0.0561	0.00174	3.14	0.0001	3090	4.91	278
22-PCP-01	20-Jun-2022	10:40	0.00483	0.25	35.3	0.0162	0.000582	0.9	0.000104	988	2.26	91.6
22-PCP-02	20-Jun-2022	17:05	0.00415	0.081	21.2	0.00246	0.00321	2.16	0.000157	305	0.705	177
22-CBP-01	12-Jun-2022	13:30	0.0005	0.05	1.43	0.00072	0.000168	0.47	0.00001	10.6	0.023	5.26
OVB-01	27-May-2022	13:40	0.00374	0.05	3.95	0.0015	0.000137	1.78	0.00001	47.7	0.167	12.1
22-OVB-01	16-Jun-2022	14:20	0.0101	0.5	70.1	0.0104	0.000863	0.728	0.0001	2000	1.83	298
22-OVB-02	16-Jun-2022	15:00	0.00211	0.05	10	0.00165	0.000735	2.05	0.00001	228	0.289	85.4
22-MAD-01	11-Jun-2022	15:55	0.00237	0.05	2.9	0.00092	0.00012	2.83	0.00001	32.1	0.0554	10.4
22-MAD-02	13-Jun-2022	16:25	0.00483	0.05	3.69	0.00108	0.000082	2.92	0.00001	20.6	0.0806	5.59
22-MAD-03	19-Jun-2022	15:05	0.00815	0.05	7.64	0.00267	0.000158	2.66	0.00001	37.8	0.223	6.74
22-CWP-01	28-Jun-2022	11:35	0.00663	0.05	6.41	0.0029	0.00195	1.96	0.00001	80.3	0.0898	35.1
22-CWP-02	28-Jun-2022	11:55	0.00819	0.05	16.7	0.00404	0.00269	2.75	0.00001	307	0.254	112
MMS1-N	16-Jun-2022	16:25	-	-	-	-	-	-	-	-	-	-
MMS1-N	11-Jul-2022	09:15	-	-	-	-	-	-	-	-	-	-
MMS1-N	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-N	12-Sep-2022	13:10	0.0356	0.1	23.1	0.00409	0.0043	3.92	0.00002	385	0.286	151
MMS1-S	16-Jun-2022	16:05	-	-	-	-	-	-	-	-	-	-
MMS1-S	11-Jul-2022	09:30	-	-	-	-	-	-	-	-	-	-
MMS1-S	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S	12-Sep-2022	13:35	0.00121	0.05	2.63	0.00105	0.000174	0.428	0.00001	37	0.0571	15.4
MMS1-S1	16-Jun-2022	17:25	-	-	-	-	-	-	-	-	-	-
MMS1-S1	11-Jul-2022	11:30	-	-	-	-	-	-	-	-	-	-
MMS1-S1	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S1	12-Sep-2022	14:05	0.0026	0.05	10.3	0.00329	0.00383	2.59	0.000012	158	0.144	60.6
MMS1-S2	16-Jun-2022	16:25	-	-	-	-	-	-	-	-	-	-
MMS1-S2	11-Jul-2022	11:00	-	-	-	-	-	-	-	-	-	-
MMS1-S2	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S2	12-Sep-2022	14:30	0.00383	0.05	5.1	0.00078	0.00028	7.67	0.00001	56.7	0.298	29.4
MMS1-S3	16-Jun-2022	16:55	-	-	-	-	-	-	-	-	-	-
MMS1-S3	11-Jul-2022	10:20	-	-	-	-	-	-	-	-	-	-
MMS1-S4	16-Jun-2022	15:55	-	-	-	-	-	-	-	-	-	-
MMS1-S4	11-Jul-2022	11:45	-	-	-	-	-	-	-	-	-	-
MMS1-S4	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S4	12-Sep-2022	15:00	0.00331	0.05	2.4	0.00127	0.000074	4.57	0.00001	51	0.094	15.7

			Dissolved Metals (Water) - Continued									
Sample ID	Sampled Date	Start Time	Te	Tl	Th	Sn	Ti	W	U	V	Zn	Zr
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	0.0002	0.00001	0.0001	0.0001	0.0006	0.0001	0.000011	0.0005	0.0023	0.0002
22-REF-02	14-Jun-2022	14:25	0.0002	0.00001	0.0001	0.0001	0.00034	0.0001	0.000017	0.0005	0.002	0.00028
22-REF-03	14-Jun-2022	14:55	0.0002	0.00001	0.0001	0.0001	0.0003	0.0001	0.00001	0.0005	0.001	0.0002
22-DC-01	27-May-2022	13:23	0.0002	0.00001	0.0001	0.0001	0.00048	0.0001	0.000202	0.0005	0.0011	0.0002
22-DC-02	27-May-2022	16:33	0.0002	0.00001	0.0001	0.0001	0.00041	0.00012	0.000199	0.0005	0.001	0.0002
22-DC-03	27-May-2022	16:58	0.0002	0.00001	0.0001	0.0001	0.00036	0.00012	0.000197	0.0005	0.001	0.0002
22-DC-04	27-May-2022	17:28	0.0002	0.00001	0.0001	0.0001	0.00052	0.00014	0.000197	0.0005	0.001	0.0002
22-DC-05	27-May-2022	14:12	0.002	0.00011	0.001	0.001	0.003	0.00372	0.00254	0.005	0.0102	0.002
22-DC-06	27-May-2022	14:47	0.002	0.000115	0.001	0.001	0.003	0.00412	0.00263	0.005	0.0117	0.002
22-DC-07	27-May-2022	15:33	0.002	0.000108	0.001	0.001	0.003	0.00398	0.00272	0.005	0.01	0.002
22-PCP-01	20-Jun-2022	10:40	0.001	0.000057	0.0005	0.0005	0.0015	0.00097	0.0025	0.0025	0.005	0.001
22-PCP-02	20-Jun-2022	17:05	0.0002	0.00001	0.0001	0.0001	0.0003	0.00254	0.000751	0.0005	0.001	0.0002
22-CBP-01	12-Jun-2022	13:30	0.0002	0.00001	0.0001	0.0001	0.00032	0.0001	0.000052	0.0005	0.001	0.0002
OVB-01	27-May-2022	13:40	0.0002	0.00001	0.00011	0.0001	0.00328	0.00032	0.000403	0.00055	0.0017	0.0002
22-OVB-01	16-Jun-2022	14:20	0.002	0.0001	0.001	0.001	0.003	0.001	0.011	0.005	0.01	0.002
22-OVB-02	16-Jun-2022	15:00	0.0002	0.00001	0.0001	0.0001	0.00186	0.0001	0.000382	0.0005	0.0022	0.00037
22-MAD-01	11-Jun-2022	15:55	0.0002	0.00001	0.0001	0.0001	0.00063	0.0001	0.000073	0.00056	0.0012	0.00028
22-MAD-02	13-Jun-2022	16:25	0.0002	0.00001	0.00013	0.0001	0.0013	0.0001	0.000427	0.00128	0.0018	0.0006
22-MAD-03	19-Jun-2022	15:05	0.0002	0.00001	0.0001	0.0001	0.0006	0.0001	0.000429	0.0005	0.0026	0.0002
22-CWP-01	28-Jun-2022	11:35	0.0002	0.00001	0.0001	0.0001	0.0003	0.0001	0.000433	0.00127	0.001	0.0002
22-CWP-02	28-Jun-2022	11:55	0.0002	0.00001	0.0001	0.0001	0.00032	0.0001	0.00171	0.00068	0.001	0.0002
MMS1-N	16-Jun-2022	16:25	-	-	-	-	-	-	-	-	-	-
MMS1-N	11-Jul-2022	09:15	-	-	-	-	-	-	-	-	-	-
MMS1-N	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-N	12-Sep-2022	13:10	0.0004	0.00002	0.0002	0.0002	0.0006	0.0002	0.00197	0.00106	0.002	0.0004
MMS1-S	16-Jun-2022	16:05	-	-	-	-	-	-	-	-	-	-
MMS1-S	11-Jul-2022	09:30	-	-	-	-	-	-	-	-	-	-
MMS1-S	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S	12-Sep-2022	13:35	0.0002	0.00001	0.0001	0.0001	0.00093	0.0001	0.00064	0.0005	0.001	0.0002
MMS1-S1	16-Jun-2022	17:25	-	-	-	-	-	-	-	-	-	-
MMS1-S1	11-Jul-2022	11:30	-	-	-	-	-	-	-	-	-	-
MMS1-S1	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S1	12-Sep-2022	14:05	0.0002	0.00001	0.0001	0.00175	0.0006	0.0002	0.000472	0.0005	2.82	0.0002
MMS1-S2	16-Jun-2022	16:25	-	-	-	-	-	-	-	-	-	-
MMS1-S2	11-Jul-2022	11:00	-	-	-	-	-	-	-	-	-	-
MMS1-S2	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S2	12-Sep-2022	14:30	0.0002	0.00001	0.00012	0.0001	0.00047	0.0001	0.000066	0.0005	2.56	0.00049
MMS1-S3	16-Jun-2022	16:55	-	-	-	-	-	-	-	-	-	-
MMS1-S3	11-Jul-2022	10:20	-	-	-	-	-	-	-	-	-	-
MMS1-S4	16-Jun-2022	15:55	-	-	-	-	-	-	-	-	-	-
MMS1-S4	11-Jul-2022	11:45	-	-	-	-	-	-	-	-	-	-
MMS1-S4	18-Aug-2022	15:00	-	-	-	-	-	-	-	-	-	-
MMS1-S4	12-Sep-2022	15:00	0.0002	0.00001	0.0001	0.0001	0.0006	0.0001	0.000212	0.0005	3.64	0.0002

			Total Metals (Water)									
Sample ID	Sampled Date	Start Time	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cs
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	0.0633	0.0001	0.00012	0.00117	0.0001	0.00005	0.01	0.000005	1.95	0.00001
22-REF-02	14-Jun-2022	14:25	0.0308	0.0001	0.00031	0.00297	0.0001	0.00005	0.01	0.000005	15.9	0.00001
22-REF-03	14-Jun-2022	14:55	0.0164	0.0001	0.0001	0.00175	0.0001	0.00005	0.01	0.000005	7.66	0.00001
22-DC-01	27-May-2022	13:23	-	-	-	-	-	-	-	-	-	-
22-DC-02	27-May-2022	16:33	-	-	-	-	-	-	-	-	-	-
22-DC-03	27-May-2022	16:58	-	-	-	-	-	-	-	-	-	-
22-DC-04	27-May-2022	17:28	-	-	-	-	-	-	-	-	-	-
22-DC-05	27-May-2022	14:12	-	-	-	-	-	-	-	-	-	-
22-DC-06	27-May-2022	14:47	-	-	-	-	-	-	-	-	-	-
22-DC-07	27-May-2022	15:33	-	-	-	-	-	-	-	-	-	-
22-PCP-01	20-Jun-2022	10:40	0.143	0.0005	0.00177	0.126	0.0001	0.00025	0.567	0.000255	798	0.000053
22-PCP-02	20-Jun-2022	17:05	0.139	0.00067	0.0014	0.0235	0.0001	0.00005	0.424	0.000056	190	0.000012
22-CBP-01	12-Jun-2022	13:30	1.43	0.00011	0.00072	0.00344	0.0001	0.00005	0.049	0.0000144	19.2	0.00002
OVB-01	27-May-2022	13:40	-	-	-	-	-	-	-	-	-	-
22-OVB-01	16-Jun-2022	14:20	0.121	0.001	0.00277	0.0892	0.0002	0.0005	0.594	0.0000513	306	0.0001
22-OVB-02	16-Jun-2022	15:00	0.672	0.0001	0.00111	0.0273	0.0001	0.00005	0.172	0.0000108	49.7	0.000036
22-MAD-01	11-Jun-2022	15:55	0.099	0.0001	0.00188	0.0116	0.0001	0.00005	0.02	0.0000064	35.8	0.00001
22-MAD-02	13-Jun-2022	16:25	0.0644	0.0001	0.00157	0.0187	0.0001	0.00005	0.071	0.0000126	53.7	0.00001
22-MAD-03	19-Jun-2022	15:05	1.33	0.0001	0.00549	0.0523	0.0001	0.00005	0.071	0.0000153	152	0.000096
22-CWP-01	28-Jun-2022	11:35	-	-	-	-	-	-	-	-	-	-
22-CWP-02	28-Jun-2022	11:55	-	-	-	-	-	-	-	-	-	-
MMS1-N	16-Jun-2022	16:25	1.83	0.00139	0.139	0.0269	0.0001	0.00005	0.118	0.000025	43	0.000098
MMS1-N	11-Jul-2022	09:15	0.178	0.00332	0.0548	0.0462	0.0002	0.0001	0.366	0.0000155	147	0.000036
MMS1-N	18-Aug-2022	15:00	0.0391	0.00302	0.171	0.0386	0.0005	0.00025	0.345	0.000025	168	0.00005
MMS1-N	12-Sep-2022	13:10	0.196	0.00232	0.112	0.034	0.0001	0.0001	0.33	0.0000307	118	0.000025
MMS1-S	16-Jun-2022	16:05	1.12	0.0003	0.0181	0.013	0.0001	0.00005	0.063	0.0000101	24	0.000061
MMS1-S	11-Jul-2022	09:30	0.335	0.00046	0.0219	0.0102	0.0001	0.00005	0.104	0.0000093	38.9	0.000032
MMS1-S	18-Aug-2022	15:00	0.228	0.00033	0.0124	0.0143	0.0001	0.00005	0.113	0.00001	49.6	0.00002
MMS1-S	12-Sep-2022	13:35	0.488	0.00013	0.00945	0.00967	0.0001	0.00005	0.057	0.0000092	27.7	0.000032
MMS1-S1	16-Jun-2022	17:25	0.297	0.00051	0.00865	0.016	0.0001	0.00005	0.116	0.0000554	41.5	0.00002
MMS1-S1	11-Jul-2022	11:30	0.293	0.00084	0.0209	0.0108	0.0001	0.00005	0.162	0.0000125	32.8	0.000023
MMS1-S1	18-Aug-2022	15:00	0.127	0.00073	0.0113	0.034	0.0002	0.000249	0.11	0.000176	137	0.000038
MMS1-S1	12-Sep-2022	14:05	0.18	0.00108	0.0358	0.0167	0.0001	0.00005	0.186	0.0000348	68.5	0.000025
MMS1-S2	16-Jun-2022	16:25	0.554	0.0001	0.00123	0.0148	0.0001	0.00005	0.02	0.0000114	22.7	0.000024
MMS1-S2	11-Jul-2022	11:00	0.102	0.0005	0.00094	0.017	0.0005	0.00025	0.05	0.000025	41.2	0.00005
MMS1-S2	18-Aug-2022	15:00	0.0514	0.0002	0.00199	0.0341	0.0002	0.0001	0.03	0.0000292	76.4	0.00002
MMS1-S2	12-Sep-2022	14:30	0.106	0.0001	0.00083	0.0453	0.0001	0.00005	0.02	0.0000205	52.2	0.000012
MMS1-S3	16-Jun-2022	16:55	0.776	0.00086	0.088	0.023	0.0001	0.00005	0.315	0.0000223	30.4	0.000048
MMS1-S3	11-Jul-2022	10:20	5.46	0.004	0.395	0.0235	0.0001	0.00005	0.536	0.0000172	12.8	0.000349
MMS1-S4	16-Jun-2022	15:55	0.431	0.0001	0.00096	0.0097	0.0001	0.00005	0.03	0.0000102	39.3	0.00002
MMS1-S4	11-Jul-2022	11:45	0.957	0.00015	0.00216	0.0294	0.0001	0.00005	0.038	0.0000171	81	0.000047
MMS1-S4	18-Aug-2022	15:00	0.397	0.00018	0.00183	0.0213	0.0001	0.00005	0.035	0.0000216	104	0.000022
MMS1-S4	12-Sep-2022	15:00	0.111	0.0001	0.00095	0.0194	0.0001	0.00005	0.015	0.0000207	90.1	0.00001

Sample ID	Sampled Date	Start Time	Total Metals (Water) - Continued									
			Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	0.0005	0.0001	0.00152	0.104	0.00005	0.0016	1.54	0.00043	0.0000064	0.000086
22-REF-02	14-Jun-2022	14:25	0.0005	0.0001	0.00186	0.236	0.00005	0.0021	5.34	0.00118	0.000005	0.000135
22-REF-03	14-Jun-2022	14:55	0.0005	0.0001	0.00094	0.034	0.00005	0.001	1.82	0.00055	0.000005	0.00005
22-DC-01	27-May-2022	13:23	-	-	-	-	-	-	-	-	-	-
22-DC-02	27-May-2022	16:33	-	-	-	-	-	-	-	-	-	-
22-DC-03	27-May-2022	16:58	-	-	-	-	-	-	-	-	-	-
22-DC-04	27-May-2022	17:28	-	-	-	-	-	-	-	-	-	-
22-DC-05	27-May-2022	14:12	-	-	-	-	-	-	-	-	-	-
22-DC-06	27-May-2022	14:47	-	-	-	-	-	-	-	-	-	-
22-DC-07	27-May-2022	15:33	-	-	-	-	-	-	-	-	-	-
22-PCP-01	20-Jun-2022	10:40	0.00064	0.00513	0.0236	0.613	0.00025	0.0286	144	1.12	0.000005	0.00681
22-PCP-02	20-Jun-2022	17:05	0.00139	0.0151	0.0208	1.26	0.000073	0.0124	60.3	0.276	0.000005	0.0079
22-CBP-01	12-Jun-2022	13:30	0.00638	0.00188	0.00744	2.9	0.000692	0.0014	4.42	0.0902	0.000005	0.00145
OVB-01	27-May-2022	13:40	-	-	-	-	-	-	-	-	-	-
22-OVB-01	16-Jun-2022	14:20	0.001	0.00726	0.00586	2.27	0.0005	0.023	313	2.06	0.000005	0.00836
22-OVB-02	16-Jun-2022	15:00	0.00138	0.00076	0.00344	0.731	0.000264	0.0062	28.8	0.176	0.000005	0.00103
22-MAD-01	11-Jun-2022	15:55	0.00104	0.00048	0.00398	0.316	0.000064	0.0027	9.01	0.0419	0.000005	0.000425
22-MAD-02	13-Jun-2022	16:25	0.00097	0.00309	0.0035	0.862	0.000082	0.0025	9.95	0.54	0.0000072	0.00177
22-MAD-03	19-Jun-2022	15:05	0.00424	0.0134	0.00351	11.9	0.000585	0.0055	18.3	1.49	0.0000249	0.00066
22-CWP-01	28-Jun-2022	11:35	-	-	-	-	-	-	-	-	-	-
22-CWP-02	28-Jun-2022	11:55	-	-	-	-	-	-	-	-	-	-
MMS1-N	16-Jun-2022	16:25	0.00651	0.00228	0.00647	2.01	0.000884	0.0051	15.1	0.105	0.000005	0.00283
MMS1-N	11-Jul-2022	09:15	0.001	0.00173	0.0087	0.224	0.000114	0.0107	77	0.273	0.000005	0.0106
MMS1-N	18-Aug-2022	15:00	0.0025	0.00219	0.00713	0.05	0.00025	0.0112	98.5	0.268	0.000005	0.0094
MMS1-N	12-Sep-2022	13:10	0.00079	0.00285	0.00788	0.238	0.000114	0.008	67	0.532	0.0000052	0.007
MMS1-S	16-Jun-2022	16:05	0.00335	0.00109	0.0063	1.13	0.000474	0.0022	3.75	0.0214	0.000005	0.00138
MMS1-S	11-Jul-2022	09:30	0.00104	0.00037	0.00647	0.279	0.000144	0.0027	7.29	0.00676	0.000005	0.00225
MMS1-S	18-Aug-2022	15:00	0.00061	0.00028	0.0053	0.138	0.000071	0.0035	14.7	0.0148	0.000005	0.00217
MMS1-S	12-Sep-2022	13:35	0.00098	0.00038	0.00379	0.366	0.00019	0.0018	8.21	0.00981	0.000005	0.00147
MMS1-S1	16-Jun-2022	17:25	0.00067	0.00164	0.0146	0.467	0.000166	0.0029	12.7	0.172	0.000005	0.00183
MMS1-S1	11-Jul-2022	11:30	0.00073	0.00064	0.00701	0.406	0.000182	0.0026	12.3	0.0212	0.000005	0.00286
MMS1-S1	18-Aug-2022	15:00	0.001	0.00512	0.0155	0.766	0.000199	0.0104	40.7	1.78	0.000005	0.00116
MMS1-S1	12-Sep-2022	14:05	0.0005	0.00095	0.00997	0.315	0.000122	0.0034	24.5	0.115	0.0000054	0.00345
MMS1-S2	16-Jun-2022	16:25	0.00136	0.0016	0.0178	0.66	0.00015	0.0133	33	0.133	0.000005	0.000375
MMS1-S2	11-Jul-2022	11:00	0.0025	0.00434	0.0174	0.185	0.00025	0.0212	72.1	0.394	0.000005	0.000767
MMS1-S2	18-Aug-2022	15:00	0.001	0.0039	0.0193	0.39	0.0001	0.0358	134	0.356	0.000005	0.000443
MMS1-S2	12-Sep-2022	14:30	0.00088	0.0011	0.0107	0.234	0.00005	0.032	115	0.116	0.000005	0.000106
MMS1-S3	16-Jun-2022	16:55	0.00194	0.0029	0.029	0.859	0.000322	0.0064	20.7	0.152	0.0000154	0.00388
MMS1-S3	11-Jul-2022	10:20	0.018	0.00634	0.0297	6.97	0.00362	0.0122	13.8	0.0898	0.0000065	0.00775
MMS1-S4	16-Jun-2022	15:55	0.00094	0.00071	0.0061	0.53	0.000123	0.0017	6.09	0.0247	0.000005	0.000194
MMS1-S4	11-Jul-2022	11:45	0.00204	0.00324	0.0133	1.97	0.000493	0.0052	17.9	0.261	0.000005	0.00152
MMS1-S4	18-Aug-2022	15:00	0.00108	0.00179	0.0118	0.733	0.000129	0.0038	17.9	0.108	0.000005	0.000937
MMS1-S4	12-Sep-2022	15:00	0.0005	0.00117	0.00754	0.291	0.000062	0.0031	16.4	0.0833	0.000005	0.00026

			Total Metals (Water) - Continued									
Sample ID	Sampled Date	Start Time	Ni	P	K	Rb	Se	Si	Ag	Na	Sr	S
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	0.00152	0.05	0.562	0.00037	0.00005	0.82	0.00001	1.86	0.00499	0.5
22-REF-02	14-Jun-2022	14:25	0.00254	0.05	1.01	0.00063	0.00005	3.58	0.00001	8.14	0.0639	0.5
22-REF-03	14-Jun-2022	14:55	0.0005	0.05	0.393	0.00036	0.00005	0.83	0.00001	4.29	0.013	0.57
22-DC-01	27-May-2022	13:23	-	-	-	-	-	-	-	-	-	-
22-DC-02	27-May-2022	16:33	-	-	-	-	-	-	-	-	-	-
22-DC-03	27-May-2022	16:58	-	-	-	-	-	-	-	-	-	-
22-DC-04	27-May-2022	17:28	-	-	-	-	-	-	-	-	-	-
22-DC-05	27-May-2022	14:12	-	-	-	-	-	-	-	-	-	-
22-DC-06	27-May-2022	14:47	-	-	-	-	-	-	-	-	-	-
22-DC-07	27-May-2022	15:33	-	-	-	-	-	-	-	-	-	-
22-PCP-01	20-Jun-2022	10:40	0.00567	0.25	39.7	0.0186	0.000717	0.93	0.000188	1100	2.54	107
22-PCP-02	20-Jun-2022	17:05	0.00434	0.077	23.7	0.00267	0.00334	2.43	0.000486	316	0.733	193
22-CBP-01	12-Jun-2022	13:30	0.0032	0.05	1.36	0.00084	0.000202	2.38	0.00001	10.6	0.0224	5.69
OVB-01	27-May-2022	13:40	-	-	-	-	-	-	-	-	-	-
22-OVB-01	16-Jun-2022	14:20	0.00999	0.5	68.9	0.0114	0.000684	1.15	0.0001	1930	1.88	315
22-OVB-02	16-Jun-2022	15:00	0.00246	0.07	8.44	0.00264	0.000629	3.12	0.00001	185	0.25	74.1
22-MAD-01	11-Jun-2022	15:55	0.00291	0.05	2.75	0.0009	0.000062	2.91	0.00001	32.7	0.0513	11.2
22-MAD-02	13-Jun-2022	16:25	0.00519	0.068	3.44	0.00111	0.000145	2.99	0.00001	20.2	0.0752	6.35
22-MAD-03	19-Jun-2022	15:05	0.0106	0.162	7.52	0.00536	0.00013	4.88	0.000014	37.4	0.213	7.3
22-CWP-01	28-Jun-2022	11:35	-	-	-	-	-	-	-	-	-	-
22-CWP-02	28-Jun-2022	11:55	-	-	-	-	-	-	-	-	-	-
MMS1-N	16-Jun-2022	16:25	0.0144	0.064	6.82	0.0041	0.00105	4.78	0.000011	97.5	0.084	31.8
MMS1-N	11-Jul-2022	09:15	0.0192	0.1	30	0.00493	0.00401	1.09	0.00002	568	0.373	168
MMS1-N	18-Aug-2022	15:00	0.0449	0.25	33.8	0.00633	0.00505	4.46	0.00005	605	0.445	185
MMS1-N	12-Sep-2022	13:10	0.0394	0.1	25.5	0.00438	0.00454	4.64	0.00002	424	0.293	175
MMS1-S	16-Jun-2022	16:05	0.00415	0.05	2.9	0.00268	0.000816	3.39	0.000012	30.3	0.0363	11.8
MMS1-S	11-Jul-2022	09:30	0.00244	0.05	4.98	0.00256	0.00118	0.95	0.00001	63.4	0.07	22.3
MMS1-S	18-Aug-2022	15:00	0.00276	0.05	5.44	0.00246	0.000603	1.18	0.000025	86.7	0.115	31.6
MMS1-S	12-Sep-2022	13:35	0.00205	0.05	2.8	0.00178	0.000226	1.35	0.00001	38.3	0.0583	17.1
MMS1-S1	16-Jun-2022	17:25	0.00254	0.05	5.98	0.00112	0.00134	3.14	0.00001	101	0.0783	36.8
MMS1-S1	11-Jul-2022	11:30	0.00165	0.05	5.65	0.0013	0.00164	2.17	0.00001	91	0.073	24.3
MMS1-S1	18-Aug-2022	15:00	0.0062	0.1	9.79	0.00158	0.00293	4.83	0.00008	180	0.331	89
MMS1-S1	12-Sep-2022	14:05	0.00284	0.05	10.5	0.00348	0.0034	2.96	0.000022	162	0.144	66.8
MMS1-S2	16-Jun-2022	16:25	0.00435	0.05	2.55	0.00114	0.00016	6.54	0.000013	16.7	0.082	6.18
MMS1-S2	11-Jul-2022	11:00	0.00415	0.25	3.93	0.001	0.00025	3.67	0.00005	33.2	0.157	9.47
MMS1-S2	18-Aug-2022	15:00	0.00532	0.1	5.1	0.00166	0.000206	8.62	0.000078	42.6	0.315	17.5
MMS1-S2	12-Sep-2022	14:30	0.0042	0.05	4.88	0.00074	0.000221	8.2	0.00001	53.6	0.27	32.3
MMS1-S3	16-Jun-2022	16:55	0.0105	0.168	10.3	0.00237	0.000715	4.33	0.000025	143	0.11	36.2
MMS1-S3	11-Jul-2022	10:20	0.0237	0.191	10	0.00628	0.00272	14.1	0.000022	158	0.0521	26.3
MMS1-S4	16-Jun-2022	15:55	0.00179	0.05	1.82	0.00146	0.000099	2.28	0.00001	29.2	0.0368	8.46
MMS1-S4	11-Jul-2022	11:45	0.00421	0.076	5.16	0.00343	0.000159	5.24	0.00001	42.3	0.112	13.9
MMS1-S4	18-Aug-2022	15:00	0.00308	0.05	3.83	0.00217	0.000224	3.86	0.000034	81.7	0.112	33.5
MMS1-S4	12-Sep-2022	15:00	0.00252	0.05	2.28	0.00124	0.000069	4.95	0.00001	49.4	0.0961	17.2

Sample ID	Sampled Date	Start Time	Total Metals (Water) - Continued									
			Te	Tl	Th	Sn	Ti	W	U	V	Zn	Zr
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
22-REF-01	14-Jun-2022	13:35	0.0002	0.00001	0.0001	0.0001	0.00061	0.0001	0.00001	0.0005	0.003	0.0002
22-REF-02	14-Jun-2022	14:25	0.0002	0.00001	0.0001	0.0001	0.00068	0.0001	0.000016	0.0005	0.003	0.00026
22-REF-03	14-Jun-2022	14:55	0.0002	0.00001	0.0001	0.0001	0.0003	0.0001	0.00001	0.0005	0.003	0.0002
22-DC-01	27-May-2022	13:23	-	-	-	-	-	-	-	-	-	-
22-DC-02	27-May-2022	16:33	-	-	-	-	-	-	-	-	-	-
22-DC-03	27-May-2022	16:58	-	-	-	-	-	-	-	-	-	-
22-DC-04	27-May-2022	17:28	-	-	-	-	-	-	-	-	-	-
22-DC-05	27-May-2022	14:12	-	-	-	-	-	-	-	-	-	-
22-DC-06	27-May-2022	14:47	-	-	-	-	-	-	-	-	-	-
22-DC-07	27-May-2022	15:33	-	-	-	-	-	-	-	-	-	-
22-PCP-01	20-Jun-2022	10:40	0.001	0.000059	0.0005	0.0005	0.00413	0.00101	0.00258	0.0025	0.015	0.001
22-PCP-02	20-Jun-2022	17:05	0.0002	0.00001	0.0001	0.0001	0.0024	0.00247	0.000714	0.00111	0.003	0.0002
22-CBP-01	12-Jun-2022	13:30	0.0002	0.00001	0.0001	0.0001	0.0718	0.0001	0.000053	0.00672	0.0057	0.0002
OVB-01	27-May-2022	13:40	-	-	-	-	-	-	-	-	-	-
22-OVB-01	16-Jun-2022	14:20	0.002	0.0001	0.001	0.001	0.00565	0.001	0.0106	0.005	0.03	0.002
22-OVB-02	16-Jun-2022	15:00	0.0002	0.00001	0.00024	0.0001	0.0274	0.0001	0.000325	0.00147	0.0038	0.00074
22-MAD-01	11-Jun-2022	15:55	0.0002	0.00001	0.0001	0.0001	0.00235	0.0001	0.000058	0.00091	0.003	0.00027
22-MAD-02	13-Jun-2022	16:25	0.0002	0.00001	0.00012	0.0001	0.0023	0.0001	0.000372	0.00143	0.003	0.00053
22-MAD-03	19-Jun-2022	15:05	0.0002	0.000014	0.00039	0.0001	0.0677	0.0001	0.000417	0.00452	0.007	0.00029
22-CWP-01	28-Jun-2022	11:35	-	-	-	-	-	-	-	-	-	-
22-CWP-02	28-Jun-2022	11:55	-	-	-	-	-	-	-	-	-	-
MMS1-N	16-Jun-2022	16:25	0.0002	0.000019	0.00059	0.00017	0.0654	0.00013	0.000788	0.00535	0.006	0.0003
MMS1-N	11-Jul-2022	09:15	0.0004	0.00002	0.0002	0.0002	0.00758	0.00021	0.00297	0.00177	0.006	0.0004
MMS1-N	18-Aug-2022	15:00	0.001	0.00005	0.0005	0.0005	0.00169	0.0005	0.00313	0.0025	0.015	0.001
MMS1-N	12-Sep-2022	13:10	0.0004	0.00002	0.0002	0.0002	0.00654	0.0002	0.00196	0.00161	0.006	0.0004
MMS1-S	16-Jun-2022	16:05	0.0002	0.000011	0.00026	0.00016	0.0396	0.0001	0.000248	0.00302	0.0146	0.001
MMS1-S	11-Jul-2022	09:30	0.0002	0.00001	0.0001	0.0001	0.00896	0.00013	0.000696	0.00187	0.0099	0.0002
MMS1-S	18-Aug-2022	15:00	0.0002	0.00001	0.0001	0.0001	0.00665	0.0001	0.00127	0.00118	0.003	0.00021
MMS1-S	12-Sep-2022	13:35	0.0002	0.00001	0.00015	0.0001	0.0149	0.0001	0.000672	0.00132	0.003	0.00022
MMS1-S1	16-Jun-2022	17:25	0.0002	0.00001	0.0001	0.0001	0.00736	0.0001	0.00028	0.00129	1.71	0.0006
MMS1-S1	11-Jul-2022	11:30	0.0002	0.00001	0.0001	0.0001	0.00677	0.0001	0.000149	0.00124	1.01	0.0002
MMS1-S1	18-Aug-2022	15:00	0.0004	0.000256	0.0002	0.0002	0.00314	0.0002	0.0015	0.00121	5.79	0.0005
MMS1-S1	12-Sep-2022	14:05	0.0002	0.00001	0.0001	0.0001	0.00354	0.0001	0.000451	0.00085	2.52	0.0002
MMS1-S2	16-Jun-2022	16:25	0.0002	0.00001	0.00028	0.0001	0.0132	0.0001	0.000182	0.00219	2.16	0.0012
MMS1-S2	11-Jul-2022	11:00	0.001	0.00005	0.0005	0.0005	0.00159	0.0005	0.000392	0.0025	12.9	0.001
MMS1-S2	18-Aug-2022	15:00	0.0004	0.00002	0.0002	0.0002	0.00123	0.0002	0.00033	0.00116	8.85	0.00069
MMS1-S2	12-Sep-2022	14:30	0.0002	0.00001	0.00015	0.0001	0.00168	0.00016	0.00007	0.00096	2.17	0.00055
MMS1-S3	16-Jun-2022	16:55	0.0002	0.00001	0.00028	0.0001	0.0195	0.0001	0.000996	0.00368	4.36	0.0018
MMS1-S3	11-Jul-2022	10:20	0.0002	0.000021	0.00077	0.0001	0.0836	0.0003	0.000789	0.0212	1.4	0.00097
MMS1-S4	16-Jun-2022	15:55	0.0002	0.00001	0.0001	0.0001	0.0185	0.0001	0.00008	0.00155	0.998	0.0006
MMS1-S4	11-Jul-2022	11:45	0.0002	0.000015	0.00029	0.00014	0.0324	0.0001	0.000714	0.00352	4.19	0.0008
MMS1-S4	18-Aug-2022	15:00	0.0002	0.000011	0.0001	0.0001	0.0149	0.0001	0.000585	0.00197	2.45	0.00032
MMS1-S4	12-Sep-2022	15:00	0.0002	0.00001	0.0001	0.0001	0.00386	0.0001	0.000208	0.00082	2.98	0.0002