Appendix D-5

2022 Waste Rock and Ore Monitoring Report,
Boston Camp

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FINAL

2022 Waste Rock and Ore Monitoring Report, Boston Camp

Hope Bay Project, Nunavut, Canada

Agnico Eagle Mines Ltd.

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

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FINAL

2022 Waste Rock and Ore Monitoring Report, Boston Camp

Hope Bay Project, Nunavut, Canada

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Appendix A 2022 Boston Seepage Field Observations and Water Quality Results
Appendix B 2022 Boston Ephemeral Streams Field Observations and Water Quality Results

Useful Definitions

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

AEM	Agnico Eagle Mines
ALS	ALS Environmental Labs
ARD	Acid rock drainage
EC	Electrical conductivity
ICP-MS	Inductively coupled plasma mass spectrometry
ML	Metal leaching
ORP	Oxidation reduction potential
QA/QC	Quality assurance and quality control
RPD	Relative percent difference
TDS	Total dissolved solids
TSS	Total suspended solids

Executive Summary

This report presents results from the 2022 seepage and ephemeral streams monitoring programs at the Boston site, as outlined in the Water and Ore/Waste Rock Management Plan for the Boston Site (SRK 2017) and Water License 2BB-BOS1727 (NWB 2017).

Ore and waste rock were generated as part of a 1996/1997 BHP Billiton underground exploration program at the Boston deposit. The waste rock was used to construct a camp pad, roads, and an airstrip at the Boston site. Ore was placed in stockpiles on the camp pad. Agnico Eagle Mines (AEM) acquired the Hope Bay project including the Boston site in 2021 and has maintained the Boston site in care and maintenance. As a condition of Water Licence 2BB-BOS1727 AEM conducts annual seepage and ephemeral streams sampling programs to validate the Boston waste rock and ore management and closure plan (SRK 2017).

In 2022, AEM completed the required geochemical monitoring programs including i) monthly seepage surveys near BOS-8 and a freshet seepage survey along the edges of the camp pad and the full extent of the airstrip for opportunistic seepage samples and ii) opportunistic sampling of five ephemerals streams (A to E) within the catchment of the Boston camp pad. AEM collected two seepage samples from BOS-8 and five ephemeral streams samples from streams A2, B2, C2 and D2.

All 2022 samples had pH values ranging from 6.6 to 7.4, indicating that the drainage from the waste rock on the camp pad is not acidic. Monitoring of the seepage from the camp pad and the ore stockpiles and downstream ephemeral streams indicates that concentrations of the contaminants of concern (sulphate, ammonia, nitrate, chloride, arsenic, cadmium, copper, zinc, iron, manganese, nickel, aluminum, lead, and selenium) are within the range of the historical data with no indication of increasing trends. Compared to SRK (2009) model predictions, 2022 monitoring data for ephemeral streams were below the maximum predicted values for chloride, sulphate, nitrate, arsenic, copper, iron, nickel, and selenium.

The results of the seepage and ephemeral streams monitoring program support the Boston waste rock and ore management and closure plan (SRK 2017). SRK recommends continued annual monitoring.

1 Introduction

At the Boston site, ore and waste rock were generated as part of a 1996 to 1997 BHP Billiton underground exploration program. The ore was placed in several stockpiles on the camp pad and the waste rock was used to construct a camp pad, roads, and an airstrip at Boston. Since then, the site has been primarily in care and maintenance, with periodic use of the camp and airstrip in support of exploration activities. Agnico Eagle Mines (AEM) acquired the Hope Bay project, including the Boston site, in 2021 and has continued to maintain the Boston site in care and maintenance.

The seepage and ephemeral streams sampling programs are conducted annually to validate the Boston waste rock and ore management and closure plan. A survey of rinse pH and conductivity of the ore is carried out every ten years as part of this plan and was last completed in 2018 (SRK 2019). This report presents results from the 2022 seepage and ephemeral streams monitoring programs at the Boston site, as outlined in the Water and Ore/Waste Rock Management Plan for the Boston Site (SRK 2017) and Water License 2BB-BOS1727 (NWB 2017).

The report is organized as follows:

- Section 2 contains a summary of the monitoring requirements.
- Section 3 summarizes analytical and quality assurance/quality control methods.
- Section 4 summarizes the results of the seepage monitoring at the Boston site.
- Section 5 summarizes the results of the ephemeral streams monitoring.

2 Monitoring Requirements

The assessment of metal leaching and acid rock drainage (ARD) and metal leaching (ML)potential from waste rock and ore at Boston camp includes monitoring the oxidation of ore (Section 2.1), water quality of seepage from ore and waste rock (Section 2.2) and water quality downstream of the camp pad and upstream of the receiving environmental (Section 2.3).

2.1 Waste Rock and Ore

Geochemical characterization of waste rock and ore materials has indicated that all waste rock and most of the ore is non-acid generating with some of the ore classified as having an uncertain potential for ARD (SRK 2009). Based on the uncertain classifications, the ore/waste rock management plan (SRK 2017) includes a commitment to monitor the oxidation of the ore by carrying out a survey of rinse pH and conductivity every ten years. This monitoring has been conducted in 2008 and 2018 and was not a requirement in 2022.

2.2 Seepage Monitoring

The objective of the seepage monitoring is to quantify contact water quality from the waste rock (camp pad) and ore stockpiles. There are two seepage monitoring programs: seepage monitoring at station BOS-8 and a freshet seepage survey along the north and east sides of the camp pad, and the southern end of the airstrip (Figure 2.1). There are differences in the monitoring programs because each program was designed using different frameworks.

As stipulated in Water Licence 2BB-BOS1727 (NWB 2017) and referenced in SRK (2017), AEM monitors the seepage station BOS-8A, BOS-8B, BOS-8C, and BOS-8D (collectively referred to as BOS-8). NWB (2017) requires the sampling of water quality station BOS-8 and any opportunistic seeps initially during spring thaw and at a minimum frequency of monthly whenever flow is observed. Samples collected at BOS-8 are analyzed for pH, electrical conductivity (EC), total suspended solids (TSS), major anions (sulphate, chloride, ammonia), and total trace metals by ICP-MS.

Legend

- 2022 Seepage
- 2021 Seepage
- 2020 Seepage
- 2019 Seepage
- 2018 Seepage
- 2017 Seepage

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LAYOUT: CAPR001813_2022_Boston_Seepage_Map

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Hope Bay Gold Project

2022 Seepage Survey

2022 Seepage Survey Locations, Boston Area

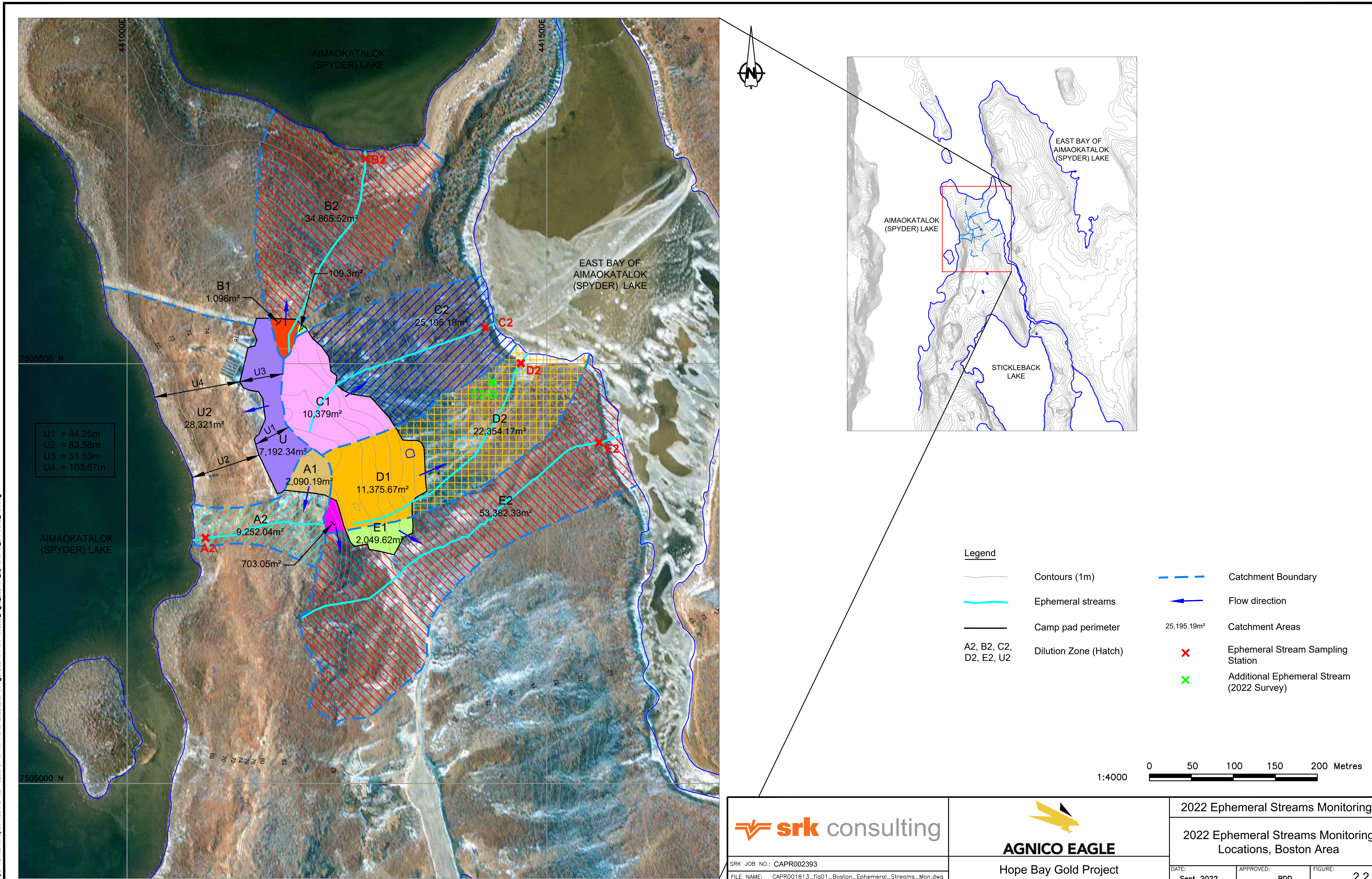
DATE:	APPROVED:	FIGURE:
Sep 2022	BDD	2.1

C:\Users\wmedemach\SRK Consulting\NA 1CT022 Hope Bay - GIS\AGP\2021_Annual_Memo_Boston_Seepage\1CT022_073_Annual_Boston_Seepage_2021.aprx

2.3 Ephemeral Streams

The purpose of the ephemeral streams monitoring is to monitor drainage downgradient of seepage from the Boston camp pad and provide an indication of whether contaminants of potential concern from ore and waste rock piles are reaching the shoreline of Aimaokatalok Lake. The results of the ephemeral streams survey are compared to the calculated average and maximum estimated concentrations of sulphate, chloride, nitrate, arsenic, copper, iron, nickel, and selenium in ephemeral streams, as determined by the water and load balance for Boston Camp (*Supporting Document B* of the 2009 *Boston Water and Ore/Waste Rock Management Plan*, SRK 2009).

Five ephemeral streams (A to E) downgradient of the waste rock pile have been sampled during spring freshet since 2009 (Figure 2.2). Samples are analyzed for pH, electrical conductivity (EC), total suspended solids (TSS), total alkalinity, major anions (sulphate, chloride, ammonia, nitrate), and dissolved trace metals by ICP.



AIMAOKATALOK (SPYDER) LAKE
EAST BAY OF AIMAOKATALOK (SPYDER) LAKE
AIMAOKATALOK (SPYDER) LAKE
441000E
441500E
7505500 N
7505000 N
B2
34,865.52m²
109.3m²
B1
1,096m²
C2
25,195.19m²
C1
10,379m²
D2
22,354.17m²
D1
11,375.67m²
E2
53,382.33m²
E1
2,049.62m²
A1
2,090.19m²
A2
9,252.04m²
703.05m²
U
7,192.34m²
U1
U2
28,321m²
U3
U4
U1 = 44.25m
U2 = 83.58m
U3 = 51.53m
U4 = 103.57m
C2-B
EAST BAY OF AIMAOKATALOK (SPYDER) LAKE
AIMAOKATALOK (SPYDER) LAKE
STICKLEBACK LAKE
N
Legend
Contours (1m)
Ephemeral streams
Camp pad perimeter
A2, B2, C2, D2, E2, U2
Dilution Zone (Hatch)
Catchment Boundary
Flow direction
25,195.19m²
Catchment Areas
Ephemeral Stream Sampling Station
Additional Ephemeral Stream (2022 Survey)
1:4000
0 50 100 150 200 Metres
srk consulting
SRK JOB NO.: CAPR002393
FILE NAME: CAPR001813_fig01_Boston_Ephemeral_Streams_Mon.dwg
AGNICO EAGLE
Hope Bay Gold Project
2022 Ephemeral Streams Monitoring
2022 Ephemeral Streams Monitoring Locations, Boston Area
DATE: Sept 2022
APPROVED: BDD
FIGURE: 2.2

3 Methods

3.1.1 Analytical Methods

Field measurements at 2022 seepage and ephemeral streams monitoring stations included electrical conductivity (EC), pH, oxidation-reduction potential (ORP), temperature, and salinity. Flow rate was not estimated in 2022 due to dispersed, channelling flow.

The water quality samples were submitted by AEM to ALS Environmental (ALS) in Burnaby, British Columbia. Analytes for all 2022 samples included:

- Physical parameters: pH, conductivity, hardness, total suspended solids (TSS)
- Anions: ammonia, sulphate
- Metals by ICP-MS: Total metals are required as for permit Water License 2BB-BOS1727 (NWB 2017) and dissolved metals are analyzed to assess ML/ARD. Samples were analyzed as follows:
  - Seepage (BOS-8) samples were analyzed for total metals
  - Ephemeral stream samples were analyzed for dissolved metals

In addition to the analytes listed above, ephemeral streams samples were also analyzed for acidity, total alkalinity, additional anions (bromide, chloride, and fluoride), and additional nutrients (nitrate, nitrite, and total phosphorus) in 2022.

Seepage samples (BOS-8) were not analyzed for chloride in 2021 and 2022.

3.1.2 Data Quality Assurance and Quality Control

SRK applied the following quality assurance and quality control (QA/QC) procedures for water samples to evaluate data quality:

- Difference between field and lab pH – corresponding values should be within one pH unit.
- Difference between field and lab conductivity – samples should have a relative percent difference (RPD) ±30%.
- Travel and field blank samples should report <2 times detection limit, in some cases <5 times detection limit is accepted.
- Method blank samples should report <2 times detection limit.
- For duplicate samples, RPD should be ±30% (when samples <10 times detection limit).
- Ion balances – for conductivity greater than 100 µS/cm, RPD should be ±10%.

4 Seepage Monitoring

4.1 Sample Collection

In 2022, AEM surveyed BOS-8 in June, July and August and collected one sample each from BOS-8A and BOS-8D (Figure 2.1) on June 6, 2022.

AEM conducted a seepage survey along the toe of the north and east side of the camp pad, and the southern extent of the airstrip in June 2022 but did not observe any flowing seeps and therefore did not collect any water quality samples. No seepage flow was observed in July and August.

Field parameters (Section 3.1.1) were collected at both stations. Flow rate could not be measured due to insufficient flow. Two samples and one field duplicate (BOS8A-DUP) were submitted to ALS for analysis as outlined in Section 3.1.1.

4.2 Results and Discussion

4.2.1 Quality Assurance and Quality Control

One field duplicate (BOS8A-DUP) was analyzed to assess reproducibility of sampling and chemical homogeneity of the seepage water. Quality control checks and results are shown in Table 4.1.

- BOS-8A and the field duplicate from this station both had high concentrations of TSS and failed QA/QC criteria with a relative percent difference of 60%. These samples also failed to meet QA/QC criteria for total metals for aluminum, arsenic, cobalt, iron, and manganese. The poor reproducibility between the duplicate and parent sample was likely due to solids contamination as indicated by elevated TSS concentrations (37 and 20 mg/L for the parent and duplicate samples, respectively).

All other data passed the QA/QC checks except ion balances could not be assessed because total alkalinity and chloride data were unavailable. SRK accepted all data as reported.

Table 4.1: Summary of QA/QC checks on laboratory data for ephemeral streams samples

QC Test	SRK QC Criteria	Results
Physical Test[1]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	Not applicable
Method Blank (n=1) for TSS and Conductivity	<2X DL	All passed
Field Duplicate (n=1) for pH, TSS, Hardness, and Conductivity	For samples >10X DL should be within +/- 30% RPD	TSS failed, RPD = 60% All others passed
Lab Duplicate (n=1) for pH, TSS, and Conductivity	For samples >10X DL should be within +/- 20% RPD	All passed

QC Test	SRK QC Criteria	Results
Field pH vs. Lab pH (n=2)	Difference should not be greater than 1 pH unit	All passed
Field EC vs Lab EC (n=2)	For samples > 10X the detection limit (DL), % RPD should be within +/-30%	All passed
Laboratory Control Samples (n=1) for pH, TSS, and Conductivity	Within specified tolerance ranges.	All passed
Anions and Nutrients[2]		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	Not applicable
Method Blank (n=1)	<2X DL	All passed
Field Duplicate (n=1)	For samples >10X DL should be within +/-30% RPD	All passed
Lab Duplicate (n=1)	For samples >10X DL should be within +/-20% RPD	All passed
Ion Balance (n=0)	EC>100 uS/cm, % difference should be within +/-10%	Not applicable; no dissolved metals
Laboratory Control Samples (n=1)	Within specified tolerance ranges.	All passed
Total Trace Metals by ICP-MS		
Field Blank (n=0)	Minimum criteria is <2X DL, will accept <5X DL	Not applicable
Method Blank (n=1)	<2X DL	All passed
Field Duplicate (n=1)	For samples >10X DL should be within +/-30% RPD	Total Al, As, Co, Fe, and Mn failed, RPD >30% All others passed
Lab Duplicate (n=1)	For samples >10X DL should be within +/-20% RPD	Total Mo failed with lab qualifier DUP-H; due to sample heterogeneity. All others passed.
Laboratory Control Samples (n=1)	Within specified tolerance ranges.	All passed

Sources: https://srk.sharepoint.com/sites/NACAPR001813/Internal/!020_Project_Data/030_Subcontractor/ALS/Boston/Boston Ephemeral stream/[YL2200614_0_XLR_QAQC_mlt.xlsx]

Notes:

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

[2] Total Ammonia, Sulfate (as SO4)

4.2.2 Field Observations

Field parameters for the two seepage samples collected in 2022 are presented in Table 4.2. Field pH at both stations was circumneutral and field EC values at BOS-8A and BOS-8D were 750 and 380 μS/cm, respectively.

Table 4.2: Field observations for seepage samples

Sample ID	pH	EC	ORP[1]	Temperature	Flow	Comments
	s.u.	*µS/cm*	*RmV*	*°C*	*L/s*	
BOS8A	7.3	750	120	6.0	-	Goose nest ~15m west of sampling point
BOS8D	7.4	380	130	3.8	-	Vegetation and channeling

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

Notes:

[3] Field calibrated ORP values

[4] Flow estimates could not be measured due to insufficient flow

4.2.3 Laboratory Results

Table 4.3 and Table 4.4 present selected parameters from the 2022 Boston seepage data set and a comparison to a statistical summary of historical Boston seepage samples (2008 to 2021). The 2022 data is presented in Appendix A. Figure 4.1 to Figure 4.7 present sulphate, ammonia, arsenic, copper, iron, nickel, and selenium concentrations observed since 2008. Values below the detection limit are plotted as equal to the detection limit. A summary of the water quality results is presented as follows:

- Laboratory pH values at BOS-8A and BOS-8D were 7.8 and 7.5, respectively. Lab EC values were roughly equivalent to field EC values. Values of EC were highest at BOS-8A (700 µS/cm) compared to BOS-8D (350 µS/cm), and both values were two to three times lower than the historical median (1200 µS/cm). Similarly, concentrations of major ions (calcium, magnesium, sodium, and sulphate) were higher at BOS-8A compared to BOS-8D.
- Sulphate concentrations at BOS-8A and BOS-8D were 270 and 76 mg/L, respectively. Both values were within the range of historic results.
- The ammonia concentration at BOS-8A was below the detection limit (<0.0050 mg/L) and lower than historical results and the concentration at BOS-8D (0.067 mg/L) was within the range of historical results.
- Concentrations of total arsenic were higher at BOS-8D (0.22 mg/L) compared to BOS-8A (0.039 mg/L) and both were in the range of historical results.
- Total cadmium, copper, and zinc concentrations at BOS-8D (0.0079 µg/L, 0.00097 mg/L, and <0.003 mg/L, respectively) were two to six times lower than historical results. Historical concentrations of all three of these metals have varied but remained stable since 2011. Concentrations of total cadmium, copper, and zinc at BOS-8A (0.017, 0.0026, and 0.0046 mg/L, respectively) were higher than BOS-8D and within the range of historical results.
- The total iron concentration at BOS-8A (1.8 mg/L) was higher than at BOS-8D (0.055 mg/L), though both results were within the range of historical values. The higher concentration in the BOS-8A sample can likely be attributed to the higher TSS concentration (37 mg/L). The TSS

concentration in the BOS-8D sample was below the detection limit (<3.0 mg/L). Historic dissolved iron concentrations have been near or below the detection limit (<0.01 mg/L) since 2018.

- BOS-8D had higher concentrations of manganese (0.12 mg/L) and nickel (0.11 mg/L) compared to BOS-8A (0.036 and 0.023 mg/L, respectively). The concentrations of total manganese and nickel at both stations were within the range of historical results.
- Concentrations of cobalt were one order of magnitude higher at BOS-8D (0.094 mg/L) compared to BOS-8A (0.0064 mg/L). Results at both stations were within the range of historical values.
- Concentrations at BOS-8A and BOS-8D for total aluminum (0.089 and 0.026 mg/L), lead (0.00046 and 0.00011 mg/L), and selenium (0.00030 and 0.00048 mg/L) were within the historical ranges of values.
- Compared with the historic data, there were no indications of increasing trends for all aforementioned parameters.

Table 4.3: Summary of general parameters, major total ions, and nutrients for 2022 and historic seepage samples

Sample ID	Sample Date	Physical Tests			Major Ions and Nutrients[1,2]					
		pH	Conductivity	TSS	Sulphate	Calcium	Magnesium	Potassium	Sodium	Ammonia
		s.u.	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L as N
2022 Samples										
BOS8A	6-Jun-22	7.8	700	37	270	74	34	4.6	12	<0.0050
BOS8D	6-Jun-22	7.5	350	<3.0	76	40	10	2.9	4.7	0.067
Historic Seepage Data										
P5		7.0	360	<3.0	69	36	9.6	2.8	5.3	0.0074
P50		7.8	1200	5.4	330	120	47	11	37	0.050
P95		8.0	2600	50	660	270	89	21	100	6.3
Count		62	62	51	62	50	50	49	48	60

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

Notes:

[1] Total concentrations presented for calcium, magnesium, potassium, and sodium.

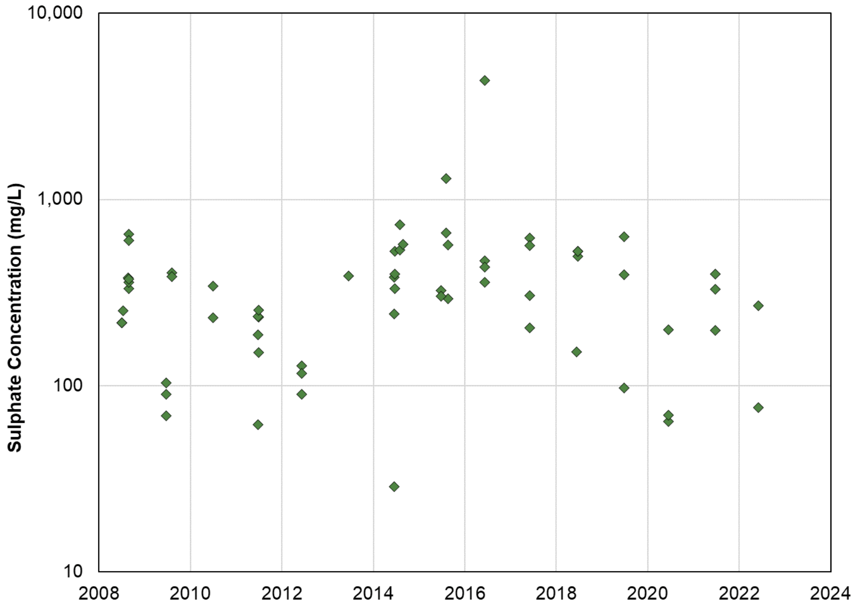
[2] Nitrate, chloride, and total alkalinity not analyzed in 2022.

Table 4.4: Summary of total metals for 2022 and historic seepage samples

Sample ID	Sample Date	Total Metals										
		Aluminum	Arsenic	Cadmium	Cobalt	Copper	Iron	Lead	Manganese	Nickel	Selenium	Zinc
		mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
2022 Samples												
BOS8A	6-Jun-22	0.089	0.039	0.017	0.0064	0.0026	1.8	0.00046	0.036	0.023	0.00030	0.0046
BOS8D	6-Jun-22	0.026	0.22	0.0079	0.094	0.00097	0.055	0.00011	0.12	0.11	0.00048	<0.0030
Historic Seepage Data												
P5		0.015	0.0045	0.015	0.0022	0.0012	0.038	0.00010	0.019	0.011	0.00038	0.0037
P50		0.11	0.12	0.050	0.051	0.0047	0.31	0.00050	0.15	0.13	0.0016	0.0060
P95		1.1	1.1	1.0	0.71	0.011	3.8	0.0050	0.70	1.4	0.0077	0.087
Count		50	48	52	50	52	52	52	50	52	48	50

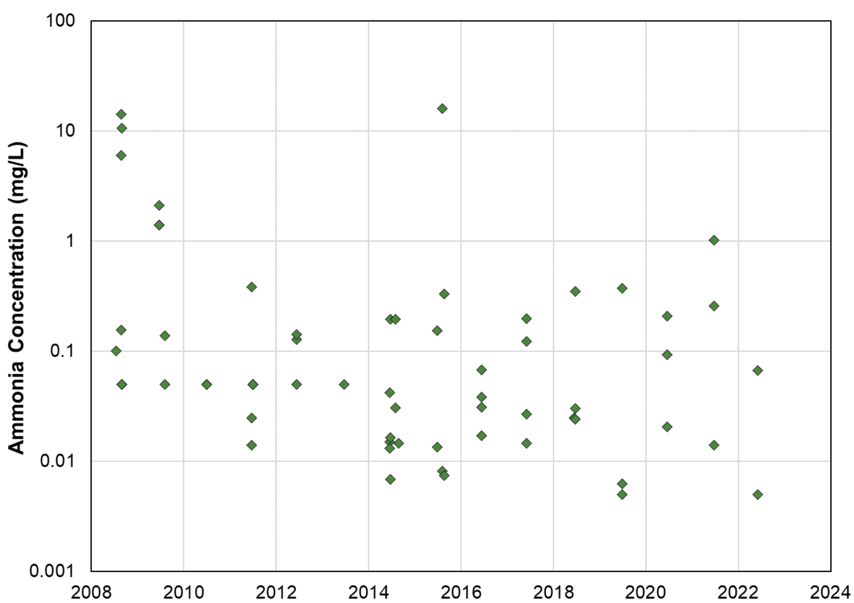
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

Figure 4.1: Seepage sulphate concentrations



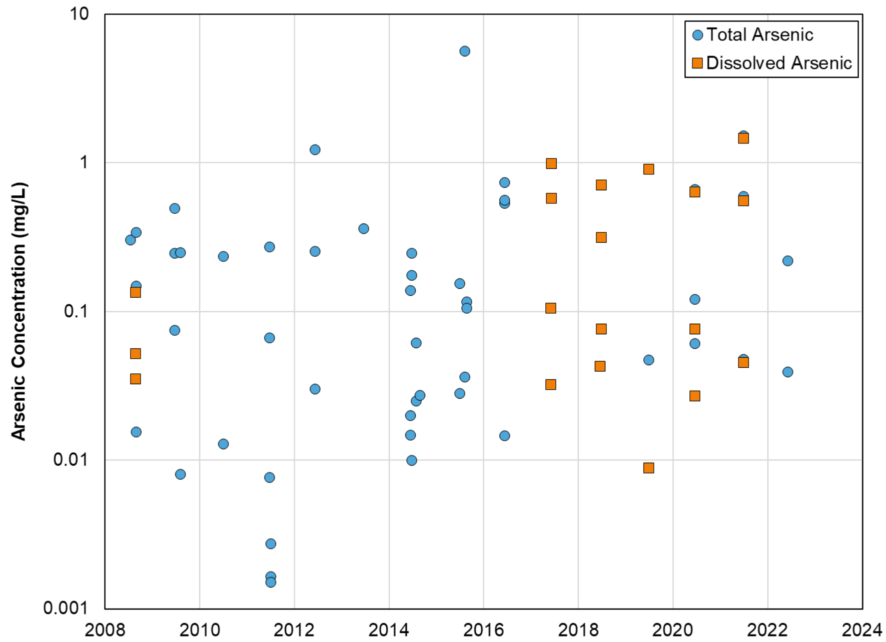
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

Figure 4.2: Seepage ammonia concentrations



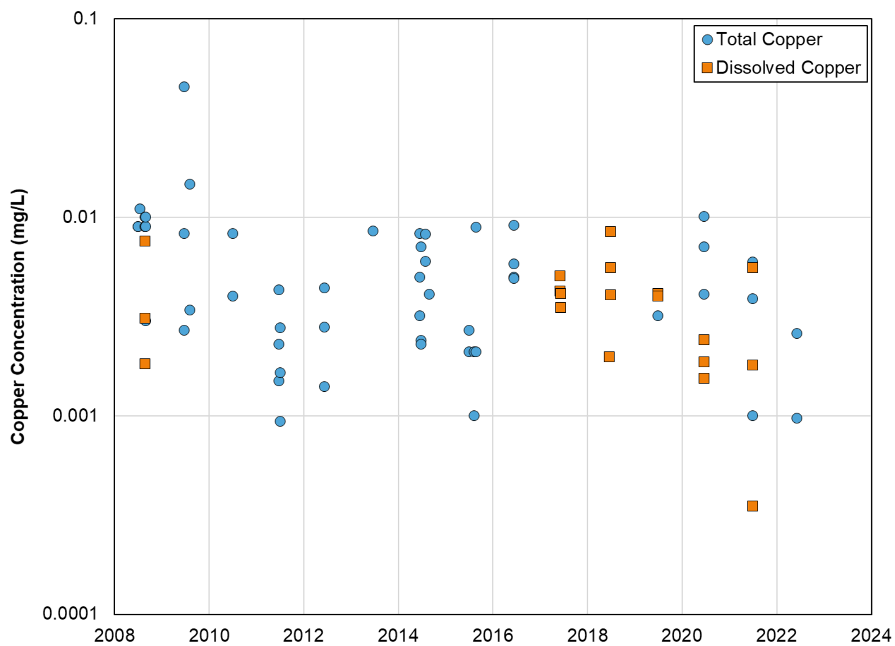
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

Figure 4.3: Seepage arsenic concentrations



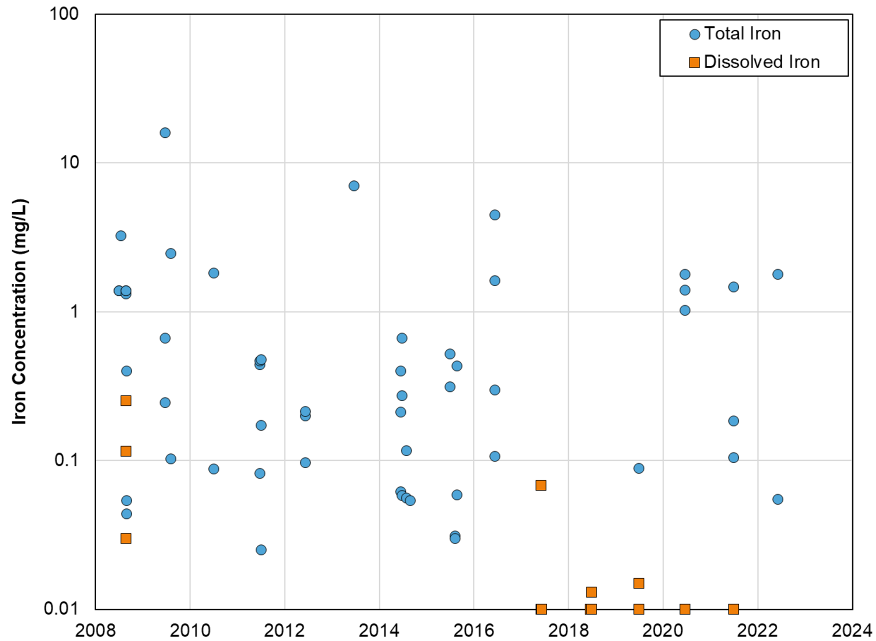
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

Figure 4.4: Seepage copper concentrations



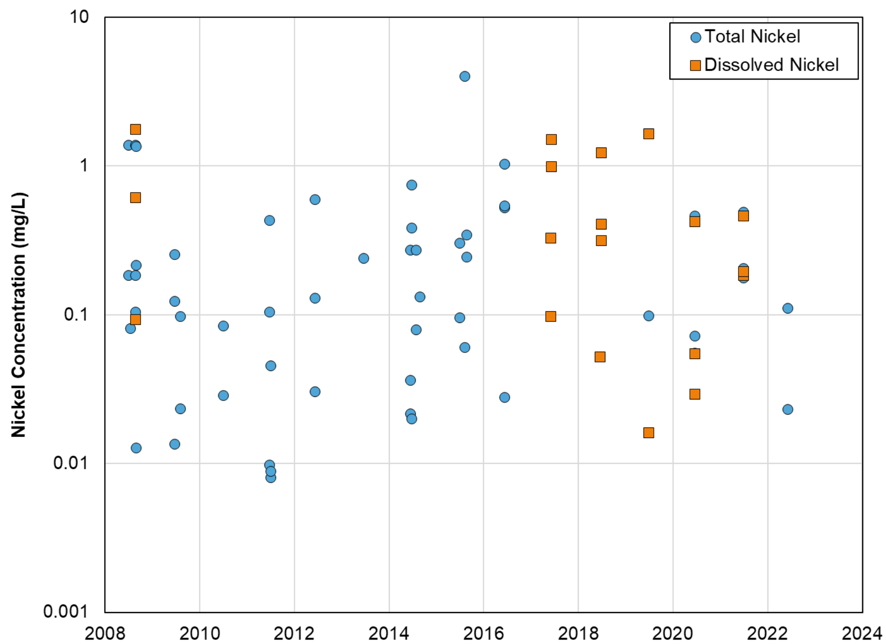
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

Figure 4.5: Seepage iron concentrations



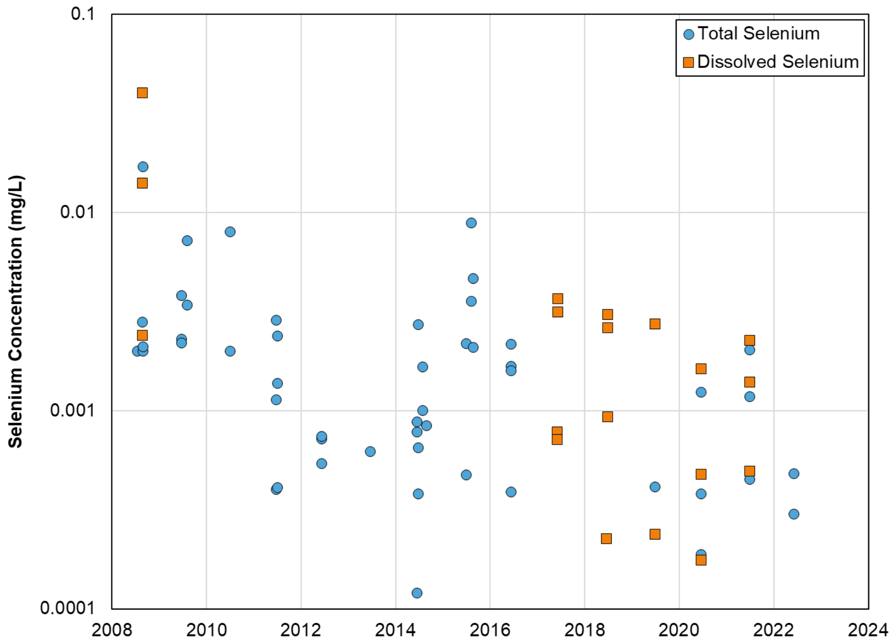
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

Figure 4.6: Seepage nickel concentrations



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

Figure 4.7: Seepage selenium concentrations



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonSeepageWQData_CAPR001813_2022_rev0.xlsx]

5 Ephemeral Streams

5.1 Sample Collection

AEM surveyed ephemeral streams A to E on June 6, 2022 and observed flow in all except E2. Furthermore, AEM observed a second ephemeral stream in catchment D (denoted as C2-B in Figure 2.2). Field parameters (Section 3.1.1) were collected at all five locations. Flow rates could not be measured due to channeling, dispersed flow. Five samples, one field duplicate (B2-DUP), and one field blank (B2-FB) were submitted to ALS for analysis as outline in Section 3.1.1

5.2 Results and Discussion

5.2.1 Quality Assurance and Quality Control

One field duplicate (B2-DUP) and one field blank (B2-FB) were analyzed. Quality control checks and results are shown in Table 5.1. All data passed the QA/QC checks and SRK accepted all data as reported.

Table 5.1: Summary of QA/QC checks on laboratory data for ephemeral streams samples

QC Test	SRK QC Criteria	Results
Physical Test[1]		
Field Blank (n=1)	Minimum criteria is <2X DL, will accept <5X DL	All passed
Method Blank (n=1)	<2X DL	All passed
Field Duplicate (n=1)	For samples >10X DL should be within +/- 30% RPD	All passed
Lab Duplicate (n=1)	For samples >10X DL should be within +/- 20% RPD	All passed
Field pH vs. Lab pH (n=5)	Difference should not be greater than 1 pH unit	All passed
Field EC vs Lab EC (n=5)	For samples > 10X the detection limit (DL), % RPD should be within +/-30%	All passed
Laboratory Control Samples (n=1)	Within specified tolerance ranges.	All passed
Anions and Nutrients[2]		
Field Blank (n=1)	Minimum criteria is <2X DL, will accept <5X DL	All passed
Method Blank (n=1)	<2X DL	All passed
Field Duplicate (n=1)	For samples >10X DL should be within +/- 30% RPD	All passed
Lab Duplicate (n=1)	For samples >10X DL should be within +/- 20% RPD	All passed

QC Test	SRK QC Criteria	Results
Ion Balance (n=5)	EC>100 µS/cm, % difference should be within +/-10%	All passed
Laboratory Control Samples (n=1)	Within specified tolerance ranges.	All passed
Trace Metals by ICP-MS		
Field Blank (n=1) for Dissolved	Minimum criteria is <2X DL, will accept <5X DL	All passed
Method Blank (n=1) for Dissolved	<2X DL	All passed
Field Duplicate (n=1) for Dissolved	For samples >10X DL should be within +/- 30% RPD	All passed
Lab Duplicate (n=1) for Dissolved	For samples >10X DL should be within +/- 20% RPD	All passed
Laboratory Control Samples (n=1) for Dissolved	Within specified tolerance ranges.	All passed
Hg-CVAAS		
Field Blank (n=1) for Dissolved	Minimum criteria is <2X DL, will accept <5X DL	Passed
Method Blank (n=1) for Dissolved	<2X DL	Passed
Field Duplicate (n=1) for Dissolved	For samples >10X DL should be within +/- 30% RPD	Passed
Lab Duplicate (n=1) for Dissolved	For samples >10X DL should be within +/- 20% RPD	Passed
Laboratory Control Samples (n=1) for Dissolved	Within specified tolerance ranges.	Passed

Sources: https://srk.sharepoint.com/sites/NACAPR001813/Internal/!020_Project_Data/030_Subcontractor/ALS/Boston/Boston%20Ephemeral%20stream/YL2200608_0_XLR_QAQC_mlt.xlsx?web=1

Notes:

[1] Conductivity, pH, Hardness (as CaCO3), Total Suspended Solids, Total Dissolved Solids, Total Alkalinity and Acidity (as CaCO3)

[2] Total Ammonia, Br, Cl, F, NO3, NO2, Total Phosphorus, Sulfate (as SO4)

5.2.2 Field Observations

Table 5.2 presents a comparison of 2022 field parameters and the historic field data set. Field pH values ranged from 6.6 to 7.3. Field EC in the C2 and D2 samples were roughly equivalent (430 and 480 µS/cm) and lower than the respective historical median results and the C2-B sample (700 µS/cm). Field EC in the A2 and B2 samples (28 µS/cm and 37 µS/cm, respectively) were lower than the other 2022 ephemeral stream samples and 5th percentile values from the historical data set.

Table 5.2: Field observations for ephemeral streams samples

Area	Date	pH	EC	ORP	Temperature	Flow[1]
		s.u.	*µS/cm*	*mV*	*°C*	*L/s*
2022 Samples						
A2	6-Jun-22	6.6	28	120	2.9	-
B2	6-Jun-22	7.3	37	100	0.5	-
C2	6-Jun-22	7.2	430	84	4.2	-
D2	6-Jun-22	7.0	480	120	8.2	-
C2-B[2]	6-Jun-22	7.0	700	120	5.7	-
Historic Ephemeral Streams Data						
A2 (2010 to 2021)	P5	7.5	140	11	4.3	0.053
	P50	7.8	250	110	10	0.074
	P95	8.1	570	330	18	0.39
	n	9	9	10	9	4
B2	14-Jun-11	6.5	310	210	2.0	-
C2 (2009 to 2021)	P5	6.5	96	70	2.8	0.11
	P50	7.2	800	160	13	1.5
	P95	7.5	1100	360	20	5.3
	n	13	13	13	13	6
D2 (2009 to 2020)	P5	6.5	160	23	2.9	0.41
	P50	6.8	1300	140	11	0.69
	P95	7.5	2000	370	19	0.97
	n	9	9	9	9	2

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQData_CAPR001813_2022_rev0.xlsx]

Notes:

[1] Flow was not estimated in 2022 due to dispersed, channeling flow.

[2] C2-B was collected from the D2 catchment area between ephemeral streams C2 and D2 (Figure 2.2)

5.2.3 Laboratory Results

A summary of water quality results for 2022 is provided in Table 5.3 and complete results are presented in Appendix B. Parameters identified by SRK (2009) as potential parameters of concern are presented in Figure 5.1 to Figure 5.8. Values below the detection limit are graphed as equal to the detection limit. Lines are included in the figure for ease of trend identification; however, ephemeral stream flow paths and therefore sample locations can vary from year to year.

A summary of the 2022 water quality data is as follows:

- The sulphate concentration at A2 (1.5 mg/L) was 25 times lower than historic median results and at B2 (0.87 mg/L), was 20 times lower than the single historical sample collected in 2011 (17 mg/L).

Concentrations at C2, D2, and C2-B ranged from 98 to 150 mg/L and were within the range of historical concentrations. Since 2009, sulphate concentrations have oscillated at A2, C2, and D2 and are 20 times lower at B2 than the last sample collected in 2011 (Figure 5.1).

- Chloride concentrations at A2 and B2 (3.5 and 2.6, respectively) were lower than historical results. Chloride at C2, D2, and C2-B (21, 52, and 64 mg/l, respectively) were within the range of historical results, though concentrations for all ephemeral streams have generally exhibited a decreasing trend (Figure 5.2).
- Nitrate concentrations were below the detection limit (<0.005 mg/L) at A2, B2, and C2 and were 0.011 and 0.015 at C2-B and D2, respectively. Nitrate concentrations have oscillated at A2 and have generally decreased at C2 and D2 since 2009 (Figure 5.4). The nitrate concentration at B2 was lower than the single historic sample.
- Aluminum concentrations for all samples ranged from 0.0074 to 0.083 mg/L. Trends at all stations were either stable or oscillating with no indications of increasing trends. Notably, the concentration at A2 (0.035 mg/L) was higher than the historical maximum observed in 2013 (0.020 mg/L).
- Copper concentrations for all samples ranged from 0.0011 to 0.0023 mg/L. Concentrations have been relatively stable for all stations except at B2, which had a concentration three times lower than the sample collected in 2011.
- Arsenic concentrations were at A2 (0.00034 mg/L) were nearly two orders of magnitude lower than historical median results (0.022 mg/L) and one order of magnitude lower at B2 (0.00032 mg/L) compared to the sample collected in 2011 (0.0033 mg/L). Concentrations at C2 (0.0012 mg/L) and D2 (0.0011 mg/L) were within the range of historical concentrations. Overall, arsenic concentrations have generally remained stable since 2009 with no indications of increasing trends (Figure 5.5).
- Iron concentrations for all locations were within the range of historical data, ranging from 0.026 to 0.10 mg/L (Figure 5.6). Overall, iron concentrations have oscillated within ten times the detection limit (0.01 mg/L) since 2009.
- The nickel concentration at A2 (0.00076) was an order of magnitude lower than historical median results (0.0096 mg/L) and at B2 was nearly two times lower than the 2011 sample (0.0031 mg/L). Concentrations at C2, D2, and C2-B ranged from 0.0058 to 0.014 mg/L and were within the range of historical data. Nickel concentrations have oscillated since 2009 and have been overall stable (Figure 5.7).
- Selenium concentrations at A2 and B2 were below the detection limit (<0.05 µg/L) whereas concentrations at C2, D2, and C2-B ranged from 0.064 to 0.12 µg/L. Values at A2 have remained stable since 2011 and values at C2 and D2 have generally decreased since 2009 (Figure 5.8). Selenium concentrations were below the detection limit for the B2 sample from 2011.
- Concentrations of the remaining dissolved metals presented in Table 5.3 were lower than (e.g. molybdenum) or within the range of historical data.

Table 5.3: Summary of selected water quality results for 2022 and historic ephemeral streams samples

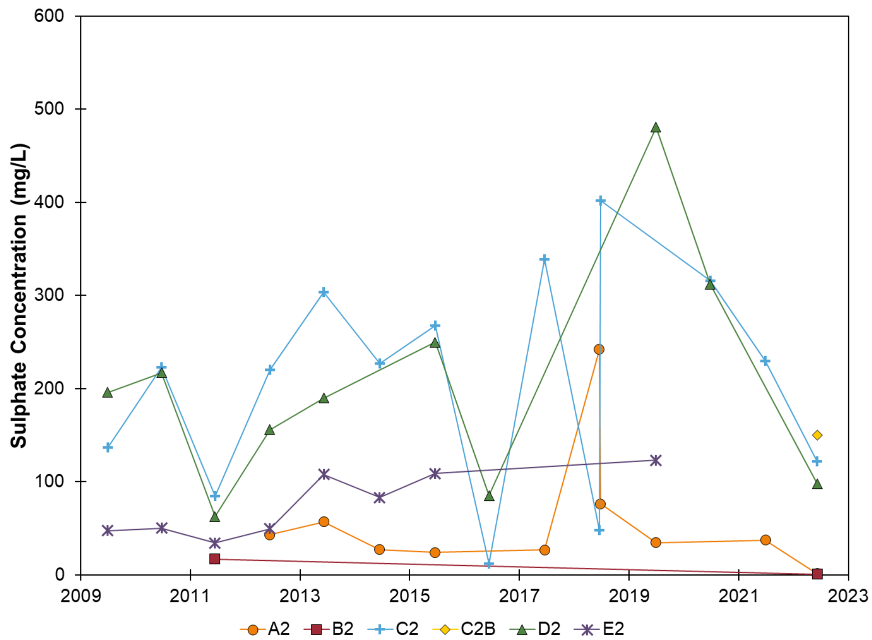
Sample ID		General Parameters				Anions and Nutrients				Dissolved Metals								
		pH	EC	TSS	Alkalinity, Total	Ammonia	Nitrate	Sulphate	Chloride	Aluminum	Arsenic	Cadmium	Copper	Iron	Lead	Nickel	Selenium	Zinc
		s.u.	*µS/cm*	*mg/L*	*mg/L as $CaCO_3$*	*mg/L as N*	*mg/L as N*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
2022 Samples																		
A2		6.5	26	<3	3.9	<0.005	<0.005	1.5	3.5	0.035	0.00034	0.0062	0.0013	0.044	<0.00005	0.00076	<0.00005	0.0012
B2		6.7	29	<3	5.5	0.0053	<0.005	0.87	2.7	0.083	0.00032	0.012	0.0023	0.1	<0.00005	0.0019	<0.00005	0.0022
C2		7.7	410	<3	42	0.0070	<0.005	120	21	0.013	0.0012	0.011	0.0013	0.092	<0.00005	0.0058	0.000064	0.0014
D2		7.7	460	<3	43	0.0058	0.015	98	52	0.012	0.0011	<0.005	0.0011	0.032	<0.00005	0.0059	0.000082	<0.001
C2-B[1]		7.9	650	<3	71	0.0079	0.011	150	64	0.0074	0.00071	0.0086	0.0023	0.026	<0.00005	0.014	0.00012	0.0013
Historical Ephemeral Streams Data																		
A2	**P05**	7.8	220	3	35	0.005	0.005	25	15	0.0034	0.0095	0.005	0.00094	0.01	0.00005	0.0037	0.000051	0.001
	P50	7.9	310	3	51	0.0077	0.017	37	31	0.0081	0.022	0.0055	0.0014	0.011	0.00005	0.0096	0.0001	0.0017
	P95	8.0	710	5.1	67	0.012	0.4	180	160	0.018	0.061	0.012	0.002	0.045	0.000088	0.018	0.00032	0.0027
	Max	8.0	740	5.9	67	0.013	0.47	240	180	0.02	0.075	0.013	0.0022	0.052	0.0001	0.018	0.00046	0.0029
	Count	9	9	7	9	9	9	9	9	9	9	9	9	9	9	9	9	9
B2	**Jun 2011**	6.3	-	-	9.6	3.4	12	17	40	0.13	0.0033	0.05	0.0071	0.14	0.0002	0.0031	0.001	0.017
C2	**P05**	7.4	180	3	32	0.005	0.005	34	16	0.011	0.0012	0.005	0.0013	0.014	0.00005	0.0034	0.000067	0.0013
	P50	7.8	820	3	53	0.013	0.42	230	62	0.014	0.0023	0.012	0.0018	0.03	0.00005	0.0079	0.00033	0.0023
	P95	7.9	1100	95	74	0.063	2.5	360	200	0.019	0.025	0.055	0.0027	0.12	0.00012	0.01	0.0013	0.0061
	Max	8.0	1100	150	78	0.083	3	400	210	0.021	0.055	0.063	0.003	0.12	0.0002	0.01	0.0018	0.0071
	Count	12	10	8	13	13	13	13	13	13	13	13	13	13	13	13	13	13
D2	**P05**	6.9	680	3	27	0.0057	0.013	72	110	0.0059	0.00096	0.0068	0.00082	0.01	0.00005	0.0042	0.00011	0.001
	P50	7.6	1400	4.1	35	0.012	0.31	200	250	0.0073	0.0015	0.026	0.0011	0.021	0.00005	0.0069	0.00077	0.003
	P95	7.8	1600	7.7	54	0.085	3.5	410	510	0.016	0.0051	0.18	0.0015	0.34	0.00025	0.025	0.0056	0.005
	Max	7.9	1600	8.1	57	0.12	4	480	550	0.017	0.0065	0.25	0.0016	0.55	0.00025	0.03	0.006	0.005
	Count	8	6	4	9	9	9	9	9	9	9	9	9	9	9	9	9	9

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQData_CAPR001813_2022_rev0.xlsx]

Notes:

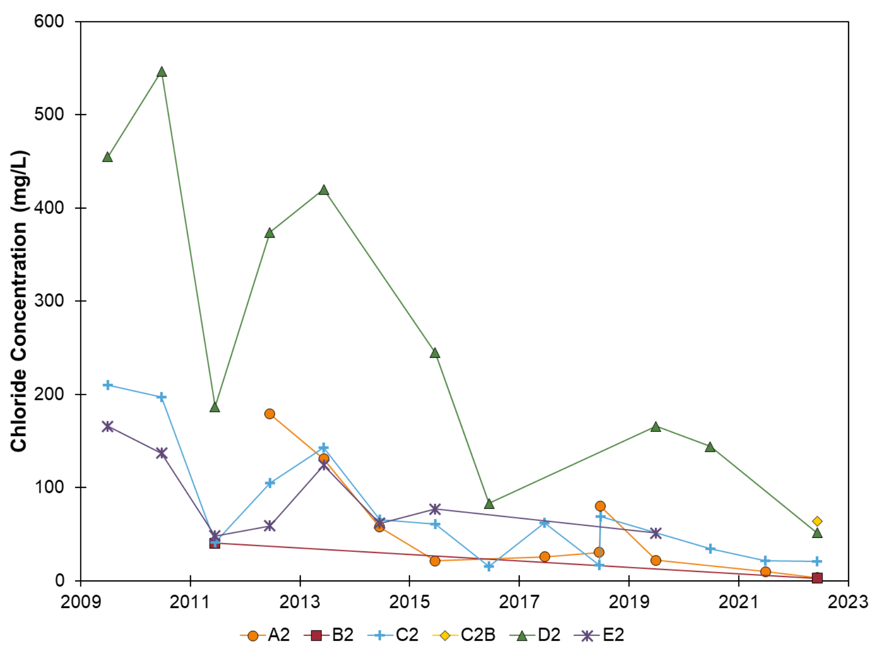
[1] C2-B was collected from the D2 catchment area between ephemeral streams C2 and D2 (Figure 2.2)

Figure 5.1: Ephemeral streams sulphate concentrations



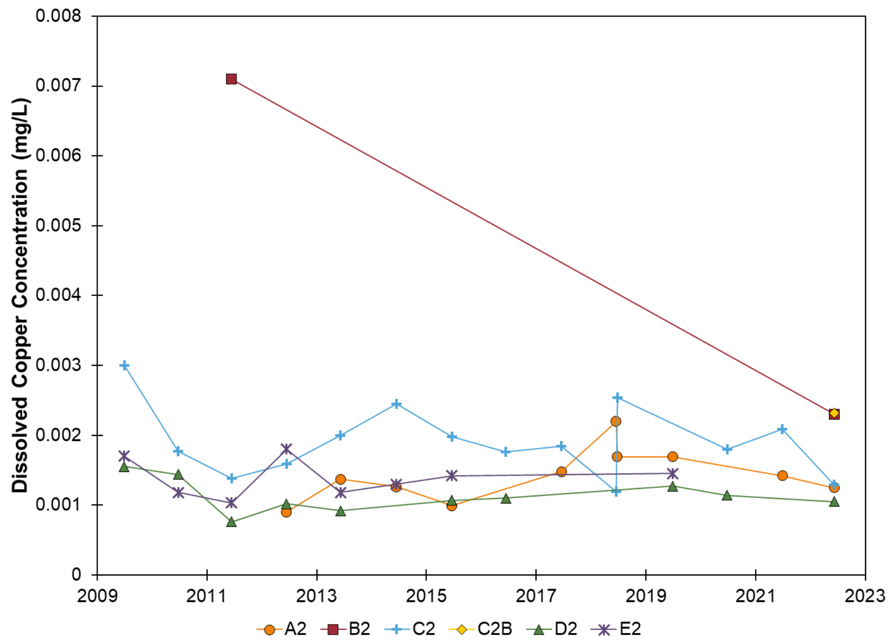
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQGraphing_CAPR001813_2022_rev0.xlsx]

Figure 5.2: Ephemeral streams chloride concentrations



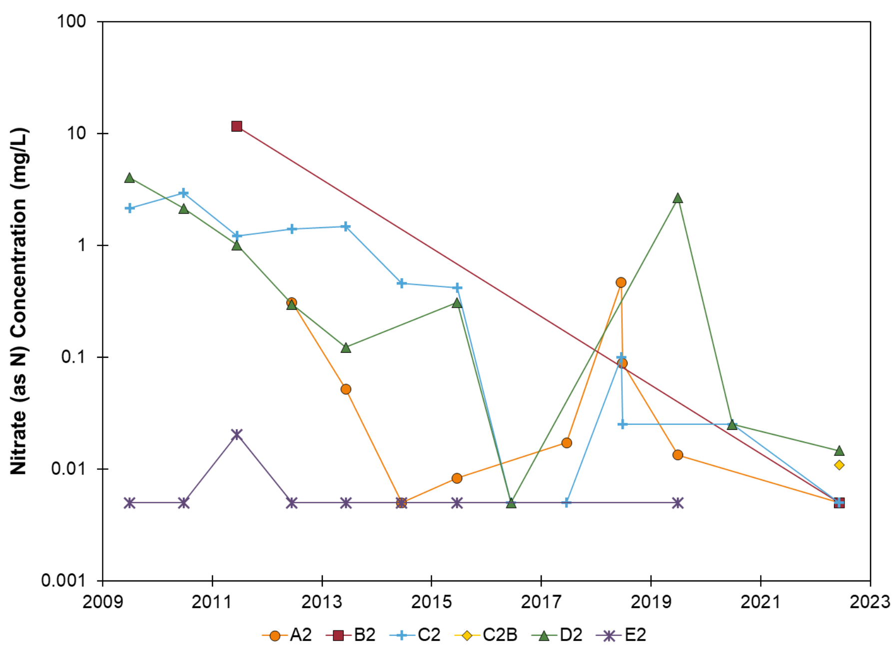
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQGraphing_CAPR001813_2022_rev0.xlsx]

Figure 5.3: Ephemeral streams copper concentrations



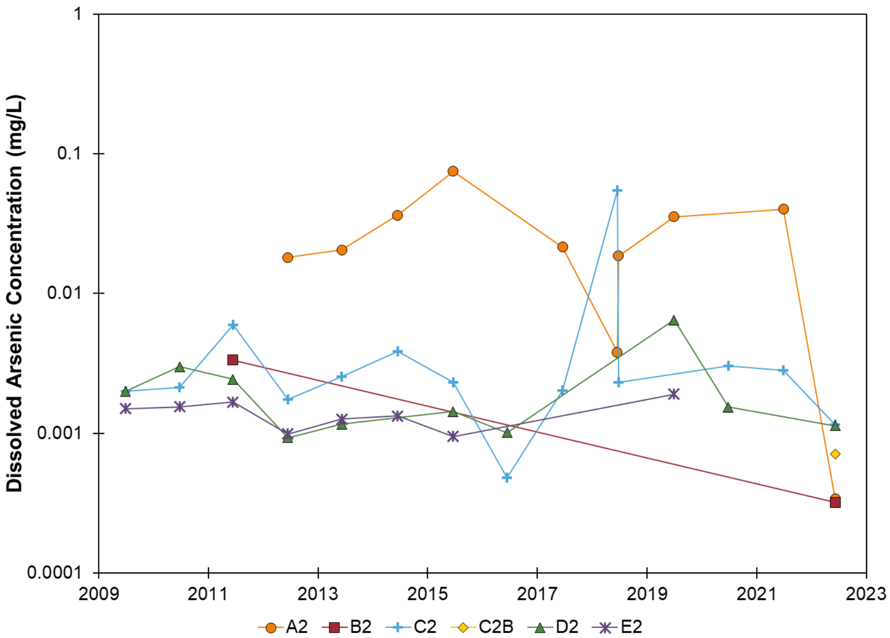
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQGraphing_CAPR001813_2022_rev0.xlsx]

Figure 5.4: Ephemeral streams nitrate concentrations



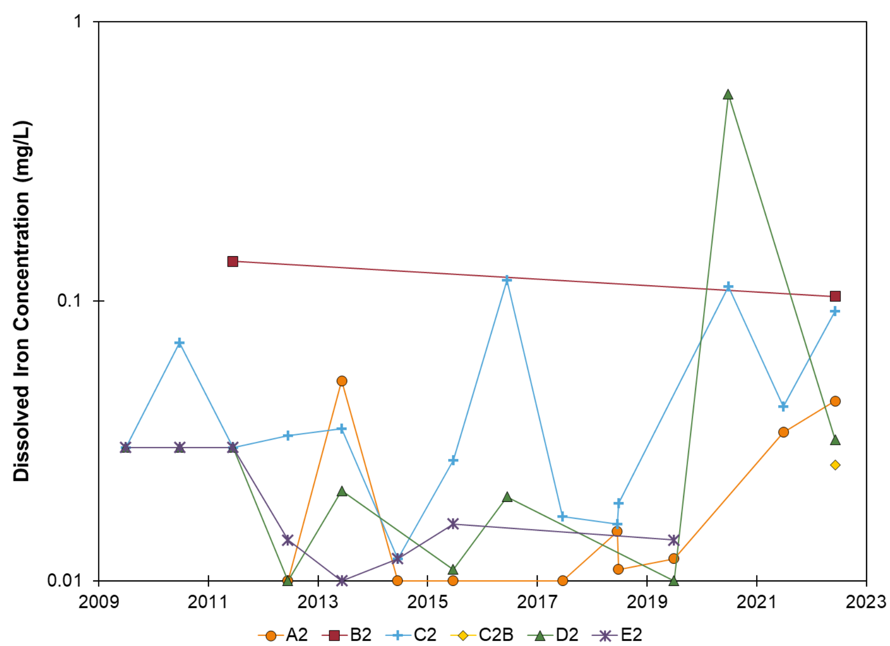
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQGraphing_CAPR001813_2022_rev0.xlsx]

Figure 5.5: Ephemeral streams arsenic concentrations



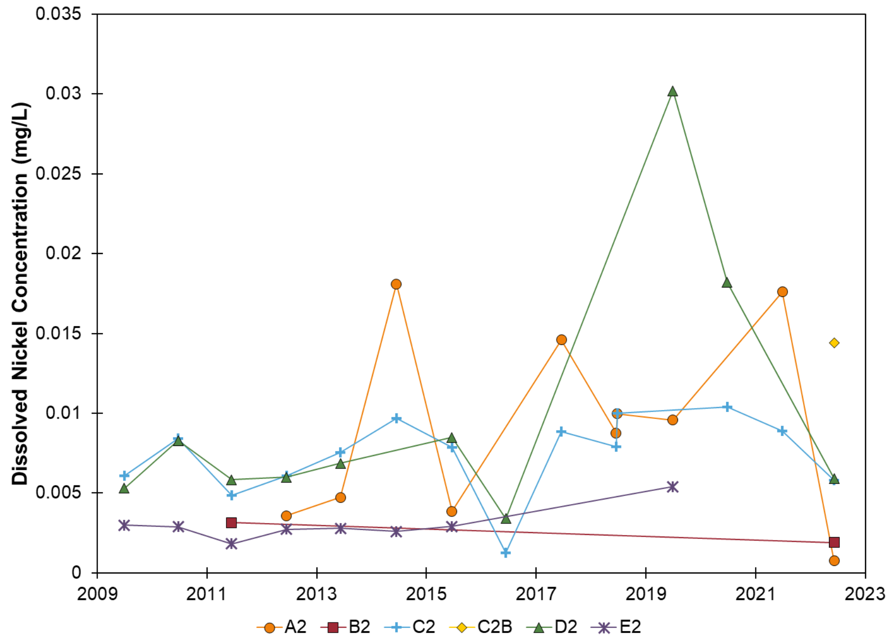
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQGraphing_CAPR001813_2022_rev0.xlsx]

Figure 5.6: Ephemeral streams iron concentrations



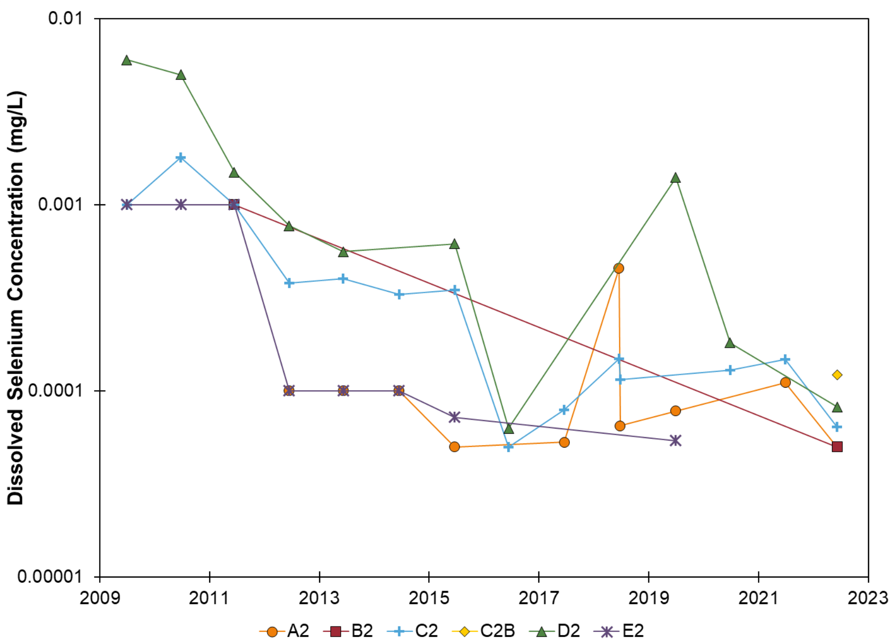
Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQGraphing_CAPR001813_2022_rev0.xlsx]

Figure 5.7: Ephemeral streams nickel concentrations



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQGraphing_CAPR001813_2022_rev0.xlsx]

Figure 5.8: Ephemeral streams selenium concentrations



Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQGraphing_CAPR001813_2022_rev0.xlsx]

5.2.4 Comparison to Water and Load Balance Predictions

Table 5.4 compares the 2022 ephemeral stream samples to the average and maximum model predictions for sulphate, chloride, nitrate, arsenic, copper, iron, nickel, and selenium (Section 2.3). All concentrations at all locations were within the range of predicted values.

Table 5.4: Comparison of 2022 Water Quality Results to Model Predictions (SRK 2009)

Parameter	Units	Predicted Value[1]				Max Predicted Value[1]				2022 Measured Values			
		A2	B2	C2	D2	A2	B2	C2	D2	A2	B2	C2	D2
Chloride	mg/L	95	24	144	144	357	68	559	559	3.5	2.7	21	52
Nitrate (as N)	mg/L	3.4	0.57	5.4	6.3	9.2	1.5	15	17	<0.0050	<0.0050	<0.0050	0.015
Sulphate	mg/L	70	13	110	130	120	21	190	220	1.5	0.87	120	98
Arsenic	mg/L	0.03	0.005	0.048	0.056	0.063	0.011	0.1	0.1	0.00034	0.00032	0.0012	0.0011
Copper	mg/L	0.0026	0.002	0.0026	0.0028	0.0033	0.002	0.004	0.005	0.0013	0.0023	0.0013	0.0011
Iron	mg/L	0.41	0.37	0.43	0.44	0.89	0.45	1.2	1.3	0.044	0.1	0.092	0.032
Nickel	mg/L	0.095	0.017	0.15	0.17	0.32	0.054	0.51	0.59	0.00076	0.0019	0.0058	0.0059
Selenium	mg/L	0.0015	0.0007	0.0021	0.0024	0.0035	0.001	0.0053	0.0061	<0.000050	<0.000050	0.000064	0.000082

Sources: https://srk.sharepoint.com/sites/FS208/Internal/!Project_Data (Not Job Specific)/19_Geochem/Working Files/Boston Annual Report/[BostonEphemeralStreams_WQData_CAPR001813_2022_rev0.xlsx]

Notes:

[1] Calculated values from Supporting Document B from SRK (2009)

6 Conclusions

The seepage program monitors contact water from the camp pad and ore stockpiles while the ephemeral stream program monitors drainage from the Boston ore stockpiles and camp pad before entering Aimaokatalok Lake.

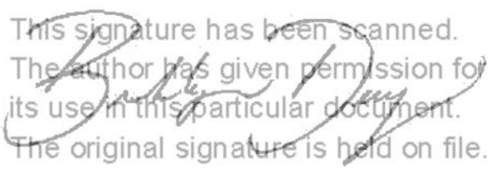
In 2022, AEM completed the required geochemical monitoring programs including i) monthly seepage surveys near BOS-8 located at the eastern edge of the camp pad and a freshet seepage survey along the northern and eastern edges of the camp pad and the full extent of the airstrip for opportunistic seepage samples and ii) opportunistic sampling of five ephemerals streams (A to E) within the catchment of the Boston camp pad. In total, AEM collected two seepage samples from BOS-8 along the eastern side of the camp pad and five ephemeral streams samples from streams A2, B2, C2 and D2. The sample from B2 is the second sample collected from the B2 catchment since the monitoring program was initiated.

All seepage and ephemeral stream samples had pH values ranging from 6.6 to 7.4, indicating that the drainage from the waste rock on the camp pad is not acidic. Monitoring of the seepage from the camp pad and the ore stockpiles indicates that water quality for the contaminants of concern (sulphate, ammonia, nitrate, chloride, arsenic, cadmium, copper, zinc, iron, manganese, nickel, aluminum, lead, and selenium) is within the range of the historical data with no indication of increasing trends. The analysis of water quality data for ephemeral streams A2, B2, C2 and D2 indicate that concentrations for the contaminants of concern were oscillating and/or stable with no indications of increasing trends. Compared to SRK (2009) model predictions, 2022 monitoring data for ephemeral streams were within the range of predicted values for chloride, sulphate, nitrate, arsenic, copper, iron, nickel, and selenium.

The results of the seepage and ephemeral streams monitoring program support the Boston waste rock and ore management and closure plan (SRK 2017). SRK recommends continued annual monitoring.

Closure

This report, 2022 Waste Rock and Ore Monitoring Report, Boston Camp, was prepared by



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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.

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[SRK] SRK Consulting (Canada) Inc., 2009. Water and Ore/Waste Rock Management Plan for the Boston Site Hope Bay Project, Nunavut. Report 1CH008.022 for Hope Bay Mining Ltd. July 2009.

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Appendix A 2022 Boston Seepage Field Observations and Water Quality Results

Sample			BOS8A	BOS8A-DUP	BOS8D
Date			06-Jun-2022	06-Jun-2022	06-Jun-2022
Time Sampled			15:45	15:53	16:25
ALS Sample ID			YL2200614-001	YL2200614-002	YL2200614-003
Description of Location				*Field duplicate of BOS8A*	
Parameter	Detection Limit	Unit			
Field Measurements					
pH	-	s.u.	7.26	-	7.43
Temperature	-	ºC	6	-	3.8
Conductivity	-	µS/cm	750	-	379
ORP	-	mV	122	-	134
Salinity	-	ppt	0.3	-	0.2
Laboratory Measurements					
conductivity	2.0	µS/cm	701	708	354
hardness (as CaCO3), from total Ca/Mg	0.50	mg/L	325	327	142
pH	0.10	pH units	7.75	7.8	7.54
solids, total suspended [TSS]	3.0	mg/L	36.8	19.8	<3.0
ammonia, total (as N)	0.0050	mg/L	<0.005	0.0062	0.0668
sulfate (as SO4)	0.30	mg/L	268	266	76.2
aluminum, total	0.0030	mg/L	0.089	0.0153	0.0255
antimony, total	0.00010	mg/L	0.00133	0.0013	0.00657
arsenic, total	0.00010	mg/L	0.0392	0.0105	0.218
barium, total	0.00010	mg/L	0.0126	0.0106	0.00506
beryllium, total	0.000020	mg/L	<0.00002	<0.00002	<0.000020
bismuth, total	0.000050	mg/L	<0.00005	<0.00005	<0.000050
boron, total	0.010	mg/L	0.053	0.051	0.076
cadmium, total	0.0000050	mg/L	0.0000173	0.0000068	0.0000079
calcium, total	0.050	mg/L	73.8	74.6	39.8
cesium, total	0.000010	mg/L	0.000026	0.000018	0.000172
chromium, total	0.00050	mg/L	0.00062	<0.0005	<0.00050
cobalt, total	0.00010	mg/L	0.00642	0.00134	0.0936
copper, total	0.00050	mg/L	0.0026	0.00157	0.00097
iron, total	0.010	mg/L	1.78	0.302	0.055
lead, total	0.000050	mg/L	0.000464	0.000067	0.000109
lithium, total	0.0010	mg/L	0.0025	0.0025	0.0086
magnesium, total	0.0050	mg/L	34.2	34.1	10.3
manganese, total	0.00010	mg/L	0.0357	0.00485	0.116
molybdenum, total	0.000050	mg/L	0.000338	0.0003	0.00165
nickel, total	0.00050	mg/L	0.0231	0.0199	0.110
phosphorus, total	0.050	mg/L	<0.05	<0.05	<0.050
potassium, total	0.050	mg/L	4.64	4.48	2.89
rubidium, total	0.00020	mg/L	0.0019	0.00183	0.00206
selenium, total	0.000050	mg/L	0.000301	0.000288	0.000481
silicon, total	0.10	mg/L	1.64	1.48	0.78
silver, total	0.000010	mg/L	0.000072	<0.00001	0.000019
sodium, total	0.050	mg/L	12.4	12.1	4.69
strontium, total	0.00020	mg/L	0.216	0.209	0.263
sulfur, total	0.50	mg/L	95.2	96.6	26.0
tellurium, total	0.00020	mg/L	<0.0002	<0.0002	<0.00020
thallium, total	0.000010	mg/L	<0.00001	<0.00001	<0.000010
thorium, total	0.00010	mg/L	<0.0001	<0.0001	<0.00010
tin, total	0.00010	mg/L	<0.0001	<0.0001	<0.00010
titanium, total	0.00030	mg/L	0.00068	<0.0003	<0.00030
tungsten, total	0.00010	mg/L	0.00089	0.00024	0.00051
uranium, total	0.000010	mg/L	0.00002	0.000016	0.000042
vanadium, total	0.00050	mg/L	0.00092	<0.0005	0.00075
zinc, total	0.0030	mg/L	0.0046	<0.003	<0.0030
zirconium, total	0.00020	mg/L	<0.0002	<0.0002	<0.00020

Appendix B 2022 Boston Ephemeral Streams Field Observations and Water Quality Results

Sample			A2	B2	C2	D2	C2-B	B2-DUP	B2-FB
Date			06-Jun-2022	06-Jun-2022	06-Jun-2022	06-Jun-2022	06-Jun-2022	06-Jun-2022	06-Jun-2022
Time Sampled			16:53	14:25	15:09	15:56	15:36	14:28	14:31
ALS Sample ID			YL2200608-001	YL2200608-002	YL2200608-003	YL2200608-004	YL2200608-005	YL2200608-006	YL2200608-007
Description of Location							*Ephemeral stream in D2 catchment*	*Field duplicate of B2*	*Field blank collected at B2*
Parameter	**Detection Limit**	**Unit**							
Field Measurements									
pH	-	s.u.	6.59	7.25	7.2	7	7.07	-	-
Temperature	-	ºC	2.9	0.5	4.2	8.2	5.7	-	-
Conductivity	-	µS/cm	27.6	36.6	433	481	699	-	-
ORP	-	mV	122	104	84	121	120	-	-
Salinity	-	ppt	6	0	0.2	0.2	0.3	-	-
Laboratory Measurements									
conductivity	2.0	µS/cm	25.7	28.7	409	461	645	28.3	<2.0
acidity (as CaCO3)	2.0	mg/L	2.5	3.0	2.6	2.5	2.4	2.8	<2.0
alkalinity, total (as CaCO3)	1.0	mg/L	3.9	5.5	42.2	42.5	71.4	5.8	<1.0
hardness (as CaCO3), dissolved	0.60	mg/L	7.64	8.84	168	179	270	8.68	<0.60
pH	0.10	pH units	6.53	6.65	7.66	7.68	7.90	6.68	5.25
solids, total dissolved [TDS]	10	mg/L	34	42	256	313	434	39	<10
solids, total suspended [TSS]	3.0	mg/L	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
ammonia, total (as N)	0.0050	mg/L	<0.0050	0.0053	0.0070	0.0058	0.0079	<0.0050	<0.0050
bromide	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	0.055	<0.050	<0.050
chloride	0.50	mg/L	3.52	2.65	21.0	51.6	63.8	2.59	<0.50
fluoride	0.020	mg/L	<0.020	<0.020	0.020	0.060	0.076	<0.020	<0.020
nitrate (as N)	0.0050	mg/L	<0.0050	<0.0050	<0.0050	0.0146	0.0109	<0.0050	<0.0050
nitrite (as N)	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
phosphorus, total	0.0020	mg/L	0.0395	0.0690	0.0478	0.0292	0.0466	0.0836	<0.0020
sulfate (as SO4)	0.30	mg/L	1.52	0.87	122	98.2	150	0.90	<0.30
aluminum, dissolved	0.0010	mg/L	0.0350	0.0827	0.0131	0.0116	0.0074	0.0800	0.0012
antimony, dissolved	0.00010	mg/L	<0.00010	<0.00010	0.00044	0.00153	0.00078	<0.00010	<0.00010
arsenic, dissolved	0.00010	mg/L	0.00034	0.00032	0.00115	0.00113	0.00071	0.00030	<0.00010
barium, dissolved	0.00010	mg/L	0.00234	0.00313	0.0141	0.0177	0.0196	0.00319	<0.00010
beryllium, dissolved	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, dissolved	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	0.010	mg/L	<0.010	<0.010	0.034	0.073	0.110	<0.010	<0.010
cadmium, dissolved	0.0000050	mg/L	0.0000062	0.0000121	0.0000114	<0.0000050	0.0000086	0.0000158	<0.0000050
calcium, dissolved	0.050	mg/L	1.59	1.81	37.5	46.7	72.2	1.81	<0.050
cesium, dissolved	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
chromium, dissolved	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, dissolved	0.00010	mg/L	0.00040	0.00236	0.00140	0.00094	0.00394	0.00229	<0.00010
copper, dissolved	0.00020	mg/L	0.00125	0.00230	0.00129	0.00105	0.00232	0.00225	<0.00020
iron, dissolved	0.010	mg/L	0.044	0.104	0.092	0.032	0.026	0.100	<0.010
lead, dissolved	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
lithium, dissolved	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0069	0.0095	<0.0010	<0.0010
magnesium, dissolved	0.0050	mg/L	0.891	1.05	18.0	15.2	21.8	1.01	<0.0050
manganese, dissolved	0.00010	mg/L	0.0332	0.515	0.121	0.00784	0.00826	0.487	<0.00010
mercury, dissolved	0.0000050	mg/L	<0.0000050	0.0000069	<0.0000050	<0.0000050	<0.0000050	0.0000072	<0.0000050
molybdenum, dissolved	0.000050	mg/L	<0.000050	0.000076	0.000286	0.00115	0.000553	0.000071	<0.000050
nickel, dissolved	0.00050	mg/L	0.00076	0.00191	0.00582	0.00591	0.0144	0.00185	<0.00050

phosphorus, dissolved	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	0.050	mg/L	0.671	1.22	2.97	3.16	4.93	1.20	<0.050
rubidium, dissolved	0.00020	mg/L	0.00097	0.00212	0.00132	0.00127	0.00204	0.00205	<0.00020
selenium, dissolved	0.000050	mg/L	<0.000050	<0.000050	0.000064	0.000082	0.000122	<0.000050	<0.000050
silicon, dissolved	0.050	mg/L	0.274	0.709	1.06	1.12	3.14	0.686	<0.050
silver, dissolved	0.000010	mg/L	<0.000010	<0.000010	0.000011	<0.000010	0.000032	<0.000010	<0.000010
sodium, dissolved	0.050	mg/L	1.64	1.85	9.56	14.0	14.2	1.85	<0.050
strontium, dissolved	0.00020	mg/L	0.00615	0.00809	0.151	0.352	0.513	0.00830	<0.00020
sulfur, dissolved	0.50	mg/L	0.83	0.69	42.9	34.2	51.5	0.74	<0.50
tellurium, dissolved	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, dissolved	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
thorium, dissolved	0.00010	mg/L	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	0.00010	<0.00010
tin, dissolved	0.00010	mg/L	0.00018	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	0.00030	mg/L	0.00046	0.00067	<0.00030	0.00043	<0.00030	0.00068	<0.00030
tungsten, dissolved	0.00010	mg/L	<0.00010	<0.00010	0.00013	<0.00010	0.00012	<0.00010	<0.00010
uranium, dissolved	0.000010	mg/L	0.000017	0.000038	0.000020	0.000013	0.000040	0.000038	<0.000010
vanadium, dissolved	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	0.0010	mg/L	0.0012	0.0022	0.0014	<0.0010	0.0013	0.0022	<0.0010
zirconium, dissolved	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020

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