NORTHERN STAR
RESOURCES LIMITED

February 28, 2023
COR-23-011
Via Electronic Submittal

Alaska Department of Environmental Conservation
Division of Water, Compliance Program
555 Cordova Street
Anchorage, AK 99501

Re: **Northern Star (Pogo) LLC 2022 Annual Quarter Monitoring Report**

To whom it may concern:

Enclosed is Northern Star (Pogo) LLC Annual 2022 Activity and Monitoring Report. This report is prepared to fulfill the requirements of the *Alaska Department of Natural Resources (ADNR) Pogo Mine Millsite Lease ADL416949, Alaska Department of Environmental Conservation (ADEC) APDES Permit AK0053341,* and *ADEC Waste Management Permit 2018DB0001.* This report covers the period from January 1, 2022 through December 31, 2022.

If you have any questions, please contact James Meyers, Senior Environmental Coordinator at 907-895-2879 or email him at jmeyers@nsrltd.com.

Sincerely,

Micheal Eckert
General Manager

Enclosure: Annual Pogo Mine Water Quality Monitoring Report, 2022

cc: Tim Pilon, ADEC (via ZENDTO)
William Groom, ADNR (via ZENDTO)
Kate Harper, ADNR (via ZENDTO)
dec-wqreporting@alaska.gov (via ZENDTO)

2022 ANNUAL MONITORING REPORT

NORTHERN STAR (POGO) LLC

Submitted To:

Alaska Department of Environmental Conservation
Division of Water, Compliance Program
555 Cordova Street
Anchorage, Alaska 99501

Alaska Department of Natural Resources
Division of Mining, Land, and Water
550 West 7th Avenue, Suite 900D
Anchorage, AK 99501-3557

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February 27, 2023

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

APPENDIX A – MAPS

Figure 1.1: General Location Map

Figure 1.2: Monitoring Locations

Figure 1.3: Surface Water Monitoring Locations

Figure 1.4: Pogo Mine As-Built

Figure 1.4a: 1525 Portal and Lower Camp As-Built

Figure 1.4b: Airstrip Area As-Built

Figure 1.4c: Mill and Permanent Camp Bench As-Built

Figure 1.4d: Permanent Camp Bench As-Built

Figure 1.4e: RTP and DSTF Area As-Built

Figure 1.4f: Pogo Mine 2022 Disturbance Areas

APPENDIX B – WASTE ROCK GEOCHEMISTRY AND FLOTATION TAILINGS SOLIDS CHEMISTRY

Table 1: Whole Rock Geochemistry for Rock Placed in Dry Stack 2022

Table 2: Geochemistry of Flotation Tailings Solids Placed in Dry Stack 2022

APPENDIX C – TIME SERIES GRAPHS OF MONITORING DATA

APPENDIX D – WHOLE EFFLUENT TOXICITY TESTINGDCS

APPENDIX E – FISH TISSUE SAMPLING LAB REPORTS

Electronic Appendices

APPENDIX F – ELECTRONIC MONITORING DATA

[SUBMITTED ELECTRONICALLY VIA ALASKA ZENDTO (STATE OF ALASKA)]

[SUBMITTED ALASKA ENVIRONMENTAL DATA MANAGEMENT SYSTEM (EDMS) PORTAL]

ACRONYMS

AAC:	Alaska Administrative Code
ADEC:	Alaska Department of Environmental Conservation
ADNR:	Alaska Department of Natural Resources
APDES:	Alaska Pollutant Discharge Elimination System
BOD:	Biological Oxygen Demand
CIP:	Carbon-in-Pulp
DCS:	Distributed Control System
DSTF:	Dry Stack Tailings Facility
DMR:	Discharge Monitoring Report
gpm:	Gallons Per Minute
ML:	Method Limit
MWTP#3:	Mine Water Treatment Plant #3
ORTW:	Off-River Treatment Works
QAP:	Quality Assurance Plan
RTP:	Recycle Tailings Pond
SCW:	Seepage Collection Wells
STP:	Sewage Treatment Plant
TSS:	Total Suspended Solids
TDS:	Total Dissolved Solids
TWUA:	Temporary Water Use Authorization
WAD:	Weak Acid Dissociable
WQS:	Water Quality Standards
XRF:	x-ray fluorescence

1. INTRODUCTION

Northern Star (Pogo) LLC prepared this report to fulfill the requirements of the *Alaska Department of Environmental Conservation (ADEC) APDES Permit AK0053341 (7/27/17), Alaska Department of Environmental Conservation (ADEC) Waste Management Permit 2018DB0001 (5/24/2018), Alaska Department of Natural Resources (ADNR) Pogo Mine Millsite Lease ADL416949*, and *ADNR Plan of Operations Approval F20189500 (7/2/2020)*. This report addresses activities executed during the year of 2022. A General Location Map can be found in **Appendix A, Figure 1.1**. Graphs show data plotted on a log-scale axis and include at least the past six years of data. This report defines individual data sets and their relation to the detection limits and the ADEC Water Quality Standards (WQS).

2. 2022 MONITORING

A prescriptive environmental monitoring program is performed in accordance with State of Alaska permits and Pogo's approved *Pogo Mine Monitoring Plan* and *Quality Assurance Project Plan (QAPP).*

The objectives of Pogo's monitoring programs are:

- To monitor the water quality of the effluent discharged from the facility,
- To establish a compliance trend for water quality in the Goodpaster River and the groundwater below the facility that can be correlated over time with mining activities or discharges from the facility.
- To monitor the Carbon-in-Pulp (CIP) tailings processes associated with the underground paste backfill, and,
- To monitor the flotation tailings and the materials placed in the Drystack Tailings Facility (DSTF).

Samples collected from the Mine Water Treatment Plant #3 (MWTP#3), groundwater stations, surface water stations, the Sewage Treatment Plant (STP) and the Off-River Treatment Works (ORTW) effluent were submitted to Energy Laboratories, Inc. and Pollen Environmental. Samples collected for PC002, monitoring mineralized waste rock, and PC003, monitoring flotation tailings, were analyzed by ALS Chemex. Annual Whole Effluent Toxicity (WET) Test samples were submitted to TRE Environmental and Eurofins Test America Laboratory, Seattle.

2.1 Summary

The WQS graphs for Cadmium, Copper, Lead, Nickel, Silver and Zinc have been updated to take the sample specific water hardness value into account. Previous reports, before the 2021 1st Quarter Monitoring Report, used the lowest possible WQS for those constituents without sample hardness being considered.

A summary of the 2022 monitoring results shows:

APDES Permit:

- **Outfall 011:** Pogo reported no exceedances at Outfall 011 during 2022. Refer to **Section 2.2.1** for more detail.
- **Outfall 001:** Pogo reported no exceedances at Outfall 001 during 2022. Refer to **Section 2.2.2** for more detail.
- **Outfall 002:** Pogo reported no exceedances at Outfall 002 during 2022. Refer to **Section 2.2.3** for more detail.

- **Surface Water:** No adverse trends were observed for the year. Refer to **Section 2.3.1** for more detail.
- **Whole Effluent Toxicity:** WET Testing took place in June. Chronic bioassays were conducted by two laboratories concurrently. All final test results were within the permit limits. Refer to **Section 2.3.2** for more detail.
- **Fish Tissue:** Annual fish tissue sampling was completed in September. All analytical results are consistent with historical data and no trends or significant anomalies were identified in 2022. No other adverse trends were observed. Refer to **Section 2.3.3** for more detail.

Waste Management Permit:

Ground Water

- **2011 Series Wells:** Two wells are located below the Drystack Tailings Facility: MW11-001A and MW11-001B. The wells monitor groundwater downstream of the DSTF and upstream of the Recycled Tailings Pond (RTP). TDS concentrations were above WQS in MW11-001A on June 17, August 29 and October 28. MW11-001B was above TDS WQS on June 17. Nitrate was above WQS in both wells for all of 2022. Refer to **Section 2.4.1** for more detail.
- **500 Series Wells:** Three wells are located below the RTP Dam: MW12-500, MW12-501, and MW12-502. The wells monitor groundwater downstream of the RTP seepage collection well (SCW) system. Chloride, nitrate, and sodium levels were detected above trigger limits while arsenic and nitrate were detected above WQS. Sodium has an increasing trend over the sampling period of 2014-2022. Refer to **Section 2.4.3.1** for more detail.
- **2018 Series Wells:** The 2018 series wells were installed in October 2018 and are sampled quarterly, with the exception of MW18-001 which is sampled monthly. MW18-001 had one sample above the trigger limit for Copper on May 14th 2022 and concentrations of arsenic and nitrate, above WQS. Except for the 3rd quarter sample, Nitrate is above WQS in MW18-002. MW18-003A and MW18-003B were installed as a nested pair of wells at the end of Liese Valley. Samples from MW18-003A indicated Copper and Nitrate were above WQS in March but below for the rest of 2022. MW18-003B iron and manganese concentrations have exceeded WQS since installation of the well in 2018 and remained above WQS throughout 2022. MW18-003B also had an exceedance of pH in June, August and October. Refer to **Section 2.4.3.2** for wells MW18-001 and MW18-002, and to **Section 2.4.4.2** for wells MW18-003A and MW18-003B.
- **200 Series Wells:** MW11-216 is located downgradient of the ore body to monitor groundwater quality and is sampled semi-annually. MW11-216 was sampled on June 19th and August 31st, 2022 and all results were below WQS. Refer to **Section 2.4.4.1** for more detail.

Process Control

- **PC001:** PC001 monitors CIP tails prior to use in paste backfill. During the 1st Quarter of 2022, one sample result was above the maximum threshold. No other values exceeded the permit thresholds. Refer to **Section 2.5.3** for more detail.
- **PC002 and PC003 Solids:** PC002 samples monitor mineralized waste rock that is placed within the DSTF. PC003 Solids samples monitor flotation tailings that are placed within the DSTF. No adverse trends were observed. Refer to **Sections 2.5.4 and 2.5.5** for more detail.
- **PC003 Liquid:** PC003 Liquid samples monitor interstitial water pressed from the flotation tailings prior to placement within the DSTF. The following constituents were above the Target Operating Ranges: WAD CN in June and TKN in March and June; Mercury was over

the operating limit for all 4 quarters. There were no sustained upward trends. No other adverse trends were observed during 2022. Refer to **Section 2.5.6** for more detail. A discussion of the results for each sampling program is provided below.

2.2 Treated Effluent Monitoring

ADEC APDES AK0053341 (8/1/17), Appendix A, 3.0

Treated effluent data are submitted to ADEC monthly via the Discharge Monitoring Reports (DMRs) under the APDES Permit. The monitoring locations for treated effluent are shown on **Appendix A, Figure 1.2**, as Outfall 011, 001, and 002.

2.2.1 Outfall 011 – Treated Effluent from Mine Water Treatment Plant

ADEC APDES AK0053341 (8/1/17), 1.4

Groundwater and drill water collected from the underground workings are sent to MWTP#3 (located near the 1525 portal). The treated effluent is returned for use underground, sent to the mill to be used as process water, or discharged to the ORTW. Surface runoff and groundwater are collected in the RTP. RTP water and mine water are sent to MWTP#3, treated, and then discharged to the ORTW, or directed to the mill through the RTP head tank for use as process water. Treated effluent was discharged to the ORTW during 2022 at an average 576 gpm. The volume of water discharged from Outfall 011 during 2022 is shown below in **Figure 1.**

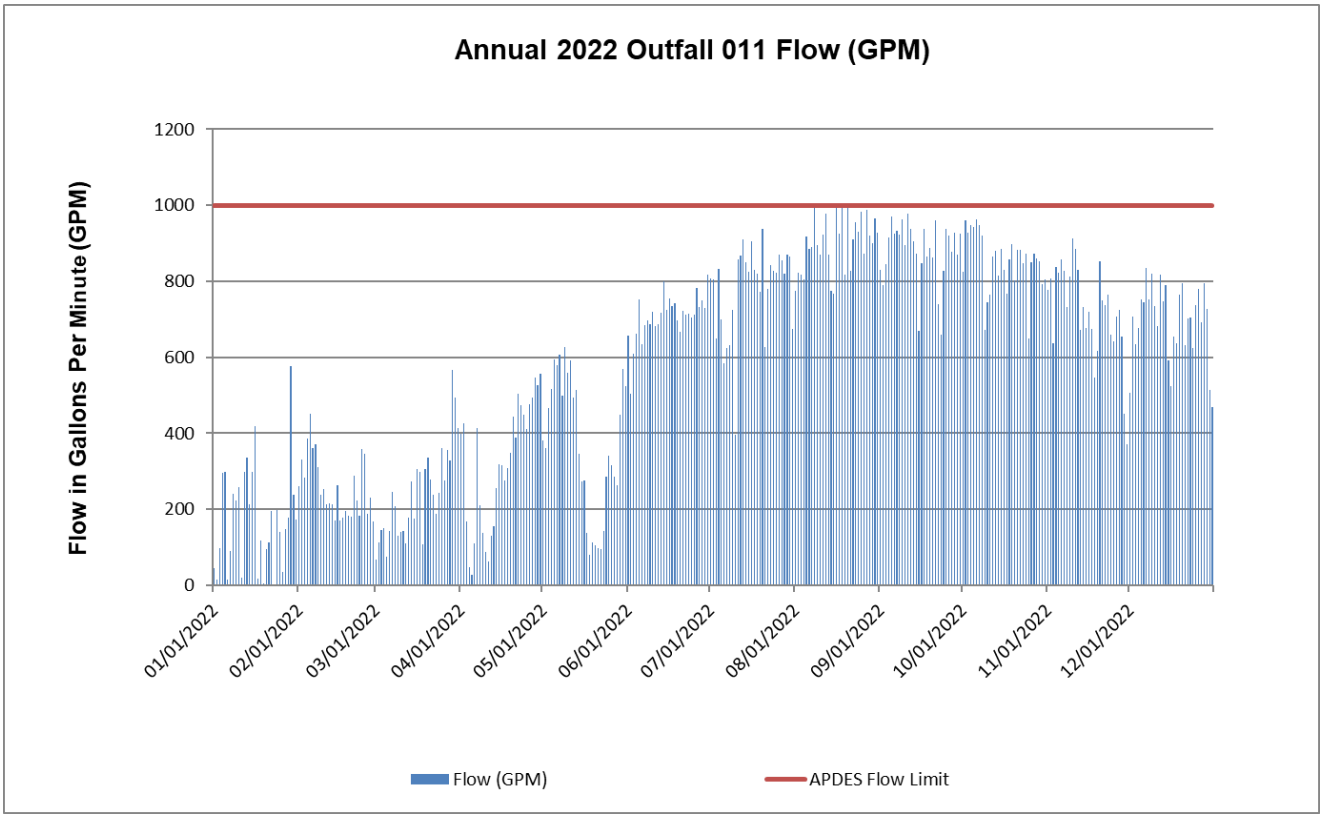


Figure 1: 2022 Annual MWTP#3 Outfall 011 Discharge to ORTW

Continuous pH data is collected at Outfall 011 along with weekly laboratory samples of WAD cyanide and quarterly laboratory samples for metals (arsenic, cadmium, copper, iron, lead, manganese, mercury, selenium, zinc), total suspended solids (TSS), hardness, and sulfate. All results

are within the limits and conditions set forth in the permit. Outfall 011 has two continuous pH meters. pH readings taken during the year show compliance with permit limits. No adverse trends are reported for the year. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.2.2 Outfall 001 – Discharge from Off River Treatment Works

ADEC APDES AK0053341 (8/1/17), 1.3

Treated effluent from MWTP#3 is sent to the ORTW. After mixing in the ORTW, water flowed over the weir of Pond 2 (Outfall 001) into the Goodpaster River at an average of 14,420 gpm throughout 2022. The sampling location is at the weir. **Figure 2** presents the 2022 flow from Outfall 001.

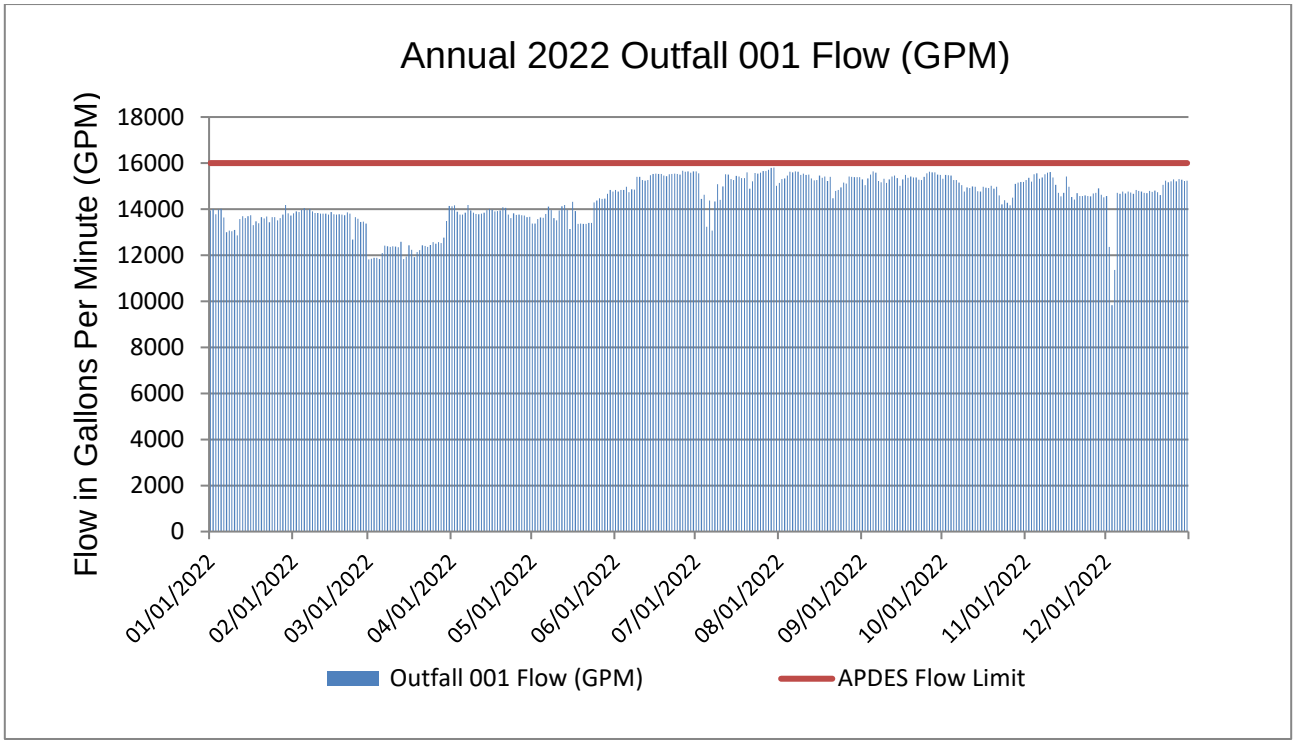


Figure 2: 2022 Annual Outfall 001 Discharge to Goodpaster River

Continuous turbidity data and twice-daily pH readings are collected along with weekly laboratory samples for copper, lead, manganese, WAD cyanide, pH, and temperature at Outfall 001. Monthly samples required by the permit include cadmium, mercury, zinc, hardness and lab turbidity.

In 2022, None of the analytical results for WAD cyanide exceeded the facility specific method limit (ML) of 20 ug/L. All other results are within the limits and conditions set forth within the permit. Time series graphs are provided in **Appendix C** and show the change in concentration limits. Monitoring data is provided in **Appendix F.**

2.2.3 Outfall 002 – Treated Effluent from Sewage Treatment Plant

ADEC APDES AK0053341 (8/1/17), 1.5

The STP operated throughout 2022 with flows ranging between 8,008 and 37,262 gallons per day. The average flow during the period at Outfall 002 was 26,656 gallons per day. Daily field parameters were collected to assess quality of treated effluent. Monthly samples were also collected for metals (arsenic, cadmium, copper, lead, manganese, mercury, and zinc), biological

oxygen demand (BOD_5), total suspended solids (TSS), fecal coliform, and nitrate/nitrite. **Figure 3** presents the gallons per day flow from Outfall 002 for 2022.

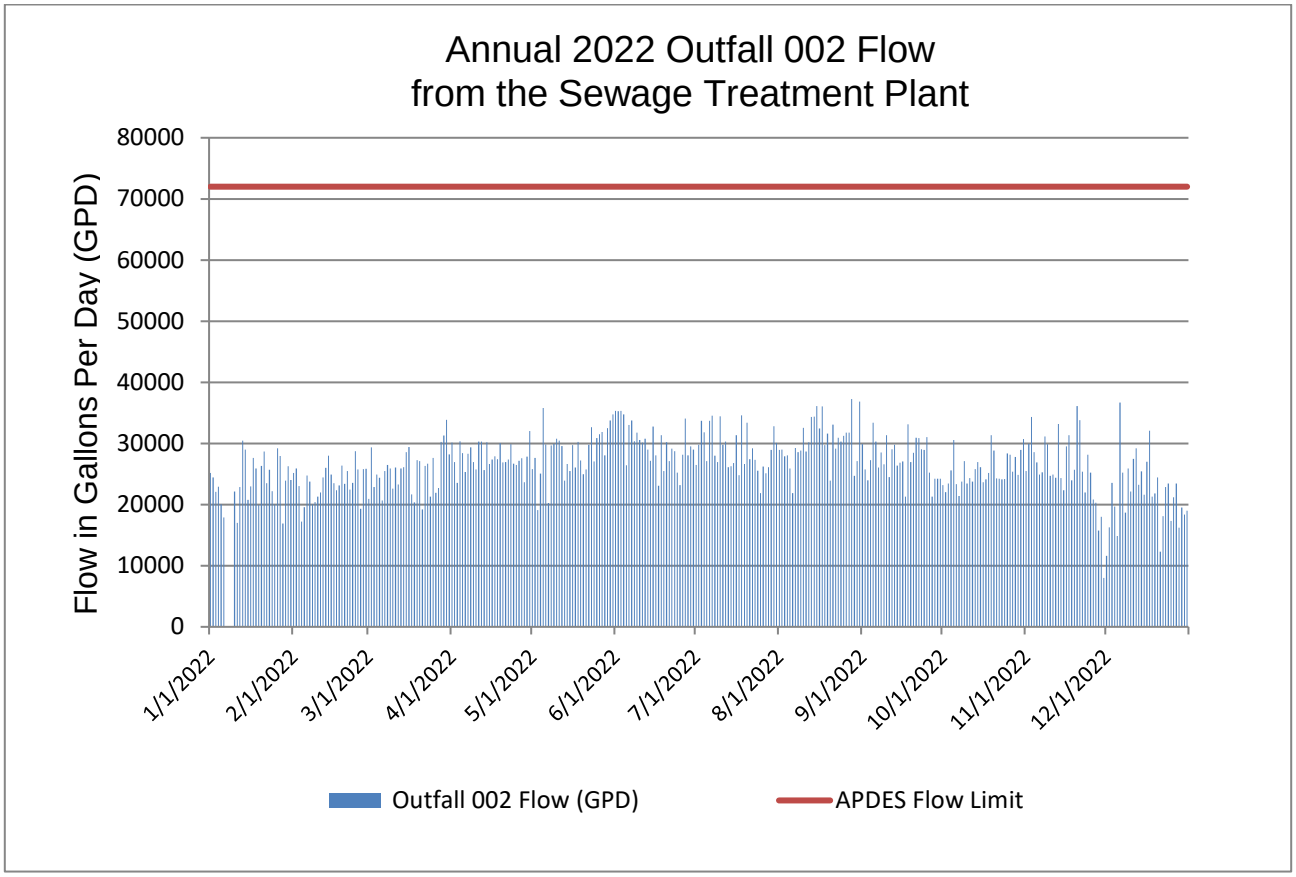


Figure 3: 2022 Annual Outfall 002 Discharge to Goodpaster River

Influent data from STP 002 were collected for BOD_5 and TSS on a quarterly basis to determine percent removal. All results were within the limits and conditions set forth in the permit. Time series graphs are provided in **Appendix C.** Monitoring data is provided in **Appendix F.**

2.3 Surface Water Monitoring

2.3.1 Goodpaster River

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.6.2; ADEC APDES AK0053341 (8/1/17), 1.8; Pogo Mine Monitoring Plan (7/20) 8.0

Six surface water stations are monitored to evaluate water quality along the Goodpaster River: SW01 and SW49 are located upstream of the Pogo Mine, SW41 is located downstream of Outfall 001, SW42 is downstream of Outfall 002, and SW15 and SW12 are located downstream from all Pogo facilities. Surface water samples are analyzed six times a year for total metals (antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc) and WAD cyanide. Physical and aggregate properties of alkalinity, conductivity, hardness, nitrite plus nitrate, pH, total dissolved solids (TDS), turbidity, and temperature are also measured.

Surface water samples were collected on March 5, May 15, June 22, August 7, September 21, and December 4, 2022. All results were within the limits and conditions set forth in the permits. No adverse trends were observed. The locations of the surface water monitoring stations are shown in **Appendix A, Figure 1.3.** Time series graphs are provided in **Appendix C**. Monitoring and historic data is provided in **Appendix F**.

2.3.2 Whole Effluent Toxicity

ADEC APDES Permit AK0053341 (8/1/17), 1.7

The annual WET test was conducted from June 20 to June 24 by TRE in Fort Collins, Colorado. A split of the same sample was also sent to Test America in Corvallis, Oregon. Results from both laboratories are presented in **Table 1**. All results were within the limits and conditions set forth within the permit. Laboratory reports are provided in **Appendix D**.

Table 1: Pogo Mine Whole Effluent Toxicity Testing 2022

Laboratory	Species	No Observed Effect Concentration (%)	Low Observed Effect Concentration (%)	Inhibition Concentration 25%	Toxicity Units Chronic	Was Toxicity Demonstrated TUc value > 2.0
TEST AMERICA	*Pimephales promelas*	100	>100	>100	<1	No
TRE	*Pimephales promelas*	100	>100	>100	<1	No

2.3.3 Fish Tissue

ADEC APDES Permit AK0053341 (8/1/17), 1.8.8

To assess long term trends in Goodpaster River quality, annual whole-body analyses of juvenile Chinook salmon are required at monitoring sites both upstream (SW01) and downstream (SW12) from the project facilities. Juvenile Chinook salmon were collected from these two stations on September 21, 2022. At SW01, fourteen fish were collected, and metals analysis was conducted on ten individual Chinook and a composite sample of four fish. Twelve juvenile Chinook salmon were collected at SW12. The samples were shipped to Eurofins Environment Testing Northwest, LLC – Tacoma.

Once the laboratory received the samples and prepped them for analysis, it was determined that some of the sample volumes were insufficient to run both mercury and metals analysis without dilution. The lab notified Pogo about the sample volume situation to discuss options. The situation was brought to ADEC's Tim Pilon's attention so we could work through the issue and develop a plan. The goal of the plan was to analyze the samples to receive the most accurate data for reporting metals and mercury concentrations in the fish captured from the sampling event. Pogo requested agency approval to increase the sample volume through diluting the sample matrix so samples could be analyzed under method 6020 for metals and 7471A for mercury.

At SW01, there was one individual sample that did not have enough sample volume to be analyzed for metals and mercury, so it was analyzed for metals only. Pogo worked with Tim Pilon on this situation and requested Agency approval to allow Pogo to use the composite sample of two fish as a substitute for the 10th sample at SW01. Based on communications with Tim Pilon, ADEC on October 13, 2022, NSR Pogo met the sampling criteria of APDES Permit AK0053341. As required by *Fish Resource Permit SF2022-183d*, a report of collection activities and a data submission form was submitted to ADF&G on November 28, 2022.

All analytical results are consistent with historical data and no trends or significant anomalies were identified in 2022. Time series graphs are provided in **Appendix C**, lab reports are provided in **Appendix E**, and monitoring and historic data are provided in **Appendix F**.

2.4 Groundwater Quality monitoring

Groundwater samples are analyzed for WAD cyanide, major cations and anions, total metals, dissolved metals, physical and aggregate properties of ammonia, conductivity, hardness, nitrates, pH, TDS, TSS, and temperature. The locations of the groundwater monitoring stations are shown in **Appendix A**, **Figure 1.2.**

2.4.1 Downgradient of DSTF

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.1.4, 1.2.6, 1.2.7, 1.5.4; Pogo Mine Monitoring Plan (7/20), 9.0

MW11-001A and MW11-001B provide information on water quality trends down-gradient from the DSTF and up-gradient of the RTP. MW11-001A is an alluvial well and MW11-001B is a bedrock well. The MW11 wells were sampled on February 18, June 17, August 29 and October 28. MW11-001A was dry during the first quarter and no sample was collected.

TDS concentrations were above WQS in MW11-001A on June 17, August 29 and October 28. MW11-001B was above TDS WQS on June 17. Nitrate was above WQS in both wells for all of 2022. Both wells are located within the process facility, so concentrations above the WQS are under observation. WQS are shown on the graphs for reference purposes only. No other adverse trends were observed. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.4.2 Liese Creek Flumes

Four flumes were installed in Liese Creek in 2012. **Figure 4** provides flow data for Flume #1 (near the toe of the DSTF) versus precipitation rate in 2022. 2022 was a below average rainfall year.

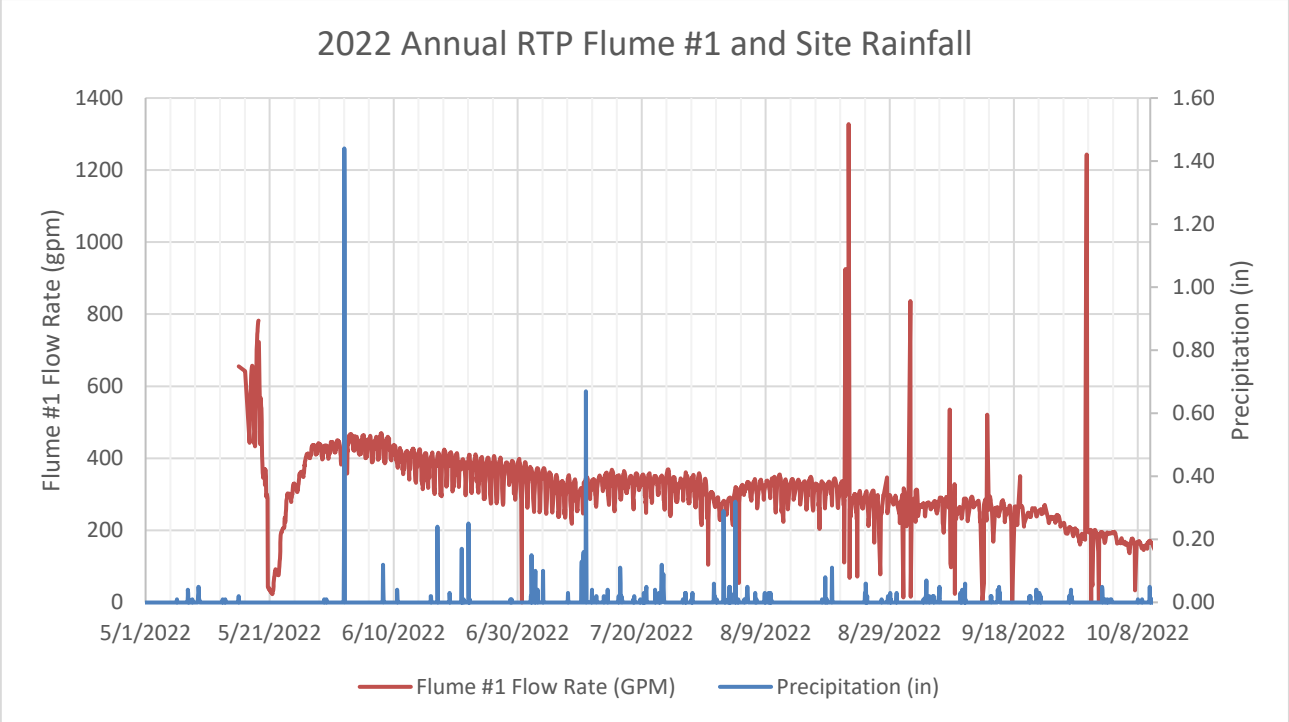


Figure 4: 2022 Flume #1 Flow and Site Rainfall

2.4.3 Downgradient of RTP Dam

2.4.3.1 MW12-500, 501, 502 WELLS

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.1.4, 1.2.6, 1.2.7, 1.5.4; Pogo Mine Monitoring Plan (7/20), 9.0

Three wells located below the RTP Dam, MW12-500, MW12-501, and MW12-502, monitor groundwater downstream of the RTP seepage collection system. Samples were collected quarterly throughout 2022 when there was available water. Trigger limits for groundwater monitoring at these locations are set forth in Pogo's ADEC Waste Management Permit 2018DB0001.

Samples for these wells were collected February 20, June 18, August 30, and October 28, 2022. No sample for MW-502 was collected in February due to low water level in the well.

Chloride, nitrate, and sodium levels were detected above trigger limits while arsenic and nitrate were detected above WQS. Containment of RTP dam seepage is under evaluation as part of a current corrective action investigation with ADEC. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.4.3.2 MW18-001 AND MW18-002

Two wells located below the RTP Dam near Liese Creek Flumes #2 and #3 are MW18-001 and MW18-002. These wells monitor groundwater downstream of the RTP seepage collection system. Samples were collected monthly for MW18-001 and quarterly for MW18-002. Well placement was designed to monitor changes in water quality parameters through the Liese Creek Valley and help identify SCW bypass flow.

MW18-001 (near Flume #2) had one sample above the trigger limit for Copper on May 14th 2022 and concentrations of arsenic and nitrate, above WQS. Except for the 3rd quarter sample, Nitrate is above WQS in MW18-002 (near Flume #3). Dam containment of the RTP water is under evaluation as part of a current corrective action investigation with ADEC.

Except as noted above, all other results are within the limits and conditions set forth within the permit. Locations of the wells are represented in **Appendix A, Figure 1.2** Pogo Monitoring Locations. Time series graphs are provided for the MW18 series wells in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.4.4 Downgradient of Ore Zone

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.1.4, 1.2.6, 1.2.7, 1.5.4; Pogo Mine Monitoring Plan (7/20), 9.0

2.4.4.1 MW11-216

Monitoring well MW11-216 provides information on water quality trends down-gradient from the ore zones. Samples are collected semi-annually. MW11-216 was sampled on June 19th and August 31st, 2022 and all results were below WQS. Piezometer well MW99-216 collects data continuously, and is verified quarterly for water elevation. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.4.4.2 MW18-003A AND MW18-003B

MW18-003A and MW18-003B were installed in 2018 to further evaluate groundwater downstream of the RTP and seepage collection well system. These wells also provide information on water quality trends down gradient from the ore zones. MW18-003A and MW18-003B were installed as a nested pair of wells at the end of Liese Valley near Flume #4. MW18-003A is an alluvial well and MW18-003B is a bedrock well.

Samples were collected from MW18-003A on March 12, 2022, and MW18-003B on February 18, 2022. MW18-003A was collected after repairs were made to a damaged pump power cable. Samples were collected from both wells on June 18, August 31, and October 30, 2022. Samples from MW18-003A indicated Copper and Nitrate were above WQS in March but below for the rest of 2022.

MW18-003B iron and manganese concentrations have exceeded WQS since installation of the well in 2018 and remained above WQS throughout 2022. MW18-003B also had an exceedance of pH in June, August and October. These results, and a slow well recharge rate indicate a low hydraulic conductivity and reducing environment present around the well. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.5 Process Control Monitoring

Process facilities are monitored as described below.

2.5.1 Water Balance

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.2.4; Pogo Plan of Operations (7/20), 9.0; Water Rights LAS 24616 and LAS 32225

At the start of 2022, the RTP reservoir volume was 12.3 million gallons. On December 31, 2022, the RTP volume was 12.0 million gallons.

Water Added to RTP

- 189.4 million gallons of runoff and seepage water was collected in the RTP
- 30.8 million gallons of treated water was recycled to the RTP distribution system

Removed from RTP distribution system

- 1.0 million gallons were pumped from the RTP for underground process water
- 45.1 million gallons were pumped from the RTP to the mill process
- 54.8 million gallons were pumped from the RTP to MWTP#3

Recycled Treated Water

- 23.7 million gallons were recycled at the mill
- 30.8 million gallons of treated water was recycled to the RTP distribution system

Discharge to ORTW

- 302.4 million gallons were treated and discharged to the ORTW

2.5.2 Permits to Appropriate Water and Temporary Water Use Permit Summary

Pogo utilizes the following ADNR Permits to Appropriate Water: LAS 32229, 32228, 32225, 32034, 32033, 32032, 24617, 24616, 24613, 24612, 24611 and ADNR Temporary Water Use Authorization (TWUA) F2021-096.

The TWUA F2021-096 will facilitate the existing diversion ditches and allow for new diversion ditches to be constructed in 2023/2024 as the DSTF design requires. New diversion ditches will be tied into the existing diversion ditches, there will be no increase in water use quantities with the addition of new diversion ditches. A summary of water usage for Permits to Appropriate Water and Temporary Water Use Authorization is provided in Table 2 and Table 3.

Table 2: Permits to Appropriate Water 2022 Monthly Total Flows

Month	LAS 24616/32225 Surface Water Collected in Recycle Tailings Pond (RTP) (gallons)	LAS 32228 RTP Seepage Collection System Wells (gallons)	LAS24617/32229 Groundwater from Underground Mine Discharged to ORTW and Recycled Underground (gallons)	LAS 24613 Goodpaster River ORTW Influent (gallons)	LAS24611 Drinking Water Wells DW02 & DW03 (gallons)	LAS 24612 Gravel Pit Pond* (gallons)	LAS 32032, 32033, 32034 Caribou, Shaw, and Gilles Creek Access Road Dust Control and Compaction ** (gallons)
January	10,366,036	2,058,778	14,622,810	598,085,897	751,606	0	0
February	3,128,445	2,055,041	20,692,960	542,594,193	669,946	0	0
March	8,068,939	1,349,223	21,183,471	532,697,849	785,031	280,000	0
April	1,215,392	1,101,934	23,633,068	584,931,604	822,444	420,000	0
May	5,614,190	1,165,091	23,154,749	599,637,263	870,629	1,066,250	240,000
June	36,180,842	1,593,527	20,047,587	631,384,771	874,309	1,546,050	398,400
July	20,377,221	1,787,668	21,713,612	630,368,272	842,025	1,031,550	268,800
August	21,318,441	1,847,964	27,354,969	622,386,365	834,129	726,500	225,600
September	23,167,023	1,878,014	32,279,222	626,354,320	747,204	448,500	158,400
October	24,796,099	1,807,948	36,504,676	628,635,571	765,353	434,000	0
November	21,585,665	1,938,252	34,222,324	614,681,482	716,649	420,000	0
December	16,244,772	3,804,450	35,064,856	618,021,208	723,226	252,000	0
Total (gallons)	192,063,064	22,387,889	310,474,303	7,229,778,795	9,402,551	6,624,850	1,291,200
Total in Acre-ft	589.4	68.7	952.8	22,187.2	28.9	20.33	4.0
Permit Limit Acre-ft	**967.8**	**600**	**2,000**	**24,195.11**	**81.77**	**241.95**	**98.5**

* Includes water used for mill make-up and for road dust control.

** Each LAS for Caribou, Shaw, and Gilles Creek allow 50,000 gallons per day from April 1st through October 31st. These have been combined to show total acre-ft for the access road dust control and compaction.

Table 3: 2022 Temporary Water Use Authorization Flows

TWUA F2021-096 Diversion Ditches	
Total Snowmelt Gallons Diverted	189,681,900
Total Rainfall Gallons Diverted	103,017,743
Total (gallons)	**292,699,643**
Total (acre-feet)	**898.3**
Permit Limit (acre-feet)	**1460**

2.5.3 Carbon-In-Pulp (CIP) Tailings Cyanide Destruction

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.2.3, 1.5.2.3; Pogo Mine Monitoring Plan (7/20), 7.2

After cyanide destruction, the CIP tailings are stored in the CIP tank prior to being mixed with cement and used as backfill in the mine. The NSR Pogo Mine Monitoring Plan requires collection of grab samples at station PC001 (CIP Stock Tank), located directly after the cyanide destruction circuit. A daily sample is collected during each paste pour. The Waste Management Permit 2018DB0001 requires that samples contain less than 10 mg/kg of WAD cyanide as a monthly average and none of the samples can contain more than 20 mg/kg of WAD cyanide. During the 1st Quarter of 2022, one sample result was above the 20 mg/kg threshold at 30.7 mg/kg. The monthly average remained below 10 mg/kg; however, the 30.7 mg/kg result exceeded the 20 mg/kg maximum allowable concentration. The exceedance was reported to the ADEC and a corrective plan was initiated, approved and implemented as required in the Waste Management Permit (*2018DB0001)*. No other values exceeded the permit thresholds. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.5.4 Mineralized Development Rock Geochemistry

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.2.1, 1.5.2.6; Pogo Mine Monitoring Plan (7/20) 7.1

Samples of whole rock materials placed in the DSTF (PC002) are collected monthly and composited to form a quarterly sample for analysis. All sample result values are within the historical ranges and the composite samples showed no adverse trends. **Appendix B**, **Table 1**, shows selected parameters for PC002 whole rock monitoring. Monitoring data is provided in **Appendix F**.

2.5.5 Flotation Tailings Geochemistry

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.4; Pogo Mine Monitoring Plan (7/20) 7.1

Flotation tailings geochemistry solid samples were collected on March 4, June 5, September 4, and December 2, 2022 at PC003, the underflow of the filter-feed tank at the end of the mill circuit, prior to disposal on the DSTF. All sample result values are within the historical ranges and no adverse trends were observed otherwise. **Appendix B, Table 2**, shows selected parameters for the PC003 Solid, flotation tailings samples. Monitoring data are provided in **Appendix F**.

2.5.6 Flotation Tailings Interstitial Water Chemistry

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.4; Pogo Mine Monitoring Plan (7/20) 7.1

The interstitial water from the tailings samples was collected at PC003 on March 4, June 5, September 4, and December 2, 2022. Most of the constituents were below the target operating ranges presented in Table 7-3 of the *2020 Pogo Mine Monitoring Plan*.

The following constituents were above the Target Operating Ranges: WAD CN in June and TKN in March and June; Mercury was over the operating limit for all 4 quarters. There were no sustained upward trends. Time series graphs are provided in Appendix C**.** Monitoring and historic data are provided in **Appendix F**.

An internal investigation began in 2018 to review the mercury concentration in PC003 as described in the 2020 Second Quarter Monitoring Report. The environmental concern with elevated mercury in the flotation tailings interstitial water is the potential for a corresponding mercury increase at the point of compliance groundwater monitoring wells down gradient of the DSTF. Data from the interstitial water samples show a mercury increase above the operating target range limit beginning in the third quarter of 2015, continuing through the first quarter of 2020 then at or above the operating range limit from the fourth quarter of 2020 through 2022. An evaluation of mine processes included mercury in water inputs to the mill, ore samples, mill reagents, liquid samples from areas within the mill circuit, solid samples of mineralized rock and flotation tailings, vapor samples from annual stack testing, and other areas unrelated to the mine process. During the evaluation, two primary factors were found to contribute to the exceedances of the flotation tails operating at target range limit:

1. The current operating target range was based on a data set with a high percentage of non-detect results.
2. Recent utilization of an analytical method with lower reporting precision and a higher reporting limit.

The observed changes in reported mercury levels for interstitial water samples have not resulted in a corresponding change in the point of compliance groundwater monitoring wells over the past five years, indicating no environmental impact occurred while mercury was elevated. Pogo has switched to a different EPA-approved dissolved mercury method (245.7) with lower reporting limits than EPA 245.1. This change is reflected in the revised QAP, which was submitted with the Plan of Operations Minor Modification in July 2020. Once a sufficient data set has been built using EPA method 245.7, the operating range limits will be revised using the new data set.

2.6 Visual Monitoring

2.6.1 Facility Inspection

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.2.1, 1.5.9.3, 1.5.9.4; Pogo Mine Monitoring Plan (7/20) 5.0, 3.1; Pogo RTP Operating and Maintenance Manual (7/18), 5.0

Weekly visual inspections of the DSTF, RTP Dam, and seepage collection wells were completed throughout the year. No cracking, bulging, settlement, geotechnical concerns, erosion, or damage was observed. The most recent Period Safety Inspection (PSI) of the Recycle Tailings Pond (RTP) Dam was completed on June 28-29 2022. Based on the 2022 PSI findings, the RTP Dam is considered to be in "*satisfactory condition*", as defined by the National Inventory of Dams (NID) Data Dictionary. The next PSI is planned for Summer of 2025.

A field inspection occurred on June 9, 2022 to support upcoming planned expansion of the Pogo

dry stack facility in 2023. During this visit, ADNR Dam Safety observed the Pogo RTP Dam and dry stack facility.

2.6.2 Biological Survey

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.2.5; Pogo Mine Monitoring Plan (7/20) 5.4

The objective of the visual biological survey program is to monitor wildlife interaction with the surface waste disposal facilities. No wildlife issues with the surface waste disposal facilities occurred during the year.

2.6.3 Invasive Weed Control

On August 5th, 2022, Salcha Delta Soil and Water Conservation District (SDSWCD) traveled the Pogo Access Road, visiting each active and inactive material site and right of way (ROW) areas affected by wildfire activity. SDSWCD field staff scouted, mapped, and photographed the extent of the target species to identify priority treatment areas, which included the following species: White sweet clover (*Melilotus albus*) (MEAL2), Bird vetch (*Vicia cracca)* (VICR), Foxtail barley (*Hordeum jubatum*) (HOJU), Alsike clover (*Trifolium hybridum*) (TRHY), and Narrowleaf hawksbeard (*Crepis tectorum*) (CRTE3). On August 14th, 2022, one Alaska State certified pesticide applicator from SDSWCD conducted initial treatment activities at priority treatment locations where MEAL2 was identified. On August 26th, 2022, field staff returned to each site to observe herbicide effectiveness. Field efforts will continue invasive weed monitoring into the summer of 2023.

2.7 Development Rock Segregation and storage

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.2.1, 1.5.2.6; Pogo Mine Monitoring Plan (7/20), 7.1.1

During 2022, 5,483 rounds were blasted underground, and of these 4,098 were sampled. A total of 303 rounds (7.4 %) were not sampled due to operational challenges and were encapsulated in the DSTF. Of the sampled rounds, 1,465 (35.7%) exceeded either the arsenic threshold of 600 mg/l or the sulfide threshold of 0.5% and these were placed in the DSTF. 2,330 rounds (56.9%) were classified as non-mineralized development rock and were used to build drains, construct shells, and line the edge of the DSTF. This material was also used as road surfacing and backfill material.

2.8 Waste Disposal

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.2.1, 1.4.4

During 2022, 918,279 dry tons of flotation tailings, 426,950 tons of mineralized rock, and 144,800 tons of non-mineralized rock were placed in the DSTF. Approximately 231,637 dry tons of flotation tails and 90,540 dry tons of CIP tailings were placed underground as paste backfill in 2022. A DSTF survey using a WingtraOne drone on September 5th, 2022, indicated 17.98 M tons of material were contained in the DSTF, representing 90% of the 20 M ton design capacity, leaving approximately 2.11 M tons. More frequent and accurate drone survey methods have replaced previously used approximation of tonnage calculated by truck load counts. **Figure 5** presents the approximate total waste disposal within the DSTF and indicates remaining design capacity.

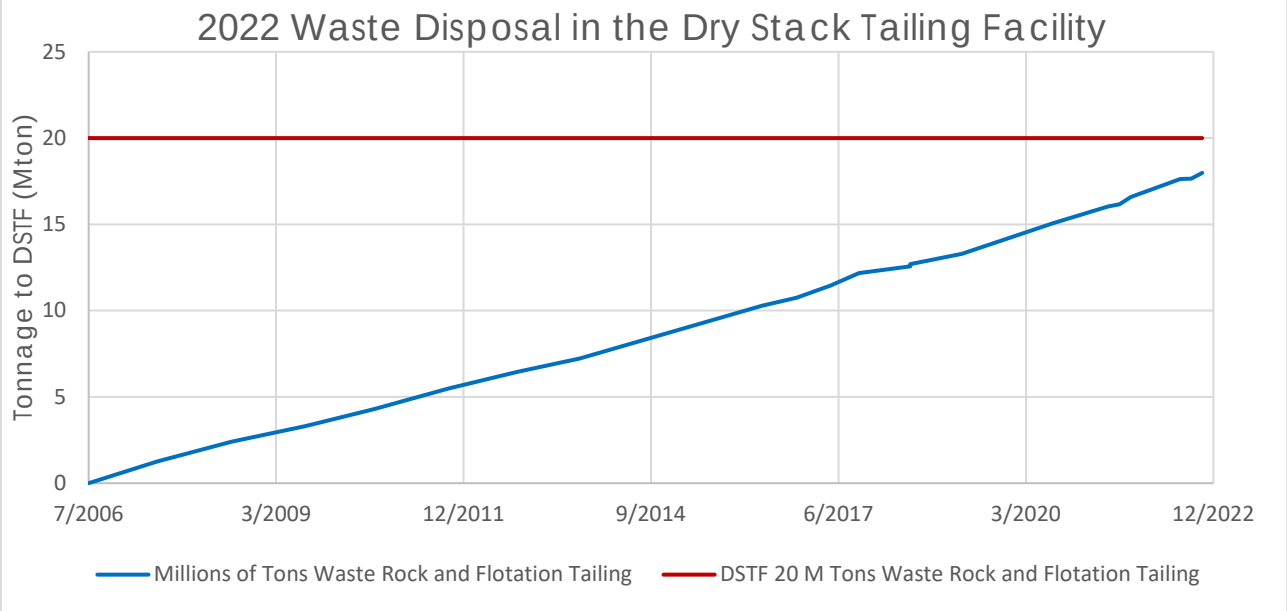


Figure 5: 2022 Annual Waste Disposal in the DSTF

The approximate quantities of miscellaneous waste materials placed either into the DSTF or underground during the year are shown in **Table 4**.

Table 4: Miscellaneous Waste Disposal in DSTF and Underground in 2022

Material	Disposal Location	Approximate Quantity	Unit
Assay Lab XRF Wafers	DSTF	30	lbs
Set Bags of Concrete	DSTF	2,500	lbs
WTP filter cake	DSTF	1,320	tons
Burn pit debris	DSTF	6	truck load
Supersacks	DSTF	1	truck load
Grind Material	DSTF	120	tons
Filter cloths	DSTF	12	each
Set Grout Bags	DSTF	9,512	lbs

2.9 Geotechnical Monitoring

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.4.3, 1.4.3.4; Pogo DSTF Construction and Maintenance Plan (7/20)

Throughout 2022, pre-permitting studies, design, and permitting work was completed as part of the DSTF expansion project. WSP Golder was retained for DSTF construction design work, and Respec was retained for design of the diversion ditches and accompanying roads.

2022 Dam Safety Inspection

On June 9 2022, Dam safety engineers form the Alaska Department of Natural Resources made a site visit in order to assess the safety of the Recycle Tailings Pond Dam (NID ID#AK00304).

- The ADNR Employees were Charles Cobb, Benjamin Wagner, and Kimberly Bustillos
- Findings from this visit were documented in the State of Alaska Consolidated Agency Comments on Pogo Mine 2022 Environmental Audit Report and integrated into the Periodic Safety Inspection conducted by WSP/Golder.

Certificate of Approval to Operate a Dam

- Certificate of Approval to Operate a Dam was issued by the State of Alaska on December 20th, 2022.
- The Certificate is valid until August 27th, 2025.

Diversion Ditch Design

- Respec has been retained to begin designing new diversion ditches to accommodate the drystack expansion.
- Early design concepts and ditch liner options were delivered to Pogo in December, 2022.
- Respec will be working with WSP to finalize the designs in 2023.

Shell construction took place on Shell 1 of the DSTF during all four quarters. The DSTF Construction and Maintenance Plan was updated during 2022 based on recommendations from the geotechnical review report and previous 2019 and 2020 geotechnical investigations. Compaction testing activities throughout 2022 is summarized below:

- On May 20, 2022, GPA Compaction Testing QA was completed by Mappa to provide points for a soil model analysis on the Troxler E-Gauge. Of the 10 points tested, 10 met the percent proctor of 90%. The percent proctor values ranged from 91.8-98.3%, with an average of 95.6%. Moisture contents ranged from 13.6-18.0%, with an average of 15.2%. NSR performed density testing at the same locations to create a soil model for the EDG. In addition to the onsite testing, three standard proctor tests were completed by Mappa. Maximum dry densities were determined to be 110.0, 111.5, and 112.0 pcf at 15.0, 15.5, and 15.5 % moisture contents, respectively.
- Three tailings samples were sent to Mappa in May for standard proctor testing. Maximum dry densities were determined to be 110.1, 109.9, and 110.9 pcf at moisture contents of 14.9, 14.5, and 15.3%, respectively. The maximum dry density for purposes compaction testing was set at 110.3 pcf. A wet density offset of -3.7 pcf and a moisture content offset of +5.4 pcf was programmed and enabled into the Troxler E-Gauge. These numbers were based on Mappa QA site visits and lab moisture content data that was collected over 6 months.
- On February 12th, 8 out of 10 points were within 10% of the standard proctor with an average of 93%. It is important to note that frozen tailings characteristics interfere with the Troxler moisture gauge, so lab moisture contents were also measured. Lab tested moisture contents ranged from 11.1-20.3% with an average of 16.5%, and the average mill moisture content over a three-day period prior to testing was 15.0%.
- On February 16th, 4 out of 6 points met the standard proctor of 90%, with an average of 91.5%. Lab tested moisture contents ranged from 14.8-22.2% with an average of 18.6%, and the average mill moisture content over a three-day period was 14.1%.
- On February 22nd, 4 out of 6 points met the standard proctor of 90%, with an average of 91.5%. No lab moisture content samples were collected, so a 4% moisture offset was used based on previous Troxler gauge tests. The average three-day mill moisture content was 14.4%.

- On March 26th, only 2 out of 8 points met the standard proctor of 90%, with an average of 87.9%. Lab moisture contents ranged from 15.5-19.5% with an average of 15.8%, and the average mill moisture content over a three-day period was 15.8%.
- On April 30th 3 of 10 points were within 10% of the standard proctor with an average of 87.54%. Lab tested moisture contents ranged from 12.06% to 17.67% with an average of 14.3%.
- On May 12th, 10 of 10 points were within 10% of the standard proctor with an average of 97.63%. Lab tested moisture contents ranged from 14.59% to 15.38% with an average of 14.97%.
- On May 16th 10 of 10 points were within 10% of the standard proctor with an average of 99.14 %. Lab tested moisture results varied from 13.92 % to 16.32 %.
- On May 20th 10 of 10 points were within 10% of the standard proctor with an average of 101.85 %. Lab tested moisture content varied from 13.89% to 21.03A%.
- On May 24th 10 of 10 points were within 10% of the standard proctor with an average of 100.99 %. Lab tested moisture content varied from 12.82 % to 14.76 %.
- On May 28th 10 of 10 points were within 10 % of the standard proctor with an average of 96.6 %. Lab tested moisture content varied from 9.70 % to 13.31 %.
- On June 03rd 4 of 8 points were within 10% of the standard proctor with an average of 89.22%. Troxler Gauge tested moisture content varied from 13.6 % to 15.1 %.
- On June 08th 6 of 6 points were within 10 % of standard proctor with an average of 97.415 %. Troxler Gauge tested moisture content varied from 9.33 % to 15.83 %.
- On June 17th 8 of 9 points were within 10 % of standard proctor with an average of 99.98 %. Troxler gauge tested moisture content varied from 11.78 % to 17.43 %.
- On June 23rd 8 of 10 points were within 10% of standard proctor with an average of 99.78 %. Troxler gauge tested moisture content varied from 11.89 % to 16.64 %.
- On June 25th 5 of 8 points were within 10% of standard proctor with an average of 91.69%. Troxler gauge tested moisture content varied from 12.9% to 14.8%.
- On July 17th,10 of 10 points were within 10% of the standard proctor with an average of 101.01%. Troxler gauge tested moisture contents ranged from 12.42% to 19.29% .
- On July 20th, 9 of 10 points were within 10% of the standard proctor with an average of 94.89%. Troxler Gauge tested moisture contents ranged from 15.44% to 20.25% with an average of 17.12%.
- On July 29th, 8 of 10 points were within 10% of the standard proctor with an average of 99.65%. Troxler Gauge tested moisture results varied from 16.03 % to 20.03 %.
- On August 12th, 10 of 10 points were within 10% of the standard proctor with an average of 100.27 %. Troxler Gauge tested moisture content varied from 10.06% to 14.00%.
- On August 21st, 10 of 10 points were within 10% of the standard proctor with an average of 93.26 %. Troxler Gauge tested moisture content varied from 16.03 % to 20.03 %.
- On August 26th, 9 of 10 points were within 10 % of the standard proctor with an average of 94.76 %. Troxler Gauge tested moisture content varied from 15.98 % to 21.89 %.

- On September 10th, 9 of 10 points were within 10% of the standard proctor with an average of 93.99%. Troxler Gauge tested moisture content varied from 18.52 % to 23.17%.
- On September 17th, 8 of 10 points were within 10 % of standard proctor with an average of 92.37 %. Troxler Gauge tested moisture content varied from 16.01 % to 26.94 %.
- On September 23rd, 5 of 10 points were within 10 % of standard proctor with an average of 90.63 %. Troxler Gauge tested moisture content varied from 20.03 % to 28.27 %.
- On October 10th, 10 of 10 points were within 10% of the standard proctor with an average of 94.56%. Troxler Gauge tested moisture content varied from 17.33 % to 24.74 %.
- On October 22nd, 9 of 10 points were within 10% of the standard proctor with an average of 99.44%. Troxler Gauge tested moisture content varied from 15.08 % to 26.03 %.
- On November 4th, 6 of 10 points were within 10% of the standard proctor with an average of 92.56%. Troxler Gauge tested moisture content varied from 7.48 % to 15.71 %.
- On November 13th, 7 of 10 points were within 10% of the standard proctor with an average of 97.06%. Troxler Gauge tested moisture content varied from 9.68 % to 15.96 %.
- On November 19th, 9 of 10 points were within 10% of the standard proctor with an average of 95.50%. Troxler Gauge tested moisture content varied from 8.72 % to 16.82 %.
- On November 26th, 8 of 10 points were within 10% of the standard proctor with an average of 98.33%. Troxler Gauge tested moisture content varied from 11.82 % to 16.49 %.
- On December 11th, 7 of 10 points were within 10% of the standard proctor with an average of 93.01%. Troxler Gauge tested moisture content varied from 7.62 % to 16.52 %. Lab tested moisture content ranged between 16.49% and 19.95%.
- The Troxler E-Gauge was shipped to a Troxler Service Center in Wheat Ridge, CO, mid-December 2022 for calibration.

2.10 Spill Reporting

ADEC APDES AK0053341 (8/1/17), Appendix A, 1.14; ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.4.10

During 2022 there were a total of 386 spills reported. Refer to **Figure 6**, 2022 Annual NSR Pogo Spill Reporting.

Figure 6: 2022 Pogo Spill Reporting

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pogo Underground Spill	27	26	22	34	25	29	28	23	32	23	66	33
Contractor Spill	0	1	1	1	1	1	0	1	0	0	0	0
Pogo Surface Spill	0	0	0	0	4	2	0	0	0	0	2	4

3. AS-BUILT REPORTS AND MAPS

The Pogo Mine Site 2022 as-built maps are presented in **Appendix A. Figure 1.4** provides an overview of all facilities within the Pogo Millsite lease boundary at the end of 2022. **Figures 1.4a** through **1.4e** provide additional detail for the major areas of the mine. Areas disturbed in 2022 are shown in Figure **1.4f.** Any wetland disturbance included in these areas has been authorized under USACE permit file POA-1996-00211 issued in 2020.

Table 5: Pogo Disturbance Acreage Table

Pogo Disturbance Acreage		
	2021	2022
Newly Disturbed Land	17	21.96
Newly Rehabbed Land	3	9.5
Total land disturbed but not rehabbed	490	502.46

4. RECLAMATION AND FINANCIAL RESPONSIBILITY

ADEC Waste Management Permit 2018DB0001 (5/24/18), 1.11, 3. ADNR Plan of Operations Approval F20189500 (5/24/2018), pg. 3, 9; ADNR Pogo Mine Millsite Lease ADL416949 (3/9/04), Section 8.

The Pogo Mine reclamation and closure bond including the road/transmission line is currently $71.91 million (refer to Table 6). The road/transmission line reclamation and closure cost estimate is currently at $7.08 million (Table 7). Reclamation and Financial Responsibility will be updated in 2023 as part of the Waste Management and Plan of Operations renewal process.

Table 6: Mine Reclamation and Closure Cost Estimates as of 2017

Summary of Estimated Reclamation and Closure Costs	
Item Description	
Earthwork/Recontouring	
Subtotal	$8,526,670
Revegetation/Stabilization	
Subtotal	$3,694,623
Detoxification/Water Treatment/Disposal of Wastewater	
Subtotal	$5,669,769
Structure, Equipment and Facility Removal	
Subtotal	$10,402,219
Monitoring	
Subtotal	$2,369,650
Construction Management and Support	
Subtotal	$1,093,448
Closure Planning	
Subtotal	$16,663,398
Subtotal Operational and Maintenance Costs	
Subtotal	**$48,419,777**
Indirect Costs	
Subtotal	$18,161,463
Total Direct and Indirect	**$66,581,240**
Inflation Proofing	$5,326,499
Grand Total	**$71,907,739**

Table 7: Pogo Access Road/Transmission Line Reclamation and Closure Cost Estimates as of 2017

Summary of Estimated Right of Way Closure Costs	
Item Description	
Earthwork/Recontouring	
Subtotal	$646,544
Revegetation/Stabilization	
Subtotal	$1,554,352
Detoxification/Water Treatment/Disposal of Wastewater	
Subtotal	$0
Structure, Equipment and Facility Removal	
Subtotal	$1,451,958
Monitoring	
Subtotal	$0
Construction Management and Support	
Subtotal	$400,440
Closure Planning	
Subtotal	$726,229
Subtotal Operational and Maintenance Costs	
Subtotal	**$4,779,523**
Indirect Costs	
Subtotal	$1,784,132
Total Direct and Indirect	**$6,563,655**
Inflation Proofing	$525,092
Grand Total	**$7,088,747**

5. PERMIT ACTIVITIES

5.1 Annual 2022 Permit activities

Regulatory notifications and major permitting activities completed in 2022 are identified below.

- **Potable water system notifications:**
  - **Pogo Mine Wastewater and Water Treatment Plant Operator Updates:** Pogo NSR

submitted updates to operator certifications on February 6.

- **Request for Interim Approval to Operate Water Main and D-500 Water Line Connection for Pogo Mine Camp Expansion, PWSID: 372643:** On March 8, NSR Pogo requested approval to operate the newly installed potable water main to D-500.
- **Pogo Mine D-600 Camp Interim Water Hauling Notification:** NSR Pogo notified ADEC Drinking Water or interim potable water hauling to D-600.
- **Request for Final Approval to Operate Water Main and D-500 Water Line Connection for Pogo Mine Camp Expansion (Phase I), PWSID: 372643:** On April 4, NSR Pogo requested approval to operate the newly installed potable water main to D-500.
- **Request for Conversion of Generic Water Tank to Potable Water Tank (Phase I):** On June 16, NSR Pogo requested approval to convert an existing 10,000-gallon water tank into a potable water tank as part of ongoing expansion of Pogo's Lower Camp capacity.
- **Request for Pre-Installation of Potable Water Line:** On June 29th, Pogo NSR requested approval to pre-install a section of potable water line that is part of the COR-22-047 Request for Conversion of Generic Water Tank to Potable Water Tank
- **Request for Final Approval to Connect KDR and D400, PWSID 372643:** On July 14, NSR Pogo requested approval to connect the Kitchen Dining and Recreation facility to D400.
- **Waiver Request for Reduced Separation Between Existing Sewer and Potable Lines, PWSID 372643:** On August 8th, NSR Pogo requested a waiver for a potable ad sewer line crossing where a minimum separation could not be maintained.
- **Request to connect D700water cart to D600 via Feed Line (PWSID 372643):** On September 2nd, NSR Pogo requested approval to connect the D700 water cart to the D600 tap via a feed line as part of the Lower Camp Expansion Project**.**
- **Request to Connect D700A and D700B to Potable Water Mains:** On October 25th. NSR Pogo requested to connect the D700A and D700B camp unit to the potable water main distribution system as part of the Lower Camp Expansion Project.
- **Pogo Mine Camp Expansion Potable 3 Upgrades 100% Submittal, PWSID 372643:** On October 27th, NSR Pogo submitted the 100% Potable Upgrades for the Lower Camp Expansion Project.
- **Pogo Mine Camp Expansion- New KDR Connection to Potable Water System:** On December 5th, NSR Pogo notified ADEC that the new KDR unit was connected to the lower camp potable water distribution system. Th potable water load from the old KDR was transferred to the new KDR.
- **Pogo Mine Camp Expansion – New D600B Camp Unit Connection to Potable Water Distribution System:** On December 17th, NSR Pogo notified ADEC that the new D600B camp unit was connected to the lower camp potable water distribution system.

- **Multi-Sector General Permit (MSGP) Annual Report AKR06AC58:** NSR Pogo submitted the required 2021 MSGP Annual Report via ADEC OASYS on January 31.

- **Air Permitting:**
  - **Semiannual Facility Operating Report, Second Half 2021, Permit No. AQ0406MSS07:** On January 31, NSR Pogo submitted the Semiannual Facility Operating Report, Second Half 2021 to ADEC Air Quality.
  - **Semiannual Facility Operating Report, Second Half 2021, Permit No. AQ0406TVP02:** On January 31, NSR Pogo submitted the Semiannual Facility Operating Report, Second Half 2021 to ADEC Air Quality.
  - **2021 Annual Report – CISWI Unit ID 412, Permit No. AQ0406TVP02:** NSR Pogo submitted this report on January 31(ADEC / EPA).
  - **Assessable Emissions Estimates for Calendar Year 2021, Permit No. AQ0406MSS07:** NSR Pogo submitted the 2022 Assessable Emissions Estimates on March 28 (ADEC / EPA).
  - **Annual Compliance Certification, Air Quality Operating Permit No. AQ0406TVP02:** On March 28, NSR Pogo submitted the Annual Compliance Certification for Permit No. AQ0406TVP02 (ADEC / EPA).
  - **2022 Mercury Performance Test Plan Submittal:** On May 5, NSR Pogo submitted the Source Test Plan outlining procedures and methods to be followed for the upcoming Mercury emissions/performance test of the gold refinery processes.
  - **2022 Mercury Performance Test 10-Day Notification:** NSR submitted the 2022 Mercury Performance Test 10-Day Notification to ADEC on July 11th.
  - **Semiannual Facility Operating Report, First Half 2022, Permit No. AQ0406MSS07:** On July 21st, NSR Pogo submitted the Semiannual Facility Operating Report, First Half 2022 to ADEC Air Quality.
  - **Semiannual Facility Operating Report, First Half 2022, Permit No. AQ0406TVP02:** On July 21st, NSR Pogo submitted the Semiannual Facility Operating Report, First Half 2022 to ADEC Air Quality.
  - **2022 Mercury Compliance Performance Test:** NSR completed the annual compliance testing from July 22nd to July 24th, on the sources to NESHAP Subpart EEEEEEE.
  - **2022 Annual Stack Testing Report:** Cover letter and test report documenting NESHAP Subpart EEEEEE testing completed for the refinery processes at Pogo Mine were submitted for Condition 10.1 of the facility's Title V permit on September 12th, 2022, to ADEC.
- **APDES Permit No. AK0053341 activities:**
  - **Accidental Discharge Notification – Sewage Pipe Break:** On January 11, NSR Pogo submitted an accidental discharge notification to the ADEC Division of Water. There were multiple sewage pipeline ruptures due to cold weather and pipe contraction/expansion conditions. Sections of the pipe were replaced, while others were fused together, and heat trace was reapplied.
  - **Request to Operate Sewage Treatment Plant Distribution System Lines:** On March 8, NSR Pogo request approval to operate the newly constructed lift station for D-500 and D-600 camps and associated sewage lines to the STP.

- **Pogo Mine Lower Camp Expansion Project, As-Built Submittal:** On April 4, NSR submitted as-built drawings for the additional connections to the Pogo Mine Sewage Treatment Plant (STP) as part of the ongoing expansion of Pogo's Lower Camp capacity.
- **Pogo Mine Sewage Treatment Plant Request to Increase Design Capacity:** On April 4, NSR submitted as-built drawings of the changes to the membrane bioreactor system and a Capacity Re-Rating Memo that proposes a rerated STP capacity based on design review.
- **Accidental Discharge Notification – RTP Head Tank overflow:** On June 7, NSR Pogo submitted an accidental discharge notification to the ADEC Division of Water. Due to failed logic controls in the Digital Control System water flowed out of the top of the RTP Head Tank 2 for about 20 seconds.
- **Lower Camp Expansion Project Request for Approval to upgrade Sewage Collection and Conveyance System:** On June 15, NSR Pogo submitted plans for the Sewer System upgrade for the Lower Camp expansion.
- **Aquatic Resource Permit Application:** On June 27, NSR Pogo applied for approval to perform the annual fish tissue survey in support of APDES permit sampling requirements.
- **Accidental Discharge Notification - RTP Transfer Tote:** On June 28, NSR Pogo submitted an accidental discharge notification to the ADEC Division of Water. An estimated 30 gallons escaped the tote and discharged to the gravel outside of the Mine Water Treatment plant.
- **Request for approval to pre-install Lower Camp Expansion sewer lines:** On July 11, NSR Pogo requested approval to pre-install sewer lines for the Lower Camp Expansion project before 100% approval.
- **Emergency Request to channel at Off-River-Treatment Works- Emergency Request Approval:** On July 19, NSR Pogo requested and received emergency authorization to remove material from the ORTW inlet to improve flow conditions.
- **Treated Mine Water ORTW Pipeline Breach Notification:** On August 8th, NSR Pogo submitted a treated mine water breach notification to ADEC regarding a leak in the MW2 discharge line. Repairs to the pipe were made.
- **Additional Emergency Request to Channel Flow at ORTW:** On August 10th, NSR Pogo submitted an additional request to channel flow at the ORTW. ADF&G denied this request on September 15th.
- **Accidental Discharge Notification-Sewage Pipe Spill:** On August 12th, NSR Pogo submitted an accidental discharge notification of a 10-gallon sewage water spill that occurred during sewer line maintenance.
- **Request to Operate New Sewage Conveyance System:** On September 2nd, NSR Pogo requested approval to operate sewage infrastructure for the Lower Camp Expansion Project.
- **Interim Water Hauling Notification for D700B and 700A (Phase 2.1):** On September 2nd, NSR Pogo notified ADEC that interim water hauling operations would begin at D700A an 700B.
- **DMR-QA Study 42:** On September 9th, a data report form for laboratory checklists

was submitted to ADEC regarding the DMR-QA study performed at Pogo for 2022. Two analytes, Total Hardness and Fluoride, were recorded as not acceptable after results came back from SGS Laboratories.

- **Compliance Inspection Summary and Recommendations (ADEC):** On November 9th and 10th, ADEC inspectors were on site to conduct inspections of the ADPES Individual permit AK0053341 and MSGP Permit AKR06AC58. Pogo received an inspection report of ADPES permitting activities and notice of violation on December 13th. Responses to NOVs were submitted on January 26th, 2023.
- **Accidental Discharge Notification – Sewage Pipe Breaks:** On December 5th, NSR Pogo submitted two Accidental Discharge Notifications to the ADEC Division of Water. There were two sewage pipeline ruptures due to frozen conditions caused by heat trace failures. Approximately 32,100 total gallons of gray water was discharged onto the ground. Contaminated material was neutralized with lime and disposed on the DSTF. Pipe connections were repaired and insulation and heat traces were reapplied.
- **Accidental Discharge Notification – Dry Shower Pipe Break:** On December 14th, NSR Pogo submitted an Accidental Discharge Notification to the ADEC when approximately 60 gallons of grey water had been discharged on the ground. A drainpipe had broken, causing the discharge in a crawl space. The pipe was repaired and braced to prevent future occurrences.
- **Updated Pogo Mine QAPP:** Minor updates were made in the Quality Assurance Plan to address changes in personnel. A more thorough review will be completed as part of the Waste Management Permit and Plan of Operations renewal applications in 2023.
- **Renewal of Alaska Pollutant Discharge Elimination System Permit No. AK0053341**
- **2022 Aquatic Resource Final Report:** Pogo submitted an Aquatic Resource Final Report from juvenile Chinook Fish Tissue sampling along the Goodpaster River to ADF&G on November 28th, 2022.

- **Waste Management Permit No. 2018DB0001 activities:**
  - **Draft 2022 Pogo Mine Environmental Audit RFP:** On February 1, NSR Pogo submitted the draft RFP for the Environmental Audit to ADEC and ADNR as required by Waste Management Permit No. 2018DB0001 and Plan of Operations No. F20189500.
  - **2022 Pogo Mine Environmental Audit Proposal:** On March 14, NSR Pogo submitted Golder's proposal for the Environmental Audit to ADEC and ADNR for review.
  - **2022 Pogo Mine Environmental Audit:** On June 26 – 28, WSP Golder performed the required 5-year environmental audit on site as required by the NSR Pogo Waste Management Permit. The environmental compliance audit compared and evaluated facility operations against site-wide regulatory permits, plans, procedures, and record keeping.
  - **CIP Tailings WAD CN limit exceedance**: On July 18th a summary of corrective actions taken after the CIP Tailings WAD CN exceedance in January 2022, was submitted to ADEC, as per the conditions of the Permit.

- **2022 Pogo Mine Environmental Audit comments:** On October 10th. NSR Pogo received state agency comments on the Draft Golder 2022 Pogo Mine Audit Report. NSR Pogo reviewed and discussed comments, which are to be relayed to the state agencies and WSP Golder.
- **Final Pogo Environmental Audit Report:** On December 2nd, NSR Pogo, ADNR, and ADEC received the Final Environmental Audit of the Pogo Mine report from WSP Golder. Overall, WSP Golder found that Pogo monitoring, reporting, and operational compliance is sufficient.
- **Notification of Pogo Mine Lift Station 22 Commencement – Lower Camp Expansion Phase 2.2 Works:** On December 9th, NSR Pogo notified ADEC that the operation of Lift Station 22 had been commenced.

- **Other:**
  - **Notification of Completion of Liese Creek Culvert Project (USACE POA 1996-00211):** On May 23rd, NSR Pogo notified the US Army Corps of Engineers that the wetlands disturbance for the Lise Creek Culvert project had been completed.
  - **Issuance of 401 Water Quality Certificate (USACE POA 1996-00211) - Pogo Mine Expansion Project:** On December 8th, NSR Pogo received the Certificate of Reasonable Assurance for work affecting navigable waters in the U.S. from ADEC for the proposed Pogo Mine Expansion Project.
  - **Notification of Completion of 2022 Emergency Action Plan Orientation and Table Top Exercise:** On December 8th, NSR Pogo notified the ADNR Dam Safety Program that the annual orientation exercise for the Pogo Recycle Tailings Pond (RTP) Dam Emergency Action Plan (EAP) and Table Top Exercise had been completed in accordance with the special conditions of the Certificate of Approval to Operate a Dam, RTP Dam (NID ID#AK00304).
  - **Completion of 6th Periodic Safety Inspection (PSI) of RTP Dam:** On June 28-29, WSP Golder preformed the 6th periodic safety inspection on site. On December 19th, NSR Pogo received the PSI report, which concluded that the RTP Dam appeared to be in satisfactory condition in accordance with 11 AAC 93. Recommendations received by ADNR and WSP Golder will be addressed by NSR Pogo in 2023.
  - **Certificate of Approval to Operate a Dam for the Pogo RTP (AK00304):** On December 21st, NSR Pogo was issued a Certificate of Approval to Operate a Dam. The Certificate expires August 27th, 2025.

APPENDIX A – MAPS

Figure 1.1: Pogo General Location Map

Figure 1.2: Pogo Mine Monitoring Locations

Figure 1.3: Surface Water Monitoring Stations

Figure 1.4: Pogo Mine As-Built

Figure 1.4a: 1525 Portal Area and Lower Camp As-Built

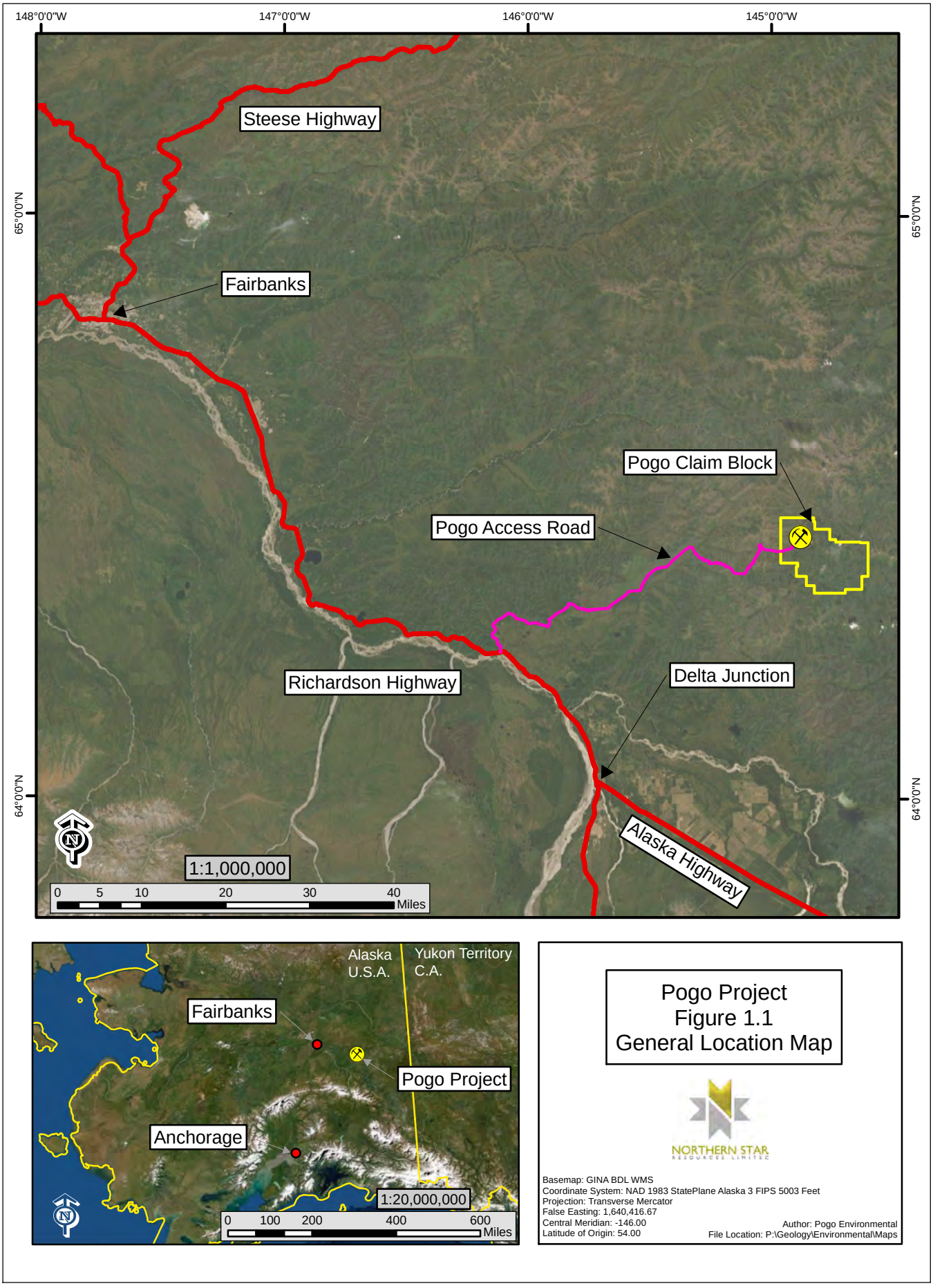
Figure 1.4b: Airstrip Area As-Built

Figure 1.4c: Mill Bench As-Built

Figure 1.4d: Upper Camp As-Built

Figure 1.4e: RTP & Dry Stack Area As-Built

Figure 1.4f: 2022 Disturbance Areas



Pogo Project
Figure 1.1
General Location Map

NORTHERN STAR RESOURCES LIMITED

Basemap: GINA BDL WMS
Coordinate System: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
False Easting: 1,640,416.67
Central Meridian: -146.00
Latitude of Origin: 54.00

Author: Pogo Environmental
File Location: P:\Geology\Environmental\Maps

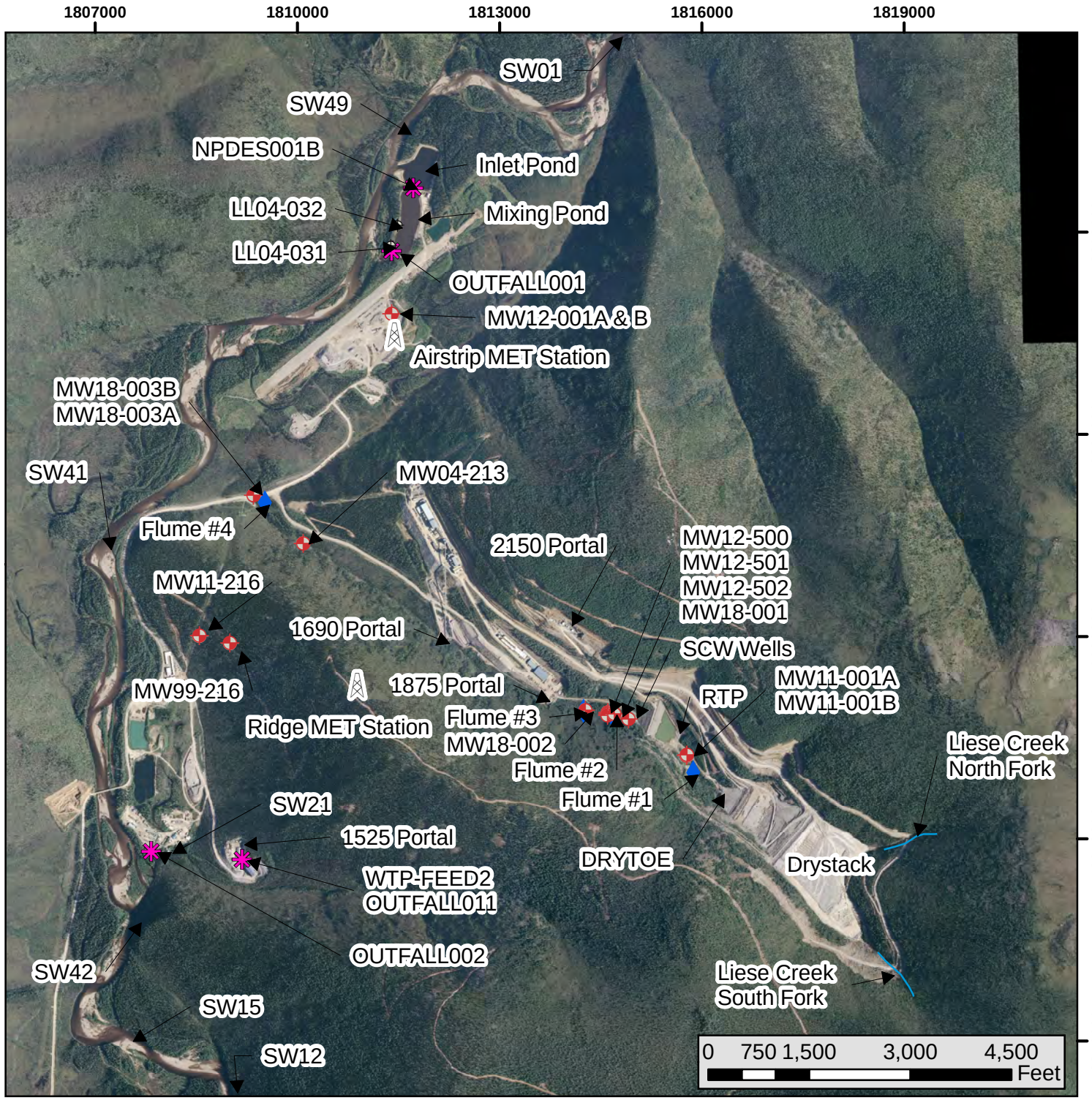
Figure 1.2
Monitoring Locations
Pogo Mine

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: Jeremiah Drewel, Environmental Coordinator

Monitoring Locations

- MET Station
- LL Wells
- Monitoring Wells
- Flume
- OUTFALL

1:25,000



N
W E
S

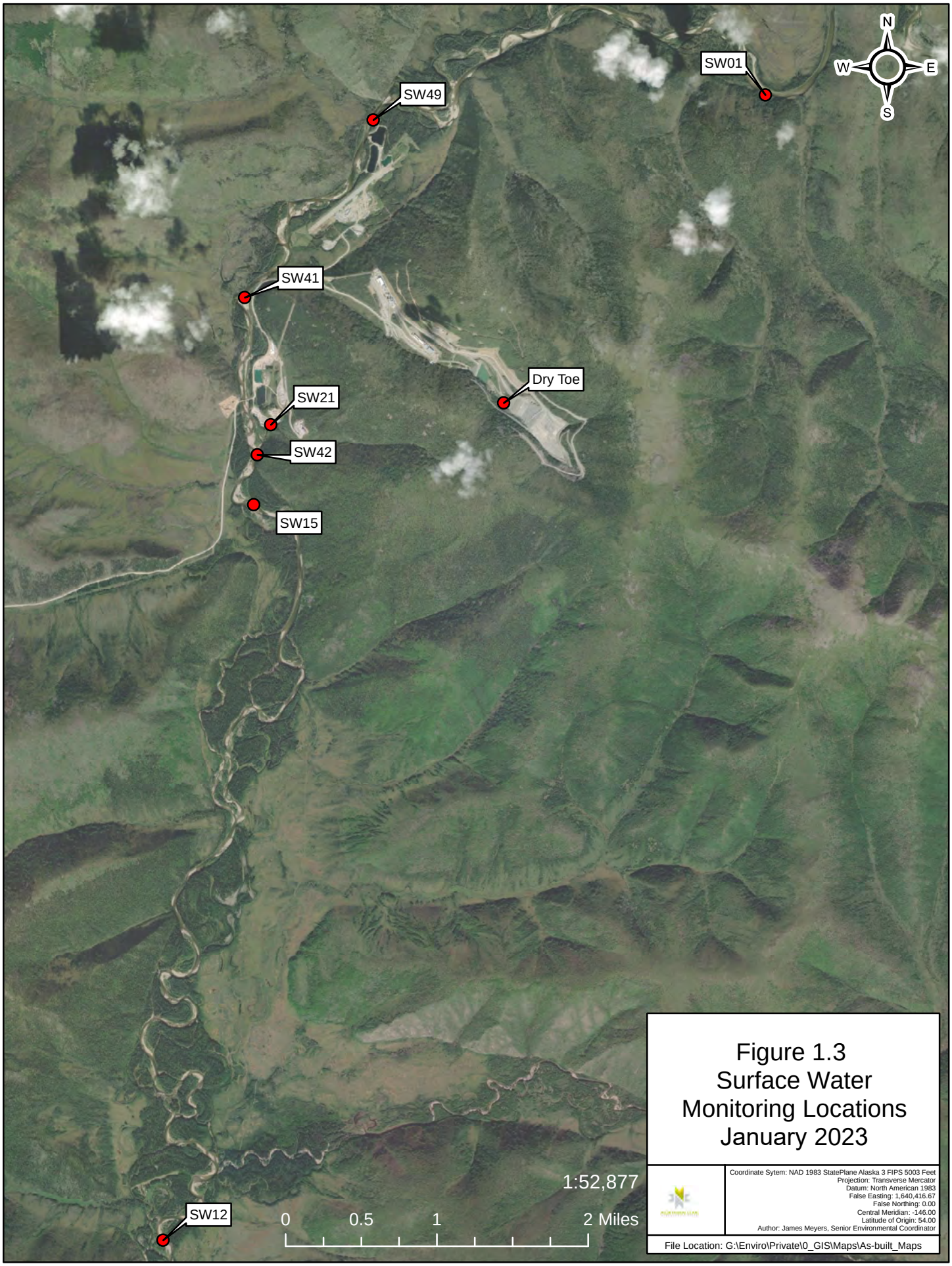


Figure 1.3
Surface Water Monitoring Locations
January 2023

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: James Meyers, Senior Environmental Coordinator

File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps

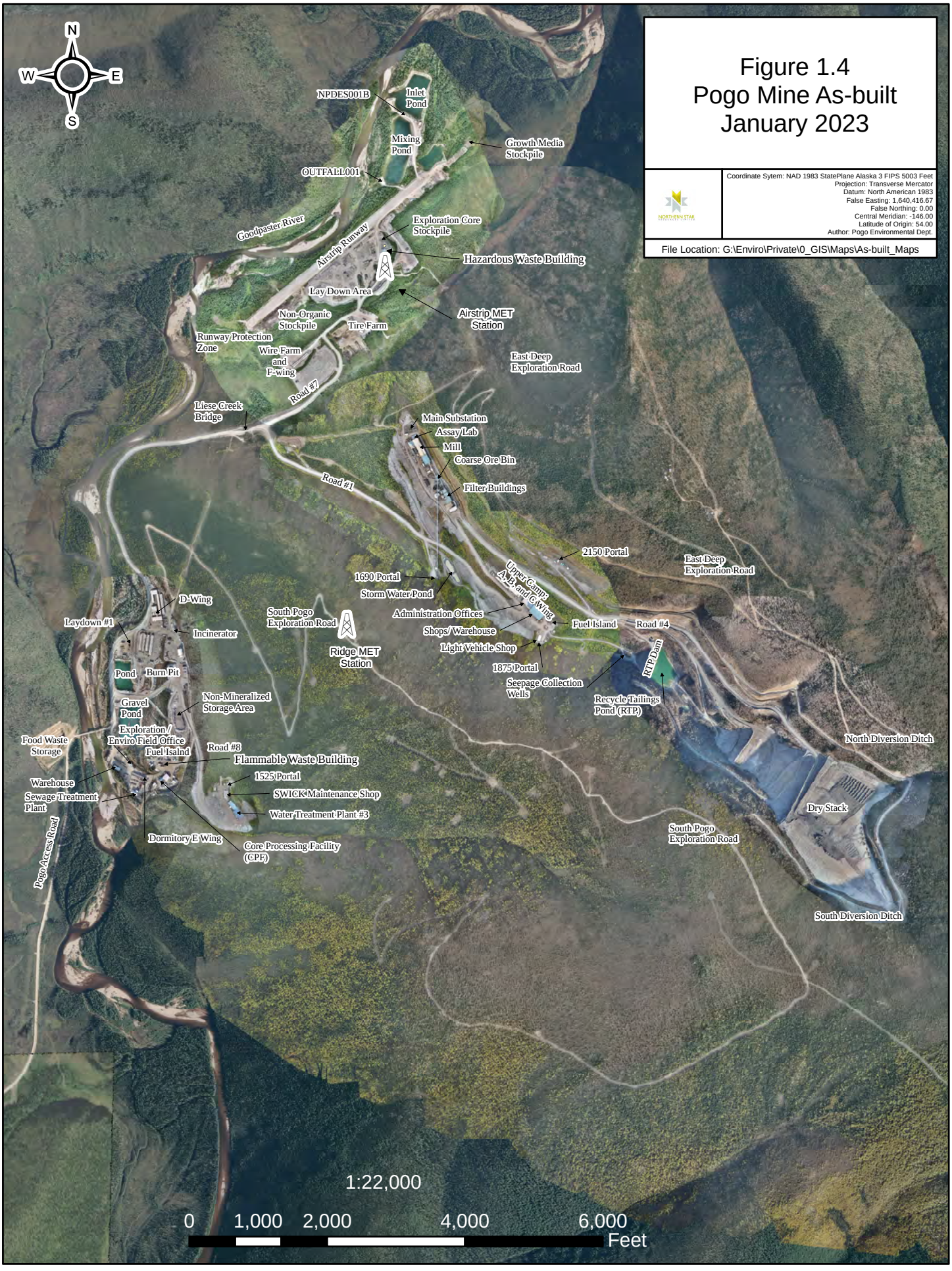

N
W
E
S
Figure 1.4
Pogo Mine As-built
January 2023
Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: Pogo Environmental Dept.
File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps
NPDES001B
Inlet Pond
Mixing Pond
Growth Media Stockpile
OUTFALL001
Goodpaster River
Exploration Core Stockpile
Airstrip Runway
Hazardous Waste Building
Lay Down Area
Airstrip MET Station
Non-Organic Stockpile
Tire Farm
Runway Protection Zone
Wire Farm and F-wing
East Deep Exploration Road
Road #7
Liese Creek Bridge
Main Substation
Assay Lab
Mill
Coarse Ore Bin
Road #1
Filter Buildings
2150 Portal
East Deep Exploration Road
1690 Portal
Storm Water Pond
Upper Camp A, B, and G Wing
D-Wing
South Pogo Exploration Road
Administration Offices
Laydown #1
Incinerator
Shops/ Warehouse
Fuel Island
Road #4
Ridge MET Station
Light Vehicle Shop
RTP Dam
1875 Portal
Pond
Burn Pit
Seepage Collection Wells
Recycle Tailings Pond (RTP)
Gravel Pond
Non-Mineralized Storage Area
Exploration / Enviro Field Office
Food Waste Storage
Fuel Isalnd
Road #8
Flammable Waste Building
North Diversion Ditch
Warehouse
1525 Portal
Sewage Treatment Plant
SWICK Maintenance Shop
Water Treatment Plant #3
Dry Stack
Pogo Access Road
Dormitory E Wing
Core Processing Facility (CPF)
South Pogo Exploration Road
South Diversion Ditch
1:22,000
0
1,000
2,000
4,000
6,000
Feet

Figure 1.4a
1525 Portal and Lower Camp As-Built
January 2023

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: Pogo Environmental Dept.

File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps

Figure 1.4b
Airstrip Area As-Built
January 2023

NORTHERN STAR RESOURCES LIMITED

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: Pogo Environmental Dept.

File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps

Goodpaster River
OUTFALL001
Inlet Pond
Mixing Pond
NPDES001B
Runway Protection Zone
Runway Protection Zone
Airstrip Runway
Growth Media Stockpile
Lay Down Area
Exploration Core Stockpile
Growth Media Stockpile
Wire Farm and F-wing
Hazardous Waste Central Accumulation Area
To Lower Camp and 1525 Portal
Airstrip MET Station
Liese Creek
Tire Farm
1:5,000
0 250 500 1,000 1,500 Feet
N W E S
To Upper Camp and Mill Bench

Figure 1.4c
Mill Bench As-Built
January 2023

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: Pogo Environmental Dept.

File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps

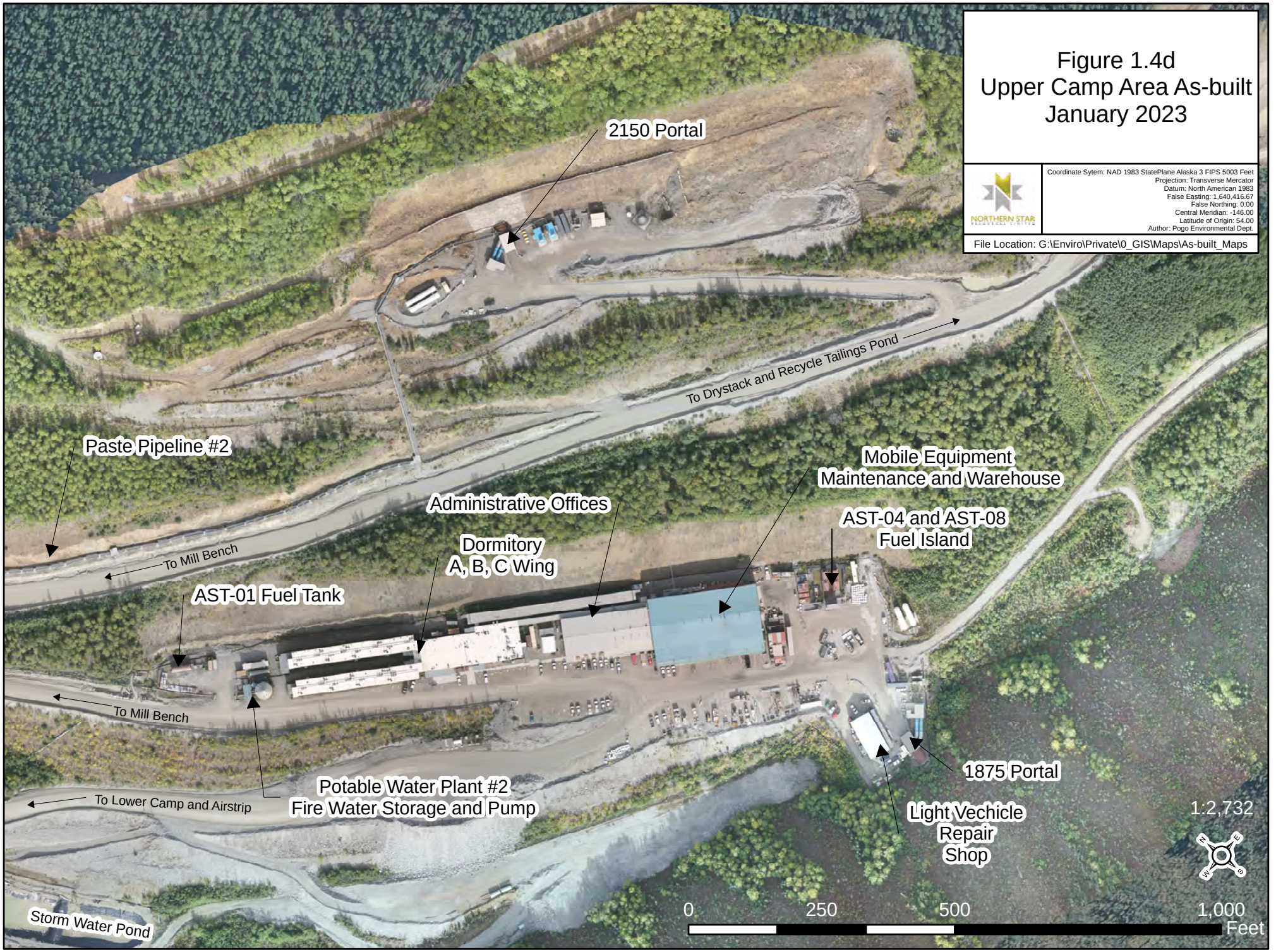
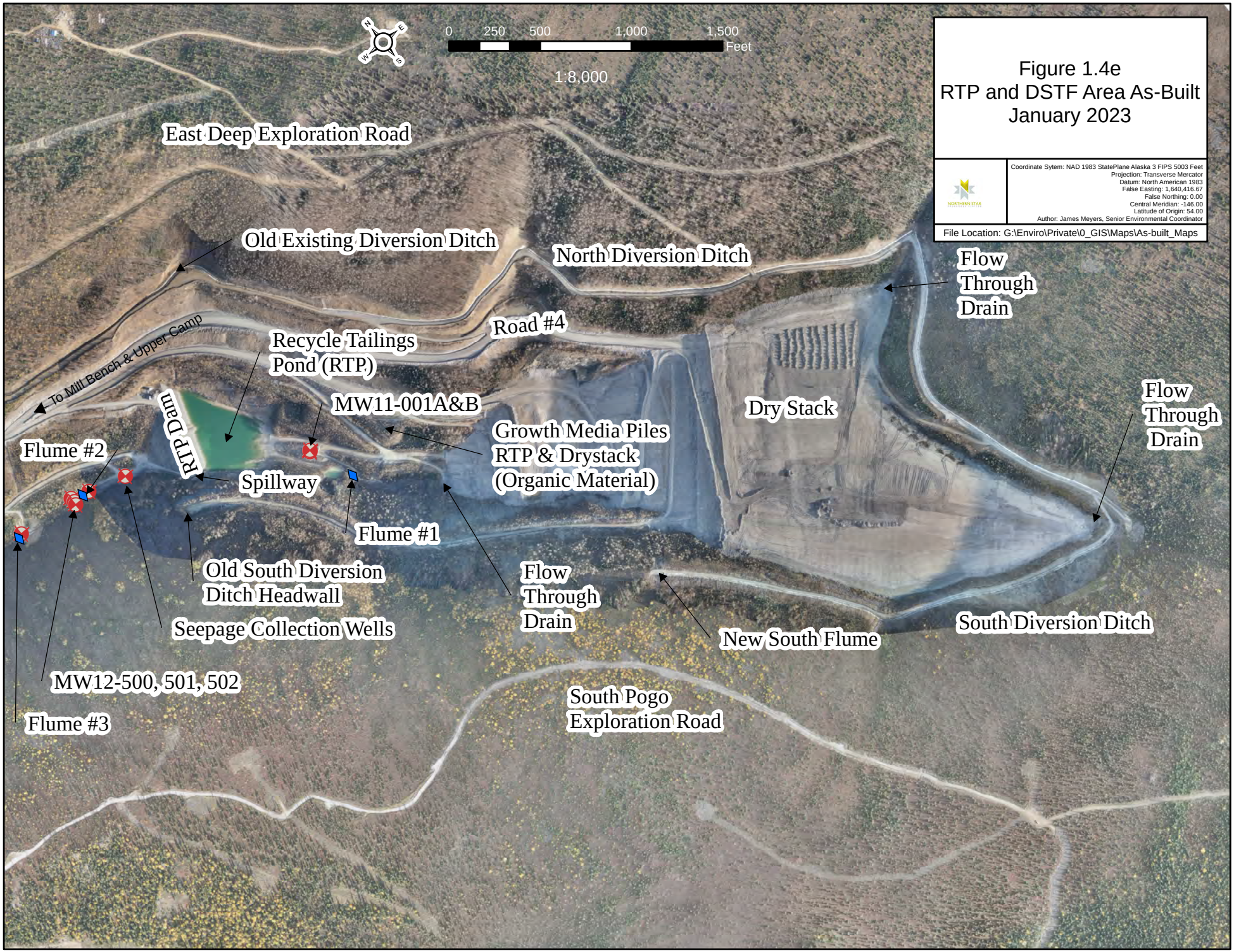
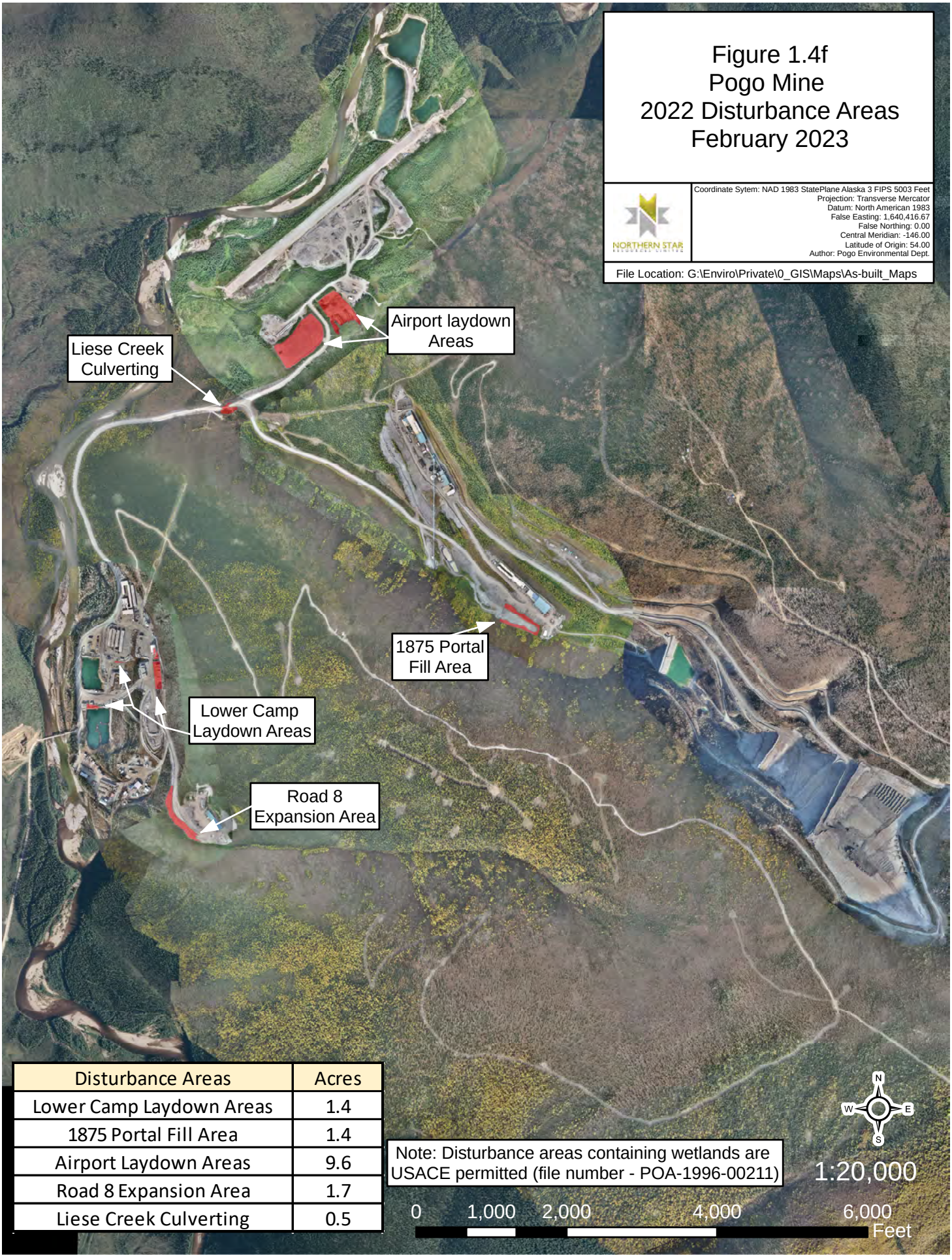


Figure 1.4d
Upper Camp Area As-built
January 2023
Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: Pogo Environmental Dept.
File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps
2150 Portal
To Drystack and Recycle Tailings Pond
Paste Pipeline #2
Mobile Equipment
Maintenance and Warehouse
Administrative Offices
AST-04 and AST-08
Fuel Island
Dormitory
A, B, C Wing
To Mill Bench
AST-01 Fuel Tank
To Mill Bench
1875 Portal
To Lower Camp and Airstrip
Potable Water Plant #2
Fire Water Storage and Pump
Light Vechicle
Repair
Shop
1:2,732
Storm Water Pond
0
250
500
1,000
Feet


0 250 500 1,000 1,500
Feet
1:8,000
Figure 1.4e
RTP and DSTF Area As-Built
January 2023
Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: James Meyers, Senior Environmental Coordinator
File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps
East Deep Exploration Road
Old Existing Diversion Ditch
North Diversion Ditch
Flow Through Drain
Road #4
To Mill Bench & Upper Camp
Recycle Tailings Pond (RTP)
RTP Dam
MW11-001A&B
Dry Stack
Flow Through Drain
Flume #2
Spillway
Growth Media Piles RTP & Drystack (Organic Material)
Flume #1
Old South Diversion Ditch Headwall
Seepage Collection Wells
Flow Through Drain
New South Flume
South Diversion Ditch
MW12-500, 501, 502
Flume #3
South Pogo Exploration Road



Disturbance Areas	Acres
Lower Camp Laydown Areas	1.4
1875 Portal Fill Area	1.4
Airport Laydown Areas	9.6
Road 8 Expansion Area	1.7
Liese Creek Culverting	0.5

APPENDIX B –

WASTE ROCK GEOCHEMISTRY AND FLOTATION TAILINGS SOLIDS CHEMISTRY DATA

Table 1: Whole Rock Geochemistry for Rock Placed in Dry Stack 2022

Table 2: Geochemistry of Flotation Tailings Solids Placed in Dry Stack 2022

Appendix B. Table 1. Whole Rock Geochemistry for Rock placed into Drystack 2022

PC002	units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Antimony, Total	mg/kg	1.36	2	1.8	1.35
Arsenic, Total	mg/kg	1,150	1,570	412	593
Carbon	%	0.48	0.63	0.24	0.26
Copper, Total	mg/kg	35.7	39.4	21.8	41.7
Inorganic Carbon	%	1.8	2.3	0.9	1.2
Iron, Total	mg/kg	34,200	38,100	28,800	52,900
Lead, Total	mg/kg	20	17	24.7	20.8
Maximum Potential Acidity	tCaCO3/1000t	10.3	14.4	5.9	19.4
Net Neutralization Potential	tCaCO3/1000t	36	55	20	22
pH, Paste	pH units	8.2	8.2	8.7	9.5
Potassium, Total	mg/kg	25,800	22,100	27,500	31,600
Ratio (NP/MPA)	su	4.46	3.83	4.38	4.22
Selenium, Total	mg/kg	2	1	<1	2
Sodium, Total	mg/kg	14,300	12,900	15,800	13,400
Sulfate Sulfur (CO_3 Leach)	%	<0.01	<0.01	<0.01	<0.01
Sulfate Sulfur (HCL Leach)	%	0.01	<0.01	0.02	<0.01
Sulfide Sulfur (Calculated)	%	0.33	0.46	0.19	0.25
Sulfur, Total (LECO)	%	0.33	0.46	0.19	0.25
Zinc, Total	mg/kg	62	60	136	81

Appendix B. Table 2. Geochemistry of Flotation Tailings Solids placed into Drystack 2022

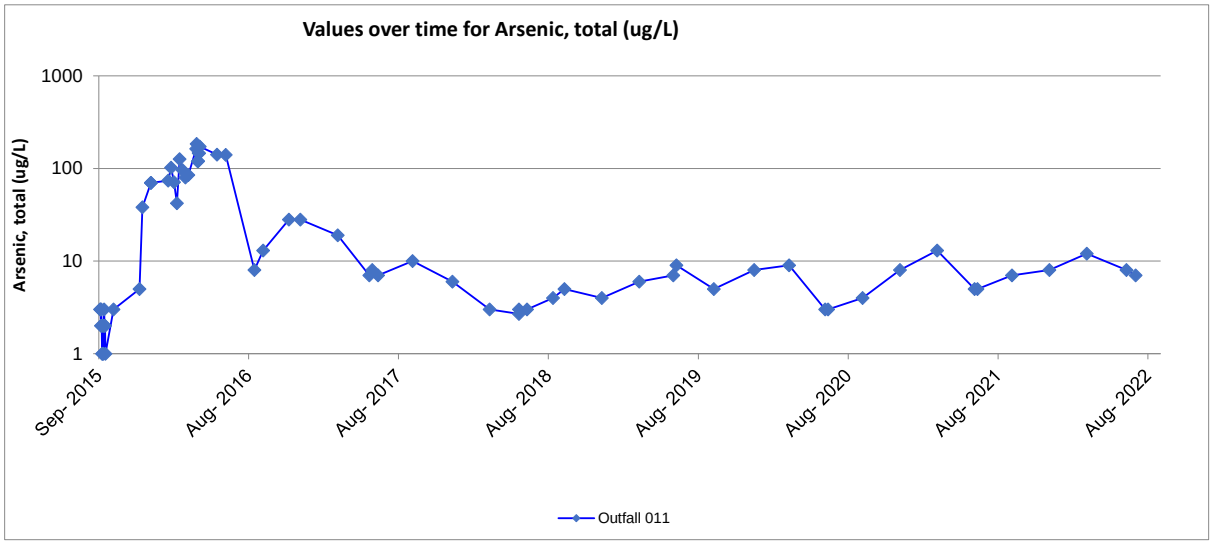
PC003 Solid	units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Antimony, Total	mg/kg	1.37	0.77	0.88	1.1
Arsenic, Total	mg/kg	394	134.5	257	284
Carbon	%	0.38	0.38	0.5	0.36
Copper, Total	mg/kg	48.6	42.9	56.8	57.3
Inorganic Carbon	%	1.4	1.4	1.8	1.3
Iron, Total	mg/kg	26,800	25,000	27,700	24,200
Lead, Total	mg/kg	11.2	8.2	7.7	8.5
Maximum Potential Acidity	tCaCO3/1000t	2.2	2.2	3.1	1.6
Net Neutralization Potential	tCaCO3/1000t	34	34	38	35
pH, Paste	pH units	8.2	8.2	8.3	7.3
Potassium, Total	mg/kg	21,600	18,100	19,700	17,300
Ratio (NP/MPA)	su	16.46	16.46	13.12	23.68
Selenium, Total	mg/kg	1	<1	<1	<1
Sodium, Total	mg/kg	7,500	8,400	8,800	5,800
Sulfate Sulfur (CO_3 Leach)	%	0.01	<0.01	0.02	0.01
Sulfate Sulfur (HCL Leach)	%	0.03	0.01	0.05	0.01
Sulfide Sulfur (Calculated)	%	0.06	0.07	0.08	0.04
Sulfur, Total (LECO)	%	0.07	0.07	0.1	0.05
Zinc, Total	mg/kg	28	22	25	23

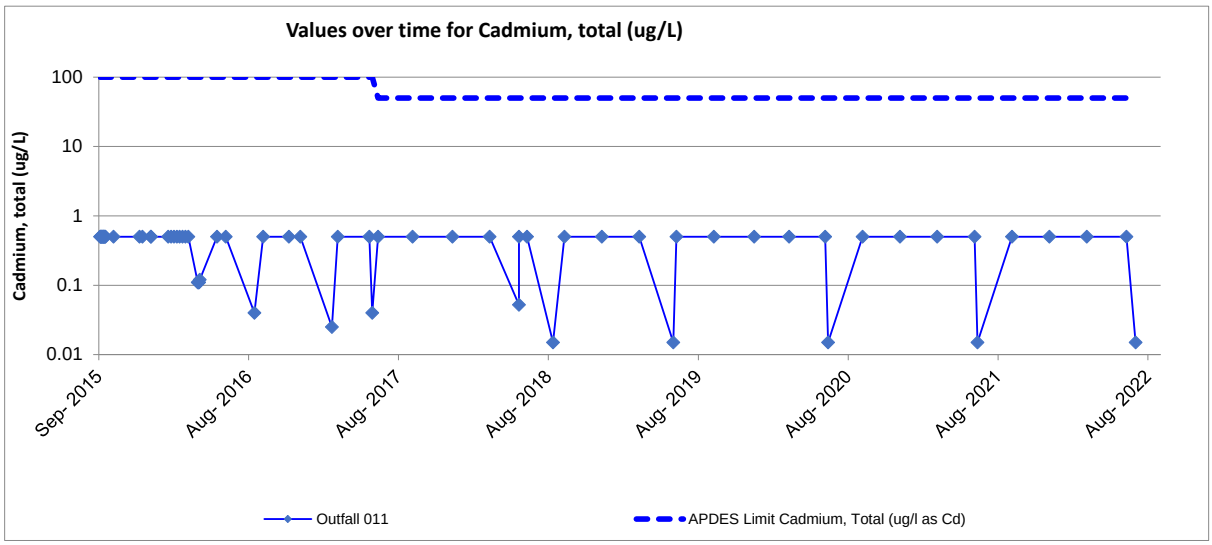
APPENDIX C –

TIME SERIES GRAPHS OF MONITORING DATA

APPENDIX C –

OUTFALL 011 GRAPHS


Values over time for Arsenic, total (ug/L)
Arsenic, total (ug/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011


Values over time for Cadmium, total (ug/L)
Cadmium, total (ug/L)
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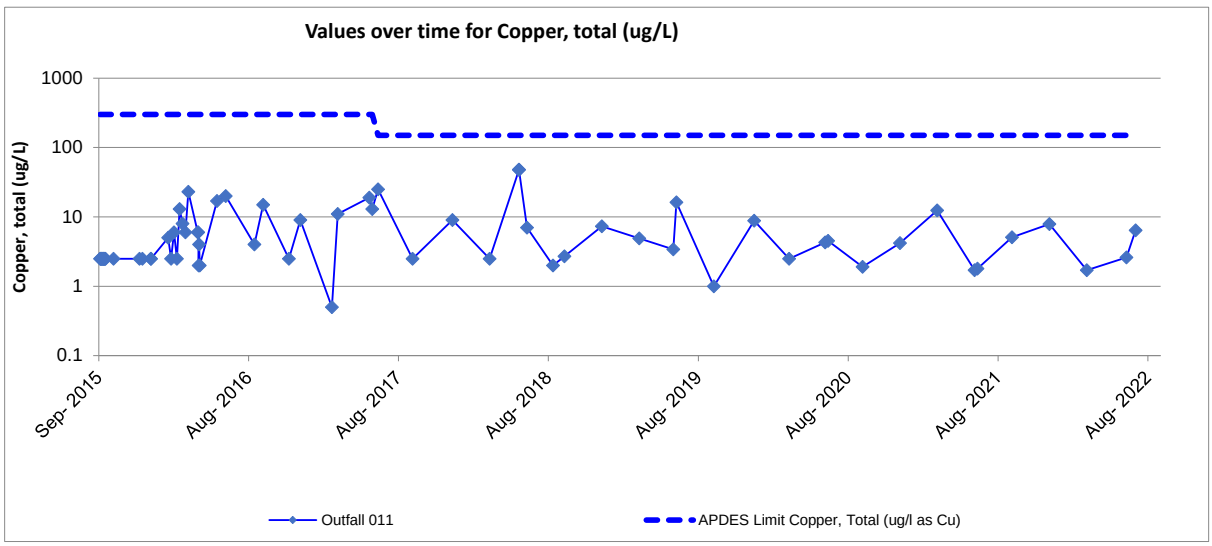
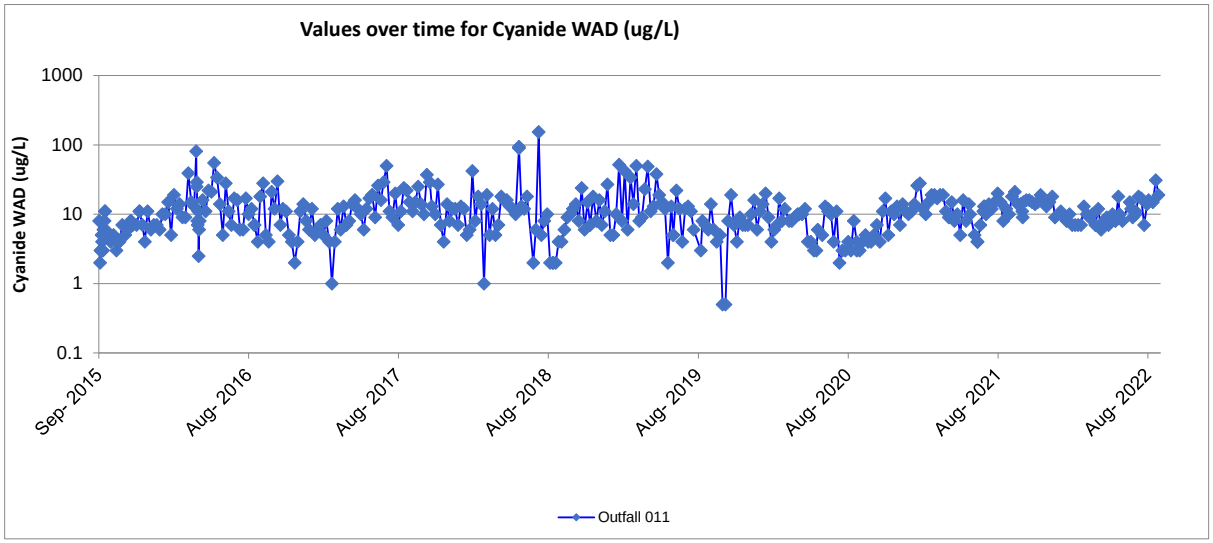
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011
APDES Limit Cadmium, Total (ug/l as Cd)


Values over time for Copper, total (ug/L)
Copper, total (ug/L)
1000
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011
APDES Limit Copper, Total (ug/l as Cu)


Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
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100
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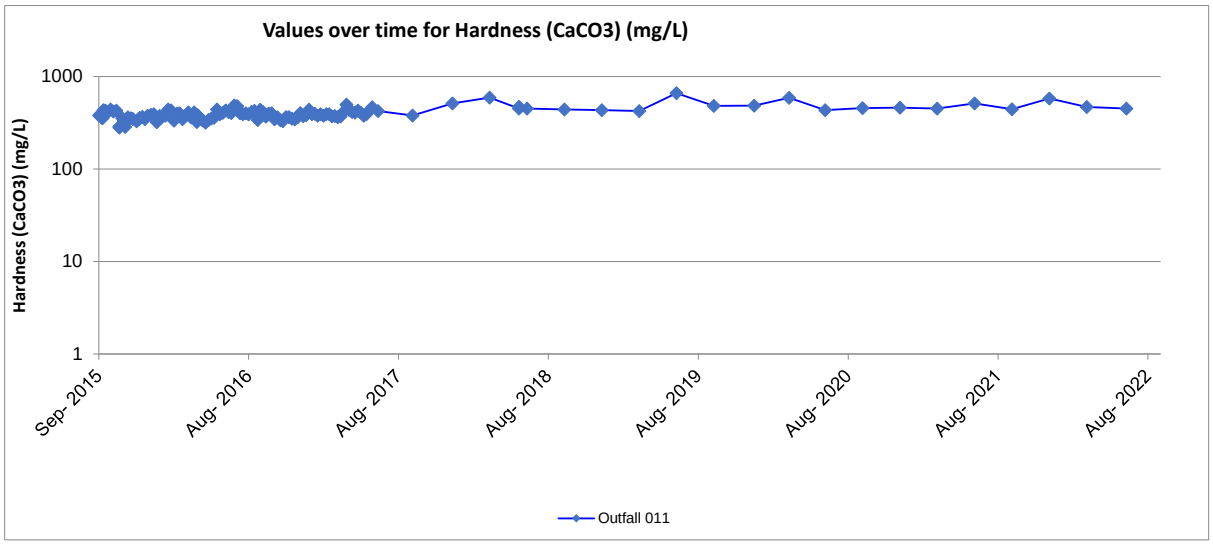
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
Outfall 011


Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
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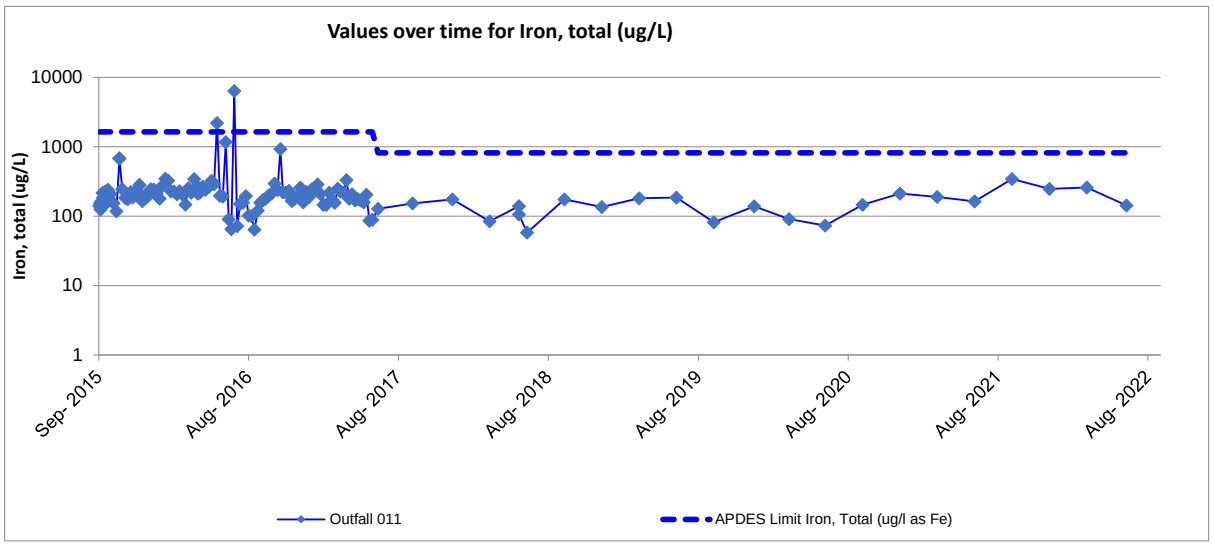
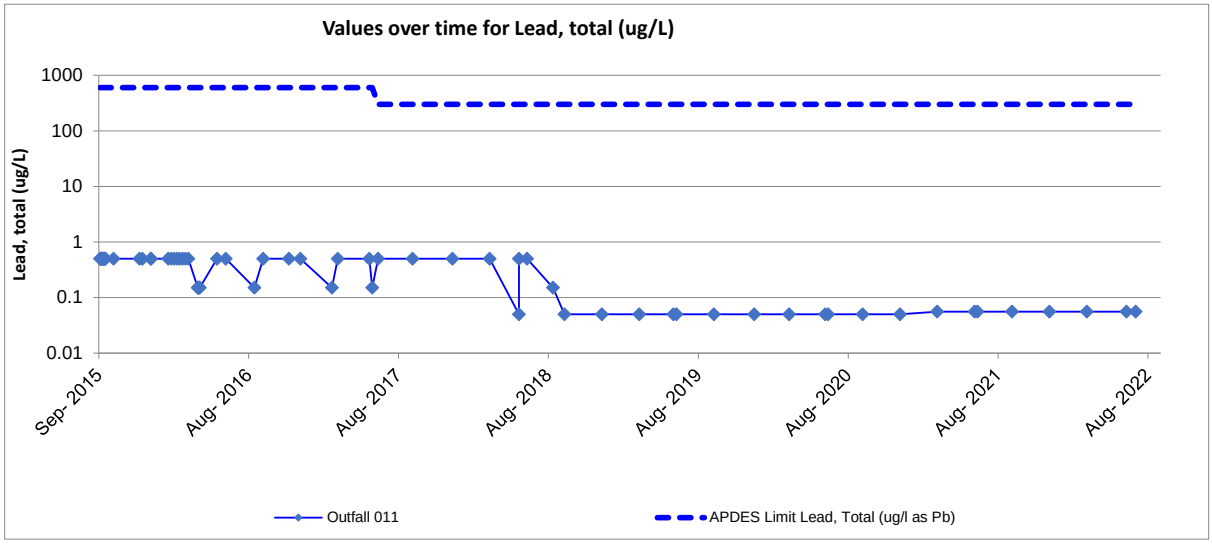
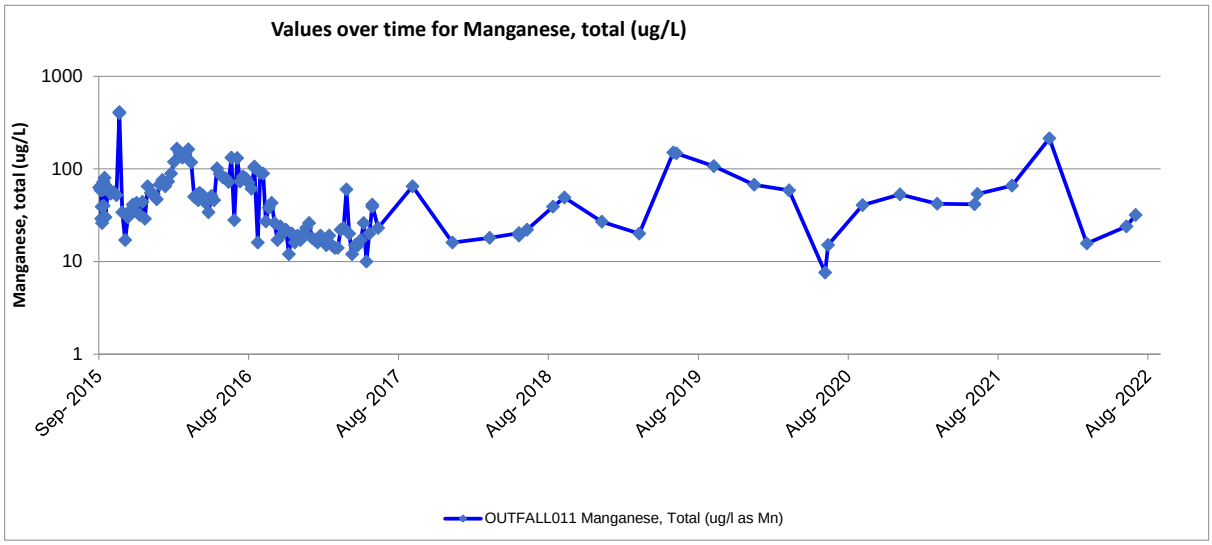
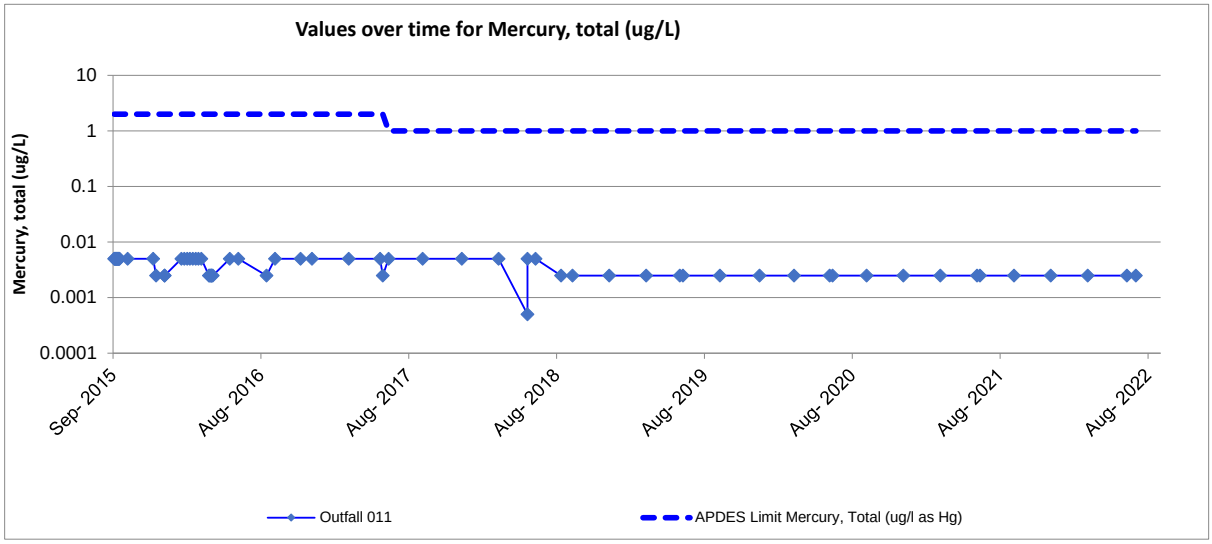
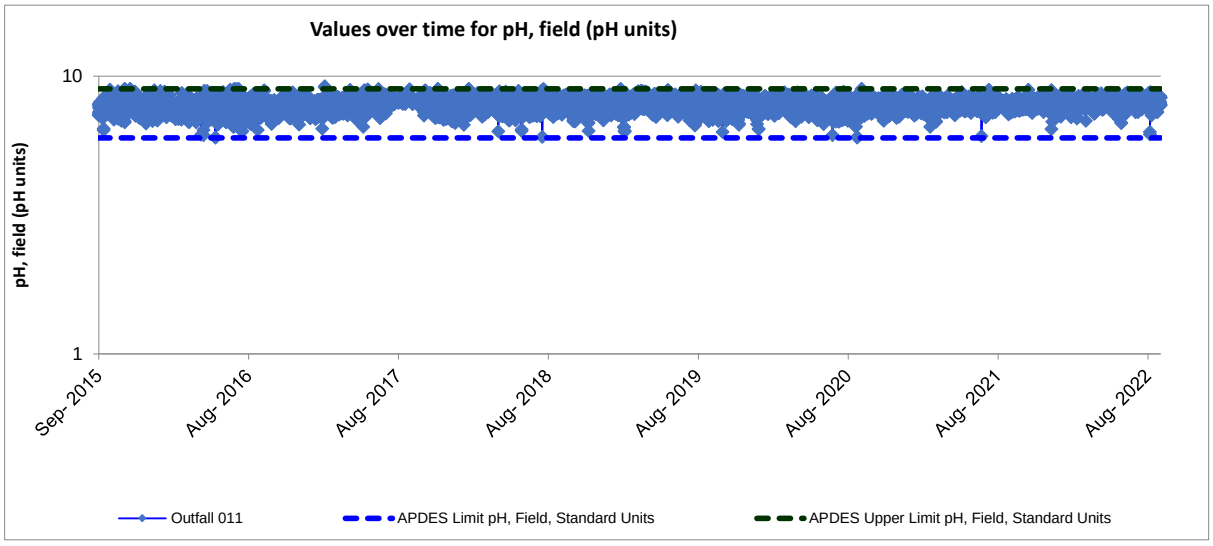
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
Outfall 011


Values over time for Iron, total (ug/L)
Iron, total (ug/L)
10000
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
Outfall 011
APDES Limit Iron, Total (ug/l as Fe)


Values over time for Lead, total (ug/L)
Lead, total (ug/L)
1000
100
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011
APDES Limit Lead, Total (ug/l as Pb)


Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
OUTFALL011 Manganese, Total (ug/l as Mn)


Values over time for Mercury, total (ug/L)
Mercury, total (ug/L)
10
1
0.1
0.01
0.001
0.0001
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011
APDES Limit Mercury, Total (ug/l as Hg)


Values over time for pH, field (pH units)
pH, field (pH units)
10
1
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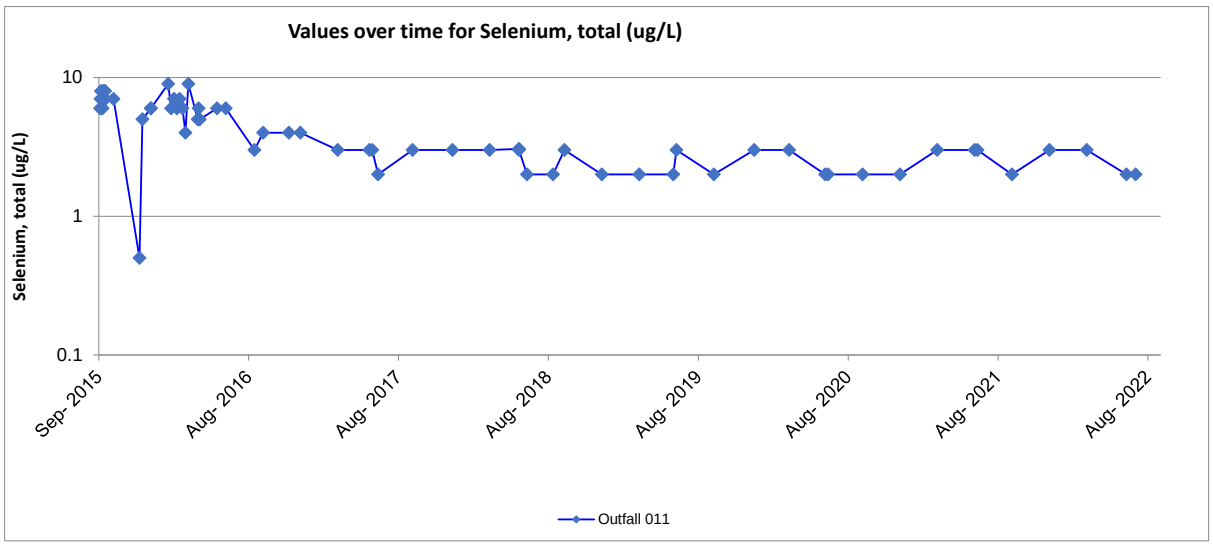
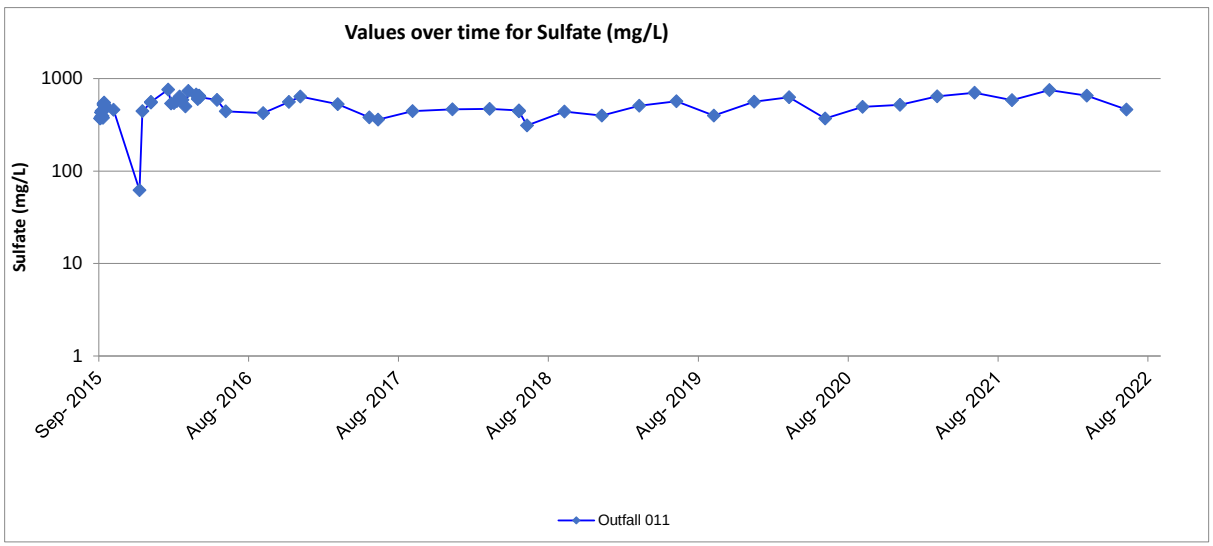
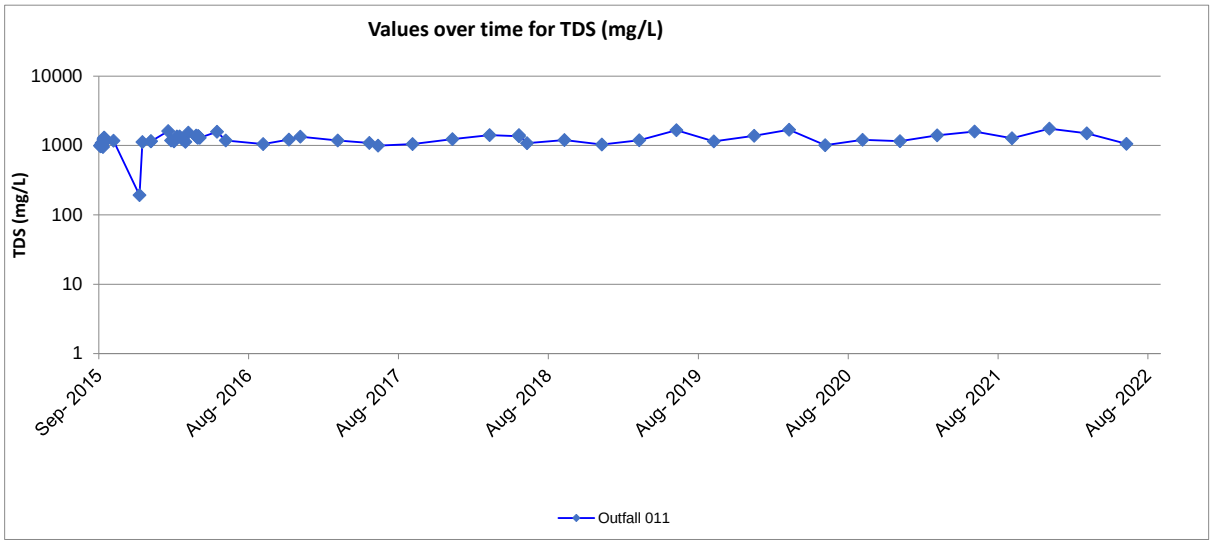
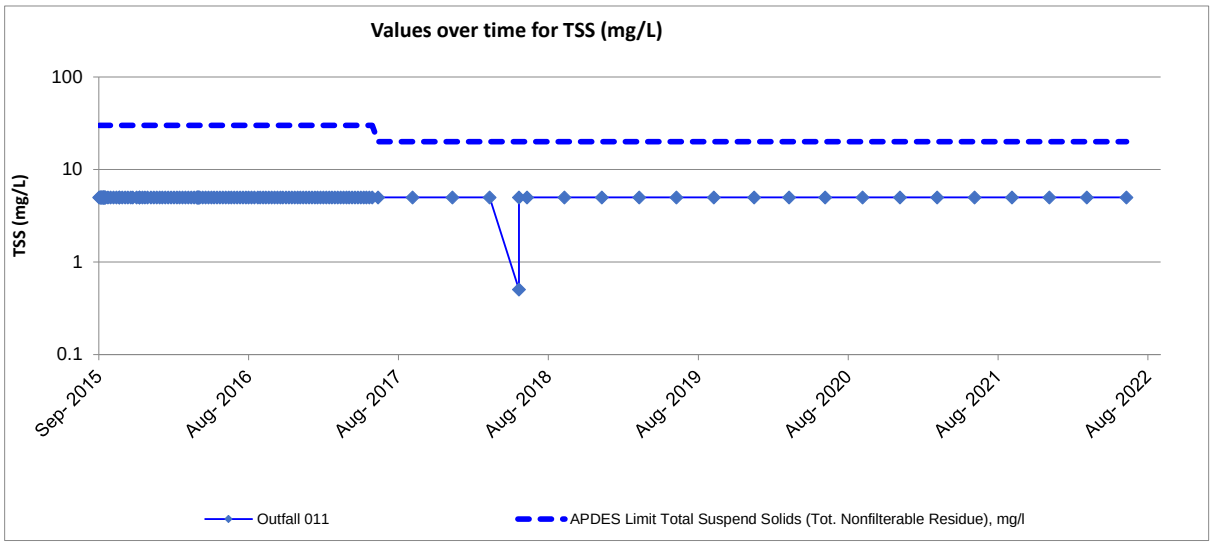
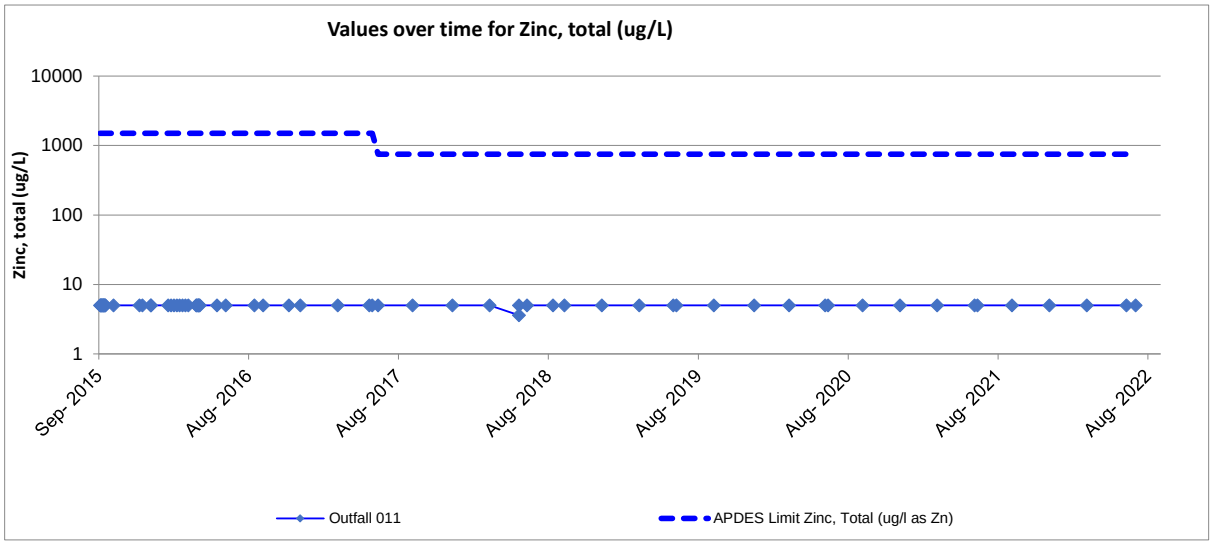
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011
APDES Limit pH, Field, Standard Units
APDES Upper Limit pH, Field, Standard Units


Values over time for Selenium, total (ug/L)
Selenium, total (ug/L)
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011

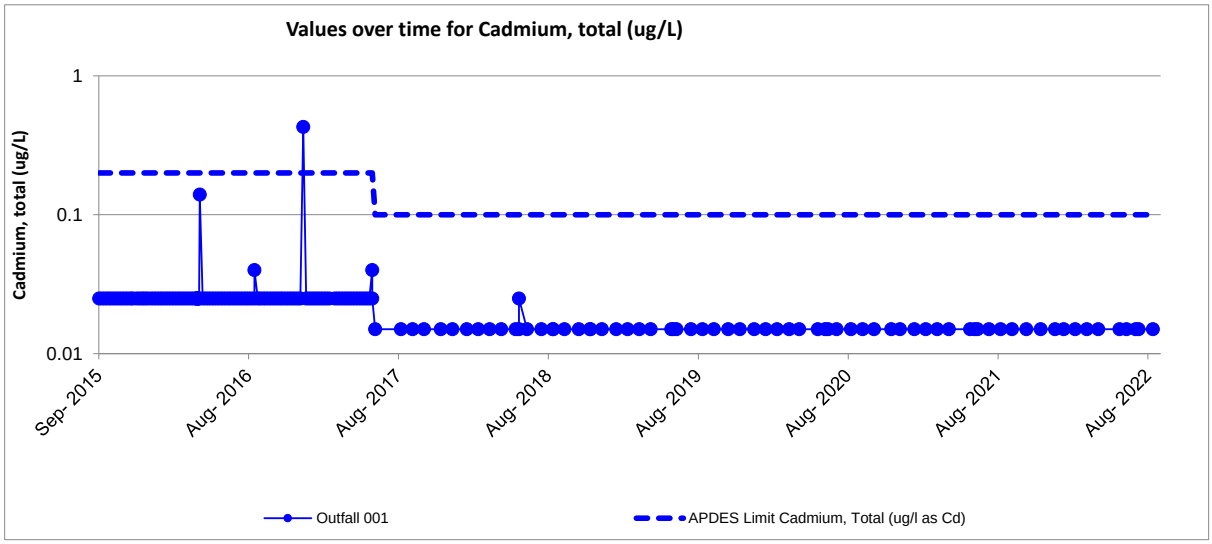

Values over time for TDS (mg/L)
TDS (mg/L)
10000
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011

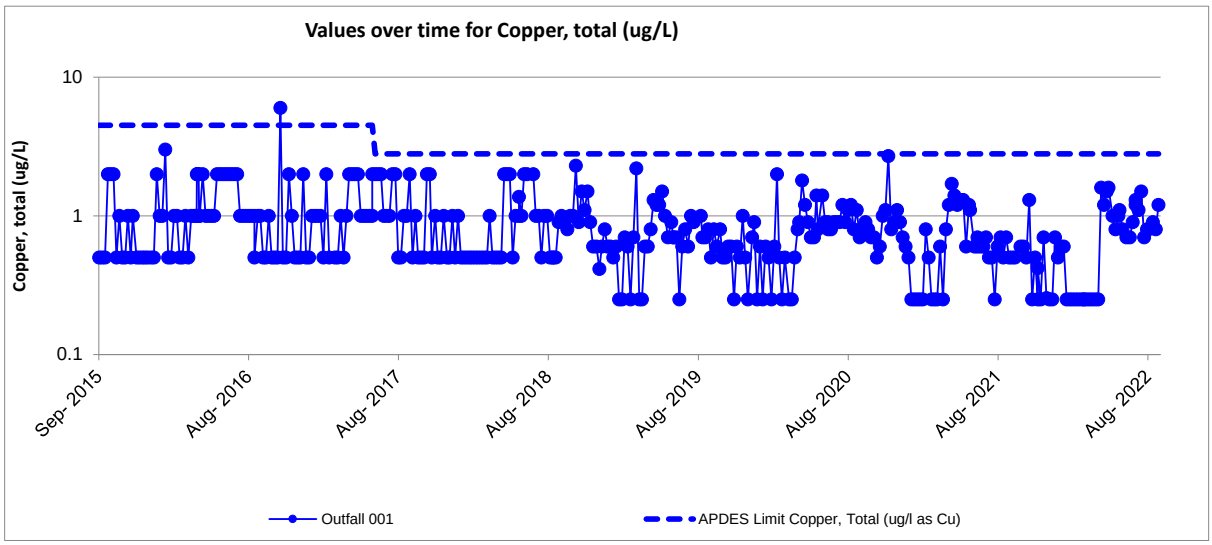

Values over time for TSS (mg/L)
TSS (mg/L)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011
APDES Limit Total Suspend Solids (Tot. Nonfilterable Residue), mg/l

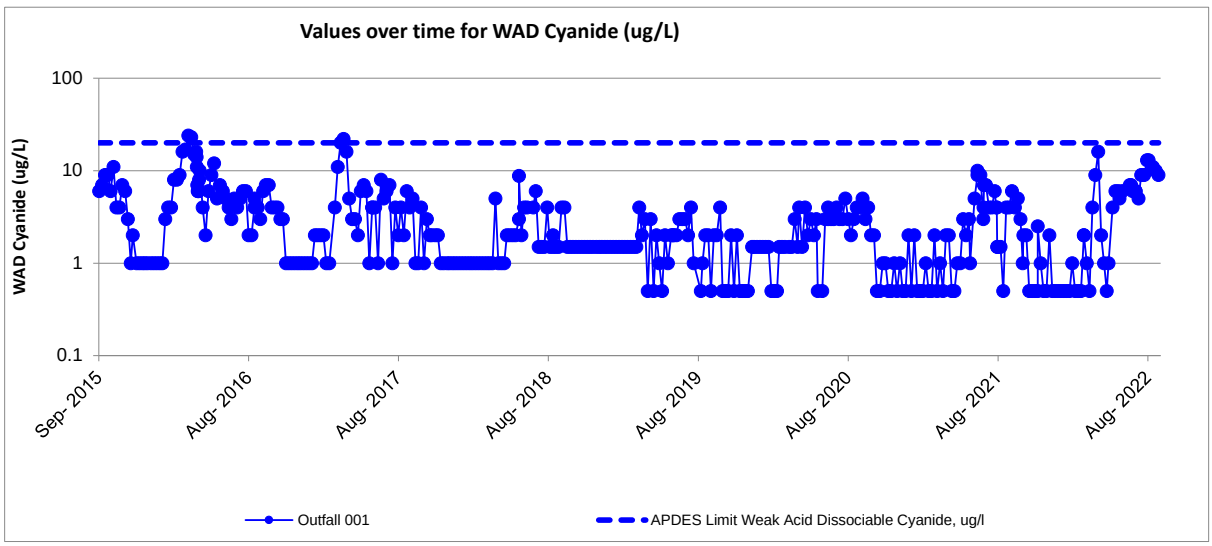

Values over time for Zinc, total (ug/L)
Zinc, total (ug/L)
10000
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 011
APDES Limit Zinc, Total (ug/l as Zn)

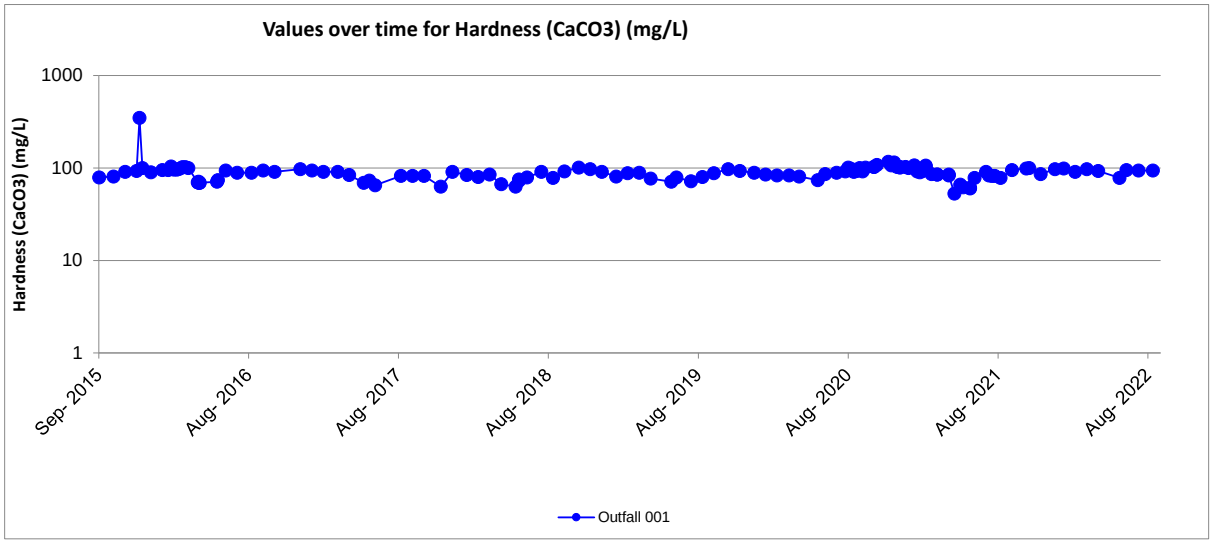
APPENDIX C –

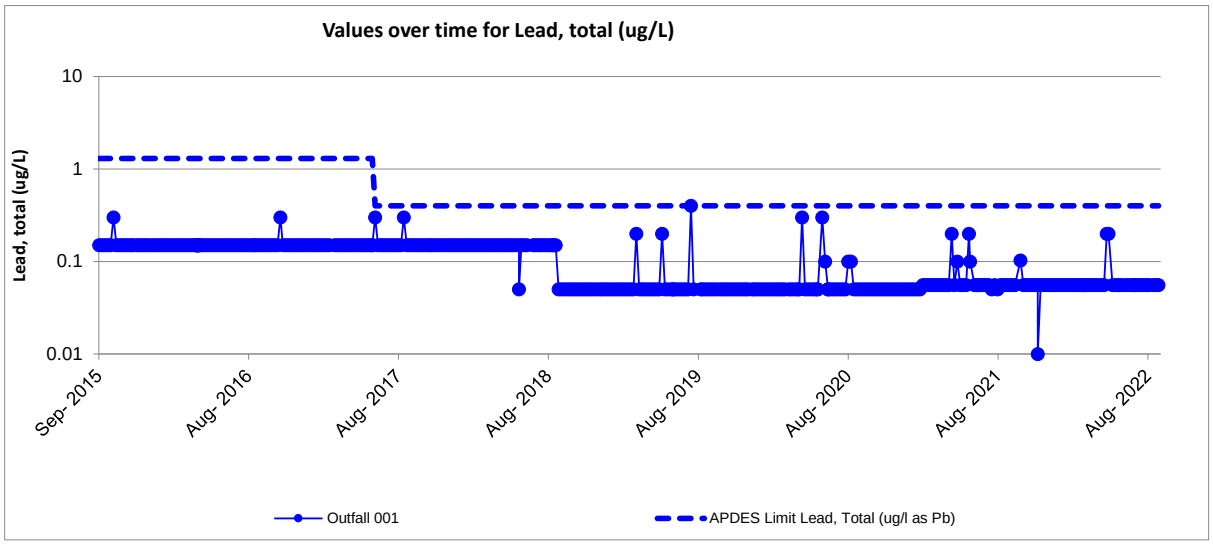
OUTFALL 001 GRAPHS

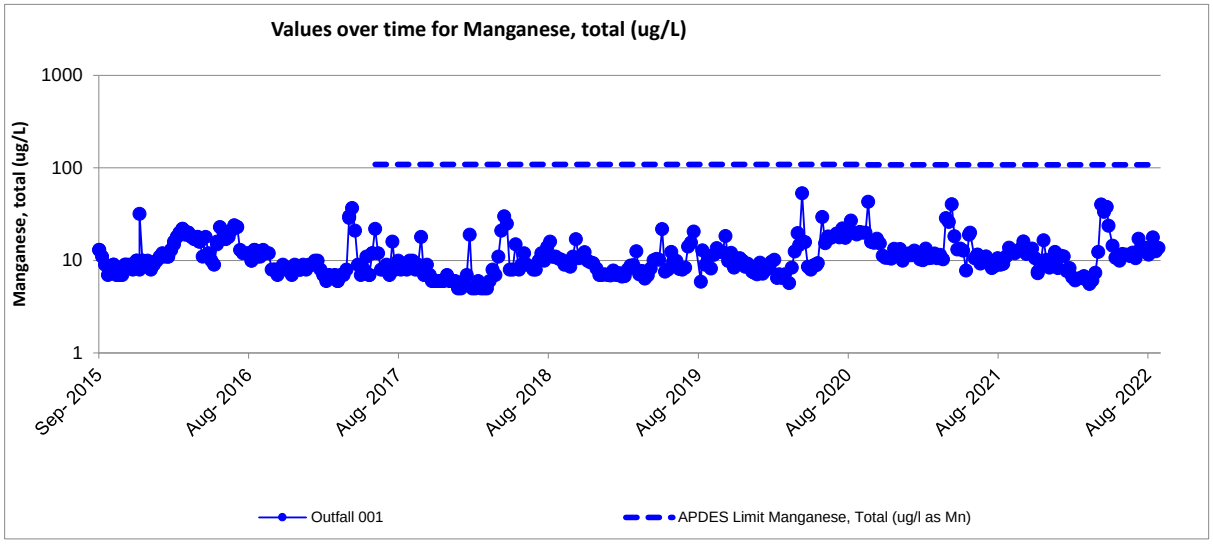

Values over time for Cadmium, total (ug/L)
Cadmium, total (ug/L)
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 001
APDES Limit Cadmium, Total (ug/l as Cd)

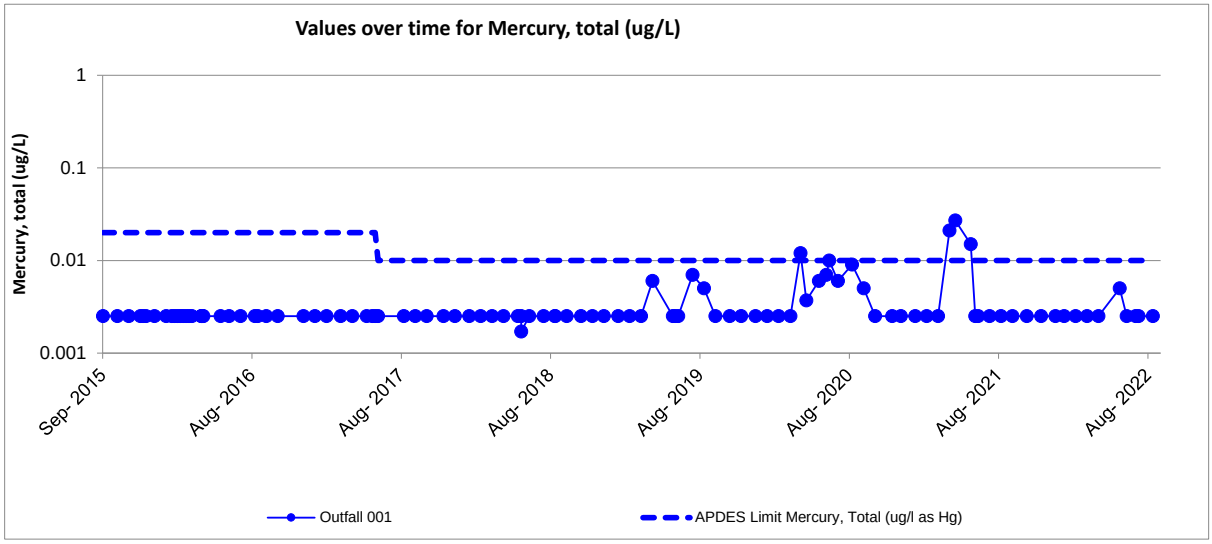

Values over time for Copper, total (ug/L)
Copper, total (ug/L)
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 001
APDES Limit Copper, Total (ug/l as Cu)

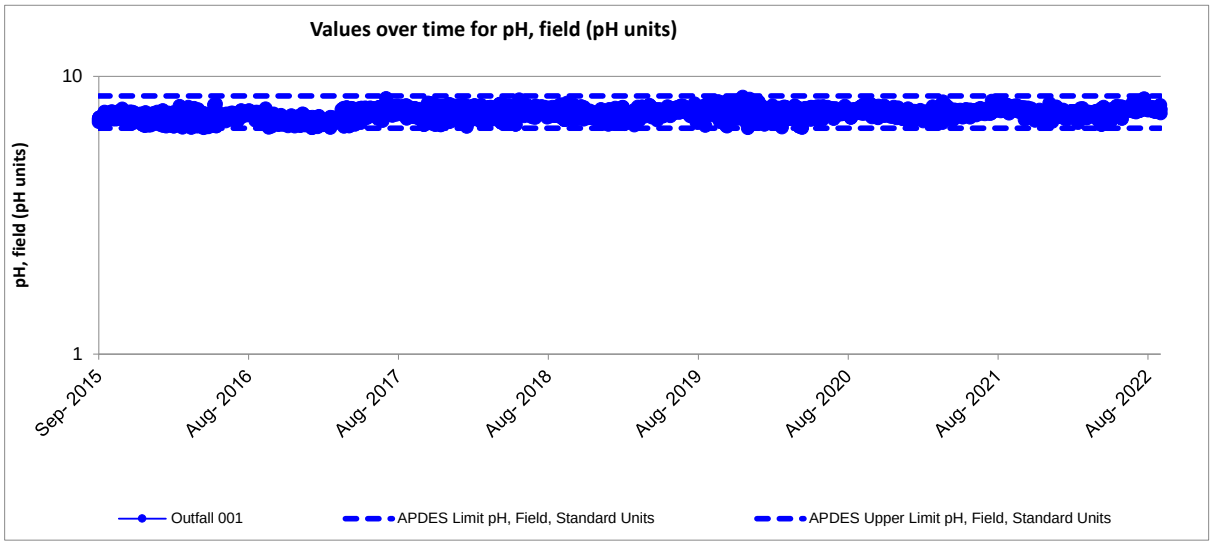

Values over time for WAD Cyanide (ug/L)
WAD Cyanide (ug/L)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 001
APDES Limit Weak Acid Dissociable Cyanide, ug/l

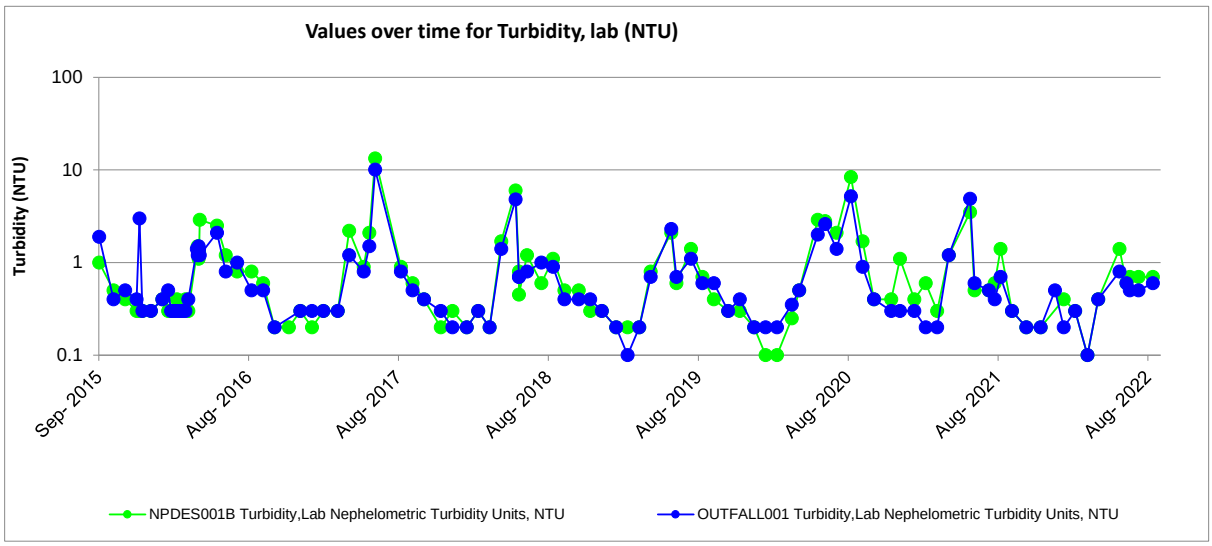

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
Outfall 001

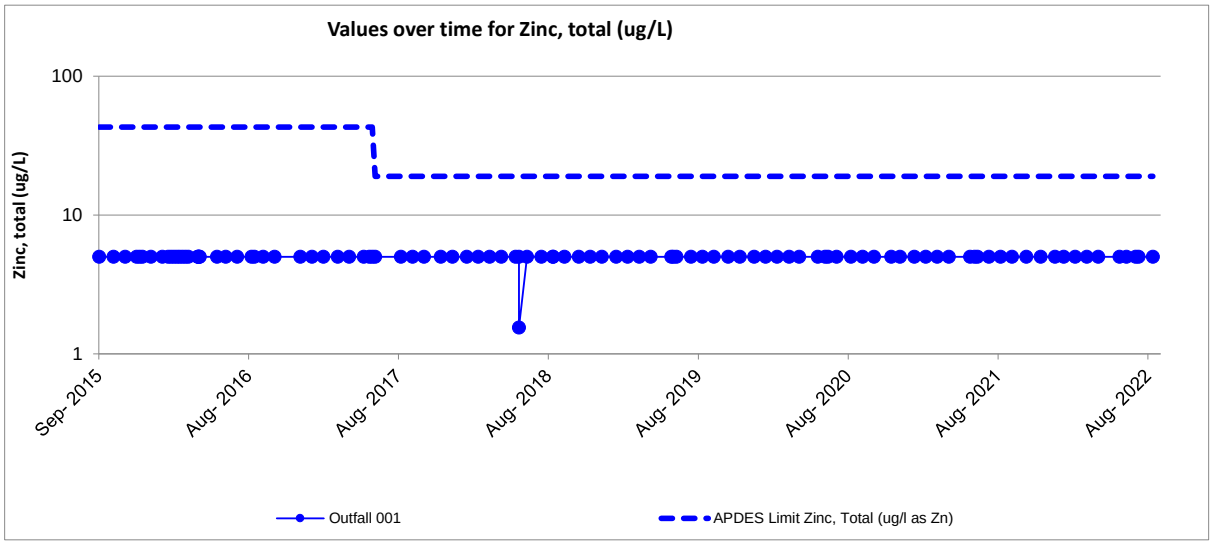

Values over time for Lead, total (ug/L)
Lead, total (ug/L)
10
1
0.1
0.01
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
Outfall 001
APDES Limit Lead, Total (ug/l as Pb)


Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
Outfall 001
APDES Limit Manganese, Total (ug/l as Mn)


Values over time for Mercury, total (ug/L)
Mercury, total (ug/L)
1
0.1
0.01
0.001
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 001
APDES Limit Mercury, Total (ug/l as Hg)

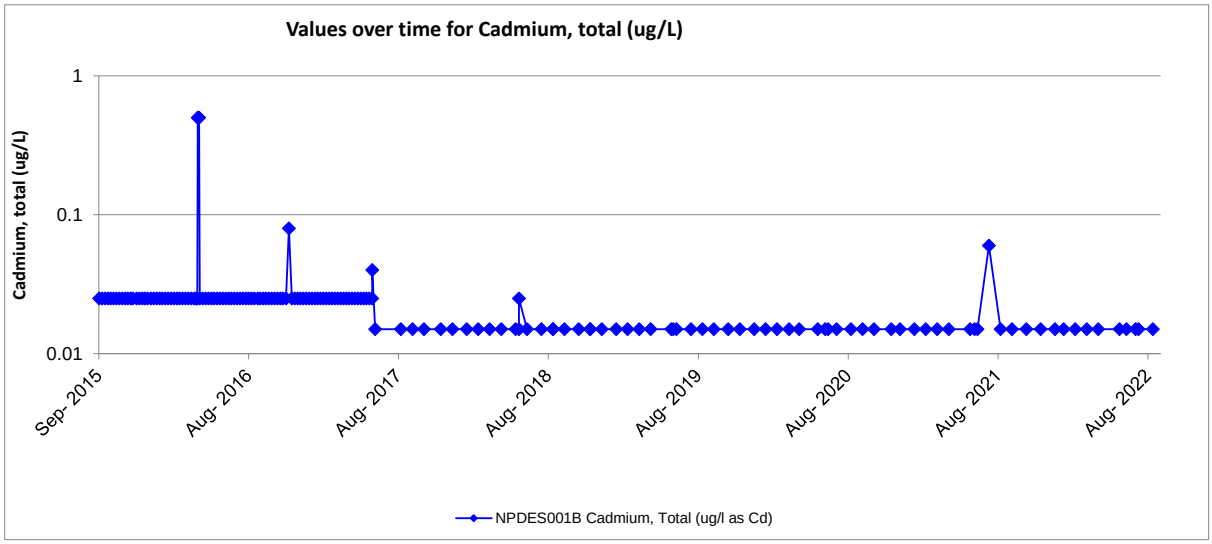

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 001
APDES Limit pH, Field, Standard Units
APDES Upper Limit pH, Field, Standard Units

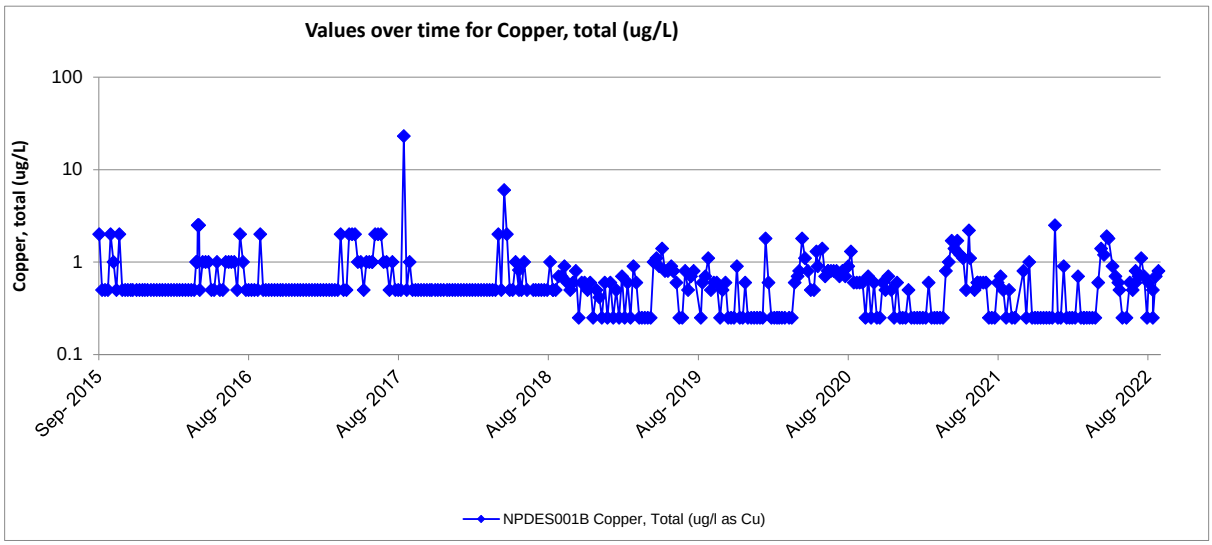

Values over time for Turbidity, lab (NTU)
Turbidity (NTU)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
NPDES001B Turbidity,Lab Nephelometric Turbidity Units, NTU
OUTFALL001 Turbidity,Lab Nephelometric Turbidity Units, NTU

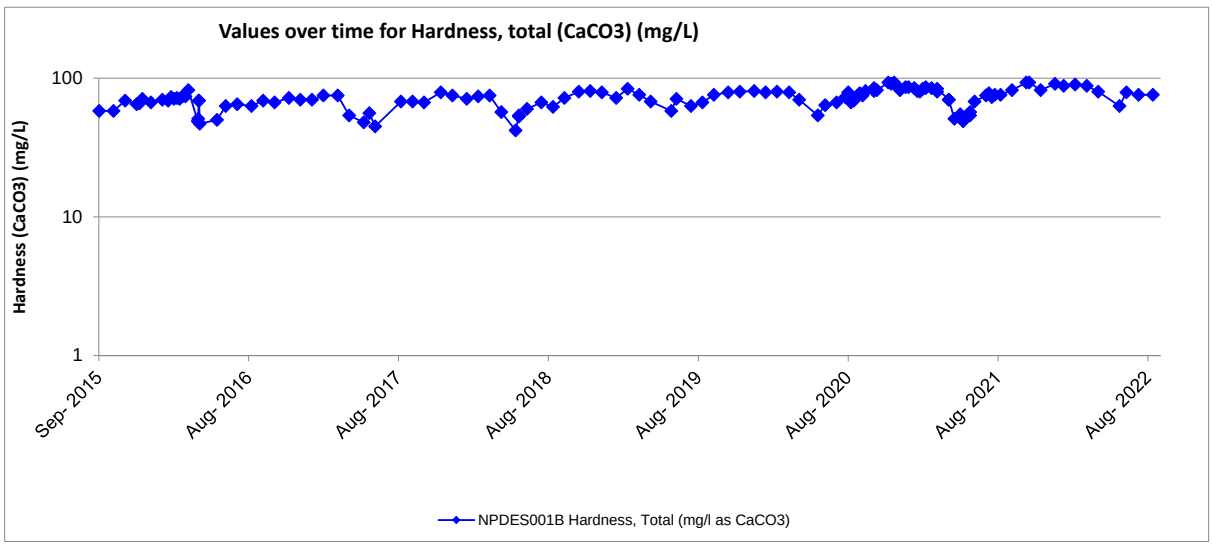

Values over time for Zinc, total (ug/L)
Zinc, total (ug/L)
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 001
APDES Limit Zinc, Total (ug/l as Zn)

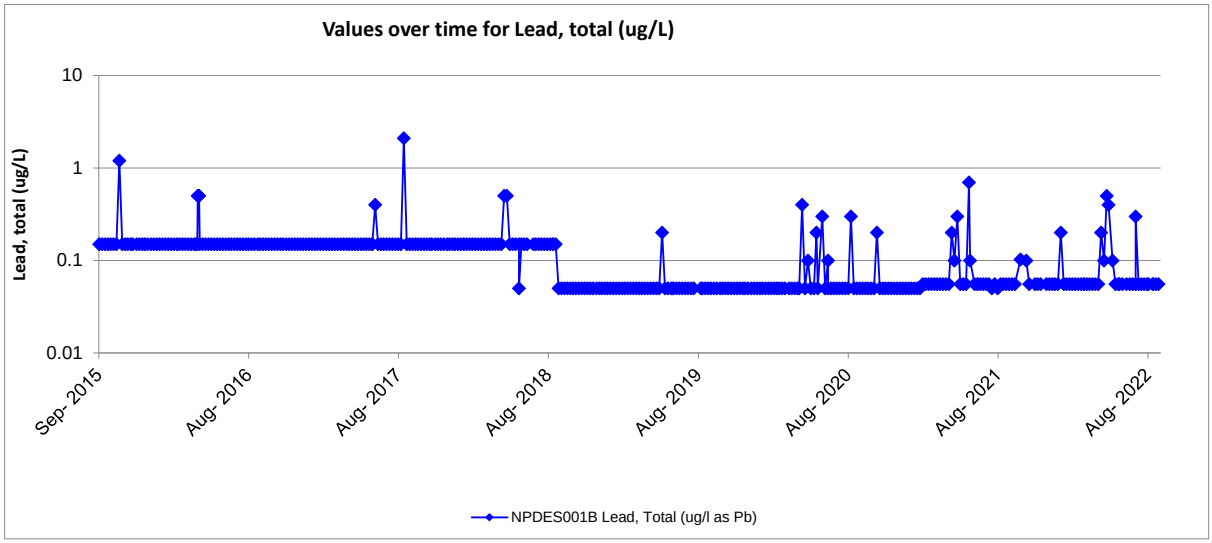
APPENDIX C –

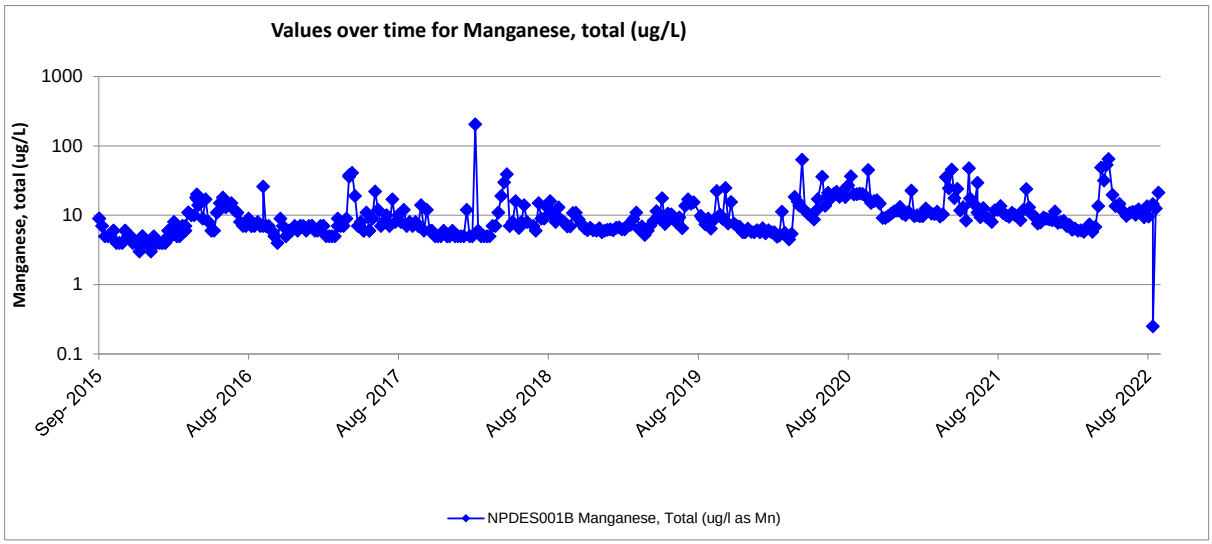
NPDES001B GRAPHS

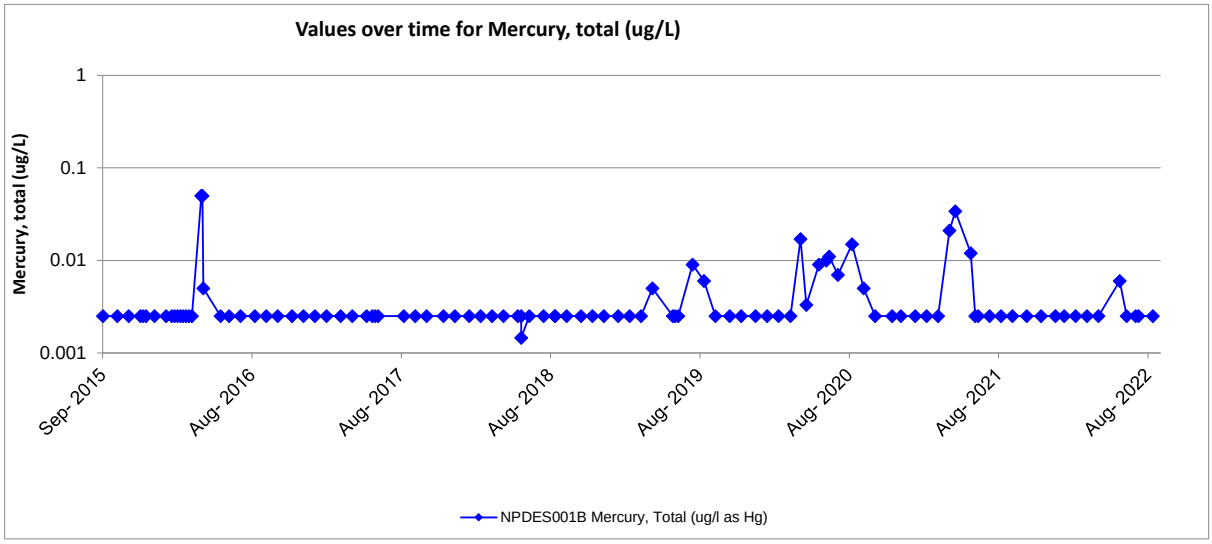

Values over time for Cadmium, total (ug/L)
Cadmium, total (ug/L)
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
NPDES001B Cadmium, Total (ug/l as Cd)

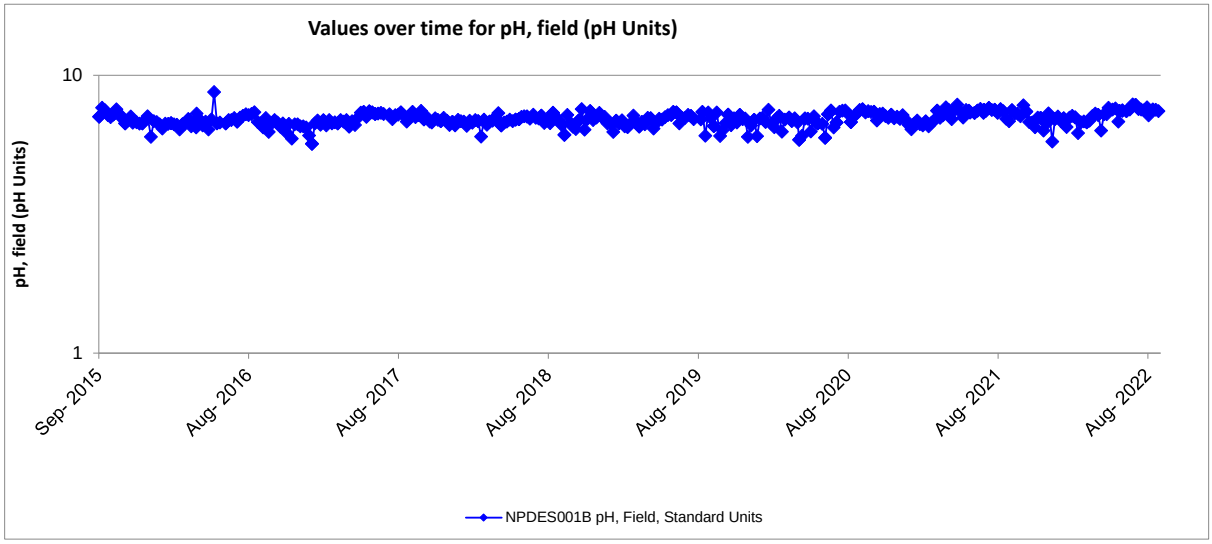

Values over time for Copper, total (ug/L)
Copper, total (ug/L)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
NPDES001B Copper, Total (ug/l as Cu)

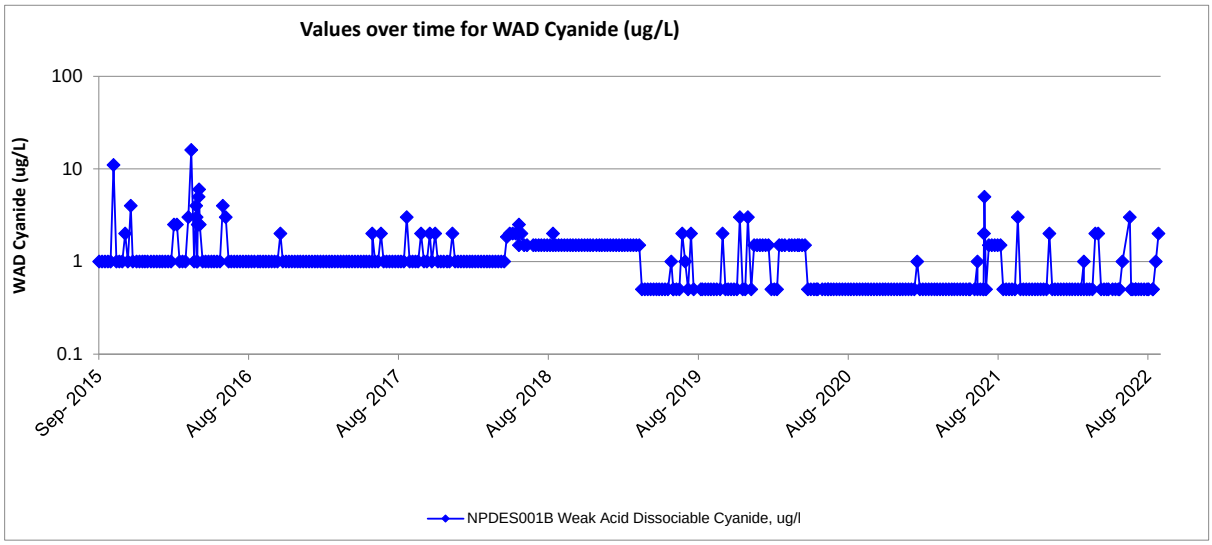

Values over time for Hardness, total (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
NPDES001B Hardness, Total (mg/l as CaCO3)

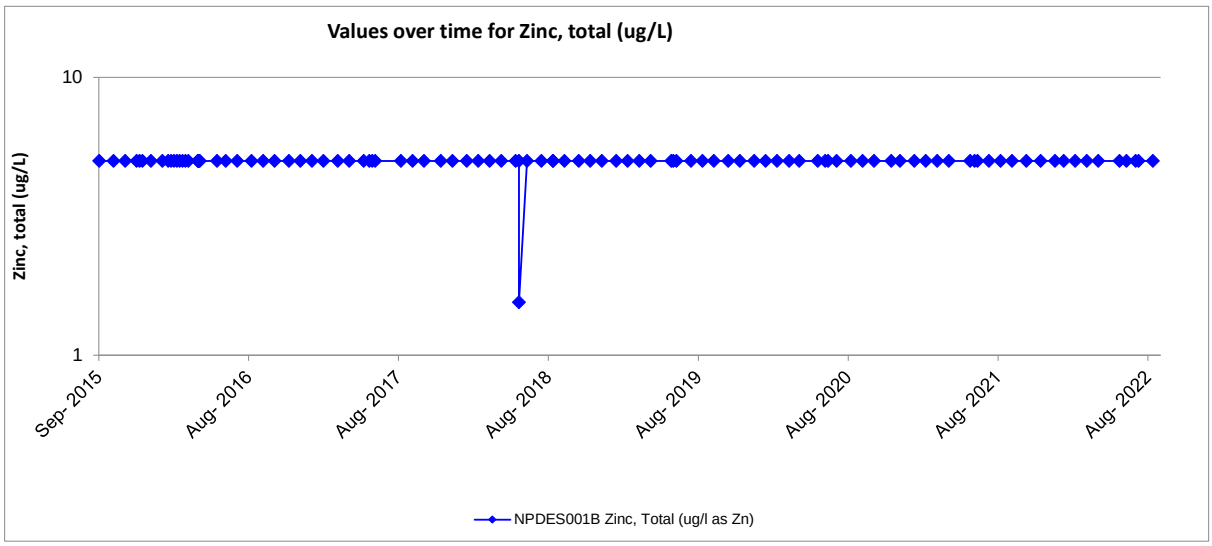

Values over time for Lead, total (ug/L)
Lead, total (ug/L)
10
1
0.1
0.01
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
NPDES001B Lead, Total (ug/l as Pb)


Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
1000
100
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
NPDES001B Manganese, Total (ug/l as Mn)


Values over time for Mercury, total (ug/L)
Mercury, total (ug/L)
1
0.1
0.01
0.001
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
NPDES001B Mercury, Total (ug/l as Hg)

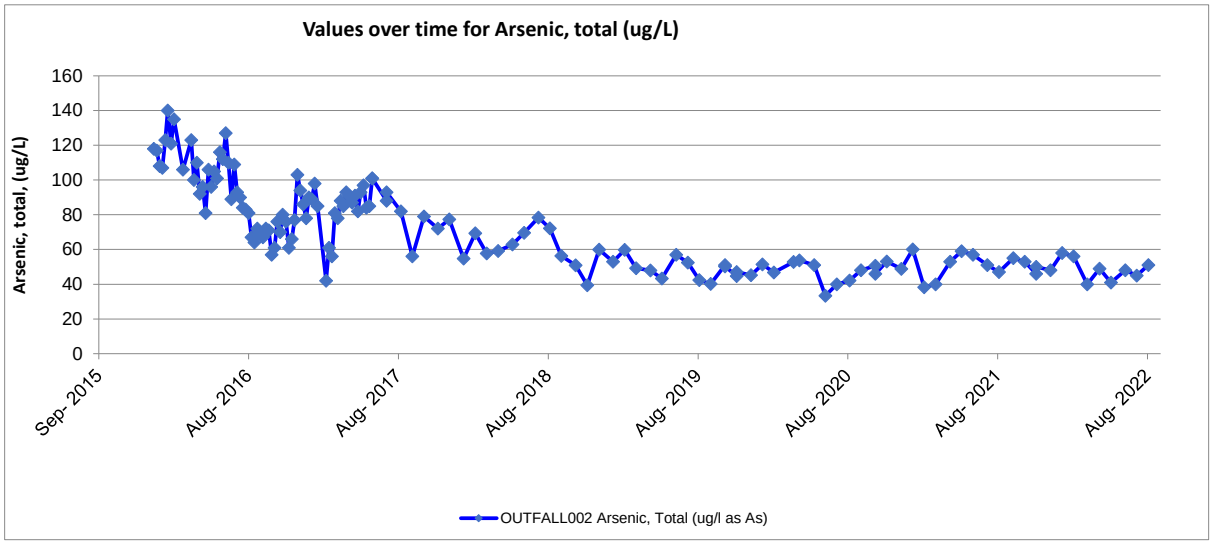

Values over time for pH, field (pH Units)
pH, field (pH Units)
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
NPDES001B pH, Field, Standard Units

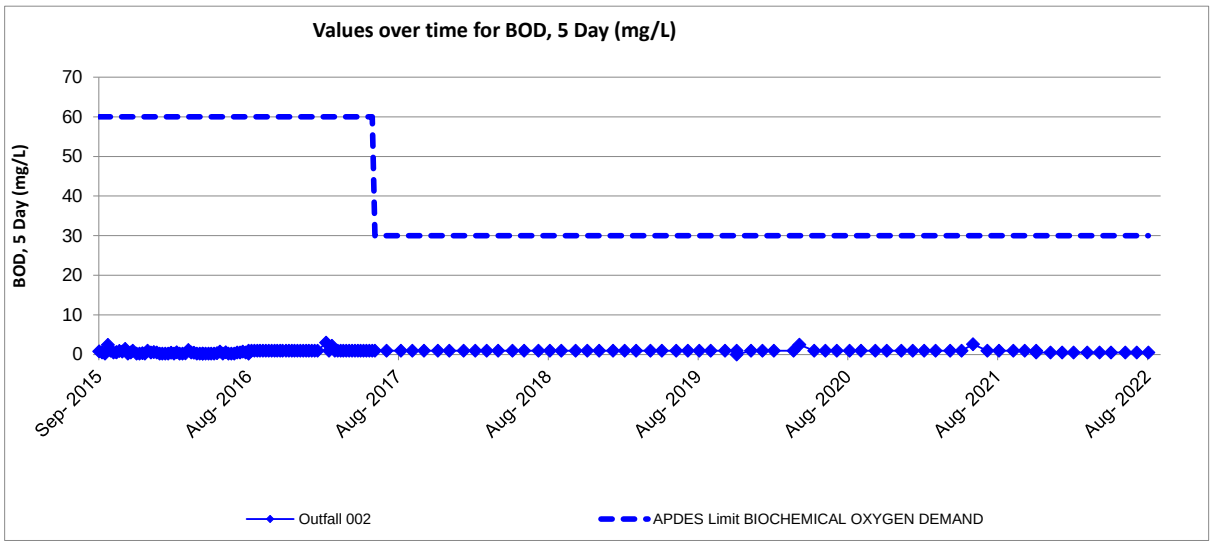

Values over time for WAD Cyanide (ug/L)
WAD Cyanide (ug/L)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
NPDES001B Weak Acid Dissociable Cyanide, ug/l

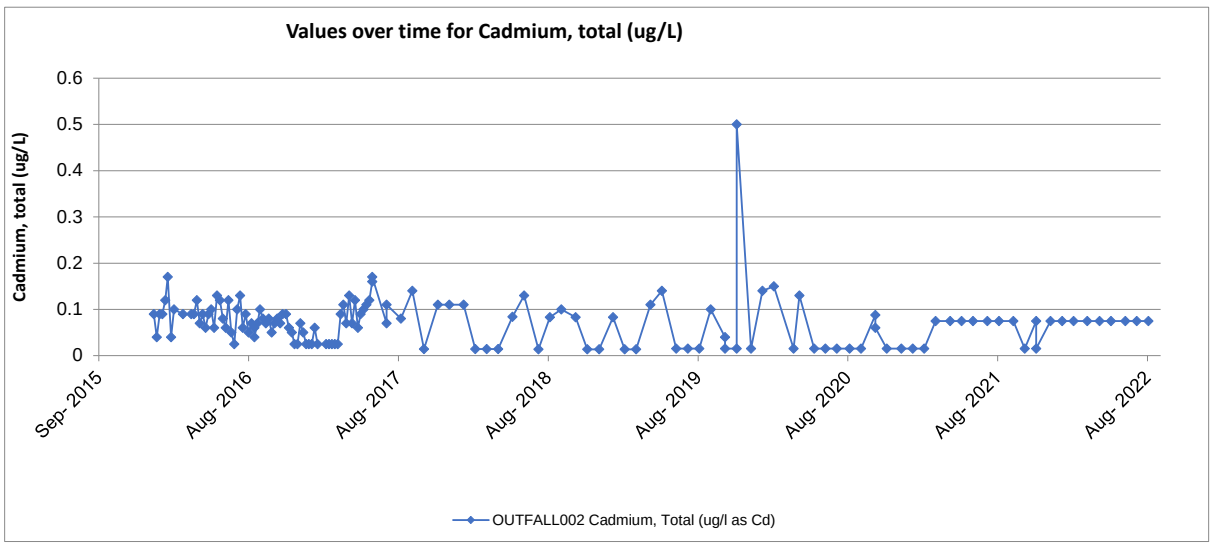

Values over time for Zinc, total (ug/L)
Zinc, total (ug/L)
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
NPDES001B Zinc, Total (ug/l as Zn)

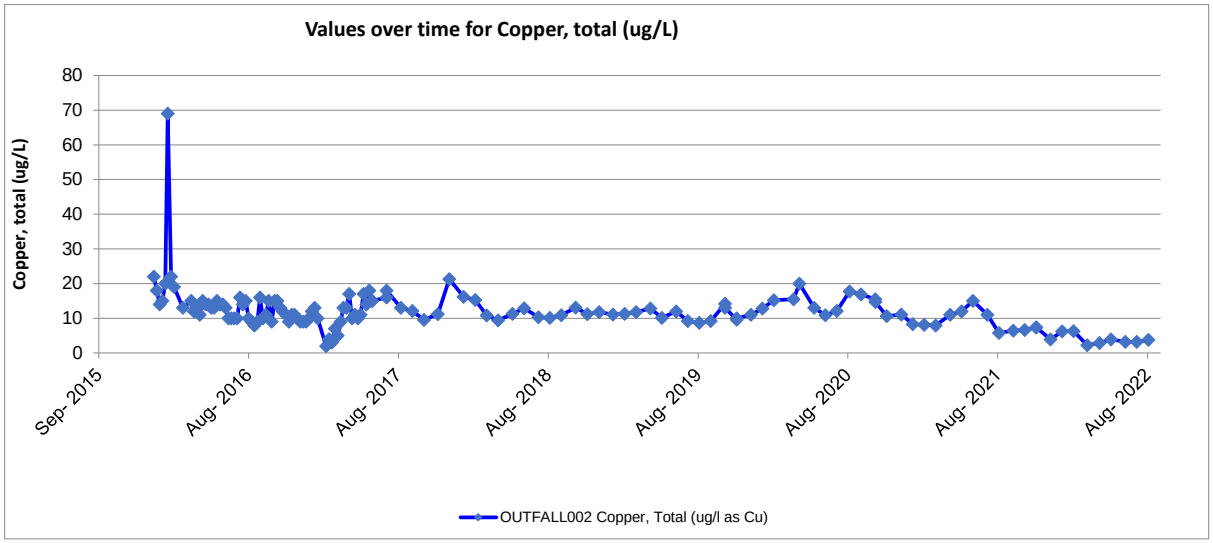
APPENDIX C –

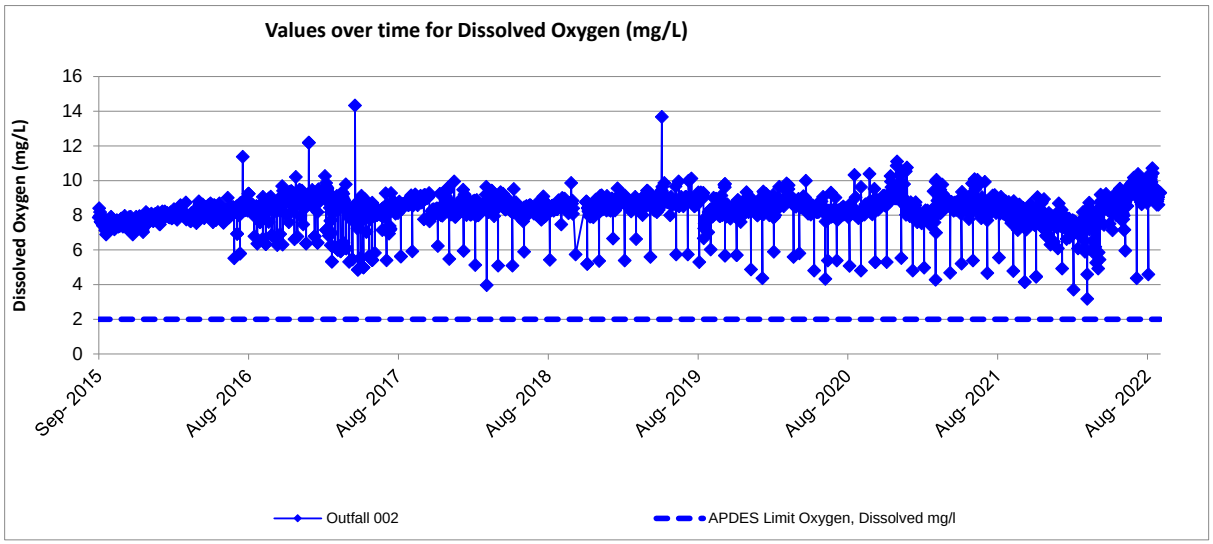
OUTFALL 002 GRAPHS

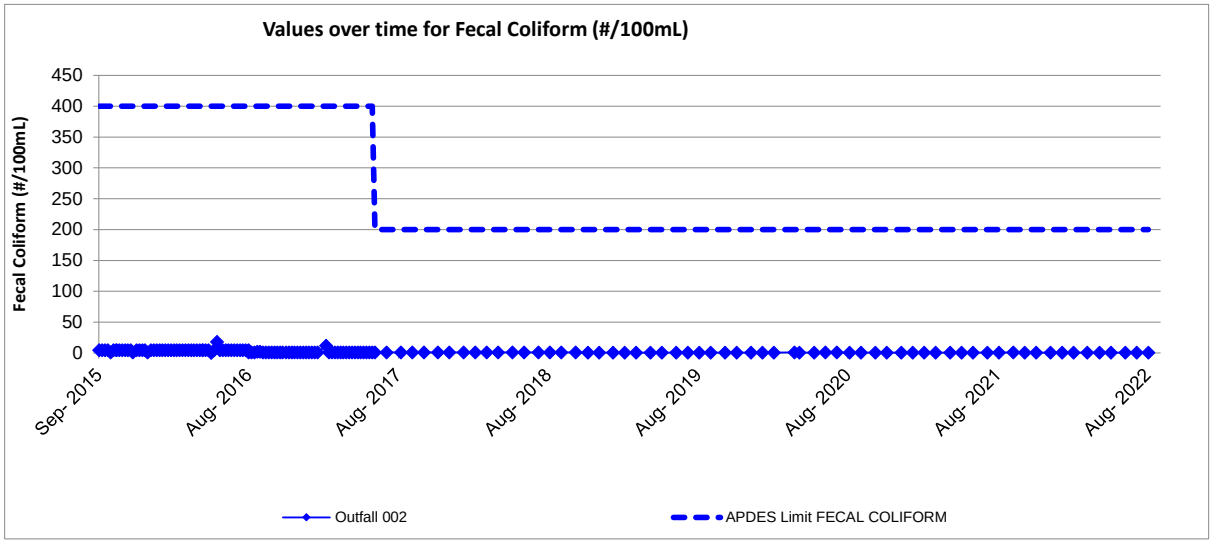

Values over time for Arsenic, total (ug/L)
Arsenic, total, (ug/L)
160
140
120
100
80
60
40
20
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
OUTFALL002 Arsenic, Total (ug/l as As)

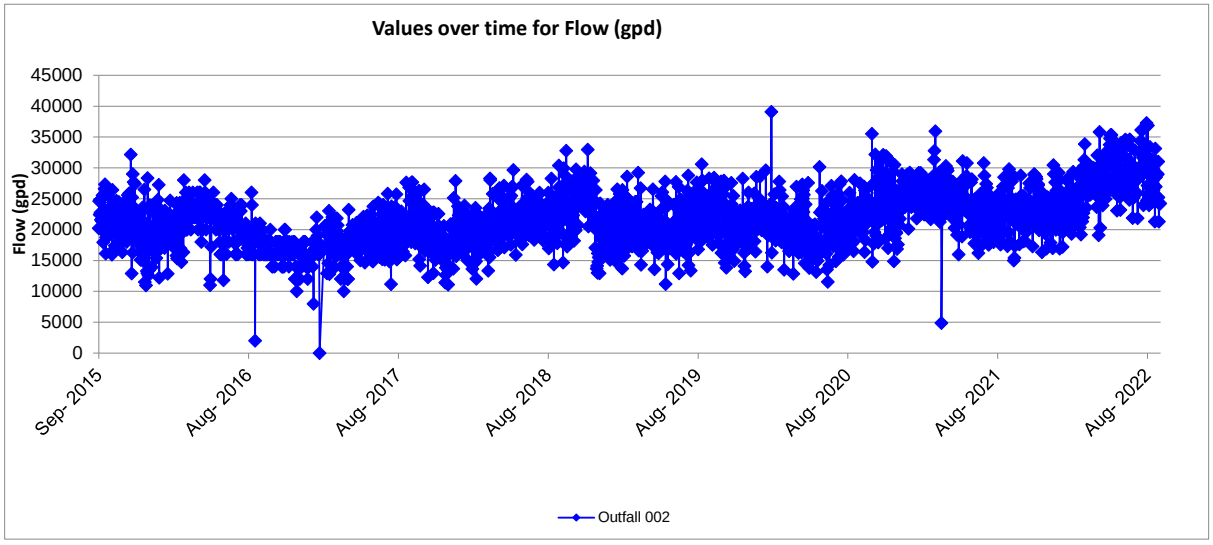

Values over time for BOD, 5 Day (mg/L)
BOD, 5 Day (mg/L)
70
60
50
40
30
20
10
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 002
APDES Limit BIOCHEMICAL OXYGEN DEMAND

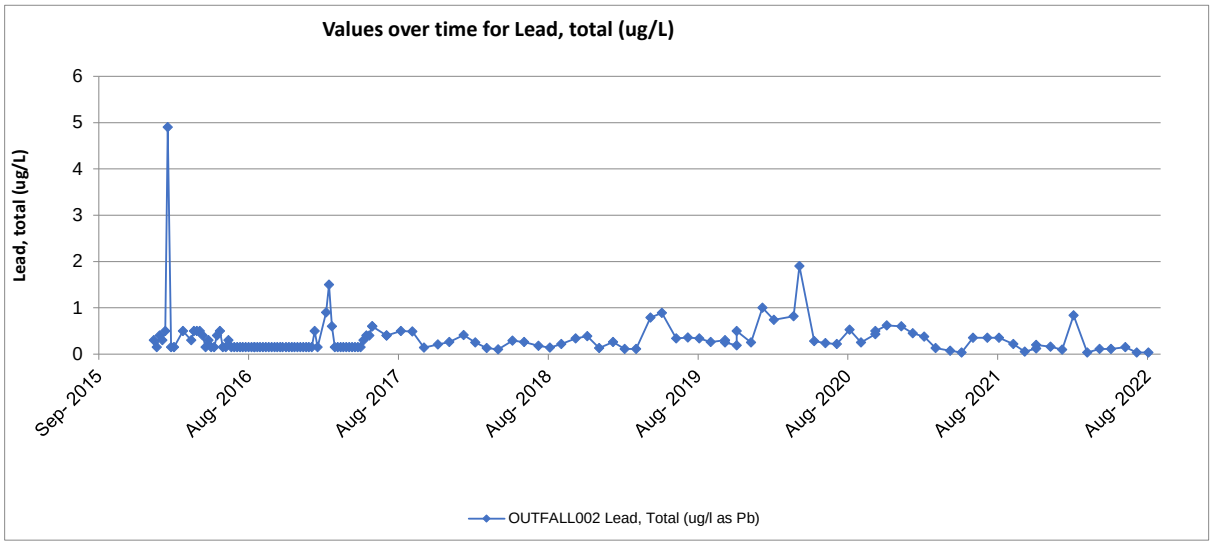

Values over time for Cadmium, total (ug/L)
Cadmium, total (ug/L)
0.6
0.5
0.4
0.3
0.2
0.1
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
OUTFALL002 Cadmium, Total (ug/l as Cd)

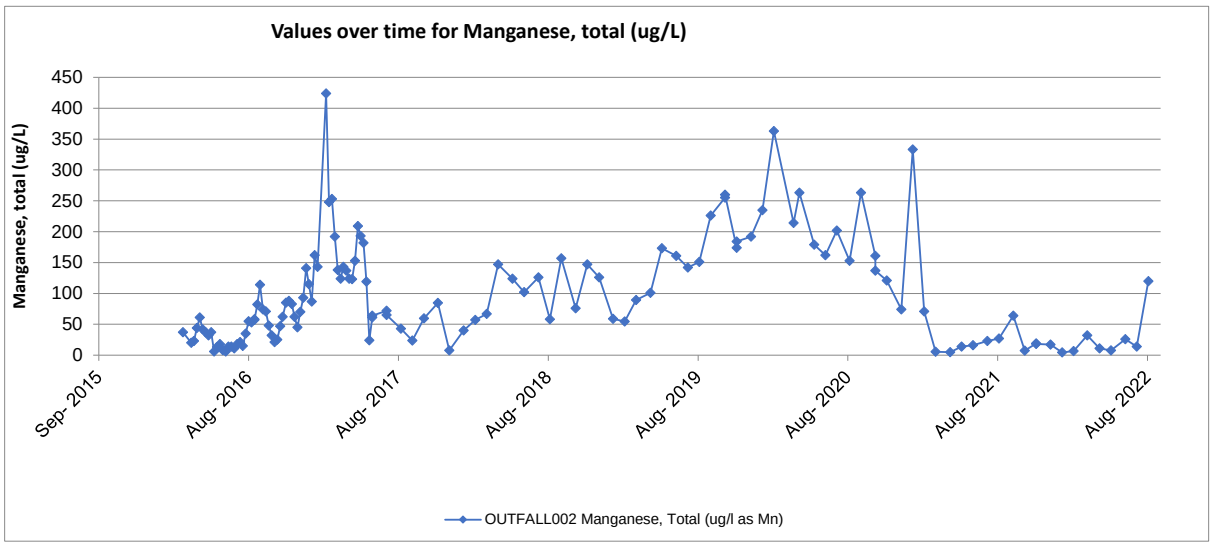

Values over time for Copper, total (ug/L)
Copper, total (ug/L)
80
70
60
50
40
30
20
10
0
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
OUTFALL002 Copper, Total (ug/l as Cu)

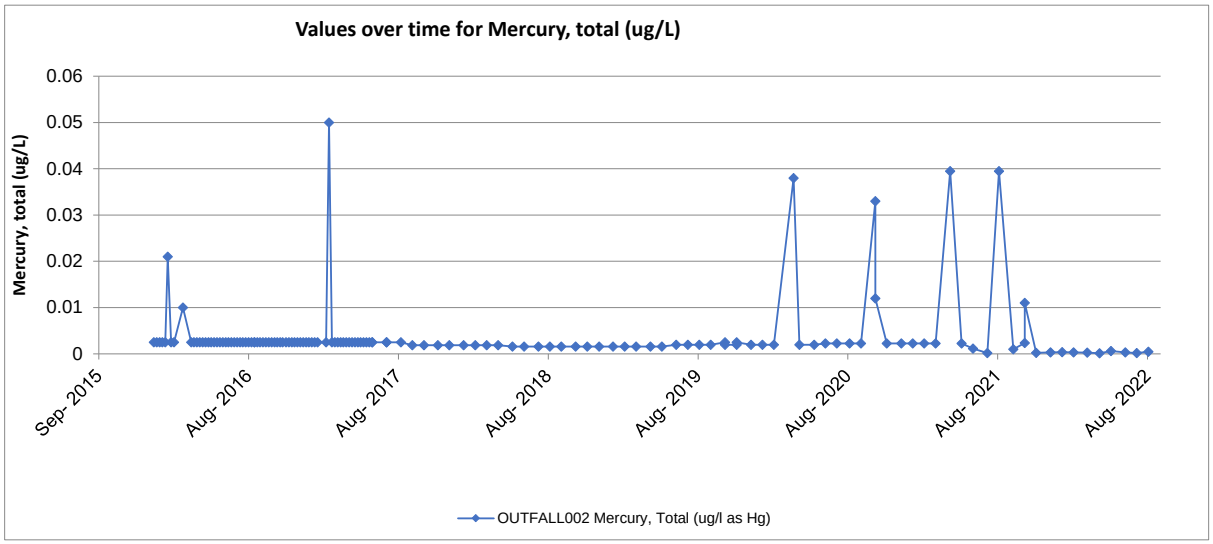

Values over time for Dissolved Oxygen (mg/L)
Dissolved Oxygen (mg/L)
16
14
12
10
8
6
4
2
0
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
Outfall 002
APDES Limit Oxygen, Dissolved mg/l

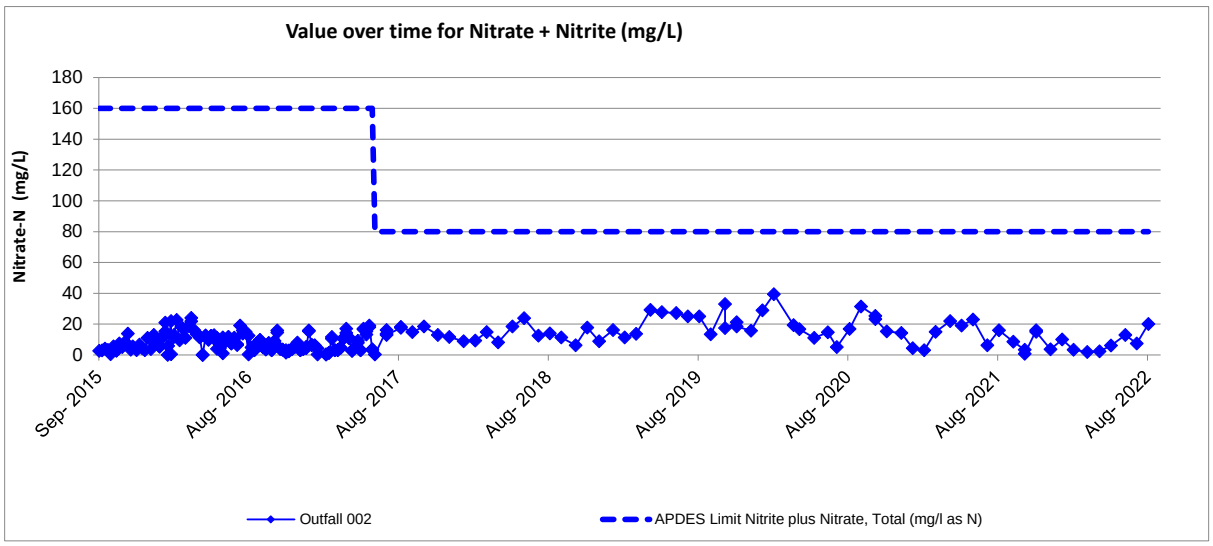

Values over time for Fecal Coliform (#/100mL)
Fecal Coliform (#/100mL)
450
400
350
300
250
200
150
100
50
0
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
Outfall 002
APDES Limit FECAL COLIFORM

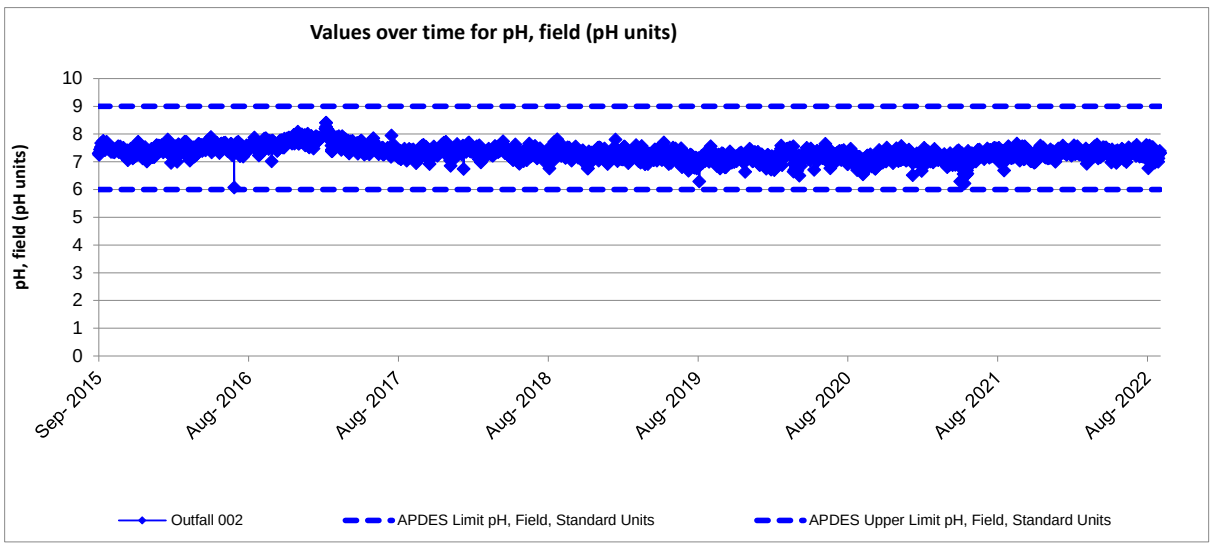

Values over time for Flow (gpd)
Flow (gpd)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 002

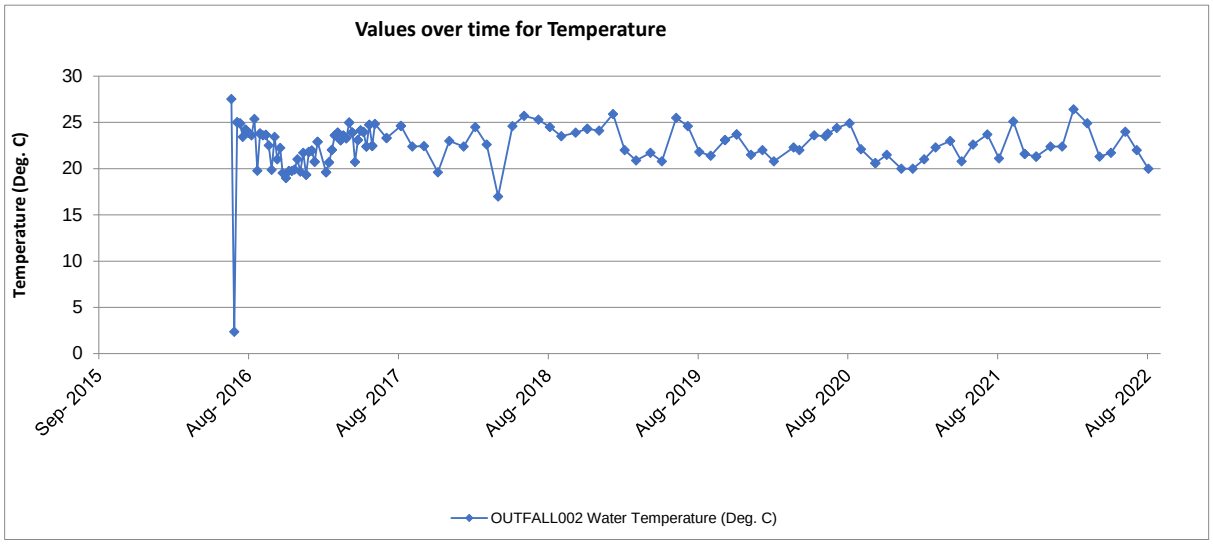

Values over time for Lead, total (ug/L)
Lead, total (ug/L)
6
5
4
3
2
1
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
OUTFALL002 Lead, Total (ug/l as Pb)

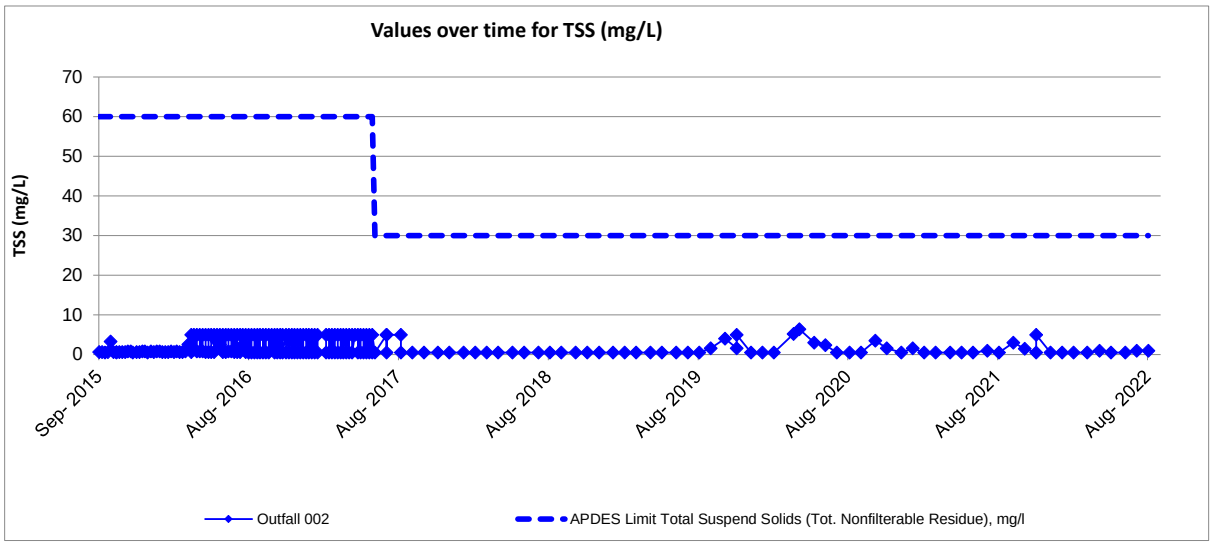

Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
450
400
350
300
250
200
150
100
50
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
OUTFALL002 Manganese, Total (ug/l as Mn)

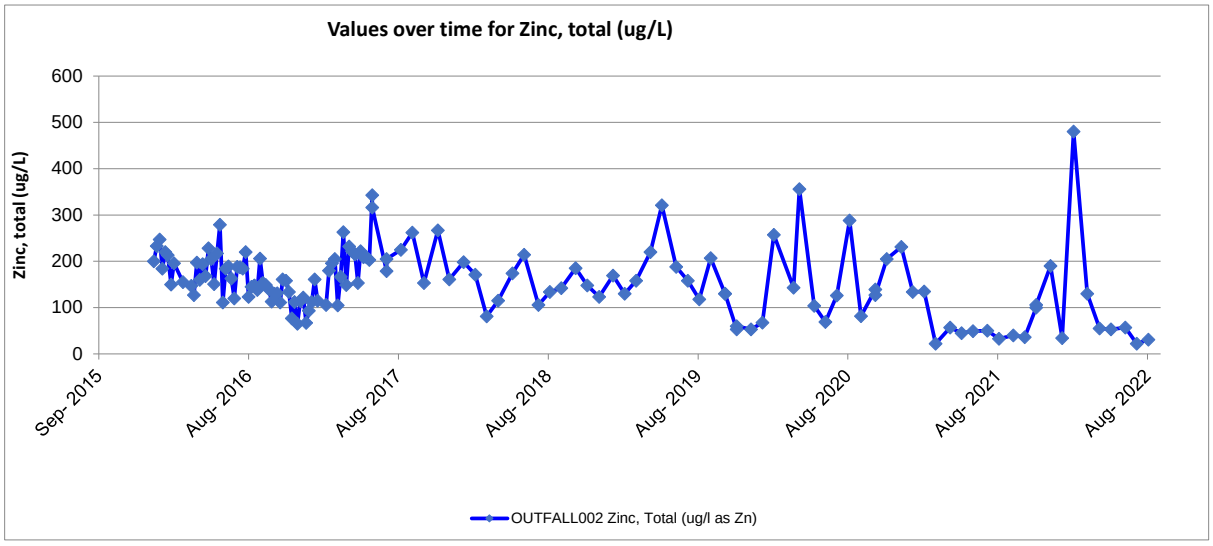

Values over time for Mercury, total (ug/L)
Mercury, total (ug/L)
0.06
0.05
0.04
0.03
0.02
0.01
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
OUTFALL002 Mercury, Total (ug/l as Hg)


Value over time for Nitrate + Nitrite (mg/L)
Nitrate-N (mg/L)
180
160
140
120
100
80
60
40
20
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 002
APDES Limit Nitrite plus Nitrate, Total (mg/l as N)


Values over time for pH, field (pH units)
pH, field (pH units)
10
9
8
7
6
5
4
3
2
1
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
Outfall 002
APDES Limit pH, Field, Standard Units
APDES Upper Limit pH, Field, Standard Units

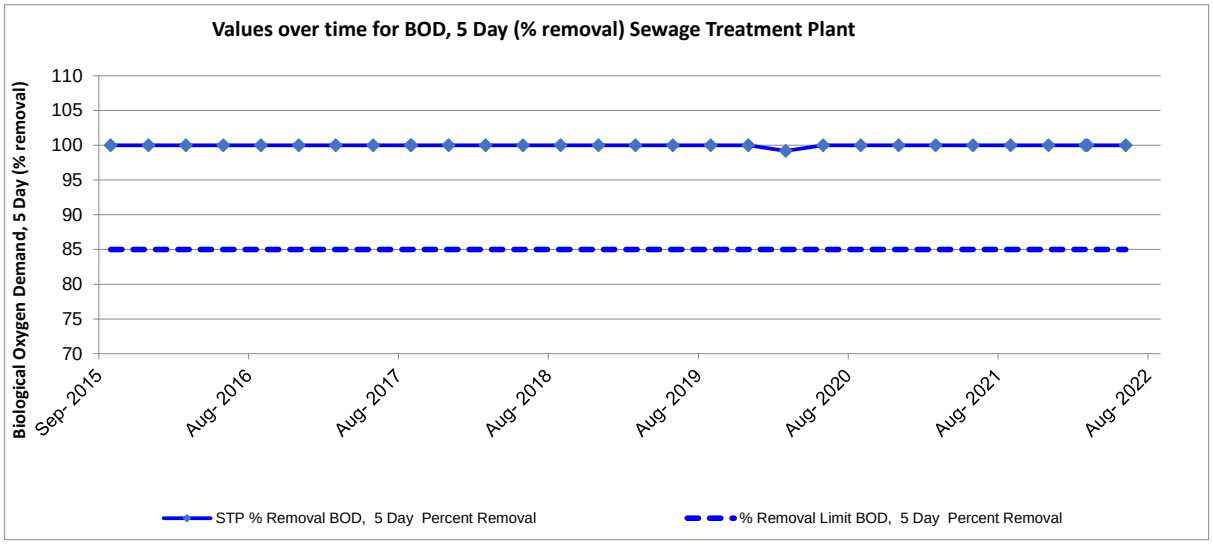

Values over time for Temperature
Temperature (Deg. C)
30
25
20
15
10
5
0
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
OUTFALL002 Water Temperature (Deg. C)

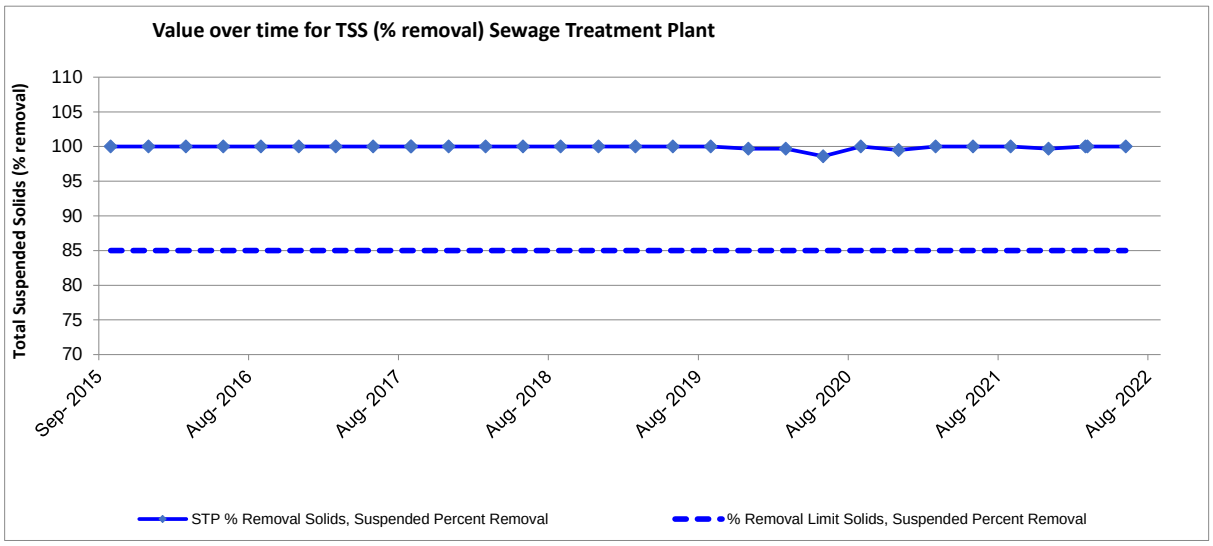

Values over time for TSS (mg/L)
TSS (mg/L)
70
60
50
40
30
20
10
0
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
Outfall 002
APDES Limit Total Suspend Solids (Tot. Nonfilterable Residue), mg/l


Values over time for Zinc, total (ug/L)
Zinc, total (ug/L)
600
500
400
300
200
100
0
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
OUTFALL002 Zinc, Total (ug/l as Zn)

APPENDIX C –

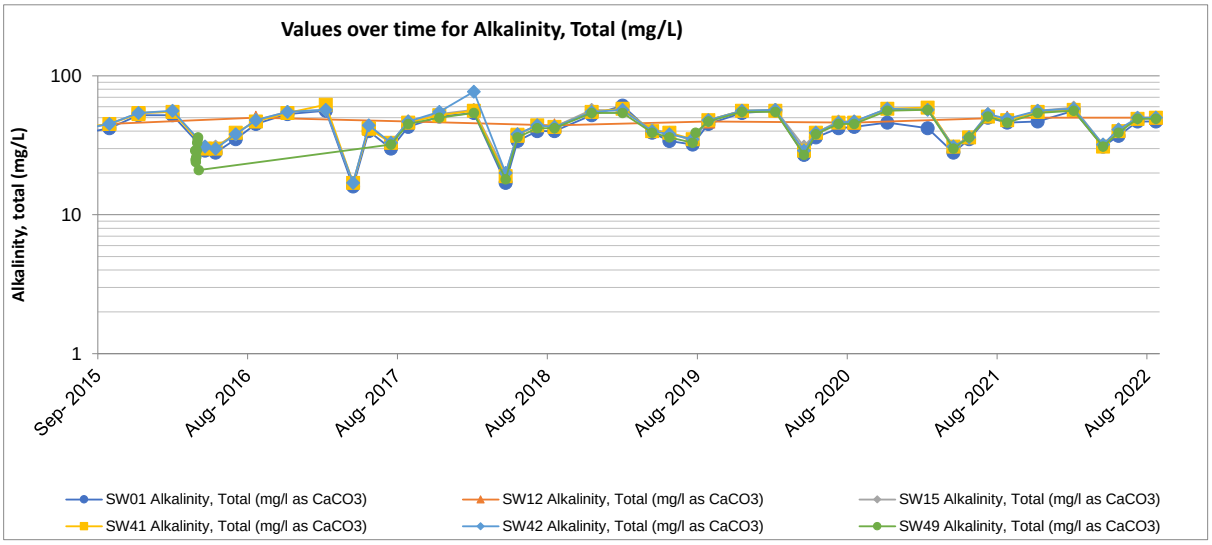
STP GRAPHS

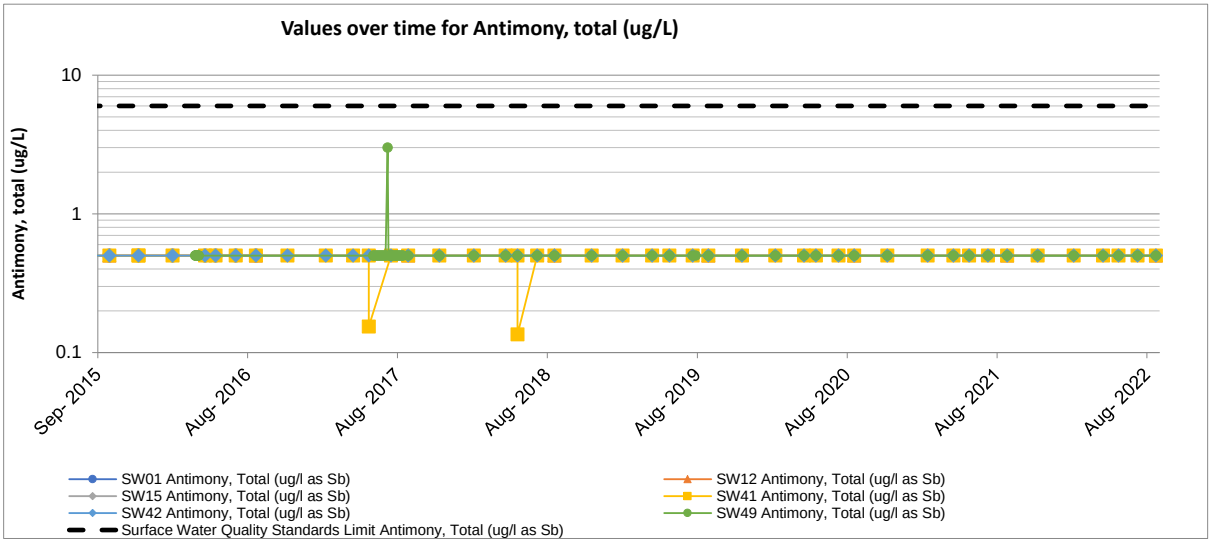

Values over time for BOD, 5 Day (% removal) Sewage Treatment Plant
Biological Oxygen Demand, 5 Day (% removal)
110
105
100
95
90
85
80
75
70
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
STP % Removal BOD, 5 Day Percent Removal
% Removal Limit BOD, 5 Day Percent Removal

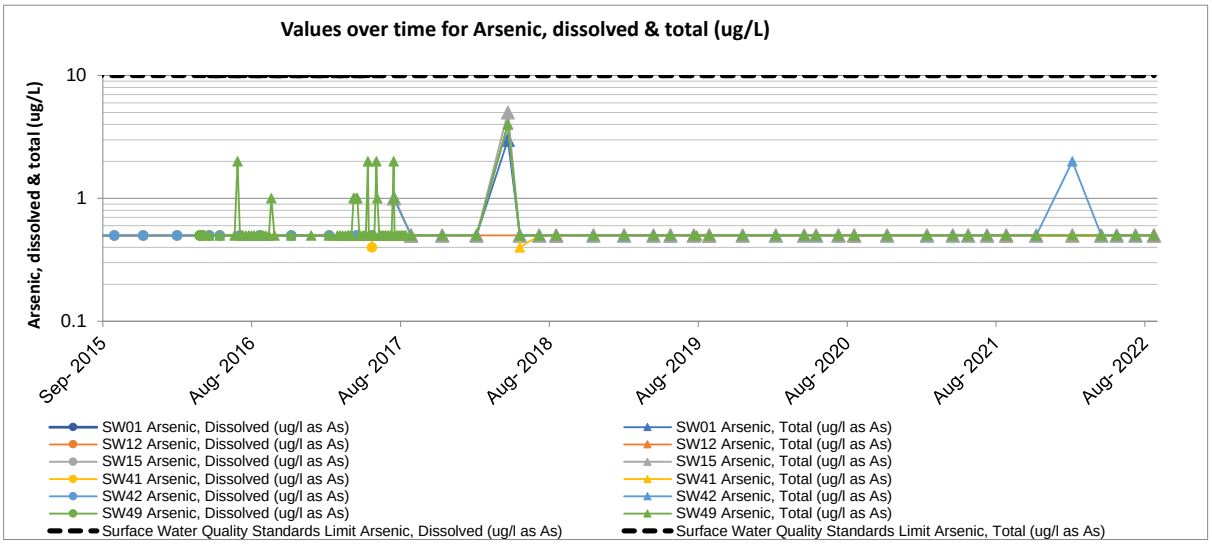

Value over time for TSS (% removal) Sewage Treatment Plant
Total Suspended Solids (% removal)
110
105
100
95
90
85
80
75
70
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
STP % Removal Solids, Suspended Percent Removal
% Removal Limit Solids, Suspended Percent Removal

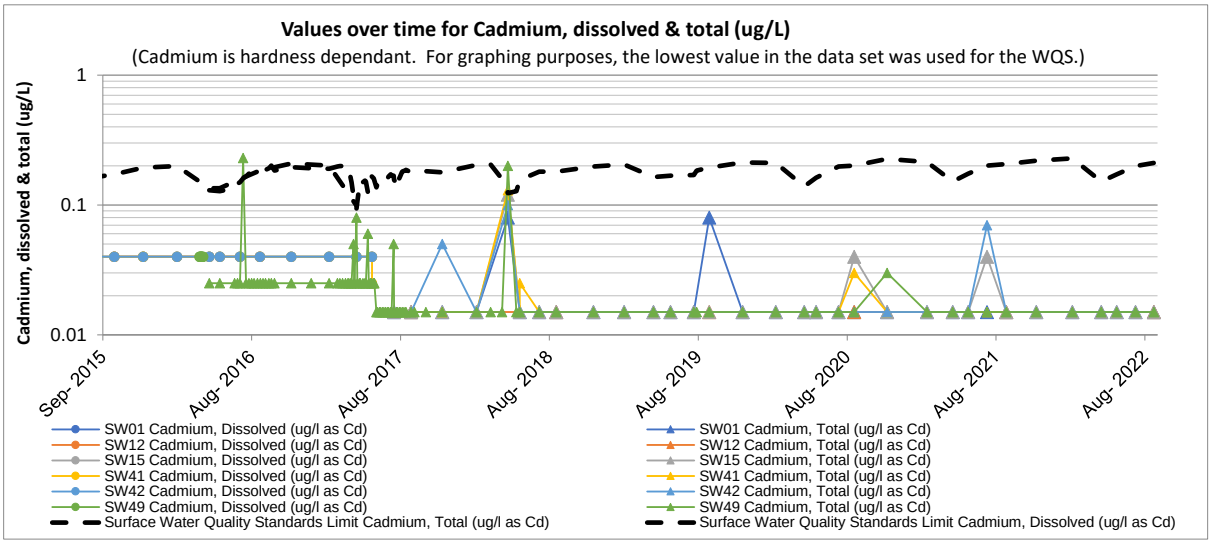
APPENDIX C –

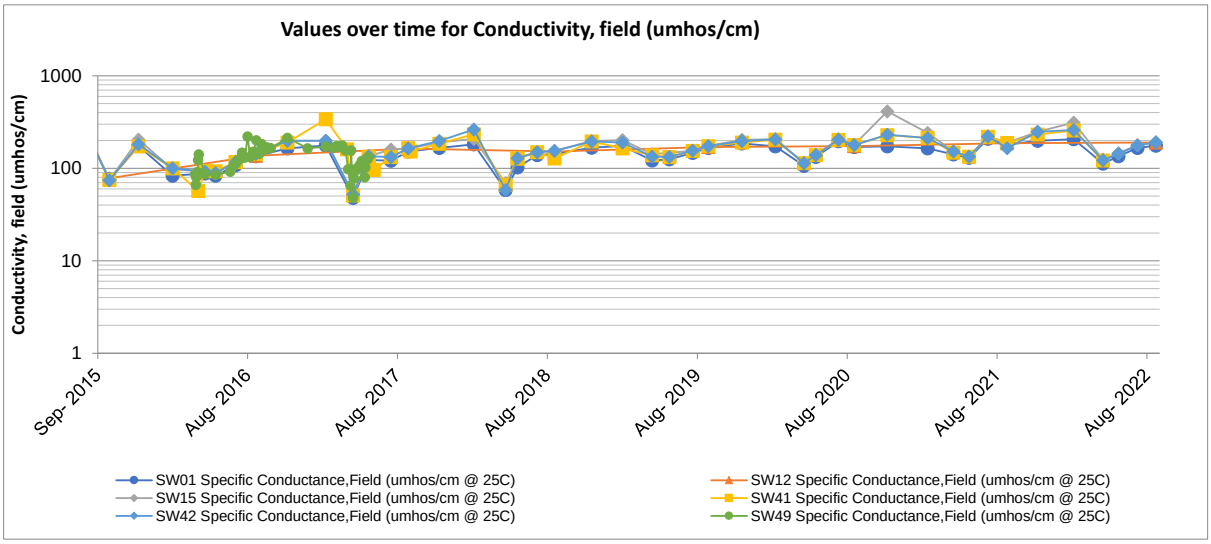
SURFACE WATER GRAPHS

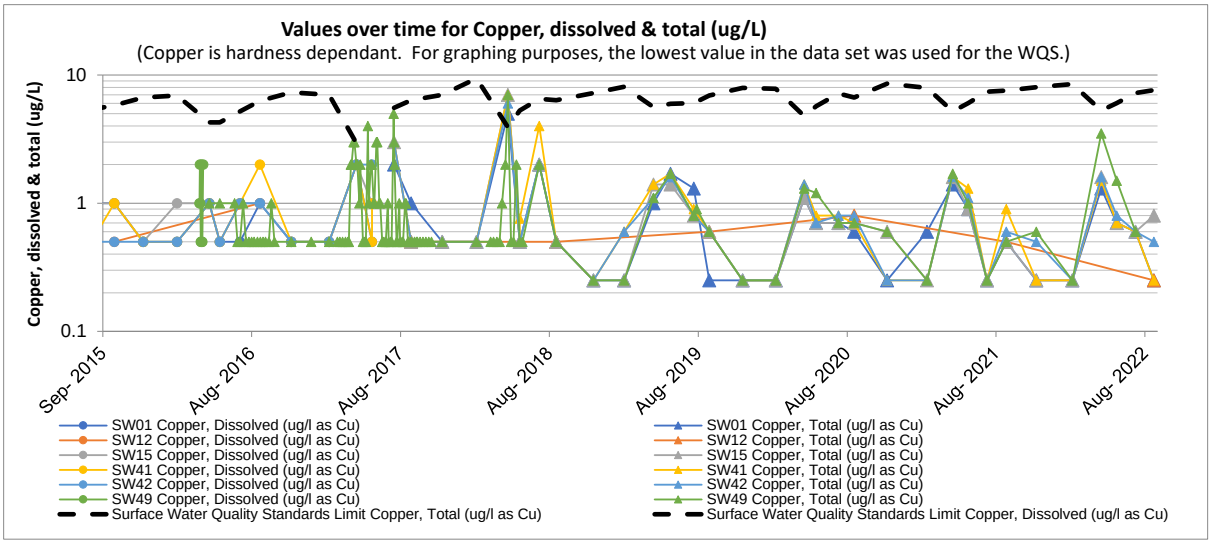

Values over time for Alkalinity, Total (mg/L)
Alkalinity, total (mg/L)
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Alkalinity, Total (mg/l as CaCO3)
SW12 Alkalinity, Total (mg/l as CaCO3)
SW15 Alkalinity, Total (mg/l as CaCO3)
SW41 Alkalinity, Total (mg/l as CaCO3)
SW42 Alkalinity, Total (mg/l as CaCO3)
SW49 Alkalinity, Total (mg/l as CaCO3)

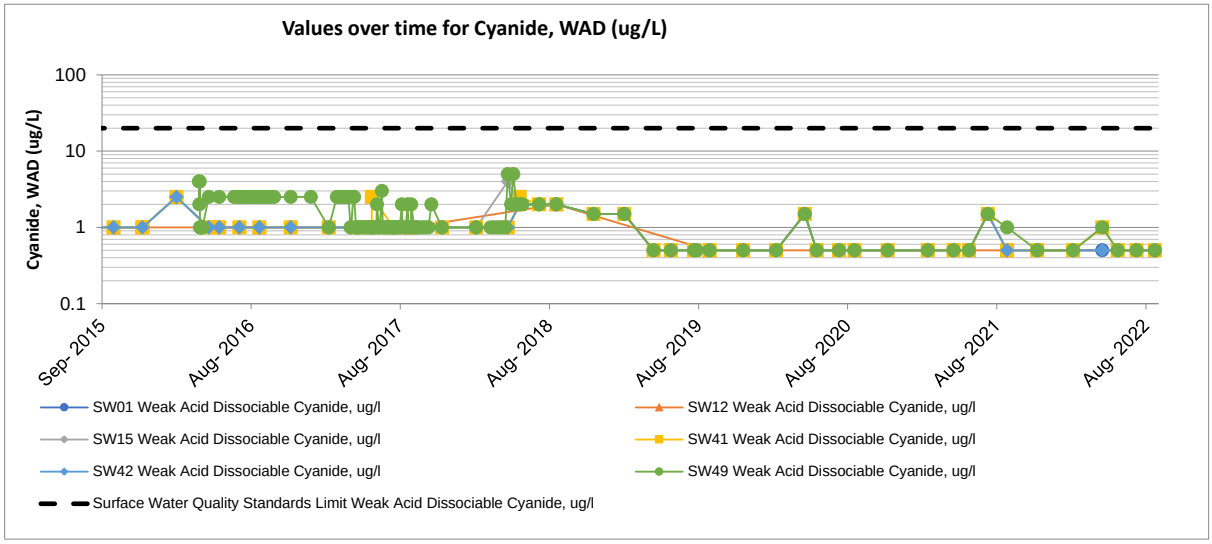

Values over time for Antimony, total (ug/L)
Antimony, total (ug/L)
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Antimony, Total (ug/l as Sb)
SW12 Antimony, Total (ug/l as Sb)
SW15 Antimony, Total (ug/l as Sb)
SW41 Antimony, Total (ug/l as Sb)
SW42 Antimony, Total (ug/l as Sb)
SW49 Antimony, Total (ug/l as Sb)
Surface Water Quality Standards Limit Antimony, Total (ug/l as Sb)

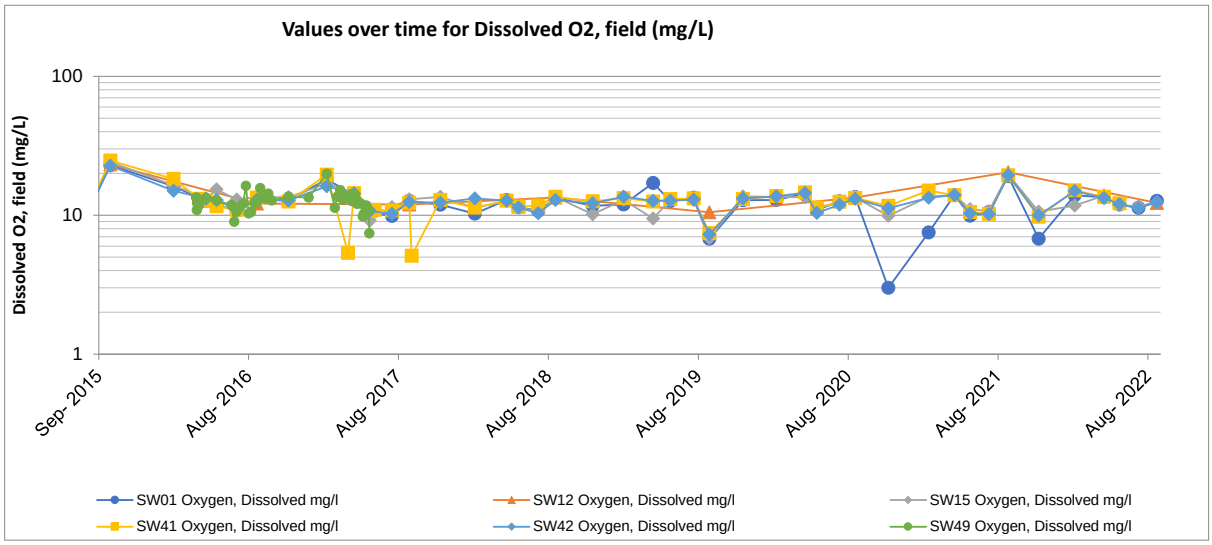

Values over time for Arsenic, dissolved & total (ug/L)
Arsenic, dissolved & total (ug/L)
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Arsenic, Dissolved (ug/l as As)
SW12 Arsenic, Dissolved (ug/l as As)
SW15 Arsenic, Dissolved (ug/l as As)
SW41 Arsenic, Dissolved (ug/l as As)
SW42 Arsenic, Dissolved (ug/l as As)
SW49 Arsenic, Dissolved (ug/l as As)
Surface Water Quality Standards Limit Arsenic, Dissolved (ug/l as As)
SW01 Arsenic, Total (ug/l as As)
SW12 Arsenic, Total (ug/l as As)
SW15 Arsenic, Total (ug/l as As)
SW41 Arsenic, Total (ug/l as As)
SW42 Arsenic, Total (ug/l as As)
SW49 Arsenic, Total (ug/l as As)
Surface Water Quality Standards Limit Arsenic, Total (ug/l as As)

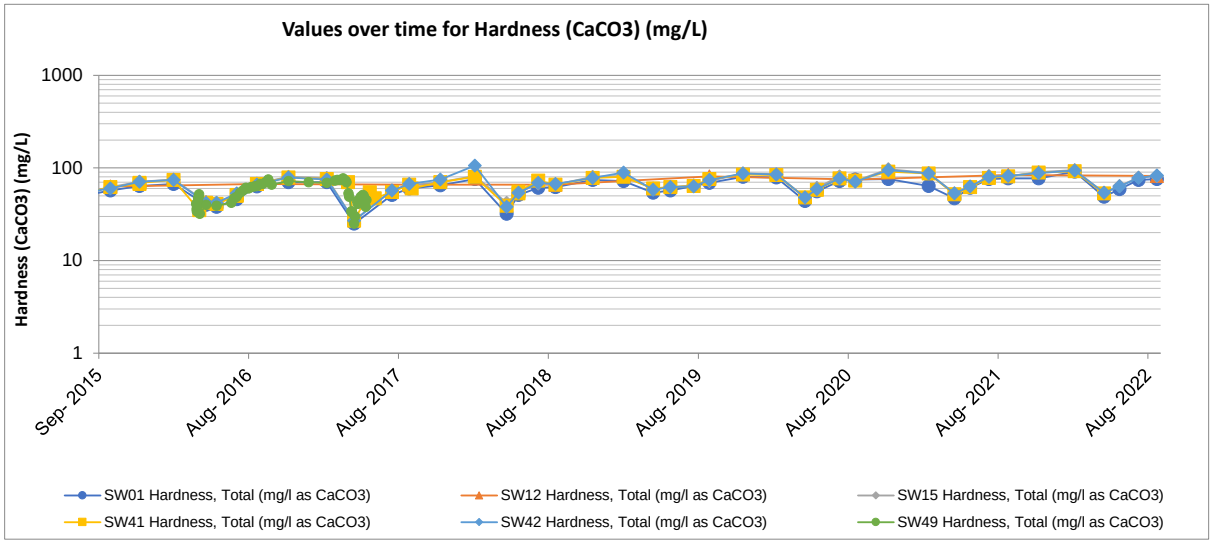

Values over time for Cadmium, dissolved & total (ug/L)
(Cadmium is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Cadmium, dissolved & total (ug/L)
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Cadmium, Dissolved (ug/l as Cd)
SW12 Cadmium, Dissolved (ug/l as Cd)
SW15 Cadmium, Dissolved (ug/l as Cd)
SW41 Cadmium, Dissolved (ug/l as Cd)
SW42 Cadmium, Dissolved (ug/l as Cd)
SW49 Cadmium, Dissolved (ug/l as Cd)
Surface Water Quality Standards Limit Cadmium, Total (ug/l as Cd)
SW01 Cadmium, Total (ug/l as Cd)
SW12 Cadmium, Total (ug/l as Cd)
SW15 Cadmium, Total (ug/l as Cd)
SW41 Cadmium, Total (ug/l as Cd)
SW42 Cadmium, Total (ug/l as Cd)
SW49 Cadmium, Total (ug/l as Cd)
Surface Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)

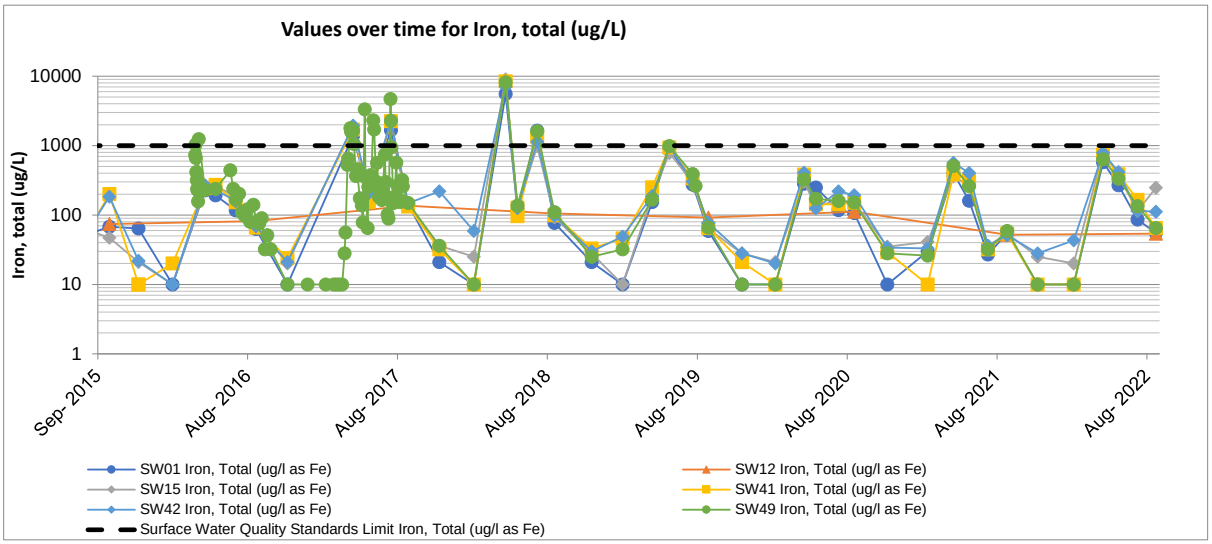

Values over time for Conductivity, field (umhos/cm)
Conductivity, field (umhos/cm)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Specific Conductance,Field (umhos/cm @ 25C)
SW15 Specific Conductance,Field (umhos/cm @ 25C)
SW42 Specific Conductance,Field (umhos/cm @ 25C)
SW12 Specific Conductance,Field (umhos/cm @ 25C)
SW41 Specific Conductance,Field (umhos/cm @ 25C)
SW49 Specific Conductance,Field (umhos/cm @ 25C)

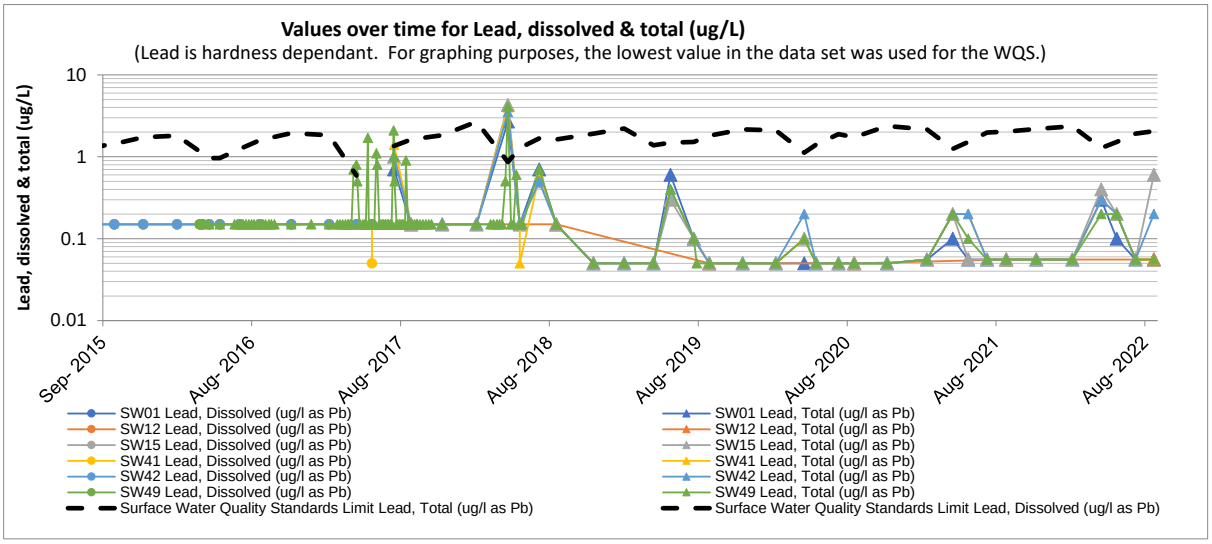

Values over time for Copper, dissolved & total (ug/L)
(Copper is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Copper, dissolved & total (ug/L)
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Copper, Dissolved (ug/l as Cu)
SW12 Copper, Dissolved (ug/l as Cu)
SW15 Copper, Dissolved (ug/l as Cu)
SW41 Copper, Dissolved (ug/l as Cu)
SW42 Copper, Dissolved (ug/l as Cu)
SW49 Copper, Dissolved (ug/l as Cu)
Surface Water Quality Standards Limit Copper, Total (ug/l as Cu)
SW01 Copper, Total (ug/l as Cu)
SW12 Copper, Total (ug/l as Cu)
SW15 Copper, Total (ug/l as Cu)
SW41 Copper, Total (ug/l as Cu)
SW42 Copper, Total (ug/l as Cu)
SW49 Copper, Total (ug/l as Cu)
Surface Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)

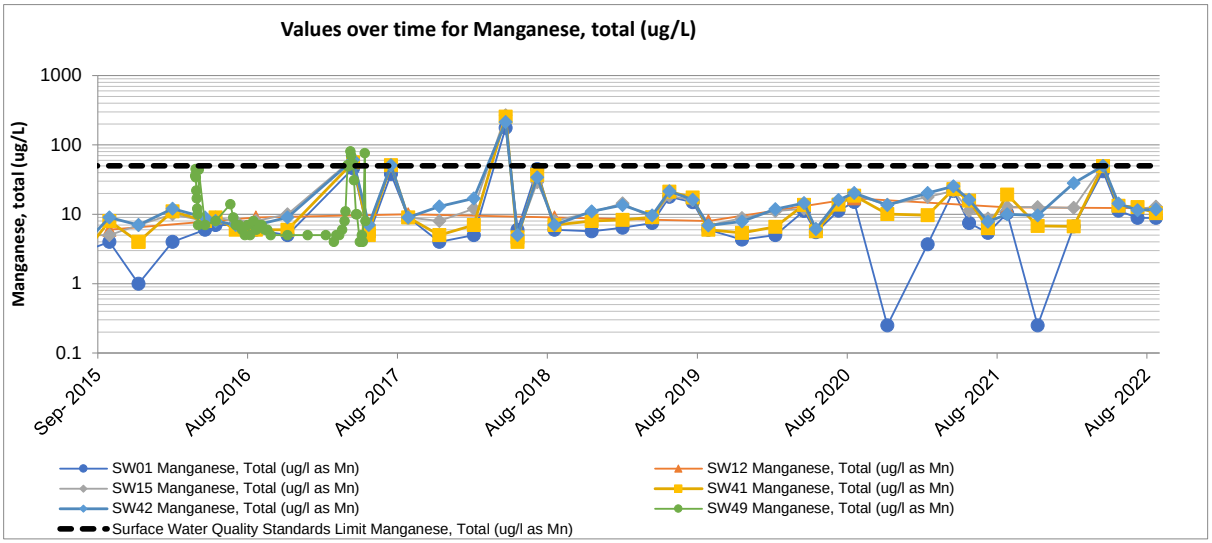

Values over time for Cyanide, WAD (ug/L)
Cyanide, WAD (ug/L)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Weak Acid Dissociable Cyanide, ug/l
SW12 Weak Acid Dissociable Cyanide, ug/l
SW15 Weak Acid Dissociable Cyanide, ug/l
SW41 Weak Acid Dissociable Cyanide, ug/l
SW42 Weak Acid Dissociable Cyanide, ug/l
SW49 Weak Acid Dissociable Cyanide, ug/l
Surface Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l

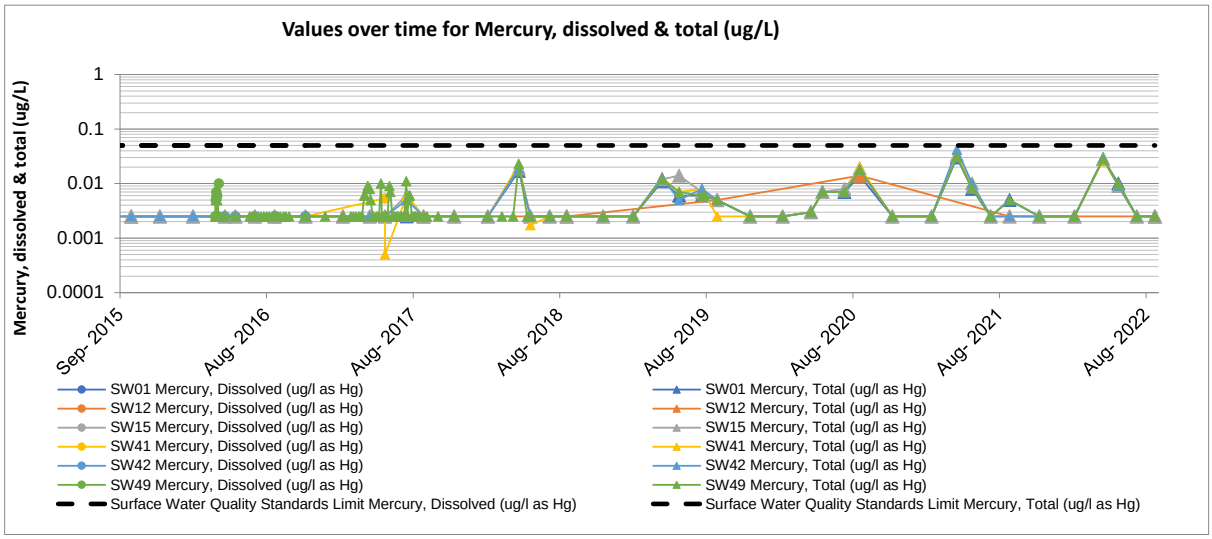

Values over time for Dissolved O2, field (mg/L)
Dissolved O2, field (mg/L)
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Oxygen, Dissolved mg/l
SW12 Oxygen, Dissolved mg/l
SW15 Oxygen, Dissolved mg/l
SW41 Oxygen, Dissolved mg/l
SW42 Oxygen, Dissolved mg/l
SW49 Oxygen, Dissolved mg/l

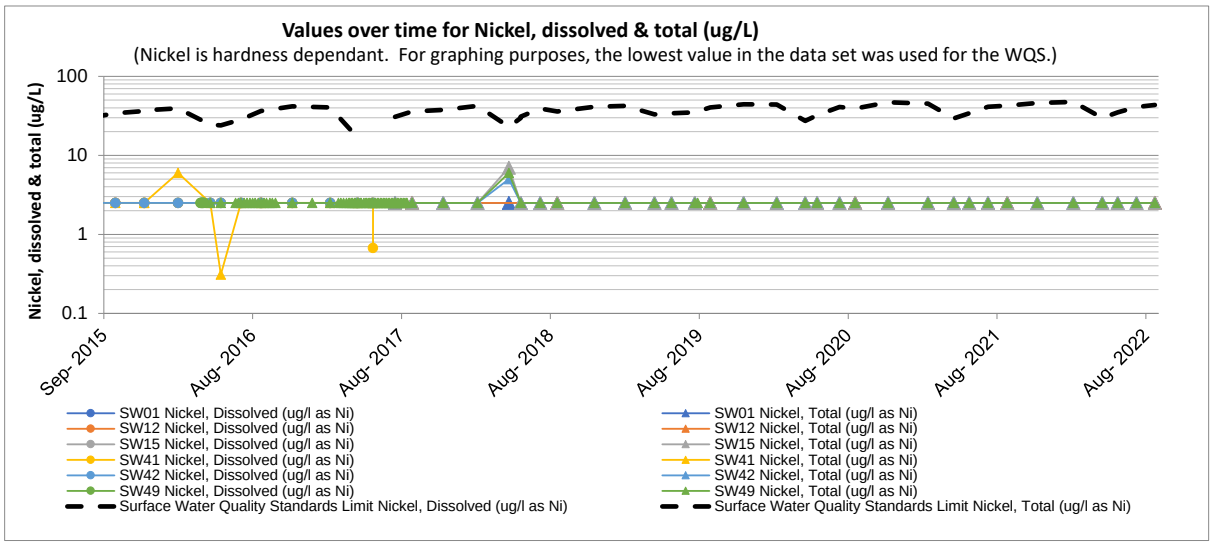

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Hardness, Total (mg/l as CaCO3)
SW12 Hardness, Total (mg/l as CaCO3)
SW15 Hardness, Total (mg/l as CaCO3)
SW41 Hardness, Total (mg/l as CaCO3)
SW42 Hardness, Total (mg/l as CaCO3)
SW49 Hardness, Total (mg/l as CaCO3)

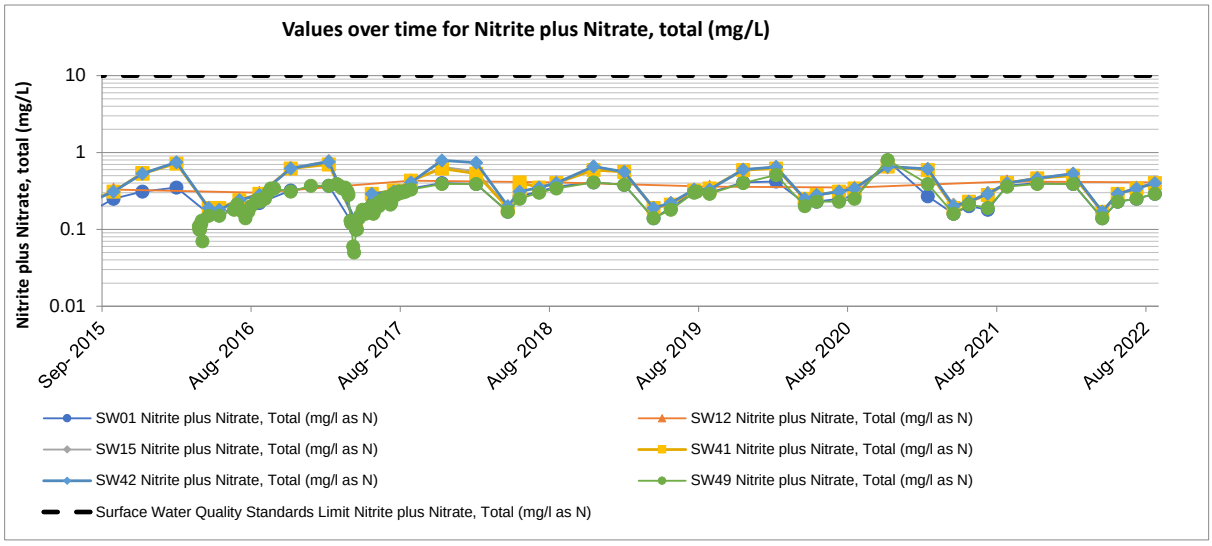

Values over time for Iron, total (ug/L)
Iron, total (ug/L)
10000
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Iron, Total (ug/l as Fe)
SW12 Iron, Total (ug/l as Fe)
SW15 Iron, Total (ug/l as Fe)
SW41 Iron, Total (ug/l as Fe)
SW42 Iron, Total (ug/l as Fe)
SW49 Iron, Total (ug/l as Fe)
Surface Water Quality Standards Limit Iron, Total (ug/l as Fe)

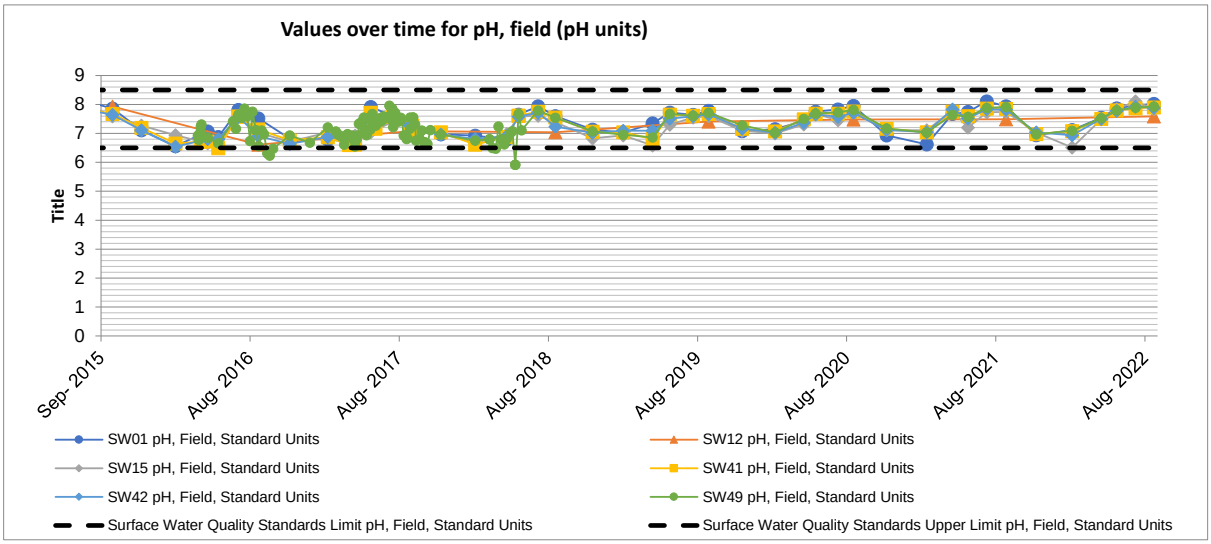

Values over time for Lead, dissolved & total (ug/L)
(Lead is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Lead, dissolved & total (ug/L)
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Lead, Dissolved (ug/l as Pb)
SW12 Lead, Dissolved (ug/l as Pb)
SW15 Lead, Dissolved (ug/l as Pb)
SW41 Lead, Dissolved (ug/l as Pb)
SW42 Lead, Dissolved (ug/l as Pb)
SW49 Lead, Dissolved (ug/l as Pb)
SW01 Lead, Total (ug/l as Pb)
SW12 Lead, Total (ug/l as Pb)
SW15 Lead, Total (ug/l as Pb)
SW41 Lead, Total (ug/l as Pb)
SW42 Lead, Total (ug/l as Pb)
SW49 Lead, Total (ug/l as Pb)
Surface Water Quality Standards Limit Lead, Total (ug/l as Pb)
Surface Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)

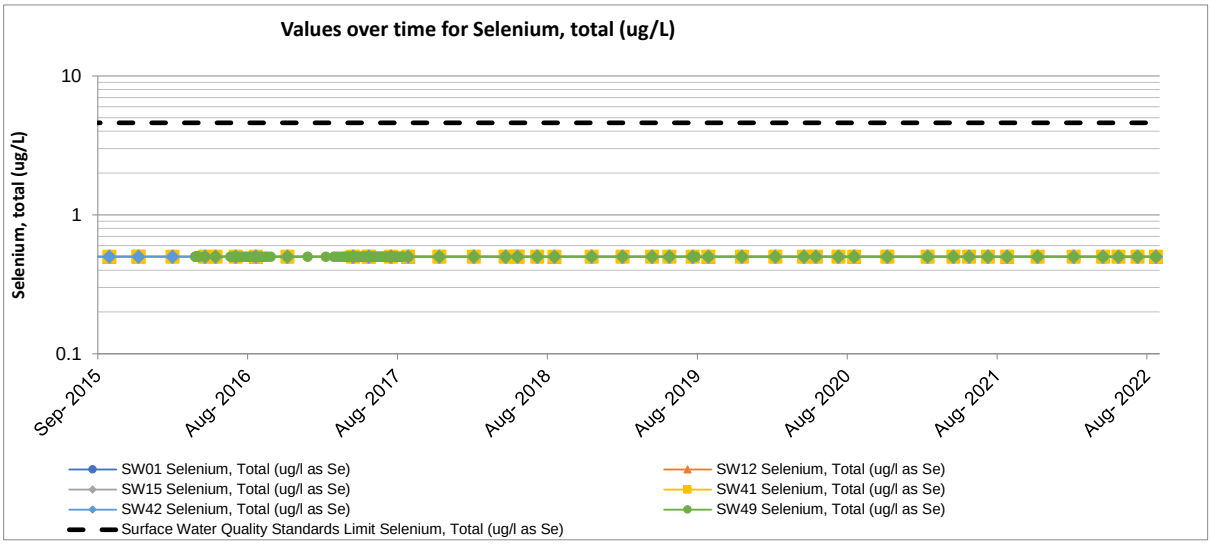

Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
1000
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Manganese, Total (ug/l as Mn)
SW12 Manganese, Total (ug/l as Mn)
SW15 Manganese, Total (ug/l as Mn)
SW41 Manganese, Total (ug/l as Mn)
SW42 Manganese, Total (ug/l as Mn)
SW49 Manganese, Total (ug/l as Mn)
Surface Water Quality Standards Limit Manganese, Total (ug/l as Mn)

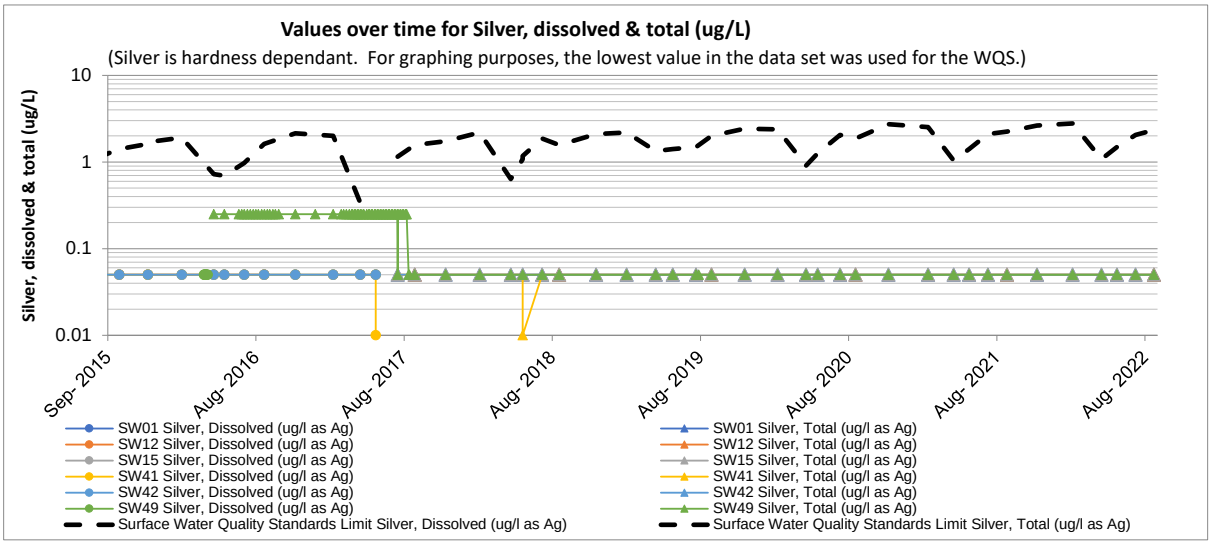

Values over time for Mercury, dissolved & total (ug/L)
Mercury, dissolved & total (ug/L)
1
0.1
0.01
0.001
0.0001
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Mercury, Dissolved (ug/l as Hg)
SW12 Mercury, Dissolved (ug/l as Hg)
SW15 Mercury, Dissolved (ug/l as Hg)
SW41 Mercury, Dissolved (ug/l as Hg)
SW42 Mercury, Dissolved (ug/l as Hg)
SW49 Mercury, Dissolved (ug/l as Hg)
Surface Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)
SW01 Mercury, Total (ug/l as Hg)
SW12 Mercury, Total (ug/l as Hg)
SW15 Mercury, Total (ug/l as Hg)
SW41 Mercury, Total (ug/l as Hg)
SW42 Mercury, Total (ug/l as Hg)
SW49 Mercury, Total (ug/l as Hg)
Surface Water Quality Standards Limit Mercury, Total (ug/l as Hg)

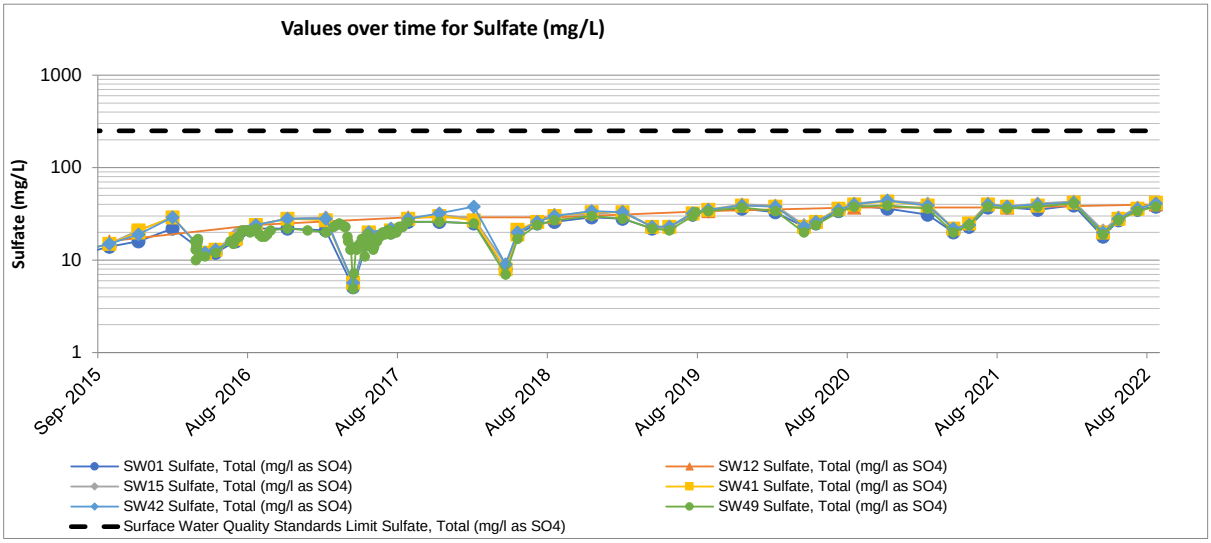

Values over time for Nickel, dissolved & total (ug/L)
(Nickel is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Nickel, dissolved & total (ug/L)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Nickel, Dissolved (ug/l as Ni)
SW12 Nickel, Dissolved (ug/l as Ni)
SW15 Nickel, Dissolved (ug/l as Ni)
SW41 Nickel, Dissolved (ug/l as Ni)
SW42 Nickel, Dissolved (ug/l as Ni)
SW49 Nickel, Dissolved (ug/l as Ni)
Surface Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)
SW01 Nickel, Total (ug/l as Ni)
SW12 Nickel, Total (ug/l as Ni)
SW15 Nickel, Total (ug/l as Ni)
SW41 Nickel, Total (ug/l as Ni)
SW42 Nickel, Total (ug/l as Ni)
SW49 Nickel, Total (ug/l as Ni)
Surface Water Quality Standards Limit Nickel, Total (ug/l as Ni)

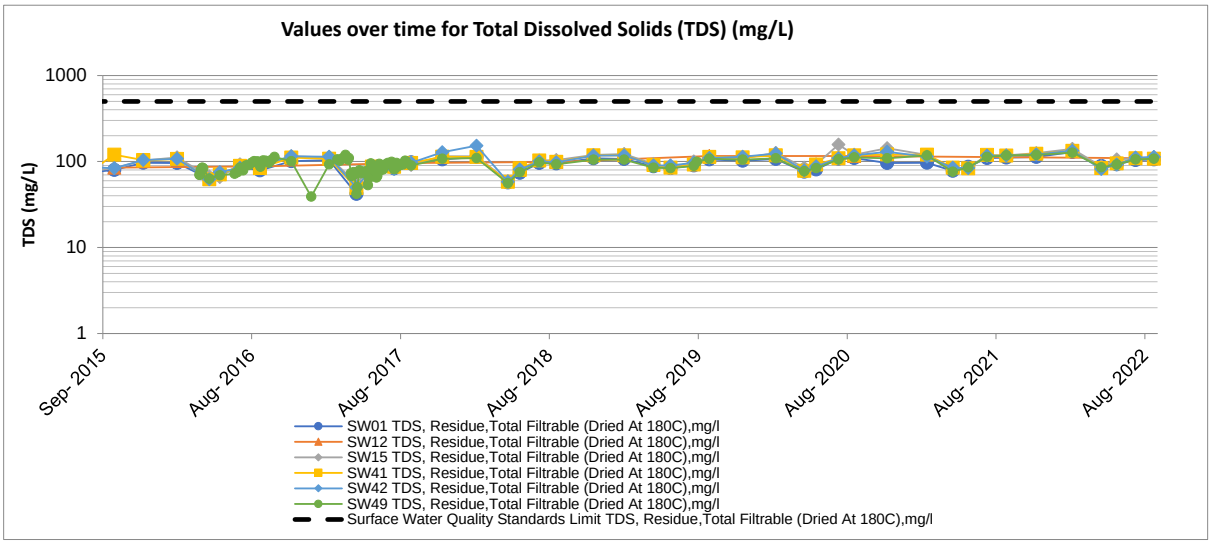

Values over time for Nitrite plus Nitrate, total (mg/L)
Nitrite plus Nitrate, total (mg/L)
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Nitrite plus Nitrate, Total (mg/l as N)
SW12 Nitrite plus Nitrate, Total (mg/l as N)
SW15 Nitrite plus Nitrate, Total (mg/l as N)
SW41 Nitrite plus Nitrate, Total (mg/l as N)
SW42 Nitrite plus Nitrate, Total (mg/l as N)
SW49 Nitrite plus Nitrate, Total (mg/l as N)
Surface Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)

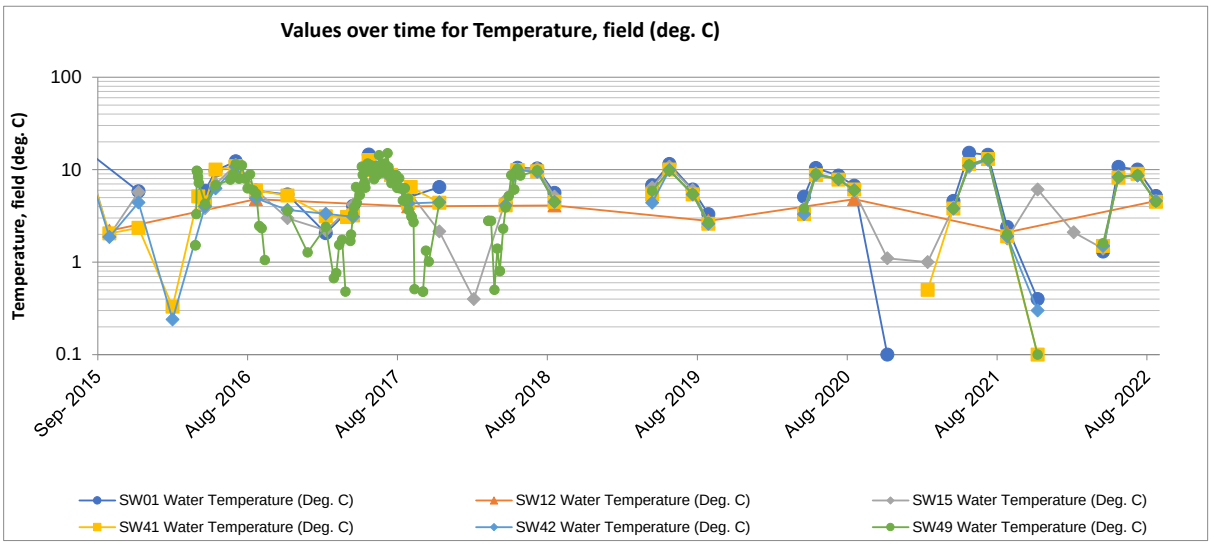

Values over time for pH, field (pH units)
Title
9
8
7
6
5
4
3
2
1
0
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 pH, Field, Standard Units
SW12 pH, Field, Standard Units
SW15 pH, Field, Standard Units
SW41 pH, Field, Standard Units
SW42 pH, Field, Standard Units
SW49 pH, Field, Standard Units
Surface Water Quality Standards Limit pH, Field, Standard Units
Surface Water Quality Standards Upper Limit pH, Field, Standard Units

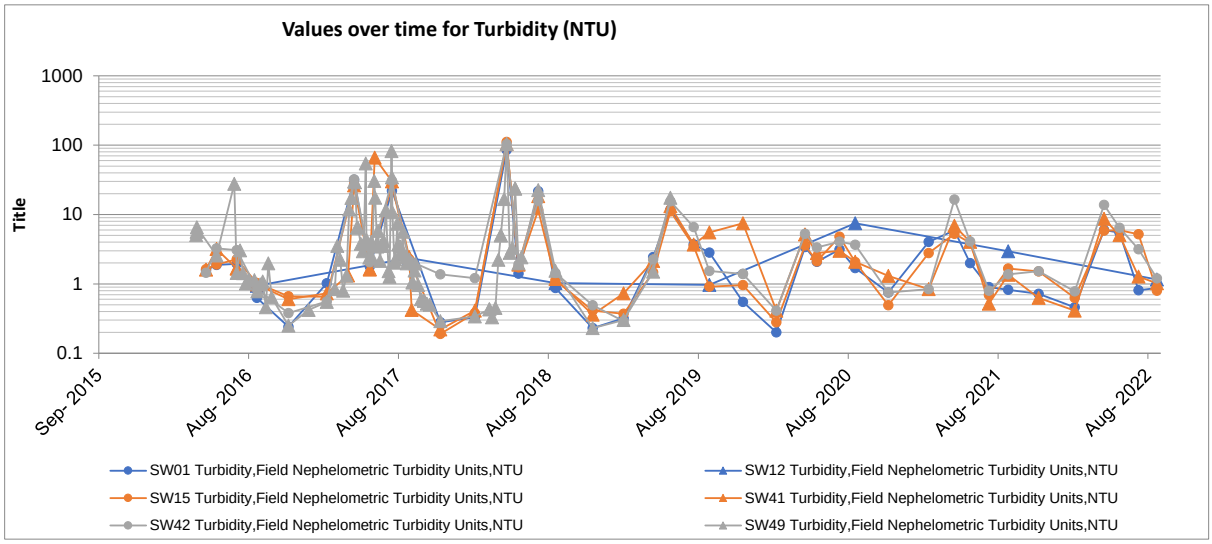

Values over time for Selenium, total (ug/L)
Selenium, total (ug/L)
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Selenium, Total (ug/l as Se)
SW12 Selenium, Total (ug/l as Se)
SW15 Selenium, Total (ug/l as Se)
SW41 Selenium, Total (ug/l as Se)
SW42 Selenium, Total (ug/l as Se)
SW49 Selenium, Total (ug/l as Se)
Surface Water Quality Standards Limit Selenium, Total (ug/l as Se)

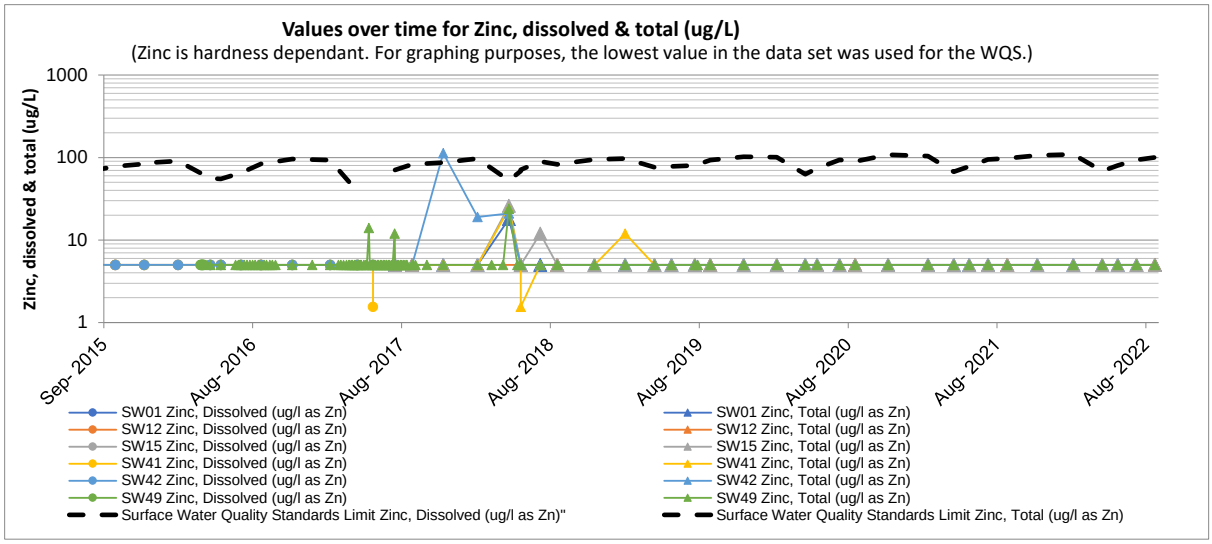

Values over time for Silver, dissolved & total (ug/L)
(Silver is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Silver, dissolved & total (ug/L)
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Silver, Dissolved (ug/l as Ag)
SW01 Silver, Total (ug/l as Ag)
SW12 Silver, Dissolved (ug/l as Ag)
SW12 Silver, Total (ug/l as Ag)
SW15 Silver, Dissolved (ug/l as Ag)
SW15 Silver, Total (ug/l as Ag)
SW41 Silver, Dissolved (ug/l as Ag)
SW41 Silver, Total (ug/l as Ag)
SW42 Silver, Dissolved (ug/l as Ag)
SW42 Silver, Total (ug/l as Ag)
SW49 Silver, Dissolved (ug/l as Ag)
SW49 Silver, Total (ug/l as Ag)
Surface Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)
Surface Water Quality Standards Limit Silver, Total (ug/l as Ag)


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Sulfate, Total (mg/l as SO4)
SW12 Sulfate, Total (mg/l as SO4)
SW15 Sulfate, Total (mg/l as SO4)
SW41 Sulfate, Total (mg/l as SO4)
SW42 Sulfate, Total (mg/l as SO4)
SW49 Sulfate, Total (mg/l as SO4)
Surface Water Quality Standards Limit Sulfate, Total (mg/l as SO4)


Values over time for Total Dissolved Solids (TDS) (mg/L)
TDS (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW12 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW15 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW41 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW42 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW49 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Surface Water Quality Standards Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l

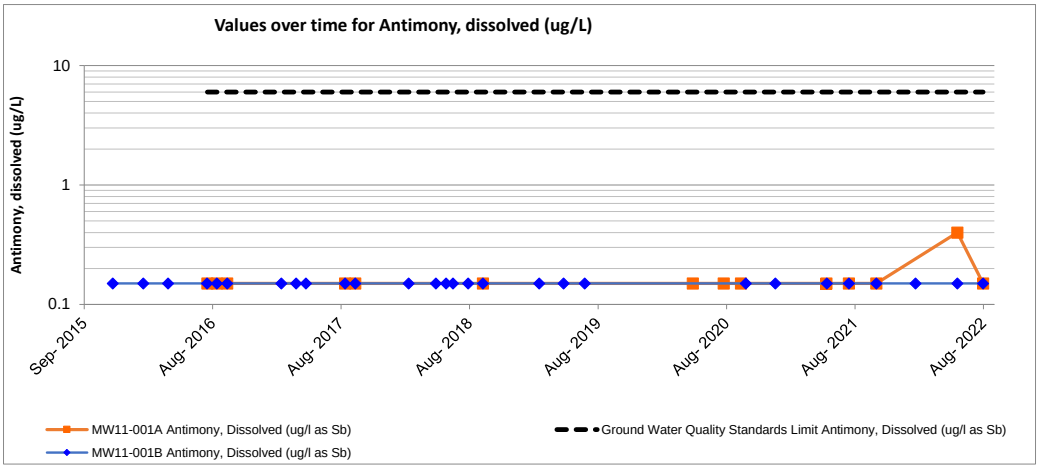

Values over time for Temperature, field (deg. C)
Temperature, field (deg. C)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Water Temperature (Deg. C)
SW12 Water Temperature (Deg. C)
SW15 Water Temperature (Deg. C)
SW41 Water Temperature (Deg. C)
SW42 Water Temperature (Deg. C)
SW49 Water Temperature (Deg. C)

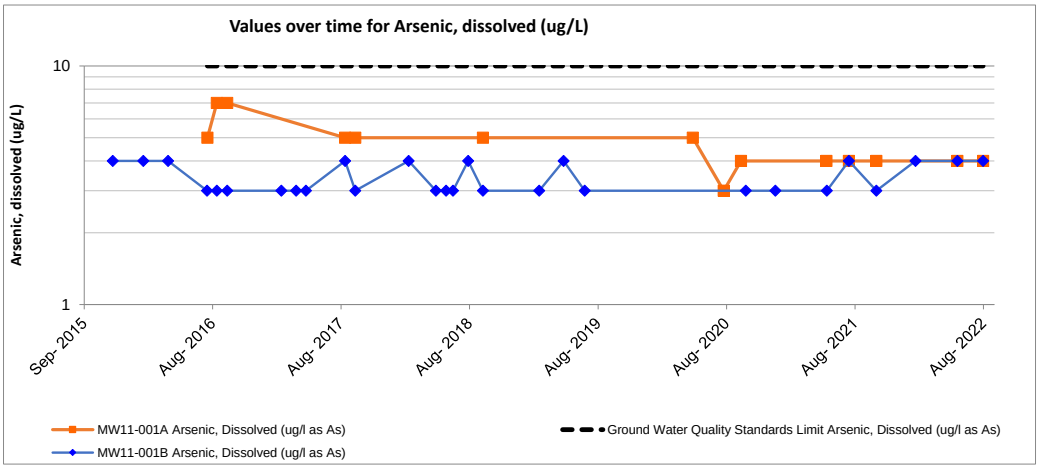

Values over time for Turbidity (NTU)
Title
1000
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Turbidity,Field Nephelometric Turbidity Units,NTU
SW12 Turbidity,Field Nephelometric Turbidity Units,NTU
SW15 Turbidity,Field Nephelometric Turbidity Units,NTU
SW41 Turbidity,Field Nephelometric Turbidity Units,NTU
SW42 Turbidity,Field Nephelometric Turbidity Units,NTU
SW49 Turbidity,Field Nephelometric Turbidity Units,NTU

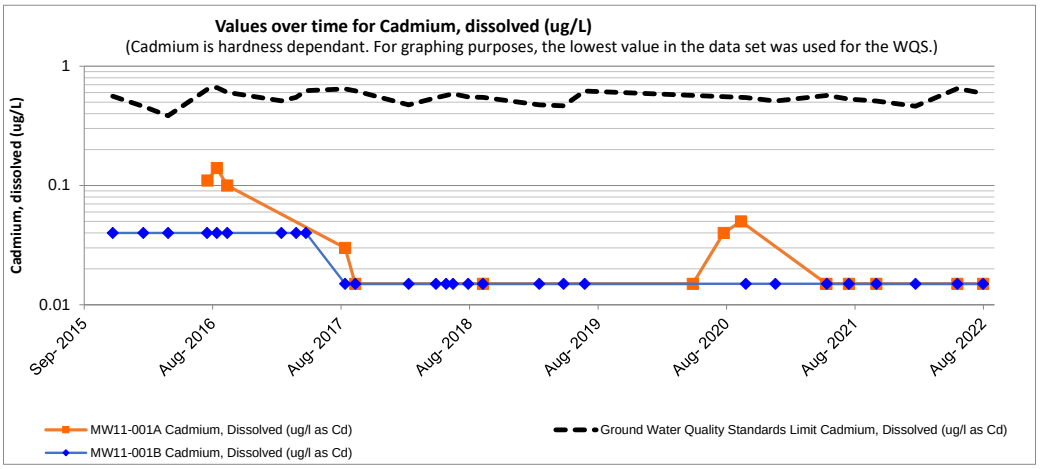

Values over time for Zinc, dissolved & total (ug/L)
(Zinc is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Zinc, dissolved & total (ug/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
SW01 Zinc, Dissolved (ug/l as Zn)
SW12 Zinc, Dissolved (ug/l as Zn)
SW15 Zinc, Dissolved (ug/l as Zn)
SW41 Zinc, Dissolved (ug/l as Zn)
SW42 Zinc, Dissolved (ug/l as Zn)
SW49 Zinc, Dissolved (ug/l as Zn)
Surface Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)"
SW01 Zinc, Total (ug/l as Zn)
SW12 Zinc, Total (ug/l as Zn)
SW15 Zinc, Total (ug/l as Zn)
SW41 Zinc, Total (ug/l as Zn)
SW42 Zinc, Total (ug/l as Zn)
SW49 Zinc, Total (ug/l as Zn)
Surface Water Quality Standards Limit Zinc, Total (ug/l as Zn)

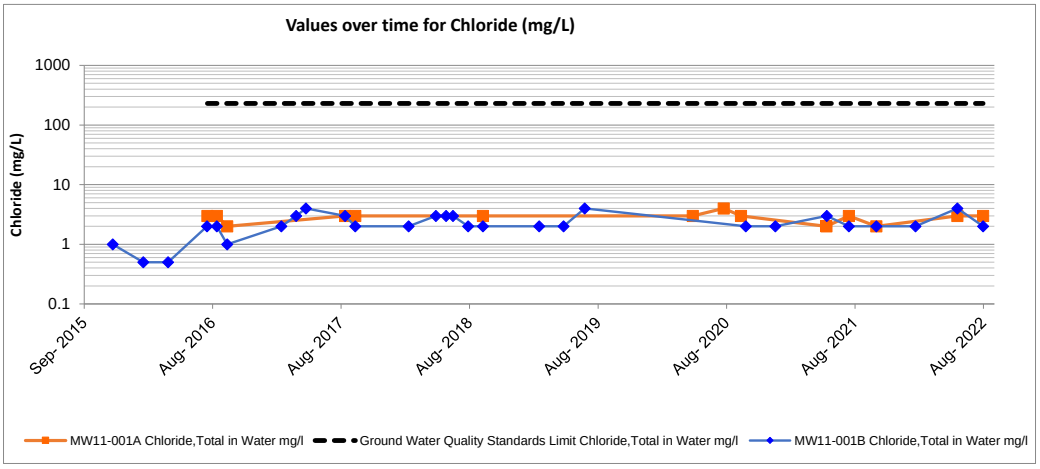
APPENDIX C –

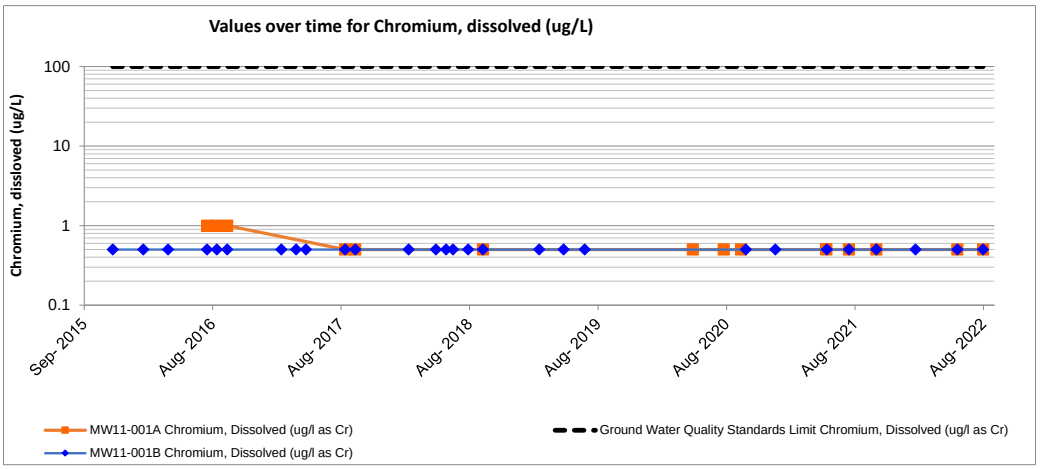
MW11-001A AND MW11-001B GRAPHS

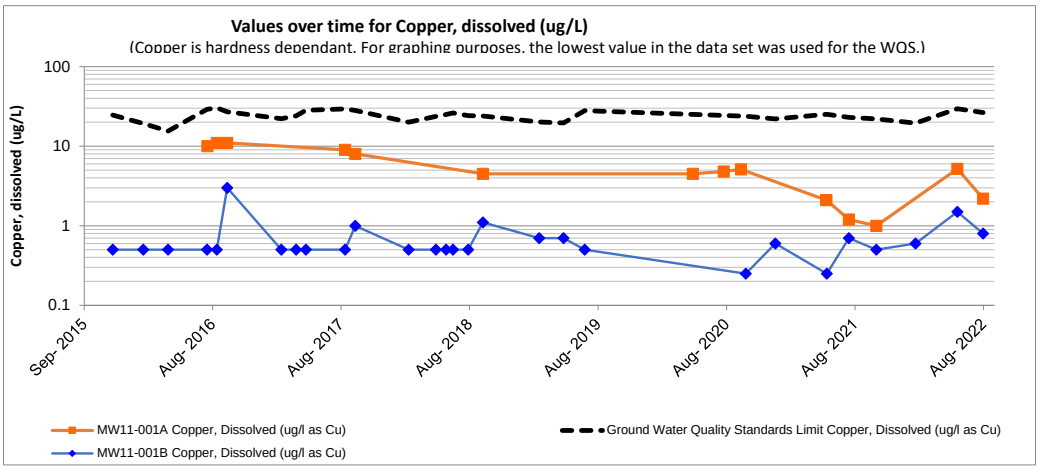

Values over time for Antimony, dissolved (ug/L)
Antimony, dissolved (ug/L)
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW11-001A Antimony, Dissolved (ug/l as Sb)
MW11-001B Antimony, Dissolved (ug/l as Sb)
Ground Water Quality Standards Limit Antimony, Dissolved (ug/l as Sb)

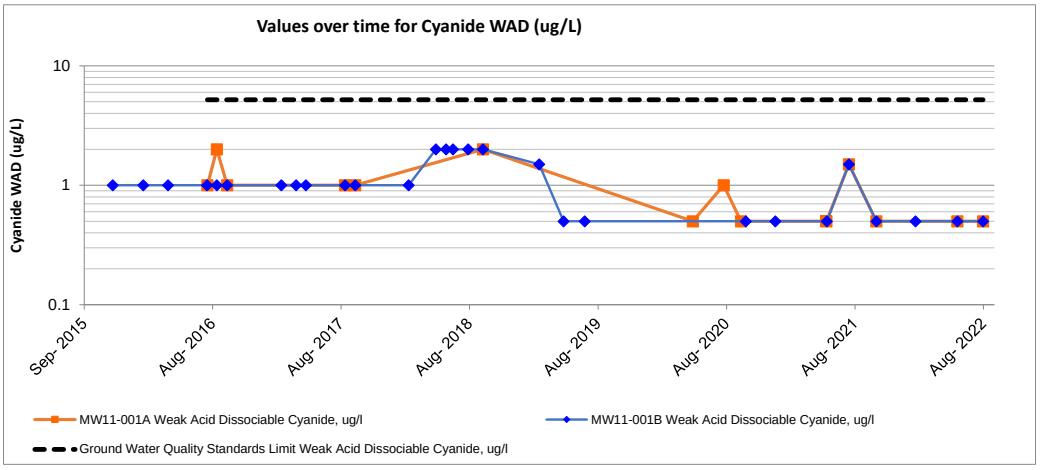

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW11-001A Arsenic, Dissolved (ug/l as As)
MW11-001B Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards Limit Arsenic, Dissolved (ug/l as As)

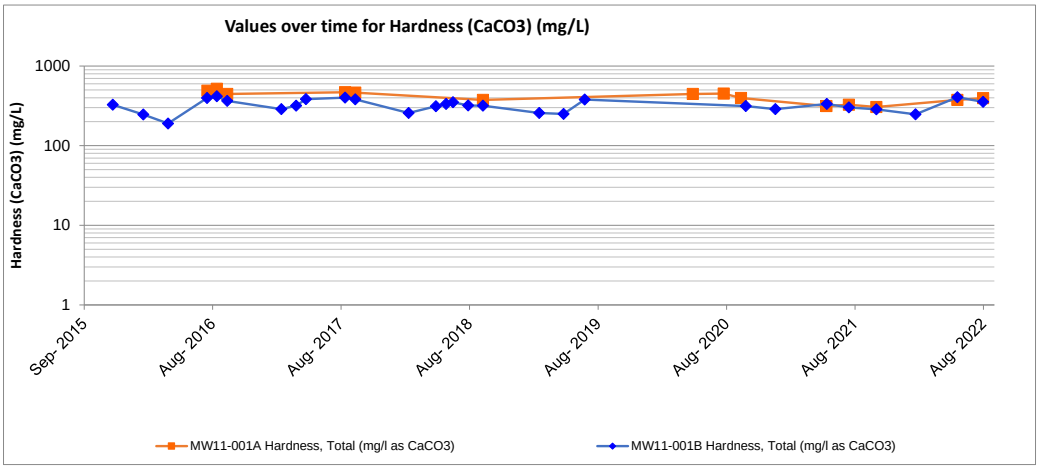

Values over time for Cadmium, dissolved (ug/L)
(Cadmium is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Cadmium, dissolved (ug/L)
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW11-001A Cadmium, Dissolved (ug/l as Cd)
MW11-001B Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)

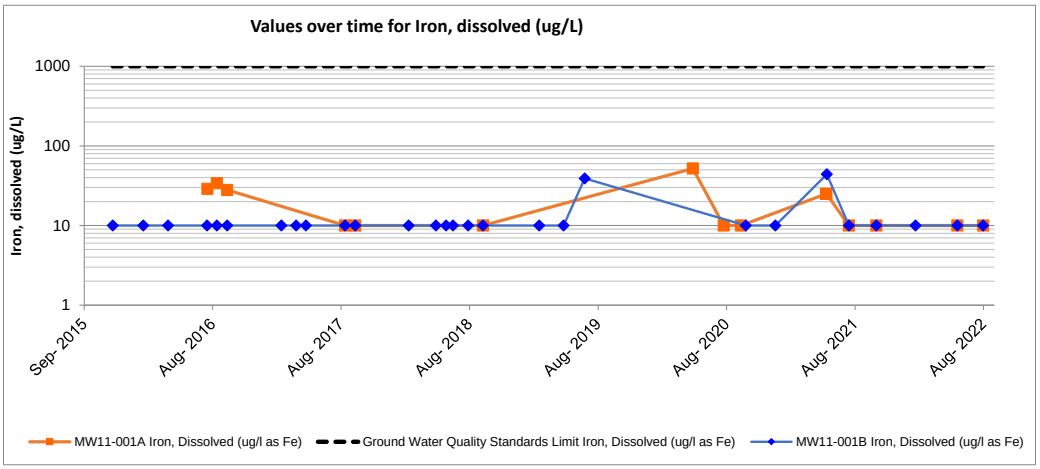

Values over time for Chloride (mg/L)
Chloride (mg/L)
1000
100
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Chloride,Total in Water mg/l
Ground Water Quality Standards Limit Chloride,Total in Water mg/l
MW11-001B Chloride,Total in Water mg/l

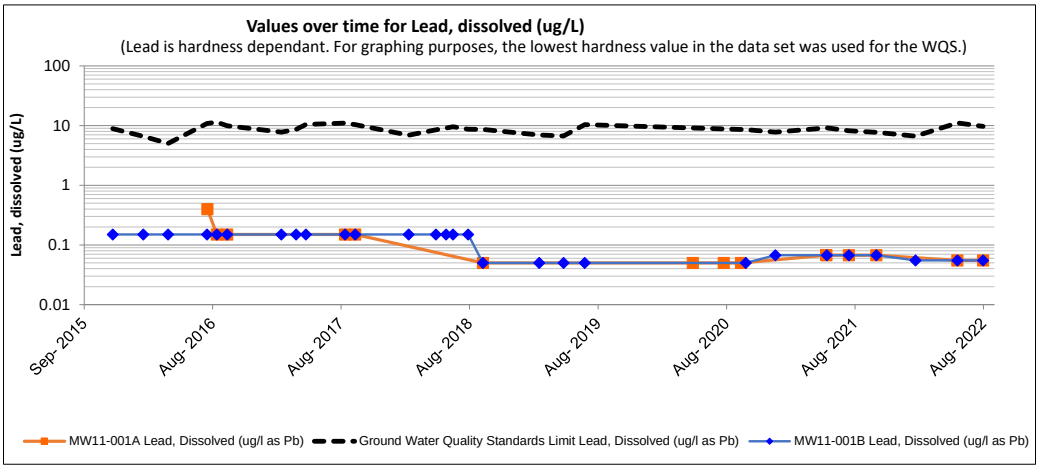

Values over time for Chromium, dissolved (ug/L)
Chromium, dissloved (ug/L)
100
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Chromium, Dissolved (ug/l as Cr)
MW11-001B Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)

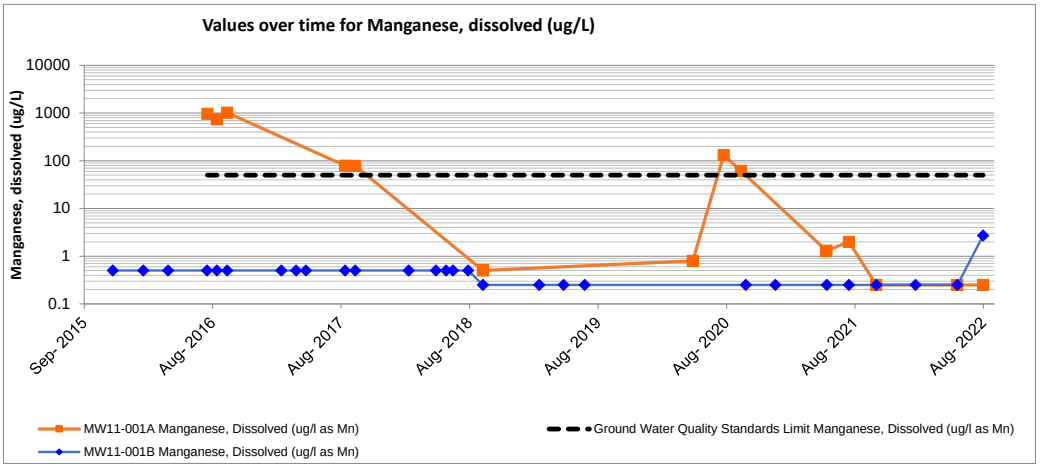

Values over time for Copper, dissolved (ug/L)
(Copper is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Copper, dissolved (ug/L)
100
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Copper, Dissolved (ug/l as Cu)
MW11-001B Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)

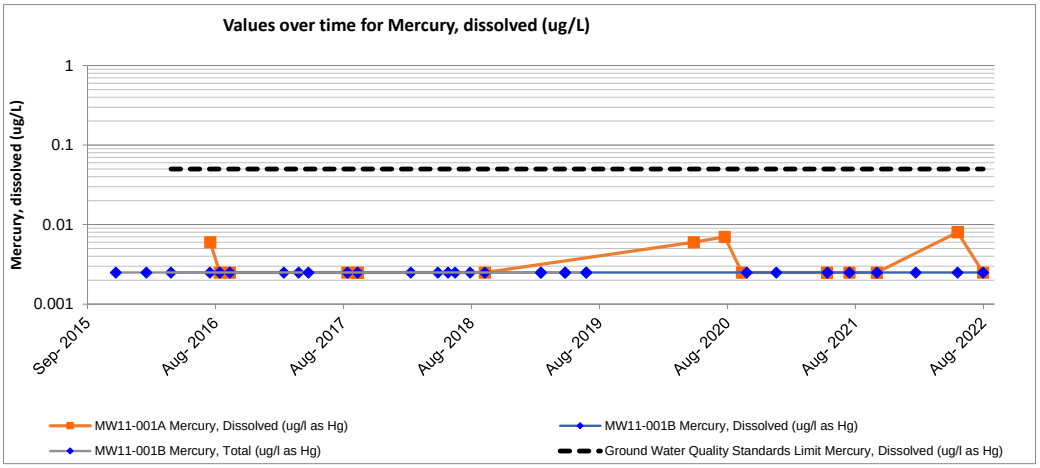

Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Weak Acid Dissociable Cyanide, ug/l
MW11-001B Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l

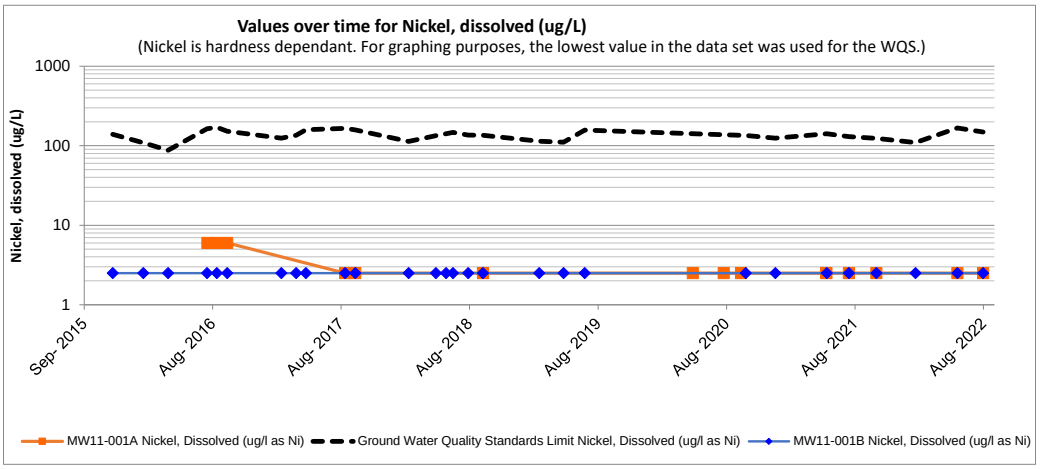

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Hardness, Total (mg/l as CaCO3)
MW11-001B Hardness, Total (mg/l as CaCO3)

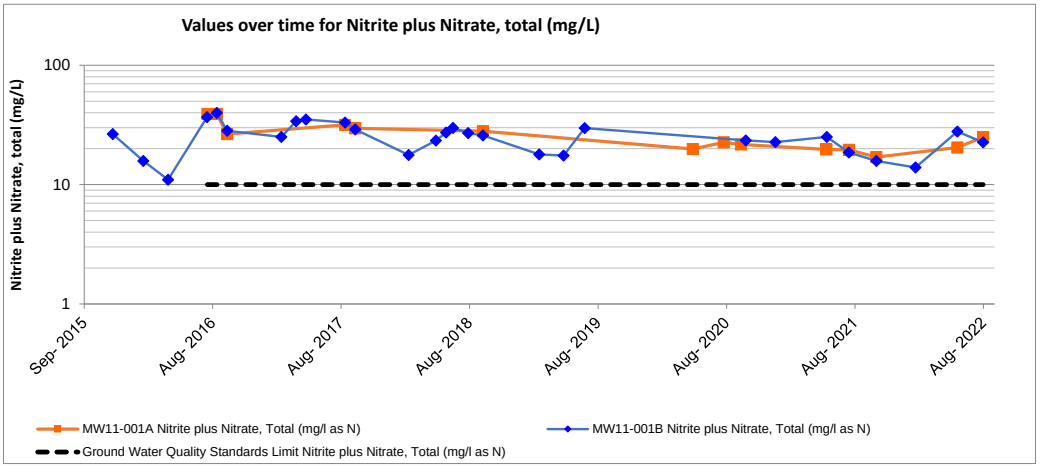

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)
MW11-001B Iron, Dissolved (ug/l as Fe)

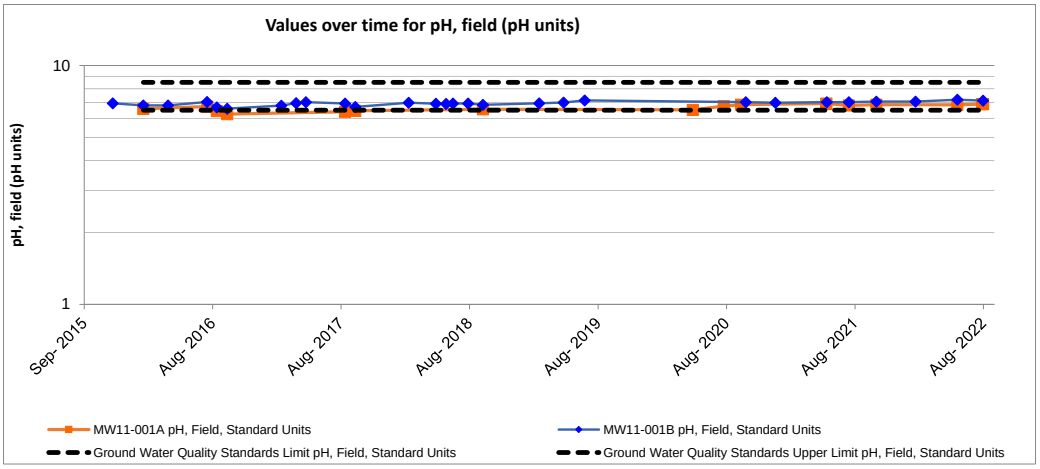

Values over time for Lead, dissolved (ug/L)
(Lead is hardness dependant. For graphing purposes, the lowest hardness value in the data set was used for the WQS.)
Lead, dissolved (ug/L)
100
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW11-001A Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)
MW11-001B Lead, Dissolved (ug/l as Pb)

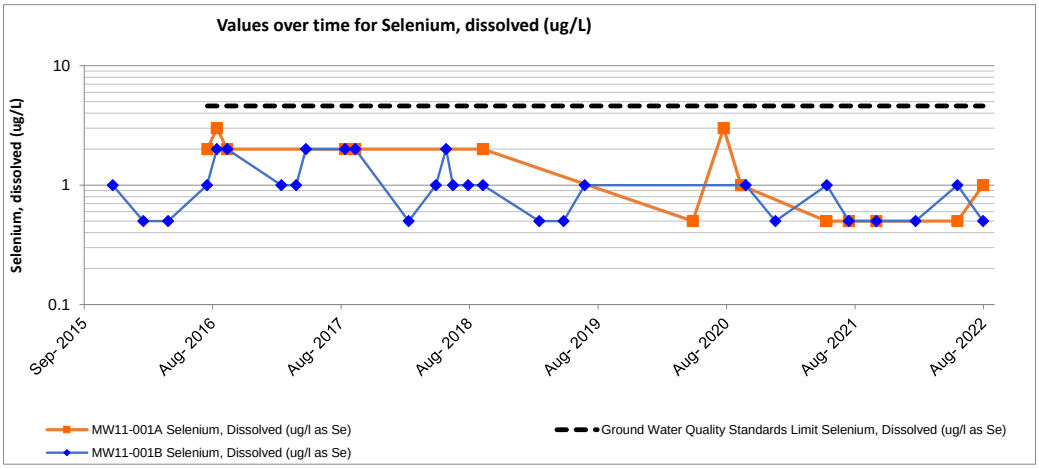

Values over time for Manganese, dissolved (ug/L)
Manganese, dissolved (ug/L)
10000
1000
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW11-001A Manganese, Dissolved (ug/l as Mn)
MW11-001B Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)

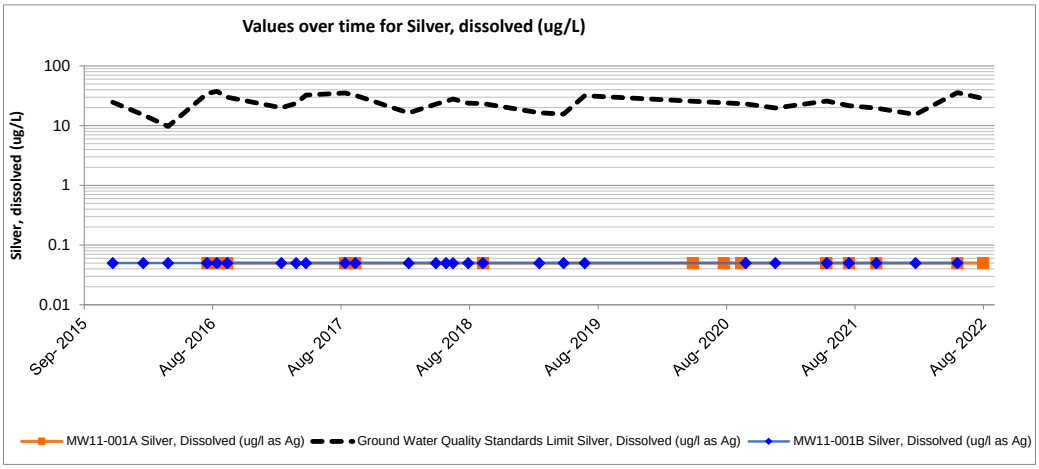

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW11-001A Mercury, Dissolved (ug/l as Hg)
MW11-001B Mercury, Dissolved (ug/l as Hg)
MW11-001B Mercury, Total (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)

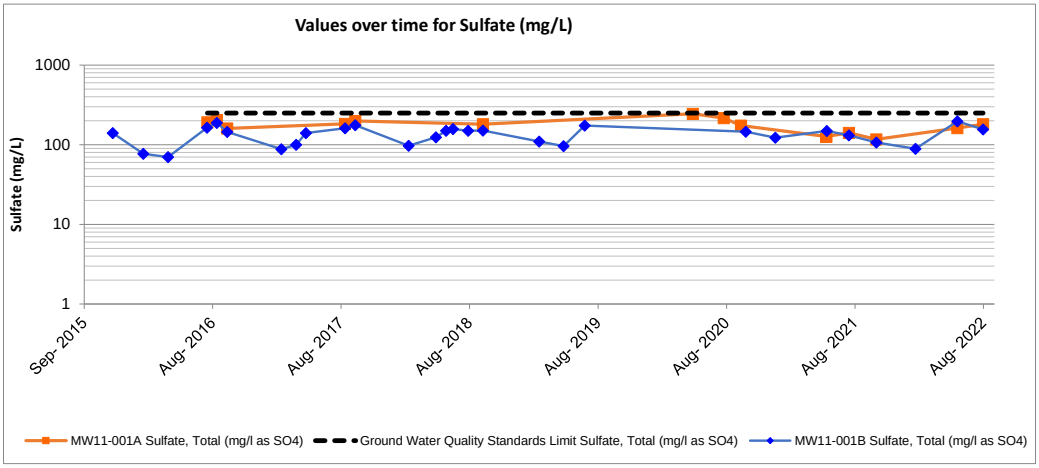

Values over time for Nickel, dissolved (ug/L)
(Nickel is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Nickel, dissolved (ug/L)
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)
MW11-001B Nickel, Dissolved (ug/l as Ni)

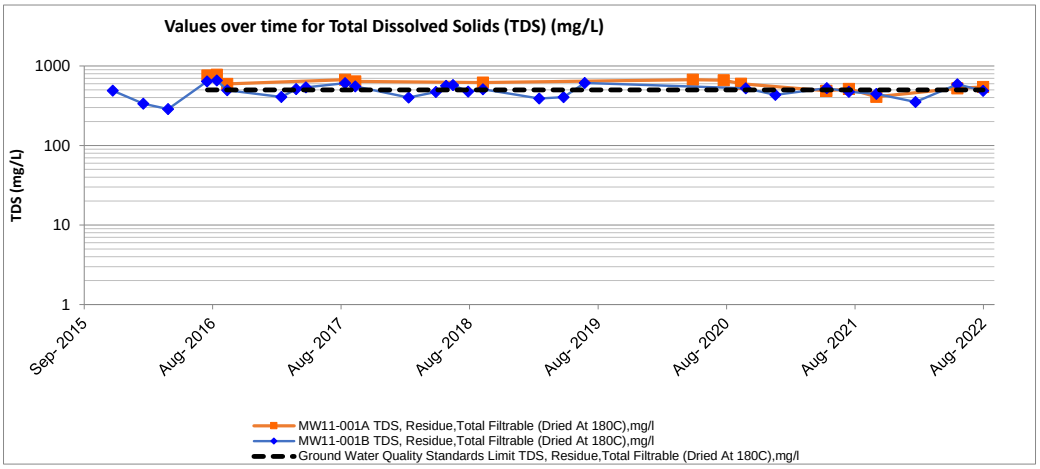

Values over time for Nitrite plus Nitrate, total (mg/L)
Nitrite plus Nitrate, total (mg/L)
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Nitrite plus Nitrate, Total (mg/l as N)
MW11-001B Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)

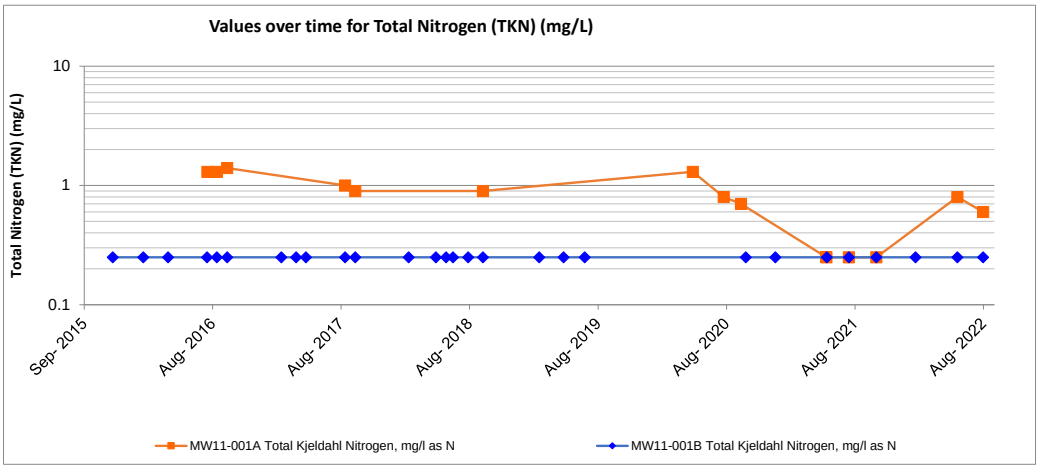

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A pH, Field, Standard Units
MW11-001B pH, Field, Standard Units
Ground Water Quality Standards Limit pH, Field, Standard Units
Ground Water Quality Standards Upper Limit pH, Field, Standard Units

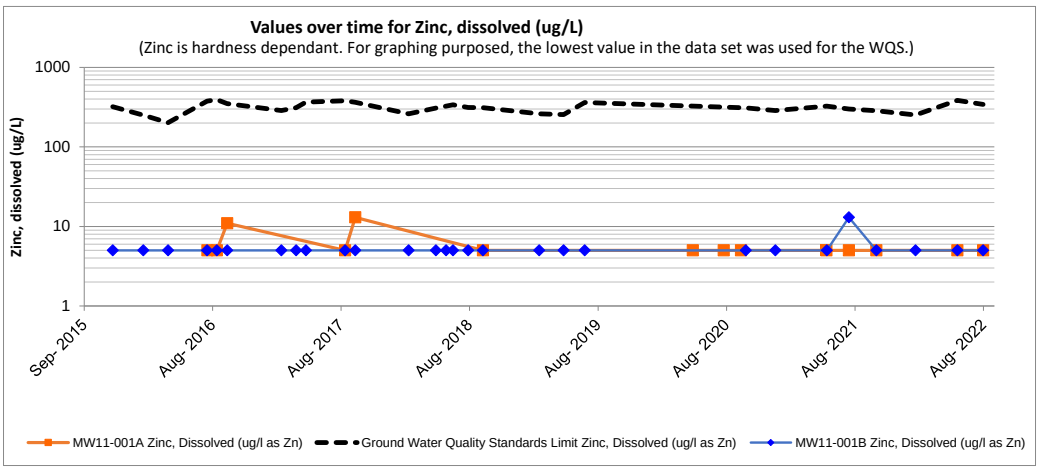

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug/L)
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Selenium, Dissolved (ug/l as Se)
MW11-001B Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards Limit Selenium, Dissolved (ug/l as Se)


Values over time for Silver, dissolved (ug/L)
Silver, dissolved (ug/L)
100
10
1
0.1
0.01
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)
MW11-001B Silver, Dissolved (ug/l as Ag)


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW11-001A Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)
MW11-001B Sulfate, Total (mg/l as SO4)


Values over time for Total Dissolved Solids (TDS) (mg/L)
TDS (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW11-001A TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW11-001B TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Ground Water Quality Standards Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l


Values over time for Total Nitrogen (TKN) (mg/L)
Total Nitrogen (TKN) (mg/L)
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW11-001A Total Kjeldahl Nitrogen, mg/l as N
MW11-001B Total Kjeldahl Nitrogen, mg/l as N

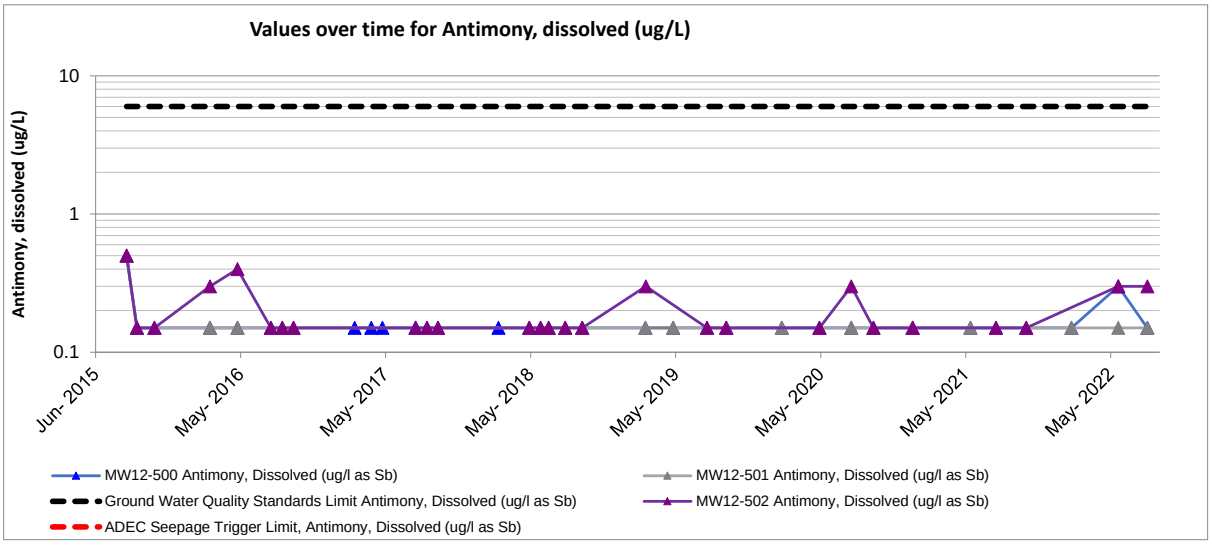

Values over time for Zinc, dissolved (ug/L)
(Zinc is hardness dependant. For graphing purposed, the lowest value in the data set was used for the WQS.)
Zinc, dissolved (ug/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW11-001A Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)
MW11-001B Zinc, Dissolved (ug/l as Zn)

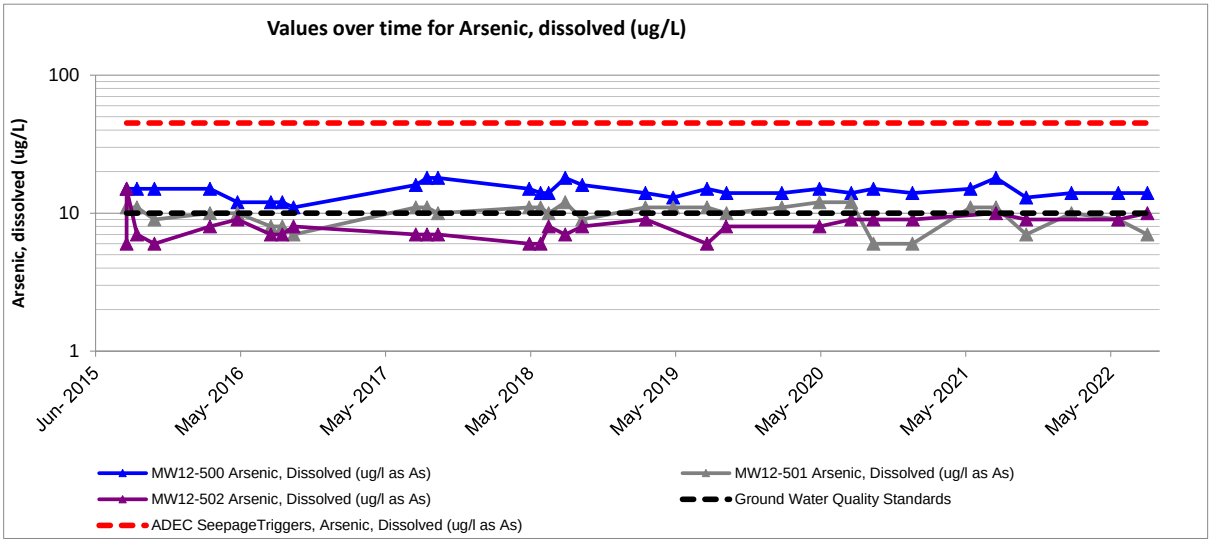
APPENDIX C –

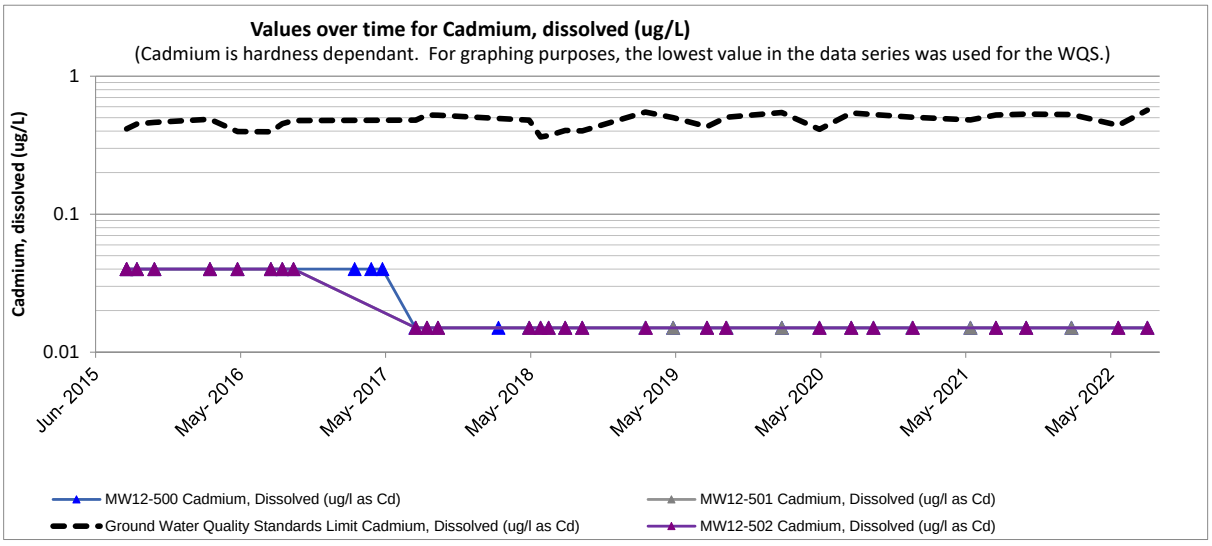
MW12-500, MW12-501, MW12-502 GRAPHS

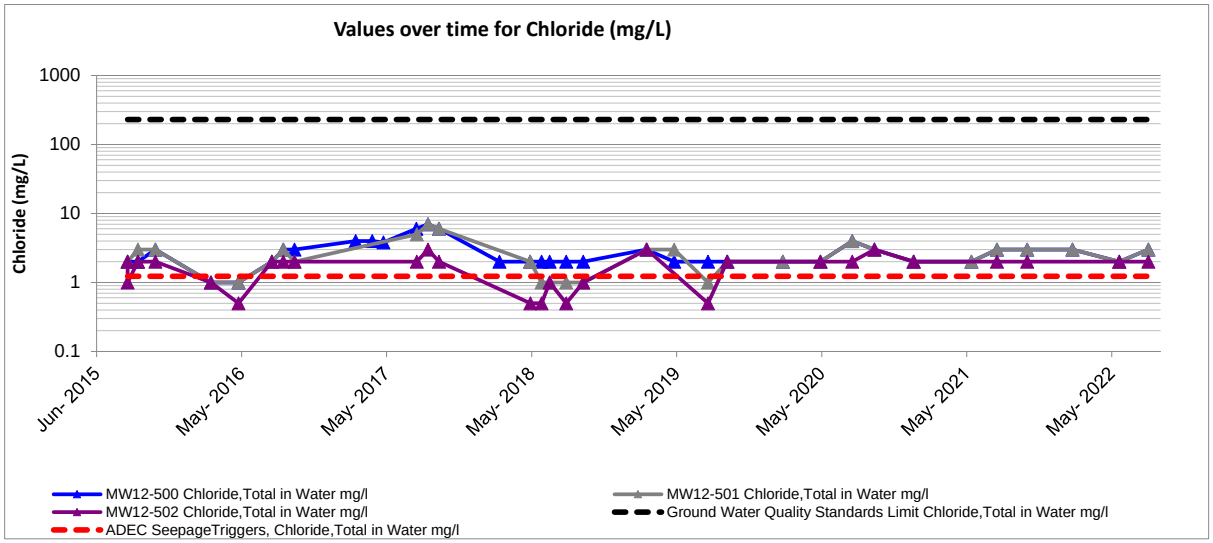
WATER QUALITY STANDARDS AND SEEPAGE

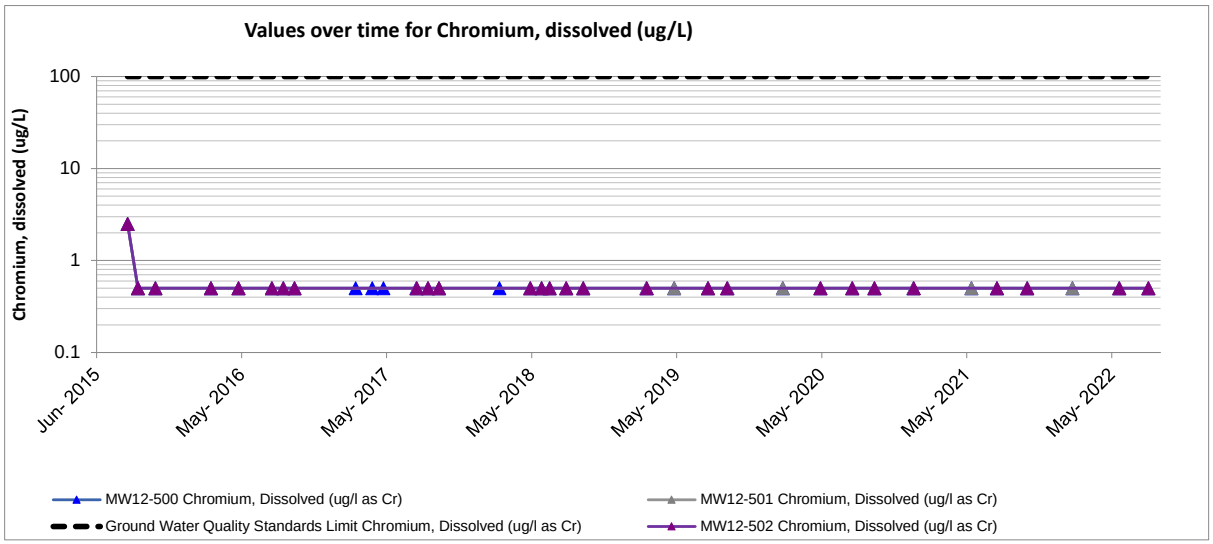
TRIGGER LIMITS

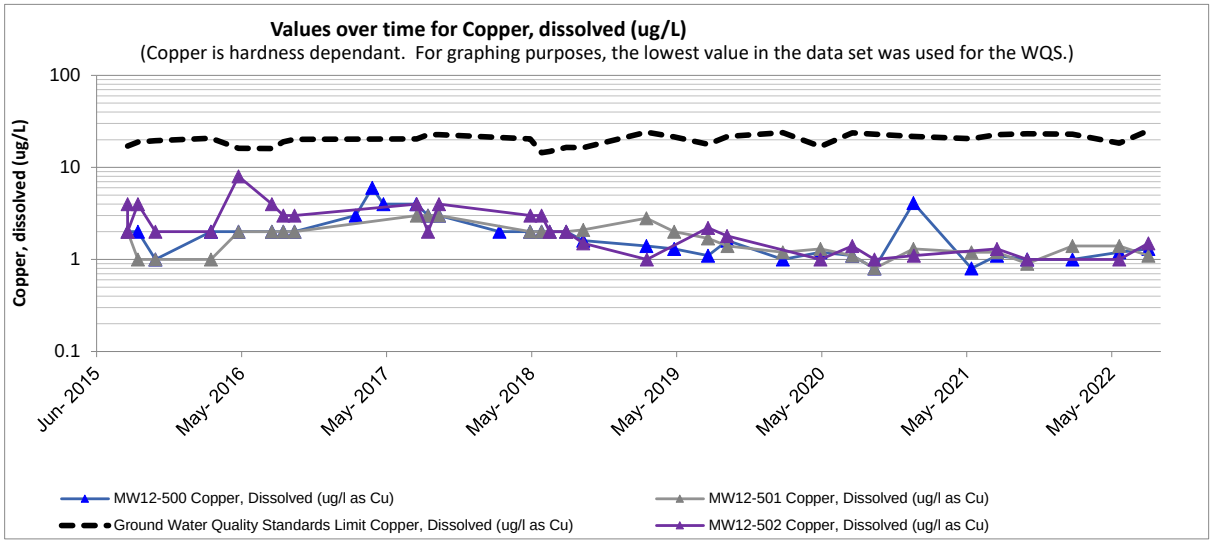

Values over time for Antimony, dissolved (ug/L)
Antimony, dissolved (ug/L)
10
1
0.1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Antimony, Dissolved (ug/l as Sb)
MW12-501 Antimony, Dissolved (ug/l as Sb)
Ground Water Quality Standards Limit Antimony, Dissolved (ug/l as Sb)
MW12-502 Antimony, Dissolved (ug/l as Sb)
ADEC Seepage Trigger Limit, Antimony, Dissolved (ug/l as Sb)

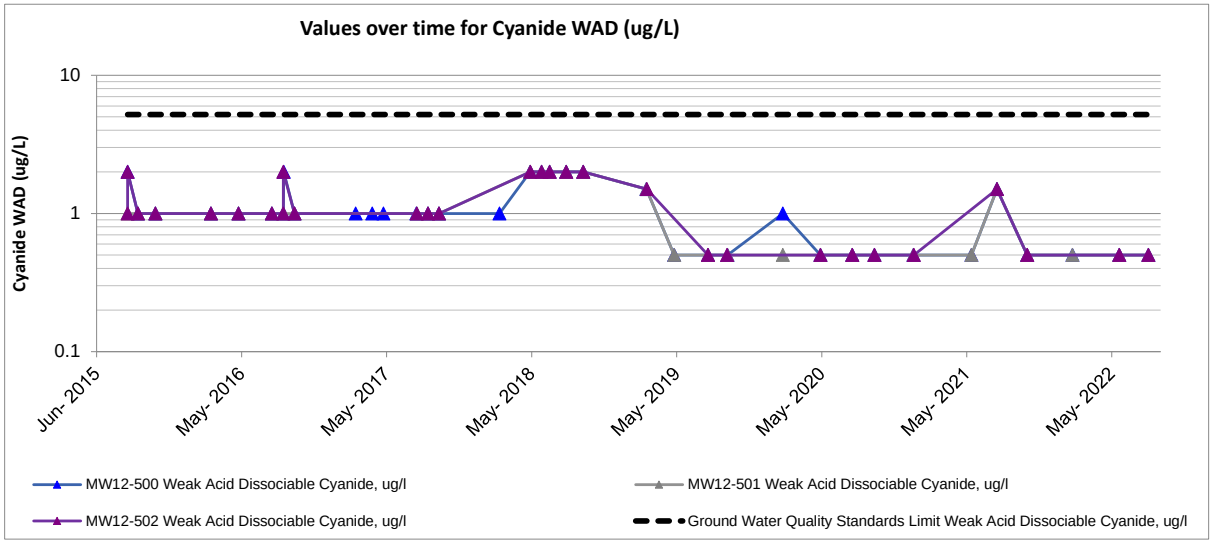

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
100
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Arsenic, Dissolved (ug/l as As)
MW12-501 Arsenic, Dissolved (ug/l as As)
MW12-502 Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards
ADEC SeepageTriggers, Arsenic, Dissolved (ug/l as As)

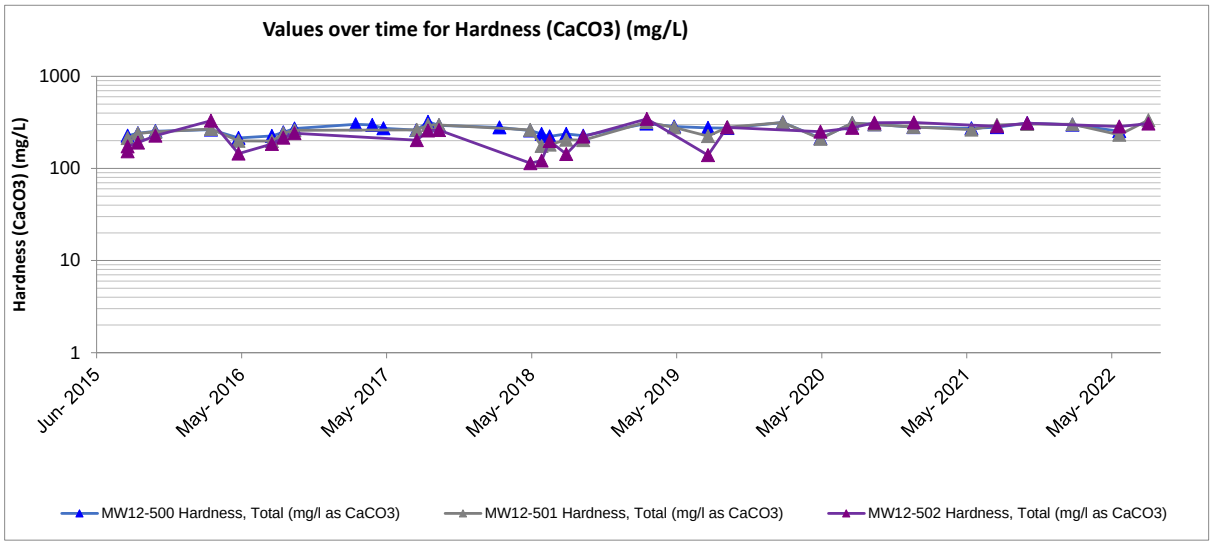

Values over time for Cadmium, dissolved (ug/L)
(Cadmium is hardness dependant. For graphing purposes, the lowest value in the data series was used for the WQS.)
Cadmium, dissolved (ug/L)
1
0.1
0.01
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Cadmium, Dissolved (ug/l as Cd)
MW12-501 Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)
MW12-502 Cadmium, Dissolved (ug/l as Cd)

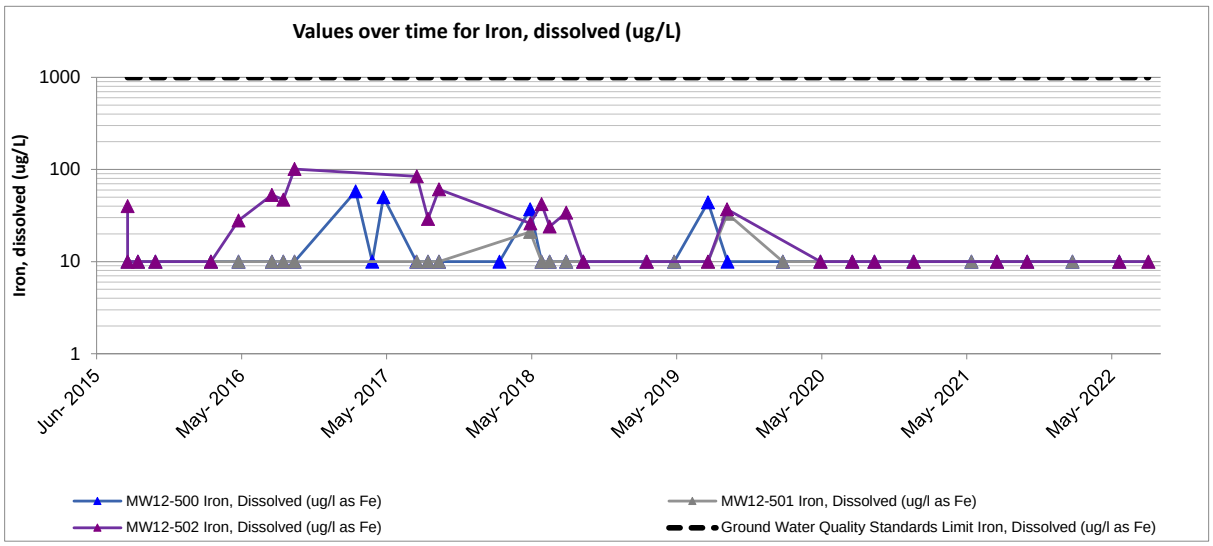

Values over time for Chloride (mg/L)
Chloride (mg/L)
1000
100
10
1
0.1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Chloride,Total in Water mg/l
MW12-501 Chloride,Total in Water mg/l
MW12-502 Chloride,Total in Water mg/l
Ground Water Quality Standards Limit Chloride,Total in Water mg/l
ADEC SeepageTriggers, Chloride,Total in Water mg/l

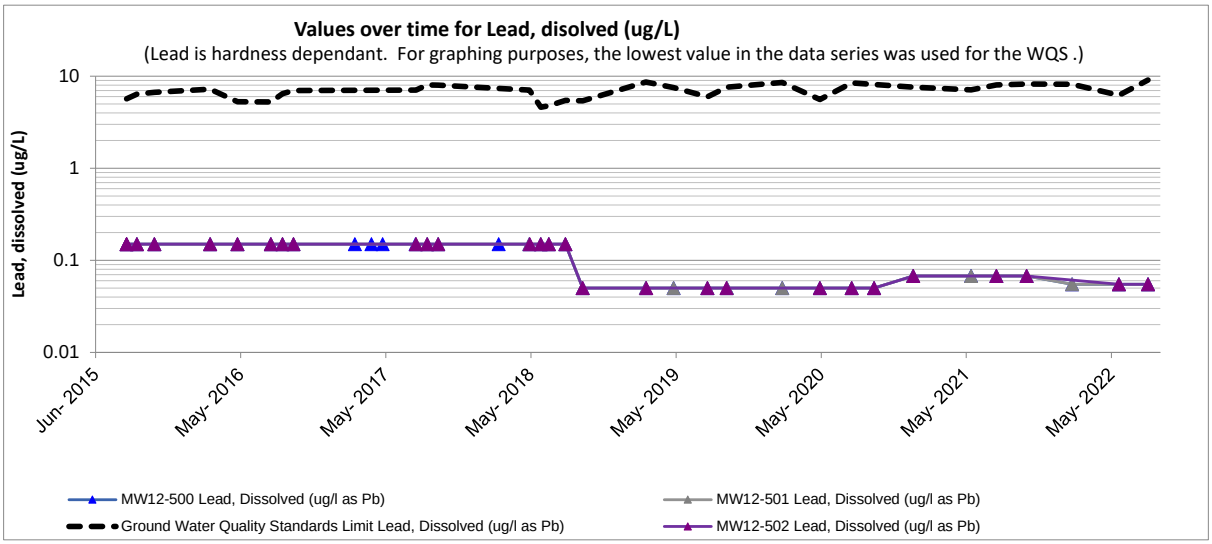

Values over time for Chromium, dissolved (ug/L)
Chromium, dissolved (ug/L)
100
10
1
0.1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Chromium, Dissolved (ug/l as Cr)
MW12-501 Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)
MW12-502 Chromium, Dissolved (ug/l as Cr)

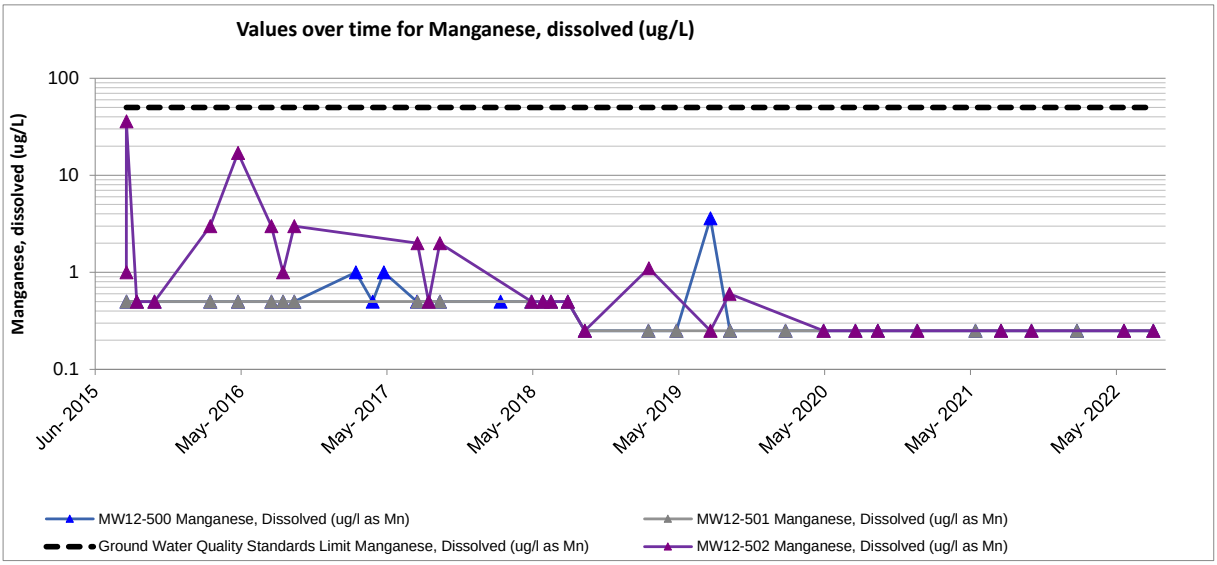

Values over time for Copper, dissolved (ug/L)
(Copper is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Copper, dissolved (ug/L)
100
10
1
0.1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Copper, Dissolved (ug/l as Cu)
MW12-501 Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)
MW12-502 Copper, Dissolved (ug/l as Cu)

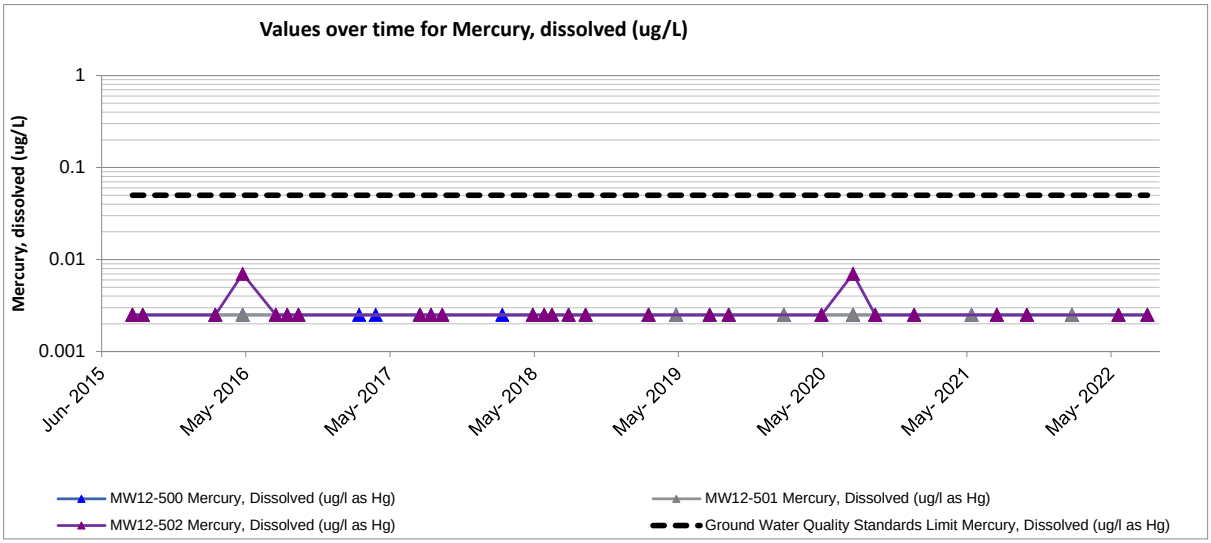

Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
10
1
0.1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Weak Acid Dissociable Cyanide, ug/l
MW12-501 Weak Acid Dissociable Cyanide, ug/l
MW12-502 Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l

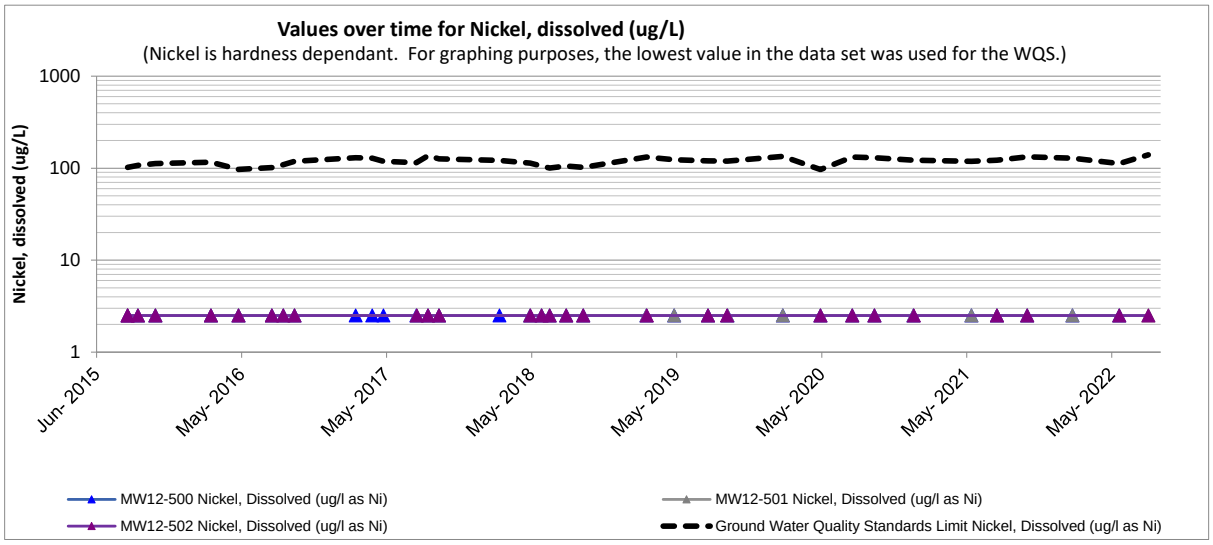

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Hardness, Total (mg/l as CaCO3)
MW12-501 Hardness, Total (mg/l as CaCO3)
MW12-502 Hardness, Total (mg/l as CaCO3)

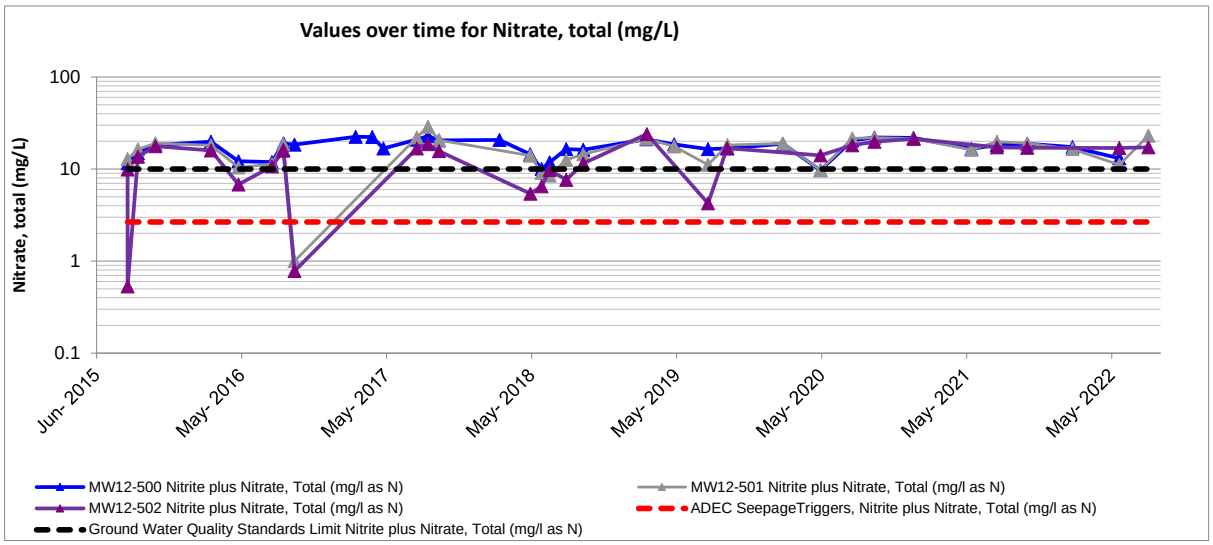

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
1000
100
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Iron, Dissolved (ug/l as Fe)
MW12-501 Iron, Dissolved (ug/l as Fe)
MW12-502 Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)

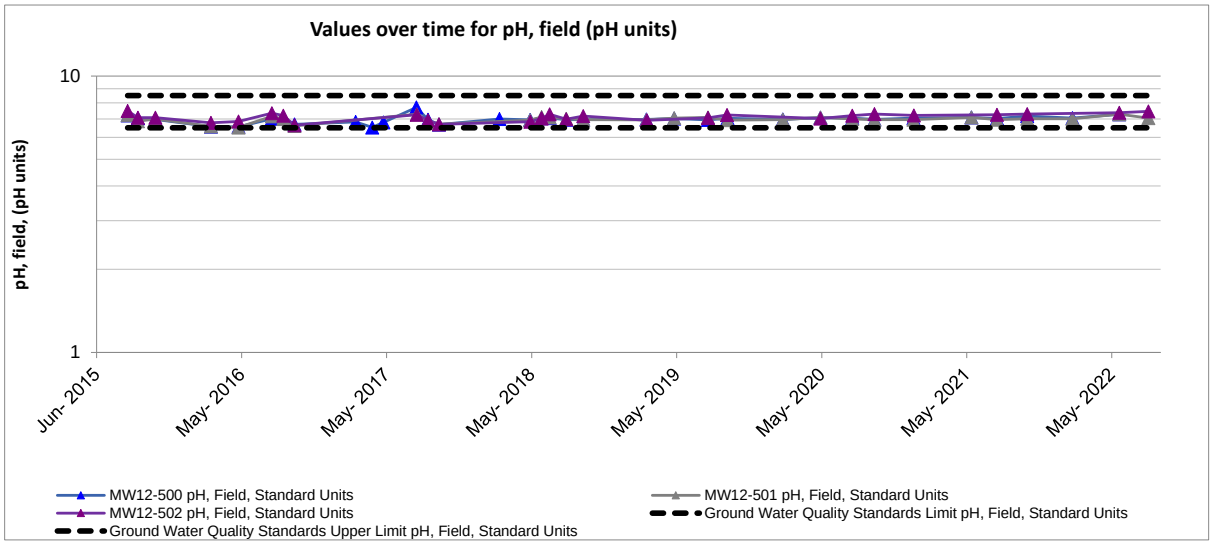

Values over time for Lead, disolved (ug/L)
(Lead is hardness dependant. For graphing purposes, the lowest value in the data series was used for the WQS .)
Lead, dissolved (ug/L)
10
1
0.1
0.01
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Lead, Dissolved (ug/l as Pb)
MW12-501 Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)
MW12-502 Lead, Dissolved (ug/l as Pb)

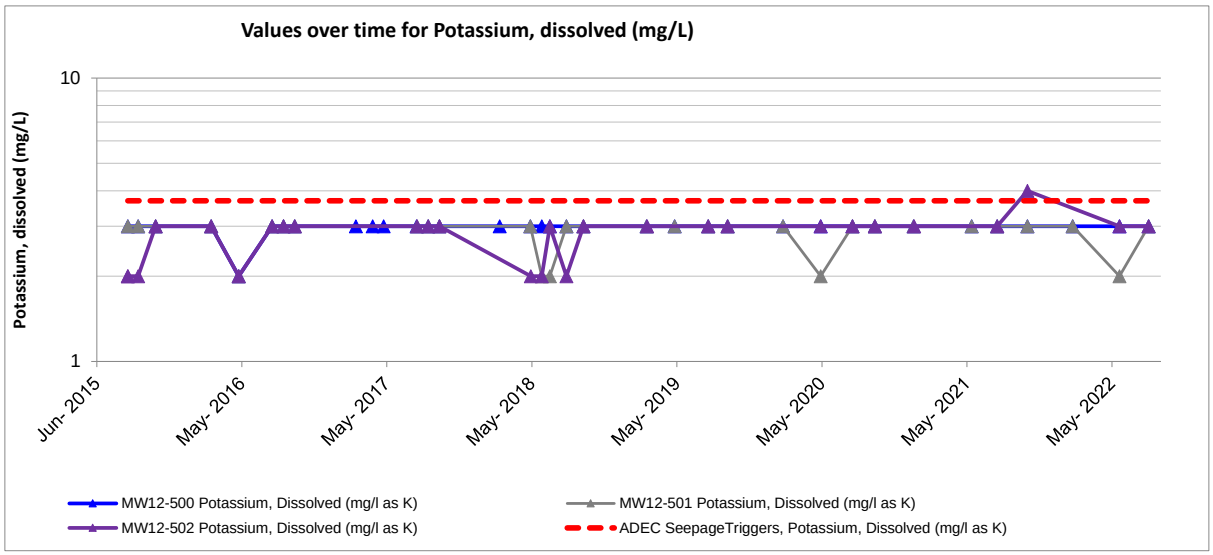

Values over time for Manganese, dissolved (ug/L)
Manganese, dissolved (ug/L)
100
10
1
0.1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Manganese, Dissolved (ug/l as Mn)
MW12-501 Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)
MW12-502 Manganese, Dissolved (ug/l as Mn)

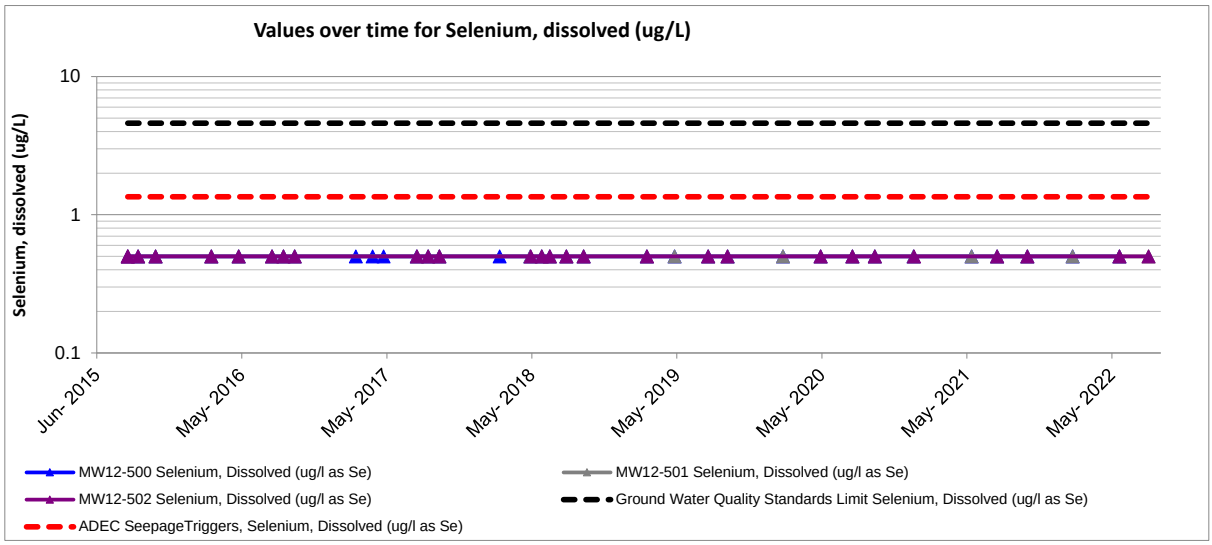

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Mercury, Dissolved (ug/l as Hg)
MW12-501 Mercury, Dissolved (ug/l as Hg)
MW12-502 Mercury, Dissolved (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)

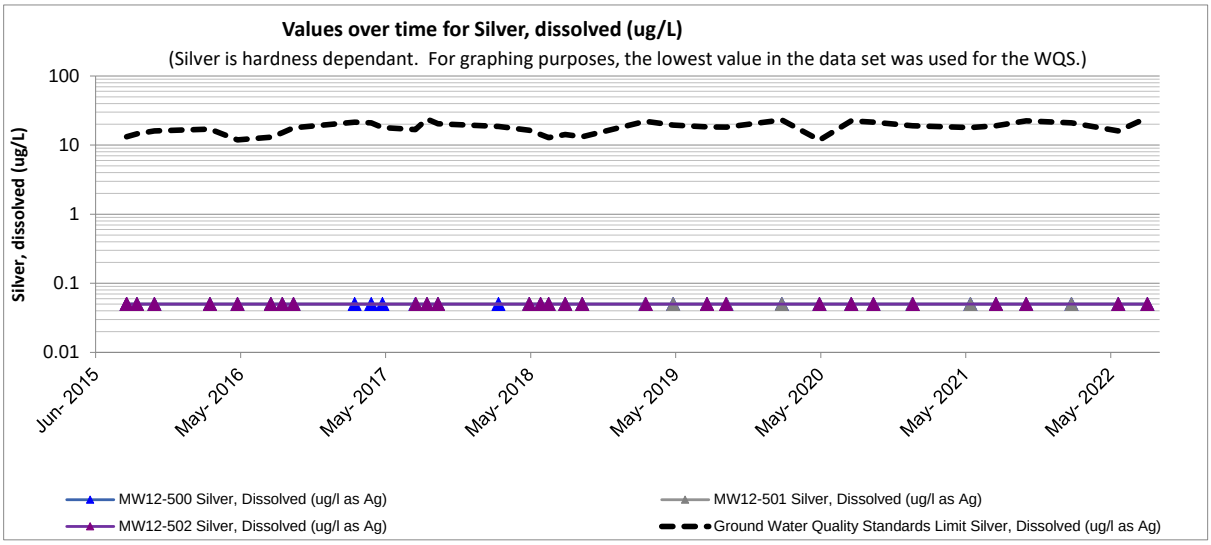

Values over time for Nickel, dissolved (ug/L)
(Nickel is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Nickel, dissolved (ug/L)
1000
100
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Nickel, Dissolved (ug/l as Ni)
MW12-501 Nickel, Dissolved (ug/l as Ni)
MW12-502 Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)

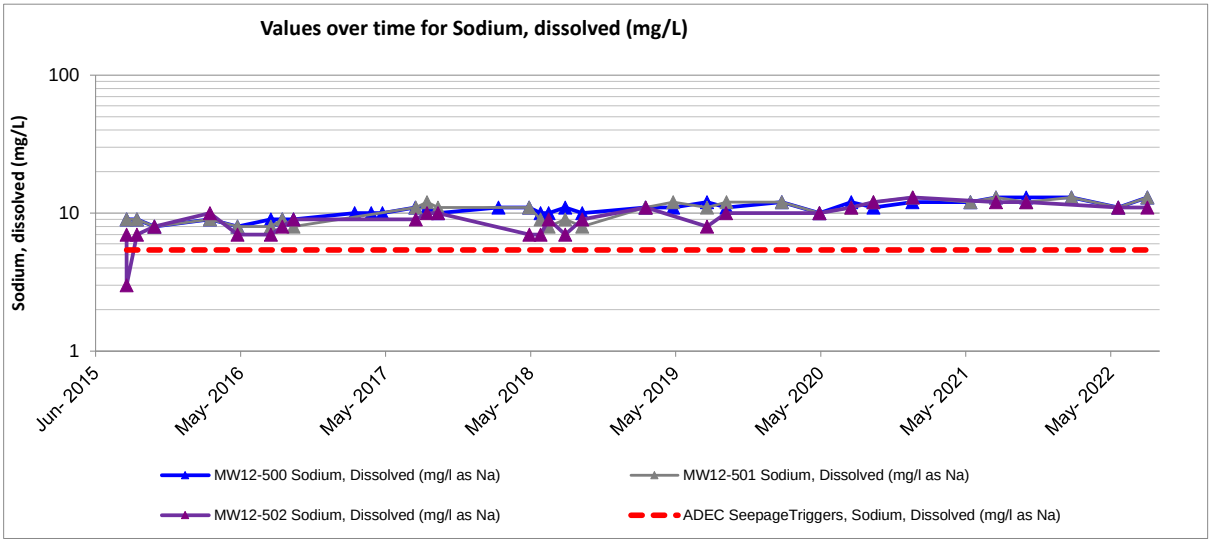

Values over time for Nitrate, total (mg/L)
Nitrate, total (mg/L)
100
10
1
0.1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Nitrite plus Nitrate, Total (mg/l as N)
MW12-501 Nitrite plus Nitrate, Total (mg/l as N)
MW12-502 Nitrite plus Nitrate, Total (mg/l as N)
ADEC SeepageTriggers, Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)

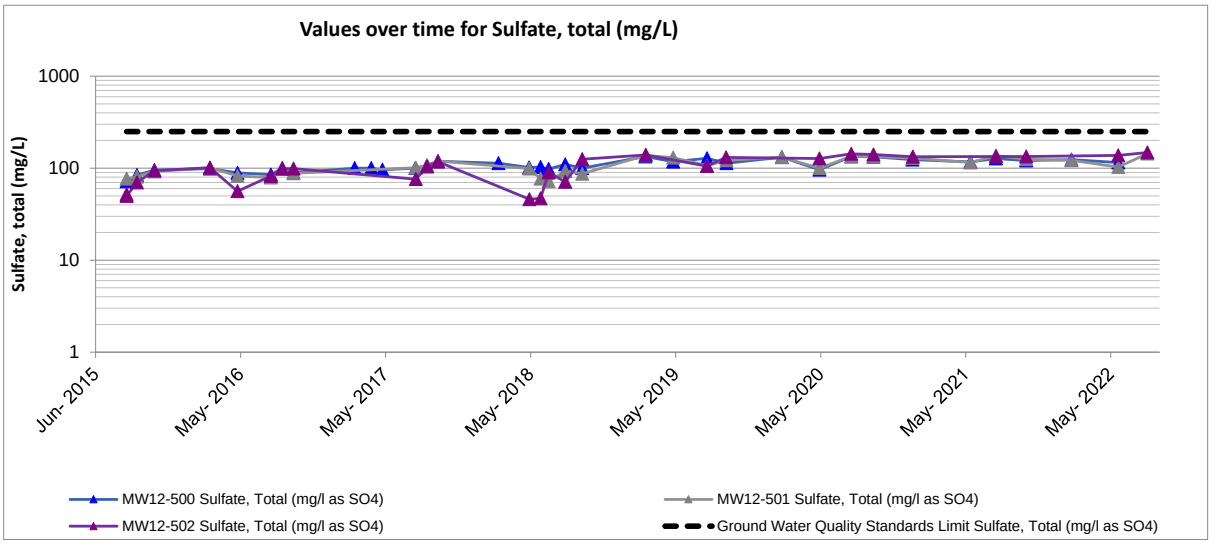

Values over time for pH, field (pH units)
pH, field, (pH units)
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 pH, Field, Standard Units
MW12-501 pH, Field, Standard Units
MW12-502 pH, Field, Standard Units
Ground Water Quality Standards Limit pH, Field, Standard Units
Ground Water Quality Standards Upper Limit pH, Field, Standard Units

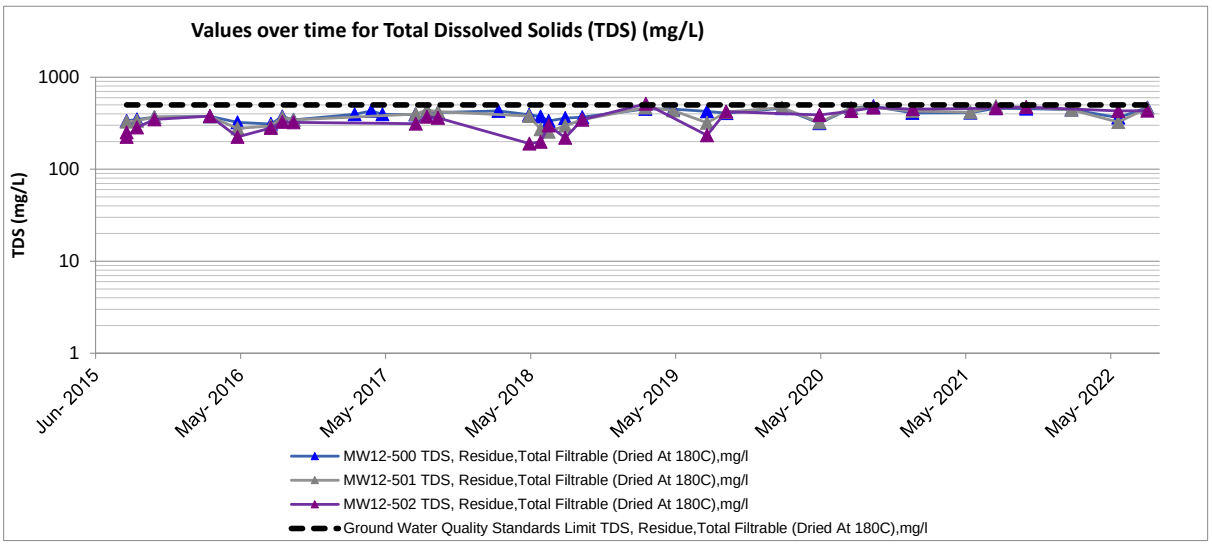

Values over time for Potassium, dissolved (mg/L)
Potassium, dissolved (mg/L)
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Potassium, Dissolved (mg/l as K)
MW12-501 Potassium, Dissolved (mg/l as K)
MW12-502 Potassium, Dissolved (mg/l as K)
ADEC SeepageTriggers, Potassium, Dissolved (mg/l as K)

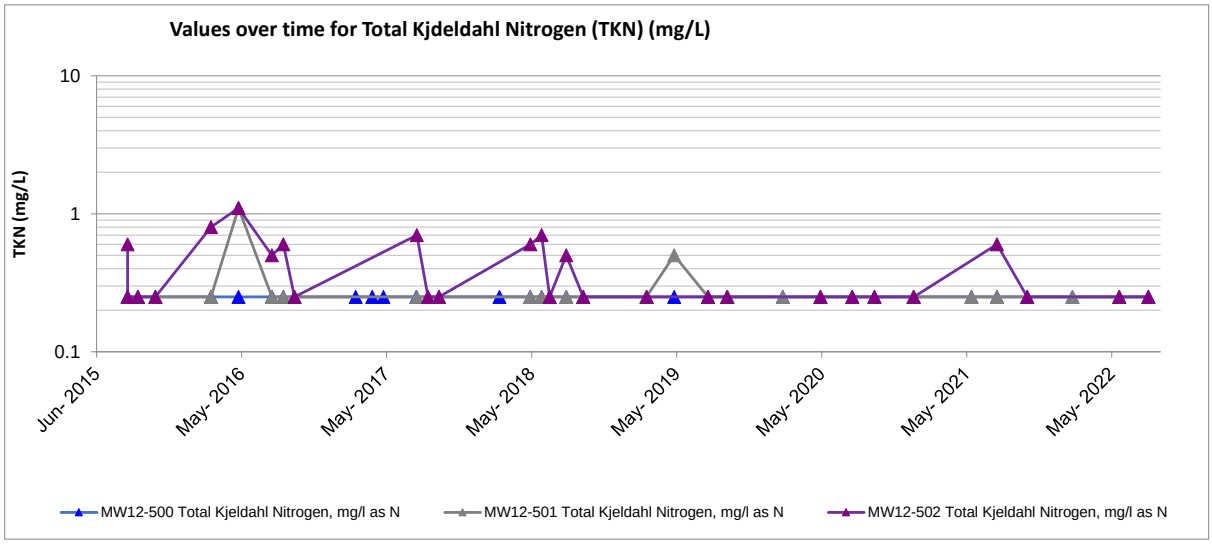

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug/L)
10
1
0.1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Selenium, Dissolved (ug/l as Se)
MW12-501 Selenium, Dissolved (ug/l as Se)
MW12-502 Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards Limit Selenium, Dissolved (ug/l as Se)
ADEC SeepageTriggers, Selenium, Dissolved (ug/l as Se)

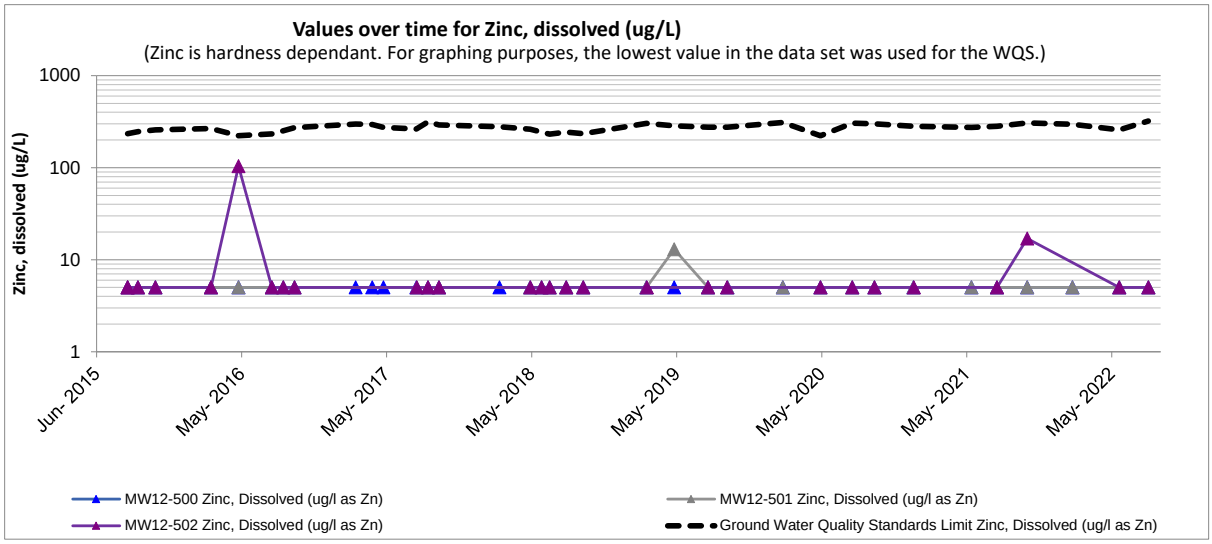

Values over time for Silver, dissolved (ug/L)
(Silver is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Silver, dissolved (ug/L)
100
10
1
0.1
0.01
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Silver, Dissolved (ug/l as Ag)
MW12-501 Silver, Dissolved (ug/l as Ag)
MW12-502 Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)


Values over time for Sodium, dissolved (mg/L)
Sodium, dissolved (mg/L)
100
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Sodium, Dissolved (mg/l as Na)
MW12-501 Sodium, Dissolved (mg/l as Na)
MW12-502 Sodium, Dissolved (mg/l as Na)
ADEC SeepageTriggers, Sodium, Dissolved (mg/l as Na)


Values over time for Sulfate, total (mg/L)
Sulfate, total (mg/L)
1000
100
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Sulfate, Total (mg/l as SO4)
MW12-501 Sulfate, Total (mg/l as SO4)
MW12-502 Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)


Values over time for Total Dissolved Solids (TDS) (mg/L)
TDS (mg/L)
1000
100
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW12-501 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW12-502 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Ground Water Quality Standards Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l

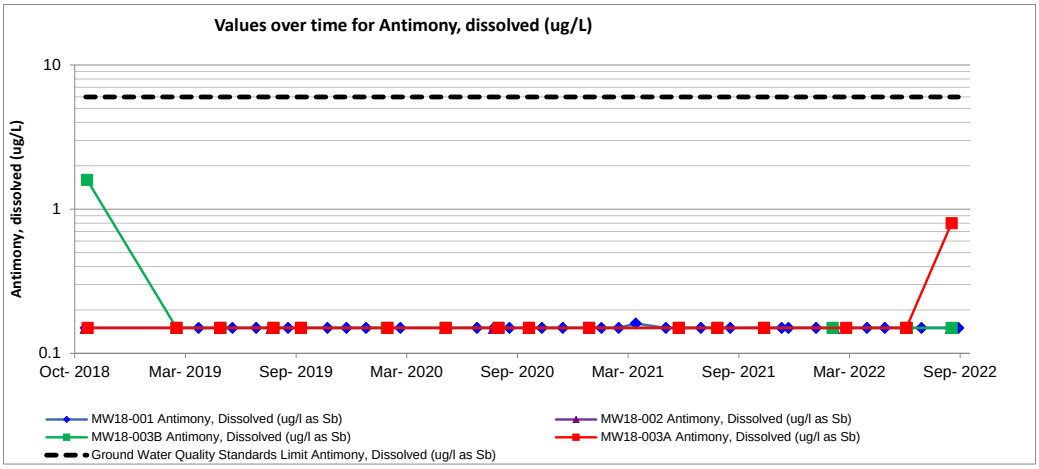

Values over time for Total Kjeldahl Nitrogen (TKN) (mg/L)
TKN (mg/L)
10
1
0.1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Total Kjeldahl Nitrogen, mg/l as N
MW12-501 Total Kjeldahl Nitrogen, mg/l as N
MW12-502 Total Kjeldahl Nitrogen, mg/l as N

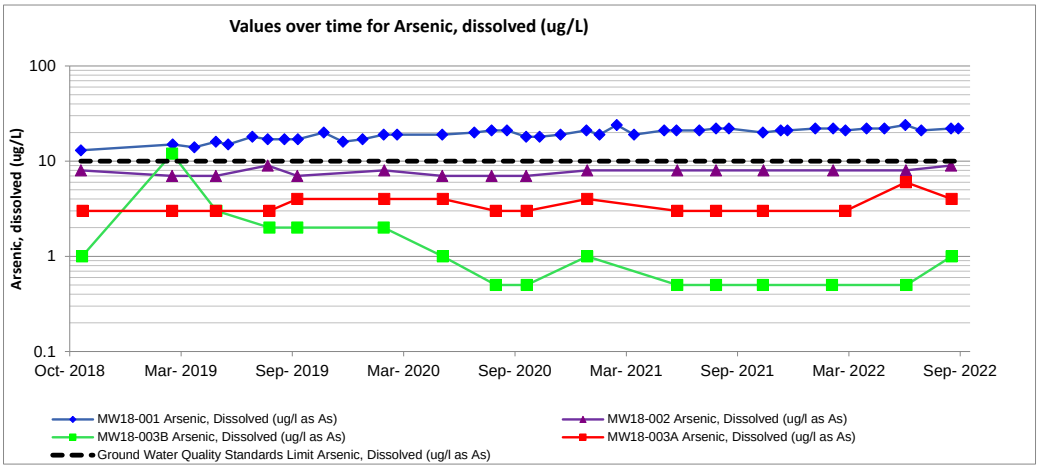

Values over time for Zinc, dissolved (ug/L)
(Zinc is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Zinc, dissolved (ug/L)
1000
100
10
1
Jun- 2015
May- 2016
May- 2017
May- 2018
May- 2019
May- 2020
May- 2021
May- 2022
MW12-500 Zinc, Dissolved (ug/l as Zn)
MW12-501 Zinc, Dissolved (ug/l as Zn)
MW12-502 Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)

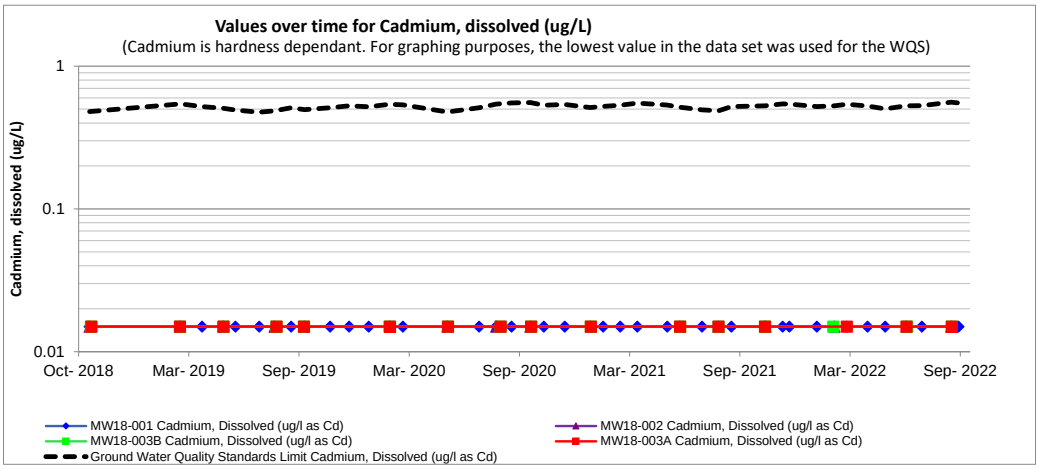
APPENDIX C –

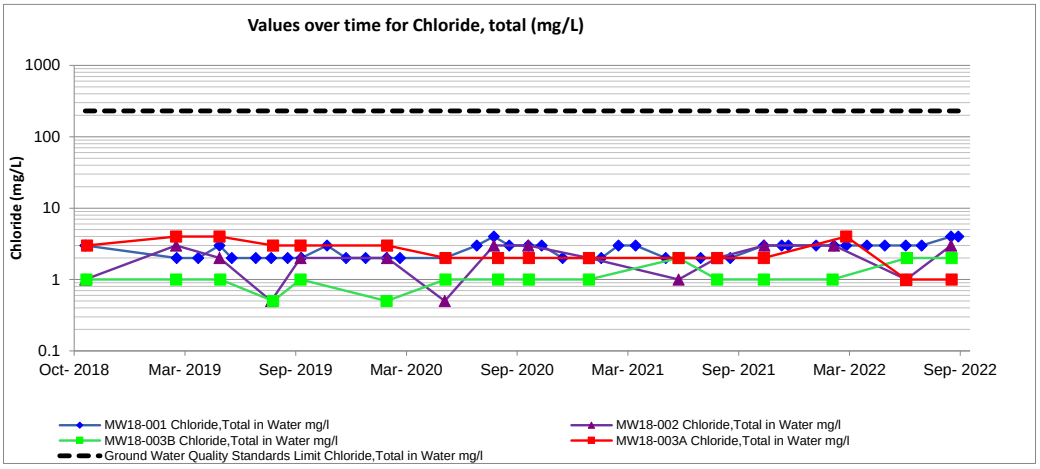
MW18-001, MW18-002, MW18-003A, MW18-003B GRAPHS

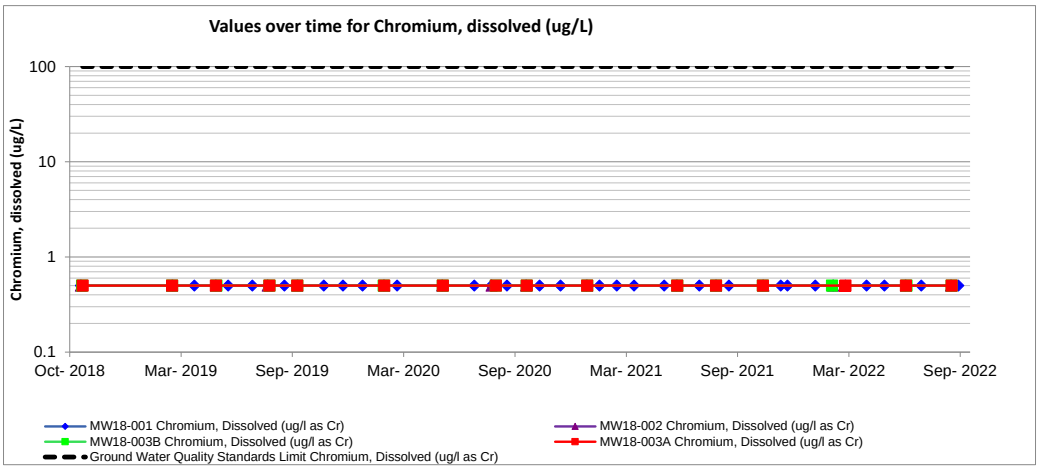
WATER QUALITY STANDARDS

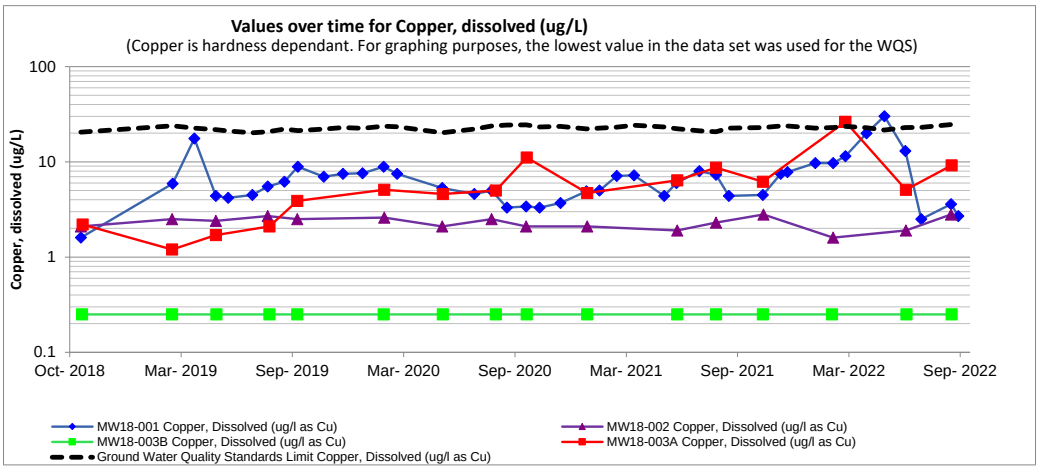

Values over time for Antimony, dissolved (ug/L)
Antimony, dissolved (ug/L)
10
1
0.1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Antimony, Dissolved (ug/l as Sb)
MW18-002 Antimony, Dissolved (ug/l as Sb)
MW18-003B Antimony, Dissolved (ug/l as Sb)
MW18-003A Antimony, Dissolved (ug/l as Sb)
Ground Water Quality Standards Limit Antimony, Dissolved (ug/l as Sb)

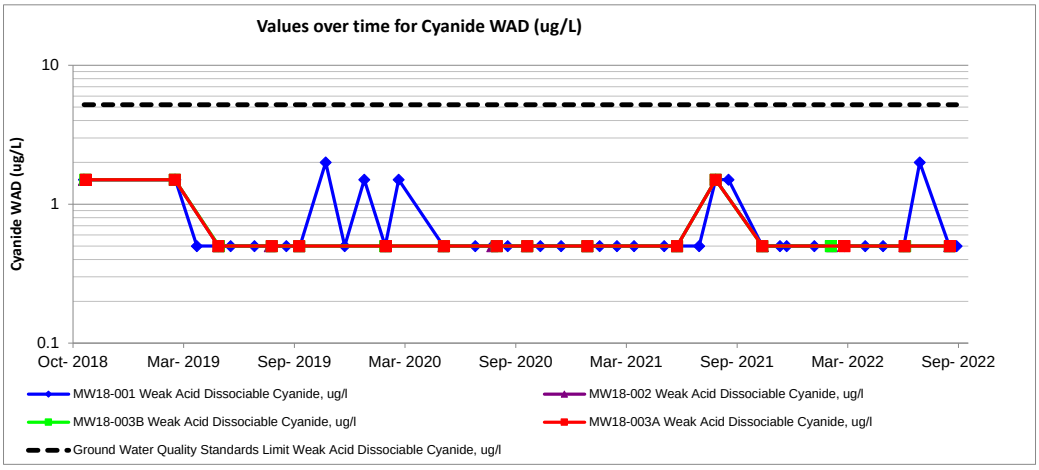

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
100
10
1
0.1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Arsenic, Dissolved (ug/l as As)
MW18-002 Arsenic, Dissolved (ug/l as As)
MW18-003B Arsenic, Dissolved (ug/l as As)
MW18-003A Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards Limit Arsenic, Dissolved (ug/l as As)

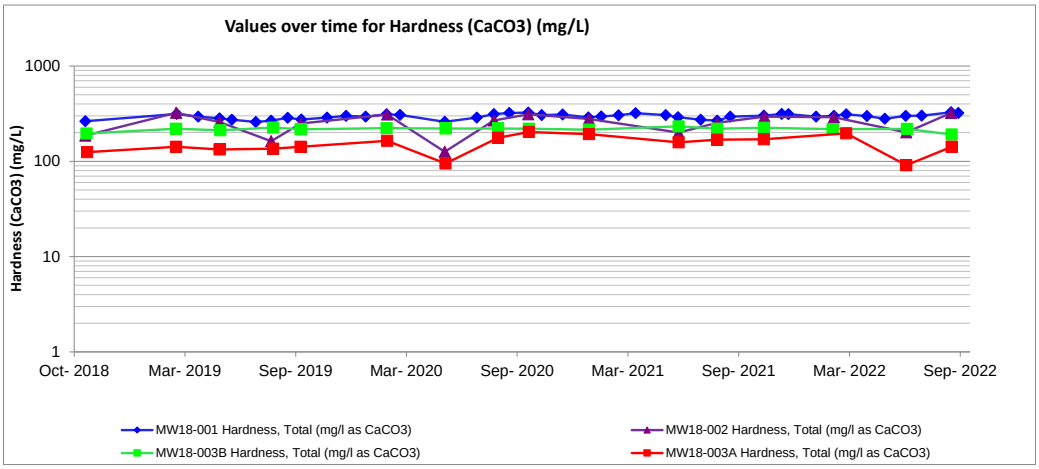

Values over time for Cadmium, dissolved (ug/L)
(Cadmium is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Cadmium, dissolved (ug/L)
1
0.1
0.01
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Cadmium, Dissolved (ug/l as Cd)
MW18-002 Cadmium, Dissolved (ug/l as Cd)
MW18-003B Cadmium, Dissolved (ug/l as Cd)
MW18-003A Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)

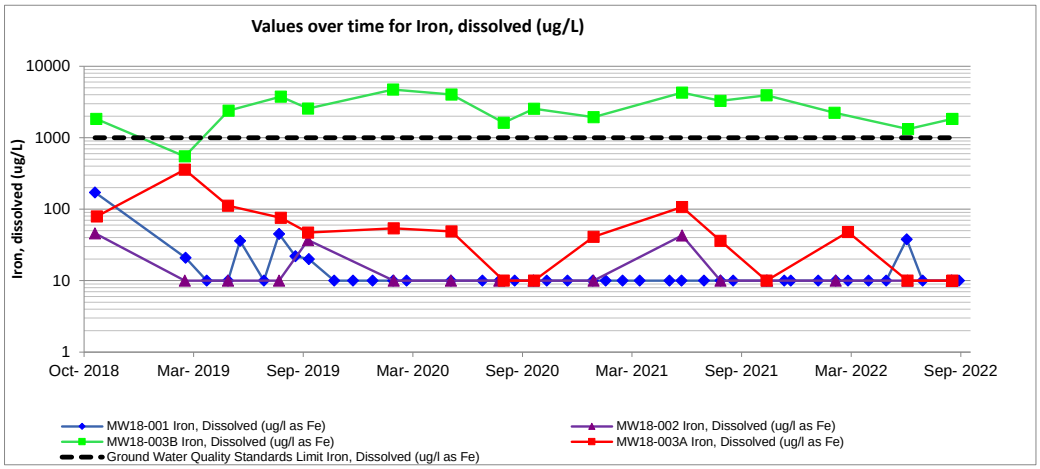

Values over time for Chloride, total (mg/L)
Chloride (mg/L)
1000
100
10
1
0.1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Chloride,Total in Water mg/l
MW18-002 Chloride,Total in Water mg/l
MW18-003B Chloride,Total in Water mg/l
MW18-003A Chloride,Total in Water mg/l
Ground Water Quality Standards Limit Chloride,Total in Water mg/l

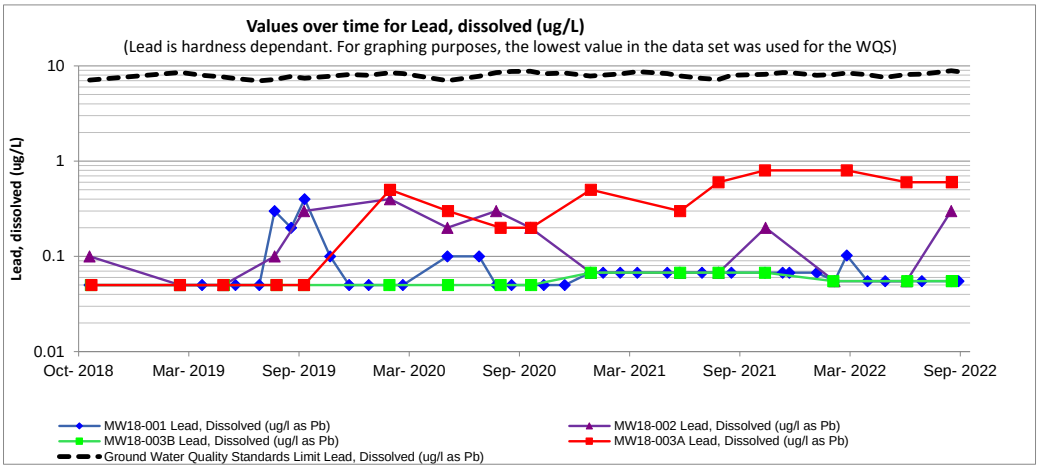

Values over time for Chromium, dissolved (ug/L)
Chromium, dissolved (ug/L)
100
10
1
0.1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Chromium, Dissolved (ug/l as Cr)
MW18-002 Chromium, Dissolved (ug/l as Cr)
MW18-003B Chromium, Dissolved (ug/l as Cr)
MW18-003A Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)

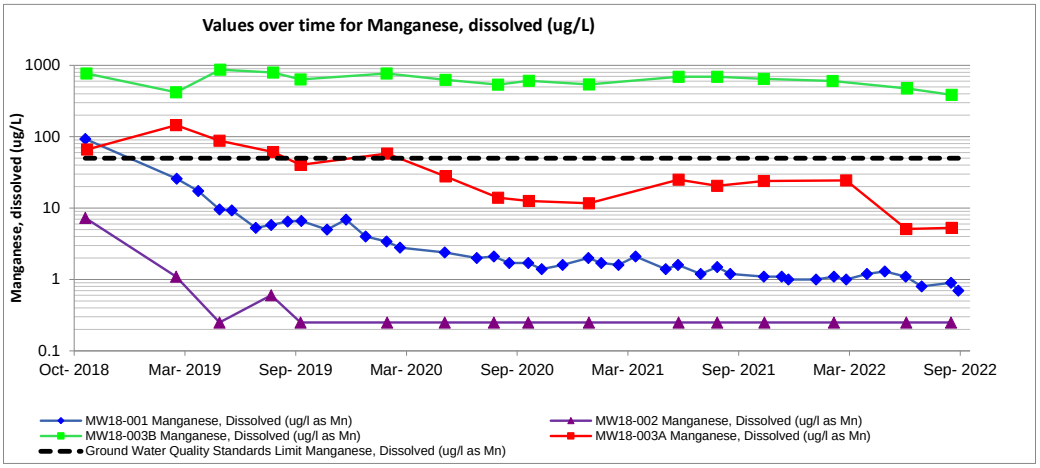

Values over time for Copper, dissolved (ug/L)
(Copper is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Copper, dissolved (ug/L)
100
10
1
0.1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Copper, Dissolved (ug/l as Cu)
MW18-002 Copper, Dissolved (ug/l as Cu)
MW18-003B Copper, Dissolved (ug/l as Cu)
MW18-003A Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)

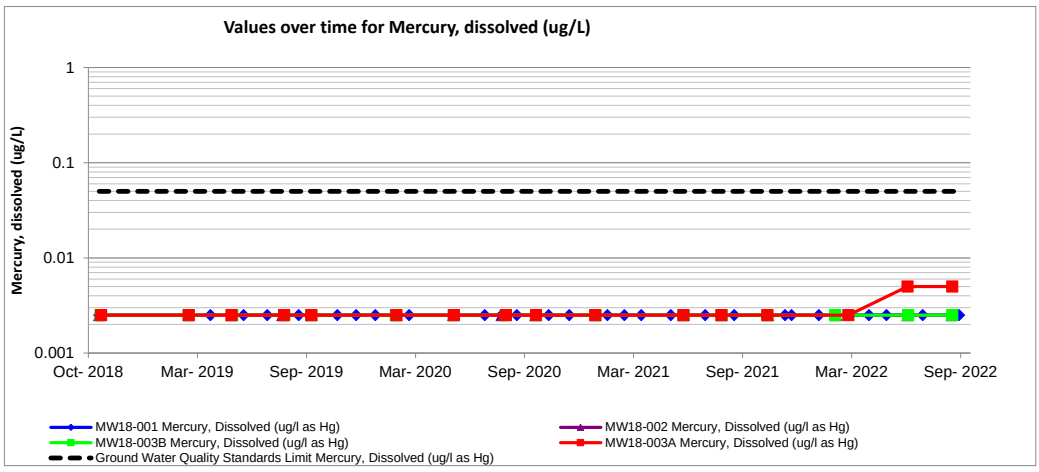

Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
10
1
0.1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Weak Acid Dissociable Cyanide, ug/l
MW18-002 Weak Acid Dissociable Cyanide, ug/l
MW18-003B Weak Acid Dissociable Cyanide, ug/l
MW18-003A Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l

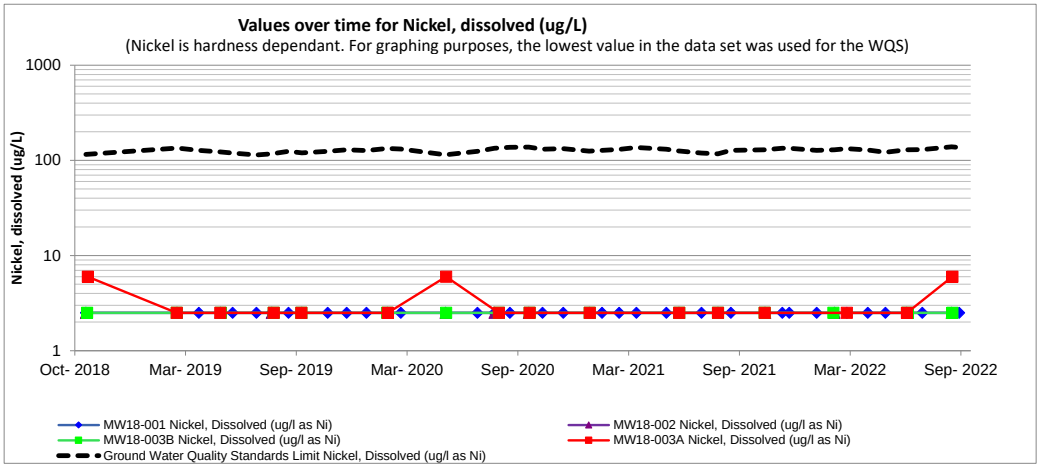

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Hardness, Total (mg/l as CaCO3)
MW18-002 Hardness, Total (mg/l as CaCO3)
MW18-003B Hardness, Total (mg/l as CaCO3)
MW18-003A Hardness, Total (mg/l as CaCO3)

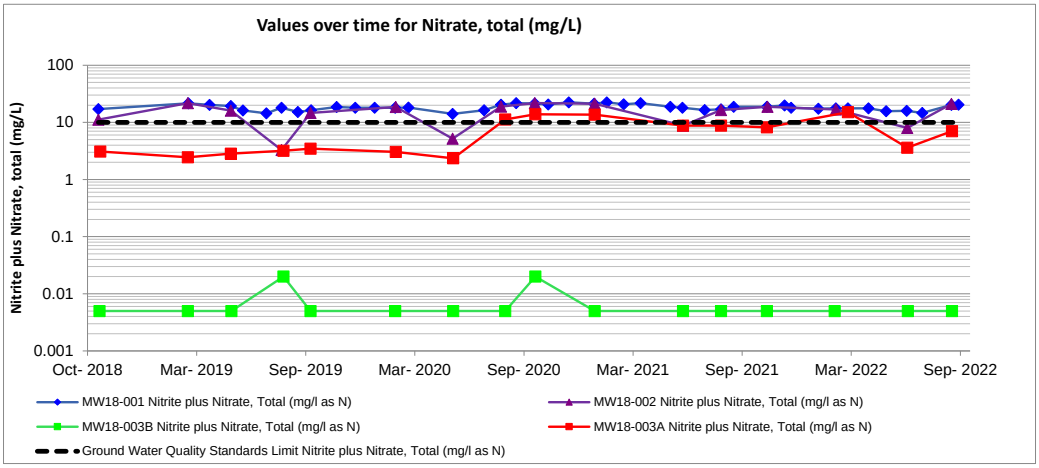

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
10000
1000
100
10
1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Iron, Dissolved (ug/l as Fe)
MW18-002 Iron, Dissolved (ug/l as Fe)
MW18-003B Iron, Dissolved (ug/l as Fe)
MW18-003A Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)

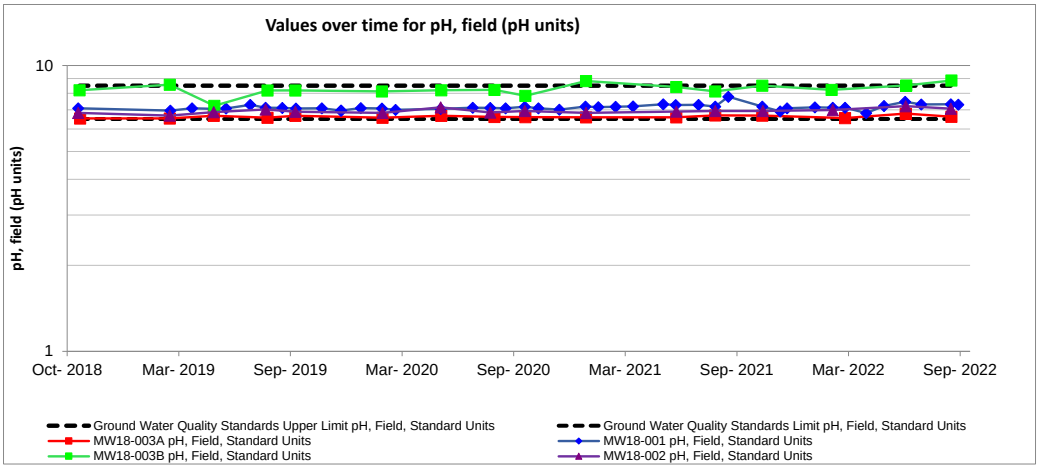

Values over time for Lead, dissolved (ug/L)
(Lead is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Lead, dissolved (ug/L)
10
1
0.1
0.01
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Lead, Dissolved (ug/l as Pb)
MW18-002 Lead, Dissolved (ug/l as Pb)
MW18-003B Lead, Dissolved (ug/l as Pb)
MW18-003A Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)

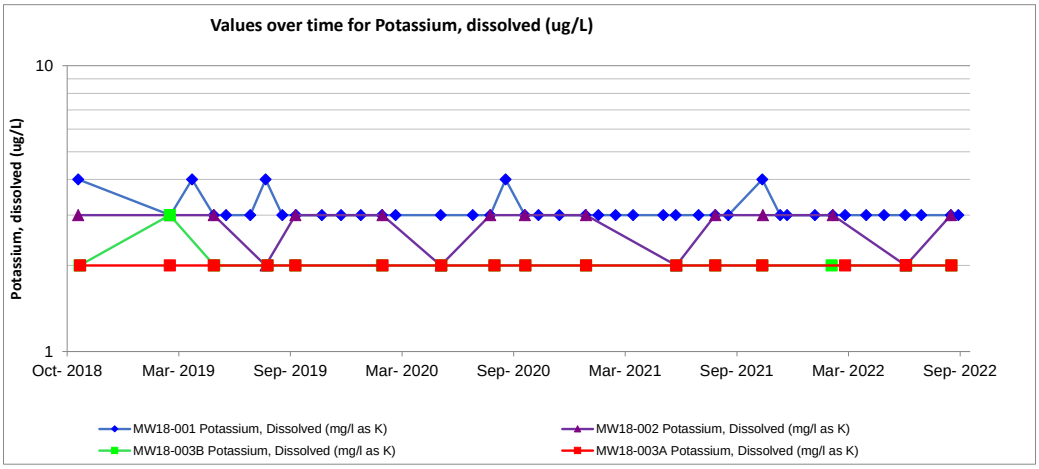

Values over time for Manganese, dissolved (ug/L)
Manganese, dissolved (ug/L)
1000
100
10
1
0.1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Manganese, Dissolved (ug/l as Mn)
MW18-002 Manganese, Dissolved (ug/l as Mn)
MW18-003B Manganese, Dissolved (ug/l as Mn)
MW18-003A Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)

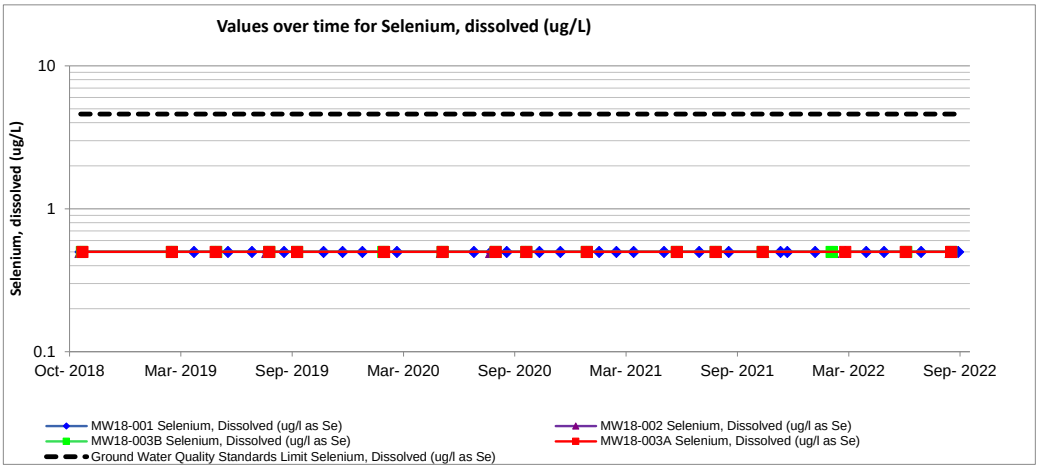

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Mercury, Dissolved (ug/l as Hg)
MW18-002 Mercury, Dissolved (ug/l as Hg)
MW18-003B Mercury, Dissolved (ug/l as Hg)
MW18-003A Mercury, Dissolved (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)

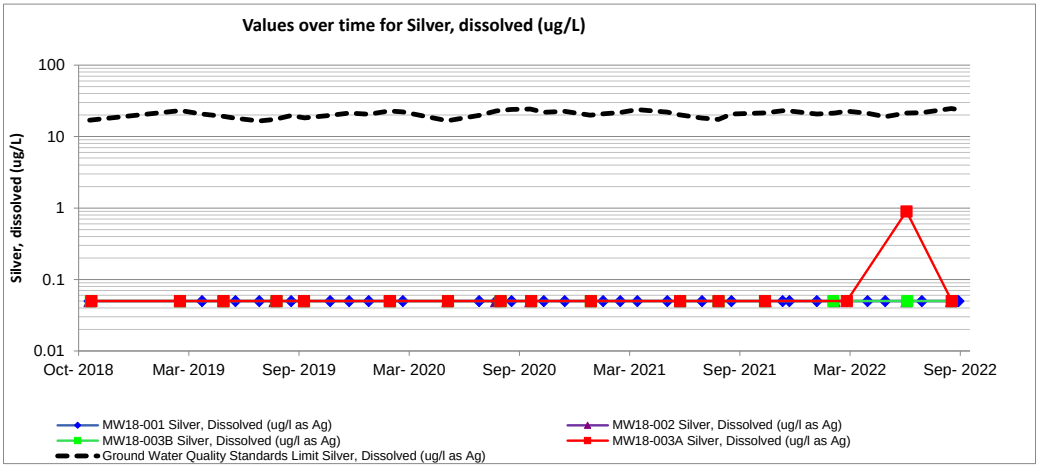

Values over time for Nickel, dissolved (ug/L)
(Nickel is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Nickel, dissolved (ug/L)
1000
100
10
1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Nickel, Dissolved (ug/l as Ni)
MW18-002 Nickel, Dissolved (ug/l as Ni)
MW18-003B Nickel, Dissolved (ug/l as Ni)
MW18-003A Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)

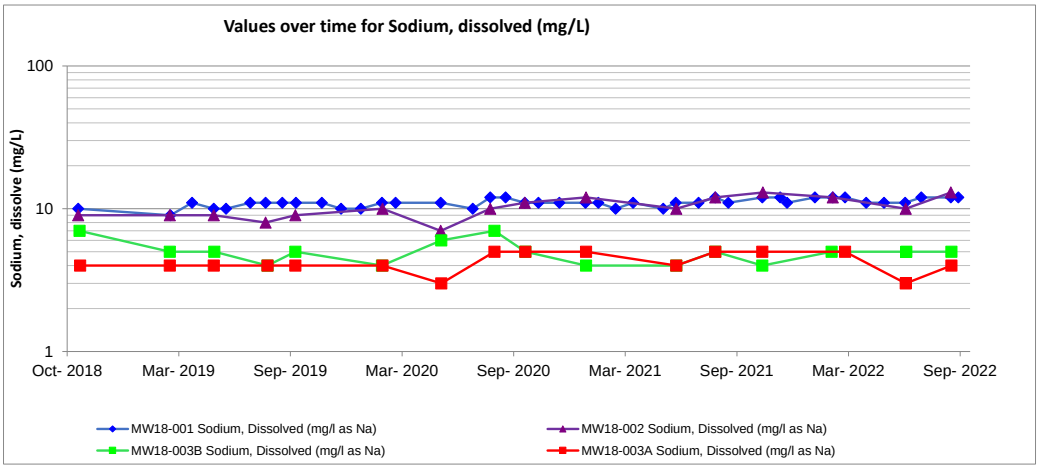

Values over time for Nitrate, total (mg/L)
Nitrite plus Nitrate, total (mg/L)
100
10
1
0.1
0.01
0.001
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Nitrite plus Nitrate, Total (mg/l as N)
MW18-002 Nitrite plus Nitrate, Total (mg/l as N)
MW18-003B Nitrite plus Nitrate, Total (mg/l as N)
MW18-003A Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)

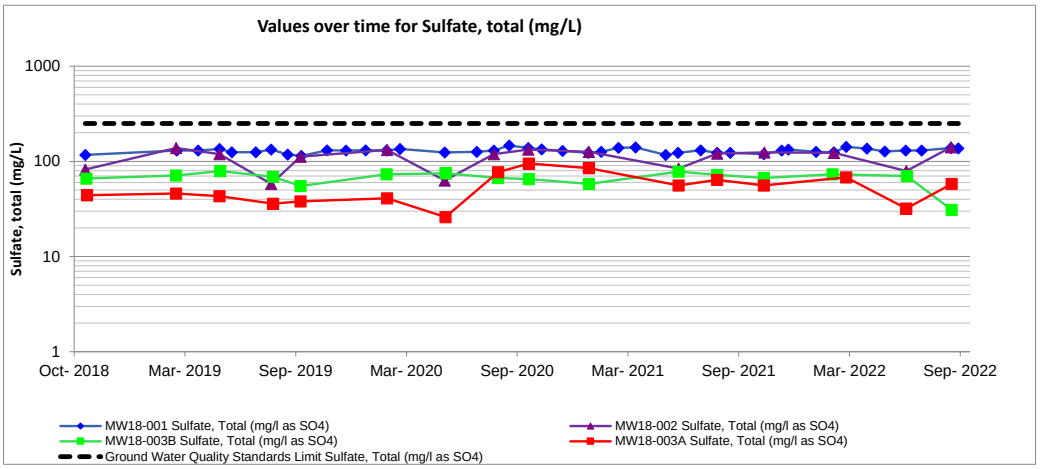

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
Ground Water Quality Standards Upper Limit pH, Field, Standard Units
Ground Water Quality Standards Limit pH, Field, Standard Units
MW18-003A pH, Field, Standard Units
MW18-001 pH, Field, Standard Units
MW18-003B pH, Field, Standard Units
MW18-002 pH, Field, Standard Units

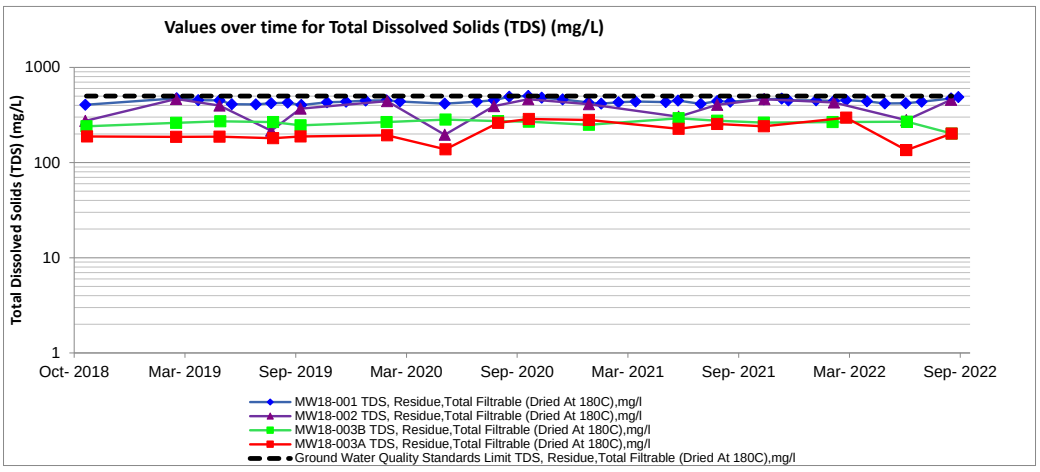

Values over time for Potassium, dissolved (ug/L)
Potassium, dissolved (ug/L)
10
1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Potassium, Dissolved (mg/l as K)
MW18-002 Potassium, Dissolved (mg/l as K)
MW18-003B Potassium, Dissolved (mg/l as K)
MW18-003A Potassium, Dissolved (mg/l as K)

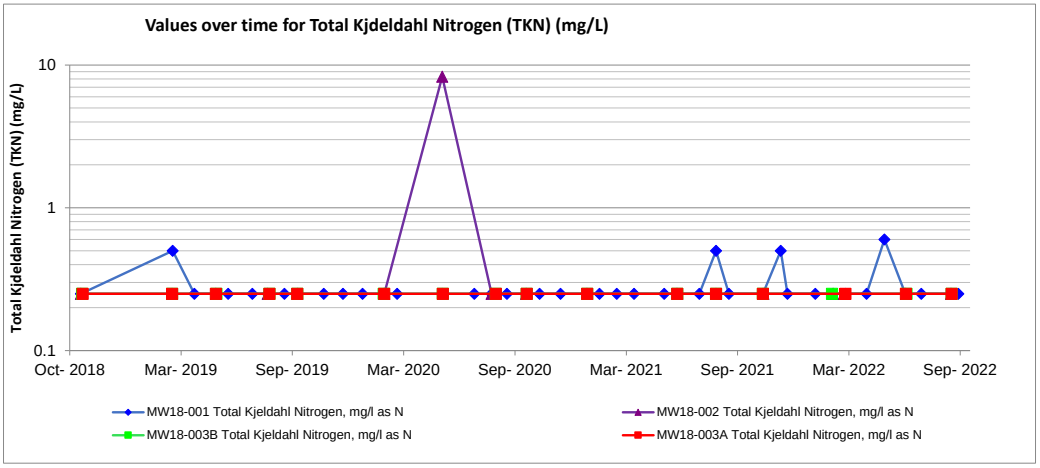

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug/L)
10
1
0.1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Selenium, Dissolved (ug/l as Se)
MW18-002 Selenium, Dissolved (ug/l as Se)
MW18-003B Selenium, Dissolved (ug/l as Se)
MW18-003A Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards Limit Selenium, Dissolved (ug/l as Se)

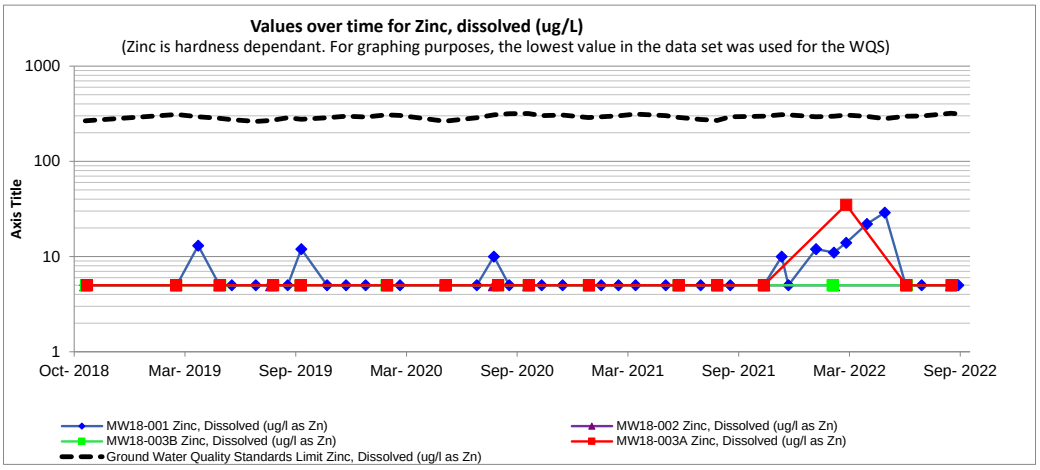

Values over time for Silver, dissolved (ug/L)
Silver, dissolved (ug/L)
100
10
1
0.1
0.01
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Silver, Dissolved (ug/l as Ag)
MW18-002 Silver, Dissolved (ug/l as Ag)
MW18-003B Silver, Dissolved (ug/l as Ag)
MW18-003A Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)


Values over time for Sodium, dissolved (mg/L)
Sodium, dissolve (mg/L)
100
10
1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Sodium, Dissolved (mg/l as Na)
MW18-002 Sodium, Dissolved (mg/l as Na)
MW18-003B Sodium, Dissolved (mg/l as Na)
MW18-003A Sodium, Dissolved (mg/l as Na)


Values over time for Sulfate, total (mg/L)
Sulfate, total (mg/L)
1000
100
10
1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Sulfate, Total (mg/l as SO4)
MW18-002 Sulfate, Total (mg/l as SO4)
MW18-003B Sulfate, Total (mg/l as SO4)
MW18-003A Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)

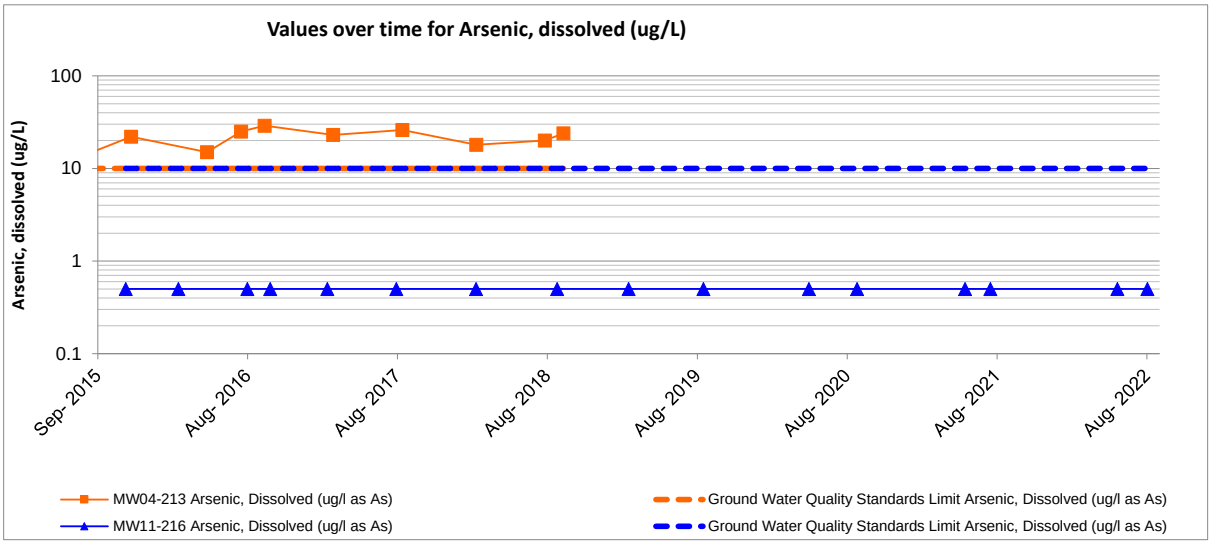

Values over time for Total Dissolved Solids (TDS) (mg/L)
Total Dissolved Solids (TDS) (mg/L)
1000
100
10
1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW18-002 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW18-003B TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW18-003A TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Ground Water Quality Standards Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l

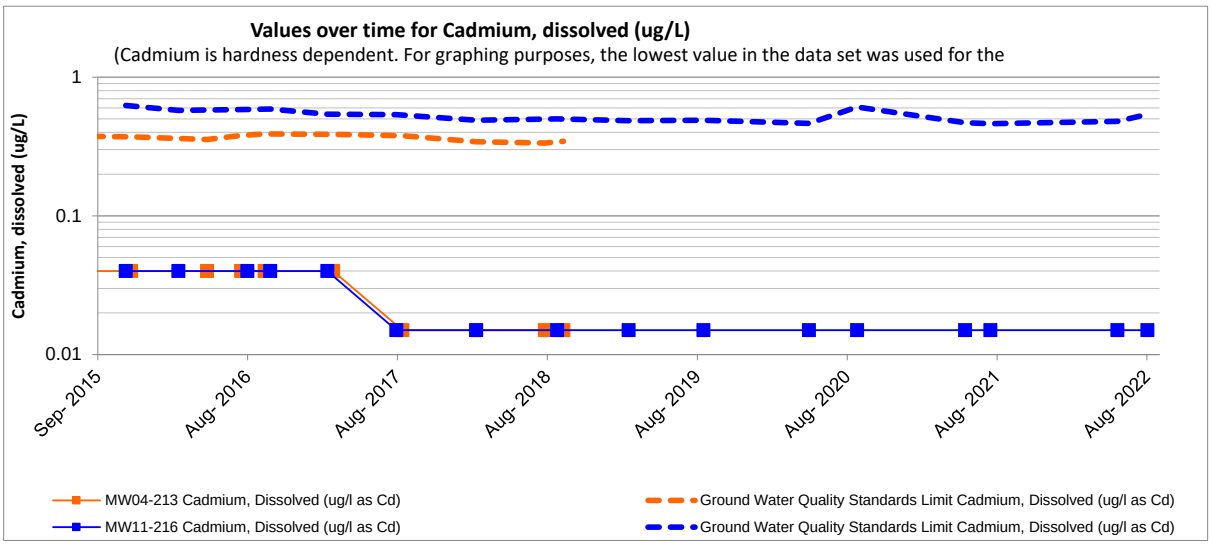

Values over time for Total Kjeldahl Nitrogen (TKN) (mg/L)
Total Kjeldahl Nitrogen (TKN) (mg/L)
10
1
0.1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Total Kjeldahl Nitrogen, mg/l as N
MW18-002 Total Kjeldahl Nitrogen, mg/l as N
MW18-003B Total Kjeldahl Nitrogen, mg/l as N
MW18-003A Total Kjeldahl Nitrogen, mg/l as N

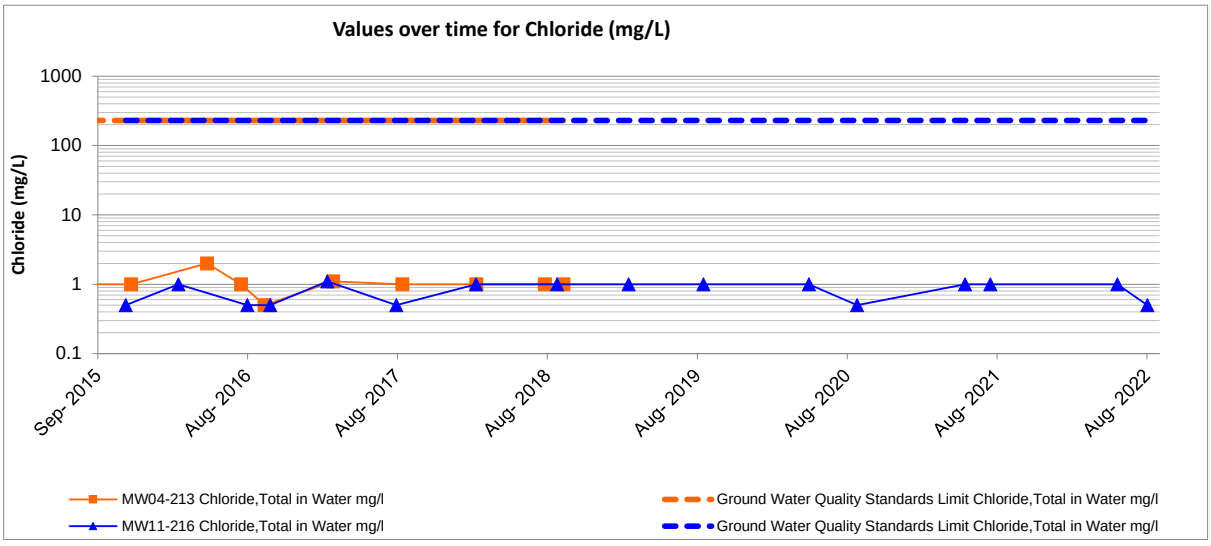

Values over time for Zinc, dissolved (ug/L)
(Zinc is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Axis Title
1000
100
10
1
Oct- 2018
Mar- 2019
Sep- 2019
Mar- 2020
Sep- 2020
Mar- 2021
Sep- 2021
Mar- 2022
Sep- 2022
MW18-001 Zinc, Dissolved (ug/l as Zn)
MW18-002 Zinc, Dissolved (ug/l as Zn)
MW18-003B Zinc, Dissolved (ug/l as Zn)
MW18-003A Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)

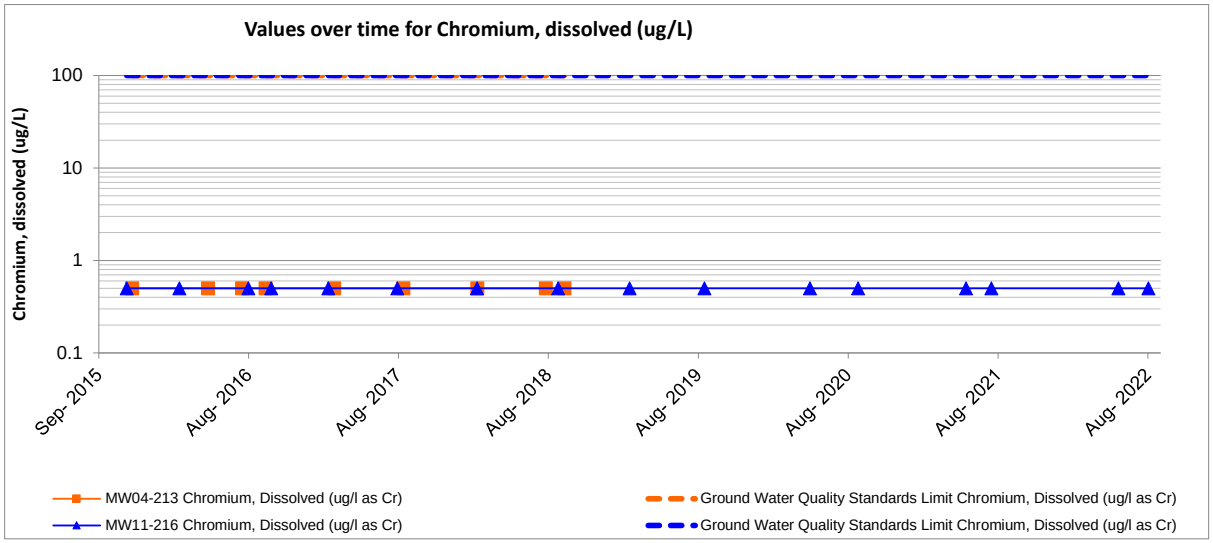
APPENDIX C –

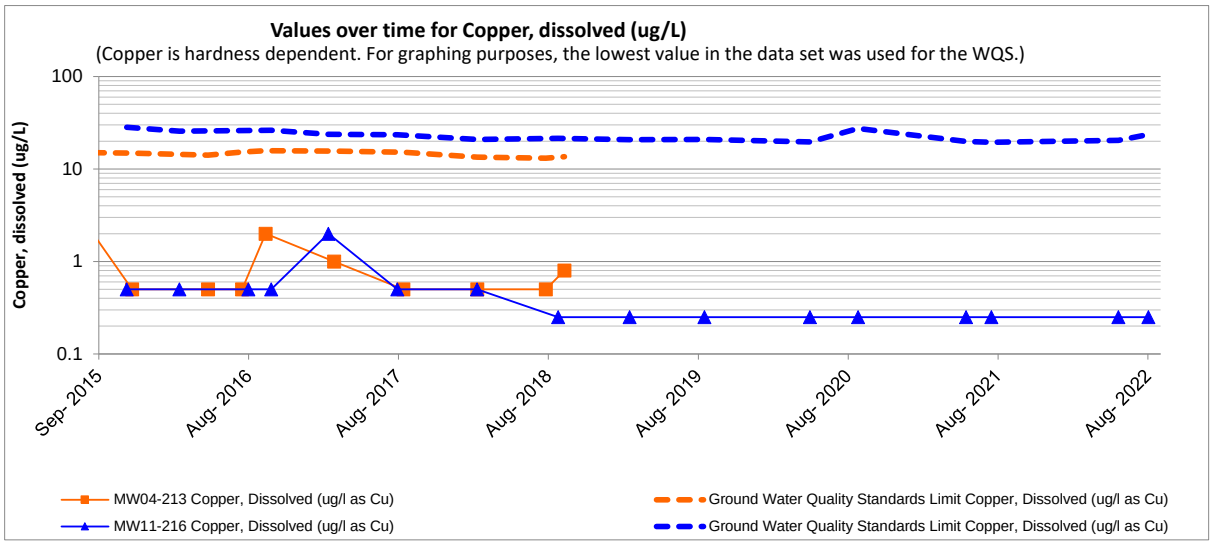
MW11-216 GRAPHS

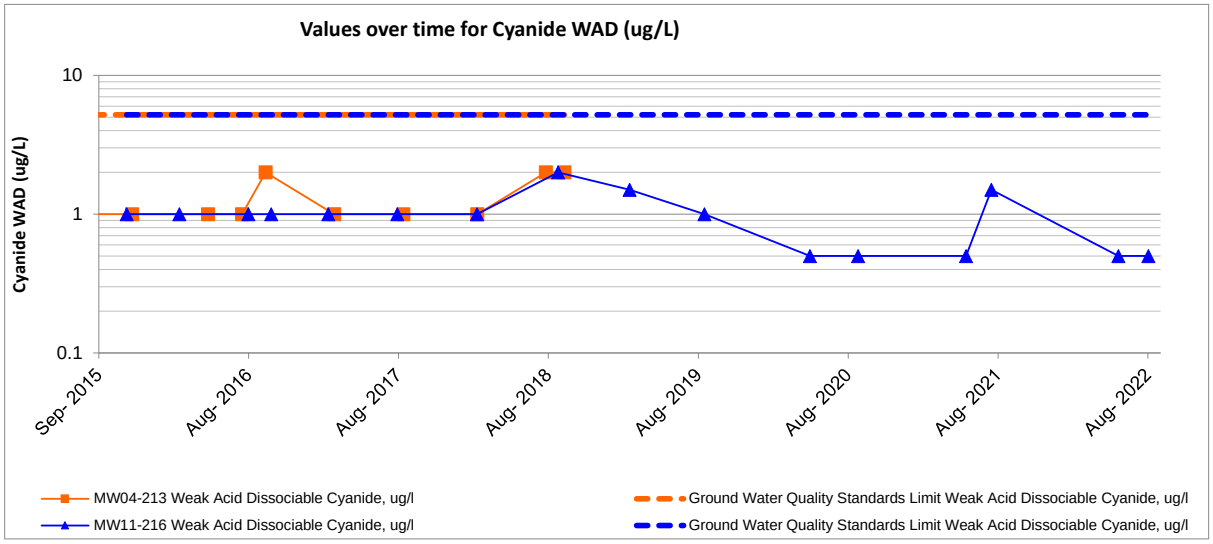

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Arsenic, Dissolved (ug/l as As)
MW11-216 Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards Limit Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards Limit Arsenic, Dissolved (ug/l as As)

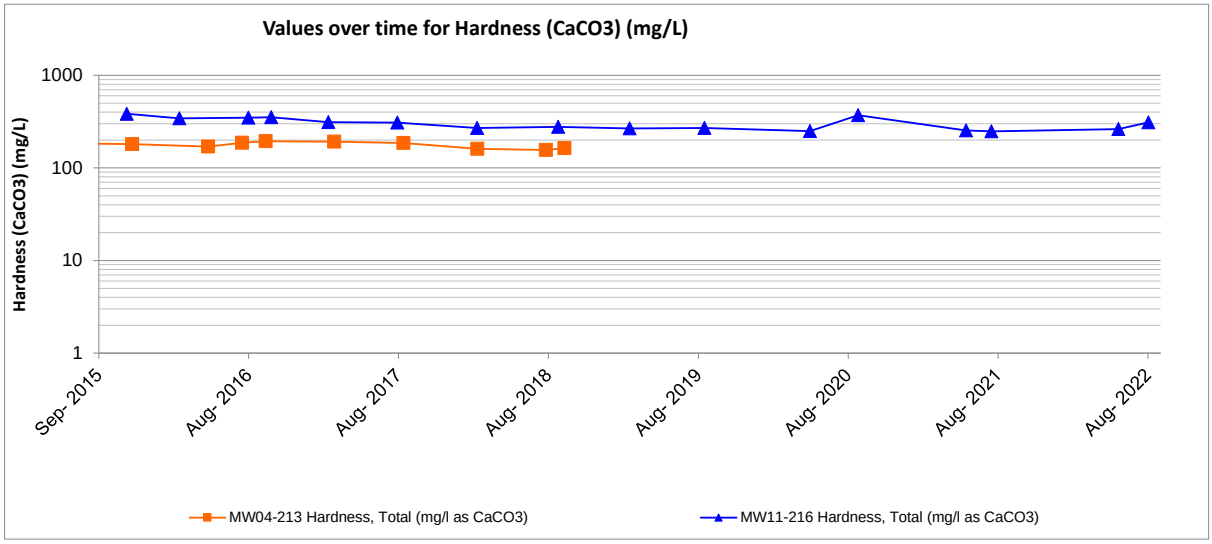

Values over time for Cadmium, dissolved (ug/L)
(Cadmium is hardness dependent. For graphing purposes, the lowest value in the data set was used for the
Cadmium, dissolved (ug/L)
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Cadmium, Dissolved (ug/l as Cd)
MW11-216 Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)

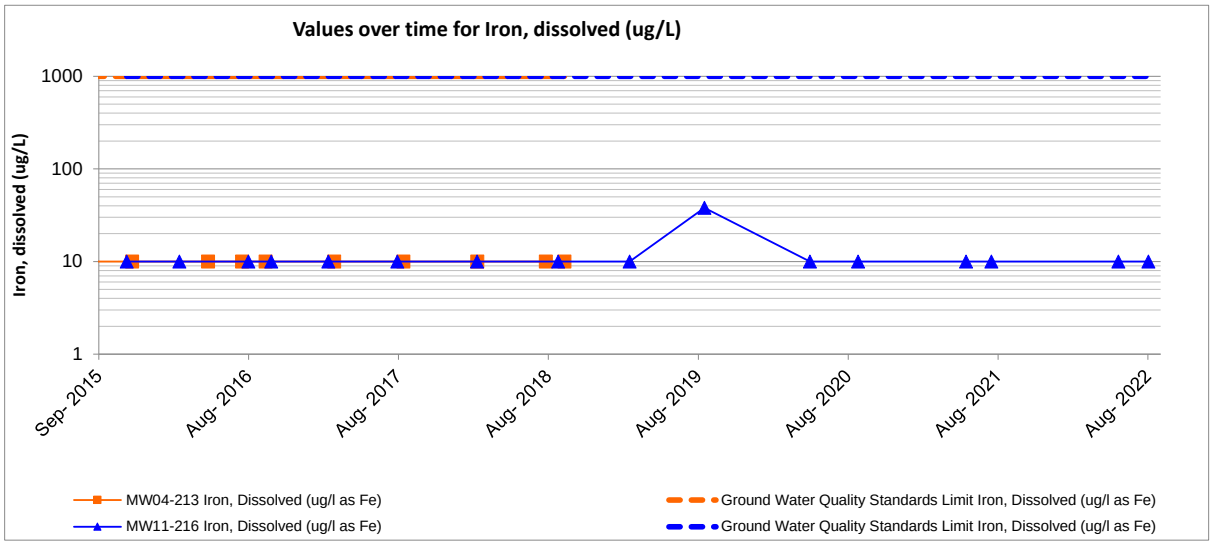

Values over time for Chloride (mg/L)
Chloride (mg/L)
1000
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Chloride,Total in Water mg/l
MW11-216 Chloride,Total in Water mg/l
Ground Water Quality Standards Limit Chloride,Total in Water mg/l
Ground Water Quality Standards Limit Chloride,Total in Water mg/l

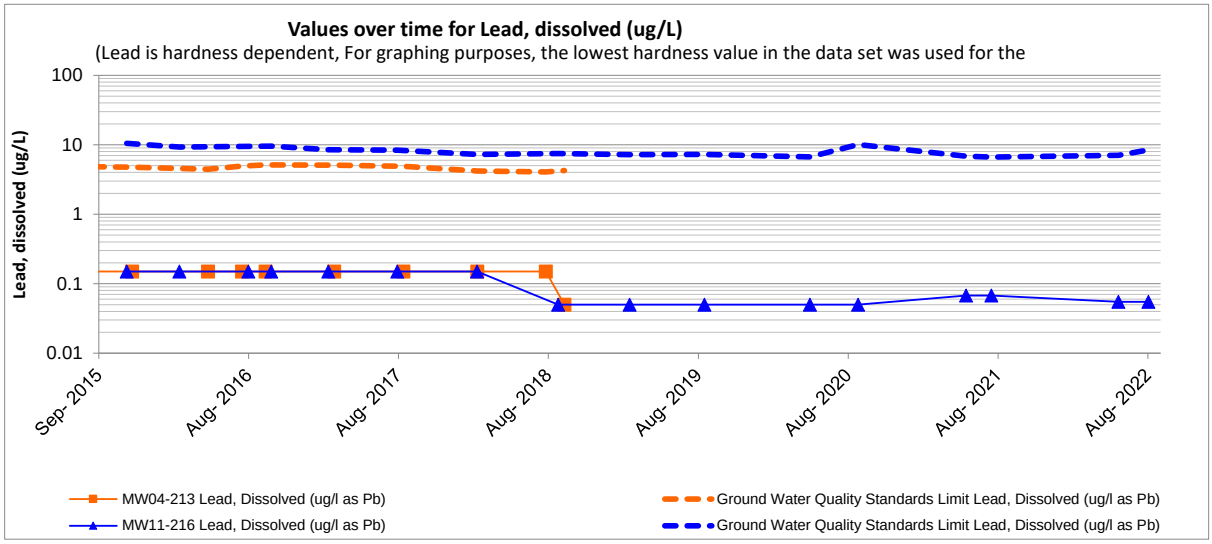

Values over time for Chromium, dissolved (ug/L)
Chromium, dissolved (ug/L)
100
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW04-213 Chromium, Dissolved (ug/l as Cr)
MW11-216 Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)

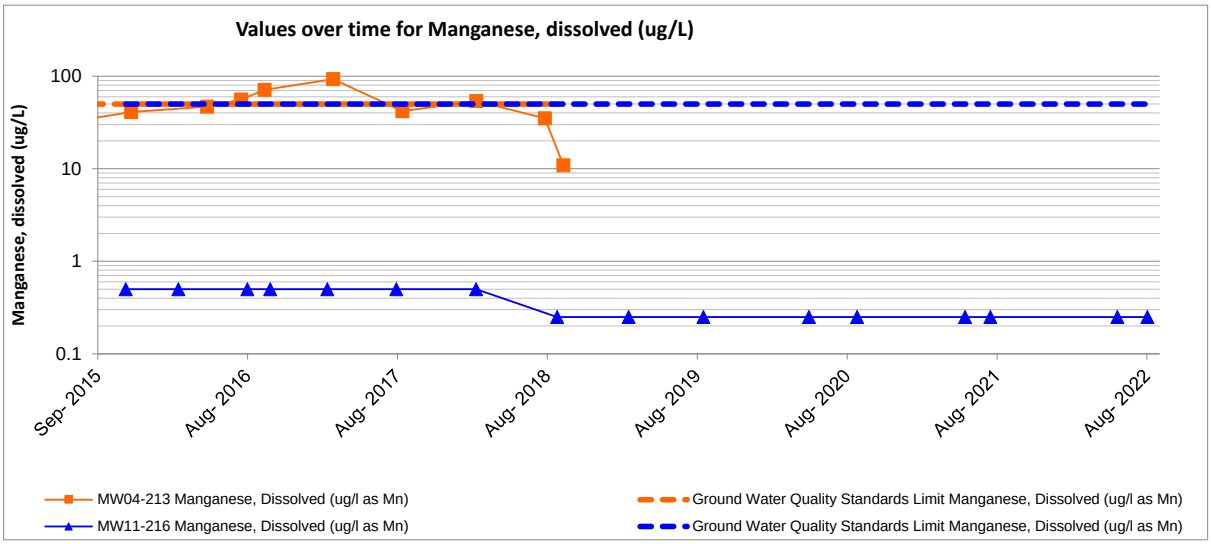

Values over time for Copper, dissolved (ug/L)
(Copper is hardness dependent. For graphing purposes, the lowest value in the data set was used for the WQS.)
Copper, dissolved (ug/L)
100
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW04-213 Copper, Dissolved (ug/l as Cu)
MW11-216 Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)

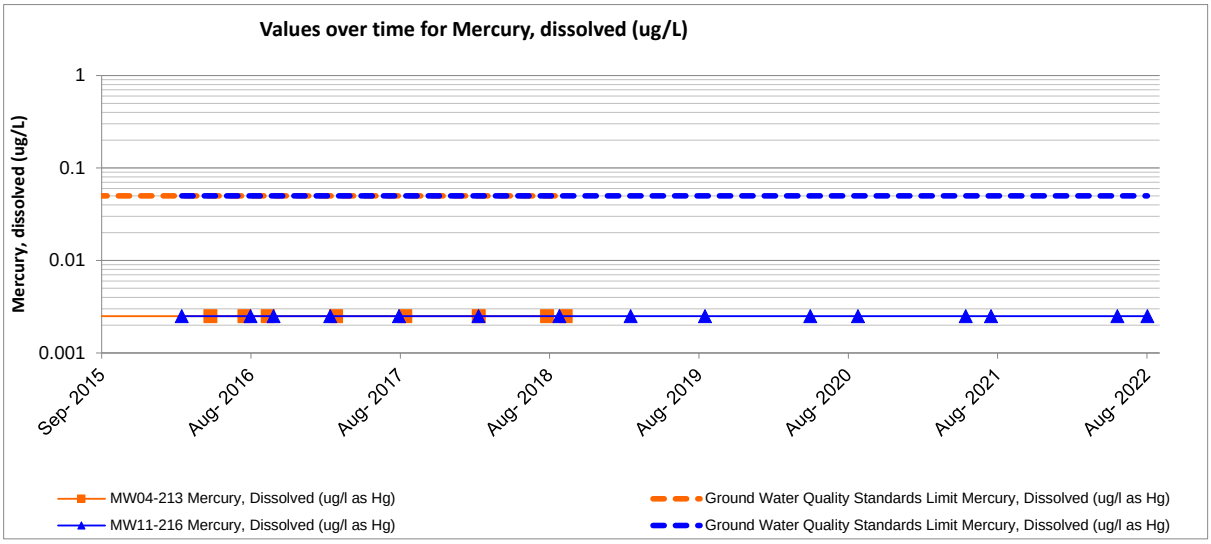

Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW04-213 Weak Acid Dissociable Cyanide, ug/l
MW11-216 Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l

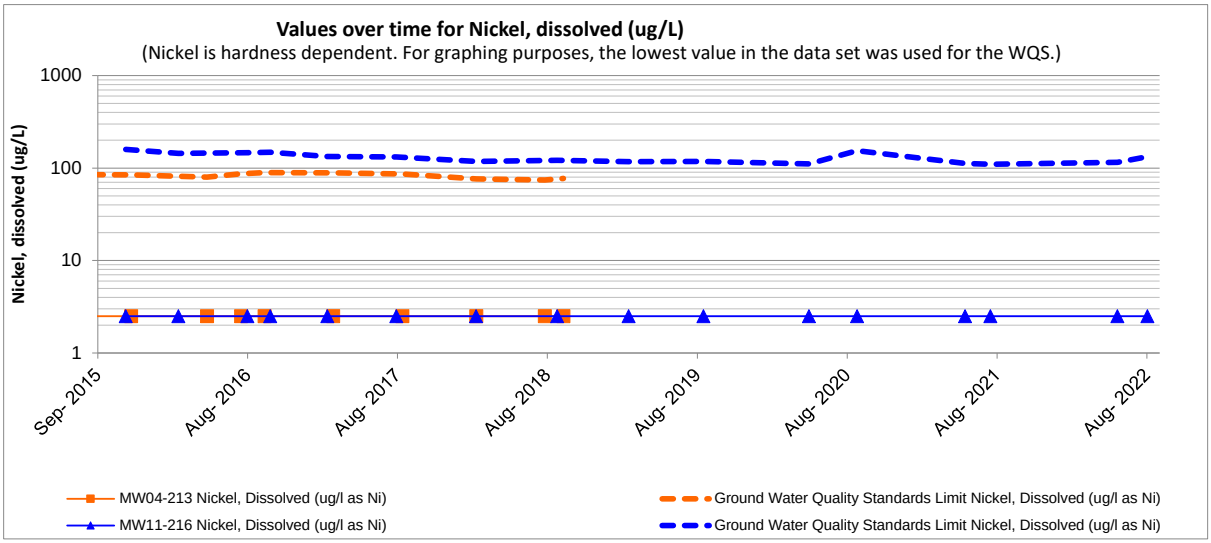

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Hardness, Total (mg/l as CaCO3)
MW11-216 Hardness, Total (mg/l as CaCO3)

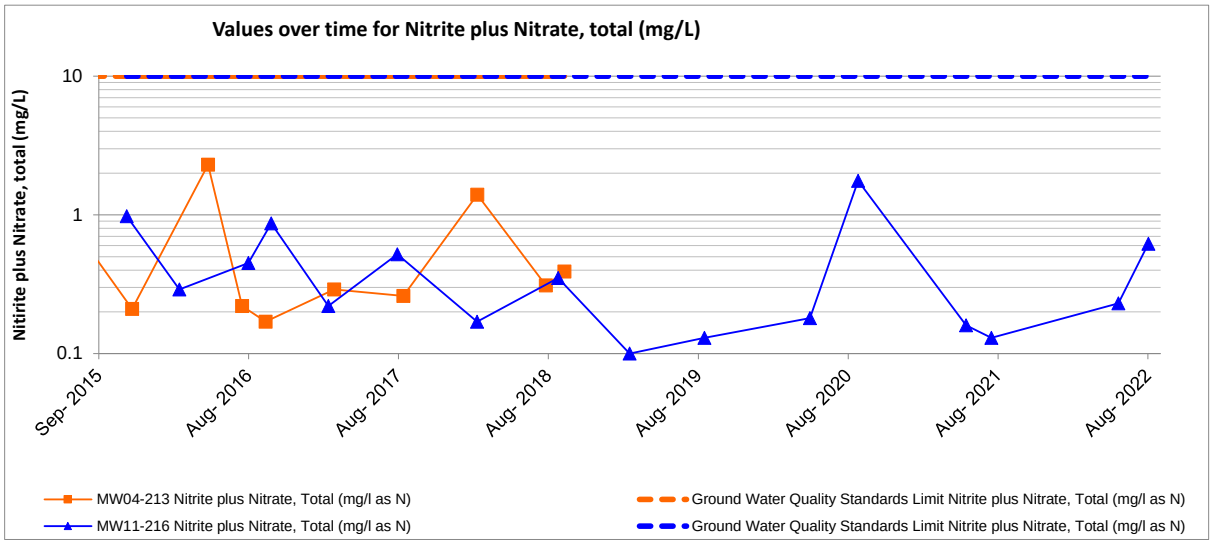

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Iron, Dissolved (ug/l as Fe)
MW11-216 Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)

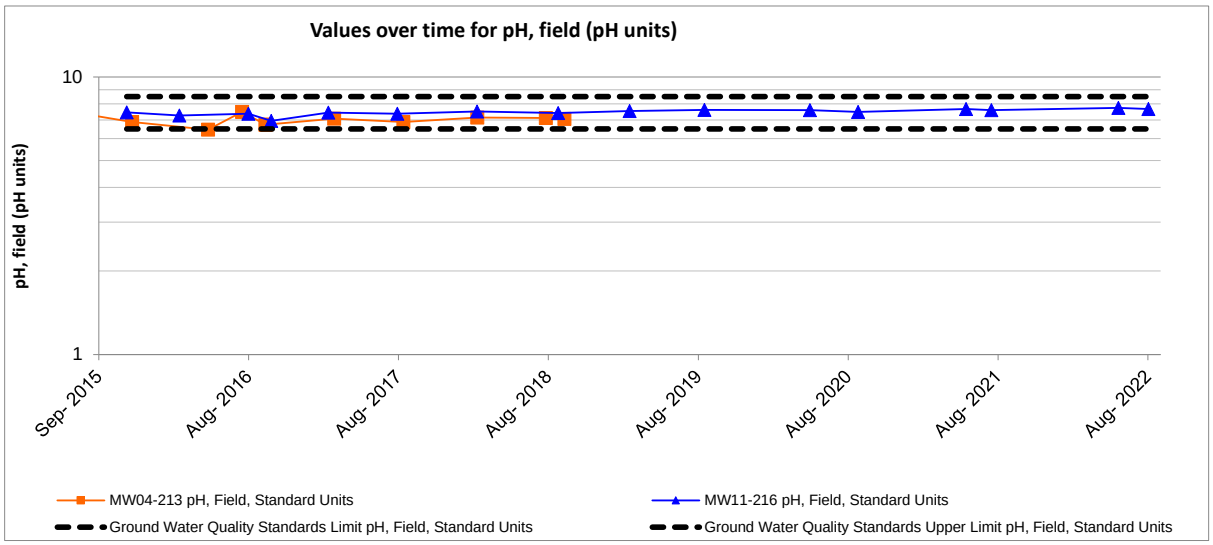

Values over time for Lead, dissolved (ug/L)
(Lead is hardness dependent, For graphing purposes, the lowest hardness value in the data set was used for the
Lead, dissolved (ug/L)
100
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Lead, Dissolved (ug/l as Pb)
MW11-216 Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)

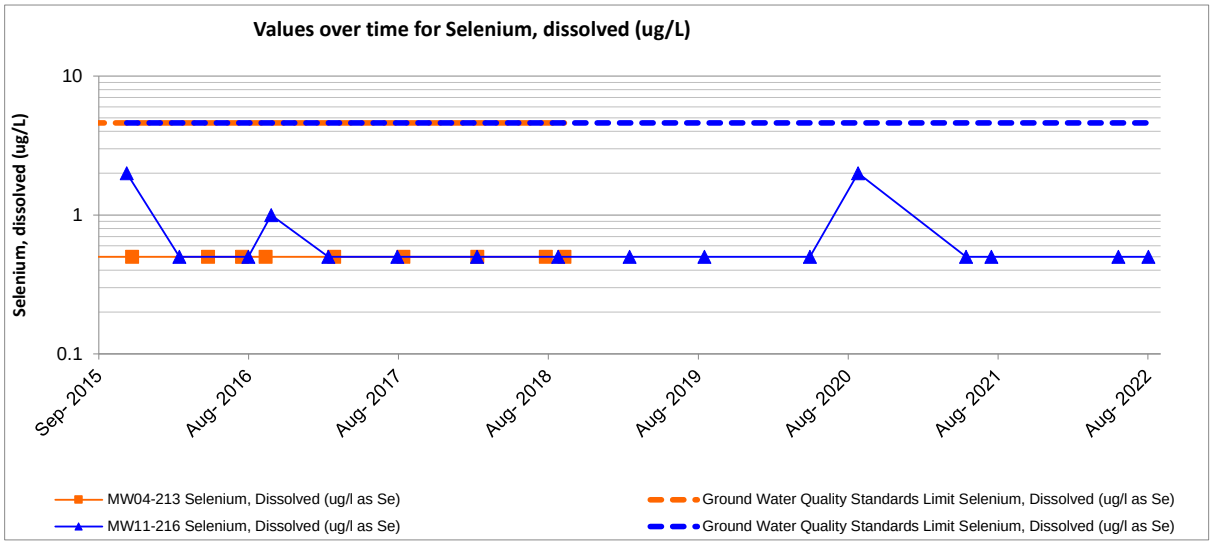

Values over time for Manganese, dissolved (ug/L)
Manganese, dissolved (ug/L)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Manganese, Dissolved (ug/l as Mn)
MW11-216 Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)

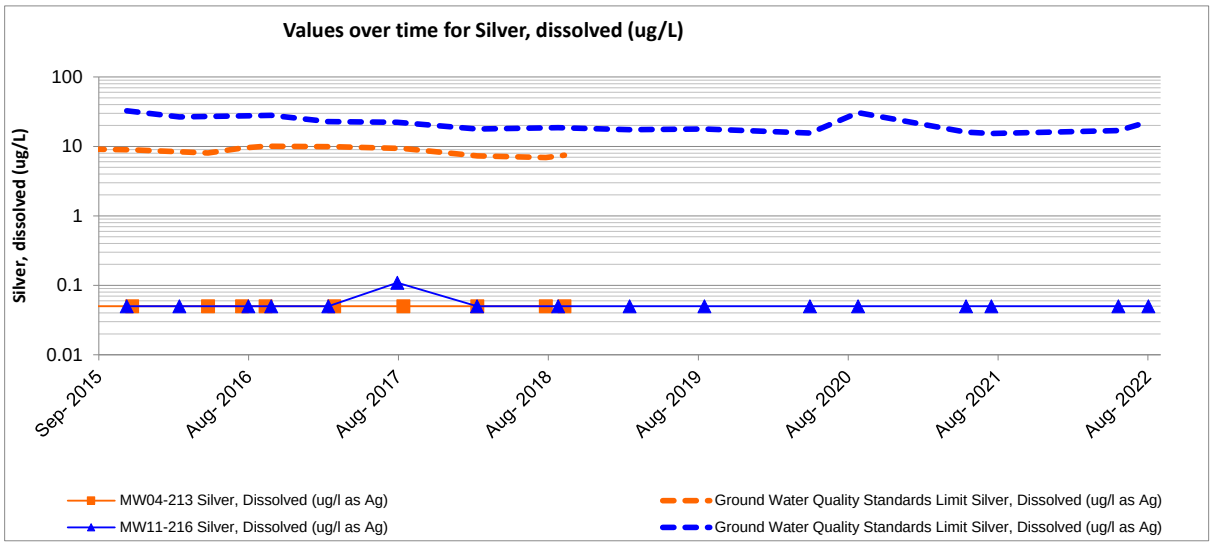

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Mercury, Dissolved (ug/l as Hg)
MW11-216 Mercury, Dissolved (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)

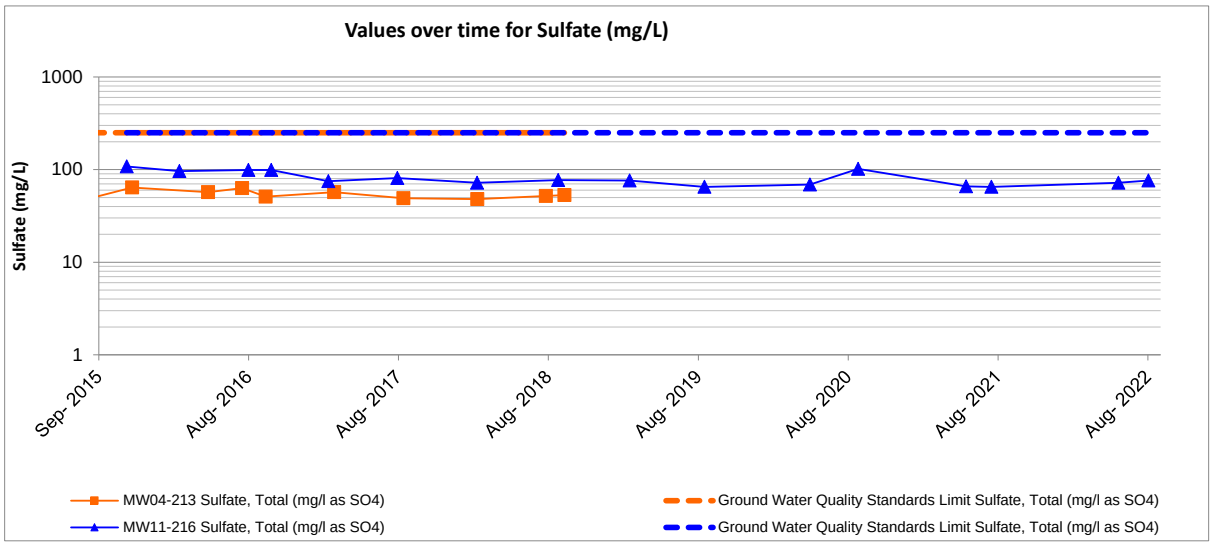

Values over time for Nickel, dissolved (ug/L)
(Nickel is hardness dependent. For graphing purposes, the lowest value in the data set was used for the WQS.)
Nickel, dissolved (ug/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Nickel, Dissolved (ug/l as Ni)
MW11-216 Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)

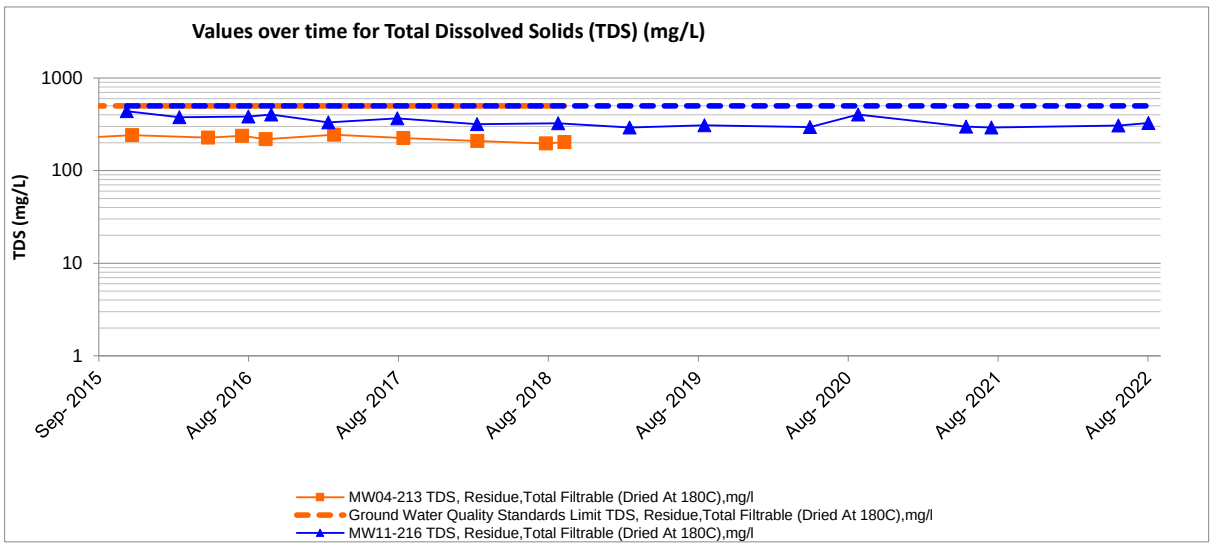

Values over time for Nitrite plus Nitrate, total (mg/L)
Nitirite plus Nitrate, total (mg/L)
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW04-213 Nitrite plus Nitrate, Total (mg/l as N)
MW11-216 Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)

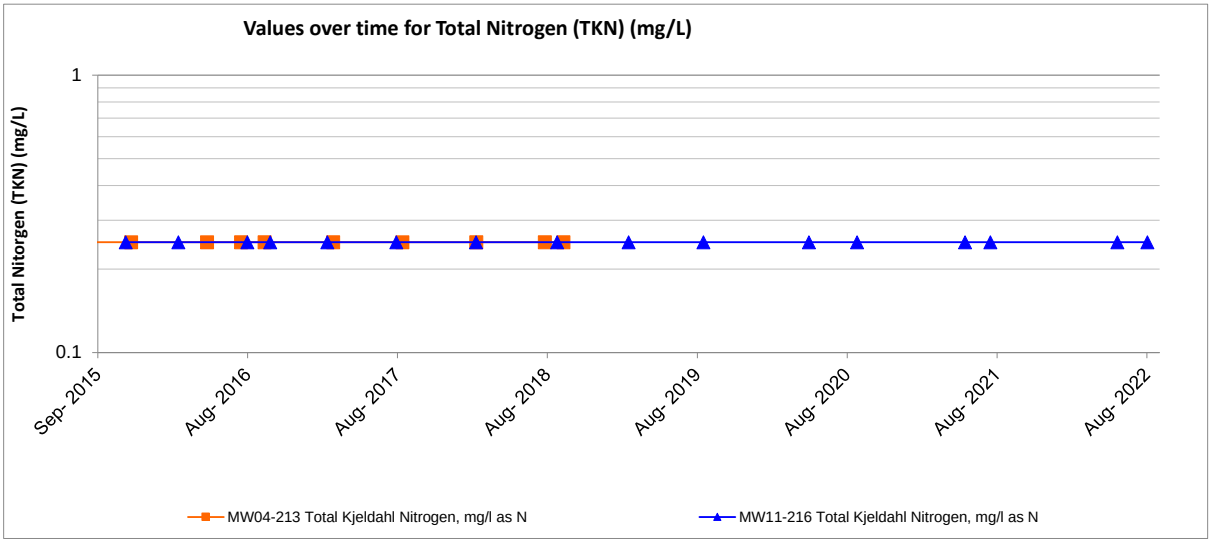

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW04-213 pH, Field, Standard Units
MW11-216 pH, Field, Standard Units
Ground Water Quality Standards Limit pH, Field, Standard Units
Ground Water Quality Standards Upper Limit pH, Field, Standard Units

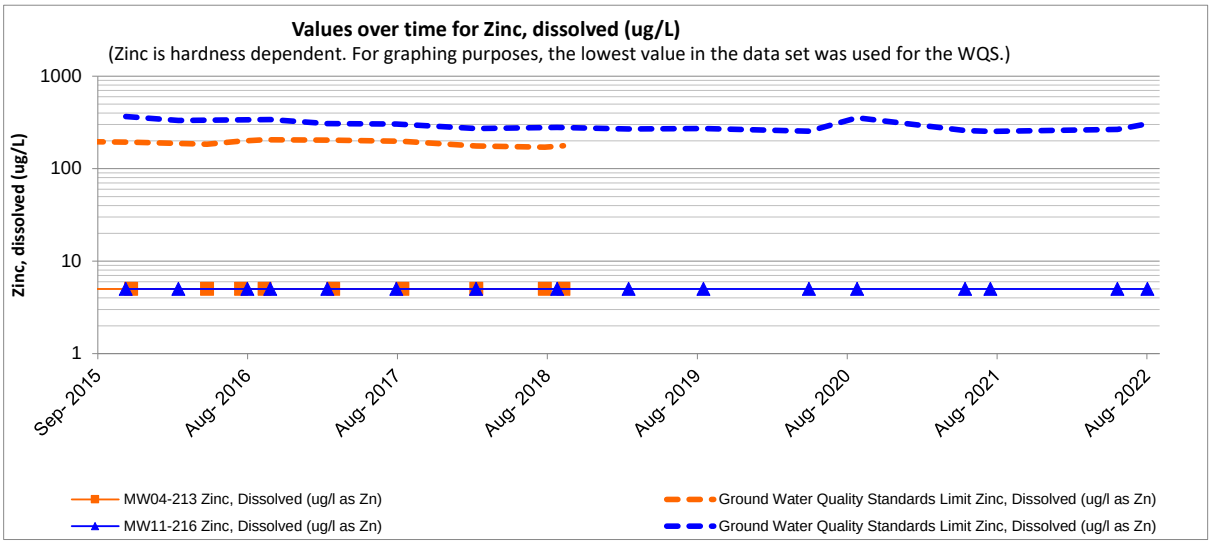

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug/L)
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
MW04-213 Selenium, Dissolved (ug/l as Se)
MW11-216 Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards Limit Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards Limit Selenium, Dissolved (ug/l as Se)


Values over time for Silver, dissolved (ug/L)
Silver, dissolved (ug/L)
100
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Silver, Dissolved (ug/l as Ag)
MW11-216 Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Sulfate, Total (mg/l as SO4)
MW11-216 Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)


Values over time for Total Dissolved Solids (TDS) (mg/L)
TDS (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Ground Water Quality Standards Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW11-216 TDS, Residue,Total Filtrable (Dried At 180C),mg/l

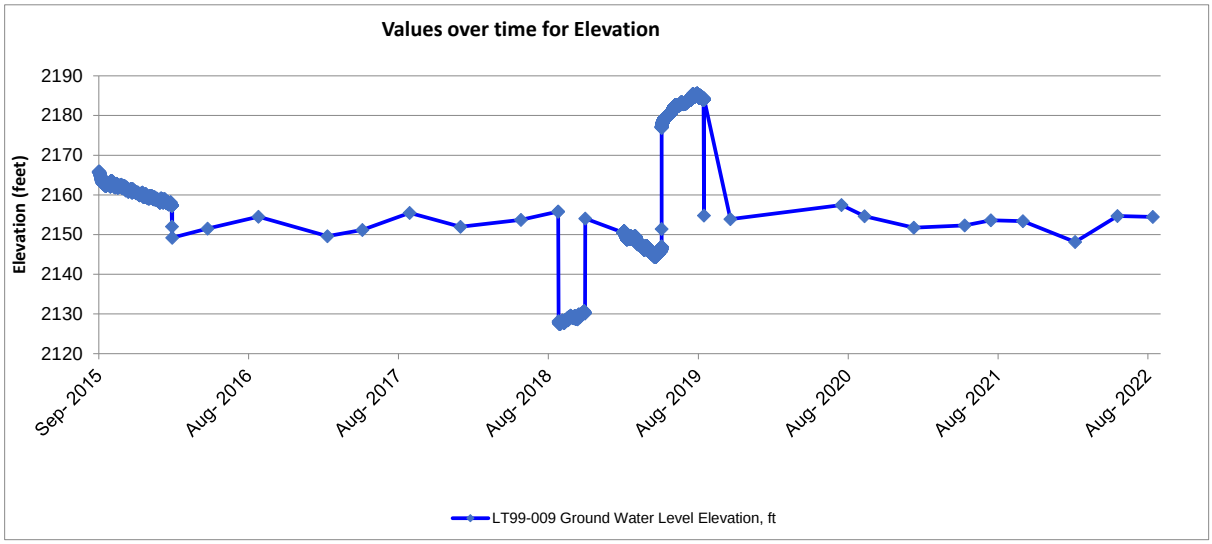

Values over time for Total Nitrogen (TKN) (mg/L)
Total Nitorgen (TKN) (mg/L)
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Total Kjeldahl Nitrogen, mg/l as N
MW11-216 Total Kjeldahl Nitrogen, mg/l as N

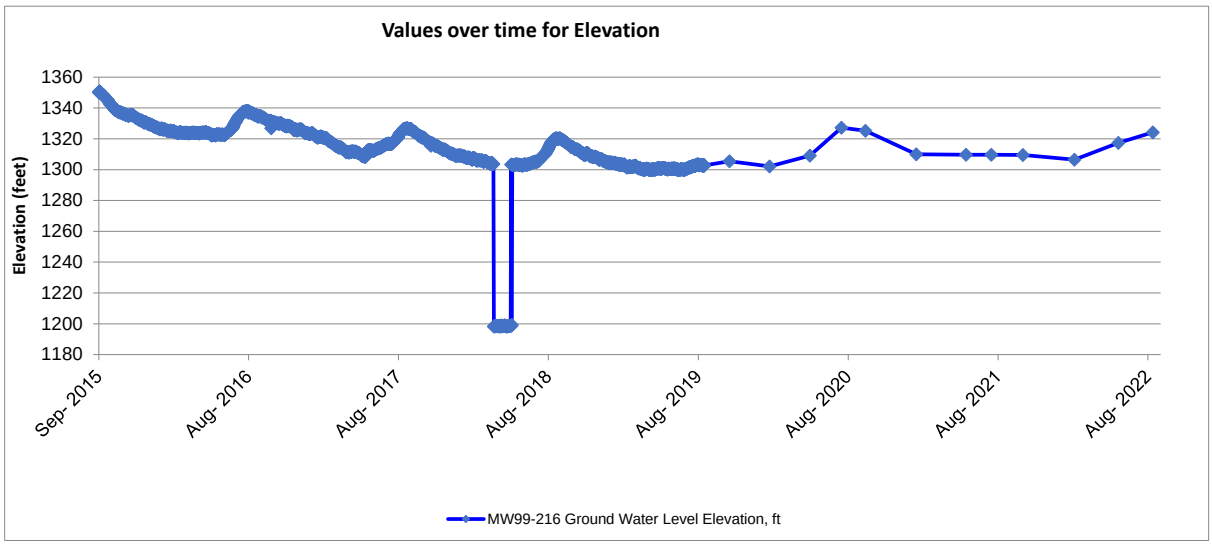

Values over time for Zinc, dissolved (ug/L)
(Zinc is hardness dependent. For graphing purposes, the lowest value in the data set was used for the WQS.)
Zinc, dissolved (ug/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW04-213 Zinc, Dissolved (ug/l as Zn)
MW11-216 Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)

APPENDIX C –

MW99-216 AND LT99-009

GROUNDWATER ELEVATION GRAPHS

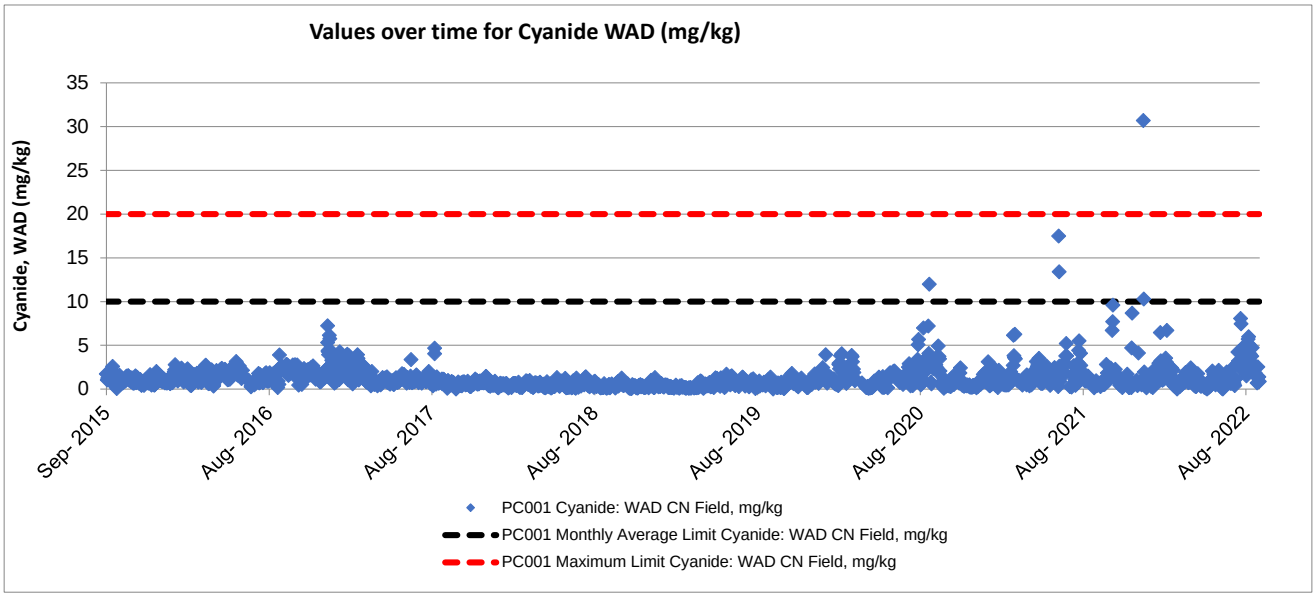

Values over time for Elevation
Elevation (feet)
2190
2180
2170
2160
2150
2140
2130
2120
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
LT99-009 Ground Water Level Elevation, ft


Values over time for Elevation
Elevation (feet)
1360
1340
1320
1300
1280
1260
1240
1220
1200
1180
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
MW99-216 Ground Water Level Elevation, ft

NORTHERN STAR
RESOURCES LIMITED

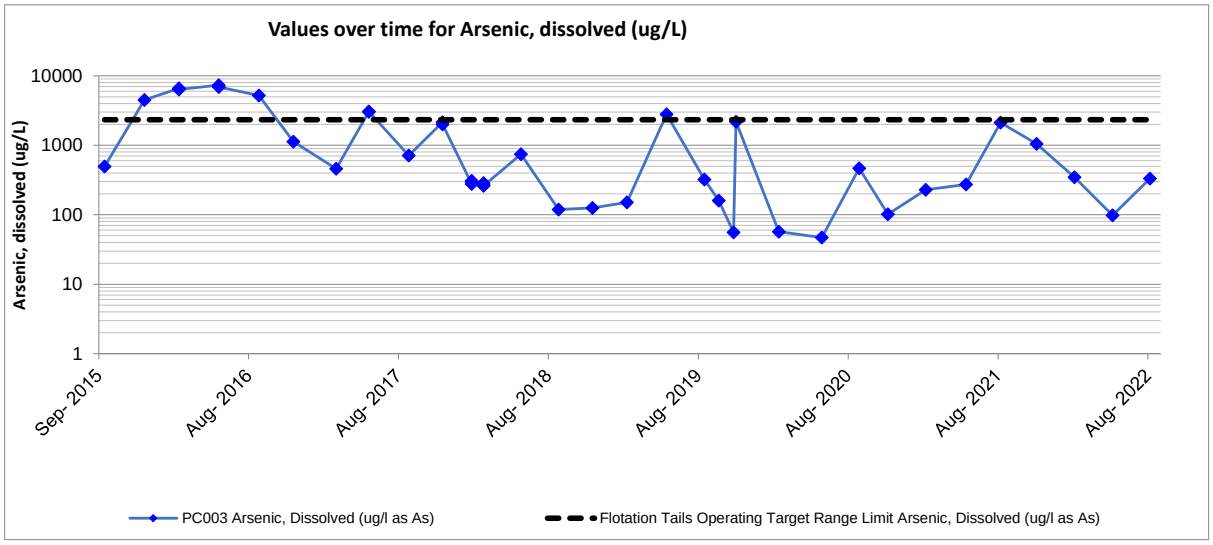
APPENDIX C –

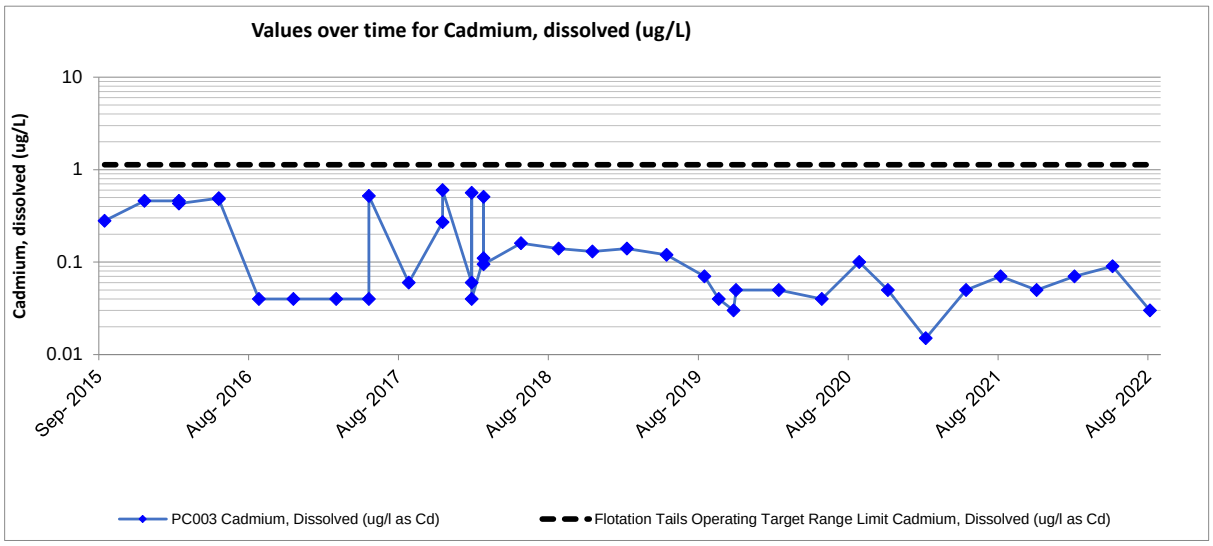
PC001 GRAPH

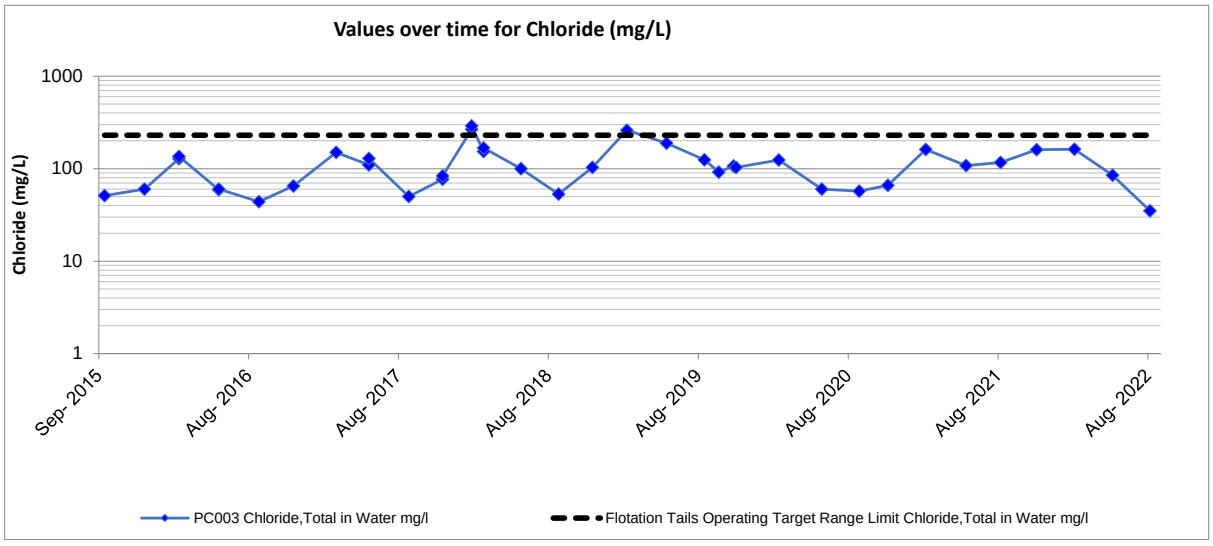

Values over time for Cyanide WAD (mg/kg)
Cyanide, WAD (mg/kg)
35
30
25
20
15
10
5
0
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC001 Cyanide: WAD CN Field, mg/kg
PC001 Monthly Average Limit Cyanide: WAD CN Field, mg/kg
PC001 Maximum Limit Cyanide: WAD CN Field, mg/kg

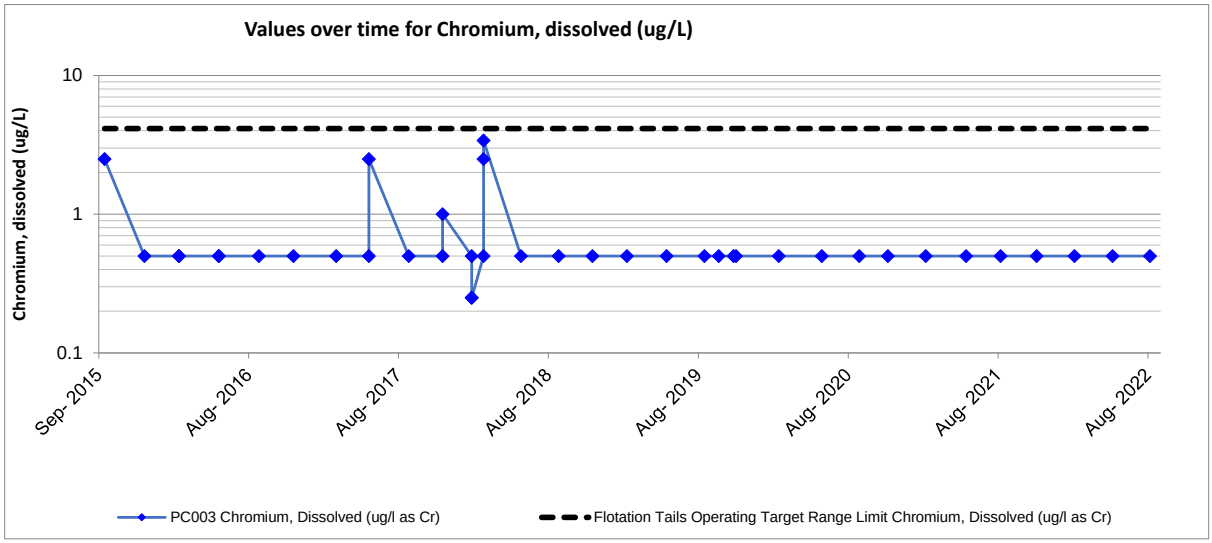
APPENDIX C –

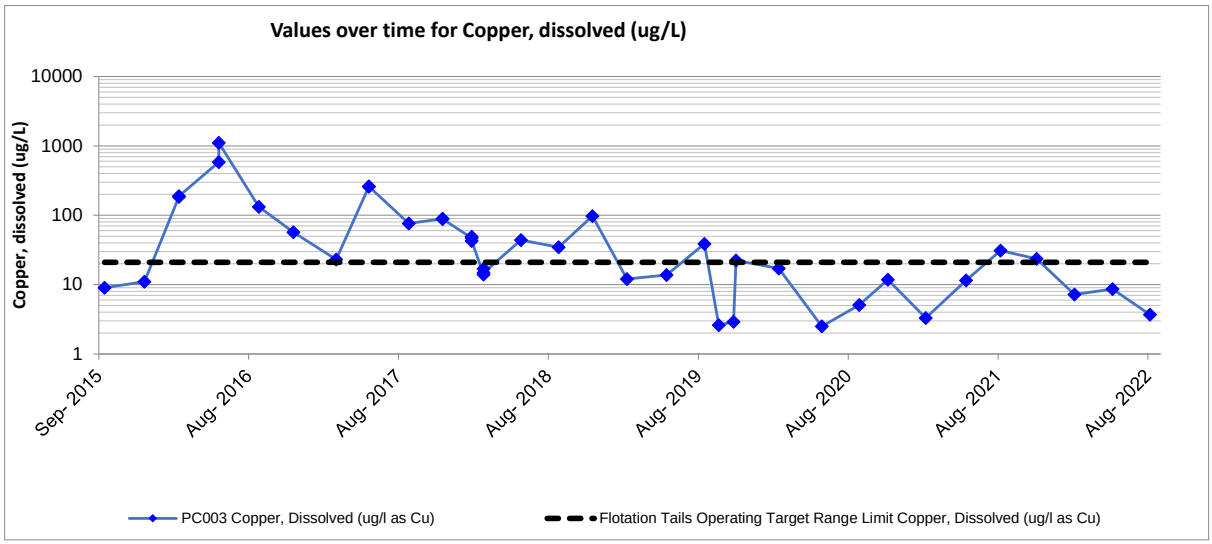
PC003 INTERSTITIAL WATER GRAPHS

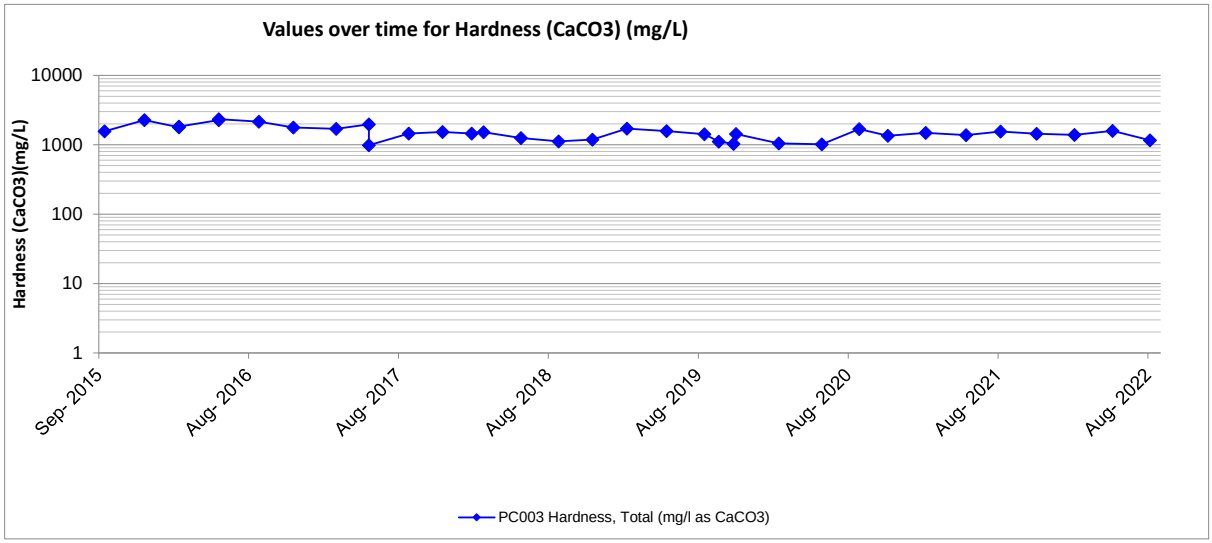

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
10000
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Arsenic, Dissolved (ug/l as As)
Flotation Tails Operating Target Range Limit Arsenic, Dissolved (ug/l as As)

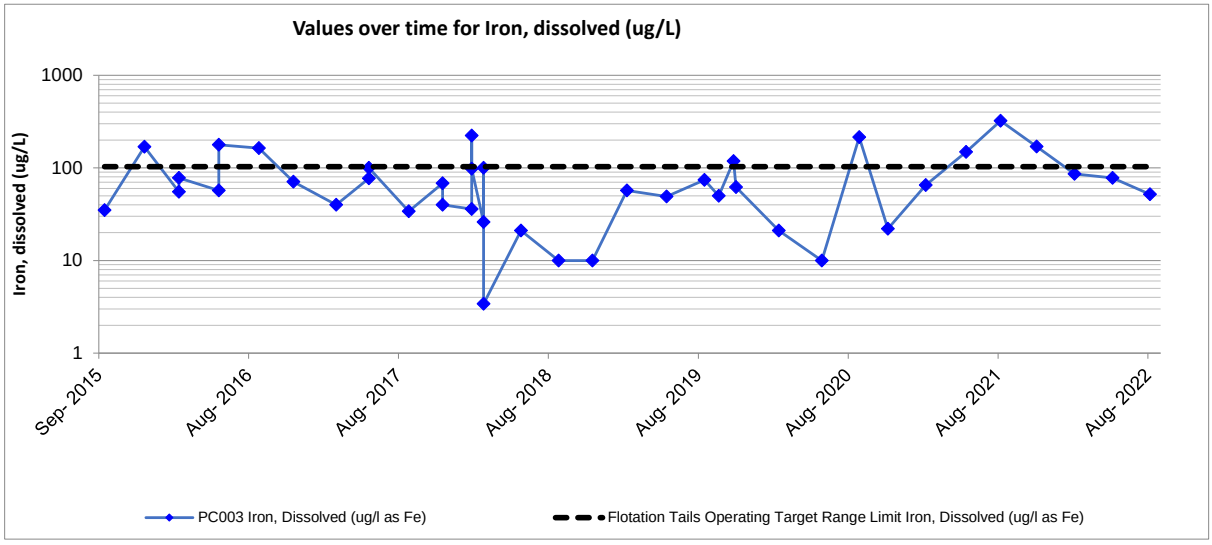

Values over time for Cadmium, dissolved (ug/L)
Cadmium, dissolved (ug/L)
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Cadmium, Dissolved (ug/l as Cd)
Flotation Tails Operating Target Range Limit Cadmium, Dissolved (ug/l as Cd)

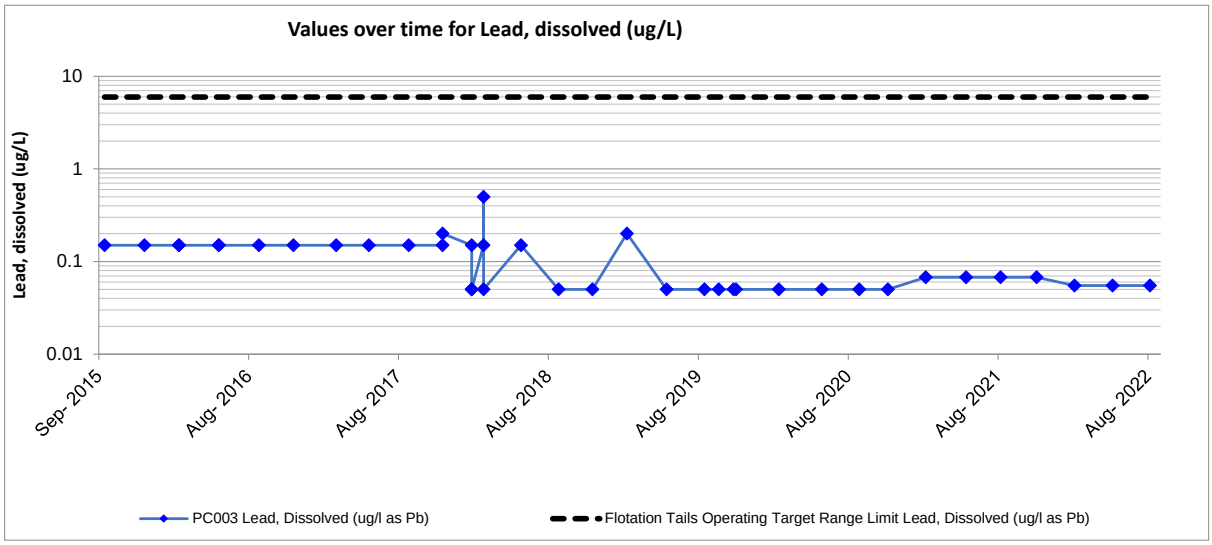

Values over time for Chloride (mg/L)
Chloride (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Chloride,Total in Water mg/l
Flotation Tails Operating Target Range Limit Chloride,Total in Water mg/l

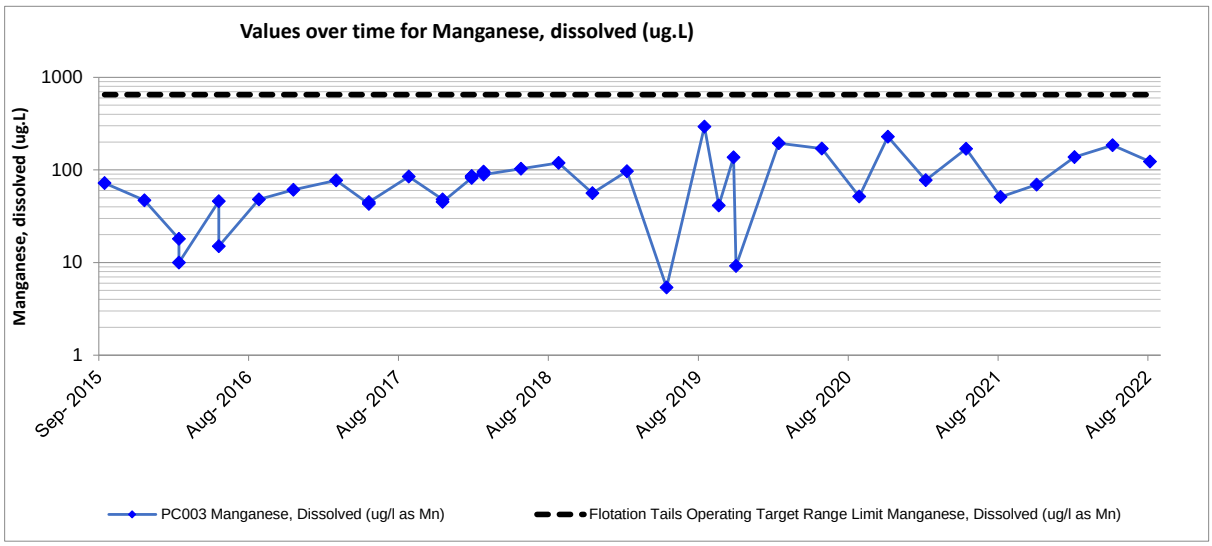

Values over time for Chromium, dissolved (ug/L)
Chromium, dissolved (ug/L)
10
1
0.1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC003 Chromium, Dissolved (ug/l as Cr)
Flotation Tails Operating Target Range Limit Chromium, Dissolved (ug/l as Cr)

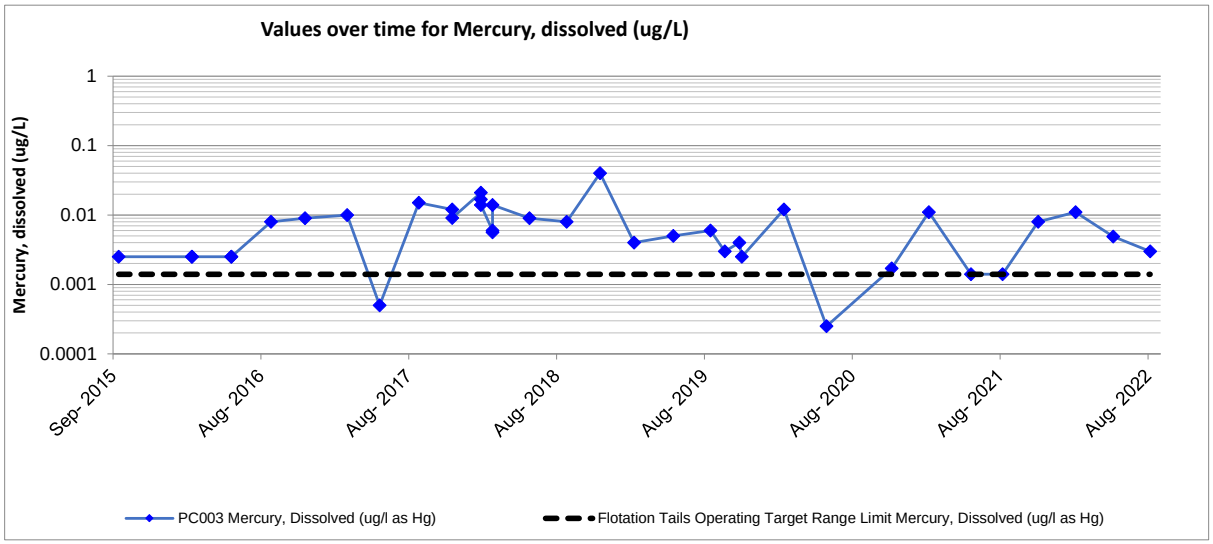

Values over time for Copper, dissolved (ug/L)
Copper, dissolved (ug/L)
10000
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC003 Copper, Dissolved (ug/l as Cu)
Flotation Tails Operating Target Range Limit Copper, Dissolved (ug/l as Cu)

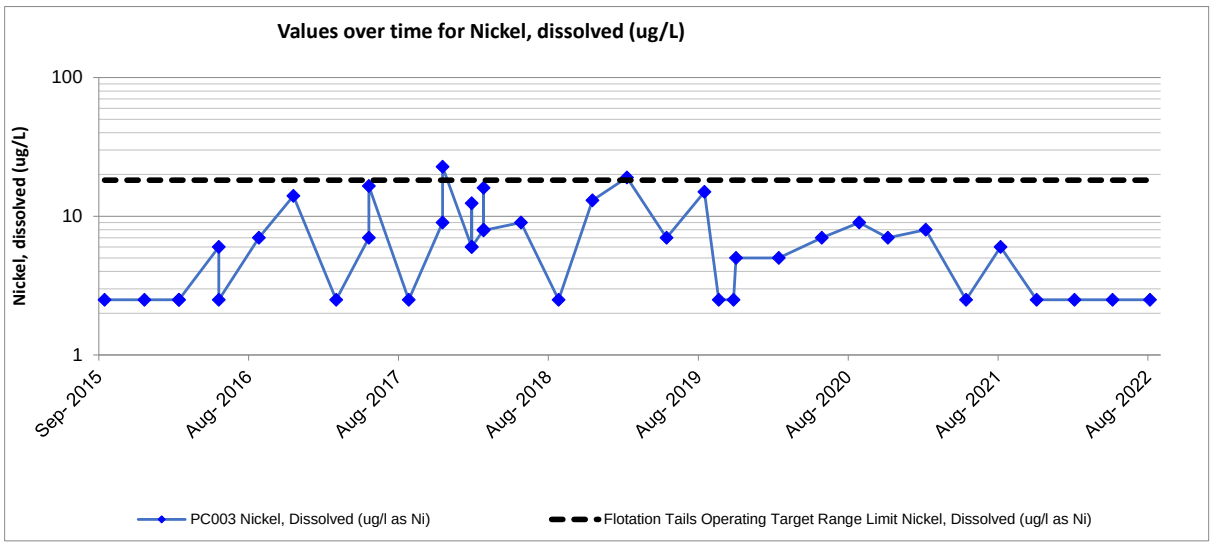

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3)(mg/L)
10000
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC003 Hardness, Total (mg/l as CaCO3)

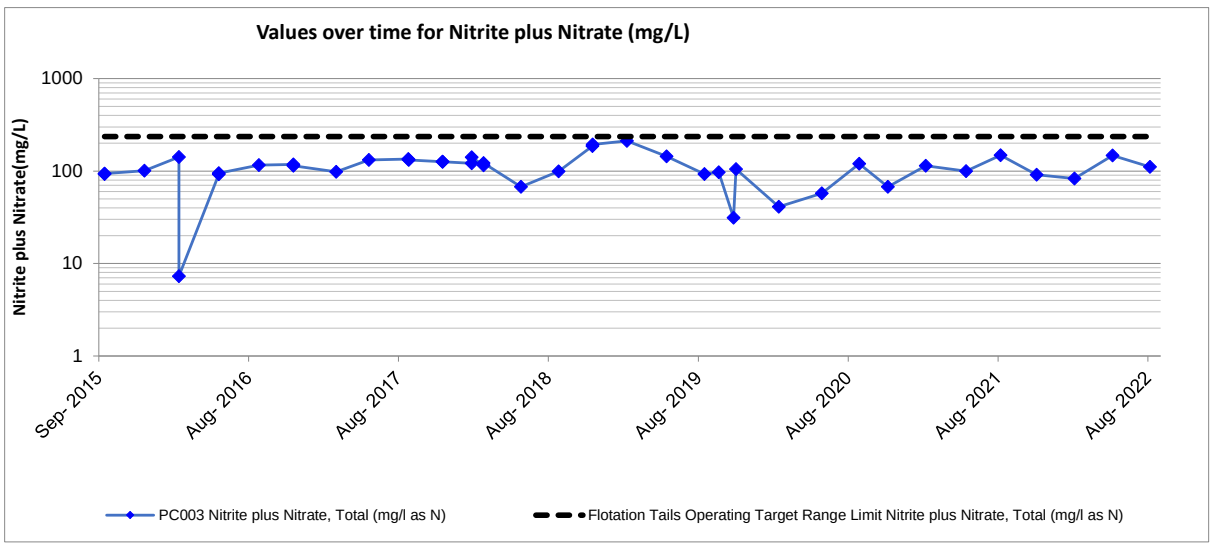

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Iron, Dissolved (ug/l as Fe)
Flotation Tails Operating Target Range Limit Iron, Dissolved (ug/l as Fe)

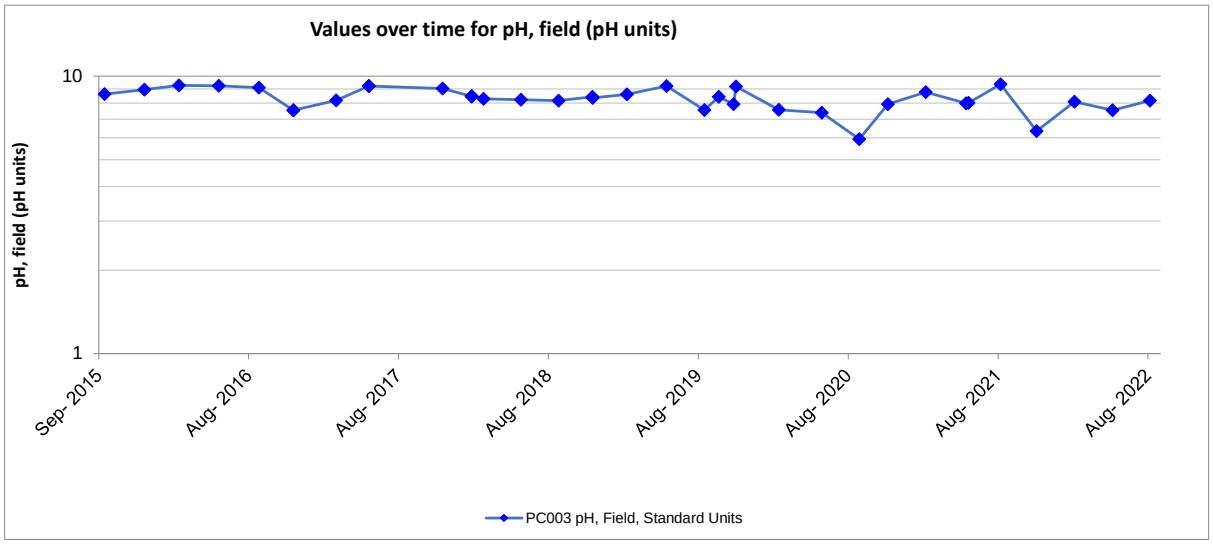

Values over time for Lead, dissolved (ug/L)
Lead, dissolved (ug/L)
10
1
0.1
0.01
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Lead, Dissolved (ug/l as Pb)
Flotation Tails Operating Target Range Limit Lead, Dissolved (ug/l as Pb)

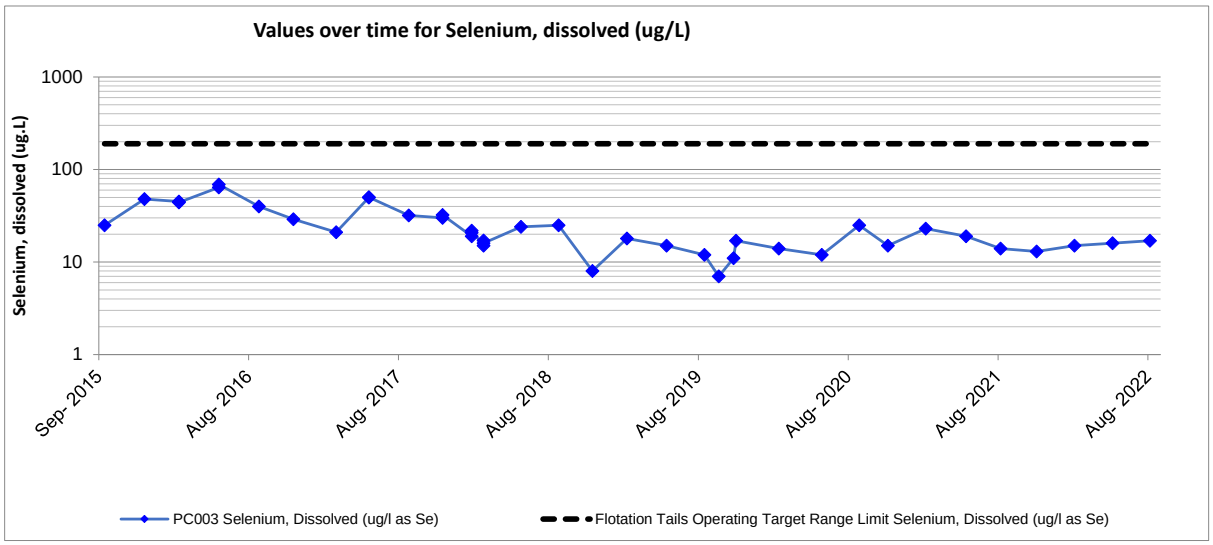

Values over time for Manganese, dissolved (ug.L)
Manganese, dissolved (ug.L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Manganese, Dissolved (ug/l as Mn)
Flotation Tails Operating Target Range Limit Manganese, Dissolved (ug/l as Mn)

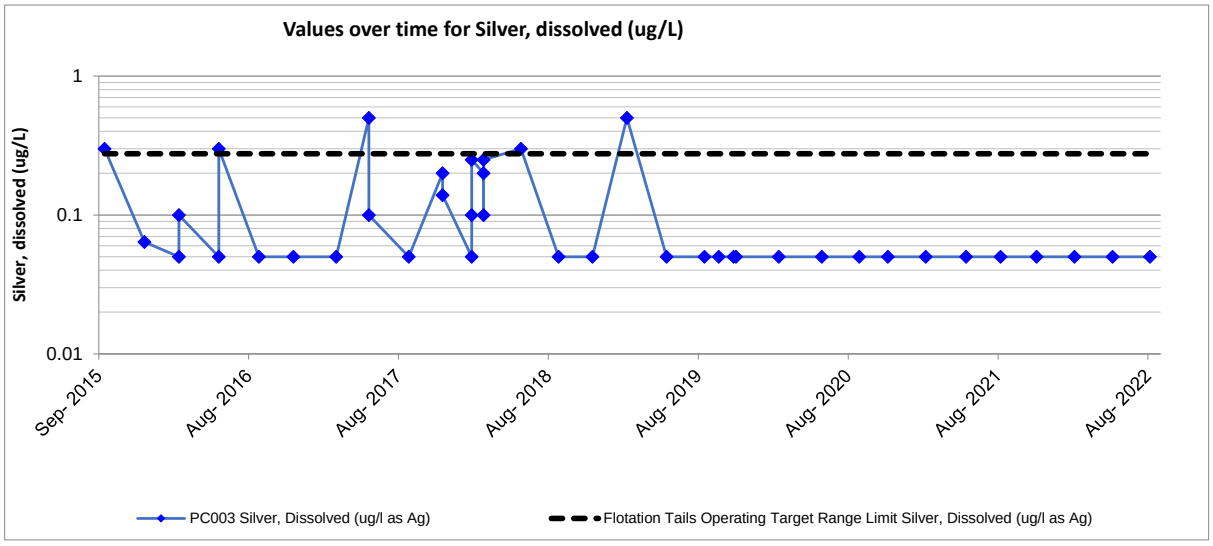

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
0.0001
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC003 Mercury, Dissolved (ug/l as Hg)
Flotation Tails Operating Target Range Limit Mercury, Dissolved (ug/l as Hg)

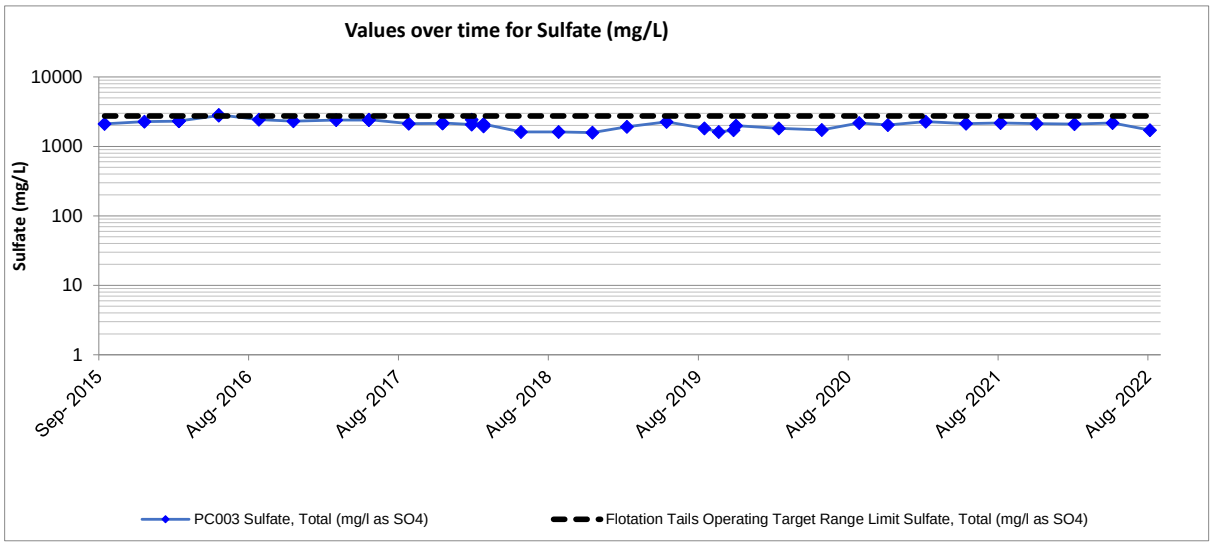

Values over time for Nickel, dissolved (ug/L)
Nickel, dissolved (ug/L)
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC003 Nickel, Dissolved (ug/l as Ni)
Flotation Tails Operating Target Range Limit Nickel, Dissolved (ug/l as Ni)

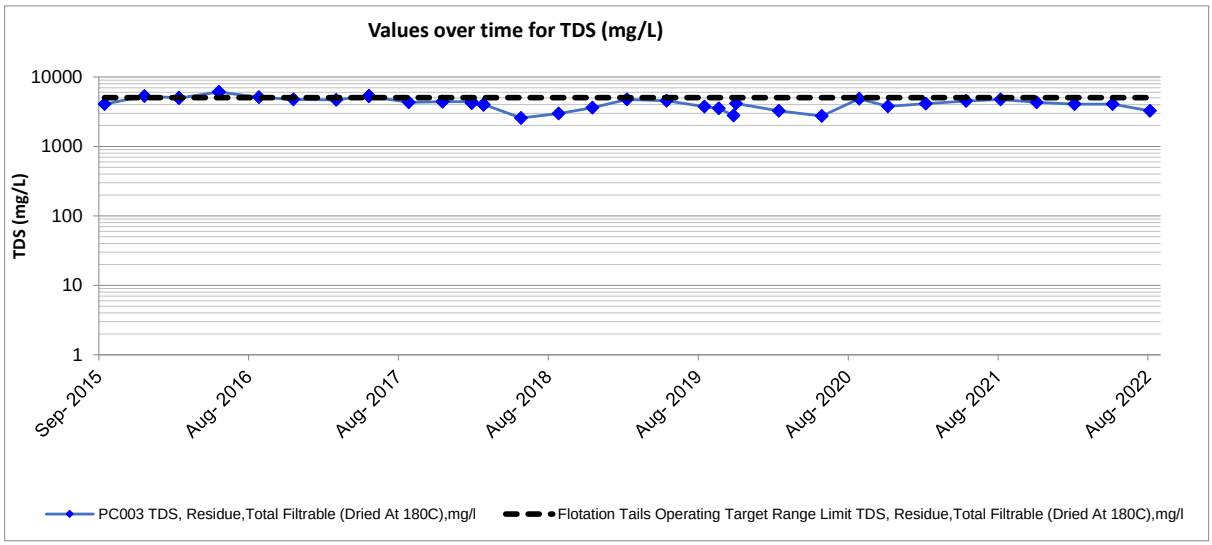

Values over time for Nitrite plus Nitrate (mg/L)
Nitrite plus Nitrate(mg/L)
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC003 Nitrite plus Nitrate, Total (mg/l as N)
Flotation Tails Operating Target Range Limit Nitrite plus Nitrate, Total (mg/l as N)

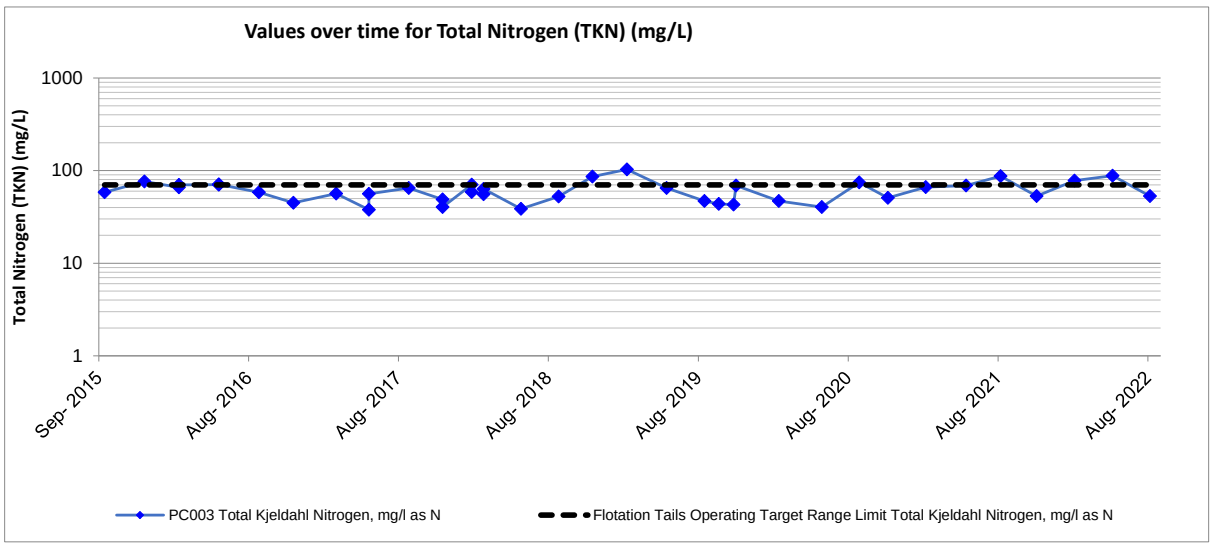

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC003 pH, Field, Standard Units

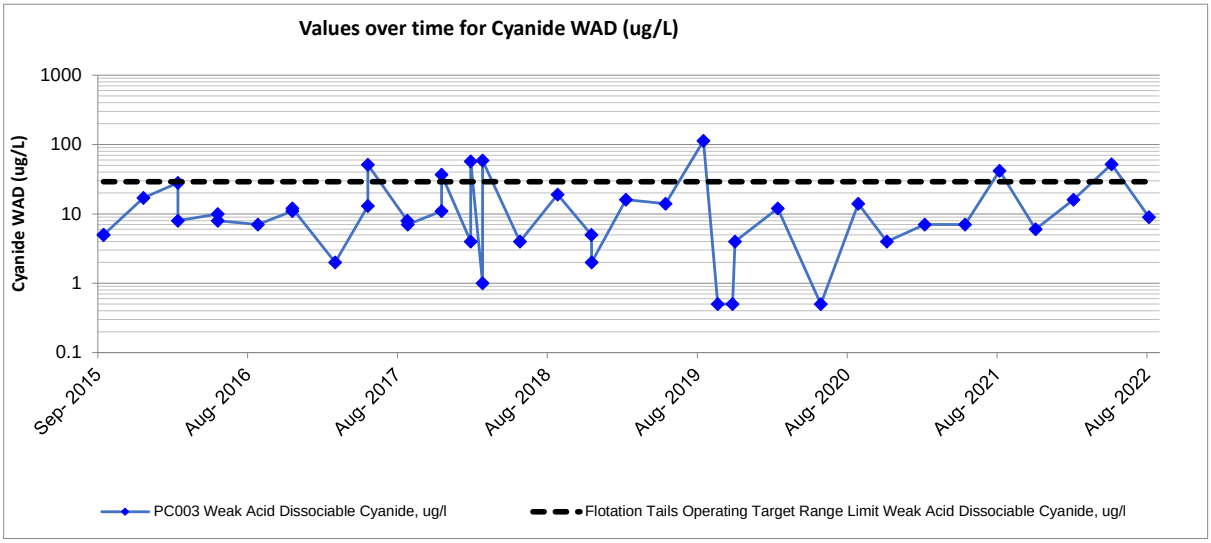

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug.L)
1000
100
10
1
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC003 Selenium, Dissolved (ug/l as Se)
Flotation Tails Operating Target Range Limit Selenium, Dissolved (ug/l as Se)

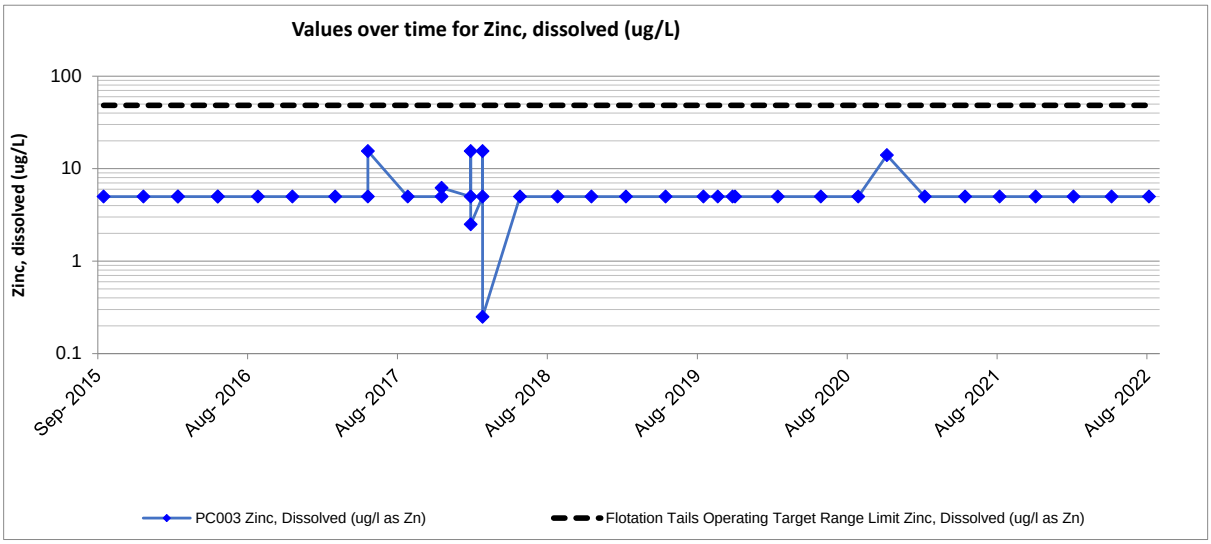

Values over time for Silver, dissolved (ug/L)
Silver, dissolved (ug/L)
1
0.1
0.01
Sep-2015
Aug-2016
Aug-2017
Aug-2018
Aug-2019
Aug-2020
Aug-2021
Aug-2022
PC003 Silver, Dissolved (ug/l as Ag)
Flotation Tails Operating Target Range Limit Silver, Dissolved (ug/l as Ag)


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
10000
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Sulfate, Total (mg/l as SO4)
Flotation Tails Operating Target Range Limit Sulfate, Total (mg/l as SO4)


Values over time for TDS (mg/L)
TDS (mg/L)
10000
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Flotation Tails Operating Target Range Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l


Values over time for Total Nitrogen (TKN) (mg/L)
Total Nitrogen (TKN) (mg/L)
1000
100
10
1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Total Kjeldahl Nitrogen, mg/l as N
Flotation Tails Operating Target Range Limit Total Kjeldahl Nitrogen, mg/l as N


Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
1000
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Weak Acid Dissociable Cyanide, ug/l
Flotation Tails Operating Target Range Limit Weak Acid Dissociable Cyanide, ug/l


Values over time for Zinc, dissolved (ug/L)
Zinc, dissolved (ug/L)
100
10
1
0.1
Sep- 2015
Aug- 2016
Aug- 2017
Aug- 2018
Aug- 2019
Aug- 2020
Aug- 2021
Aug- 2022
PC003 Zinc, Dissolved (ug/l as Zn)
Flotation Tails Operating Target Range Limit Zinc, Dissolved (ug/l as Zn)

APPENDIX D –

2022 WHOLE EFFLUENT TOXICITY TESTING

WET LABORATORY REPORTS

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A, Fort Collins, Colorado, 80524

T 970.416.0916 F 970.490.2963

July 13, 2022

Mr. Nathan Kehoe
Northern Star Resources Limited
Pogo Operations
P.O. Box 145
Delta Junction, Alaska 99737

RE: Results of WET test – June 2022

Dear Mr. Kehoe,

Attached is a copy of the report for the *Pimephales promelas* (fathead minnow) toxicity test initiated in June 2022 with effluent from your facility.

TRE Environmental Strategies, LLC greatly appreciates this opportunity to provide our services to you. Please do not hesitate to call if you have any questions.

Sincerely,

Whitney Naddy
Report Author
naddywm.tre@gmail.com

Rami B. Naddy, Ph.D.
Manager/Environmental Toxicologist
naddyrb.tre@gmail.com

Enclosures

14001-412-031

Report of Short-Term Chronic Toxicity Testing using the Fathead Minnow (*Pimephales promelas*)

Project ID: 14001-412-031
June 2022

Sponsor and Laboratory Information

Sponsor	Northern Star Resources Limited Pogo Operations P.O. Box 145 Delta Junction, AK 99737
Project Officer	Nathan Kehoe (907) 895-2760
Testing Facility	TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972
Study Director	Rami B. Naddy, Ph.D. (970) 416-0916 email: naddyrb.tre@gmail.com
Report Author	Whitney Naddy (970) 416-0916 email: naddywm.tre@gmail.com

Test Information

Test	Short-Term Chronic under Static-Renewal Conditions
Basis	USEPA (2002), method 1000.0
Test Dates and Time	June 23, 2022 @ 1535 to June 30, 2022 @ 1530
Test Length	7 days
Species	*Pimephales promelas*
Test Material	Effluent (Grab)
Outfall	001
Permit Number	AK-005334-1
Receiving Stream	Goodpaster River
Dilution Water	Moderately Hard Reconstituted Water
Test Concentrations	MH, 6.25, 12.5, 25, 50, and 100% effluent
IWC	100% effluent
Permit Compliance	_X_ **Pass** ____Fail

- *Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report*
- *Test results comply with The NELAC Institute (TNI) standards. Reports are intended to be considered in their entirety; TRE is not responsible for consequences arising from use of a partial report*
- *This report contains 6 pages plus 2 appendices*

Effluent Collection and Receipt

Sample No.	Field No.	Collection Date & Time	TRE No.	Date of Receipt	Temp. at Arrival (°C)	Qual.
1	NA	06/20/22 @ 0615 - 0621	---	06/22/22	5.9	N1, HT
2	NA	06/22/22 @ 0646 - 0649	36635	06/23/22	4.3, 4.8	
3	NA	06/24/22 @ 0651 - 0652	36638	06/25/22	3.4	

Note: See Appendix A for chain of custody records

Effluent Characterization

Sample No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
2	7.7	78	38	247	<0.02	<1.0
3	7.7	76	40	226	<0.02	1.3

Initial Dilution/Control Water Characterization

Batch No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
14680	8.1	94	64	348	<0.02	<1.0

Test Conditions

Type	Static-Renewal Short-term Chronic
Test Endpoints	Survival and Growth (Dry Weight Per Original Fish)
Test Chambers	473-ml plastic cups
Test Solution Volume	250 ml
Replicates per Treatment	4
Organisms per Replicate	10
Test Temperature	25 ± 1°C (≤3°C differential)
Lighting	Fluorescent, 16 hours light:8 hours dark
Chamber Placement	Random according to computer-generated chart
Aeration?	[X] No [ ] Yes
Test Solution Renewal	Daily

Test Organism

Species	*Pimephales promelas*
Age	<24 hours
Source	TRE In-house culture, batch 062322
Acclimation	None
Feeding	0.05 ml brine shrimp nauplii per test chamber 3x/day through Day 4 (noon feeding), followed by 0.1 ml brine shrimp nauplii per test chamber 3x/day for the remainder of the test
Reference Toxicant Testing	Initiated June 2, 2022 using sodium chloride (NaCl)

TEST RESULTS

Biological Data

Treatment (% Effluent)	Percent Survival of *Pimephales promelas*							Mean Dry Weight (mg)[W1]	Significant Reduction Relative to Control?	
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7		Surv.	Growth
0 (MH)	100	97.5	97.5	97.5	97.5	97.5	95	0.652	N/A	N/A
6.25[X2]	100	100	100	100	100	97.5	95	0.581	No	No
12.5	100	100	100	100	100	95	95	0.563	No	No
25	100	100	97.5	95	95	95	95	0.598	No	No
50	100	100	100	100	100	100	100	0.670	No	No
100	100	100	100	97.5	95	95	95	0.602	No	No
Percent Minimum Significant Difference (Growth)								14.1	Acceptable	

Note: See Appendix B for copies of laboratory data sheets

Data Analysis and Test Endpoints

Biological Endpoint	Statistical Endpoint	Value (% Effluent)	Endpoint < IWC?
Survival	NOEC	100	No
	LOEC	>100	---
Growth (per original fish)	NOEC	100	No
	LOEC	>100	---
	ChV	>100	---
	IC_{25}	>100	No
	TU_c ($100/IC_{25}$)	<1.0	---

NOEC = No Observed Effect Concentration
LOEC = Lowest Observed Effect Concentration
ChV = Chronic Value
IC_{25} = 25% Inhibition Concentration
TU_c = Chronic Toxic Units
Note: Analyses completed using, where appropriate, CETIS version 1.8.7 (2014).

Physical and Chemical Data

Treatment (% Effluent)	pH		Dissolved Oxygen (mg/L)		Conductivity (µS/cm)		Temperature (°C)		Qual.
	Low	High	Low	High	Low	High	Low	High	
0 (MH)	7.4	8.1	5.0	7.0	280	348	24	25	
100	7.3	7.9	4.9	9.2	216	267	24	25	
All Treatments	7.3	8.2	≥4.2		NA		24	25	T3
							24	26	T4

Reference Toxicant Test Results for *P. promelas*

IC_{25} (mg Cl^-/L)	TRE Historical 95% Control Limits (mg Cl^-/L)	
	Low	High
1,439	561	1,959

References

CETIS. 2014. Comprehensive Environmental Toxicity Information System. User Guide (version 1.8.7). Tidepool Scientific, LLC. McKinleyville, CA.

USEPA. 2002. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. Fourth Edition. EPA-821-R-02-013.

Explanation of Qualifiers

Note: study-specific narratives within the body of the report are denoted, if necessary, with the superscript letters **a - d**, and associated footnotes. Other qualifications and definitions are defined below.

S -	Sample temperature upon receipt was outside the range recommended by USEPA (2002), (i.e., 0 to 6°C or ambient if collected and used on the same day).
I -	Ice was present in the sample upon receipt.
NI -	Sample was not used for testing.
N2 -	Liquid from container with ice was not used for testing.
F -	Sample was filtered to remove indigenous organisms prior to use.
HT -	Sample hold time (normally 36 hours) was exceeded.
HA -	Hardness and alkalinity concentrations are presented as $CaCO_3$.
G -	TRC = Total Residual Chlorine
T1 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range but the allowed 3°C differential was not exceeded.
T2 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range and the allowed 3°C differential was exceeded.
T3 -	Temperatures measured in test solutions.
T4 -	Continuous temperatures measured in the environmental chamber or water bath.
X1 -	Mean young per original female. If any 4th or higher broods were produced, they were excluded from calculation of mean young per female and statistical analysis of reproduction.
X2 -	One or more organisms in this treatment were lost or not found in the test chamber and were excluded from analysis, as the loss was attributed to technician error. See laboratory data sheets for additional detail, as appropriate.
X3 -	One or more male *C. dubia* were found in this treatment and were included in analysis of survival but excluded from analysis of reproduction. See laboratory data sheets for additional detail, as appropriate.
X4 -	One or more fish were alive at test termination but were lost during the drying/weighing process. These fish were included in analysis of survival but excluded from analysis of growth. See laboratory data sheets for additional detail, as appropriate.
O1 -	Dissolved oxygen concentrations were ≤4.0 mg/L in one or more treatments during the test; aeration was initiated in all test chambers. See laboratory data sheets for additional detail, as appropriate.
O2 -	Dissolved oxygen concentrations ≤4.0 mg/L were observed in one or more treatments only at test termination.
O3 -	Dissolved oxygen concentrations were ≤4.0 mg/L in one or more treatments during the test but aeration was not possible. See laboratory data sheets for additional detail, as appropriate.
W1 -	Weight per original number of organisms introduced at test initiation.
W2 -	Weight per surviving number of organisms at test termination.
V1 -	Value was statistically (α=0.05 or 0.01, as appropriate) reduced relative to the control, but was considered a Type I error (anomalous false positive), and was disregarded. The NOEC was interpreted accordingly.
V2 -	Value was not statistically (α=0.05 or 0.01, as appropriate) less than the control, but was considered a Type II error (anomalous false negative). The NOEC was interpreted accordingly.
P1 -	PMSD was below the lower bound indicated by USEPA (2002). A statistically significant reduction for a treatment was disregarded if the RPD for that treatment was less than the lower bound.
P2 -	PMSD was above the upper bound indicated by USEPA (2002), and statistically significant reductions in organism performance were detected.
P3 -	PMSD was above the upper bound indicated by USEPA (2002), and no statistically significant reductions in organism performance were detected.
R -	Monthly reference toxicant test endpoint for this species was outside the 95% control limits for the 20 most recent endpoints.

Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol (if applicable) and standard operating procedures, and that the resulting data and report meet the requirements of TNI standards. This report is an accurate reflection of the raw data.

Quality Assurance Unit — Date: July 13, 2022

Data Analyst — Date: 07/11/2022

APPENDIX A

Chain of Custody Records

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Northern Star Resources Limited (Pogo) Project #: 14001-412 (031)

Chain of Custody Tape #: 51273 Intact?(circle): Yes No (Not Used)

Sampler (Print/Affiliation): _____ Signature: _____

Client / Sample ID	Sample Collection				Sample Type		Volume	Preservation (i.e.: 0-6°C)	Test Requested							Sample Temp. Upon Arrival (Therm. # 121) °C	Lab Sample ID
	Beginning		Ending		Grab	Comp.			Matrix (Liq., Soil, Sediment, etc.)	FC							
	Date	Time	Date	Time													
Effluent #1	6/20/2022	06:15	6/20/22	06:21	✓		2.5G	0-6°C	L	X						5.9	

Sample Relinquished By: (Print Name/Affiliation) Nathan Kehoe / NSR Pogo Date: 6/20/2022

Signature: _____ Time: 07:00

Received By: (Print Name/Affiliation) _____ Date: _____

Signature: _____ Time: _____

Sample Relinquished By: (Print Name/Affiliation) _____ Date: _____

Signature: _____ Time: _____

Received By: (Print Name/Affiliation) Taylor Albert / TRE Date: 6/22/22

Signature: _____ Time: 0745

Sample Relinquished By: (Print Name/Affiliation) _____ Date: _____

Signature: _____ Time: _____

Received By: (Print Name/Affiliation) _____ Date: _____

Signature: _____ Time: _____

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): ~~FedEx~~ Other UPS Courier

Temp Blank? (Yes) ~~No~~

Comments: temp 12.6 pH: 7.58 NPDES: AK0053341 PO# 2039686

Received on Ice: (Yes) No

Effective Date: 02/13/19

Did not use / out of holding

(1)) 6/22/22; S

Serial No. 07242

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Northern Star Resources Limited (POGO) Project #: 14001-412(031)

Chain of Custody Tape #: 51272 Intact?(circle): (Yes) No Not Used

Sampler (Print/Affiliation): Nathan Kehoe / Pogo Environmental - Northern Star Resources Signature:

Client / Sample ID	Sample Collection				Sample Type		Volume	Preservation (i.e.: 0-6°C)	Test Requested							Sample Temp. Upon Arrival (Therm. #IR1) °C	Lab Sample ID
	Beginning		Ending						Matrix (Liq., Soil, Sediment, etc.)	FC							
	Date	Time	Date	Time	Grab	Comp.											
Effluent #2	6/22/22	6:46	6/22/22	6:49	✓		1G	0-6°C	L	x						4.3	36635
Effluent #2	6/22/22	6:40	6/22/22	6:45	✓		25G	0-6°C	L	x						4.8	↓

Sample Relinquished By: (Print Name/Affiliation) Nathan Kehoe Date: 6/22/22 Time: 07:30

Signature:

Received By: (Print Name/Affiliation) Date: Time:

Signature:

Sample Relinquished By: (Print Name/Affiliation) Date: Time:

Signature:

Received By: (Print Name/Affiliation) Taylor Albert / TRE Date: 06/23/22 Time: 0750

Signature:

Sample Relinquished By: (Print Name/Affiliation) Date: Time:

Signature:

Received By: (Print Name/Affiliation) Date: Time:

Signature:

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): FedEx Other UPS Courier

Temp Blank? Yes (No)

Received on Ice: (Yes) No

Comments: pH: 7.65 temp: 11.4°C

NPDES AK005334 1

PO # 2039686

Effective Date: 02/13/19

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Northern Star Resources Limited (POG) Project #: 14001-412 (031)

Chain of Custody Tape #: 51274 Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): Nathan Kehoe / NSR Signature:

Client / Sample ID	Sample Collection				Sample Type		Volume	Preservation (i.e.: 0-6°C)	Test Requested							Sample Temp. Upon Arrival (Therm. #1) °C	Lab Sample ID
	Beginning		Ending						Matrix (Liq., Soil, Sediment, etc.)	FC							
	Date	Time	Date	Time	Grab	Comp.											
Effluent #3	6/24/22	06:45	6/24/22	06:50	✓		2.5G	0-6°C	L	X						3.4	340038
Effluent #3	6/24/22	06:51	6/24/22	06:52	✓		1G	0-6°C	L	X							

Sample Relinquished By: (Print Name/Affiliation) Nathan Kehoe / NSR Pogo Date: 6/24/22 Time: 07:20 Received By: (Print Name/Affiliation) Date: Time:

Signature: Signature:

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Relinquished By: (Print Name/Affiliation) Date: Received By: (Print Name/Affiliation) Date:

Signature: Time: Signature: Time:

Sample Relinquished By: (Print Name/Affiliation) Date: Received By: (Print Name/Affiliation) Heidi Ryschon / TRE Date: 6/25/22

Signature: Time: Signature: Heidi Ryschon Time: 0940

Sample Shipped Via (circle): FedEx Other UPS Courier

Temp Blank? Yes No

Received on Ice: Yes No

Comments: pH: 7.65 Temp: 11.3°C NPDES: AK0053341 PO# 2039686

Effective Date: 02/13/19

APPENDIX B

Test Data

QA new 7/13/22

TOXICITY DATA PACKAGE COVER SHEET

Test Type: Chronic

Project Number: 14001-412-031

Test Substance: Effluent-(Outfall 001)

Species: *Pimephales promelas*

Dilution Water Type: Mod Hard

Organism Lot or Batch Number: 062322

Concurrent Control Water Type: NA

Age: <24 hr (< 24 hr) Supplier: TRE

Date and Time Test Began: 6/23/22 @ 1535

Date and Time Test Ended: 6/30/22 @ 1530

Protocol Number: USEPA 2002, Method 1000.0

Investigator(s): WT/HP/DL/JS/TA

Background Information

pH control?: Yes **No**

Type of Test: Static-Renewal

If yes, give % CO_2: N/A

Test Temperature: 25 ± 1 °C

Env. Chmbr/Bath #: 25

Test Chmbrs: 473-ml cups/beakers

Test Solution Vol.: 250 ml

Number of Replicates per Treatment: 4

Length of Test: 7 days

Number of Organisms per Replicate: 10

Photoperiod: 16 h light : 8 h dark

Light Intensity: 50 to 100 ft.-c.

Type of Food and Quantity per Chamber: 0.1 ml B.S.

Feeding Frequency: 3 x Daily

Test Substance Characterization Parameters and Frequency:

Hardness: Sx Receipt Alkalinity: Sx Receipt NH_3: Sx Receipt TRC: Sx Receipt

pH: Daily Conductivity: Daily

Test Concentrations (Volume:Volume): 0 (MH), 6.25, 12.5, 25, 50, and 100%

Agency Summary Sheet(s)?: None

Reference Toxicant Data: Test Dates: 06/07/22 to 06/09/22 IC_{25}: 1439 mg/L Cl

Hist. 95% Control Limits: 561 to 1959 Method for Determining Ref. Tox. Value: Linear Interpolation

Special Procedures and Considerations:
D.O. maintained ≥ 4.0 mg/L
*Conductivity measured in dilution water and 100% effluent at test termination
If survival in any test chamber falls below 50%, reduce feeding in that chamber to 0.05 ml of brine shrimp
Appropriate correction factors have been applied to all temperatures recorded in this data package
Study Director Initials: AS for RBN Date: 6/21/22

QA nw 7/13/22

TEST SUBSTANCE USAGE LOG

Project Number: 14001-412-031

	Sample 1	Sample 2	Sample 3
Test Substance Number	36635	310038	
Test Substance Collection Date and Time	From: 6/22/22 @ 0646	From: 6/24/22 @ 0645	From: @
	To: 6/22/22 @ 0649	To: 6/24/22 @ 0650	To: @
Sample Type (Grab or Comp)	grab	Grab	
Date Test Substance Received	6/23/22	6/25/22	
Dilution Water Number RW# or TRE#, circle one	14680	14080	
Concurrent Control Water RW#	NA	NA	
Date(s) Used	6/23/22	6/25/22	
	6/24/22	6/26/22	
		6/27/22	
		6/28/22 6/29/22	

Preparation of Test Solutions

Test Substance Conc. (% Effluent)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)
0 (MH)	0	1000	1000						
6.25%	62.5	938	1000						
12.5%	125	875	1000						
25%	250	750	1000						
50%	500	500	1000						
100%	1000	0	1000						
Total	1937.5	4062.5	6000						

Initials / Date	6/23/22 WT Mixed FC		
Initials / Date	PLW 6/24/22 " "		
Initials / Date	HP 6/25/22 " "		
Initials / Date	WT 6/26/22 " "		
Initials / Date	RJ 6/27/22 " "		
Initials / Date	WT 6/28/22 " "		
Initials / Date	TA 6/29/22 " "		
Initials / Date			

QA rev 7/13/22

FATHEAD MINNOW (*PIMEPHALES PROMELAS*)
CHRONIC BIOLOGICAL DATA

Project Number: 14001-412-031

% surv.

%Conc.	Test Replicate	Number of Surviving Organisms Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Remarks
0 (MH)	A	10	10	10	10	10	10	10	9	
	B	10	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	10	95
	D	10	10	9	9	9	9	9	9	
6.25%	A	10	10*	10	10	10	10	10 ~~9~~	8	*1 extra org removed 0.8
	B	10	10	10	10	10	10	10	10	94.7 1/1
	C	10	10	10	10	10	10	9*	9	*tech error 95 1/1
	D	10	10	10	10	10	10	9*	9	* tech error 1/1
12.5%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	95
	C	10	10	10	10	10	10	~~9~~ 8	8	
	D	10	10	10	10	10	10	10	10	
25%	A	10	10	10	10	10	10	10	10	*org not found
	B	10	10	10	10	9*	9	9	9	
	C	10	10	10	9	9	9	9	9	95
	D	10	10	10	10	10	10	10	10	
50%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	100
	C	10	10	10	10	10	10	10	10	
	D	10	10*	10	10	10	10	10	10	*1 org siphoned
100%	A	10	10*	10	10	10	10	10	10	*extra org removed
	B	10	10	10	10	10	10	10	10	95
	C	10	10	10	10	9	8*	8	8	*org not found
	D	10	10	10	10	10	10	10	10	
	A									
	B									
	C									
	D									
Date:		6/23/22	6/24/22	6/25/22	6/26/22	6/27/22	6/28/22	6/29/22	6/30/22	
Time:		1535	1055	1140	1020	1620	1055	1545	1530	
Initials:		WT/HP	PV	HP	WT	PS	WT	TA	WT	

① WP 6/25/22 TA ② WT 07/01/22

QA mw 7/13/22

CHRONIC CHEMICAL DATA (INITIAL)

Project Number: 14001-412-031

Test Species: ***Pimephales promelas***

%	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Meter #	Remarks
Conc.: 0 (MH)									All Conc.	
pH	8.1	8.1	7.8	8.1	8.1	8.1	8.1		19	
D.O. (mg/L)	6.7	6.5	6.8	6.8	6.7	7.0	6.9		17	
Temp. (°C)	25	25	25	25	25	25	25		L36	
Cond. (µS/cm)	348	342	327	~~326~~ 332	327	298	334		16	
Hard. (mg/L)	94		98						Titr.	
Alk. (mg/L)	64		57						Titr.	
TRC (mg/L) 6/20	<0.02								22	
NH_3 (mg/L)	<1.0								HA1	
Conc.: 6.25%										
pH	8.1	8.1	8.0	8.1	8.2	8.1	8.2			
D.O. (mg/L)	6.8	6.6	7.0	7.0	7.1	7.1	7.1			
Temp. (°C)	*	*	*	*	*	*	*			
Cond. (µS/cm)	~~352~~ 345	337	310	~~337~~ 328	325	295	319			
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH_3 (mg/L)										
Conc.: 12.5%										
pH	8.1	8.0	8.1	8.1	8.1	8.1	8.1			
D.O. (mg/L)	6.8	6.8	6.9	7.0	7.0	7.2	7.1			
Temp. (°C)	*	*	*	*	*	*	*			
Cond. (µS/cm)	342	332	308	326	308	293	302			
Conc.: 25%										
pH	8.0	8.0	8.0	8.1	8.1	8.0	8.1			
D.O. (mg/L)	7.0	7.0	7.0	7.2	7.2	7.3	7.2			
Temp. (°C)	*	*	*	*	*	*	*			
Cond. (µS/cm)	330	320	305	310	308	282	287			
Date:	6/23/22	6/24/22	6/25/22	6/26/22	6/27/22	6/28/22	6/29/22			
Time:	1445	1045	1125	0940	1540	1020	1555			
Initials:	WT	DV	HP	WT	RS	WT	TA			

Note: Hardness, alkalinity, TRC, and NH3 data appearing on this page have been transcribed from the wet chemistry log QA Form No. 084.

*Dilution/control water and effluent were brought to 25°C prior to making the dilution series. The temperature of resulting effluent dilution is assumed to also be 25°C. ① WT 6/23/22 ⑤

QA WJW 7/13/22

CHRONIC CHEMICAL DATA (INITIAL)

Project Number:	14001-412-031
Test Species:	*Pimephales promelas*

%	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Meter #	Remarks
Conc.: 50%									All Conc.	
pH	7.9	7.8	7.9	8.0	8.0	~~7.7~~ 7.8 ①				
D.O. (mg/L)	7.1	7.7	7.7	7.5	7.4	7.8				
Temp. (°C)	*	*	*	*	*	*	*			
Cond. (μS/cm)	305	292	279	283	279	260				
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Cond. (μS/cm)										
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Cond. (μS/cm)										
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Cond. (μS/cm)										
Conc.: 100%										
pH	7.7	7.6	7.7	7.7	7.7	7.5	7.9			
D.O. (mg/L)	7.8	9.2	7.8	8.7	8.2	8.9	7.6			
Temp. (°C)	25	25	25	25	25	25	25			
Cond. (μS/cm)	247	236	220	228	226	216	267			
Hard. (mg/L)	78		74							
Alk. (mg/L)	38		40							
TRC (mg/L)	<0.02		<0.02							
NH_3 (mg/L)	<1.0		1.3							
Date:	6/23/22	6/24/22	6/25/22	6/26/22	6/27/22	6/28/22	6/29/22			
Time:	1445	1045	1125	0940	1540	1020	1555			
Initials:	WT	A	HD	WT	RJ	WT	TA			

Note: Hardness, alkalinity, TRC, and NH3 data appearing on this page have been transcribed from the wet chemistry log QA Form No. 084.

*Dilution/control water and effluent were brought to 25°C prior to making the dilution series. The temperature of resulting effluent dilution is assumed to also be 25°C.

① RJ 6/27/22, WP

QA new 7/13/22

CHRONIC CHEMICAL DATA (FINAL)

Project Number:	14001-412-031
Test Species:	***Pimephales promelas***

%		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Meter #	Remarks
Conc.:	0 (MH)							280		All Conc.	* conductivity 16
pH		7.8	7.7	7.9	7.7	7.5	7.5	7.4		20	
D.O. (mg/L)		~~5.8~~ 5.9 ①	5.4	5.8	5.2	5.0	5.3	5.0		18	
Temp (°C)		24	24	25	24	24	25	24		L-45	
Conc.:	6.25%										
pH		7.7	7.6	7.8	7.6	7.5	7.8	7.4			
D.O. (mg/L)		5.6	5.0	5.2	5.0	4.2	4.6	4.9			
Temp (°C)		24	24	25	24	24	25	25			
Conc.:	12.5%										
pH		7.8	7.6	7.7	7.5	7.5	7.4	7.4			
D.O. (mg/L)		5.9	5.0	5.5	4.6	4.5	4.6	5.1			
Temp (°C)		24	24	25	24	24	25	24			
Conc.:	25%										
pH		7.7	7.6	7.9	7.6	7.5	7.5	7.5			
D.O. (mg/L)		5.6	4.7	5.6	4.9	4.6	4.9	5.1			
Temp (°C)		24	24	25	24	24	25	24			
Conc.:	50%										
pH		7.6	7.6	7.8	7.5	7.4	7.7	7.4			
D.O. (mg/L)		5.6	5.0	5.4	4.8	4.4	4.9	4.6			
Temp (°C)		24	24	25	24	25	25	24			
Conc.:	100%							220			* conductivity
pH		7.5	7.4	7.8	7.5	7.4	7.6	7.3			
D.O. (mg/L)		5.7	5.0	5.9	~~24~~ ② 5.3	4.9	5.1	5.0			
Temp (°C)		24	25	25	24	25	25	24			
Conc.:											
pH											
D.O. (mg/L)											
Temp (°C)											
Date:		6/24/22	6/25/22	6/26/22	6/27/22	6/28/22	6/29/22	6/30/22			
Time:		1050	1125	0950	1540	1025	1555	1435			
Initials:		PL	HP	WT	RJ	WT	TA	WT			

① PL 6/24/22 TC
② RJ 6/27/22 WP

DAILY TOXICITY TEST LOG

QA Review 7/13/22

Project Number:	14001-412-031
Test Species:	***Pimephales promelas***

General Comments	Random Chart: Zeta Min/Max Therm. #: M-32	Feeding * 0.05 BS Day 0-Day 4 Noon + 0.1 BS Day 4 PM-Day 6PM	Initials/Date
Test Day 0	Test Solution Mixed at: 1445 Test Organisms Added at: 1535	Fed @ * 1700 RS/HP	WT 6/23/22
Test Day 1	Real Time Temp= 25 °C Range = 25-26 °C	Fed @ * RS 0845/HP * 1200 PL * 1625 WT	PL 6/24/22
Test Day 2	Real Time Temp= 24 °C Range = 25-24 °C	Fed @ * 0825 RS/HP * 1430 RS/HP	HP 6/25/22
Test Day 3	Real Time Temp= 25 °C Range = 25-26 °C	Fed @ * 0815 HP * 1450 PL	WT 6/26/22
Test Day 4	Real Time Temp= 25 °C Range = 24-26 °C	Fed @ * 0820 RS/PL + 1220 RS/ [illegible] + 1650 RS/ [illegible]	RS 6/27/22
Test Day 5	Real Time Temp= 25 °C Range = 25-26 °C	Fed @ * 0820 WT + RS/PL 1140 + 1640 PL	WT 6/28/22
Test Day 6	Real Time Temp= 25 °C Range = 25-26 °C	Fed @ * 0835 HP + 1200 PL + 1630 TA	TA 6/29/22
Test Day 7	Real Time Temp= 26 °C Range = 25-26 °C	NONE	WT 6/30/22
Test Day 8			

Δ only 2 feedings RS 6/25/22

■ Continued feeding 0.05mL B.S. due to low D.O.S

412

QA Form No.010
Revision 7
Effective 01/20
QA: MB 7/6/22

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-412-031	Test Substance: effluent	Comments: Analytical Balance ID: SAH#1
Species: P. promelas	Analyst Tare: TA Analyst Gross: WT	Dried in Oven # 2 from Date: 6/30/22 Time: 1540 to Date: 7/1/22 Time: 0815
Date/Time of Tare Wt.: 6/30/22 1110	Date/Time of Gross Wt.: 7/1/22 @ 1420	

Weight Type (Circle): Wet Blot Dry Dry (60-90°C) Dry (>100°C) AFDW (>500°C) Lot or Batch Number: 062322

Boat No.	Treatment	Rep.	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)[1]	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
	MH	A		1.13439	1.14044	0.00605					9		
		B		1.13387	1.14071	0.00684					10		
		C		1.13641	1.14339	0.00698					10		
		D		1.14716	1.15331	0.00615					9		
	6.25	A		1.12517	1.13057	0.00540					8		
		B		1.14205	1.14812	0.00607					10		
		C		1.15147	1.15746	0.00599					9		
		D		1.14240	1.14813	0.00573					9		
	12.5	A		1.16071	1.16660	0.00589					10		
		B		1.13703	1.14355	0.00652					10		
		C		1.14579	1.15021	0.00442					8		
		D		1.13804	1.14369	0.00565					10		
Blank				1.15199	1.15198	-0.00001							
Range													
Mean													

Test Solution Volume: Loading Rate:

[1] Add in weight loss of blank boat, if appropriate.

412

QA Form No.010
Revision 7
Effective 01/20
QA: AS 7/8/22

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-412-031 | Test Substance: effluent | Comments: Analytical Balance ID: SMA #1
Species: P. promelas | Analyst Tare: TA Analyst Gross: WT | Dried in Oven # 2 from Date: 6/30/22 Time: 1540 to Date: 7/1/22 Time: 0815
Date/Time of Tare Wt.: 6/30/22 1110 | Date/Time of Gross Wt.: 7/1/22 @ 1420

Weight Type (Circle): Wet Blot Dry Dry (60-90°C) Dry (>100°C) AFDW (>500°C) | Lot or Batch Number: 062322

Boat No.	Treatment	Rep.	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)[1]	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
	25	A		1.14249	1.14857	0.00608					10		
		B		1.14539	1.15112	0.00573					9		
		C		1.14046	1.14674	0.00628					9		
		D		1.14163	1.14741	0.00578					10		
	50	A		1.13683	1.14293	0.00610					10		
		B		1.15454	1.16201	0.00747					10		
		C		1.14944	1.15587	0.00643					10		
		D		1.13825	1.14501	0.00676					10		
	100	A		1.13911	1.14533	0.00622					10		
		B		1.15093	1.15745	0.00652					10		
		C		1.13843	1.14376	0.00533					8		
		D		1.13219	1.13814	0.00595					10		
Blank													
Range													
Mean													

Test Solution Volume: | Loading Rate:

[1] Add in weight loss of blank boat, if appropriate.

QA Form No. 010a
Revision 1
Effective 02/14

HP 7/6/22
QA: MS 7/8/22

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-412-031 Species: Fathead minnow

Treatment	Rep	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)	No of Orig. Organisms	Mean Wt./ Original Organism (mg)	Mean Wt./ Treatment (mg) (Original)	Number of Surv. Organisms	Mean Wt./ Surviving Organism (mg)	Mean Wt./ Treatment (mg) (Surviving)
MH	A		1.13439	1.14044	0.00605	0.00606	10	0.606	0.6515	9	0.673	0.6854
	B		1.13387	1.14071	0.00684	0.00685	10	0.685		10	0.685	
	C		1.13641	1.14339	0.00698	0.00699	10	0.699		10	0.699	
	D		1.14716	1.15331	0.00615	0.00616	10	0.616		9	0.684	
6.25%	A		1.12517	1.13057	0.00540	0.00541	10	0.541	0.5808	8	0.676	0.6472
	B		1.14205	1.14812	0.00607	0.00608	10	0.608		10	0.608	
	C		1.15147	1.15746	0.00599	0.00600	10	0.600		9	0.667	
	D		1.14240	1.14813	0.00573	0.00574	10	0.574		9	0.638	
12.5%	A		1.16071	1.16660	0.00589	0.00590	10	0.590	0.5630	10	0.590	0.5907
	B		1.13703	1.14355	0.00652	0.00653	10	0.653		10	0.653	
	C		1.14579	1.15021	0.00442	0.00443	10	0.443		8	0.554	
	D		1.13804	1.14369	0.00565	0.00566	10	0.566		10	0.566	
25%	A		1.14249	1.14857	0.00608	0.00609	10	0.609	0.5978	10	0.609	0.6312
	B		1.14539	1.15112	0.00573	0.00574	10	0.574		9	0.638	
	C		1.14046	1.14674	0.00628	0.00629	10	0.629		9	0.699	
	D		1.14163	1.14741	0.00578	0.00579	10	0.579		10	0.579	
50%	A		1.13683	1.14293	0.00610	0.00611	10	0.611	0.6700	10	0.611	0.6700
	B		1.15454	1.16201	0.00747	0.00748	10	0.748		10	0.748	
	C		1.14944	1.15587	0.00643	0.00644	10	0.644		10	0.644	
	D		1.13825	1.14501	0.00676	0.00677	10	0.677		10	0.677	
100%	A		1.13911	1.14533	0.00622	0.00623	10	0.623	0.6015	10	0.623	0.6349
	B		1.15093	1.15745	0.00652	0.00653	10	0.653		10	0.653	
	C		1.13843	1.14376	0.00533	0.00534	10	0.534		8	0.668	
	D		1.13219	1.13814	0.00595	0.00596	10	0.596		10	0.596	
Blank			1.15199	1.15198	-0.00001							

7/6/22 HP
QA: AB 7/8/22

Project Number: 14001-412-031 Species: Fathead minnow

Summary Statistics for Survival Data

Treatment	N	Min	Max	Mean	SD	C.V.
MH	4	0.9	1.0	0.9500	0.0577	6.077%
6.25%	4	0.8	1.0	0.9000	0.0816	9.072%
12.5%	4	0.8	1.0	0.9500	0.1000	10.526%
25%	4	0.9	1.0	0.9500	0.0577	6.077%
50%	4	1.0	1.0	1.0000	0.0000	0.000%
100%	4	0.8	1.0	0.9500	0.1000	10.526%

Summary Statistics for Growth Data (dry wt per original)

Treatment	N	Min	Max	Mean	SD	C.V.	% of control
MH	4	0.606	0.699	0.6515	0.0473	7.259%	--
6.25%	4	0.541	0.608	0.5808	0.0302	5.203%	89%
12.5%	4	0.443	0.653	0.5630	0.0880	15.633%	86%
25%	4	0.574	0.629	0.5978	0.0259	4.340%	92%
50%	4	0.611	0.748	0.6700	0.0586	8.741%	103%
100%	4	0.534	0.653	0.6015	0.0507	8.423%	92%

Summary Statistics for Growth Data (dry wt per surviving organism)

Treatment	N	Min	Max	Mean	SD	C.V.
MH	4	0.673	0.699	0.6854	0.0105	1.534%
6.25%	4	0.608	0.676	0.6472	0.0308	4.761%
12.5%	4	0.554	0.653	0.5907	0.0442	7.480%
25%	4	0.579	0.699	0.6312	0.0511	8.101%
50%	4	0.611	0.748	0.6700	0.0586	8.741%
100%	4	0.596	0.668	0.6349	0.0319	5.018%

CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **TRE Environmental Strategies**

Analysis ID:	12-1123-3410	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jul-22 15:17	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5343-1855	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	23 Jun-22 15:35	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	30 Jun-22 15:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	7d	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	16-9252-3788	**Code:**	64E1DD0C	**Client:**	Northern Star Res
Sample Date:	22 Jun-22 06:49	**Material:**	Ambient Sample	**Project:**	WET Annual Compliance Test
Receive Date:	23 Jun-22 07:50	**Source:**	Discharge Monitoring Report		
Sample Age:	33h (4.3 °C)	**Station:**	Outfall 001		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	14.1%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		6.25	1.849	2.41	0.092	6	0.1341	CDF	Non-Significant Effect
		12.5	2.313	2.41	0.092	6	0.0596	CDF	Non-Significant Effect
		25	1.405	2.41	0.092	6	0.2598	CDF	Non-Significant Effect
		50	-0.4835	2.41	0.092	6	0.9373	CDF	Non-Significant Effect
		100	1.307	2.41	0.092	6	0.2954	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.6515	0.25 - NL	Yes	Passes Acceptability Criteria
PMSD	0.1414	0.12 - 0.3	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.034423	0.0068846	5	2.352	0.0827	Non-Significant Effect
Error	0.05269551	0.002927528	18			
Total	0.08711851		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.059	15.1	0.4087	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9839	0.884	0.9552	Normal Distribution

Mean Dry Biomass-mg Summary

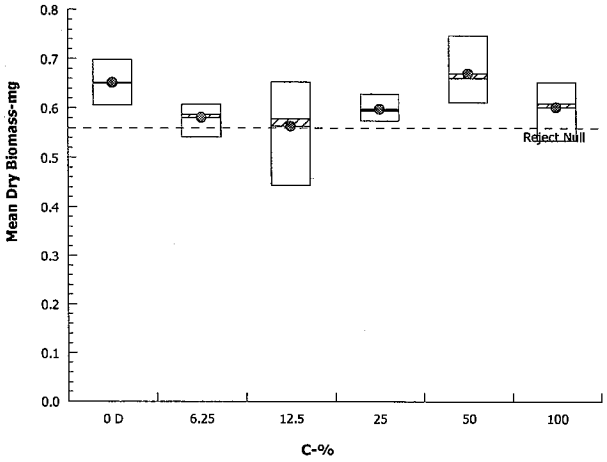
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.6515	0.5763	0.7267	0.6505	0.606	0.699	0.02364	7.26%	0.0%
6.25		4	0.5808	0.5327	0.6288	0.587	0.541	0.608	0.01511	5.2%	10.9%
12.5		4	0.563	0.423	0.703	0.578	0.443	0.653	0.04401	15.6%	13.6%
25		4	0.5978	0.5565	0.639	0.594	0.574	0.629	0.01297	4.34%	8.25%
50		4	0.67	0.5768	0.7632	0.6605	0.611	0.748	0.02928	8.74%	-2.84%
100		4	0.6015	0.5209	0.6821	0.6095	0.534	0.653	0.02533	8.42%	7.67%

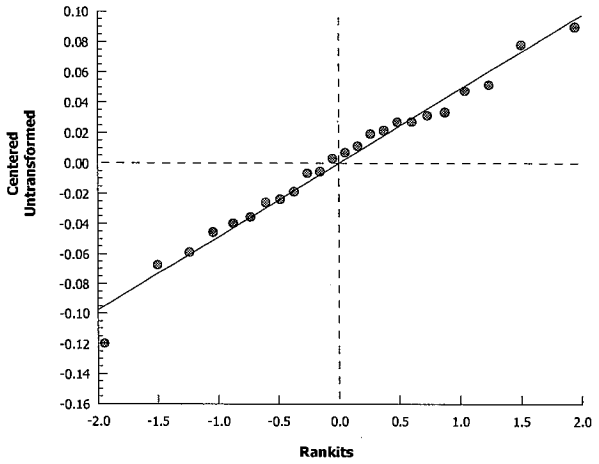
Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.606	0.685	0.699	0.616
6.25		0.541	0.608	0.6	0.574
12.5		0.59	0.653	0.443	0.566
25		0.609	0.574	0.629	0.579
50		0.611	0.748	0.644	0.677
100		0.623	0.653	0.534	0.596

Analysis ID:	12-1123-3410	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jul-22 15:17	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





AQUATIC TOXICOLOGY REPORT

Project Name: NORTHERN STAR (POGO) LLC

Location: DELTA JUNCTION, ALASKA

Prepared by: Eurofins Environment Testing Northwest, LLC - ASL

(formerly Eurofins TestAmerica – ASL)

1100 NE Circle Boulevard, Suite 310
Corvallis, Oregon 97330
541-243-6137

Accredited in accordance with NELAP

Oregon Environmental Laboratory Accreditation Program #OR100022 (NELAP)
State of Washington DOE Environmental Laboratory Accreditation Program, Lab ID C556
California State Environmental Laboratory Accreditation Program, Certificate No.: 1726

Report Date: July 22, 2022 Released by: Michelle Bennett

Lab I.D. No. B5386

Results relate only to the items tested and the sample(s) as received by the laboratory. The results included in this report have been reviewed for compliance and meet all requirements for accredited parameters. All data have been found to be compliant with laboratory protocol, with the exception of any items noted in this report. For questions, please contact the Project Manager (contact info on next page).

CONTENTS

LABORATORY CONTACT: Brett Muckey, Laboratory Director
Brett.Muckey@et.eurofinsus.com (541) 243-0980

INTRODUCTION

Eurofins Environment Testing Northwest, LLC Applied Sciences Laboratory (EETNW - ASL) conducted toxicity testing on sample(s) from Northern Star (Pogo) LLC, Delta Junction, Alaska.

Testing was initiated on: June 21, 2022

The test(s) were conducted using:

- the fathead minnow (*Pimephales promelas*)

OVERVIEW OF REGULATORY GUIDANCE

The following provides an overview and excerpts of applicable permit specifics, regulatory guidance, and other relevant information. This is intended only as a helpful guide, from a laboratory perspective, for understanding test outcomes. The final responsibility for interpretation of results remains with the client and/or regulatory agency.

The following guidance is taken from EETNW-ASL reading of the NPDES permit for Northern Star - Pogo (permit #AK0053341, effective July 1, 2017, expires June 30, 2022).

Whole Effluent Toxicity Testing (WET) Requirements:

- "1.7.2 Chronic toxicity testing must be conducted on grab sample of effluent."
- "1.7.3 Chronic Test Species and Methods"
  - "1.7.3.1 For Outfall 001, chronic tests must be conducted annually prior to August 1."
  - "1.7.3.2 … using the fathead minnow, *Pimephales promelas.* "
  - "1.7.3.3 The presence of chronic toxicity must be determined as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition (EPA/821-R-02-013, October 2002)."
  - "1.7.3.4 Results must be reported in TU_c, where $TU_c = 100/IC_{25}$."
- 1.7.4 Quality Assurance
  - 1.7.4.3.1 If organisms are not cultured in-house, concurrent testing with reference toxicants must be conducted. If organisms are cultured in-house, monthly reference toxicant testing is sufficient. Reference toxicant tests must be conducted using the same test conditions as the effluent toxicity tests.
- "1.7.5 A trigger for chronic toxicity of 2 TUc shall apply for the purposes of determining compliance with Permit Part 1.7.6 [accelerated testing] and 1.7.7 [TIE/TRE]."

SUMMARY OF TEST RESULTS

Exhibit 1 provides a summary of the final test results.

EXHIBIT 1
Summary of Chronic Test Results

Species	NOEC (%)	LOEC (%)	IC_{25} (%)	TUc	Was chronic toxicity demonstrated (a TUc value > 2.0)?
P. promelas	100	> 100	> 100	< 1	No

Note: acronyms are as defined below.

From the NPDES permit - *Chronic Toxicity Trigger*: "Toxicity Triggers. Since data does not exist to support the development of a WET limit at this time, a target level for chronic toxicity of 2 TUc shall apply …"

More detailed information is provided in the Results and Discussion section.

ACRONYM DEFINITIONS (from EPA guidance):

NOEC = No Observed Effect Concentration: The highest test concentration that causes no observable adverse effects on the test organisms (i.e. no statistically significant reduction from the control).
LOEC = Low Observed Effect Concentration: The lowest test concentration that does cause an observable adverse effect on the test organisms (i.e. is statistically significant reduction from the control).
LC_{50} = Lethal Concentration (50%): A point estimate of the test concentration that would cause death in 50 percent of the test population.
IC_{25} = Inhibition Concentration (25%): A point estimate of the test concentration that would cause a 25 percent reduction of a non-quantal biological measurement (i.e. growth, reproduction, etc.) for the test population.

METHODS AND MATERIALS

TEST METHODS

The chronic test methods were performed according to: *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, (EPA 2002), EPA-821-R-02-013.

Additional guidance was provided by:

- *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing* (40 CFR Part 136), (EPA August 2000), EPA 821-B-00-004.

DEVIATIONS FROM PROTOCOLS

Deviations from required procedures in the test methods:

- None noted.

Deviations from recommended procedures in the test methods:

- None noted.

TEST DESIGN

The following summarizes the conditions used for both overall testing and the specifics for each test (observations and notations can be found on the datasheets in Appendix A):

Overall Test Design:

- Chronic tests: 6.25, 12.5, 25, 50, and 100 percent sample + dilution water for the control.

Test Organism Conditions:

- All organisms tested were fed and maintained during culturing, acclimation, and testing as prescribed by the EPA (2002).
- The test organisms appeared vigorous and in good condition prior to testing.

P. promelas chronic test:

- Source: Aquatox Inc., Hot Springs, Arkansas
- Age: Less than 48 hours old and within an 24 hour age range
- Design: Four test vessels per concentration, ten organisms per vessel
- Test Solution Renewal: Daily
- Monitoring:
    - Daily: Survival
    - Daily: DO and pH in pre and post-renewal solutions, all concentrations
    - Daily: Temperature in pre-renewal solutions, all concentrations
    - With each new sample: Conductivity in post-renewal solutions, control and highest sample concentration
- Termination: 7 days after test initiation.
- Endpoints: Survival and Growth (average dry weight per organism added @ initiation)

DILUTION WATER

The dilution water used was the standard culture water used by EETNW - ASL:

- Reconstituted, moderately hard water (as per EPA protocol) with a total hardness of 75 to 105 mg/L as $CaCO_3$ and an alkalinity of 50 to 75 mg/L as $CaCO_3$.

SAMPLE COLLECTION AND STORAGE

Samples were collected by Northern Star (Pogo) LLC personnel. The samples were accepted as scheduled by EETNW - ASL. Chain of Custody and Sample Receipt Records are provided in Appendix C.

- All samples were received within the EPA recommended 0 to 6 ºC range.
- All samples were initially used for test initiation or test solution renewal within the EPA recommended maximum holding time of 36 hours of sample collection.
- All subsequent uses of a sample occurred within the EPA recommended maximum holding time of 72 hours past the time of initial use of that sample.
- Following receipt, the samples were stored in the dark at 0 to 6 °C until test solutions were prepared and tested.

SAMPLE PREPARATION

Samples used during these tests were:

- Temperature adjusted prior to test initiation and each daily renewal.
- Filtered through a 60 µm net upon arrival.

DATA ANALYSIS

The statistical analyses performed for the chronic tests were those outlined in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, USEPA Office of Water, Fourth Edition (EPA 2002), EPA-821-R-02-013, using CETIS.

- The specific statistical analysis and CETIS version used for each endpoint evaluation is listed with the statistical outputs included with each test in Appendix A.
- If any additional analysis methods were also used, an explanation of the rationale and reference to the source method is included with the presentation of those results below.

RESULTS AND DISCUSSION

The raw data sheets for all tests are presented in Appendix A.

CHRONIC BIOASSAYS

Table 1 summarizes the survival and growth data for the *P. promelas* chronic test.

Table 1
Summary of Chronic Results
P. promelas

Sample Concentration (%)	Percent Survival	Mean Dry Weight Per Organism Added (mg)
Control	97.5	0.667
6.25	100	0.638
12.5	100	0.682
25	97.5	0.689
50	85.0	0.626
100	95.0	0.694

Statistical analysis in accordance with the EPA protocol results in:

- NOEC = 100 %
- LOEC > 100 %
- IC_{25} > 100 %
- TU_c < 1.0

From the NPDES permit - *Chronic Toxicity Trigger*: "Toxicity Triggers. Since data does not exist to support the development of a WET limit at this time, a target level for chronic toxicity of 2 TUc shall apply …"

Dissolved oxygen concentrations remained at 4.0 mg/L or greater throughout the test period. Test temperatures remained at 25±1°C.

The *P. promelas* test meets Test Acceptability Criteria (TAC) for a minimum 80 percent control survival and a minimum weight of 0.250 mg per surviving control organism. Unless referenced above, the tests proceeded without any noted deviations or interruptions that could have affected test results. The testing should be considered "valid".

REFERENCE TOXICANT TESTS

Reference toxicant (reftox) testing is performed to document both initial and ongoing laboratory performance of the test method(s). While the health of the test organisms is primarily evaluated by the performance of the laboratory control, reftox test results also may be used to assess the health and sensitivity of the test organisms. Reftox test results within their respective cumulative summary (Cusum) chart limits are indicative of consistent laboratory performance and normal test organism sensitivity.

The results of the reftox tests indicate that the test organisms were within their respective cusum chart limits based on EPA guidelines. This demonstrates ongoing laboratory proficiency of the test methods and suggests normal test organism sensitivity in the associated client testing.

The *P. promelas* chronic reftox test was conducted using potassium chloride. The data sheets for the reference toxicant tests are provided in Appendix B.

Table 2 summarizes the reference toxicant test results and Cusum chart limits.

Table 2
Chronic Reference Toxicant Tests (g/L)

Species	IC_{25}	Cusum Chart Limits
P. promelas (survival)	0.61	0.59 to 0.68
P. promelas (growth)	0.63	0.45 to 0.73

APPENDIX A

RAW DATA SHEETS

eurofins Environment Testing America **FRESHWATER TOXICITY TEST: SAMPLE AND DILUTION WATER DATA**

Client: Northern Star — SDG # BG3896

Contact: Nathan Kehoe / Jill Van Patten 907-895-2760 / 907-687-3579

Test Initiation: Date 6/21/22

Test Termination: Date 6/28/22

Sample ID Number	Field ID	Collected Date (mm/dd/yy)	Collected Time (Pacific Zone)	Received Date (mm/dd/yy)	Received Time (Pacific Zone)	Temp (°C) as Rc'vd	Total Residual Chlorine (mg/l) ☐ Dechlorination allowed: as Rc'vd / after Dechlor.	Ammonia NH_3-N mg/l as Rc'vd	Hardness mg/l as $CaCO_3$ as Rc'vd	Alkalinity mg/l as $CaCO_3$ as Rc'vd	DO (mg/L) as Rc'vd	pH as Rc'vd	Cond. (uS) as Rc'vd	60 um filtered prior to use?
BG3896 01	Outfall 001-WET	6/20/22	05:22	6/21/22	12:22	2.6 / 3.1	<0.02 -	0.94	72	-	-	-	-	☑ TC
BG3896 -02	Outfall 001-WET	6/22/22	05:27	6/23/22	12:05	2.6 / 3.1	<0.02 -	0.88	78	-	-	-	-	☑ DM
BG3896 -03	Outfall 001-WET	6/24/22	05:32	6/25/22	09:45	2.2 / 2.6	<0.02 -	0.96	78	-	-	-	-	☑ DM
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
			Reporting Limits:			na	0.02 mg/L	0.10 mg/L	5 mg/L	5 mg/L	na	na	na	na

Note: "-" Indicates data collection or dechlorination not needed. Any other adjustments to samples prior to use are documented in Comments below or on Dilutions page.

Dilution Water	ID#	Hardness mg/l as $CaCO_3$	Alkalinity mg/l as $CaCO_3$
Recon MH (FHM)	5572	92	52
	5574	93	57
	5575	78	50
	5576	92	58

Comments: ☑ Indicates the action was taken, (☐= action not taken): " - " = sample not dechlorinated, or analyte not collected/needed.

Water Quality Meters Used/ID#: Dissolved Oxygen # 7 pH # 11 Conductivity # 2

FRESHWATER TOXICITY TEST: TEST ORGANISM INFORMATION

Client: Northern Star

Sample Designation (SDG): B 6736

Test Species Information	FHM #2225 *Pimephales promelas* Chronic				
Organism Age at Initiation	<48 hrs, all within a 24 hour window				
Test Container Size	800 ml				
Test Volume	500 ml				
Feeding: Type and Amount	0.15 ml *Artemia*, 2 x Daily				
Aeration: In Test Chambers via Slow Bubble :	☒ None ☐ Prior to use ☐ @ _____ hrs				
Acclimation Period	<24 hrs				
Organism Source	Aquatox				
Size	-				
Loading Rate	-				

Dissolved Oxygen aeration justifications (in test chambers):

Test(s): ☐ All ☐ _____

Date:

Comments:

Test Solution Preparation and Dilution Record

Note: ☐ Indicates task not done, ☑ Indicates task was done. Temp adj. = Temperature adjusted to ambient or test temp

Ditto marks (' ') indicate that the same SDG, batch of dilution water, or food as the previous day's entry was used.

Client: Northern Star

Fathead minnow - Chronic

Test Concentration (%)	Sample Volume (mls)		Final Volume (mls)
Control	0.00	→	2000
6.25	125	→	2000
12.5	250	→	2000
25	500	→	2000
50	1,000	→	2000
100	2,000	→	2000

Total Sample volume needed per day = 3875 mls

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B5396-01	☐ Temp adj, ☐ Aerated	ID # 5572	6/12/2022	12:35	TC
1	B5396-01	☐ Temp adj, ☐ Aerated	ID # 5572	6/22/22	07:59	TC
2	B5396-02	☐ Temp adj, ☐ Aerated	ID # 5574	6/23/22	13:17	DY
3	B5396-02	☐ Temp adj, ☐ Aerated	ID # 5574	6/24/22	10:25	KG
4	B5396-03	☐ Temp adj, ☐ Aerated	ID # 5575	6/25/22	10:10	KG
5	B5396-03	☐ Temp adj, ☐ Aerated	ID # 5575	6/26/22	10:40	KG
6	B5396-03	☐ Temp adj, ☐ Aerated	ID # 5576	6/27/22	10:20	KG

eurofins | Environment Testing America

FATHEAD MINNOW 7-DAY SURVIVAL AND WATER QUALITY DATA

Random Template Used: 6 conc. x 4 reps. # 11 | Waterbath/incubator Used: # 10 | Date Initiated 6/21/2022 Time 15:00

Initial sample ID B 5386 - 01 | Date Terminated 6/28/2022 Time 10:08

Client Northern Star 1542 KG 6/24/22 | Sample Description

Tech: Day 0 DY Day 1 DY Day 2 DY Day 3 DY Day 4 KG Day 5 KG Day 6 KG Day 7 DY

Time: Day 0 1436 Day 1 1235 Day 2 1529 Day 3 ~~1342~~ Day 4 1355 Day 5 1437 Day 6 1425 Day 7 1008

Conc. or Percent	Day	Number of Live Organisms A	B	C	D	Dissolved O_2 (mg/l) Pre	Post	pH Pre	Post	Temp. (°C) Pre	Therm. ID #	Conductivity (µS) Post (1st use)
Control	0	10	10	10	10		8.0		7.7	Post: 24.9	250	361
	1	10	10	10	10	7.5	8.8	7.4	7.5	25.0	250	
	2	10 ✓	10	10	10	7.4	8.0	7.6	7.9	24.8	250	325
	3	10	10	10	10	7.5	8.1	7.5	8.0	24.8	250	
	4	10	9	10	10	7.8	8.1	7.7	7.6	25.0	248	318
	5	10	9	10	10	7.5	8.2	7.7	7.7	25.0	250	
	6	10	9	10	10	7.8	8.0	7.7	8.0	25.0	250	
	7	10	9	10	10	7.2		7.2		24.8	250	
6.25 %	0	10	10	10	10		8.0		7.7	Post: 25.0		
	1	10	10	10	10	7.5	8.2	7.3	7.5	25.0		
	2	10	10	10	10	7.4	8.0	7.6	7.9	24.8		
	3	10	10	10 ✓	10 ✓	7.6	8.5	7.6	8.0	24.8		
	4	10	10	10	10	7.6	8.1	7.7	7.7	24.9		
	5	10	10	10	10	7.5	8.2	7.6	7.8	25.0		
	6	10	10	10	10	7.5	8.0	7.6	8.0	25.0		
	7	10	10	10	10	7.2		7.2		24.8		
12.5 %	0	10	10	10	10		8.2		7.7	Post: 25.0		
	1	10	10	10	10 ✓	7.5	8.3	7.3	7.5	25.1		
	2	10	10	10	10	7.4	8.1	7.5	7.9	24.9		
	3	10	10	10	10	7.6	8.3	7.5	7.9	25.0		
	4	10	10	10	10	7.6	8.2	7.6	7.6	25.0		
	5	10	10	10	10	7.5	8.1	7.6	7.8	25.0		
	6	10	10	10	10	7.5	8.3	7.6	7.9	24.9		
	7	10	10	10	10	7.2		7.2		24.9		
25 %	0	~~10~~ 9	10	10	10		8.2		7.6	Post: 25.1		
	1	10	9	10	10	7.4	8.3	7.3	7.5	25.0		
	2	10	9	10	10 ✓	7.4	8.3	7.5	7.8	24.8		
	3	10	9	10	10	7.5	8.4	7.5	7.8	24.8		
	4	10	9	10	10	8.0	8.2	7.6	7.6	25.0		
	5	10	9	10	10	7.4	8.2	7.6	7.8	24.9		
	6	10	9	10	10	7.5	8.5	7.6	7.9	24.8		
	7	9M	9	10	10	7.2		7.2		25.0		
50 %	0	10	10	10	10		8.4		7.5	Post: 24.9		
	1	10	10	10	10	7.5	*8.3	7.2	7.4	25.0		
	2	10	9	10	10 ✓	7.5	*8.0	7.4	7.5	24.8		
	3	10	9 ✓	10	10	7.5	*8.3	7.5	7.7	24.8		
	4	9	9	10	10	7.5	8.3	7.5	7.6	24.8		
	5	5F	9	10	10	7.4	8.3	7.5	7.7	24.9		
	6	5	9	10	10	7.5	8.3	7.5	7.8	25.0		
	7	5	9	10	10	7.2		7.2		24.8		
100 %	0	10	10	10	10		8.6		7.3	Post: 24.9		231
	1	10	10	10	10	7.6	*8.4	7.2	7.2	25.1		
	2	10	10	10	10	7.5	*8.1	7.3	7.2	24.8		233
	3	10 ✓	10	10	10	7.5	*8.4	7.4	7.4	25.0		
	4	9	10 ✓	10	10	7.6	8.8	7.4	7.5	25.0		234
	5	9	9	10	10	7.4	8.8	7.5	7.6	25.0		
	6	9	9	10	10	7.5	8.5	7.9	7.9	25.0		
	7	9	9	10	10	7.3		7.1		24.9		

✓ Indicates one organism inadvertently poured off during solution renewal, replaced into container.
"M" = organism missing, start count reduced. "Inj" = organism injured, remove from stats.
"F" = fungus noted on dead organisms.
☐ Aeration in test chambers begun @ _____ (Note observations on Test Organism Info sheet)

Pre =Pre-renewal solutions. Post =Post-renewal solutions.
Day 0 Temperatures = Post-renewals
Therm ID# = Thermometer ID used for all measurements that day.
(23.8) = Temp. out of recommended range

*Post Shakedown DY 6/22/22 / DY 6/23/22 / DY 6/24/22

FATHEAD MINNOW 7-DAY GROWTH DATA

Client: Pogo | Tins Labeled As: Pogo

Lab ID: B5386 | Start Date: 6/21/2022

Sample Description:

Technician:	KG	KG
Date:	7/4/2022	6/27/2022
Balance Serial #:	B328543647	B328543647

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A	845.38	839.20	10
	B	829.63	823.62	9
	C	777.47	770.39	10
	D	830.78	823.39	10
6.25 %	A	843.71	837.94	10
	B	797.12	791.29	10
	C	767.13	759.92	10
	D	772.09	765.38	10
12.5 %	A	775.11	768.02	10
	B	775.07	768.58	10
	C	819.62	812.74	10
	D	800.41	793.58	10
25 %	A	803.59	797.78	9 of 9
	B	797.47	791.03	9
	C	818.98	811.61	10
	D	828.82	821.53	10
50 %	A	816.12	810.92	5
	B	836.96	830.76	9
	C	822.28	814.99	10
	D	825.31	818.98	10
100 %	A	825.74	819.55	9
	B	815.13	808.93	9
	C	801.64	795.50	10
	D	807.18	797.95	10
	A			
	B			
	C			
	D			

weigh to 0.01 mg

FATHEAD MINNOW 7-DAY GROWTH DATA

Client: Pogo | Tins Labeled As: Pogo

Lab ID: B5386 | Start Date: 6/21/2022

Sample Description:

Technician:		KG
Date:		6/27/2022
Balance Serial #:	B328543647	B328543647

Percent	Replicate	Total Weight (mg)	Tare Weight (mg)	No. of Fish
Control	A		839.20	10
	B		823.62	9
	C		770.39	10
	D		823.39	10
6.25 %	A		837.94	10
	B		791.29	10
	C		759.92	10
	D		765.38	10
12.5 %	A		768.02	10
	B		768.58	10
	C		812.74	10
	D		793.58	10
25 %	A		797.78	9 of 9
	B		791.03	9
	C		811.61	10
	D		821.53	10
50 %	A		810.92	5
	B		830.76	9
	C		814.99	10
	D		818.98	10
100 %	A		819.55	9
	B		808.93	9
	C		795.50	10
	D		797.95	10
	A			
	B			
	C			
	D			

weigh to 0.01 mg

Fathead Minnow 7-d Larval Survival and Growth Test — **Eurofins TestAmerica - Corvallis**

Batch ID:	02-7580-8059	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Michelle Bennett		
Start Date:	21 Jun-22 15:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	28 Jun-22 10:08	**Species:**	Pimephales promelas	**Brine:**			
Test Length:	6d 19h	**Taxon:**	Actinopterygii	**Source:**	Aquatox, AR	**Age:**	1D
Sample ID:	08-7978-6409	**Code:**	B5386-01	**Project:**			
Sample Date:	20 Jun-22 05:22	**Material:**	Mining Discharge/Runoff	**Source:**	Northern Star (Pogo) LLC (AK0053341		
Receipt Date:	21 Jun-22 12:22	**CAS (PC):**		**Station:**			
Sample Age:	34h (3.1 °C)	**Client:**					

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
02-3191-1419	7d Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	15.2%	1	1
00-3684-9943	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test		100	>100	---	21.7%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
04-2379-2816	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)		IC25	>100	---	---	<1	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
02-3191-1419	7d Survival Rate	Control Resp	0.975	0.8	>>	Yes	Passes Criteria
00-3684-9943	Mean Dry Biomass-mg	Control Resp	0.6665	0.25	>>	Yes	Passes Criteria
04-2379-2816	Mean Dry Biomass-mg	Control Resp	0.6665	0.25	>>	Yes	Passes Criteria
00-3684-9943	Mean Dry Biomass-mg	PMSD	0.2169	0.12	0.3	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.9750	0.8954	1.0550	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	-2.56%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	-2.56%
25		4	0.9750	0.8954	1.0550	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
50		4	0.8500	0.4712	1.2290	0.5000	1.0000	0.1190	0.2380	28.01%	12.82%
100		4	0.9500	0.8581	1.0420	0.9000	1.0000	0.0289	0.0577	6.08%	2.56%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.6665	0.5593	0.7737	0.601	0.739	0.03369	0.06738	10.11%	0.00%
6.25		4	0.638	0.5265	0.7495	0.577	0.721	0.03503	0.07006	10.98%	4.28%
12.5		4	0.6822	0.6427	0.7218	0.649	0.709	0.01243	0.02486	3.64%	-2.36%
25		4	0.6889	0.6077	0.7701	0.644	0.737	0.02552	0.05104	7.41%	-3.36%
50		4	0.6255	0.4895	0.7615	0.52	0.729	0.04275	0.0855	13.67%	6.15%
100		4	0.694	0.451	0.937	0.614	0.923	0.07634	0.1527	22.00%	-4.13%

Fathead Minnow 7-d Larval Survival and Growth Test **Eurofins TestAmerica - Corvallis**

7d Survival Rate Detail MD5: E4B2B557FC535DD6C0D0E1BA3E26F640

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	0.9000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	0.9000	1.0000	1.0000
50		0.5000	0.9000	1.0000	1.0000
100		0.9000	0.9000	1.0000	1.0000

Mean Dry Biomass-mg Detail MD5: FDBA1C11A2E4526A32CA4D3322537D0C

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.618	0.601	0.708	0.739
6.25		0.577	0.583	0.721	0.671
12.5		0.709	0.649	0.688	0.683
25		0.6456	0.644	0.737	0.729
50		0.52	0.62	0.729	0.633
100		0.619	0.62	0.614	0.923

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	9/10	10/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		9/9	9/10	10/10	10/10
50		5/10	9/10	10/10	10/10
100		9/10	9/10	10/10	10/10

Fathead Minnow 7-d Larval Survival and Growth Test — **Eurofins TestAmerica - Corvallis**

Analysis ID:	02-3191-1419	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	20 Jul-22 13:13	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	20 Jul-22 13:12	**MD5 Hash:**	E4B2B557FC535DD6C0D0E1BA3E26F640	**Editor ID:**	000-042-882-4

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.1485	15.23%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	20	10	1	6	CDF	0.9516	Non-Significant Effect
		12.5	20	10	1	6	CDF	0.9516	Non-Significant Effect
		25	18	10	2	6	CDF	0.8333	Non-Significant Effect
		50	15.5	10	2	6	CDF	0.5438	Non-Significant Effect
		100	16	10	2	6	CDF	0.6105	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.108806	0.0217611	5	1.19	0.3528	Non-Significant Effect
Error	0.329095	0.0182831	18			
Total	0.437901		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.7933	0.884	0.0002	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%
25		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
50		4	0.8500	0.4712	1.0000	0.9500	0.5000	1.0000	0.1190	28.01%	12.82%
100		4	0.9500	0.8581	1.0000	0.9500	0.9000	1.0000	0.0289	6.08%	2.56%

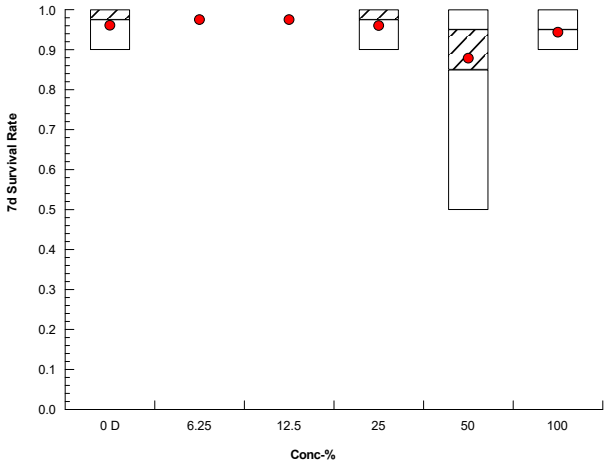
Angular (Corrected) Transformed Summary

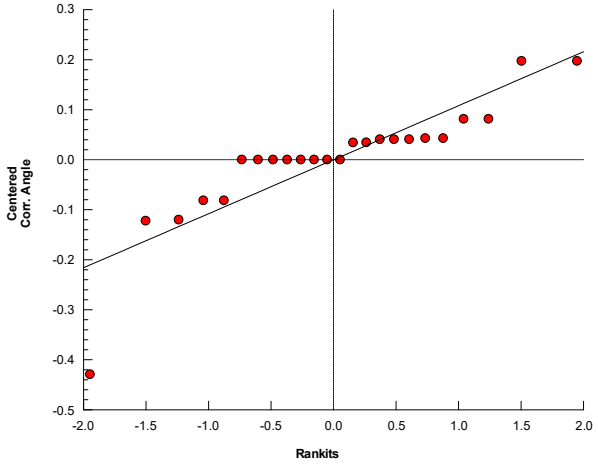
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.3710	1.2420	1.5010	1.4120	1.2490	1.4120	0.0407	5.94%	0.00%
6.25		4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	-2.97%
12.5		4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	-2.97%
25		4	1.3690	1.2420	1.4970	1.4080	1.2490	1.4120	0.0401	5.85%	0.16%
50		4	1.2150	0.7432	1.6860	1.3310	0.7854	1.4120	0.1481	24.39%	11.42%
100		4	1.3310	1.1810	1.4800	1.3310	1.2490	1.4120	0.0471	7.07%	2.97%

Fathead Minnow 7-d Larval Survival and Growth Test **Eurofins TestAmerica - Corvallis**

Analysis ID:	02-3191-1419	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	20 Jul-22 13:13	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	20 Jul-22 13:12	**MD5 Hash:**	E4B2B557FC535DD6C0D0E1BA3E26F640	**Editor ID:**	000-042-882-4

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Eurofins TestAmerica - Corvallis**

Analysis ID:	00-3684-9943	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.7
Analyzed:	20 Jul-22 13:13	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	20 Jul-22 13:12	**MD5 Hash:**	FDBA1C11A2E4526A32CA4D3322537D0C	**Editor ID:**	000-042-882-4

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	0.1446	21.69%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	0.4744	2.407	0.145	6	CDF	0.6586	Non-Significant Effect
		12.5	-0.2622	2.407	0.145	6	CDF	0.8989	Non-Significant Effect
		25	-0.3727	2.407	0.145	6	CDF	0.9199	Non-Significant Effect
		50	0.6825	2.407	0.145	6	CDF	0.5660	Non-Significant Effect
		100	-0.4578	2.407	0.145	6	CDF	0.9336	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0159836	0.0031967	5	0.443	0.8127	Non-Significant Effect
Error	0.129886	0.0072159	18			
Total	0.14587		23			

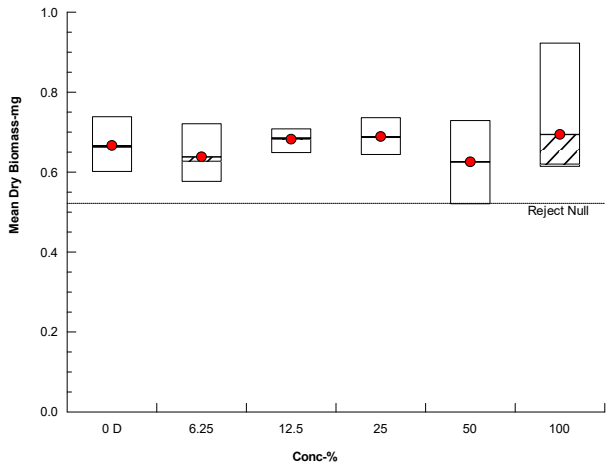
ANOVA Assumptions Tests

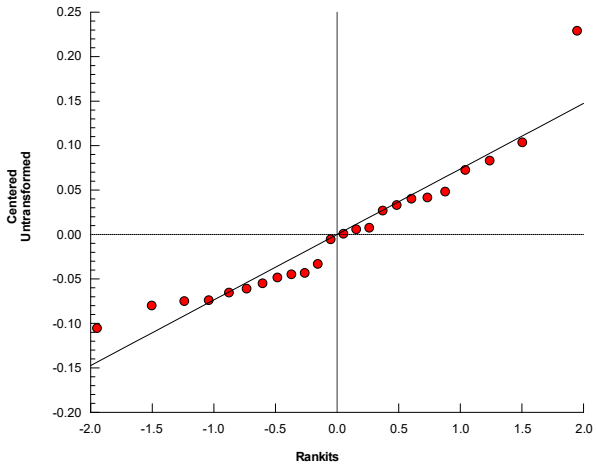
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	8.336	15.09	0.1387	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9128	0.884	0.0406	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	0.6665	0.5593	0.7737	0.663	0.601	0.739	0.03369	10.11%	0.00%
6.25		4	0.638	0.5265	0.7495	0.627	0.577	0.721	0.03503	10.98%	4.28%
12.5		4	0.6822	0.6427	0.7218	0.6855	0.649	0.709	0.01243	3.64%	-2.36%
25		4	0.6889	0.6077	0.7701	0.6873	0.644	0.737	0.02552	7.41%	-3.36%
50		4	0.6255	0.4895	0.7615	0.6265	0.52	0.729	0.04275	13.67%	6.15%
100		4	0.694	0.451	0.937	0.6195	0.614	0.923	0.07634	22.00%	-4.13%

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Eurofins TestAmerica - Corvallis**

Analysis ID:	04-2379-2816	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.7
Analyzed:	20 Jul-22 13:13	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	20 Jul-22 13:12	**MD5 Hash:**	FDBA1C11A2E4526A32CA4D3322537D0C	**Editor ID:**	000-042-882-4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2145904	200	Yes	Two-Point Interpolation

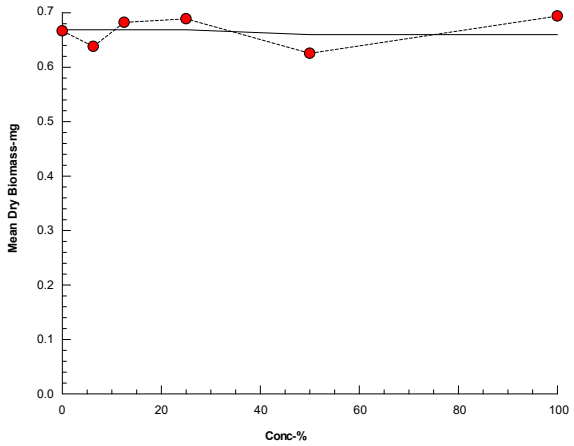
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>100	---	---	<1	---	---

Mean Dry Biomass-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	D	4	0.6665	0.663	0.601	0.739	10.11%	0.00%	0.6689	0.00%
6.25		4	0.638	0.627	0.577	0.721	10.98%	4.28%	0.6689	0.00%
12.5		4	0.6822	0.6855	0.649	0.709	3.64%	-2.36%	0.6689	0.00%
25		4	0.6889	0.6873	0.644	0.737	7.41%	-3.36%	0.6689	0.00%
50		4	0.6255	0.6265	0.52	0.729	13.67%	6.15%	0.6598	1.37%
100		4	0.694	0.6195	0.614	0.923	22.00%	-4.13%	0.6598	1.37%

Graphics



APPENDIX B

REFERENCE TOXICANT DATA SHEETS

FATHEAD MINNOW 7-DAY SURVIVAL AND WATER QUALITY DATA

Random Template Used: 6 conc. x 4 reps. # 11 | Waterbath/incubator Used: # 10 | Date Initiated 6/21/2022 Time 15:23

Stock Sol. ID S B003 -060 | Date Terminated 6/28/2022 Time 09:36

Organism ID: FHM 2225 | Test Container Size: 800 ml | Solution Volume / rep: 500 ml

Client: QA / QC - RefTox | Sample Description: KCl (50 g/L stock)

Tech: Day 0 DY | Day 1 DY | Day 2 DY | Day 3 DY | Day 4 KG | Day 5 KG | Day 6 KG | Day 7 DY

Time: Day 0 1435 | Day 1 1208 | Day 2 1543 | Day 3 1555 | Day 4 1405 | Day 5 1420 | Day 6 1440 | Day 7 0936

Conc. or Percent	Day	Number of Live Organisms A	B	C	D	Dissolved O_2 (mg/l) Pre	Post	pH Pre	Post	Temp. (°C) Pre	Therm. ID #	Conductivity (µS) Post (daily)
Control	0	10	10	10	10		8.0		7.6	Post 25.0	250	302
	1	10	10	10	10	7.4	8.1	7.3	7.7	25.0	256	299
	2	10	10	10	10	7.4	7.8	7.3	7.9	25.0	260	321
	3	10	10	10	10	7.6	7.9	7.6	7.7	25.0	250	322
	4	10	10	10	10	7.6	8.0	7.5	7.8	25.0	278	307
	5	10	10	10	10	7.4	8.0	7.4	7.9	25.0	250	317
	6	10	10	10	10	7.5	8.1	7.4	8.0	25.0	250	320
	7	10	10	10	10	7.2		7.4		25.0	250	
0.25 g/L	0	10	10	10	10		8.0		7.6	Post 25.0		754
	1	9	10	10	10	7.4	8.2	7.3	7.6	25.0		716
	2	9	10	10	10	7.4	8.0	7.3	7.7	25.0		777
	3	9 ✓	10	10	10	7.6	8.1	7.6	8.0	24.9		792
	4	9	10	10	10	7.6	8.1	7.6	7.8	24.9		760
	5	9	10	10	10	7.4	8.0	7.5	7.8	25.0		764
	6	9	10	10	10	7.3	8.1	7.4	8.0	25.0		710
	7	9	10	10	10	7.2		7.4		24.9 Post DY		
0.50 g/L	0	10	10	10	10		8.0		7.8	Post 25.1 DY		1204
	1	10	8	10	10	7.5	8.3	7.4	7.6	25.1		1209
	2	10	8	10	10	7.4	8.0	7.4	8.0	25.1		1238
	3	10	8	10	10	7.6	8.1	7.6	8.0	24.9		1250
	4	10	8	10	10	7.5	8.1	7.6	7.8	25.0		1208
	5	10	8	10	10	7.5	8.1	7.7	7.9	25.0		1231
	6	10	8	10	10	7.5	8.1	7.6	8.1	25.0		1225
	7	10	8	10	10	7.3		7.5		25.0		
1.0 g/L	0	~~10~~ 9	10	10	10		7.8		7.8	Post 25.1		2090
	1	3 M	1	6	5	7.6	8.3	7.5	7.7	25.1		2100
	2	2	1	6	3	7.7	8.0	7.6	8.6	25.0		2100
	3	1	1	6	3	7.8	8.2	7.8	8.0	25.0		2160
	4	1	1	5	0	7.6	8.2	7.7	7.8	25.0		2080
	5	1	0	3		7.2	8.1	7.6	7.9	25.0		2110
	6	1	1	3		7.8	8.2	7.6	8.1	25.0		2109
	7	1	1	3		7.3		7.5		25.0		
2.0 g/L	0	10	10	10	10		7.9		7.8	Post 25.0		3790
	1	0	0	0	1	7.7	8.3	7.5	7.7	25.0		3820
	2				1	7.8	8.0	7.7	8.0	25.0		3790
	3				0	7.8	8.2	7.8	8.0	25.1		3800
	4					~~7.7~~ *	~~8.1~~ *	~~7.7~~ *	~~7.9~~ *	~~25.0~~ *		
	5											
	6											
	7											
4.0 g/L	0	10	10	10	10		7.9		7.8	Post 25.1		6940
	1	0	0	0	0	7.7		7.6		25.0		7160
	2											
	3											
	4											
	5											
	6											
	7											

✓ Indicates one organism inadvertently poured off during solution renewal, replaced into container.

"M" = organism missing, start count reduced. "Inj" = organism injured, remove from stats.

"F" = fungus noted on dead organisms.

Pre =Pre-renewal solutions. Post =Post-renewal solutions.

Day 0 Temperatures = Post-renewals

Therm ID# = Thermometer ID used for all measurements that day.

(23.8) = Temp. out of recommended range

Endpoint		Cusum Chart Limits	
Survival - EC_{25}	0.61	0.59 to	0.68
Growth - IC_{25}	0.63	0.45 to	0.73

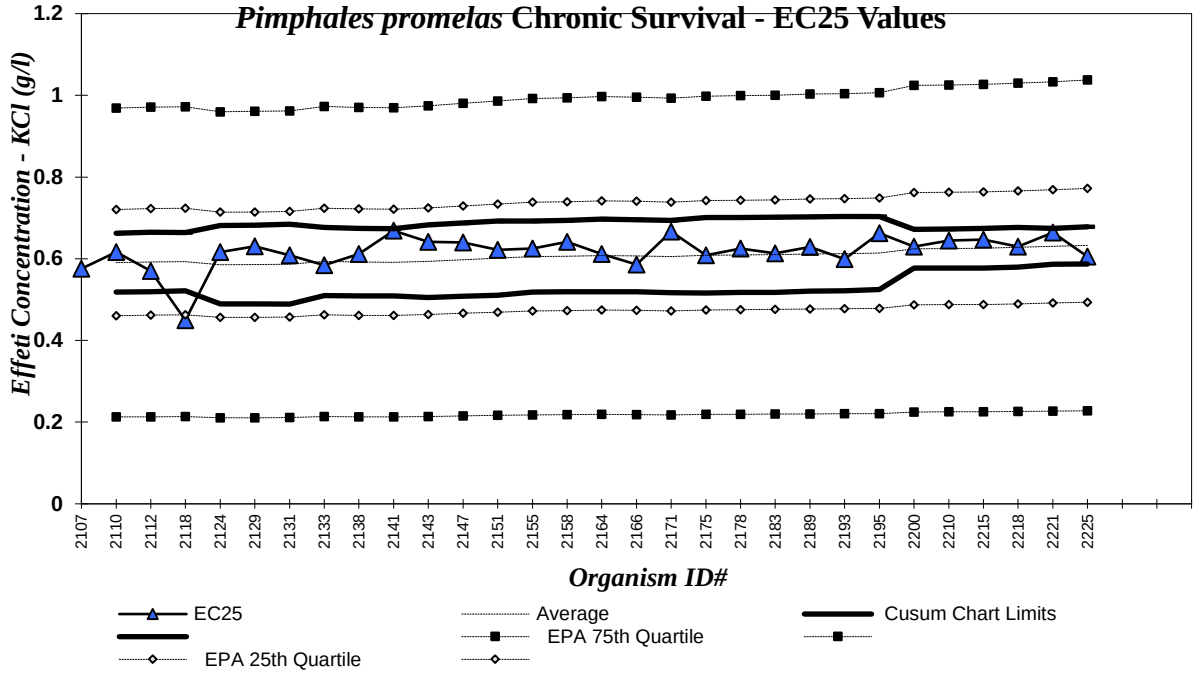
Task Manager: Tori

Project Manager: Tori

QA Officer: MB

REFERENCE TOXICANT CUMLATIVE SUMMARY (CUSUM) CHART

***Pimphales promelas* Chronic Survival - EC25 Values**



***Pimephales promelas* - Chronic (EPA Test Method 1000.0)**

POTASSIUM CHLORIDE (g/L)

Endpoint: Chronic Survival

Stats Method: Linear Interpolation

Test Conditions: Recon MH, 25 oC

From EPA 833-R-00-003:

10th Quartile CV (*control limit*) = 0.03

25th Quartile CV (*warning limit*) = 0.11

75th Quartile CV (*warning limit*) = 0.32

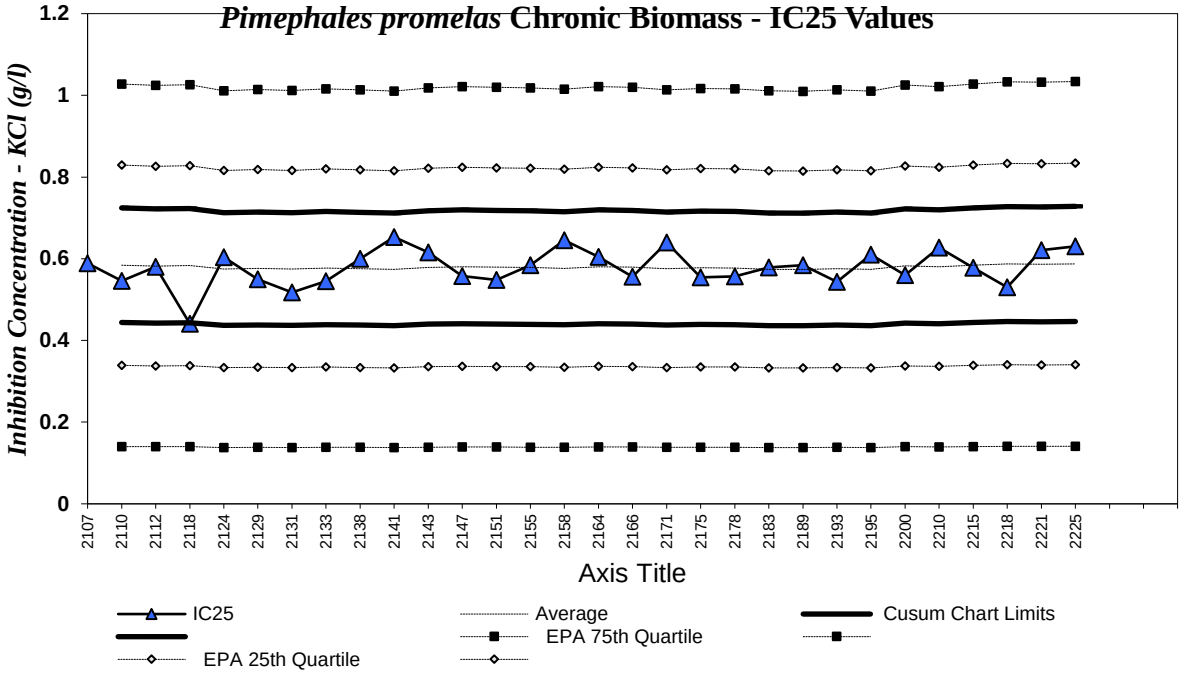
90th Quartile CV (*control limit*) = 0.52

Intralab CV is compared to EPA ***Warning limits*** *(25th and 75th CV's) and* ***Control limits*** *(10th and 90th CV's), If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.*

Event #	FHM ID #	Test Start Date	EC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
76	2178	9/9/2021	**0.63**	0.6	0.05	**0.52**	**0.70**	0.08
77	2183	9/28/2021	**0.61**	0.6	0.05	**0.52**	**0.70**	0.07
78	2189	11/2/2021	**0.63**	0.6	0.05	**0.52**	**0.70**	0.07
79	2193	11/16/2021	**0.60**	0.6	0.05	**0.52**	**0.70**	0.07
80	2195	12/7/2021	**0.66**	0.6	0.04	**0.52**	**0.70**	0.04
81	2200	1/25/2022	**0.63**	0.6	0.02	**0.58**	**0.67**	0.04
82	2210	3/8/2022	**0.64**	0.6	0.02	**0.58**	**0.67**	0.04
83	2215	4/19/2022	**0.65**	0.6	0.02	**0.58**	**0.67**	0.04
84	2218	5/10/2022	**0.63**	0.6	0.02	**0.58**	**0.68**	0.03
85	2221	6/3/2022	**0.66**	0.6	0.02	**0.59**	**0.67**	0.04
86	2225	6/21/2022	**0.61**	0.6	0.02	**0.59**	**0.68**	0.03

REFERENCE TOXICANT CUMLATIVE SUMMARY (CUSUM) CHART

***Pimephales promelas* Chronic Biomass - IC25 Values**



Pimephales promelas - Chronic (EPA Test Method 1000.0)

POTASSIUM CHLORIDE (g/L)

Endpoint: Chronic Growth (Biomass)

Stats Method: Linear Interpolation

Test Conditions: Recon MH, 25 oC

From EPA 833-R-00-003:

10th Quartile CV (*control limit*) =	0.12
25th Quartile CV (*warning limit*) =	0.21
75th Quartile CV (*warning limit*) =	0.38
90th Quartile CV (*control limit*) =	0.45

Intralab CV is compared to EPA ***Warning limits*** *(25th and 75th CV's) and* ***Control limits*** *(10th and 90th CV's), If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.*

Event #	FHM ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits		Intralab CV
						AVG-2SD	AVG+2SD	
79	2193	11/16/2021	**0.54**	0.58	0.05	**0.44**	**0.71**	0.09
80	2195	12/7/2021	**0.61**	0.57	0.05	**0.44**	**0.71**	0.07
81	2200	1/25/2022	**0.56**	0.58	0.04	**0.44**	**0.72**	0.07
82	2210	3/8/2022	**0.63**	0.58	0.04	**0.44**	**0.72**	0.07
83	2215	4/19/2022	**0.58**	0.58	0.04	**0.44**	**0.72**	0.06
84	2218	5/10/2022	**0.53**	0.59	0.04	**0.45**	**0.73**	0.06
85	2221	6/3/2022	**0.62**	0.59	0.04	**0.45**	**0.73**	0.06
86	2225	6/21/2022	**0.63**	0.59	0.04	**0.45**	**0.73**	0.06
87								
88								

APPENDIX C

CHAIN OF CUSTODY

eurofins | Environment Testing America

Sample Receipt Record

Batch Number: BS3340-01 Date Received: 6/21/22

Client/Project: Pogo Received By: TC

Were custody seals intact? [X] Yes [ ] No [ ] N/A

Packing Material: [X] Ic [X] Blue Ic [ ] Box

Temperature: Digital Therm ID: 264 Expires: 9/9/2022 Observed: 2.6, 3.1 °C

- OR - (for solid samples) IR Therm ID: Expires: / /20 Observed: °C

IR Gun Daily Offset: °C

Corrected Sample Temperature (IR Observed + IR Offset): °C

Is Temp OK? (≤ 6.0 °C) [X] Yes [ ] No [ ] N/A

If sample is noted @ ≤ 0.0 °C, is the sample frozen or partially frozen? [ ] Yes [ ] No [X] N/A

Was a Chain of Custody (CoC) Provided? [X] Yes [ ] No [ ] N/A

Was the CoC correctly filled out? (If No, document below) [X] Yes [ ] No [ ] N/A

Were the sample containers in good condition (not broken or leaking)? [X] Yes [ ] No [ ] N/A

Are all samples within 36 hours of collection? [X] Yes [ ] No [ ] N/A

Method of Shipment: [ ] Hand Delivered, [ ] FedEx, [ ] UPS, [X] Other: Air Cargo [ ] N/A

Sample Exception Report (The following exceptions were noted)

Client was notified on: Client contact:

Resolution to Exception:

CHAIN OF CUSTODY RECORD - FOR AQUATIC TOXICITY TESTING

eurofins | Eurofins Environment Testing Northwest, LLC

Client: Northern Star (Pogo) LLC NPDES# AK 0053341

Address: PO Box 145
Delta Junction, AK 99737

Contact Person: Nathan Kehne

Phone: 907-895-2760

PO# 2040672

Composite Sample Information	
Samples/Hour	Volume/Sample
Total Hours	Total Volume
Initiated: Date	Time
Ended: Date	Time
Chilled During Collection	

Ship Samples to:

Eurofins Environment Testing NW
Attention: Aquatic Toxicology Laboratory
1100 NE Circle Blvd. Suite 310
Corvallis, OR 97330
Phone: 541-243-6137

Analysis Required / Comments

Sample ID	Date	Time	Sample Type Comp.	Sample Type Grab	# of Containers	Lab ID#	Fathead Acute	Fathead Chronic	Cerio Acute	Cerio Chronic	Daphnia Acute	Trout Acute	SHM Acute	SHM Chronic	MB Acute	MB Chronic	MYS Acute	MYS Chronic	Algae	CA Haz Waste	WA Haz Waste			Concentration and/or Comments
Outfall001-WET	6/20/22	06:22		✓	2	B533601	✓	✓																

Sampled By & Title (Please sign and print name) Nathan Kehne - Env. Coordinator	Date/Time 6/20/22 07:00	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name) Joel Cummins	Date/Time 6/21/22 1222	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Shipped Via UPS___ Bus___ Fed-Ex___ Hand___ Other___	Shipping # COC_Bioassay_as of 020522
Work Authorized By (Please sign and print name)	Remarks		Doc Control ID: ASL612-0519

027 FAI 6342 7652 027-6342 7652

Shipper's Name and Address
Northern Star (Pogo) LLC
Mile 50 Pogo Mile Road
Delta Junction, AK 99737
USA
Tel: 9076873579

Shipper's Account Number: 27442486983
Customer's ID Number: 48927

Not Negotiable
Air Waybill
Issued By: Alaska AIR CARGO
P.O. BOX 68900 SEATTLE, WA 98168
800-225-2752 ALASKACARGO.COM

Consignee's Name and Address
CITY DELIVERY SERVIC
PO BOX 311
CORVALLIS, OREGON 97339
USA
Tel: 541 926 7300

Consignee's Account Number:

Also notify
Tel:

Issuing Carrier's Agent and City:

Accounting Information: 48927
Northern Star (Pogo) LLC
Mile 50 Pogo Mile Road
Delta Junction, AK 99737
USA

SRN/2040672
GoldStreak

Agent's IATA Code:
Account No.:

Airport of Departure (Addr. of First Carrier) and Requested Routing
Fairbanks

To	By First Carrier	To / By	To / By	Currency	WT/VAL	Other	Declared Value For Carriage	Declared Value For Customs
SEA	Alaska Airlines	PDX	AS	USD	PX X	X	NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance
Portland	AS 594/21	AS 2266/21	XXX

Handling Information
NOA 541-926-7300
STORE IN COOLER WHEN POSSIBLE

SCI

No of Pieces	Gross Weight	kg lb	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	74.0	L Q		74.0		AS AGREED	WATER SAMPLES Dims: 12 x 22 x13 x 1 GSX COL
1	74.0					AS AGREED	Volume: 1.986

Prepaid	Weight Charge	Collect	Other Charges
	AS AGREED		XBC 12.50
Valuation Charge			
Tax			
Total Other Charges Due Agent			
Total Other Charges Due Carrier			
Total Prepaid	Total Collect		
AS AGREED			

Shipper certifies that the particulars on the face hereof are correct and that **insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.**

For: Northern Star (Pogo) LLC

Signature of Shipper or his Agent

KK THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

☐ THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

20 Jun 2022 10:23 — Executed On (Date)
Fairbanks — at (Place)
Alaska Airlines — Signature of Issuing Carrier or its Agent

027-6342 7652

eurofins | Environment Testing America

Sample Receipt Record

Batch Number: B53960-02 Date Received: 6/23/22

Client/Project: Pogo Received By: TC

Were custody seals intact? [X] Yes [ ] No [ ] N/A

Packing Material: [ ] Ice [X] Blue Ice [ ] Box

Temperature: Digital Therm ID: 26U Expires: ~~6~~ 9/9/2022 /20 Observed: 7.6 3.1 °C

Is Temp OK? (≤ 6.0 °C) [X] Yes [ ] No [ ] N/A

2nd TC 6/23

- OR - (for solid samples) IR Therm ID: Expires: / /20 Observed: °C

IR Gun Daily Offset: °C

Corrected Sample Temperature (IR Observed + IR Offset): °C

If sample is noted @ ≤ 0.0 °C, is the sample frozen or partially frozen? [ ] Yes [ ] No [X] N/A

Was a Chain of Custody (CoC) Provided? [X] Yes [ ] No [ ] N/A

Was the CoC correctly filled out? (If No, document below) [X] Yes [ ] No [ ] N/A

Were the sample containers in good condition (not broken or leaking)? [X] Yes [ ] No [ ] N/A

Are all samples within 36 hours of collection? [X] Yes [ ] No [ ] N/A

Method of Shipment: [ ] Hand Delivered, [ ] FedEx, [ ] UPS, [X] Other: Air cargo [ ] N/A

Sample Exception Report (The following exceptions were noted)

Client was notified on: Client contact:

Resolution to Exception:

CHAIN OF CUSTODY RECORD - FOR AQUATIC TOXICITY TESTING

eurofins | Eurofins Environment Testing Northwest, LLC

Client: Northern Star (Pogo) LLC NPDES# AK 0053341

Address: Po Box 145
Delta Junction, AK 99737

Contact Person: Nathan Kehoe
Phone: 907-895-2760

PO# 2040672

Composite Sample Information
Samples/Hour _____ Volume/Sample _____
Total Hours _____ Total Volume _____
Initiated: Date _____ Time _____
Ended: Date _____ Time _____
Chilled During Collection _____

Ship Samples to:
Eurofins Environment Testing NW
Attention: Aquatic Toxicology Laboratory
1100 NE Circle Blvd. Suite 310
Corvallis, OR 97330
Phone: 541-243-6137

Analysis Required / Comments

Sample ID	Date	Time	Sample Type Comp.	Sample Type Grab	# of Containers	Lab ID#	Fathead Acute	Fathead Chronic	Cerio Acute	Cerio Chronic	Daphnia Acute	Trout Acute	SHM Acute	SHM Chronic	MB Acute	MB Chronic	MYS Acute	MYS Chronic	Algae	CA Haz Waste	WA Haz Waste			Concentration and/or Comments
MAJ 6/24/22 Outfall-off wet	6/22/22	06:27		✓	2	B932600	✓	✓																
Outfall001-WET																								

Sampled By & Title (Please sign and print name) Matthew Drews Enviro Spec. MD	Date/Time 6/22/22 7:30	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name) Tovi Crumrine	Date/Time 6/23/22 1205	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Shipped Via UPS___ Bus___ Fed-Ex___ Hand___ Other___	Shipping # COC_Bioassay_as of 020522
Work Authorized By (Please sign and print name)	Remarks		Doc Control ID: ASL612-0519

eurofins | Environment Testing America

Sample Receipt Record

Batch Number: B 5386-03 Date Received: 6/28/22

Client/Project: Northern Star - Pogo Received By: DY

Were custody seals intact? ☑ Yes ☐ No ☐ N/A

Packing Material: ☐ Ic ☑ Blue Ice ☐ Box

Temperature: Digital Therm ID: 264 Expires: 9 / 9 /2022 Observed: 2.3 2.6 °C

Is Temp OK? (≤ 6.0 °C) ☑ Yes ☐ No ☐ N/A

- OR - (for solid samples) IR Therm ID: Expires: / /20 Observed: °C

IR Gun Daily Offset: °C

Corrected Sample Temperature (IR Observed + IR Offset): °C

If sample is noted @ ≤ 0.0 °C, is the sample frozen or partially frozen? ☐ Yes ☐ No ☑ N/A

Was a Chain of Custody (CoC) Provided? ☑ Yes ☐ No ☐ N/A

Was the CoC correctly filled out? (If No, document below) ☑ Yes ☐ No ☐ N/A

Were the sample containers in good condition (not broken or leaking)? ☑ Yes ☐ No ☐ N/A

Are all samples within 36 hours of collection? ☑ Yes ☐ No ☐ N/A

Method of Shipment: ☑ Hand Delivered, ☐ FedEx, ☐ UPS, ☑ Other: Air Cargo ☐ N/A

Sample Exception Report (The following exceptions were noted)

Client was notified on: Client contact:

Resolution to Exception:

CHAIN OF CUSTODY RECORD - FOR AQUATIC TOXICITY TESTING

eurofins | Eurofins Environment Testing Northwest, LLC

Client: Northern Star (Pogo) LLC NPDES# AK 0053341

Address: PO Box 145
Delta Junction, AK 99737

Contact Person: Nathan Kehoe

Phone: 907-895-2760

PO# 2040672

Composite Sample Information
Samples/Hour _____ Volume/Sample _____
Total Hours _____ Total Volume _____
Initiated: Date _____ Time _____
Ended: Date _____ Time _____
Chilled During Collection _____

Ship Samples to:
Eurofins Environment Testing NW
Attention: Aquatic Toxicology Laboratory
1100 NE Circle Blvd. Suite 310
Corvallis, OR 97330
Phone: 541-243-6137

Analysis Required / Comments

Sample ID	Date	Time	Sample Type Comp.	Sample Type Grab	# of Containers	Lab ID#	Fathead Acute	Fathead Chronic	Cerio Acute	Cerio Chronic	Daphnia Acute	Trout Acute	SHM Acute	SHM Chronic	MB Acute	MB Chronic	MYS Acute	MYS Chronic	Algae	CA Haz Waste	WA Haz Waste			Concentration and/or Comments
OutFall001-WET	6/24/22	06:32		✓	2	85386-03	✓	✓																

Sampled By & Title: Nathan Kehoe - Env. Coordinator (Please sign and print name)		Date/Time: 6/24/22 07:20	Relinquished By (Please sign and print name)	Date/Time
Received By: Daisy Youngas (Please sign and print name)		Date/Time: 6/25/22 0945	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)		Date/Time	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)		Date/Time	Shipped Via: UPS___ Bus___ Fed-Ex___ Hand___ Other___	Shipping # COC_Bioassay_as of 020522
Work Authorized By (Please sign and print name)		Remarks		Doc Control ID: ASL612-0519

027 FAI 6342 7674 027-6342 7674

Shipper's Name and Address
Northern Star (Pogo) LLC
Mile 50 Pogo Mile Road
Delta Junction, AK 99737
USA
Tel: 9076873579

Shipper's Account Number: 27442486983
Customer's ID Number: 48927

Not Negotiable
Air Waybill
Issued By: Alaska AIR CARGO
P.O. BOX 68900 SEATTLE, WA 98168
800-225-2752 ALASKACARGO.COM

Consignee's Name and Address
CITY DELIVERY SERVIC
PO BOX 311
CORVALLIS, OR 97339
USA
Tel: 541 926 7300

Consignee's Account Number:

Also notify
Tel:

Issuing Carrier's Agent and City:

Agent's IATA Code:

Account No.:

Airport of Departure (Addr. of First Carrier) and Requested Routing
Fairbanks

Accounting Information 48927
Northern Star (Pogo) LLC
Mile 50 Pogo Mile Road
Delta Junction, AK 99737
USA

SRN/2040672
GoldStreak

To	By First Carrier	To / By		To / By	Currency		WT/VAL		Other		Declared Value For Carriage	Declared Value For Customs
SEA	Alaska Airlines	PDX	AS		USD	PX	X		X		NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance
Portland	AS 124/24	AS 511/25	XXX

Handling Information
STORE IN COOLER WHEN POSSIBLE

SCI

No of Pieces	Gross Weight	kg lb	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	75.0	L Q		75.0		AS AGREED	WATER SAMPLES Dims: 24 x 13 x14 x 1 GSX COL
1	75.0					AS AGREED	Volume: 2.528

Prepaid	Weight Charge	Collect	Other Charges
AS AGREED			XBC 12.50

Valuation Charge:

Tax:

Total Other Charges Due Agent:

Total Other Charges Due Carrier:

Shipper certifies that the particulars on the face hereof are correct and that **insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.**

For: Northern Star (Pogo) LLC

Signature of Shipper or his Agent

NR THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

☐ THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

Total Prepaid	Total Collect
AS AGREED	

24 Jun 2022 10:50 — Executed On (Date)
Fairbanks — at (Place)
Alaska Airlines — Signature of Issuing Carrier or its Agent

027-6342 7674

APPENDIX E –

2022 FISH TISSUE TESTING

LABORATORY REPORTS

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-118295-1
Client Project/Site: Chinook - Discrete and Composites-2022

For:
Northern Star (Pogo) LLC
PO BOX 145
Delta Junction, Alaska 99737

Attn: Nathan Kehoe

Authorized for release by:
10/19/2022 4:06:24 PM

Sheri Cruz, Project Manager I
(253)922-2310
Sheri.Cruz@et.eurofinsus.com

Table of Contents

Job ID: 580-118295-1

Laboratory: Eurofins Seattle

Narrative

CASE NARRATIVE

Client: Northern Star (Pogo) LLC
Project: Chinook - Discrete and Composites-2022
Report Number: 580-118295-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues.

It should be noted that samples with elevated Reporting Limits (RLs) resulting from a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes within the calibration range of the instrument or that reduces the interferences thereby enabling the quantification of target analytes.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 09/27/2022; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was -2.3 C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

RECEIPT EXCEPTIONS
There was a sample designated SW01F01, water, that was actually a fish sample. It is sample SW01F01 (580-118295-14).

Method 7471A: Insufficient sample volume was provided for the following sample for the 7471A analysis: SW01F08 (580-118295-21).

TOTAL METALS (ICPMS)
Samples BAIT (580-118295-1), SW12F01 (580-118295-3), SW12F02 (580-118295-4), SW12F03 (580-118295-5), SW12F04 (580-118295-6), SW12F05 (580-118295-7), SW12F06 (580-118295-8), SW12F07 (580-118295-9), SW12F08 (580-118295-10), SW12F09 (580-118295-11), SW12F10 (580-118295-12), SW12COMP (580-118295-13), SW01F01 (580-118295-14), SW01F02 (580-118295-15), SW01F03 (580-118295-16), SW01F04 (580-118295-17), SW01F05 (580-118295-18), SW01F06 (580-118295-19), SW01F07 (580-118295-20), SW01F08 (580-118295-21), SW01F09 (580-118295-22), SW01F10 (580-118295-23) and SW01COMP (580-118295-24) were analyzed for total metals (ICPMS) in accordance with EPA SW-846 Method 6020. The samples were prepared on 10/11/2022 and analyzed on 10/12/2022 and 10/14/2022.

Samples BAIT (580-118295-1)[10X], SW12F01 (580-118295-3)[10X], SW12F02 (580-118295-4)[10X], SW12F03 (580-118295-5)[10X], SW12F04 (580-118295-6)[10X], SW12F05 (580-118295-7)[10X] and SW12F06 (580-118295-8)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL RECOVERABLE METALS (ICPMS)
Sample SW-FB2 (580-118295-2) was analyzed for total recoverable metals (ICPMS) in accordance with EPA SW-846 Method 6020. The samples were prepared on 10/14/2022 and analyzed on 10/17/2022.

Job ID: 580-118295-1 (Continued)

Laboratory: Eurofins Seattle (Continued)

Sample SW-FB2 (580-118295-2)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL MERCURY

Sample SW-FB2 (580-118295-2) was analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared and analyzed on 10/06/2022.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL MERCURY

Samples BAIT (580-118295-1), SW12F01 (580-118295-3), SW12F02 (580-118295-4), SW12F03 (580-118295-5), SW12F04 (580-118295-6), SW12F05 (580-118295-7), SW12F06 (580-118295-8), SW12F07 (580-118295-9), SW12F08 (580-118295-10), SW12F09 (580-118295-11), SW12F10 (580-118295-12), SW12COMP (580-118295-13), SW01F01 (580-118295-14), SW01F02 (580-118295-15), SW01F03 (580-118295-16), SW01F04 (580-118295-17), SW01F05 (580-118295-18), SW01F06 (580-118295-19), SW01F07 (580-118295-20), SW01F09 (580-118295-22), SW01F10 (580-118295-23) and SW01COMP (580-118295-24) were analyzed for total mercury in accordance with EPA SW-846 Method 7471A. The samples were prepared on 10/11/2022 and analyzed on 10/13/2022 and 10/14/2022.

A deviation from the Standard Operating Procedure (SOP) occurred. Details are as follows: Due to lack of sample volume, an initial mass of less than 0.6g was used. Samples SW12F07 (580-118295-9), SW01F03 (580-118295-16), SW01F04 (580-118295-17), SW01F05 (580-118295-18), SW01F06 (580-118295-19), SW01F07 (580-118295-20), SW01F09 (580-118295-22) and SW01F10 (580-118295-23).

The following sample did not have enough sample volume for an initial mass of 0.6g. SW12F06 (580-118295-8)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: BAIT
Lab Sample ID: 580-118295-1
Date Collected: 09/19/22 15:00
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.24	0.033	mg/Kg		10/11/22 10:55	10/12/22 17:32	10
Arsenic	**0.26**		0.24	0.048	mg/Kg		10/11/22 10:55	10/12/22 17:32	10
Cadmium	ND		0.38	0.037	mg/Kg		10/11/22 10:55	10/12/22 17:32	10
Copper	**56**		0.48	0.11	mg/Kg		10/11/22 10:55	10/12/22 17:32	10
Lead	ND		0.24	0.023	mg/Kg		10/11/22 10:55	10/12/22 17:32	10
Nickel	ND		0.24	0.093	mg/Kg		10/11/22 10:55	10/12/22 17:32	10
Selenium	**2.6**		0.72	0.14	mg/Kg		10/11/22 10:55	10/12/22 17:32	10
Silver	**0.095**	**J**	0.096	0.0096	mg/Kg		10/11/22 10:55	10/12/22 17:32	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.030	0.0089	mg/Kg		10/11/22 10:57	10/13/22 16:30	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW-FB2
Lab Sample ID: 580-118295-2
Date Collected: 09/21/22 10:08
Matrix: Water
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0050	0.0010	mg/L		10/14/22 18:29	10/17/22 14:32	5
Antimony	ND		0.0040	0.00063	mg/L		10/14/22 18:29	10/17/22 14:32	5
Cadmium	ND		0.0020	0.00019	mg/L		10/14/22 18:29	10/17/22 14:32	5
Copper	ND		0.010	0.0030	mg/L		10/14/22 18:29	10/17/22 14:32	5
Lead	**0.00034**	**J**	0.0020	0.00020	mg/L		10/14/22 18:29	10/17/22 14:32	5
Nickel	ND		0.015	0.00063	mg/L		10/14/22 18:29	10/17/22 14:32	5
Selenium	ND		0.040	0.010	mg/L		10/14/22 18:29	10/17/22 14:32	5
Silver	ND		0.0020	0.00013	mg/L		10/14/22 18:29	10/17/22 14:32	5

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030	0.00015	mg/L		10/06/22 11:25	10/06/22 17:53	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F01
Lab Sample ID: 580-118295-3
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:55	10/12/22 17:35	10
Arsenic	ND		0.25	0.050	mg/Kg		10/11/22 10:55	10/12/22 17:35	10
Cadmium	ND		0.40	0.038	mg/Kg		10/11/22 10:55	10/12/22 17:35	10
Copper	**2.2**		0.50	0.11	mg/Kg		10/11/22 10:55	10/12/22 17:35	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:55	10/12/22 17:35	10
Nickel	ND		0.25	0.096	mg/Kg		10/11/22 10:55	10/12/22 17:35	10
Selenium	**0.37**	**J**	0.75	0.14	mg/Kg		10/11/22 10:55	10/12/22 17:35	10
Silver	ND		0.10	0.010	mg/Kg		10/11/22 10:55	10/12/22 17:35	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.011**	**J**	0.025	0.0075	mg/Kg		10/11/22 10:57	10/13/22 16:32	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F02
Lab Sample ID: 580-118295-4
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.033	mg/Kg		10/11/22 10:55	10/12/22 17:39	10
Arsenic	**0.050**	**J**	0.25	0.049	mg/Kg		10/11/22 10:55	10/12/22 17:39	10
Cadmium	ND		0.39	0.038	mg/Kg		10/11/22 10:55	10/12/22 17:39	10
Copper	**0.54**		0.49	0.11	mg/Kg		10/11/22 10:55	10/12/22 17:39	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:55	10/12/22 17:39	10
Nickel	ND		0.25	0.095	mg/Kg		10/11/22 10:55	10/12/22 17:39	10
Selenium	**0.33**	**J**	0.74	0.14	mg/Kg		10/11/22 10:55	10/12/22 17:39	10
Silver	ND		0.098	0.0098	mg/Kg		10/11/22 10:55	10/12/22 17:39	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.019**	**J**	0.028	0.0085	mg/Kg		10/11/22 10:57	10/13/22 16:39	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F03
Lab Sample ID: 580-118295-5
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.24	0.033	mg/Kg		10/11/22 10:55	10/12/22 17:42	10
Arsenic	ND		0.24	0.049	mg/Kg		10/11/22 10:55	10/12/22 17:42	10
Cadmium	ND		0.39	0.038	mg/Kg		10/11/22 10:55	10/12/22 17:42	10
Copper	**0.55**		0.49	0.11	mg/Kg		10/11/22 10:55	10/12/22 17:42	10
Lead	ND		0.24	0.023	mg/Kg		10/11/22 10:55	10/12/22 17:42	10
Nickel	ND		0.24	0.094	mg/Kg		10/11/22 10:55	10/12/22 17:42	10
Selenium	**0.36**	**J**	0.73	0.14	mg/Kg		10/11/22 10:55	10/12/22 17:42	10
Silver	ND		0.098	0.0098	mg/Kg		10/11/22 10:55	10/12/22 17:42	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.024**	**J**	0.028	0.0084	mg/Kg		10/11/22 10:57	10/13/22 16:41	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F04
Lab Sample ID: 580-118295-6
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.23	0.031	mg/Kg		10/11/22 10:55	10/12/22 17:21	10
Arsenic	ND		0.23	0.046	mg/Kg		10/11/22 10:55	10/12/22 17:21	10
Cadmium	ND		0.37	0.035	mg/Kg		10/11/22 10:55	10/12/22 17:21	10
Copper	**0.43**	**J**	0.46	0.10	mg/Kg		10/11/22 10:55	10/12/22 17:21	10
Lead	ND		0.23	0.022	mg/Kg		10/11/22 10:55	10/12/22 17:21	10
Nickel	ND		0.23	0.089	mg/Kg		10/11/22 10:55	10/12/22 17:21	10
Selenium	**0.32**	**J**	0.69	0.13	mg/Kg		10/11/22 10:55	10/12/22 17:21	10
Silver	ND		0.092	0.0092	mg/Kg		10/11/22 10:55	10/12/22 17:21	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.025**	**J**	0.028	0.0083	mg/Kg		10/11/22 10:57	10/13/22 16:43	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F05
Lab Sample ID: 580-118295-7

Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.24	0.033	mg/Kg		10/11/22 10:55	10/12/22 17:25	10
Arsenic	**0.061**	**J**	0.24	0.048	mg/Kg		10/11/22 10:55	10/12/22 17:25	10
Cadmium	ND		0.38	0.037	mg/Kg		10/11/22 10:55	10/12/22 17:25	10
Copper	**0.68**		0.48	0.11	mg/Kg		10/11/22 10:55	10/12/22 17:25	10
Lead	ND		0.24	0.023	mg/Kg		10/11/22 10:55	10/12/22 17:25	10
Nickel	ND		0.24	0.092	mg/Kg		10/11/22 10:55	10/12/22 17:25	10
Selenium	**0.42**	**J**	0.72	0.14	mg/Kg		10/11/22 10:55	10/12/22 17:25	10
Silver	ND		0.096	0.0096	mg/Kg		10/11/22 10:55	10/12/22 17:25	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.026	0.0077	mg/Kg		10/11/22 10:57	10/13/22 16:45	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F06
Lab Sample ID: 580-118295-8
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.24	0.033	mg/Kg		10/11/22 10:55	10/12/22 17:28	10
Arsenic	ND		0.24	0.048	mg/Kg		10/11/22 10:55	10/12/22 17:28	10
Cadmium	ND		0.38	0.037	mg/Kg		10/11/22 10:55	10/12/22 17:28	10
Copper	**0.50**		0.48	0.11	mg/Kg		10/11/22 10:55	10/12/22 17:28	10
Lead	ND		0.24	0.023	mg/Kg		10/11/22 10:55	10/12/22 17:28	10
Nickel	ND		0.24	0.093	mg/Kg		10/11/22 10:55	10/12/22 17:28	10
Selenium	**0.34**	**J**	0.72	0.14	mg/Kg		10/11/22 10:55	10/12/22 17:28	10
Silver	ND		0.096	0.0096	mg/Kg		10/11/22 10:55	10/12/22 17:28	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.038**	**J**	0.066	0.020	mg/Kg		10/11/22 10:57	10/13/22 16:47	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F07
Lab Sample ID: 580-118295-9
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:45	10/14/22 15:17	10
Arsenic	ND		0.25	0.049	mg/Kg		10/11/22 10:45	10/14/22 15:17	10
Cadmium	ND		0.39	0.038	mg/Kg		10/11/22 10:45	10/14/22 15:17	10
Copper	**0.30**	**J**	0.49	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:17	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 15:17	10
Nickel	ND		0.25	0.095	mg/Kg		10/11/22 10:45	10/14/22 15:17	10
Selenium	**0.21**	**J**	0.74	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:17	10
Silver	ND		0.099	0.0099	mg/Kg		10/11/22 10:45	10/14/22 15:17	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.074	0.022	mg/Kg		10/11/22 10:51	10/14/22 17:09	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F08
Lab Sample ID: 580-118295-10
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.24	0.033	mg/Kg		10/11/22 10:45	10/14/22 15:21	10
Arsenic	ND		0.24	0.048	mg/Kg		10/11/22 10:45	10/14/22 15:21	10
Cadmium	ND		0.39	0.037	mg/Kg		10/11/22 10:45	10/14/22 15:21	10
Copper	**0.59**		0.48	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:21	10
Lead	ND		0.24	0.023	mg/Kg		10/11/22 10:45	10/14/22 15:21	10
Nickel	ND		0.24	0.093	mg/Kg		10/11/22 10:45	10/14/22 15:21	10
Selenium	**0.28**	**J**	0.73	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:21	10
Silver	ND		0.097	0.0097	mg/Kg		10/11/22 10:45	10/14/22 15:21	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.028**		0.028	0.0083	mg/Kg		10/11/22 10:51	10/14/22 17:11	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F09
Lab Sample ID: 580-118295-11
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:45	10/14/22 15:24	10
Arsenic	ND		0.25	0.049	mg/Kg		10/11/22 10:45	10/14/22 15:24	10
Cadmium	ND		0.39	0.038	mg/Kg		10/11/22 10:45	10/14/22 15:24	10
Copper	**0.40**	**J**	0.49	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:24	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 15:24	10
Nickel	ND		0.25	0.095	mg/Kg		10/11/22 10:45	10/14/22 15:24	10
Selenium	**0.29**	**J**	0.74	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:24	10
Silver	ND		0.099	0.0099	mg/Kg		10/11/22 10:45	10/14/22 15:24	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.025**		0.025	0.0076	mg/Kg		10/11/22 10:51	10/14/22 17:13	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F10
Lab Sample ID: 580-118295-12
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.033	mg/Kg		10/11/22 10:45	10/14/22 15:28	10
Arsenic	ND		0.25	0.049	mg/Kg		10/11/22 10:45	10/14/22 15:28	10
Cadmium	ND		0.39	0.038	mg/Kg		10/11/22 10:45	10/14/22 15:28	10
Copper	**0.47**	**J**	0.49	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:28	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 15:28	10
Nickel	ND		0.25	0.095	mg/Kg		10/11/22 10:45	10/14/22 15:28	10
Selenium	**0.26**	**J**	0.74	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:28	10
Silver	ND		0.098	0.0098	mg/Kg		10/11/22 10:45	10/14/22 15:28	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.023**	**J**	0.028	0.0084	mg/Kg		10/11/22 10:51	10/14/22 17:20	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12COMP
Lab Sample ID: 580-118295-13
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:45	10/14/22 15:31	10
Arsenic	**0.055**	**J**	0.25	0.049	mg/Kg		10/11/22 10:45	10/14/22 15:31	10
Cadmium	ND		0.40	0.038	mg/Kg		10/11/22 10:45	10/14/22 15:31	10
Copper	**0.56**		0.49	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:31	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 15:31	10
Nickel	ND		0.25	0.095	mg/Kg		10/11/22 10:45	10/14/22 15:31	10
Selenium	**0.17**	**J**	0.74	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:31	10
Silver	ND		0.099	0.0099	mg/Kg		10/11/22 10:45	10/14/22 15:31	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0097**	**J**	0.026	0.0078	mg/Kg		10/11/22 10:51	10/14/22 17:22	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01F01
Lab Sample ID: 580-118295-14
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.24	0.033	mg/Kg		10/11/22 10:45	10/14/22 15:35	10
Arsenic	ND		0.24	0.049	mg/Kg		10/11/22 10:45	10/14/22 15:35	10
Cadmium	ND		0.39	0.038	mg/Kg		10/11/22 10:45	10/14/22 15:35	10
Copper	**1.9**		0.49	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:35	10
Lead	ND		0.24	0.024	mg/Kg		10/11/22 10:45	10/14/22 15:35	10
Nickel	ND		0.24	0.095	mg/Kg		10/11/22 10:45	10/14/22 15:35	10
Selenium	**0.26**	**J**	0.73	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:35	10
Silver	ND		0.098	0.0098	mg/Kg		10/11/22 10:45	10/14/22 15:35	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0085**	**J**	0.028	0.0085	mg/Kg		10/11/22 10:51	10/14/22 17:24	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01F02
Lab Sample ID: 580-118295-15
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.033	mg/Kg		10/11/22 10:45	10/14/22 15:38	10
Arsenic	ND		0.25	0.049	mg/Kg		10/11/22 10:45	10/14/22 15:38	10
Cadmium	ND		0.39	0.038	mg/Kg		10/11/22 10:45	10/14/22 15:38	10
Copper	**0.62**		0.49	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:38	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 15:38	10
Nickel	ND		0.25	0.095	mg/Kg		10/11/22 10:45	10/14/22 15:38	10
Selenium	**0.46**	**J**	0.74	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:38	10
Silver	ND		0.098	0.0098	mg/Kg		10/11/22 10:45	10/14/22 15:38	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.023**	**J**	0.029	0.0088	mg/Kg		10/11/22 10:51	10/14/22 17:26	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01F03
Lab Sample ID: 580-118295-16
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:45	10/14/22 15:42	10
Arsenic	ND		0.25	0.050	mg/Kg		10/11/22 10:45	10/14/22 15:42	10
Cadmium	ND		0.40	0.038	mg/Kg		10/11/22 10:45	10/14/22 15:42	10
Copper	**0.39**	**J**	0.50	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:42	10
Lead	**0.029**	**J**	0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 15:42	10
Nickel	ND		0.25	0.096	mg/Kg		10/11/22 10:45	10/14/22 15:42	10
Selenium	**0.29**	**J**	0.74	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:42	10
Silver	ND		0.099	0.0099	mg/Kg		10/11/22 10:45	10/14/22 15:42	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.093	0.028	mg/Kg		10/11/22 10:51	10/14/22 17:28	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites-2022

Job ID: 580-118295-1

Client Sample ID: SW01F04
Date Collected: 09/21/22 16:10
Date Received: 09/27/22 10:30

Lab Sample ID: 580-118295-17
Matrix: Tissue

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:45	10/14/22 15:46	10
Arsenic	ND		0.25	0.050	mg/Kg		10/11/22 10:45	10/14/22 15:46	10
Cadmium	ND		0.40	0.038	mg/Kg		10/11/22 10:45	10/14/22 15:46	10
Copper	**0.35**	**J**	0.50	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:46	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 15:46	10
Nickel	ND		0.25	0.096	mg/Kg		10/11/22 10:45	10/14/22 15:46	10
Selenium	**0.15**	**J**	0.75	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:46	10
Silver	ND		0.10	0.010	mg/Kg		10/11/22 10:45	10/14/22 15:46	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.026**	**J**	0.031	0.0094	mg/Kg		10/11/22 10:51	10/14/22 17:30	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01F05
Lab Sample ID: 580-118295-18
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:45	10/14/22 15:49	10
Arsenic	ND		0.25	0.050	mg/Kg		10/11/22 10:45	10/14/22 15:49	10
Cadmium	ND		0.40	0.038	mg/Kg		10/11/22 10:45	10/14/22 15:49	10
Copper	**0.38**	**J**	0.50	0.11	mg/Kg		10/11/22 10:45	10/14/22 15:49	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 15:49	10
Nickel	ND		0.25	0.096	mg/Kg		10/11/22 10:45	10/14/22 15:49	10
Selenium	**0.23**	**J**	0.75	0.14	mg/Kg		10/11/22 10:45	10/14/22 15:49	10
Silver	ND		0.10	0.010	mg/Kg		10/11/22 10:45	10/14/22 15:49	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.36	0.11	mg/Kg		10/11/22 10:51	10/14/22 17:33	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01F06
Lab Sample ID: 580-118295-19
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:45	10/14/22 16:03	10
Arsenic	ND		0.25	0.050	mg/Kg		10/11/22 10:45	10/14/22 16:03	10
Cadmium	ND		0.40	0.038	mg/Kg		10/11/22 10:45	10/14/22 16:03	10
Copper	**0.59**		0.50	0.11	mg/Kg		10/11/22 10:45	10/14/22 16:03	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 16:03	10
Nickel	ND		0.25	0.096	mg/Kg		10/11/22 10:45	10/14/22 16:03	10
Selenium	**0.29**	**J**	0.74	0.14	mg/Kg		10/11/22 10:45	10/14/22 16:03	10
Silver	ND		0.099	0.0099	mg/Kg		10/11/22 10:45	10/14/22 16:03	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.23	0.069	mg/Kg		10/11/22 10:51	10/14/22 17:35	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01F07
Lab Sample ID: 580-118295-20
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:45	10/14/22 16:07	10
Arsenic	ND		0.25	0.050	mg/Kg		10/11/22 10:45	10/14/22 16:07	10
Cadmium	ND		0.40	0.038	mg/Kg		10/11/22 10:45	10/14/22 16:07	10
Copper	**0.41**	**J**	0.50	0.11	mg/Kg		10/11/22 10:45	10/14/22 16:07	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 16:07	10
Nickel	ND		0.25	0.096	mg/Kg		10/11/22 10:45	10/14/22 16:07	10
Selenium	**0.24**	**J**	0.75	0.14	mg/Kg		10/11/22 10:45	10/14/22 16:07	10
Silver	ND		0.099	0.0099	mg/Kg		10/11/22 10:45	10/14/22 16:07	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.13	0.039	mg/Kg		10/11/22 10:51	10/14/22 17:37	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites-2022

Job ID: 580-118295-1

Client Sample ID: SW01F08
Date Collected: 09/21/22 16:10
Date Received: 09/27/22 10:30

Lab Sample ID: 580-118295-21
Matrix: Tissue

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.30	0.041	mg/Kg		10/11/22 10:45	10/14/22 16:10	10
Arsenic	ND		0.30	0.060	mg/Kg		10/11/22 10:45	10/14/22 16:10	10
Cadmium	ND		0.48	0.046	mg/Kg		10/11/22 10:45	10/14/22 16:10	10
Copper	**0.90**		0.60	0.13	mg/Kg		10/11/22 10:45	10/14/22 16:10	10
Lead	ND		0.30	0.029	mg/Kg		10/11/22 10:45	10/14/22 16:10	10
Nickel	ND		0.30	0.12	mg/Kg		10/11/22 10:45	10/14/22 16:10	10
Selenium	**0.36**	**J**	0.90	0.17	mg/Kg		10/11/22 10:45	10/14/22 16:10	10
Silver	ND		0.12	0.012	mg/Kg		10/11/22 10:45	10/14/22 16:10	10

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01F09
Lab Sample ID: 580-118295-22
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.033	mg/Kg		10/11/22 10:45	10/14/22 16:14	10
Arsenic	ND		0.25	0.049	mg/Kg		10/11/22 10:45	10/14/22 16:14	10
Cadmium	ND		0.39	0.038	mg/Kg		10/11/22 10:45	10/14/22 16:14	10
Copper	**0.52**		0.49	0.11	mg/Kg		10/11/22 10:45	10/14/22 16:14	10
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:45	10/14/22 16:14	10
Nickel	ND		0.25	0.095	mg/Kg		10/11/22 10:45	10/14/22 16:14	10
Selenium	**0.34**	**J**	0.74	0.14	mg/Kg		10/11/22 10:45	10/14/22 16:14	10
Silver	ND		0.098	0.0098	mg/Kg		10/11/22 10:45	10/14/22 16:14	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.10	0.030	mg/Kg		10/11/22 10:51	10/14/22 17:39	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites-2022

Job ID: 580-118295-1

Client Sample ID: SW01F10

Date Collected: 09/21/22 16:10
Date Received: 09/27/22 10:30

Lab Sample ID: 580-118295-23

Matrix: Tissue

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.24	0.033	mg/Kg		10/11/22 10:45	10/14/22 16:17	10
Arsenic	ND		0.24	0.048	mg/Kg		10/11/22 10:45	10/14/22 16:17	10
Cadmium	ND		0.38	0.037	mg/Kg		10/11/22 10:45	10/14/22 16:17	10
Copper	**0.54**		0.48	0.11	mg/Kg		10/11/22 10:45	10/14/22 16:17	10
Lead	ND		0.24	0.023	mg/Kg		10/11/22 10:45	10/14/22 16:17	10
Nickel	ND		0.24	0.092	mg/Kg		10/11/22 10:45	10/14/22 16:17	10
Selenium	**0.28**	**J**	0.72	0.14	mg/Kg		10/11/22 10:45	10/14/22 16:17	10
Silver	ND		0.096	0.0096	mg/Kg		10/11/22 10:45	10/14/22 16:17	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.019**	**J**	0.058	0.018	mg/Kg		10/11/22 10:51	10/14/22 17:45	1

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01COMP
Lab Sample ID: 580-118295-24
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Method: SW846 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.24	0.032	mg/Kg		10/11/22 10:45	10/14/22 16:21	10
Arsenic	ND		0.24	0.047	mg/Kg		10/11/22 10:45	10/14/22 16:21	10
Cadmium	ND		0.38	0.036	mg/Kg		10/11/22 10:45	10/14/22 16:21	10
Copper	**0.94**		0.47	0.10	mg/Kg		10/11/22 10:45	10/14/22 16:21	10
Lead	ND		0.24	0.023	mg/Kg		10/11/22 10:45	10/14/22 16:21	10
Nickel	ND		0.24	0.091	mg/Kg		10/11/22 10:45	10/14/22 16:21	10
Selenium	**0.18**	**J**	0.71	0.14	mg/Kg		10/11/22 10:45	10/14/22 16:21	10
Silver	ND		0.094	0.0094	mg/Kg		10/11/22 10:45	10/14/22 16:21	10

Method: SW846 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.011**	**J**	0.021	0.0063	mg/Kg		10/11/22 10:51	10/14/22 17:48	1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 580-406576/24-A
Matrix: Tissue
Analysis Batch: 407038

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406576

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.50	0.068	mg/Kg		10/11/22 10:45	10/14/22 21:10	10
Arsenic	ND		0.50	0.10	mg/Kg		10/11/22 10:45	10/14/22 21:10	10
Cadmium	ND		0.80	0.077	mg/Kg		10/11/22 10:45	10/14/22 21:10	10
Copper	ND		1.0	0.22	mg/Kg		10/11/22 10:45	10/14/22 21:10	10
Lead	ND		0.50	0.048	mg/Kg		10/11/22 10:45	10/14/22 21:10	10
Nickel	ND		0.50	0.19	mg/Kg		10/11/22 10:45	10/14/22 21:10	10
Selenium	ND		1.5	0.29	mg/Kg		10/11/22 10:45	10/14/22 21:10	10
Silver	ND		0.20	0.020	mg/Kg		10/11/22 10:45	10/14/22 21:10	10

Lab Sample ID: LCS 580-406576/25-A
Matrix: Tissue
Analysis Batch: 407038

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406576

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	50.0	47.6		mg/Kg		95	80 - 120
Arsenic	50.0	47.4		mg/Kg		95	80 - 120
Cadmium	50.0	47.6		mg/Kg		95	80 - 120
Copper	50.0	49.5		mg/Kg		99	80 - 120
Lead	50.0	48.2		mg/Kg		96	80 - 120
Nickel	50.0	48.7		mg/Kg		97	80 - 120
Selenium	50.0	45.4		mg/Kg		91	80 - 120
Silver	50.0	49.0		mg/Kg		98	80 - 120

Lab Sample ID: LCSD 580-406576/26-A
Matrix: Tissue
Analysis Batch: 407038

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 406576

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	50.0	47.3		mg/Kg		95	80 - 120	1	20
Arsenic	50.0	47.1		mg/Kg		94	80 - 120	0	20
Cadmium	50.0	47.0		mg/Kg		94	80 - 120	1	20
Copper	50.0	49.5		mg/Kg		99	80 - 120	0	20
Lead	50.0	47.8		mg/Kg		96	80 - 120	1	20
Nickel	50.0	48.8		mg/Kg		98	80 - 120	0	20
Selenium	50.0	45.0		mg/Kg		90	80 - 120	1	20
Silver	50.0	48.4		mg/Kg		97	80 - 120	1	20

Lab Sample ID: MB 580-406579/17-A
Matrix: Tissue
Analysis Batch: 406789

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406579

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.25	0.034	mg/Kg		10/11/22 10:55	10/12/22 16:22	5
Arsenic	ND		0.25	0.050	mg/Kg		10/11/22 10:55	10/12/22 16:22	5
Cadmium	ND		0.40	0.039	mg/Kg		10/11/22 10:55	10/12/22 16:22	5
Copper	ND		0.50	0.11	mg/Kg		10/11/22 10:55	10/12/22 16:22	5
Lead	ND		0.25	0.024	mg/Kg		10/11/22 10:55	10/12/22 16:22	5
Nickel	ND		0.25	0.097	mg/Kg		10/11/22 10:55	10/12/22 16:22	5
Selenium	ND		0.75	0.14	mg/Kg		10/11/22 10:55	10/12/22 16:22	5

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 580-406579/17-A
Matrix: Tissue
Analysis Batch: 406789

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406579

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		0.10	0.010	mg/Kg		10/11/22 10:55	10/12/22 16:22	5

Lab Sample ID: LCS 580-406579/18-A
Matrix: Tissue
Analysis Batch: 406789

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406579

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	50.0	49.7		mg/Kg		99	80 - 120
Arsenic	50.0	49.6		mg/Kg		99	80 - 120
Cadmium	50.0	49.9		mg/Kg		100	80 - 120
Copper	50.0	50.6		mg/Kg		101	80 - 120
Lead	50.0	50.4		mg/Kg		101	80 - 120
Nickel	50.0	50.1		mg/Kg		100	80 - 120
Selenium	50.0	49.6		mg/Kg		99	80 - 120
Silver	50.0	50.6		mg/Kg		101	80 - 120

Lab Sample ID: LCSD 580-406579/19-A
Matrix: Tissue
Analysis Batch: 406789

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 406579

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	50.0	49.7		mg/Kg		99	80 - 120	0	20
Arsenic	50.0	49.6		mg/Kg		99	80 - 120	0	20
Cadmium	50.0	50.0		mg/Kg		100	80 - 120	0	20
Copper	50.0	51.1		mg/Kg		102	80 - 120	1	20
Lead	50.0	49.9		mg/Kg		100	80 - 120	1	20
Nickel	50.0	50.2		mg/Kg		100	80 - 120	0	20
Selenium	50.0	49.1		mg/Kg		98	80 - 120	1	20
Silver	50.0	50.6		mg/Kg		101	80 - 120	0	20

Lab Sample ID: MB 580-407003/26-A
Matrix: Water
Analysis Batch: 407212

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 407003

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00080	0.00013	mg/L		10/14/22 18:29	10/17/22 12:39	1
Arsenic	ND		0.0010	0.00020	mg/L		10/14/22 18:29	10/17/22 12:39	1
Cadmium	ND		0.00040	0.000037	mg/L		10/14/22 18:29	10/17/22 12:39	1
Copper	ND		0.0020	0.00060	mg/L		10/14/22 18:29	10/17/22 12:39	1
Lead	ND		0.00040	0.000040	mg/L		10/14/22 18:29	10/17/22 12:39	1
Nickel	ND		0.0030	0.00013	mg/L		10/14/22 18:29	10/17/22 12:39	1
Selenium	ND		0.0080	0.0021	mg/L		10/14/22 18:29	10/17/22 12:39	1
Silver	ND		0.00040	0.000025	mg/L		10/14/22 18:29	10/17/22 12:39	1

Lab Sample ID: LCS 580-407003/27-A
Matrix: Water
Analysis Batch: 407212

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 407003

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	1.00	1.00		mg/L		100	80 - 120

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 580-407003/27-A
Matrix: Water
Analysis Batch: 407212

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 407003

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic			1.00	1.00		mg/L		100	80 - 120		
Cadmium			1.00	1.01		mg/L		101	80 - 120		
Copper			1.00	1.03		mg/L		103	80 - 120		
Lead			1.00	1.01		mg/L		101	80 - 120		
Nickel			1.00	1.02		mg/L		102	80 - 120		
Selenium			1.00	1.04		mg/L		104	80 - 120		
Silver			1.00	1.01		mg/L		101	80 - 120		

Lab Sample ID: LCSD 580-407003/28-A
Matrix: Water
Analysis Batch: 407212

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 407003

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony			1.00	1.00		mg/L		100	80 - 120	0	20
Arsenic			1.00	1.01		mg/L		101	80 - 120	0	20
Cadmium			1.00	1.01		mg/L		101	80 - 120	0	20
Copper			1.00	1.03		mg/L		103	80 - 120	0	20
Lead			1.00	1.01		mg/L		101	80 - 120	0	20
Nickel			1.00	1.03		mg/L		103	80 - 120	1	20
Selenium			1.00	0.995		mg/L		99	80 - 120	4	20
Silver			1.00	1.01		mg/L		101	80 - 120	1	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 580-406202/17-A
Matrix: Water
Analysis Batch: 406282

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406202

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030	0.00015	mg/L		10/06/22 11:25	10/06/22 17:23	1

Lab Sample ID: LCS 580-406202/18-A
Matrix: Water
Analysis Batch: 406282

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406202

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury			0.00200	0.00202		mg/L		101	80 - 120		

Lab Sample ID: LCSD 580-406202/19-A
Matrix: Water
Analysis Batch: 406282

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 406202

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury			0.00200	0.00199		mg/L		100	80 - 120	1	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 580-406577/24-A
Matrix: Tissue
Analysis Batch: 407143
Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406577

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.030	0.0090	mg/Kg		10/11/22 10:52	10/14/22 16:54	1

Lab Sample ID: LCS 580-406577/25-A
Matrix: Tissue
Analysis Batch: 407143
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406577

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.167	0.191		mg/Kg		115	80 - 120

Lab Sample ID: LCSD 580-406577/26-A
Matrix: Tissue
Analysis Batch: 407143
Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 406577

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.167	0.170		mg/Kg		102	80 - 120	12	20

Lab Sample ID: MB 580-406581/23-A
Matrix: Tissue
Analysis Batch: 406959
Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 406581

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.030	0.0090	mg/Kg		10/11/22 11:09	10/13/22 16:13	1

Lab Sample ID: LCS 580-406581/24-A
Matrix: Tissue
Analysis Batch: 406959
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 406581

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.167	0.154		mg/Kg		93	80 - 120

Lab Sample ID: LCSD 580-406581/25-A
Matrix: Tissue
Analysis Batch: 406959
Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 406581

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.167	0.146		mg/Kg		87	80 - 120	6	20

Lab Chronicle

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: BAIT
Lab Sample ID: 580-118295-1
Date Collected: 09/19/22 15:00
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406579	ABP	EET SEA	10/11/22 10:55
Total/NA	Analysis	6020		10	406789	FCW	EET SEA	10/12/22 17:32
Total/NA	Prep	7471A			406581	ABP	EET SEA	10/11/22 10:57
Total/NA	Analysis	7471A		1	406959	JLS	EET SEA	10/13/22 16:30

Client Sample ID: SW-FB2
Lab Sample ID: 580-118295-2
Date Collected: 09/21/22 10:08
Matrix: Water
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total Recoverable	Prep	3005A			407003	TMH	EET SEA	10/14/22 18:29
Total Recoverable	Analysis	6020		5	407212	FCW	EET SEA	10/17/22 14:32
Total/NA	Prep	7470A			406202	ABP	EET SEA	10/06/22 11:25
Total/NA	Analysis	7470A		1	406282	CA	EET SEA	10/06/22 17:53

Client Sample ID: SW12F01
Lab Sample ID: 580-118295-3
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406579	ABP	EET SEA	10/11/22 10:55
Total/NA	Analysis	6020		10	406789	FCW	EET SEA	10/12/22 17:35
Total/NA	Prep	7471A			406581	ABP	EET SEA	10/11/22 10:57
Total/NA	Analysis	7471A		1	406959	JLS	EET SEA	10/13/22 16:32

Client Sample ID: SW12F02
Lab Sample ID: 580-118295-4
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406579	ABP	EET SEA	10/11/22 10:55
Total/NA	Analysis	6020		10	406789	FCW	EET SEA	10/12/22 17:39
Total/NA	Prep	7471A			406581	ABP	EET SEA	10/11/22 10:57
Total/NA	Analysis	7471A		1	406959	JLS	EET SEA	10/13/22 16:39

Client Sample ID: SW12F03
Lab Sample ID: 580-118295-5
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406579	ABP	EET SEA	10/11/22 10:55
Total/NA	Analysis	6020		10	406789	FCW	EET SEA	10/12/22 17:42
Total/NA	Prep	7471A			406581	ABP	EET SEA	10/11/22 10:57
Total/NA	Analysis	7471A		1	406959	JLS	EET SEA	10/13/22 16:41

Client Sample ID: SW12F04
Lab Sample ID: 580-118295-6
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406579	ABP	EET SEA	10/11/22 10:55
Total/NA	Analysis	6020		10	406789	FCW	EET SEA	10/12/22 17:21
Total/NA	Prep	7471A			406581	ABP	EET SEA	10/11/22 10:57
Total/NA	Analysis	7471A		1	406959	JLS	EET SEA	10/13/22 16:43

Client Sample ID: SW12F05
Lab Sample ID: 580-118295-7
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406579	ABP	EET SEA	10/11/22 10:55
Total/NA	Analysis	6020		10	406789	FCW	EET SEA	10/12/22 17:25
Total/NA	Prep	7471A			406581	ABP	EET SEA	10/11/22 10:57
Total/NA	Analysis	7471A		1	406959	JLS	EET SEA	10/13/22 16:45

Client Sample ID: SW12F06
Lab Sample ID: 580-118295-8
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406579	ABP	EET SEA	10/11/22 10:55
Total/NA	Analysis	6020		10	406789	FCW	EET SEA	10/12/22 17:28
Total/NA	Prep	7471A			406581	ABP	EET SEA	10/11/22 10:57
Total/NA	Analysis	7471A		1	406959	JLS	EET SEA	10/13/22 16:47

Client Sample ID: SW12F07
Lab Sample ID: 580-118295-9
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:17
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:09

Client Sample ID: SW12F08
Lab Sample ID: 580-118295-10
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:21
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:11

Lab Chronicle

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW12F09
Lab Sample ID: 580-118295-11
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:24
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:13

Client Sample ID: SW12F10
Lab Sample ID: 580-118295-12
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:28
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:20

Client Sample ID: SW12COMP
Lab Sample ID: 580-118295-13
Date Collected: 09/21/22 10:30
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:31
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:22

Client Sample ID: SW01F01
Lab Sample ID: 580-118295-14
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:35
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:24

Client Sample ID: SW01F02
Lab Sample ID: 580-118295-15
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:38
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:26

Lab Chronicle

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01F03
Lab Sample ID: 580-118295-16
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:42
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:28

Client Sample ID: SW01F04
Lab Sample ID: 580-118295-17
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:46
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:30

Client Sample ID: SW01F05
Lab Sample ID: 580-118295-18
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 15:49
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:33

Client Sample ID: SW01F06
Lab Sample ID: 580-118295-19
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 16:03
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:35

Client Sample ID: SW01F07
Lab Sample ID: 580-118295-20
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 16:07
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:37

Lab Chronicle

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Client Sample ID: SW01F08
Lab Sample ID: 580-118295-21
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 16:10

Client Sample ID: SW01F09
Lab Sample ID: 580-118295-22
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 16:14
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:39

Client Sample ID: SW01F10
Lab Sample ID: 580-118295-23
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 16:17
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:45

Client Sample ID: SW01COMP
Lab Sample ID: 580-118295-24
Date Collected: 09/21/22 16:10
Matrix: Tissue
Date Received: 09/27/22 10:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			406576	ABP	EET SEA	10/11/22 10:45
Total/NA	Analysis	6020		10	407038	FCW	EET SEA	10/14/22 16:21
Total/NA	Prep	7471A			406577	ABP	EET SEA	10/11/22 10:51
Total/NA	Analysis	7471A		1	407143	JLS	EET SEA	10/14/22 17:48

Laboratory References:
EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Laboratory: Eurofins Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-004	02-19-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020	3005A	Water	Antimony
6020	3005A	Water	Arsenic
6020	3005A	Water	Cadmium
6020	3005A	Water	Copper
6020	3005A	Water	Lead
6020	3005A	Water	Nickel
6020	3005A	Water	Selenium
6020	3005A	Water	Silver
6020	3050B	Tissue	Antimony
6020	3050B	Tissue	Arsenic
6020	3050B	Tissue	Cadmium
6020	3050B	Tissue	Copper
6020	3050B	Tissue	Lead
6020	3050B	Tissue	Nickel
6020	3050B	Tissue	Selenium
6020	3050B	Tissue	Silver
7471A	7471A	Tissue	Mercury

Oregon	NELAP	4167	07-08-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020	3050B	Tissue	Antimony
6020	3050B	Tissue	Arsenic
6020	3050B	Tissue	Cadmium
6020	3050B	Tissue	Copper
6020	3050B	Tissue	Lead
6020	3050B	Tissue	Nickel
6020	3050B	Tissue	Selenium
6020	3050B	Tissue	Silver
7471A	7471A	Tissue	Mercury

Sample Summary

Client: Northern Star (Pogo) LLC
Job ID: 580-118295-1
Project/Site: Chinook - Discrete and Composites-2022

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-118295-1	BAIT	Tissue	09/19/22 15:00	09/27/22 10:30
580-118295-2	SW-FB2	Water	09/21/22 10:08	09/27/22 10:30
580-118295-3	SW12F01	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-4	SW12F02	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-5	SW12F03	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-6	SW12F04	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-7	SW12F05	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-8	SW12F06	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-9	SW12F07	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-10	SW12F08	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-11	SW12F09	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-12	SW12F10	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-13	SW12COMP	Tissue	09/21/22 10:30	09/27/22 10:30
580-118295-14	SW01F01	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-15	SW01F02	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-16	SW01F03	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-17	SW01F04	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-18	SW01F05	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-19	SW01F06	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-20	SW01F07	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-21	SW01F08	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-22	SW01F09	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-23	SW01F10	Tissue	09/21/22 16:10	09/27/22 10:30
580-118295-24	SW01COMP	Tissue	09/21/22 16:10	09/27/22 10:30

Northern Star (Pogo) LLC Chain of Custody

# of Coolers: 1

Company Name: **Northern Star (Pogo) LLC**	Contact Name: Nathan Kehoe Phone: (907) 895-2760	Laboratory Name: **Eurofins TestAmerica**
Report Mail Address: ***3204 International Street Fairbanks, Alaska 99701***	Invoice to: pogo.ap@nsrltd.com P.O. or Contract #: PO# 2044987	Mail Adddress: **Eurofins TestAmerica - Seattle 5755 8th Street East Tacoma, WA 98424**
Email: ***pogoenvironment@nsrltd.com***	**Turnaround Time for Results (TAT)** X Standard ____ Expedited	Lab Phone: **(253)922-2310**
		APDES Permit #: AK0053341
		Public Water System (PWS) ID#:

Special Instructions/Comments:

Requested Analysis/Method: Fish Tissue per Quote 58016959

Lab ID#	Client Sample Identification / Location	Date Sampled	Time Sampled	Matrix (S-DW-WW-Other)	No. of Containers	EPA 6020 Metals Sb, As, Cd, Cu, Pb, Ni, Se, Ag	EPA 7471A Mercury							Field Preserved
						Pre: None	Pre: None							
	Bait	9/19/2022	15:00	Fish	1	X	X							N
	SW-FB2	9/21/2022	10:08	Water	1	X	X		Preserved with HNO3					Y
	SW12F01	9/21/2022	10:30	Fish	1	X	X							N
	SW12F02	9/21/2022	10:30	Fish	1	X	X							N
	SW12F03	9/21/2022	10:30	Fish	1	X	X							N
	SW12F04	9/21/2022	10:30	Fish	1	X	X							N
	SW12F05	9/21/2022	10:30	Fish	1	X	X							N
	SW12F06	9/21/2022	10:30	Fish	1	X	X							N
	SW12F07	9/21/2022	10:30	Fish	1	X	X							N
	SW12F08	9/21/2022	10:30	Fish	1	X	X							N
	SW12F09	9/21/2022	10:30	Fish	1	X	X							N
	SW12F10	9/21/2022	10:30	Fish	1	X	X							N
	SW12COMP	9/21/2022	10:30	Fish	1	X	X							N

580-118295 Chain of Custody

Relinquished by:	Date	Time	Received by:	Date	Time
	9/21/22	0845	Sydney Lawhon	9/21/22	1030
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Re	Date	Time

Therm. ID: 189 Cor: 2.3° Unc: 2.7°
Cooler Dsc: BK
Packing: BW
Cust. Seal: Yes ✓ No ____
Blue Ice, Wet, Dry, None
FedEx: ____
UPS: ____
Lab Cour: ____
Other: Client

Section To Be Completed by Laboratory

Custody Seal Intact? Y / N ____
Samples On Ice? Y / N ____
Receipt Temperature: ____ °C
Signatures Complete? Y / N ____
Signatures Match? Y / N ____
Add'l Notes: ____

Name of Sampler: (printed) Nathan Kehoe / Matt Drews

Northern Star (Pogo) LLC Chain of Custody

# of Coolers: 1

Company Name: **Northern Star (Pogo) LLC**	Contact Name: Nathan Kehoe Phone: (907) 895-2760	Laboratory Name: **TestAmerica Seattle**
Report Mail Address: ***3204 International Street*** ***Fairbanks, Alaska 99701*** ***pogoenvironment@nsrltd.com***	Invoice to: pogo.ap@nsrltd.com P.O. or Contract #: PO# 2044987 **Turnaround Time for Results (TAT)** __X__ Standard _____ Expedited	Mail Adddress: **Eurofins TestAmerica - Seattle** **5755 8th Street East** **Tacoma, WA 98424** Lab Phone: **(253)922-2310** **APDES Permit #:** AK0053341 **Public Water System (PWS) ID#:**

Special Instructions/Comments:

Requested Analysis/Method: Fish Tissue per Quote 58016959

Lab ID#					Pre: None	Pre: None							
Client Sample Identification / Location	**Date Sampled**	**Time Sampled**	**Matrix (S-DW-WW-Other)**	**No. of Containers**	***EPA 6020 Metals*** *Sb, As, Cd, Cu, Pb, Ni, Se, Ag*	***EPA 7471A*** *Mercury*							**Field Preserved**
SW01F01	9/21/2022	16:10	Water	1	X	X							N
SW01F02	9/21/2022	16:10	Fish	1	X	X							N
SW01F03	9/21/2022	16:10	Fish	1	X	X							N
SW01F04	9/21/2022	16:10	Fish	1	X	X							N
SW01F05	9/21/2022	16:10	Fish	1	X	X							N
SW01F06	9/21/2022	16:10	Fish	1	X	X							N
SW01F07	9/21/2022	16:10	Fish	1	X	X							N
SW01F08	9/21/2022	16:10	Fish	1	X	X							N
SW01F09	9/21/2022	16:10	Fish	1	X	X							N
SW01F10	9/21/2022	16:10	Fish	1	X	X							N
SW01COMP	9/21/2022	16:10	Fish	5	X	X							N

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	9/26/22	0845	[signature]	9/27/22	1036
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

Section To Be Completed by Laboratory

Custody Seal Intact? Y / N _____

Samples On Ice? Y / N _____

Receipt Temperature: _____ °C

Signatures Complete? Y / N _____

Signatures Match? Y / N _____

Add'l Notes: _____

Name of Sampler: (printed) Nathan Kehoe / Matt Drews / Russell Gossett

Login Sample Receipt Checklist

Client: Northern Star (Pogo) LLC

Job Number: 580-118295-1

Login Number: 118295
List Number: 1
Creator: Vallelunga, Diana L

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX F –

ELECTRONIC MONITORING DATA

[SUBMITTED ELECTRONICALLY VIA ALASKA ZENDTO (STATE OF ALASKA)]