Memorandum

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January 31, 2023

TO: Stephen Bourn, Flambeau Mining Company
Leland Roberts, Flambeau Mining Company

CC: Steve Donohue, Foth Infrastructure & Environment, LLC
Foth Project #: 17F777.23

FR: Nick Glander, Foth Infrastructure & Environment, LLC
Steve Lehrke, Foth Infrastructure & Environment, LLC
Sharon Kozicki, Foth Infrastructure & Environment, LLC

RE: 2022 Annual Summary Memorandum – Reclaimed Flambeau Mine
Flambeau Mining Company

1. Purpose and Need

This 2022 Annual Summary Memorandum documents the work that was completed by Flambeau Mining Company (Flambeau) at the Reclaimed Flambeau Mine Site, Ladysmith, Wisconsin, in 2022, to satisfy the requirements of the Mining Permit (MP). These requirements are summarized in Table 1.

Table 1 – Mine Permit Location Information Key

Condition Number	Location of Information	Condition Requirement
(WDNR, 2022[1]) MP, 1f	Section 2	*"Flambeau Mining Company shall continue to conduct environmental monitoring and long-term care activities as described in the 2020 Updated Monitoring Plan."*
(WDNR, 2022[1]) MP, 1g	Section 2	*"Flambeau Mining Company shall maintain all necessary monitoring devices, including wells and piezometers, in good working condition and shall replace or repair any damaged or inoperable devices, as needed."*
(WDNR, 2022[1]),1h	Section 3	*"Flambeau Mining Company shall maintain the mining site to manage surface water runoff and minimize, to the extent practicable, erosion and sedimentation, and shall repair any areas of excessive erosion, perform routine maintenance,*

Condition Number	Location of Information	Condition Requirement
		and augment, as necessary, any components of the surface water management system to ensure effective and controlled drainage from the site. Any construction activities affecting the surface water drainage system shall be conducted in compliance with applicable regulatory authorities."
(WDNR, 2022[1]),1l	Section 3	*"If in the course of conducting routine monitoring, maintenance or other construction activities on the site, materials or conditions that could result in significant environmental pollution are encountered, Flambeau Mining Company shall notify the Department within five business days and formulate a plan to investigate and report to the Department on any necessary actions to address the issue in accordance with applicable law and regulatory requirements."*
(WDNR, 2022[1]),1l	Section 3, Attachment A, Attachment B	*"By January 31 of each year, Flambeau Mining Company shall submit an annual report to the Department covering the period of January 1 through December 31 of the preceding year. The annual report shall summarize and document all monitoring activities including assessments of any trends detected and any exceedances of groundwater quality standards at the intervention boundary, assess the backfilled pit water quality and potential impacts to the Flambeau River, summarize any routine maintenance activities conducted on the mining site, qualitatively discuss and document overall site conditions, identify any deviations or unanticipated conditions experienced during the year, summarize any remedial measures implemented to prevent or mitigate significant environmental pollution, and document continued coverage of the reclamation bond and long-term care bond required under s. 293.51, Wis. Stats."*

1. *Findings of Fact, Conclusions of Law and Revised Mining Permit – Flambeau Mining Company,* Wisconsin Department of Natural Resources, December 20, 2022.

Long term monitoring is conducted in accordance with the Updated Monitoring Plan (August 2020) and Quality Assurance Project Plan (QAPP) (August 2020) which were amended and submitted to the Wisconsin Department of Natural Resources (Department) in August 2020.

2. 2022 Certificate of Completion Determination

On November 4, 2021, Flambeau submitted a petition seeking issuance of a Certificate of Completion of Reclamation for the Industrial Outlot area of the Reclaimed Flambeau Mine. The Department issued a public notice on June 6, 2022, announcing the request and provided the public a comment period before and after the public hearing held on July 6, 2022. The hearing was conducted virtually, and provisions were also made to accept in-person statements at the Ladysmith Service Center. After the comment period, the Department determined Flambeau met the requirements of the approved Reclamation Plan, as amended by the 1998 Modification Approval. The Certificate of Completion of Reclamation for the Industrial Outlot portion of the mining site was issued on December 20, 2022.

The Certificate of Completion of Reclamation issued in 2007 signified that Flambeau had fulfilled the requirements of reclamation for the mining site, except the Industrial Outlot. As a result, the Certification of Completion of Reclamation for the Industrial Outlot, considered together with the 2007 Certification of Completion of Reclamation, signifies that the Flambeau Mining Company has fulfilled the requirements of reclamation for the entire mine site.

As stated in number 27 of the Findings of Fact to the Revised mining permit, The Department has been engaged with Flambeau Mining Company on a study of Stream C to determine if Stream C is attaining its designated uses. This engagement will continue in 2023.

3. 2022 Site Monitoring

Environmental monitoring at the Reclaimed Flambeau Mine, during 2022, included assessing the quality of groundwater and backfill pore water. All data obtained during environmental monitoring continues to show that Flambeau remains in compliance with all permit standards and the Flambeau River remains protected.

3.1 Groundwater Sampling and Analysis

Semi-annual groundwater monitoring was performed in accordance with descriptions provided in the Updated Monitoring Plan, the QAPP, and the Local Agreement. Results of the 2022 monitoring were submitted to the Department's Mine Reclamation Unit on August 3, 2022 and January 5, 2023. Those reports are incorporated by reference.

Figure 1 shows the groundwater potentiometric surface using data obtained during 2022. The map was generated using the shallowest measured water levels, and thus represents shallow groundwater flow in the native formations and in the replaced till and sandstone in the backfilled pit footprint. The potentiometric surface shows a direction of regional shallow groundwater flow toward the Flambeau River.

Figure 2 shows the potentiometric surface using the deeper water level for nested wells, where available, and the water levels for the B completion in the backfill monitoring wells. Beyond the pit footprint, the groundwater levels generally mimic the shallow groundwater conditions. Within the pit backfill, the surface reflects a general direction of groundwater flow in the backfilled Type I and Type II stockpile materials along the axis of the pit toward the Flambeau River.

Figure 3 shows hydraulic head in the cross section along the axis of the pit. The cross section is interpreted to show predominantly horizontal flow in the backfilled Type I and Type II

stockpile materials but with a downward hydraulic gradient at the eastern pit area and an upward hydraulic gradient with convergent groundwater flow near the Flambeau River. These observations are consistent with previous, post-mining years.

3.1.1 Trend Analysis

A detailed analysis of statistical trends occurring in the groundwater and surface water data was performed. Statistical tests evaluated the long-term trends occurring during the post-mining period (October 1997 to the present) and the short-term trends for the most recent five years. Historical trend graphs of the data are also presented.

A detailed discussion of the trend results for each well nest is provided in Attachment A. In general, the number of more notable concentration trends, as observed in previous Annual Memos have reduced for both the intervention boundary and in-pit wells, indicating a broader stabilization in the groundwater concentrations. A number of the trends, noted through the Mann-Kendall nonparametric test, are due to slight but consecutive concentration changes (either increasing or decreasing) and not reflective of a substantial overall concentration change. The majority of the observed trends continue to occur in the semi-annual groundwater indicator monitoring parameters.

For the intervention boundary wells, a slow increasing statistical trend occurs for alkalinity and hardness in MW-1002G. Increasing trends in these parameters began in 2014 for alkalinity and 2011 for hardness. An increasing trend in the five-year data also exists for conductivity in MW-1005, although the 2022 sample data decreased from the previous maximum value observed during 2021.

For the MW-1013 in-pit well nest, iron at MW-1013, which previously had an increasing trend and historically exhibited a large degree of variation, again exhibited stronger seasonal variation during 2020 through 2022 with increased concentrations observed during the fall event.

For the in-pit well nest at MW-1014, copper in in MW-1014B remains at lowered concentrations after a substantial decrease in 2019. Arsenic at MW-1014C shows a smaller increasing trend since 2003, however, concentrations remain below the maximum observed in this well during July 2000.

No statistical trends were noted in the five-year datasets for surface water at sampling location SW-1 and SW-2. A tabular summary of the 2022 analytical SW-3 results is provided in Attachment B.

3.2 Protection of the Flambeau River

Potential impact to the Flambeau River was estimated by performing a concentration reduction factor (CRF) calculation in the Request to Modify the Updated Monitoring Plan (November 2018). This calculation was initially presented in Appendix L of the Mine Permit Application for the Flambeau Project (December 1989), and then updated with current gradient and concentration data for copper, iron, manganese, and sulfate in a memorandum submitted by Flambeau, to the Department, on October 17, 2000, entitled “Backfilled Pit Water Quality Assessment” (October 2000). The 2022 calculation, updated using the current gradient and concentrations, is incorporated by reference. The results of the 2022 calculation were consistent with the 1989 and 2000 CRF calculations, with the CRF being on the order of 0.00000010 and 0.0000010 milligrams per liter (mg/L) for average and low flow conditions,

respectively. This CRF results in negligible, unmeasurable, and incremental impacts to the Flambeau River that are 3 to 5 orders of magnitude lower than background concentrations in the Flambeau River indicating that the River remains protected. The 2022 Flambeau River analytical results are summarized in Attachment A for SW-1 and SW-2. The 2022 Flambeau River analytical results are summarized in Attachment B for SW-3.

3.3 Annual Site Inspection

The site was inspected during the 2022 groundwater monitoring events. During these events, there were no areas of erosion or settling observed; vegetative growth appeared normal; and all monitoring devices were functional, with the following exception:

The beaver dam/issue, first observed in 2019, had expanded and was impeding drainage to the weir causing flooding in the local area. The beaver removal began in 2020 and continued in 2021. In spring of 2021, the beaver dam was removed and the trailway was restored. There were no beaver removal activities conducted in 2022.

3.4 Other Activities

The Flambeau River was voluntarily monitored in the spring and fall for copper, iron, manganese, total hardness, zinc, and total suspended solids (TSS). These results are summarized in Attachment A for SW-1 and SW-2. The results are summarized in Attachment B for SW-3. The results indicate that the Flambeau River remains protected.

4. References

2022 Revised Mining Permit	December 2022
2021 Annual Summary Memorandum	January 2022
2020 Annual Summary Memorandum	January 2021
Reclaimed Flambeau Mine Well Abandonment Documentation Submittal	November 2020
2020 Updated Monitoring Plan	August 2020
Reclaimed Flambeau Mine Well Abandonment Work Plan	August 2020
Beaver Removal Work Plan	August 2020
2019 Annual Summary Memorandum	January 2020
2018 Annual Summary Memorandum	January 2019
Request to Modify the Updated Monitoring Plan	November 2018
2017 Annual Report	January 2018
2016 Annual Report	January 2017
Copper Park Business and Recreation Area Supplement Construction Documentation Report	November 2016
2015 Annual Report	January 2016

2015 Flambeau Mining Company Surface Water Monitoring Plan	September 2015
Copper Park Business and Recreation Area Work Plan Supplement	May 2015
Quality Assurance Project Plan	February 2015
2014 Annual Report	January 2015
2013 Annual Report	January 2014
Copper Park Business and Recreation Area Maintenance and Monitoring Plan	February 2013
2012 Annual Report	January 2013
Copper Park Business and Recreation Area Construction Documentation Report	January 2013
2012 Annual Reclamation Report	November 2012
2011 Annual Report	January 2012
2011 Annual Reclamation Report	November 2011
Copper Park Business and Recreation Area Work Plan	May 2011
2010 Annual Report	January 2011
2010 Annual Reclamation Report	November 2010
2009 Annual Report	February 2010
2009 Annual Reclamation Report	November 2009
2008 Annual Report	January 2009
2008 Annual Reclamation Report	November 2008
2008 Monitoring Results and Copper Park Lane Work Plan	October 2008
2007 Annual Report	January 2008
COC Stipulation Monitoring Work Plan	December 2007
Quality Assurance Project Plan – Stipulation Monitoring Work Plan QAPP for the Flambeau Mine	December 2007
2007 Annual Reclamation Report	November 2007
Stipulation and Order	May 2007
2006 Annual Report	January 2007
Biofilter Management Plan	January 2007
2006 Annual Reclamation Report	November 2006
Construction Documentation Report – Flambeau Industrial Outlot	September 2006

2005 Annual Report	January 2006
2005 Annual Reclamation Report	November 2005
2004 Annual Reclamation Report	November 2004
2001 Annual Reclamation Report	November 2001
2000 Annual Report	January 2001
Revised Mining Permit Quality Assurance/Quality Control Plan	August 1991
Updated Monitoring Plan	July 1991
Mining Permit	January 1991
Operational Phase and Long Term Care Quality Assurance Plan	November 1993
Mine Permit Application	December 1989
Local Agreement	August 1988

5. Submittal Summary

Document	Date	Submittee
2021 Annual Summary Memorandum	January 2022	Greg Pils[1]
Environmental Groundwater Monitoring (First half 2022)	August 2022	Greg Pils[1]
Environmental Groundwater Monitoring (Second half 2022)	January 2023	Greg Pils[1]

1. Wisconsin Department of Natural Resources
   Division of External Services
   Bureau of Environmental Analysis & Sustainability

Attachments

Figure 1	November 2022 Potentiometric Surface, Shallow Groundwater Levels
Figure 2	November 2022 Potentiometric Surface, Wells Screened at Mid-Depths
Figure 3	2022 Mine Pit Cross Section A-A' with In-Pit Groundwater Monitoring Wells
Attachment A	Groundwater Quality & Elevation/Surface Water Quality Trends
Attachment B	SW-3 2022 Data Table

Figures

38,000 E
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39,000 N

1090.57
MW-1002
MW-1002G
1090.43

1087.91
MW-1015A
MW-1015B
1087.93

MW-1004 1107.86
MW-1004S 1107.88
MW-1004P 1105.89

MW-1013 1114.10
MW-1013A 1098.59
MW-1013B 1099.00
MW-1013C 1101.98

MW-1010P
1087.78
MW-1000PR
1088.02
MW-1000R
1089.15

ST-9-26
1117.80

OW-39
1100.52

PZ-S3
1124.49

MW-1014 1123.09
MW-1014A 1120.32
MW-1014B 1116.54
MW-1014C 1111.02

ST-9-23
1124.71
ST-9-23A
1126.92

MW-1005 1140.42
MW-1005P 1139.05
MW-1005S 1139.93

MW-1001 1118.80
MW-1001P 1118.15
MW-1001G 1117.74

1090
1095
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N

LEGEND

1125 — POTENTIOMETRIC SURFACE CONTOUR

INFERRED POTENTIOMETRIC SURFACE CONTOUR BASED ON HISTORICAL DATA

MW-1001
1118.80
GROUNDWATER MONITORING WELL AND MEASURED GROUNDWATER ELEVATION (FT MSL) (NOVEMBER 16, 2022)

1119.54 *
ASTERISK DENOTES ELEVATION FROM WELL NEST REPRESENTED BY GROUNDWATER CONTOUR

SLURRY WALL LOCATION

APPROXIMATE LIMITS OF FORMER MINE PIT

NOTE:
FOR THE PURPOSE OF THIS POTENTIOMETRIC SURFACE MAP THE SHALLOWEST, NON DRY WELL OF THE NESTED WELL SET WAS USED TO GENERATE THE POTENTIOMETRIC SURFACE.

FLAMBEAU MINING COMPANY
2022 ANNUAL SUMMARY MEMORANDUM

Foth Environment Solutions

REVISED	DATE	BY	DESCRIPTION

PREPARED BY:	NMG1	DATE:	JAN. '23
REVIEWED BY:	MAN	DATE:	JAN. '23
APPROVED BY:	SVF	DATE:	JAN. '23

FLAMBEAU MINING COMPANY

FIGURE 1
NOVEMBER 2022
POTENTIOMETRIC SURFACE
SHALLOW GROUNDWATER LEVELS

Scale: 0 250' 500'
Date: JANUARY 2023
Drawn By: JOW
Project No: 17F777.23

Thursday, January 26, 2023 9:51:55 AM Flambeau Mining\17F777\CAD\Figures\2022 Annual Memo
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MW-1002
MW-1002G
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MW-1015A
MW-1015B
1087.93

MW-1004 1107.86
MW-1004S 1107.88
MW-1004P 1105.89

MW-1013 1114.10
MW-1013A 1098.59
MW-1013B 1099.00
MW-1013C 1101.98

MW-1010P
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MW-1000PR
1088.02
MW-1000R
1089.15

MW-1014 1123.09
MW-1014A 1120.32
MW-1014B 1116.54
MW-1014C 1111.02

ST-9-23
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ST-9-26
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OW-39
1100.52

MW-1001 1118.80
MW-1001P 1118.15
MW-1001G 1117.74

MW-1005 1140.42
MW-1005P 1139.05
MW-1005S 1139.93

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LEGEND

1125 — POTENTIOMETRIC SURFACE CONTOUR

INFERRED POTENTIOMETRIC SURFACE CONTOUR BASED ON HISTORICAL DATA

MW-1002G
1090.43
GROUNDWATER MONITORING WELL AND MEASURED GROUNDWATER ELEVATION (FT MSL) (NOVEMBER 16, 2022)

SLURRY WALL LOCATION

APPROXIMATE LIMITS OF FORMER MINE PIT

NOTE:
"B-WELLS" IN THE BACKFILL PIT AND DEEPER WELLS IN AREAS WITH WELL NESTS OUTSIDE OF THE BACKFILLED PIT WERE USED.

FLAMBEAU MINING COMPANY
2022 ANNUAL SUMMARY MEMORANDUM

Foth

Foth Environment Solutions				
REVISED	DATE	BY	DESCRIPTION	
PREPARED BY:		NMG1	DATE:	JAN. '23
REVIEWED BY:		MAN	DATE:	JAN. '23
APPROVED BY:		SVF	DATE:	JAN. '23

FLAMBEAU MINING COMPANY

FIGURE 2
NOVEMBER 2022
POTENTIOMETRIC SURFACE
WELLS SCREENED AT MID-DEPTHS

Scale: 0 250' 500'
Date: JANUARY 2023
Drawn By: JOW
Project No: 17F777.23

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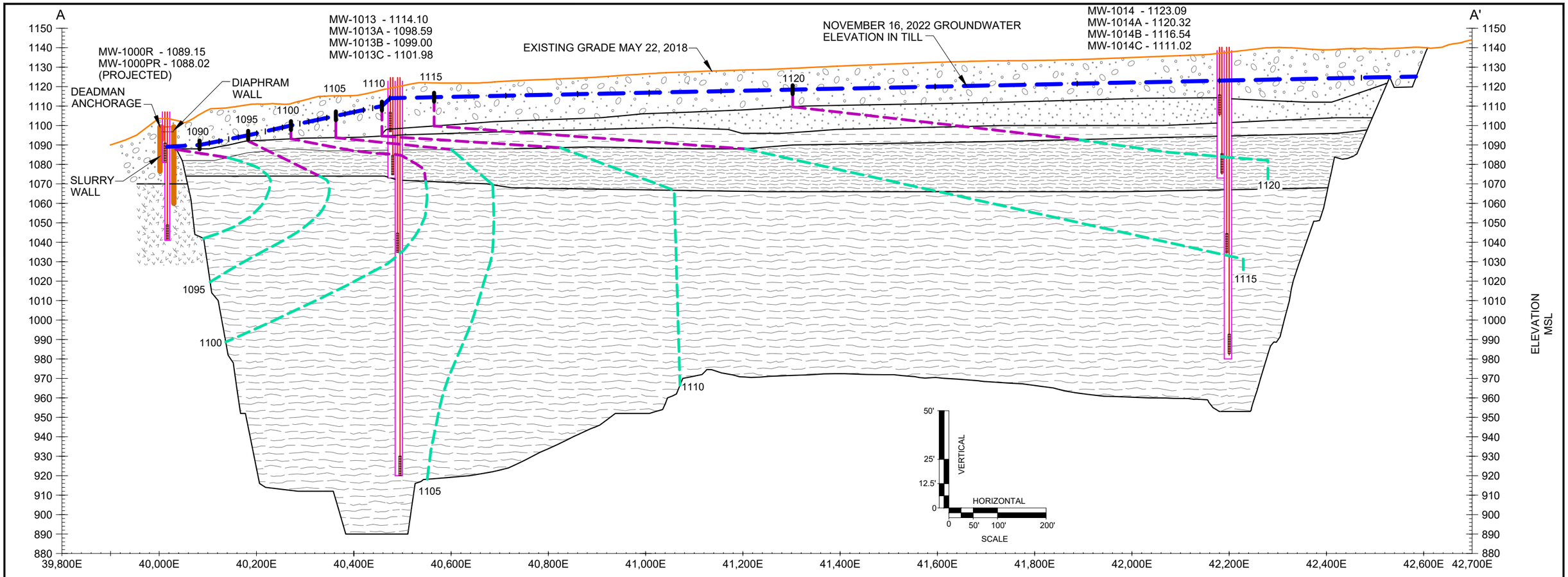

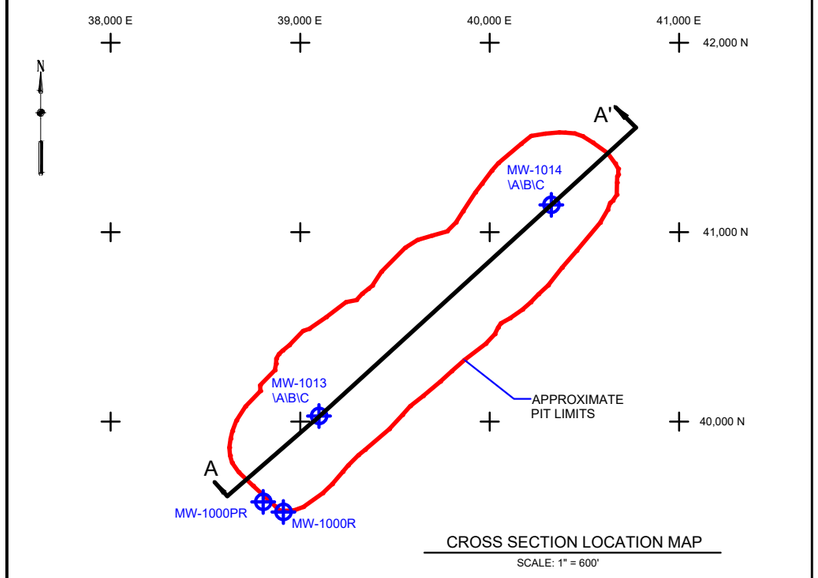

MINE PIT COORDINATES

SECTION A - A'

LEGEND

- TILL
- SANDSTONE
- SAPROLITE
- TYPE I MATERIAL
- TYPE II MATERIAL
- PRECAMBRIAN
- WATER TABLE
- GROUNDWATER EQUIPOTENTIAL LINE IN TYPE I AND II BACKFILL
- GROUNDWATER EQUIPOTENTIAL LINE IN SHALLOW FLOW SYSTEM

Foth Environment Solutions			
REVISED	DATE	BY	DESCRIPTION

PREPARED BY:	NMG1	DATE: JAN. '23
REVIEWED BY:	MAN	DATE: JAN. '23
APPROVED BY:	SVF	DATE: JAN. '23

FLAMBEAU MINING COMPANY

FIGURE 3

2022 MINE PIT CROSS SECTION A - A' WITH IN-PIT GROUNDWATER MONITORING WELLS

Scale: 0 250' 500' | Date: JANUARY 2023

Drawn By: JOW | Project No: 17F777.23

FLAMBEAU MINING COMPANY
2022 ANNUAL SUMMARY MEMORANDUM

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Attachment A
Groundwater Quality & Elevation/Surface Water Quality Trends

Memorandum

2121 Innovation Court, Suite 100
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January 13, 2023

TO: Stephen Bourn, Flambeau Mining Company
Leland Roberts, Flambeau Mining Company

CC: Steve Donohue, Foth Infrastructure & Environment, LLC
Sharon Kozicki, P.G., Foth Infrastructure & Environment, LLC

FR: Stephen Lehrke, Ph.D., Foth Infrastructure & Environment, LLC

RE: 2022 Annual Memo Report – Groundwater and Surface Water Trends

1. Background

Groundwater and surface water sample results collected during the 2022 monitoring programs were added to the analytical monitoring historical database. These results were statistically tested and graphically displayed to determine whether any significant increasing or decreasing trends are occurring in the groundwater or surface water chemistry. This is done to satisfy the requirements of Part 4, Condition 9 of the Mine Permit, to summarize the monitoring activities and any observed trends. The 2022 surface water samples from the Flambeau River were collected voluntarily by Flambeau Mining Company (Flambeau).

The trend analyses presented in this memorandum (memo) reflect the changes to the long-term groundwater monitoring program as provided in the approved 2020 Updated Monitoring Plan (Foth, 2020)[1]. Analytes previously collected on a quarterly schedule are now collected semi-annually, and analytes collected on an annual basis are now limited to calcium, chloride, lead, magnesium, potassium, and zinc. Groundwater elevation data is also collected semi-annually at the intervention boundary and in-pit wells, along with eight piezometer locations retained for that purpose.

Groundwater quality results, trend graphs, and statistical test results are included as attachments: Attachment 1 presents the semi-annual monitoring parameters, and Attachment 2 presents the annual monitoring parameters. Surface water quality results, trend graphs, and statistical test results are included as Attachment 3. Hydrographs are included as Attachment 4.

Intervention boundary wells included in the trend analyses are MW-1000R, MW-1000PR, MW-1010P, MW-1002, MW-1002G, MW-1004, MW-1004P, MW-1004S, MW-1005, MW-1005P, and MW-1005S. The in-pit wells included in the trend analyses are MW-1013, MW-1013A, MW-1013B, MW-1013C, MW-1014, MW-1014A, MW-1014B, and MW-1014C. Wells MW-1015A and

[1] Foth, 2020. *2020 Updated Monitoring Plan*, Reclaimed Flambeau Mine, Project I.D.: 17F777.20, Flambeau Mining Company, Ladysmith, Wisconsin. August 2020.

MW-1015B (also included in the analyses) were constructed in January 2001 approximately 1,000 feet northwest of the backfilled pit and adjacent to the compliance boundary.

Statistical trend test methods are described in Section 2 of this memo, with more detailed results provided in Section 3, and a summary of conclusions of the trend results provided in Section 4.

2. Statistical Methods

Groundwater and surface water trends over time were assessed using the non-parametric Mann-Kendall test. This test indicates general increasing or decreasing trends over the time periods evaluated. Two data sets (utilizing two distinct start dates) were assessed: "short-term" trends encompass the results of 2018 through 2022, i.e., the last five years, and "long-term" trends encompass the results from October 1997, when the post-mining period began, through the end of 2022.

Monitoring and long-term trend analyses began in July 1999 for the annual monitoring parameters. Monitoring and long-term trend analyses began in February 1999 for the in-pit wells (i.e., MW-1013B, MW-1013C, MW-1014A, MW-1014B, and MW-1014C), and in April 2001 for wells MW-1015A and MW-1015B. Trend analyses for wells MW-1013, MW-1013A, and MW-1014 began in October 2005, and for MW-1000R and MW-1004 in October 2010, when groundwater levels recovered sufficiently to collect samples.

The statistical results of the non-parametric Mann-Kendall test are used in conjunction with the time series graphs in Attachments 1, 2, and 3 to evaluate trend conditions within the context of the broader site hydrology. It should be noted that a statistically increasing or decreasing trend as determined through the Mann-Kendall test does not necessarily indicate a substantial increase or decrease in actual parameter concentrations. For example, there are situations where variation in the data is small, allowing slight but consecutive increasing or decreasing concentration changes to be detected as a statistically significant trend. Although these minor trends may occur, they should not be construed as an indication of a broader impact on water quality.

In some cases, the Mann-Kendall trend test results of Attachments 1, 2, and 3 may indicate a statistical trend in the "long-term" data (i.e., results since October 1997), while "short-term" data do not illustrate a trend. In these situations, higher or lower concentration data may have been observed in the past, but more recent concentration data has stabilized. The trend result discussion given below focuses on cases that exhibit trends only in the more recent "short-term" data of 2018 through 2022.

The procedure for the Mann-Kendall test is given in Gilbert (1987)[2] and U.S. Environmental Protection Agency (USEPA) (2009)[3]. The Type I error for each test was set to 0.01 (two-tailed), with the exception of the five-year trend tests for the annual parameters. To counteract the decrease in statistical power due to small sample sizes in those cases, the type I error (two-

[2]Gilbert, R.O., 1987. *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold, New York.

[3]USEPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. EPA 530-R-09-007. Office of Resource Conservation and Recovery, Program Implementation and Information Division, Washington, D.C.

tailed) was set to 0.05 to increase the statistical power (power of detecting existing trends). All non-detected values were replaced with a common value below the lowest detected value.

In the trend test results of Attachments 1, 2, and 3, a "+" indicates a statistically increasing trend and a "-" indicates a statistically decreasing trend. If neither a "+" or "-" is given, no statistically significant trend is present as measured by the Mann-Kendall test.

3. Trend Results

The majority of trends, increasing and/or decreasing, were exhibited in the groundwater results for the semi-annual parameters. Statistical trend results at each well are summarized below. Historical trend graphs from Attachment 1 (semi-annual parameters), Attachment 2 (annual parameters), Attachment 3 (surface water), and Attachment 4 (hydrographs) aid in interpretation. The results are organized by well nest and location.

As previously noted, the Mann-Kendall test may at times indicate that a statistical trend exists due to slight but consecutive concentration changes (either increasing or decreasing). In certain instances, trend tests (Attachments 1, 2, and 3) indicate either an increasing ("+") or decreasing ("-") result which does not reflect a substantial overall concentration change as illustrated in the time series graphs. The discussion below is therefore limited to trends existing in the recent five-year dataset that show at least a modest change in relative concentration level.

3.1 Semi-Annual Parameters (Attachment 1)

Semi-annual parameters include alkalinity, arsenic, copper, hardness, iron, manganese, sulfate, total dissolved solids (TDS), pH, conductivity, oxidation reduction potential (ORP), and water elevation.

3.1.1 Intervention Boundary Wells

- **MW-1000R/MW-1000PR/MW-1010P (Figures B-1a through B-1d):** These three wells are located near the immediate southwest boundary and hydraulically downgradient of the reclaimed mine pit.

  Changes in Reported Trends from Previous Annual Report:

  - None to report. No statistical trends in the recent five-year datasets are occurring.

  Continuing Trends from Previous Annual Report:

  - None to report.

- **MW-1002/MW-1002G (Figures B-2a through B-2d):** This well nest is located approximately 1,800 feet to the northwest and hydraulically side-gradient to the former mine pit.

  Changes in Reported Trends from Previous Annual Report:

  - A statistically increasing trend is shown for conductivity in the five-year data for MW-1002 and MW-1002G, mostly due to small increases during 2021 and 2022.

Continuing Trends from Previous Annual Report:

- Alkalinity and hardness in MW-1002G continue to have slowly increasing statistical trends indicated in the five-year data. Increasing trends in these parameters began in 2014 for alkalinity and 2011 for hardness.

- **MW-1004/MW-1004S/MW-1004P (Figures B-3a through B-3d):** This well nest is located near the immediate northwest boundary and is hydraulically downgradient of the former mine pit.

  Changes in Reported Trends from Previous Annual Report:

  - None to report. No statistical trends in the recent five-year datasets are occurring.

  Continuing Trends from Previous Annual Report:

  - None to report.

- **MW-1005/MW-1005S/MW-1005P (Figures B-4a through B-4d):** This well nest is located approximately 1,000 feet to the southeast and hydraulically upgradient of the former mine pit.

  Changes in Reported Trends from Previous Annual Report:

  - An increasing trend in the five-year data exists for conductivity in MW-1005, although the 2022 sample results decreased from the previous maximum value observed during 2021.

  - The previous slowly decreasing statistical trends observed in MW-1005S for alkalinity and manganese have ceased.

  Continuing Trends from Previous Annual Report:

  - None to report.

- **MW-1015A/MW-1015B (Figures B-5a through B-5d):** This well nest is located approximately 1,000 feet to the west and hydraulically downgradient of the former mine pit.

  Changes in Reported Trends from Previous Annual Report:

  - None to report.

  Continuing Trends from Previous Annual Report:

  - Statistically increasing trends in the five-year datasets are observed in MW-1015A for alkalinity, hardness, and sulfate. However, these are slower trends, reflecting only small changes in actual concentration.

3.1.2 In-Pit Wells

- **MW-1013/MW-1013A/MW-1013B/MW-1013C (Figures B-6a through B-6d):** This well nest is located within the former mine pit on the southwest side.

  Changes in Reported Trends from Previous Annual Report:

  - Alkalinity has a statistically increasing trend in MW-1013, but generally within the range of historical observations.
  - A statistically decreasing trend in the five-year data for conductivity in MW-1013C has ceased, with concentrations returning to the range generally observed historically.

  Continuing Trends from Previous Annual Report:

  - A statistically decreasing trend continues in the five-year data for sulfate for the already low concentrations in MW-1013.
  - Iron in MW-1013 has historically exhibited a large degree of variation. Between 2006 and 2009 seasonal effects were apparent, with iron being highest during the first and fourth quarter sampling events. While the seasonal effect seemed to diminish following 2009, iron concentrations in this well were elevated in 2013, and again in 2018, and to a lesser degree in 2019. While no statistical trend is currently reported, the seasonal effect was once again stronger during 2020, 2021, and 2022 with the fourth quarter concentrations elevated from the second quarter concentrations.
  - In the 2021 Annual Report, an overall statistically increasing trend was reported in the five-year data for alkalinity in MW-1013C. That trend is no longer statistically significant due to concentration decreases at the end of 2021 and beginning of 2022. However, the latest sample collected in November 2022 does still show an additional concentration increase. Continued sampling in 2023 will indicate whether this single result reflects an ongoing increasing trend.

- **MW-1014/MW-1014A/MW-1014B/MW-1014C (Figures B-7a through B-7d):** This well nest is located within the former mine pit on the northeast side.

  Changes in Reported Trends from Previous Annual Report:

  - A smaller statistically increasing trend in the five-year dataset is given for manganese in MW-1014A.

  Continuing Trends from Previous Annual Report:

  - Statistically increasing trends in the five-year datasets for hardness and sulfate in MW-1014 continue but are slower trends reflecting only smaller changes in actual concentration.
  - A decreasing trend of copper is observed in MW-1014B, with concentrations being particularly lower during 2019. Copper, hardness, manganese, sulfate, TDS, and conductivity in MW-1014B all illustrated significantly reduced concentrations during

May and June of 2019, with concentrations of hardness, manganese, sulfate, TDS, and conductivity, for the most part, subsequently rebounding to previously observed levels.

- Arsenic at MW-1014C shows a smaller increasing trend since 2003, however, concentrations remain below the maximum observed in this well during July 2000.

3.2 Annual Parameters (Attachment 2)

As previously noted, per the 2020 Updated Monitoring Plan, analytes collected on an annual basis are now limited to calcium, chloride, lead, magnesium, potassium, and zinc. Similar to previous trend analyses, the annual groundwater parameters illustrate few statistically significant trends. Of those trends that are noted, most reflect relatively small consecutive concentration changes. The following summary is limited to those trends which show at least a modest change in recent concentrations.

Historical trend charts for the annual parameters are illustrated on Figures B-8a through B-14b of Attachment 2.

Changes in Reported Trends from Previous Annual Report:

- Statistical trends were noted for the intervention boundary well MW-1015A with magnesium, and for the in-pit wells MW-1014 with chloride and MW-1014A with zinc. However, these reflect only small changes in actual concentration.

Continuing Trends from Previous Annual Report:

- The statistically decreasing trend previously reported in the five-year dataset for chloride in MW-1015B continues. Chloride concentrations have been sequentially decreasing in this well since the high observed during 2017.

- Calcium, chloride, and magnesium had small concentration increases during 2011 in MW-1005, which remained consistent through 2015. Concentrations of these parameters rose again from 2016 through 2018, potentially attributed to application of road salt on State Highway 27 along with rising water levels and evaporative concentration effects. However, concentrations have since remained generally consistent, with no statistical trend currently reported in the five-year datasets.

3.3 Surface Water (Attachment 3)

Flambeau voluntarily continued surface water sampling of the Flambeau River in 2022. Sampling parameters currently include copper, hardness, iron, manganese, zinc, total suspended solids (TSS), pH, conductivity, dissolved oxygen (DO) and ORP. Concentrations were generally stable with no statistical trends in the five-year data.

3.4 Hydrographs (Attachment 4)

As observed in the hydrographs (Figures B-16a through B-16j), water levels have stabilized in all wells that showed significant drawdown during the production period from 1993 to 1997.

Groundwater elevations increased steadily from 1999 through 2002 for the in-pit wells MW-1013A, MW-1013B, MW-1013C, MW-1014, MW-1014A, MW-1014B, and MW-1014C, and

stabilized after 2003. At MW-1013, groundwater elevation rose through 2004 and stabilized during 2005.

Generally, higher groundwater elevations are noted for all wells during 2010 and 2011, reflecting the increased precipitation observed in those years. Elevations dropped in 2012 and rebounded during summer 2013. An increase in water levels was observed from 2014 through 2017 for both the intervention boundary and the in-pit wells. Decreased elevations were observed in 2018, followed by a rebound in 2019, tapering elevations during 2020 through 2021, and a small rebound in second quarter 2022.

4. Conclusions

A detailed analysis of statistical trends occurring in the groundwater and surface water data was performed. Statistical tests evaluated the long-term trends occurring during the post-mining period (October 1997 to the present) and the short-term trends for the most recent five years. Historical trend graphs of the data are also presented.

A detailed discussion of the trend results for each well nest is provided in Section 3. In general, the number of more notable concentration trends as observed in previous Annual Reports has reduced for both the intervention boundary and in-pit wells, indicating a broader stabilization in the groundwater concentrations. A number of the trends, noted through the Mann-Kendall nonparametric test, are due to slight but consecutive concentration changes (either increasing or decreasing) and not reflective of a substantial overall concentration change. The majority of the observed trends continue to occur in the semi-annual groundwater indicator monitoring parameters.

For the intervention boundary wells, a slow increasing statistical trend occurs for alkalinity and hardness in MW-1002G. Increasing trends in these parameters began in 2014 for alkalinity and 2011 for hardness. An increasing trend in the five-year data also exists for conductivity in MW-1005, although the 2022 sample data decreased from the previous maximum value observed during 2021.

For the MW-1013 in-pit well nest, iron at MW-1013, which previously had an increasing trend and historically exhibited a large degree of variation, again exhibited stronger seasonal variation during 2020 through 2022 with increased concentrations observed during the fall event.

For the in-pit well nest at MW-1014, copper in in MW-1014B remains at lowered concentrations after a substantial decrease in 2019. Arsenic at MW-1014C shows a smaller increasing trend since 2003, however, concentrations remain below the maximum observed in this well during July 2000.

No statistical trends were noted in the five-year datasets for surface water.

Attachments

- Attachment 1: Groundwater – Semi-Annual Parameters
- Attachment 2: Groundwater - Annual Parameters
- Attachment 3: Surface Water
- Attachment 4: Hydrographs and Groundwater Elevation Data

Attachment 1
Groundwater – Semi-Annual Parameters

Trend Analysis

Trend Graphs

2022 Data

Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2022

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1000PR												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	17	-18	36	-32	-23	3	-35	-40	-4	5	-15	-25
p-Level	0.388	0.359	0.055	0.090	0.234	0.914	0.062	0.031	0.872	0.830	0.450	0.192
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	95	76	95	95	95	95	95	95	95	95	79	95
Mann-Kendall S	1893	1379	-1118	-3218	-270	-2847	-3359	-3150	1493	-3241	-1267	1435
p-Level	0.000	0.000	0.000	0.000	0.387	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Trend	+	+	-	-		-	-	-	+	-	-	+
MW-1000R												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	-19	-3	-37	-9	0	-33	-17	3	2	13	-17	-13
p-Level	0.33	0.914	0.048	0.668	1	0.08	0.388	0.914	0.957	0.518	0.388	0.518
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	43	43	43	43	43	43	43	43	43	43	42	94
Mann-Kendall S	-479	-10	-457	-431	-209	-422	-205	-416	73	-441	-333	1578
p-Level	5.6066E-07	0.898328	1.82E-06	6.73363E-06	0.00438	1.04662E-05	0.032702	1.39E-05	0.451	4.13E-06	0.000321	0.000
Trend	-		-	-	-	-		-		-	-	+
MW-1010P												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	36	-9	-15	44	0	33	39	-2	-3	45	-11	-15
p-Level	0.055	0.668	0.450	0.017	1.000	0.080	0.036	0.957	0.914	0.014	0.590	0.450
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	95	76	95	95	95	95	95	95	95	95	80	95
Mann-Kendall S	1344	910	-1005	3270	-1631	-834	3494	1487	781	2803	545	1115
p-Level	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.012	0.000	0.024	0.000
Trend	+	+	-	+	-	-	+	+		+		+
MW-1002												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	13	0	-12	27	-9	5	23	19	-9	63	-8	-3
p-Level	0.518	1.000	0.554	0.158	0.668	0.830	0.234	0.330	0.668	0.000	0.708	0.914
Trend										+		
Trend Results for All Data Since Oct. 1997												
Sample Size	95	73	95	95	95	95	95	95	95	95	30	95
Mann-Kendall S	1549	-50	10	1630	-615	-287	-1887	190	-291	1370	-106	1029
p-Level	0.000	0.553	0.969	0.000	0.012	0.158	0.000	0.543	0.351	0.000	0.061	0.001
Trend	+			+			-			+		+
MW-1002G												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	57	0	3	60	0	0	-16	17	-2	57	-8	-1
p-Level	0.002	1.000	0.914	0.000	1.000	1.000	0.419	0.388	0.957	0.002	0.708	1.000
Trend	+			+						+		
Trend Results for All Data Since Oct. 1997												
Sample Size	95	73	95	95	95	95	95	95	95	95	30	95
Mann-Kendall S	2031	-113	315	2995	-406	66	-539	1595	-551	2511	-126	982
p-Level	0.000	0.058	0.069	0.000	0.072	0.741	0.083	0.000	0.077	0.000	0.025	0.002
Trend	+			+				+		+		+

Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2022

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1004												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	-1	-7	18	-20	23	25	-23	-2	28	3	-9	-1
p-Level	1	0.748	0.359	0.305	0.234	0.192	0.234	0.957	0.142	0.914	0.668	1
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	42	42	42	42	42	42	42	42	42	42	41	82
Mann-Kendall S	-170	-4	235	-136	-24	-15	-100	144	183	-90	-319	857
p-Level	0.06686812	0.941664	0.011097	0.143242747	0.79927	0.876370742	0.283042	0.120845	0.048414	0.334753	0.000354	0.001
Trend											-	+
MW-1004S												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	-5	0	-34	15	0	-1	-3	4	-6	7	-5	-1
p-Level	0.830	1.000	0.071	0.450	1.000	1.000	0.914	0.872	0.789	0.748	0.830	1.000
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	95	75	95	95	95	95	95	95	95	95	80	95
Mann-Kendall S	178	-45	1007	627	-782	-181	1957	-580	387	45	-1099	1614
p-Level	0.569	0.552	0.001	0.044	0.000	0.472	0.000	0.062	0.214	0.887	0.000	0.000
Trend			+		-		+				-	+
MW-1004P												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	26	11	-11	3	3	8	-15	18	27	31	-41	12
p-Level	0.175	0.590	0.590	0.914	0.914	0.708	0.450	0.359	0.158	0.100	0.026	0.554
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	96	76	96	96	96	96	96	96	96	96	76	96
Mann-Kendall S	1241	813	-893	1614	2381	2200	440	17	632	1144	-999	1842
p-Level	0.000	0.000	0.000	0.000	0.000	0.000	0.129	0.959	0.046	0.000	0.000	0.000
Trend	+	+	-	+	+	+				+	-	+
MW-1005												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	33	-6	-16	11	-21	-9	6	18	-23	51	-17	11
p-Level	0.080	0.789	0.419	0.590	0.280	0.668	0.789	0.359	0.234	0.004	0.388	0.590
Trend										+		
Trend Results for All Data Since Oct. 1997												
Sample Size	95	73	95	95	95	95	95	95	95	95	30	94
Mann-Kendall S	-717	-383	744	2103	-173	1015	1601	2071	-824	2166	-74	1619
p-Level	0.021	0.066	0.004	0.000	0.579	0.001	0.000	0.000	0.008	0.000	0.194	0.000
Trend			+	+		+	+	+	-	+		+
MW-1005S												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	-28	23	0	-20	-40	-21	62	-6	-21	-3	7	21
p-Level	0.142	0.234	1.000	0.305	0.031	0.280	0.000	0.789	0.280	0.914	0.748	0.280
Trend							+					
Trend Results for All Data Since Oct. 1997												
Sample Size	95	73	95	95	95	95	95	95	95	95	30	95
Mann-Kendall S	-360	-66	-31	-48	-788	-362	-4	-965	170	-122	24	1649
p-Level	0.234	0.755	0.750	0.877	0.011	0.238	0.992	0.002	0.586	0.697	0.685	0.000
Trend								-				+

Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2022

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1005P												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	20	31	0	10	15	-14	-7	-17	-22	-9	-43	21
p-Level	0.305	0.100	1.000	0.629	0.450	0.484	0.748	0.388	0.257	0.668	0.020	0.280
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	95	73	95	95	95	95	95	95	95	95	82	95
Mann-Kendall S	517	507	-111	1087	2411	1238	-470	-158	49	965	13	1342
p-Level	0.088	0.002	0.539	0.000	0.000	0.000	0.014	0.613	0.877	0.002	0.962	0.000
Trend		+		+	+	+				+		+
MW-1015A												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	47	0	0	80	0	28	47	31	27	35	-27	-23
p-Level	0.010	1.000	1.000	0.000	1.000	0.142	0.010	0.100	0.158	0.062	0.158	0.234
Trend	+			+			+					
Trend Results for All Data Since Oct. 1997												
Sample Size	89	82	89	89	90	90	89	89	90	90	66	90
Mann-Kendall S	1554	-161	155	1609	-95	-916	-176	258	432	1822	-591	722
p-Level	0.000	0.048	0.339	0.000	0.564	0.001	0.534	0.360	0.133	0.000	0.001	0.012
Trend	+			+		-				+	-	
MW-1015B												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	38	0	-11	17	-2	17	30	-6	5	15	-25	-23
p-Level	0.042	1.000	0.590	0.388	0.957	0.388	0.113	0.789	0.830	0.450	0.192	0.234
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	89	82	89	89	90	90	89	89	90	90	67	90
Mann-Kendall S	-160	48	91	1676	-197	-1351	538	139	513	1479	995	770
p-Level	0.528	0.714	0.306	0.000	0.494	0.000	0.003	0.624	0.074	0.000	0.000	0.007
Trend				+		-	+			+	+	+
MW-1013												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	47	22	5	-14	11	7	-53	-6	-13	7	-18	34
p-Level	0.010	0.257	0.830	0.484	0.590	0.748	0.004	0.789	0.518	0.748	0.359	0.071
Trend	+						-					
Trend Results for All Data Since Oct. 1997												
Sample Size	63	63	63	63	63	63	63	63	63	63	63	90
Mann-Kendall S	446	56	191	-560	302	881	-1597	-243	-41	-675	-656	2762
p-Level	0.008	0.734	0.253	0.001	0.074	0.000	0.000	0.150	0.812	0.000	0.000	0.000
Trend	+			-		+	-			-	-	+
MW-1013A												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	35	12	-11	19	12	43	25	28	-6	35	9	15
p-Level	0.062	0.554	0.590	0.330	0.554	0.020	0.192	0.142	0.789	0.062	0.668	0.450
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	63	63	63	63	63	63	63	63	63	63	62	90
Mann-Kendall S	702	10	-98	32	89	863	-45	430	-76	-110	-534	2217
p-Level	0.000	0.945	0.485	0.854	0.586	0.000	0.794	0.011	0.656	0.518	0.001	0.000
Trend	+					+					-	+

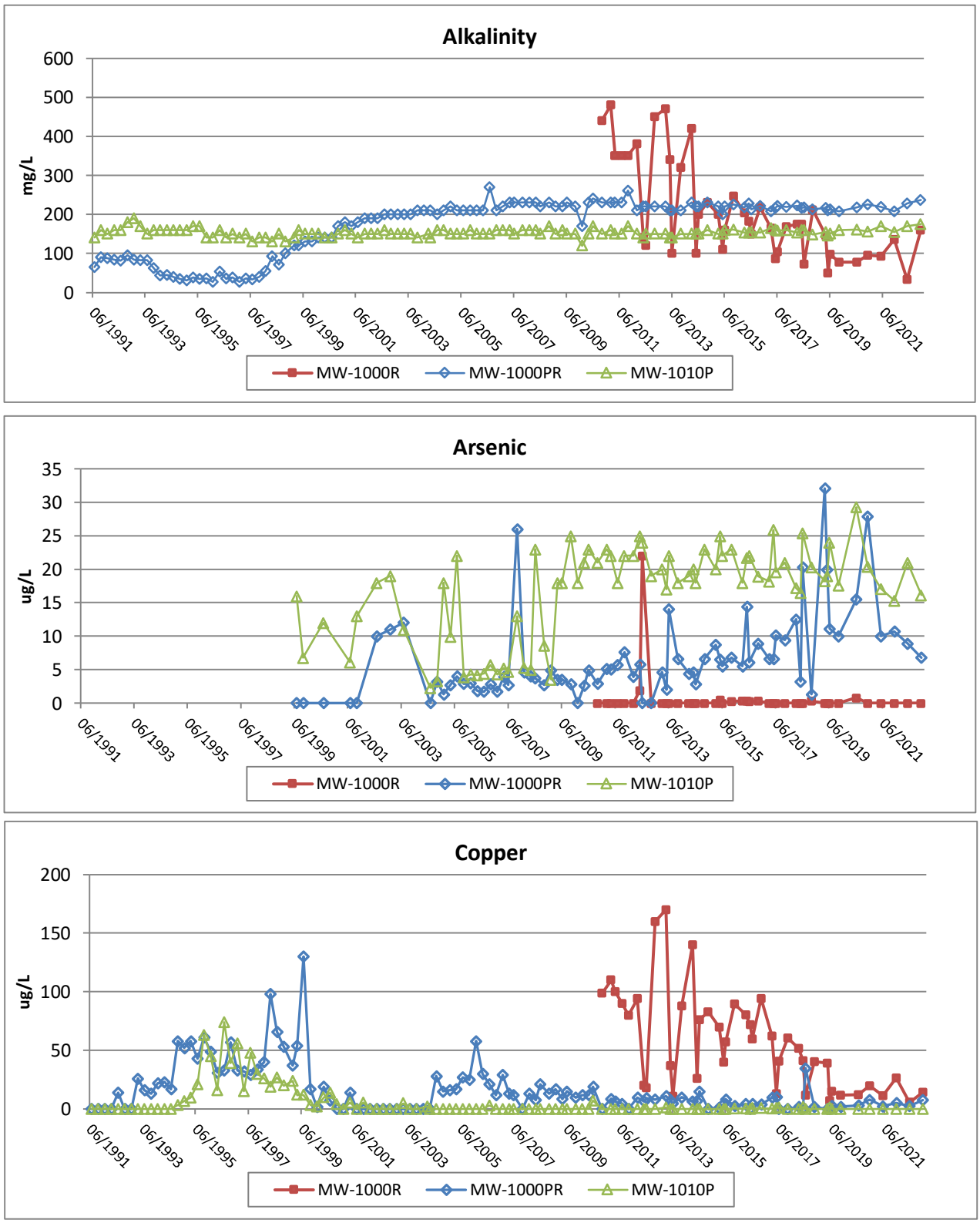
Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2022

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1013B												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	43	-5	-19	11	4	-1	-10	-13	-25	19	-7	17
p-Level	0.020	0.830	0.330	0.590	0.872	1.000	0.629	0.518	0.192	0.330	0.748	0.388
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	90	78	90	90	90	90	90	90	90	90	82	90
Mann-Kendall S	-349	-41	1821	-669	-683	-909	1378	-1284	-442	-1242	-655	2248
p-Level	0.225	0.854	0.000	0.016	0.009	0.002	0.000	0.000	0.123	0.000	0.009	0.000
Trend			+		-	-	+	-		-	-	+
MW-1013C												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	44	23	-15	-5	3	-19	-18	-26	21	-25	-25	21
p-Level	0.017	0.234	0.450	0.830	0.914	0.330	0.359	0.175	0.280	0.192	0.192	0.280
Trend												
Trend Results for All Data Since Oct. 1997												
Sample Size	90	78	90	90	90	90	90	90	90	89	82	90
Mann-Kendall S	401	1657	177	-1757	3389	196	-731	-2274	456	-1949	-263	2254
p-Level	0.162	0.000	0.430	0.000	0.000	0.495	0.009	0.000	0.112	0.000	0.294	0.000
Trend		+		-	+		-	-		-		+
MW-1014												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	33	12	-16	53	9	35	58	31	29	7	-9	34
p-Level	0.080	0.554	0.419	0.004	0.668	0.062	0.001	0.100	0.126	0.748	0.668	0.071
Trend				+			+					
Trend Results for All Data Since Oct. 1997												
Sample Size	63	63	63	63	63	63	63	63	63	63	63	87
Mann-Kendall S	314	65	-371	349	16	722	-349	261	-31	-251	-862	2198
p-Level	0.060	0.578	0.028	0.038	0.883	0.000	0.038	0.122	0.859	0.138	0.000	0.000
Trend						+					-	+
MW-1014A												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	29	27	37	42	0	49	-5	34	-3	18	-19	25
p-Level	0.126	0.158	0.048	0.023	1.000	0.006	0.830	0.071	0.914	0.359	0.330	0.192
Trend						+						
Trend Results for All Data Since Oct. 1997												
Sample Size	85	75	85	85	85	85	85	85	85	85	82	90
Mann-Kendall S	1059	387	1375	124	-1223	-1705	235	-486	-546	-1193	-723	2432
p-Level	0.000	0.061	0.000	0.624	0.000	0.000	0.372	0.058	0.038	0.000	0.004	0.000
Trend	+		+		-	-				-	-	+
MW-1014B												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	-27	-12	-67	-22	21	-31	-31	-30	-3	-9	3	35
p-Level	0.158	0.554	0.000	0.257	0.280	0.100	0.100	0.113	0.914	0.668	0.914	0.062
Trend			-									
Trend Results for All Data Since Oct. 1997												
Sample Size	90	78	90	90	90	90	90	90	91	91	82	91
Mann-Kendall S	-1067	-113	-1689	-2025	47	-3230	-1137	-2164	440	-2243	-1822	2303
p-Level	0.000	0.620	0.000	0.000	0.793	0.000	0.000	0.000	0.131	0.000	0.000	0.000
Trend	-		-	-		-	-	-		-	-	+

Trend Analysis Results - Groundwater (Semi-Annual Parameters)
Year Ending 2022

	Alkalinity	Arsenic	Copper	Hardness	Iron	Manganese	Sulfate	TDS	Field pH (su)	Cond (umhos /cm)	Redox (mV)	Grd Water El (Feet)
MW-1014C												
Trend Results for Most Recent 5 Years												
Sample Size	14	14	14	14	14	14	14	14	14	14	14	14
Mann-Kendall S	-1	51	0	-5	-14	-4	2	34	21	15	-39	35
p-Level	1.000	0.004	1.000	0.830	0.484	0.872	0.957	0.071	0.280	0.450	0.036	0.062
Trend		+										
Trend Results for All Data Since Oct. 1997												
Sample Size	90	78	90	90	90	90	90	90	90	90	82	90
Mann-Kendall S	-2548	1970	84	-2257	-2977	-2744	-2197	-2131	957	-2918	-133	2152
p-Level	0.000	0.000	0.664	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.597	0.000
Trend	-	+		-	-	-	-	-	+	-		+

Notes: Overall increasing trend denoted by "+".
Overall decreasing trend denoted by "-"
All trend tests performed at a Type I (two-tailed) error rate of 0.01.



Note: Fourth quarter 2010 was the first time MW-1000R had sufficient water recovery for sampling.

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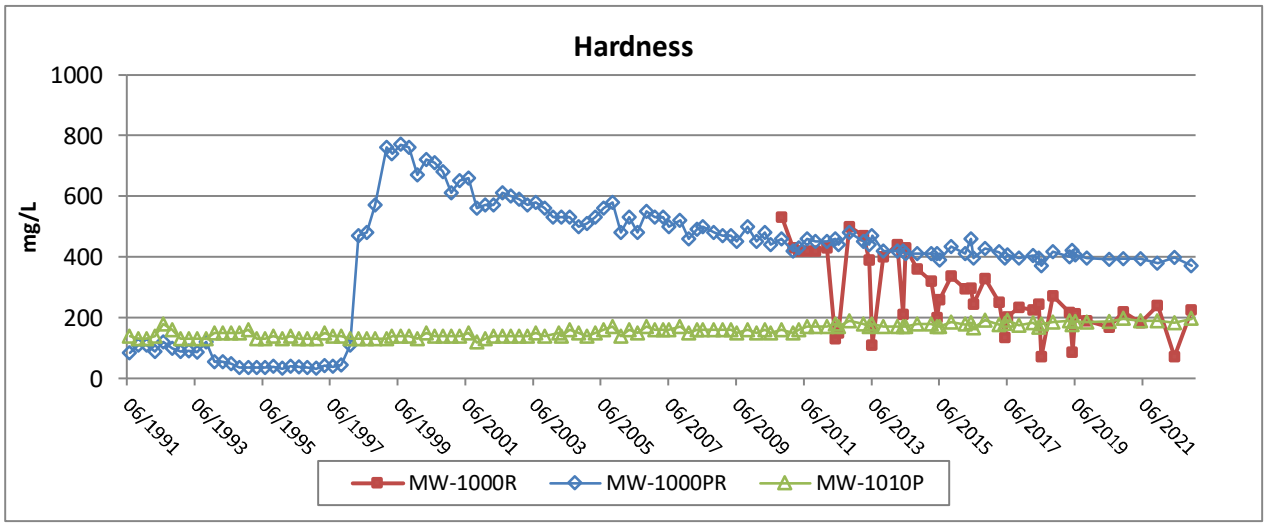
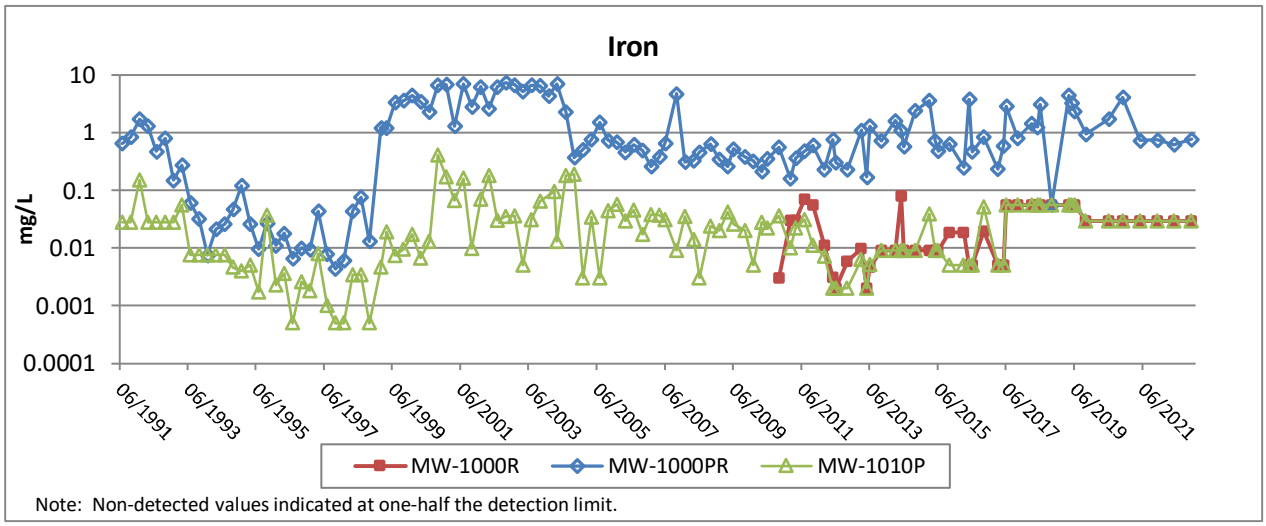
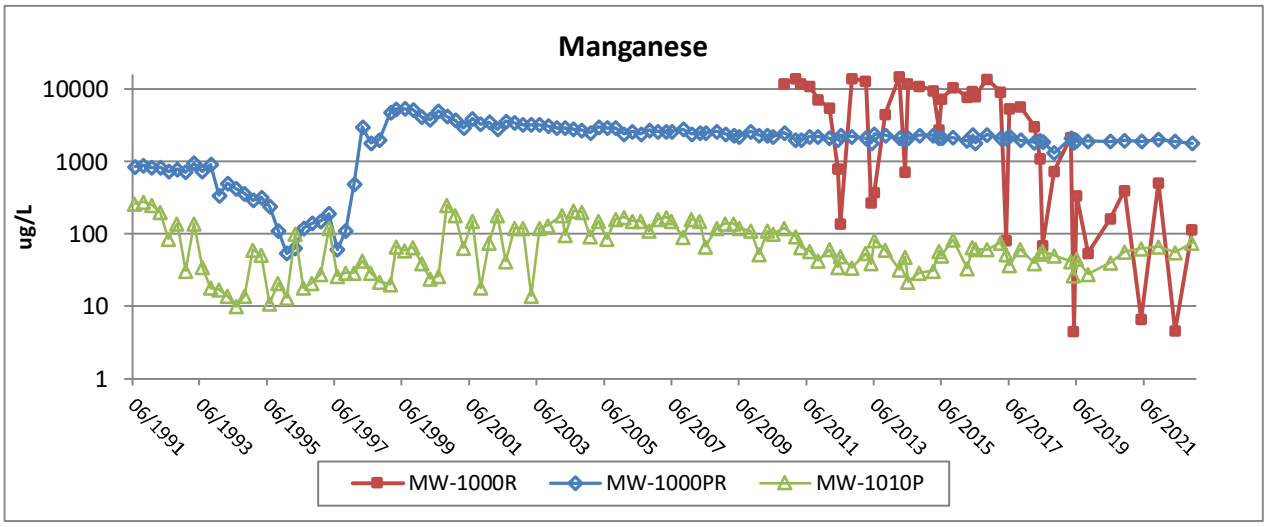
Figure B-1a
Groundwater Trend Graphs - Semi-Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





Note: Non-detected values indicated at one-half the detection limit.



Note: Iron trend graphs are displayed on a logarithmic scale so the trend patterns of MW-1000R, MW-1000PR and MW-1010P are visible at different concentration scales.

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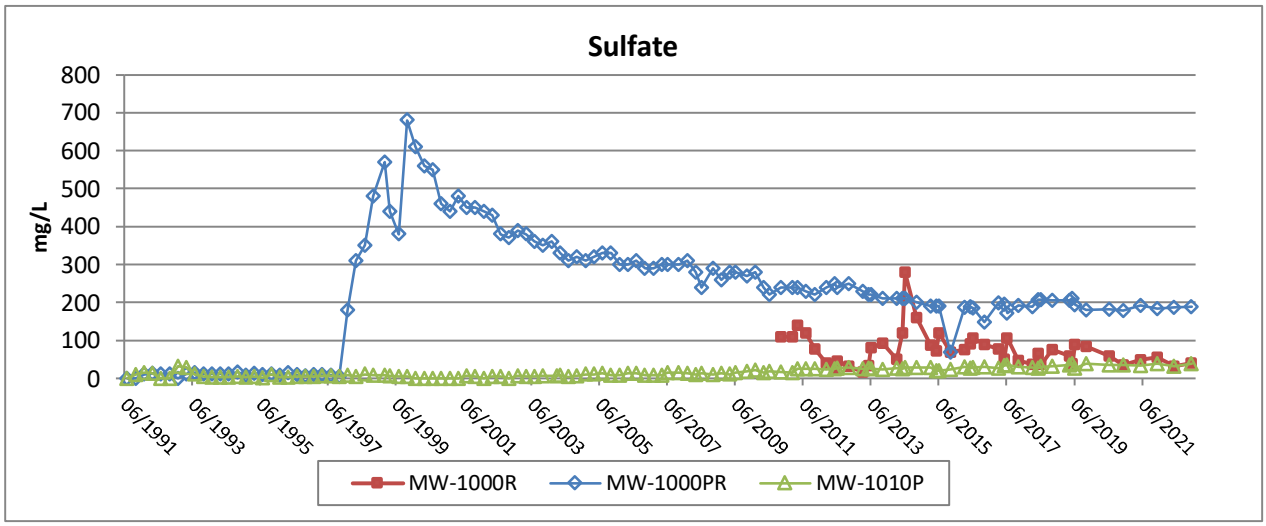
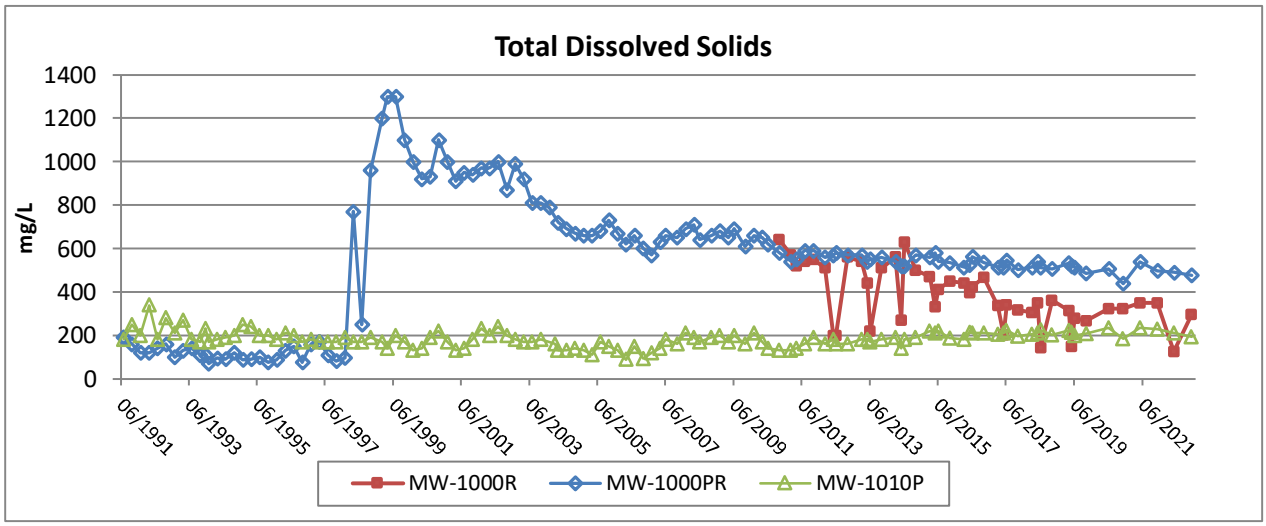
Figure B-1b
Groundwater Trend Graphs - Semi-Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





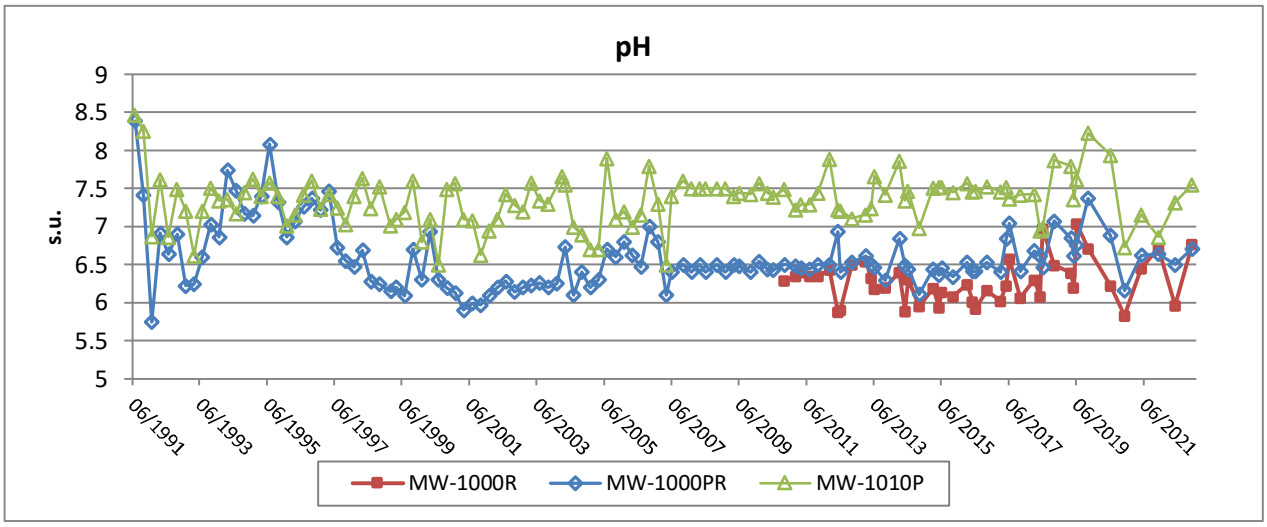


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Figure B-1c
Groundwater Trend Graphs - Semi-Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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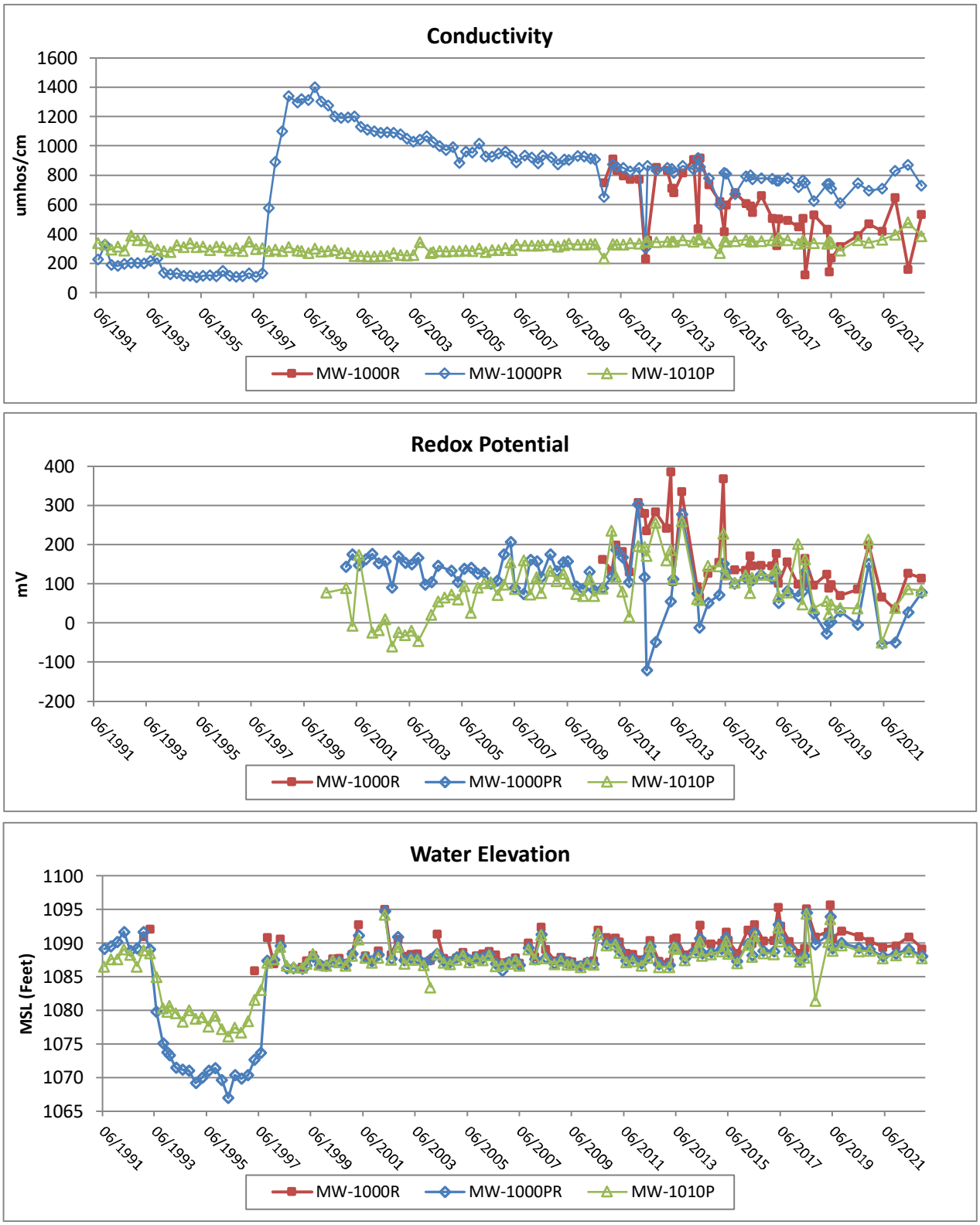

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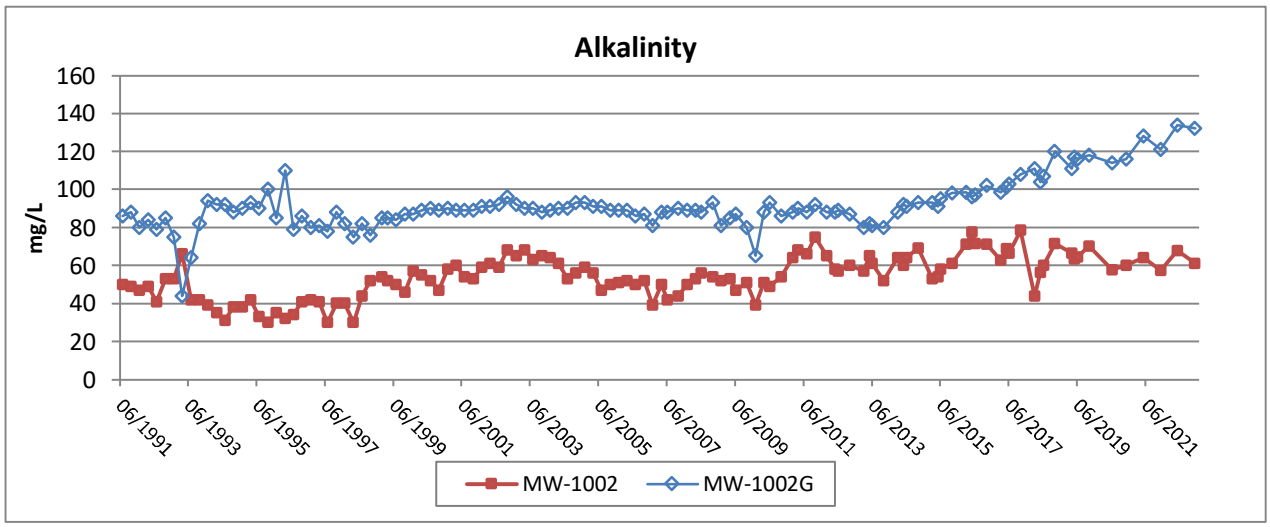
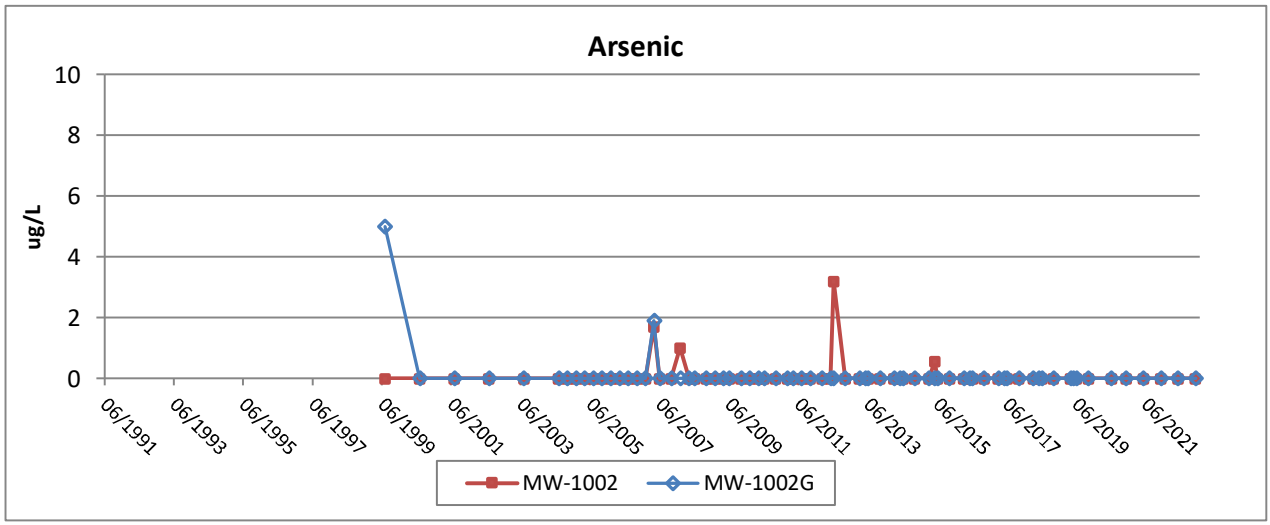
Figure B-1d
Groundwater Trend Graphs - Semi-Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





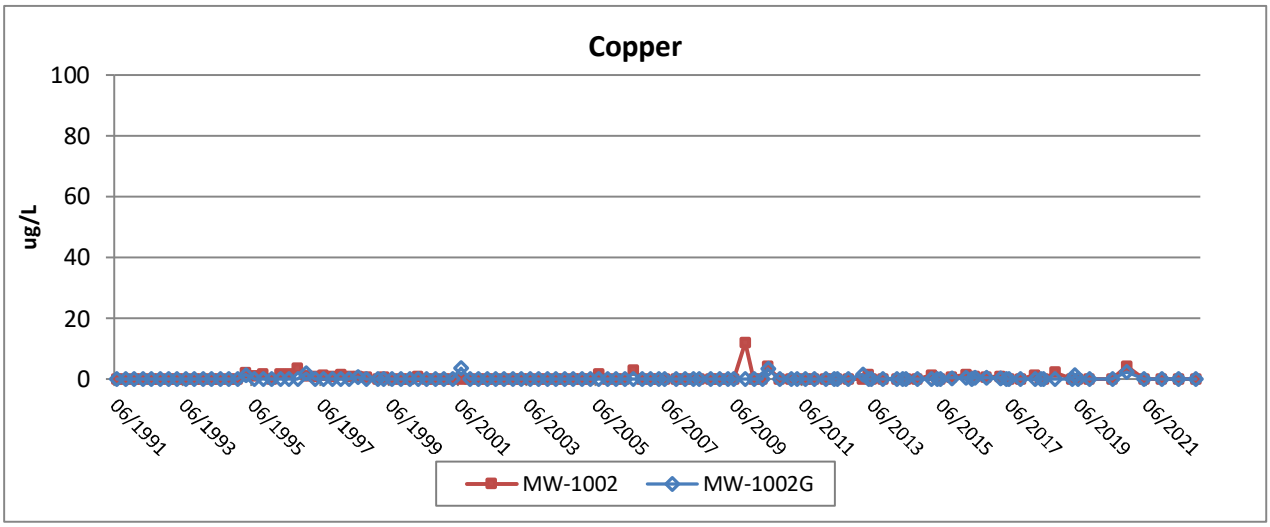


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Figure B-2a
Groundwater Trend Graphs - Semi-Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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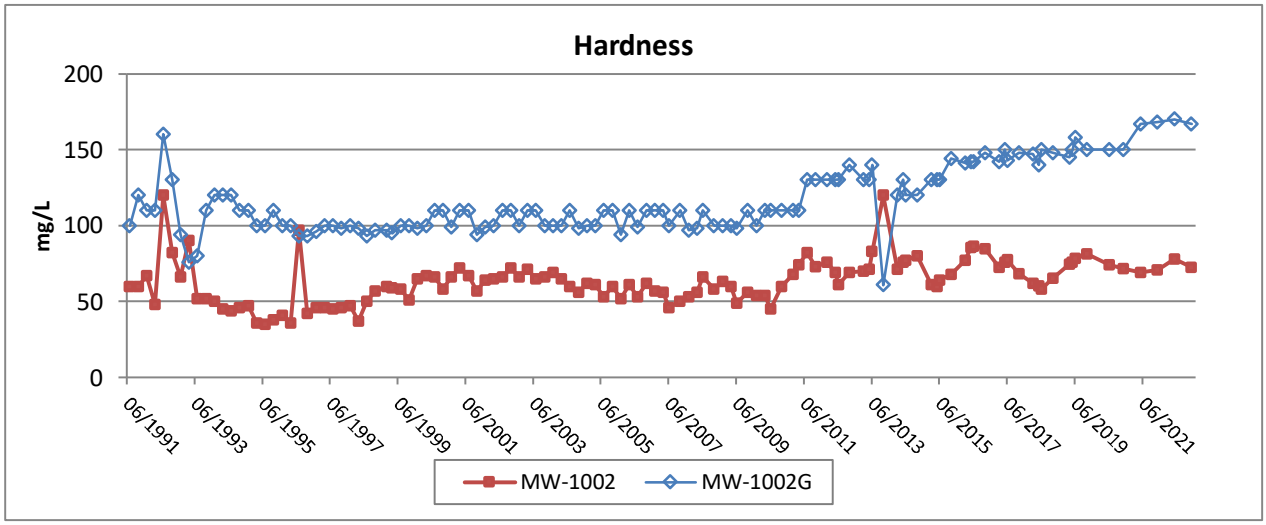

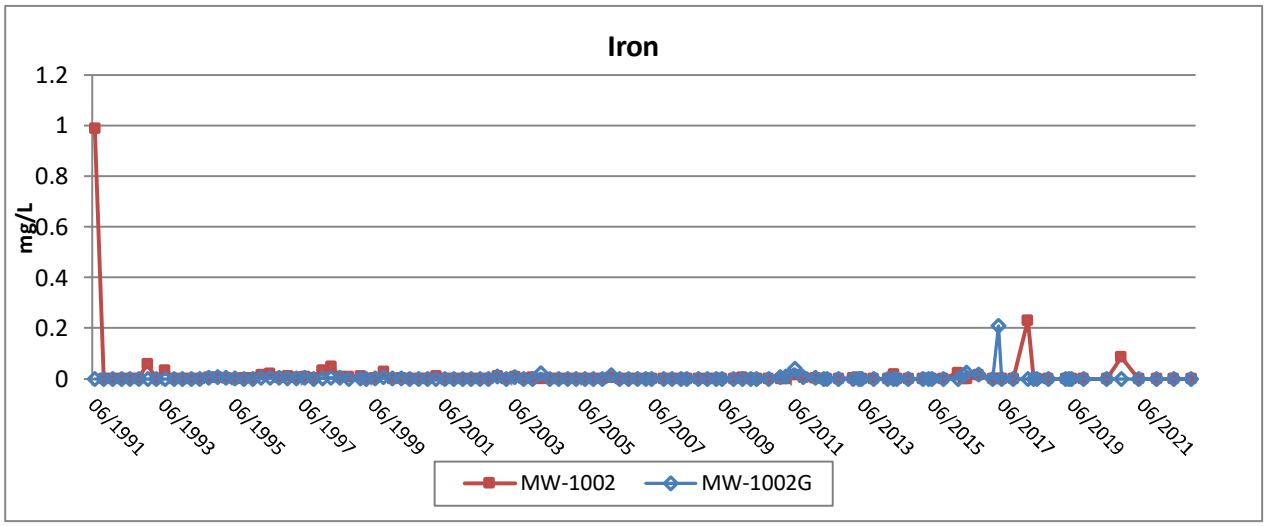

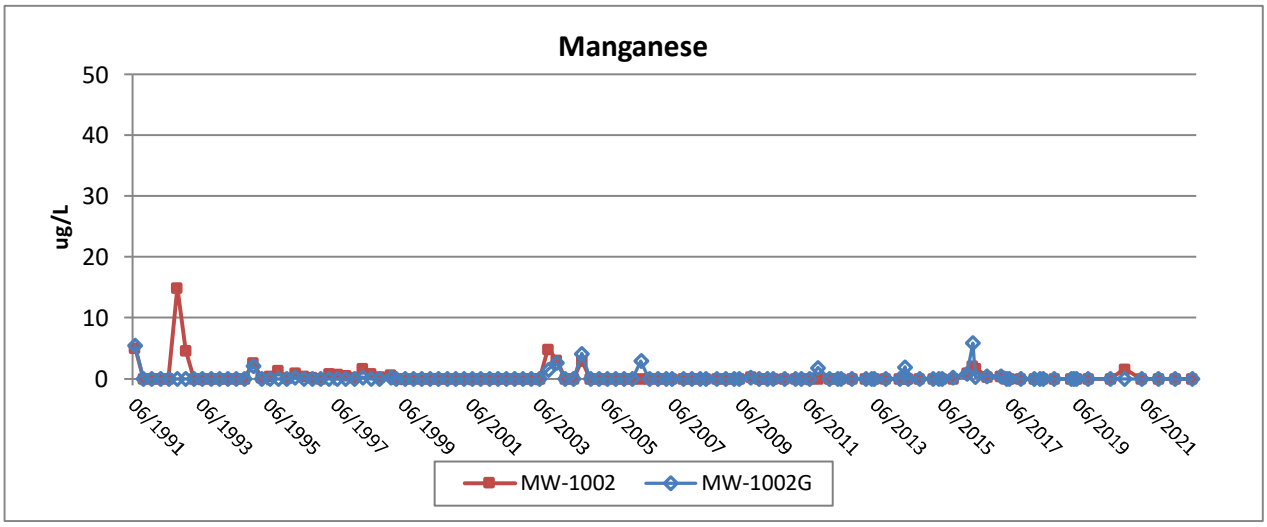

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Figure B-2b
Groundwater Trend Graphs - Semi-Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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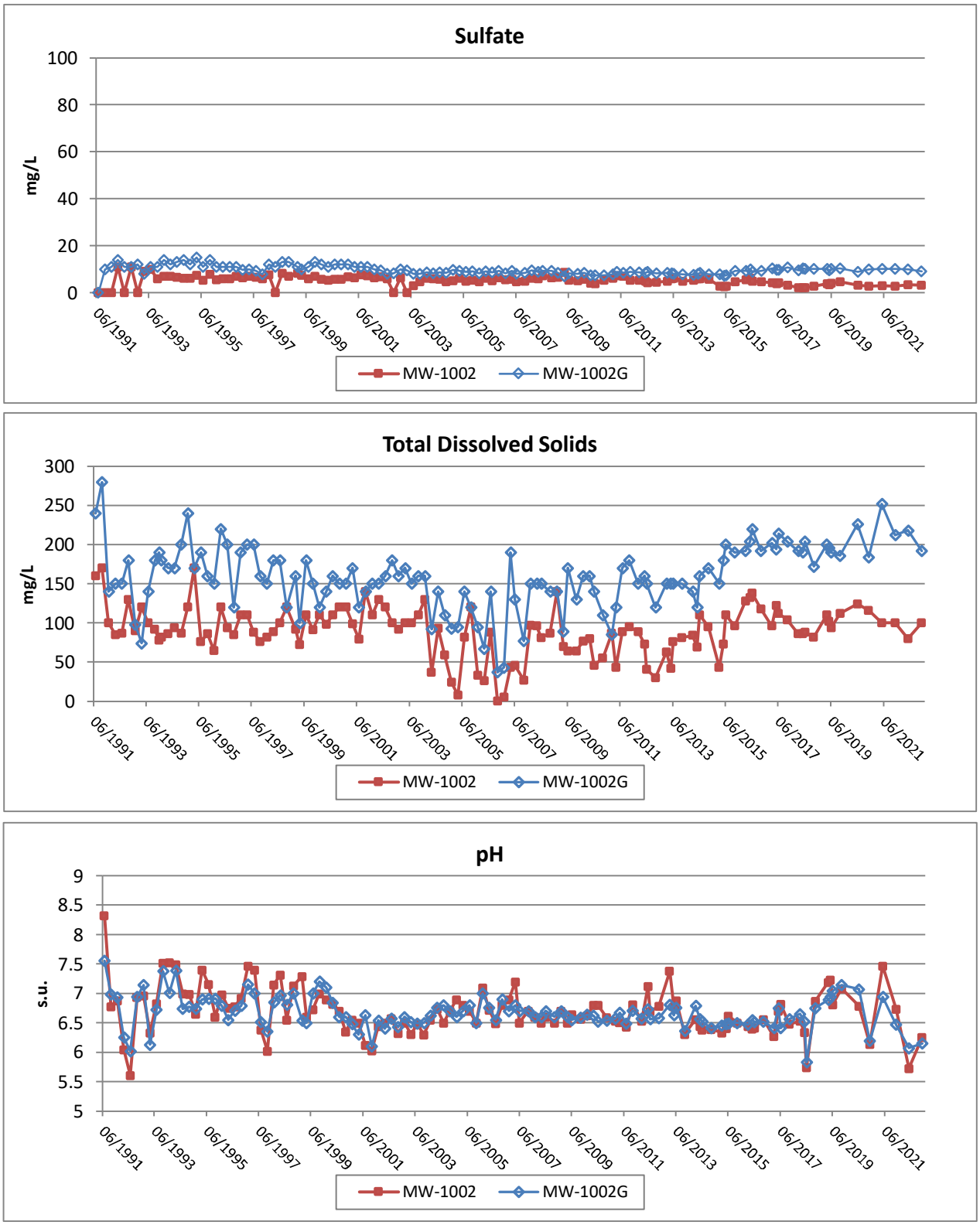

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Figure B-2c
Groundwater Trend Graphs - Semi-Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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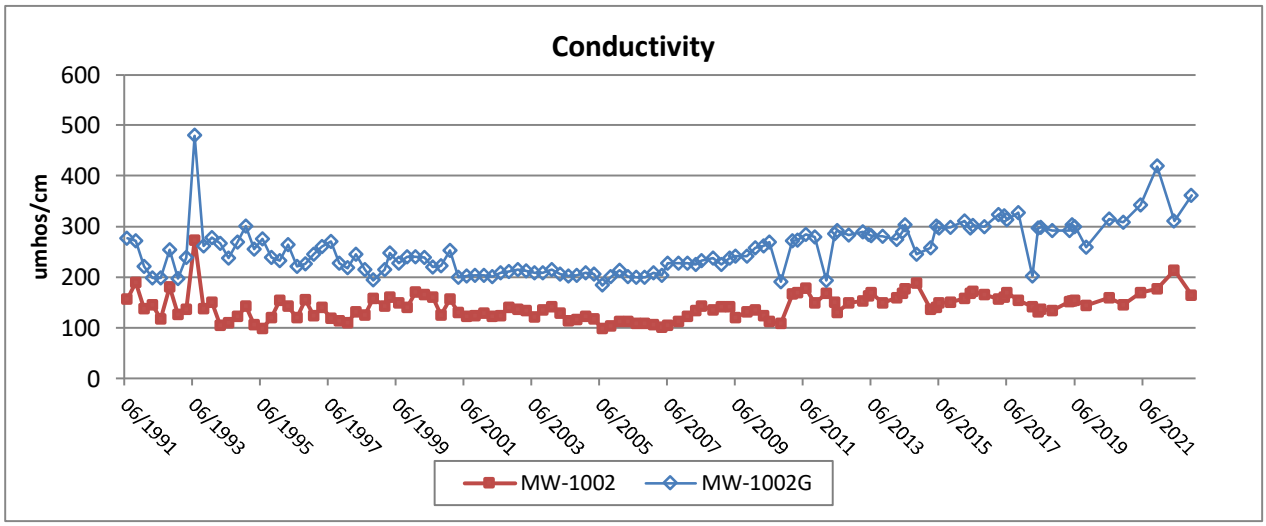

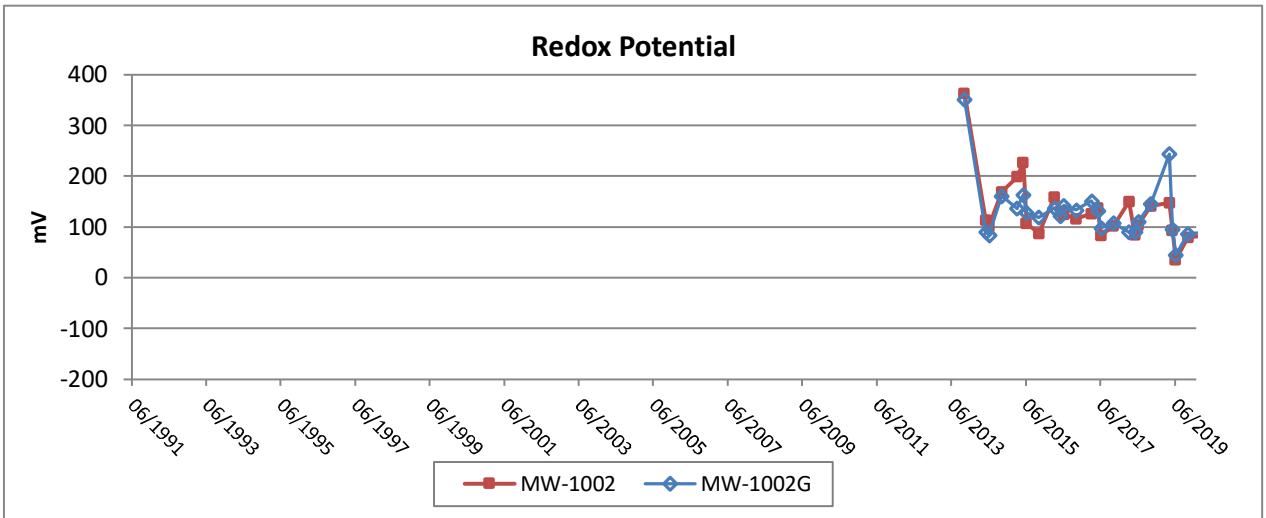

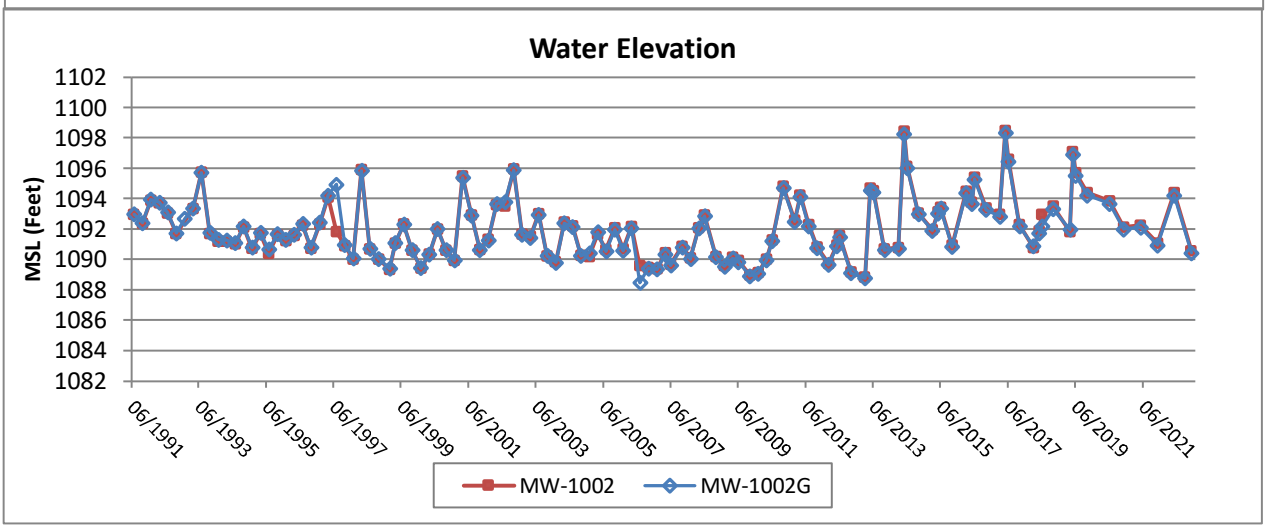

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Figure B-2d
Groundwater Trend Graphs - Semi-Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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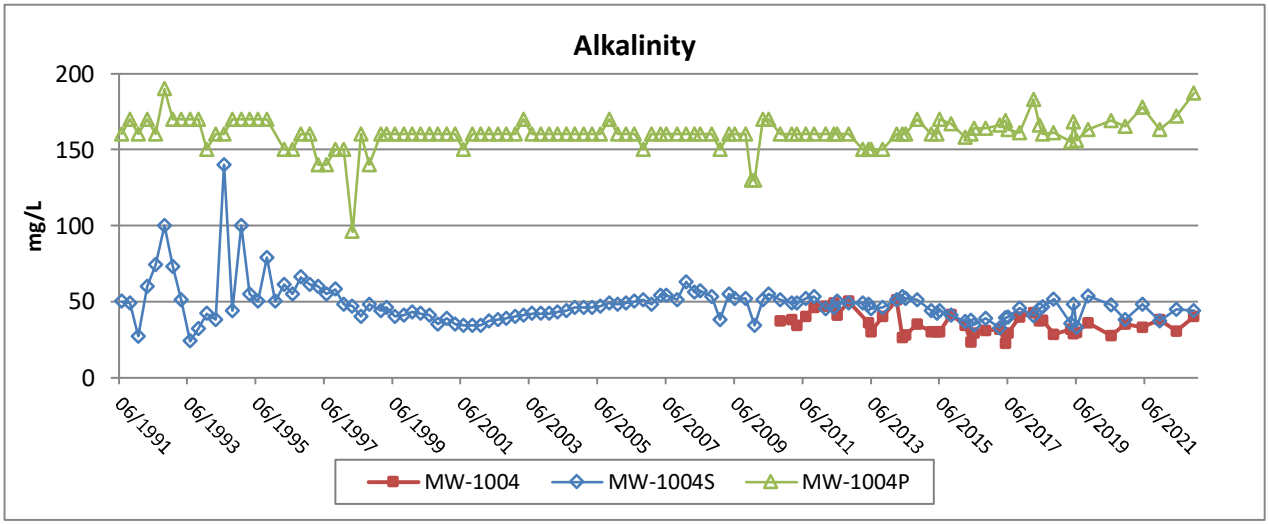

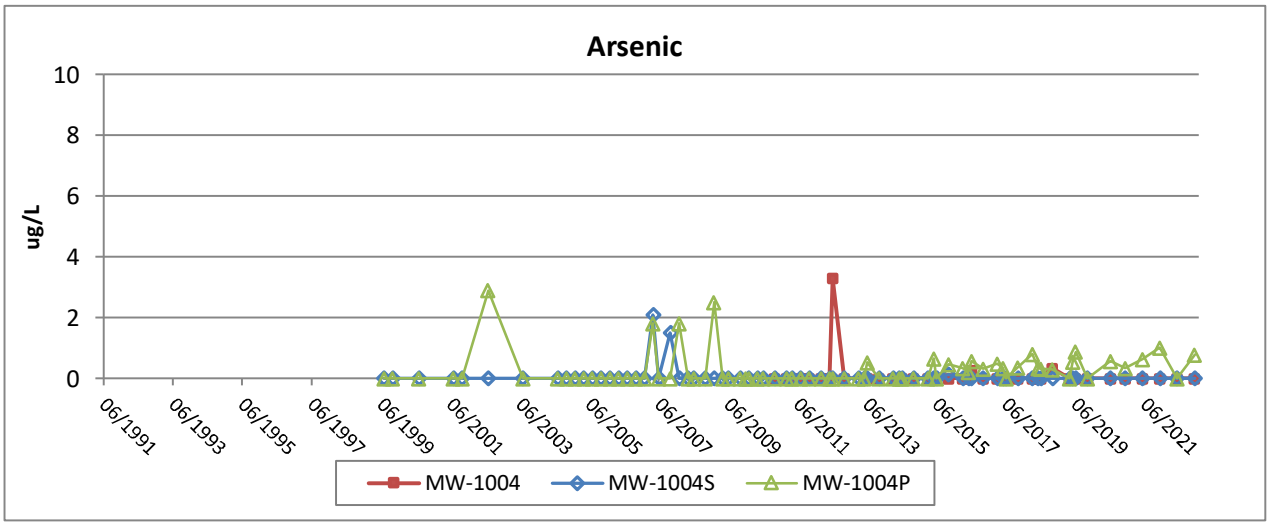

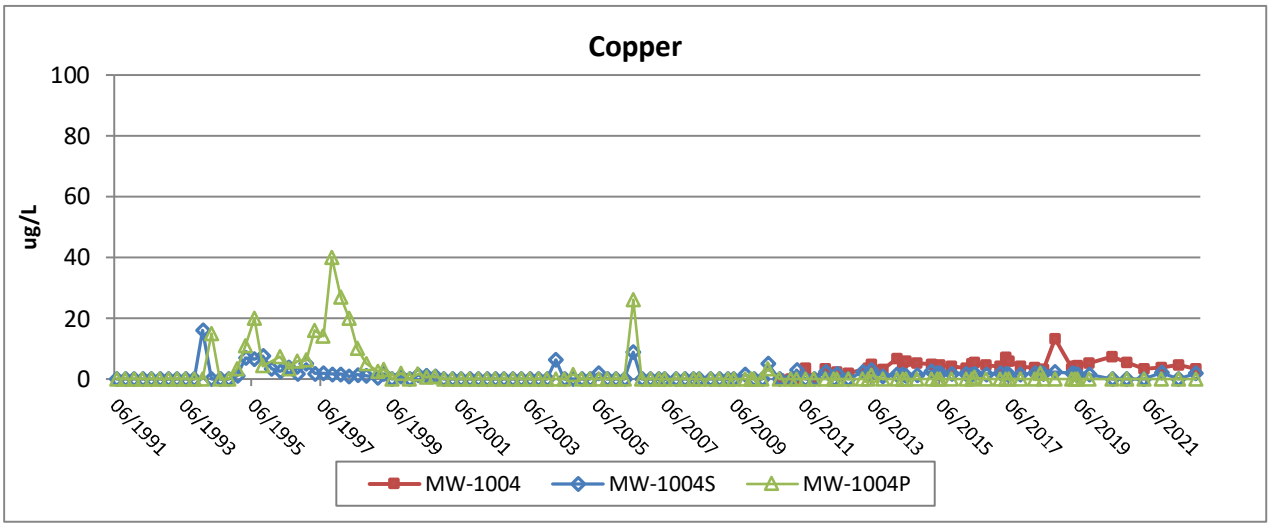

Note: Fourth quarter 2010 was the first time MW-1004 had sufficient water recovery for sampling.

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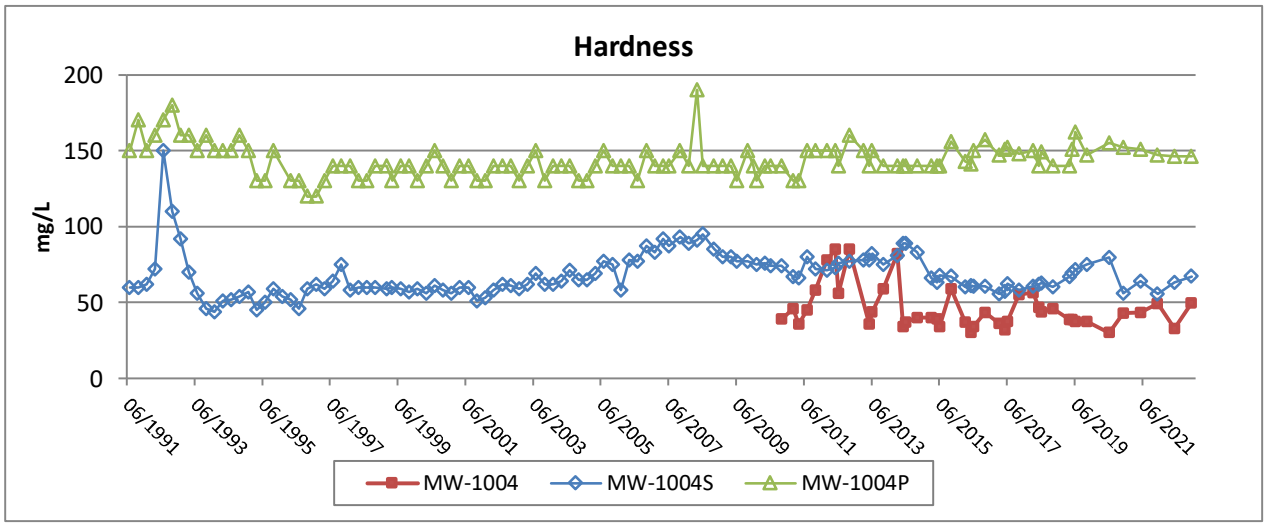
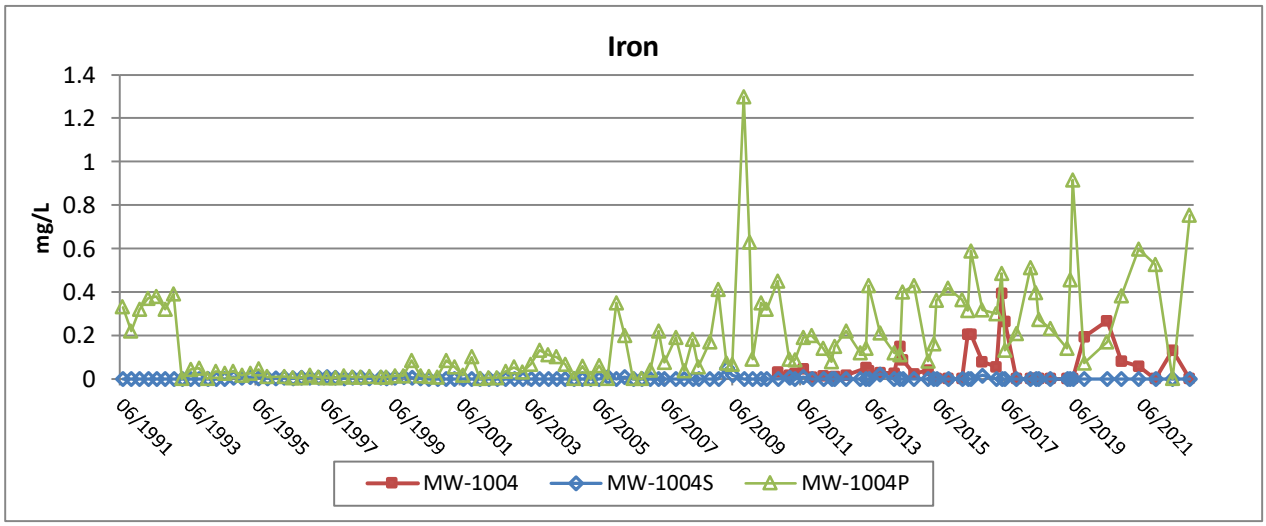
Figure B-3a
Groundwater Trend Graphs - Semi-Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





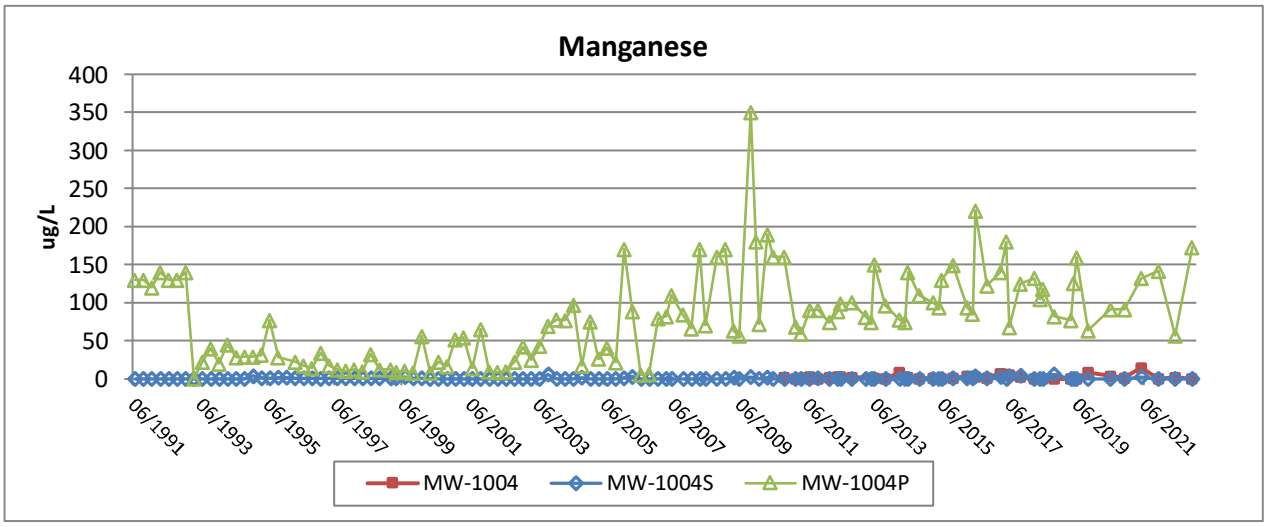


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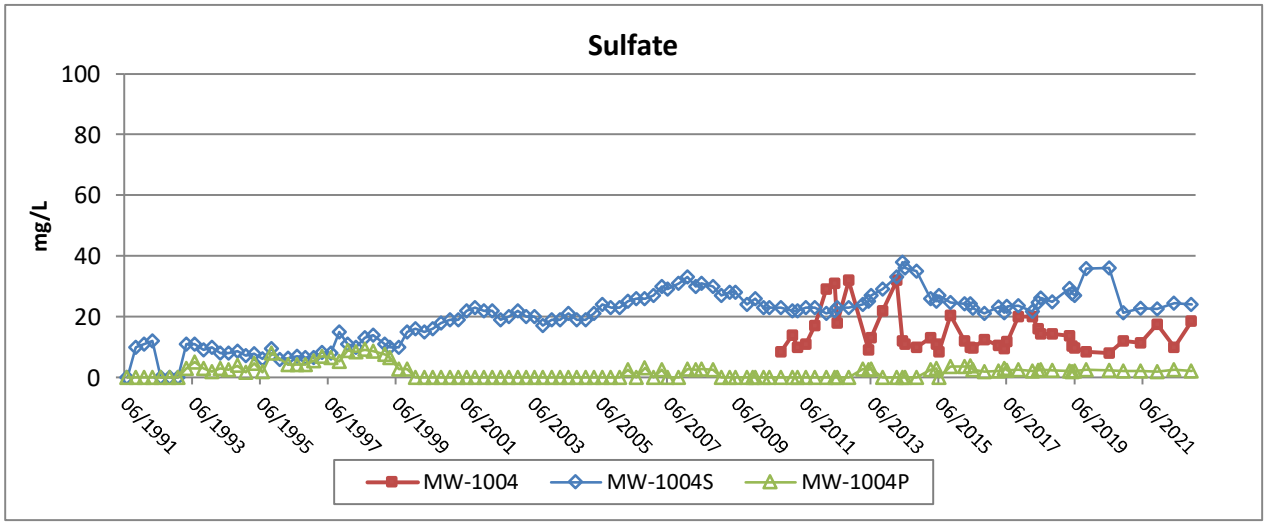
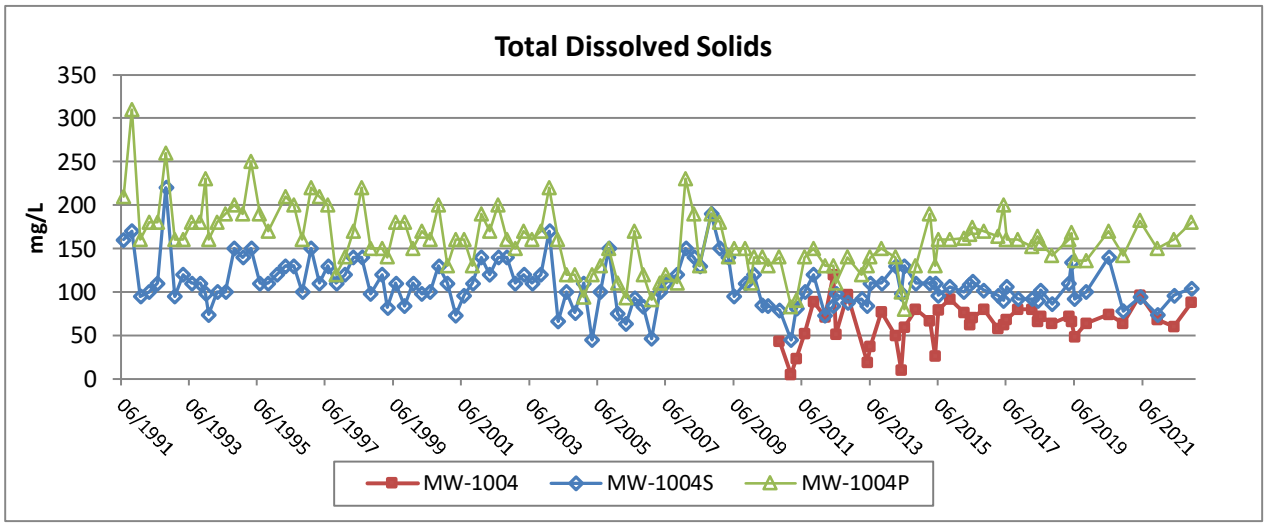
Figure B-3b
Groundwater Trend Graphs - Semi-Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





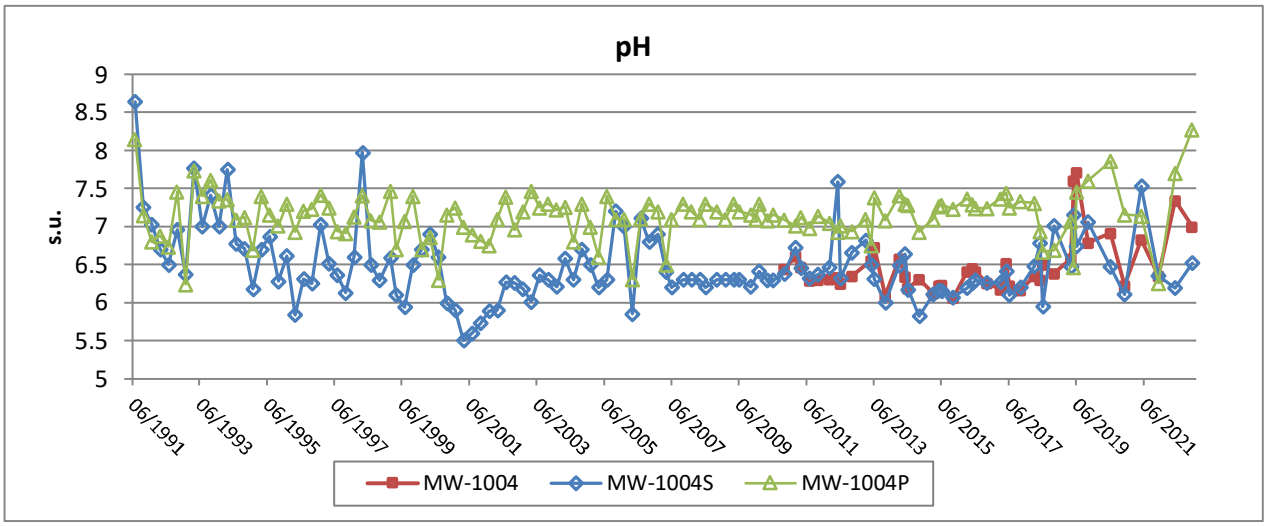


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Figure B-3c
Groundwater Trend Graphs - Semi-Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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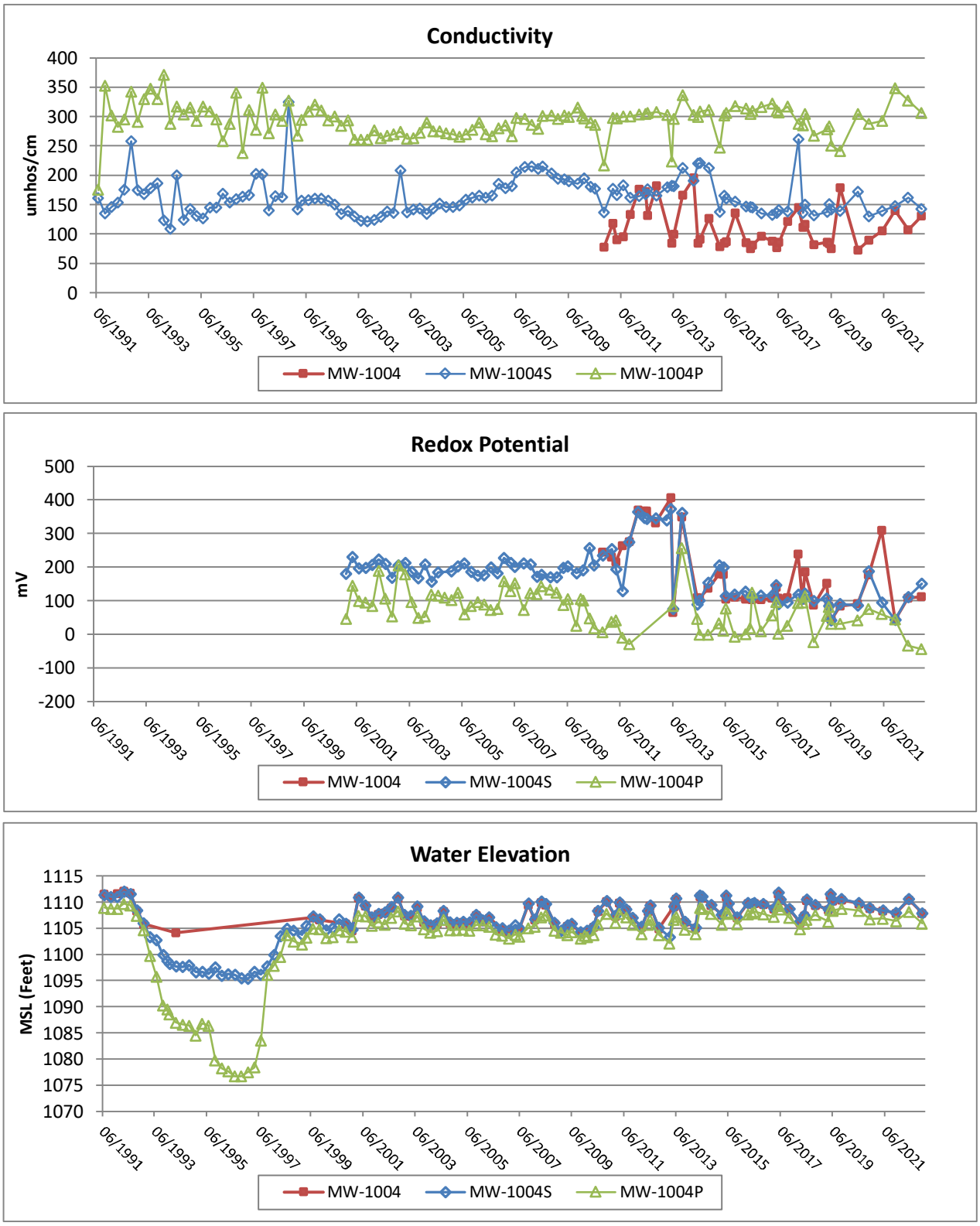

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Figure B-3d
Groundwater Trend Graphs - Semi-Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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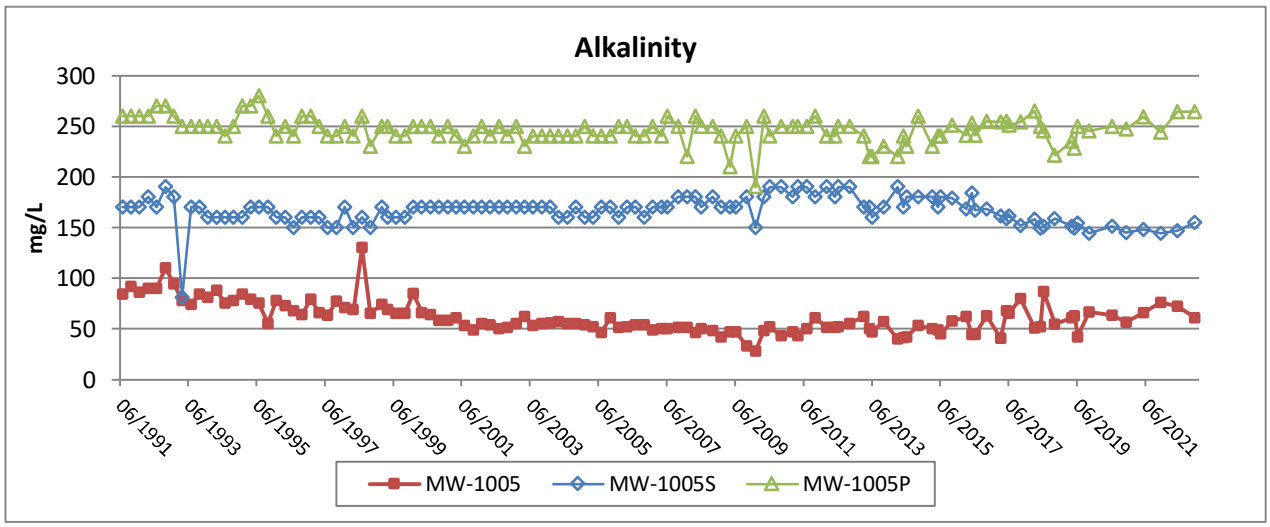

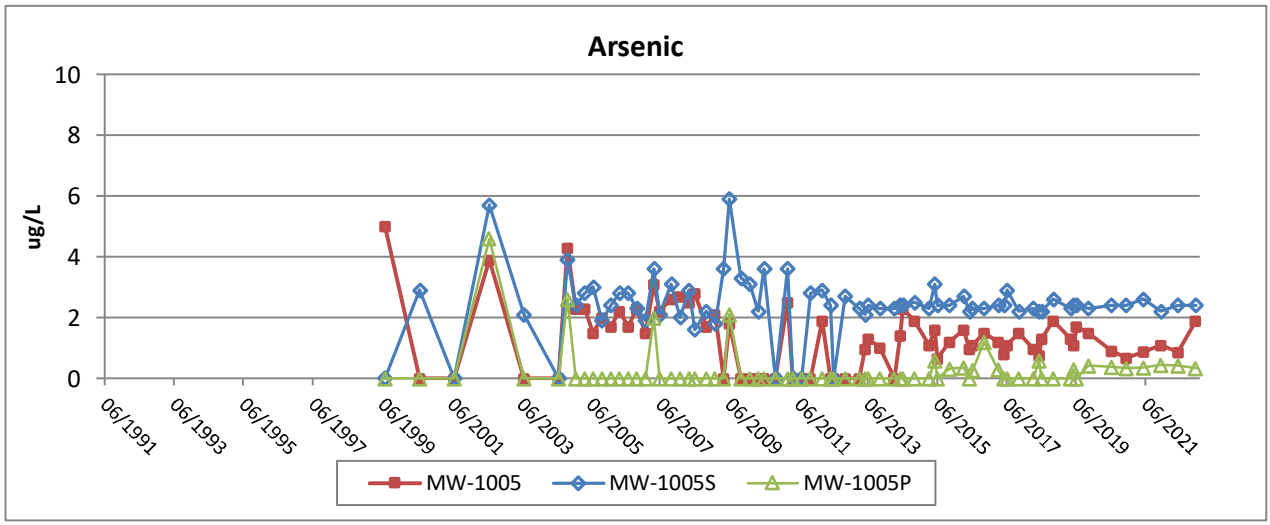

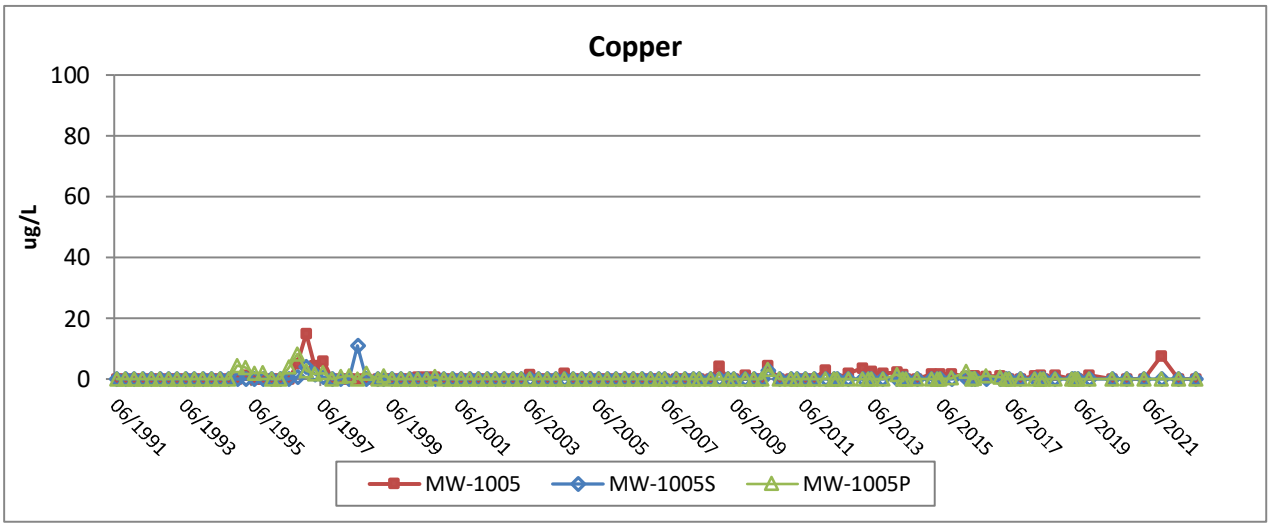

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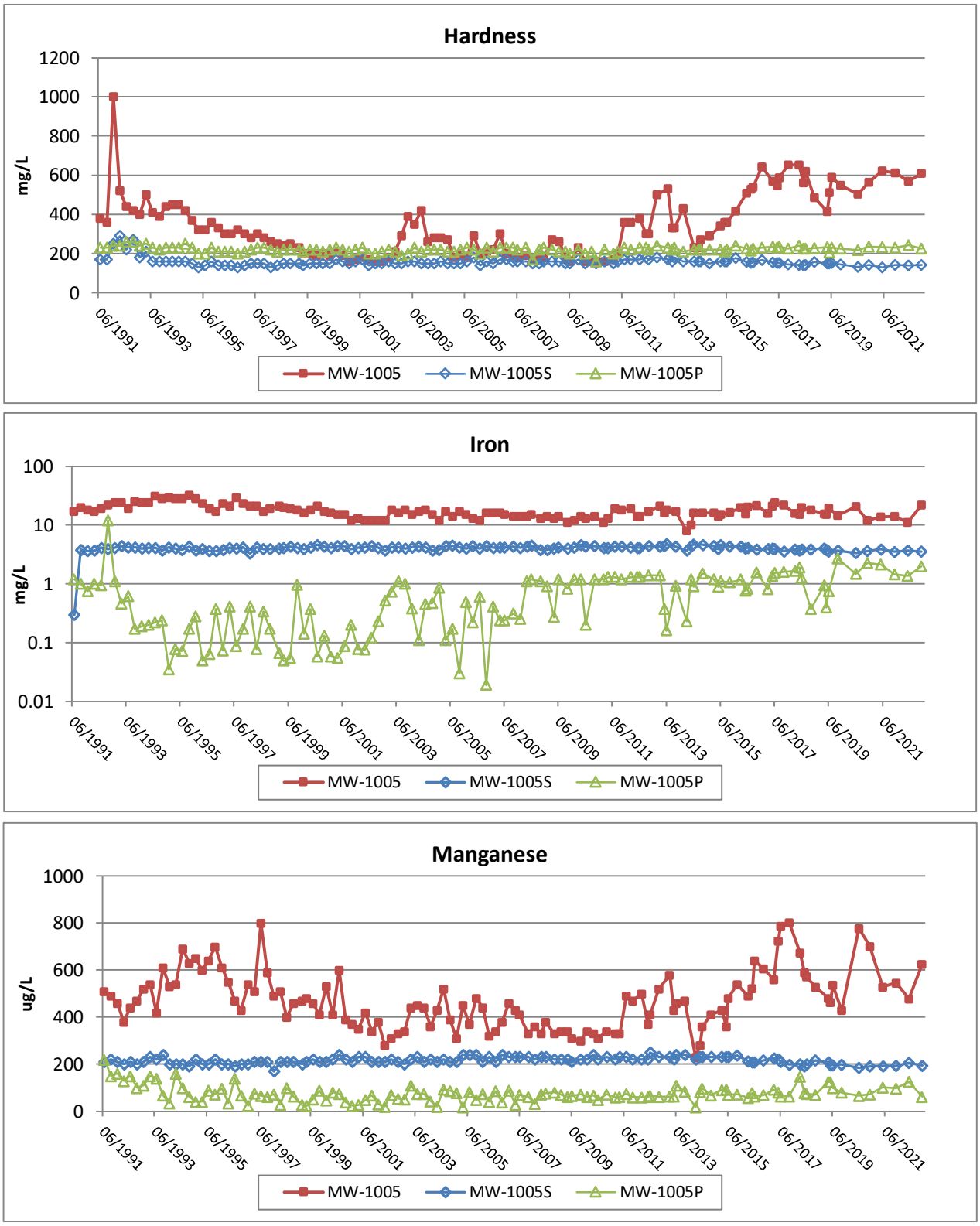
Figure B-4a
Groundwater Trend Graphs - Semi-Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22



Note: Iron trend graphs are displayed on a logarithmic scale so the trend patterns of MW-1005, MW-1005S and MW-1005P are visible at different concentration scales.

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Figure B-4b
Groundwater Trend Graphs - Semi-Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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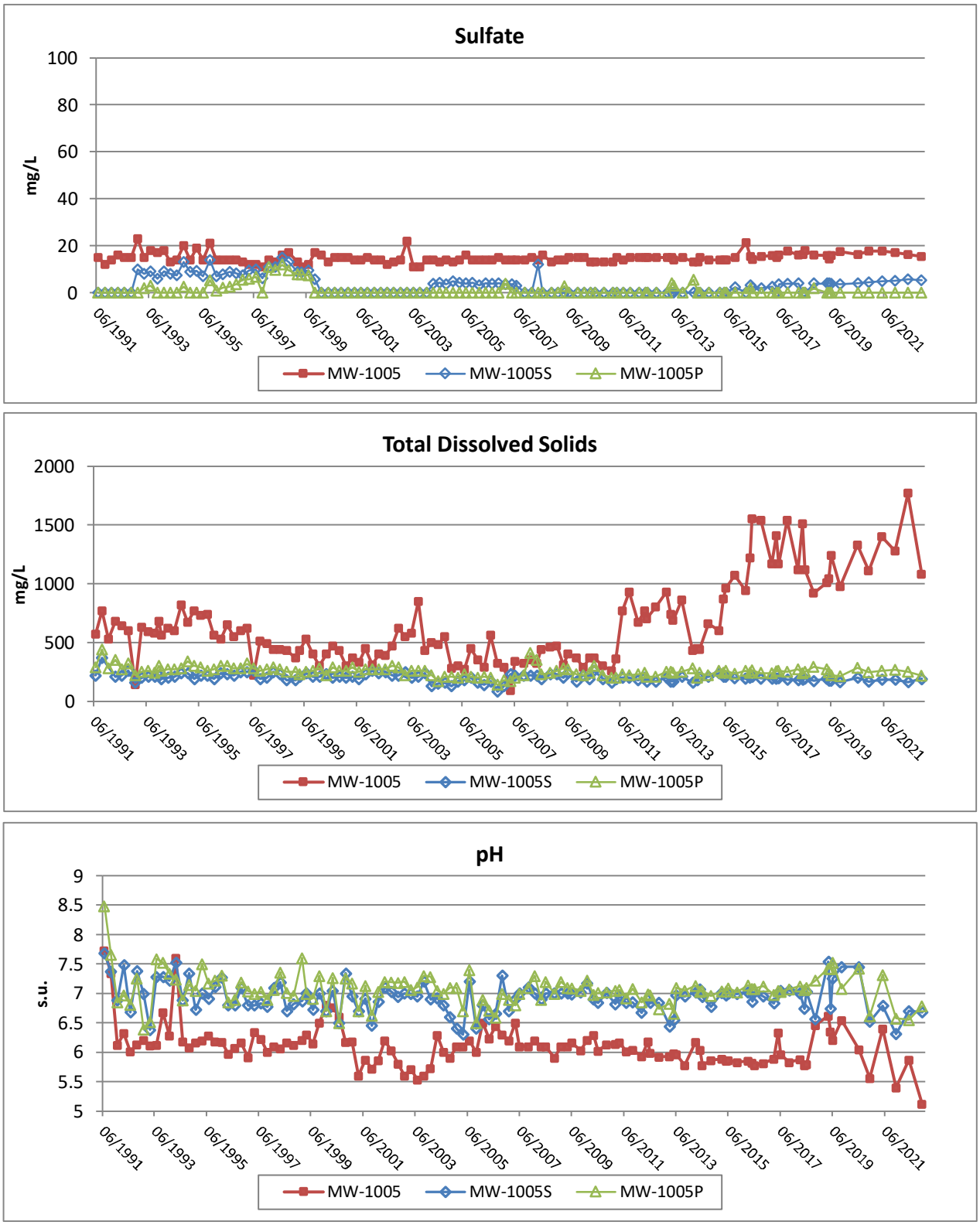

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Figure B-4c
Groundwater Trend Graphs - Semi-Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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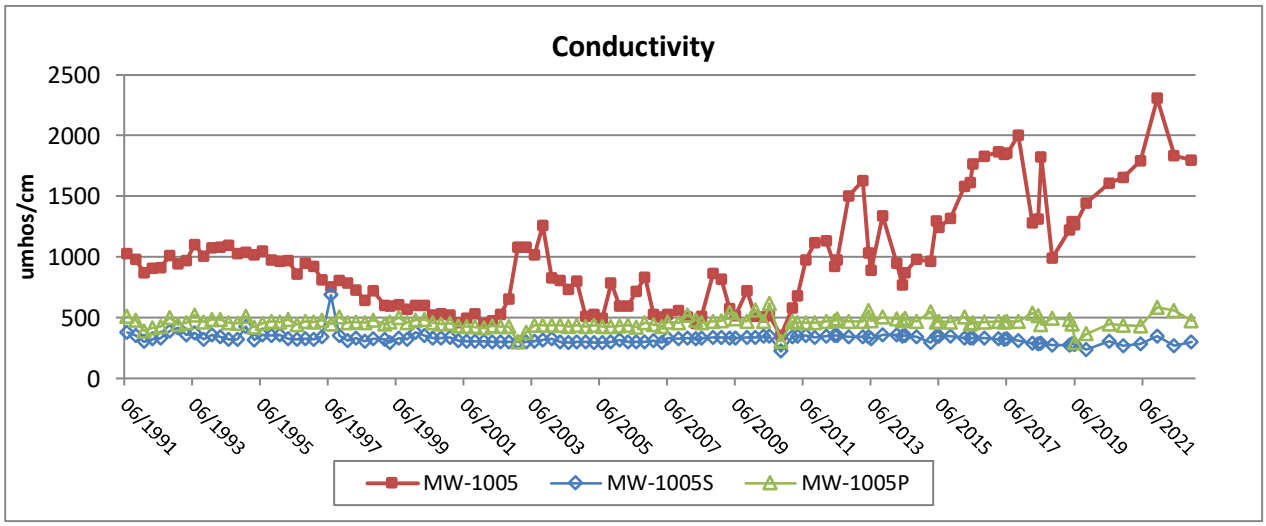

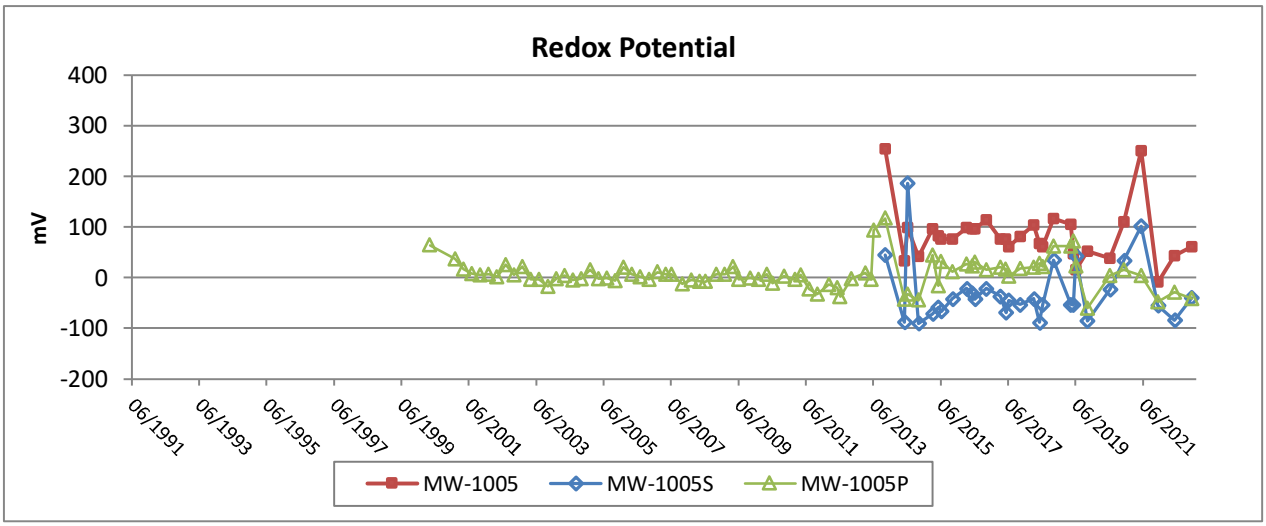

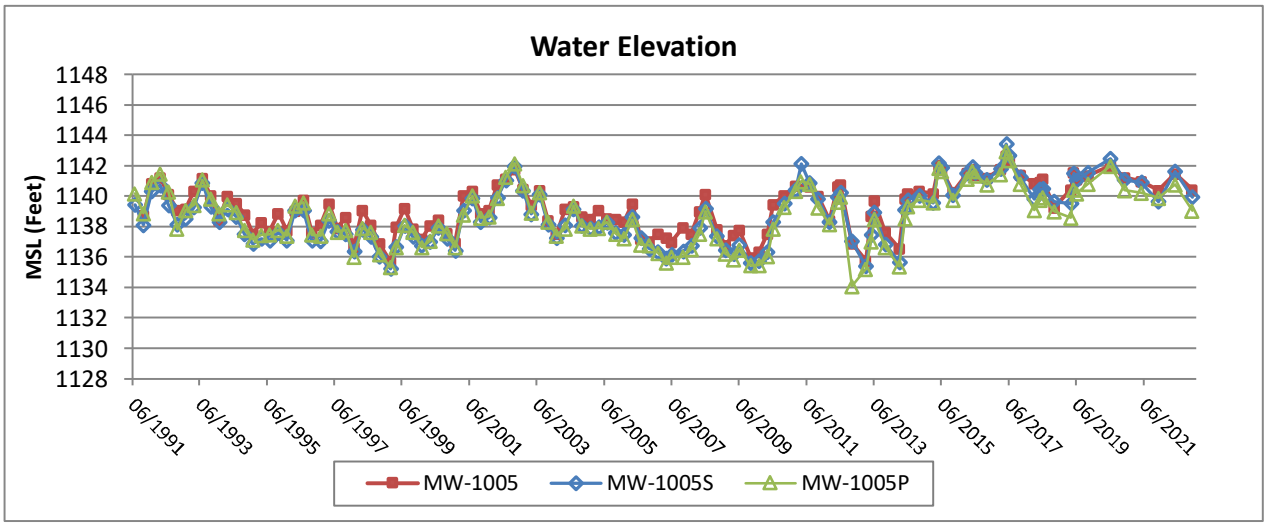

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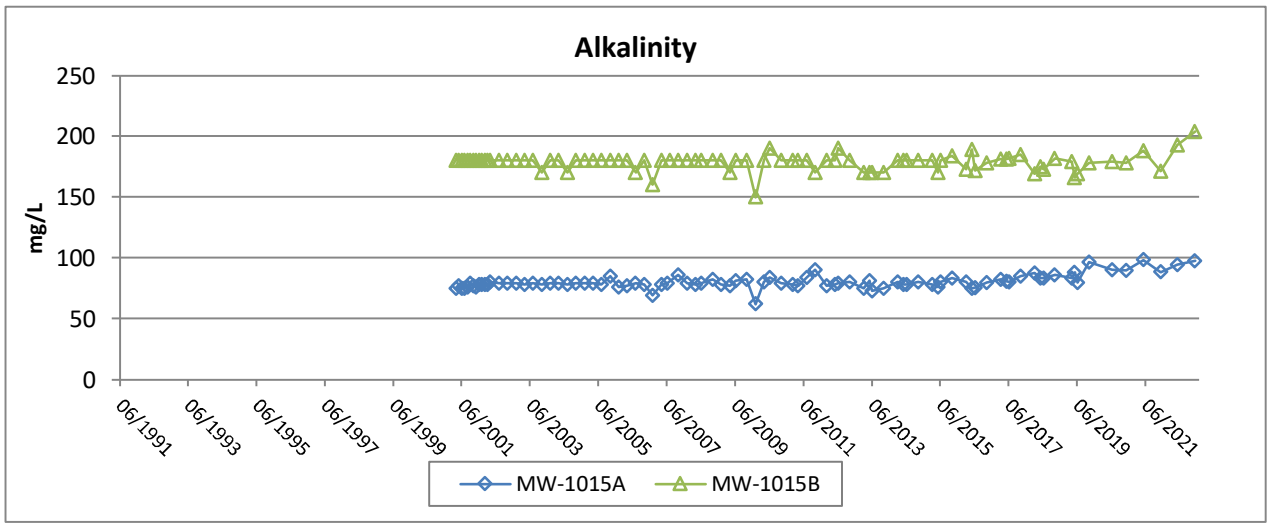
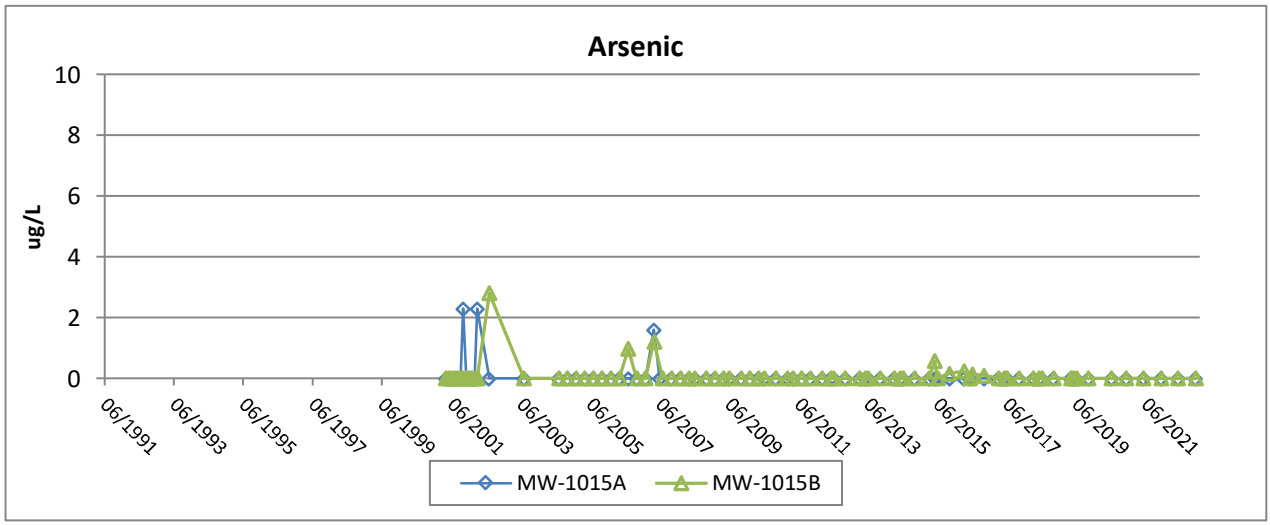
Figure B-4d
Groundwater Trend Graphs - Semi-Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





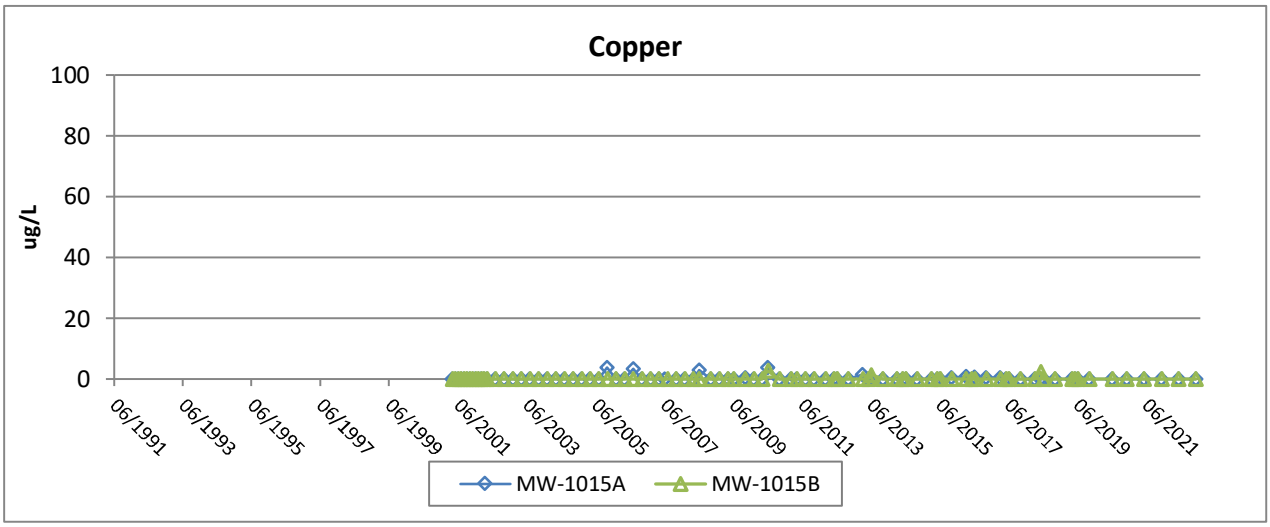


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Figure B-5a
Groundwater Trend Graphs - Semi-Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

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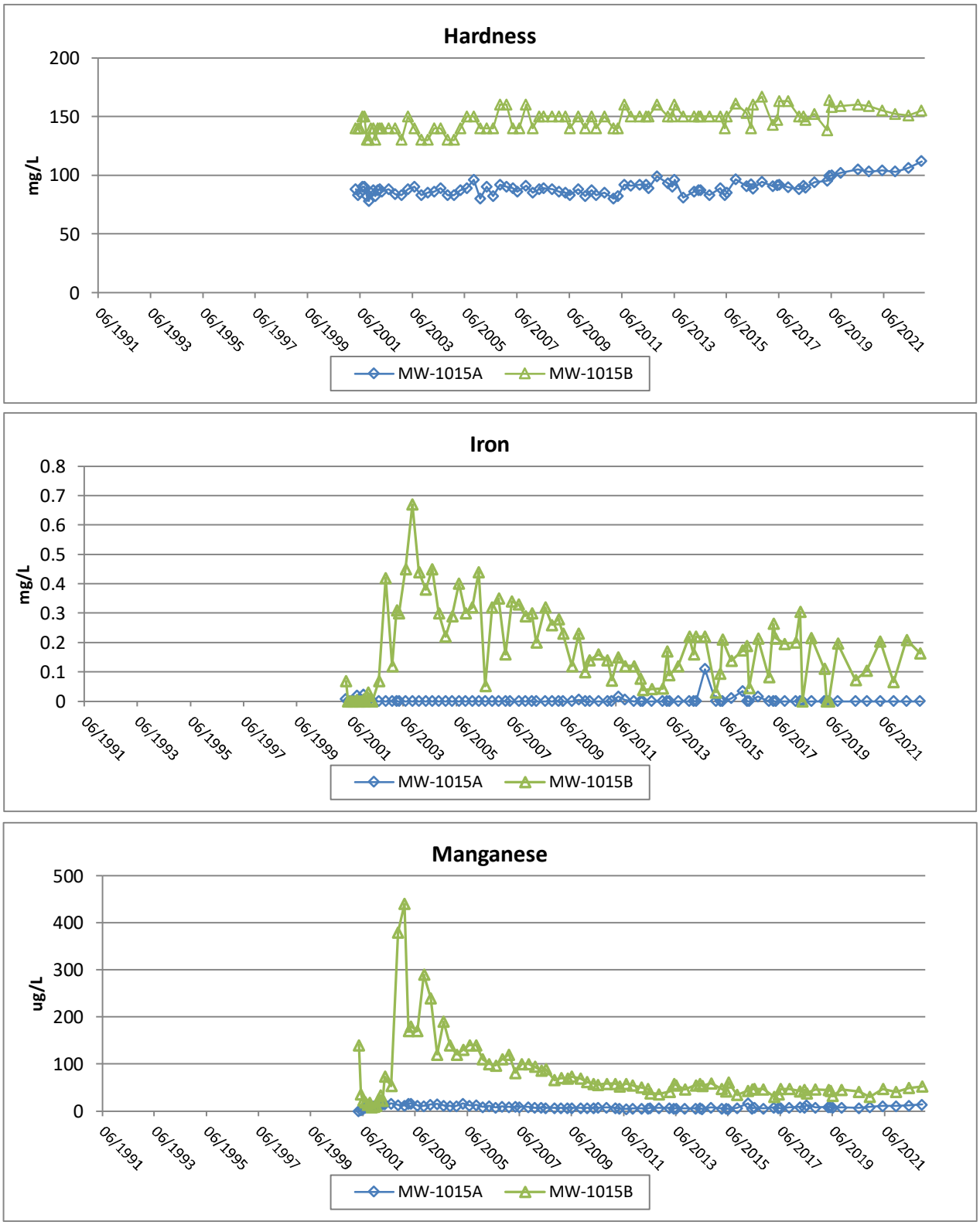

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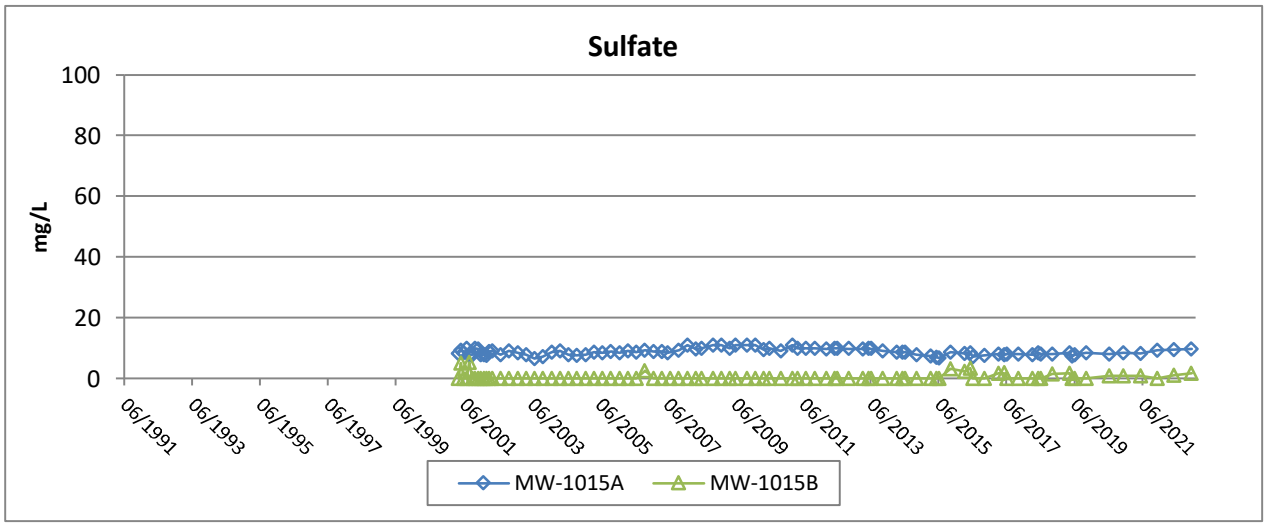
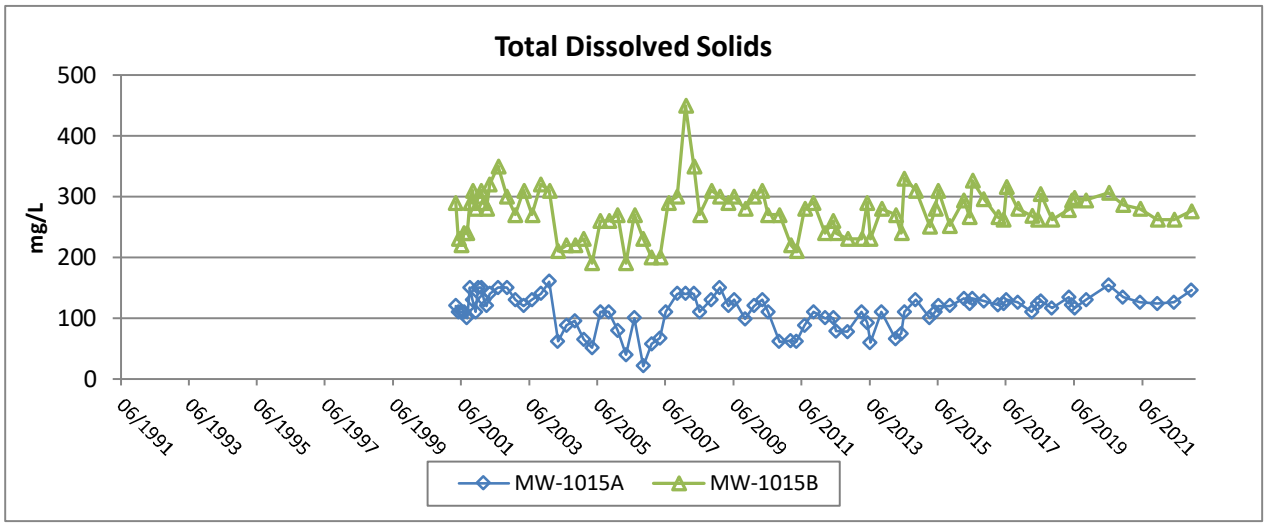
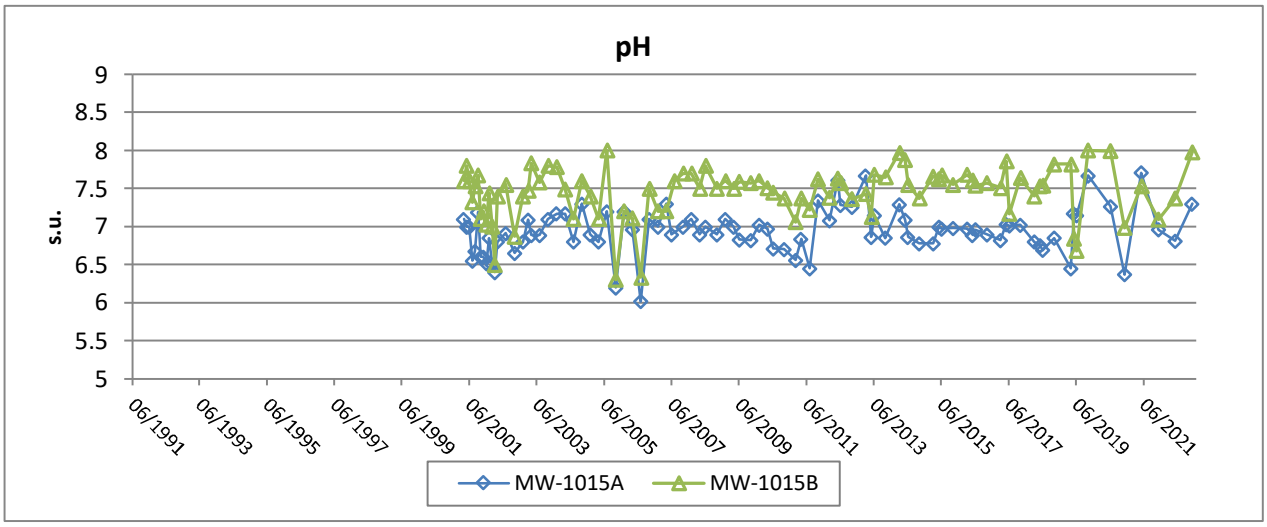
Figure B-5b
Groundwater Trend Graphs - Semi-Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22







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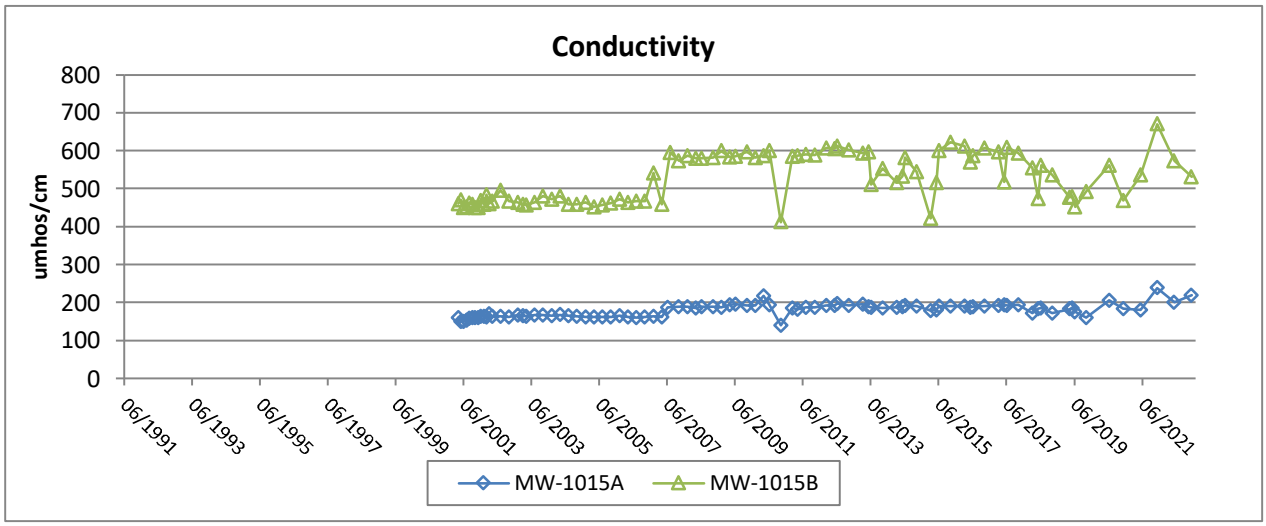
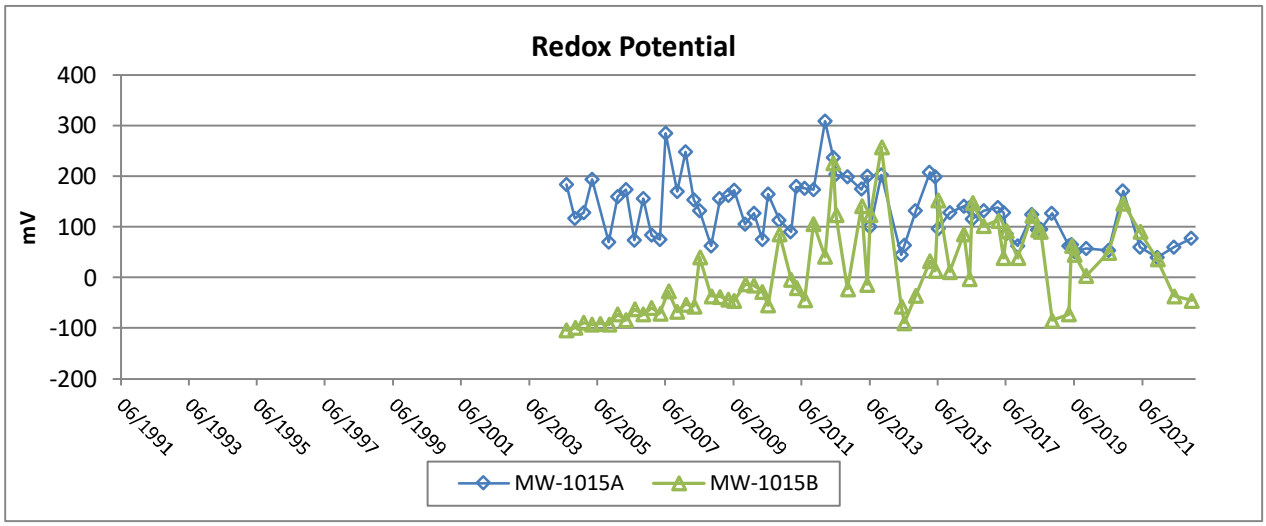
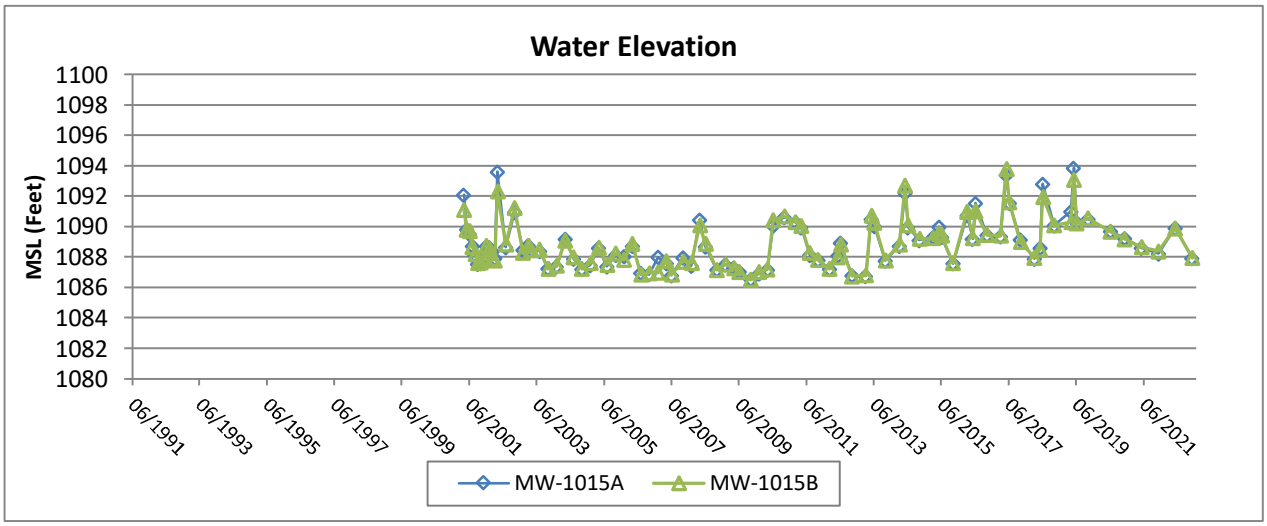
FLAMBEAU MINING COMPANY

Figure B-5c
Groundwater Trend Graphs - Semi-Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22







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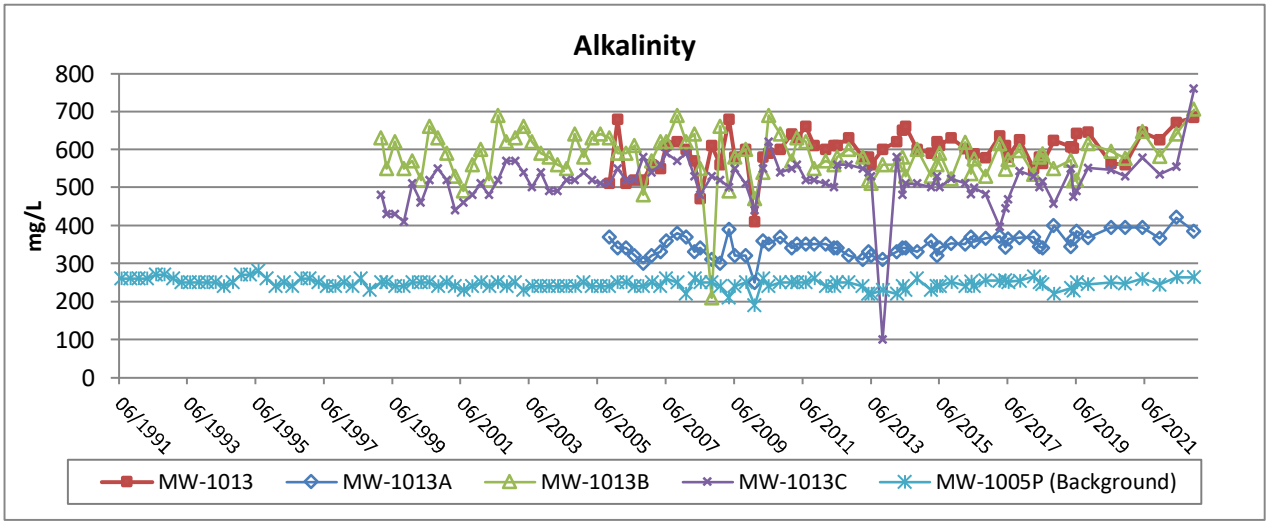
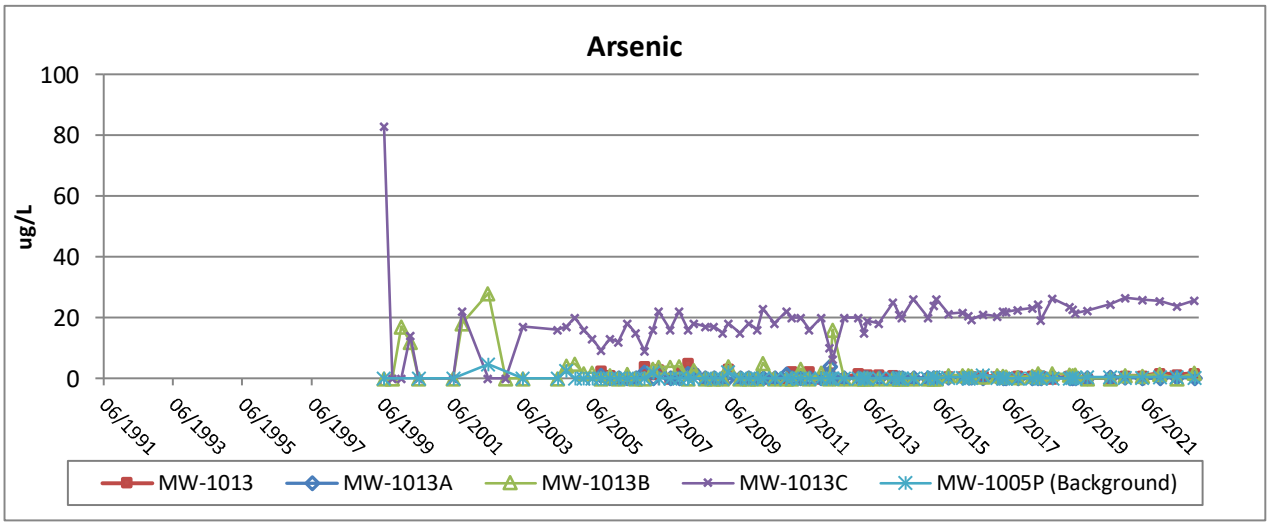
FLAMBEAU MINING COMPANY

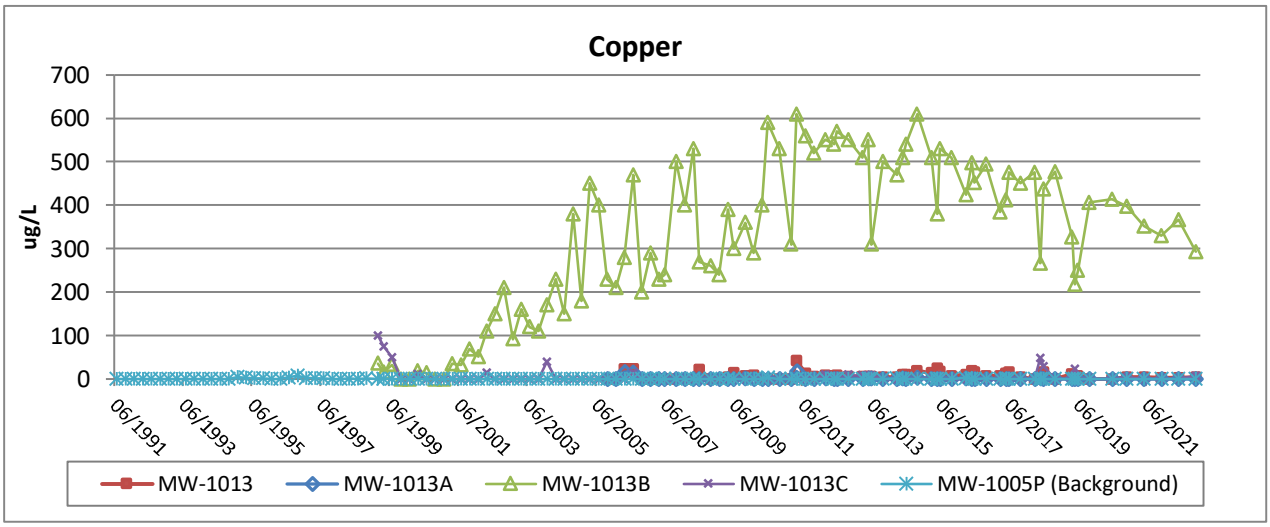
Figure B-5d
Groundwater Trend Graphs - Semi-Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

pw:\Flambeau Mining\0017F777\10500 Reference Information\Stats\2022 Annual Report\GWGraphs_Qtrly.xlsm







Note: Fourth quarter 2005 was the first time MW-1013 had sufficient water recovery for sampling.

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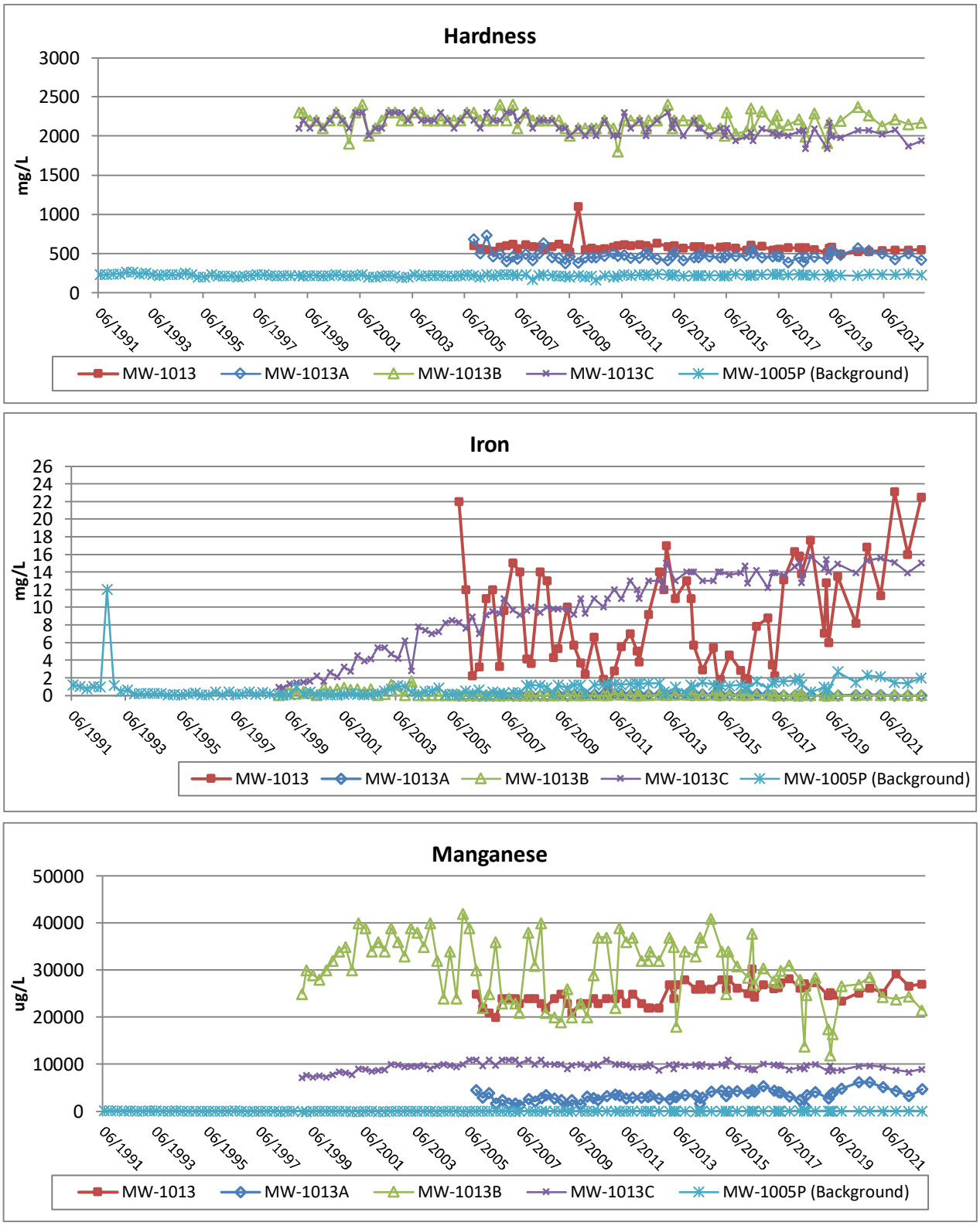
FLAMBEAU MINING COMPANY

Figure B-6a

Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22



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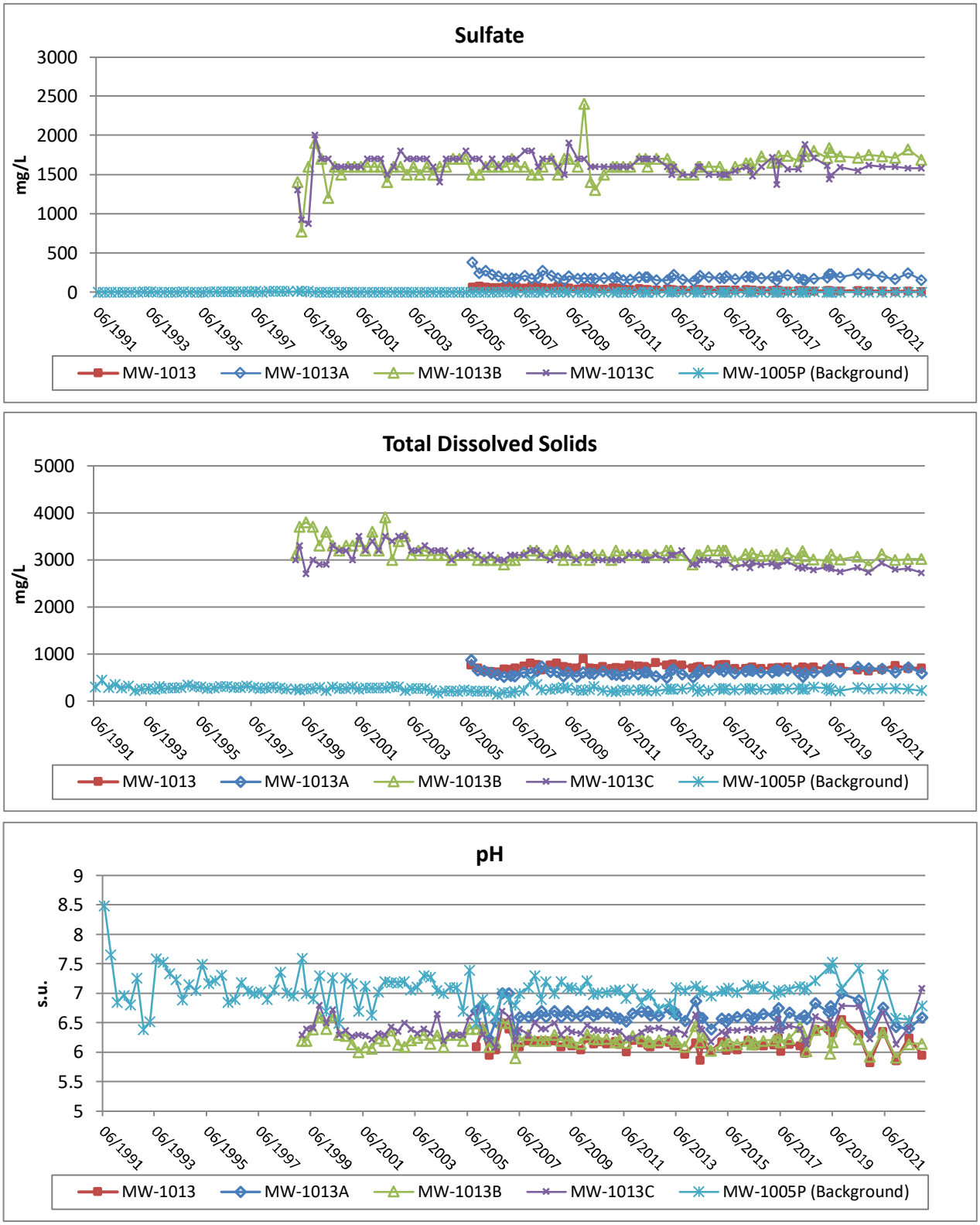
FLAMBEAU MINING COMPANY

Figure B-6b

Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

pw:\Flambeau Mining\0017F777\10500 Reference Information\Stats\2022 Annual Report\GWGraphs_Qtrly.xlsm



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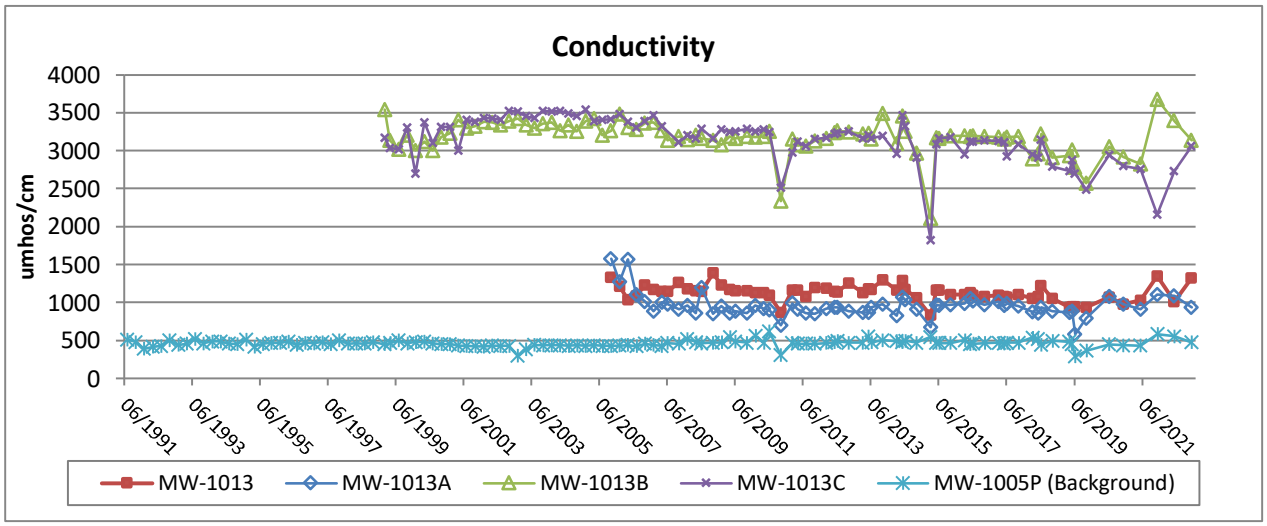
FLAMBEAU MINING COMPANY

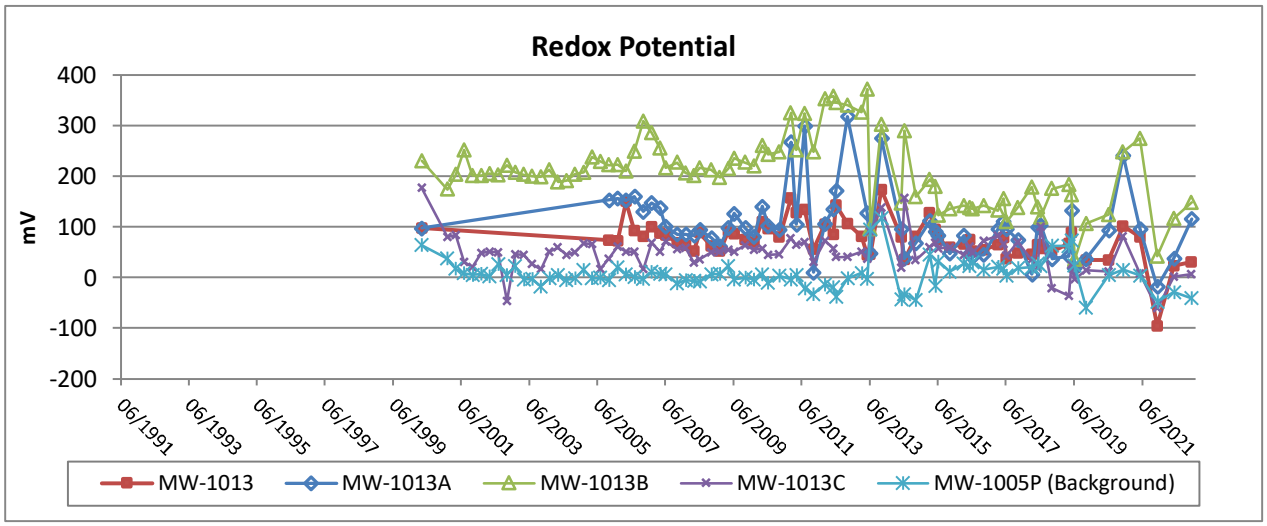
Figure B-6c

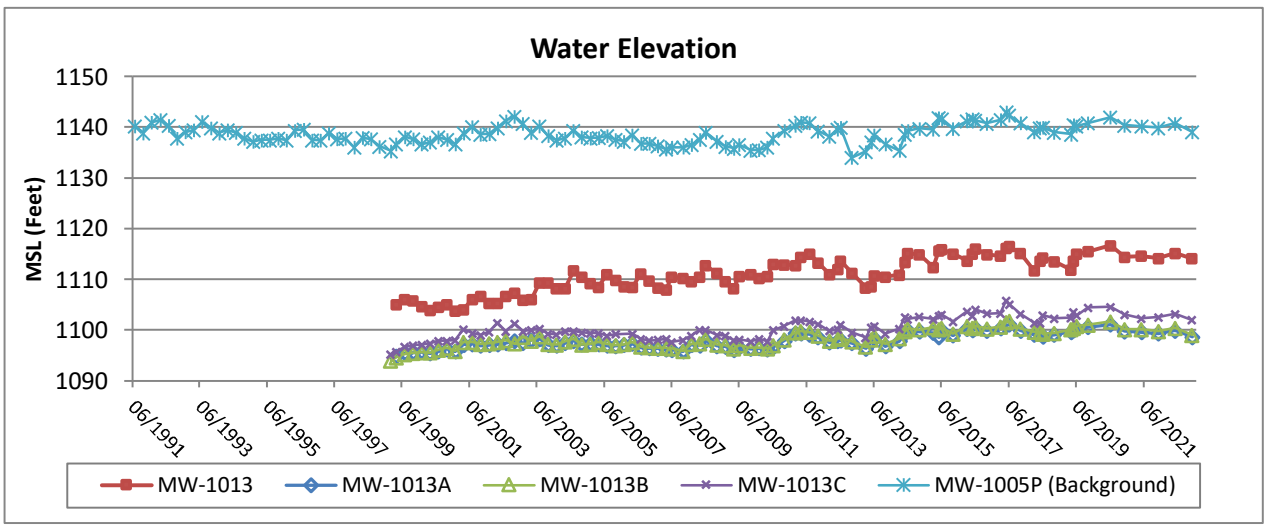
Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

pw:\Flambeau Mining\0017F777\10500 Reference Information\Stats\2022 Annual Report\GWGraphs_Qtrly.xlsm







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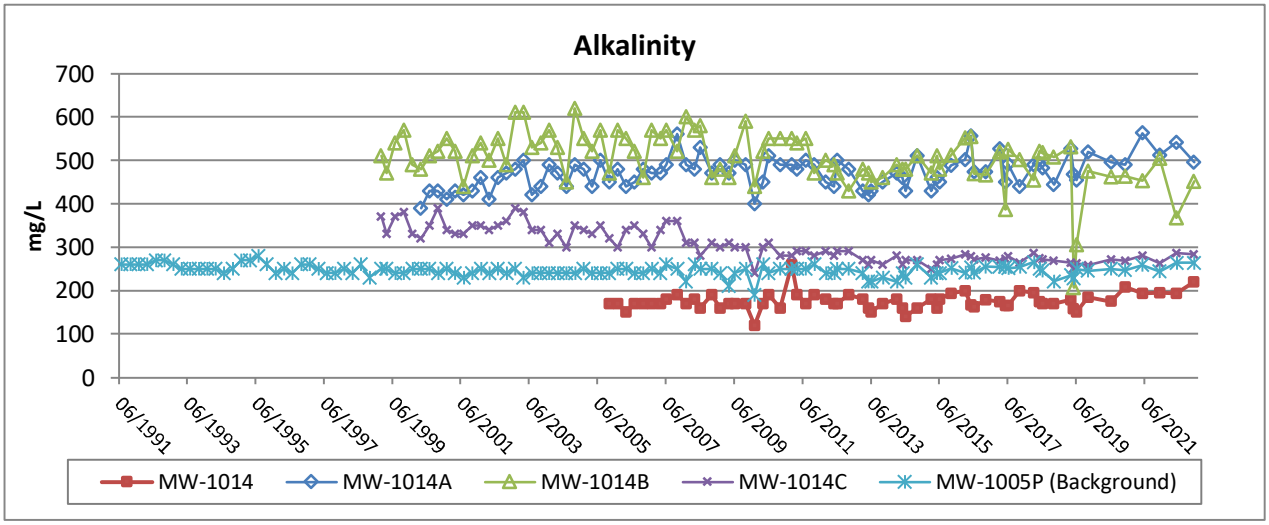
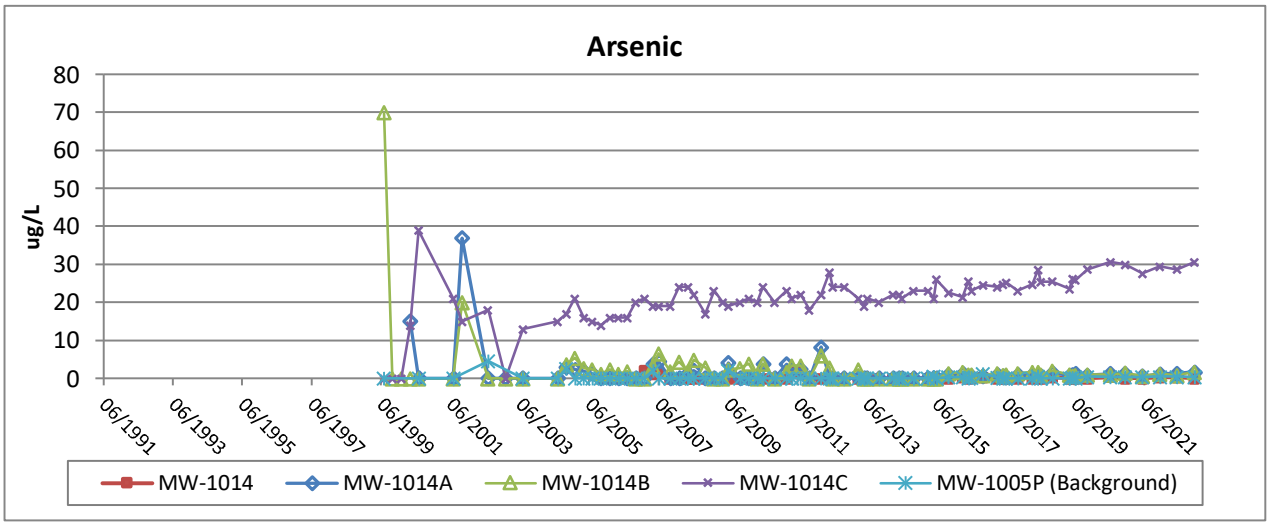
FLAMBEAU MINING COMPANY

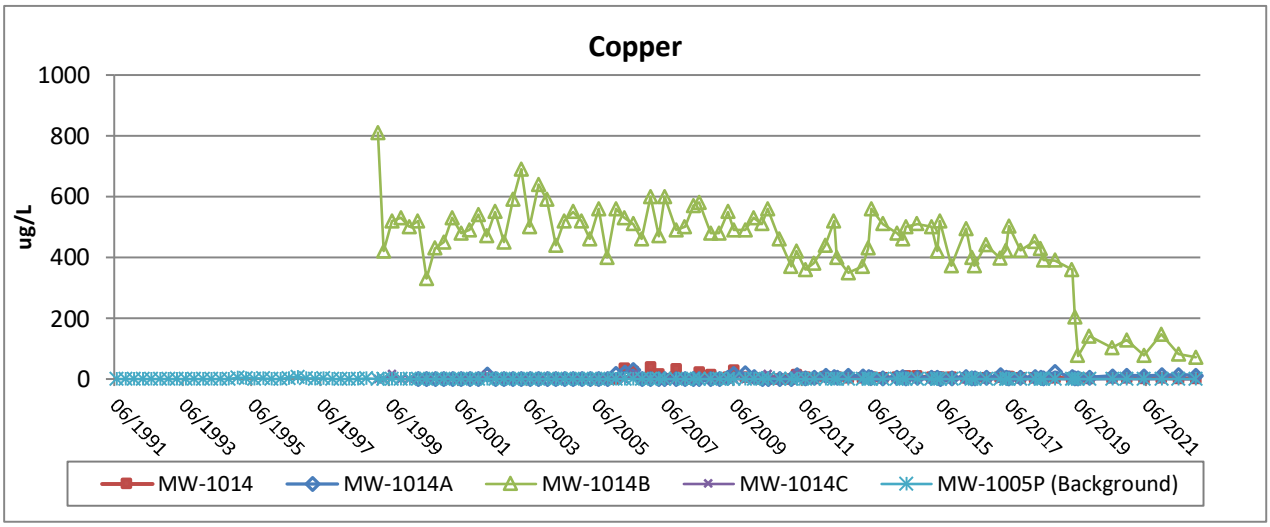
Figure B-6d

Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





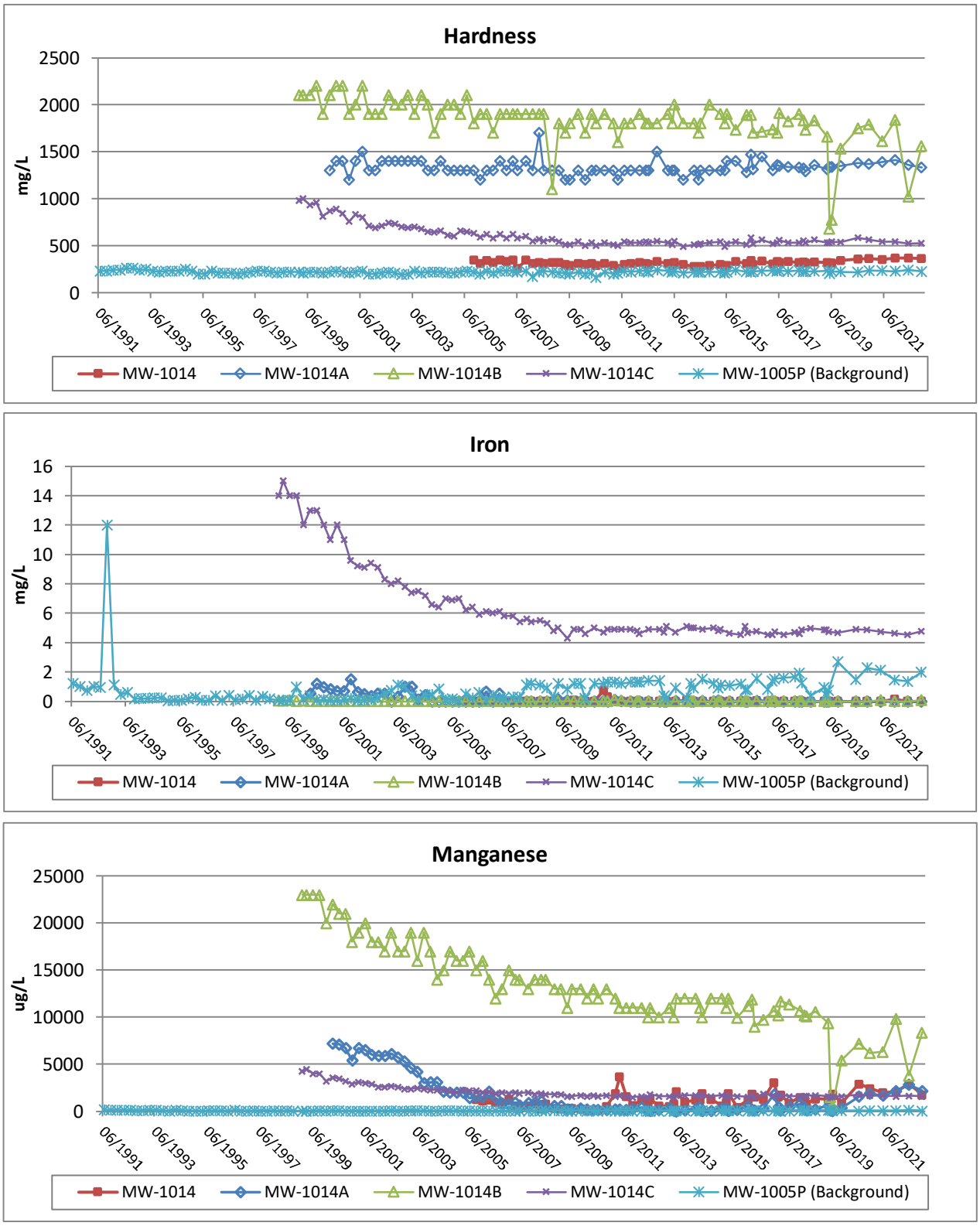


FLAMBEAU MINING COMPANY

Figure B-7a

Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22



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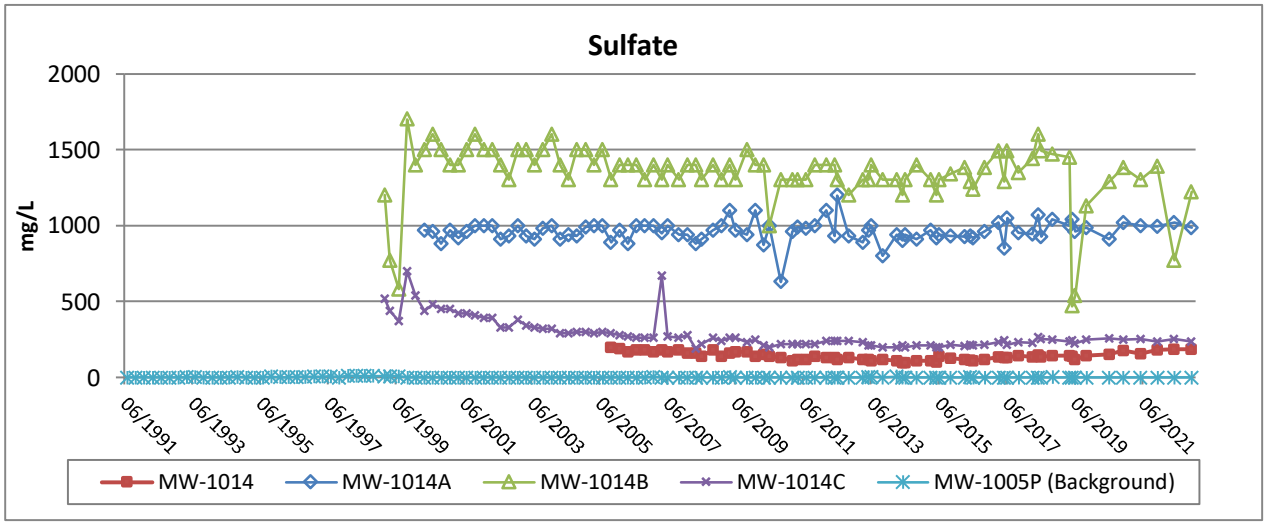
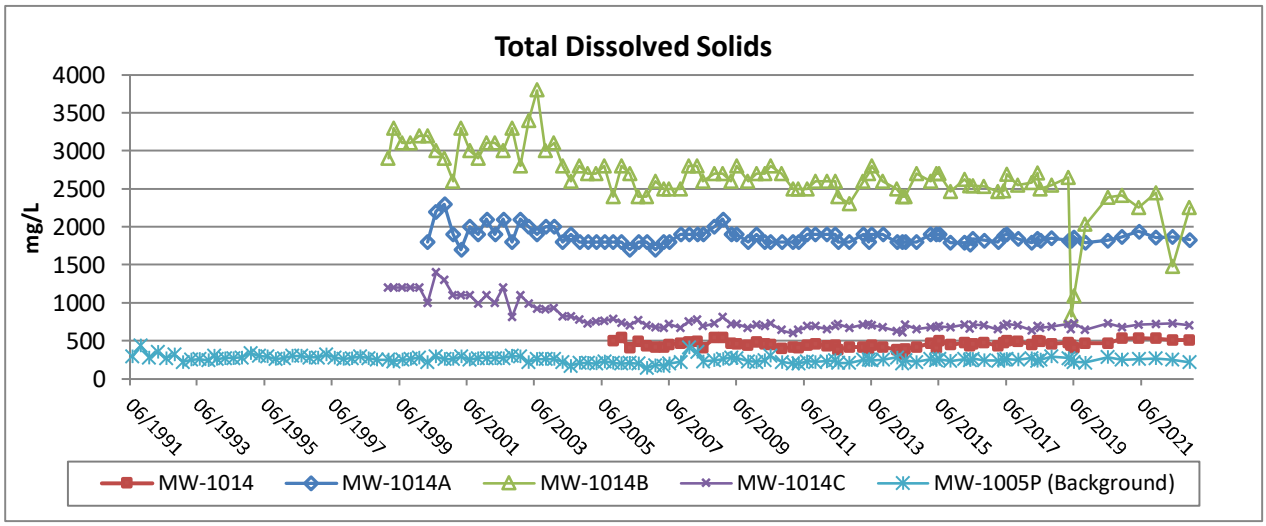
FLAMBEAU MINING COMPANY

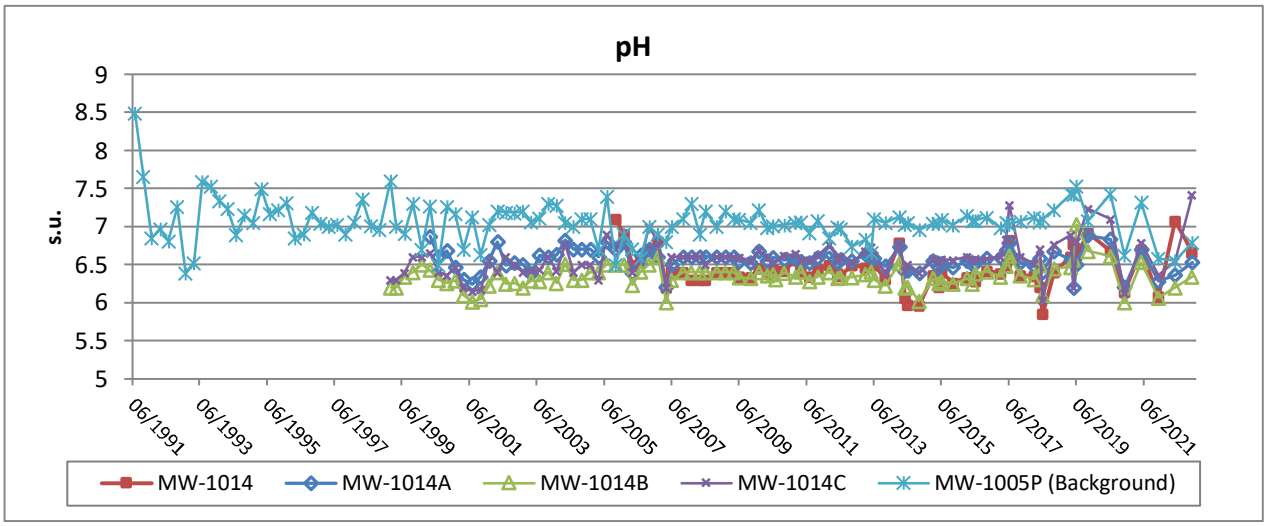
Figure B-7b

Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22







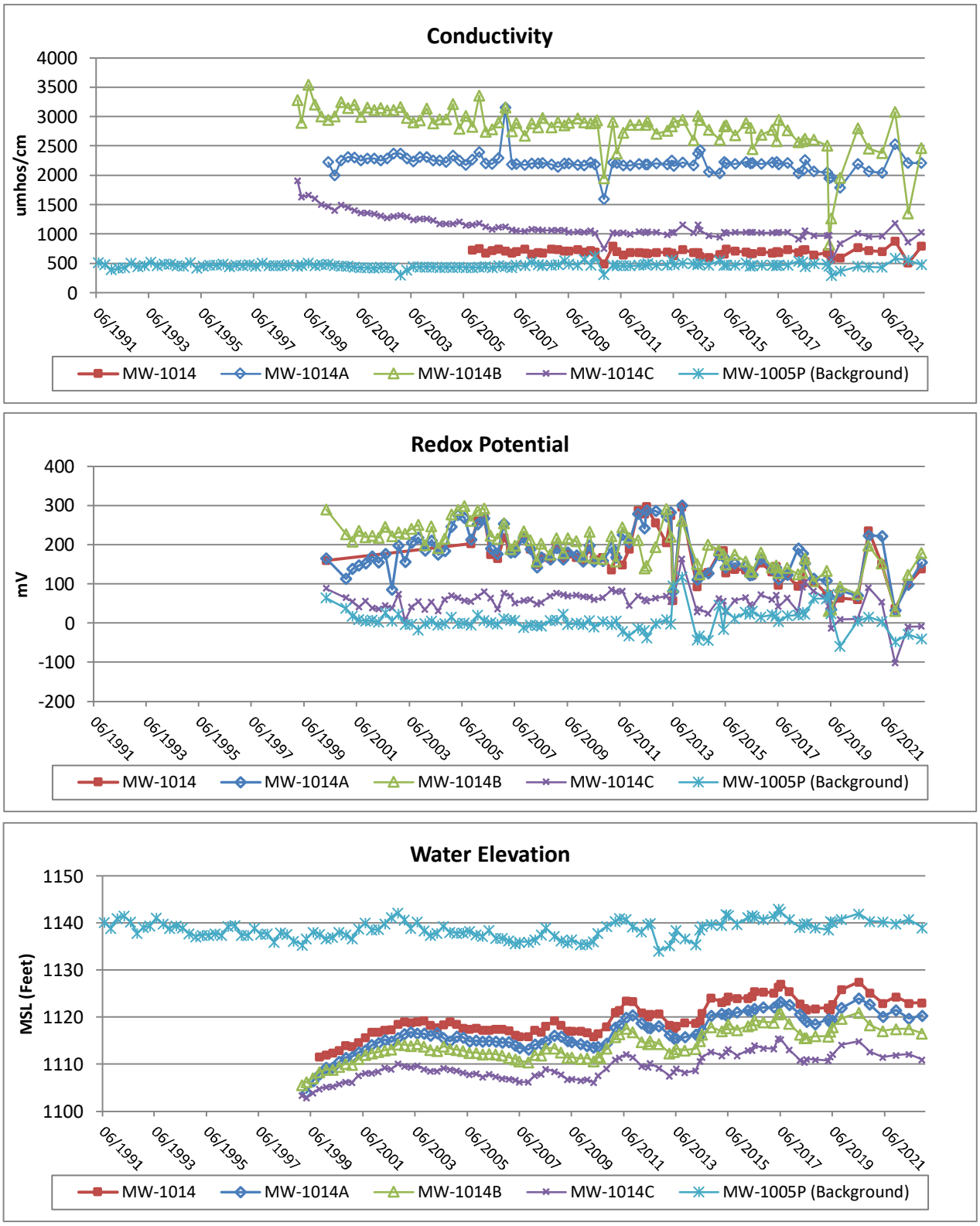
Foth

FLAMBEAU MINING COMPANY

Figure B-7c

Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22



Foth

FLAMBEAU MINING COMPANY

Figure B-7d

Groundwater Trend Graphs - Semi-Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

2022 Groundwater Results - Semi-Annual Parameters

Sample Date (yyyy-mm)	Location		Water Elevation ft	Alkalinity as CaCO3 mg/l	Arsenic ug/l	Copper ug/l	Hardness mg/l	Iron mg/l	Manganese ug/l	Sulfate mg/l	Total Dissolved Solids mg/l	pH s.u.	Conductivity umhos/cm	Redox Potential mV
2022-05	MW-1000PR		1089.08	228	8.9	2.7	399	0.619	1890	187	490	6.50	869.00	27.9
2022-05	MW-1000R		1090.96	33.3	< 0.28	5.8	72.4	< 0.0580	4.6	32.7	126	5.96	157.00	126.0
2022-05	MW-1002		1094.38	67.9	< 0.28	< 1.9	78.1	< 0.0580	< 1.2	3.4	80.0	5.73	214.00	122.0
2022-05	MW-1002G		1094.21	134	< 0.28	< 1.9	170	< 0.0580	< 1.2	10.0	218	6.07	311.00	122.9
2022-05	MW-1002G	Dup.		133	< 0.28	< 1.9	166	< 0.0580	< 1.2	10.0	216			
2022-05	MW-1004		1110.45	30.4	< 0.28	4.7	32.9	0.132	1.8	9.9	60.0	7.34	107.00	107.4
2022-05	MW-1004P		1108.19	172	< 0.28	< 1.9	146	< 0.0580	56.8	2.6	160	7.70	327.00	-34.0
2022-05	MW-1004S		1110.56	44.6	< 0.28	< 1.9	63.1	< 0.0580	< 1.2	24.4	96.0	6.19	162.00	110.9
2022-05	MW-1005		1141.48	71.9	0.86	< 1.9	569	11.1	479	16.3	1770	5.87	1830.00	42.7
2022-05	MW-1005P		1140.77	264	0.42	< 1.9	242	1.36	126	< 0.44	250	6.55	556.00	-29.2
2022-05	MW-1005S		1141.62	147	2.4	< 1.9	140	3.68	205	5.6	164	6.70	270.00	-84.0
2022-05	MW-1010P		1088.72	170	21.0	< 1.9	183	< 0.0580	55.3	32.3	210	7.32	477.00	85.7
2022-05	MW-1013		1115.12	671	1.3	3.3	541	16	26600	12.7	686	6.25	1015.00	22.8
2022-05	MW-1013A		1099.84	421	0.32	< 1.9	499	< 0.0580	3200	243	716	6.40	1086.00	38.0
2022-05	MW-1013B		1100.37	640	< 27.9	366	2150	< 5.8	24400	1820	3020	6.14	3391.00	116.4
2022-05	MW-1013C		1103.13	555	23.8	< 1.9	1870	13.9	8380	1580	2820	6.42	2731.00	2.0
2022-05	MW-1014		1122.97	193	0.28	2.8	370	< 0.0580	2890	185	506	7.07	508.00	98.6
2022-05	MW-1014A		1119.7	541	1.3	13.8	1360	< 0.0580	2820	1020	1870	6.36	2204.00	98.2
2022-05	MW-1014B		1117.54	367	0.86	82.8	1020	< 0.0580	3790	770	1480	6.20	1347.00	122.4
2022-05	MW-1014C		1112.14	286	28.7	< 1.9	524	4.52	1640	252	732	6.54	856.00	-10.2
2022-05	MW-1014C	Dup.		283	28.4	< 1.9	522	4.48	1530	251	714			
2022-05	MW-1015A		1089.92	94.4	< 0.28	< 1.9	106	< 0.0580	12.4	9.4	126	6.81	201.00	59.8
2022-05	MW-1015B		1089.89	193	< 0.28	< 1.9	151	0.209	49.0	1.1	262	7.37	573.00	-36.8
2022-11	MW-1000PR		1088.02	237	6.8	7.6	371	0.766	1780	189	476	6.71	729.00	77.7
2022-11	MW-1000R		1089.15	160	< 0.28	14.2	226	< 0.0580	115	40.8	296	6.77	531.00	114.1
2022-11	MW-1002		1090.57	61.1	< 0.28	< 1.9	72.4	< 0.0580	< 1.2	3.2	100	6.26	164.00	129.0
2022-11	MW-1002G		1090.43	132	< 0.28	< 1.9	167	< 0.0580	< 1.2	9.1	192	6.15	361.00	84.9
2022-11	MW-1002G	Dup.		135	< 0.28	< 1.9	174	< 0.0580	< 1.2	9.1	200			
2022-11	MW-1004		1107.86	40.2	< 0.28	3.4	49.7	< 0.0580	< 1.2	18.6	88.0	7.00	131.00	112.0
2022-11	MW-1004P		1105.89	187	0.78	< 1.9	146	0.752	173	2.1	180	8.28	306.00	-44.6
2022-11	MW-1004S		1107.88	43.9	< 0.28	2.0	67.2	< 0.0580	< 1.2	24.0	104	6.52	142.00	150.7
2022-11	MW-1005		1140.42	60.9	1.9	< 1.9	609	21.7	626	15.4	1080	5.12	1796.00	61.0
2022-11	MW-1005P		1139.05	264	0.34	< 1.9	226	1.97	62.0	< 0.44	218	6.79	473.00	-41.2
2022-11	MW-1005S		1139.93	155	2.4	< 1.9	142	3.55	194	5.2	190	6.68	299.00	-39.8
2022-11	MW-1010P		1087.78	175	16.1	< 1.9	197	< 0.0580	76.0	39.4	194	7.55	384.00	82.1
2022-11	MW-1013		1114.1	685	1.6	5.0	550	22.5	27100	8.7	702	5.95	1324.00	31.0
2022-11	MW-1013A		1098.59	385	< 0.28	< 1.9	419	< 0.0580	4700	153	592	6.59	934.00	115.5
2022-11	MW-1013B		1099	706	1.8	293	2170	< 0.0580	21500	1690	3020	6.15	3131.00	148.2
2022-11	MW-1013C		1101.98	761	25.6	7.2	1940	15	9020	1580	2720	7.09	3061.00	7.0
2022-11	MW-1014		1123.09	220	< 0.28	2.8	361	< 0.0580	1760	184	508	6.66	793.00	137.5
2022-11	MW-1014A		1120.32	495	1.6	12.2	1330	< 0.0580	2160	984	1830	6.53	2206.00	154.9
2022-11	MW-1014B		1116.54	451	1.7	71.4	1560	0.0809	8370	1220	2250	6.34	2460.00	178.9
2022-11	MW-1014C		1111.02	283	30.6	< 1.9	529	4.77	1580	236	702	7.42	1028.00	-8.7
2022-11	MW-1014C	Dup.		281	30.1	< 1.9	535	4.81	1650	248	720			
2022-11	MW-1015A		1087.91	97.7	< 0.28	< 1.9	112	< 0.0580	14.1	9.7	146	7.30	219.00	77.4
2022-11	MW-1015B		1087.93	204	< 0.28	< 1.9	155	0.163	52.0	1.7	276	7.98	530.00	-45.7

Attachment 2
Groundwater - Annual Parameters

Trend Analysis

Trend Graphs

2022 Data

Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2022

	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1000PR						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-1	-5	-3	0	4	-2
p-Level	1.000	0.359	0.650	1.000	0.484	0.816
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	28	22	28	28	20	36
Mann-Kendall S	-307	-34	53	-314	-35	-423
p-Level	0.000	0.357	0.307	0.000	0.274	0.000
Trend	-			-		-
MW-1000R						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	0	4	0	0	-2	0
p-Level	1	0.484	1	1	0.816	1
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	12	12	12	12	12	12
Mann-Kendall S	-24	32	-3	-26	-31	-5
p-Level	0.116	0.032	0.893	0.086	0.038	0.789
Trend						
MW-1010P						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	4	5	2	3	1	0
p-Level	0.484	0.359	0.816	0.650	1.000	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	28	22	28	28	20	36
Mann-Kendall S	268	108	30	262	13	60
p-Level	0.000	0.002	0.570	0.000	0.701	0.424
Trend	+	+		+		
MW-1002						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	3	6	0	2	8	0
p-Level	0.650	0.234	1.000	0.816	0.084	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	23	19	24	23	19	34
Mann-Kendall S	73	109	3	81	35	0
p-Level	0.056	0.000	0.961	0.034	0.238	1.000
Trend		+				
MW-1002G						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	6	4	0	8	8	0
p-Level	0.234	0.484	1.000	0.084	0.084	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	23	19	24	23	19	34
Mann-Kendall S	173	129	0	176	36	-23
p-Level	0.000	0.000	1.000	0.000	0.224	0.746
Trend	+	+		+		

Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2022

	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1004						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-2	-5	0	-4	4	0
p-Level	0.816	0.359	1	0.484	0.484	1
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	12	12	12	12	12	12
Mann-Kendall S	-25	27	-1	-30	7	-1
p-Level	0.101	0.074	0.973	0.044	0.688	0.973
Trend						
MW-1004S						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-1	-2	0	2	4	0
p-Level	1.000	0.816	1.000	0.816	0.484	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	26	20	26	26	20	35
Mann-Kendall S	67	-119	10	45	-42	0
p-Level	0.146	0.000	0.845	0.336	0.186	1.000
Trend		-				
MW-1004P						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-4	0	0	-3	6	0
p-Level	0.484	1.000	1.000	0.650	0.234	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	26	20	26	26	20	35
Mann-Kendall S	132	65	0	95	47	2
p-Level	0.003	0.037	1.000	0.038	0.137	0.989
Trend	+					
MW-1005						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-2	4	0	-4	8	0
p-Level	0.816	0.484	1.000	0.484	0.084	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	23	19	24	23	19	34
Mann-Kendall S	121	110	1	126	115	21
p-Level	0.000	0.000	0.990	0.000	0.000	0.768
Trend	+	+		+	+	
MW-1005S						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-4	1	0	0	-1	0
p-Level	0.484	1.000	1.000	1.000	1.000	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	23	19	24	23	19	34
Mann-Kendall S	-76	46	15	-60	-56	0
p-Level	0.047	0.116	0.731	0.120	0.054	1.000
Trend						

Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2022

	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1005P						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	6	4	0	2	4	-2
p-Level	0.234	0.484	1.000	0.816	0.484	0.816
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	24	19	24	24	19	34
Mann-Kendall S	61	57	12	64	34	27
p-Level	0.138	0.050	0.788	0.118	0.252	0.702
Trend						
MW-1015A						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	6	4	0	9	8	0
p-Level	0.234	0.484	1.000	0.050	0.084	1.000
Trend				+		
Trend Results for All Data Since Oct. 1997						
Sample Size	23	18	33	23	18	38
Mann-Kendall S	100	68	21	130	-28	0
p-Level	0.008	0.009	0.758	0.000	0.312	1.000
Trend	+	+		+		
MW-1015B						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	2	-10	0	0	8	0
p-Level	0.816	0.016	1.000	1.000	0.084	1.000
Trend		-				
Trend Results for All Data Since Oct. 1997						
Sample Size	23	18	33	23	18	38
Mann-Kendall S	123	42	15	137	6	0
p-Level	0.000	0.122	0.830	0.000	0.852	1.000
Trend	+			+		
MW-1013						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-4	-8	-4	-4	4	0
p-Level	0.484	0.084	0.484	0.484	0.484	1.000
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	18	18	18	18	17	18
Mann-Kendall S	-18	-123	-52	9	-34	3
p-Level	0.525	0.000	0.053	0.766	0.176	0.940
Trend		-				
MW-1013A						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	0	2	0	2	0	-2
p-Level	1.000	0.816	1.000	0.816	1.000	0.816
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	18	18	18	18	17	18
Mann-Kendall S	11	-8	-21	21	-10	-7
p-Level	0.708	0.794	0.454	0.454	0.716	0.822
Trend						

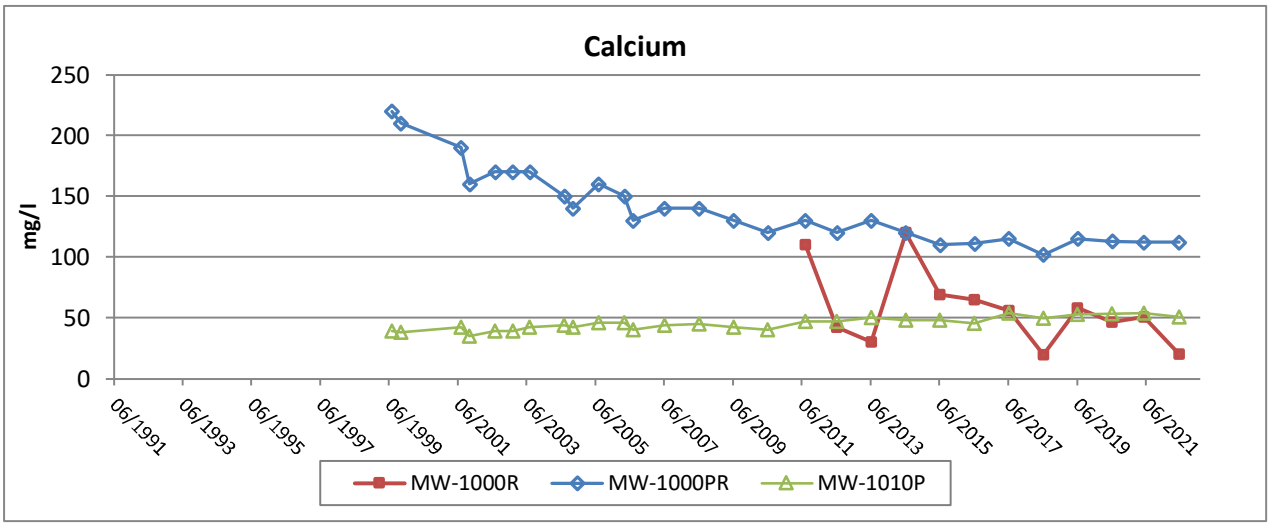
Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2022

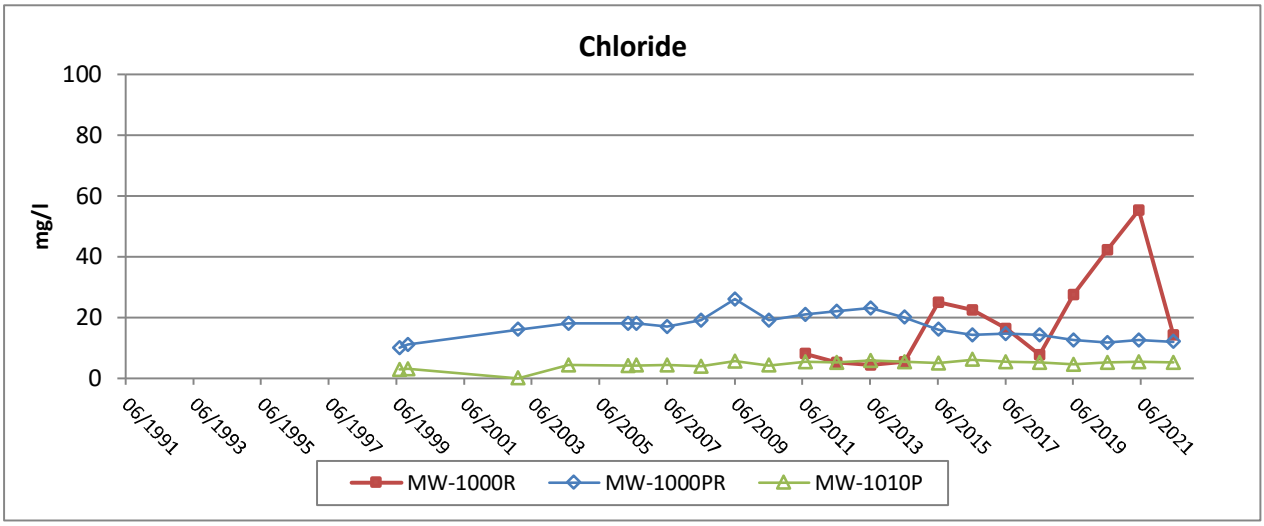
	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1013B						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	2	3	0	4	2	-4
p-Level	0.816	0.650	1.000	0.484	0.816	0.484
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	31	25	30	31	23	38
Mann-Kendall S	-106	39	20	-93	-103	208
p-Level	0.074	0.379	0.737	0.118	0.006	0.008
Trend					-	+
MW-1013C						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	3	0	-4	0	0	-8
p-Level	0.650	1.000	0.484	1.000	1.000	0.084
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	31	25	30	31	23	38
Mann-Kendall S	-70	4	57	-247	-58	-364
p-Level	0.243	0.944	0.320	0.000	0.133	0.000
Trend				-		-
MW-1014						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	8	-9	0	8	8	-5
p-Level	0.084	0.050	1.000	0.084	0.084	0.359
Trend		-				
Trend Results for All Data Since Oct. 1997						
Sample Size	18	18	18	18	17	18
Mann-Kendall S	45	90	-3	52	-1	-39
p-Level	0.096	0.000	0.940	0.053	0.984	0.152
Trend		+				
MW-1014A						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	4	-2	2	6	2	10
p-Level	0.484	0.816	0.816	0.234	0.816	0.016
Trend						+
Trend Results for All Data Since Oct. 1997						
Sample Size	28	22	27	28	20	35
Mann-Kendall S	-31	22	23	-12	-46	242
p-Level	0.557	0.559	0.650	0.830	0.146	0.000
Trend						+
MW-1014B						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	-2	-4	0	-2	-4	-2
p-Level	0.816	0.484	1.000	0.816	0.484	0.816
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	31	24	30	31	23	38
Mann-Kendall S	-252	22	45	-314	-117	-507
p-Level	0.000	0.606	0.436	0.000	0.002	0.000
Trend	-			-	-	-

Trend Analysis Results - Groundwater (Annual Parameters)
Year Ending 2022

	Calcium	Chloride	Lead	Magnesium	Potassium	Zinc
MW-1014C						
Trend Results for Most Recent 5 Years						
Sample Size	5	5	5	5	5	5
Mann-Kendall S	0	1	0	-4	2	-6
p-Level	1.000	1.000	1.000	0.484	0.816	0.234
Trend						
Trend Results for All Data Since Oct. 1997						
Sample Size	31	25	30	31	23	38
Mann-Kendall S	-294	192	-3	-358	-105	-669
p-Level	0.000	0.000	0.972	0.000	0.006	0.000
Trend	-	+		-	-	-

Notes: Overall increasing trend denoted by "+".
Overall decreasing trend denoted by "-"
Long term trend tests performed at a Type I (two-tailed) error rate of 0.01.
5-Year Trend tests performed at a Type I (two-tailed) error rate of 0.05.
N/A - No trend test performed due to insufficient data.





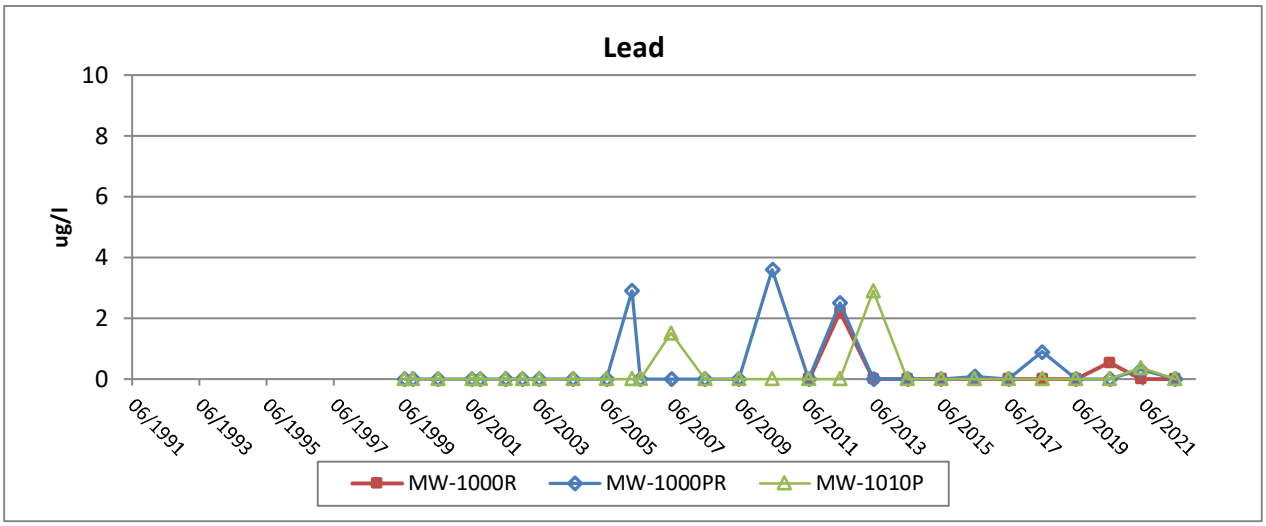


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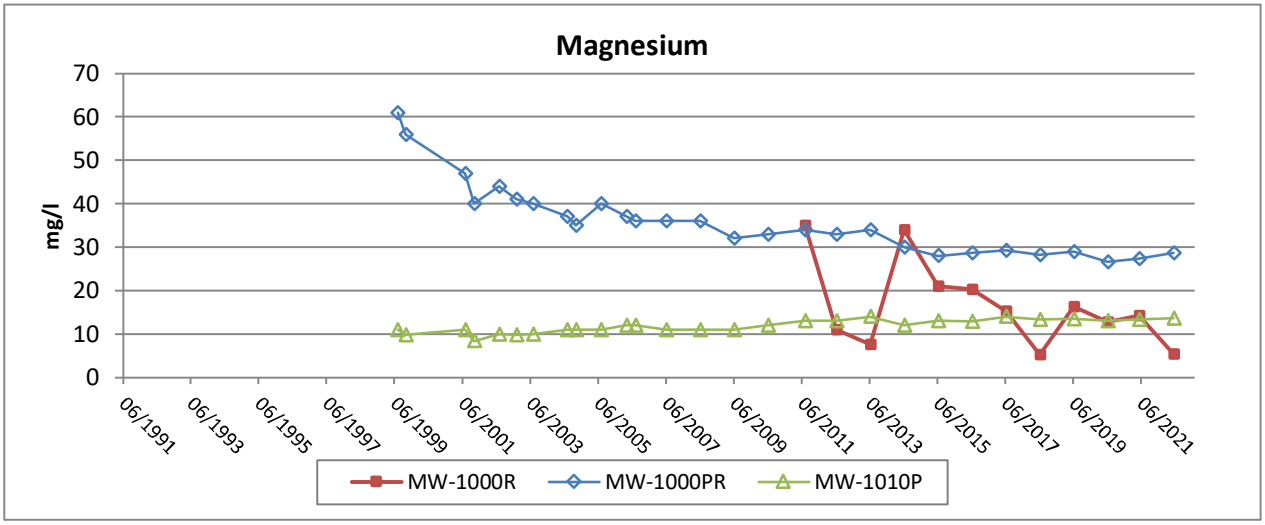
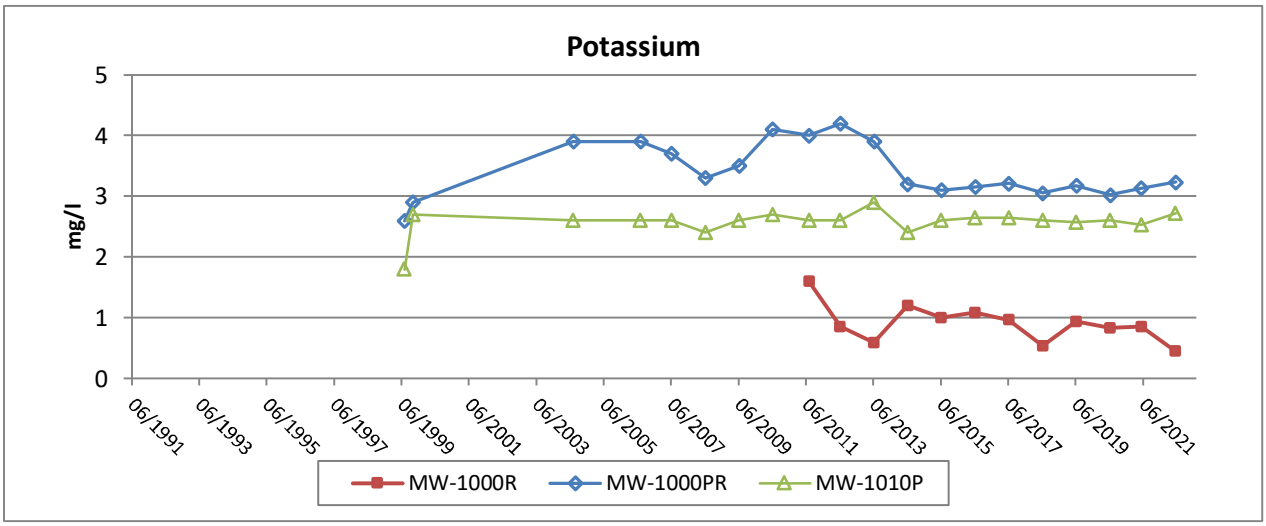
Figure B-8a
Groundwater Trend Graphs - Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





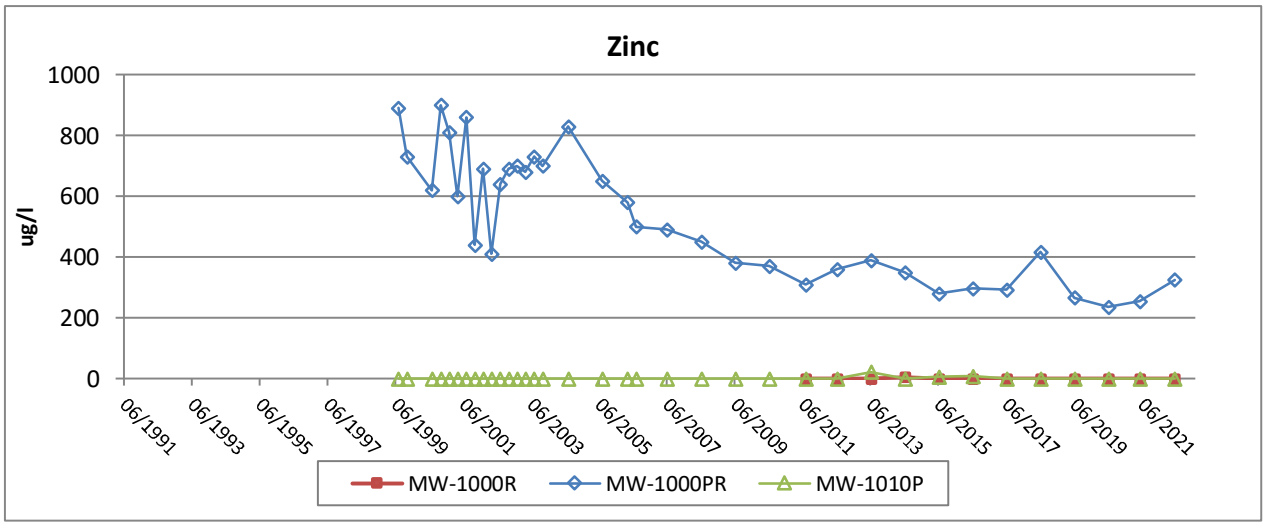


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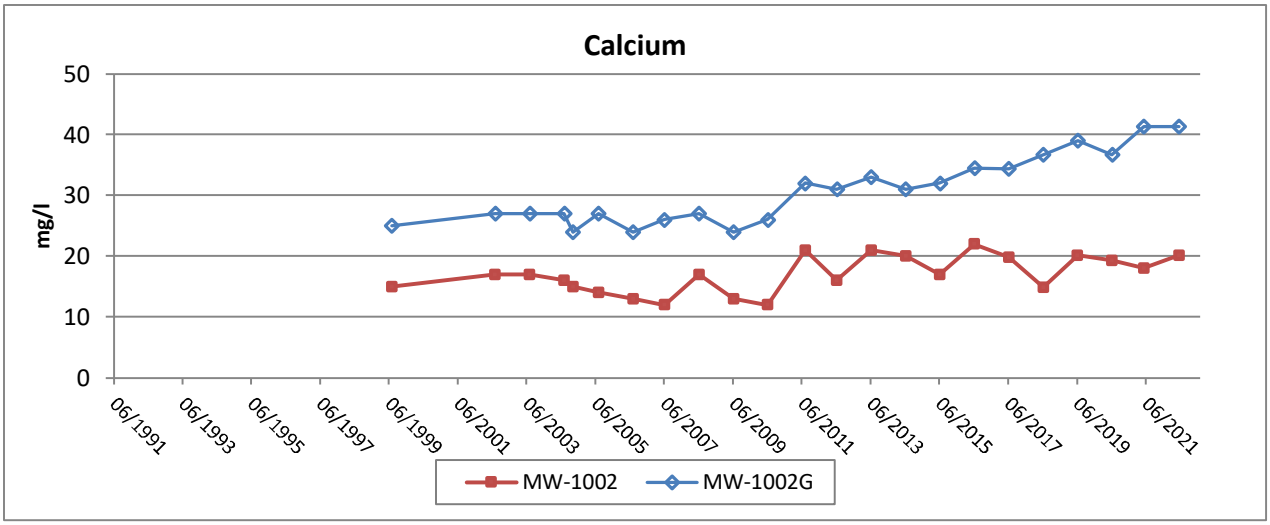
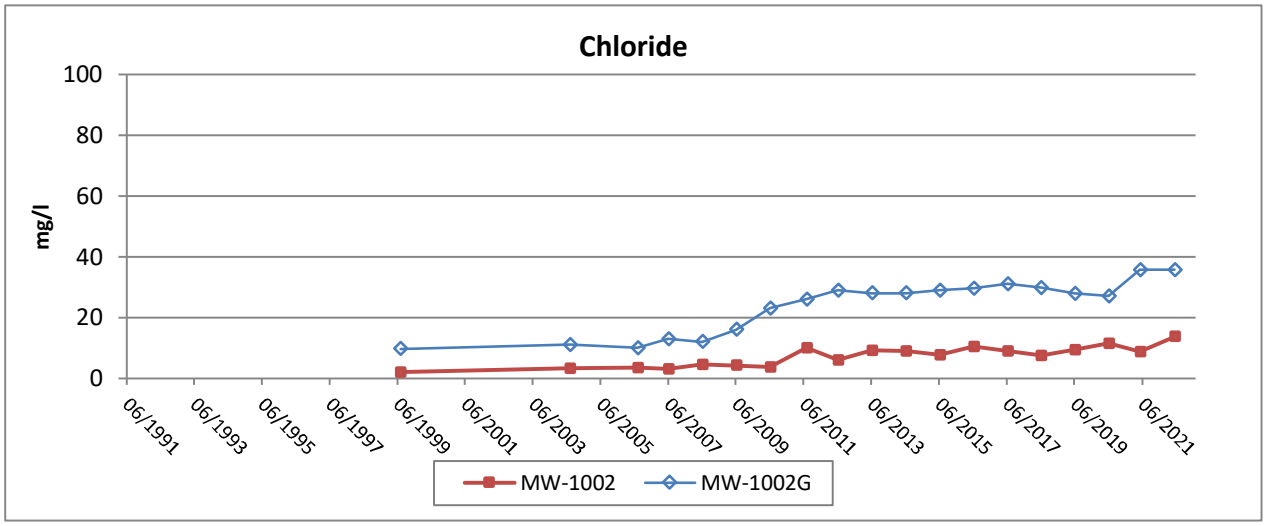
Figure B-8b
Groundwater Trend Graphs - Annual Results
MW-1000R/MW-1000PR/MW-1010P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





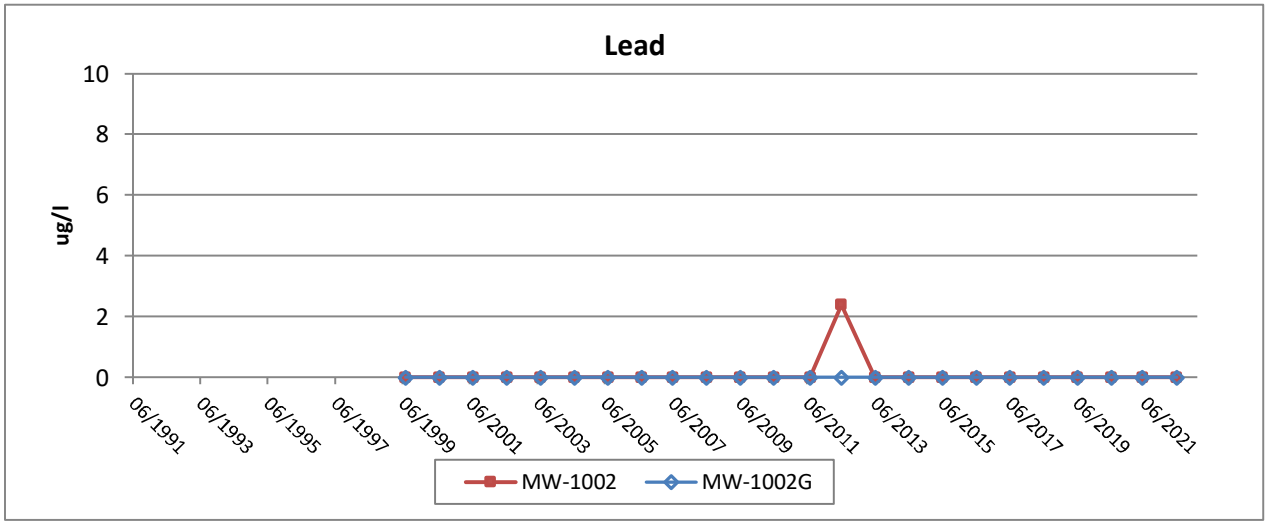


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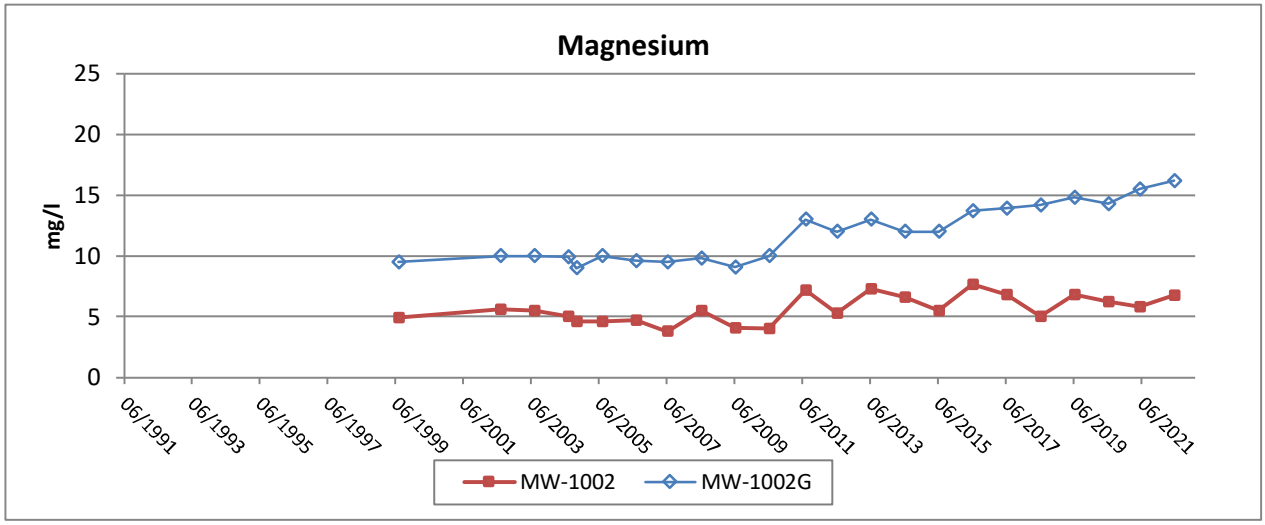
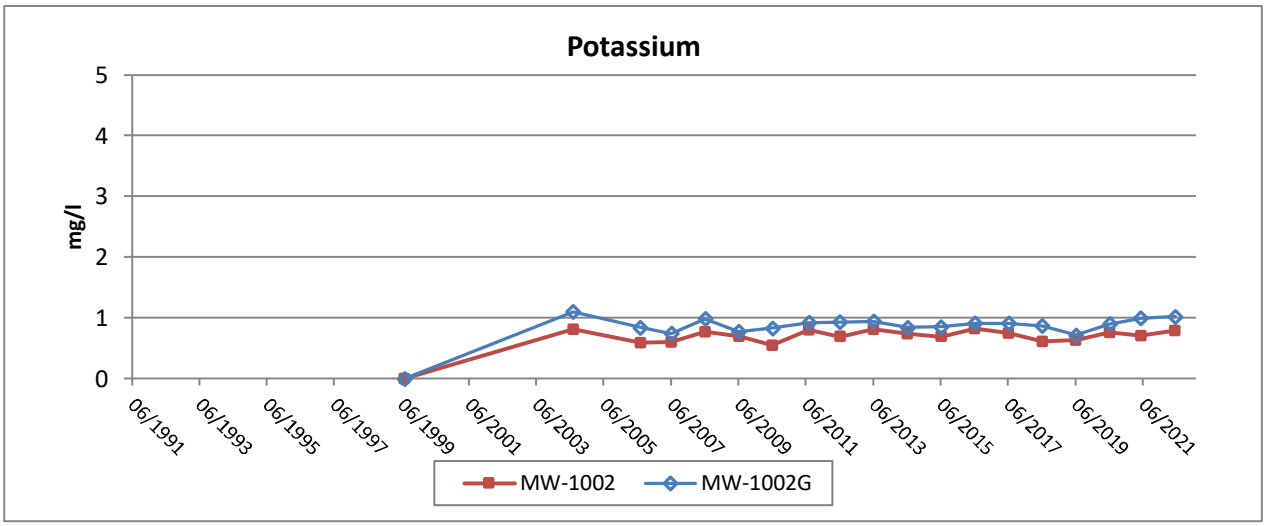
Figure B-9a
Groundwater Trend Graphs - Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





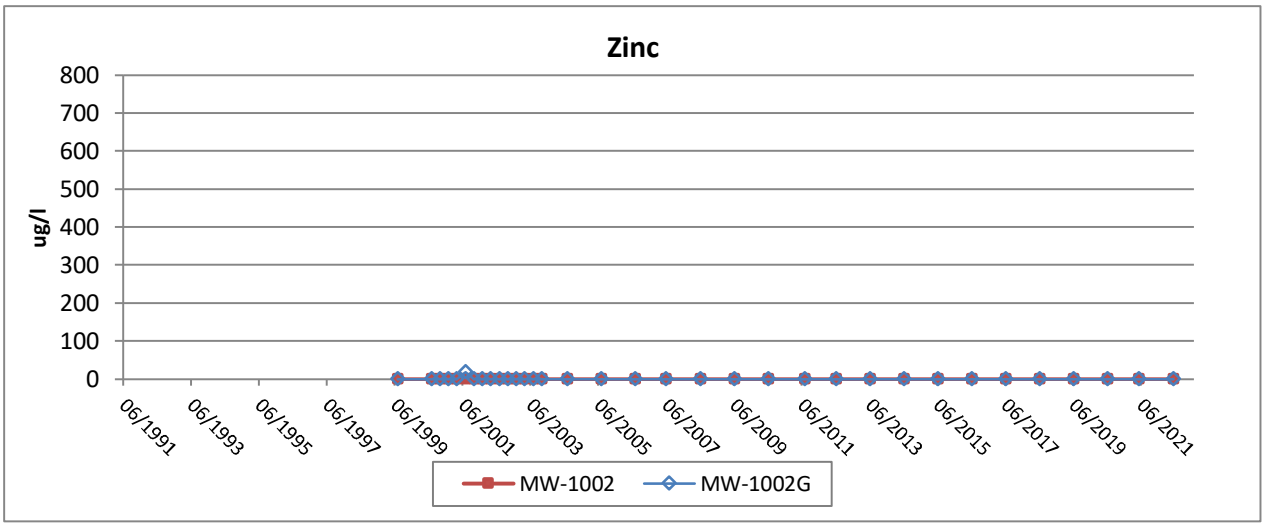


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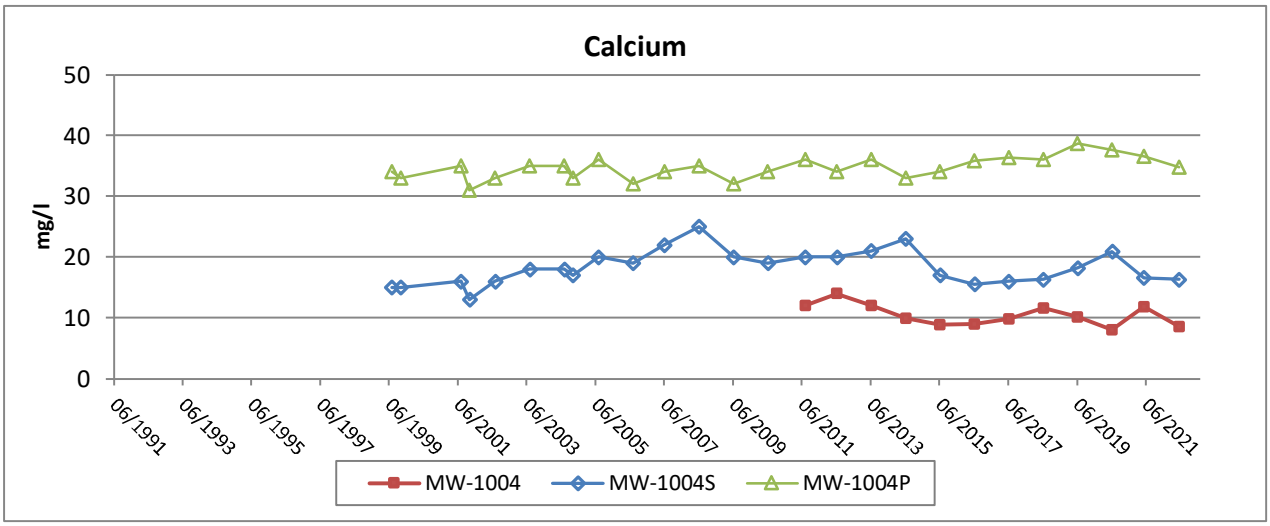
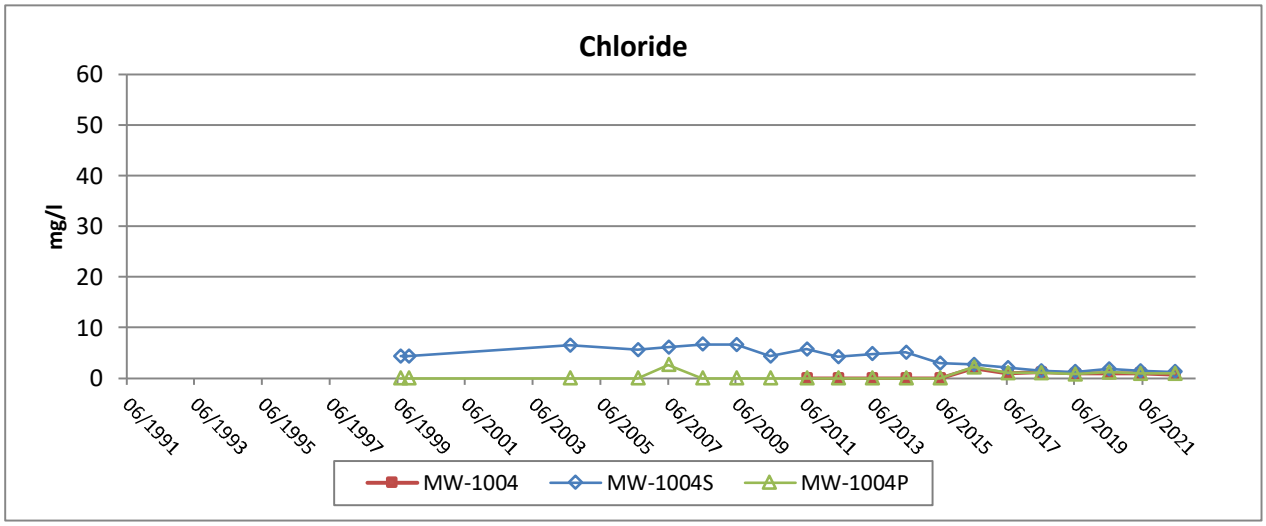
Figure B-9b
Groundwater Trend Graphs - Annual Results
MW-1002/MW-1002G

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





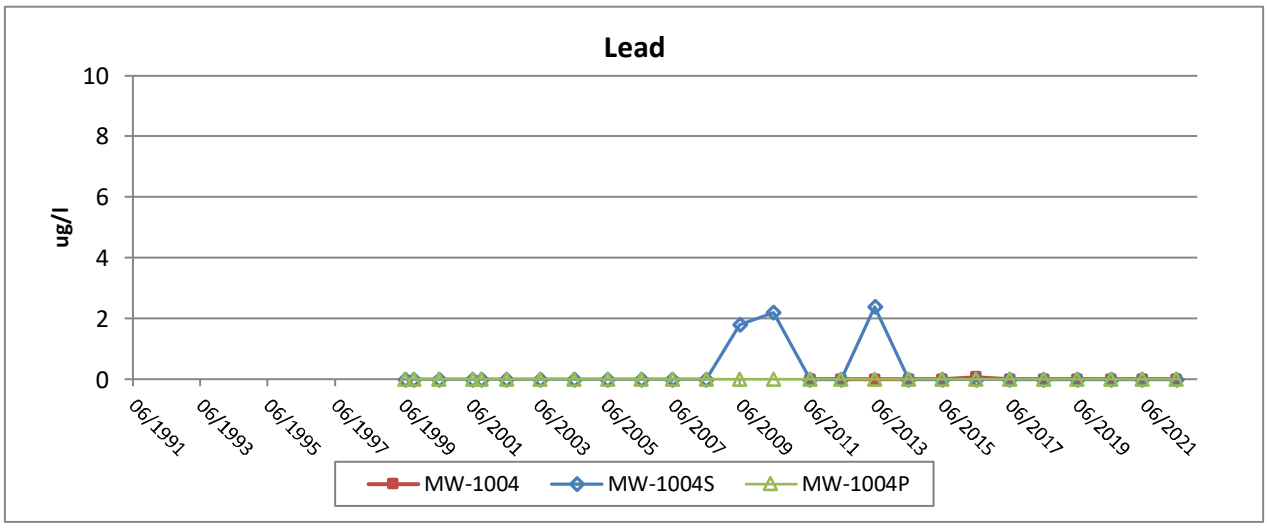


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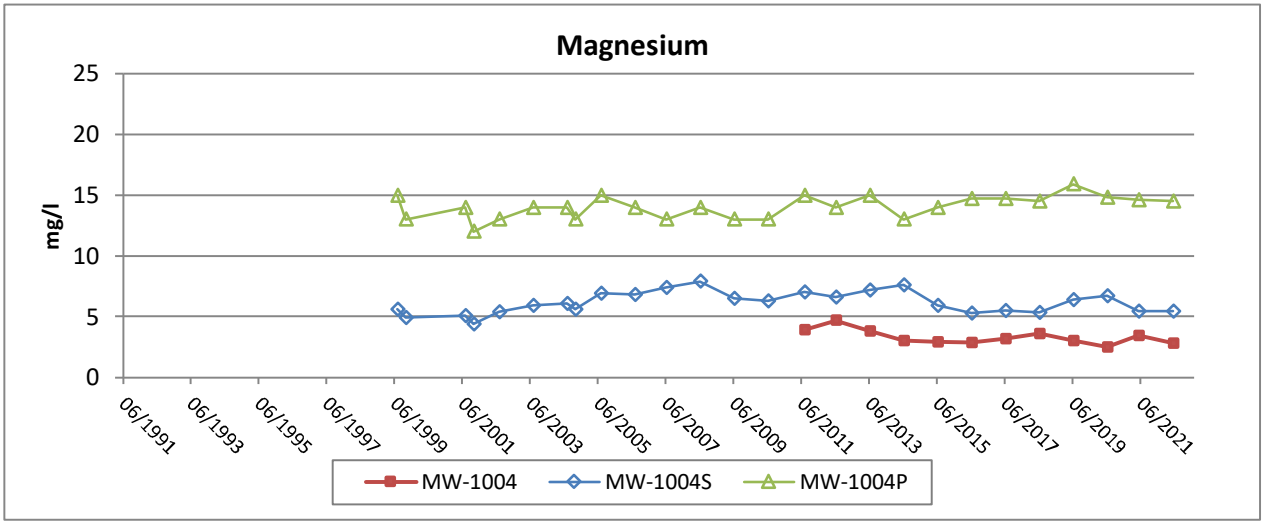
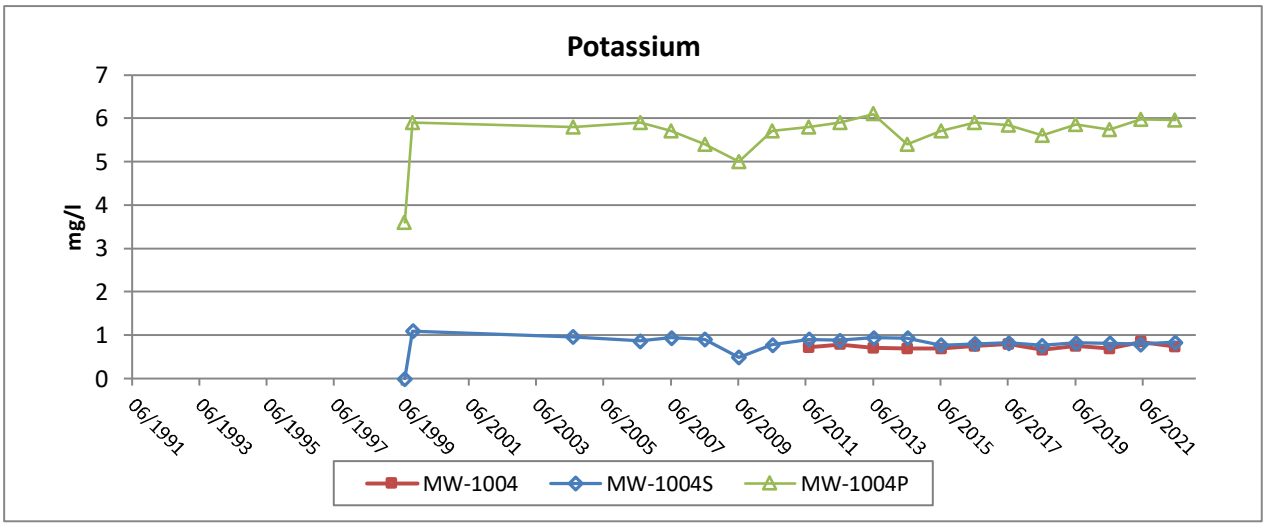
Figure B-10a
Groundwater Trend Graphs - Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





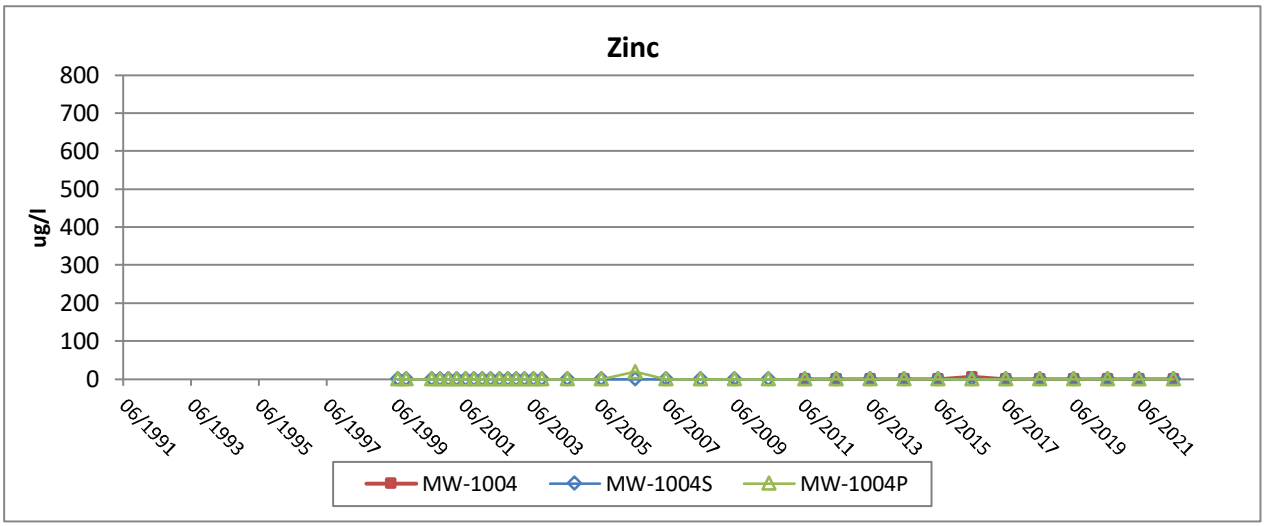


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Figure B-10b
Groundwater Trend Graphs - Annual Results
MW-1004/MW-1004S/MW-1004P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

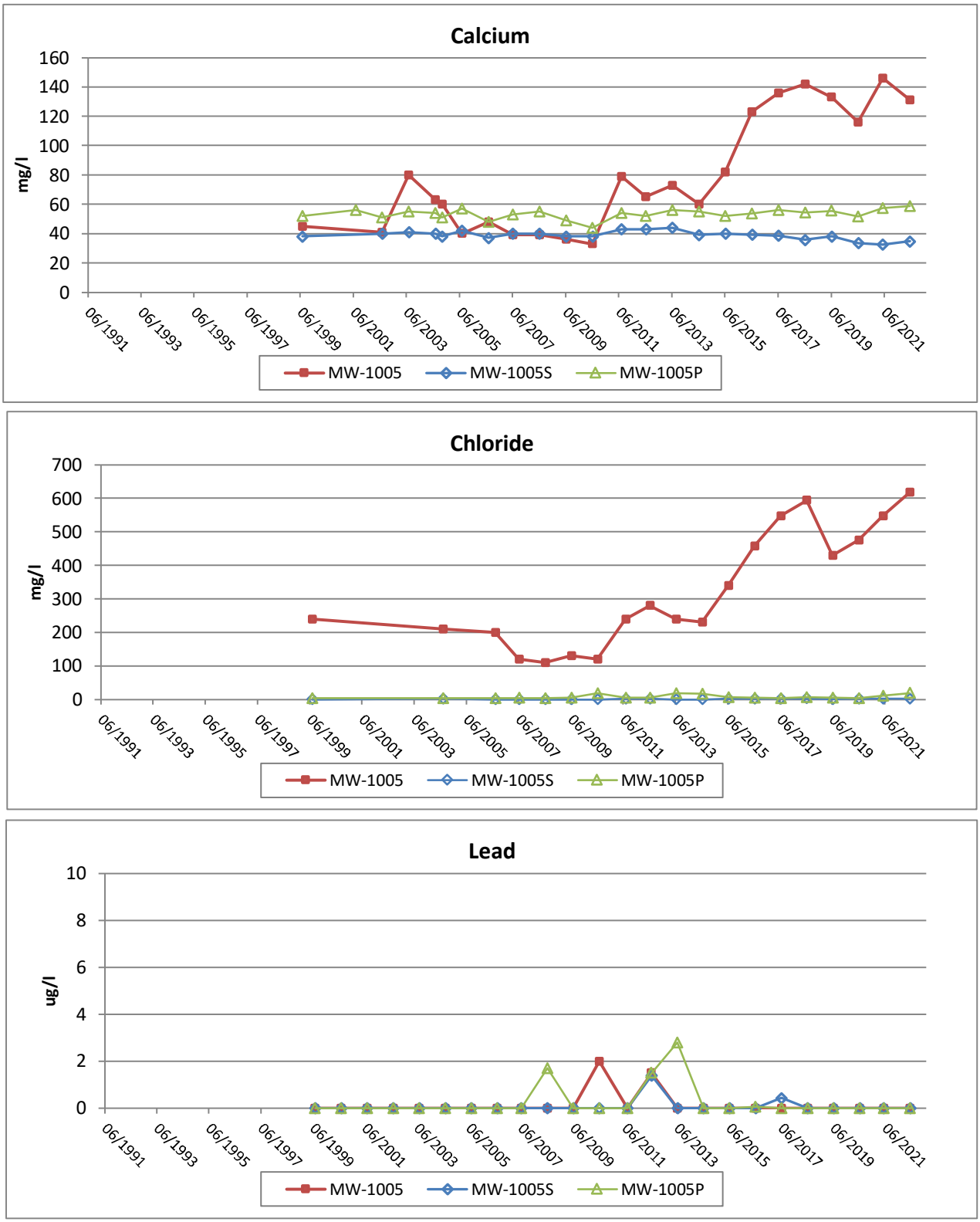

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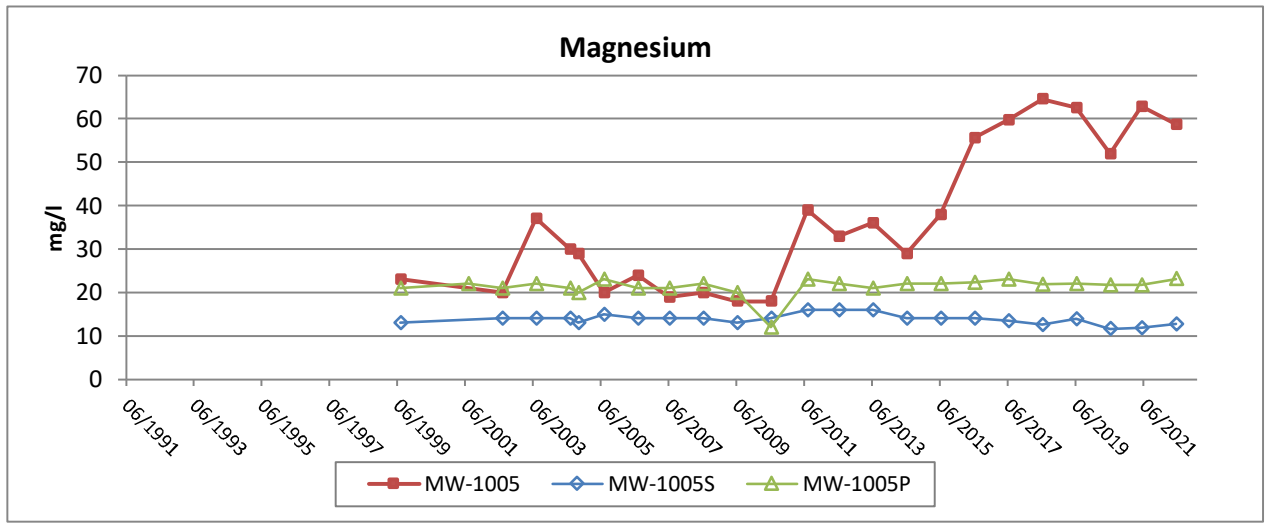
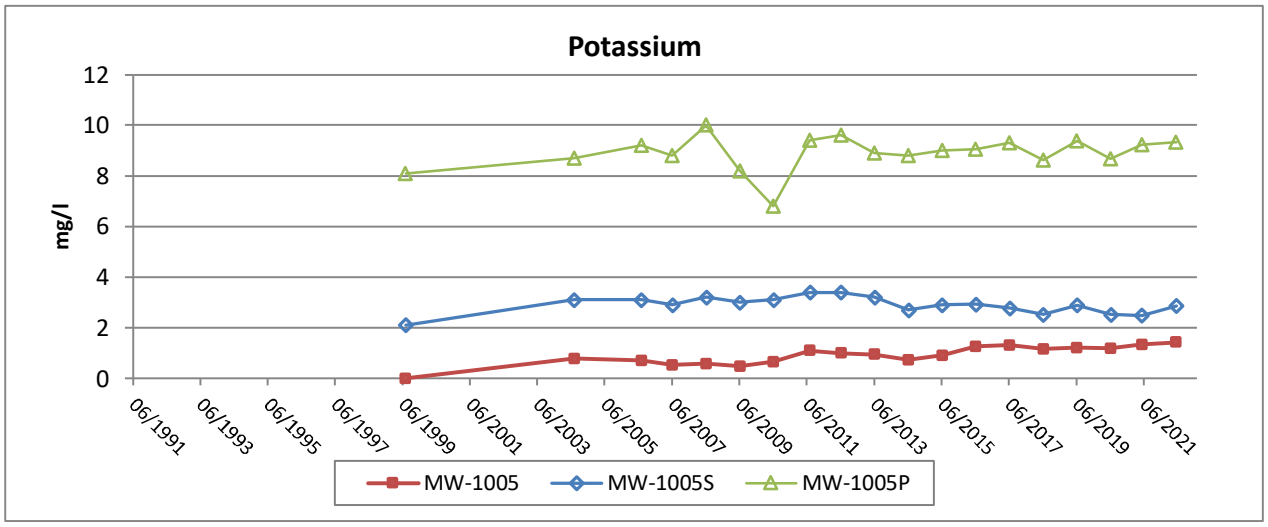
Figure B-11a
Groundwater Trend Graphs - Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





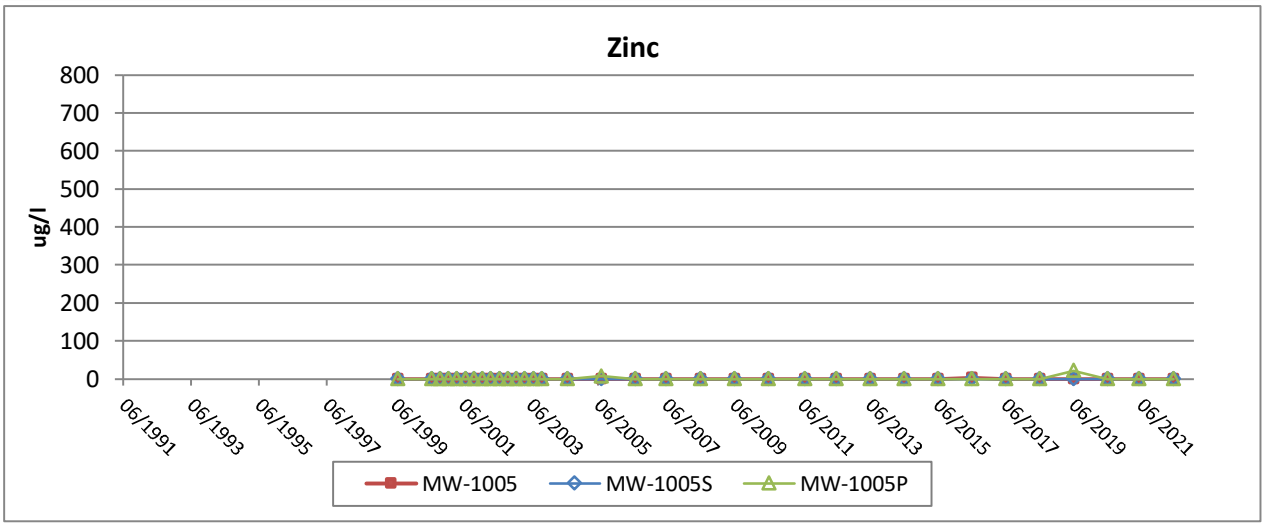


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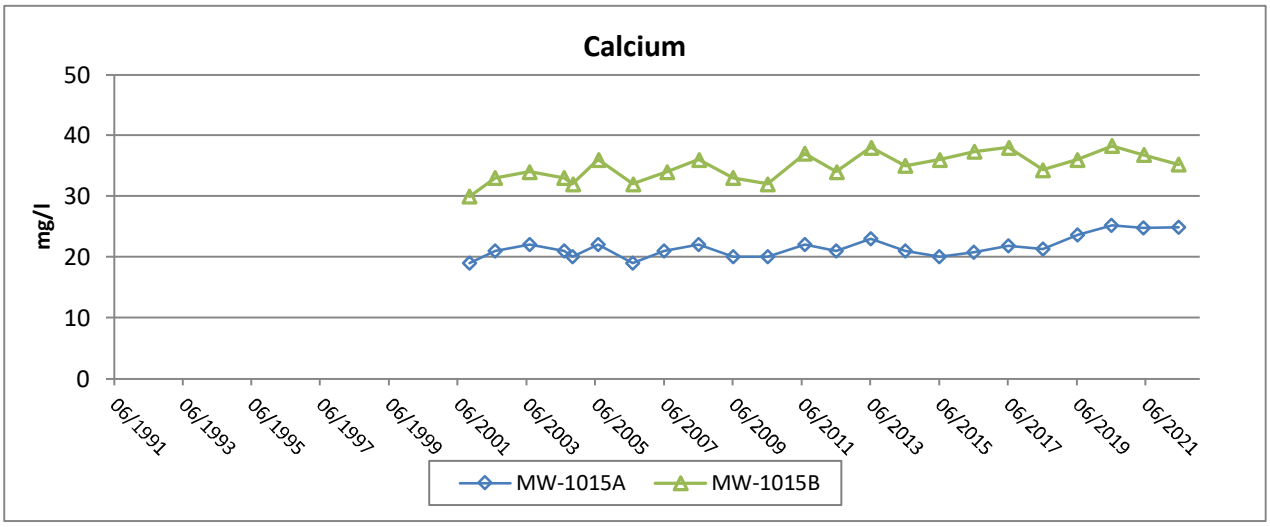
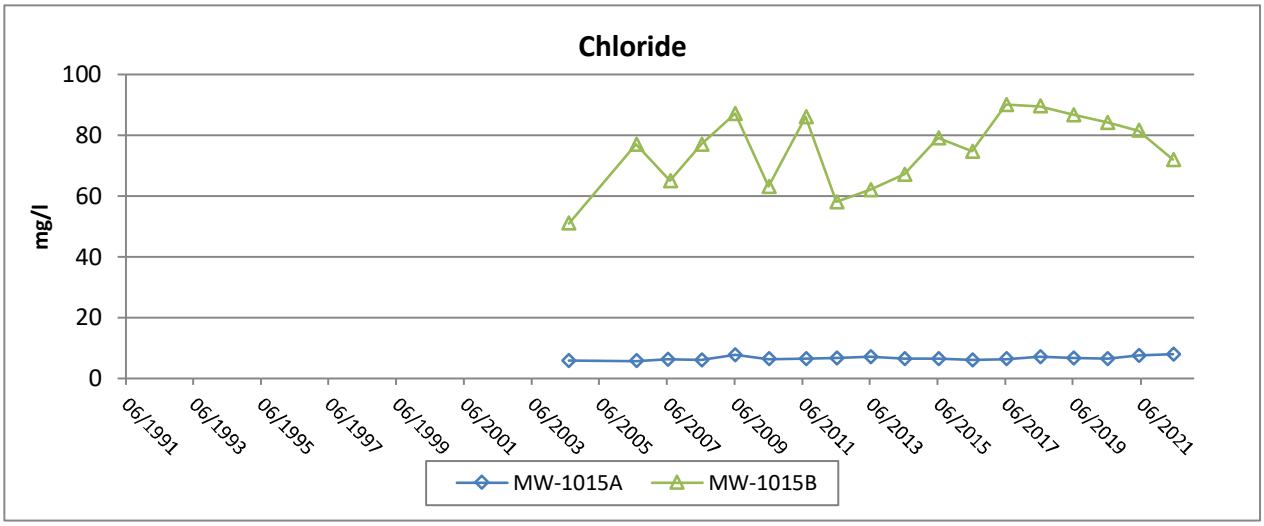
Figure B-11b
Groundwater Trend Graphs - Annual Results
MW-1005/MW-1005S/MW-1005P

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





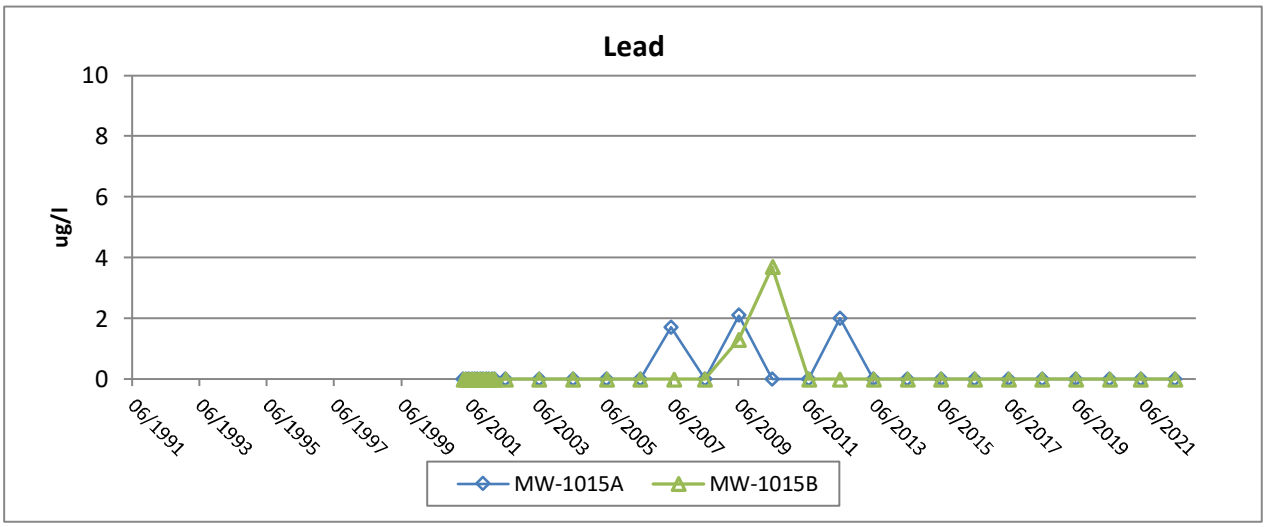


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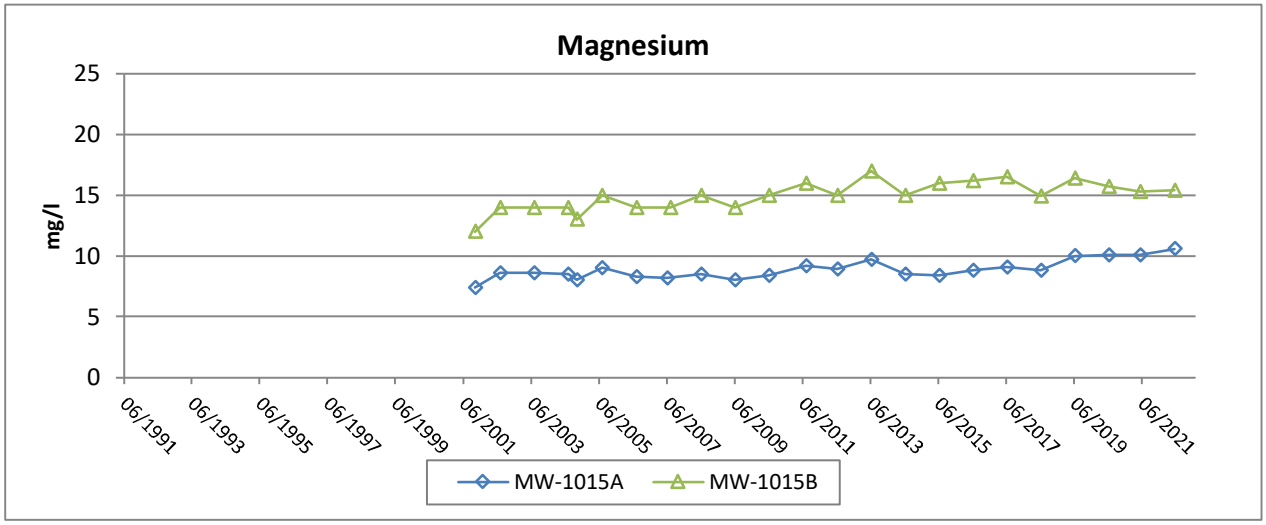
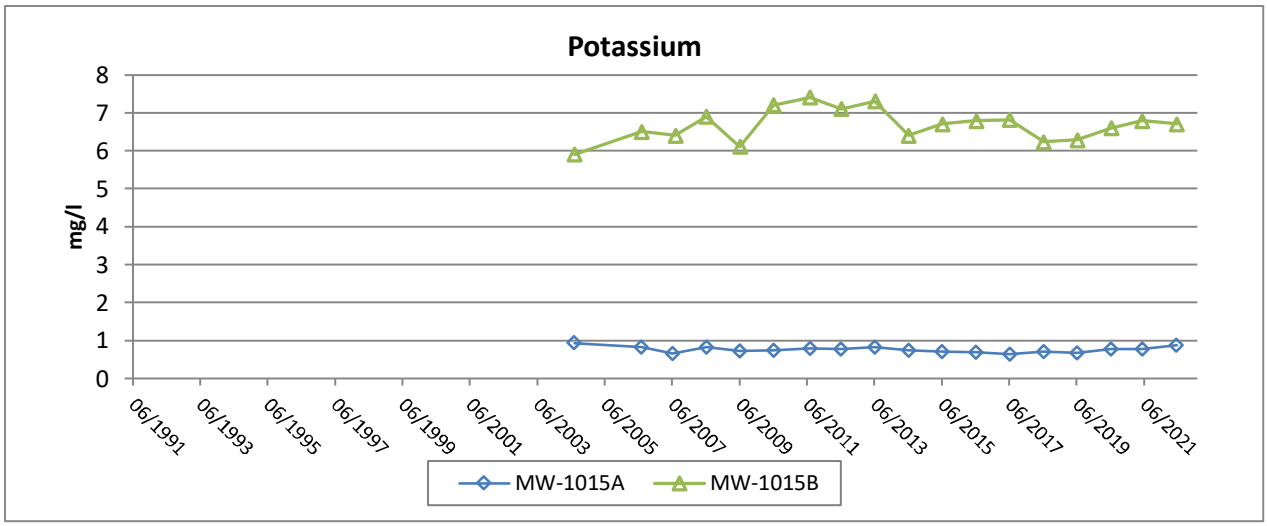
Figure B-12a
Groundwater Trend Graphs - Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





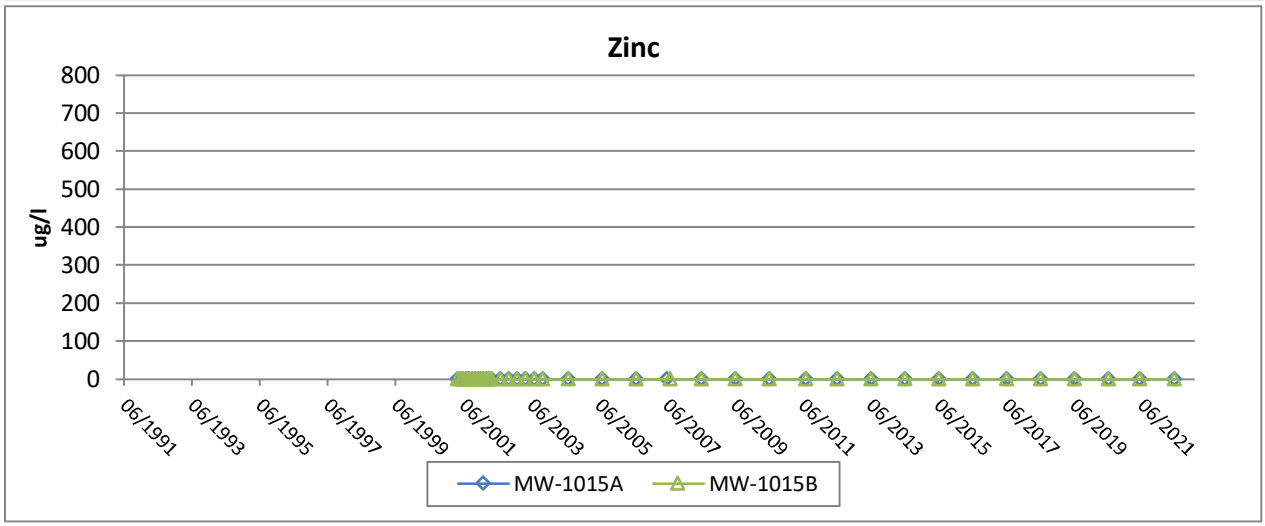


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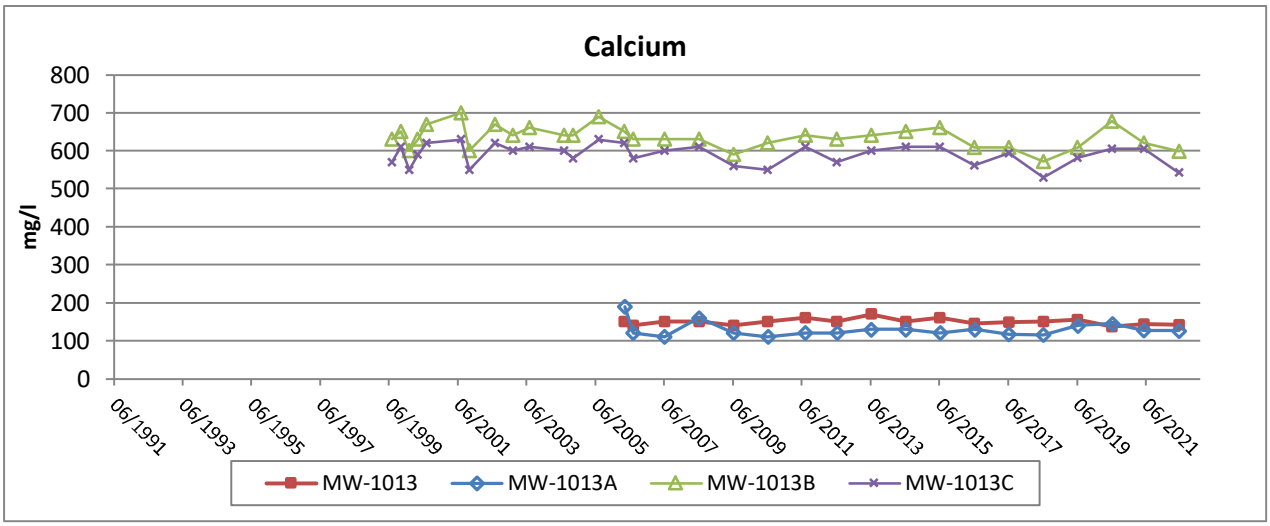
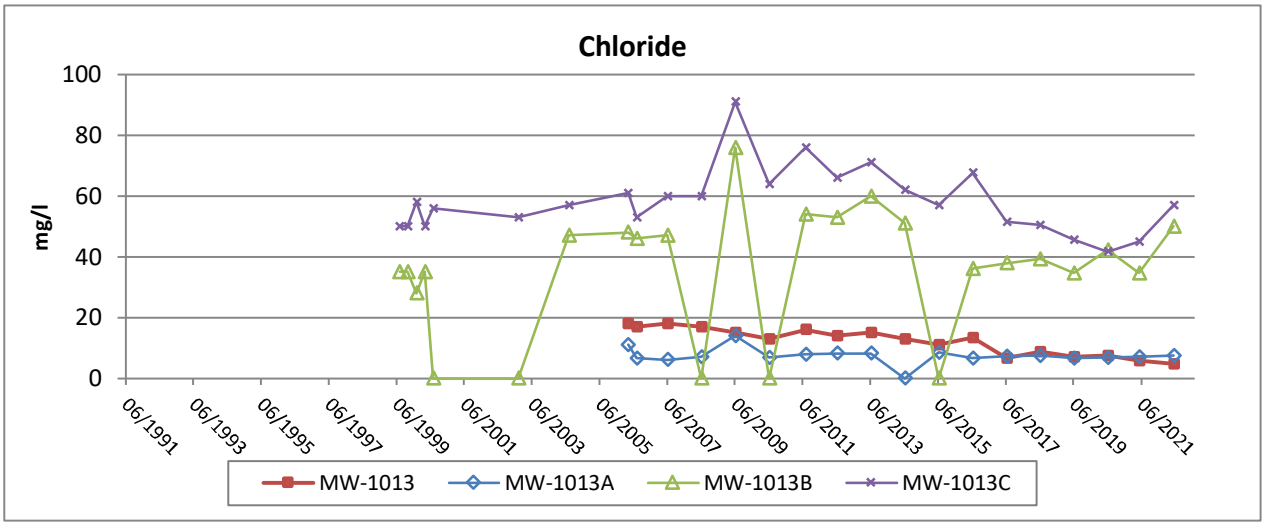
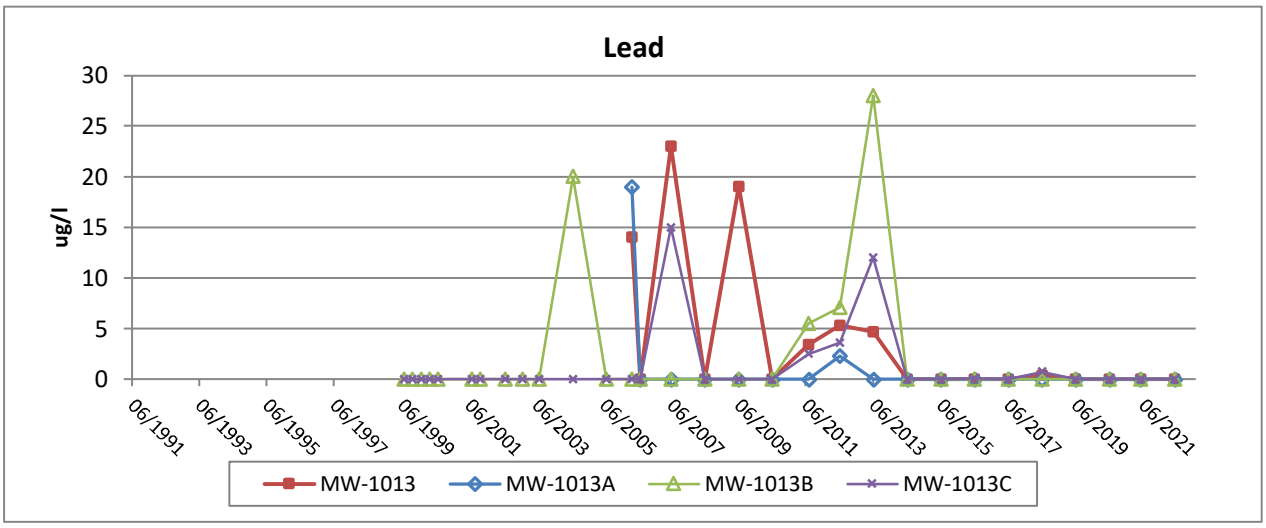
Figure B-12b
Groundwater Trend Graphs - Annual Results
MW-1015A/MW-1015B

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22







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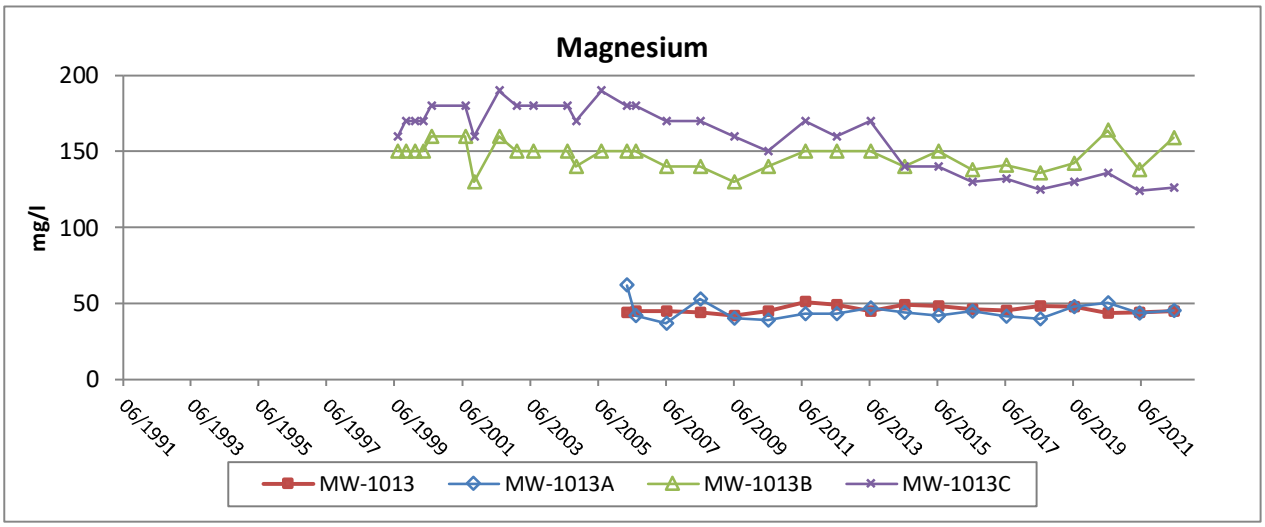
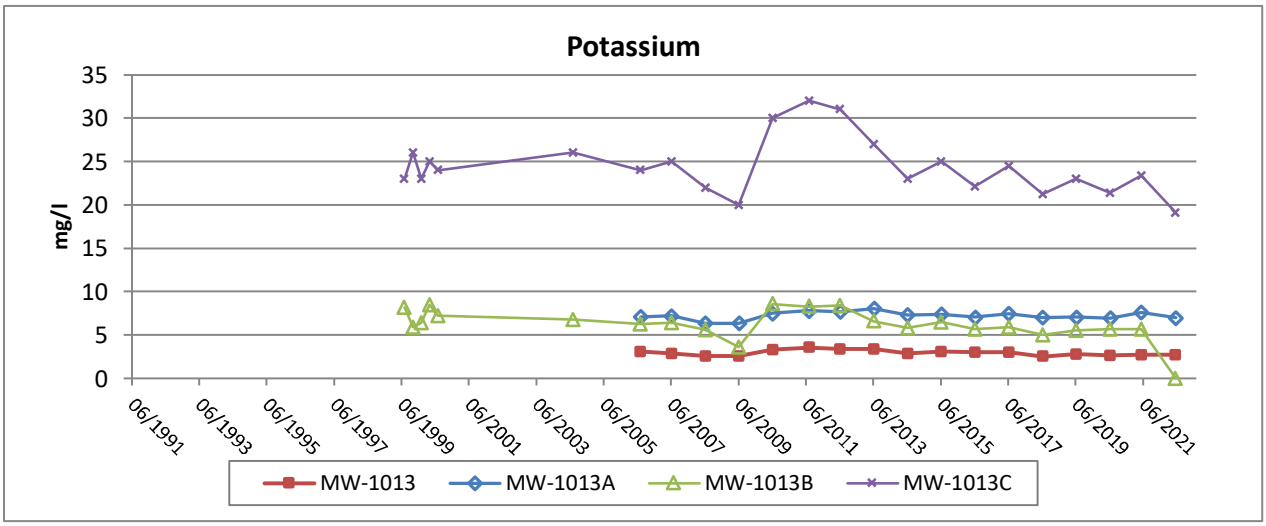
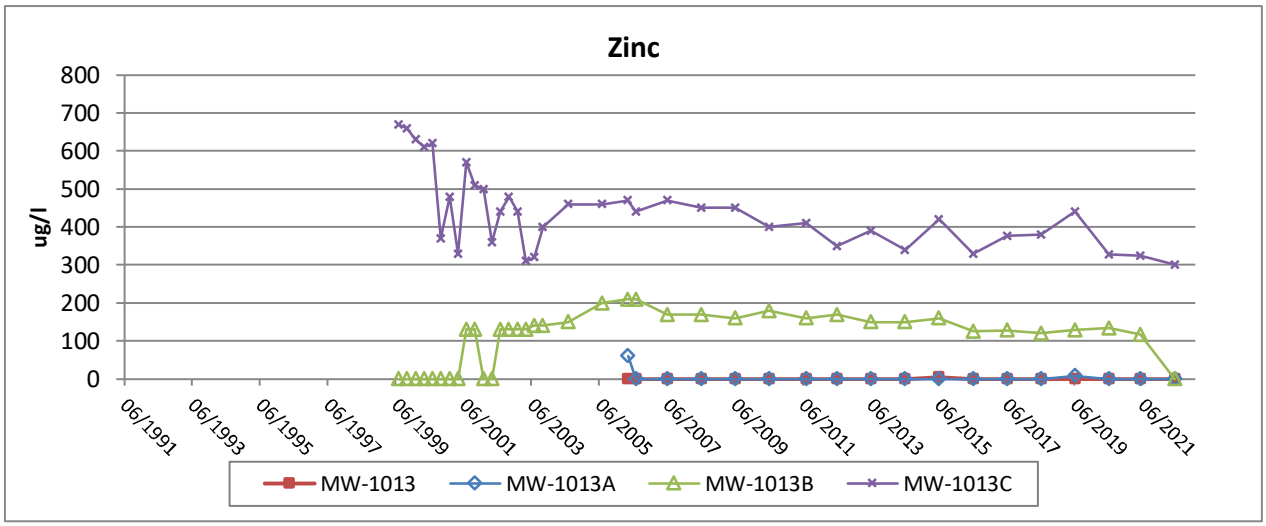
FLAMBEAU MINING COMPANY

Figure B-13a
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22







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FLAMBEAU MINING COMPANY

Figure B-13b
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1013/MW-1013A/MW-1013B/MW-1013C

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

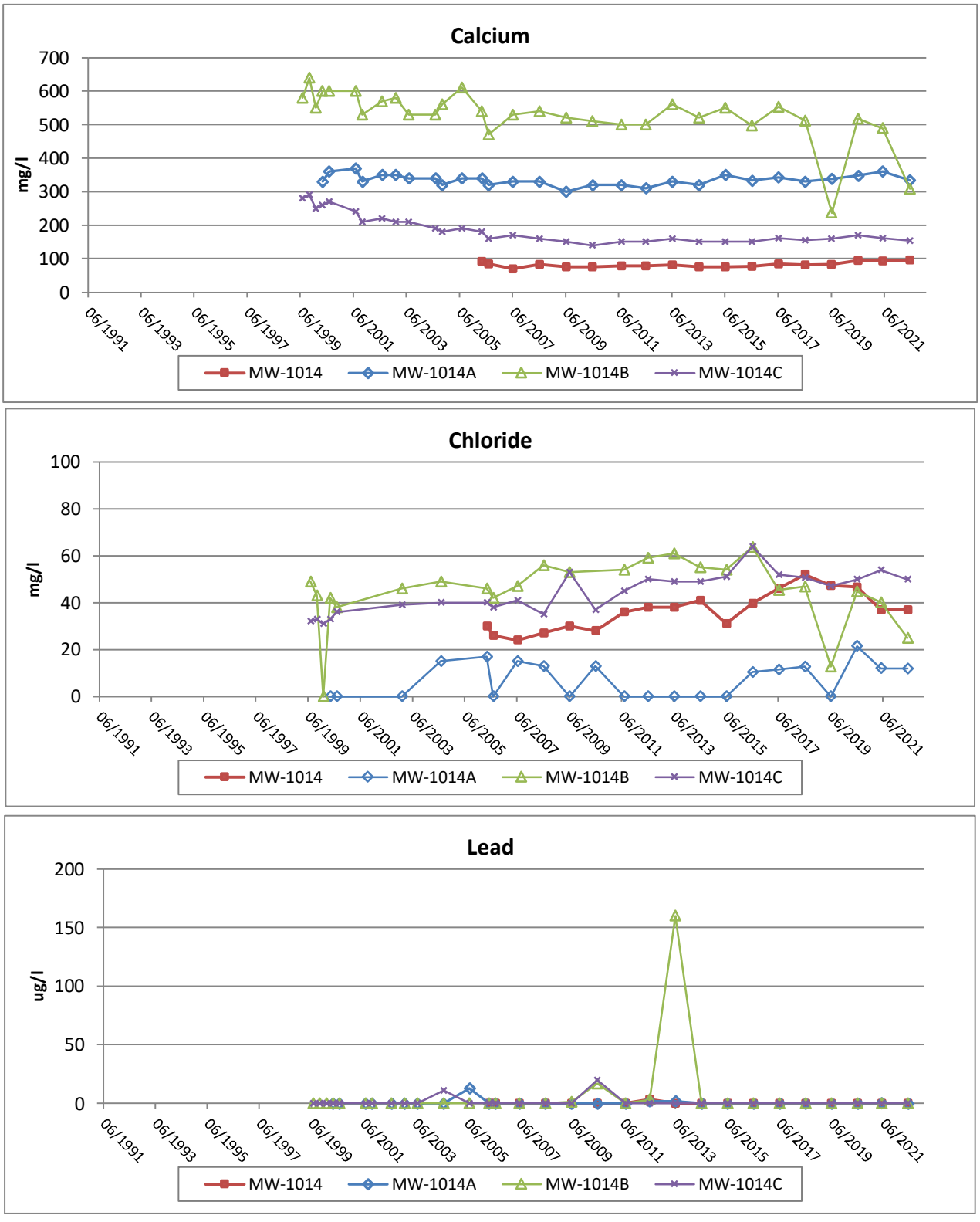

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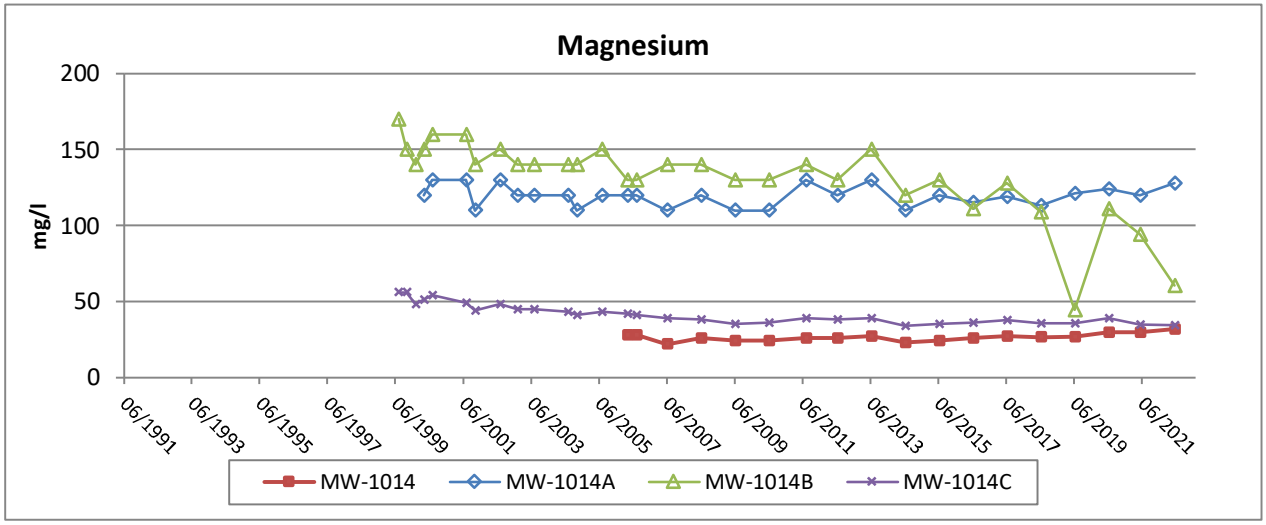
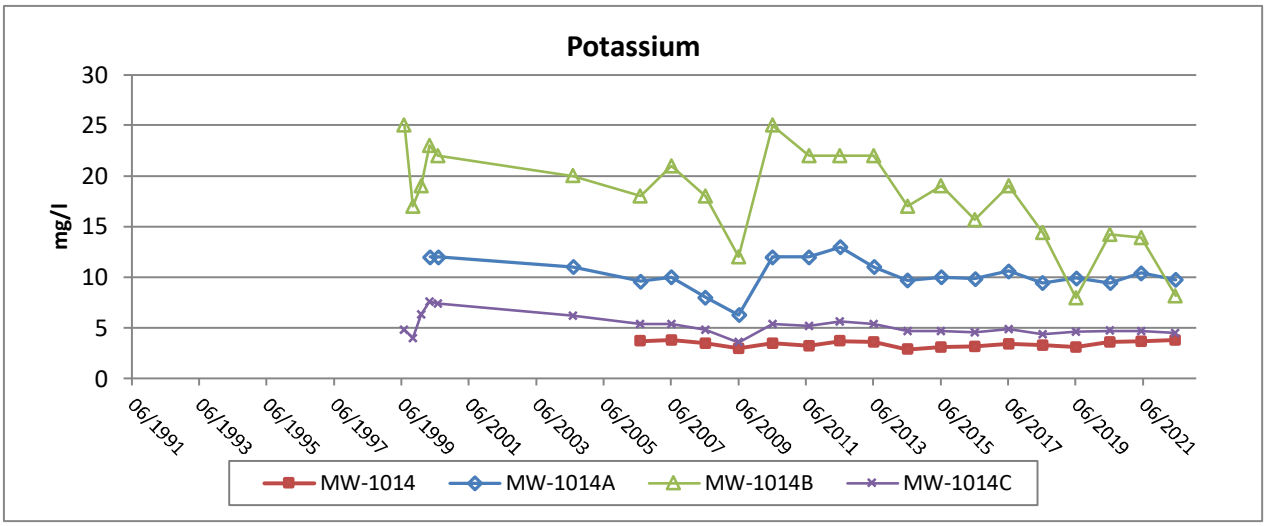
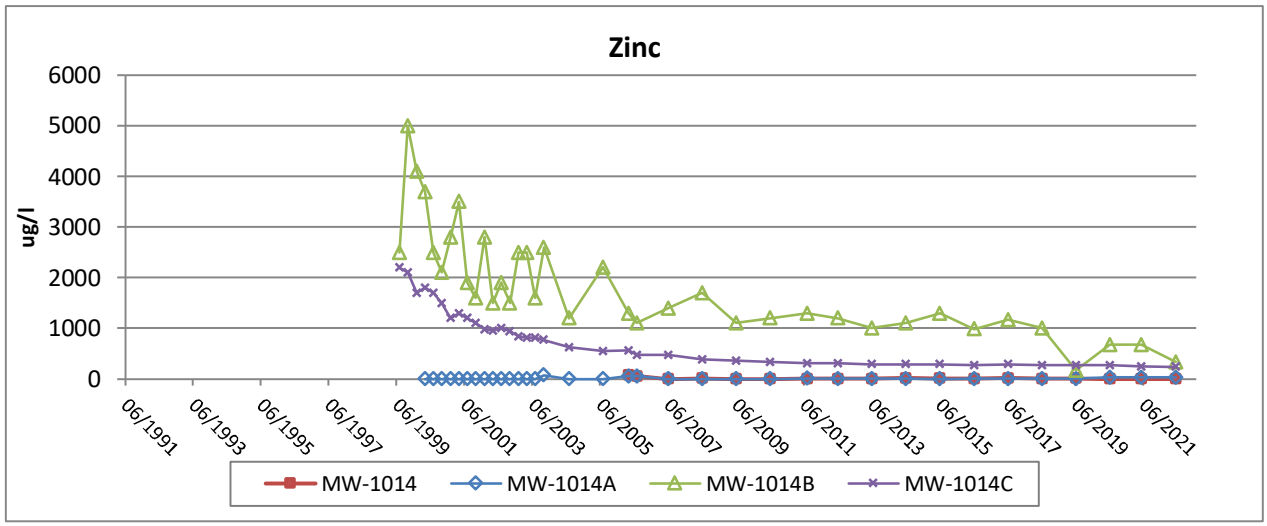
Figure B-14a
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22







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FLAMBEAU MINING COMPANY

Figure B-14b
Groundwater Trend Graphs - Annual Results (In-Pit Wells)
MW-1014/MW-1014A/MW-1014B/MW-1014C

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

2022 Groundwater Results - Annual Parameters

Sample Date (yyyy-mm)	Location		Calcium mg/l	Chloride mg/l	Lead ug/l	Magnesium mg/l	Potassium mg/l	Zinc ug/l
2022-05	MW-1000PR		112	12.0	< 0.24	28.6	3.23	325
2022-05	MW-1000R		20.2	14.3	< 0.24	5.33	0.45	< 10.3
2022-05	MW-1002		20.1	13.7	< 0.24	6.78	0.793	< 10.3
2022-05	MW-1002G		41.4	35.7	< 0.24	16.2	1.02	< 10.3
2022-05	MW-1002G	Dup.	40.3	35.7	< 0.24	15.8	0.997	< 10.3
2022-05	MW-1004		8.57	0.73	< 0.24	2.79	0.735	< 10.3
2022-05	MW-1004P		34.8	0.99	< 0.24	14.5	5.96	< 10.3
2022-05	MW-1004S		16.3	1.3	< 0.24	5.46	0.84	< 10.3
2022-05	MW-1005		131	618	< 0.24	58.7	1.43	< 10.3
2022-05	MW-1005P		58.7	19.3	< 0.24	23.2	9.33	< 10.3
2022-05	MW-1005S		34.7	1.6	< 0.24	12.8	2.86	< 10.3
2022-05	MW-1010P		50.7	5.2	< 0.24	13.6	2.72	< 10.3
2022-05	MW-1013		142	4.8	< 0.24	45	2.73	< 10.3
2022-05	MW-1013A		126	7.4	< 0.24	45.1	6.99	< 10.3
2022-05	MW-1013B		599	50.1	< 0.24	159	< 23.7	< 1030
2022-05	MW-1013C		542	57.0	< 0.24	126	19.1	301
2022-05	MW-1014		95.5	36.9	< 0.24	31.9	3.79	< 10.3
2022-05	MW-1014A		334	11.8	< 0.24	128	9.74	35.8
2022-05	MW-1014B		308	24.9	< 0.24	60.6	8.13	338
2022-05	MW-1014C		154	49.9	< 0.24	34.2	4.5	241
2022-05	MW-1014C	Dup.	153	50.5	< 0.24	33.9	4.5	240
2022-05	MW-1015A		24.9	7.9	< 0.24	10.6	0.878	< 10.3
2022-05	MW-1015B		35.2	72.0	< 0.24	15.4	6.7	< 10.3

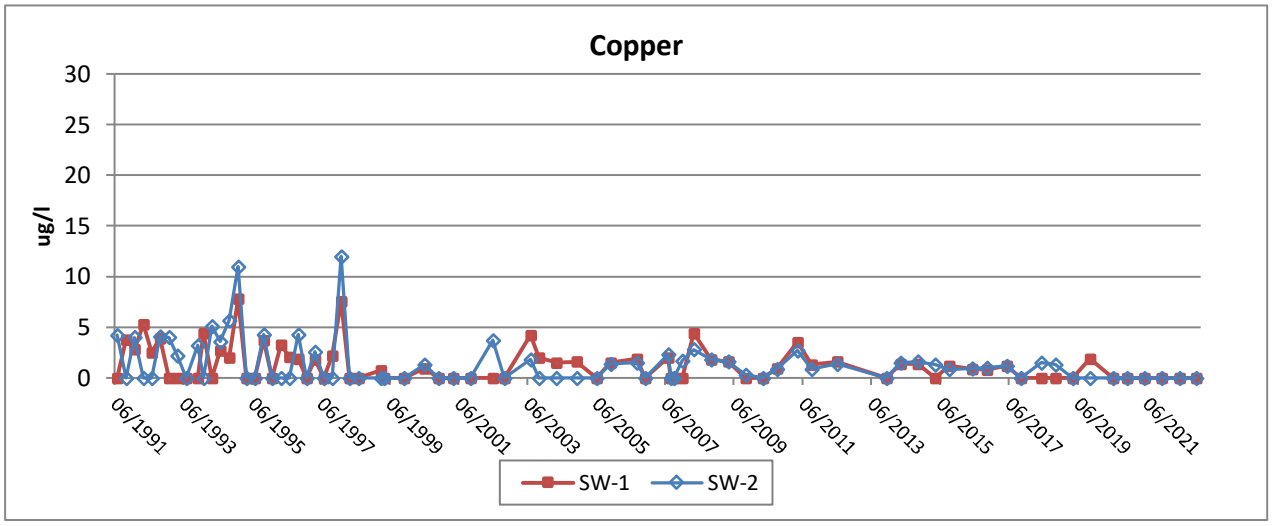
Attachment 3
Surface Water

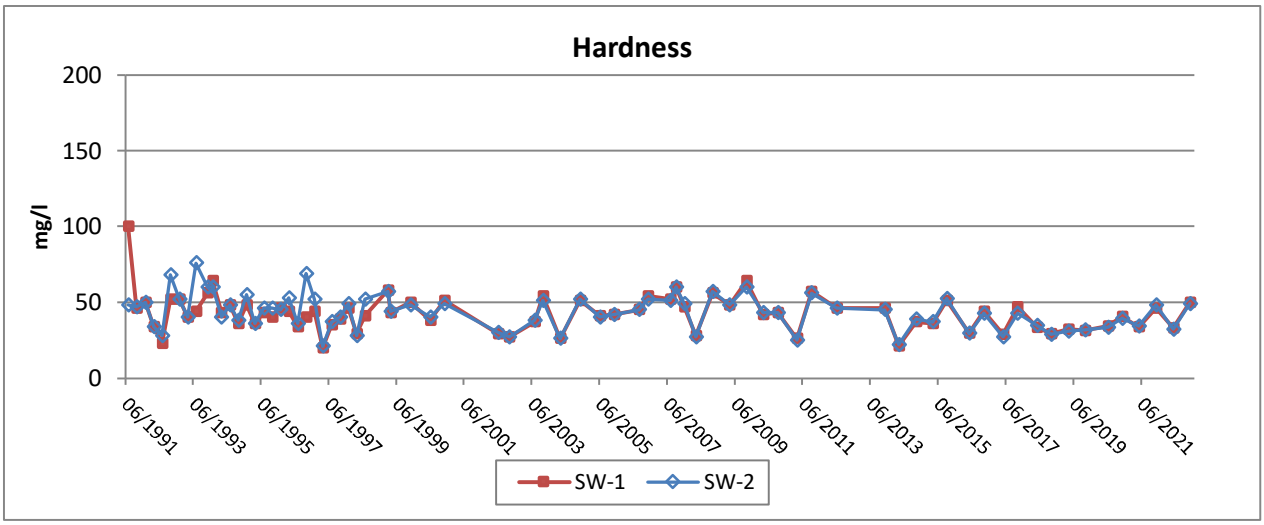
Trend Analysis
Trend Graphs
2022 Data

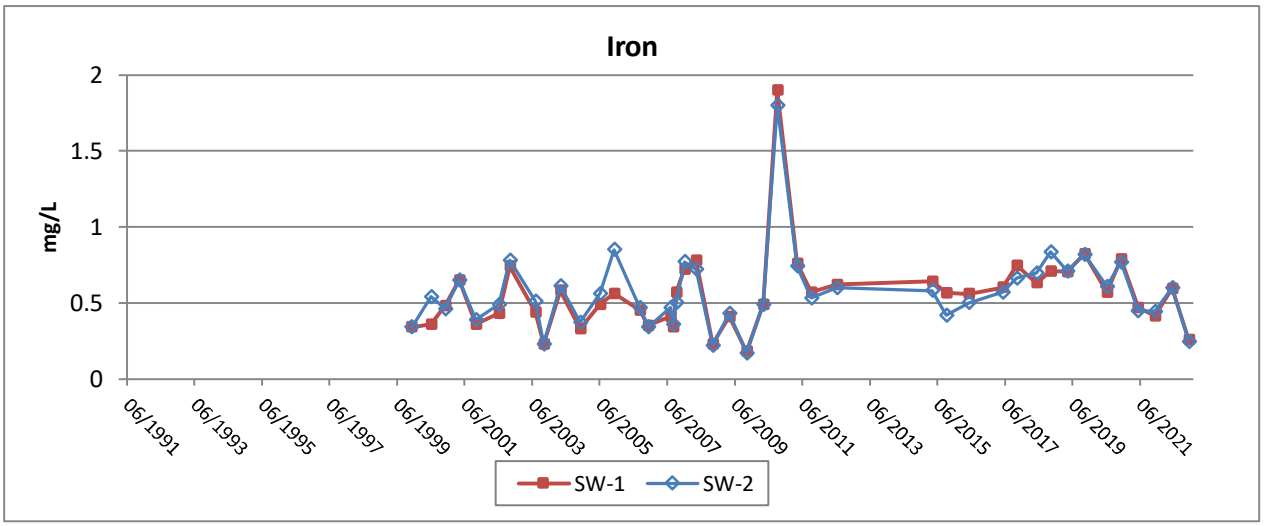
Trend Analysis Results - Surface Water
Year Ending 2022

	Conductivity (Field) (umhos/cm)	pH(Field) (su)	Copper	Hardness	Iron	Manganese	Zinc	Dissolved Oxygen	Redox Potential	Total Suspended Solids
SW-1										
Trend Results for Most Recent 5 Years										
Sample Size	8	7	10	10	10	10	10	6	7	10
Mann-Kendall S	4	-1	-3	23	-21	3	0	7	1	-24
p-Level	0.720	1.000	0.862	0.046	0.072	0.862	1.000	0.272	1.000	0.037
Trend										
Trend Results for All Data Since Oct. 1997										
Sample Size	51	50	53	50	43	40	51	24	16	27
Mann-Kendall S	-307	-68	-177	-136	217	-42	-128	78	-10	-66
p-Level	0.013	0.575	0.143	0.259	0.024	0.636	0.209	0.056	0.690	0.177
Trend										
SW-2										
Trend Results for Most Recent 5 Years										
Sample Size	8	7	10	10	10	10	10	6	7	10
Mann-Kendall S	4	-5	-17	23	-27	-11	-9	7	3	-11
p-Level	0.720	0.562	0.156	0.046	0.016	0.380	0.484	0.272	0.772	0.380
Trend										
Trend Results for All Data Since Oct. 1997										
Sample Size	51	50	53	50	43	40	51	24	16	27
Mann-Kendall S	-322	57	-9	-193	135	-97	-50	80	-30	-71
p-Level	0.009	0.639	0.947	0.108	0.161	0.265	0.634	0.050	0.194	0.146
Trend	-									

Notes: Overall increasing trend denoted by "+".
Overall decreasing trend denoted by "-"
All trend tests performed at a Type I (two-tailed) error rate of 0.01.





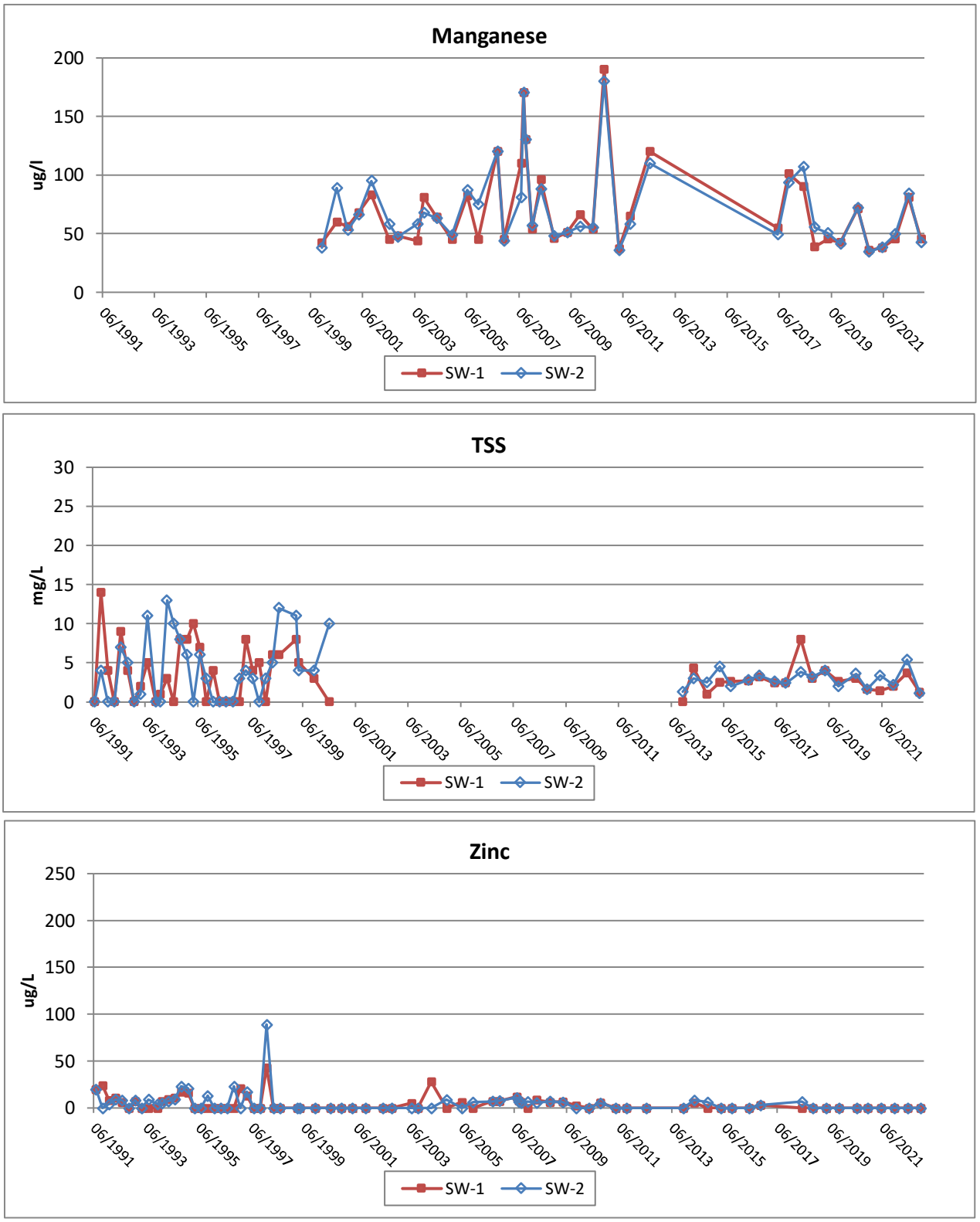


Foth

FLAMBEAU MINING COMPANY

Figure B-15a
Surface Water Trend Graphs
SW-1/SW-2

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

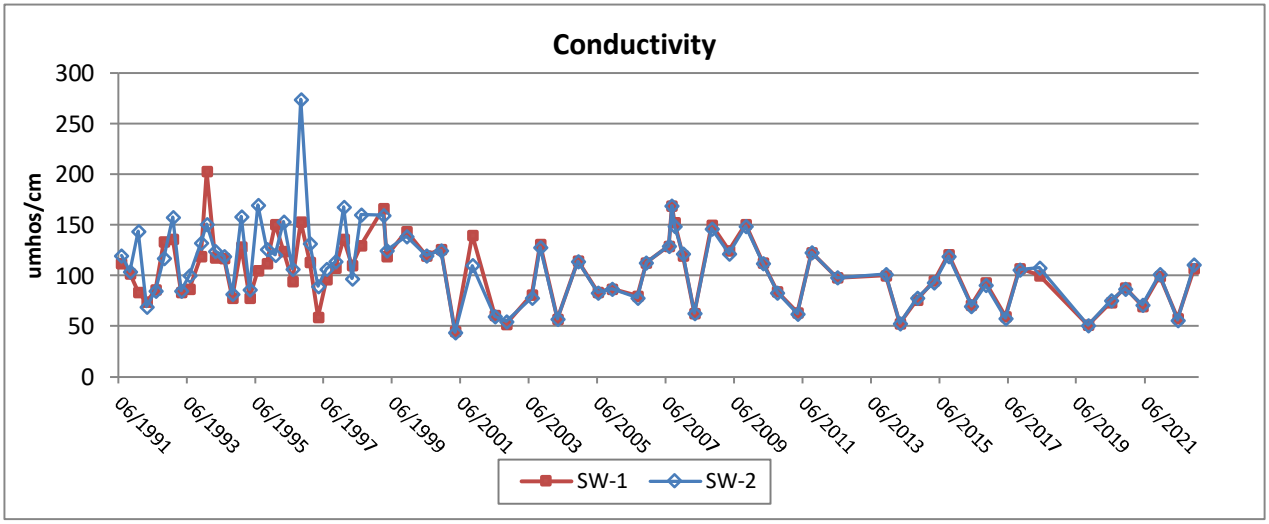


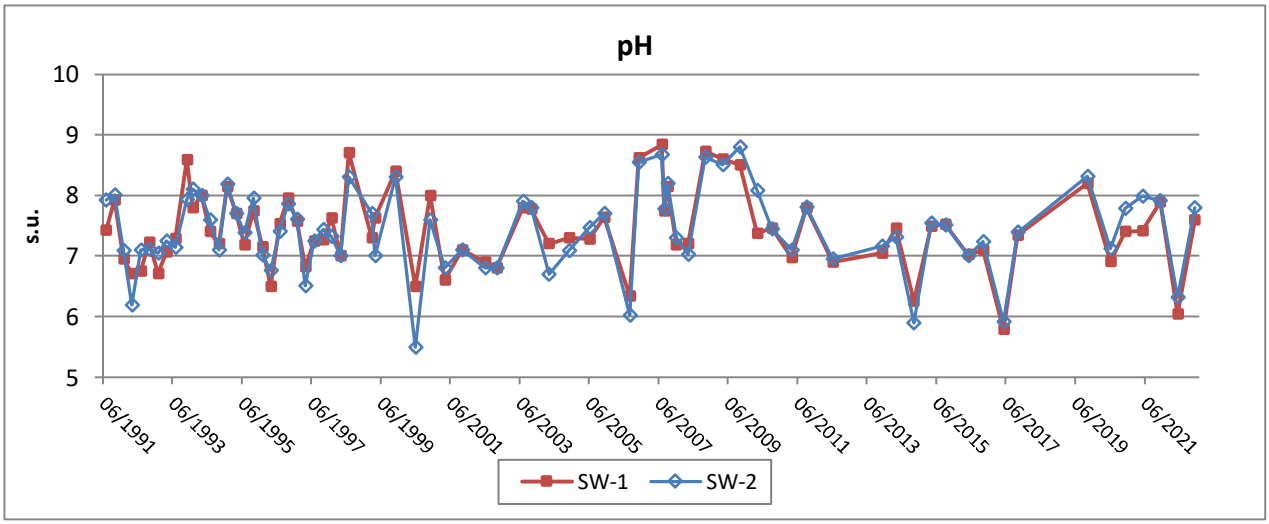
Foth

FLAMBEAU MINING COMPANY

Figure B-15b
Surface Water Trend Graphs
SW-1/SW-2

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22



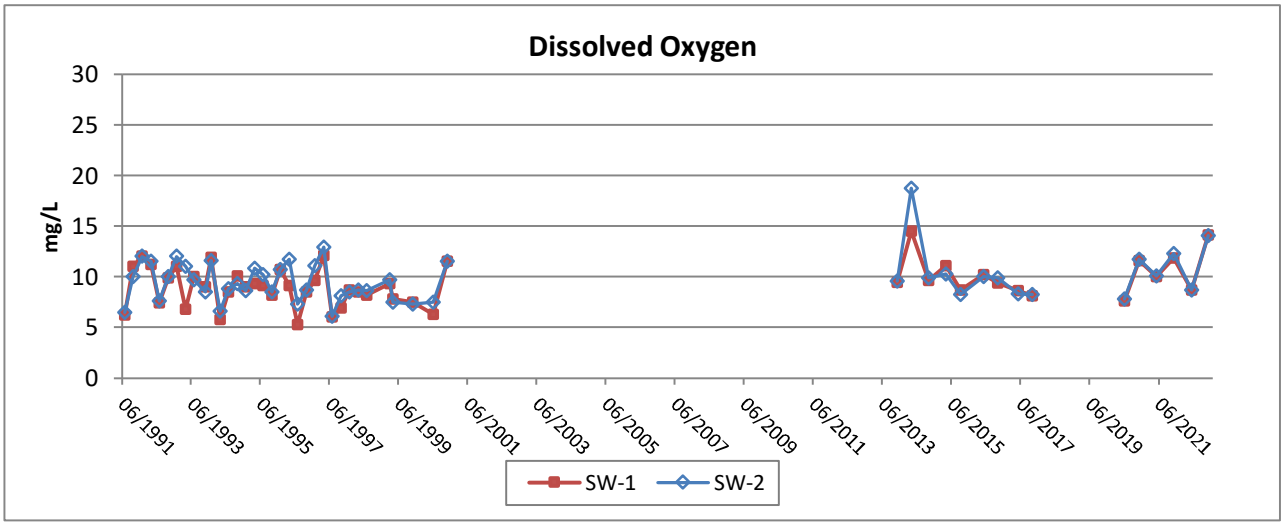


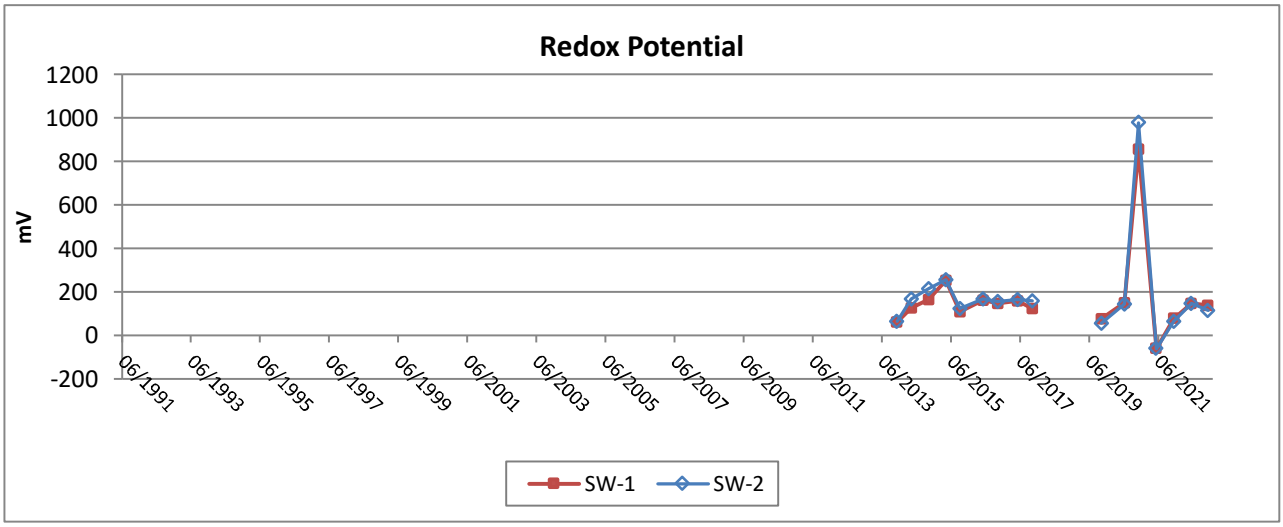
Foth

FLAMBEAU MINING COMPANY

Figure B-15c
Surface Water Trend Graphs
SW-1/SW-2

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





Foth

FLAMBEAU MINING COMPANY

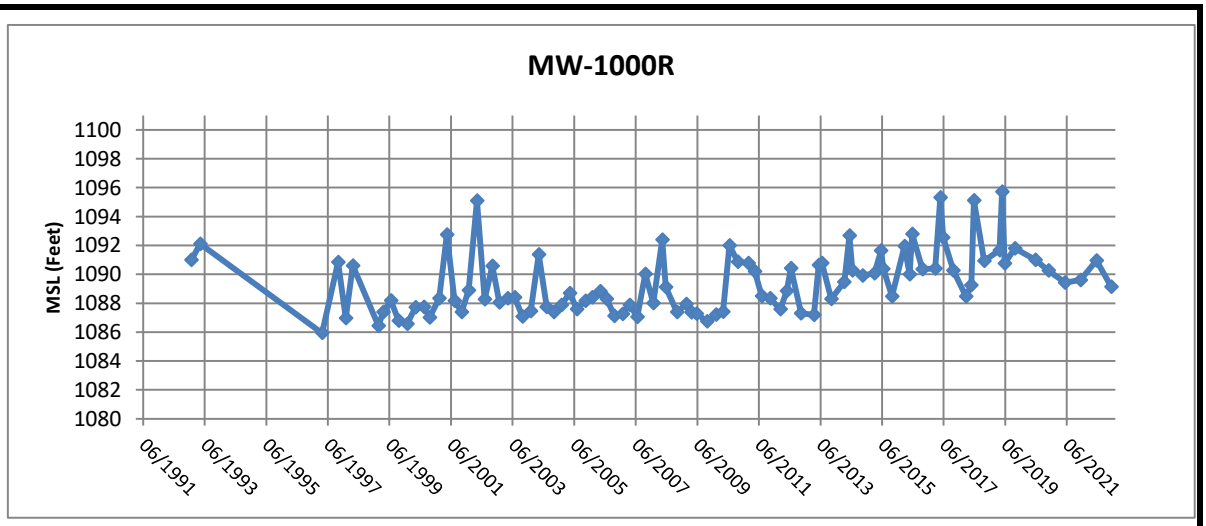
Figure B-15d
Surface Water Trend Graphs
SW-1/SW-2

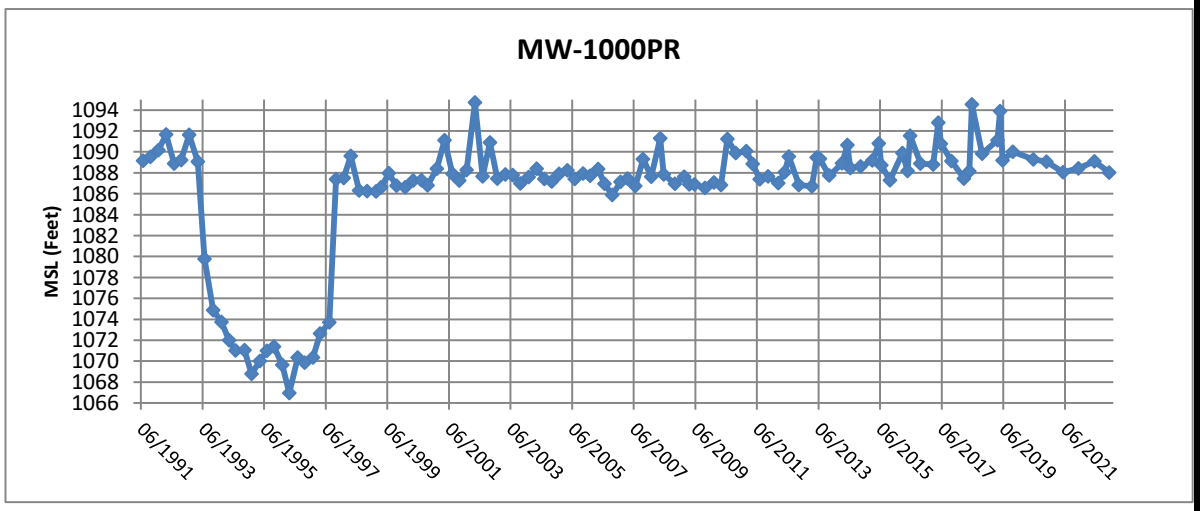
Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

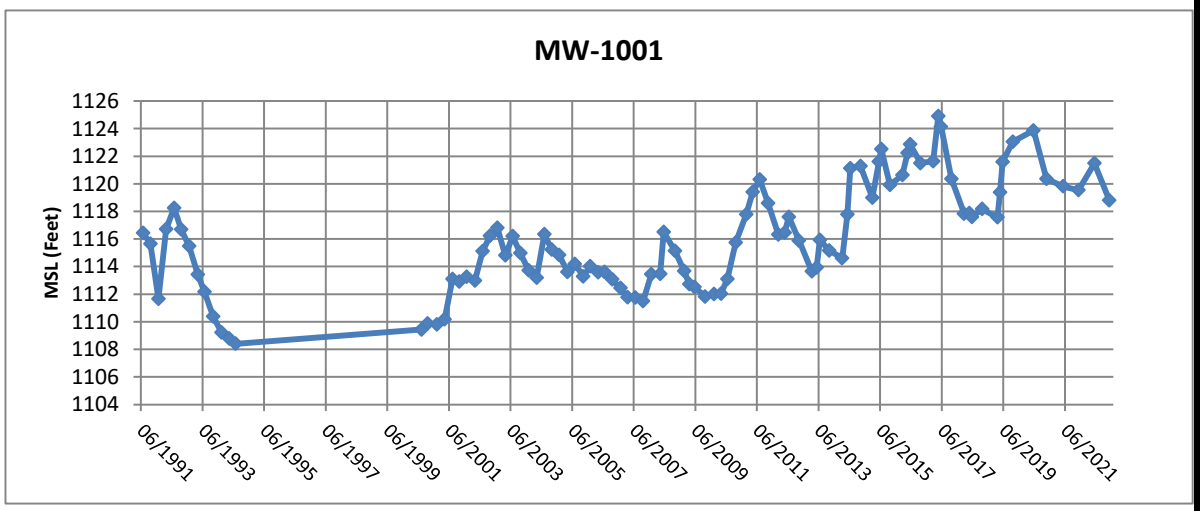
2022 Surface Water Results

Sample Date (yyyy-mm)	Location		Conductivity (Field) umhos/cm	pH (Field) s.u.	Copper ug/l	Hardness mg/l	Iron mg/l	Manganese ug/l	Zinc ug/l	Dissolved Oxygen mg/l	Redox Potential mV	Total Suspended Solids mg/l
2022-05	SW-1		58	6.04	< 1.9	32.9	0.594	80.7	< 10.3	8.67	146.5	3.7
2022-05	SW-1	Dup.			< 1.9	32.6	0.587	81.2	< 10.3			3.9
2022-05	SW-2		56	6.32	< 1.9	32.2	0.598	84.2	< 10.3	8.7	145.3	5.4
2022-11	SW-1		107	7.59	< 1.9	49.7	0.256	45.7	< 10.3	14.14	137.9	1.2
2022-11	SW-1	Dup.			< 1.9	48.3	0.25	45.6	< 10.3			1.4
2022-11	SW-2		111	7.80	< 1.9	48.9	0.247	42.4	< 10.3	14.05	113.1	1.1

Attachment 4
Hydrographs and Groundwater Elevation Data







Foth

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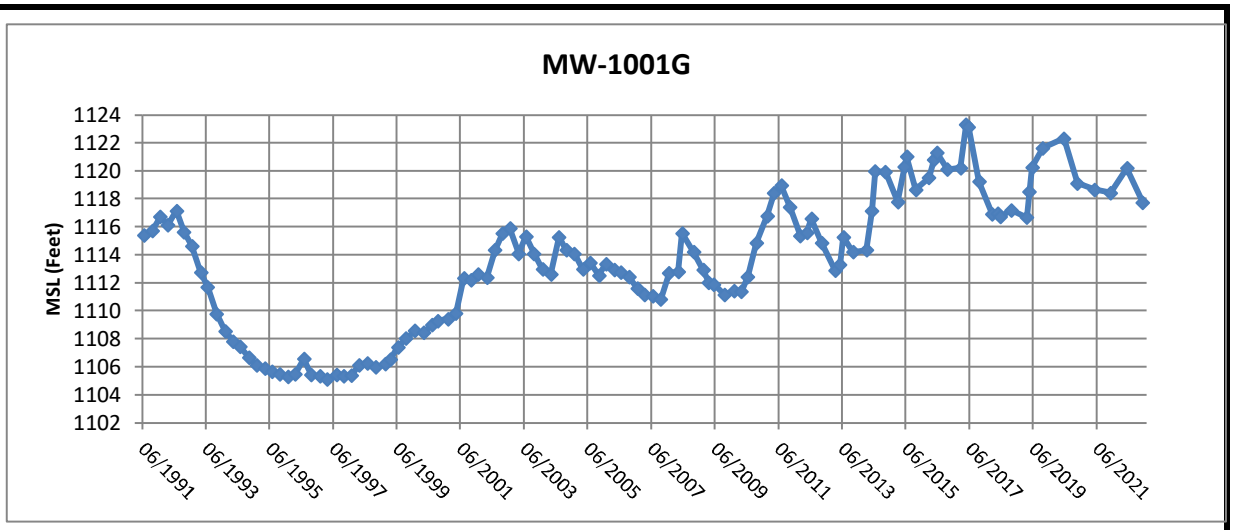
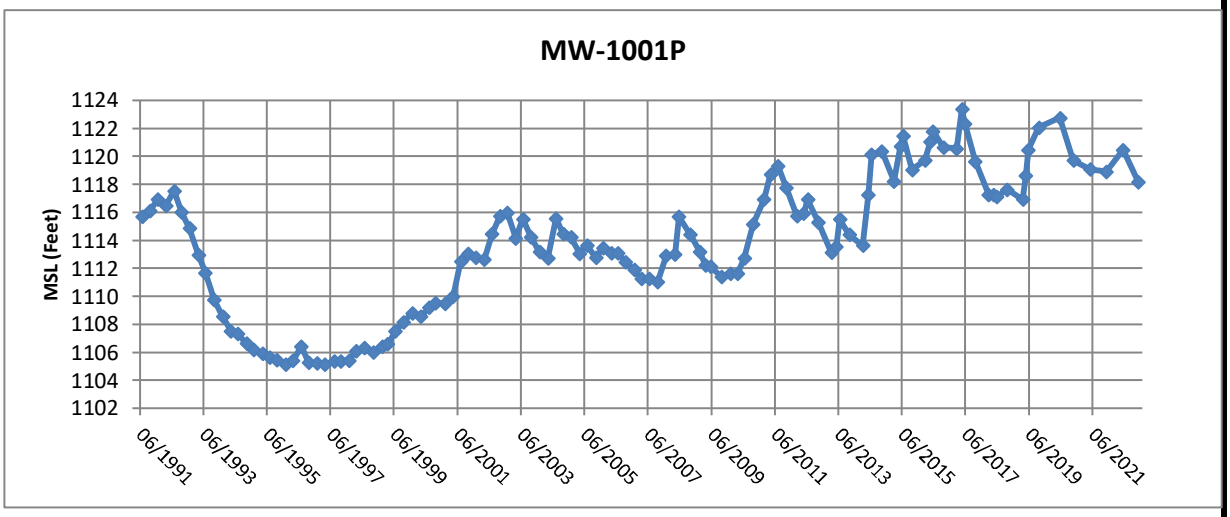
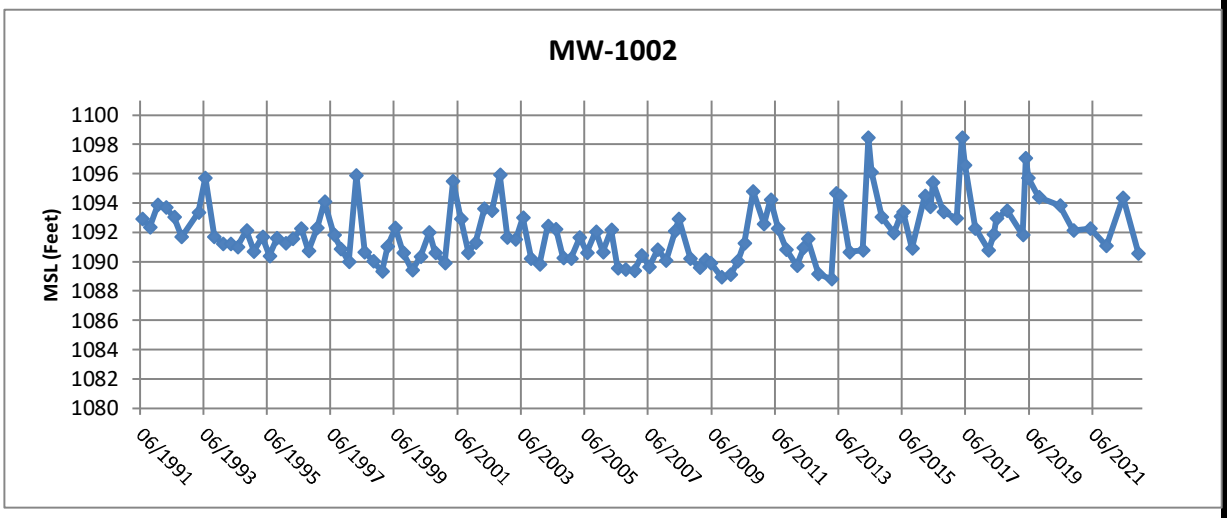
Figure B-16a
Hydrographs

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





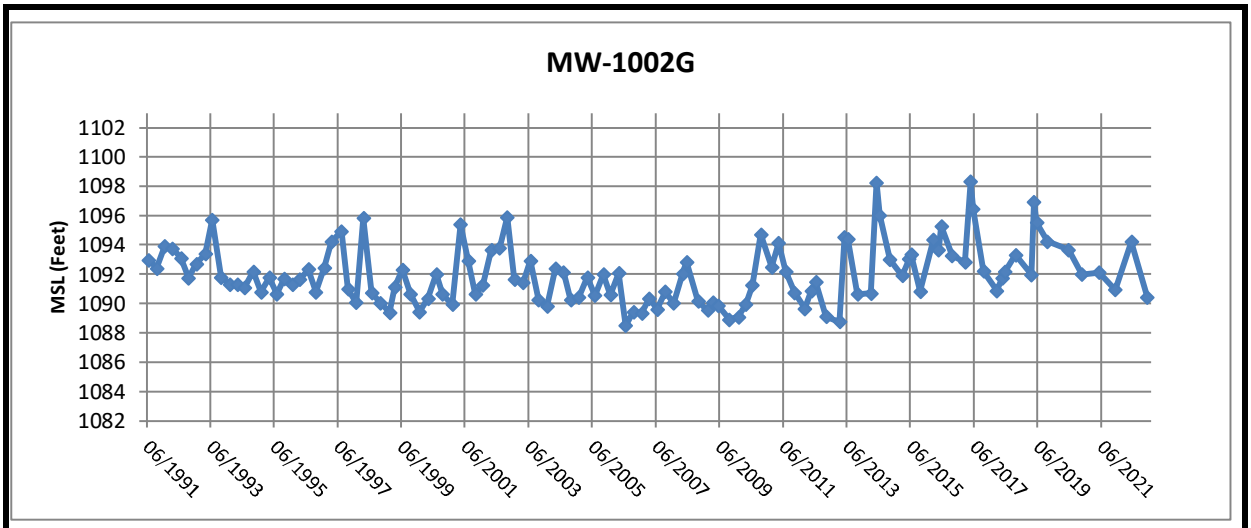


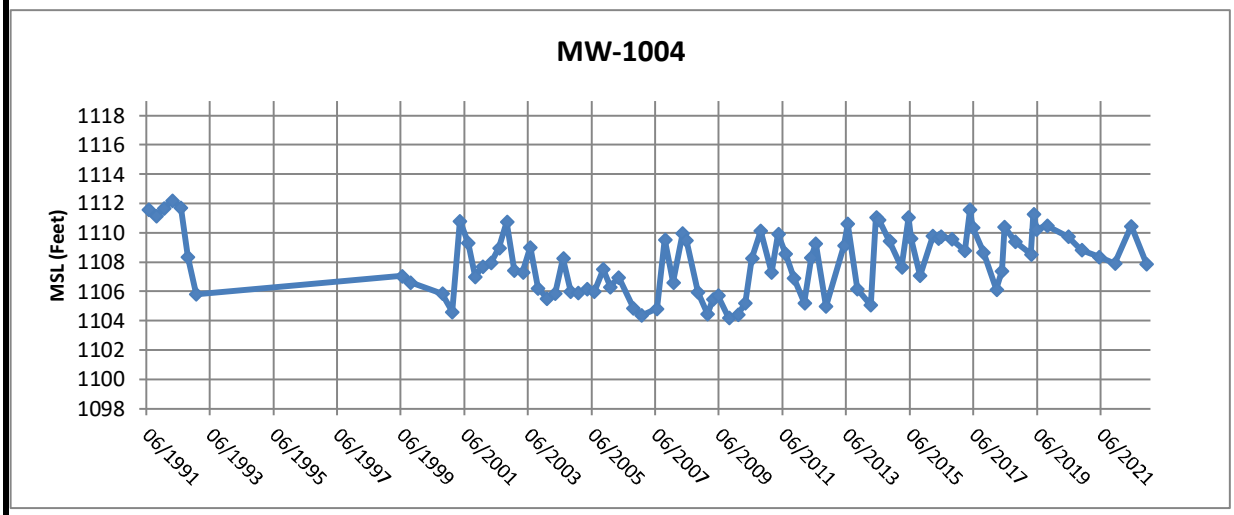
Foth

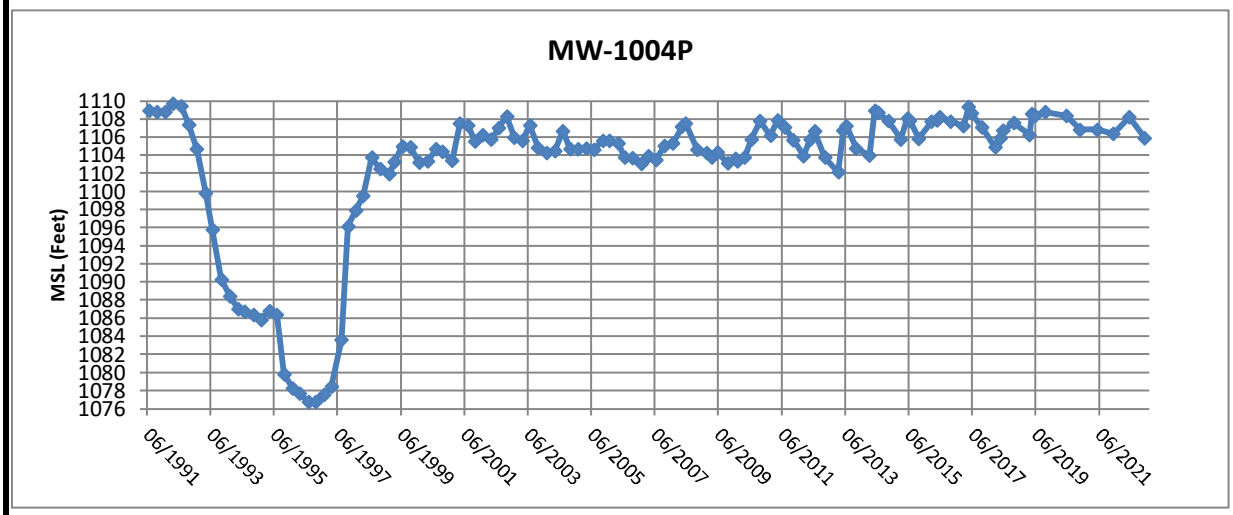
FLAMBEAU MINING COMPANY

Figure B-16b
Hydrographs

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





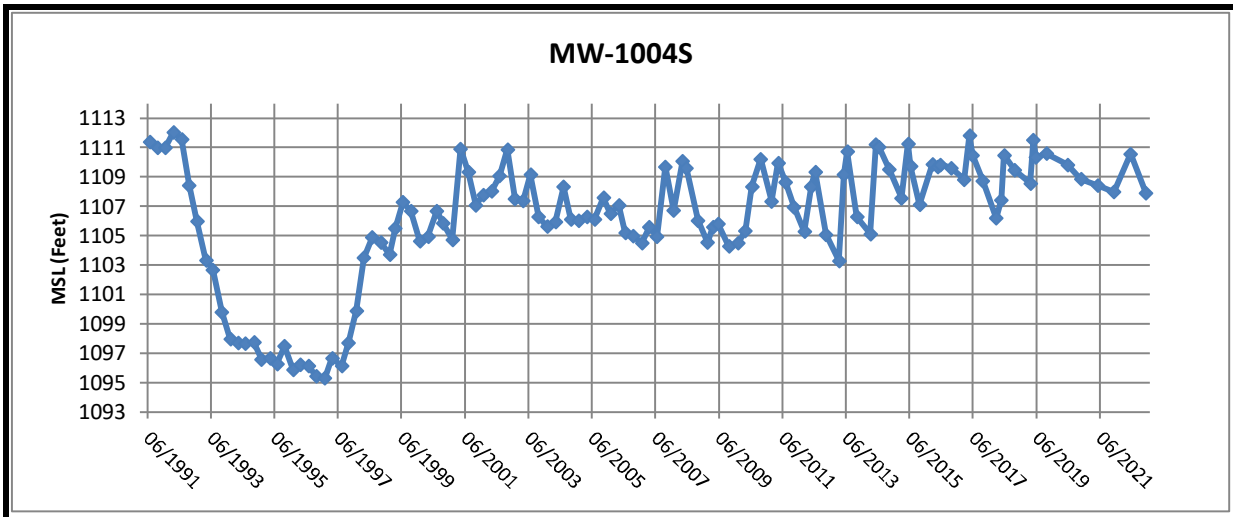


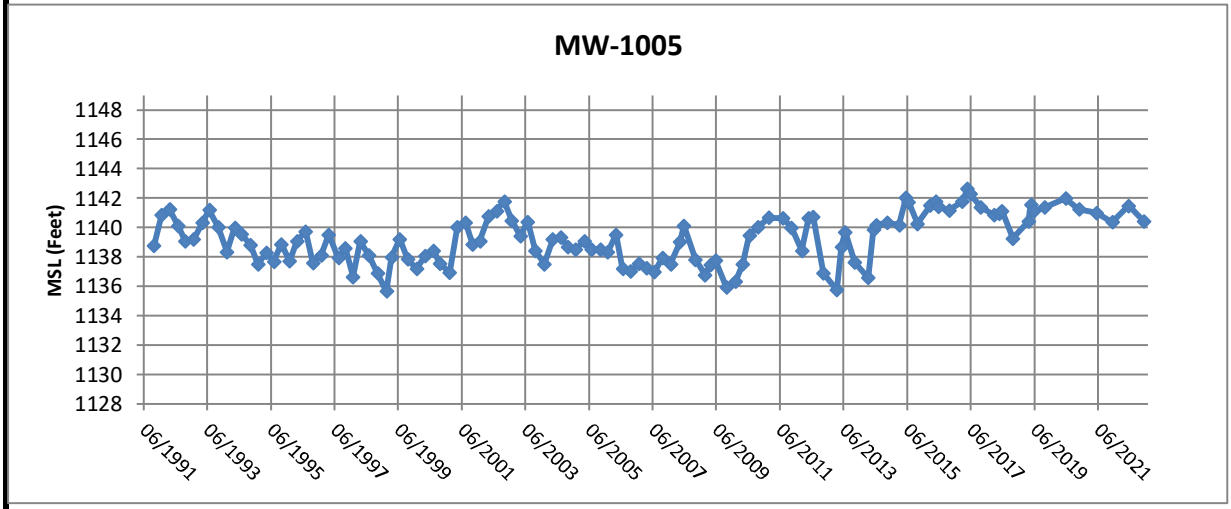
Foth

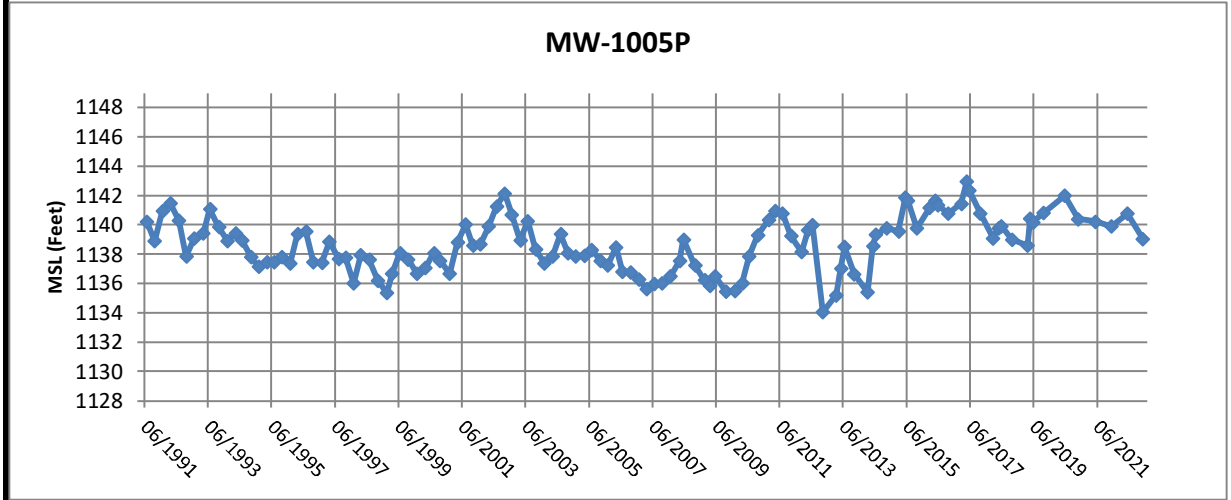
FLAMBEAU MINING COMPANY

Figure B-16c
Hydrographs

Scale: NA	Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





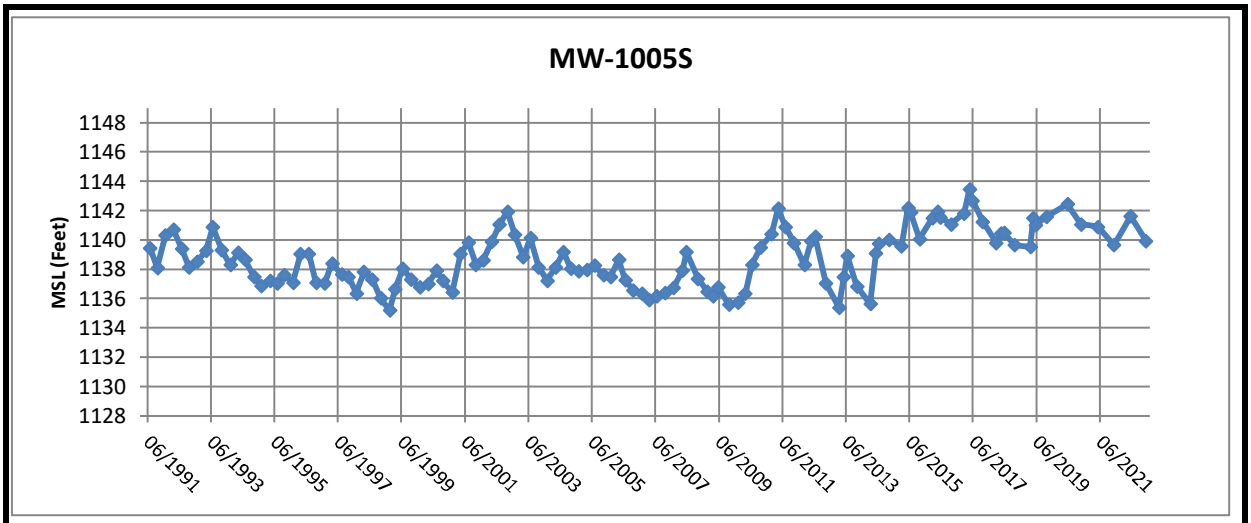


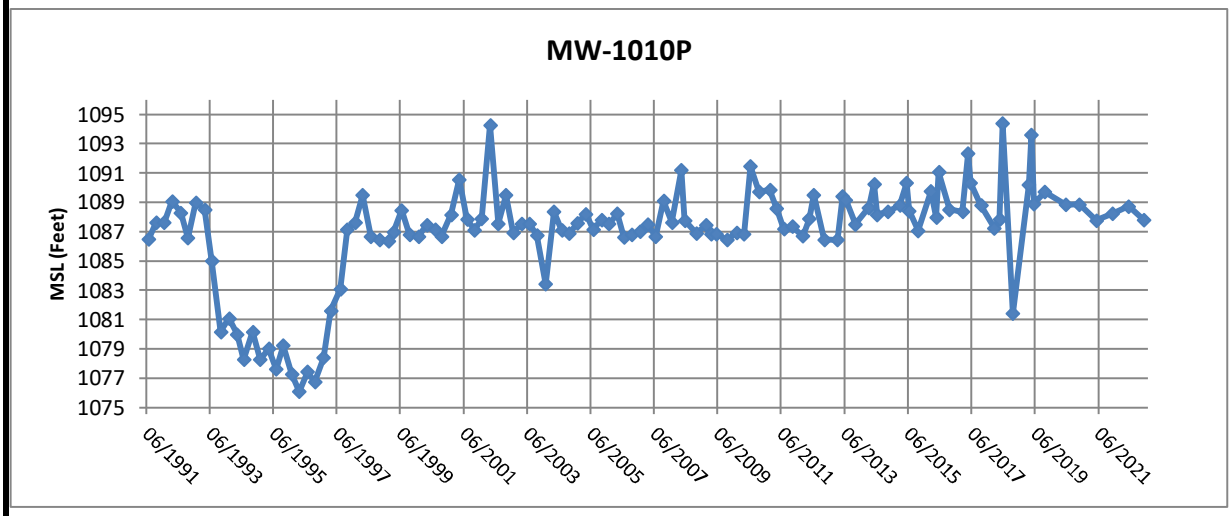
Foth

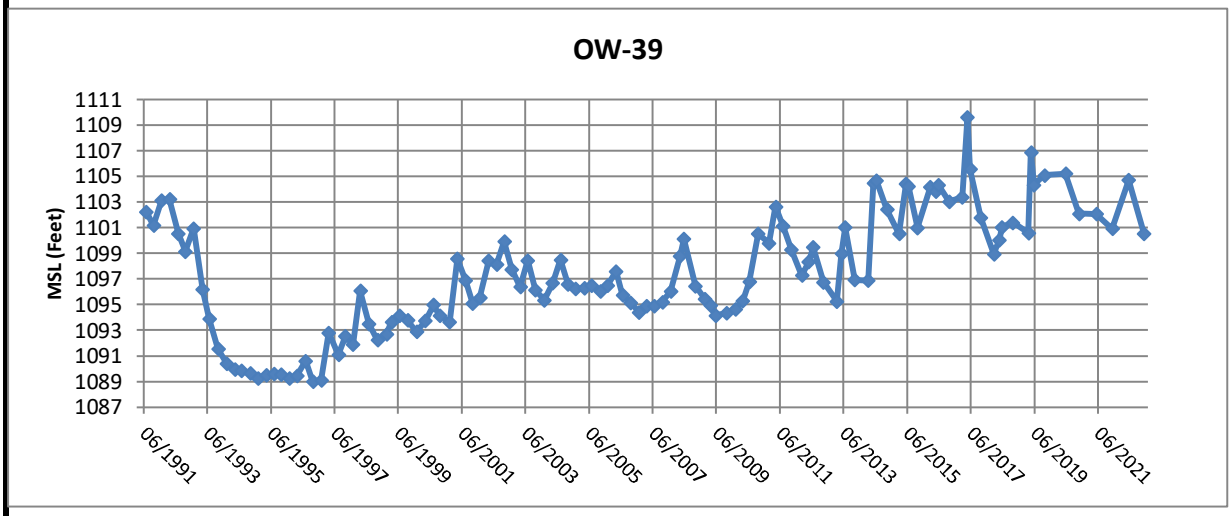
FLAMBEAU MINING COMPANY

Figure B-16d
Hydrographs

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





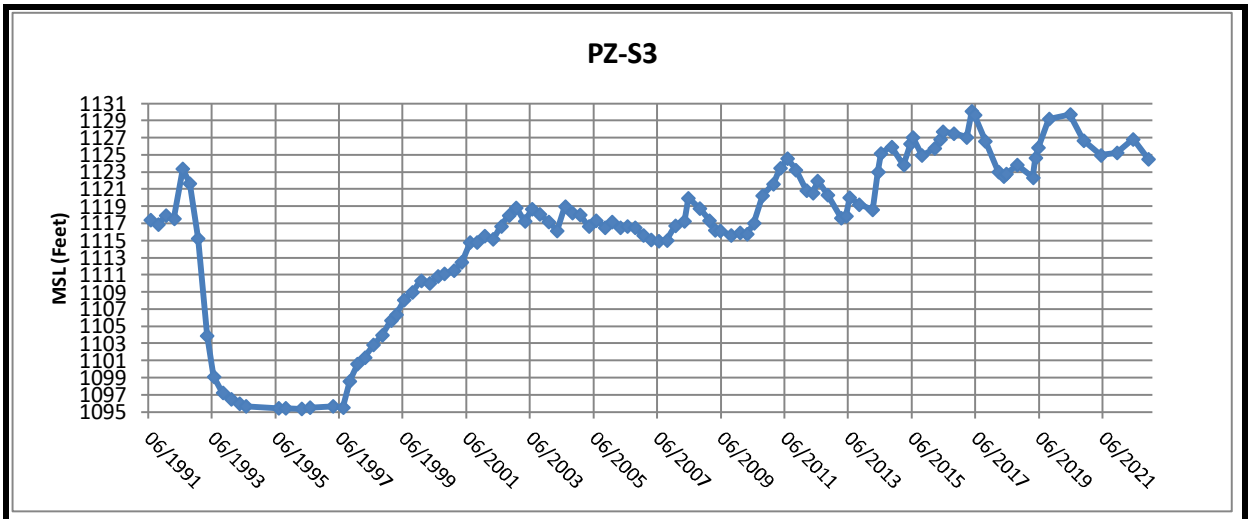


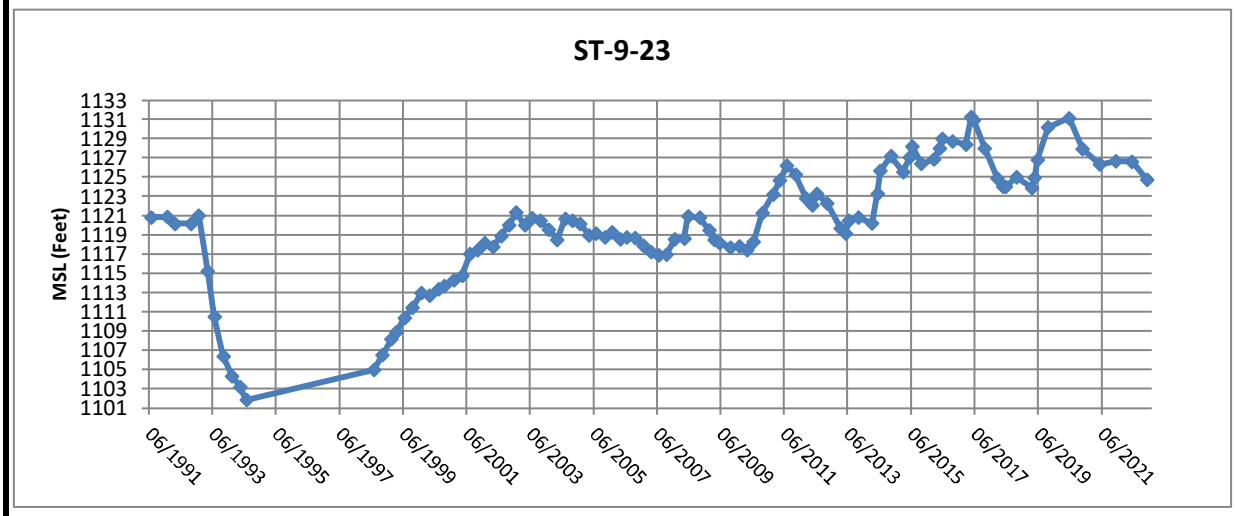
Foth

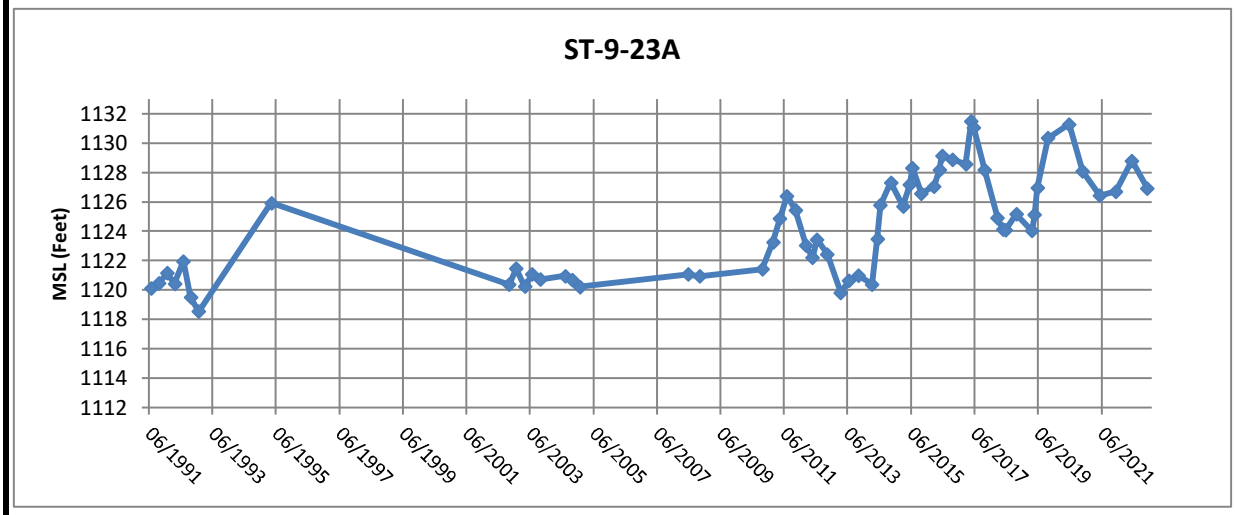
FLAMBEAU MINING COMPANY

Figure B-16e
Hydrographs

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





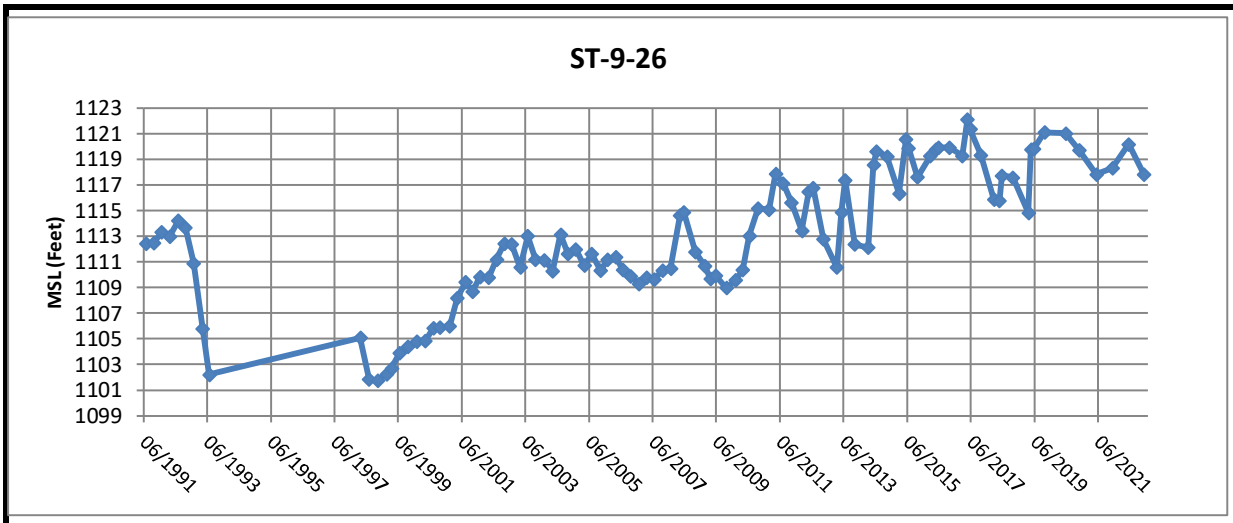


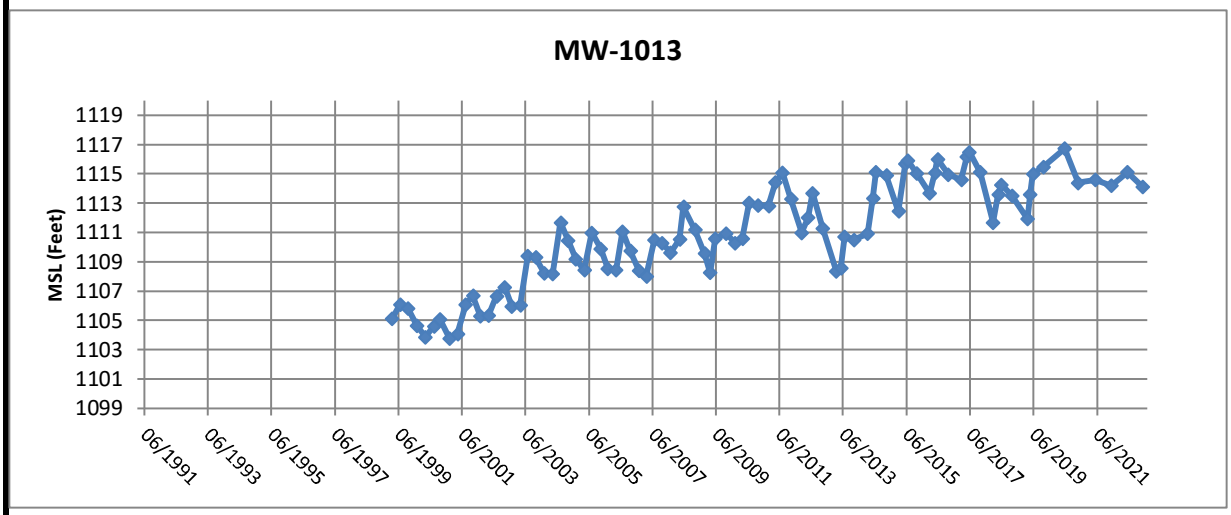
Foth

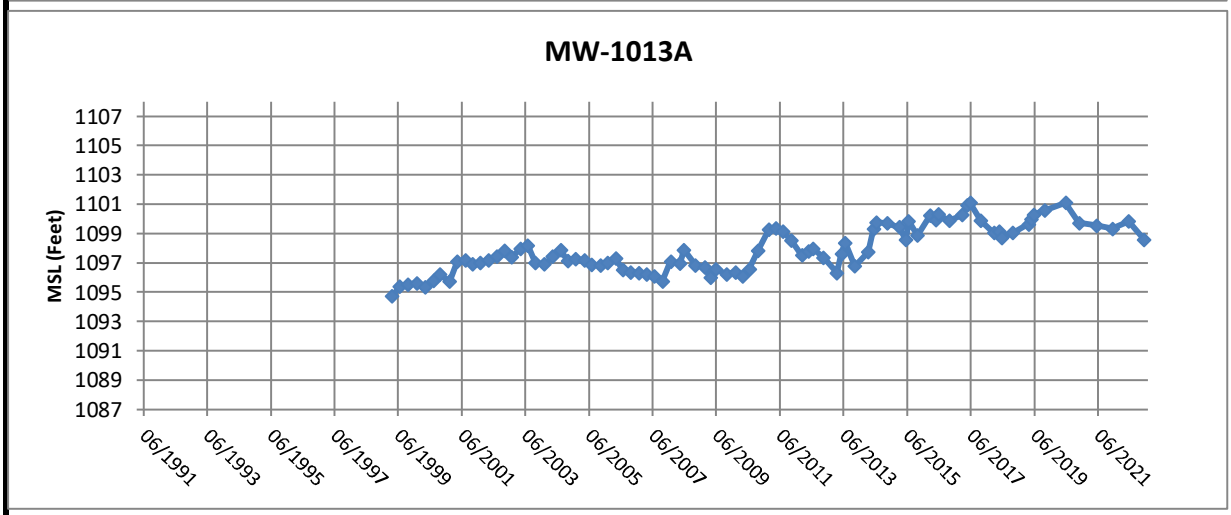
FLAMBEAU MINING COMPANY

Figure B-16f
Hydrographs

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





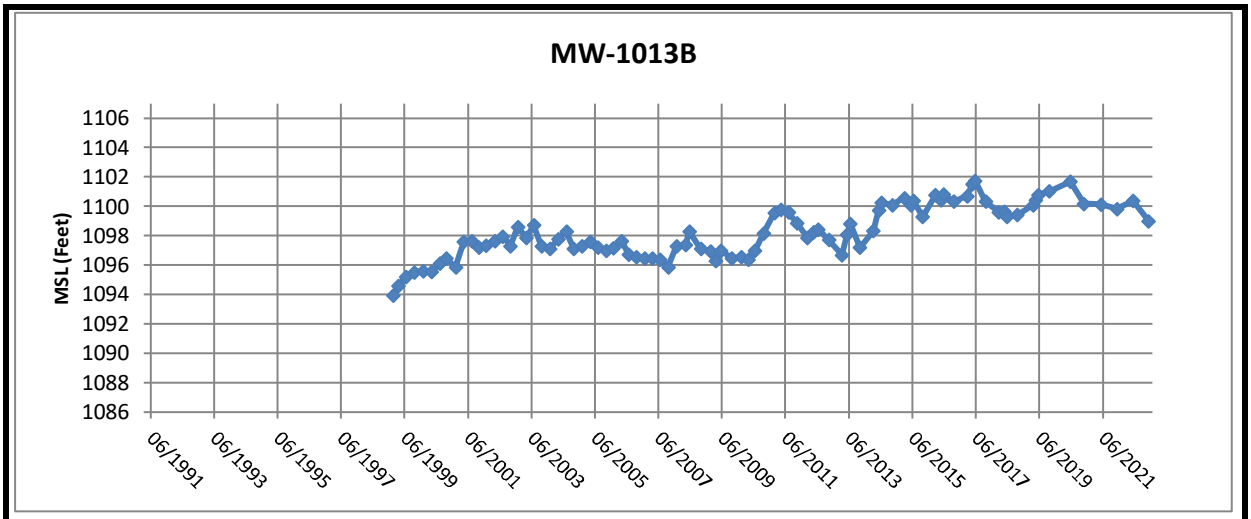


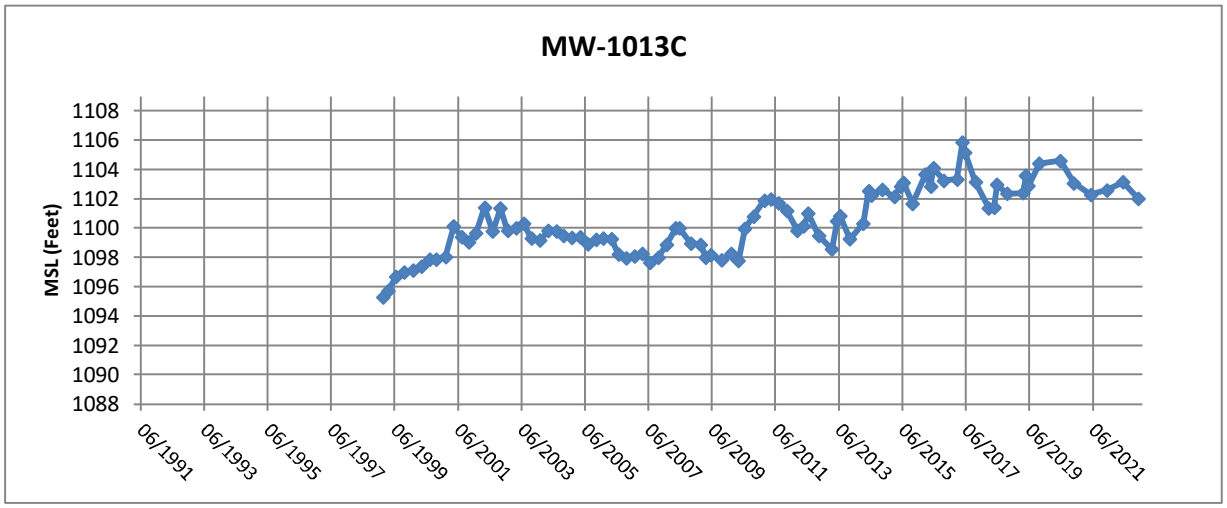
Foth

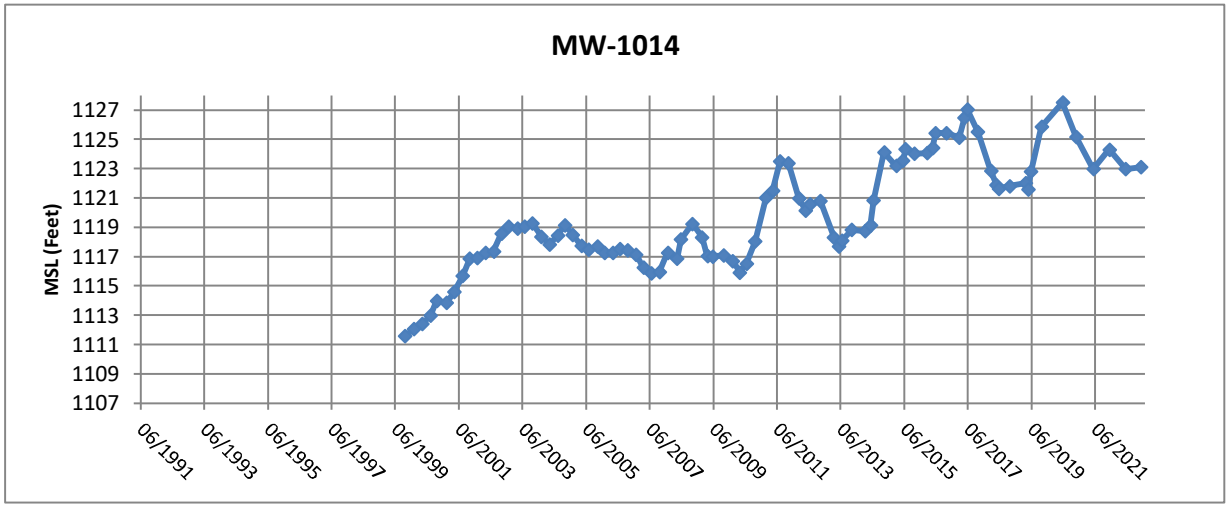
FLAMBEAU MINING COMPANY

Figure B-16g
Hydrographs

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





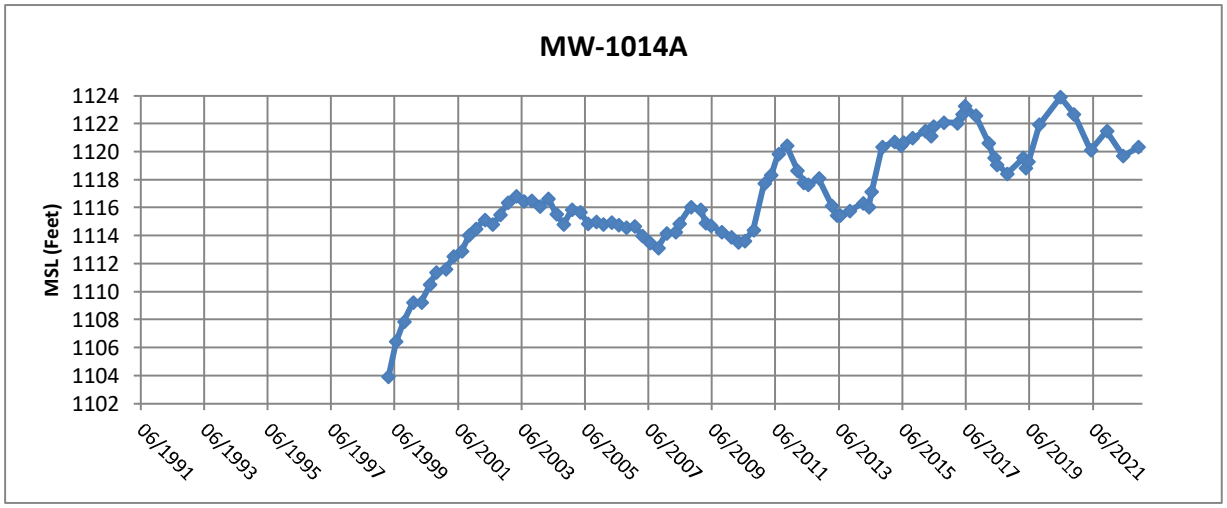


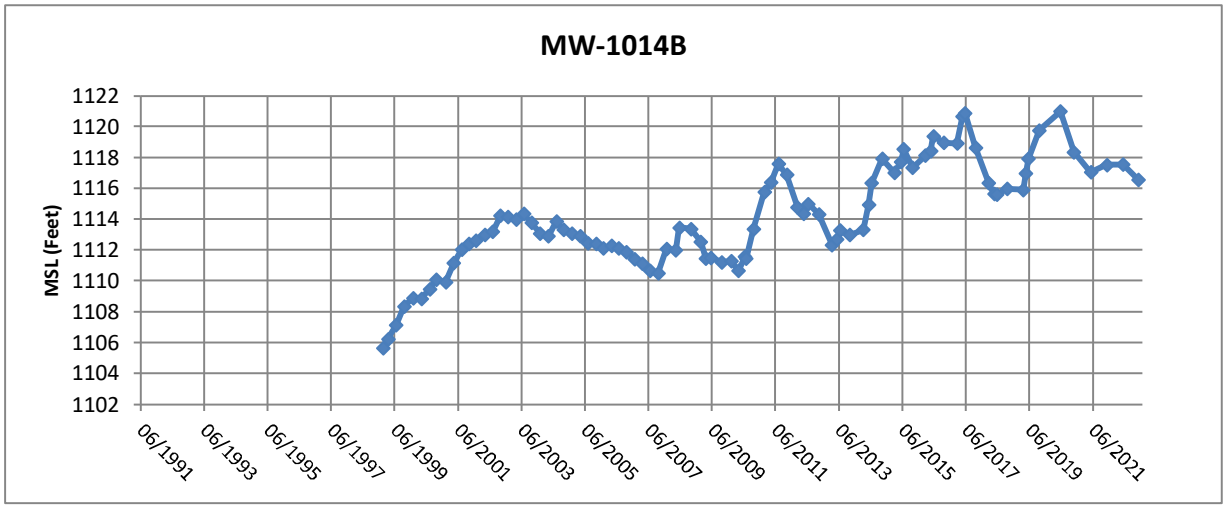
Foth

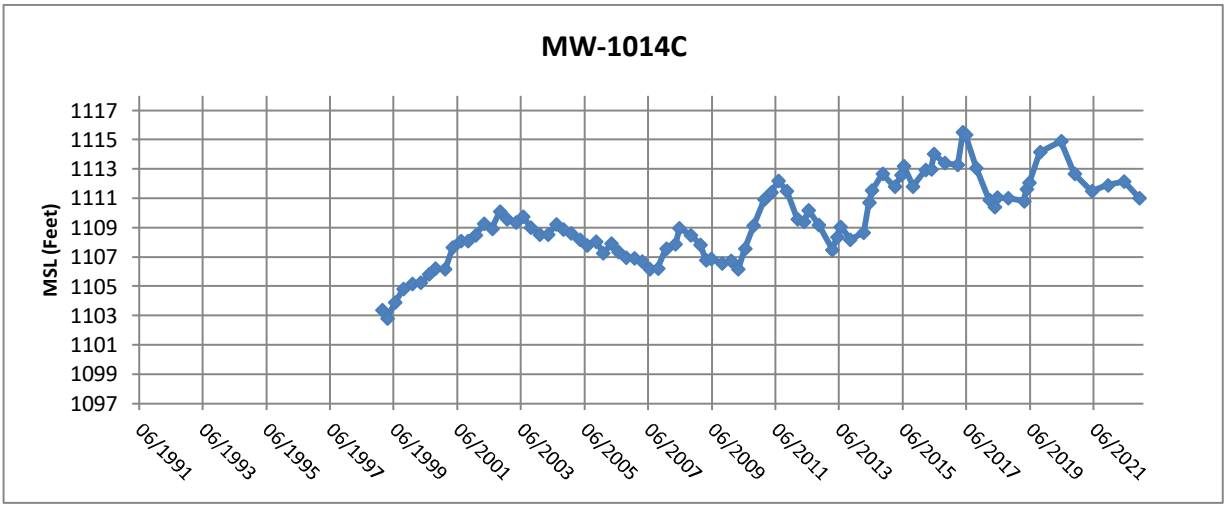
FLAMBEAU MINING COMPANY

Figure B-16h
Hydrographs

Scale: NA		Date: January 2023
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





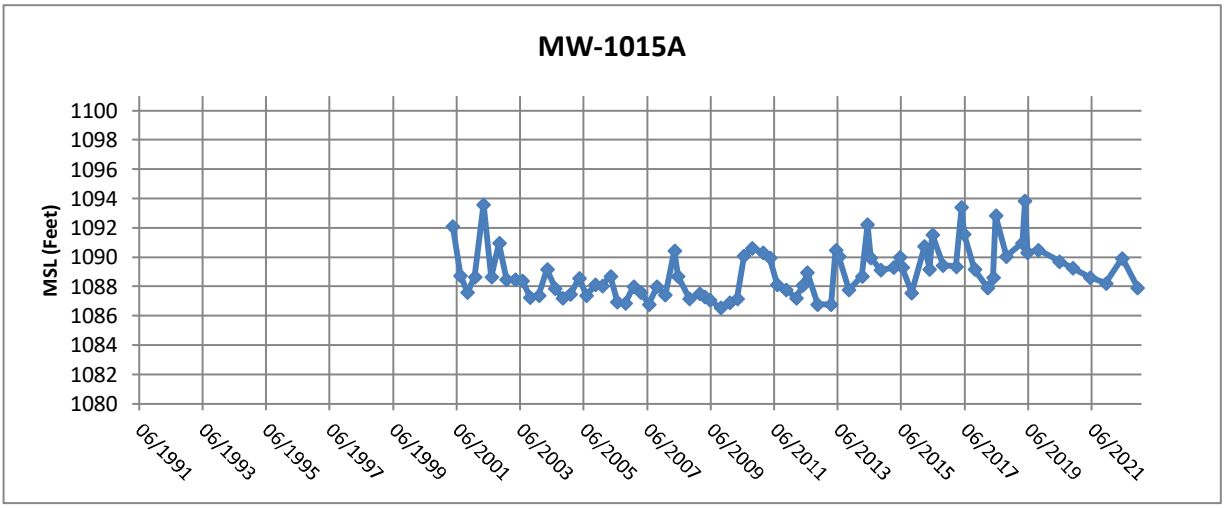


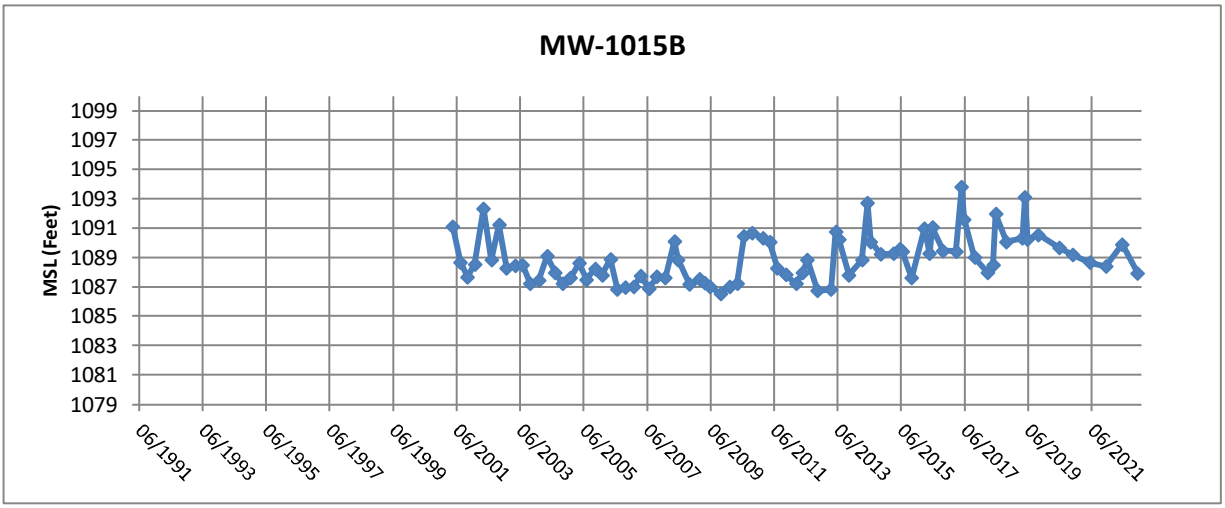
Foth

FLAMBEAU MINING COMPANY

Figure B-16i
Hydrographs

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22





Foth

FLAMBEAU MINING COMPANY

Figure B-16j
Hydrographs

Scale: NA	Date: January 2023	
Prepared By: SGL	Checked By: SVF	Project: 17F777.22

2022 Groundwater Elevation Results

Location	Sample Date	Elevation Ft. (MSL)		Sample Date	Elevation Ft. (MSL)
MW-1000PR	5/24/2022	1089.08		11/16/2022	1088.02
MW-1000R	5/24/2022	1090.96		11/16/2022	1089.15
MW-1001	5/24/2022	1121.49		11/16/2022	1118.80
MW-1001G	5/24/2022	1120.19		11/16/2022	1117.74
MW-1001P	5/24/2022	1120.47		11/16/2022	1118.15
MW-1002	5/24/2022	1094.38		11/16/2022	1090.57
MW-1002G	5/24/2022	1094.21		11/16/2022	1090.43
MW-1004	5/24/2022	1110.45		11/16/2022	1107.86
MW-1004P	5/24/2022	1108.19		11/16/2022	1105.89
MW-1004S	5/24/2022	1110.56		11/16/2022	1107.88
MW-1005	5/24/2022	1141.48		11/16/2022	1140.42
MW-1005P	5/24/2022	1140.77		11/16/2022	1139.05
MW-1005S	5/24/2022	1141.62		11/16/2022	1139.93
MW-1010P	5/24/2022	1088.72		11/16/2022	1087.78
MW-1013	5/24/2022	1115.12		11/16/2022	1114.10
MW-1013A	5/24/2022	1099.84		11/16/2022	1098.59
MW-1013B	5/24/2022	1100.37		11/16/2022	1099.00
MW-1013C	5/24/2022	1103.13		11/16/2022	1101.98
MW-1014	5/24/2022	1122.97		11/16/2022	1123.09
MW-1014A	5/24/2022	1119.70		11/16/2022	1120.32
MW-1014B	5/24/2022	1117.54		11/16/2022	1116.54
MW-1014C	5/24/2022	1112.14		11/16/2022	1111.02
MW-1015A	5/24/2022	1089.92		11/16/2022	1087.91
MW-1015B	5/24/2022	1089.89		11/16/2022	1087.93
OW-39	5/24/2022	1104.72		11/16/2022	1100.52
PZ-S3	5/24/2022	1126.84		11/16/2022	1124.49
ST-9-23	5/24/2022	1126.62		11/16/2022	1124.71
ST-9-23A	5/24/2022	1128.80		11/16/2022	1126.92
ST-9-26	5/24/2022	1120.18		11/16/2022	1117.80

Attachment B
SW-3 2022 Data Table

SW-3 2022 Data Table
Flambeau Mining Company

Date	Analyte	Conductivity	Dissolved Oxygen	pH	Redox Potential	Copper	Hardness	Iron	Manganese	Total Suspended Solids	Zinc
	Units	umhos/cm	mg/l	s.u.	mV	ug/l	mg/l	mg/l	ug/l	mg/l	ug/l
	Location	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
5/24/2022		57.0	8.63	5.71	123.7	<1.9	32.7	0.587	81.1	3.9	<10.3
11/16/2022		109.0	13.99	7.59	135.3	<1.9	48.1	0.249 J	42.5	1.2	<10.3

Prepared by: NMG1
Checked by: SVF

mg/l - milligrams per liter
mV = millivolts
s.u. = standard units
ug/l = micrograms per liter
umhos/cm - micromohs per centimeter
NA = Not Analyzed
J = Estimated concentration at or above the Limit of Detection and below the Limit of Quantitation.