REPORT

ALTERNATE SOURCE DEMONSTRATION

J.B. Sims Generating Station - Unit 3 Impoundments

Submitted to:

Grand Haven Board of Light and Power

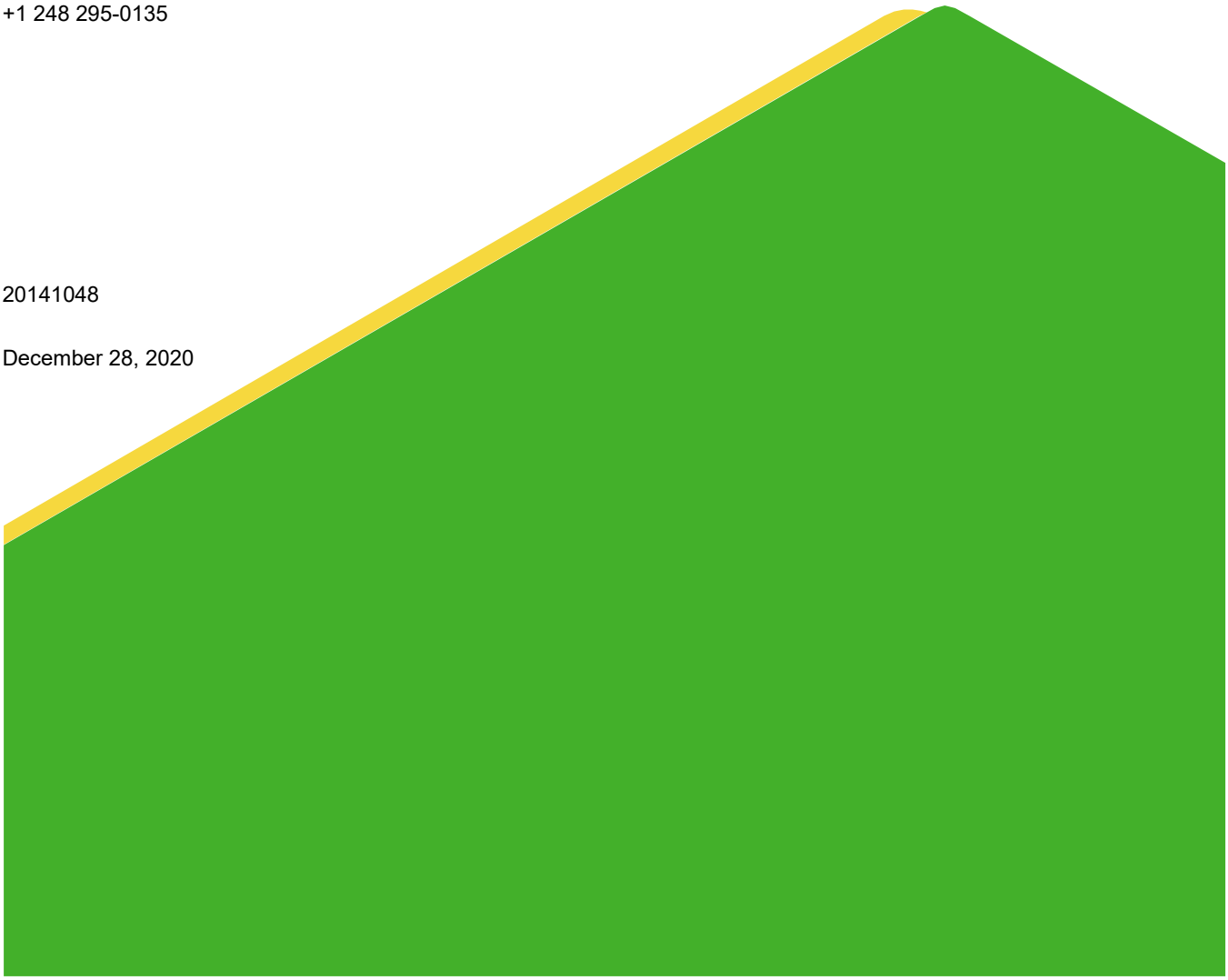
J.B. Sims Generating Station
1700 Eaton Drive
Grand Haven, Michigan 48417

Submitted by:

Golder Associates Inc.

27200 Haggerty Road, Suite B-12 Farmington Hills, Michigan, USA 48331-5719

+1 248 295-0135



20141048

December 28, 2020

Distribution List

JB Sims Operating Record

Grand Haven Board of Light and Power

Michigan Department of Environment, Great Lakes, and Energy

United States Environmental Protection Agency

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Certification

This *Alternate Source Demonstration, J.B. Sims Generating Station Unit 3 Impoundments*, Grand Haven, Ottawa County, Michigan, has been prepared in compliance with applicable United States Environmental Protection Agency (USEPA) coal combustion residual (CCR) rule (40 Code of Federal Regulations [CFR] 257 Subpart D; published in 80 FR 21302-21501, April 17, 2015) under the direction of a licensed professional engineer with Golder Associates Inc.

I hereby certify that this *Alternate Source Demonstration, J.B. Sims Generating Station Unit 3 Impoundments*, located at 1232 North Third Street, Grand Haven, Ottawa County, Michigan 49417 has been prepared to meet the requirements of 40 CFR § 257.95(g)(3)(ii).

Golder Associates Inc.

Dawn L. Prell, C.P.G.
Senior Hydrogeologist

STATE OF MICHIGAN
TIFFANY D. JOHNSON
ENGINEER NO. 49160
LICENSED PROFESSIONAL ENGINEER

Tiffany D. Johnson, P.E.
Michigan Professional Engineer No. 6201049160
12/28/20

1.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule (40 Code of Federal Regulations [CFR] 257 Subpart D; published in 80 FR 21302-21501, April 17, 2015) (CCR Rule or The Rule) as well as State of Michigan enacted Public Act No. 640 of 2018 (PA 640) to amend the Natural Resources and Environmental Protection Act, also known as Part 115 of PA 451 of 1994, as amended (Part 115 amendment), this *Alternate Source Demonstration* (ASD) for Unit 3 East(A) and West(B) Bottom Ash Impoundments (Unit 3 Impoundments) at J.B. Sims Generating Station (JB Sims) has been prepared to document an alternate source for Statistically Significant Levels (SSLs) calculated for groundwater at JB Sims Unit 3 Impoundments during assessment monitoring. This document satisfies the requirements of the CCR Rule and Part 115 Amendment which allows the owner or operator to demonstrate that a source other than the CCR Unit has caused an SSL and that the SSL was the result of an alternate source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

As documented by this report, the SSLs for chromium, cobalt, fluoride, lead, and lithium are attributed to the existing, historical ash material that was used as fill, or municipal solid waste (MSW) in the subsurface beneath the constructed surface impoundments for Unit 3 and are not caused by a release from the Unit 3 impoundment.

2.0 SITE DESCRIPTION AND BACKGROUND

JB Sims is a retired coal-fired power generating facility located on the southwestern portion of Harbor Island in Grand Haven, Michigan, and is owned by the Grand Haven Board of Light and Power (GHBLP). JB Sims is situated on Harbor Island with the Grand River and South Channel of the Grand River surrounding the island. The flow of the Grand River and South Channel of the Grand River flow is a south-westerly direction towards Lake Michigan, which is about one mile west of the site. Figure 1, Site Location Map, depicts the location of the Plant relative to the surrounding area.

2.1 CCR Units

Unit 3A/B - CCR was placed into the Unit 3 Impoundments located onsite (see Figure 2, Monitoring Well Location Map). The Unit 3 Impoundments were located adjacent to each other and are formed by clay embankments with a common clay embankment between them. Prior to the retirement of JB Sims, the impoundment areas for Unit 3 range from 175 to 190 feet long by 71 to 80 feet wide with an approximate surface area of 0.2 and 0.3 acres for the east and west impoundments, respectively. The Unit 3 Impoundments ceased accepting CCR as of August 2020 and have been closed by removal of CCR materials. Documentation and certification of closure was completed by Golder in December 2020 (Golder, 2020a).

Unit 1/2 - The historical Units 1 and 2 Unlined Impoundment ceased accepting CCR as of June 2012. The Environmental Protection Agency (EPA) recently defined an expanded boundary to the east of the Units 1/2 impoundment on November 24, 2020 (see Figure 2). This eastern expanded boundary ceased receiving material prior to 1978. GHBLP is working with the regulators to develop, review, and approve details regarding the closure and remediation plans for this separate CCR unit at JB Sims.

2.2 Geologic and Hydrogeologic Setting

The site soil borings in the vicinity of the CCR units consist of unconsolidated fine sand with intervals of silt and sand within the first 20 feet below ground surface (bgs). The fine sand is underlain by silt and clay to the bottom of each boring (ERM, 2017a).

Groundwater was encountered in the fine sand located above the silt and clay unit. This groundwater unit is a shallow unit which is influenced by the seasonal fluctuations of the Grand River as well as surface infiltration. In addition to the hydraulic influence from the Grand River, the groundwater elevations across the Site are relatively flat resulting in complex hydrogeologic conditions at the Site. To assist with the hydrogeologic complexity at the

Site, groundwater elevation data has been collected from staff gauges positioned within surface water bodies across the site as well as site groundwater monitoring wells. Based on observed groundwater and surface water elevation data, groundwater flow direction changes on a localized scale depending the seasonal influence from the Grand River and surface infiltration across the site. However, the overall regional hydrogeologic flow is west toward the Grand River. Flow in the Grand River is also west toward Lake Michigan. The location of the monitoring wells and staff gauges are presented on Figure 2. Representative groundwater elevation contour maps for the site are presented as Figures 3 through 5, Groundwater Contour Maps.

As described in the *Groundwater Monitoring System Certification* (ERM, 2017b), sand in the uppermost aquifer assumes an effective porosity of 30 percent (%) and consists of poorly-graded fine sand with an estimated hydraulic conductivity of 27 feet per day and well-graded fine sand with an estimated hydraulic conductivity of 53 feet per day.

3.0 SUMMARY OF ANALYTICAL RESULTS AND STATISTICAL ANALYSES

JB Sims identified statistically significant increases (SSIs) of Appendix III parameters above the established prediction limits based on the site-specific statistical plan. As a result, JB Sims has evaluated Appendix IV constituents following the requirements of the CCR Rule and Part 115 Amendment. The following sections summarize the groundwater assessment monitoring conducted for the Unit 3 Impoundment and presents the statistical analysis method for evaluation of Appendix IV monitoring constituents.

3.1 Statistical Analysis Methods

During assessment monitoring, concentrations of Appendix IV constituents are compared to a calculated Groundwater Protection Standard (GWPS). As described in the CCR Rule and Part 115 Amendment the GWPS is:

1) The maximum contaminant level (MCL) established under §§ 141.62 and 141.66 of this title (the "MCL") or GWPS consistent with section 20120a established under the Part 115 Amendment if it is more strict
2) Where an MCL has not been established:
   a) Cobalt 6 micrograms per liter (ug/l)
   b) Lead 15 ug/l
   c) Lithium 40 ug/l
   d) Molybdenum 100 ug/l
3) Background levels for constituents where the background level is higher than the MCL or rule-specified GWPS.

As specified in 40 CFR § 257.95(h), the GWPS is the MCL or the background concentration for constituents for which an MCL has not been established. Since an MCL has not been established for lithium, the GWPS is the background concentration. The upper tolerance limits (UTLs) have been calculated using pooled upgradient/background well data to determine the site-specific background concentration (i.e. GWPS).

After the GWPS is established, confidence intervals are then constructed for downgradient well data for each of the Appendix IV constituents using the GWPS for comparison. Only when the entire confidence interval is above a GWPS is the constituent considered to be a statistically significant level (SSL).

3.2 Assessment Monitoring

On January 31, 2018, Assessment Monitoring was initiated at JB Sims. Pursuant to 40 CFR §257.95(a) monitoring wells were sampled for each of Appendix IV parameters in March, June, and September 2020. The Appendix IV data for the Unit 3 Impoundments were compared to the GWPS using confidence intervals.

3.3 Statistically Significant Levels

Analytical data from the 2020 monitoring events have been statistically analyzed in accordance with the site's certified statistical analysis method. Review of the Sanitas™ results indicates that using the GWPS established according to both 40 CFR §257.95(h) and 391-3-4-.10(6)(a), the following SSLs were identified:

Confidence Interval Statistically Significant Level Exceedances March 2020	
Appendix IV Parameter	**Unit 3 Monitoring Well**
Chromium	MW-2
Cobalt	MW-1R
Fluoride	MW-1R, MW-2
Lead	MW-1R
Lithium	MW-1R, MW-2, MW-9

4.0 ALTERNATE SOURCE DEMONSTRATION

In accordance with 40 CFR § 257.95, the following provides details of an alternate source demonstration (ASD) for the SSLs identified in wells downgradient of Unit 3 at JB Sims. There are multiple lines of evidence that support the conclusion that the reported concentrations of chromium, cobalt, fluoride, lead, and lithium in groundwater sampled from monitoring wells MW-1R is not the result of a release from the Unit 3 ash impoundment. The source of groundwater impacts is the historic ash and waste material placed as fill at the JB Sims site. The following lines of evidence support an ASD for groundwater impacts at JB Sims:

- Construction of Unit 3 Impoundments and observed integrity of the clay liner during closure by removal.
- Geochemical fingerprint of site groundwater compared to fingerprint of porewater from within Unit 3 and background groundwater samples.
- The lack of positive statistical trends in groundwater samples from wells exhibiting SSLs.

4.1 Construction of Unit 3 Impoundments

The liner design criteria for existing CCR surface impoundments as described in 40 CFR § 257.71 is as follows:

- A liner consisting of a minimum of two feet of compacted soil with hydraulic conductivity of no more than 1 x 10^{-7} centimeter per second (cm/sec) as required in § 257.71(a)(1)(i);
- A composite liner that meets the requirements of § 257.70(b); or
- An alternative composite liner that meets the requirements of § 257.70(c).

As referenced in the *Documentation of Liner Construction Report*, dated April 2017 and updated January 2018, the Unit 3 Impoundments were engineered and constructed with a 3-foot thick compacted clay liner system. According to the Black & Veatch Construction Report (Black & Veatch, 1983), the Unit 3 Impoundments were constructed with clay dikes and a 3-foot thick compacted clay bottom. Specifically, evidence was found from review of the historical documentation that indicates the Unit 3 Impoundments were constructed with a minimum 3-foot thick compacted clay liner system and a permeability of 1 x 10^{-8} feet per second (or 3 x 10^{-7} cm/sec). However, a supplemental field investigation resulted in an in-situ permeability of less than 1 x 10^{-7} cm/sec in two locations at the bottom of the Unit 3 West (B) Impoundment. The permeability of the compacted clay liner is generally greater than 1 x 10^{-7} cm/sec and the site could not demonstrate that there is a composite liner present. The site can demonstrate that the Unit 3 West (B) Impoundment meets the permeability requirements but cannot demonstrate that for the Unit 3 East (A) Impoundment. Although Unit 3 Impoundments do not completely meet

the requirements described in 40 CFR § 257.71, an engineered and properly constructed clay liner for Unit 3 Impoundments is documented.

Unit 3 CCR removal and documentation procedures were implemented starting in July 2020 and were completed in December 2020. Golder provided and documented multiple lines of evidence demonstrating that CCR and CCR contaminated clay liner has been removed from Unit 3 with 95 percent confidence. A portion of clean clay liner was left in place to protect the underlying historical MSW and ash fill from stormwater runoff and ground water interfaces.

During excavation operations, CCR and CCR impacted clay removal was documented based on the following three lines of evidence:

- First line of evidence – comparison of excavation termination grades as compared to the existing top of the engineered clay liner.
- Second line of evidence – photographic documentation including periodic photographs of CCR removal progression and photographs of excavated areas at random grid nodes.
- Third line of evidence – quantitative colorimetric analysis at random grid nodes to confirm CCR removal.

  As a supplement to quantitative colorimetric testing, microscopic quantification of CCR content was used to confirm CCR removal if excavated areas are greater than 5-percent CCR in the colorimetric samples.
- Fourth line of evidence – analytical testing of the remaining clay liner using total metals concentration and verification using Synthetic Precipitation Leaching Procedure (SPLP), as needed per the Closure Work Plan.

The multiple lines of evidence approach provided a predictable and reliable means to objectively measure concentrations of CCR based on physical sample properties. Golder has certified that the soil material remaining at the base of the excavation contain no visually identifiable CCR and has documented a minimum of 95 percent CCR and CCR impacted clay removal when tested by colorimetric, microscopic and analytical methods in accordance with the EGLE approved method for certification.

4.2 Geochemical Fingerprinting

During routine monitoring events conducted at the site, major cation and anion concentrations were analyzed from the CCR monitoring network as well as source water and the Grand River. These data were used to compare major ion chemistry from wells situated both upgradient and downgradient of the Unit 3 Impoundment. Data were used to plot diagrams to evaluate the geochemical signatures of site groundwater.

Groundwater major ion abundance in the form of Piper and ternary diagrams shown on Figures 4.2.1 and 4.2.2 was used to determine if the Unit 3 ash impoundment could be the cause of the SSLs identified in downgradient groundwater at wells MW-1R, MW-2, and MW-9. In the ternary and quaternary diagrams such as those included in the Piper diagram, mixtures (e.g., downgradient groundwater) consisting of two end-member solutions, such as upgradient groundwater and a discrete source, would fall on a straight line between the two endmember compositions.

Major ion relative abundance indicates that groundwater from downgradient monitoring wells (MW-1R, MW-2, and MW-9) is geochemically closely related to background groundwater observed at well MW-7, especially for major relative cation abundance (Figure 4.2.1 Piper Diagram). Conversely, the grab samples collected from Units 1/2, and 3 contain a much higher relative abundance of sulfate and chloride (SO_4^- + Cl^-) and is sulfate (SO_4^-)-dominated, compared to both downgradient and upgradient groundwater samples.

In addition, sulfate and sodium (Na^+) wells range from 18:10 to 94:10 in Units 1-3. However, sulfate to sodium ratios in downgradient wells range from <1:10 to 4:10. This is also true when comparing the sulfate to sodium ratio where downgradient wells (<1:10 to 4:10) closer resemble the background ratio of 0.5:10 rather than that of Units 1-3 water (18:10 to 94:10). Given the generally conservative properties of sodium, the downgradient wells that triggered the SSLs are not a result of water from Units 1-3 mixing with groundwater.

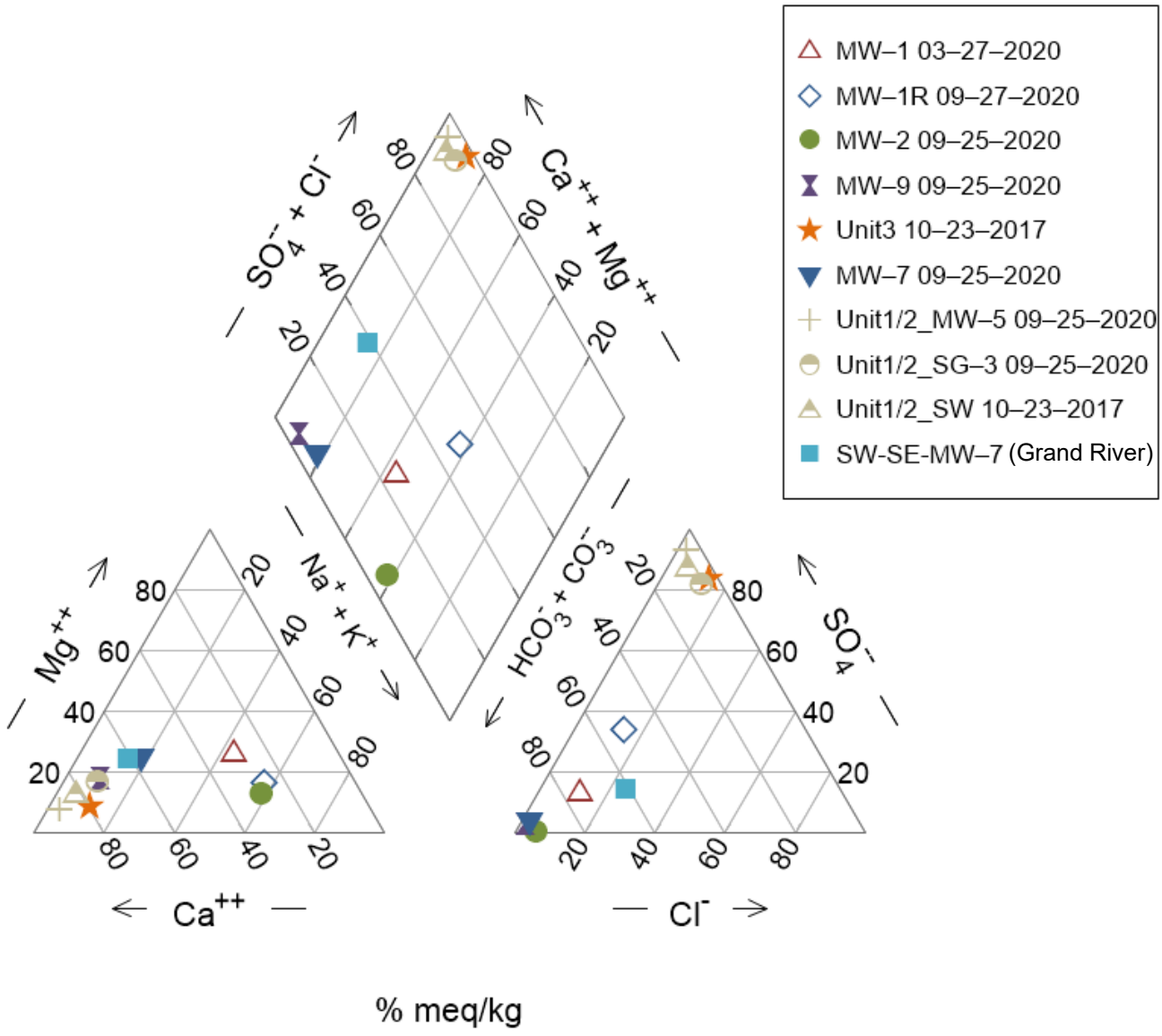

Figure 4.2.1: Piper Diagram

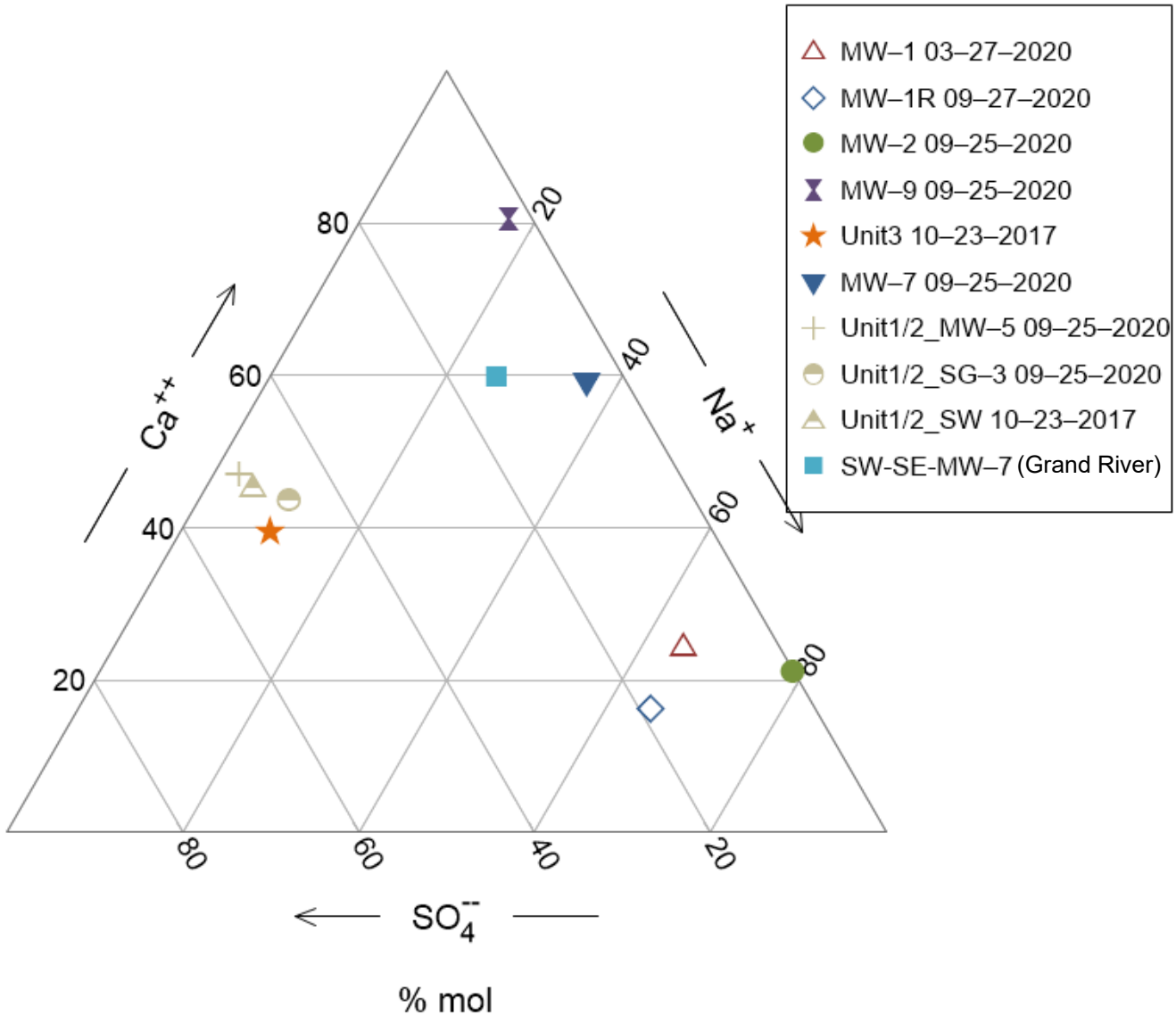

Figure 4.2.2: Ternary Diagram

Review of geochemical signatures presented in Figures 4.2.1 and 4.2.2 reveal the following:

- Unit 1/2 and Unit 3 impoundment source samples plot similar to typical CCR.
- Data from samples collected at well MW-7 mimics groundwater quality similar to well MW-9 and the Grand River. Therefore, it is appropriate to utilize groundwater data from well MW-7 to establish site specific "background" GWPS.
- Monitoring wells MW-1R, MW-2 and MW-9 do not plot on a mixing line between background (well MW-7 and the Grand River) and Unit 3 source. Thus, the source of impacts cannot be the Unit 3 impoundment.
- Groundwater quality at wells MW-1/MW-1R and MW-2 suggests a mixing of the Grand River and an alternate source (one that is not typical of CCR).

In summary, these plots show that groundwater quality at wells in the vicinity of Unit 3 have a geochemical fingerprint that is unique and differ significantly from what was reported for the Unit 3 Impoundments source water. Thus, no mixing is evident. As such, the source of the groundwater impacts is not indicative of a release from Unit 3 but rather are from an alternate source such as historical island fill that has been documented at the site.

4.3 Statistical Trends

Trend Plots for site groundwater quality data were generated using the Sanitas™ statistical software. The resulting trend plots for each well exhibiting a SSL are included as Appendix B, Trend Analyses. Increasing trends would be most noteworthy and require additional review. Alternatively, decreasing trends are also important in that they generally indicate improving groundwater conditions. A summary of the trend analyses is provided in Table 4.3.1 below. Either a neutral or negative trend would indicate the groundwater plume is stable.

Table 4.3.1: Summary of Statistical Trends

Well ID	Constituent	Slope Positive (increasing) / Negative (decreasing)	Trend (increasing / decreasing / no significant trend)
MW-1R	Cobalt	Negative Slope	No Significant Trend
	Fluoride	Negative Slope	No Significant Trend
	Lead	Negative Slope	No Significant Trend
	Lithium	Negative Slope	No Significant Trend
MW-2	Chromium	Neutral Slope	No Significant Trend
	Cobalt	Negative Slope	No Significant Trend
	Fluoride	Neutral Slope	No Significant Trend
	Lithium	Negative Slope	Decreasing Trend
MW-9	Lithium	Positive slope	No Significant Trend

Based on review of the SSL associated trend plots presented in Appendix B, there are no significant trends noted with the exception of lithium at well MW-2. As such, since the trend plots show no significant trends, we can conclude that groundwater quality is not improving over time, which is what we would expect to see following closure by removal if Unit 3 were contributing to contamination. The lack of significant trends suggests that the source of groundwater quality has been in place for a significant amount of time and has not changed in recent history.

4.4 Alternate Source Demonstration Summary

The evaluation of site data presented in this document demonstrates that the SSLs of chromium, cobalt, fluoride, lead, and lithium in monitoring wells MW-1R, MW-2 and MW-9 are not the result of a release from the Unit 3 impoundments but rather the source of these impacts is most likely groundwater migrating through ash and waste materials that were used as fill for the JB Sims site.

These lines of evidence, namely the construction of Unit 3 Impoundments, geochemical fingerprinting and the lack of trends strongly support a source other than Unit 3 Impoundments. This information serves as an “Alternate Source Demonstration” prepared for JB Sims in accordance with § 257.95(g)(3)(ii).

5.0 CONCLUSIONS

This ASD has been prepared in response to SSLs identified for chromium, cobalt, fluoride, lead, and lithium in monitoring wells MW-1R, MW-2 and MW-9.

The following lines of evidence support and ASD for groundwater impacts at JB Sims:

- Construction of Unit 3 Impoundments and observed integrity of the unit during closure by removal indicate that the Unit 3 impoundments clay liner had not leaked and CCR material and CCR impacted clay within the Unit 3 impoundments have been removed.
- Geochemical fingerprint of site groundwater compared to fingerprint of porewater from Unit 3 as well as background groundwater and Grand River samples indicate that the groundwater from monitoring wells that surround the Unit 3 impoundments are from a source other than the CCR materials placed within the Unit 3 impoundments.
- The lack of positive statistical trends in groundwater samples from wells exhibiting SSLs show stable or improving groundwater quality overtime which is not likely if the Unit 3 impoundment (which were active until closure in August 2020) were leaking.

Review of analytical results and statistical evaluations indicate that the SSLs identified are not the result of a release from the Unit 3 Impoundments at JB Sims but can be attributed to use of ash and waste material as fill for the JB Sims site. Therefore, no further action (i.e., Assessment of Corrective Measures) is warranted, and the Unit 3 Impoundments at JB Sims will remain in Assessment Monitoring.

While this ASD has been prepared for the Unit 3 Impoundments, GHBLP will continue to pursue corrective action for groundwater impacts at JB Sims and will continue to work with EGLE and EPA towards a closure plan and source control measures for the Unit 1/2 impoundment.

6.0 REFERENCES

B&V, 1983. *City of Grand haven, Michigan Board of Light and Power J.B. Sims Station, Unit 3 Ash Pond Construction Report*, Black & Veach, 1983.

ERM 2017a. *Sampling and Analysis Plan* for the Grand Haven Board of Light and Power, Environmental Resources Management Michigan, Inc. 2017.

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Figures

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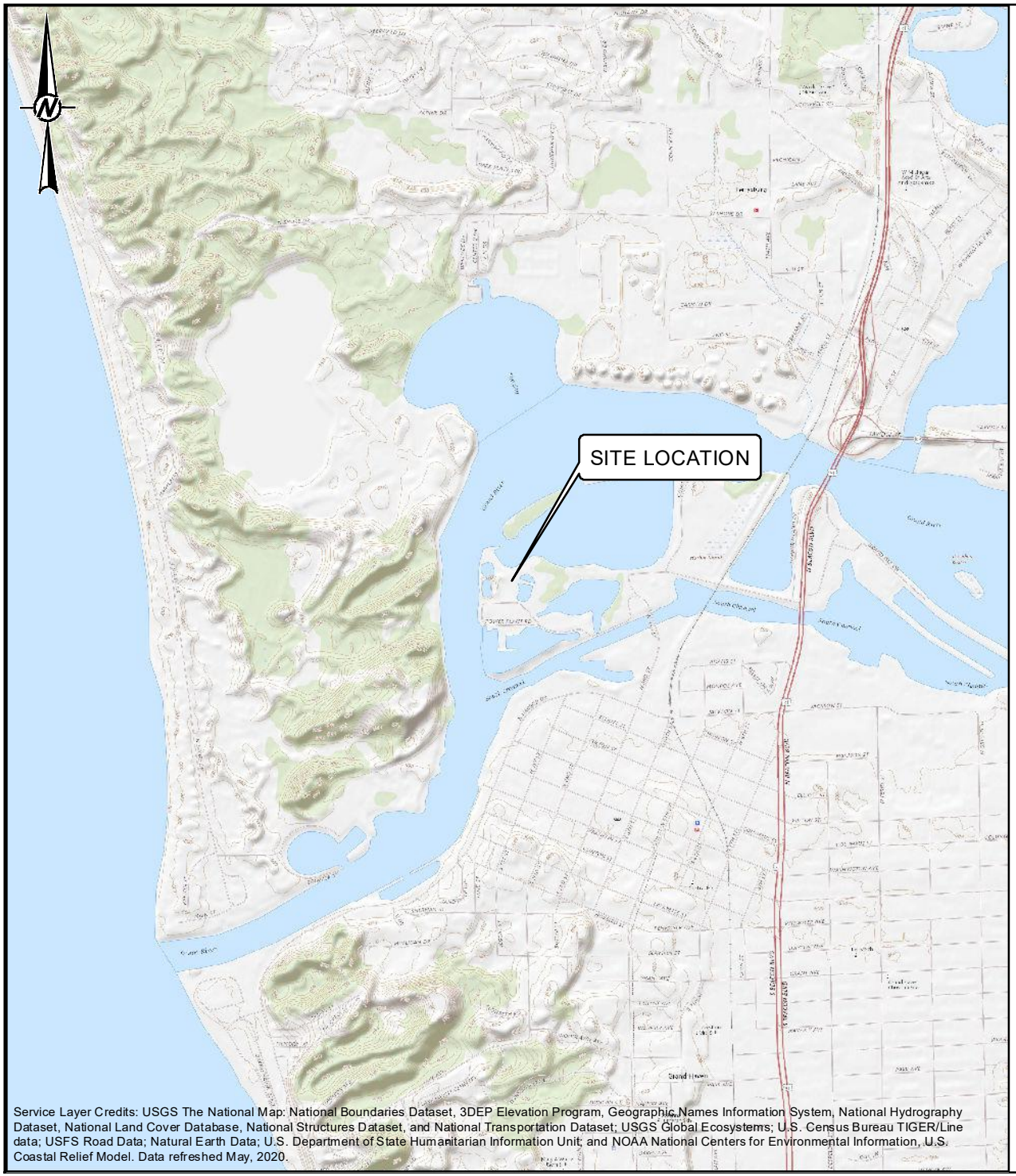

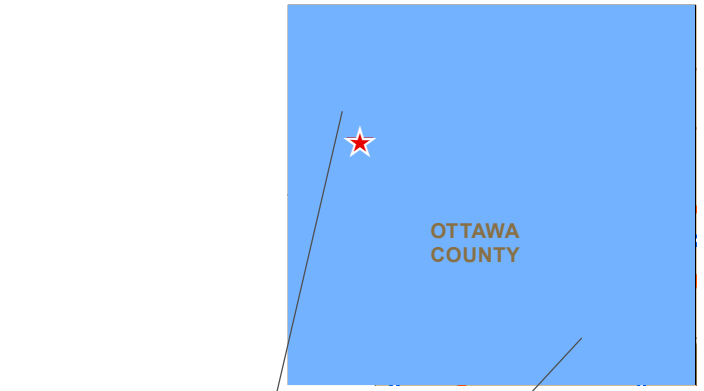

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CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

PROJECT
JB SIMS GENERATING STATION
ALTERNATE SOURCE DEMONSTRATION
FOR UNIT 3 IMPOUNDMENTS

TITLE
SITE LOCATION MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-15
PREPARED	DJC
DESIGN	CEP
REVIEW	
APPROVED	

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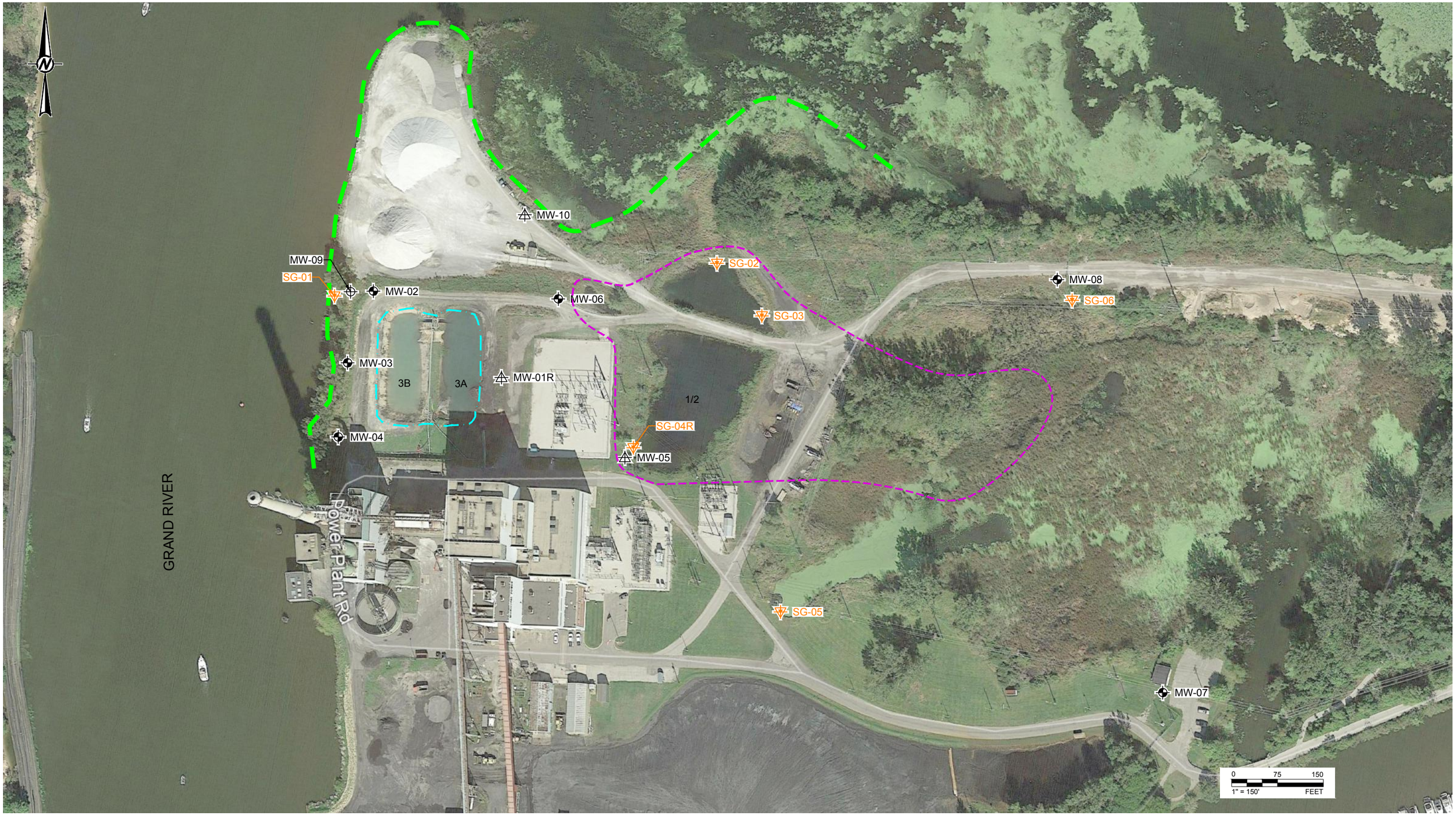

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NOTE(S)

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- STAFF GAUGE
- PROPOSED MIXING ZONE (~1,890 FEET)
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT

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GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-15
DESIGNED	CEP
PREPARED	DJC
REVIEWED	CEP
APPROVED	DPR

PROJECT
JB SIMS GENERATING STATION
ALTERNATE SOURCE DEMONSTRATION
FOR UNIT 3 IMPOUNDMENTS

TITLE
PROPOSED MIXING ZONE

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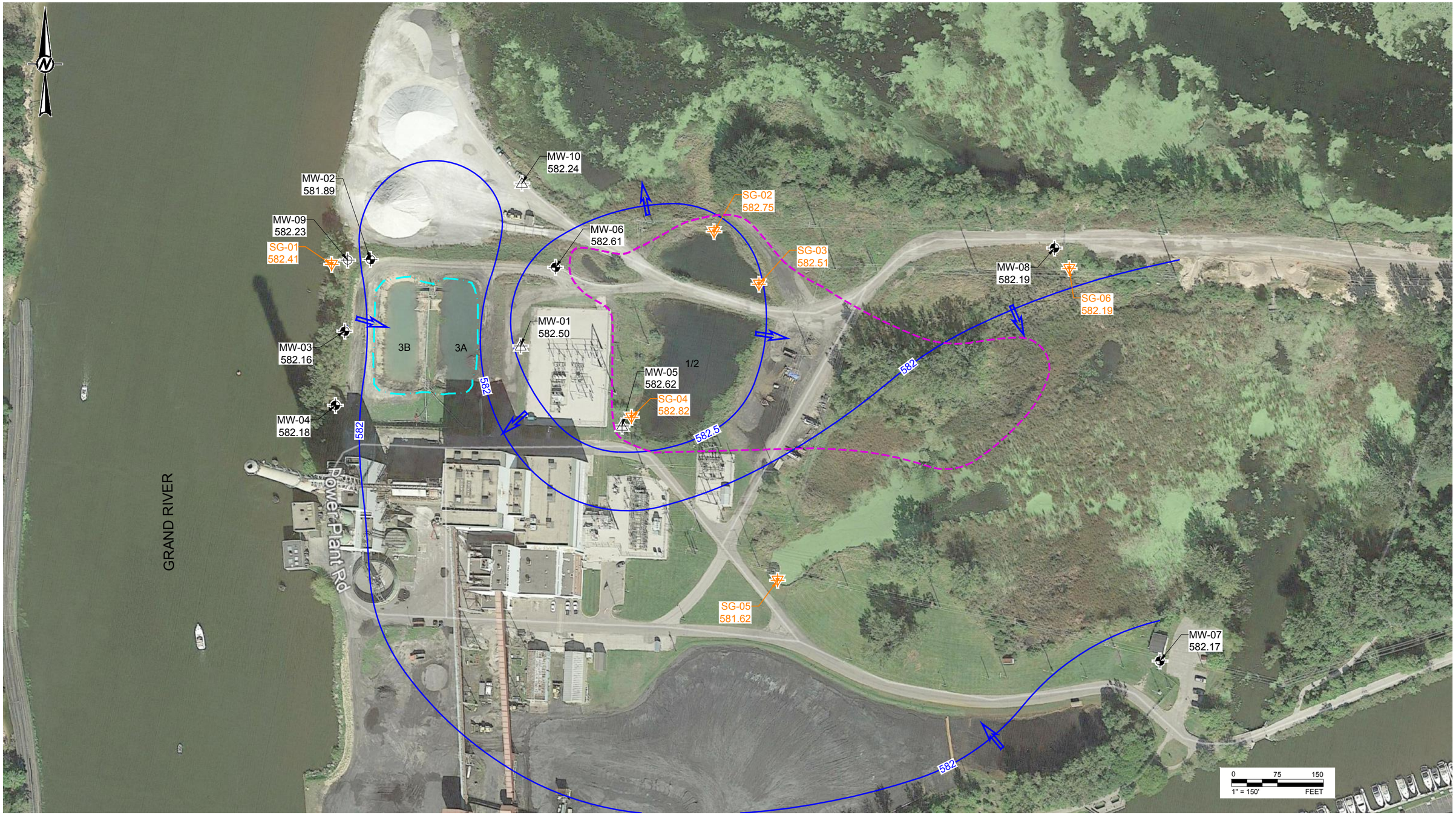

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- UNIT 3 LIMITS OF ASH PLACEMENT
- GROUNDWATER FLOW DIRECTION

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GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-15
DESIGNED	CEP
PREPARED	DJC
REVIEWED	CEP
APPROVED	DPR

PROJECT
JB SIMS GENERATING STATION
ALTERNATE SOURCE DEMONSTRATION
FOR UNIT 3 IMPOUNDMENTS

TITLE
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MARCH 27, 2020

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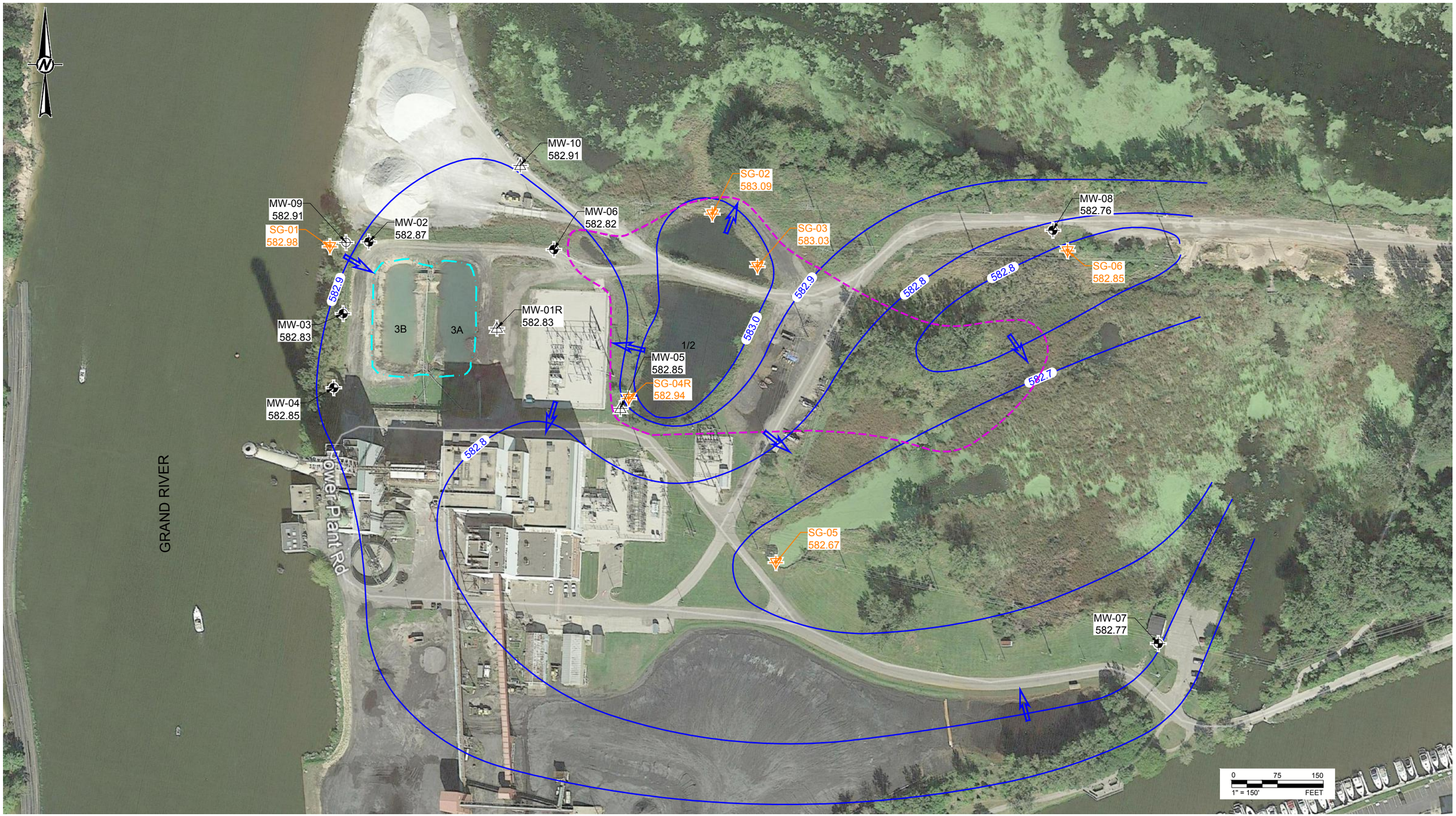

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- GROUNDWATER FLOW DIRECTION

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PREPARED	DJC
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APPROVED	DPR

PROJECT
JB SIMS GENERATING STATION
ALTERNATE SOURCE DEMONSTRATION
FOR UNIT 3 IMPOUNDMENTS

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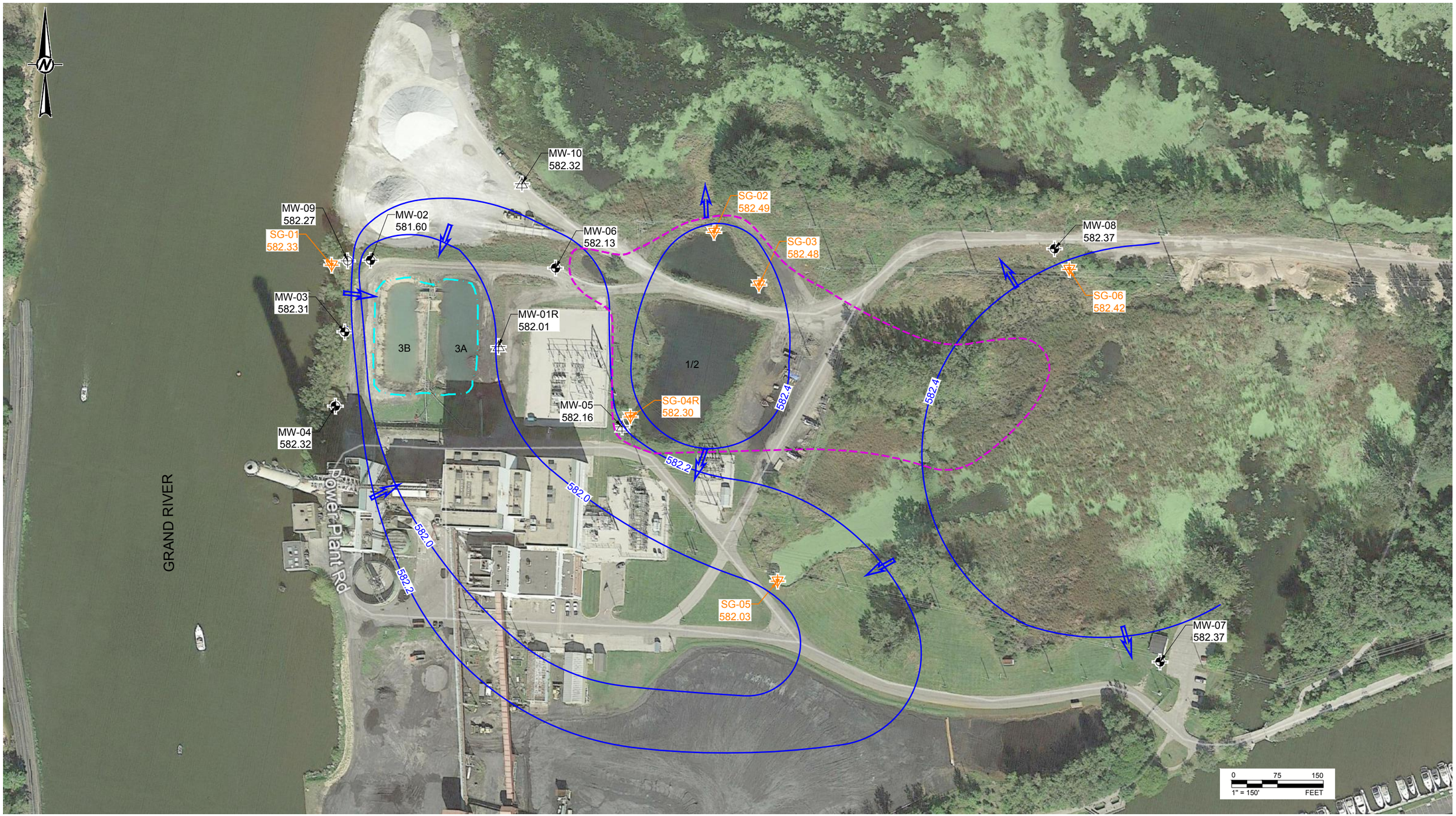

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- 582 — GROUNDWATER CONTOURS
- LIMIT OF UNITS 1/2 ASH PLACEMENT AFTER 1981
- UNIT 3 LIMITS OF ASH PLACEMENT
- GROUNDWATER FLOW DIRECTION

CLIENT
GRAND HAVEN BOARD OF LIGHT AND POWER
GRAND HAVEN, MICHIGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-15
DESIGNED	CEP
PREPARED	DJC
REVIEWED	CEP
APPROVED	DPR

PROJECT
JB SIMS GENERATING STATION
ALTERNATE SOURCE DEMONSTRATION
FOR UNIT 3 IMPOUNDMENTS

TITLE
GROUNDWATER CONTOUR MAP
SEPTEMBER 25, 2020

PROJECT NO.	CONTROL	REV.	FIGURE
20141048	20141048D004.dwg	0	5

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

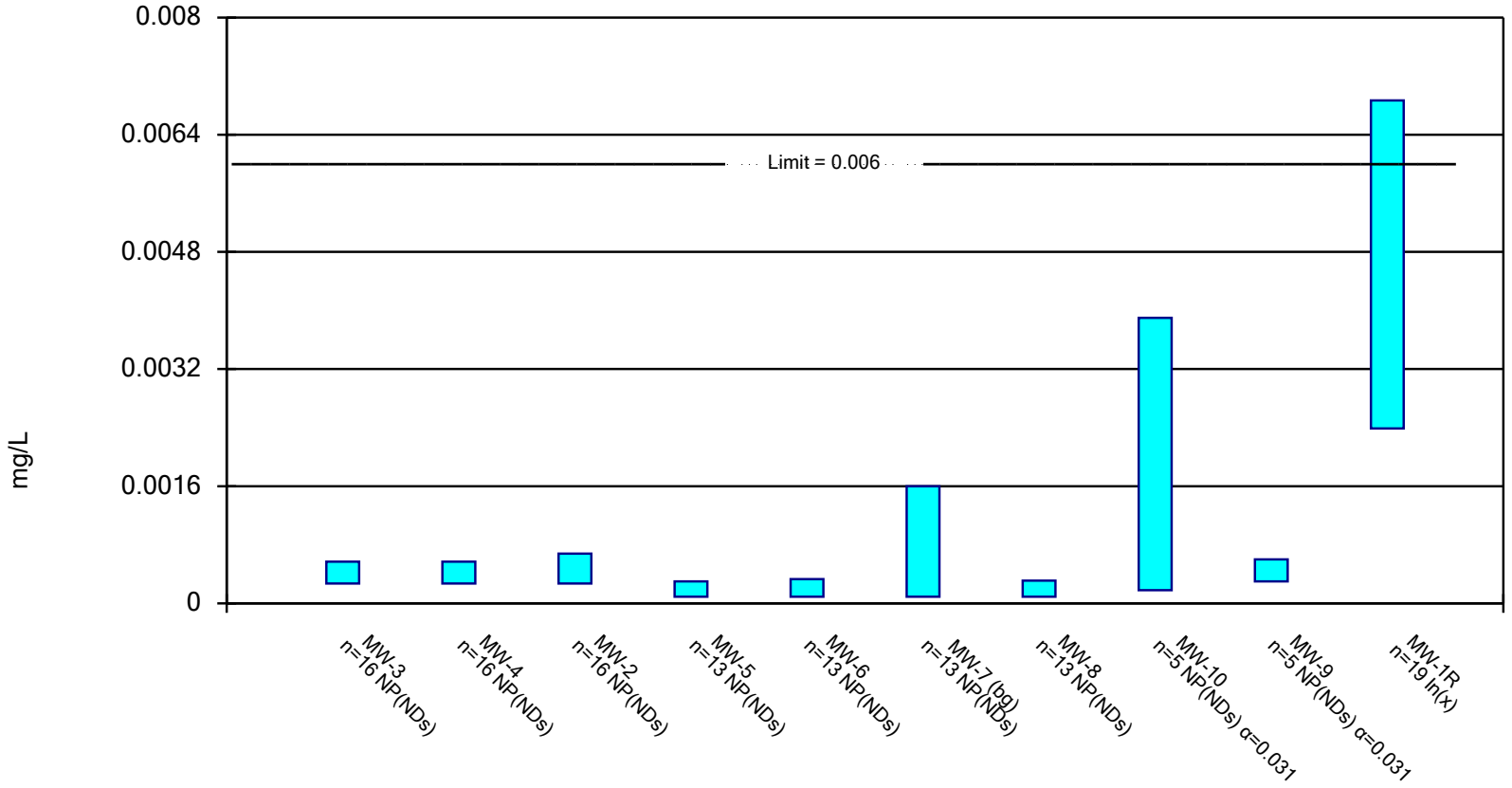
Path: \\golder.gds\corp\exlevata\offlon\Detroit\CAD\Projects\20x-Projects\20141048-GHBLP-JB Sims Generating\PRODUCTION\D-ALTERNATE SOURCE DEMONSTRATION\ | File Name: 20141048D004.dwg | Last Edited By: dcoss Date: 2020-12-15 Time:4:33:19 PM | Printed By: DCoss Date: 2020-12-15 Time:4:33:32 PM

APPENDIX A

Confidence Intervals

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

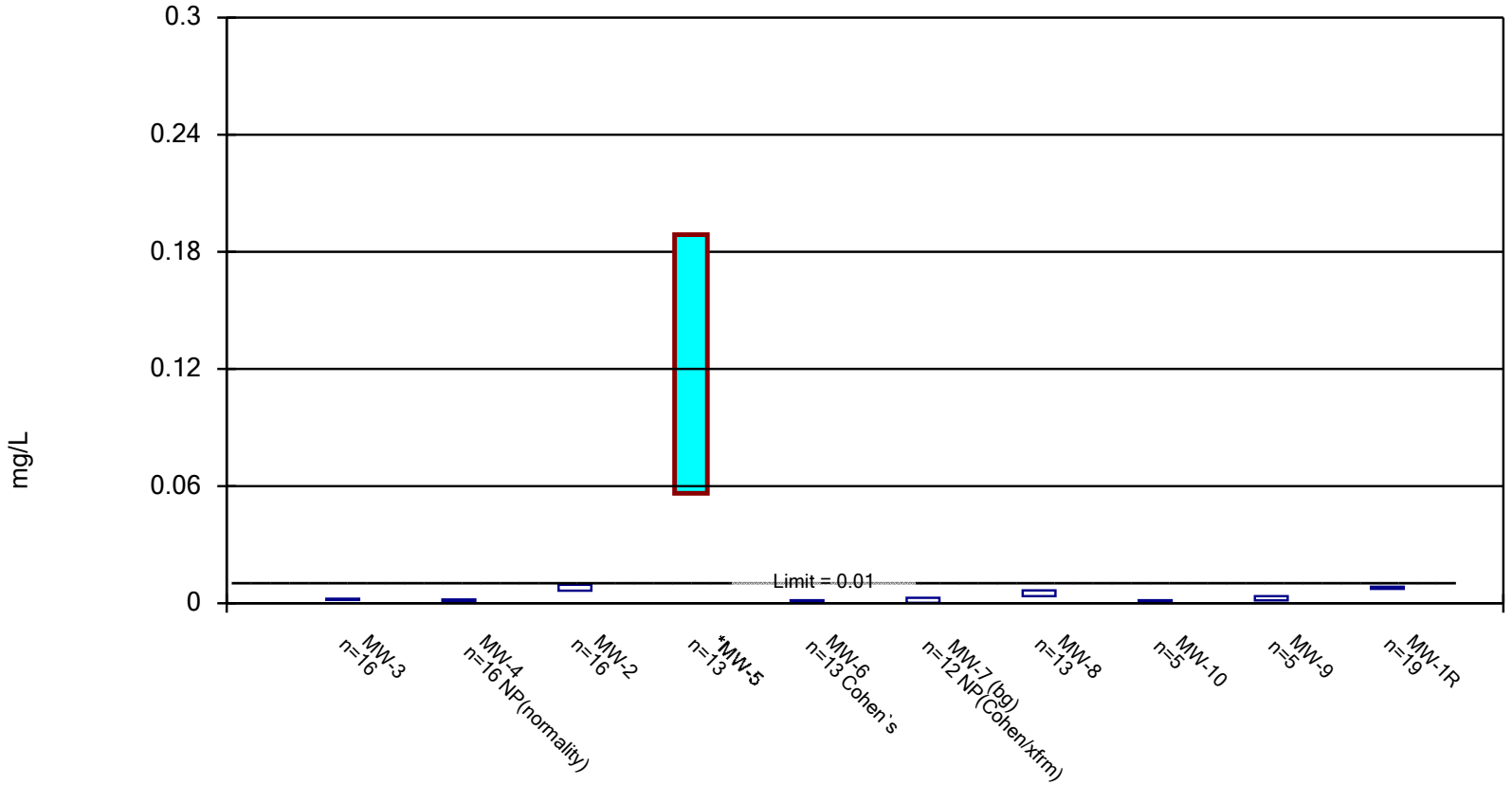


Constituent: Antimony Analysis Run 11/18/2020 11:18 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

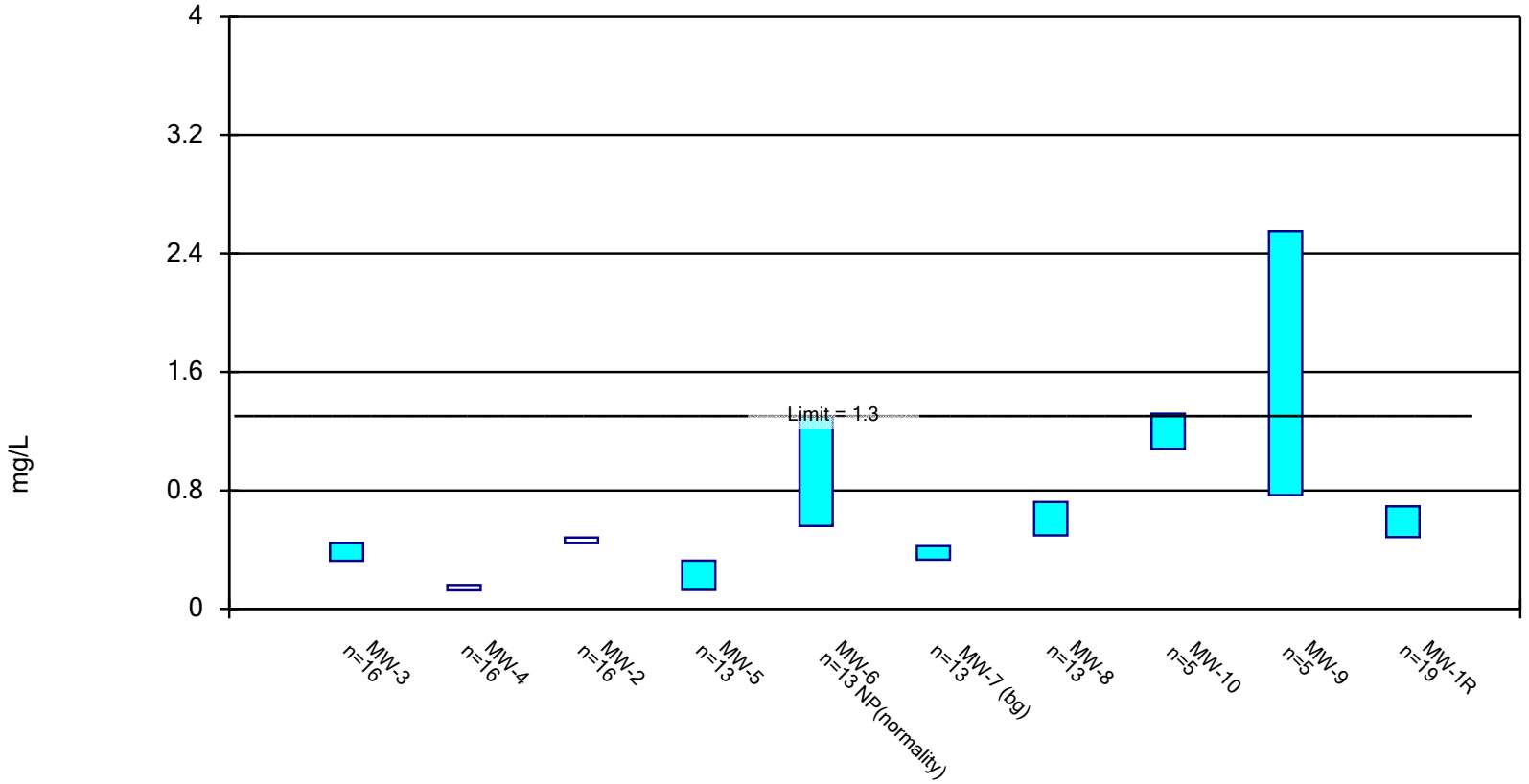


Constituent: Arsenic Analysis Run 11/18/2020 11:18 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

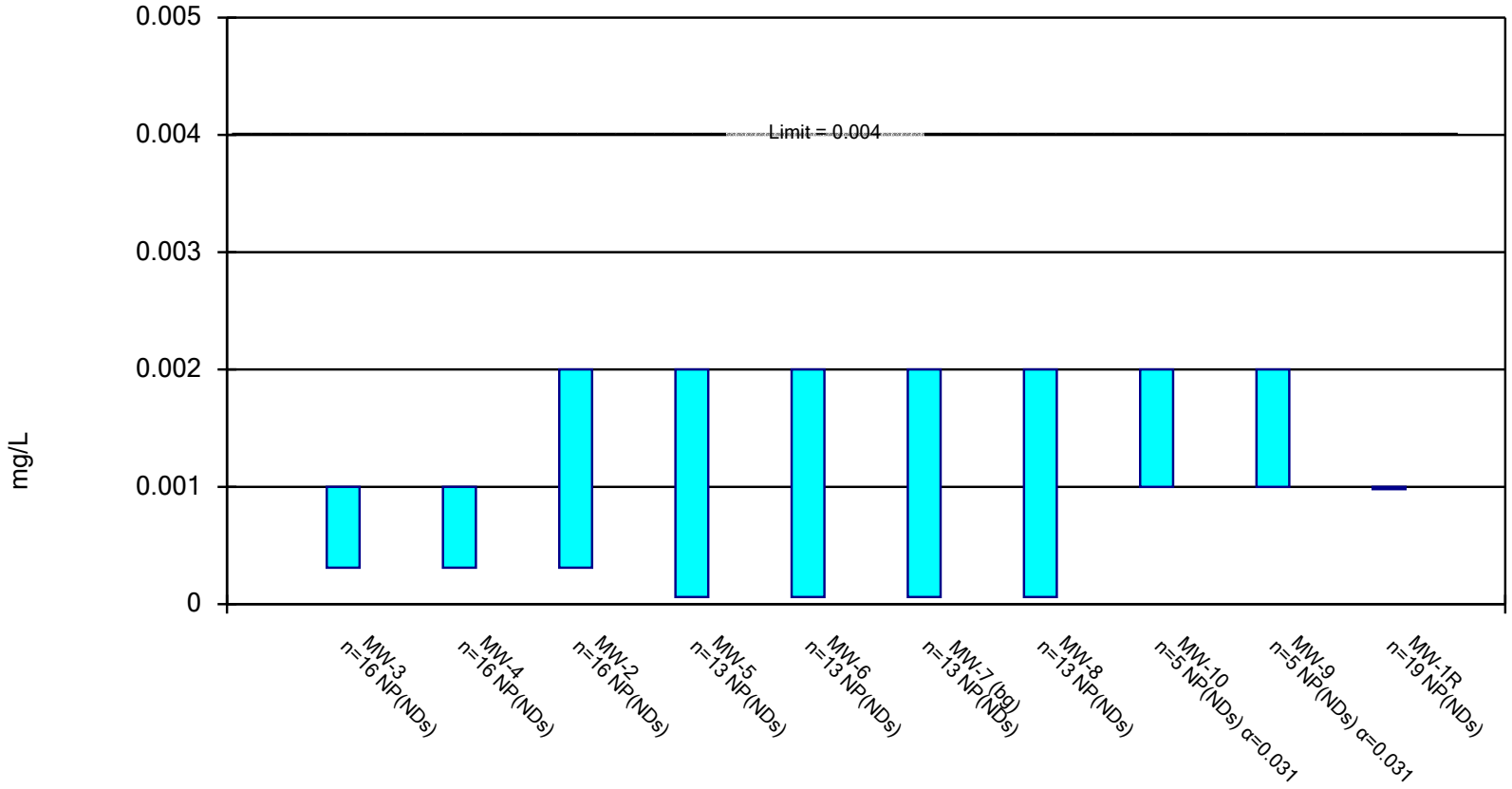


Constituent: Barium Analysis Run 11/18/2020 11:18 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

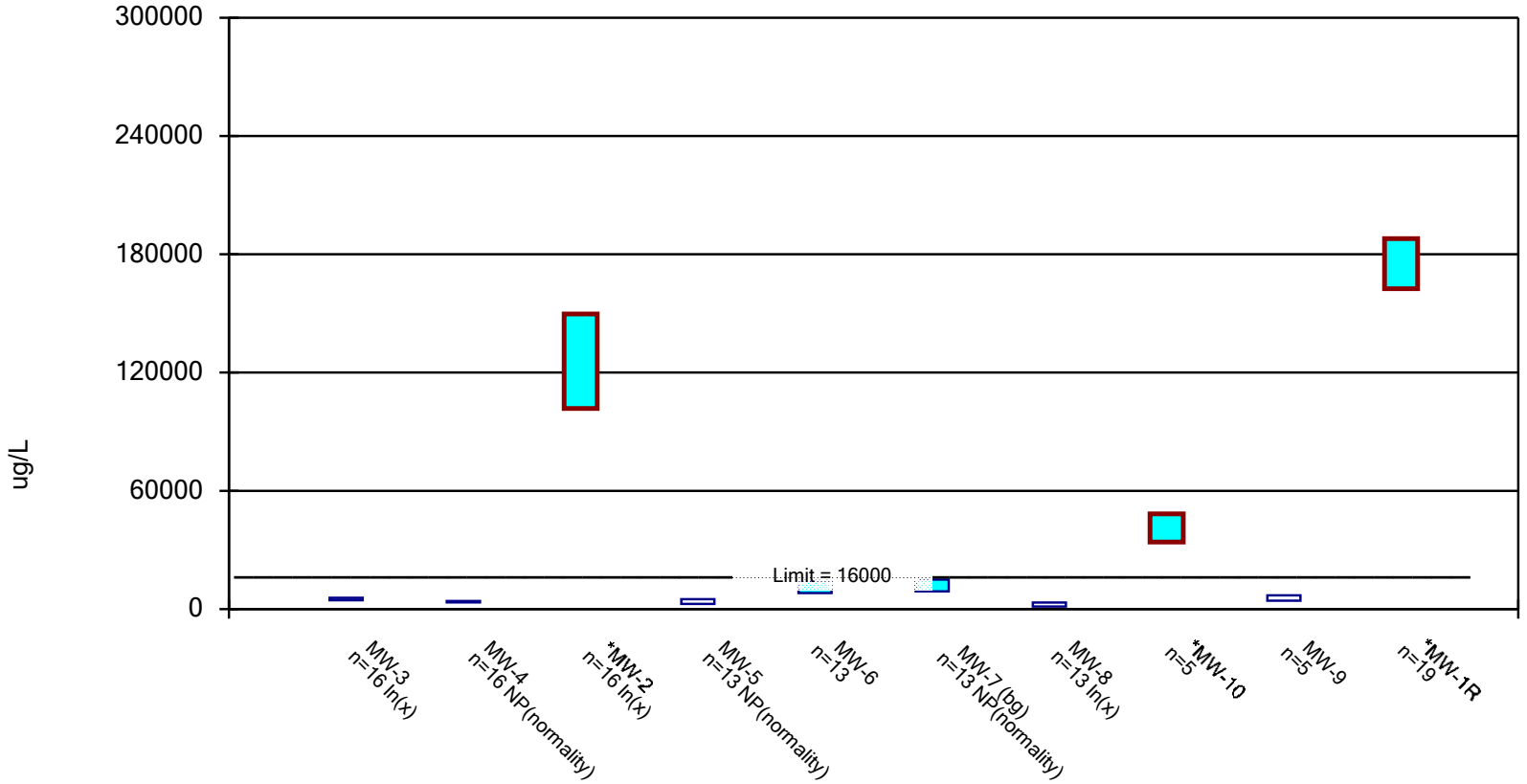


Constituent: Beryllium Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

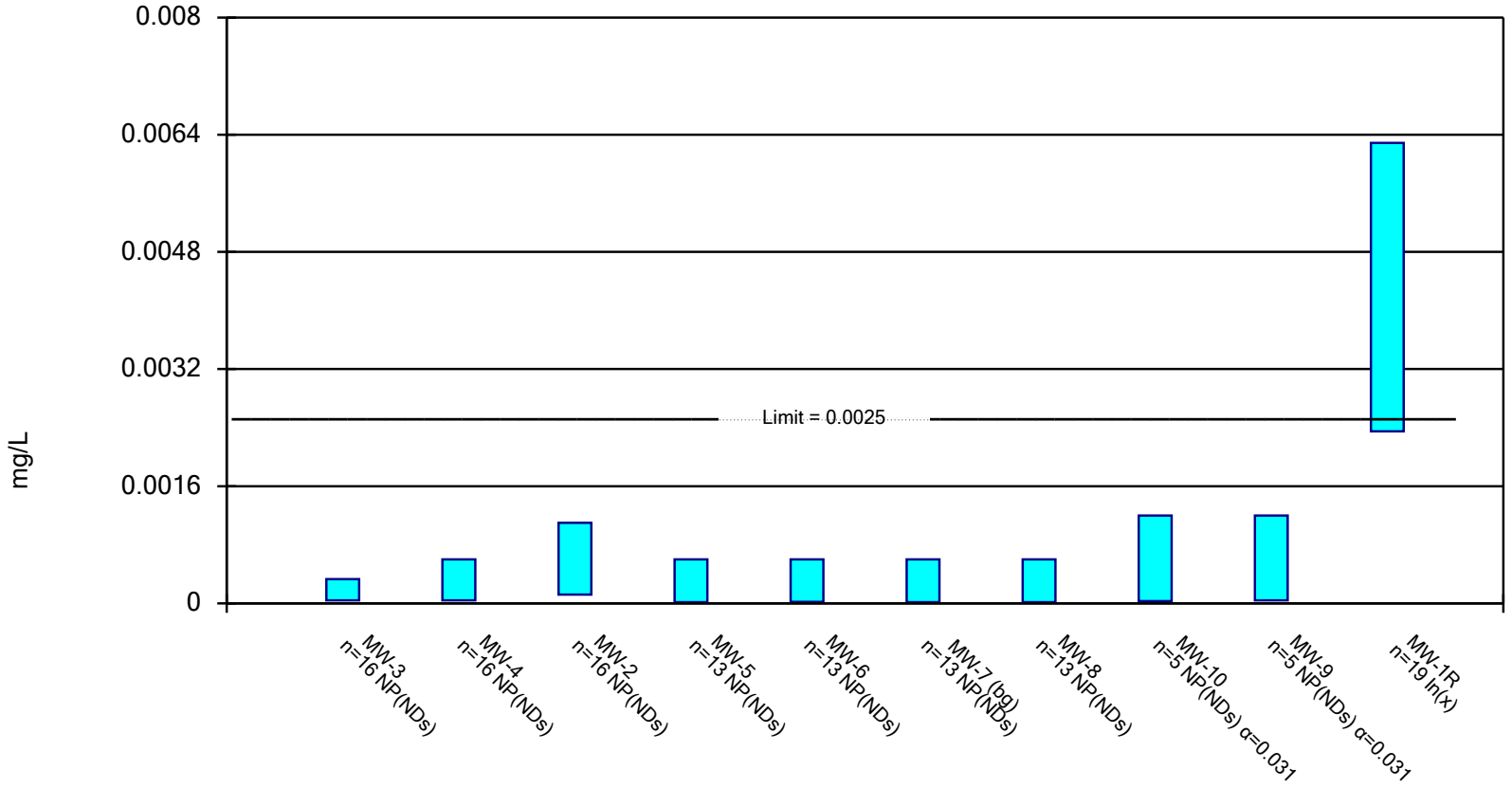


Constituent: Boron Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

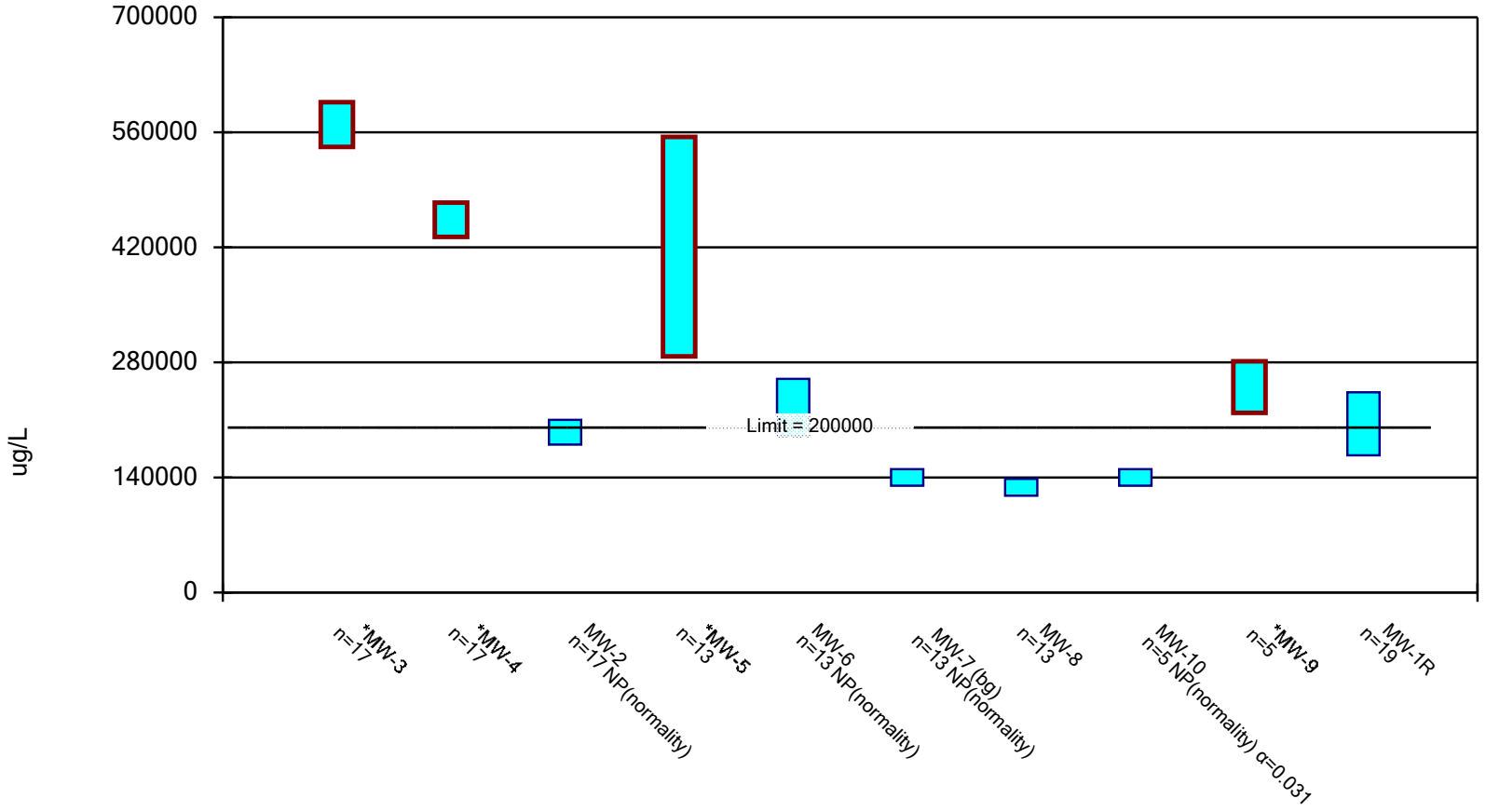


Constituent: Cadmium Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

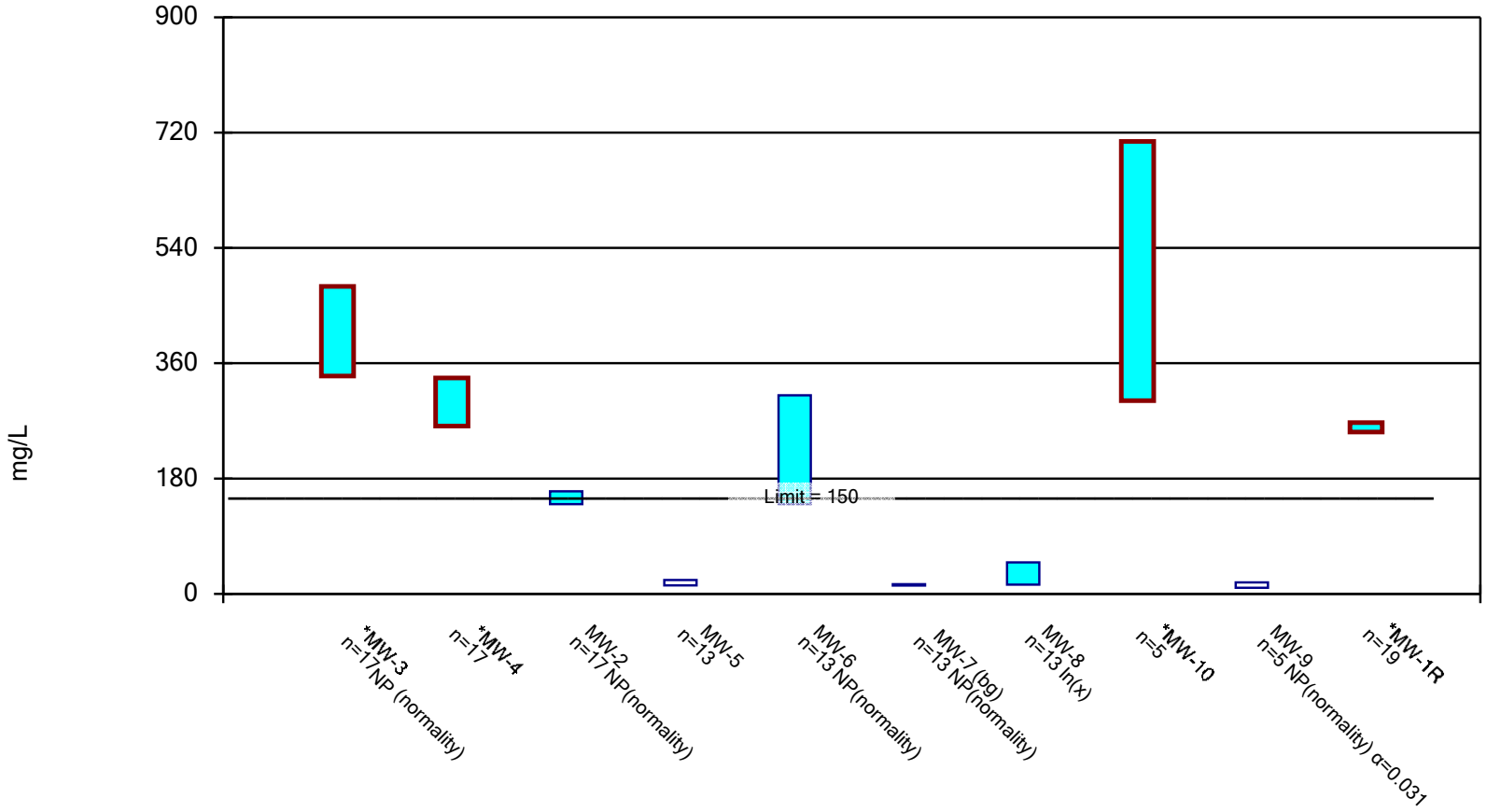


Constituent: Calcium Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

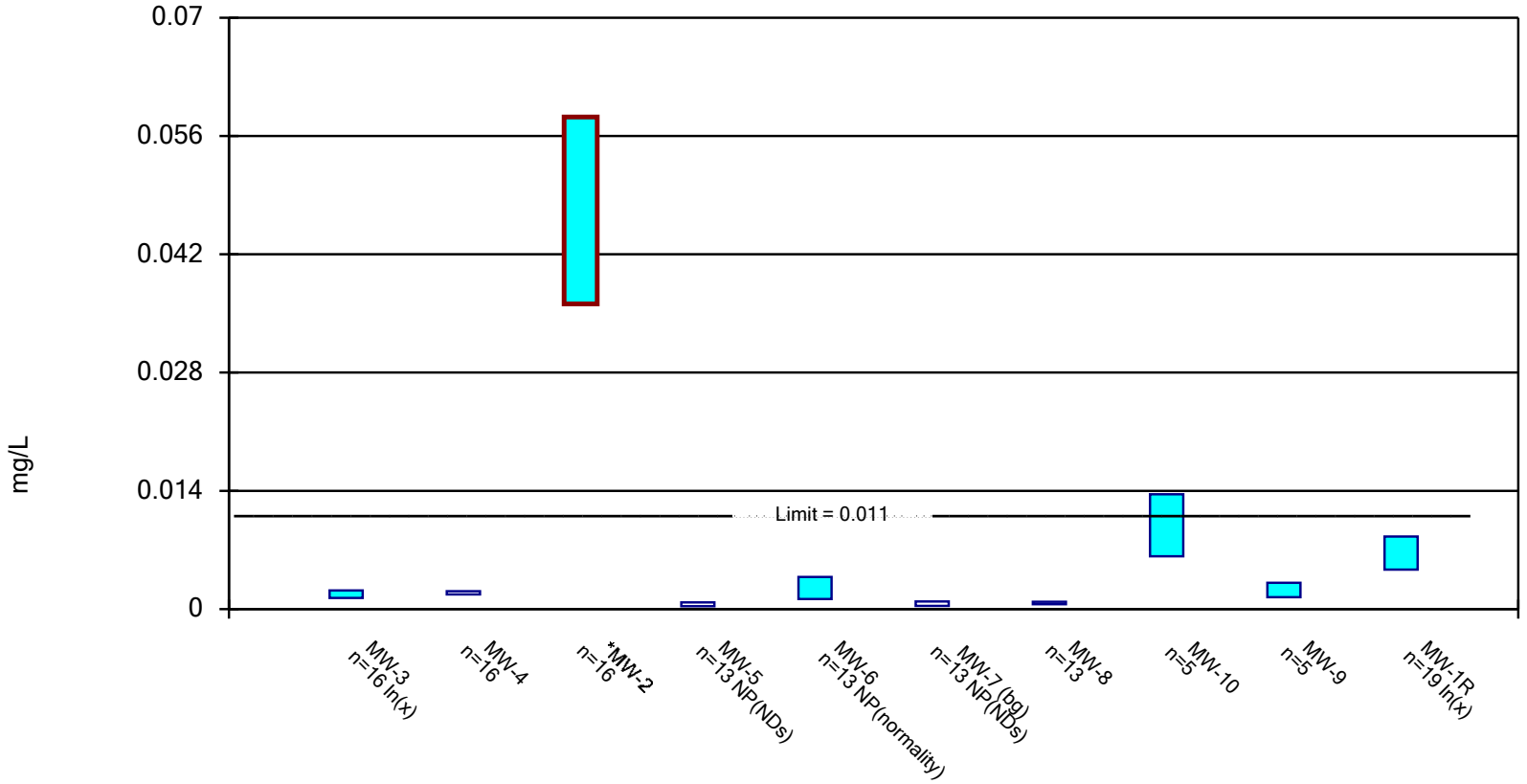


Constituent: Chloride Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

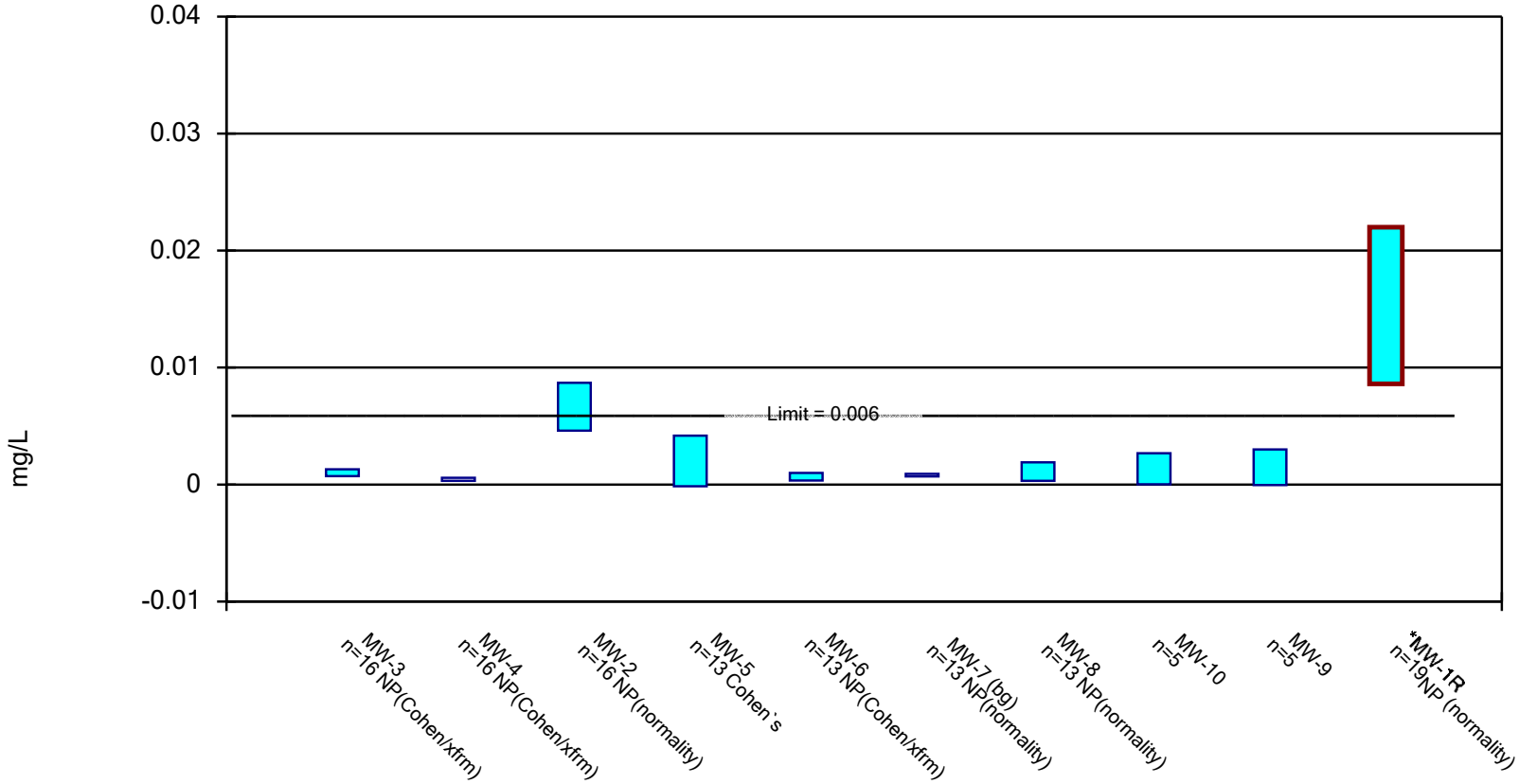


Constituent: Chromium Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

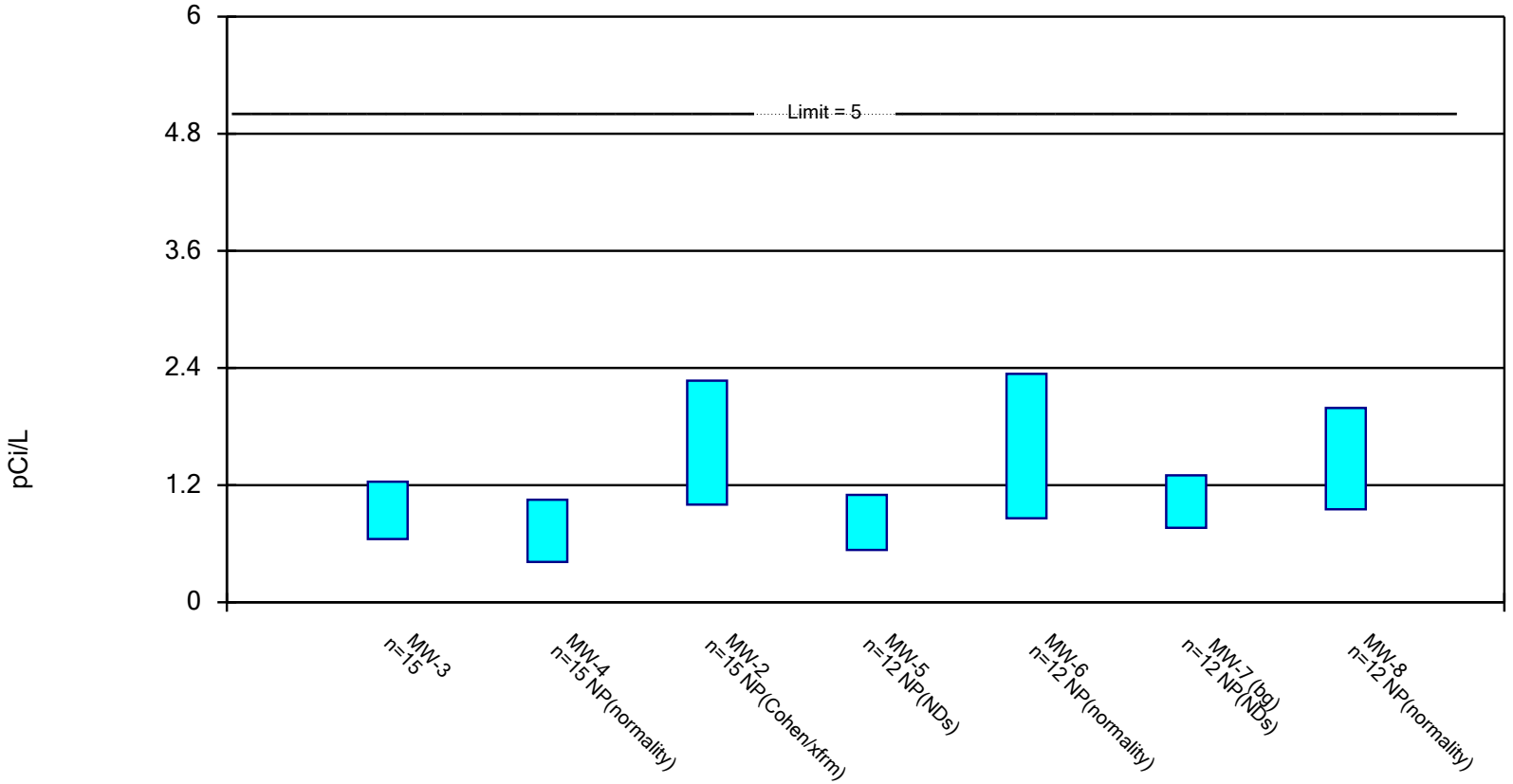


Constituent: Cobalt Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

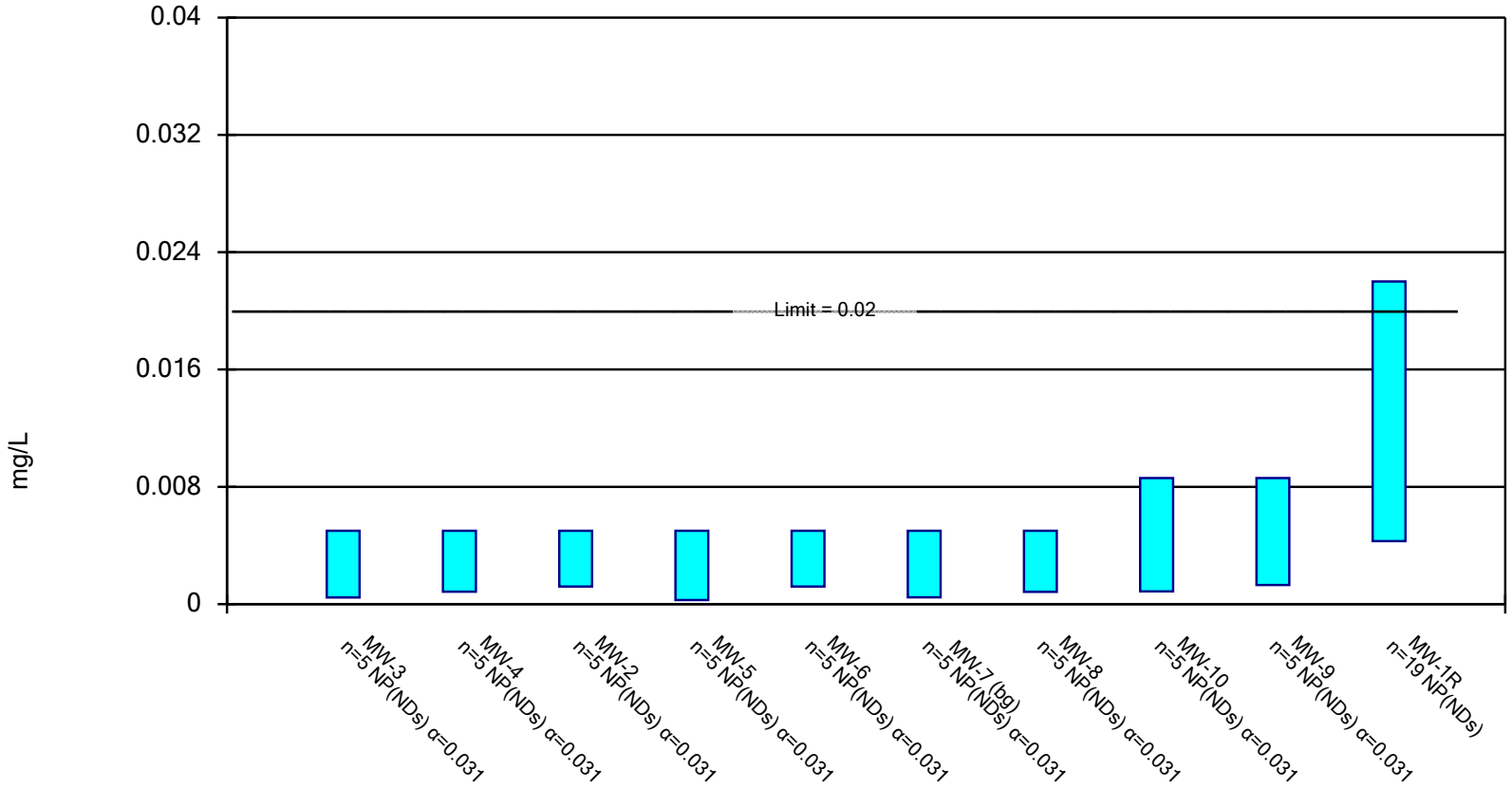


Constituent: Combined Radium 226 + 228 Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

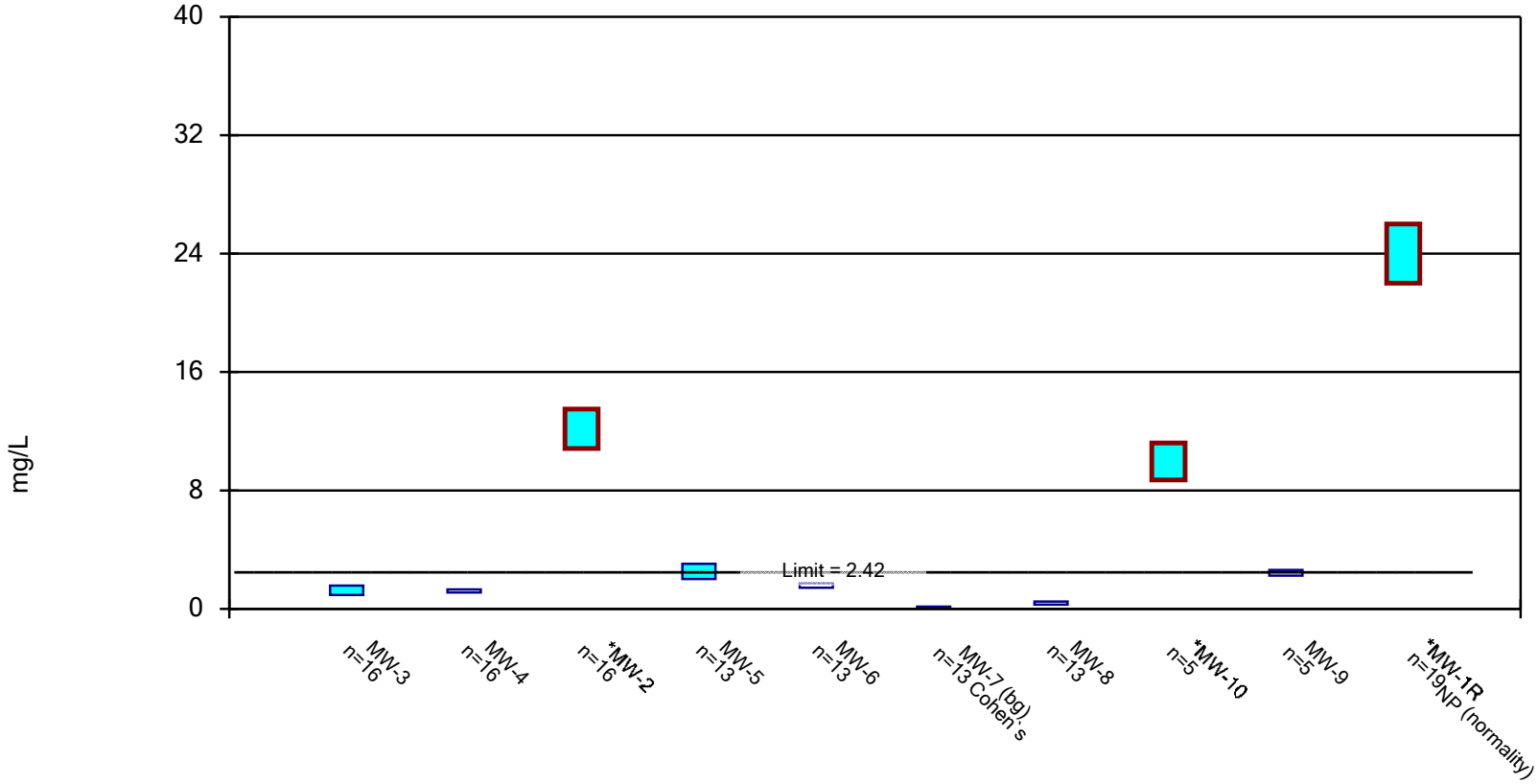


Constituent: Copper Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

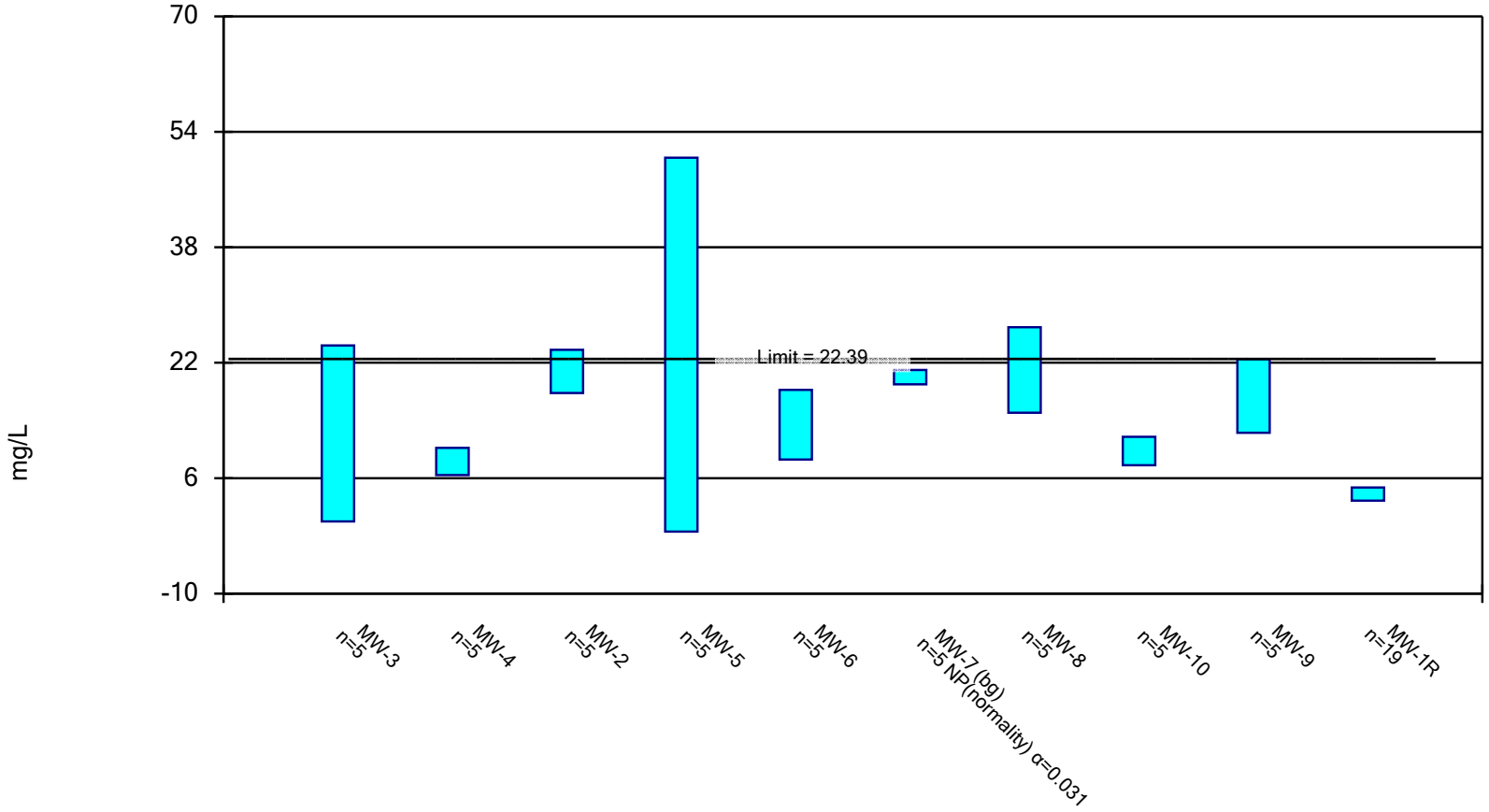


Constituent: Fluoride Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

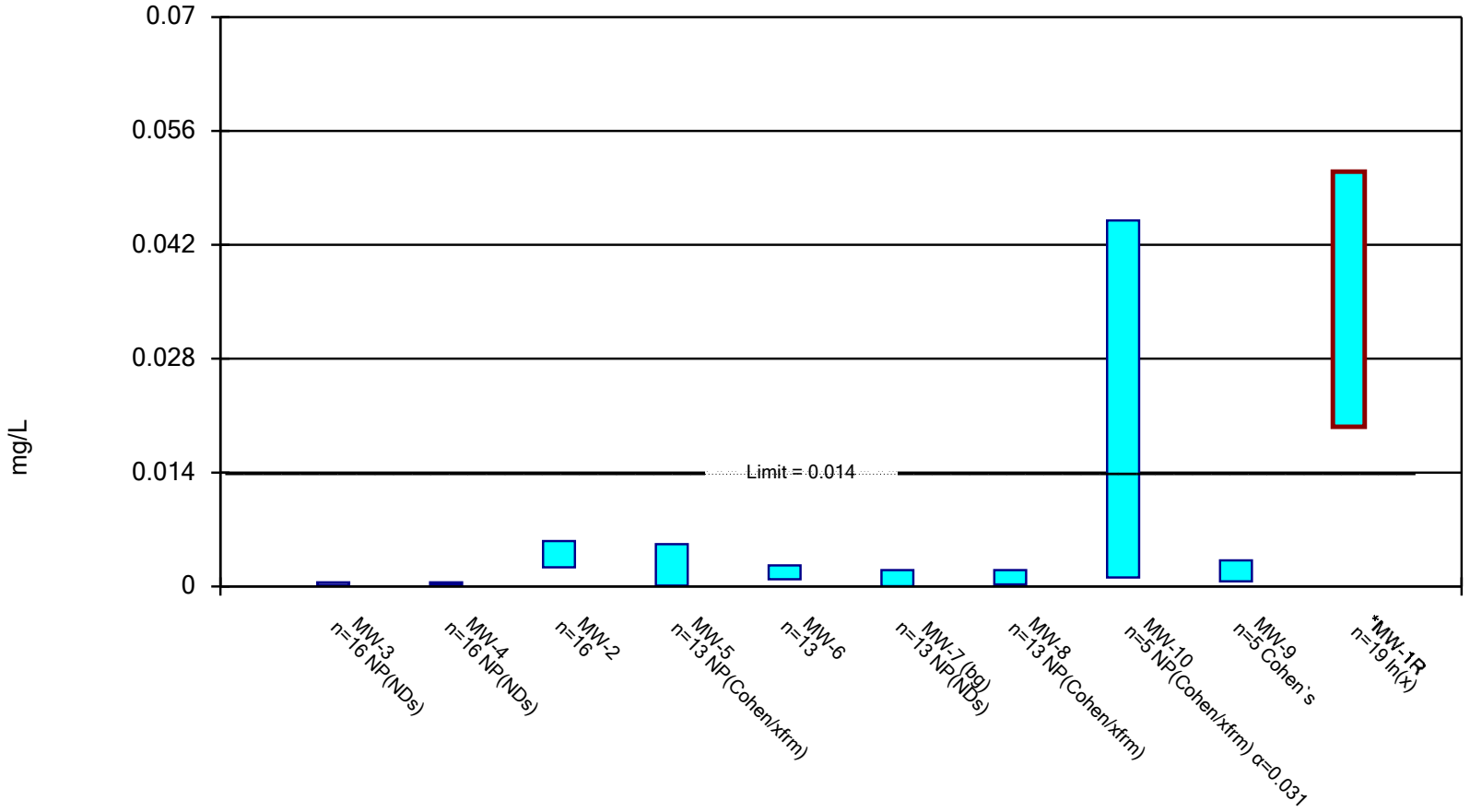


Constituent: Iron Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

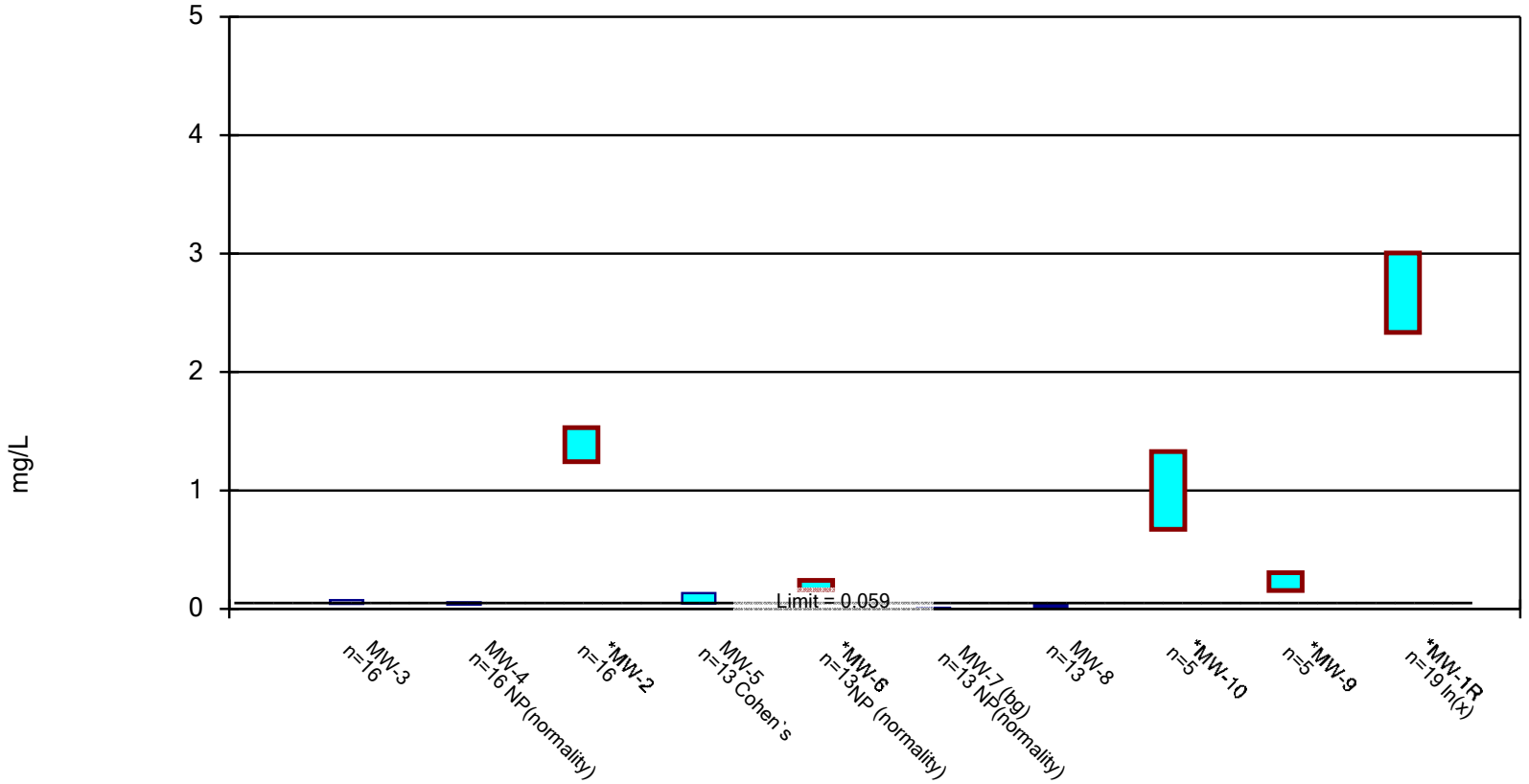


Constituent: Lead Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

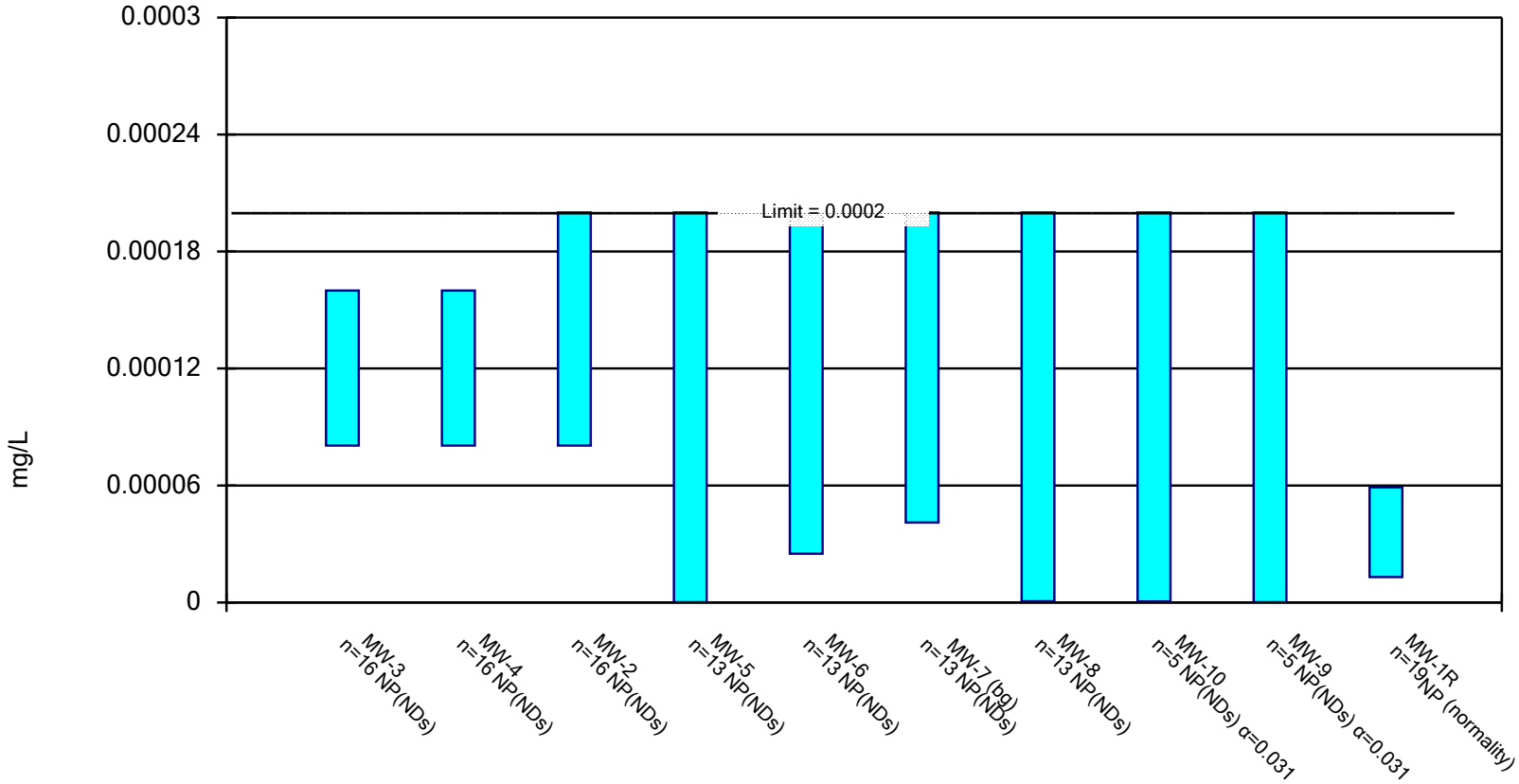


Constituent: Lithium Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

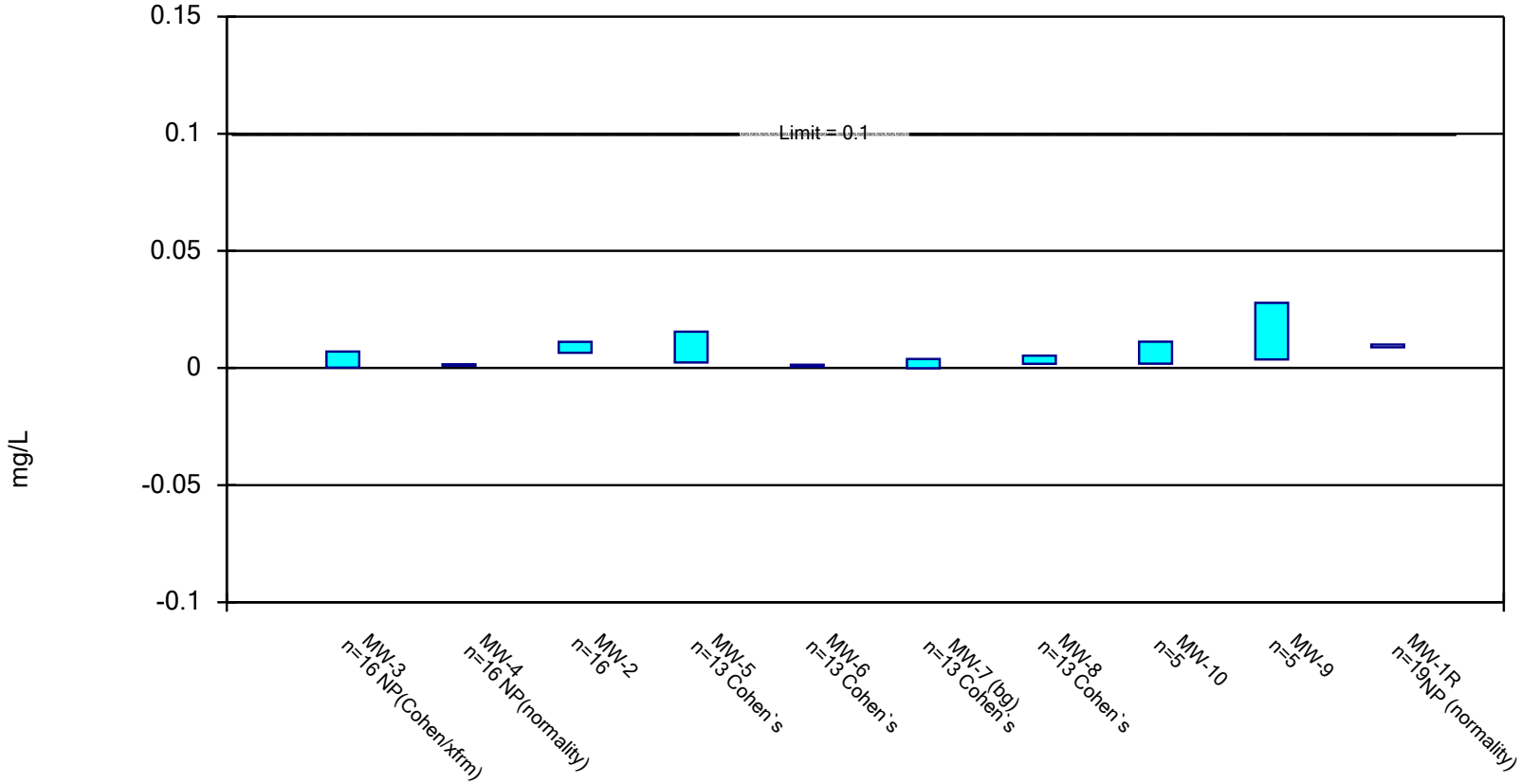


Constituent: Mercury Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

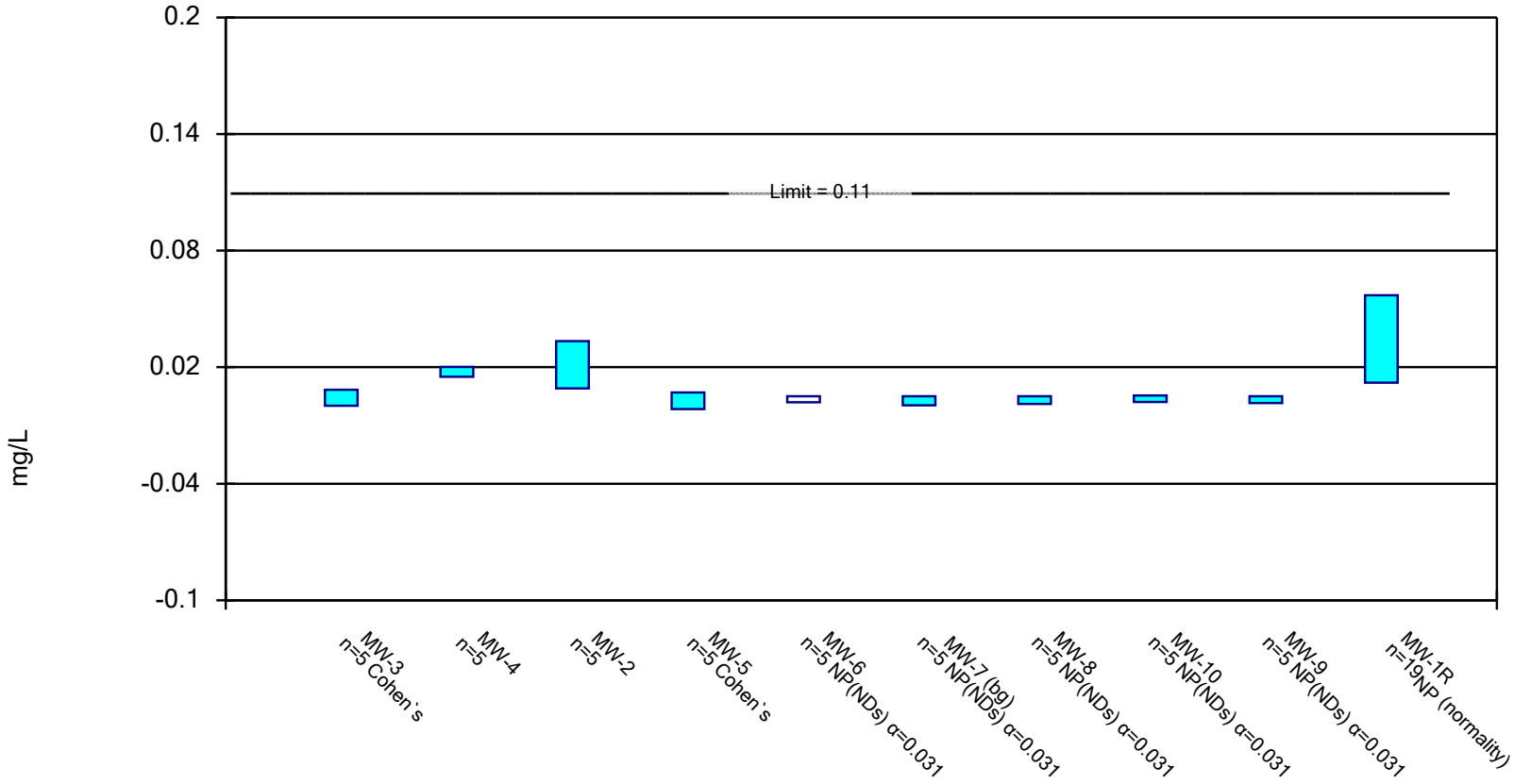


Constituent: Molybdenum Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

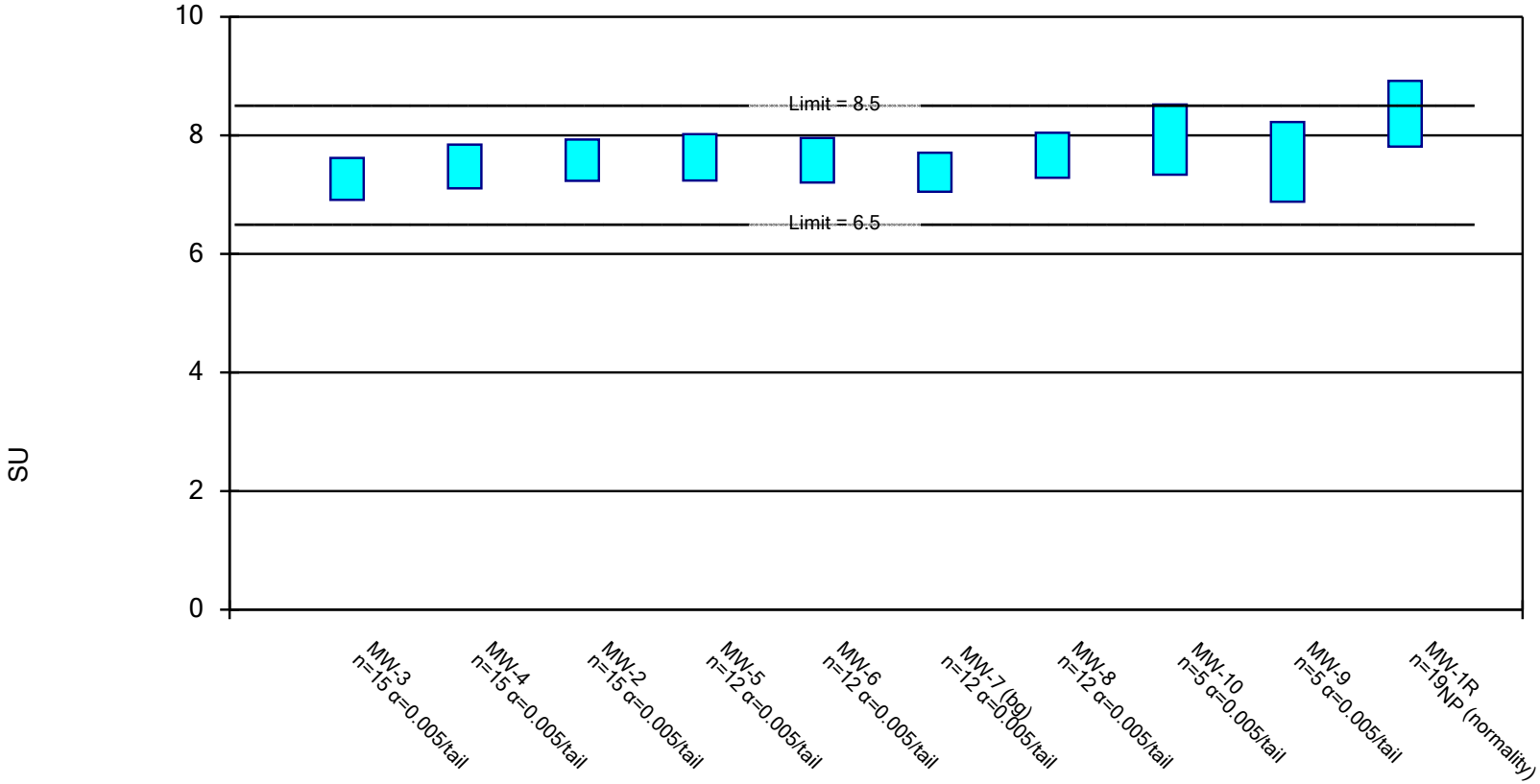


Constituent: Nickel Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

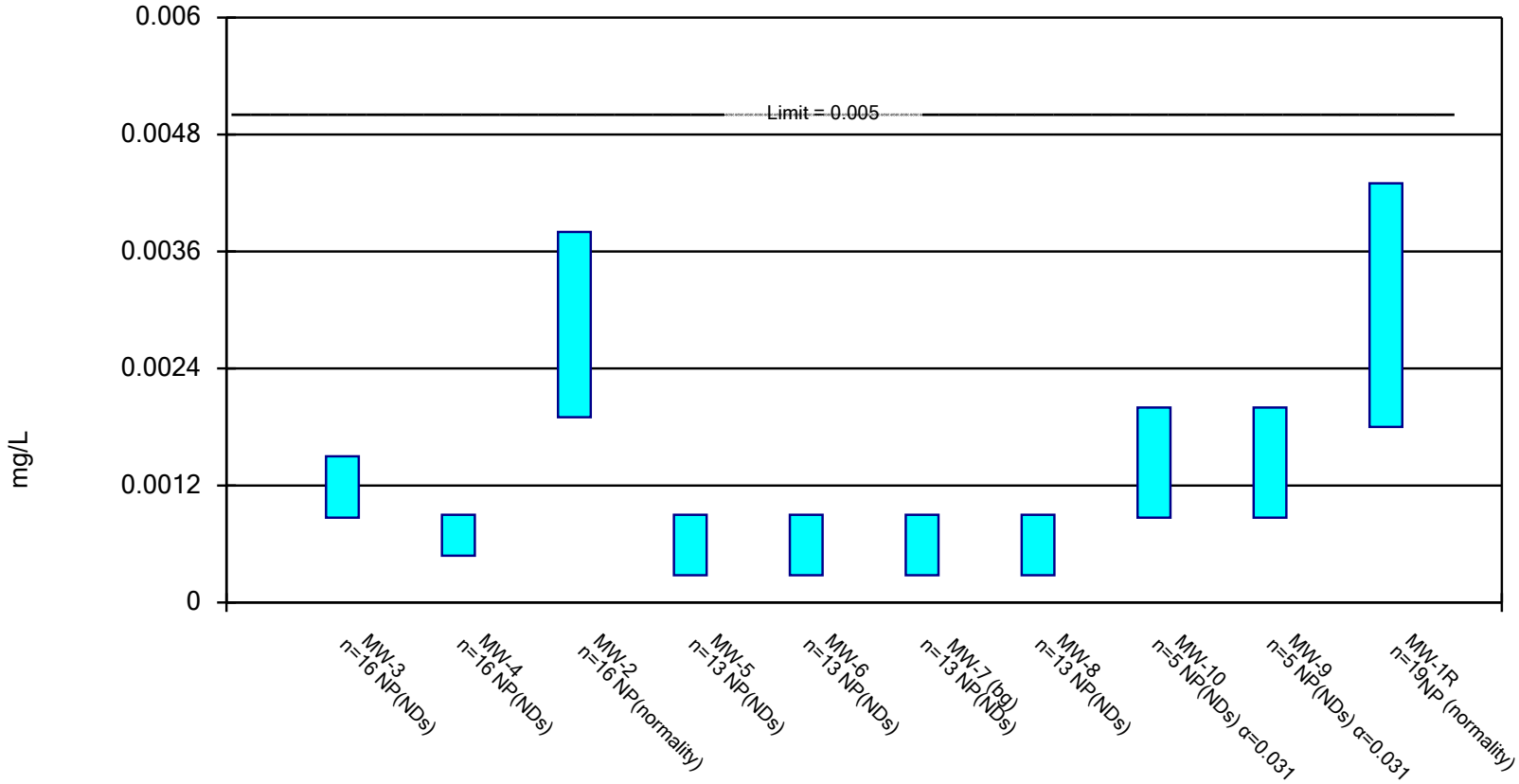


Constituent: pH Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

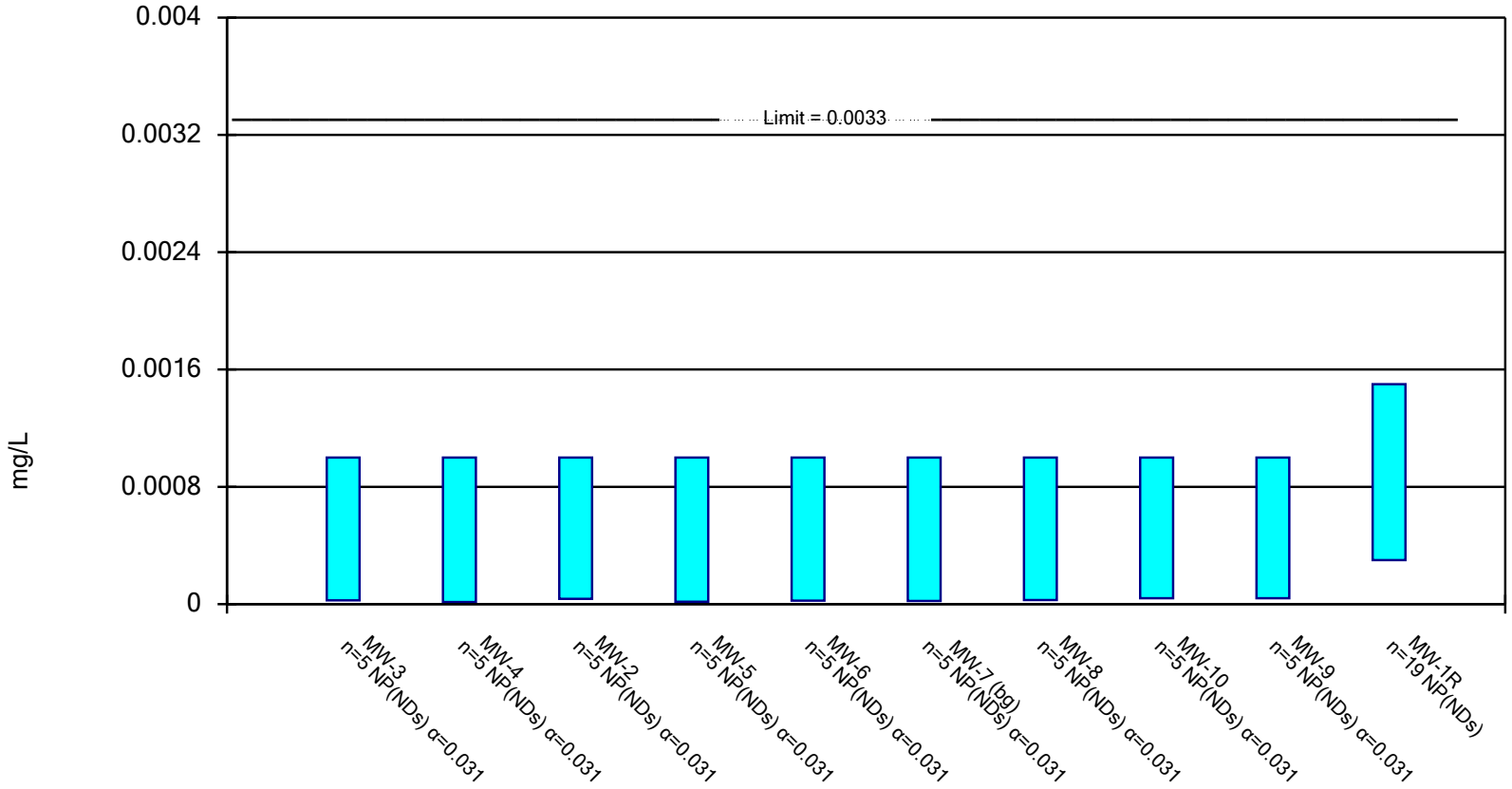


Constituent: Selenium Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

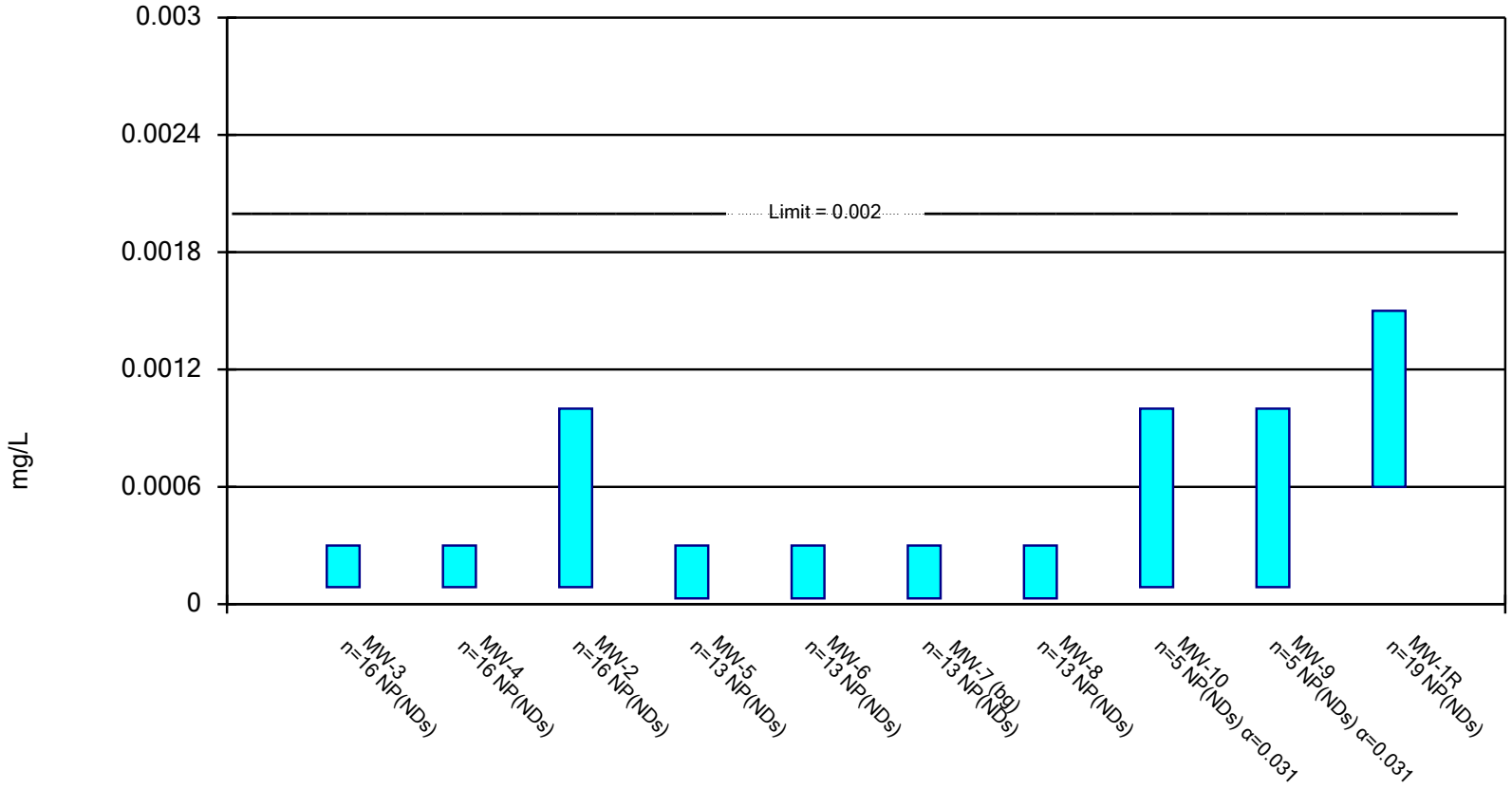


Constituent: Silver Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

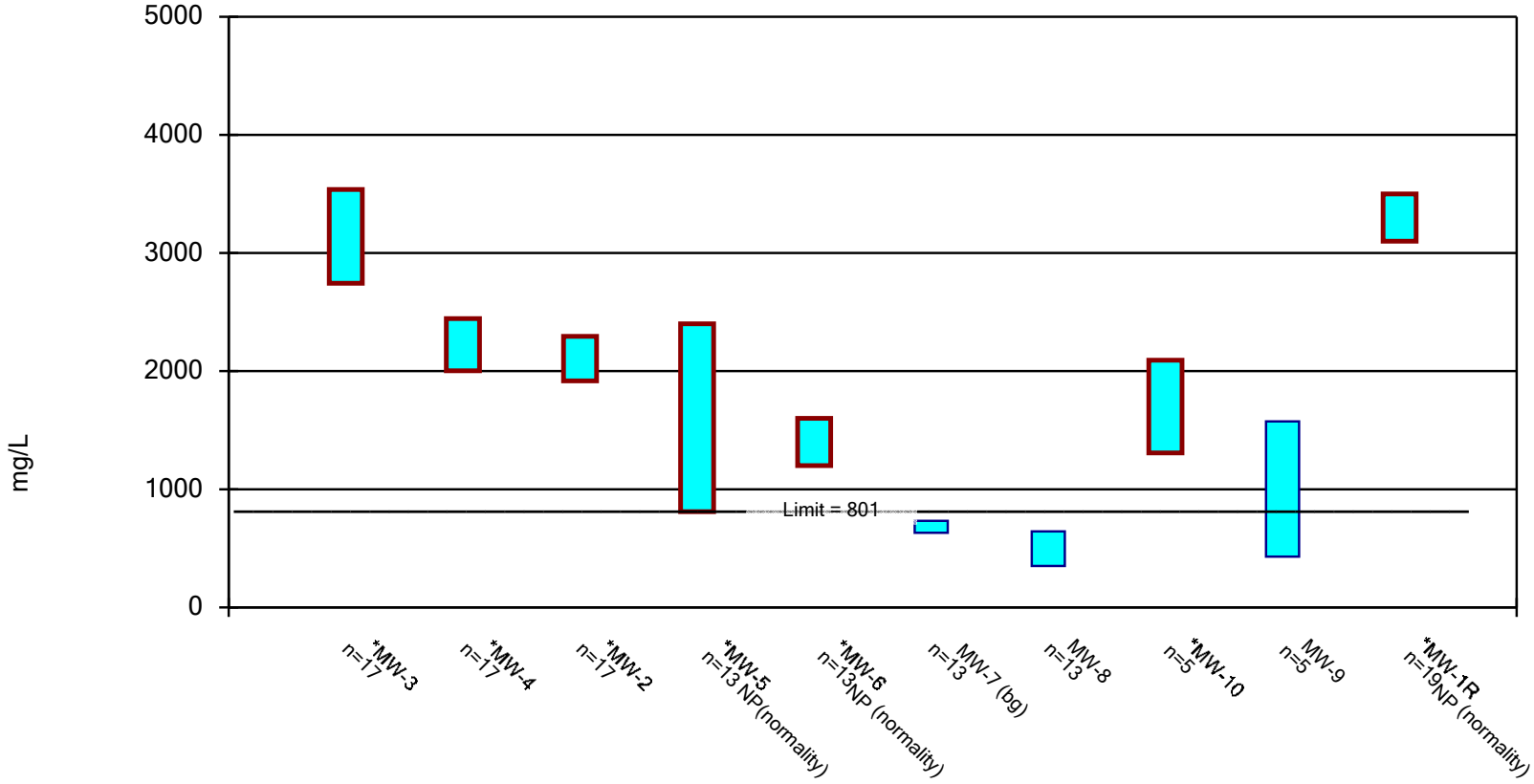


Constituent: Thallium Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

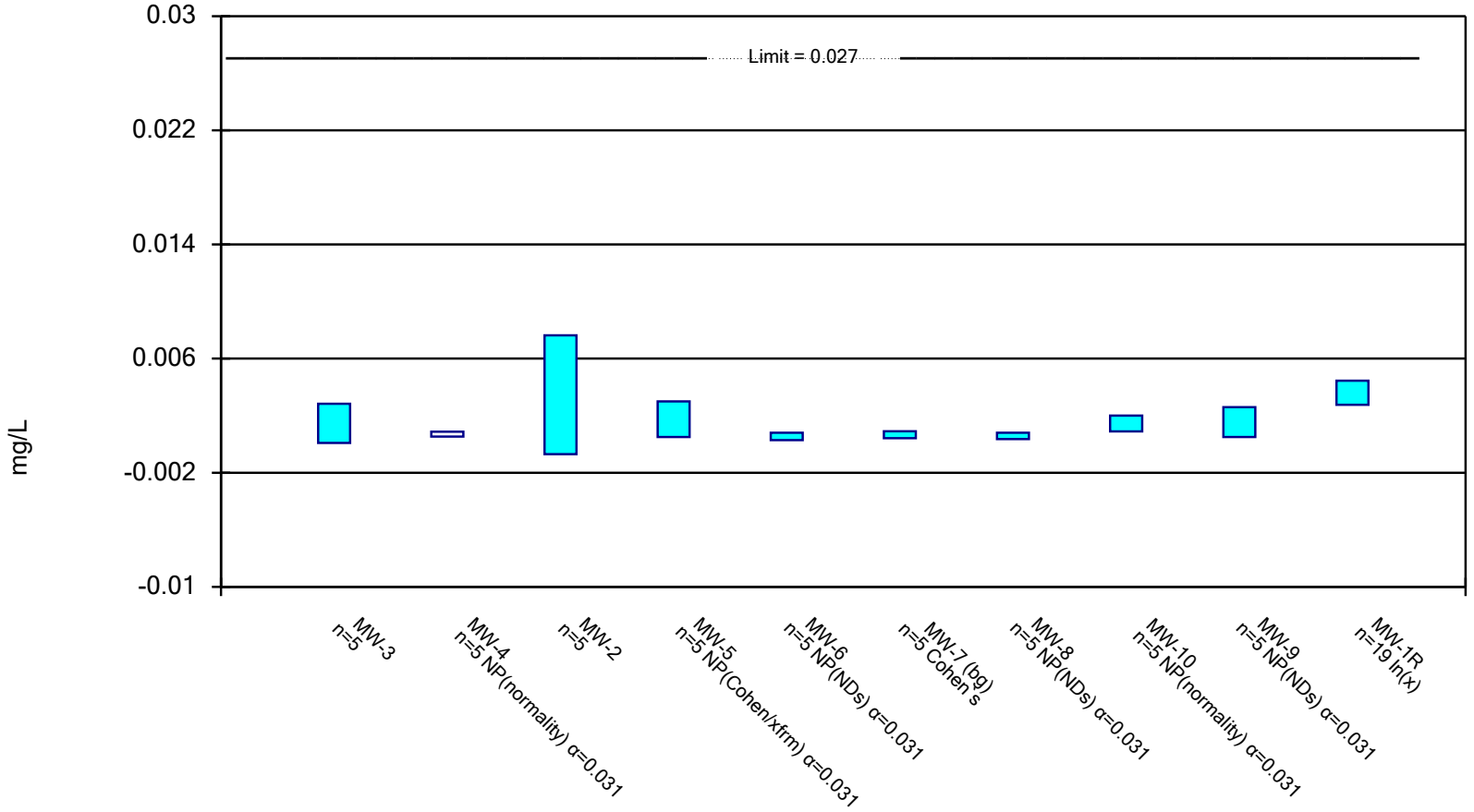


Constituent: Total Dissolved Solids Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

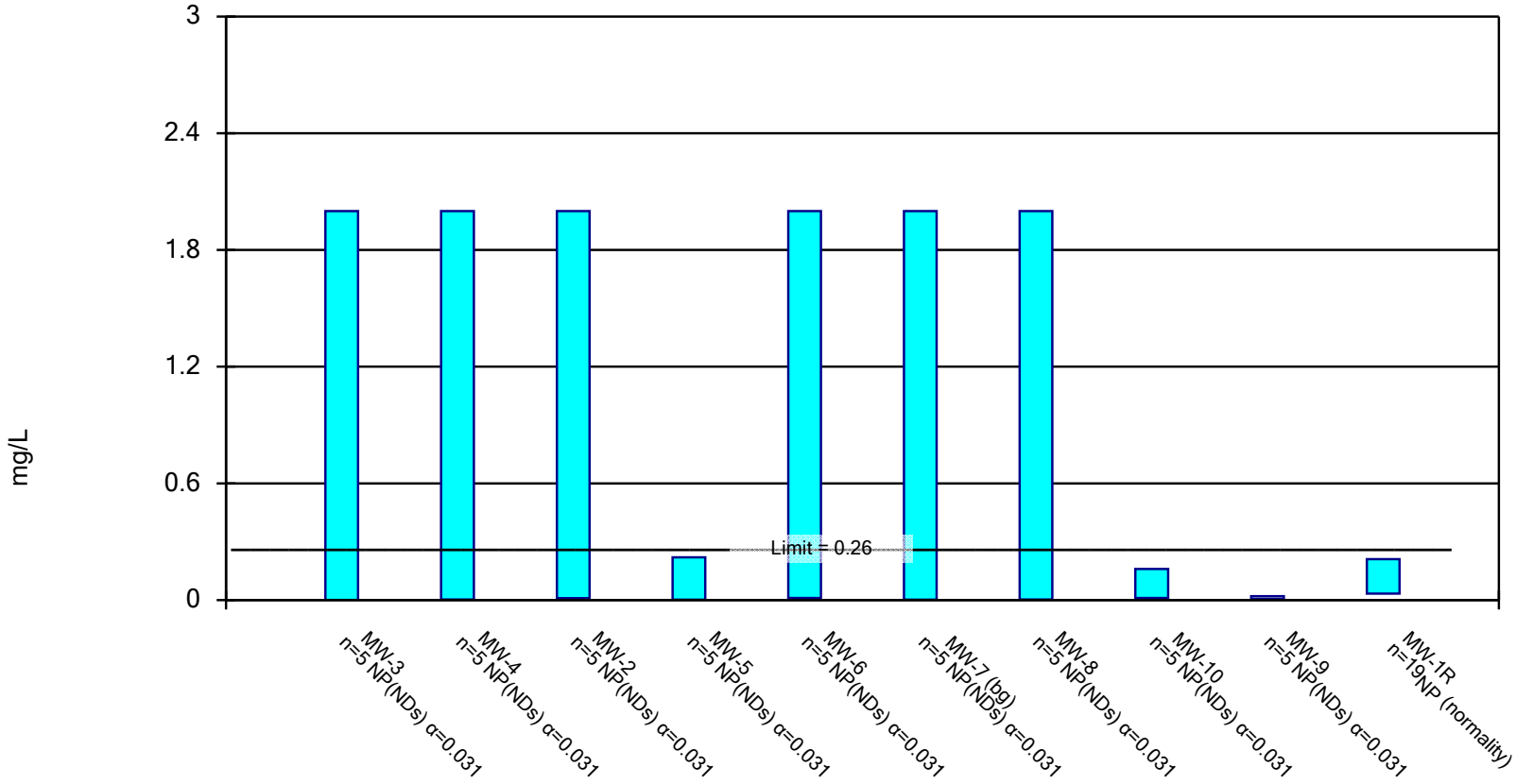


Constituent: Vanadium Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.



Constituent: Zinc Analysis Run 11/18/2020 11:19 AM View: MI GWPS

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Confidence Interval

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP Printed 11/18/2020, 11:21 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	Transform	Alpha	Method
Antimony (mg/L)	MW-3	0.00057	0.00027	0.006	No	16	0.0003678	0.0001549	93.75	No	0.01	NP (NDs)
Antimony (mg/L)	MW-4	0.00057	0.00027	0.006	No	16	0.0003657	0.000151	93.75	No	0.01	NP (NDs)
Antimony (mg/L)	MW-2	0.00068	0.00027	0.006	No	16	0.001048	0.001824	56.25	No	0.01	NP (NDs)
Antimony (mg/L)	MW-5	0.0003	0.00009	0.006	No	13	0.0002031	0.0001002	100	No	0.01	NP (NDs)
Antimony (mg/L)	MW-6	0.00033	0.00009	0.006	No	13	0.0002138	0.0001065	69.23	No	0.01	NP (NDs)
Antimony (mg/L)	MW-7 (bg)	0.0016	0.00009	0.006	No	13	0.0003142	0.0003983	84.62	No	0.01	NP (NDs)
Antimony (mg/L)	MW-8	0.00031	0.00009	0.006	No	13	0.0002062	0.00009851	84.62	No	0.01	NP (NDs)
Antimony (mg/L)	MW-10	0.0039	0.00018	0.006	No	5	0.001056	0.001597	60	No	0.031	NP (NDs)
Antimony (mg/L)	MW-9	0.0006	0.0003	0.006	No	5	0.00036	0.0001342	100	No	0.031	NP (NDs)
Antimony (mg/L)	MW-1R	0.006869	0.002388	0.006	No	19	0.006028	0.006	5.263	ln(x)	0.01	Param.
Arsenic (mg/L)	MW-3	0.002285	0.001728	0.01	No	16	0.002006	0.0004281	0	No	0.01	Param.
Arsenic (mg/L)	MW-4	0.0019	0.0012	0.01	No	16	0.001456	0.0003054	0	No	0.01	NP (normality)
Arsenic (mg/L)	MW-2	0.009467	0.006464	0.01	No	16	0.007966	0.002308	6.25	No	0.01	Param.
Arsenic (mg/L)	**MW-5**	**0.1888**	**0.05634**	**0.01**	**Yes**	**13**	**0.1226**	**0.08909**	**0**	**No**	**0.01**	**Param.**
Arsenic (mg/L)	MW-6	0.001564	0.0008821	0.01	No	13	0.001196	0.0004875	15.38	No	0.01	Param.
Arsenic (mg/L)	MW-7 (bg)	0.0028	0.00025	0.01	No	12	0.001253	0.001339	33.33	No	0.01	NP (Cohens/xfrm)
Arsenic (mg/L)	MW-8	0.006563	0.003621	0.01	No	13	0.005092	0.001978	0	No	0.01	Param.
Arsenic (mg/L)	MW-10	0.001555	0.0009126	0.01	No	5	0.001234	0.0001918	0	No	0.01	Param.
Arsenic (mg/L)	MW-9	0.003663	0.001457	0.01	No	5	0.00256	0.000658	0	No	0.01	Param.
Arsenic (mg/L)	MW-1R	0.008451	0.007338	0.01	No	19	0.007895	0.0009507	0	No	0.01	Param.
Barium (mg/L)	MW-3	0.4447	0.3253	1.3	No	16	0.385	0.09172	0	No	0.01	Param.
Barium (mg/L)	MW-4	0.1614	0.1255	1.3	No	16	0.1434	0.02761	0	No	0.01	Param.
Barium (mg/L)	MW-2	0.483	0.4445	1.3	No	16	0.4638	0.02964	0	No	0.01	Param.
Barium (mg/L)	MW-5	0.3266	0.1286	1.3	No	13	0.2276	0.1331	0	No	0.01	Param.
Barium (mg/L)	MW-6	1.3	0.56	1.3	No	13	0.9673	0.3586	0	No	0.01	NP (normality)
Barium (mg/L)	MW-7 (bg)	0.4249	0.332	1.3	No	13	0.3785	0.06243	0	No	0.01	Param.
Barium (mg/L)	MW-8	0.7215	0.4969	1.3	No	13	0.6092	0.151	0	No	0.01	Param.
Barium (mg/L)	MW-10	1.318	1.082	1.3	No	5	1.2	0.07071	0	No	0.01	Param.
Barium (mg/L)	MW-9	2.551	0.7686	1.3	No	5	1.66	0.532	0	No	0.01	Param.
Barium (mg/L)	MW-1R	0.6932	0.4858	1.3	No	19	0.5895	0.1771	0	No	0.01	Param.
Beryllium (mg/L)	MW-3	0.001	0.00031	0.004	No	16	0.0006463	0.0004874	100	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-4	0.001	0.00031	0.004	No	16	0.0006463	0.0004874	100	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-2	0.002	0.00031	0.004	No	16	0.001026	0.000963	81.25	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-5	0.002	0.00006	0.004	No	13	0.0007154	0.0006031	100	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-6	0.002	0.00006	0.004	No	13	0.0006792	0.0005987	100	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-7 (bg)	0.002	0.00006	0.004	No	13	0.0006792	0.0005987	100	No	0.01	NP (NDs)

Confidence Interval

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Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	Transform	Alpha	Method
Beryllium (mg/L)	MW-8	0.002	0.00006	0.004	No	13	0.0006453	0.00062	92.31	No	0.01	NP (NDs)
Beryllium (mg/L)	MW-10	0.002	0.001	0.004	No	5	0.0012	0.0004472	100	No	0.031	NP (NDs)
Beryllium (mg/L)	MW-9	0.002	0.001	0.004	No	5	0.0012	0.0004472	100	No	0.031	NP (NDs)
Beryllium (mg/L)	MW-1R	0.001	0.001	0.004	No	19	0.001	0	100	No	0.01	NP (NDs)
Boron (ug/L)	MW-3	5695	4505	16000	No	16	5144	954.3	0	ln(x)	0.01	Param.
Boron (ug/L)	MW-4	4100	3400	16000	No	16	3794	635.1	0	No	0.01	NP (normality)
Boron (ug/L)	**MW-2**	**149707**	**101792**	**16000**	**Yes**	**16**	**129000**	**43927**	**0**	**ln(x)**	**0.01**	**Param.**
Boron (ug/L)	MW-5	5000	2600	16000	No	13	4346	3016	0	No	0.01	NP (normality)
Boron (ug/L)	MW-6	14252	8149	16000	No	13	11201	4104	0	No	0.01	Param.
Boron (ug/L)	MW-7 (bg)	15000	9000	16000	No	13	12277	3708	0	No	0.01	NP (normality)
Boron (ug/L)	MW-8	3352	1300	16000	No	13	2554	1828	0	ln(x)	0.01	Param.
Boron (ug/L)	**MW-10**	**48349**	**34051**	**16000**	**Yes**	**5**	**41200**	**4266**	**0**	**No**	**0.01**	**Param.**
Boron (ug/L)	MW-9	6957	4283	16000	No	5	5620	798.1	0	No	0.01	Param.
Boron (ug/L)	**MW-1R**	**187968**	**162558**	**16000**	**Yes**	**19**	**175263**	**21697**	**0**	**No**	**0.01**	**Param.**
Cadmium (mg/L)	MW-3	0.00033	0.00004	0.0025	No	16	0.0002791	0.000265	93.75	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-4	0.0006	0.00004	0.0025	No	16	0.0002733	0.0002635	87.5	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-2	0.0011	0.00012	0.0025	No	16	0.0005931	0.0006635	56.25	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-5	0.0006	0.000017	0.0025	No	13	0.0001906	0.0003236	76.92	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-6	0.0006	0.000021	0.0025	No	13	0.0002056	0.000316	53.85	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-7 (bg)	0.0006	0.000017	0.0025	No	13	0.0001926	0.0003225	92.31	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-8	0.0006	0.000017	0.0025	No	13	0.0001977	0.00032	84.62	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-10	0.0012	0.00003	0.0025	No	5	0.000706	0.0004687	60	No	0.031	NP (NDs)
Cadmium (mg/L)	MW-9	0.0012	0.00004	0.0025	No	5	0.000688	0.0004458	100	No	0.031	NP (NDs)
Cadmium (mg/L)	MW-1R	0.006288	0.00235	0.0025	No	19	0.005537	0.005533	10.53	ln(x)	0.01	Param.
Calcium (ug/L)	**MW-3**	**596586**	**542237**	**200000**	**Yes**	**17**	**569412**	**43369**	**0**	**No**	**0.01**	**Param.**
Calcium (ug/L)	**MW-4**	**474422**	**432637**	**200000**	**Yes**	**17**	**453529**	**33343**	**0**	**No**	**0.01**	**Param.**
Calcium (ug/L)	MW-2	210000	180000	200000	No	17	201176	37564	0	No	0.01	NP (normality)
Calcium (ug/L)	**MW-5**	**554284**	**287254**	**200000**	**Yes**	**13**	**420769**	**179558**	**0**	**No**	**0.01**	**Param.**
Calcium (ug/L)	MW-6	260000	190000	200000	No	13	219331	69596	0	No	0.01	NP (normality)
Calcium (ug/L)	MW-7 (bg)	150000	130000	200000	No	13	146154	17578	0	No	0.01	NP (normality)
Calcium (ug/L)	MW-8	138320	117834	200000	No	13	128077	13775	0	No	0.01	Param.
Calcium (ug/L)	MW-10	150000	130000	200000	No	5	136000	8944	0	No	0.031	NP (normality)
Calcium (ug/L)	**MW-9**	**281349**	**218651**	**200000**	**Yes**	**5**	**250000**	**18708**	**0**	**No**	**0.01**	**Param.**
Calcium (ug/L)	MW-1R	243679	166847	200000	No	19	205263	65606	0	No	0.01	Param.
Chloride (mg/L)	**MW-3**	**480**	**340**	**150**	**Yes**	**17**	**425.9**	**102.6**	**0**	**No**	**0.01**	**NP (normality)**
Chloride (mg/L)	**MW-4**	**336.9**	**261.9**	**150**	**Yes**	**17**	**299.4**	**59.84**	**0**	**No**	**0.01**	**Param.**

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Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	Transform	Alpha	Method
Chloride (mg/L)	MW-2	160	140	150	No	17	145.9	8.703	0	No	0.01	NP (normality)
Chloride (mg/L)	MW-5	21.62	13.17	150	No	13	17.39	5.68	0	No	0.01	Param.
Chloride (mg/L)	MW-6	310	140	150	No	13	247.7	65.72	0	No	0.01	NP (normality)
Chloride (mg/L)	MW-7 (bg)	15	13	150	No	13	14.23	0.8321	0	No	0.01	NP (normality)
Chloride (mg/L)	MW-8	49.06	14.5	150	No	13	37.27	34.14	0	ln(x)	0.01	Param.
Chloride (mg/L)	**MW-10**	**706.3**	**301.7**	**150**	**Yes**	**5**	**504**	**120.7**	**0**	**No**	**0.01**	**Param.**
Chloride (mg/L)	MW-9	18	9.5	150	No	5	12.1	3.362	0	No	0.031	NP (normality)
Chloride (mg/L)	**MW-1R**	**267.3**	**252.7**	**150**	**Yes**	**19**	**260**	**12.47**	**0**	**No**	**0.01**	**Param.**
Chromium (mg/L)	MW-3	0.002206	0.001318	0.011	No	16	0.001847	0.0008413	0	ln(x)	0.01	Param.
Chromium (mg/L)	MW-4	0.00212	0.00173	0.011	No	16	0.001925	0.0003	0	No	0.01	Param.
Chromium (mg/L)	**MW-2**	**0.05825**	**0.03613**	**0.011**	**Yes**	**16**	**0.04719**	**0.017**	**0**	**No**	**0.01**	**Param.**
Chromium (mg/L)	MW-5	0.0008	0.00034	0.011	No	13	0.0006669	0.0001979	76.92	No	0.01	NP (NDs)
Chromium (mg/L)	MW-6	0.0038	0.0012	0.011	No	13	0.001838	0.00109	0	No	0.01	NP (normality)
Chromium (mg/L)	MW-7 (bg)	0.0009	0.00037	0.011	No	13	0.0007869	0.0006348	61.54	No	0.01	NP (NDs)
Chromium (mg/L)	MW-8	0.0008739	0.0005799	0.011	No	13	0.0007269	0.0001977	23.08	No	0.01	Param.
Chromium (mg/L)	MW-10	0.01359	0.006246	0.011	No	5	0.00992	0.002192	0	No	0.01	Param.
Chromium (mg/L)	MW-9	0.003111	0.001409	0.011	No	5	0.00226	0.0005079	0	No	0.01	Param.
Chromium (mg/L)	MW-1R	0.008598	0.004665	0.011	No	19	0.007253	0.004152	0	ln(x)	0.01	Param.
Cobalt (mg/L)	MW-3	0.0013	0.00072	0.006	No	16	0.0009469	0.0003039	18.75	No	0.01	NP (Cohens/xfrm)
Cobalt (mg/L)	MW-4	0.00058	0.00032	0.006	No	16	0.0005244	0.0003353	31.25	No	0.01	NP (Cohens/xfrm)
Cobalt (mg/L)	MW-2	0.0087	0.0046	0.006	No	16	0.007075	0.001964	0	No	0.01	NP (normality)
Cobalt (mg/L)	MW-5	0.00418	-0.0001515	0.006	No	13	0.002588	0.002214	30.77	No	0.01	Param.
Cobalt (mg/L)	MW-6	0.00099	0.00035	0.006	No	13	0.0007654	0.0004255	46.15	No	0.01	NP (Cohens/xfrm)
Cobalt (mg/L)	MW-7 (bg)	0.00091	0.0007	0.006	No	13	0.0008577	0.0002361	30.77	No	0.01	NP (normality)
Cobalt (mg/L)	MW-8	0.0019	0.00032	0.006	No	13	0.0008585	0.000691	30.77	No	0.01	NP (normality)
Cobalt (mg/L)	MW-10	0.00267	0.00002181	0.006	No	5	0.001346	0.0007902	20	No	0.01	Param.
Cobalt (mg/L)	MW-9	0.003004	-0.00004386	0.006	No	5	0.00148	0.0009094	20	No	0.01	Param.
Cobalt (mg/L)	**MW-1R**	**0.022**	**0.0086**	**0.006**	**Yes**	**19**	**0.02322**	**0.02449**	**0**	**No**	**0.01**	**NP (normality)**
Combined Radium 226 + 228 (pCi/L)	MW-3	1.235	0.6471	5	No	15	0.941	0.4337	33.33	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-4	1.05	0.413	5	No	15	0.8741	0.4175	46.67	No	0.01	NP (normality)
Combined Radium 226 + 228 (pCi/L)	MW-2	2.27	1	5	No	15	1.542	0.8918	40	No	0.01	NP (Cohens/xfrm)
Combined Radium 226 + 228 (pCi/L)	MW-5	1.1	0.536	5	No	12	0.9475	0.2654	66.67	No	0.01	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-6	2.34	0.86	5	No	12	1.263	0.8004	50	No	0.01	NP (normality)
Combined Radium 226 + 228 (pCi/L)	MW-7 (bg)	1.3	0.762	5	No	12	0.9818	0.1418	75	No	0.01	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-8	1.99	0.952	5	No	12	1.199	0.4417	50	No	0.01	NP (normality)
Copper (mg/L)	MW-3	0.005	0.00045	0.02	No	5	0.002966	0.002168	60	No	0.031	NP (NDs)

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Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	Transform	Alpha	Method
Copper (mg/L)	MW-4	0.005	0.00085	0.02	No	5	0.00319	0.001876	60	No	0.031	NP (NDs)
Copper (mg/L)	MW-2	0.005	0.0012	0.02	No	5	0.00362	0.001482	60	No	0.031	NP (NDs)
Copper (mg/L)	MW-5	0.005	0.00028	0.02	No	5	0.003316	0.001895	60	No	0.031	NP (NDs)
Copper (mg/L)	MW-6	0.005	0.0012	0.02	No	5	0.00364	0.001477	60	No	0.031	NP (NDs)
Copper (mg/L)	MW-7 (bg)	0.005	0.00046	0.02	No	5	0.00293	0.002214	60	No	0.031	NP (NDs)
Copper (mg/L)	MW-8	0.005	0.00084	0.02	No	5	0.003076	0.002016	60	No	0.031	NP (NDs)
Copper (mg/L)	MW-10	0.0086	0.00087	0.02	No	5	0.004614	0.00275	80	No	0.031	NP (NDs)
Copper (mg/L)	MW-9	0.0086	0.0013	0.02	No	5	0.0047	0.002607	80	No	0.031	NP (NDs)
Copper (mg/L)	MW-1R	0.022	0.0043	0.02	No	19	0.0113	0.008943	52.63	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-3	1.572	0.9454	2.42	No	16	1.259	0.4816	0	No	0.01	Param.
Fluoride (mg/L)	MW-4	1.315	1.103	2.42	No	16	1.209	0.163	0	No	0.01	Param.
Fluoride (mg/L)	**MW-2**	**13.5**	**10.83**	**2.42**	**Yes**	**16**	**12.16**	**2.049**	**0**	**No**	**0.01**	**Param.**
Fluoride (mg/L)	MW-5	3.039	2.022	2.42	No	13	2.531	0.6836	0	No	0.01	Param.
Fluoride (mg/L)	MW-6	1.739	1.43	2.42	No	13	1.585	0.2075	0	No	0.01	Param.
Fluoride (mg/L)	MW-7 (bg)	0.1496	0.07961	2.42	No	13	0.1072	0.05543	23.08	No	0.01	Param.
Fluoride (mg/L)	MW-8	0.4948	0.2867	2.42	No	13	0.3908	0.1399	0	No	0.01	Param.
Fluoride (mg/L)	**MW-10**	**11.21**	**8.714**	**2.42**	**Yes**	**5**	**9.96**	**0.7436**	**0**	**No**	**0.01**	**Param.**
Fluoride (mg/L)	MW-9	2.631	2.249	2.42	No	5	2.44	0.114	0	No	0.01	Param.
Fluoride (mg/L)	**MW-1R**	**26**	**22**	**2.42**	**Yes**	**19**	**23.34**	**5.18**	**0**	**No**	**0.01**	**NP (normality)**
Iron (mg/L)	MW-3	24.39	0.006008	22.39	No	5	12.2	7.277	0	No	0.01	Param.
Iron (mg/L)	MW-4	10.21	6.434	22.39	No	5	8.32	1.126	0	No	0.01	Param.
Iron (mg/L)	MW-2	23.8	17.8	22.39	No	5	20.8	1.789	0	No	0.01	Param.
Iron (mg/L)	MW-5	50.41	-1.405	22.39	No	5	24.5	15.46	0	No	0.01	Param.
Iron (mg/L)	MW-6	18.23	8.572	22.39	No	5	13.4	2.881	0	No	0.01	Param.
Iron (mg/L)	MW-7 (bg)	21	19	22.39	No	5	19.6	0.8944	0	No	0.031	NP (normality)
Iron (mg/L)	MW-8	26.92	15.08	22.39	No	5	21	3.536	0	No	0.01	Param.
Iron (mg/L)	MW-10	11.73	7.786	22.39	No	5	9.76	1.178	0	No	0.01	Param.
Iron (mg/L)	MW-9	22.51	12.29	22.39	No	5	17.4	3.05	0	No	0.01	Param.
Iron (mg/L)	MW-1R	4.701	2.888	22.39	No	19	3.795	1.548	0	No	0.01	Param.
Lead (mg/L)	MW-3	0.0005	0.00019	0.014	No	16	0.0004812	0.0004405	56.25	No	0.01	NP (NDs)
Lead (mg/L)	MW-4	0.0005	0.00028	0.014	No	16	0.0004756	0.0004204	56.25	No	0.01	NP (NDs)
Lead (mg/L)	MW-2	0.005573	0.002346	0.014	No	16	0.003959	0.00248	6.25	No	0.01	Param.
Lead (mg/L)	MW-5	0.0052	0.00011	0.014	No	13	0.003037	0.007625	38.46	No	0.01	NP (Cohens/xfrm)
Lead (mg/L)	MW-6	0.002581	0.0008838	0.014	No	13	0.001732	0.001141	15.38	No	0.01	Param.
Lead (mg/L)	MW-7 (bg)	0.002	0.00004	0.014	No	13	0.0005885	0.0008699	61.54	No	0.01	NP (NDs)
Lead (mg/L)	MW-8	0.002	0.00025	0.014	No	13	0.001036	0.001063	30.77	No	0.01	NP (Cohens/xfrm)

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Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	Transform	Alpha	Method
Lead (mg/L)	MW-10	0.045	0.0011	0.014	No	5	0.01076	0.01917	20	No	0.031	NP (Cohens/xfrm)
Lead (mg/L)	MW-9	0.0032	0.0006371	0.014	No	5	0.001386	0.0006881	40	No	0.01	Param.
Lead (mg/L)	**MW-1R**	**0.051**	**0.01963**	**0.014**	**Yes**	**19**	**0.04486**	**0.04486**	**0**	**ln(x)**	**0.01**	**Param.**
Lithium (mg/L)	MW-3	0.07409	0.04304	0.059	No	16	0.05856	0.02386	6.25	No	0.01	Param.
Lithium (mg/L)	MW-4	0.056	0.036	0.059	No	16	0.04744	0.01507	6.25	No	0.01	NP (normality)
Lithium (mg/L)	**MW-2**	**1.53**	**1.242**	**0.059**	**Yes**	**16**	**1.386**	**0.2211**	**0**	**No**	**0.01**	**Param.**
Lithium (mg/L)	MW-5	0.1329	0.04476	0.059	No	13	0.09234	0.05326	15.38	No	0.01	Param.
Lithium (mg/L)	**MW-6**	**0.24**	**0.16**	**0.059**	**Yes**	**13**	**0.1881**	**0.07093**	**7.692**	**No**	**0.01**	**NP (normality)**
Lithium (mg/L)	MW-7 (bg)	0.0094	0.0034	0.059	No	13	0.008948	0.01517	38.46	No	0.01	NP (normality)
Lithium (mg/L)	MW-8	0.03752	0.01987	0.059	No	13	0.02869	0.01187	7.692	No	0.01	Param.
Lithium (mg/L)	**MW-10**	**1.328**	**0.6716**	**0.059**	**Yes**	**5**	**1**	**0.196**	**0**	**No**	**0.01**	**Param.**
Lithium (mg/L)	**MW-9**	**0.3049**	**0.1551**	**0.059**	**Yes**	**5**	**0.23**	**0.04472**	**0**	**No**	**0.01**	**Param.**
Lithium (mg/L)	**MW-1R**	**3.005**	**2.335**	**0.059**	**Yes**	**19**	**2.711**	**0.628**	**0**	**ln(x)**	**0.01**	**Param.**
Mercury (mg/L)	MW-3	0.00016	0.0000805	0.0002	No	16	0.0001276	0.00005334	93.75	No	0.01	NP (NDs)
Mercury (mg/L)	MW-4	0.00016	0.0000805	0.0002	No	16	0.0001276	0.00005344	100	No	0.01	NP (NDs)
Mercury (mg/L)	MW-2	0.0002	0.0000805	0.0002	No	16	0.0002009	0.0002978	93.75	No	0.01	NP (NDs)
Mercury (mg/L)	MW-5	0.0002	1.6e-7	0.0002	No	13	0.0001027	0.00007447	92.31	No	0.01	NP (NDs)
Mercury (mg/L)	MW-6	0.0002	0.000025	0.0002	No	13	0.0001046	0.00006955	76.92	No	0.01	NP (NDs)
Mercury (mg/L)	MW-7 (bg)	0.0002	0.000041	0.0002	No	13	0.0001065	0.00007056	76.92	No	0.01	NP (NDs)
Mercury (mg/L)	MW-8	0.0002	6.2e-7	0.0002	No	13	0.00009893	0.00007191	84.62	No	0.01	NP (NDs)
Mercury (mg/L)	MW-10	0.0002	5.1e-7	0.0002	No	5	0.0001122	0.0001032	60	No	0.031	NP (NDs)
Mercury (mg/L)	MW-9	0.0002	1.6e-7	0.0002	No	5	0.0001122	0.0001033	80	No	0.031	NP (NDs)
Mercury (mg/L)	MW-1R	0.000059	0.000013	0.0002	No	19	0.0000377	0.00004429	5.263	No	0.01	NP (normality)
Molybdenum (mg/L)	MW-3	0.007	0.00013	0.1	No	16	0.002857	0.003252	50	No	0.01	NP (Cohens/xfrm)
Molybdenum (mg/L)	MW-4	0.0016	0.001	0.1	No	16	0.0013	0.0006614	25	No	0.01	NP (normality)
Molybdenum (mg/L)	MW-2	0.01115	0.00651	0.1	No	16	0.008831	0.003568	12.5	No	0.01	Param.
Molybdenum (mg/L)	MW-5	0.01551	0.002348	0.1	No	13	0.009645	0.007755	15.38	No	0.01	Param.
Molybdenum (mg/L)	MW-6	0.001363	0.0005612	0.1	No	13	0.001017	0.0005165	38.46	No	0.01	Param.
Molybdenum (mg/L)	MW-7 (bg)	0.003839	-0.0001281	0.1	No	13	0.002309	0.002125	30.77	No	0.01	Param.
Molybdenum (mg/L)	MW-8	0.005236	0.001782	0.1	No	13	0.003668	0.002041	15.38	No	0.01	Param.
Molybdenum (mg/L)	MW-10	0.01124	0.001843	0.1	No	5	0.00654	0.002803	0	No	0.01	Param.
Molybdenum (mg/L)	MW-9	0.02781	0.003669	0.1	No	5	0.01574	0.007203	0	No	0.01	Param.
Molybdenum (mg/L)	MW-1R	0.01	0.0088	0.1	No	19	0.009626	0.00184	0	No	0.01	NP (normality)
Nickel (mg/L)	MW-3	0.008375	0.0001117	0.11	No	5	0.0039	0.002074	20	No	0.01	Param.
Nickel (mg/L)	MW-4	0.02014	0.01506	0.11	No	5	0.0176	0.001517	0	No	0.01	Param.
Nickel (mg/L)	MW-2	0.03336	0.009035	0.11	No	5	0.0212	0.007259	0	No	0.01	Param.

Confidence Interval

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP Printed 11/18/2020, 11:21 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	Transform	Alpha	Method
Nickel (mg/L)	MW-5	0.00701	-0.001534	0.11	No	5	0.003108	0.00215	20	No	0.01	Param.
Nickel (mg/L)	MW-6	0.005	0.0019	0.11	No	5	0.00274	0.001276	60	No	0.031	NP (NDs)
Nickel (mg/L)	MW-7 (bg)	0.005	0.0004	0.11	No	5	0.002044	0.001879	60	No	0.031	NP (NDs)
Nickel (mg/L)	MW-8	0.005	0.0011	0.11	No	5	0.00236	0.00156	60	No	0.031	NP (NDs)
Nickel (mg/L)	MW-10	0.0054	0.0021	0.11	No	5	0.00326	0.001539	60	No	0.031	NP (NDs)
Nickel (mg/L)	MW-9	0.005	0.0015	0.11	No	5	0.00306	0.001539	80	No	0.031	NP (NDs)
Nickel (mg/L)	MW-1R	0.057	0.012	0.11	No	19	0.02507	0.02111	0	No	0.01	NP (normality)
pH (SU)	MW-3	7.62	6.912	8.5	No	15	7.266	0.4604	0	No	0.005	Param.
pH (SU)	MW-4	7.845	7.106	8.5	No	15	7.475	0.4808	0	No	0.005	Param.
pH (SU)	MW-2	7.929	7.234	8.5	No	15	7.581	0.4523	0	No	0.005	Param.
pH (SU)	MW-5	8.019	7.237	8.5	No	12	7.628	0.4363	0	No	0.005	Param.
pH (SU)	MW-6	7.956	7.204	8.5	No	12	7.58	0.4196	0	No	0.005	Param.
pH (SU)	MW-7 (bg)	7.708	7.05	8.5	No	12	7.379	0.3669	0	No	0.005	Param.
pH (SU)	MW-8	8.045	7.284	8.5	No	12	7.664	0.4242	0	No	0.005	Param.
pH (SU)	MW-10	8.52	7.336	8.5	No	5	7.928	0.2873	0	No	0.005	Param.
pH (SU)	MW-9	8.226	6.882	8.5	No	5	7.554	0.3263	0	No	0.005	Param.
pH (SU)	MW-1R	8.92	7.81	8.5	No	19	8.363	0.541	0	No	0.01	NP (normality)
Selenium (mg/L)	MW-3	0.0015	0.00087	0.005	No	16	0.001013	0.000479	56.25	No	0.01	NP (NDs)
Selenium (mg/L)	MW-4	0.0009	0.00048	0.005	No	16	0.0008125	0.0004254	81.25	No	0.01	NP (NDs)
Selenium (mg/L)	MW-2	0.0038	0.0019	0.005	No	16	0.003494	0.003292	12.5	No	0.01	NP (normality)
Selenium (mg/L)	MW-5	0.0009	0.00028	0.005	No	13	0.0005985	0.0005087	100	No	0.01	NP (NDs)
Selenium (mg/L)	MW-6	0.0009	0.00028	0.005	No	13	0.0005985	0.0005087	100	No	0.01	NP (NDs)
Selenium (mg/L)	MW-7 (bg)	0.0009	0.00028	0.005	No	13	0.0005985	0.0005087	100	No	0.01	NP (NDs)
Selenium (mg/L)	MW-8	0.0009	0.00028	0.005	No	13	0.0005985	0.0005087	100	No	0.01	NP (NDs)
Selenium (mg/L)	MW-10	0.002	0.00087	0.005	No	5	0.001294	0.0005578	100	No	0.031	NP (NDs)
Selenium (mg/L)	MW-9	0.002	0.00087	0.005	No	5	0.001294	0.0005578	100	No	0.031	NP (NDs)
Selenium (mg/L)	MW-1R	0.0043	0.0018	0.005	No	19	0.002689	0.001223	21.05	No	0.01	NP (normality)
Silver (mg/L)	MW-3	0.001	0.000026	0.0033	No	5	0.0003332	0.000396	80	No	0.031	NP (NDs)
Silver (mg/L)	MW-4	0.001	0.000014	0.0033	No	5	0.0003258	0.000403	60	No	0.031	NP (NDs)
Silver (mg/L)	MW-2	0.001	0.000036	0.0033	No	5	0.0003352	0.000394	80	No	0.031	NP (NDs)
Silver (mg/L)	MW-5	0.001	0.000016	0.0033	No	5	0.0003312	0.0003979	80	No	0.031	NP (NDs)
Silver (mg/L)	MW-6	0.001	0.000024	0.0033	No	5	0.0003328	0.0003964	80	No	0.031	NP (NDs)
Silver (mg/L)	MW-7 (bg)	0.001	0.000022	0.0033	No	5	0.0003312	0.0003979	60	No	0.031	NP (NDs)
Silver (mg/L)	MW-8	0.001	0.000028	0.0033	No	5	0.0003336	0.0003956	80	No	0.031	NP (NDs)
Silver (mg/L)	MW-10	0.001	0.00004	0.0033	No	5	0.000448	0.0003668	100	No	0.031	NP (NDs)
Silver (mg/L)	MW-9	0.001	0.00004	0.0033	No	5	0.000448	0.0003668	100	No	0.031	NP (NDs)

Confidence Interval

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP Printed 11/18/2020, 11:21 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	Transform	Alpha	Method
Silver (mg/L)	MW-1R	0.0015	0.0003	0.0033	No	19	0.0007421	0.0005419	100	No	0.01	NP (NDs)
Thallium (mg/L)	MW-3	0.0003	0.000087	0.002	No	16	0.0002386	0.0002215	100	No	0.01	NP (NDs)
Thallium (mg/L)	MW-4	0.0003	0.000087	0.002	No	16	0.0002386	0.0002215	100	No	0.01	NP (NDs)
Thallium (mg/L)	MW-2	0.001	0.000087	0.002	No	16	0.0004636	0.0006392	100	No	0.01	NP (NDs)
Thallium (mg/L)	MW-5	0.0003	0.000029	0.002	No	13	0.0001677	0.0002672	100	No	0.01	NP (NDs)
Thallium (mg/L)	MW-6	0.0003	0.000029	0.002	No	13	0.0001659	0.0002678	92.31	No	0.01	NP (NDs)
Thallium (mg/L)	MW-7 (bg)	0.0003	0.000029	0.002	No	13	0.0001677	0.0002672	100	No	0.01	NP (NDs)
Thallium (mg/L)	MW-8	0.0003	0.000029	0.002	No	13	0.0001726	0.000265	100	No	0.01	NP (NDs)
Thallium (mg/L)	MW-10	0.001	0.000087	0.002	No	5	0.0004574	0.0003541	100	No	0.031	NP (NDs)
Thallium (mg/L)	MW-9	0.001	0.000087	0.002	No	5	0.0005074	0.0003946	80	No	0.031	NP (NDs)
Thallium (mg/L)	MW-1R	0.0015	0.0006	0.002	No	19	0.001237	0.0006291	94.74	No	0.01	NP (NDs)
Total Dissolved Solids (mg/L)	**MW-3**	**3538**	**2744**	**801**	**Yes**	**17**	**3141**	**633.5**	**0**	**No**	**0.01**	**Param.**
Total Dissolved Solids (mg/L)	**MW-4**	**2445**	**2003**	**801**	**Yes**	**17**	**2224**	**352.7**	**0**	**No**	**0.01**	**Param.**
Total Dissolved Solids (mg/L)	**MW-2**	**2294**	**1917**	**801**	**Yes**	**17**	**2106**	**301**	**0**	**No**	**0.01**	**Param.**
Total Dissolved Solids (mg/L)	**MW-5**	**2400**	**810**	**801**	**Yes**	**13**	**1714**	**705.3**	**0**	**No**	**0.01**	**NP (normality)**
Total Dissolved Solids (mg/L)	**MW-6**	**1600**	**1200**	**801**	**Yes**	**13**	**1469**	**165.3**	**0**	**No**	**0.01**	**NP (normality)**
Total Dissolved Solids (mg/L)	MW-7 (bg)	732.8	631.8	801	No	13	682.3	67.96	0	No	0.01	Param.
Total Dissolved Solids (mg/L)	MW-8	642.9	350.9	801	No	13	496.9	196.3	0	No	0.01	Param.
Total Dissolved Solids (mg/L)	**MW-10**	**2093**	**1307**	**801**	**Yes**	**5**	**1700**	**234.5**	**0**	**No**	**0.01**	**Param.**
Total Dissolved Solids (mg/L)	MW-9	1575	429.3	801	No	5	1002	341.8	0	No	0.01	Param.
Total Dissolved Solids (mg/L)	**MW-1R**	**3500**	**3100**	**801**	**Yes**	**19**	**3237**	**550**	**0**	**No**	**0.01**	**NP (normality)**
Vanadium (mg/L)	MW-3	0.002832	0.00008392	0.027	No	5	0.001458	0.00082	0	No	0.01	Param.
Vanadium (mg/L)	MW-4	0.00088	0.00053	0.027	No	5	0.000674	0.0001668	0	No	0.031	NP (normality)
Vanadium (mg/L)	MW-2	0.007633	-0.0007013	0.027	No	5	0.003466	0.002487	0	No	0.01	Param.
Vanadium (mg/L)	MW-5	0.003	0.0005	0.027	No	5	0.001298	0.0009935	20	No	0.031	NP (Cohens/xfrm)
Vanadium (mg/L)	MW-6	0.0008	0.00029	0.027	No	5	0.00061	0.0002175	60	No	0.031	NP (NDs)
Vanadium (mg/L)	MW-7 (bg)	0.0009065	0.0004244	0.027	No	5	0.00065	0.0001229	20	No	0.01	Param.
Vanadium (mg/L)	MW-8	0.0008	0.00036	0.027	No	5	0.00053	0.0001622	60	No	0.031	NP (NDs)
Vanadium (mg/L)	MW-10	0.002	0.0009	0.027	No	5	0.00156	0.0005177	0	No	0.031	NP (normality)
Vanadium (mg/L)	MW-9	0.0026	0.0005	0.027	No	5	0.0013	0.0009823	60	No	0.031	NP (NDs)
Vanadium (mg/L)	MW-1R	0.004453	0.002757	0.027	No	19	0.003811	0.001742	0	ln(x)	0.01	Param.
Zinc (mg/L)	MW-3	2	0.00081	0.26	No	5	0.4114	0.8881	80	No	0.031	NP (NDs)
Zinc (mg/L)	MW-4	2	0.003	0.26	No	5	0.4118	0.8879	80	No	0.031	NP (NDs)
Zinc (mg/L)	MW-2	2	0.0099	0.26	No	5	0.4132	0.8871	80	No	0.031	NP (NDs)
Zinc (mg/L)	MW-5	0.22	0.0025	0.26	No	5	0.0557	0.09212	60	No	0.031	NP (NDs)
Zinc (mg/L)	MW-6	2	0.011	0.26	No	5	0.4134	0.8869	80	No	0.031	NP (NDs)

Confidence Interval

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP Printed 11/18/2020, 11:21 AM

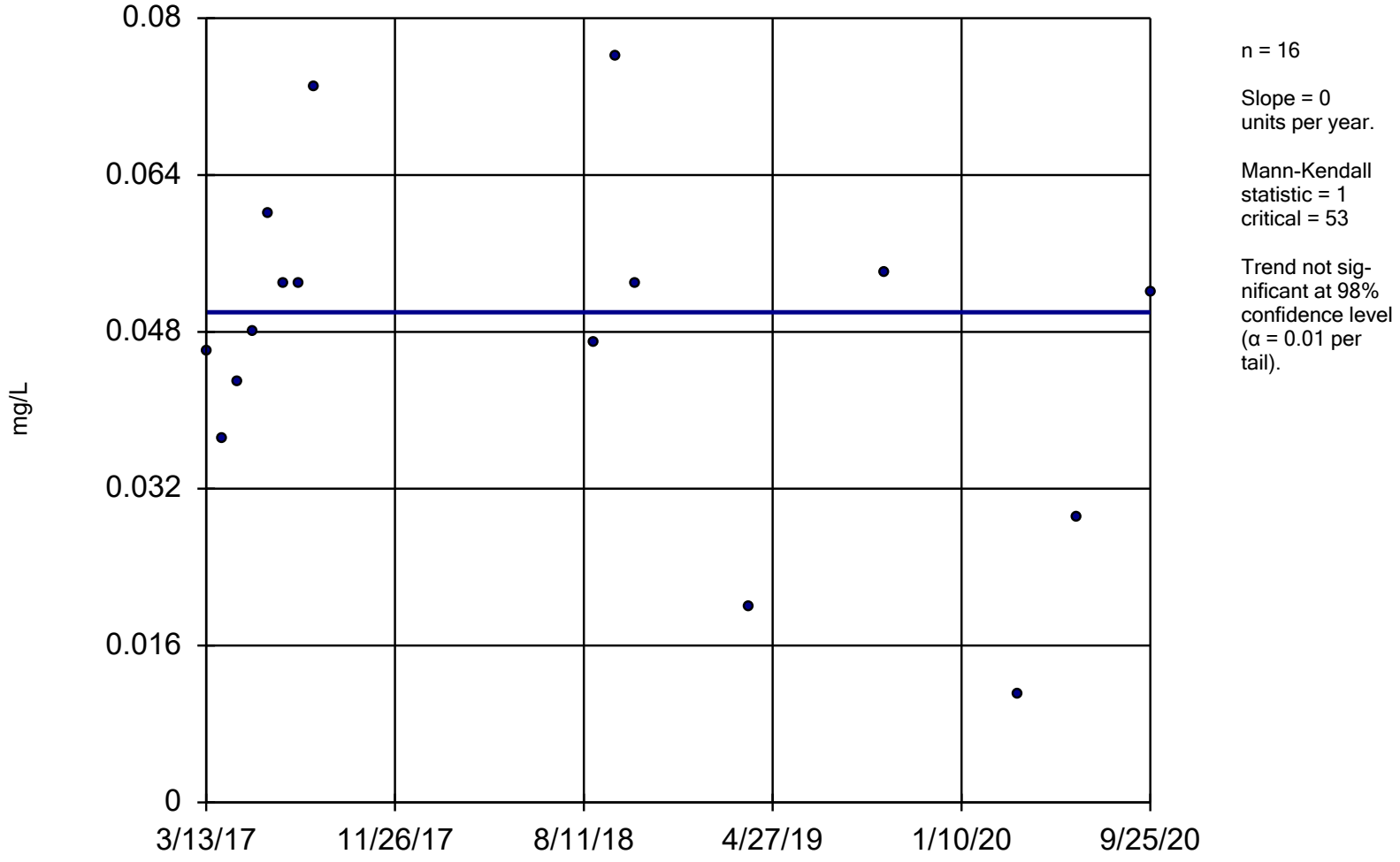
Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	Transform	Alpha	Method
Zinc (mg/L)	MW-7 (bg)	2	0.0023	0.26	No	5	0.4117	0.8879	80	No	0.031	NP (NDs)
Zinc (mg/L)	MW-8	2	0.0026	0.26	No	5	0.4117	0.8879	80	No	0.031	NP (NDs)
Zinc (mg/L)	MW-10	0.16	0.011	0.26	No	5	0.045	0.06436	60	No	0.031	NP (NDs)
Zinc (mg/L)	MW-9	0.02	0.0064	0.26	No	5	0.01608	0.00548	80	No	0.031	NP (NDs)
Zinc (mg/L)	MW-1R	0.21	0.033	0.26	No	19	0.08805	0.08473	0	No	0.01	NP (normality)

APPENDIX B

Trend Plots

Sen's Slope Estimator

MW-2

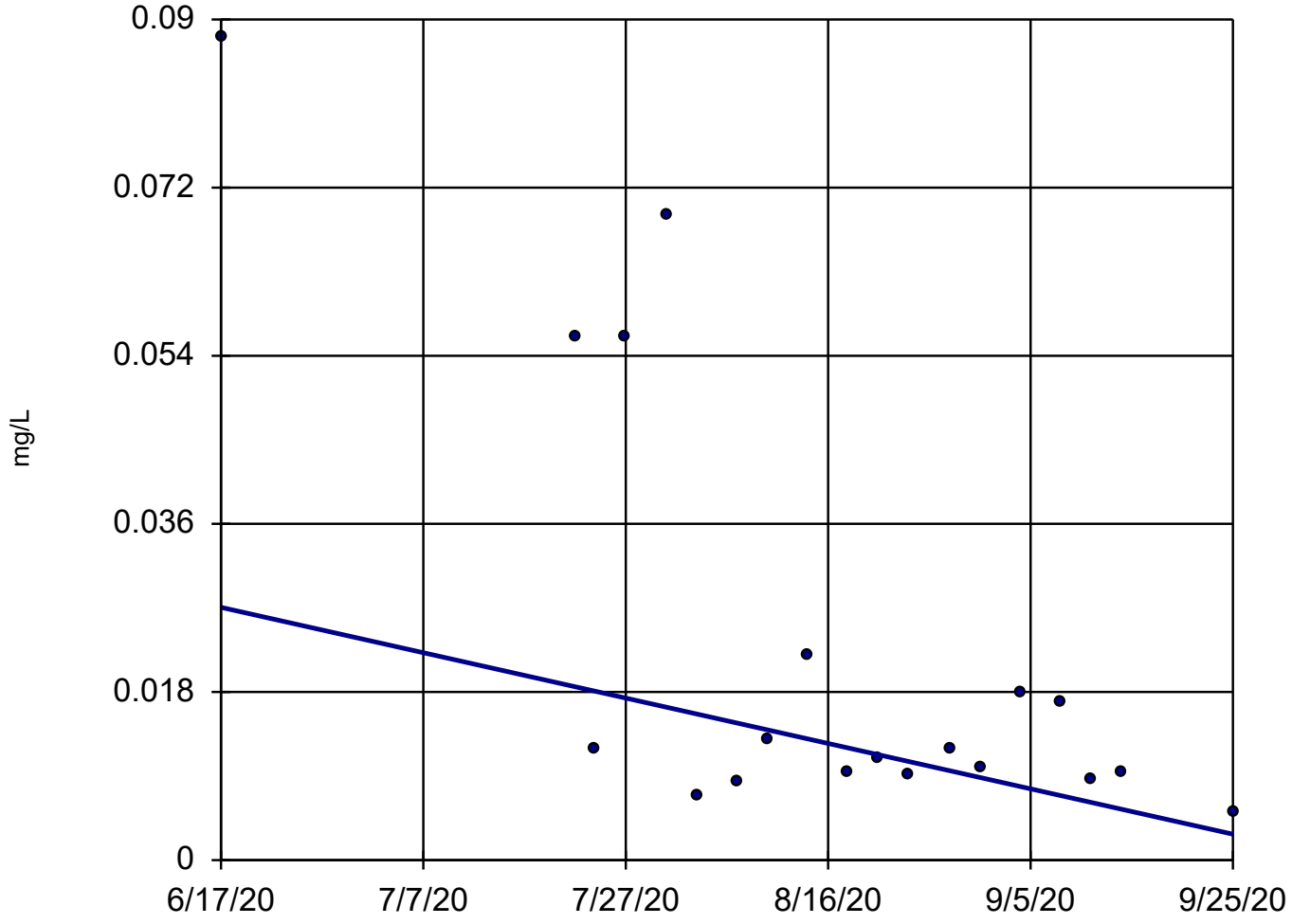


Constituent: Chromium Analysis Run 11/18/2020 3:24 PM

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sen's Slope Estimator

MW-1R



n = 19

Slope = -0.08864 units per year.

Mann-Kendall statistic = -64
critical = -68

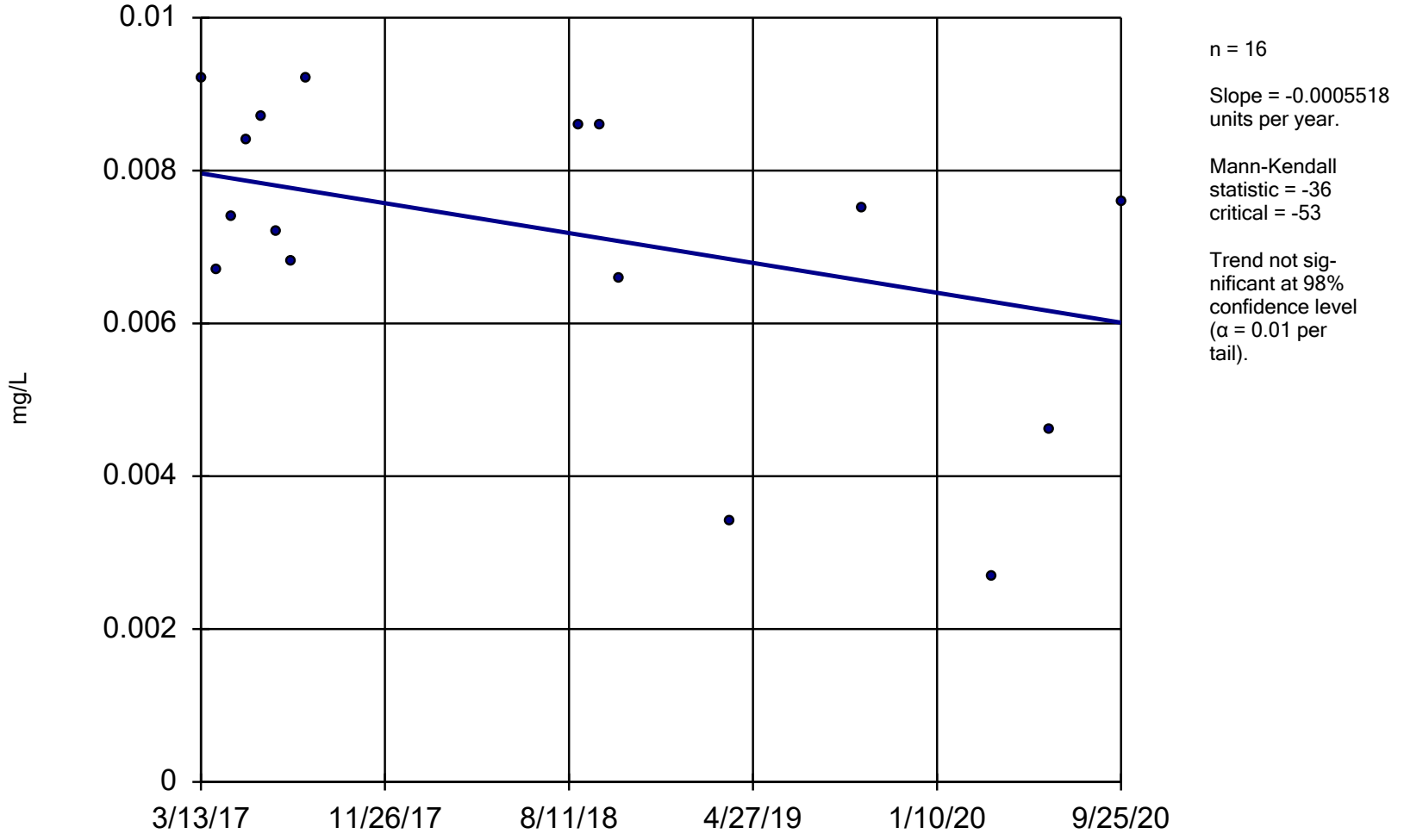
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Cobalt Analysis Run 11/18/2020 3:25 PM

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sen's Slope Estimator

MW-2



n = 16

Slope = -0.0005518 units per year.

Mann-Kendall statistic = -36
critical = -53

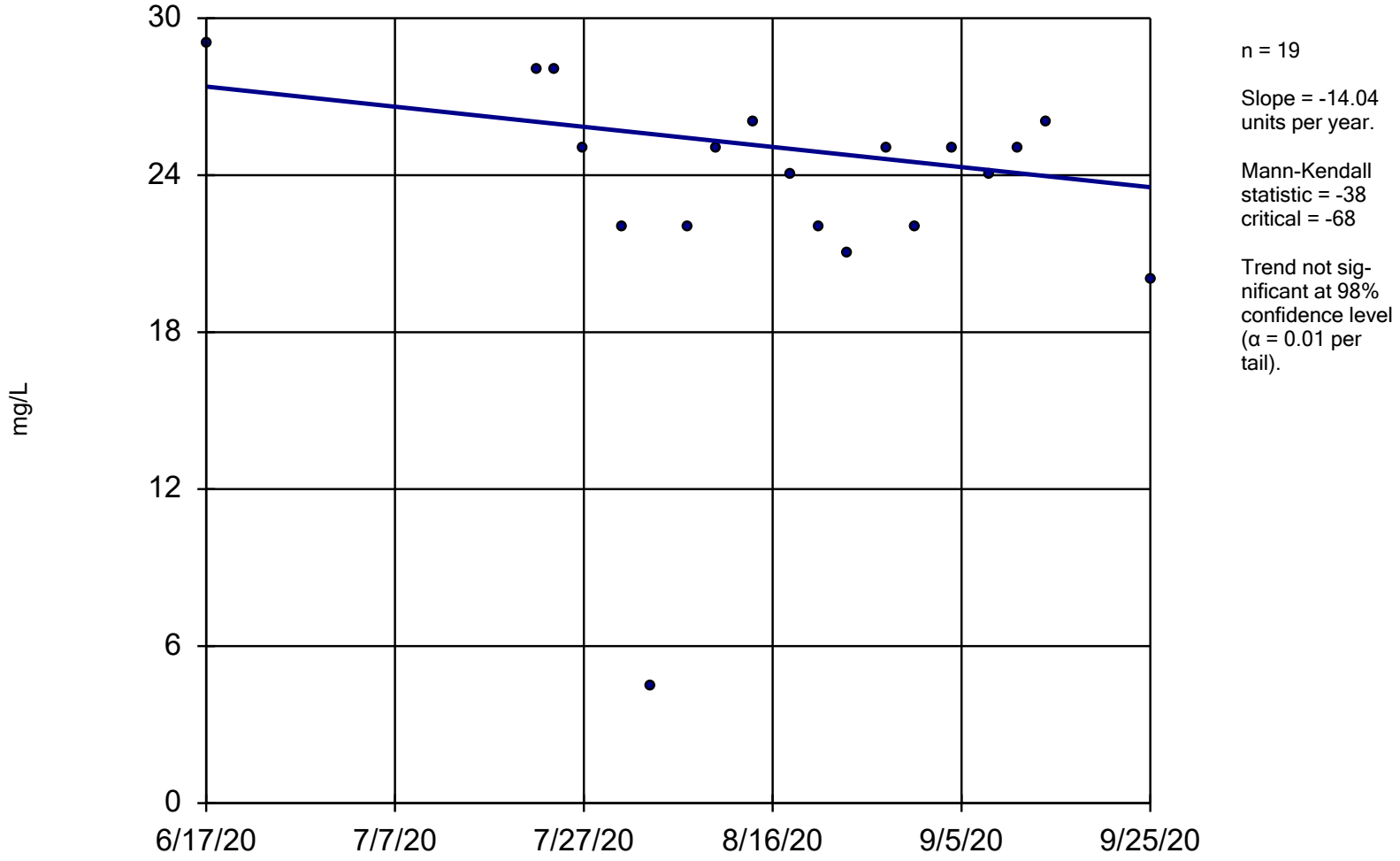
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Cobalt Analysis Run 11/18/2020 3:25 PM

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sen's Slope Estimator

MW-1R



n = 19

Slope = -14.04 units per year.

Mann-Kendall statistic = -38
critical = -68

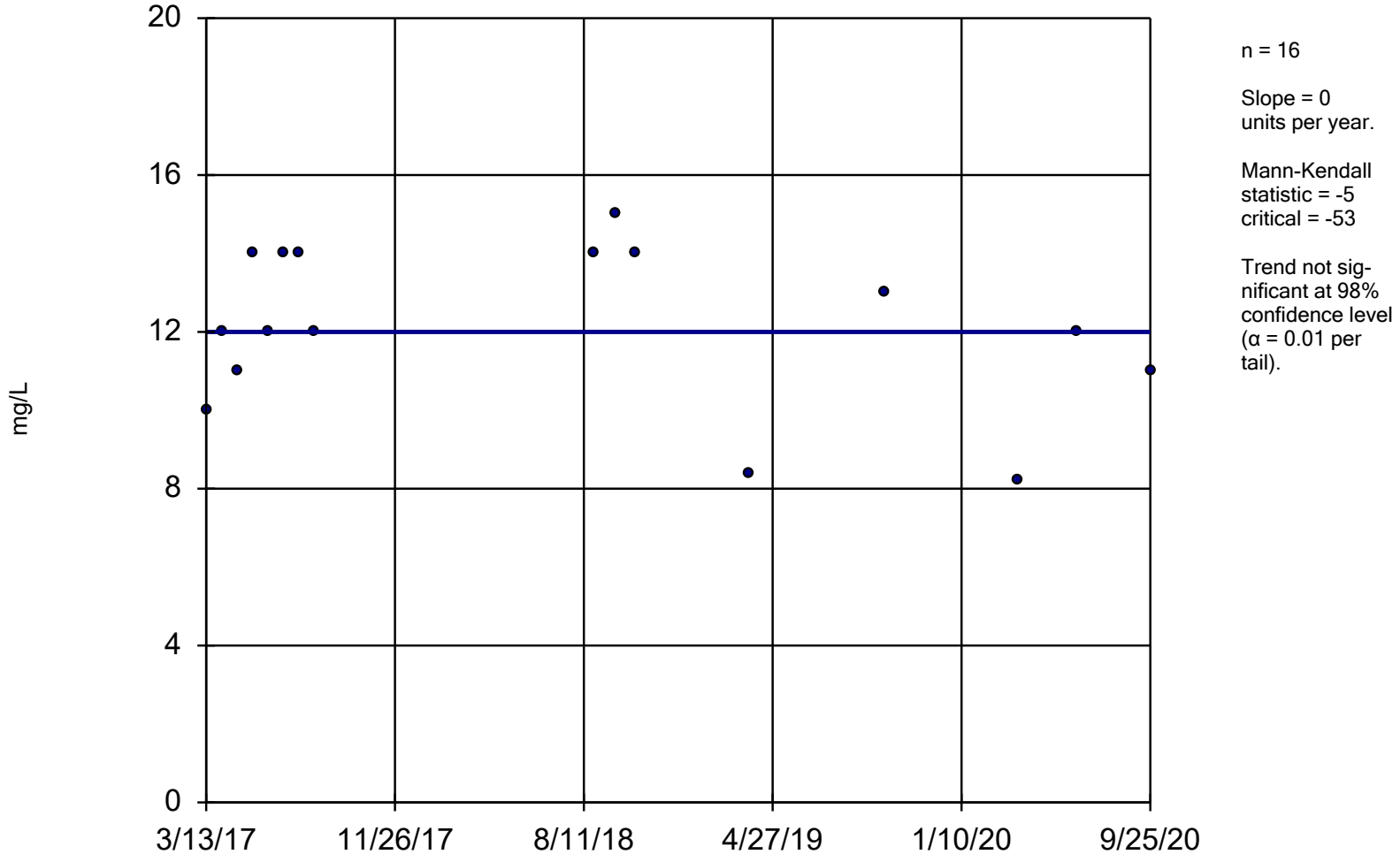
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Fluoride Analysis Run 11/18/2020 3:25 PM

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sen's Slope Estimator

MW-2



n = 16

Slope = 0
units per year.

Mann-Kendall
statistic = -5
critical = -53

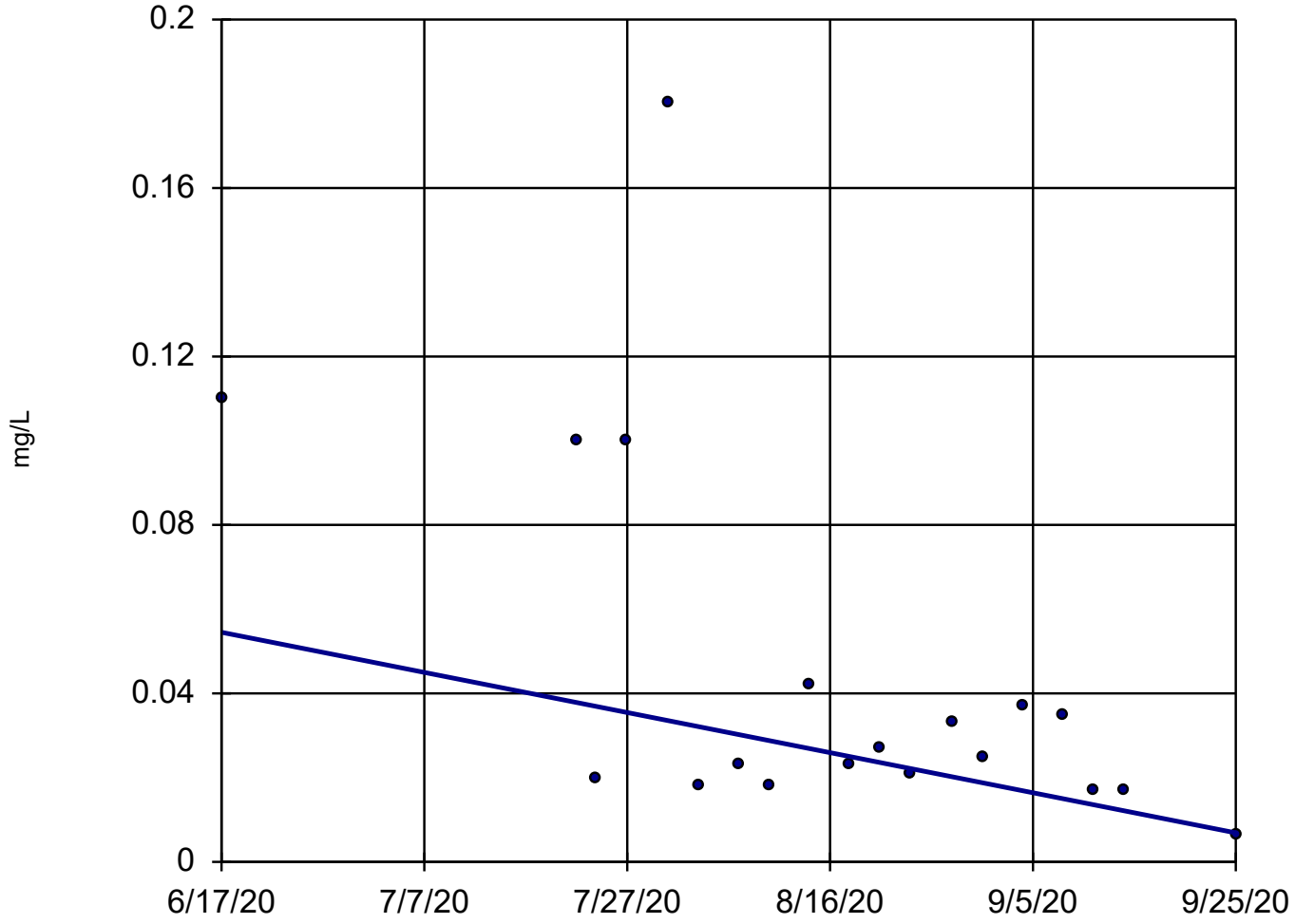
Trend not sig-
nificant at 98%
confidence level
(α = 0.01 per
tail).

Constituent: Fluoride Analysis Run 11/18/2020 3:25 PM

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sen's Slope Estimator

MW-1R



n = 19

Slope = -0.1738 units per year.

Mann-Kendall statistic = -61
critical = -68

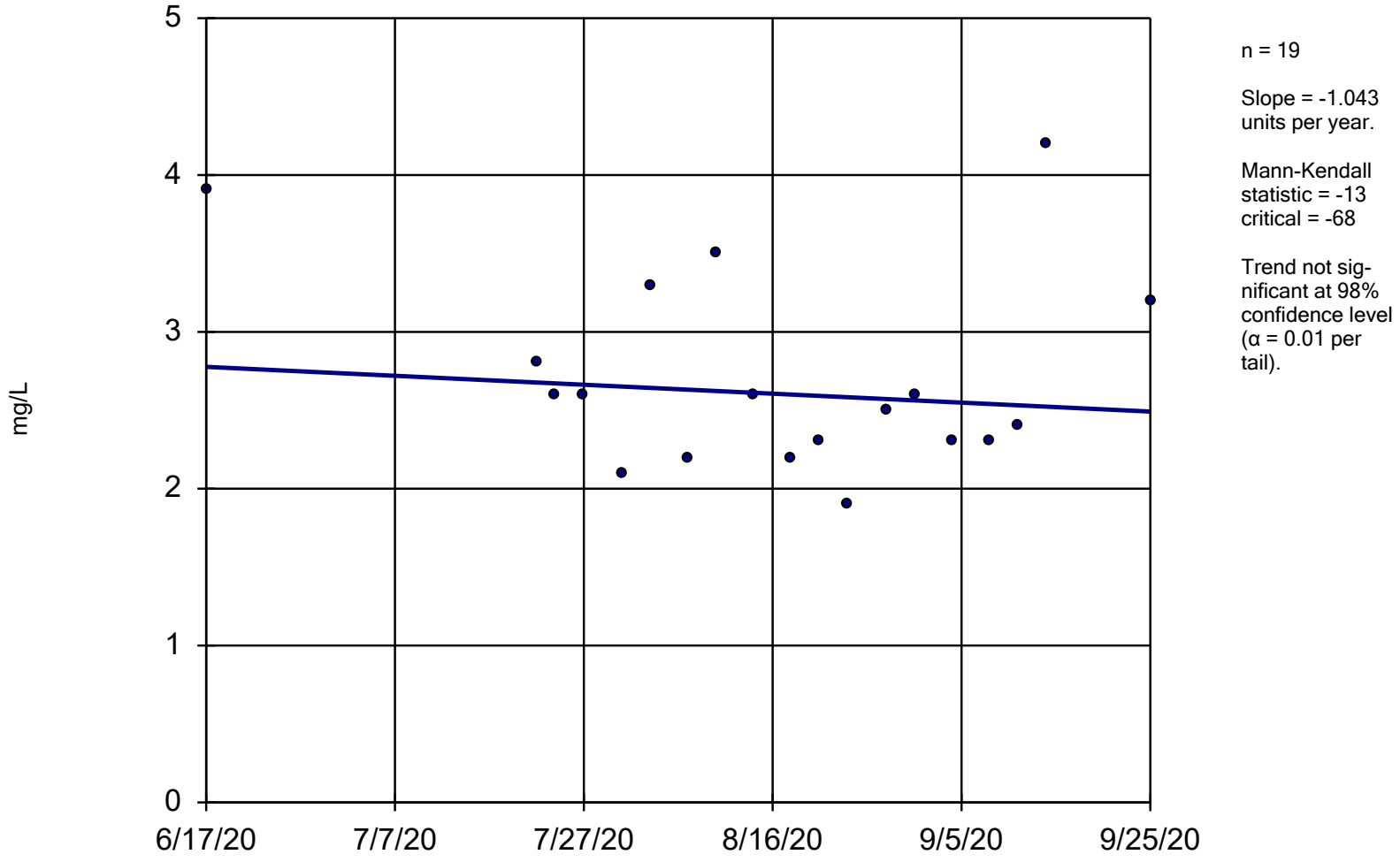
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Lead Analysis Run 11/18/2020 3:25 PM

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sen's Slope Estimator

MW-1R



n = 19

Slope = -1.043 units per year.

Mann-Kendall statistic = -13
critical = -68

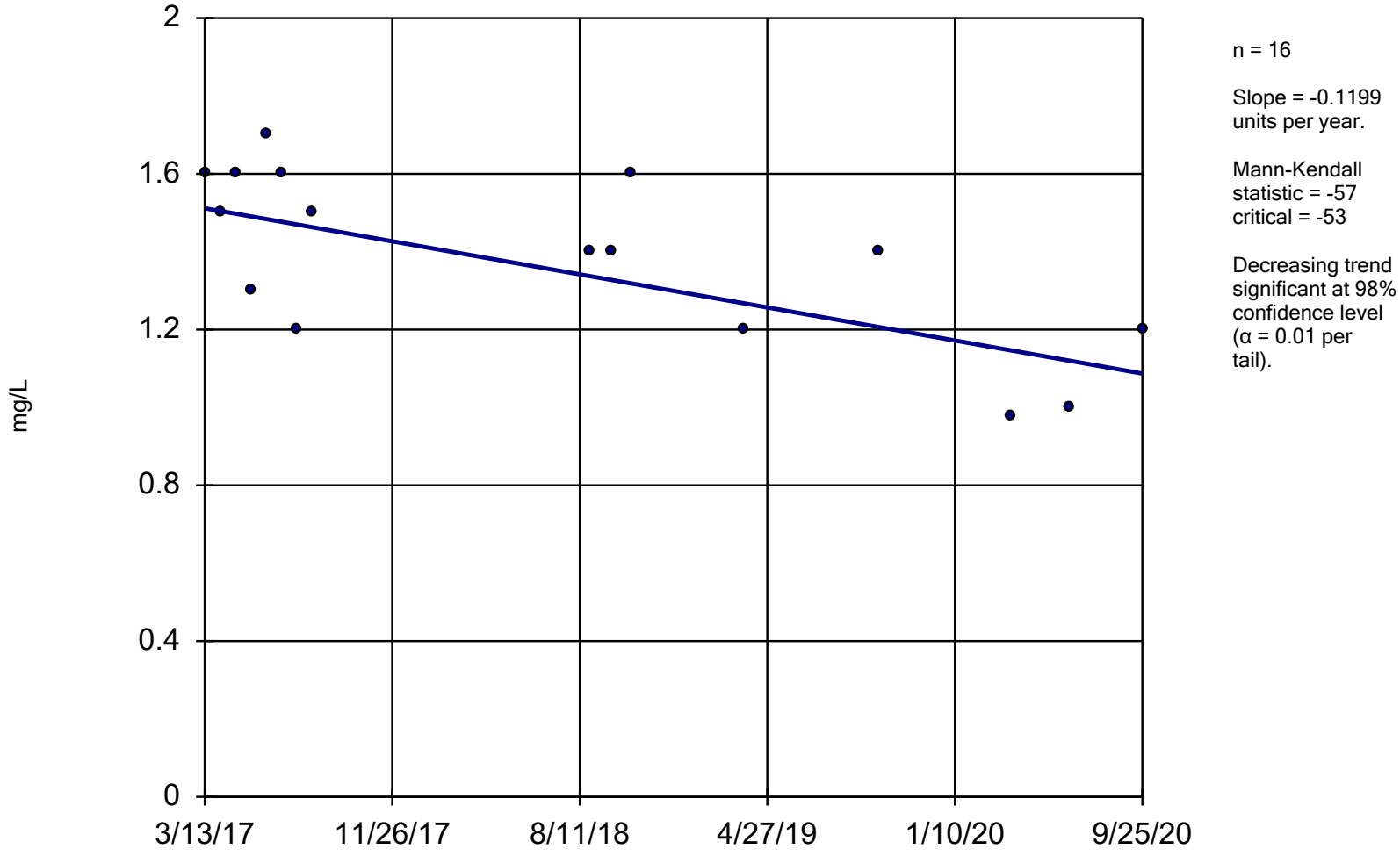
Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Lithium Analysis Run 11/18/2020 3:25 PM

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sen's Slope Estimator

MW-2



n = 16

Slope = -0.1199 units per year.

Mann-Kendall statistic = -57
critical = -53

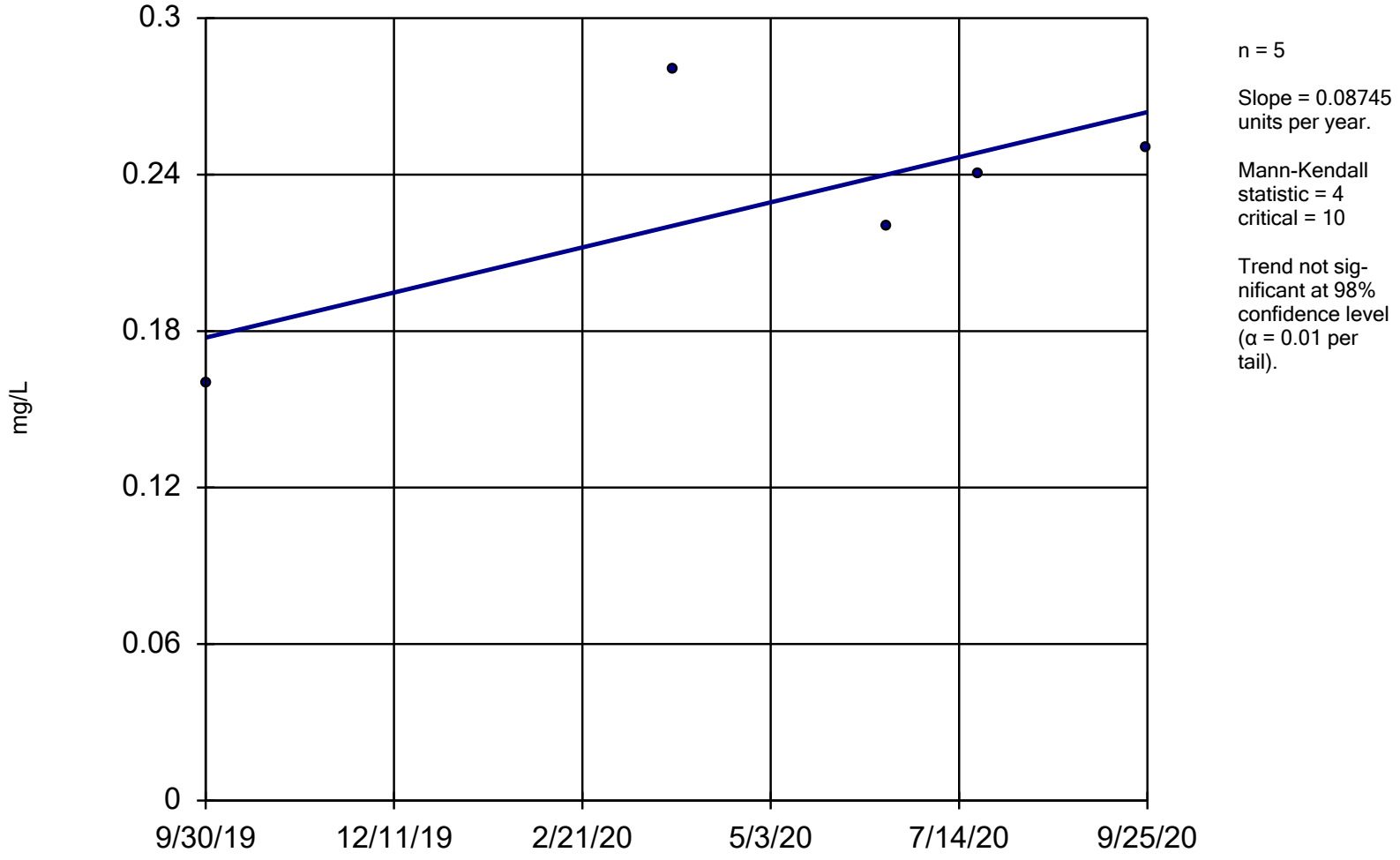
Decreasing trend significant at 98% confidence level (α = 0.01 per tail).

Constituent: Lithium Analysis Run 11/18/2020 3:25 PM

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Sen's Slope Estimator

MW-9



n = 5

Slope = 0.08745 units per year.

Mann-Kendall statistic = 4
critical = 10

Trend not significant at 98% confidence level (α = 0.01 per tail).

Constituent: Lithium Analysis Run 11/18/2020 3:25 PM

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP

Trend Test

Grand Haven BLP Client: Golder Associates Data: DT-Grand Haven BLP Printed 11/18/2020, 3:27 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Chromium (mg/L)	MW-2	0	1	53	No	16	0	n/a	n/a	0.02	NP
Cobalt (mg/L)	MW-2	-0.00...	-36	-53	No	16	0	n/a	n/a	0.02	NP
Cobalt (mg/L)	MW-1R	-0.08864	-64	-68	No	19	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-2	0	-5	-53	No	16	0	n/a	n/a	0.02	NP
Fluoride (mg/L)	MW-1R	-14.04	-38	-68	No	19	0	n/a	n/a	0.02	NP
Lead (mg/L)	MW-1	0	1	44	No	14	35.71	n/a	n/a	0.02	NP
Lead (mg/L)	MW-1R	-0.1738	-61	-68	No	19	0	n/a	n/a	0.02	NP
Lithium (mg/L)	**MW-2**	**-0.1199**	**-57**	**-53**	**Yes**	**16**	**0**	**n/a**	**n/a**	**0.02**	**NP**
Lithium (mg/L)	MW-9	0.08745	4	10	No	5	0	n/a	n/a	0.02	NP
Lithium (mg/L)	MW-1R	-1.043	-13	-68	No	19	0	n/a	n/a	0.02	NP

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