2023 Annual Water Quality Report and Engineering Inspection

Permit #70-SDP-09-91P

Central Iowa Power Cooperative

December 7, 2023

→ The Power of Commitment

2023 Annual Water Quality Report and Engineering Inspection
Permit #70-SDP-09-91C

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Michael J. Alowitz, P.E. — Date: 12/7/23

License Number: 18160

My license renewal date is: December 31, 2024

Pages or sheets covered by this seal: Entire Document

Executive Summary

Period of Report Coverage

This Annual Water Quality Report (AWQR) presents the data collected in October 2023 for the Central Iowa Power Cooperative (CIPCO) Coal Combustion Residue (CCR) Monofill. For most analytes, the report includes data from October 2016 onward when analysis was shifted to total metals instead of dissolved metals. Greater historical data for chloride and sulfate is included because these analytes were not previously filtered.

Report Priority

The 2023 CIPCO AWQR is consistent with past data. Decreasing trends are observed more frequently than increasing trends. Elevated concentrations remain primarily in one area identified by MW-15 and MW-17. The recommendations are to continue groundwater monitoring.

Site Status and Applicable Rules

The CIPCO CCR Monofill ceased receiving CCR in 2014 and closure cap construction was completed in 2015. Closure Permit #70-SDP-09-91C (Closure Permit) was issued February 1, 2016. The CCR Monofill is permitted and closed under 567 Iowa Administrative Code, Chapter 103. Figure 2 – Site Plan and Monitoring Network shows the status of the site monitoring network and topographic conditions.

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Acronyms/Abbreviations:

AWQR	Annual Water Quality Report
CIPCO	Central Iowa Power Cooperative (CIPCO
CCR	Coal Combustion Residue
HA	Lifetime Health Advisory
HIR	Hydrogeological Investigation Report
HMSP	Hydrologic Monitoring System Plan
GWQA	Groundwater Quality Assessment
IAC	Iowa Administrative Code
IDNR	Iowa Department of Natural Resources
MCL	EPA Maximum Contaminant Level
ORP	Oxidation Reduction Potential
SDWR	Secondary Drinking Water Regulations
SWS	Statewide Standard
U	Used in Table 8 to denote concentrations that are reported as non-detect. The associated value represents half the reporting limit.
UCL	Upgradient Control Limit
USEPA	United States Environmental Protection Agency

1. Introduction

This Annual Water Quality Report (AWQR) and Engineering Inspection was prepared by GHD on behalf of Central Iowa Power Cooperative (CIPCO) for the closed Fair Station Coal Combustion Residue (CCR) Monofill (Monofill) in Muscatine County, Iowa. The Monofill ceased receiving CCR in 2014 and closure cap construction was completed in 2015. Closure Permit #70-SDP-09-91C (Closure Permit) was issued February 1, 2016.

1.1 Background

The Monofill received CCR from the Fair Station power plant in Muscatine, Iowa from 1974 through November 7, 2014. No material other than CCR and other approved materials from demolition of Fair Station have been disposed in the Monofill. Prior to 1974, the Monofill property was used for agricultural activities. Cap construction was completed in 2014 and 2015. Final seeding of the cover was completed in September 2015. The Construction Summary Report was submitted to the Iowa Department of Natural Resources (IDNR) on December 22, 2015, and the Closure Permit was issued on February 1, 2016. The closure activities did not require modification of the groundwater monitoring network.

The local geology consists of sands, silts, and clays similar to what would be expected from alluvial deposition. The 1994 Hydrogeological Investigation Report (HIR) and Hydrologic Monitoring System Plan (HMSP) concluded these deposits did not appear to be great enough in thickness or extent to form an alluvial aquifer. Over the majority of the Monofill, Pennsylvanian shale is found at depths of 15 feet below ground surface or less, underlain by Devonian limestone. On the eastern, higher elevation portion of the Monofill, depth to bedrock is greater than 15 feet.

The Monofill is located adjacent to the Pine Creek flood plain. Pine Creek enters the Mississippi River approximately ½ mile southwest of the Monofill. Water table groundwater flow is generally toward Pine Creek. The Devonian aquifer flow is generally directed west/southwest, toward Pine Creek and the Mississippi River. The location of the Monofill is shown in Figure 1.

A groundwater quality assessment (GWQA) was initiated at the Monofill site in 2012 and completed in 2013. As an outgrowth of those activities, new monitoring wells MW-17, MW-19, and MW-20 were integrated into the HMSP and the analyte list was expanded at the direction of the IDNR, as reflected in this AWQR. Monitoring well MW-19 has since been abandoned.

The December 9, 2016 AWQR for 2016 data was the last report to include dissolved (filtered) metals analysis for groundwater samples. Following an IDNR comment letter dated May 17, 2017, CIPCO applied for a variance to switch to unfiltered samples. The December 9, 2016 AWQR included a side-by-side comparison of filtered and unfiltered samples collected generally through low-flow techniques. The variance request also sought to reduce the analyte list. The variance was approved in a letter dated July 24, 2017, with the exception that arsenic and cobalt analyses remain required. The approval eliminates barium, beryllium, copper, lead, selenium, and zinc. The variance was incorporated into Revision 1 of the closure permit also issued July 24, 2017.

Due to the change to sampling total metals (unfiltered metals), it was necessary to establish new baseline concentrations for metals. Four sampling events: October 2016, August 2017, October 2017, and April 2018 formed the new baseline concentrations. Historical data reflecting total metals are no longer reported; however, the data are available in the December 9, 2016 AWQR.

It is anticipated a 10-year post-closure monitoring period, completed with an annual sampling event in 2026, will be required; however, the potential to cease monitoring earlier exists.

1.2 Monitoring System

Groundwater samples are collected from three water table monitoring wells (upgradient well MW-11, and downgradient wells MW-2 and MW-6), and water table monitoring wells MW-4, MW-7, and MW-10 are used for elevation monitoring only. Groundwater samples are collected from seven uppermost aquifer wells (upgradient location MW-9 and downgradient locations MW-1, MW-3, MW-5, MW-15, MW-17, and MW-20). Surface water sampling was discontinued with issuance of the Closure Permit. Figure 2 shows the locations of monitoring wells and identifies upgradient locations. Table 1 and Table 2 present the monitoring program summary and implementation schedule, respectively. Table 4 presents the monitoring well maintenance and performance summary.

Based on past groundwater data, MW-1, although hydraulically upgradient, is evaluated as a downgradient well. All other wells are characterized as upgradient or downgradient consistent with site data.

1.3 Sample Collection

Sampling for the 2023 AWQR was completed in October 2023. Groundwater samples were collected with low-flow pneumatic bladder pumps with dedicated tubing and dedicated (disposable) bladders except for MW-9.

A flow-through monitoring cell was used prior to sample collection to measure pH, conductivity, temperature, dissolved oxygen, turbidity, and oxidation reduction potential (ORP). The sampling method for MW-9 remained a disposable polyethylene bailer without a flow-cell.

1.4 Analytical Parameters

Groundwater samples collected during the sampling event were analyzed for arsenic, cobalt, iron, magnesium, manganese, chloride, and sulfate as required in Paragraph 567—103.1(4)d of the Iowa Administrative Code (IAC). A variance granted in July 2017 eliminated the requirement for barium, beryllium, copper, lead, selenium, and zinc analyses based on historical data. Boron, lithium, molybdenum, sodium, and strontium are also analyzed per the amended HMSP. Laboratory analysis was conducted by Eurofins Environmental Testing North Central, LLC. (Eruofins) of Cedar Falls, Iowa. Eurofins provided prepared sample containers for the monitoring event.

2. Groundwater Flow Conditions

2.1 Horizontal Groundwater Flow

Static water levels were measured at each of the monitoring wells included in the monitoring system in October 2023. Table 13 presents groundwater elevations measured in wells during the October 2023 monitoring event. A water table contour map (Figure 3) was prepared using water level measurements from the October 2023 monitoring event. During this monitoring event, the inferred groundwater flow direction at the water table was toward the southwest. Figure 4 shows the potentiometric surface of the uppermost aquifer based on measurements from the October 2023 monitoring event. The apparent direction of flow in the uppermost aquifer is generally to the southwest. The flow of groundwater in both the water table and uppermost aquifer at the Monofill is toward Pine Creek located west of the Monofill.

2.2 Vertical Hydraulic Gradients

Water levels measured in monitoring well clusters MW-2/MW-3, MW-6/MW-5, MW-10/MW-9, and MW-7/MW-20 during the 2022 monitoring event were used to calculate vertical hydraulic gradients for the Monofill. The vertical hydraulic gradients were calculated by the following equation:

$$\frac{\text{Water Elevation in Deep Well} - \text{Water Elevation in Shallow Well}}{\text{Elevation of Middle of Saturated Zone of Shallow Well Screen} - \text{Elevation of Middle of Saturated Zone of Deep Well Screen}}$$

The calculated vertical hydraulic gradients are presented in Table 14. The results are similar to historical results for each well pair. The downward-directed flow reported at MW-10/MW-9 remains the largest gradient on site; MW-9 is the deepest well on site.

3. Analytical Results

Groundwater sample collection records for October 2023 are provided in Appendix A and the associated laboratory analytical reports are provided in Appendix B. Table 8 present current and historical analytical data (with total metals) collected at the Monofill for sampling locations and analytes in the current monitoring plan. Historical data with total metals was last presented in the December 9, 2016 AWQR. Appendix C includes graphs of concentration versus time for all analytes and in each monitored unit (water table and uppermost aquifer). Table 10 summarizes the annual laboratory results and basic trend analysis.

3.1 Data Analysis

Sample results are compared to multiple reference concentrations: 1) published concentration standards, 2) baseline concentrations, 3) upgradient control limits (UCLs) and, 4) where applicable, a two-year average concentration. All comparisons are shown in the Analytical Data Summary in Appendix C. Comparison to published standards and UCLs are included graphically in Appendix C.

3.1.1 Published Standards

To evaluate the status of water quality at the Monofill, a comparison was made between the sample result and federal drinking water quality standards, as required by Paragraph 567—103.1(4)d of the IAC. Sample results were compared to the United States Environmental Protection Agency (USEPA) Maximum Contaminant Level (MCL), Lifetime Health Advisory (HA) Level, or Secondary Drinking Water Regulations (SDWR) guidelines as presented in the 2018 Edition of the Drinking Water Standards and Health Advisories, dated March 2018 (2018 Standards) (USEPA, 2018). The following definitions of the various standards are adapted from the 2018 Standards document:

– MCL – The highest level for a contaminant that is allowed in drinking water. MCLs are enforceable standards. There is an MCL for arsenic.
– HA – An estimate of acceptable drinking water levels for a chemical substance based on health effects information. The lifetime HA is the concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for a lifetime of exposure. The lifetime HA is based on exposure of a 70-kilogram (kg) adult consuming 2 liters of water per day. An HA is not a legally enforceable federal standard, but serves as technical guidance to assist federal, state, and local officials. There is an HA for boron, manganese, molybdenum, selenium, and strontium.
– SDWR – Non-enforceable federal guidelines regarding cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water. An SDWR guideline exists for chloride, iron, manganese, and sulfate.

Iowa Statewide Standards (SWSs) are used for comparison of cobalt and lithium results since no MCL, HA, or SDWR guideline has been established for cobalt and lithium. Under 40 CFR Part 257.95(h)(2), federal standards for lithium (0.04 mg/L) and cobalt (0.006 mg/L) were established in 2018 for monitoring CCR sites where the federal coal ash rule is applicable. These federal standards are higher than the SWS of 0.014 mg/L and 0.003 mg/L for lithium and cobalt, respectively, in protected groundwater sources.

3.1.2 Baseline Concentrations

Baseline concentrations for total metals were established at all wells based on sample events in October 2016, August 2017, October 2017, and April 2018. Baseline concentrations are included in Table 10. For sulfate and chloride, historical values are used for baseline concentrations since these samples are not filtered and there was no difference with historical samples. Table 5 presents background summary data.

3.1.3 UCLs

A UCL was calculated for each upgradient sampling location as the average of all previous sampling results for each analyte in each well plus two standard deviations. The calculated UCLs are presented in Tables 5 and 8. Non-detect results were conservatively represented by one-half the reporting limit for calculation of the UCL. Table 6 presents exceedances of a control limit not immediately preceded by an exceedance. The cobalt concentration at MW-5 exceeded the UCL for the second year in a row. Iron was measured above the UCL at MW-5 for the first time in several years and manganese dipped below the UCL.. Table 8 provides all associated data and Table 9 presents a graphical summary of UCL and/or published standard exceedances in the last 5 years.

3.1.4 Two-Year Average Concentration

For magnesium and sodium, no MCL, HA, SDWR guideline, or SWS is established. In order to evaluate the status of water quality at the Monofill for these compounds (magnesium and sodium), a comparison was made between the sample result and the two-year average concentration for that parameter in each well, in accordance with Paragraph 567—103.1(4)d of the IAC. Non-detect results were represented by the reporting limit for calculating the two-year average concentration.

3.2 Reporting Limits

In the previous year’s results, there were several constituents that had elevated reporting limits at certain wells, such as arsenic (MW-15), lithium (MW-6), and molybdenum (MW-2). In these cases, the results are graphed in the usual manner at one-half the reporting limit; however, they can appear on the graphs as spikes in concentration. The 2023 data have reporting limits consistent with historical data.

3.3 Evaluation of Analytical and Field Data

3.3.1 Published Standards

No reported concentrations exceed an MCL.

HAs were exceeded for boron (five locations), manganese (five locations), and molybdenum (three locations).

SDWR guidelines were exceeded for iron (five locations), manganese (eight locations), and sulfate (two locations).

SWSs were exceeded for cobalt (two locations) and lithium (eight locations).

Figure 5 identifies the monitoring points where published standards were exceeded. Table 7 presents a summary of ongoing and newly identified exceedances of the published standards.

3.3.2 Baseline Concentrations

October 2023 sample results exceeded baseline concentrations for the following wells and analytes:

- Boron at eight locations
- Chloride at four locations
- Cobalt at one location
- Iron at one location
- Lithium at three locations
- Magnesium at four locations
- Manganese at four locations
- Molybdenum at one location
- Sodium at five locations
- Strontium at five locations
- Sulfate at two locations

3.3.3 Trend Review

Trends can be observed in the charts in Appendix C and are summarized in Table 10. Most analytes and wells saw no trend. Decreasing trends outnumber increasing trends for laboratory analytes.

Sulfate concentrations at uppermost aquifer monitoring wells MW-15 and MW-17 remain approximately an order of magnitude higher than the other monitoring locations. The 2023 data show MW-17 sulfate concentration is consistent with past data. The 2023 sulfate result for MW-15 is an increase over recent years and ends a 2-year downward trend in concentration. There is no obvious trend in MW-15 sulfate results and a slight increasing trend in MW-17. The last time the sulfate SDWR limit was exceeded at MW-5 was 2013; the last time at MW-6 was 2015. Sulfate last exceeded the SDWR limit at wells MW-1 and MW-2 in 2021. For the 2023 results, only monitoring wells MW-15 and MW-17 exceeded their sulfate baseline concentrations.

Chloride concentrations exhibit a long-term trend of decreasing concentrations at every location with elevated results. The 2023 data showed slight increases in chloride across the monitoring network except for MW-1 and MW-17 where there were slight decreases in chloride concentration; however, all results stay very close to those of previous years. The maximum chloride concentration reported, 18.3 mg/L at MW-15, is less than 10 percent of the SDWR value of 250 mg/L.

Sulfate and chloride are often used as indicators for CCR impact on groundwater. The long-term overall trends for sulfate and chloride at the CIPCO CCR Monofill show the positive effects of closure.

The reported cobalt and manganese concentrations at monitoring well MW-5 were still higher compared to previous years, although slightly decreased from 2022. Monitoring well MW-5 is co-located with MW-6 which has consistently exhibited the highest cobalt and manganese concentrations on site. Future monitoring events will help identify if the results of the last to sampling events signify a new trend in MW-5.

A historically increasing trend in molybdenum was evident at monitoring well MW-17 through 2021 but the last 2 years of data have been decreasing. MW-15 molybdenum concentration exhibits an increasing trend.

Sodium results show a long-term increasing trend at MW-17; however, the 2023 result is lower than the 2022 result. In MW-15, there have been increases over the last few years, but generally a flat or decreasing trend in sodium concentrations in other areas of the Site.

The prevalence of decreasing trends may be affected by ongoing low water levels at the time of sampling. Continued monitoring will further help assess the concentration patterns and trends.

4. Summary and Recommendations

No MCLs were exceeded in the October 2023 groundwater monitoring event. HAs (boron, manganese, and molybdenum), SDWR guidelines (iron, manganese, and sulfate), and the SWSs (cobalt and lithium) were exceeded at locations consistent with historical results.

Overall, groundwater monitoring results are in-line with expectations and decreasing trends are seen in sulfate data, while chloride data are consistent with historical trends. Overall, decreasing concentration trends are observed more than increasing trends but for most locations and analytes, no clear trend was noted.

The groundwater monitoring network remains appropriate for assessing the Monofill's impact on groundwater. Overall, the Monofill does not appear to be impacting groundwater at concentrations of concern relative to drinking water exposure. The standards used to evaluate the Monofill's impact on groundwater are drinking water standards. Although HAs and SDWR guidelines are exceeded, the Monofill does not pose a significant risk because no drinking water receptors are located immediately downgradient of the Monofill, local users of groundwater have deep wells, and the extent of impacts appears to be limited.

Routine annual monitoring at the Monofill should continue in October 2024. No change to the analyte list is proposed at this time. Although surface water monitoring may be warranted in the future, at this time, it is not recommended to resume. Years of past surface water monitoring did not show an impact, and sulfate concentrations (the largest mass in terms of milligrams per liter and thus most likely to be observed at levels of impact) at MW-17 remain within the range of historical results.

5. Inspections

CIPCO continued routine inspections of the Monofill since closure. Appendix D includes a summary of the 2023 inspection activities and corrective actions. Sam Honolod of CIPCO routinely inspects the Monofill property.

Overall, the cap is well vegetated. Multiple mowing events were conducted during the year. Maintenance work on drainage channels was performed.

In 2022, a significant effort was completed by CIPCO to protect the landfill berm along Pine Creek. Two areas of historical erosion were cleared, covered with flex-a-mat, and re-seeded. This area generally appeared to be protected with the flex-a-mat performing as expected.

Minor maintenance tasks were identified such as fence repair. In 2023, woody vegetation around the stormwater ponds was cleared.

CIPCO will continue multiple site visits and inspections to support landfill maintenance.

Tables

Table 1

Monitoring Program Summary
2023 Annual Water Quality Report
CIPCO Fair Station CCR Monofill
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Monitoring Well	Formation	Current Monitoring Program	Change for next sampling event	Control Limit Exceedances	Total # of Samples in each monitoring program since January 1, 2018		
					Routine (Annual)	Supplemental	Remedial Action
MW-1	Uppermost Aquifer	Annual	No Change	Chloride, Iron, Lithium, Magnesium, Sulfate	7	0	0
MW-2	Water Table	Annual	No Change	Boron, Lithium, Sodium, Strontium, Sulfate	7	0	0
MW-3	Uppermost Aquifer	Annual	No Change	Boron, Sodium, Strontium	7	0	0
MW-5	Uppermost Aquifer	Annual	No Change	Boron, Chloride, Cobalt, Iron, Magnesium, Sodium, Sulfate	7	0	0
MW-6	Water Table	Annual	No Change	Arsenic, Boron, Chloride, Cobalt, Manganese, Molybdenum, Sodium, Strontium	7	0	0
MW-9	Uppermost Aquifer	Annual	No Change		7	0	0
MW-11	Water Table	Annual	No Change		7	0	0
MW-15	Uppermost Aquifer	Annual	No Change	Boron, Chloride, Lithium, Magnesium, Molybdenum, Sodium, Sulfate	7	0	0
MW-17	Uppermost Aquifer	Annual	No Change	Boron, Chloride, Iron, Lithium, Magnesium, Molybdenum, Sodium, Sulfate	7	0	0
MW-20	Uppermost Aquifer	Annual	No Change	Boron, Sodium	7	0	0
Other monitoring points							
MW-4	Water Table	Water Level	No Change	NA	0	0	0
MW-7	Water Table	Water Level	No Change	NA	0	0	0
MW-10	Water Table	Water Level	No Change	NA	0	0	0

Table 2

Monitoring Program Implementation Schedule
2023 Annual Water Quality Report
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Monitoring Well	Recent Sampling Dates and Constituents				Upcoming Sampling Dates and Constituents
					Annually
MW-1	Arsenic, cobalt, iron, magnesium, manganese, chloride, and sulfate as required in Paragraph 567—103.1(4)d of the Iowa Administrative Code (IAC). A variance granted in July 2017 eliminated the requirement to analyze for barium, beryllium, copper, lead, selenium, and zinc based on historic data. Boron, lithium, molybdenum, sodium, and strontium are also analyzed per the amended HMSP.				
MW-2					
MW-3					
MW-5					
MW-6					
MW-9					
MW-11					
MW-15					
MW-17					
MW-20					

Table 3

Monitoring Well Maintenance and Performance Revaluation Schedule
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CIPCO Fair Station CCR Monofill
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This table is not applicable to the CIPCO Fair Station CCR Monofill

Table 4

Monitoring Well Maintenance and Performance Summary
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Well	Top of Casing	Top of Screen	Total Depth		Date of Measurements		
					10/19/2021	10/11/2022	10/10/2023
MW-1	588.13	571.51	36	Groundwater Level (ft)	21.92	24.71	25.41
				Groundwater Elevation (Ft MSL)	566.21	563.42	562.72
				Measured Well Depth (ft)			
				Submerged screen	N	N	N
MW-2	559.42	546.7	12.69	Groundwater Level (ft)	6.90	7.17	7.51
				Groundwater Elevation (Ft MSL)	552.52	552.25	551.91
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y
MW-3	559.17	512.69	46.41	Groundwater Level (ft)	9.30	9.18	9.44
				Groundwater Elevation (Ft MSL)	549.87	549.99	549.73
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y
MW-4	556.93	557.78	10.3	Groundwater Level (ft)	9.73	9.70	9.60
				Groundwater Elevation (Ft MSL)	547.2	547.23	547.33
				Measured Well Depth (ft)			
				Submerged screen	N	N	N
MW-5	555.54	527.24	28.3	Groundwater Level (ft)	6.72	5.88	6.80
				Groundwater Elevation (Ft MSL)	548.82	549.66	548.74
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y
MW-6	555.89	541.11	14.82	Groundwater Level (ft)	7.73	7.20	7.99
				Groundwater Elevation (Ft MSL)	548.16	548.69	547.9
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y
MW-7	555.55	548.78	17.99	Groundwater Level (ft)	3.51	3.45	3.03
				Groundwater Elevation (Ft MSL)	552.04	552.10	552.52
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y
MW-9	629.13	513.59	118.67	Groundwater Level (ft)	33.18	33.21	32.83
				Groundwater Elevation (Ft MSL)	595.95	595.92	596.30
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y
MW-10	629.39	597.45	32.25	Groundwater Level (ft)	24.98	23.58	23.21
				Groundwater Elevation (Ft MSL)	604.41	605.81	606.18
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y
MW-11	587.99	586.22	20.44	Groundwater Level (ft)	5.58	6.81	7.36
				Groundwater Elevation (Ft MSL)	582.41	581.18	580.63
				Measured Well Depth (ft)			
				Submerged screen	N	N	N
MW-15	558.66	539.50	29.16	Groundwater Level (ft)	12.42	12.46	12.55
				Groundwater Elevation (Ft MSL)	546.24	546.20	546.11
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y
MW-17	557.32	541.97	20.35	Groundwater Level (ft)	12.08	11.98	12.22
				Groundwater Elevation (Ft MSL)	545.24	545.34	545.1
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y
MW-20	558.92	524.52	44.4	Groundwater Level (ft)	5.98	5.70	5.92
				Groundwater Elevation (Ft MSL)	552.94	553.22	553.00
				Measured Well Depth (ft)			
				Submerged screen	Y	Y	Y

Table 5

Background Summary
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CIPCO Fair Station CCR Monofill
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Interwell Background/Control Limit (MW-11 Water Table)

Constituent	Units	Samples	Detections	Background level	Statistical Test	Action Level	Source
Inorganics							
Arsenic (As)	mg/L	10	0	0.0016	M+/-2SD	0.01	MCL
Boron (Bo)	mg/L	10	0	0.132	M+/-2SD	6	HA
Chloride (Cl)	mg/L	42	38	12.6	M+/-2SD	250	SDWR
Cobalt (Co)	mg/L	10	5	0.001295	M+/-2SD	0.0028	SWS
Iron (Fe)	mg/L	10	9	0.95	M+/-2SD	0.3	SDWR
Lithium (Li)	mg/L	10	1	0.0076	M+/-2SD	0.014	SWS
Magnesium (Mg)	mg/L	10	10	54.3	M+/-2SD	NA	
Manganese (Mn)	mg/L	10	10	0.463	M+/-2SD	0.3, 0.05	HA, SDWR
Molybdenum (Mo)	mg/L	10	0	0.001	M+/-2SD	0.04	HA
Sodium (Na)	mg/L	10	10	14.7	M+/-2SD	NA	
Strontium (St)	mg/L	10	10	0.153	M+/-2SD	4	HA
Sulfate (SO4)	mg/L	29	28	136	M+/-2SD	250	SDWR

Interwell Background/Control Limit (MW-9 Uppermost Aquifer)

Constituent	Units	Samples	Detections	Background level	Statistical Test	Action Level	Source
Inorganics							
Arsenic (As)	mg/L	10	0	0.0016	M+/-2SD	0.01	MCL
Boron (Bo)	mg/L	10	7	0.372	M+/-2SD	6	HA
Chloride (Cl)	mg/L	40	7	5.9	M+/-2SD	250	SDWR
Cobalt (Co)	mg/L	10	2	0.001768	M+/-2SD	0.0028	SWS
Iron (Fe)	mg/L	10	2	0.65	M+/-2SD	0.3	SDWR
Lithium (Li)	mg/L	10	10	0.0494	M+/-2SD	0.014	SWS
Magnesium (Mg)	mg/L	10	10	35.5	M+/-2SD	NA	
Manganese (Mn)	mg/L	10	7	0.751	M+/-2SD	0.3, 0.05	HA, SDWR
Molybdenum (Mo)	mg/L	10	0	0.001	M+/-2SD	0.04	HA
Sodium (Na)	mg/L	10	10	13.3	M+/-2SD	NA	
Strontium (St)	mg/L	10	10	0.733	M+/-2SD	4	HA
Sulfate (SO4)	mg/L	29	27	36.2	M+/-2SD	250	SDWR

Table 6

Summary of Well/Detected Constituent Pairs With No Immediately Preceding Control Limit Exceedances
2023 Annual Water Quality Report
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Well	Constituent	Units	Most recent result	Control Limit
MW-1	Manganese	mg/L	0.399	0.3 (HAL)
MW-2	Lithium	mg/L	0.0373	0.014
MW-2	Manganese	mg/L	0.0670	0.05 (SDWR)
MW-3	Iron	mg/L	0.309	0.3
MW-3	Manganese	mg/L	0.708	0.3 (HAL)
MW-17	Manganese	mg/L	0.354	0.3 (HAL)

Notes:
For this table, control limit identified as published standards.
Manganese has a Secondary Drinking Water Regulation (SDWR) limit of 0.05 mgilligrams per liter (mg/L) and a Health Advisory Level (HAL) of 0.3 mg/L.

Table 7

Summary of Ongoing and Newly Identified Control Limit Exceedances
2023 Annual Water Quality Report
CIPCO Fair Station CCR Monofill
Permit No. 70-SDP-09-91C

Well	Constituent	Units	Most recent result	Background/Baseline Standard	Action Level/ Statewide Standard
MW-1	Boron	mg/L	0.300	0.284	6
	Chloride	mg/L	6.3	6.6	250
	Cobalt	mg/L	0.00149	0.000946	0.0028
	Iron	mg/L	3.64	1.69	0.3
	Lithium	mg/L	0.0630	0.0667	0.014
	Manganese	mg/L	0.399	0.296	0.3/0.05
	Strontium	mg/L	0.646	0.748	4
	Sulfate	mg/L	250	370	250
MW-2	Boron	mg/L	7.56	7.36	6
	Cobalt	mg/L	0.0005U	0.000315	0.0028
	Lithium	mg/L	0.0373	0.0516	0.014
	Magnesium	mg/L	32.2	30.1	NA
	Manganese	mg/L	0.0670	0.05661	0.3/0.05
	Strontium	mg/L	0.33	0.323	4
	Sulfate	mg/L	206	703	250
MW-3	Iron	mg/L	0.309	1.05	0.3
	Lithium	mg/L	0.0393	0.0391	0.014
	Manganese	mg/L	0.708	1.599	0.3/0.05
	Sodium	mg/L	24.7	33.4	NA
	Strontium	mg/L	0.84	0.772	4
MW-5	Boron	mg/L	6.23	5.63	6
	Chloride	mg/L	15.9	13.7	250
	Cobalt	mg/L	0.00282	0.003063	0.0028
	Iron	mg/L	0.770	1.09	0.3
	Lithium	mg/L	0.0197	0.0264	0.014
	Manganese	mg/L	0.598	0.592	0.3/0.05
	Strontium	mg/L	0.315	0.318	4
MW-6	Boron	mg/L	8.06	6.31	6
	Chloride	mg/L	15.7	13.2	250
	Colbalt	mg/L	0.00302	0.00481	0.0028
	Iron	mg/L	0.794	0.981	0.3
	Lithium	mg/L	0.01U	0.0055	0.014
	Manganese	mg/L	5.17	8.29	0.3/0.05
	Molybdenmun	mg/L	0.0477	0.0679	0.04
MW-9	Boron	mg/L	0.216	0.159	6
	Lithium	mg/L	0.0448	0.045	0.014
	Magnesium	mg/L	32.4	30.9	NA
	Sodium	mg/L	12.5	9.2	NA
MW-11	Chloride	mg/L	10.3	8.6	250
	Magnesium	mg/L	50.8	48	NA
	Manganese	mg/L	0.126	0.302	0.3/0.05
	Sodium	mg/L	14.2	12.0	NA
	Strontium	mg/L	0.146	0.134	4

Table 7

Summary of Ongoing and Newly Identified Control Limit Exceedances
2023 Annual Water Quality Report
CIPCO Fair Station CCR Monofill
Permit No. 70-SDP-09-91C

Well	Constituent	Units	Most recent result	Background/Baseline Standard	Action Level/ Statewide Standard
MW-15	Boron	mg/L	37.5	28.9	6
	Chloride	mg/L	18.3	16.9	250
	Lithium	mg/L	0.166	0.156	0.014
	Magnesium	mg/L	116	105	NA
	Manganese	mg/L	0.253	0.510	0.3/0.05
	Molybdenum	mg/L	0.215	0.0746	0.04
	Sodium	mg/L	98.9	85.7	NA
	Strontium	mg/L	0.645	0.629	4
	Sulfate	mg/L	1380	783	250
MW-17	Boron	mg/L	19.7	16	6
	Chloride	mg/L	16.9	17.4	250
	Iron	mg/L	1.34	2.58	0.3
	Lithium	mg/L	0.289	0.278	0.014
	Magnesium	mg/L	157	180	NA
	Manganese	mg/L	0.354	0.265	0.3/0.05
	Molybdenum	mg/L	0.0972	0.1489	0.04
	Sodium	mg/L	75.2	58.2	NA
	Strontium	mg/L	0.424	0.400	4
	Sulfate	mg/L	1,090	869	250
MW-20	Boron	mg/L	1.45	1.3	6
	Lithium	mg/L	0.0222	0.0241	0.014
	Sodium	mg/L	91.0	77.5	NA
	Strontium	mg/L	0.544	0.578	4

Note: Non detect results are denoted by U and shown as the reporting limit. Table 8 shows 1/2 the Reporting Limit.

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL ARSENIC (unfiltered) (mg/L) MCL = 0.01

		Water Table			Uppermost Aquifer						
	Reporting	Upgradient	Downgradient		Upgradient	Downgradient					
Date	Limit	MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.00200	0.00100U	0.00100U	***0.00460***	0.00100U	***0.00305***	0.00100U	0.00100U	***0.00684***	***0.00335***	0.00100U
Aug-17	0.00200	0.00100U	0.00100U	***0.00246***	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U
Oct-17	0.00200	0.00100U	0.00100U	0.00100U	0.00100U	0.00057	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U
Apr-18	0.00200	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U
Oct-18	0.00200	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U
Oct-19	0.00200	0.00100U	0.00100U	***0.00278***	0.00100U	0.00100U	0.00100U	0.00100U	**0.00219**	0.00100U	0.00100U
Oct-20	0.00200	0.00100U	0.00100U	***0.00239***	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U
Oct-21	0.00200	0.00100U	0.00100U	***0.00272***	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U
Oct-22	0.00200	0.00100U	0.00400U	0.00400U	0.00100U	0.00100U	0.00100U	0.00100U	0.00400U	0.00400U	0.00100U
Oct-23	0.00200	0.00100U	0.00100U	**0.00222**	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U	0.00100U
HISTORIC AVERAGE		0.0010	0.0013	0.0024	0.0010	0.0012	0.0010	0.0010	0.0020	0.0015	0.0010
BASELINE AVERAGE		0.0010	0.0010	0.0023	0.0010	0.0014	0.0010	0.0010	0.0025	0.0016	0.0010
UCL		0.0016			0.0016						

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL BORON (unfiltered) (mg/L) HA=6

		Water Table			Uppermost Aquifer						
	Reporting	Upgradient	Downgradient		Upgradient	Downgradient					
Date	Limit	MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.200	0.100U	7.94	6.94	0.100U	0.263	3.39	5.76	31.2	15.2	1.29
Aug-17	0.200	0.100U	6.48	6.75	0.217	0.260	2.52	5.28	24.9	15.6	1.27
Oct-17	0.200	0.100U	7.71	7.07	0.219	0.321	2.40	6.31	28.4	17.9	1.39
Apr-18	0.200	0.100U	7.31	4.48	0.100U	0.291	2.76	5.16	31.0	15.3	1.23
Oct-18	0.200	0.100U	8.53	6.89	0.364	0.452	3.10	6.23	35.9	16.4	1.61
Oct-19	0.200	0.100U	9.35	7.60	0.100U	0.345	2.82	6.06	44.5	17.4	1.37
Oct-20	0.200	0.100U	7.21	6.76	0.282	0.332	3.80	6.77	44.0	25.4	1.51
Oct-21	0.200	0.100U	7.91	6.15	0.208	0.299	2.21	5.60	29.6	26.7	1.71
Oct-22	0.200	0.050U	8.47	7.51	0.219	0.281	2.34	6.32	36.8	25.9	1.37
Oct-23	0.200	0.050U	7.56	8.06	0.216	0.300	1.43	6.23	37.5	19.7	1.45
HISTORIC AVERAGE		0.090	7.8	6.8	0.203	0.314	2.68	5.97	34.4	19.6	1.42
BASELINE AVERAGE		0.100	7.36	6.31	0.159	0.284	2.77	5.63	28.9	16.0	1.30
UCL		0.132			0.372						

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

CHLORIDE (mg/L) SDWR = 250

		Water Table			Uppermost Aquifer						
	Reporting	Upgradient	Downgradient		Upgradient	Downgradient					
Date	Limit	MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Aug-95	5	6	***17***		2.5U	2.5U	2.5U		***18***		
Nov-95	5	6.7	***24***		2.5U	2.5U	2.5U		***17***		
Feb-96	5	8.3	***26***			2.5U	2.5U		***18***		
Jun-96	5	6.1	***24***		2.5U	2.5U	2.5U		***15***		
Sep-96	5	*9.2*	***19***			2.5U	**6.3**		***20***		
Apr-97	5	7.6	***20***		2.5U	2.5U	5.7		***17***		
Oct-97	5	7.8	***19***		*5.6*	2.5U	2.5U		***18***		
Apr-98	5	*11*	***31***		2.5U	**6.4**	***9.8***		***18***		
Oct-98	5	7.2	***24***		2.5U	2.5U	5.6				
Apr-99	10	5U	***18***		5U	5U	5U		**16**		
Oct-99	10	5U	***18***		5U	5U	5U		***17***		
Apr-00	10	5U	**15**		5U	5U	5U		**11**		
Dec-00	5	7.4	***19.4***		2.5U	2.5U	5		***16.9***		
May-01	5.0	*8.9*	***20.4***		2.5U	5.5	***10.2***		**15.5**		
Jul-01	5.0	*9.9*	**14.7**		2.5U	***8.6***	**7.1**		***16.9***		
Oct-01	5.0	7.6	**16.2**		2.5U	**6.3**	**6.9**		***17.9***		
Jan-02	5.0	8.0	***18.3***		2.5U	6.0	5.2		***17.3***		
Oct-02	5.0	*10.3*	**16.2**		2.5U	***7.2***	2.5U		***19.0***		
Oct-03	5	***12.6***	***18.1***		*5.6*	***6.7***	2.5U		***19.5***		
Oct-04	5.0	6.8	**14.3**		2.5U	***9.0***	2.5U		***20.2***		
Oct-05	5.0	7	2.5U	***14.2***	2.5U	***12.7***	***16.5***	**13.0**	***21.1***		
Jan-06	5.0			***15.4***				***15***			
Apr-06	5.0			11.3				**13.2**			
Jul-06	5.0			11.9				**13.5**			
Oct-06	5.0	7.43	***18.3***	***14.0***	*5.2*	***12.4***	2.5U	**13.4**	***23.1***		
Oct-07	5.0	6.65	***17.5***	9.91	2.5U	***13.9***	2.5U	**11.9**	***21.6***		
Oct-08	5.0	6.36	**15**	10.5	2.5U	***33.8***	2.5U	**11.3**	***21.5***		

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

CHLORIDE (mg/L) SDWR = 250

Date	Reporting Limit	Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-09	5.0	6.49	14.2	13.0	7.0	28.1	2.5U	12.2	21.9		
Oct-10	5.0	5.63	12.6	13.0	2.5U	17.3	2.5U	11.8	19.6		
Oct-11	5.0	7.56	21.3	20.6	2.5U	16.7	2.5U	15.4	21.7		
Oct-12	5.0	6.32	19.9	21.9	2.5U	14.4	2.5U	15.1	19.9		
Dec-12	5.0	9.3	25.2	22.6	2.5U	16.4	2.5U	19.2	23.8	16.1	
Oct-13	5.0	7.06	15.3	19.2	2.5U	13.6	2.5U	18.1	20.4	18.3	9.14
Jan-14	5.0									17.9	
Apr-14	5.0									16.9	5.41
Jul-14	5.0									16.6	
Oct-14	5.0										5.96
Oct-14	5.0	13.7	16.5	20.5	5.00	13.7	2.5U	20.4	23.4	19.1	7.29
Oct-15	5.0	11.2	13.4	26.8	6.00	12.7	8.96	22.8	21.6	20.2	11.5
Oct-16	5.0	9.23	36.6	15.9	5.59	12.6	2.5U	18.4	21.1	18.2	5.65
Aug-17	5.0	10.4	15.3	15.8	2.5U	10.5	2.5U	19.3	20.2	19.3	6.11
Oct-17	5.0	10.4	13.7	16.7	2.5U	13.1	2.5U	18.6	20.3	19.4	5.06
Apr-18	5.0	10.4	14.4	18.3	2.5U	11.1	5.26	18.2	19.2	19.3	6.21
Oct-18	5.0	10.2	12.3	15.9	2.5U	9.2	2.5U	17.3	19.4	18.0	2.5U
Oct-19	5.0	7.5	10.7	13.2	2.5U	7.8	2.5U	15.9	16.7	17.1	2.5U
Oct-20	5.0	2.5U	9.3	2.5U	2.5U	5.8	2.5U	2.5U	15.2	15.6	2.5U
Oct-21	5.0	9.61	9.6	15.8	2.5U	6.91	2.5U	15.5	16.6	18.2	5.36
Oct-22	5.0	9.71	8.92	13.2	2.5U	7.21	2.5U	13.8	15.2	21.0	2.5U
Oct-23	5.00	10.3	9.67	15.7	2.5U	6.30	2.5U	15.9	18.3	16.9	2.5U
HISTORIC AVERAGE		8.1	17.3	15.5	3.2	9.3	4.2	15.3	18.8	18.1	5.35
BASELINE AVERAGE		8.6	17.4	13.2	2.5	6.6	7.4	13.7	16.9	17.4	5.8
UCL		12.6			5.9						

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL COBALT (unfiltered) (mg/L) Statwide Standard = 0.0028 mg/L

Date	Reporting Limit	Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.000500	0.00135	0.000508	***0.00523***	0.000250U	0.000871	***0.00464***	**0.00259**	***0.00277***	0.000250U	0.000516
Aug-17	0.000500	0.000558	0.000250U	***0.00500***	0.000250U	*0.00104*	***0.00772***	**0.00269**	0.00135	0.000250U	*0.00112*
Oct-17	0.000500	0.00031	0.000250U	***0.00522***	0.00056	*0.00100*	**0.00262**	***0.00423***	0.00061	0.000250U	0.000490
Apr-18	0.000500	0.00106	0.000250U	**0.00379**	***0.00229***	0.000874	0.00200	**0.00274**	*0.00182*	0.000250U	0.000250U
Oct-18	0.000500	0.000250U	0.000250U	**0.00324**	0.000250U	*0.001020*	0.00089	0.00158	*0.00169*	0.000250U	0.000250U
Oct-19	0.000500	0.000250U	0.000250U	**0.00405**	0.000250U	*0.001280*	0.00132	0.00081	***0.00218***	0.000250U	0.00054
Oct-20	0.000500	0.000560	0.000250U	***0.00500***	0.000250U	*0.001200*	0.000659	0.00203	0.000810	0.000250U	0.000250U
Oct-21	0.000500	0.000250U	*0.000638*	***0.00559***	0.000250U	***0.00233***	0.000648	0.000840	0.000250U	0.000250U	0.000250U
Oct-22	0.000500	0.000250U	0.00100U	**0.00363**	0.000250U	0.000723	0.00129	***0.00354***	0.00100U	0.00100U	0.000250U
Oct-23	0.000500	0.000250U	0.000250U	**0.00302**	0.000250U	*0.00149*	0.00162	**0.00282**	0.000780	0.000250U	0.000250U
HISTORIC AVERAGE		0.000509	0.000390	0.004377	0.000485	0.001183	0.002341	0.002387	0.001326	0.000325	0.000416
BASELINE AVERAGE		0.000820	0.000315	0.004810	0.000838	0.000946	0.004245	0.003063	0.001638	0.000250	0.000594
UCL		0.001295			0.001768						

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL IRON (unfiltered) (mg/L) SDWR = 0.3

		Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
Date	Reporting Limit	MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.100	*1.03*	0.223	**1.16**	0.050U	***1.82***	***1.10***	**1.02**	*0.507*	***2.93***	0.050U
Aug-17	0.100	0.476	0.207	**1.09**	0.050U	**1.39**	***1.78***	***1.52***	0.322	***3.16***	***1.13***
Oct-17	0.100	0.247	0.5U	0.872	***0.798***	***1.74***	0.398	***1.16***	0.5U	***2.68***	0.213
Apr-18	0.100	0.471	0.184	0.802	*0.354*	***1.79***	**0.938**	0.668	0.399	**1.53**	0.050U
Oct-18	0.100	0.374	0.050U	0.396	0.050U	**1.41**	0.249	0.210	0.129	**2.50**	0.117
Oct-19	0.100	0.181	0.200U	0.893	0.050U	***1.80***	0.125	0.200U	0.050U	***3.34***	0.050U
Oct-20	0.100	*0.595*	0.050U	0.900	0.050U	**1.58**	0.050U	0.176	0.050U	**2.46**	0.137
Oct-21	0.100	0.111	0.050U	***1.80***	0.050U	***2.13***	0.050U	0.400	0.050U	***2.66***	0.050U
Oct-22	0.100	0.050U	0.200U	0.739	0.050U	**1.50**	0.258	0.611	0.200U	**2.00**	0.133
Oct-23	0.100	0.255	0.050U	0.794	0.050U	***3.64***	0.309	**0.770**	0.050U	**1.34**	0.128
HISTORIC AVERAGE		0.379	0.171	0.945	0.155	1.88	0.526	0.674	0.226	2.46	0.206
BASELINE AVERAGE		0.556	0.279	0.981	0.313	1.69	1.05	1.09	0.432	2.58	0.361
UCL		0.95			0.65						

Table 8

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL LITHIUM (unfiltered) (mg/L) Statewide Standard = 0.014 mg/L

Date	Reporting Limit	Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.0140	0.0070U	***0.0571***	0.0070U	0.0435	**0.0663**	*0.0434*	0.0257	***0.163***	**0.270**	0.0214
Aug-17	0.0100	0.0050U	**0.0515**	0.0050U	0.0433	**0.0643**	0.0361	0.0242	***0.157***	**0.275**	0.0186
Oct-17	0.0100	*0.0080*	***0.0627***	0.0050U	*0.0500*	***0.0684***	*0.0416*	*0.0318*	***0.165***	***0.314***	*0.0289*
Apr-18	0.0100	0.0050U	**0.0351**	0.0050U	0.0433	**0.0677**	0.0354	0.0237	**0.138**	**0.254**	*0.0274*
Oct-18	0.0100	0.0050U	**0.0411**	0.0050U	0.0448	**0.0591**	0.0309	0.0205	**0.149**	**0.265**	0.0207
Oct-19	0.0100	0.0050U	**0.0444**	0.0050U	0.0417	***0.0708***	0.0339	0.0258	***0.204***	***0.302***	0.0216
Oct-20	0.0100	0.0050U	**0.0383**	0.0050U	*0.0457*	***0.0667***	0.0361	0.0245	***0.162***	***0.317***	*0.0241*
Oct-21	0.0100	0.0050U	**0.0406**	*0.0140*	0.0404	**0.0656**	*0.0410*	0.0237	**0.135**	***0.318***	*0.0210*
Oct-22	0.0100	0.0050U	0.0200U	0.0200U	0.0405	**0.0573**	*0.0392*	0.0182	**0.156**	***0.295***	0.0190
Oct-23	0.0100	0.0050U	**0.0373**	0.0050U	0.0448	**0.0630**	*0.0393*	0.0197	***0.166***	***0.289***	0.0222
HISTORIC AVERAGE		0.0055	0.0428	0.0076	0.0438	0.0649	0.0377	0.024	0.160	0.290	0.0225
BASELINE AVERAGE		0.0062	0.0516	0.0055	0.0450	0.0667	0.0391	0.0264	0.156	0.278	0.0241
UCL		0.0076			0.0494						

Table 8

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL MAGNESIUM (unfiltered) (mg/L) No Standard Established, Use 2-Year Average

Date	Reporting Limit	Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.500	48.2	*30.6*	*44.1*	*31.1*	***84.8***	*23.4*	**38.6**	**103**	**177**	18.3
Aug-17	0.050	*48.1*	29.2	*45.4*	30.8	**77.9**	21.4	**39.2**	**105**	**171**	18.0
Oct-17	0.050	53.3	*35.3*	*45.0*	*32.5*	**78.5**	*23.0*	***44.2***	***113***	***207***	*19.6*
Apr-18	0.0500	42.3	25.2	31.5	29.3	***83.6***	*23.8*	***43.2***	**98.2**	**166**	18.1
Oct-18	0.0500	*50.0*	27.3	38.2	30.4	**73.2**	*25.1*	**35.0**	***121***	**169**	16.7
Oct-19	0.0500	45.9	*33.8*	37.4	*34.0*	**75.5**	22.5	**36.5**	**103**	***192***	17.4
Oct-20	0.0500	*48.9*	*37.0*	39.6	*35.1*	**77.0**	*27.3*	***42.0***	***117***	***230***	*19.5*
Oct-21	0.0500	*49.1*	*36.6*	33.6	30.4	**74.1**	20.3	**35.9**	***108***	***182***	17.0
Oct-22	0.0500	47.1	*30.5*	33.2	28.9	**69.7**	19.6	33.8	***117***	**179**	15.7
Oct-23	0.0500	*50.8*	*32.2*	35.3	*32.4*	**72.7**	19.4	**38.3**	***116***	**157**	16.6
2-YEAR AVERAGE		48.1	33.6	33.4	29.7	71.9	20.0	34.9	112.5	180.5	16.4
HISTORIC AVERAGE		48.4	31.8	38.3	31.5	76.7	22.6	38.7	110	183	17.7
BASELINE AVERAGE		48.0	30.1	41.5	30.9	81.2	22.9	41.3	105	180	18.5
UCL		54.3			35.5						

Table 8

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL MANGANESE (unfiltered) (mg/L) HA=0.3, SDWR=0.05

Date	Reporting Limit	Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.0200	*0.380*	*0.102*	***8.92***	0.0419	0.276	**2.64**	0.502	*0.783*	*0.266*	*0.132*
Aug-17	0.0100	0.214	0.0496	***8.48***	0.0477	0.271	**2.74**	0.521	0.476	0.244	*0.123*
Oct-17	0.0100	0.170	0.0397	***8.71***	*0.505*	*0.306*	0.463	*0.776*	0.205	*0.293*	*0.102*
Apr-18	0.0100	0.442	0.0330	**7.05**	*0.882*	*0.331*	0.553	0.568	*0.575*	0.255	0.0298
Oct-18	0.0100	0.102	0.0271	**6.20**	0.0274	*0.325*	0.165	0.334	*0.609*	0.212	0.0815
Oct-19	0.0100	0.238	*0.0563*	***8.55***	0.044	*0.313*	0.194	0.167	*0.779*	*0.284*	0.0759
Oct-20	0.0100	0.292	0.0525	**7.73**	0.0050U	*0.363*	0.474	0.410	0.364	*0.336*	0.0669
Oct-21	0.0100	0.160	0.0552	**3.63**	0.0477	*0.466*	0.339	0.147	0.0292	0.248	0.0360
Oct-22	0.0100	0.0615	0.0440	**6.61**	0.0050U	0.251	0.159	***1.54***	0.167	0.262	0.0279
Oct-23	0.0100	0.126	*0.0670*	**5.17**	0.0050U	*0.399*	0.708	*0.598*	0.253	*0.354*	0.0427
HISTORIC AVERAGE		0.219	0.053	7.11	0.161	0.330	0.844	0.556	0.424	0.275	0.072
BASELINE AVERAGE		0.302	0.0561	8.29	0.369	0.296	1.599	0.592	0.510	0.265	0.097
UCL		0.463			0.751						

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL MOLYBDENUM (unfiltered) (mg/L) HA=0.04

Date	Reporting Limit	Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.00200	0.00100U	0.00100U	**0.0509**	0.00100U	0.00100U	0.00100U	0.00100U	***0.0907***	***0.198***	0.00100U
Aug-17	0.00200	0.00100U	0.00100U	***0.0750***	0.00100U	0.00100U	0.00100U	0.00100U	**0.0511**	**0.119**	0.00100U
Oct-17	0.00200	0.00100U	0.00100U	***0.0783***	0.00100U	0.00100U	0.00100U	0.00100U	***0.0806***	**0.0995**	0.00100U
Apr-18	0.00200	0.00100U	0.00100U	**0.0674**	0.00100U	0.00100U	0.00100U	0.00100U	***0.0758***	***0.1790***	0.00100U
Oct-18	0.00200	0.00100U	0.00100U	**0.0524**	0.00100U	0.00100U	0.00100U	0.00100U	**0.0639**	***0.166***	0.00100U
Oct-19	0.00200	0.00100U	0.00100U	***0.0933***	0.00100U	0.00100U	0.00100U	0.00100U	***0.4830***	***0.178***	***0.00242***
Oct-20	0.00200	0.00100U	0.00100U	**0.0626**	0.00100U	0.00100U	0.00100U	0.00100U	***0.0924***	***0.254***	***0.00240***
Oct-21	0.00200	0.00100U	0.00100U	**0.0220**	0.00100U	0.00100U	0.00100U	0.00100U	***0.104***	***0.301***	0.00100U
Oct-22	0.00200	0.00100U	0.00400U	**0.0667**	0.00100U	0.00100U	0.00100U	0.00100U	***0.179***	**0.127**	0.00100U
Oct-23	0.00200	0.00100U	0.00100U	**0.0477**	0.00100U	0.00100U	0.00100U	0.00100U	***0.215***	**0.0972**	0.00100U
HISTORIC AVERAGE		0.0010	0.0013	0.0616	0.0010	0.0010	0.0010	0.0010	0.1436	0.1719	0.0013
BASELINE AVERAGE		0.001	0.001	0.0679	0.0010	0.0010	0.0010	0.0010	0.0746	0.1489	0.0010
UCL		0.001			0.001						

Table 8

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL SODIUM (unfiltered) (mg/L) No Standard Established, Use 2-Year Average

Date	Reporting Limit	Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.500	*12.4*	***26.9***	***21.8***	*12.0*	12.3	**32.4**	***21.1***	***101***	**56.8**	***80.3***
Aug-17	1.000	12.0	**23.3**	***20.8***	*9.7*	***13.3***	**25.1**	**19.4**	**84.2**	***60.1***	***79.1***
Oct-17	1.000	11.1	**22.6**	***19.7***	8.18	***13.2***	***38.7***	**19.6**	**77.4**	***62.5***	***77.7***
Apr-18	1.00	*12.5*	***24.9***	**14.7**	6.96	11.2	***37.4***	**19.7**	**80**	**53.4**	**72.9**
Oct-18	1.00	*14.3*	**22.7**	**18.0**	7.90	12.2	***40.7***	***20.1***	***100***	***61.0***	***89.3***
Oct-19	1.00	*12.5*	**19.3**	**17.7**	*9.87*	10.1	**32.9**	**18.9**	***99.1***	***68.5***	***78.2***
Oct-20	1.00	*12.9*	**20.0**	**18.7**	*9.84*	10.8	**25.9**	***20.8***	***95.1***	***76.5***	***92.0***
Oct-21	1.00	*13.0*	**18.8**	**18.0**	*9.85*	10.3	**26.4**	**18.6**	**76.1**	***81.5***	***82.7***
Oct-22	1.00	*13.0*	**18.2**	**17.0**	*11.0*	10.4	***45.9***	**18.3**	***91.7***	***81.3***	***82.9***
Oct-23	1.00	*14.2*	**17.9**	**18.3**	*12.5*	11.8	**24.7**	**19.7**	***98.9***	***75.2***	***91.0***
2-YEAR AVERAGE		13.0	18.5	17.5	10.4	10.4	36.2	18.5	83.9	81.4	82.8
HISTORIC AVERAGE		12.8	21.5	18.5	9.8	11.6	33.0	19.6	90.4	67.7	82.6
BASELINE AVERAGE		12.0	24.4	19.3	9.2	12.5	33.4	20.0	85.7	58.2	77.5
UCL		14.7			13.3						

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

TOTAL STRONTIUM (unfiltered) (mg/L) HA=4

Date	Reporting Limit	Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-16	0.00100	0.127	***0.327***	***0.413***	0.574	0.719	***0.781***	0.287	0.620	0.379	0.534
Aug-17	0.00100	*0.138*	***0.338***	***0.424***	0.653	0.711	0.743	0.310	*0.645*	*0.405*	*0.592*
Oct-17	0.00100	*0.142*	***0.363***	**0.365**	0.649	0.691	0.734	0.318	0.583	0.397	0.557
Apr-18	0.00100	0.128	**0.263**	**0.288**	*0.741*	***0.871***	***0.828***	*0.357*	*0.668*	*0.420*	*0.628*
Oct-18	0.00100	0.134	**0.290**	**0.330**	0.648	0.656	0.585	0.273	0.543	0.342	0.517
Oct-19	0.00100	*0.138*	***0.357***	**0.358**	*0.668*	***0.757***	0.676	*0.320*	***0.766***	*0.430*	0.565
Oct-20	0.00100	*0.137*	***0.358***	**0.328**	0.612	***0.761***	0.730	*0.320*	***0.778***	*0.494*	*0.591*
Oct-21	0.00100	*0.151*	***0.397***	**0.263**	0.586	***0.780***	***0.899***	*0.373*	*0.651*	*0.506*	*0.584*
Oct-22	0.00100	*0.138*	**0.319**	**0.278**	0.626	0.711	**0.741**	*0.335*	*0.652*	*0.441*	0.567
Oct-23	0.00100	*0.146*	***0.330***	**0.273**	0.594	0.646	***0.840***	0.315	*0.645*	*0.424*	0.544
HISTORIC AVERAGE		0.138	0.334	0.332	0.635	0.730	0.756	0.321	0.655	0.424	0.568
BASELINE AVERAGE		0.134	0.323	0.373	0.654	0.748	0.772	0.318	0.629	0.400	0.578
UCL		0.153			0.733						

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

SULFATE (mg/L) SDWR=250

Date	Reporting Limit	Water Table			Uppermost Aquifer					
		Upgradient	Downgradient		Upgradient	Downgradient				
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Aug-95											
Nov-95											
Feb-96											
Jun-96											
Sep-96											
Apr-97											
Oct-97											
Apr-98											
Oct-98											
Apr-99											
Oct-99											
Apr-00											
Dec-00											
May-01	10	88	800		50	320	180		81		
Jul-01	10	120	170		32	150	27		250		
Oct-01	10	96	860		16	540	150		1,700		
Jan-02	10	88	980		14	470	120		1,100		
Oct-02	10	110	850		35	500	78		1,100		
Oct-03	10	89	1,100		17	420	66		1,400		
Oct-04	10.0	92.5	790		15.8	538	72.5		1,420		
Oct-05	10.0	130	990	380	22.0	750	94.0	370	1,900		
Jan-06	10.0			394				304			
Apr-06	10.0			361				355			
Jul-06	10.0			380				232			
Oct-06	10.0	121	798	338	16.8	456	49.5	259	1,610		
Oct-07	10.0	125	1,020	315	23.5	665	74.9	398	1,760		
Oct-08	10.0	91.8	664	184	18.4	840	116	265	1,380		

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

SULFATE (mg/L) SDWR=250

Date	Reporting Limit	Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-09	200.0	79.0	600	200	21.0	730	110	92.0	1,400		
Oct-10	100/200	102	479	193	19.3	522	137	211	1,300		
Oct-11	Varies	111	788	245	19.8	471	90	211	1,480		
Oct-12	Varies	113	801	307	16.1	457	55.7	248	1,400		
Dec-12	Varies	109	992	295	14.7	452	68.6	226	1,520	804	
Oct-13	Varies	105	551	332	17.4	452	65.3	257	1,440	957	31.3
Jan-14	100									860	
Apr-14	100									828	20.4
Jul-14	100									830	
Oct-14											19.6
Oct-14	Varies	97.6	520	309	23.0	408	96.5	211	1,330	947	25.7
Oct-15	20.00	78.0	310	265	20.8	364	62.8	202	1,350	901	24.8
Oct-16	5.00	77.9	313	177	22.4	340	87.1	185	1,370	984	28.1
Aug-17	5.00	85.2	272	175	19.8	325	85.0	161	1,200	973	29.2
Oct-17	5.00	84.7	307	153	18.5	311	114	150	1,260	1,050	26.9
Apr-18	5.00	82.4	288	125	15.2	319	176	142	1,330	1,070	25.4
Oct-18	5.00	84.6	283	135	14.7	306	179	136	1,330	1,010	24.5
Oct-19	5.00	87.3	301	105	19.6	303	140	128	1,250	948	24.9
Oct-20	5.00	19.9	265	25.8	2.50U	270	21.8	22.3	1,320	949	25.8
Oct-21	5.00	89.2	318	108	21.2	275	50.2	90.8	1,140	1,140	27.0
Oct-22	5.00	75.6	216	78.1	16.6	247	54.1	59.9	929	1,060	22.6
Oct-23	5.00	74.3	206	75.6	18.8	250	24.4	62.2	1,380	1,090	26.7
HISTORIC AVERAGE		93	580	226	20	429	91	199	1,291	965	26
BASELINE AVERAGE		98	703	379	28	370	119	315	783	869	110
UCL		136			36.2						

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

Temperature (degrees Celsius)

Date		Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Aug-95											
Nov-95											
Feb-96											
Jun-96											
Sep-96		17.0	20.0			18.0	18.0		14.0		
Apr-97											
Oct-97		13.6	13.1		13.1	11.8	11.2		13.4		
Apr-98											
Oct-98			14.5				11.9				
Apr-99											
Oct-99		11.7	13.3		11.7	10.6	11.1		13.3		
Apr-00		8.5	7.5		11.0	10.0	9.0		12.0		
Dec-00		10	10.0		11	11	12		10		
May-01		10.5	13.1		11.4	13.4	12.9		12.6		
Jul-01		13.9	15.2		12.8	15.3	15.0		13.8		
Oct-01		11	12.6		9	10.5	11.4		12.6		
Jan-02		12	9.3		9	11.7	9.9		10.2		
Oct-02		10.7	12.0		8.1	10.8	10.6		11.0		
Oct-03		14.7	13		13.5	12.5	14.5		14.7		
Oct-04		12.7	14		12.7	11.5	11.9		13.2		
Oct-05		15.7	15.9	15.1	13.5		13.7	12.8	13.9		
Jan-06											
Apr-06											
Jul-06											
Oct-06											
Oct-07		14.4	15.1	17.1	13.2	12.7	12.5	16.2	14.1		
Oct-08		13.5	11.8	15.1		11.6	11.1	13.5	11.1		

Table 8

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

Temperature (degrees Celsius)

Date		Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-09		13.9	14.9	16.9	13.0	13.9	12.6	16.0	13.9		
Oct-10		12.6	12.5	16.5	12.3	11.9	11.1	14.3	12.2		
Oct-11		12.4	11.3	14.5	11.5	11.5	9.7	13.9	10.9		
Oct-12		16.5	13.4	16.0	14.8	15.4	11.8	15.6	12.1		
Dec-12		11.9	10.5	12.1	11.6	11.1		13.7	12.3	12.5	
Oct-13		10.3	10.2	11.7	10.3	9.2	9.6	13.0	10.0	11.4	9.4
Jan-14										7.4	
Apr-14										8.7	10.3
Jul-14										14.9	
Oct-14											12.3
Oct-14		11.9	11.9	10.8	11.1	11.0	10.1	12.5	10.9	11.9	11.6
Oct-15		13.5	15.6	16.1	11.0	11.9	14.1	14.8	15.0	14.3	12.5
Oct-16		12.0	14.2	16.4	13.0	10.9	12.0	14.7	14.1	14.3	11.7
Aug-17		11.4	13.9	15.7	13.1	10.7	12.9	13.5	13.1	12.8	12.9
Oct-17		12.7	13.3	15.7	12.8	11.7	11.1	14.0	12.1	12.8	11.0
Apr-18		9.5	7.0	7.2	10.5	10.5	10.4	9.8	10.2	8.7	9.7
Oct-18		12.3	13.9	15.3	11.3	10.7	11.6	14.2	12.8	13.8	12.7
Oct-19		12.6	15.4	16.9	13.1	12.3	12.2	14.4	13.4	14.5	12.8
Oct-20		16.7	14.0	13.2	14.3	13.6	17.1	17.5	13.6	13.5	16.5
Oct-21		14.45	14.51		18.04	13.78	14.61	19.23	19.8	17.06	13.4
Oct-22		13.32	14.65	16.35	12.46	13.34	12.07	14.86	14.86	14.17	16.99
Oct-23		12.92	14.97	16.6	14.29	11.48	14.85	14.86	17.08	14.03	12.68

Table 8

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

pH

Date		Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Aug-95											
Nov-95											
Feb-96											
Jun-96											
Sep-96		6.48	6.95			6.83	7.16		7.27		
Apr-97											
Oct-97		6.70	6.14		7.12	6.60	6.14		6.95		
Apr-98											
Oct-98		8.01	8.30		8.62	8.66	7.12				
Apr-99											
Oct-99		6.92	7.01		7.19	7.01	7.44		6.40		
Apr-00		7.00	6.59		7.46	6.81	7.31		6.96		
Dec-00		6.62			7.25	5.72	6.79		6.61		
May-01		7.00	7.05		7.50	7.32	6.84		7.44		
Jul-01		6.98	6.81			6.75	7.2		7.58		
Oct-01		7.04	6.43		7.32	5.72	7.01		6.97		
Jan-02		7.01	6.47		7.32	6.78	7.20		6.90		
Oct-02		7.01	8.28		9.31	7.30	8.34		7.49		
Oct-03		7.10	6.7		7.52	6.83	7.22		6.98		
Oct-04		6.78	7.15		7.60	5.82	7.33		7.12		
Oct-05		7.84	7.05	6.30	7.90		7.49	5.84	6.81		
Jan-06											
Apr-06											
Jul-06											
Oct-06		6.68	6.26	6.16		6.13	7.24		6.68		
Oct-07		7.92	7.34	7.67	7.84	7.23	7.40	8.30	7.15		
Oct-08		7.10	6.65	6.88		6.76	7.24	7.10	6.99		

Table 8

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

pH

Date		Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-09		7.13	6.93	6.96	7.16	6.94	7.23	7.12	6.91		
Oct-10		7.10	6.60	6.83	7.22	6.71	7.19	7.16	7.01		
Oct-11		7.11	6.56	7.00	7.30	7.08	7.24	7.28	7.07		
Oct-12											
Dec-12		6.88	6.43	6.75	7.02	6.67		6.91	6.87	6.97	
Oct-13		6.88	6.44	6.85	7.03	6.74	6.54	6.76	5.64	6.15	7.00
Jan-14										6.42	
Apr-14										6.25	7.35
Jul-14										6.72	
Oct-14											5.44
Oct-14		7.74	7.57	5.56	7.41	7.50	7.93	6.32	7.57	7.23	8.00
Oct-15		7.03	6.63	6.70	7.23	6.77	7.35	6.92	7.08	6.95	7.52
Oct-16		6.85	6.52	6.79	7.35	6.73	7.06	6.88	6.88	6.98	7.38
Aug-17		6.56	6.37	6.65	6.40	6.60	6.88	6.76	6.85	6.82	7.14
Oct-17		6.76	6.43	6.73	7.30	5.94	6.96	6.76	6.71	6.71	7.16
Apr-18		6.78	6.58	6.95	7.00	6.61	7.15	6.94	6.84	6.97	7.52
Oct-18		6.97	6.57	6.92	7.43	6.83	7.06	6.97	6.96	7.06	7.47
Oct-19		7.03	6.54	6.77	6.05	6.90	7.13	6.79	7.03	7.16	7.35
Oct-20		6.94	6.53	6.92	7.36	6.80	7.09	6.98	7.00	7.03	7.48
Oct-21		7.00	7.11		7.44	6.79	7.30	7.05	7.05	6.96	6.83
Oct-22		7.02	6.69	7.23	7.68	6.84	7.13	7.3	7.27	7.33	7.41
Oct-23		6.42	6.44	6.72	8.07	6.48	6.98	6.7	6.83	6.82	7.11

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

Specific Conductance (microSiemens/cm)

Date		Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Aug-95											
Nov-95											
Feb-96											
Jun-96											
Sep-96											
Apr-97											
Oct-97		785	1,205		570	1,114	483		1,290		
Apr-98											
Oct-98		880	1,830		664	1,140	620				
Apr-99											
Oct-99		891	1,580		619	1,432	672		2,200		
Apr-00		847	1,461		585	1,192	821		1,917		
Dec-00		839	1,626		592	1,287	761		2.27		
May-01		895	1,903		642	1,415	927		2,080		
Jul-01		783	1,704			1,362	870		1,899		
Oct-01		897	1,710		674	1,287	846		2.35		
Jan-02		887	1,828		674	1,566	802		2,345		
Oct-02		873	1,799		625	1,566	744		2,333		
Oct-03		896	2,090		636	1,473	747.4		2,394		
Oct-04		976	1,822		719.8	1,833	817.2		2,964		
Oct-05		855	1,711	979	612		728	933	2,463		
Jan-06											
Apr-06											
Jul-06											
Oct-06		1,315	2,170	1,107	782	3,760	828		2,680		
Oct-07		861	1,751	797	629	1,811	716	943	246		
Oct-08		908	1,537	764		2,190	818	954	2,583		

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

Specific Conductance (microSiemens/cm)

Date		Water Table			Uppermost Aquifer						
		Upgradient	Downgradient		Upgradient	Downgradient					
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Oct-09		866	1,315	880	705.00	1,980	856	911	2,570		
Oct-10		896.6	1,288	879.7	676.2	1,761	899.9	893.5			
Oct-11		921.4	1,740	1,047	693	1,621	820	927	2,601		
Oct-12		1,036	1,691	1,050	633	1,543	835	1,005	2,501		
Dec-12		938.2	1,985	1,082	663.3	1,517		1,022	2,708	1,917	
Oct-13		829.9	1,153	1,021	601.0	1,353	826.2	956.7	254	1,890	651.0
Jan-14										1,995	
Apr-14										2,081	700.0
Jul-14										1,979	
Oct-14											754.2
Oct-14		852	1,190	1,183	694.4	1,328	938.1	938.7	2,200	1,899	624.5
Oct-15		891.2	1,024	1,220	677.1	1,424	709.4	1,029	2,488	2,035	672.5
Oct-16		867	978	1,080	654	1,400	703	1,020	2,410	2,090	667
Aug-17		913	962	1,110	723	1,330	678	1,000	2,260	2,160	691
Oct-17		1,430	1,690	1,760	1,110	2,200	1,260	1,720	4,060	3,830	1,180
Apr-18		880	1,040	927	667	1,400	781	997	2,530	2,250	695
Oct-18		906	1,005	979	686	1,310	887	998	1,825	2,114	688
Oct-19		1,160	1,100	1,040	625	1,370	840	970	2,550	2,170	730
Oct-20		845	960	1,000	681	1,190	691	857	2,390	2,270	655
Oct-21		846	1128		771	1144	677	854	2105	2154	626
Oct-22		926	1001	832	751	1183	790	840	1922	1909	686
Oct-23		824	805	810	603	1108	499	820	2291	2067	612

Analytical Data Summary
Central Iowa Power Cooperative Ash Disposal Landfill

Notes:
Baseline Data to be completed in 2018 for all calculations except Chloride and Sulfate.
mg/L - Milligrams per liter.
MCL - Maximum Contaminant Level.
UCL - Upgradient Control Limit.
HA - Health Advisory.
SDWR - Safe Drinking Water Regulations Guideline.
U - Value shown is 1/2 the detection limit. This value was used, where applicable, in calculation of UCL, baseline, and 2-year average.
Shaded values indicate concentration exceeds water quality criteria (e.g, the MCL, HA, SDWR limit, SWS, or 2-year average).
BOLD Bold indicates value exceeds the calculated UCL.
Italics Italics indicates sample result exceeds baseline concentration.
UCL, calculated as the Historic Average plus two standard deviations; based on upgradient wells only.
2-Year Average is the average concentration over the prior two years of sampling data.
Historic Average is the average based on analytical results for each well as shown. Historic dissolved metals are not included.
Baseline Average is the average concentration based four (4) quarters or four (4) initial sampling events.

Table 9

Historic Control Limit and Action Level Exceedances
2023 Annual Water Quality Report
CIPCO Fair Station CCR Monofill
Permit No. 70-SDP-09-91C

Key: gray =CL; black =action level						
Well	Constituent	Fall 2019	Fall 2020	Fall 2021	Fall 2022	Fall 2023
MW-1	Chloride					
	Cobalt					
	Iron					
	Lithium					
	Magnesium					
	Manganese					
	Sodium					
	Strontium					
	Sulfate					
MW-2	Boron					
	Lithium					
	Magnesium					
	Manganese					
	Sodium					
	Strontium					
	Sulfate					
MW-3	Boron					
	Iron					
	Lithium					
	Magnesium					
	Manganese					
	Sodium					
	Strontium					
	Sulfate					
MW-5	Boron					
	Chloride					
	Cobalt					
	Iron					
	Lithium					
	Magnesium					
	Manganese					
	Sodium					
	Sulfate					

Table 9

Historic Control Limit and Action Level Exceedances
2023 Annual Water Quality Report
CIPCO Fair Station CCR Monofill
Permit No. 70-SDP-09-91C

Key: gray =CL; black =action level						
Well	**Constituent**	**Fall 2019**	**Fall 2020**	**Fall 2021**	**Fall 2022**	**Fall 2023**
MW-6	Arsenic					
	Boron					
	Chloride					
	Cobalt					
	Iron					
	Magnesium					
	Manganese					
	Molybdenum					
	Sodium					
	Strontium					
MW-9	Lithium					
	Magnesium					
	Sodium					
MW-11	Iron					
	Magnesium					
	Manganese					
	Sodium					
MW-15	Arsenic					
	Boron					
	Chloride					
	Cobalt					
	Lithium					
	Magnesium					
	Manganese					
	Molybdenum					
	Sodium					
	Strontium					
	Sulfate					

Table 9

Historic Control Limit and Action Level Exceedances
2023 Annual Water Quality Report
CIPCO Fair Station CCR Monofill
Permit No. 70-SDP-09-91C

Key: gray =CL; black =action level		Fall 2019	Fall 2020	Fall 2021	Fall 2022	Fall 2023
Well	**Constituent**					
MW-17	Boron					
	Chloride					
	Iron					
	Lithium					
	Magnesium					
	Manganese					
	Molybdenum					
	Sodium					
	Sulfate					
MW-20	Boron					
	Lithium					
	Magnesium					
	Manganese					
	Molybdenum					
	Sodium					

Data shown for 5 years total.

Table 10

Groundwater Quality Assessment Plan Trend Analysis
2023 Annual Water Quality Report
Central Iowa Power Cooperative CCR Monofill
Permit No. 70-SDP-09-91C

		Water Table			Uppermost Aquifer						
		MW-11	MW-2	MW-6	MW-9	MW-1	MW-3	MW-5	MW-15	MW-17	MW-20
Parameter	***Units***	***UG***	***DG***	***DG***	***UG***	***DG***	***DG***	***DG***	***DG***	***DG***	***DG***
Arsenic	mg/L	ND	ND	0.00222	ND	ND	ND	ND	ND	ND	ND
	Trend	NA	NA	None	NA	NA	NA	NA	NA	NA	NA
Boron	mg/L	ND	7.56	8.06	0.216	0.300	1.43	6.23	37.5	19.7	1.45
	Trend	NA	None	Increasing	None	None	None	None	None	None	None
Chloride	mg/L	10.3	9.67	15.7	ND	6.3	ND	15.9	18.3	16.9	ND
	Trend	None	Decreasing	None	NA	Decreasing	NA	Decreasing	None	Increasing	NA
Cobalt	mg/L	ND	ND	0.00302	ND	0.001490	0.00162	0.00282	0.00078	ND	ND
	Trend	None	NA	None	None	None	Increasing	Decreasing	None	NA	NA
Iron	mg/L	0.255	ND	0.794	ND	3.64	0.309	0.770	ND	1.34	ND
	Trend	Decreasing	NA	None	NA	None	NA	Increasing	None	Decreasing	None
Lithium	mg/L	ND	0.0373	ND	0.0448	0.0630	0.0393	0.0197	0.166	0.289	0.0222
	Trend	NA	None	NA	None	Decreasing	None	None	None	None	None
Magnesium	mg/L	50.8	32.2	35.3	32.4	72.7	19.4	38.3	116	157	16.6
	Trend	None	None	None	None	Decreasing	Decreasing	None	None	Decreasing	None
Manganese	mg/L	0.126	0.0670	5.17	ND	0.399	0.708	0.598	0.253	0.354	0.0427
	Trend	None	None	Decreasing	None	None	None	None	None	None	None
Molybdenum	mg/L	ND	ND	0.0477	ND	ND	ND	ND	0.215	0.0972	ND
	Trend	NA	NA	None	NA	NA	NA	NA	Increasing	Decreasing	NA
Sodium	mg/L	14.2	17.9	18.3	12.5	11.8	24.7	19.7	98.9	75.2	91.0
	Trend	Increasing	Decreasing	None	None	None	None	None	Increasing	None	None
Strontium	mg/L	0.146	0.330	0.273	0.594	0.646	0.840	0.315	0.645	0.424	0.544
	Trend	None	None	None	None	Decreasing	None	Decreasing	None	Decreasing	Decreasing
Sulfate	mg/L	74.3	206	75.6	18.8	250	24.4	62.2	1,380	1,090	26.7
	Trend	None	Decreasing	Decreasing	None	Decreasing	None	Decreasing	None	Increasing	None
Temperature	°C	12.92	14.97	16.60	14.29	11.48	14.85	14.86	17.08	14.03	12.68
	Trend	None	None	None	None	None	None	None	None	None	None
pH	pH Units	6.42	6.44	6.72	8.07	6.48	6.98	6.70	6.83	6.82	7.11
	Trend	None	Decreasing	None	Increasing	None	None	None	None	None	None
Specific Conductance	µS/cm	824	805	810	603	1,108	499	820	2,291	2,067	612
	Trend	None	Decreasing	None	None	None	None	None	None	None	None

Notes:

UG - Upgradient.
mg/L - Milligrams per liter.
µS/cm - MicroSiemens per centimeter.
NA - Not applicable; no trend observed due to predominance of non-detect results.
ND - Not detected.
NS - Not sampled.
°C - Degrees Celsius.

Table 11

Leachate Management Summary
2023 Annual Water Quality Report
CIPCO Fair Station CCR Monofill
Permit No. 70-SDP-09-91C

This table is not applicable to the CIPCO Fair Station CCR Monofill

Table 12

Gas Monitoring Summary
2023 Annual Water Quality Report
CIPCO Fair Station CCR Monofill
Permit No. 70-SDP-09-91C

This table is not applicable to the CIPCO Fair Station CCR Monofill

Table 13

Groundwater Elevations [a]
Central Iowa Power Cooperative CCR Monofill
October 10, 2023

Monitoring Well	Unit	Elevation (feet)
MW-1	Uppermost Aquifer	562.72
MW-2	Water Table	551.92
MW-3	Uppermost Aquifer	549.73
MW-4	Water Table	547.32
MW-5	Uppermost Aquifer	548.74
MW-6	Water Table	547.89
MW-7	Water Table	553.74
MW-9	Uppermost Aquifer	596.30
MW-10	Water Table	606.18
MW-11	Water Table	580.63
MW-15	Uppermost Aquifer	546.10
MW-17	Uppermost Aquifer	545.10
MW-20	Uppermost Aquifer	553.00

Notes:
[a] All groundwater elevations in feet North American Veritcal Datum 1988.
CCR - Coal combustion residue.

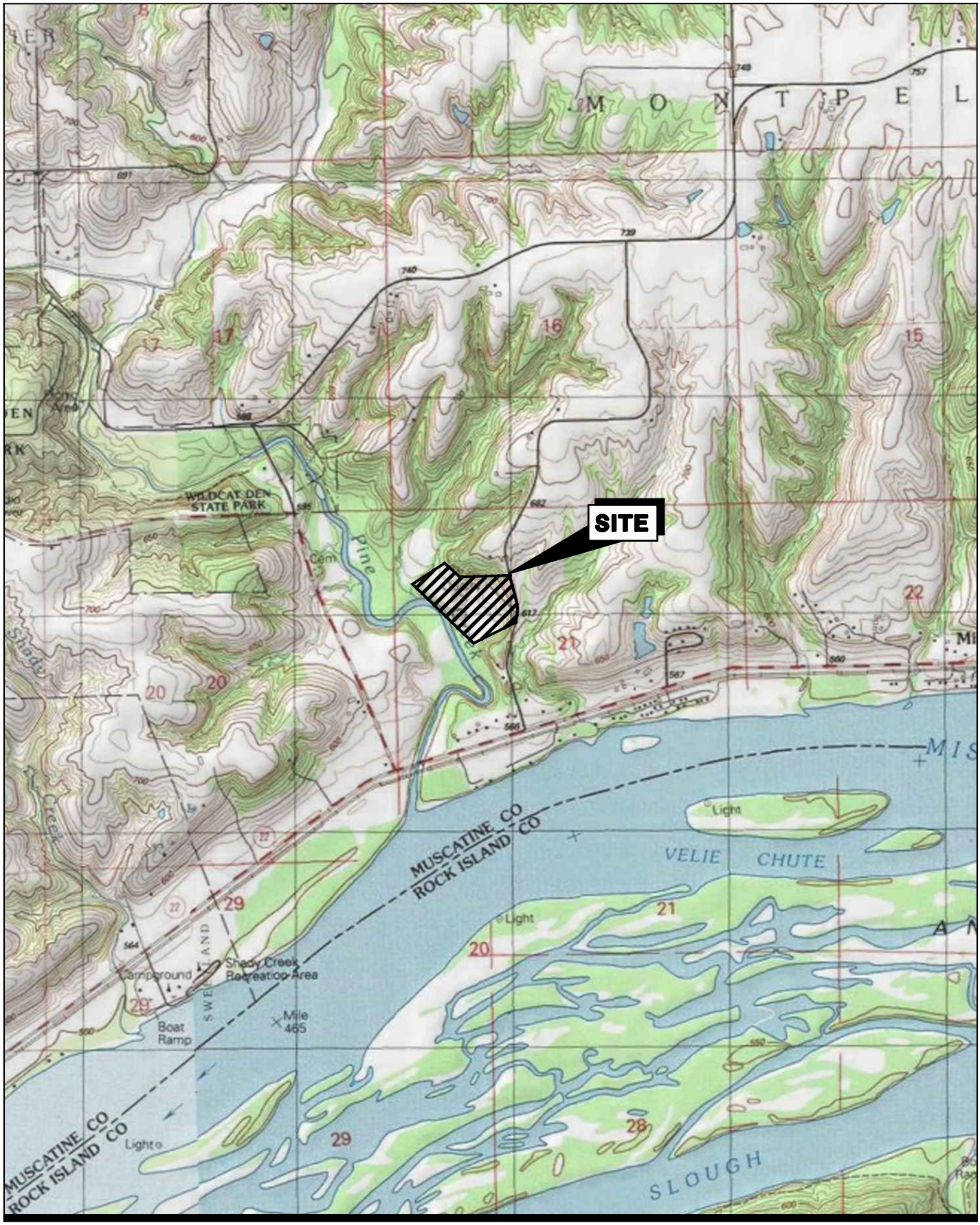
Table 14

Vertical Hydraulic Grandients[a] (ft/ft)
Central Iowa Power Cooperative CCR Monofill
October 10, 2023

Well Cluster	Gradient
Shallow/Deep	
MW-2/MW-3	-0.060
MW-6/MW-5	0.052
MW-10/MW-9	-0.118
MW-7/MW-20	-0.031

Notes:
[a] Positive hydraulic gradients indicate upward-directed flow, and negative hydraulic gradients indicate downward-directed flow.
CCR - Coal combustion residue.
ft/ft - Foot per foot.

Figures



0 1000 2000 ft

1" = 2000 ft

Coordinate System:
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N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

Project No. **12560436**
Date **November 2023**

SITE LOCATION MAP

FIGURE 1

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D101_DE-003.DWG
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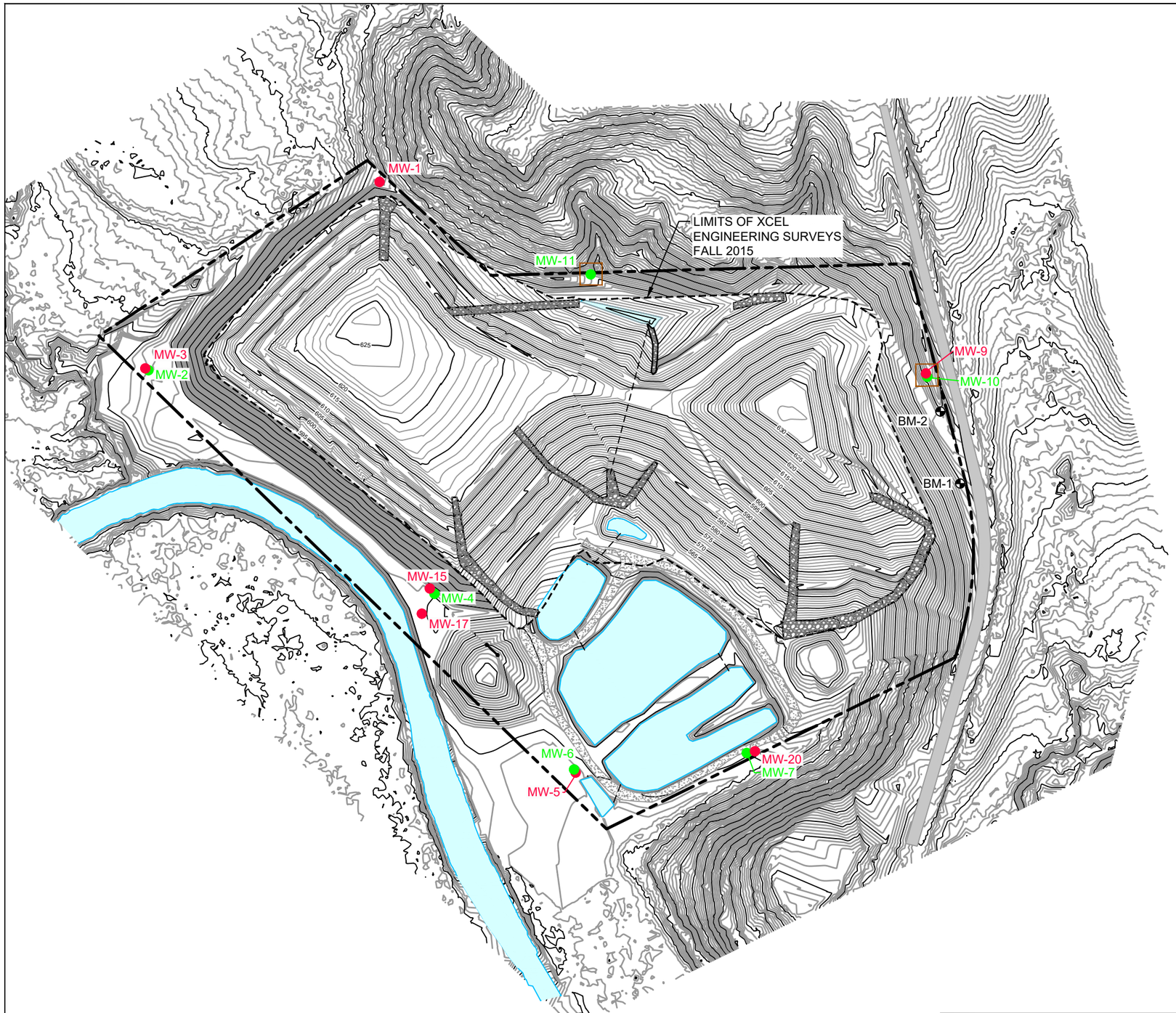

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 — UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 — WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- BM-2 — BENCHMARK LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION

BENCHMARKS:

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

BM-1 - SPIKE IN CORNER POSTS SOUTH ENTRANCE AS SHOWN
ELEV = 620.53'

BM-2 - MAG NAIL IN TOP OF THE NORTHERLY GATE POST AS SHOWN
ELEV = 627.73'

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, AND MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

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CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

SITE MAP AND MONITORING NETWORK

Project No. **12560436**
Date **November 2023**

FIGURE 2

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D102_DE-003.DWG
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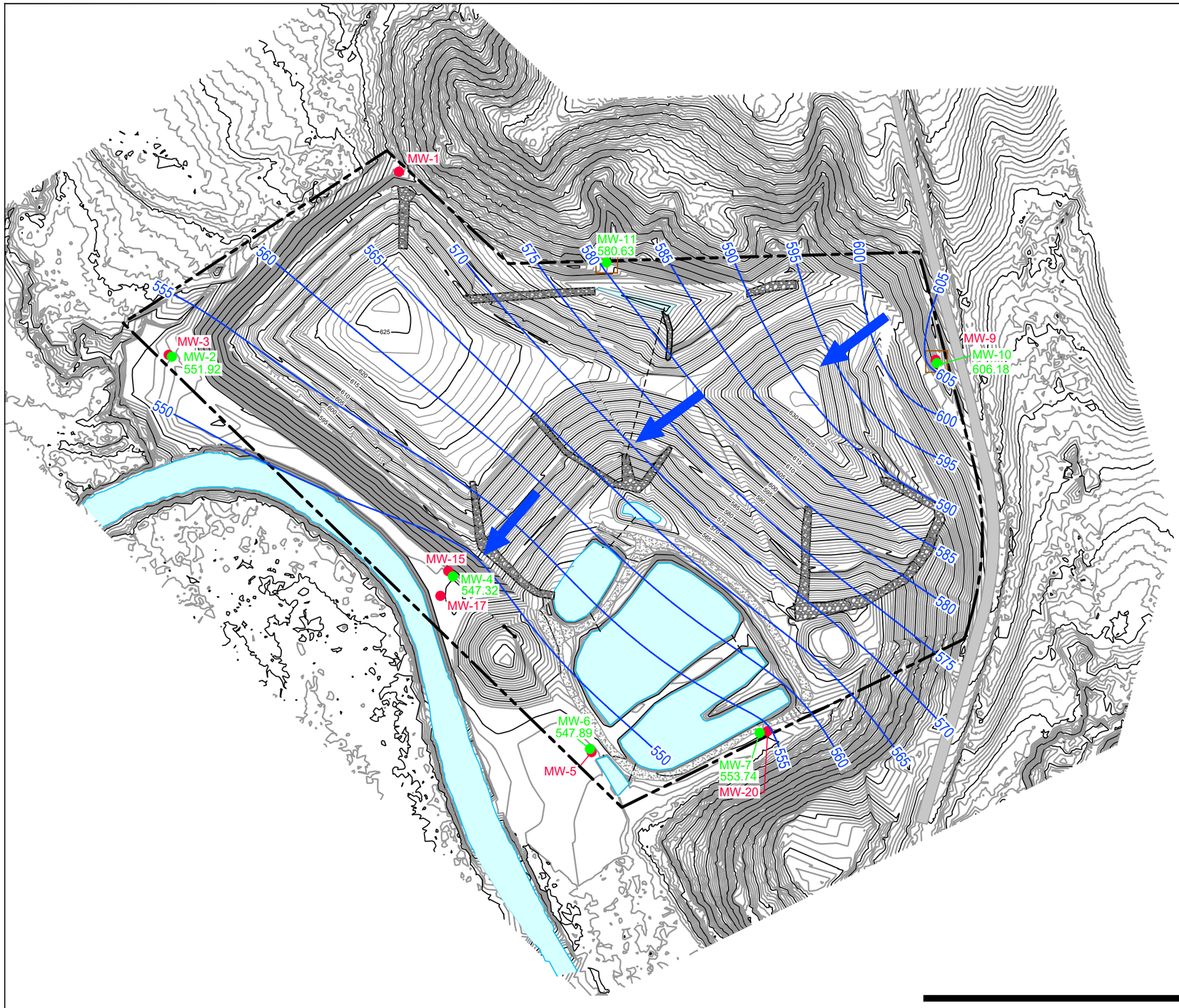

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-2 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 605 — GROUNDWATER ELEVATION CONTOUR
- FLOW DIRECTION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

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CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

WATER TABLE POTENTIOMETRIC SURFACE OCTOBER 10, 2023

Project No. **12560436**
Date **November 2023**

FIGURE 3

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D103_DE-003.DWG
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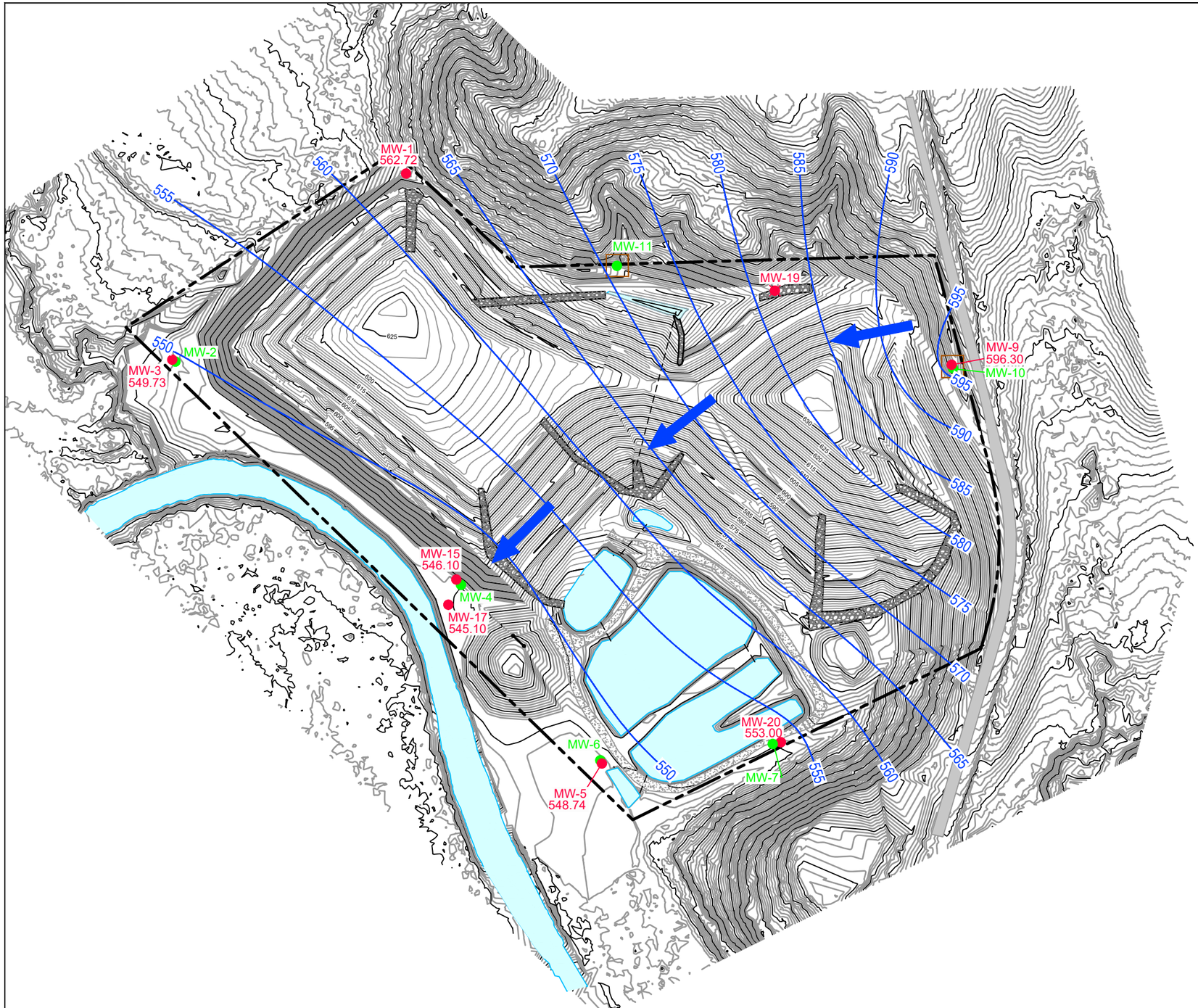

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 — UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-2 — WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 595 — GROUNDWATER ELEVATION CONTOUR
- FLOW DIRECTION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

UPPERMOST AQUIFER POTENTIOMETRIC SURFACE OCTOBER 10, 2023

Project No. **12560436**
Date **November 2023**

FIGURE 4

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D104_DE-003.DWG
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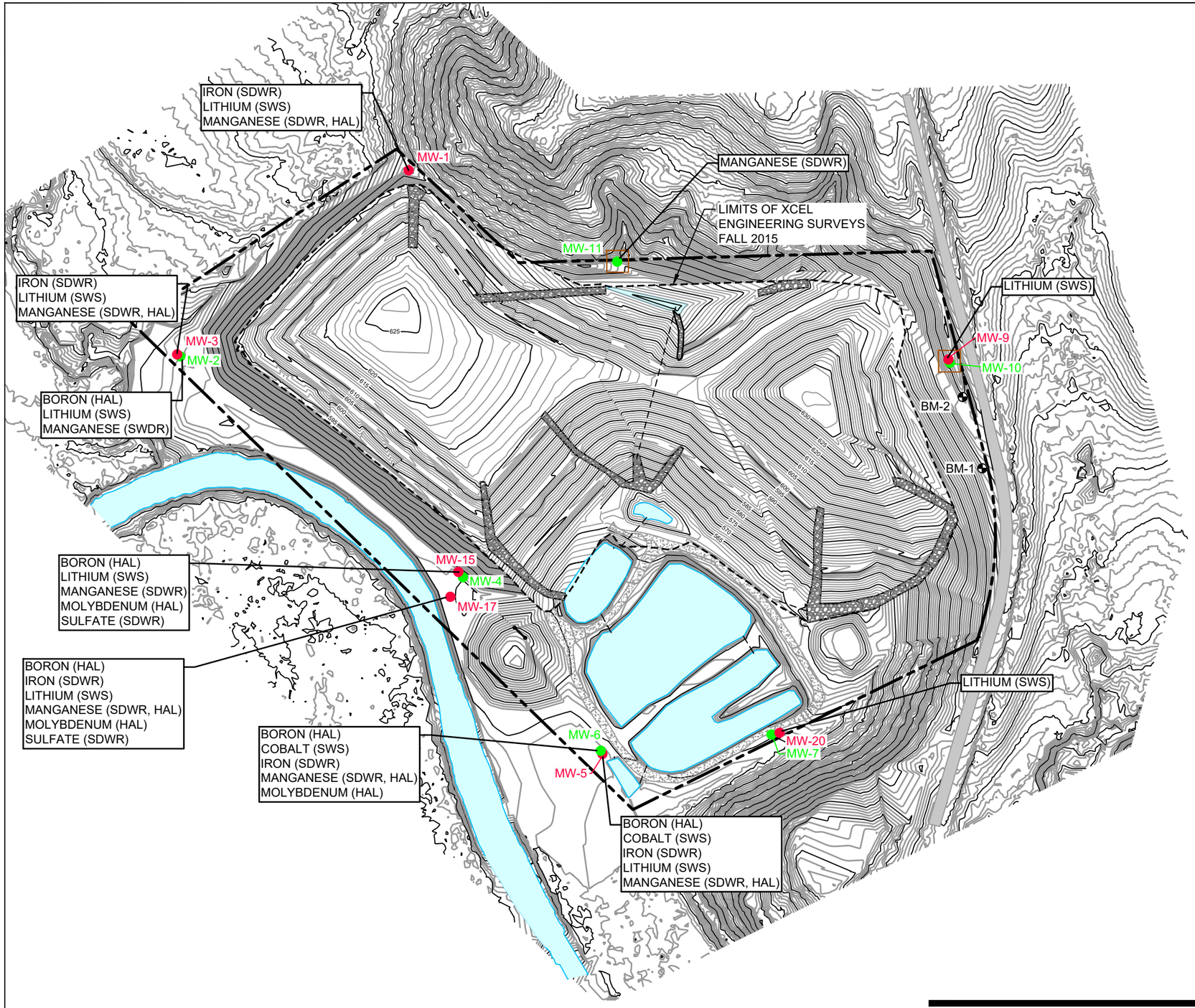

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- □ DENOTES UPGRADIENT LOCATION
- HAL = HEALTH ADVISORY LEVEL
- SDWR = SECONDARY DRINKING WATER REGULATION
- SWS = STATEWIDE STANDARD

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.
3. NO CONCENTRATION EXCEEDED A MAXIMUM CONTAMINANT LEVEL (MCL).

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPSO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

SUMMARY OF EXCEEDANCES OF PUBLISHED STANDARDS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 5

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D105_DE-003.DWG
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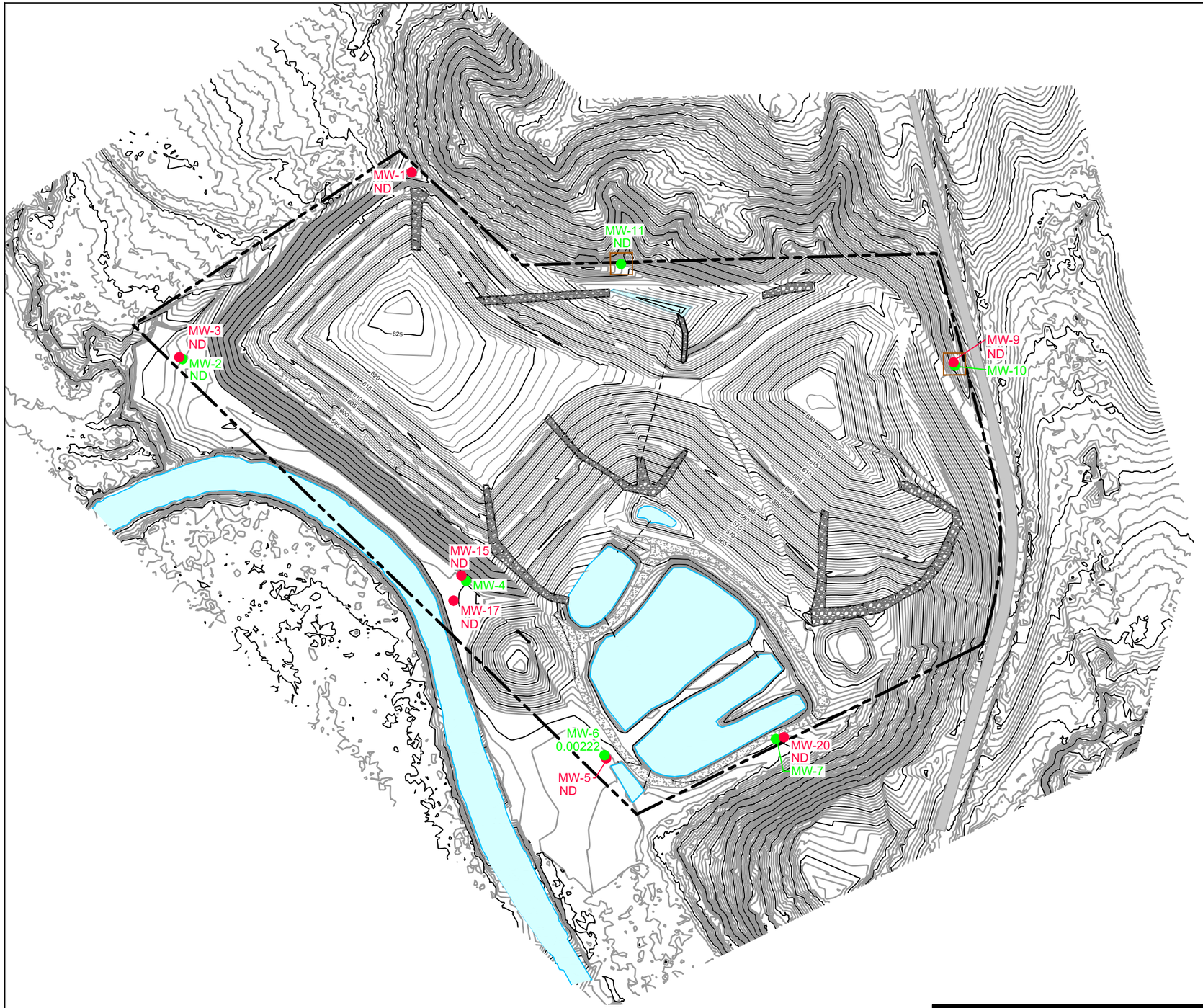

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 — UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 — WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 0.00630 — ARSENIC CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

ARSENIC SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 6

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D106_DE-003.DWG
Plot Date: 07 November 2023 4:25 PM

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- □ DENOTES UPGRADIENT LOCATION
- 0.216 BORON CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

BORON SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 7

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D107_DE-003.DWG
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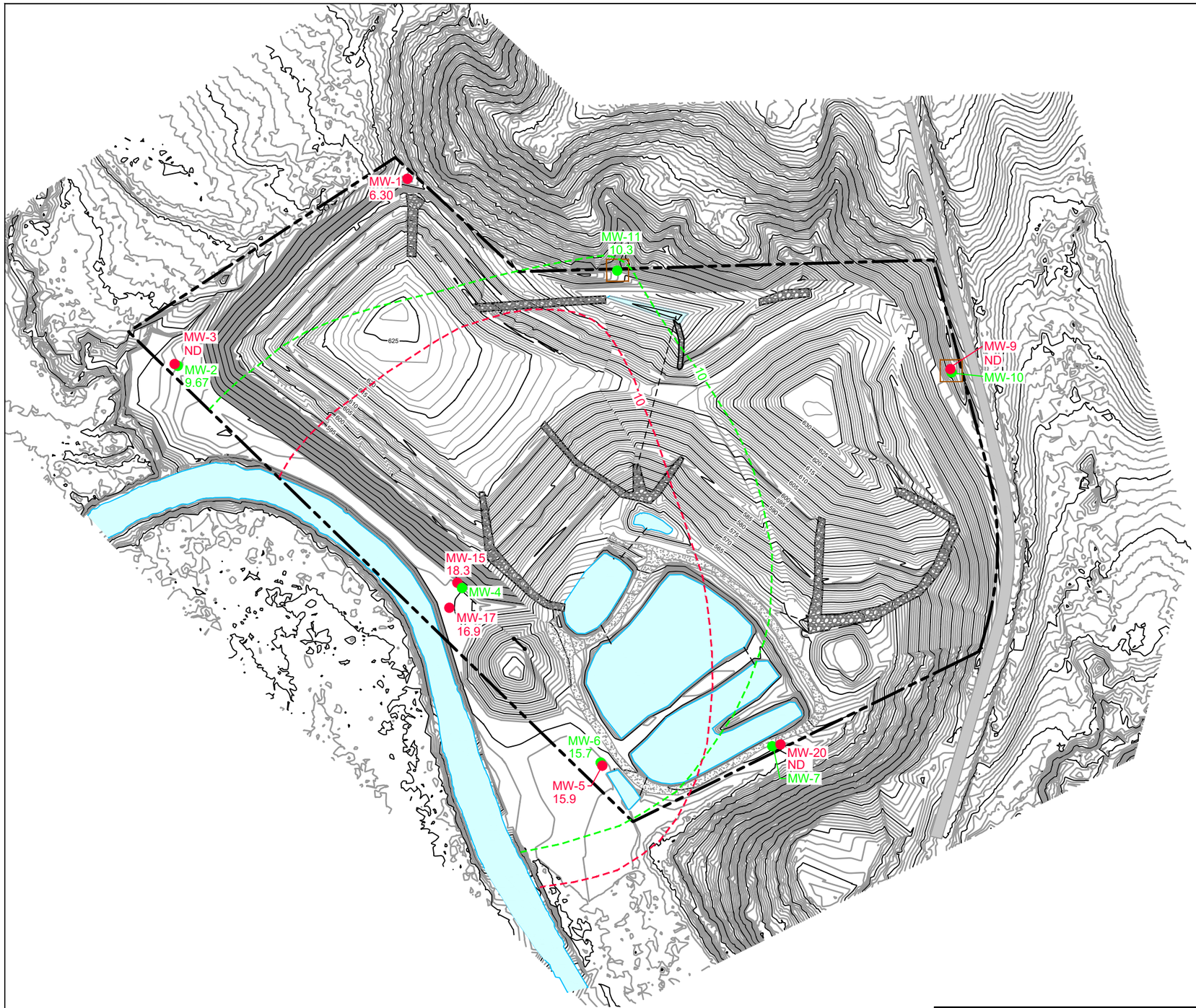

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 — UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 — WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 6.3 — CHLORIDE CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

CHLORIDE SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 8

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D108_DE-003.DWG
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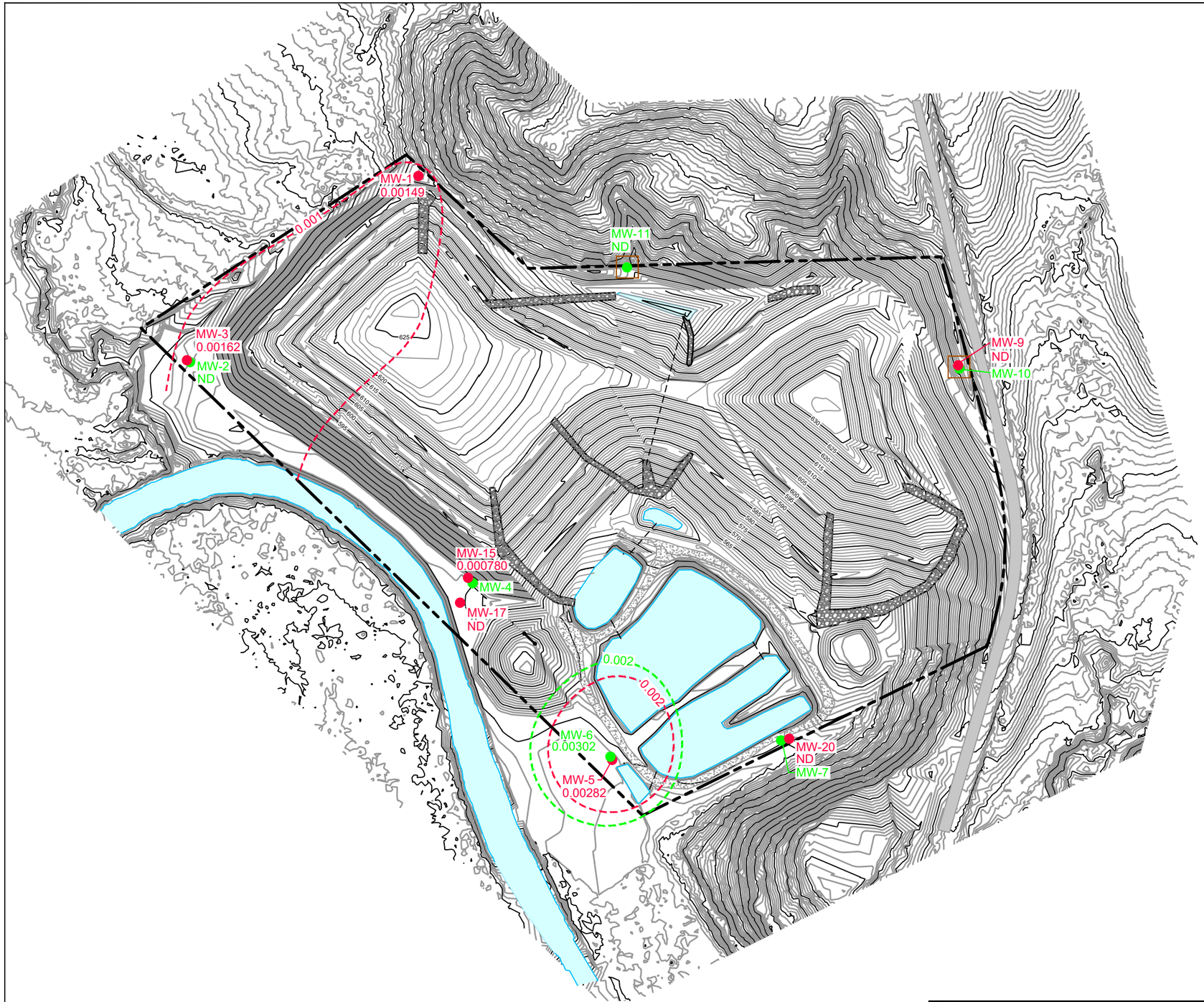

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- □ DENOTES UPGRADIENT LOCATION
- 0.00282 COBALT CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

COBALT SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 9

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D109_DE-003.DWG
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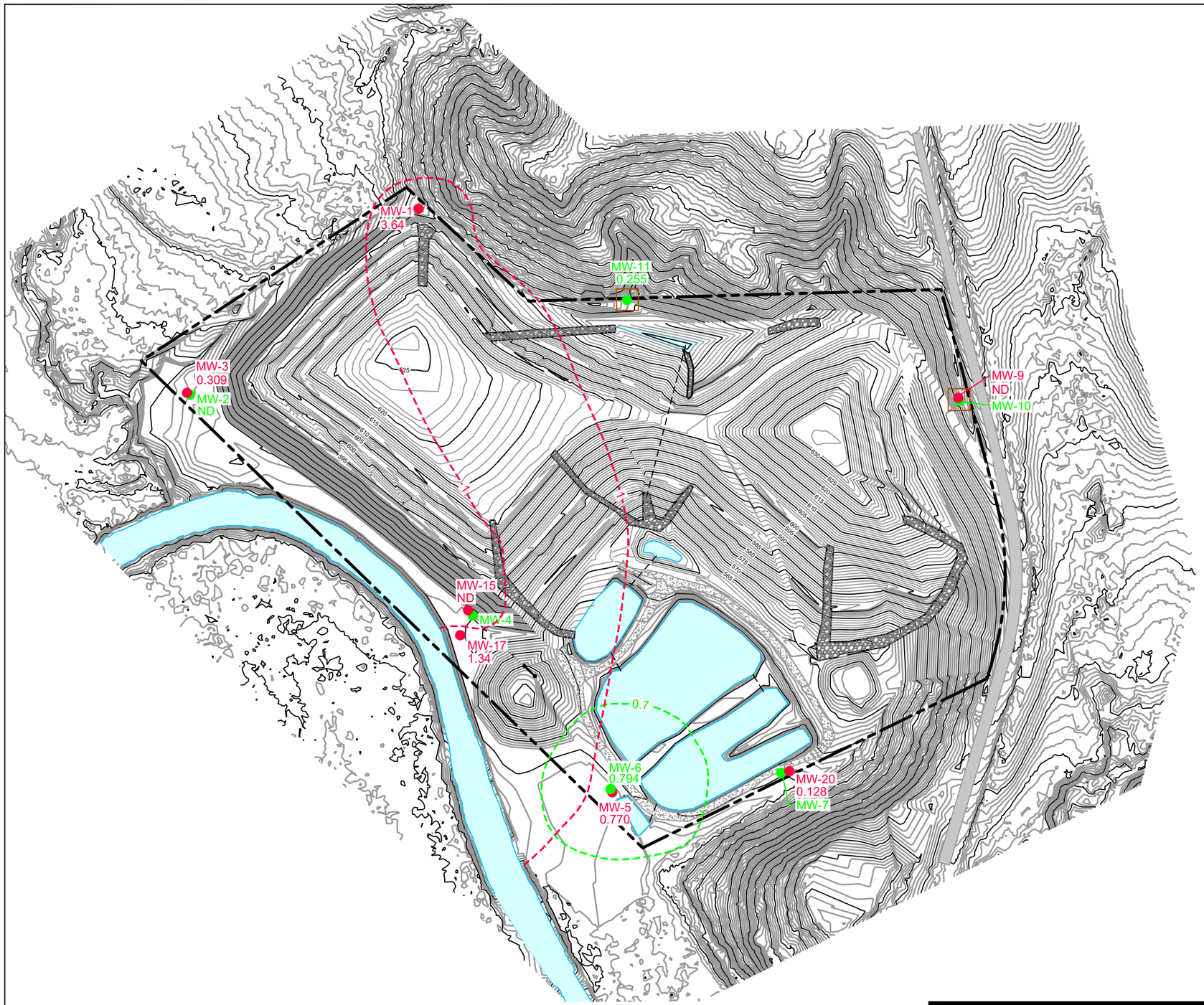

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 — UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 — WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 1.34 — IRON CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

IRON SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 10

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D110_DE-003.DWG
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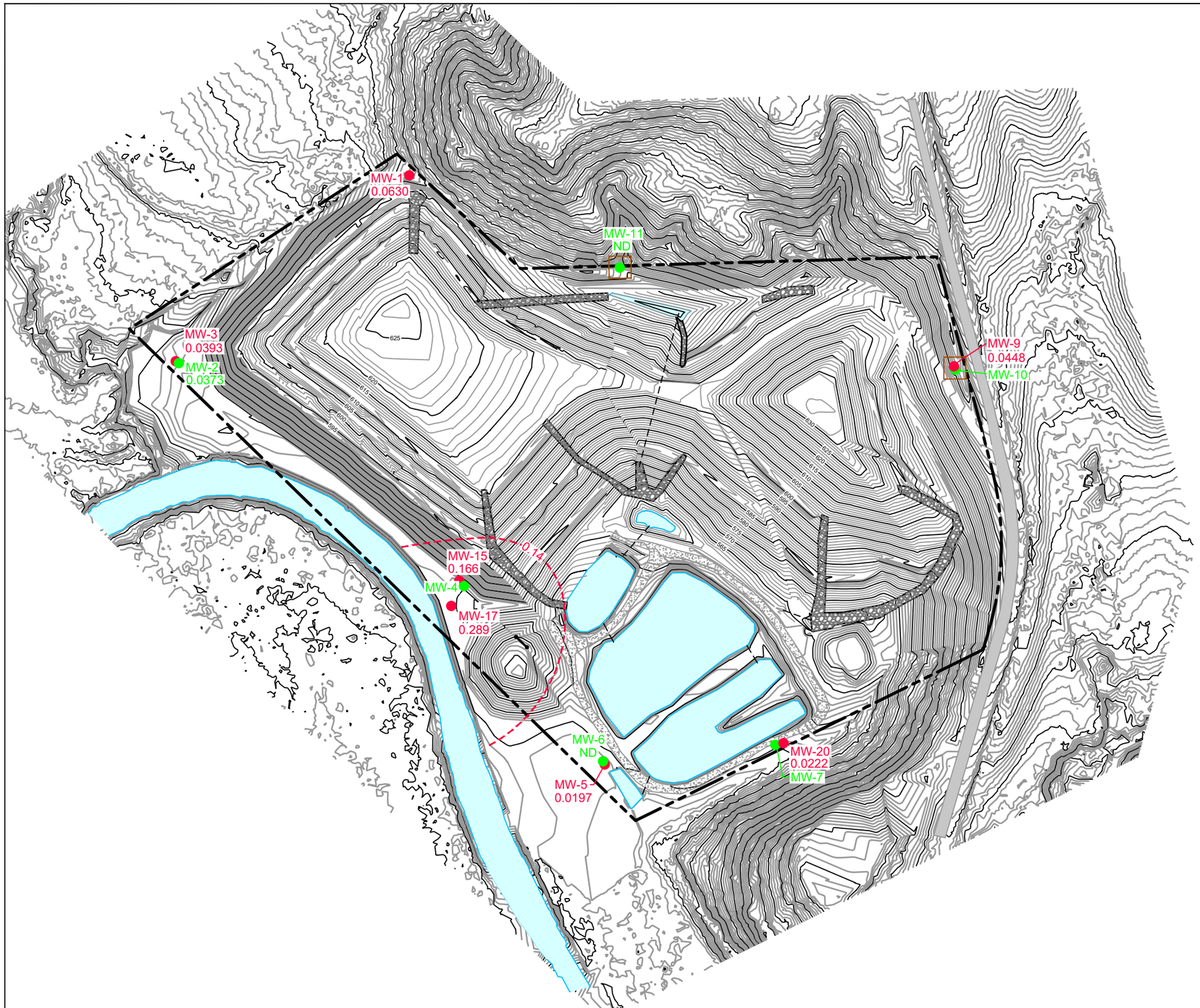

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 0.0448 LITHIUM CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

LITHIUM SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 11

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D111_DE-003.DWG
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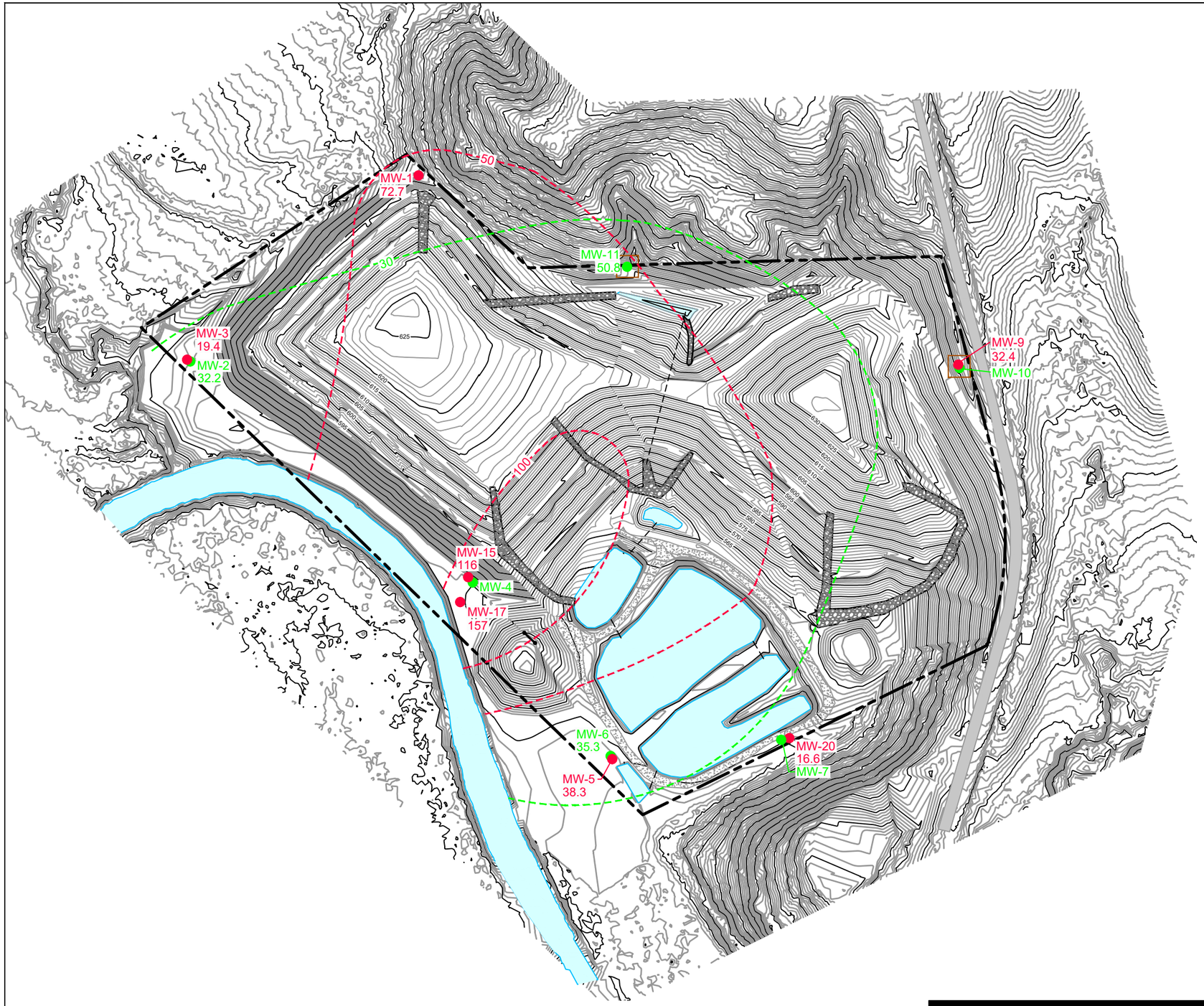

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- SURFACE WATER LOCATION AND DESIGNATION
- □ DENOTES UPGRADIENT LOCATION
- 32.4 MAGNESIUM CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

MAGNESIUM SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 12

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D112_DE-003.DWG
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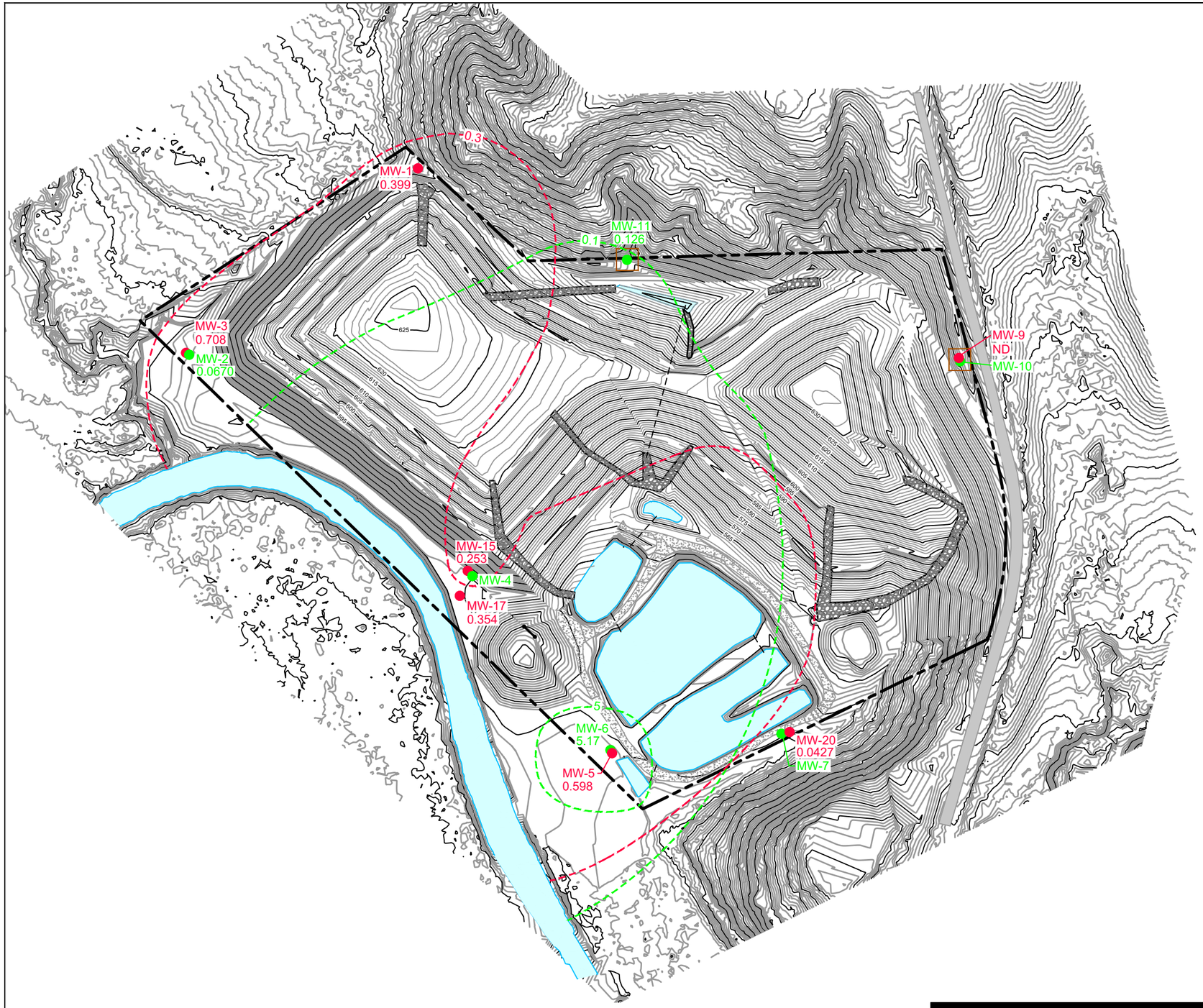

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 0.399 MANGANESE CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

MANGANESE SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 13

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D113_DE-003.DWG
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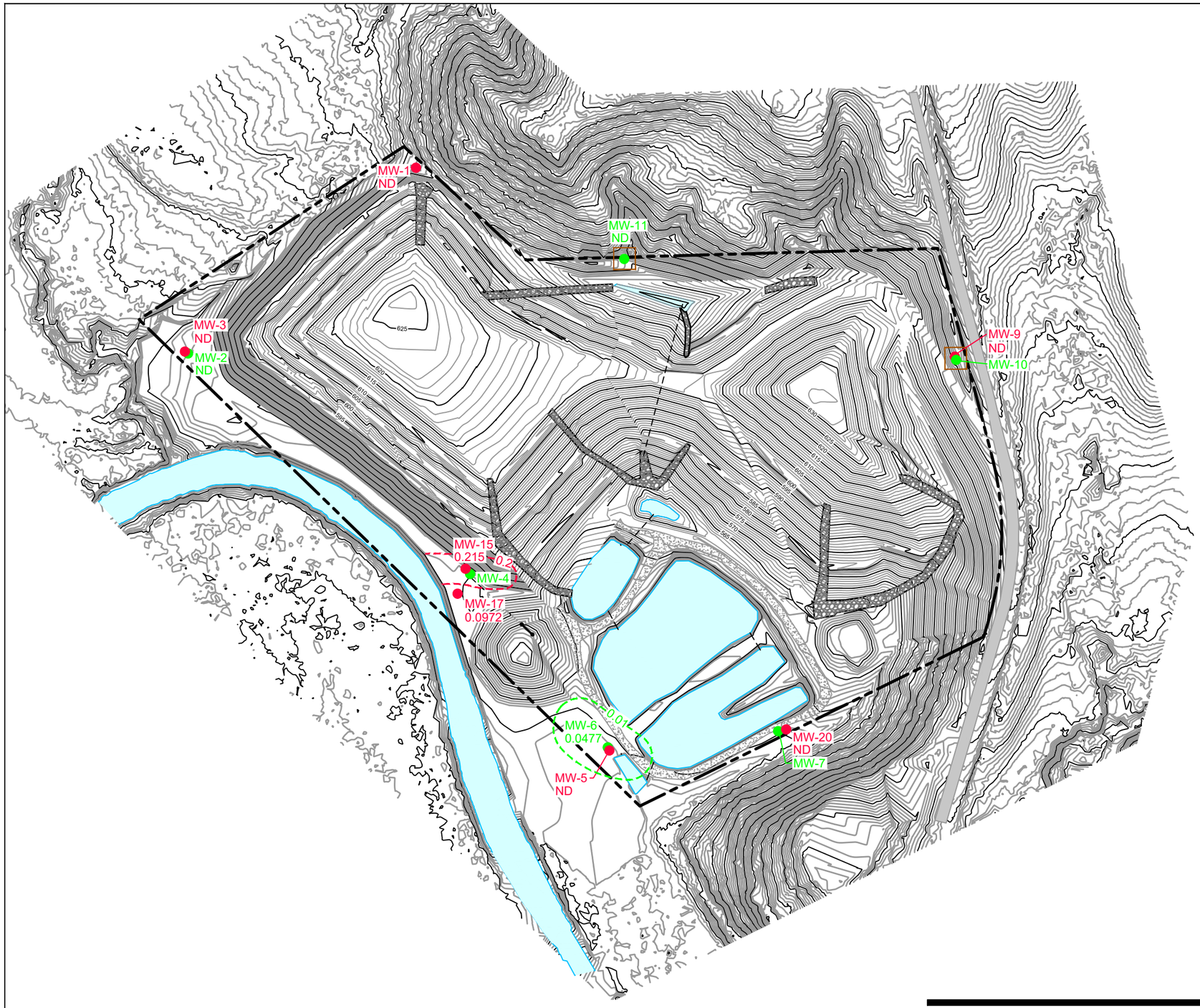

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- □ DENOTES UPGRADIENT LOCATION
- 0.215 MOLYBDENUM CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

MOLYBDENUM SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 14

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D114_DE-003.DWG
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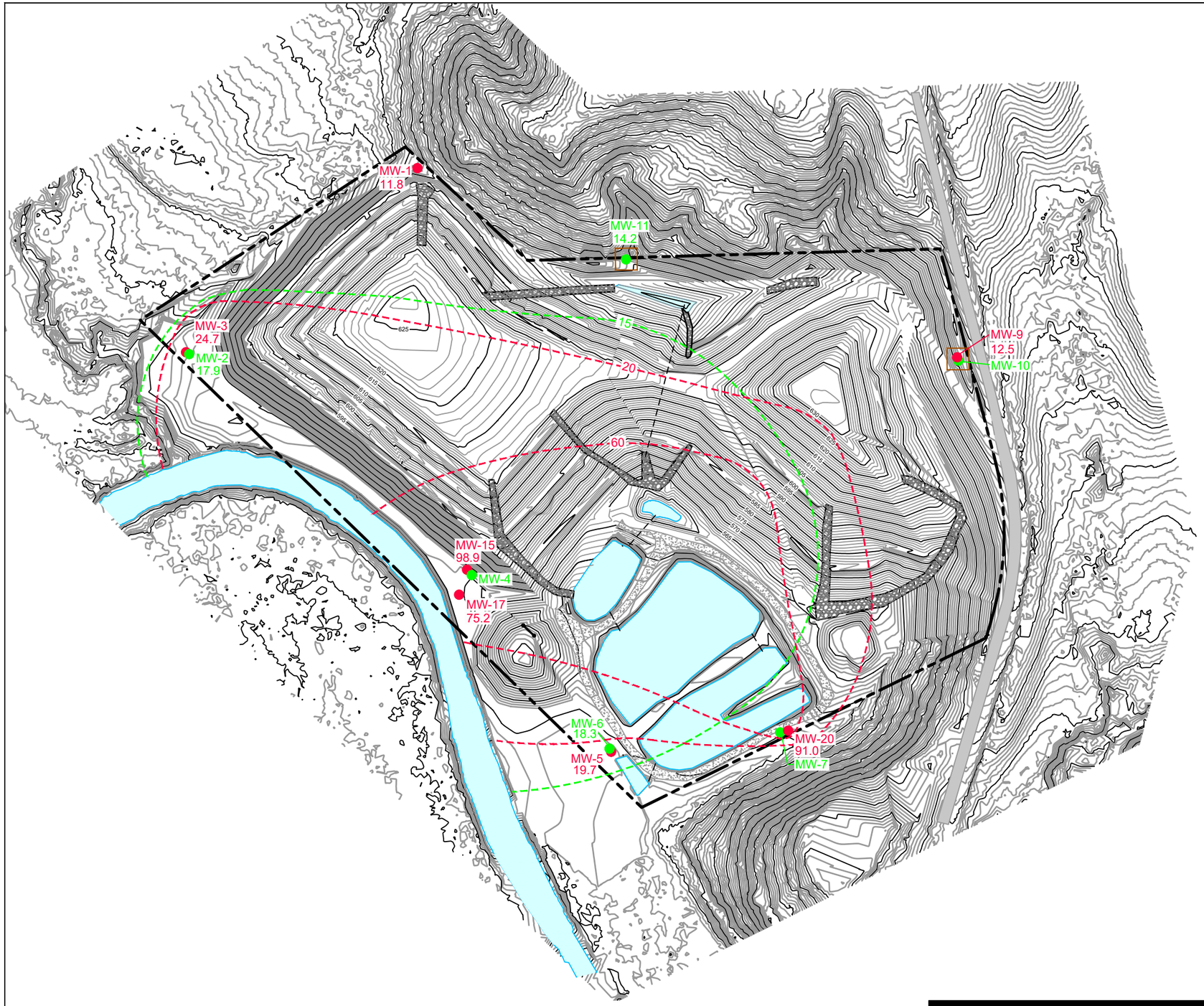


LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- □ DENOTES UPGRADIENT LOCATION
- 12.5 SODIUM CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

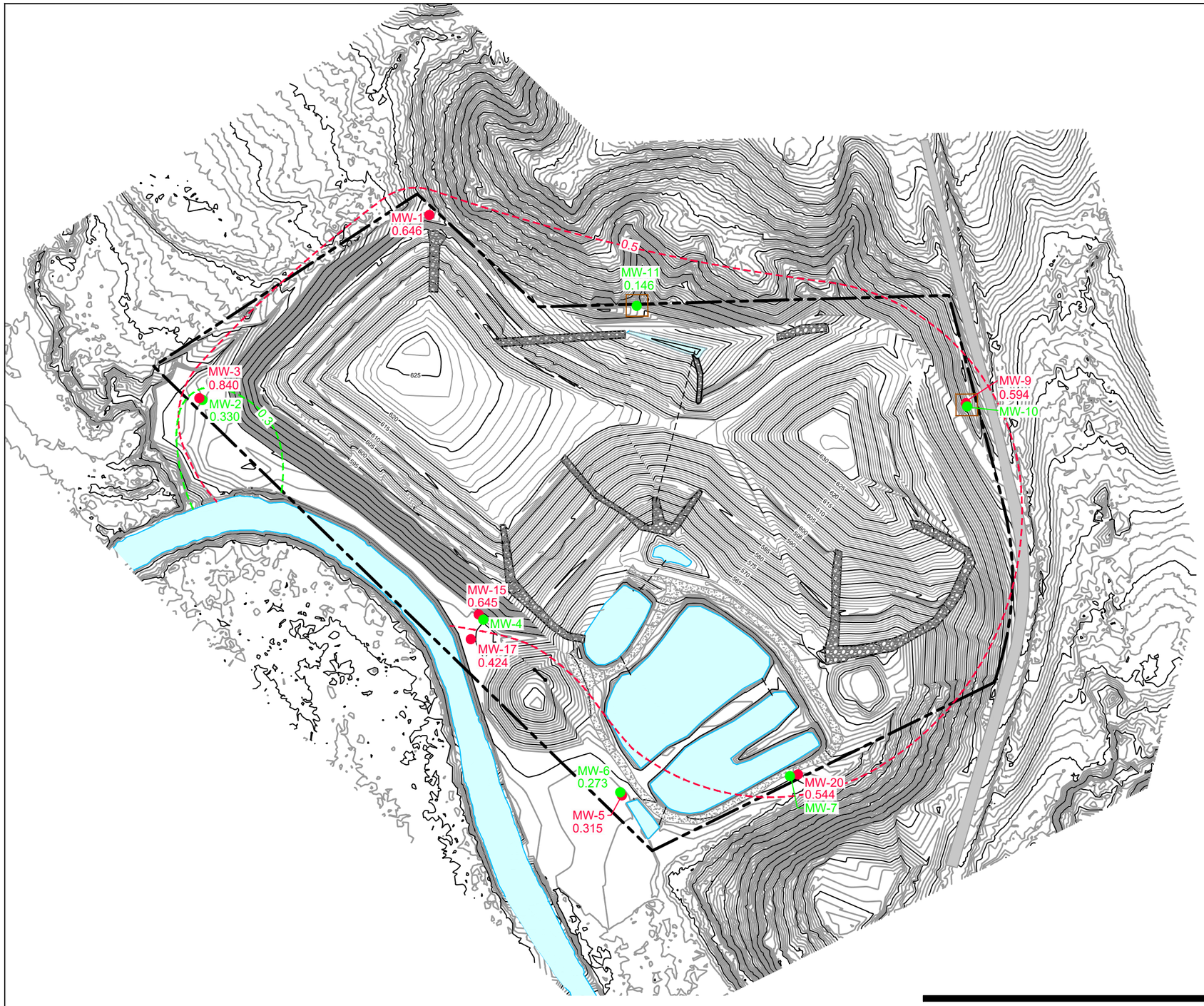
CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

SODIUM SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 15

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D115_DE-003.DWG
Plot Date: 08 November 2023 10:31 AM



LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- □ DENOTES UPGRADIENT LOCATION
- 0.594 STRONTIUM CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

STRONTIUM SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 16

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D116_DE-003.DWG
Plot Date: 13 November 2023 4:51 PM

LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 18.8 SULFATE CONCENTRATION (mg/L) OR NOT DETECTED (ND)
- UPPERMOST AQUIFER ESTIMATED ISOCONCENTRATION
- WATER TABLE AQUIFER ESTIMATED ISOCONCENTRATION

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

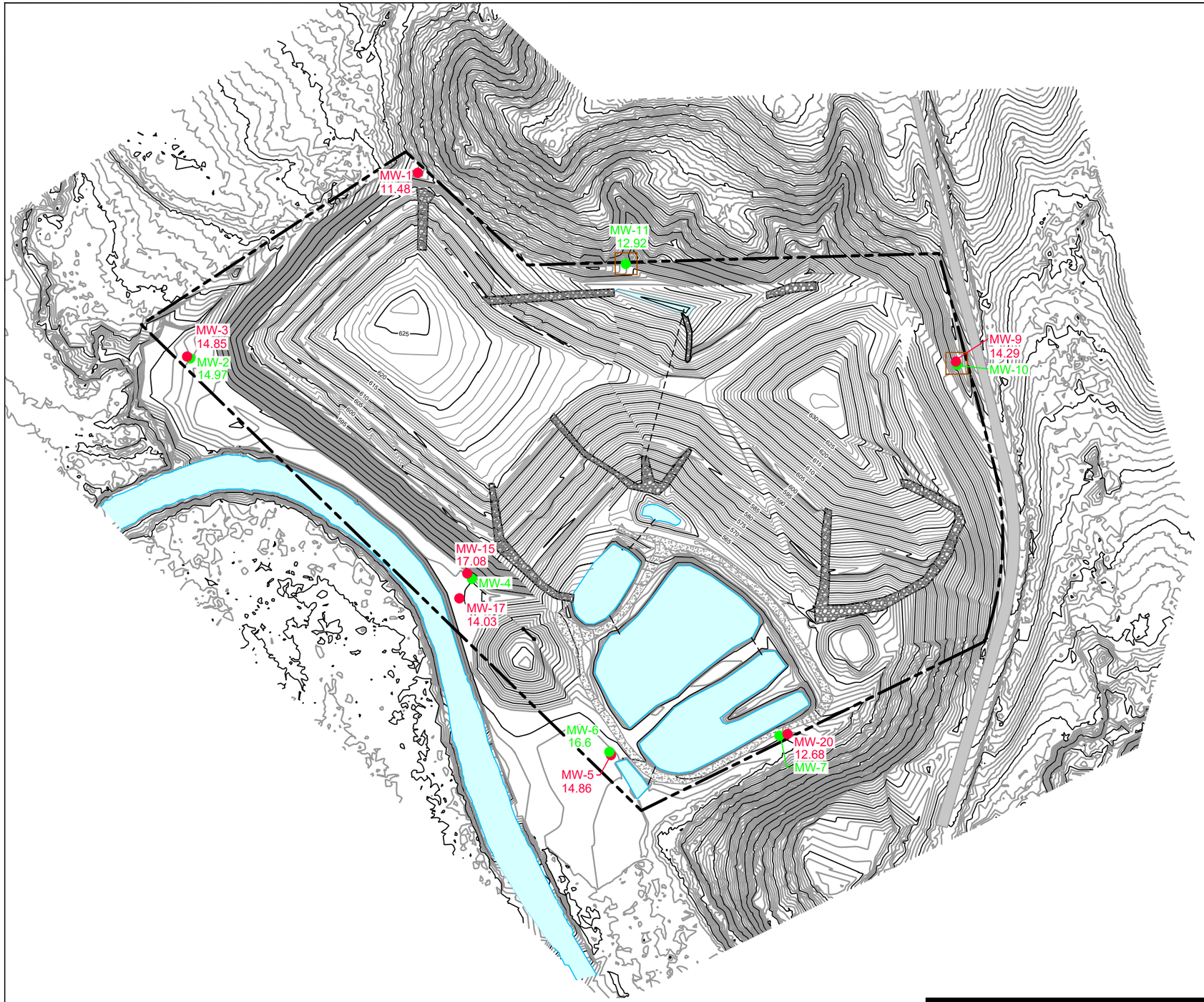
CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

SULFATE SAMPLE RESULTS
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 17

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D117_DE-003.DWG
Plot Date: 13 November 2023 4:54 PM



LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- □ DENOTES UPGRADIENT LOCATION
- 14.29 TEMP (DEGREES CELSIUS) OR NOT RECORDED (NR)

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

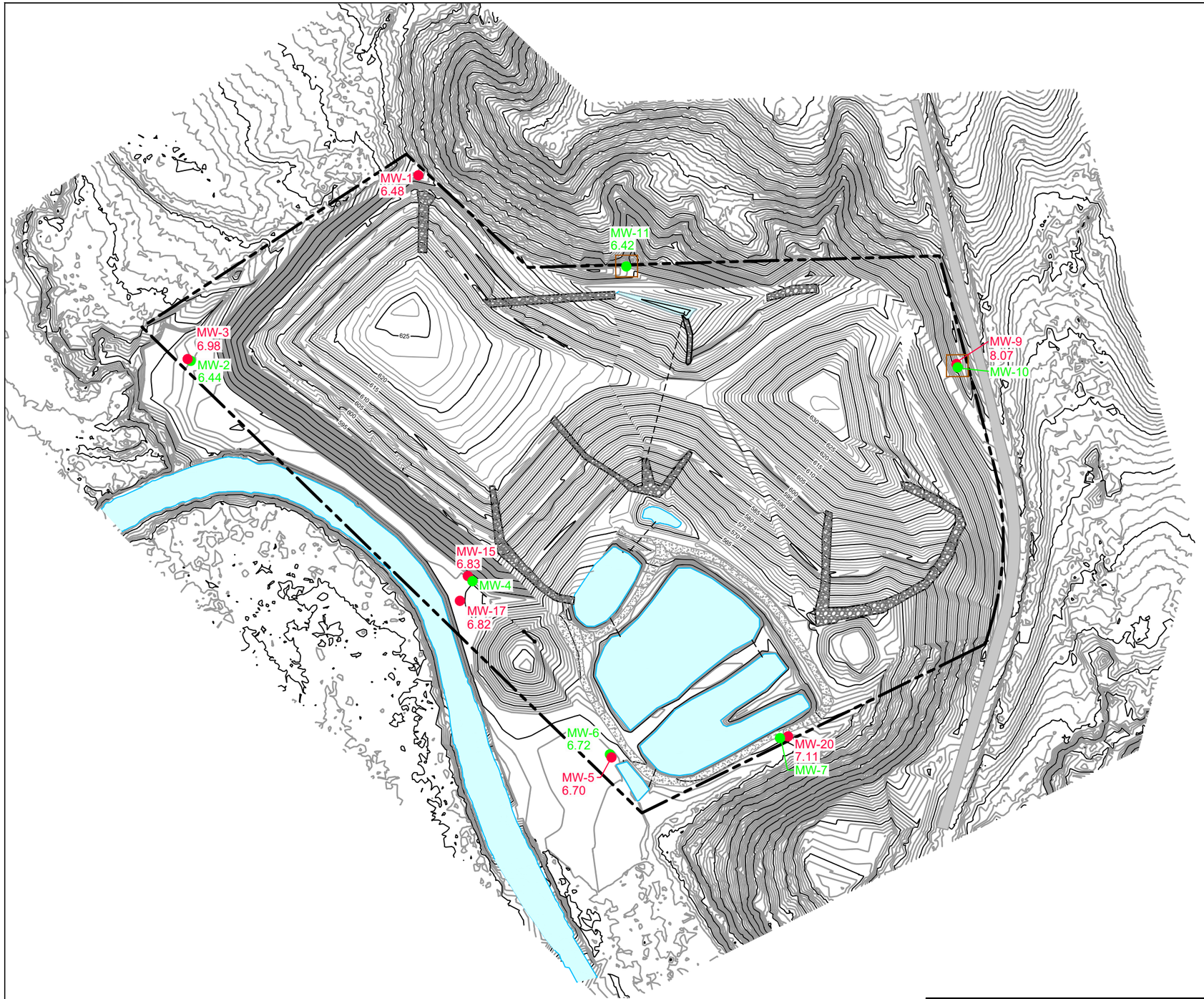
CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

TEMPERATURE VALUES
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 18

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D118_DE-003.DWG
Plot Date: 08 November 2023 10:52 AM



LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 — UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 — WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 8.07 — pH CONCENTRATION (mg/L), NOT DETECTED (ND) OR NOT RECORDED (NR)

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

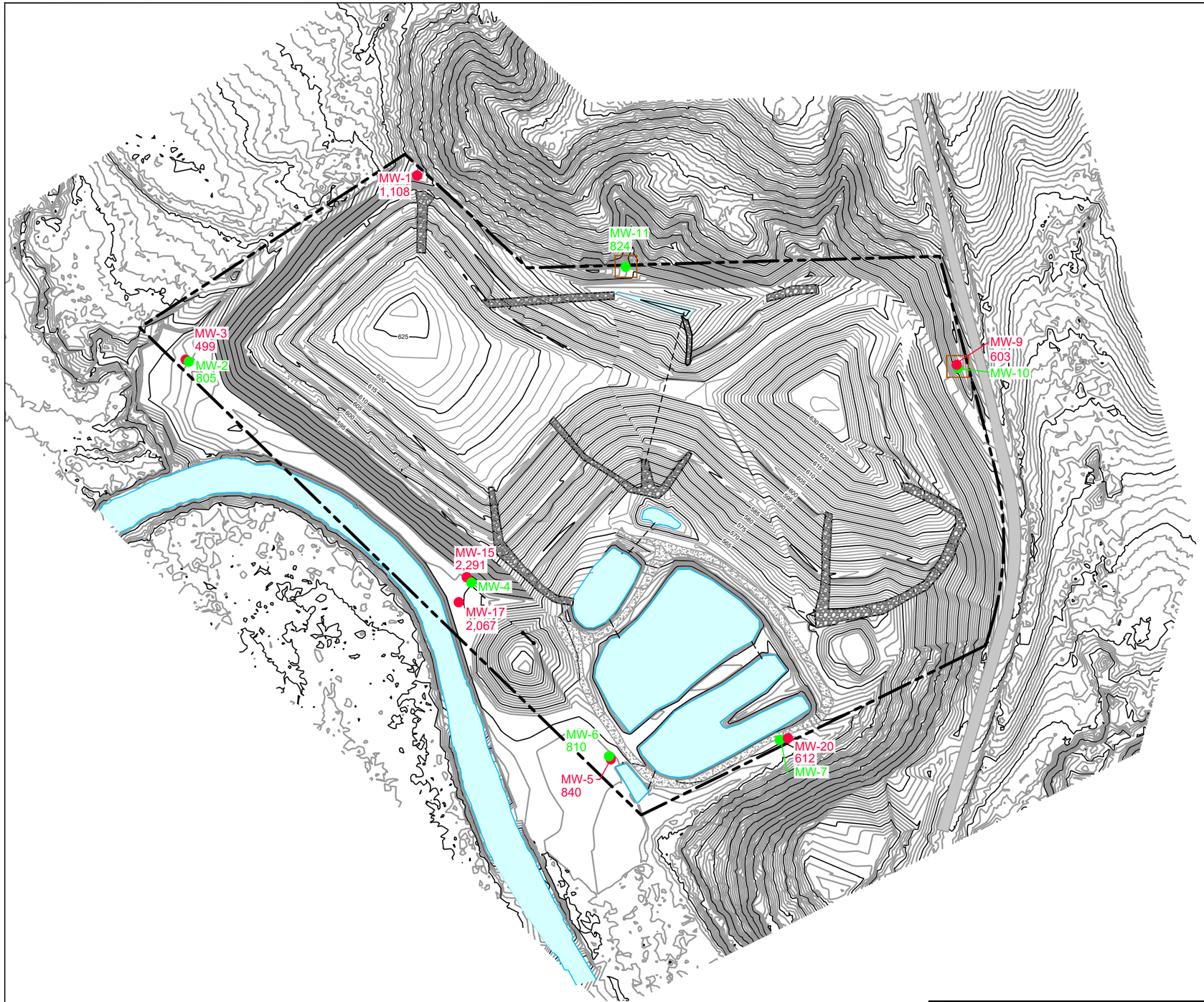
CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

pH VALUES
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 19

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D119_DE-003.DWG
Plot Date: 08 November 2023 10:58 AM



LEGEND:

- 650 — APPROXIMATE EXISTING GROUND SURFACE CONTOUR AND ELEVATION, FEET
- CULVERT
- PROPERTY LINE
- RIP-RAP
- PUBLIC ROAD
- MW-9 ● UPPERMOST AQUIFER MONITORING WELL LOCATION AND DESIGNATION
- MW-10 ● WATER TABLE MONITORING WELL LOCATION AND DESIGNATION
- DENOTES UPGRADIENT LOCATION
- 1,108 SPECIFIC CONDUCTANCE (uS/cm), NOT DETECTED (ND) OR NOT RECORDED (NR)

DRAWING REFERENCE(S):

DATE OF SURVEY: MULTIPLE
SURVEYS BY: IOWA LIDAR PROJECT, XCEL ENGINEERING, AND SNYDER AND ASSOCIATES.

BASIS OF BEARING:

IOWA STATE PLANE SOUTH COORDINATE SYSTEM

NOTES:

1. LIDAR DATA WERE USED TO CREATE CONTOURS IN A 300' AREA OUTSIDE OF THE PROPERTY LINE. LIDAR DATA WERE OBTAINED FROM THE IOWA DEPARTMENT OF NATURAL RESOURCES. MAPPING WAS PERFORMED FROM 2008-2010 AND IS SHOWN IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). ACCURACY OF LIDAR DATA STATED AS ±8 INCHES BY IOWA DEPARTMENT OF NATURAL RESOURCES.
2. MW-4, MW-7, MW-10 USED FOR WATER LEVEL MEASUREMENT ONLY.

0 100 200 ft
1" = 200 ft
Coordinate System:
IOWA STATE PLANE SOUTH

N

GHD

CENTRAL IOWA POWER COOPERATIVE
CIPCO FAIR STATION MONOFILL
ANNUAL WATER QUALITY REPORT

SPECIFIC CONDUCTANCE VALUES
OCTOBER 2023

Project No. **12560436**
Date **November 2023**

FIGURE 20

Filename: N:\US\Des Moines\Projects\563\12560436\Digital_Design\ACAD\Figures\RPT-003\12560436-GHD-00-00-RPT-EN-D120_DE-003.DWG
Plot Date: 08 November 2023 11:04 AM

Appendices

Appendix A

Monitoring Forms

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-1** Upgradient **X**
Downgradient

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **588.13 ft** Ground Elevation **587.23 ft**
Depth of Well **36.27 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**9:32**	**25.41 ft**	**562.72 ft**
* After Purging	**10/10/2023**	**10:00**	**25.41 ft**	**562.72 ft**
* Before Sampling	**10/10/2023**	**10:00**	**25.41 ft**	**562.72 ft**

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **1.47 gallons**
No. of Well Volumes (based on current water level) **0.83 well volumes**
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Dedicated Bailer
Pump type **Pneumatic Bladder** Dedicated Pump **No**
If not dedicated, method of cleaning **Replace bladder, rinse w/water, dedicated tubing**

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **11.48** Units **°C**
Equipment Used **Aquatroll 500**
pH **6.48**
Equipment Used **Aquatroll 500**
Specific Cond. **1,108** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 200.1 DO: 5.68 Turb.: 11.78 Sample Time: 10/10/2023 10:00**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 9:32:26 AM
Project: CIPCO-MW-1 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-1 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 25 ft** **Total Depth: 35 ft** **Initial Depth to Water: 25.41 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 35 ft** **Pump Intake From TOC: 30 ft** **Estimated Total Volume Pumped: 5550 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:

Weather Conditions:
36° sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10 %	+/- 10	+/- 0.33	
10/10/2023 9:32 AM	00:00	6.48 pH	11.90 °C	988.44 µS/cm	7.79 mg/L	28.88 NTU	202.9 mV	25.61 ft	300.00 ml/min
10/10/2023 9:35 AM	03:05	6.51 pH	11.63 °C	997.43 µS/cm	7.17 mg/L	25.83 NTU	203.4 mV	25.41 ft	300.00 ml/min
10/10/2023 9:38 AM	06:10	6.50 pH	11.54 °C	1,032.4 µS/cm	6.24 mg/L	18.08 NTU	203.6 mV	25.41 ft	300.00 ml/min
10/10/2023 9:41 AM	09:15	6.48 pH	11.50 °C	1,059.2 µS/cm	5.26 mg/L	15.19 NTU	203.9 mV	25.41 ft	300.00 ml/min
10/10/2023 9:44 AM	12:20	6.48 pH	11.48 °C	1,085.5 µS/cm	5.59 mg/L	17.14 NTU	202.2 mV	25.41 ft	300.00 ml/min
10/10/2023 9:47 AM	15:25	6.48 pH	11.47 °C	1,096.9 µS/cm	5.66 mg/L	6.49 NTU	201.5 mV	25.41 ft	300.00 ml/min
10/10/2023 9:50 AM	18:30	6.48 pH	11.48 °C	1,107.9 µS/cm	5.68 mg/L	11.78 NTU	200.1 mV	25.41 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-1	ST-1000

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-2** Upgradient
Downgradient **X**

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **559.43 ft** Ground Elevation **557.67 ft**
Depth of Well **12.95 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**14:12**	**7.51 ft**	**551.92 ft**
* After Purging	**10/10/2023**	**14:50**	**7.51 ft**	**551.92 ft**
* Before Sampling	**10/10/2023**	**14:50**	**7.51 ft**	**551.92 ft**

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **1.41 gallons**
No. of Well Volumes (based on current water level) **1.59 well volumes**
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Dedicated Bailer
Pump type **Pneumatic Bladder** Dedicated Pump **No**
If not dedicated, method of cleaning **Replace bladder, rinse w/water, dedicated tubing**

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **14.97** Units **°C**
Equipment Used **Aquatroll 500**
pH **6.44**
Equipment Used **Aquatroll 500**
Specific Cond. **805** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 59.8 DO: 0.11 Turb.: 4.40 Sample Time: 10/10/2023 14:50**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 2:12:20 PM
Project: CIPCO-MW-2 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-2 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 2.95 ft** **Total Depth: 12.95 ft** **Initial Depth to Water: 7.51 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 12.95 ft** **Pump Intake From TOC: 7.95 ft** **Estimated Total Volume Pumped: 5336.667 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:

Weather Conditions:
50° sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10 %	+/- 10	+/- 0.33	
10/10/2023 2:12 PM	00:00	6.56 pH	15.71 °C	811.60 µS/cm	0.98 mg/L	36.80 NTU	58.5 mV	7.51 ft	200.00 ml/min
10/10/2023 2:15 PM	03:00	6.53 pH	15.43 °C	807.61 µS/cm	0.44 mg/L	27.37 NTU	60.1 mV	7.51 ft	200.00 ml/min
10/10/2023 2:18 PM	06:00	6.50 pH	15.28 °C	806.94 µS/cm	0.31 mg/L	17.05 NTU	60.8 mV	7.51 ft	200.00 ml/min
10/10/2023 2:21 PM	09:00	6.48 pH	15.14 °C	805.46 µS/cm	0.25 mg/L	14.09 NTU	61.2 mV	7.51 ft	200.00 ml/min
10/10/2023 2:24 PM	12:00	6.47 pH	15.07 °C	805.09 µS/cm	0.22 mg/L	10.84 NTU	61.3 mV	7.51 ft	200.00 ml/min
10/10/2023 2:27 PM	15:00	6.46 pH	15.03 °C	805.14 µS/cm	0.18 mg/L	8.77 NTU	61.2 mV	7.51 ft	200.00 ml/min
10/10/2023 2:29 PM	16:48	6.43 pH	14.98 °C	805.20 µS/cm	0.16 mg/L	9.19 NTU	61.1 mV	7.51 ft	200.00 ml/min
10/10/2023 2:29 PM	17:08	6.44 pH	15.03 °C	804.97 µS/cm	0.16 mg/L	6.39 NTU	61.0 mV	7.51 ft	200.00 ml/min
10/10/2023 2:33 PM	20:41	6.43 pH	15.00 °C	805.12 µS/cm	0.14 mg/L	10.29 NTU	60.7 mV	7.51 ft	200.00 ml/min
10/10/2023 2:36 PM	23:41	6.44 pH	14.98 °C	804.91 µS/cm	0.13 mg/L	6.09 NTU	60.2 mV	7.51 ft	200.00 ml/min
10/10/2023 2:39 PM	26:41	6.44 pH	14.97 °C	805.16 µS/cm	0.11 mg/L	4.40 NTU	59.8 mV	7.51 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW-2	ST-14:50

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-3** Upgradient
Downgradient **X**

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **559.17 ft** Ground Elevation **556.69 ft**
Depth of Well **46.75 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**14:50**	**9.44 ft**	**549.73 ft**
* After Purging	**10/10/2023**	**16:05**	**9.70 ft**	**549.47 ft**
* Before Sampling	**10/10/2023**	**16:05**	**9.70 ft**	**549.47 ft**

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **2.87 gallons**
No. of Well Volumes (based on current water level) **0.47 well volumes**
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Dedicated Bailer
Pump type **Pneumatic Bladder** Dedicated Pump **No**
If not dedicated, method of cleaning **Replace bladder, rinse w/water, dedicated tubing**

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **14.85** Units **°C**
Equipment Used **Aquatroll 500**
pH **6.98**
Equipment Used **Aquatroll 500**
Specific Cond. **499** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 34.3 DO: 0.37 Turb.: 148.14 Sample Time: 10/10/2023 16:05**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 2:50:32 PM
Project: CIPCO-MW-3 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-3 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 36.5 ft** **Total Depth: 46.5 ft** **Initial Depth to Water: 9.44 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 46.5 ft** **Pump Intake From TOC: 41.5 ft** **Estimated Total Volume Pumped: 10867.5 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 150 ml/min** **Final Draw Down: 0.26 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:

Weather Conditions:
50°sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10 %	+/- 10	+/- 0.33	
10/10/2023 2:50 PM	00:00	6.60 pH	15.00 °C	614.33 µS/cm	0.87 mg/L	61.68 NTU	49.0 mV	9.44 ft	300.00 ml/min
10/10/2023 2:53 PM	03:27	6.87 pH	14.44 °C	478.64 µS/cm	1.32 mg/L	118.79 NTU	44.2 mV	9.90 ft	300.00 ml/min
10/10/2023 2:57 PM	06:54	6.98 pH	14.27 °C	456.10 µS/cm	0.88 mg/L	160.37 NTU	41.9 mV	9.90 ft	150.00 ml/min
10/10/2023 3:00 PM	10:21	7.01 pH	14.54 °C	455.44 µS/cm	0.64 mg/L	166.28 NTU	40.5 mV	9.90 ft	150.00 ml/min
10/10/2023 3:04 PM	13:48	7.02 pH	14.72 °C	456.90 µS/cm	0.51 mg/L	187.08 NTU	39.6 mV	9.90 ft	150.00 ml/min
10/10/2023 3:07 PM	17:15	7.03 pH	14.81 °C	459.09 µS/cm	0.45 mg/L	208.93 NTU	39.0 mV	9.90 ft	150.00 ml/min
10/10/2023 3:11 PM	20:42	7.02 pH	14.83 °C	462.50 µS/cm	0.42 mg/L	236.87 NTU	38.4 mV	9.70 ft	150.00 ml/min
10/10/2023 3:14 PM	24:09	7.02 pH	14.89 °C	465.24 µS/cm	0.38 mg/L	236.61 NTU	38.0 mV	9.70 ft	150.00 ml/min
10/10/2023 3:18 PM	27:36	7.01 pH	14.94 °C	468.52 µS/cm	0.36 mg/L	193.22 NTU	37.5 mV	9.70 ft	150.00 ml/min
10/10/2023 3:21 PM	31:03	7.01 pH	14.90 °C	471.44 µS/cm	0.32 mg/L	190.43 NTU	37.0 mV	9.70 ft	150.00 ml/min
10/10/2023 3:25 PM	34:30	7.01 pH	14.88 °C	473.85 µS/cm	0.29 mg/L	187.12 NTU	36.6 mV	9.70 ft	150.00 ml/min
10/10/2023 3:28 PM	37:57	7.00 pH	14.83 °C	476.38 µS/cm	0.26 mg/L	180.02 NTU	36.2 mV	9.70 ft	150.00 ml/min

10/10/2023 3:31 PM	41:24	7.00 pH	14.85 °C	478.69 µS/cm	0.25 mg/L	194.67 NTU	35.8 mV	9.70 ft	150.00 ml/min
10/10/2023 3:35 PM	44:51	7.00 pH	14.80 °C	481.45 µS/cm	0.24 mg/L	197.79 NTU	35.3 mV	9.70 ft	150.00 ml/min
10/10/2023 3:38 PM	48:18	6.99 pH	14.77 °C	484.47 µS/cm	0.22 mg/L	194.78 NTU	34.9 mV	9.70 ft	150.00 ml/min
10/10/2023 3:42 PM	51:45	7.03 pH	15.06 °C	0.98 µS/cm	7.02 mg/L	0.00 NTU	35.5 mV	9.70 ft	150.00 ml/min
10/10/2023 3:45 PM	55:12	6.98 pH	14.96 °C	492.08 µS/cm	1.35 mg/L	252.69 NTU	36.0 mV	9.70 ft	150.00 ml/min
10/10/2023 3:49 PM	58:39	6.98 pH	14.92 °C	491.95 µS/cm	0.59 mg/L	150.65 NTU	35.4 mV	9.70 ft	150.00 ml/min
10/10/2023 3:52 PM	01:02:06	6.98 pH	14.92 °C	494.98 µS/cm	0.43 mg/L	148.25 NTU	34.7 mV	9.70 ft	150.00 ml/min
10/10/2023 3:56 PM	01:05:33	6.98 pH	14.85 °C	498.61 µS/cm	0.37 mg/L	148.14 NTU	34.3 mV	9.70 ft	150.00 ml/min

Samples

Sample ID:	Description:
Mw-3	St-1605

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-4** Upgradient
Downgradient **X**

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **556.92 ft** Ground Elevation **555.34 ft**
Depth of Well **10.45 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**9.60 ft**	**547.32 ft**
* After Purging			
* Before Sampling			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **Water Level Only**
No. of Well Volumes (based on current water level)
Was well pumped/bailed dry?

Equipment used:
Bailer type Dedicated Bailer
Pump type Dedicated Pump
If not dedicated, method of cleaning

*D. FIELD MEASUREMENT

Weather Conditions
Field Measurements (after stabilization)
Temperature Units
Equipment Used **Aquatroll 500**
pH
Equipment Used **Aquatroll 500**
Specific Cond. Units
Equipment Used **Aquatroll 500**

Comments: **No sample**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-5** Upgradient
Downgradient **X**

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **555.54 ft** Ground Elevation **553.24 ft**
Depth of Well **28.50 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**11:26**	**6.80 ft**	**548.74 ft**
* After Purging	**10/10/2023**	**11:45**	**6.80 ft**	**548.74 ft**
* Before Sampling	**10/10/2023**	**11:45**	**6.80 ft**	**548.74 ft**

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **0.91 gallons**
No. of Well Volumes (based on current water level) **0.26 well volumes**
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Dedicated Bailer
Pump type **Pneumatic Bladder** Dedicated Pump **No**
If not dedicated, method of cleaning **Replace bladder, rinse w/water, dedicated tubing**

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **14.86** Units **°C**
Equipment Used **Aquatroll 500**
pH **6.70**
Equipment Used **Aquatroll 500**
Specific Cond. **820** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 156.3 DO: 0.08 Turb.: 5.15 Sample Time: 10/10/2023 11:45**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 11:26:58 AM
Project: CIPCO-MW-5 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-5 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 18.5 ft** **Total Depth: 28.5 ft** **Initial Depth to Water: 6.8 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 28.5 ft** **Pump Intake From TOC: 23.5 ft** **Estimated Total Volume Pumped: 3460 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:

Weather Conditions:
40° sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10 %	+/- 10	+/- 0.33	
10/10/2023 11:26 AM	00:00	6.81 pH	14.65 °C	789.60 µS/cm	1.72 mg/L	15.71 NTU	163.1 mV	6.80 ft	300.00 ml/min
10/10/2023 11:29 AM	02:53	6.77 pH	14.76 °C	785.19 µS/cm	0.43 mg/L	9.79 NTU	160.4 mV	6.80 ft	300.00 ml/min
10/10/2023 11:32 AM	05:46	6.74 pH	14.79 °C	798.13 µS/cm	0.19 mg/L	5.11 NTU	159.1 mV	6.80 ft	300.00 ml/min
10/10/2023 11:35 AM	08:39	6.71 pH	14.83 °C	812.06 µS/cm	0.12 mg/L	3.44 NTU	157.8 mV	6.80 ft	300.00 ml/min
10/10/2023 11:38 AM	11:32	6.70 pH	14.86 °C	819.71 µS/cm	0.08 mg/L	5.15 NTU	156.3 mV	6.80 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-5	ST-1145

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-6** Upgradient
Downgradient **X**

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **555.88 ft** Ground Elevation **553.47 ft**
Depth of Well **15.10 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**11:47**	**7.99 ft**	**547.89 ft**
* After Purging	**10/10/2023**	**12:10**	**8.20 ft**	**547.68 ft**
* Before Sampling	**10/10/2023**	**12:10**	**8.20 ft**	**547.68 ft**

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **0.58 gallons**
No. of Well Volumes (based on current water level) **0.50 well volumes**
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Dedicated Bailer
Pump type **Pneumatic Bladder** Dedicated Pump **No**
If not dedicated, method of cleaning **Replace bladder, rinse w/water, dedicated tubing**

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **16.60** Units **°C**
Equipment Used **Aquatroll 500**
pH **6.72**
Equipment Used **Aquatroll 500**
Specific Cond. **810** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 144.4 DO: 0.10 Turb.: 2.52 Sample Time: 10/10/2023 12:10**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 11:47:16 AM
Project: CIPCO - MW-6 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-6 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 5.08 ft** **Total Depth: 15.08 ft** **Initial Depth to Water: 7.99 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 15.08 ft** **Pump Intake From TOC: 10.08 ft** **Estimated Total Volume Pumped: 2205 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.21 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:

Weather Conditions:
50° sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10 %	+/- 10	+/- 0.33	
10/10/2023 11:47 AM	00:00	6.78 pH	16.64 °C	791.92 µS/cm	1.61 mg/L	17.38 NTU	148.5 mV	7.99 ft	300.00 ml/min
10/10/2023 11:49 AM	02:27	6.72 pH	16.78 °C	809.72 µS/cm	0.40 mg/L	6.89 NTU	147.1 mV	8.20 ft	300.00 ml/min
10/10/2023 11:52 AM	04:54	6.72 pH	16.72 °C	808.78 µS/cm	0.17 mg/L	3.17 NTU	145.6 mV	8.20 ft	300.00 ml/min
10/10/2023 11:54 AM	07:21	6.72 pH	16.60 °C	809.90 µS/cm	0.10 mg/L	2.52 NTU	144.4 mV	8.20 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-6	ST-12:10

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-7** Upgradient
Downgradient **X**

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **556.77 ft** Ground Elevation **555.05 ft**
Depth of Well **18.19 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**3.03 ft**	**553.74 ft**
* After Purging			
* Before Sampling			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **Water Level Only**
No. of Well Volumes (based on current water level)
Was well pumped/bailed dry?

Equipment used:
Bailer type Dedicated Bailer
Pump type Dedicated Pump
If not dedicated, method of cleaning

*D. FIELD MEASUREMENT

Weather Conditions
Field Measurements (after stabilization)
Temperature Units
Equipment Used **Aquatroll 500**
pH
Equipment Used **Aquatroll 500**
Specific Cond. Units
Equipment Used

Comments: **No sample**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-9** Upgradient **X**
Downgradient

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **629.13 ft** Ground Elevation **627.04 ft**
Depth of Well **118.67 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**16:45**	**32.83 ft**	**596.30 ft**
* After Purging	**10/10/2023**	**17:00**		
* Before Sampling	**10/10/2023**	**17:00**		

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **not full purge**
No. of Well Volumes (based on current water level)
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Disposable Polyethylene Dedicated Bailer Yes
Pump type Dedicated Pump
If not dedicated, method of cleaning

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **14.29** Units **°C**
Equipment Used **Aquatroll 500**
pH **8.07**
Equipment Used **Aquatroll 500**
Specific Cond. **603** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 25 DO: 8.54 Turb.: 0.57 Sample Time: 10/10/2023 17:00**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 4:45:42 PM
Project: CIPCO-MW-9 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-9 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 108.65 ft** **Total Depth: 118.65 ft** **Initial Depth to Water: 32.83 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 118.65 ft** **Pump Intake From TOC: 113.65 ft** **Estimated Total Volume Pumped: 0 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:
Pulled bailer to sample. One groundwater quality reading

Weather Conditions:
50° sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10 %	+/- 10	+/- 0.33	
10/10/2023 4:45 PM	00:00	8.07 pH	14.29 °C	603.21 µS/cm	8.54 mg/L	0.57 NTU	25.0 mV	32.83 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-9	ST-1700

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-10** Upgradient **X**
Downgradient

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **629.39 ft** Ground Elevation **627.21 ft**
Depth of Well **32.25 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**23.21 ft**	**606.18 ft**
* After Purging			
* Before Sampling			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **Water Level Only**
No. of Well Volumes (based on current water level)
Was well pumped/bailed dry?

Equipment used:
Bailer type Dedicated Bailer
Pump type Dedicated Pump
If not dedicated, method of cleaning

*D. FIELD MEASUREMENT

Weather Conditions
Field Measurements (after stabilization)
Temperature Units
Equipment Used **Aquatroll 500**
pH
Equipment Used **Aquatroll 500**
Specific Cond. Units
Equipment Used

Comments: **No sample**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-11** Upgradient **X**
Downgradient

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **587.99 ft** Ground Elevation **586.18 ft**
Depth of Well **20.40 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**8:46**	**7.36 ft**	**580.63 ft**
* After Purging	**10/10/2023**	**9:15**	**7.36 ft**	**580.63 ft**
* Before Sampling	**10/10/2023**	**9:15**	**7.36 ft**	**580.63 ft**

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **1.24 gallons**
No. of Well Volumes (based on current water level) **0.58 well volumes**
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Dedicated Bailer
Pump type **Pneumatic Bladder** Dedicated Pump **No**
If not dedicated, method of cleaning **Replace bladder, rinse w/water, dedicated tubing**

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **12.92** Units **°C**
Equipment Used **Aquatroll 500**
pH **6.42**
Equipment Used **Aquatroll 500**
Specific Cond. **824** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 199.5 DO: 0.57 Turb.: 17.05 Sample Time: 10/10/2023 9:15**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 8:46:21 AM
Project: CIPCO-MW-11 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-11 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10.4 ft** **Total Depth: 20.4 ft** **Initial Depth to Water: 7.36 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 20.4 ft** **Pump Intake From TOC: 15.4 ft** **Estimated Total Volume Pumped: 4710 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:

Weather Conditions:
36° sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10 %	+/- 10	+/- 0.33	
10/10/2023 8:46 AM	00:00	6.60 pH	12.98 °C	856.86 µS/cm	3.19 mg/L	36.09 NTU	205.5 mV	7.36 ft	300.00 ml/min
10/10/2023 8:48 AM	02:37	6.50 pH	12.31 °C	847.38 µS/cm	1.68 mg/L	24.06 NTU	202.5 mV	7.36 ft	300.00 ml/min
10/10/2023 8:51 AM	05:14	6.46 pH	12.82 °C	840.86 µS/cm	1.24 mg/L	16.79 NTU	201.3 mV	7.36 ft	300.00 ml/min
10/10/2023 8:54 AM	07:51	6.43 pH	13.03 °C	840.02 µS/cm	0.96 mg/L	16.58 NTU	201.7 mV	7.36 ft	300.00 ml/min
10/10/2023 8:56 AM	10:28	6.41 pH	12.94 °C	831.53 µS/cm	0.75 mg/L	14.26 NTU	200.3 mV	7.36 ft	300.00 ml/min
10/10/2023 8:59 AM	13:05	6.41 pH	12.87 °C	828.12 µS/cm	0.65 mg/L	17.36 NTU	201.0 mV	7.36 ft	300.00 ml/min
10/10/2023 9:02 AM	15:42	6.42 pH	12.92 °C	824.21 µS/cm	0.57 mg/L	17.05 NTU	199.5 mV	7.36 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-11	ST-915

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-15** Upgradient
Downgradient **X**

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **558.65 ft** Ground Elevation **556.33 ft**
Depth of Well **29.20 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**13:05**	**12.55 ft**	**546.10 ft**
* After Purging	**10/10/2023**	**13:45**	**13.05 ft**	**545.60 ft**
* Before Sampling	**10/10/2023**	**13:45**	**13.05 ft**	**545.60 ft**

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **1.57 gallons**
No. of Well Volumes (based on current water level) **0.58 well volumes**
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Dedicated Bailer
Pump type **Pneumatic Bladder** Dedicated Pump **No**
If not dedicated, method of cleaning **Replace bladder, rinse w/water, dedicated tubing**

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **17.08** Units **°C**
Equipment Used **Aquatroll 500**
pH **6.83**
Equipment Used **Aquatroll 500**
Specific Cond. **2,291** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 69.5 DO: 0.43 Turb.: 0.00 Sample Time: 10/10/2023 13:45**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 1:05:18 PM
Project: CIPCO-MW-15 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-15 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10.4 ft** **Total Depth: 29.15 ft** **Initial Depth to Water: 12.55 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 29.15 ft** **Pump Intake From TOC: 19.15 ft** **Estimated Total Volume Pumped: 5930.833 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 0.5 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:

Weather Conditions:
55°sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10	+/- 10	+/- 0.33	
10/10/2023 1:05 PM	00:00	6.95 pH	14.71 °C	2,182.9 µS/cm	3.99 mg/L	0.35 NTU	101.4 mV	12.55 ft	300.00 ml/min
10/10/2023 1:08 PM	02:54	6.95 pH	14.67 °C	2,183.4 µS/cm	1.38 mg/L	3.76 NTU	98.9 mV	13.30 ft	300.00 ml/min
10/10/2023 1:11 PM	05:48	6.93 pH	14.93 °C	2,192.6 µS/cm	0.96 mg/L	0.00 NTU	96.4 mV	13.30 ft	300.00 ml/min
10/10/2023 1:14 PM	08:42	6.91 pH	15.51 °C	2,206.5 µS/cm	0.92 mg/L	0.00 NTU	93.3 mV	13.40 ft	300.00 ml/min
10/10/2023 1:16 PM	11:36	6.88 pH	15.58 °C	2,232.1 µS/cm	0.68 mg/L	0.30 NTU	90.7 mV	13.40 ft	300.00 ml/min
10/10/2023 1:19 PM	14:30	6.85 pH	15.81 °C	2,248.6 µS/cm	0.53 mg/L	0.00 NTU	87.8 mV	13.40 ft	50.00 ml/min
10/10/2023 1:20 PM	15:35	6.85 pH	16.19 °C	2,249.6 µS/cm	0.51 mg/L	0.14 NTU	86.3 mV	13.25 ft	50.00 ml/min
10/10/2023 1:22 PM	16:51	6.85 pH	16.49 °C	2,251.7 µS/cm	0.62 mg/L	0.03 NTU	84.7 mV	13.25 ft	100.00 ml/min
10/10/2023 1:28 PM	22:51	6.84 pH	17.24 °C	2,274.3 µS/cm	0.52 mg/L	0.00 NTU	77.6 mV	13.05 ft	100.00 ml/min
10/10/2023 1:30 PM	25:29	6.83 pH	17.22 °C	2,286.4 µS/cm	0.46 mg/L	0.00 NTU	75.0 mV	13.05 ft	100.00 ml/min
10/10/2023 1:36 PM	31:29	6.83 pH	17.08 °C	2,290.8 µS/cm	0.43 mg/L	0.00 NTU	69.5 mV	13.05 ft	100.00 ml/min

Samples

Sample ID:	Description:
Mw-15	ST-13:45

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-17** Upgradient
Downgradient **X**

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **557.32 ft** Ground Elevation **554.53 ft**
Depth of Well **20.35 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**12:17**	**12.22 ft**	**545.10 ft**
* After Purging	**10/10/2023**	**12:50**	**12.50 ft**	**544.82 ft**
* Before Sampling	**10/10/2023**	**12:50**	**12.50 ft**	**544.82 ft**

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **1.66 gallons**
No. of Well Volumes (based on current water level) **1.25 well volumes**
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Dedicated Bailer
Pump type **Pneumatic Bladder** Dedicated Pump **No**
If not dedicated, method of cleaning **Replace bladder, rinse w/water, dedicated tubing**

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **14.03** Units **°C**
Equipment Used **Aquatroll 500**
pH **6.82**
Equipment Used **Aquatroll 500**
Specific Cond. **2,067** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 129.3 DO: 0.17 Turb.: 1.36 Sample Time: 10/10/2023 12:50**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 12:17:45 PM
Project: CIPCO-MW-17 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-17 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10.35 ft** **Total Depth: 20.35 ft** **Initial Depth to Water: 12.22 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 20.35 ft** **Pump Intake From TOC: 15.35 ft** **Estimated Total Volume Pumped: 6295 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.28 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:

Weather Conditions:
50° sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10 %	+/- 10	+/- 0.33	
10/10/2023 12:17 PM	00:00	7.00 pH	15.05 °C	2,303.6 µS/cm	3.26 mg/L	32.88 NTU	135.9 mV	12.22 ft	300.00 ml/min
10/10/2023 12:20 PM	02:37	6.95 pH	14.57 °C	2,467.9 µS/cm	1.31 mg/L	34.65 NTU	137.9 mV	12.22 ft	300.00 ml/min
10/10/2023 12:22 PM	05:14	6.91 pH	14.28 °C	2,471.2 µS/cm	0.62 mg/L	22.84 NTU	138.6 mV	12.50 ft	300.00 ml/min
10/10/2023 12:25 PM	07:51	6.89 pH	14.11 °C	2,377.1 µS/cm	0.39 mg/L	15.13 NTU	138.1 mV	12.50 ft	300.00 ml/min
10/10/2023 12:28 PM	10:28	6.87 pH	13.96 °C	2,275.6 µS/cm	0.30 mg/L	9.33 NTU	137.0 mV	12.50 ft	300.00 ml/min
10/10/2023 12:30 PM	13:08	6.85 pH	13.94 °C	2,185.6 µS/cm	0.23 mg/L	4.89 NTU	135.4 mV	12.50 ft	300.00 ml/min
10/10/2023 12:33 PM	15:45	6.84 pH	13.90 °C	2,123.0 µS/cm	0.20 mg/L	2.92 NTU	133.4 mV	12.50 ft	300.00 ml/min
10/10/2023 12:36 PM	18:22	6.83 pH	13.89 °C	2,086.8 µS/cm	0.18 mg/L	1.14 NTU	131.5 mV	12.50 ft	300.00 ml/min
10/10/2023 12:38 PM	20:59	6.82 pH	14.03 °C	2,066.6 µS/cm	0.17 mg/L	1.36 NTU	129.3 mV	12.50 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW-17	ST-1250

FORM FOR
GROUNDWATER SAMPLING AND/OR
GROUNDWATER ELEVATION MEASUREMENT

Site Name **CIPCO Ash Disposal Landfill** Permit No. **70-SDP-09-91P**

Monitoring Well/Piezometer No. **MW-20** Upgradient
Downgradient **X**

Name Of person sampling **Clint Oberbroeckling**

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/piezometer Properly Capped? **Yes** Standing Water or Litter? **No**
If no, explain If yes, explain

B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Elevation: Top of inner well casing **558.92 ft** Ground Elevation **555.95 ft**
Depth of Well **44.39 ft** Inside Casing Diameter (inches) **2.0 in**
Equipment Used **Solinst Model 101 Water Level Probe**

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date/Time		Depth to Groundwater	Groundwater Elevation
Before Purging	**10/10/2023**	**10:35**	**5.92 ft**	**553.00 ft**
* After Purging	**10/10/2023**	**11:00**	**6.71 ft**	**552.21 ft**
* Before Sampling	**10/10/2023**	**11:00**	**6.71 ft**	**552.21 ft**

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) **0.72 gallons**
No. of Well Volumes (based on current water level) **0.11 well volumes**
Was well pumped/bailed dry? **No**

Equipment used:
Bailer type Dedicated Bailer
Pump type **Pneumatic Bladder** Dedicated Pump **No**
If not dedicated, method of cleaning **Replace bladder, rinse w/water, dedicated tubing**

*D. FIELD MEASUREMENT

Weather Conditions **Sunny**
Field Measurements (after stabilization)
Temperature **12.68** Units **°C**
Equipment Used **Aquatroll 500**
pH **7.11**
Equipment Used **Aquatroll 500**
Specific Cond. **612** Units **µS/cm**
Equipment Used **Aquatroll 500**

Comments: **ORP: 176.4 DO: 0.59 Turb.: 6.64 Sample Time: 10/10/2023 11:00**

Note: Attach Laboratory Report and 8-1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Low-Flow Test Report:

Test Date / Time: 10/10/2023 10:35:36 AM
Project: CIPCO-MW-20 (2)
Operator Name: Clint Oberbroeckling

Location Name: MW-20 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 34.4 ft** **Total Depth: 44.4 ft** **Initial Depth to Water: 5.92 ft**	**Pump Type: QED Sample PRO** **Tubing Type: Nylon- Double Bonded** **Tubing Inner Diameter: 0.25 in** **Tubing Length: 44.4 ft** **Pump Intake From TOC: 39.4 ft** **Estimated Total Volume Pumped: 2725 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 50 ml/min** **Final Draw Down: 0.79 ft**	**Instrument Used: Aqua TROLL 500** **Serial Number: 745328**

Test Notes:

Weather Conditions:
40° sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.1	+/- 0.5	+/- 3 %	+/- 0.3	+/- 10 %	+/- 10	+/- 0.33	
10/10/2023 10:35 AM	00:00	6.86 pH	12.26 °C	608.15 µS/cm	5.18 mg/L	2.43 NTU	180.5 mV	5.92 ft	300.00 ml/min
10/10/2023 10:38 AM	03:23	7.10 pH	12.18 °C	602.61 µS/cm	3.20 mg/L	1.15 NTU	178.9 mV	5.92 ft	300.00 ml/min
10/10/2023 10:42 AM	06:46	7.17 pH	11.45 °C	608.06 µS/cm	2.47 mg/L	3.02 NTU	177.9 mV	6.20 ft	50.00 ml/min
10/10/2023 10:45 AM	10:09	7.16 pH	12.25 °C	612.15 µS/cm	1.81 mg/L	10.02 NTU	177.7 mV	6.20 ft	50.00 ml/min
10/10/2023 10:49 AM	13:32	7.13 pH	12.40 °C	611.46 µS/cm	1.26 mg/L	8.86 NTU	178.2 mV	6.20 ft	50.00 ml/min
10/10/2023 10:52 AM	16:55	7.12 pH	12.49 °C	611.68 µS/cm	0.88 mg/L	7.44 NTU	177.1 mV	6.20 ft	50.00 ml/min
10/10/2023 10:52 AM	17:17	7.12 pH	12.51 °C	611.92 µS/cm	0.83 mg/L	8.40 NTU	176.9 mV	6.71 ft	50.00 ml/min
10/10/2023 10:56 AM	20:40	7.11 pH	12.68 °C	611.92 µS/cm	0.59 mg/L	6.64 NTU	176.4 mV	6.71 ft	50.00 ml/min

Samples

Sample ID:	Description:

MW-20	ST-1100

Appendix B

Laboratory Analytical Reports

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Michael Alowitz
GHD Services Inc.
11228 Aurora Avenue
Des Moines, Iowa 50322-7905

Generated 10/24/2023 9:27:31 AM

JOB DESCRIPTION

CIPCO Ash Landfill Project

JOB NUMBER

310-266968-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

myEOL

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization

Generated
10/24/2023 9:27:31 AM

Authorized for release by
Meredith Liechti, Service Center Manager
meredith.liechti@et.eurofinsus.com
(319)277-2401

Table of Contents

Job ID: 310-266968-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-266968-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 10/11/2023 4:55 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.8°C

HPLC/IC
Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW-3 (310-266968-3), MW-9 (310-266968-6) and MW-20 (310-266968-10). Elevated reporting limits (RLs) are provided.

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

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

Sample Summary

Client: GHD Services Inc.
Project/Site: CIPCO Ash Landfill Project

Job ID: 310-266968-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-266968-1	MW-1	Water	10/10/23 10:00	10/11/23 16:55
310-266968-2	MW-2	Water	10/10/23 14:50	10/11/23 16:55
310-266968-3	MW-3	Water	10/10/23 16:05	10/11/23 16:55
310-266968-4	MW-5	Water	10/10/23 11:45	10/11/23 16:55
310-266968-5	MW-6	Water	10/10/23 12:10	10/11/23 16:55
310-266968-6	MW-9	Water	10/10/23 17:00	10/11/23 16:55
310-266968-7	MW-11	Water	10/10/23 09:15	10/11/23 16:55
310-266968-8	MW-15	Water	10/10/23 13:45	10/11/23 16:55
310-266968-9	MW-17	Water	10/10/23 12:50	10/11/23 16:55
310-266968-10	MW-20	Water	10/10/23 11:00	10/11/23 16:55

Detection Summary

Client: GHD Services Inc.
Project/Site: CIPCO Ash Landfill Project

Job ID: 310-266968-1

Client Sample ID: MW-1 — Lab Sample ID: 310-266968-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6.30		5.00		mg/L	5		9056A	Total/NA
Sulfate	250		5.00		mg/L	5		9056A	Total/NA
Boron	0.300		0.100		mg/L	1		6020B	Total/NA
Cobalt	0.00149		0.000500		mg/L	1		6020B	Total/NA
Iron	3.64		0.100		mg/L	1		6020B	Total/NA
Lithium	0.0630		0.0100		mg/L	1		6020B	Total/NA
Magnesium	72.7		0.500		mg/L	1		6020B	Total/NA
Manganese	0.399	F1	0.0100		mg/L	1		6020B	Total/NA
Sodium	11.8		1.00		mg/L	1		6020B	Total/NA
Strontium	0.646		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-2 — Lab Sample ID: 310-266968-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.67		5.00		mg/L	5		9056A	Total/NA
Sulfate	206		5.00		mg/L	5		9056A	Total/NA
Boron	7.56		0.700		mg/L	7		6020B	Total/NA
Lithium	0.0373		0.0100		mg/L	1		6020B	Total/NA
Magnesium	32.2		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0607		0.0100		mg/L	1		6020B	Total/NA
Sodium	17.9		1.00		mg/L	1		6020B	Total/NA
Strontium	0.330		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-3 — Lab Sample ID: 310-266968-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	24.4		5.00		mg/L	5		9056A	Total/NA
Boron	1.43		0.100		mg/L	1		6020B	Total/NA
Cobalt	0.00162		0.000500		mg/L	1		6020B	Total/NA
Iron	0.309		0.100		mg/L	1		6020B	Total/NA
Lithium	0.0393		0.0100		mg/L	1		6020B	Total/NA
Magnesium	19.4		0.500		mg/L	1		6020B	Total/NA
Manganese	0.708		0.0100		mg/L	1		6020B	Total/NA
Sodium	24.7		1.00		mg/L	1		6020B	Total/NA
Strontium	0.840		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-5 — Lab Sample ID: 310-266968-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.9		5.00		mg/L	5		9056A	Total/NA
Sulfate	62.2		5.00		mg/L	5		9056A	Total/NA
Boron	6.23		0.700		mg/L	7		6020B	Total/NA
Cobalt	0.00282		0.000500		mg/L	1		6020B	Total/NA
Iron	0.770		0.100		mg/L	1		6020B	Total/NA
Lithium	0.0197		0.0100		mg/L	1		6020B	Total/NA
Magnesium	38.3		0.500		mg/L	1		6020B	Total/NA
Manganese	0.598		0.0100		mg/L	1		6020B	Total/NA
Sodium	19.7		1.00		mg/L	1		6020B	Total/NA
Strontium	0.315		0.00100		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GHD Services Inc.
Project/Site: CIPCO Ash Landfill Project

Job ID: 310-266968-1

Client Sample ID: MW-6 — Lab Sample ID: 310-266968-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.7		5.00		mg/L	5		9056A	Total/NA
Sulfate	75.6		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00222		0.00200		mg/L	1		6020B	Total/NA
Boron	8.06		0.700		mg/L	7		6020B	Total/NA
Cobalt	0.00302		0.000500		mg/L	1		6020B	Total/NA
Iron	0.794		0.100		mg/L	1		6020B	Total/NA
Magnesium	35.3		0.500		mg/L	1		6020B	Total/NA
Manganese	5.17		0.0700		mg/L	7		6020B	Total/NA
Molybdenum	0.0477		0.00200		mg/L	1		6020B	Total/NA
Sodium	18.3		1.00		mg/L	1		6020B	Total/NA
Strontium	0.273		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-9 — Lab Sample ID: 310-266968-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	18.8		5.00		mg/L	5		9056A	Total/NA
Boron	0.216		0.100		mg/L	1		6020B	Total/NA
Lithium	0.0448		0.0100		mg/L	1		6020B	Total/NA
Magnesium	32.4		0.500		mg/L	1		6020B	Total/NA
Sodium	12.5		1.00		mg/L	1		6020B	Total/NA
Strontium	0.594		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-11 — Lab Sample ID: 310-266968-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	10.3		5.00		mg/L	5		9056A	Total/NA
Sulfate	74.3		5.00		mg/L	5		9056A	Total/NA
Iron	0.255		0.100		mg/L	1		6020B	Total/NA
Magnesium	50.8		0.500		mg/L	1		6020B	Total/NA
Manganese	0.126		0.0100		mg/L	1		6020B	Total/NA
Sodium	14.2		1.00		mg/L	1		6020B	Total/NA
Strontium	0.146		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-15 — Lab Sample ID: 310-266968-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18.3		10.0		mg/L	10		9056A	Total/NA
Sulfate	1380		100		mg/L	100		9056A	Total/NA
Boron	37.5		1.00		mg/L	10		6020B	Total/NA
Cobalt	0.000780		0.000500		mg/L	1		6020B	Total/NA
Lithium	0.166		0.0100		mg/L	1		6020B	Total/NA
Magnesium	116		5.00		mg/L	10		6020B	Total/NA
Manganese	0.253		0.0100		mg/L	1		6020B	Total/NA
Molybdenum	0.215		0.00200		mg/L	1		6020B	Total/NA
Sodium	98.9		1.00		mg/L	1		6020B	Total/NA
Strontium	0.645		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-17 — Lab Sample ID: 310-266968-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	16.9		5.00		mg/L	5		9056A	Total/NA
Sulfate	1090		20.0		mg/L	20		9056A	Total/NA
Boron	19.7		1.00		mg/L	10		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-17 (Continued)
Lab Sample ID: 310-266968-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	1.34		0.100		mg/L	1		6020B	Total/NA
Lithium	0.289		0.0100		mg/L	1		6020B	Total/NA
Magnesium	157		5.00		mg/L	10		6020B	Total/NA
Manganese	0.354		0.0100		mg/L	1		6020B	Total/NA
Molybdenum	0.0972		0.00200		mg/L	1		6020B	Total/NA
Sodium	75.2		1.00		mg/L	1		6020B	Total/NA
Strontium	0.424		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-20
Lab Sample ID: 310-266968-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	26.7		5.00		mg/L	5		9056A	Total/NA
Boron	1.45		0.100		mg/L	1		6020B	Total/NA
Iron	0.128		0.100		mg/L	1		6020B	Total/NA
Lithium	0.0222		0.0100		mg/L	1		6020B	Total/NA
Magnesium	16.6		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0427		0.0100		mg/L	1		6020B	Total/NA
Sodium	91.0		1.00		mg/L	1		6020B	Total/NA
Strontium	0.544		0.00100		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-1
Lab Sample ID: 310-266968-1
Date Collected: 10/10/23 10:00
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**6.30**		5.00		mg/L			10/20/23 14:42	5
Sulfate	**250**		5.00		mg/L			10/20/23 14:42	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:18	1
Boron	**0.300**		0.100		mg/L		10/16/23 09:15	10/17/23 14:18	1
Cobalt	**0.00149**		0.000500		mg/L		10/16/23 09:15	10/17/23 14:18	1
Iron	**3.64**		0.100		mg/L		10/16/23 09:15	10/17/23 14:18	1
Lithium	**0.0630**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:18	1
Magnesium	**72.7**		0.500		mg/L		10/16/23 09:15	10/17/23 14:18	1
Manganese	**0.399**	**F1**	0.0100		mg/L		10/16/23 09:15	10/17/23 14:18	1
Molybdenum	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:18	1
Sodium	**11.8**		1.00		mg/L		10/16/23 09:15	10/17/23 14:18	1
Strontium	**0.646**		0.00100		mg/L		10/16/23 09:15	10/17/23 14:18	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-2
Lab Sample ID: 310-266968-2
Date Collected: 10/10/23 14:50
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**9.67**		5.00		mg/L			10/20/23 14:54	5
Sulfate	**206**		5.00		mg/L			10/20/23 14:54	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:40	1
Boron	**7.56**		0.700		mg/L		10/16/23 09:15	10/17/23 15:30	7
Cobalt	<0.000500		0.000500		mg/L		10/16/23 09:15	10/17/23 14:40	1
Iron	<0.100		0.100		mg/L		10/16/23 09:15	10/17/23 14:40	1
Lithium	**0.0373**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:40	1
Magnesium	**32.2**		0.500		mg/L		10/16/23 09:15	10/17/23 14:40	1
Manganese	**0.0607**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:40	1
Molybdenum	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:40	1
Sodium	**17.9**		1.00		mg/L		10/16/23 09:15	10/17/23 14:40	1
Strontium	**0.330**		0.00100		mg/L		10/16/23 09:15	10/17/23 14:40	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-3
Lab Sample ID: 310-266968-3
Date Collected: 10/10/23 16:05
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			10/20/23 15:06	5
Sulfate	**24.4**		5.00		mg/L			10/20/23 15:06	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:42	1
Boron	**1.43**		0.100		mg/L		10/16/23 09:15	10/17/23 22:17	1
Cobalt	**0.00162**		0.000500		mg/L		10/16/23 09:15	10/17/23 14:42	1
Iron	**0.309**		0.100		mg/L		10/16/23 09:15	10/17/23 14:42	1
Lithium	**0.0393**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:42	1
Magnesium	**19.4**		0.500		mg/L		10/16/23 09:15	10/17/23 14:42	1
Manganese	**0.708**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:42	1
Molybdenum	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:42	1
Sodium	**24.7**		1.00		mg/L		10/16/23 09:15	10/17/23 14:42	1
Strontium	**0.840**		0.00100		mg/L		10/16/23 09:15	10/17/23 14:42	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-5
Lab Sample ID: 310-266968-4

Date Collected: 10/10/23 11:45
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**15.9**		5.00		mg/L			10/20/23 15:18	5
Sulfate	**62.2**		5.00		mg/L			10/20/23 15:18	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:44	1
Boron	**6.23**		0.700		mg/L		10/16/23 09:15	10/17/23 15:32	7
Cobalt	**0.00282**		0.000500		mg/L		10/16/23 09:15	10/17/23 14:44	1
Iron	**0.770**		0.100		mg/L		10/16/23 09:15	10/17/23 14:44	1
Lithium	**0.0197**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:44	1
Magnesium	**38.3**		0.500		mg/L		10/16/23 09:15	10/17/23 14:44	1
Manganese	**0.598**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:44	1
Molybdenum	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:44	1
Sodium	**19.7**		1.00		mg/L		10/16/23 09:15	10/17/23 14:44	1
Strontium	**0.315**		0.00100		mg/L		10/16/23 09:15	10/17/23 14:44	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-6
Lab Sample ID: 310-266968-5
Date Collected: 10/10/23 12:10
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	15.7		5.00		mg/L			10/20/23 15:54	5
Sulfate	75.6		5.00		mg/L			10/20/23 15:54	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00222		0.00200		mg/L		10/16/23 09:15	10/17/23 14:47	1
Boron	8.06		0.700		mg/L		10/16/23 09:15	10/17/23 15:34	7
Cobalt	0.00302		0.000500		mg/L		10/16/23 09:15	10/17/23 14:47	1
Iron	0.794		0.100		mg/L		10/16/23 09:15	10/17/23 14:47	1
Lithium	<0.0100		0.0100		mg/L		10/16/23 09:15	10/17/23 14:47	1
Magnesium	35.3		0.500		mg/L		10/16/23 09:15	10/17/23 14:47	1
Manganese	5.17		0.0700		mg/L		10/16/23 09:15	10/17/23 15:34	7
Molybdenum	0.0477		0.00200		mg/L		10/16/23 09:15	10/17/23 14:47	1
Sodium	18.3		1.00		mg/L		10/16/23 09:15	10/17/23 14:47	1
Strontium	0.273		0.00100		mg/L		10/16/23 09:15	10/17/23 14:47	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-9
Lab Sample ID: 310-266968-6
Date Collected: 10/10/23 17:00
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			10/20/23 16:07	5
Sulfate	**18.8**		5.00		mg/L			10/20/23 16:07	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:49	1
Boron	**0.216**		0.100		mg/L		10/16/23 09:15	10/17/23 22:20	1
Cobalt	<0.000500		0.000500		mg/L		10/16/23 09:15	10/17/23 14:49	1
Iron	<0.100		0.100		mg/L		10/16/23 09:15	10/17/23 14:49	1
Lithium	**0.0448**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:49	1
Magnesium	**32.4**		0.500		mg/L		10/16/23 09:15	10/17/23 14:49	1
Manganese	<0.0100		0.0100		mg/L		10/16/23 09:15	10/17/23 14:49	1
Molybdenum	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:49	1
Sodium	**12.5**		1.00		mg/L		10/16/23 09:15	10/17/23 14:49	1
Strontium	**0.594**		0.00100		mg/L		10/16/23 09:15	10/17/23 14:49	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-11
Lab Sample ID: 310-266968-7
Date Collected: 10/10/23 09:15
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**10.3**		5.00		mg/L			10/20/23 16:19	5
Sulfate	**74.3**		5.00		mg/L			10/20/23 16:19	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:51	1
Boron	<0.100		0.100		mg/L		10/16/23 09:15	10/17/23 22:22	1
Cobalt	<0.000500		0.000500		mg/L		10/16/23 09:15	10/17/23 14:51	1
Iron	**0.255**		0.100		mg/L		10/16/23 09:15	10/17/23 14:51	1
Lithium	<0.0100		0.0100		mg/L		10/16/23 09:15	10/17/23 14:51	1
Magnesium	**50.8**		0.500		mg/L		10/16/23 09:15	10/17/23 14:51	1
Manganese	**0.126**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:51	1
Molybdenum	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:51	1
Sodium	**14.2**		1.00		mg/L		10/16/23 09:15	10/17/23 14:51	1
Strontium	**0.146**		0.00100		mg/L		10/16/23 09:15	10/17/23 14:51	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-15
Lab Sample ID: 310-266968-8
Date Collected: 10/10/23 13:45
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**18.3**		10.0		mg/L			10/20/23 16:31	10
Sulfate	**1380**		100		mg/L			10/20/23 09:17	100

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:53	1
Boron	**37.5**		1.00		mg/L		10/16/23 09:15	10/17/23 15:36	10
Cobalt	**0.000780**		0.000500		mg/L		10/16/23 09:15	10/17/23 14:53	1
Iron	<0.100		0.100		mg/L		10/16/23 09:15	10/17/23 14:53	1
Lithium	**0.166**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:53	1
Magnesium	**116**		5.00		mg/L		10/16/23 09:15	10/17/23 15:36	10
Manganese	**0.253**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:53	1
Molybdenum	**0.215**		0.00200		mg/L		10/16/23 09:15	10/17/23 14:53	1
Sodium	**98.9**		1.00		mg/L		10/16/23 09:15	10/17/23 14:53	1
Strontium	**0.645**		0.00100		mg/L		10/16/23 09:15	10/17/23 14:53	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-17
Lab Sample ID: 310-266968-9
Date Collected: 10/10/23 12:50
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**16.9**		5.00		mg/L			10/20/23 09:29	5
Sulfate	**1090**		20.0		mg/L			10/20/23 16:43	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:56	1
Boron	**19.7**		1.00		mg/L		10/16/23 09:15	10/17/23 15:39	10
Cobalt	<0.000500		0.000500		mg/L		10/16/23 09:15	10/17/23 14:56	1
Iron	**1.34**		0.100		mg/L		10/16/23 09:15	10/17/23 14:56	1
Lithium	**0.289**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:56	1
Magnesium	**157**		5.00		mg/L		10/16/23 09:15	10/17/23 15:39	10
Manganese	**0.354**		0.0100		mg/L		10/16/23 09:15	10/17/23 14:56	1
Molybdenum	**0.0972**		0.00200		mg/L		10/16/23 09:15	10/17/23 14:56	1
Sodium	**75.2**		1.00		mg/L		10/16/23 09:15	10/17/23 14:56	1
Strontium	**0.424**		0.00100		mg/L		10/16/23 09:15	10/17/23 14:56	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-20
Lab Sample ID: 310-266968-10
Date Collected: 10/10/23 11:00
Matrix: Water
Date Received: 10/11/23 16:55

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			10/20/23 16:55	5
Sulfate	**26.7**		5.00		mg/L			10/20/23 16:55	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 15:05	1
Boron	**1.45**		0.100		mg/L		10/16/23 09:15	10/17/23 22:25	1
Cobalt	<0.000500		0.000500		mg/L		10/16/23 09:15	10/17/23 15:05	1
Iron	**0.128**		0.100		mg/L		10/16/23 09:15	10/17/23 15:05	1
Lithium	**0.0222**		0.0100		mg/L		10/16/23 09:15	10/17/23 15:05	1
Magnesium	**16.6**		0.500		mg/L		10/16/23 09:15	10/17/23 15:05	1
Manganese	**0.0427**		0.0100		mg/L		10/16/23 09:15	10/17/23 15:05	1
Molybdenum	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 15:05	1
Sodium	**91.0**		1.00		mg/L		10/16/23 09:15	10/17/23 15:05	1
Strontium	**0.544**		0.00100		mg/L		10/16/23 09:15	10/17/23 15:05	1

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.

Glossary

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-403413/3
Matrix: Water
Analysis Batch: 403413

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			10/20/23 14:18	1
Sulfate	<1.00		1.00		mg/L			10/20/23 14:18	1

Lab Sample ID: LCS 310-403413/4
Matrix: Water
Analysis Batch: 403413

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.639		mg/L		96	90 - 110
Sulfate	10.0	10.09		mg/L		101	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-402547/1-A
Matrix: Water
Analysis Batch: 402835

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402547

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:12	1
Boron	<0.100		0.100		mg/L		10/16/23 09:15	10/17/23 14:12	1
Cobalt	<0.000500		0.000500		mg/L		10/16/23 09:15	10/17/23 14:12	1
Iron	<0.100		0.100		mg/L		10/16/23 09:15	10/17/23 14:12	1
Lithium	<0.0100		0.0100		mg/L		10/16/23 09:15	10/17/23 14:12	1
Magnesium	<0.500		0.500		mg/L		10/16/23 09:15	10/17/23 14:12	1
Manganese	<0.0100		0.0100		mg/L		10/16/23 09:15	10/17/23 14:12	1
Molybdenum	<0.00200		0.00200		mg/L		10/16/23 09:15	10/17/23 14:12	1
Sodium	<1.00		1.00		mg/L		10/16/23 09:15	10/17/23 14:12	1
Strontium	<0.00100		0.00100		mg/L		10/16/23 09:15	10/17/23 14:12	1

Lab Sample ID: LCS 310-402547/2-A
Matrix: Water
Analysis Batch: 402835

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402547

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.200	0.2003		mg/L		100	80 - 120
Boron	0.200	0.1955		mg/L		98	80 - 120
Cobalt	0.100	0.1057		mg/L		106	80 - 120
Iron	0.200	0.2313		mg/L		116	80 - 120
Lithium	0.200	0.2020		mg/L		101	80 - 120
Magnesium	2.00	2.114		mg/L		106	80 - 120
Manganese	0.100	0.09788		mg/L		98	80 - 120
Molybdenum	0.200	0.2051		mg/L		103	80 - 120
Sodium	2.00	2.129		mg/L		106	80 - 120
Strontium	0.200	0.1978		mg/L		99	80 - 120

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 310-266968-1 MS
Matrix: Water
Analysis Batch: 402835

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 402547

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	<0.00200		0.200	0.2314		mg/L		115	75 - 125
Boron	0.300		0.200	0.5350		mg/L		118	75 - 125
Cobalt	0.00149		0.100	0.1177		mg/L		116	75 - 125
Iron	3.64		0.200	3.960	4	mg/L		158	75 - 125
Lithium	0.0630		0.200	0.3014		mg/L		119	75 - 125
Magnesium	72.7		2.00	78.05	4	mg/L		268	75 - 125
Manganese	0.399	F1	0.100	0.5341	F1	mg/L		135	75 - 125
Molybdenum	<0.00200		0.200	0.2342		mg/L		117	75 - 125
Sodium	11.8		2.00	14.57	4	mg/L		140	75 - 125
Strontium	0.646		0.200	0.8768		mg/L		115	75 - 125

Lab Sample ID: 310-266968-1 MSD
Matrix: Water
Analysis Batch: 402835

Client Sample ID: MW-1
Prep Type: Total/NA
Prep Batch: 402547

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	<0.00200		0.200	0.2106		mg/L		105	75 - 125	9	20
Boron	0.300		0.200	0.5104		mg/L		105	75 - 125	5	20
Cobalt	0.00149		0.100	0.1052		mg/L		104	75 - 125	11	20
Iron	3.64		0.200	3.888	4	mg/L		123	75 - 125	2	20
Lithium	0.0630		0.200	0.2757		mg/L		106	75 - 125	9	20
Magnesium	72.7		2.00	74.88	4	mg/L		110	75 - 125	4	20
Manganese	0.399	F1	0.100	0.5104		mg/L		111	75 - 125	5	20
Molybdenum	<0.00200		0.200	0.2090		mg/L		104	75 - 125	11	20
Sodium	11.8		2.00	13.95	4	mg/L		109	75 - 125	4	20
Strontium	0.646		0.200	0.8426		mg/L		98	75 - 125	4	20

HPLC/IC

Analysis Batch: 403413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-266968-1	MW-1	Total/NA	Water	9056A	
310-266968-2	MW-2	Total/NA	Water	9056A	
310-266968-3	MW-3	Total/NA	Water	9056A	
310-266968-4	MW-5	Total/NA	Water	9056A	
310-266968-5	MW-6	Total/NA	Water	9056A	
310-266968-6	MW-9	Total/NA	Water	9056A	
310-266968-7	MW-11	Total/NA	Water	9056A	
310-266968-8	MW-15	Total/NA	Water	9056A	
310-266968-8	MW-15	Total/NA	Water	9056A	
310-266968-9	MW-17	Total/NA	Water	9056A	
310-266968-9	MW-17	Total/NA	Water	9056A	
310-266968-10	MW-20	Total/NA	Water	9056A	
MB 310-403413/3	Method Blank	Total/NA	Water	9056A	
LCS 310-403413/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 402547

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-266968-1	MW-1	Total/NA	Water	3005A	
310-266968-2	MW-2	Total/NA	Water	3005A	
310-266968-3	MW-3	Total/NA	Water	3005A	
310-266968-4	MW-5	Total/NA	Water	3005A	
310-266968-5	MW-6	Total/NA	Water	3005A	
310-266968-6	MW-9	Total/NA	Water	3005A	
310-266968-7	MW-11	Total/NA	Water	3005A	
310-266968-8	MW-15	Total/NA	Water	3005A	
310-266968-9	MW-17	Total/NA	Water	3005A	
310-266968-10	MW-20	Total/NA	Water	3005A	
MB 310-402547/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-402547/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-266968-1 MS	MW-1	Total/NA	Water	3005A	
310-266968-1 MSD	MW-1	Total/NA	Water	3005A	

Analysis Batch: 402835

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-266968-1	MW-1	Total/NA	Water	6020B	402547
310-266968-2	MW-2	Total/NA	Water	6020B	402547
310-266968-2	MW-2	Total/NA	Water	6020B	402547
310-266968-3	MW-3	Total/NA	Water	6020B	402547
310-266968-4	MW-5	Total/NA	Water	6020B	402547
310-266968-4	MW-5	Total/NA	Water	6020B	402547
310-266968-5	MW-6	Total/NA	Water	6020B	402547
310-266968-5	MW-6	Total/NA	Water	6020B	402547
310-266968-6	MW-9	Total/NA	Water	6020B	402547
310-266968-7	MW-11	Total/NA	Water	6020B	402547
310-266968-8	MW-15	Total/NA	Water	6020B	402547
310-266968-8	MW-15	Total/NA	Water	6020B	402547
310-266968-9	MW-17	Total/NA	Water	6020B	402547
310-266968-9	MW-17	Total/NA	Water	6020B	402547
310-266968-10	MW-20	Total/NA	Water	6020B	402547

Metals (Continued)

Analysis Batch: 402835 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-402547/1-A	Method Blank	Total/NA	Water	6020B	402547
LCS 310-402547/2-A	Lab Control Sample	Total/NA	Water	6020B	402547
310-266968-1 MS	MW-1	Total/NA	Water	6020B	402547
310-266968-1 MSD	MW-1	Total/NA	Water	6020B	402547

Analysis Batch: 402883

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-266968-3	MW-3	Total/NA	Water	6020B	402547
310-266968-6	MW-9	Total/NA	Water	6020B	402547
310-266968-7	MW-11	Total/NA	Water	6020B	402547
310-266968-10	MW-20	Total/NA	Water	6020B	402547

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-1
Lab Sample ID: 310-266968-1
Date Collected: 10/10/23 10:00
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403413	QTZ5	EET CF	10/20/23 14:42
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 14:18

Client Sample ID: MW-2
Lab Sample ID: 310-266968-2
Date Collected: 10/10/23 14:50
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403413	QTZ5	EET CF	10/20/23 14:54
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 14:40
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		7	402835	A6US	EET CF	10/17/23 15:30

Client Sample ID: MW-3
Lab Sample ID: 310-266968-3
Date Collected: 10/10/23 16:05
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403413	QTZ5	EET CF	10/20/23 15:06
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 14:42
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402883	A6US	EET CF	10/17/23 22:17

Client Sample ID: MW-5
Lab Sample ID: 310-266968-4
Date Collected: 10/10/23 11:45
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403413	QTZ5	EET CF	10/20/23 15:18
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 14:44
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		7	402835	A6US	EET CF	10/17/23 15:32

Client Sample ID: MW-6
Lab Sample ID: 310-266968-5
Date Collected: 10/10/23 12:10
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403413	QTZ5	EET CF	10/20/23 15:54
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 14:47

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-6
Lab Sample ID: 310-266968-5
Date Collected: 10/10/23 12:10
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		7	402835	A6US	EET CF	10/17/23 15:34

Client Sample ID: MW-9
Lab Sample ID: 310-266968-6
Date Collected: 10/10/23 17:00
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403413	QTZ5	EET CF	10/20/23 16:07
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 14:49
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402883	A6US	EET CF	10/17/23 22:20

Client Sample ID: MW-11
Lab Sample ID: 310-266968-7
Date Collected: 10/10/23 09:15
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403413	QTZ5	EET CF	10/20/23 16:19
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 14:51
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402883	A6US	EET CF	10/17/23 22:22

Client Sample ID: MW-15
Lab Sample ID: 310-266968-8
Date Collected: 10/10/23 13:45
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		100	403413	QTZ5	EET CF	10/20/23 09:17
Total/NA	Analysis	9056A		10	403413	QTZ5	EET CF	10/20/23 16:31
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 14:53
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		10	402835	A6US	EET CF	10/17/23 15:36

Client Sample ID: MW-17
Lab Sample ID: 310-266968-9
Date Collected: 10/10/23 12:50
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403413	QTZ5	EET CF	10/20/23 09:29
Total/NA	Analysis	9056A		20	403413	QTZ5	EET CF	10/20/23 16:43

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Client Sample ID: MW-17
Lab Sample ID: 310-266968-9
Date Collected: 10/10/23 12:50
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 14:56
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		10	402835	A6US	EET CF	10/17/23 15:39

Client Sample ID: MW-20
Lab Sample ID: 310-266968-10
Date Collected: 10/10/23 11:00
Matrix: Water
Date Received: 10/11/23 16:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403413	QTZ5	EET CF	10/20/23 16:55
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402835	A6US	EET CF	10/17/23 15:05
Total/NA	Prep	3005A			402547	KCK5	EET CF	10/16/23 09:15
Total/NA	Analysis	6020B		1	402883	A6US	EET CF	10/17/23 22:25

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020B	3005A	Water	Lithium

Method Summary

Client: GHD Services Inc.
Job ID: 310-266968-1
Project/Site: CIPCO Ash Landfill Project

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

eurofins | Environment Testing America

310-266968 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD

City/State: CITY | STATE FA | Project:

Receipt Information

Date/Time Received: DATE 10/11/23 | TIME 1655 | Received By: SC

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☑ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☑ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☐ Yes ☑ No *If yes:* Cooler # _____ of _____

Cooler Custody Seals Present? ☑ Yes ☐ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☑ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☑ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☑ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: 6 | Correction Factor (°C): 0

Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 2.8 | Corrected Temp (°C): 2.8

Sample Container Temperature

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

Received 2 250 unpreserved + 2 250ml Nitric bottles empty

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613
Phone: 319-277-2401 Fax: 319-277-2425

Chain of Custody Record

TestAmerica Des Moines SC
214

eurofins

Client Information	Sampler: Clint Oberbroeckling	Lab PM: Liechti, Meredith L	Carrier Tracking No(s):	COC No: 310-86199-9253.2
Client Contact: Michael Alowitz	Phone: 515-210-4299	E-Mail: meredith.liechti@et.eurofinsus.com	State of Origin:	Page: ~~Page 2 of 3~~ 1 of 1
Company: GHD Services Inc.	PWSID:	Analysis Requested		Job #: 12560436
Address: 11228 Aurora Avenue	Due Date Requested: 14 Cal Days			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify), Other
City: Des Moines	TAT Requested (days): Std			
State, Zip: IA, 50322-7905	Compliance Project: Δ Yes Δ No			
Phone: 515-321-2725(Tel)	PO #: 340-001594			
Email: Michael.Alowitz@ghd.com	WO #: 12560436-2021			
Project Name: CIPCO Ash Landfill	Project #: 31007062			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A - (MOD) Total Select ICPMS Metals	9056A_ORGFM_28D - Chloride and Sulfate	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N		
MW-1	10/10/23	1000	G	Water			X	X		
MW-2		1450		Water						
MW-3		1605		Water						
MW-5		1145		Water						
MW-6		1210		Water						
MW-9		1700		Water						
MW-11		915		Water						
MW-15		1345		Water						
MW-17		1250		Water						
MW-20		1100		Water						
				Water						

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I, II, III, IV, Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date:	Time	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		10/11/23 1130	GHD	Front Desk	10/11/23 1130	GHD
2	Front Desk	10/11/23	GHD	James Box	10/11/23 1353	Eurofins/TA
3				SL	10/11/23 1655	

Custody Seals Intact: Δ Yes Δ No | Custody Seal No

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-266968-1

Login Number: 266968

List Source: Eurofins Cedar Falls

List Number: 1

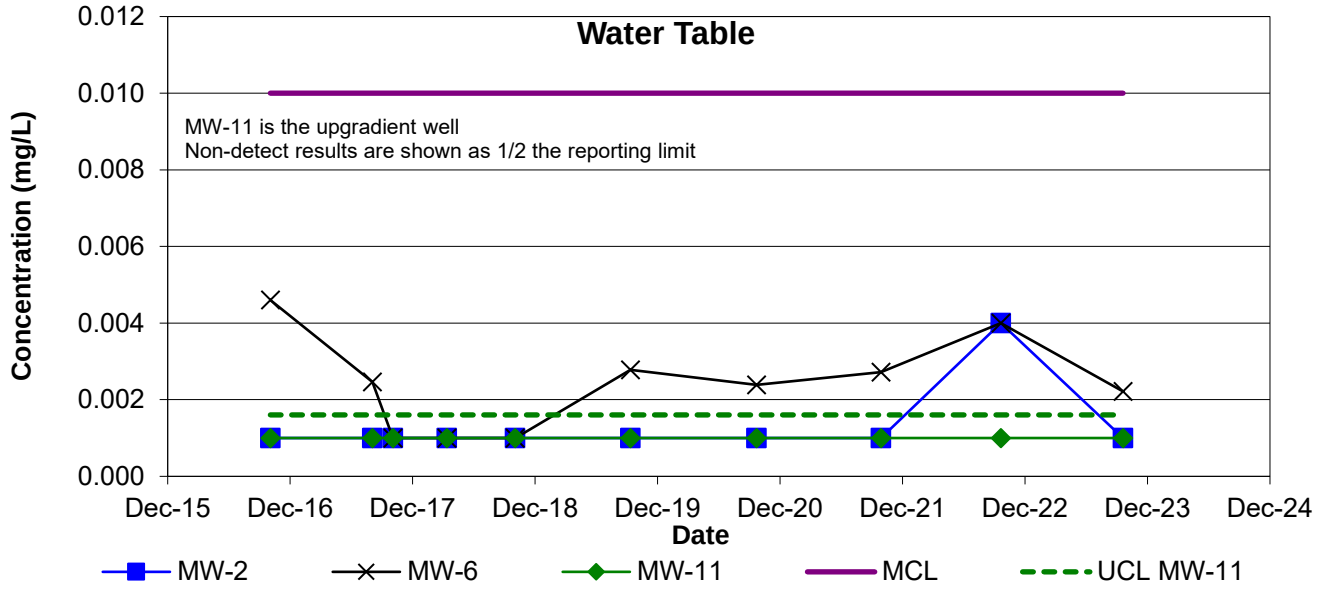
Creator: Lage, Sydney

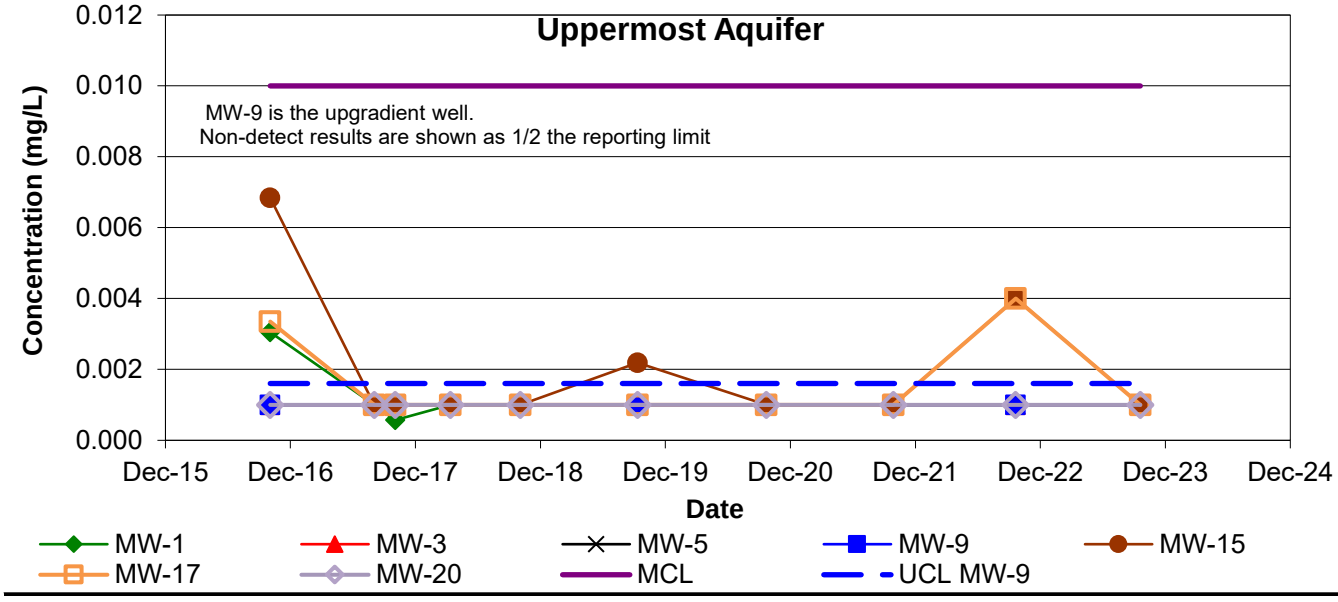
Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix C

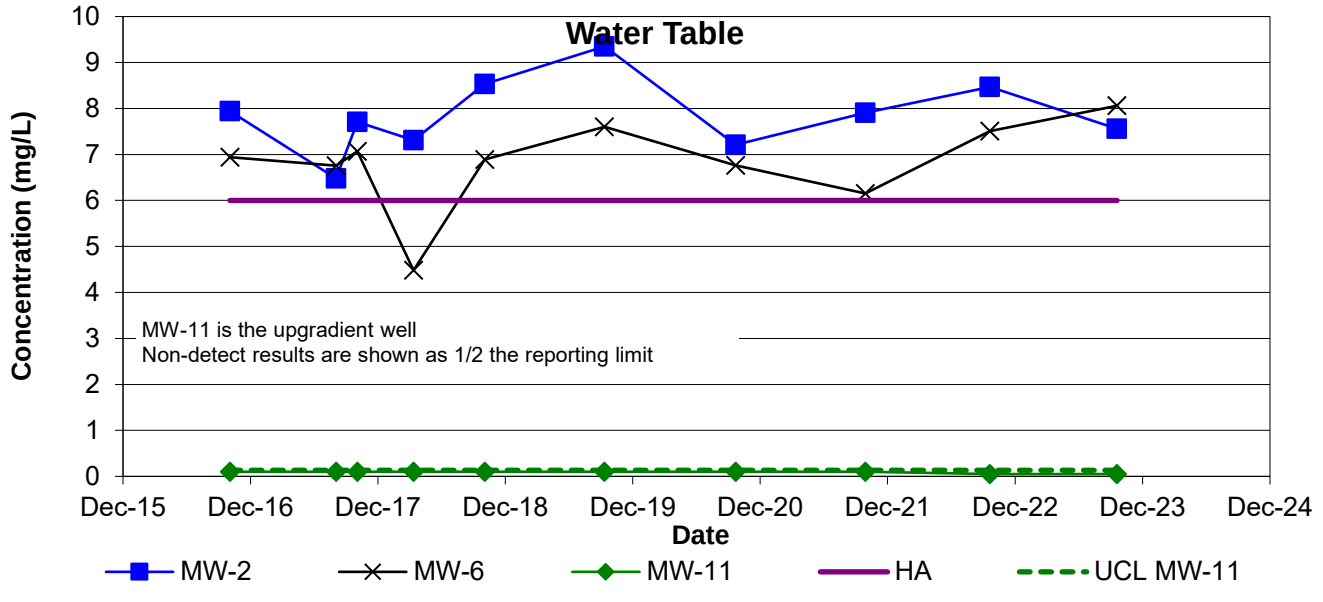
Graphs of Analytical and Monitoring Results

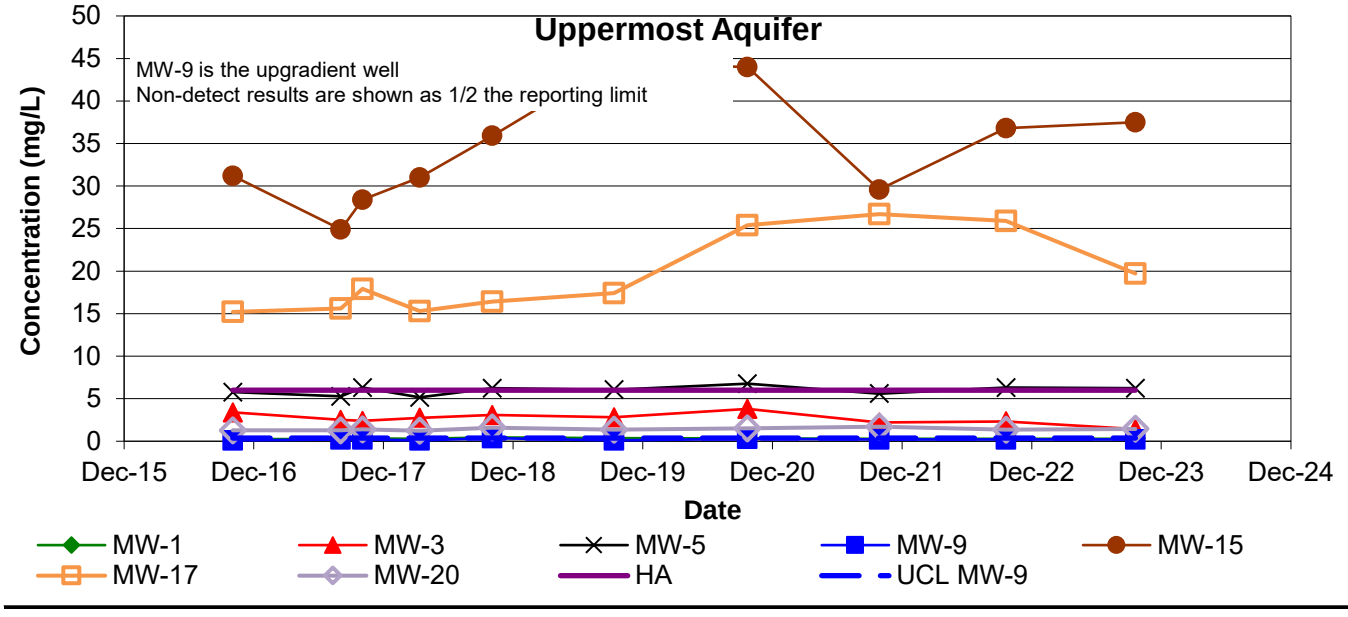
ARSENIC


Water Table
MW-11 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Concentration (mg/L)
0.012
0.010
0.008
0.006
0.004
0.002
0.000
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
MCL
UCL MW-11

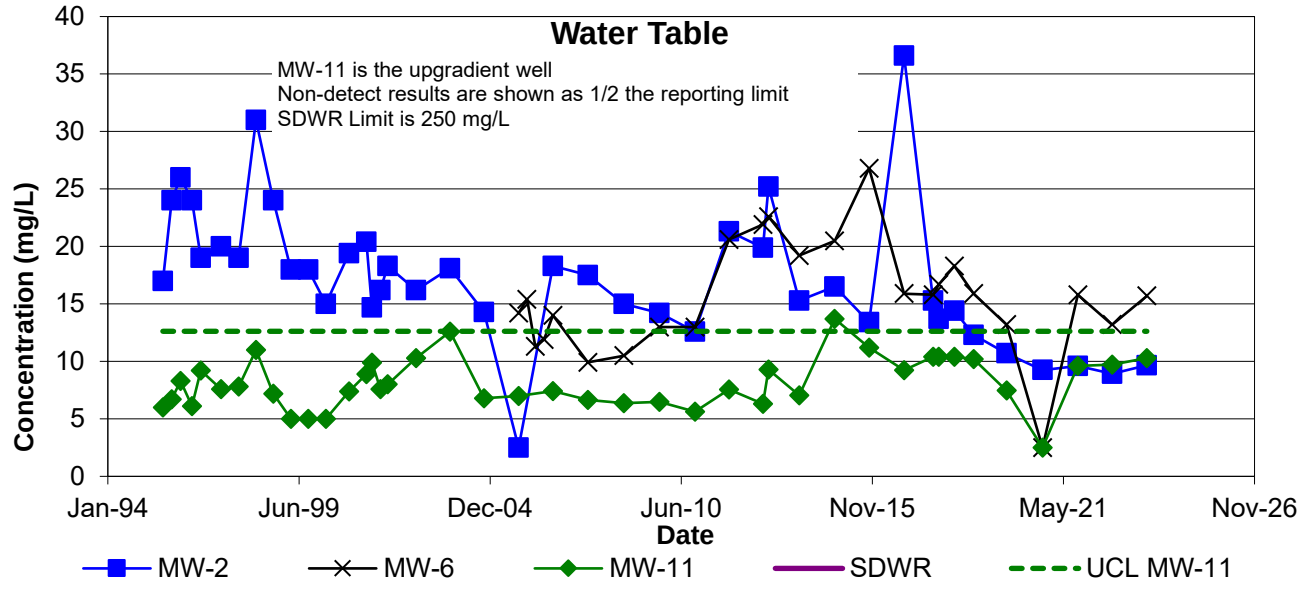

Uppermost Aquifer
MW-9 is the upgradient well.
Non-detect results are shown as 1/2 the reporting limit
Concentration (mg/L)
0.012
0.010
0.008
0.006
0.004
0.002
0.000
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
MCL
UCL MW-9

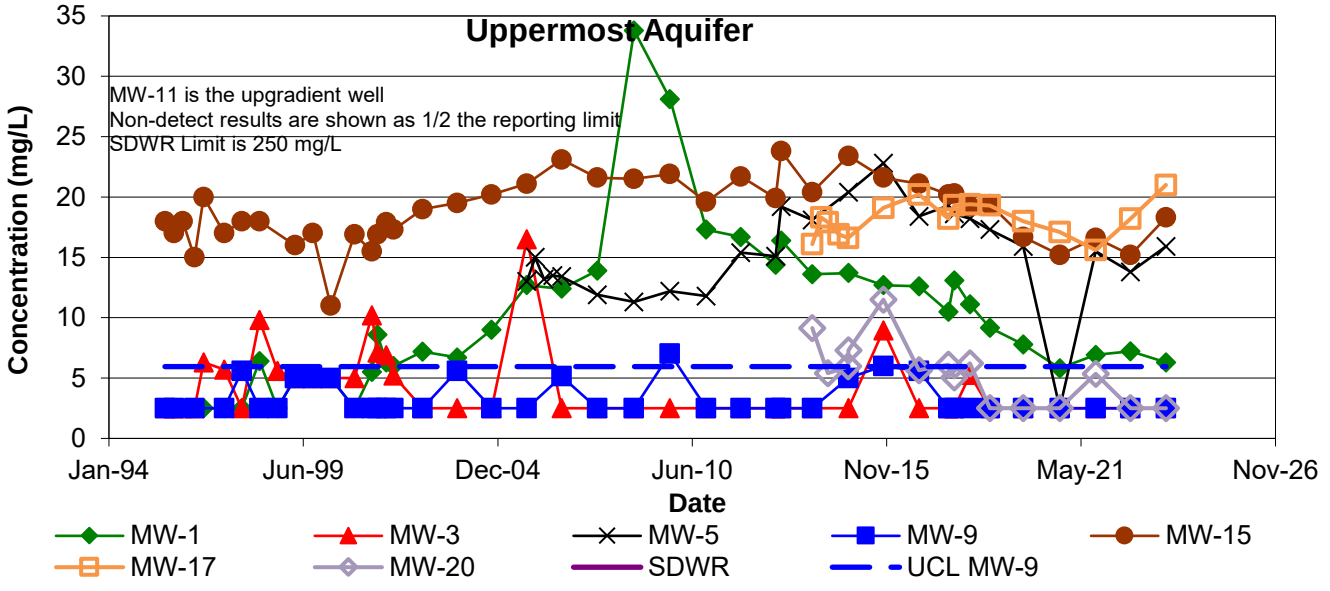
BORON


Water Table
Concentration (mg/L)
10
9
8
7
6
5
4
3
2
1
0
MW-11 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
HA
UCL MW-11

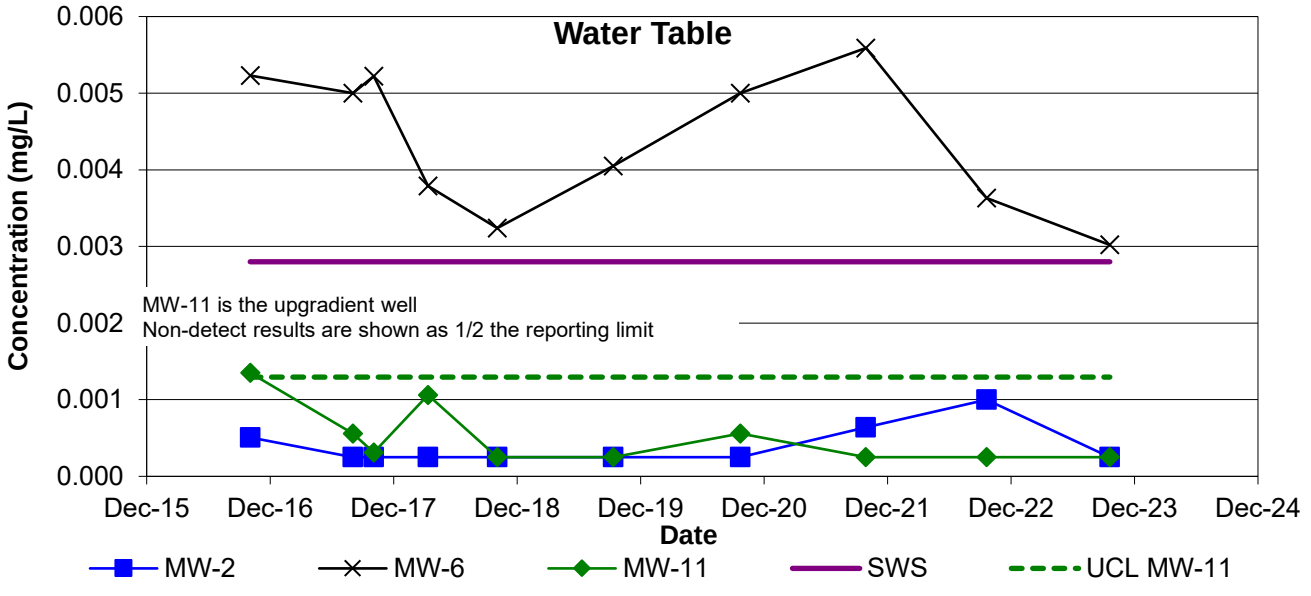

Uppermost Aquifer
Concentration (mg/L)
50
45
40
35
30
25
20
15
10
5
0
MW-9 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
HA
UCL MW-9

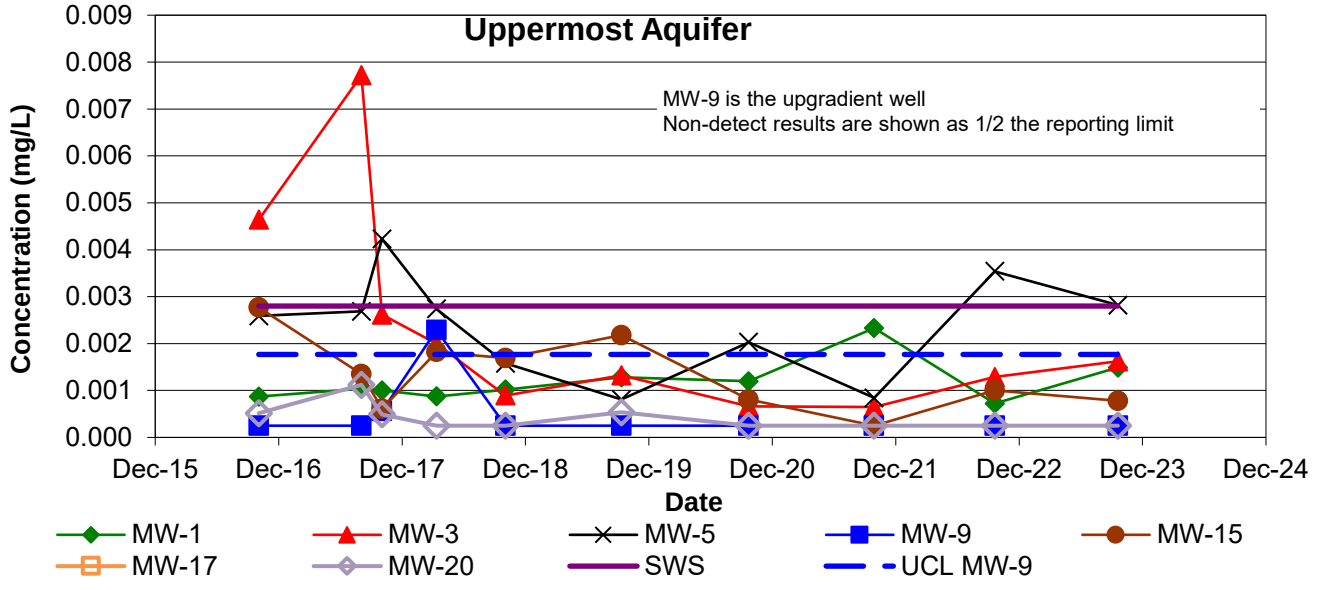
CHLORIDE


Water Table
MW-11 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
SDWR Limit is 250 mg/L
Concentration (mg/L)
0
5
10
15
20
25
30
35
40
Jan-94
Jun-99
Dec-04
Jun-10
Nov-15
May-21
Nov-26
Date
MW-2
MW-6
MW-11
SDWR
UCL MW-11

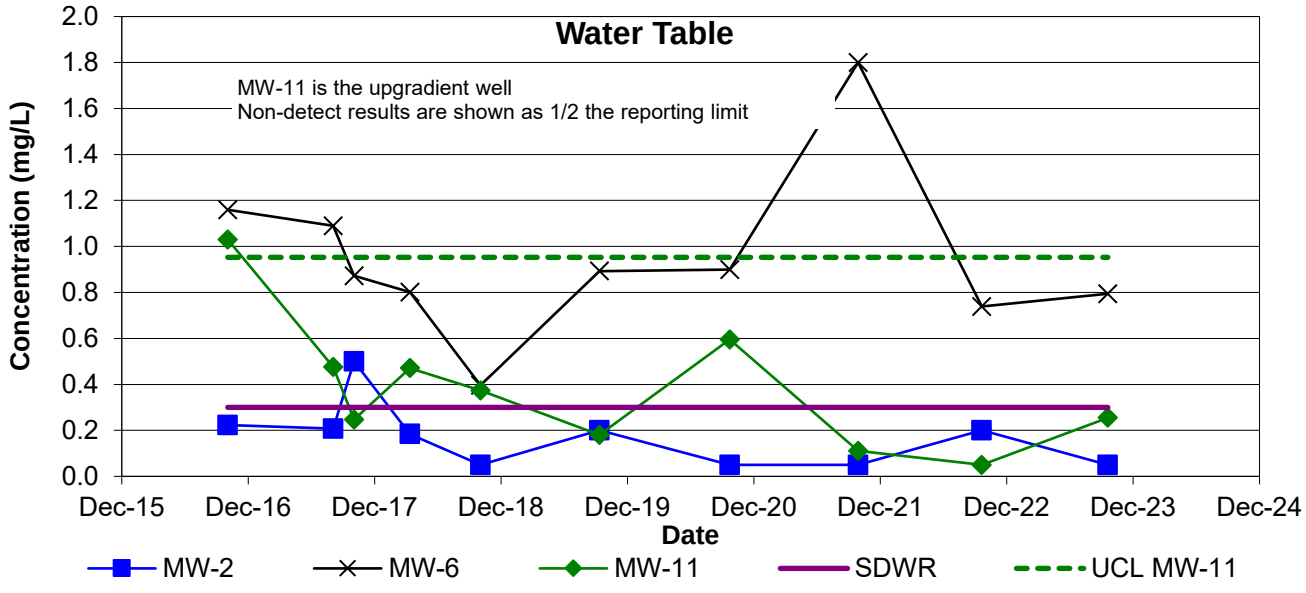

Uppermost Aquifer
MW-11 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
SDWR Limit is 250 mg/L
Concentration (mg/L)
0
5
10
15
20
25
30
35
Jan-94
Jun-99
Dec-04
Jun-10
Nov-15
May-21
Nov-26
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
SDWR
UCL MW-9

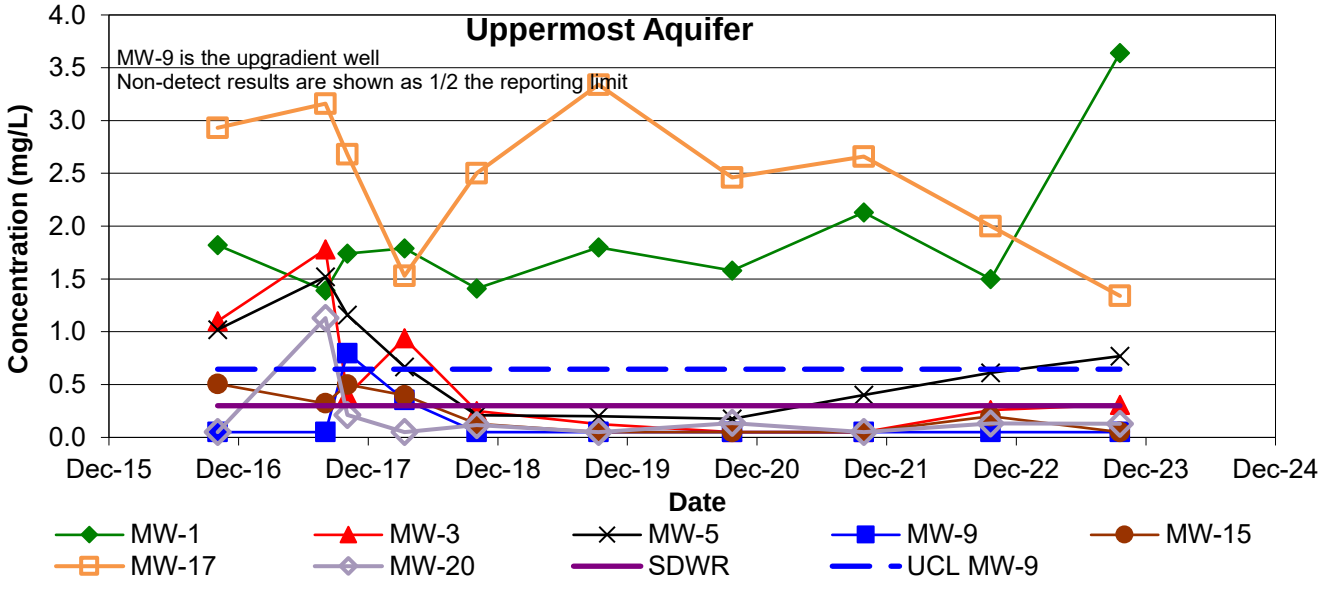
COBALT


Water Table
Concentration (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0.000
MW-11 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
SWS
UCL MW-11

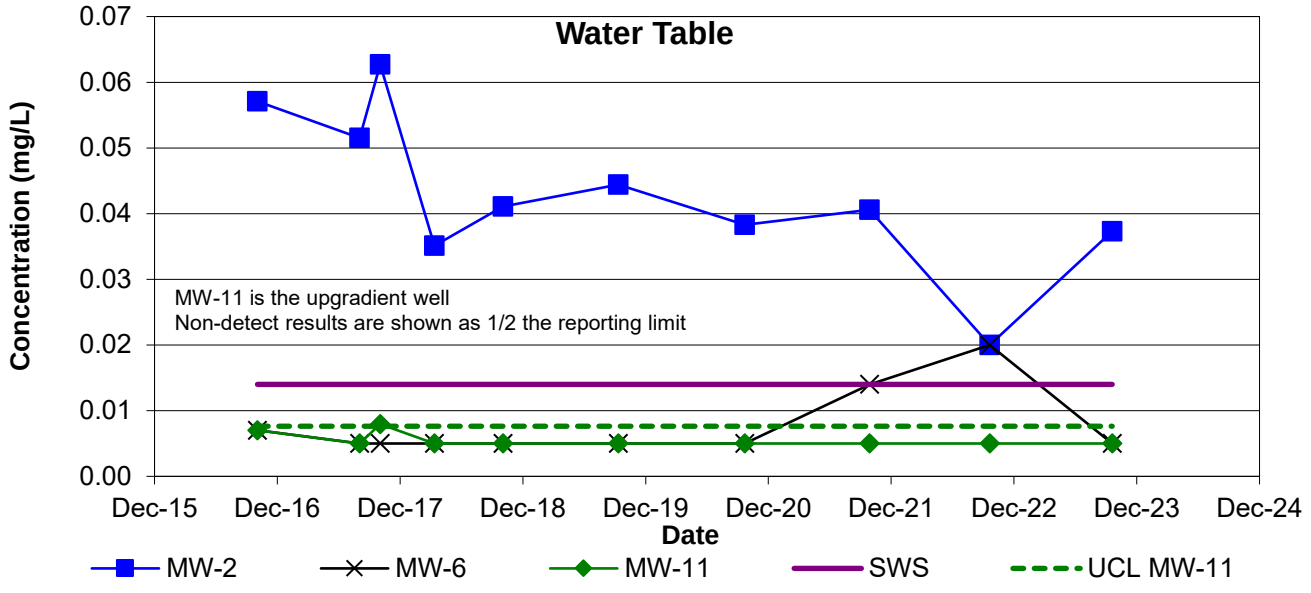

Uppermost Aquifer
Concentration (mg/L)
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
MW-9 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
SWS
UCL MW-9

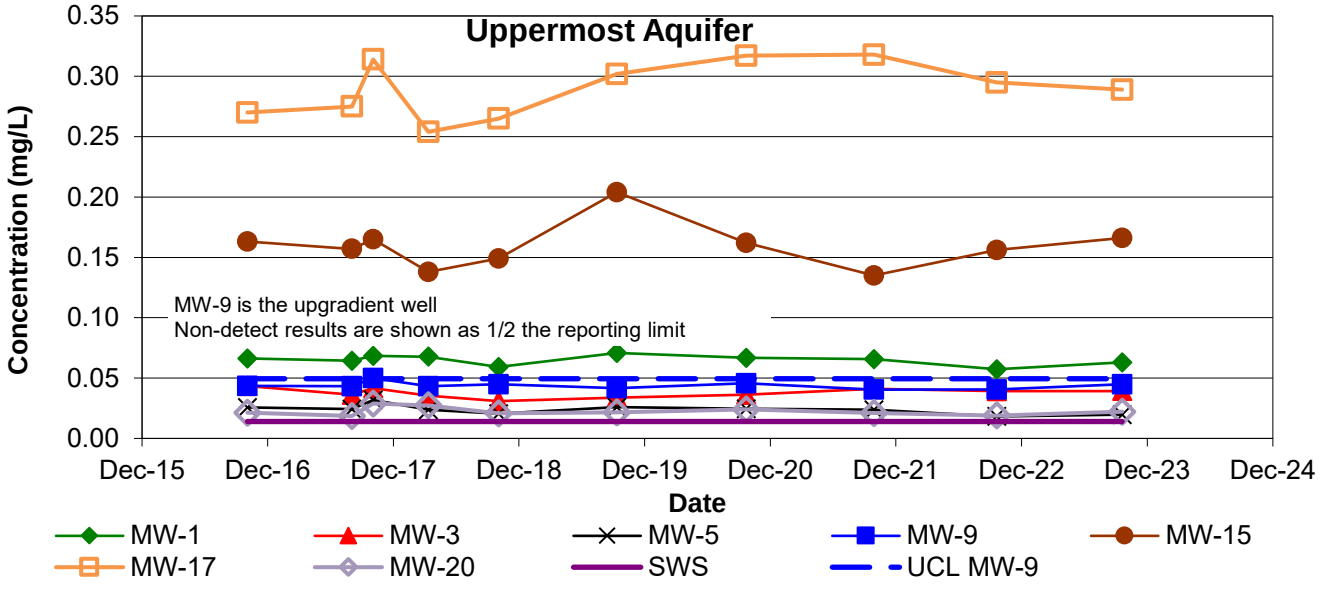
IRON


Water Table
MW-11 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Concentration (mg/L)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
SDWR
UCL MW-11

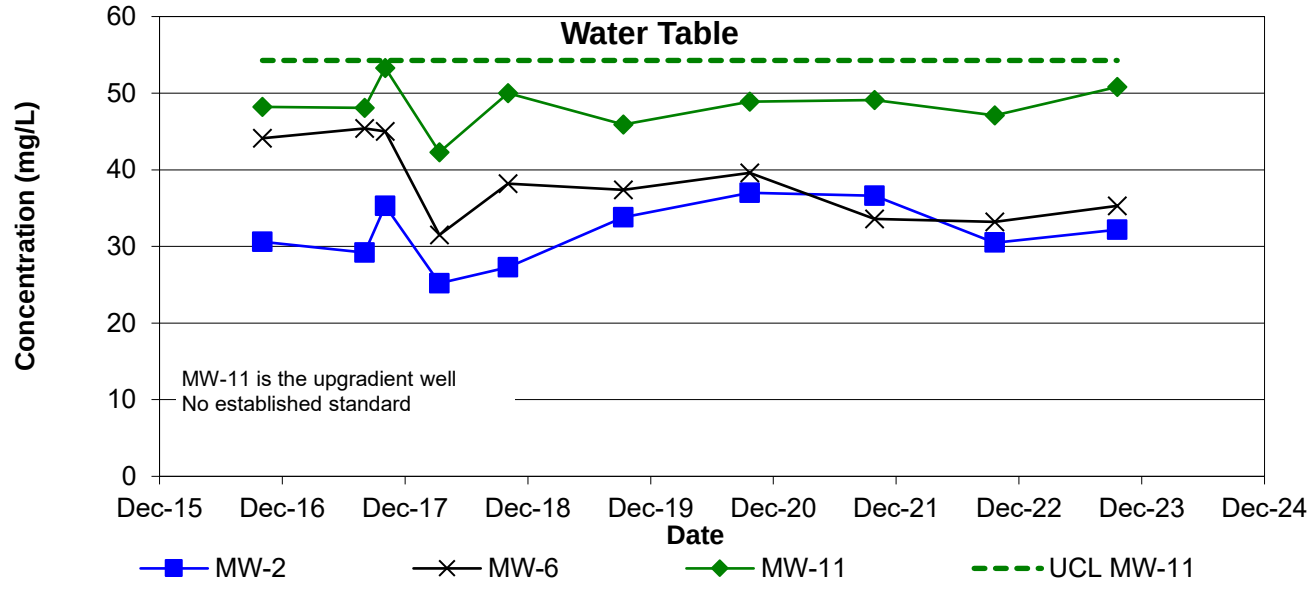

Uppermost Aquifer
MW-9 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Concentration (mg/L)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
SDWR
UCL MW-9

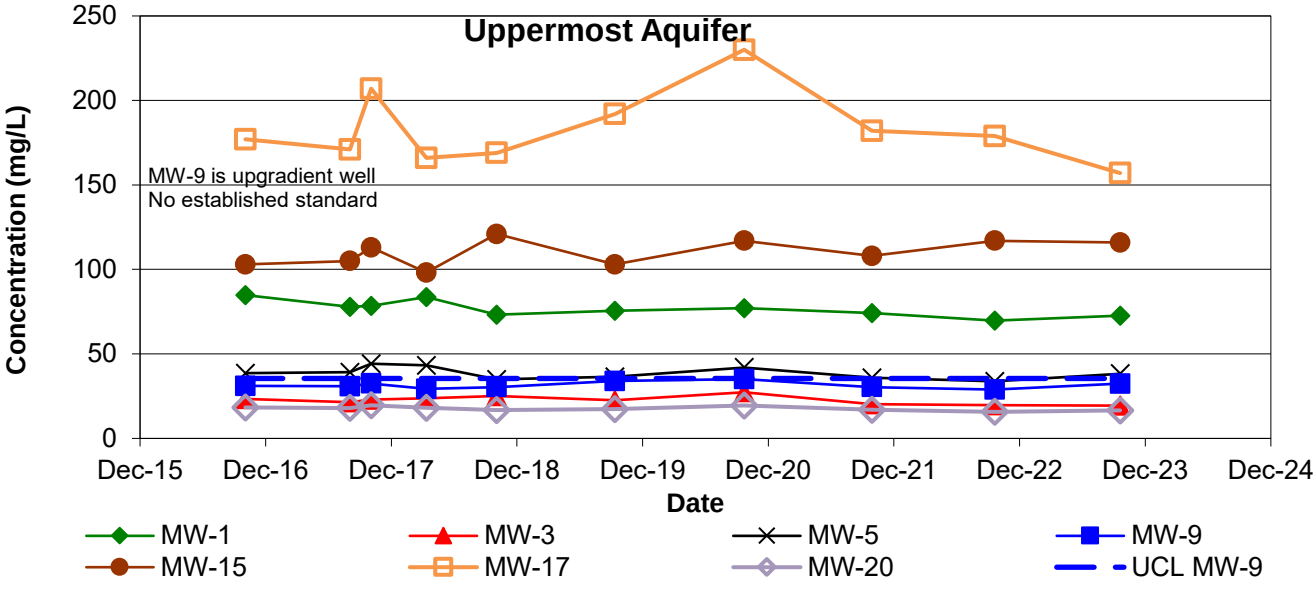
LITHIUM


Water Table
Concentration (mg/L)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
MW-11 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
SWS
UCL MW-11

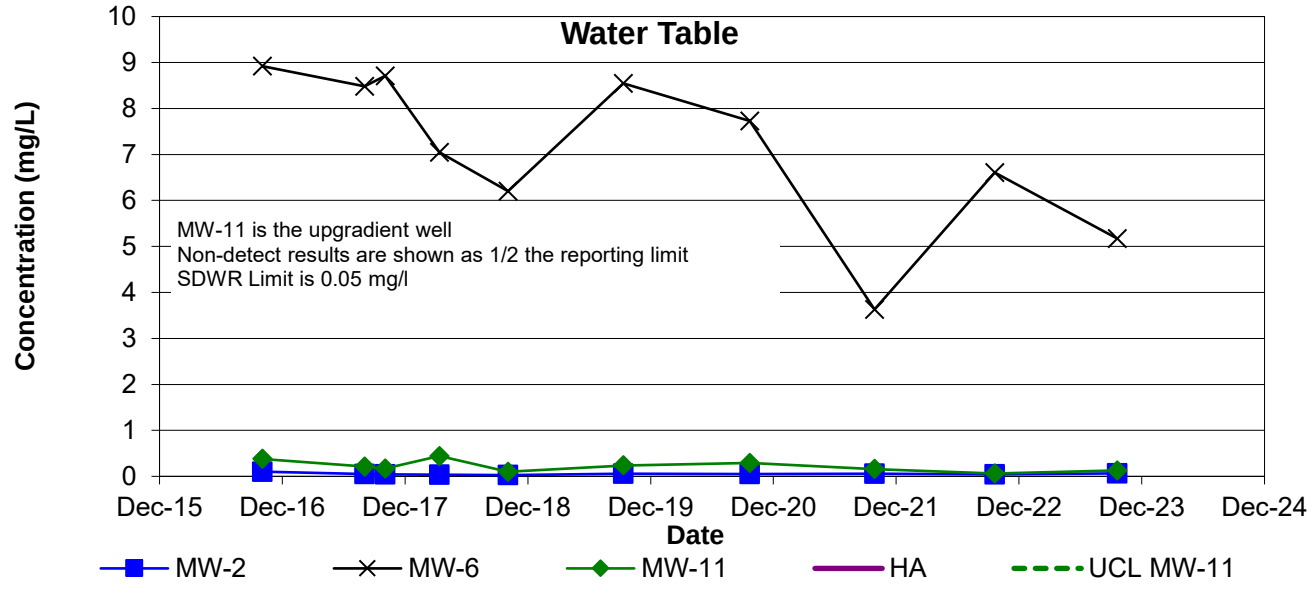

Uppermost Aquifer
Concentration (mg/L)
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
MW-9 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
SWS
UCL MW-9

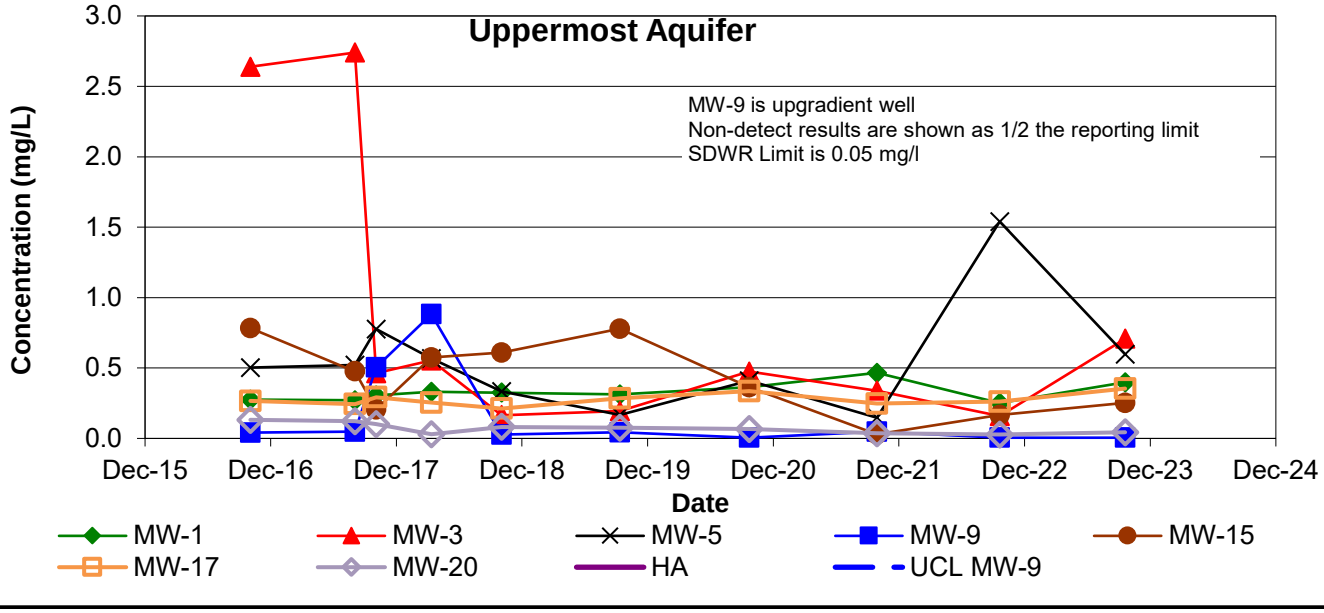
MAGNESIUM


Water Table
Concentration (mg/L)
60
50
40
30
20
10
0
MW-11 is the upgradient well
No established standard
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
UCL MW-11

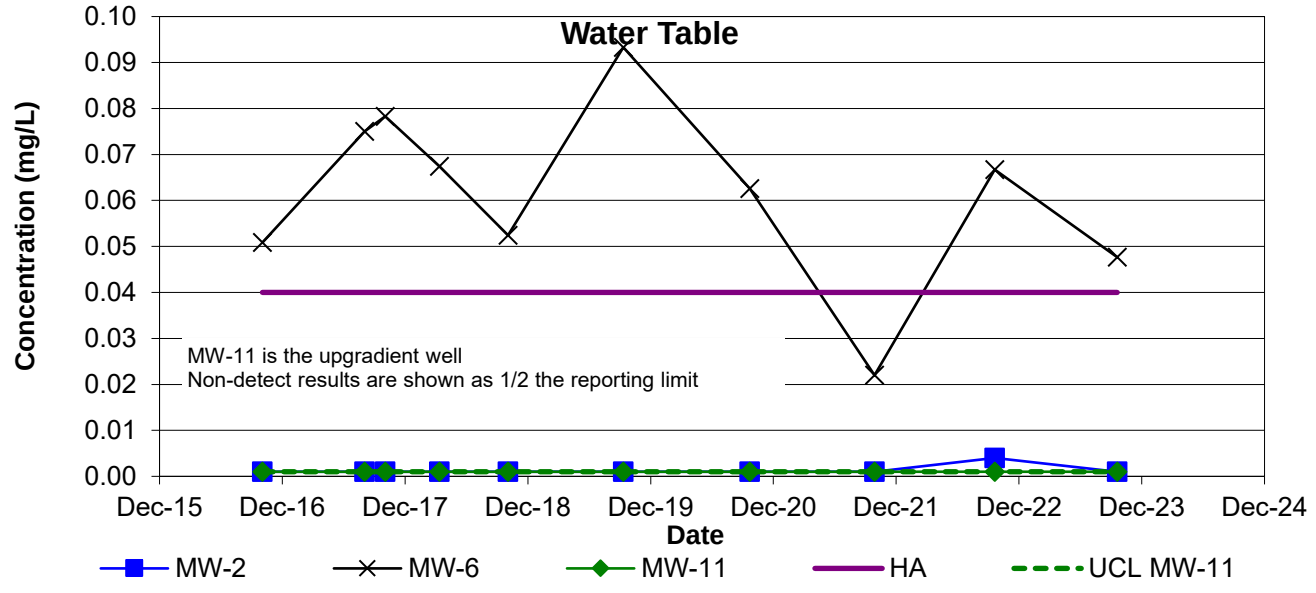

Uppermost Aquifer
Concentration (mg/L)
250
200
150
100
50
0
MW-9 is upgradient well
No established standard
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
UCL MW-9

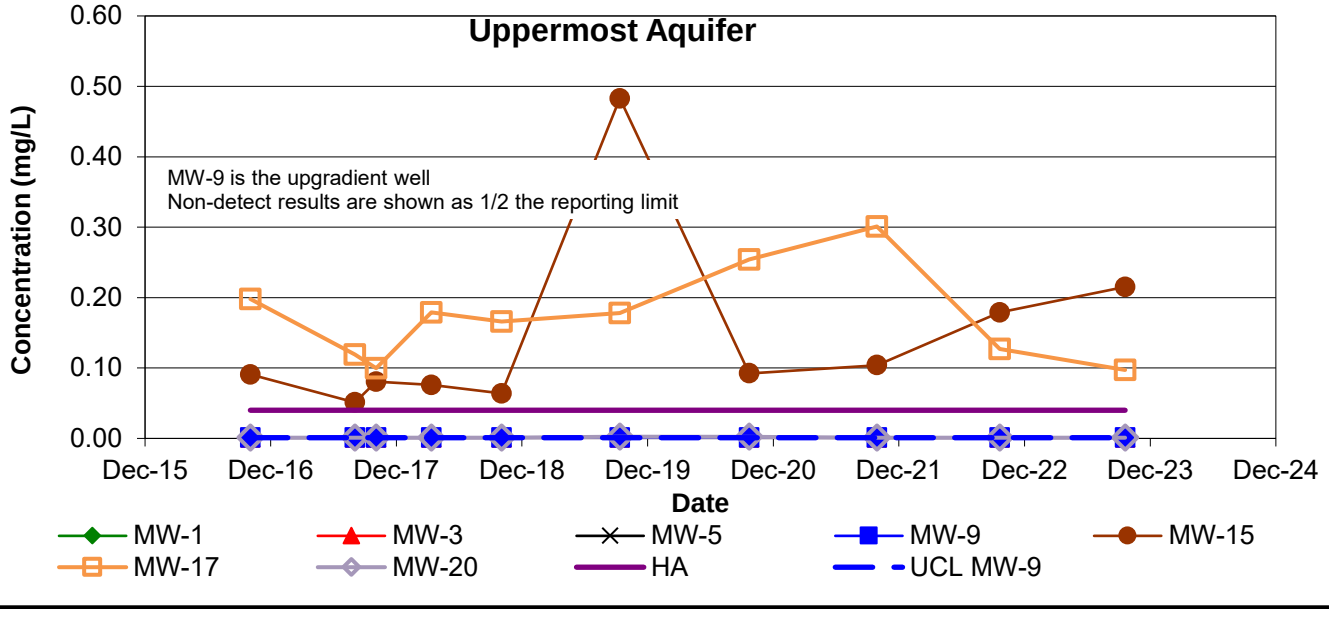
MANGANESE


Water Table
Concentration (mg/L)
10
9
8
7
6
5
4
3
2
1
0
MW-11 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
SDWR Limit is 0.05 mg/l
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
HA
UCL MW-11

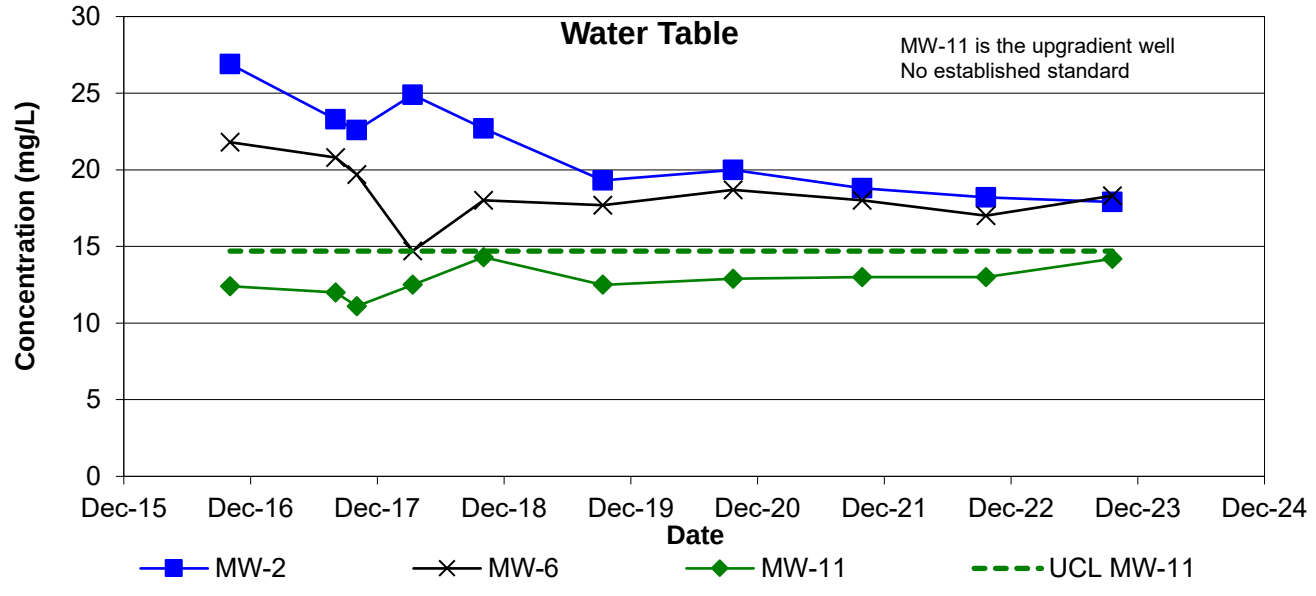

Uppermost Aquifer
Concentration (mg/L)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
MW-9 is upgradient well
Non-detect results are shown as 1/2 the reporting limit
SDWR Limit is 0.05 mg/l
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
HA
UCL MW-9

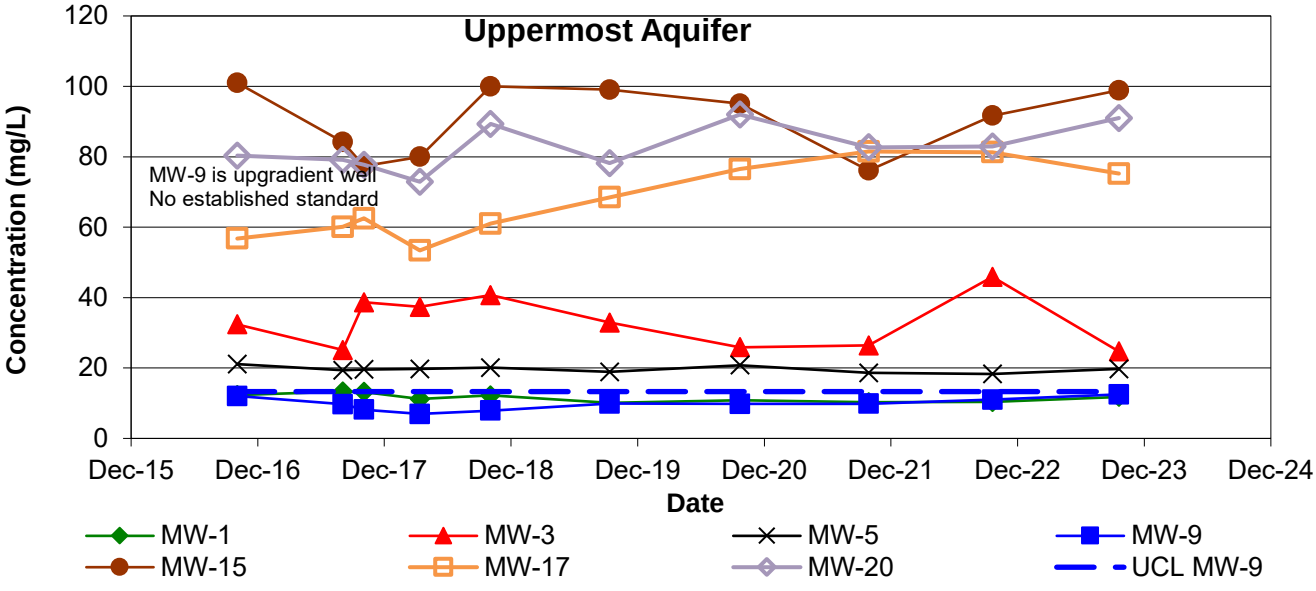
MOLYBDENUM


Water Table
Concentration (mg/L)
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
MW-11 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
HA
UCL MW-11

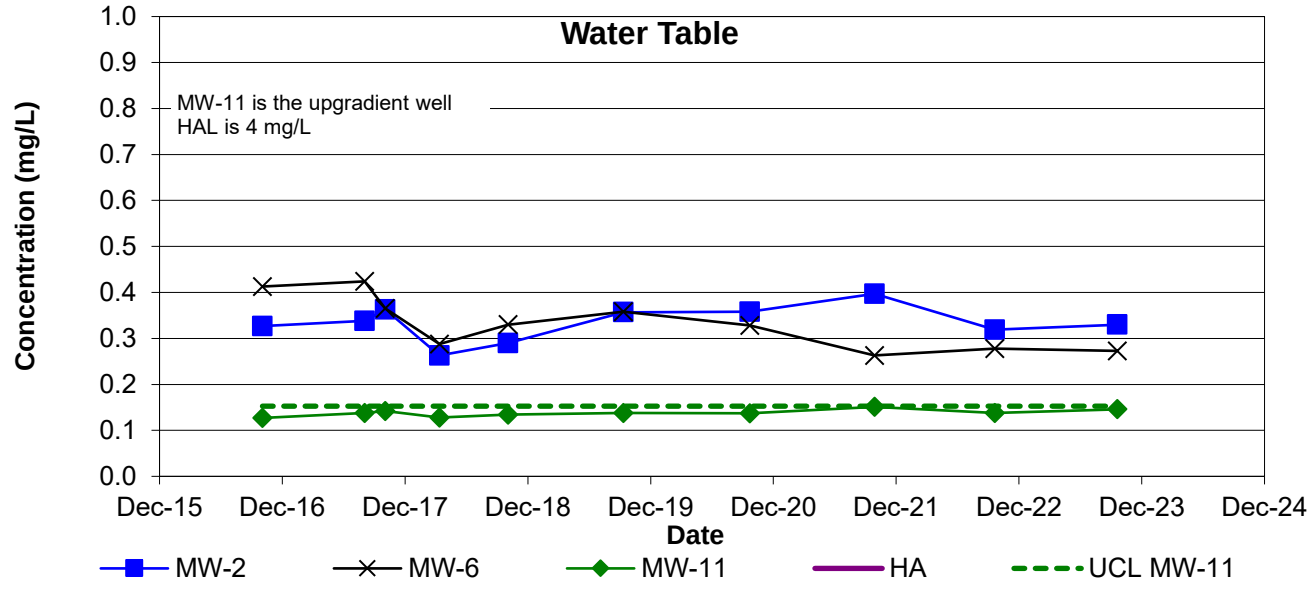

Uppermost Aquifer
Concentration (mg/L)
0.60
0.50
0.40
0.30
0.20
0.10
0.00
MW-9 is the upgradient well
Non-detect results are shown as 1/2 the reporting limit
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
HA
UCL MW-9

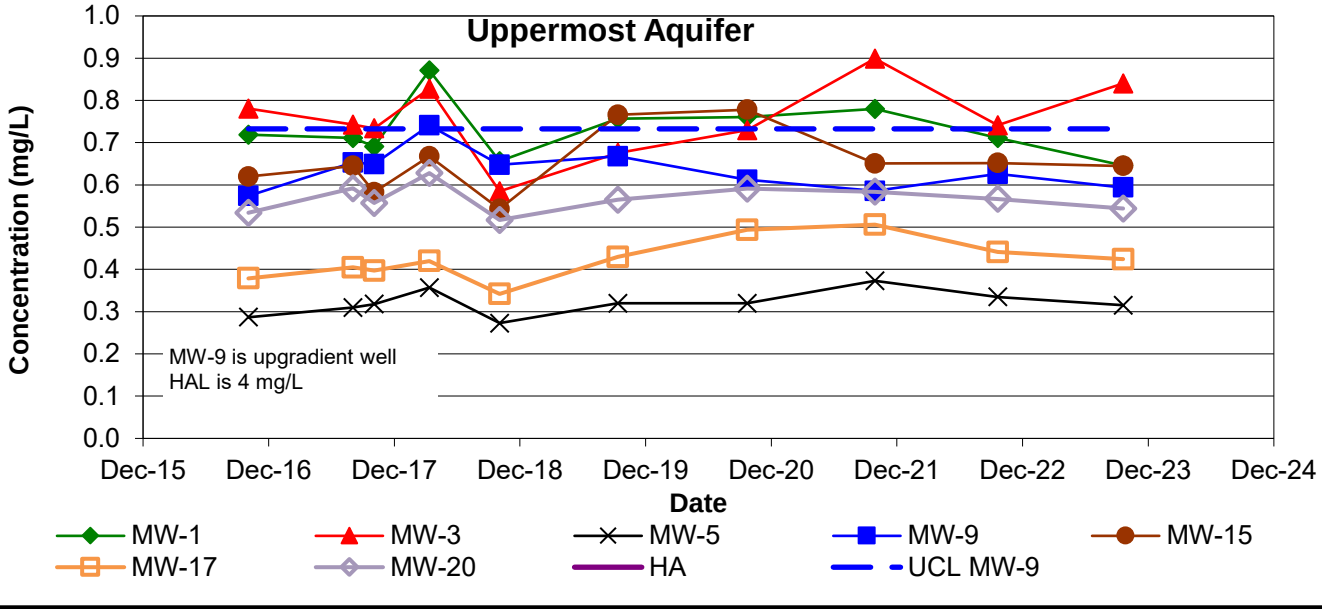
SODIUM


Water Table
MW-11 is the upgradient well
No established standard
Concentration (mg/L)
30
25
20
15
10
5
0
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
UCL MW-11

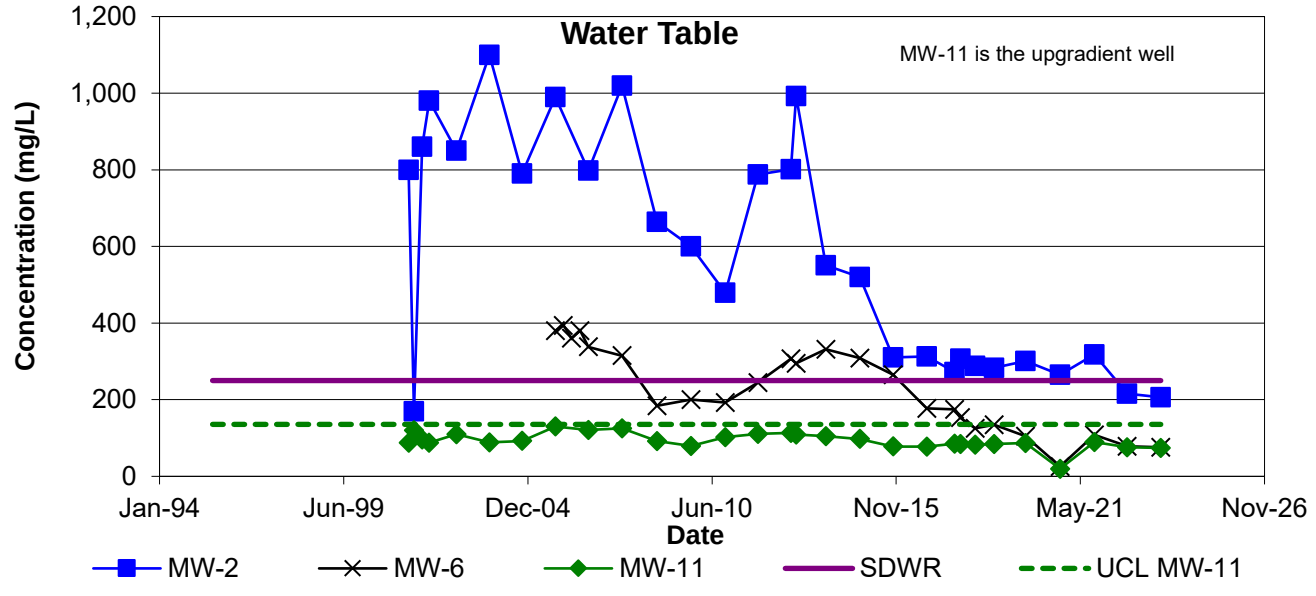

Uppermost Aquifer
MW-9 is upgradient well
No established standard
Concentration (mg/L)
120
100
80
60
40
20
0
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
UCL MW-9

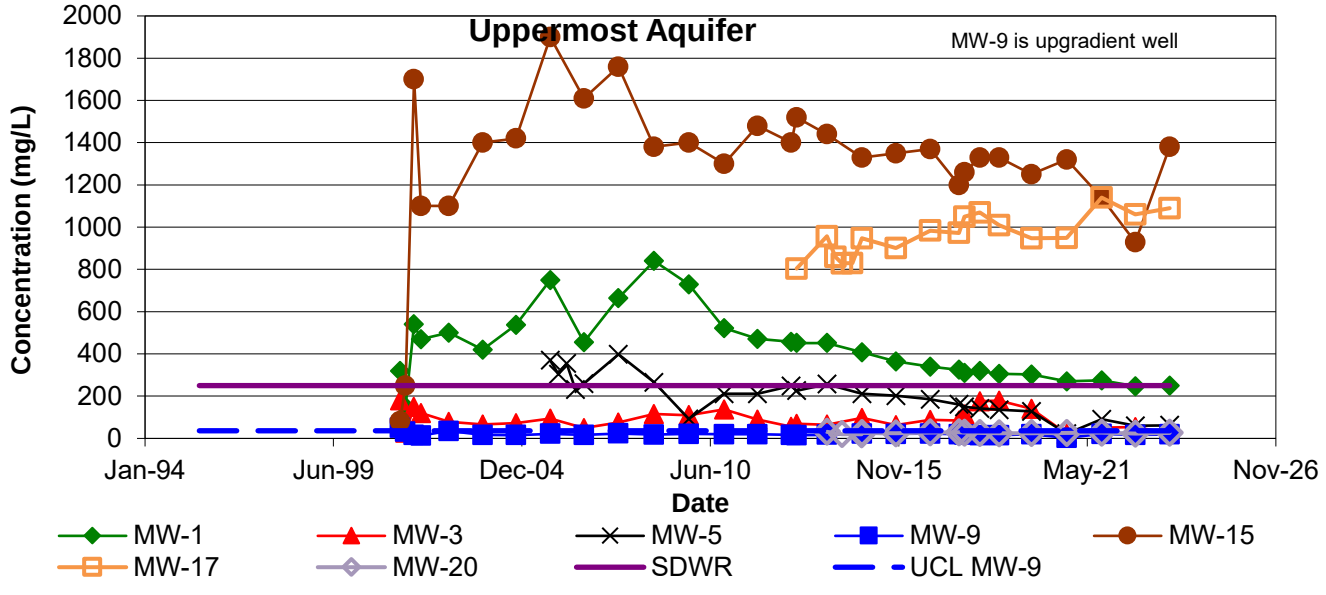
STRONTIUM


Water Table
MW-11 is the upgradient well
HAL is 4 mg/L
Concentration (mg/L)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-2
MW-6
MW-11
HA
UCL MW-11

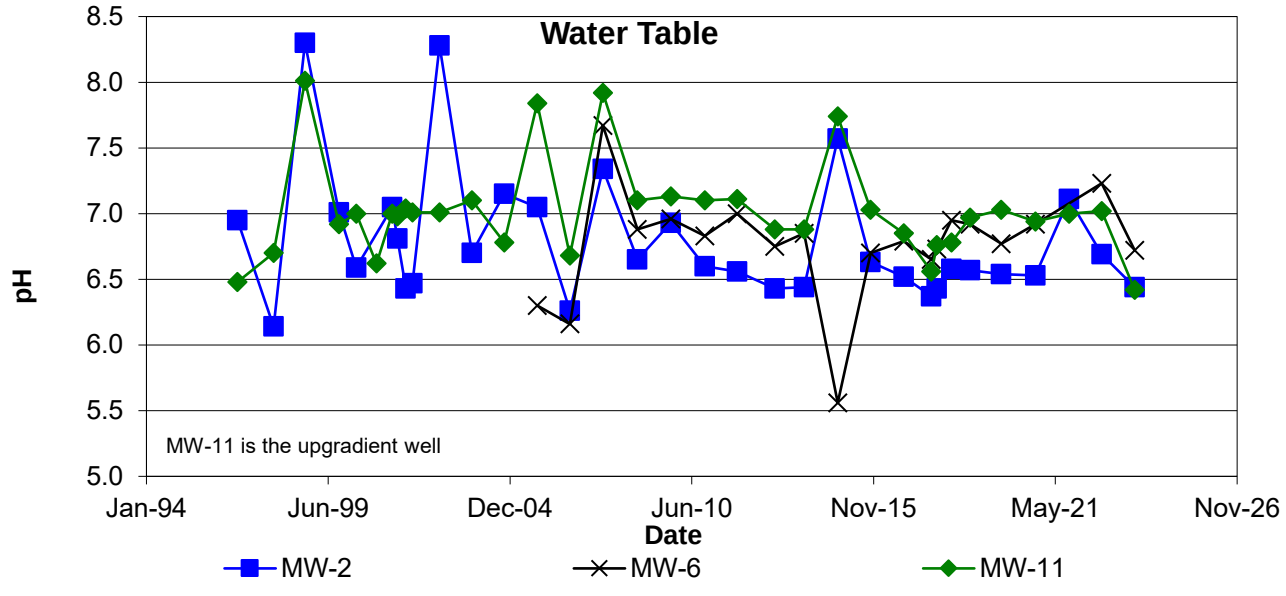

Uppermost Aquifer
MW-9 is upgradient well
HAL is 4 mg/L
Concentration (mg/L)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Dec-21
Dec-22
Dec-23
Dec-24
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
HA
UCL MW-9

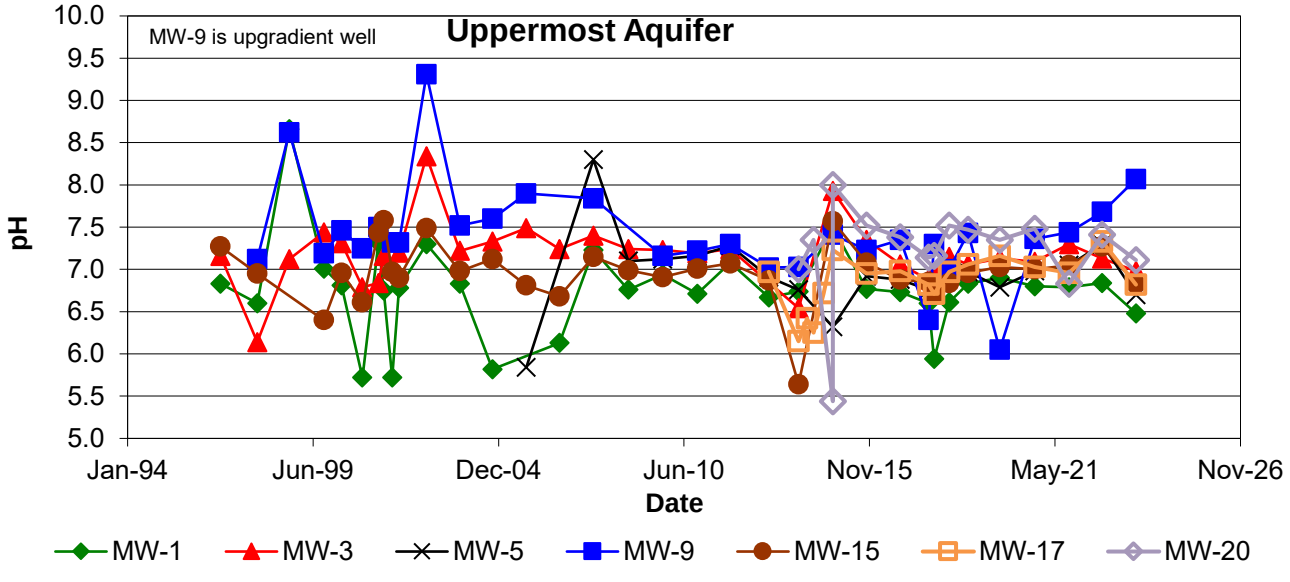
SULFATE


Water Table
MW-11 is the upgradient well
Concentration (mg/L)
1,200
1,000
800
600
400
200
0
Jan-94
Jun-99
Dec-04
Jun-10
Nov-15
May-21
Nov-26
Date
MW-2
MW-6
MW-11
SDWR
UCL MW-11

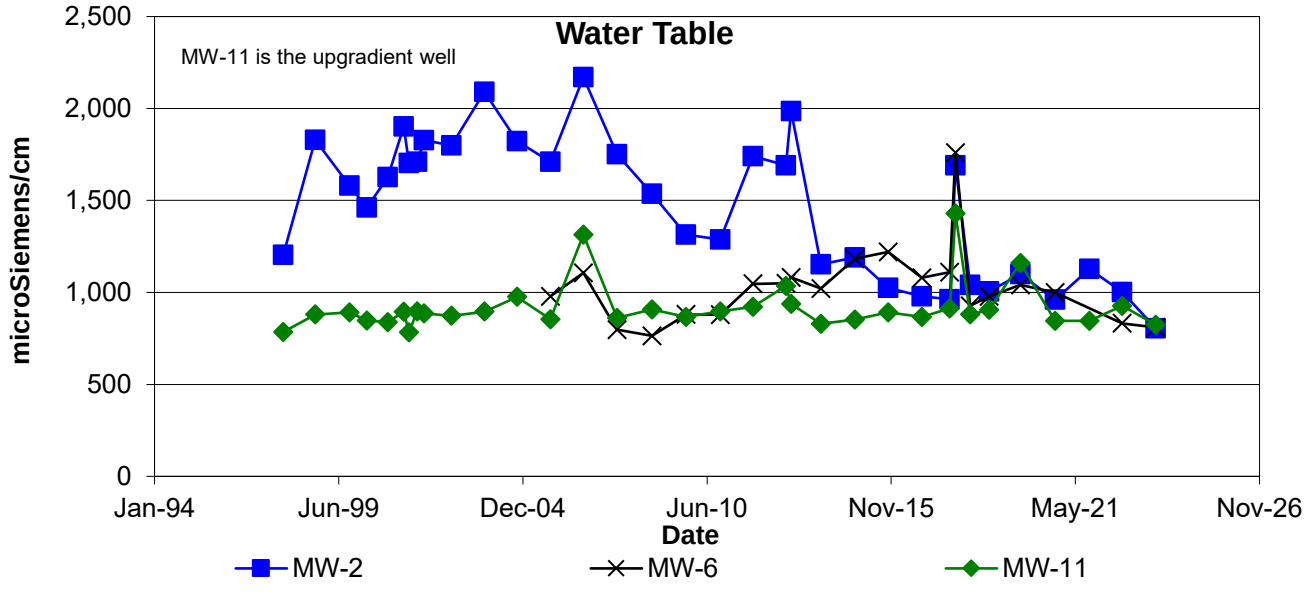

Uppermost Aquifer
MW-9 is upgradient well
Concentration (mg/L)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan-94
Jun-99
Dec-04
Jun-10
Nov-15
May-21
Nov-26
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20
SDWR
UCL MW-9

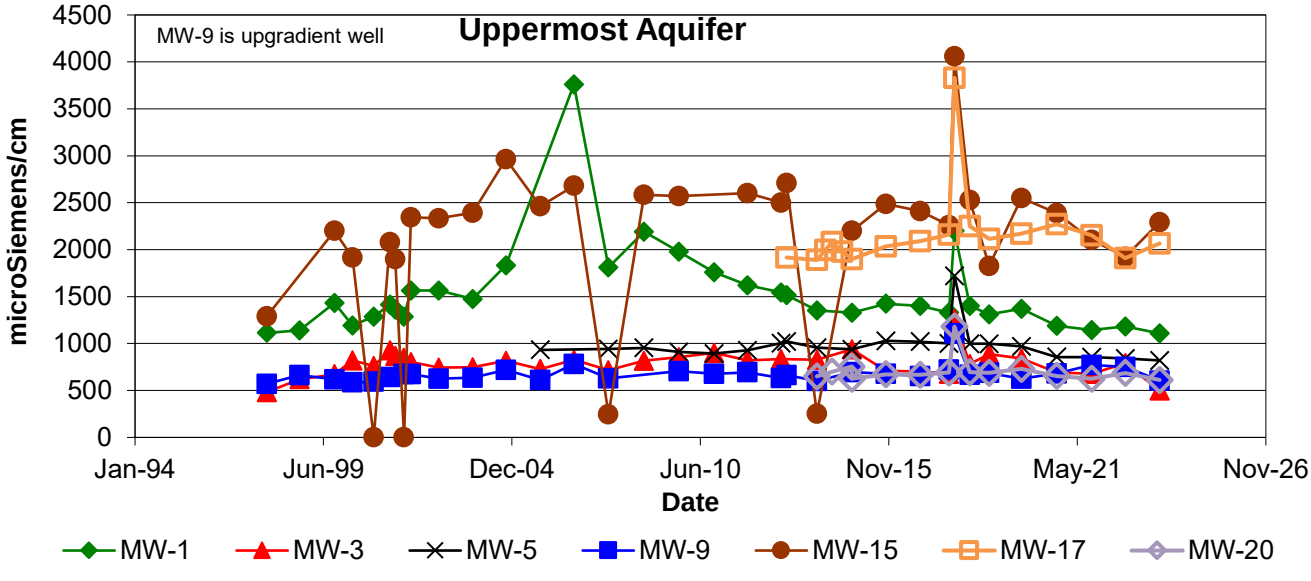
pH


Water Table
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
MW-11 is the upgradient well
Jan-94
Jun-99
Dec-04
Jun-10
Nov-15
May-21
Nov-26
Date
MW-2
MW-6
MW-11

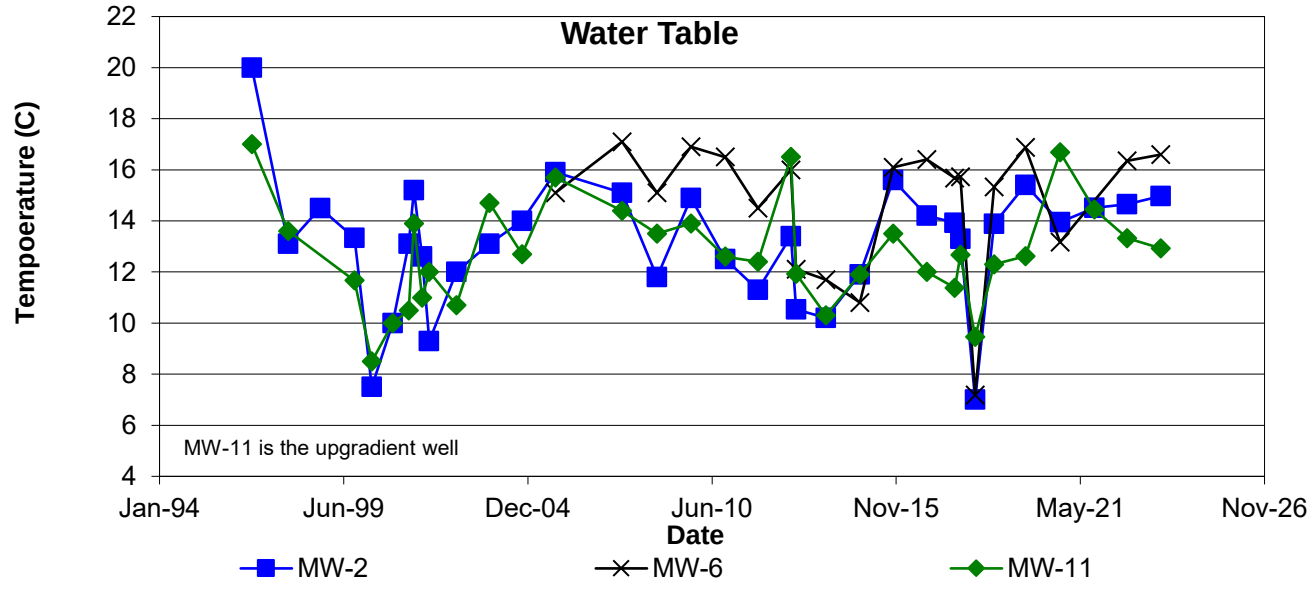

Uppermost Aquifer
MW-9 is upgradient well
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
pH
Jan-94
Jun-99
Dec-04
Jun-10
Nov-15
May-21
Nov-26
Date
MW-1
MW-3
MW-5
MW-9
MW-15
MW-17
MW-20

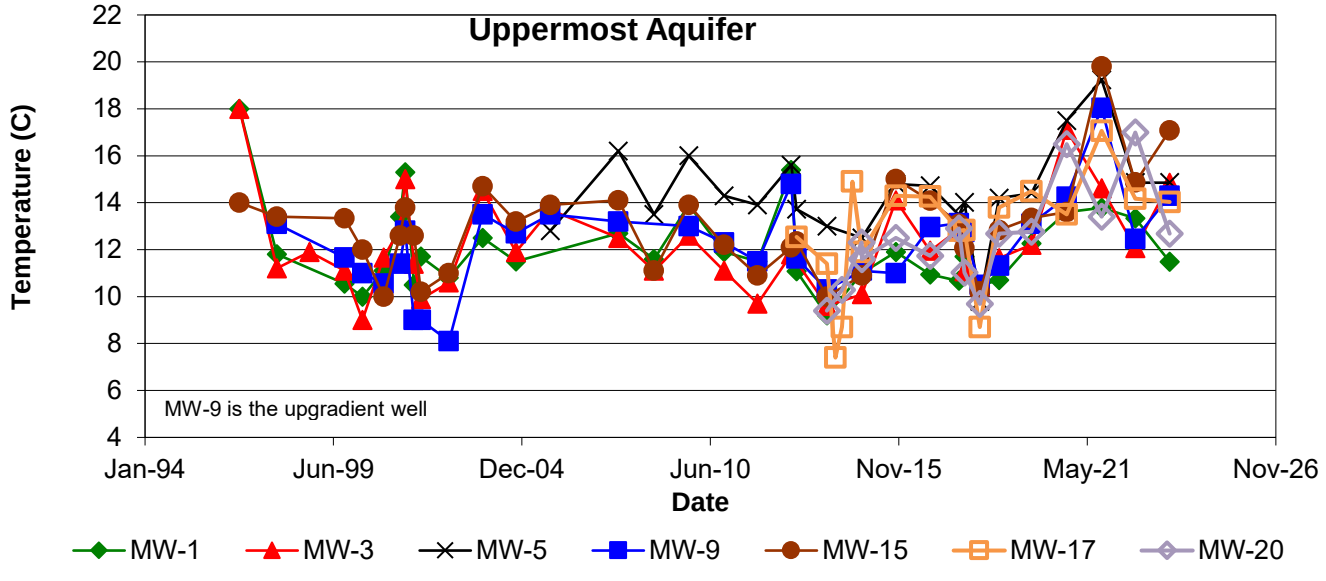
CONDUCTIVITY





TEMPERATURE





Appendix D

Inspection Summary

CIPCO
Central Iowa Power Cooperative
A Touchstone Energy® Cooperative

November 17, 2023

Mick Leat
Iowa Department of Natural Resources
Wallace State Office Building
502 East 9th Street, 4th Floor
Des Moines, IA 50319-0034

Dear Mick,

This letter has been prepared to provide a summary of monthly inspections complemented by Central Iowa Power Cooperative (CIPCO) of the closed Fair Station Coal Combustion Residue Landfill near Muscatine, Iowa.

BACKGROUND

2015 activities included: final capping of the ash, terrace, and rip-rap channel installation and seeding in September. Vegetation was started to be established in most areas by the end of 2015. Straw waddles were installed in areas of slow growth and areas at risk of washing out. The closure permit was issued February 1, 2016.

2023 Inspection Summary and Actions

The Flex-a-mat installed in 2022 on the steep slopes is proving to be an excellent solution with great vegetation growth that has minimized the erosion. The 2023 summer was dry not only in the Muscatine area but for much of Eastern Iowa. The vegetation remained in good shape throughout the year. A couple localized dry patches that were re-seeded are showing good growth. The site only required mowing twice this year.

The main maintenance items conducted were: re-work of the east rip-rap channel to reduce the surface runoff velocity and erosion, culvert clean out, sapling removal along the retainage ponds, fence repairs and general cleaning of the rip-rap channels. The Mississippi River backed up into Mosquito Creek in the spring, this flooding made its way into the low elevation portions of the property. The fence along Mosquito Creek will continue to be repaired following some additional tree clearing.

Clint Oberbroeckling of GHD conducted the annual well sampling on October 10th.

CIPCO will continue to monitor and maintain the CCR Landfill according to the IDNR standards.

Regards,
Sam Honold
CIPCO – Supervisor, Generation Engineering

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