

July 28, 2022  
File No. 27221400.00

Mr. Brian Trower  
Assistant Director – Electric Department  
Ames Municipal Electric System  
502 Carroll Avenue  
Ames, Iowa 50010

Subject: 2021-2022 Annual Groundwater Monitoring and Corrective Action Report  
Coal Combustion Residuals (CCR) Inactive Surface Impoundment

Dear Mr. Trower

On behalf of the City of Ames Municipal Electric System, SCS Engineers (SCS) is submitting this 2021-2022 Annual Groundwater Monitoring and Corrective Action Report for the Ames Municipal Electric System Inactive Coal Combustion Residuals (CCR) Surface Impoundment (Impoundment).

If you have any questions regarding this document, please contact the undersigned.

Sincerely,



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# 2021-2022 Annual Groundwater Monitoring and Corrective Action Report



City of Ames Municipal Electric System  
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**SCS ENGINEERS**

27221400.00 | July 28, 2022

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## 1.0 INTRODUCTION

This 2021-2022 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the “Coal Combustion Residuals (CCR) Final Rule” (Rule) published by the United States Environmental Protection Agency (USEPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule*, dated April 17, 2015 (USEPA, 2015), and subsequent revisions. The City of Ames Municipal Electric System CCR Ash Impoundment (Impoundment) is classified as an “inactive” CCR unit and is therefore regulated by the August 5, 2016, update to the Rule subject to the new language of 40 CFR 257.100(e). Owners and operators of inactive CCR surface impoundments subject to the provisions of the new 40 CFR 257.100(e)(5)(ii) were required to prepare an annual groundwater monitoring and corrective action report no later than August 1, 2019, and annually thereafter per 40 CFR 257.90(e).

Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90(e). Changes to the text of 40 CFR 257.90(e), based on the new 40 CFR 257.100(e), are shown in [brackets]. The applicable sections of the Rule are provided below in italics, followed by applicable information relative to the 2021-2022 Annual Groundwater Monitoring and Corrective Action Report for the City of Ames Municipal Electric System Inactive CCR Ash Impoundment.

### 1.1 § 257.90(e)(6) SUMMARY

*A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:*

#### 1.1.1 § 257.90(e)(6)(i) Initial Monitoring Program

*At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;*

At the start of the current annual reporting period (August 1, 2021), the Impoundment was operating under an assessment monitoring program in compliance with § 257.95.

#### 1.1.2 § 257.90(e)(6)(ii) Final Monitoring Program

*At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in § 257.95;*

At the end of the current annual reporting period (July 31, 2022), the Impoundment was operating under an assessment monitoring program in compliance with § 257.95.

#### 1.1.3 § 257.90(e)(6)(iii) Statistically Significant Increases

*If it was determined that there was a statistically significant increase over background for one or more constituents listed in Appendix III to this part pursuant to § 257.94(e):*

(A) Identify those constituents listed in Appendix III to this part and the names of the monitoring wells associated with such an increase; and

Monitoring Event	Monitoring Well	Constituent
Spring 2019	MW-104	Boron, Calcium, Chloride, Sulfate, TDS

(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.

The assessment monitoring program was initiated on November 13, 2019, and the initial assessment monitoring sampling event was performed on October 9, 2019.

#### 1.1.4 § 257.90(e)(6)(iv) Statistically Significant Levels

If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in Appendix IV to this part pursuant to § 257.95(g) include all of the following:

(A) Identify those constituents listed in Appendix IV to this part and the names of the monitoring wells associated with such an increase;

A statistically significant level above the groundwater protection standard was not identified.

(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;

Not applicable because a statistically significant level above the groundwater protection standard was not identified.

(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and

Not applicable because there was no assessment of corrective measures initiated for the CCR Unit.

(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.

Not applicable because there was no assessment of corrective measures initiated for the CCR Unit.

#### 1.1.5 § 257.90(e)(6)(v) Selection of Remedy

Whether a remedy was selected pursuant to § 257.97 during the current annual reporting period, and if so, the date of remedy selection; and

Not applicable because corrective measures are not required.

### 1.1.6 § 257.90(e)(6)(vi) Remedial Activities

*Whether remedial activities were initiated or are ongoing pursuant to § 257.98 during the current annual reporting period.*

Not applicable because corrective measures are not required.

## 2.0 §257.90(E) ANNUAL REPORT REQUIREMENTS

**Annual groundwater monitoring and corrective action report.** For [inactive] CCR surface impoundments, no later than [August 1, 2019], and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For [inactive] CCR surface impoundments, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than [August 1] of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by §257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

### 2.1 §257.90(e)(1) SITE MAP

*A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;*

A site map with an aerial image showing the Impoundment and background (or upgradient) and downgradient monitoring wells with identification numbers for the Impoundment groundwater monitoring program is provided as **Figure 1** in **Appendix A**.

### 2.2 §257.90(e)(2) MONITORING SYSTEM CHANGES

*Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;*

The Impoundment groundwater monitoring system was initially certified on April 15, 2019. No new monitoring wells were installed and no wells were decommissioned as part of the Impoundment groundwater monitoring program during this reporting period.

### 2.3 §257.90(e)(3) SUMMARY OF SAMPLING EVENTS

*In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;*

The sampling events during this reporting period are included in Table 1 below.

Table 1. 2021-2022 Sampling Event Summary

Date of Sample	Monitoring Program	Monitoring Points Sampled	Parameter List
October 1, 2021	Assessment	MW-101*, MW-102*, MW-103*, MW-104, MW-105, MW-106, MW-107, MW-108	Appendix III+
April 1, 2022	Assessment	MW-101*, MW-102*, MW-103*, MW-104, MW-105, MW-106, MW-107, MW-108	Appendix III & Appendix IV

Note: Appendix III+ denotes a sample was collected and analyzed for the Appendix III parameters plus those Appendix IV parameters that were detected during the previous sampling event.

\*: Upgradient monitoring well

The October 1, 2021, assessment monitoring samples were analyzed for Appendix III constituents and those Appendix IV constituents previously detected during the April 2021 sampling event on a well-specific basis. The April 1, 2022, assessment monitoring samples were analyzed for Appendix III and Appendix IV constituents.

The Appendix III and Appendix IV constituents are specified in both 40 CFR 257 and in Table 3 of the April 16, 2019, City of Ames CCR Groundwater Monitoring Sampling and Analysis Program report. An analytical data summary table is included in **Appendix B Table B-1**. The field data are summarized in **Appendix B Table B-2**.

## 2.4 §257.90(e)(4) MONITORING TRANSITION NARRATIVE

*A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and*

The Impoundment groundwater monitoring program transitioned from detection monitoring to assessment monitoring following the identification of verified statistically significant increases (SSIs) at MW-104 (boron, calcium, chloride, sulfate, and total dissolved solids) from the August 1, 2019, resampling event. Assessment monitoring sampling began on October 9, 2019. Assessment monitoring sampling is currently ongoing at the Impoundment.

## 2.5 §257.90(e)(5) OTHER REQUIREMENTS

*Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.*

A summary of potentially required information and the corresponding section of the Rule is provided in the following sections.

### 2.5.1 §257.90(e)

*For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year...*

*Status of Groundwater Monitoring and Corrective Action Program for the CCR Unit.*

The groundwater monitoring and corrective action program for the Impoundment is currently in assessment monitoring.

*Summary of Key Actions Completed.*

Detection monitoring resampling was completed on August 1, 2019. Statistical evaluation of the resampling event data identified five confirmed SSIs at MW-104, resulting in assessment monitoring program initiation, and the subsequent completion of seven assessment monitoring sampling events in October 2019, April 2020, May 2020, October 2020, April 2021, October 2021, and April 2022. Statistical evaluation of the assessment monitoring data identified various Appendix III and/or Appendix IV SSIs from each of the five assessment monitoring sampling events. None of the SSIs exceeded their respective groundwater protection standards at statistically significant levels (SSL). Since no SSLs have been identified, assessment of corrective measures and subsequent corrective action are not required for the Impoundment at this time.

*Description of Any Problems Encountered.*

No noteworthy problems were reported associated with the collection and laboratory analysis of groundwater samples and statistical evaluation of groundwater analytical data over the reporting period.

*Discussion of Actions to Resolve the Problems.*

Not applicable because no noteworthy problems were encountered.

*Projection of Key Activities for the Upcoming Year (August 2022-July 2023).*

Semiannual assessment monitoring groundwater sampling, analysis, and statistical evaluation will continue during the fall 2022 and spring 2023 of the upcoming reporting year. Verification sampling and alternative source demonstration(s) will be completed, if required. The 2022-2023 Groundwater Monitoring and Corrective Action Report will be prepared.

**2.5.2 §257.94(d)(3)**

*Demonstration providing the basis for an alternative monitoring frequency for detection monitoring and certification that it meets the requirements of this section.*

Not applicable because no alternative monitoring frequency for detection monitoring and certification was warranted.



### **2.5.3 §257.94(e)(2)**

*Demonstration that an alternative source other than the CCR unit caused the statistically significant increase (SSI) over background or that the SSI was caused by an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. In addition, certification of the demonstration is to be included in the annual report.*

Not applicable because no such demonstration was warranted.

### **2.5.4 §257.95(b)**

*Within 90 days of triggering an assessment monitoring program, and annually thereafter, the owner or operator of the CCR unit must sample and analyze the groundwater for all constituents listed in appendix IV to this part.*

The assessment monitoring program was triggered on August 15, 2019, after analytical results from the August 1, 2019, resampling event were received and statistical analyses performed identifying SSIs. The first assessment monitoring sampling event was conducted within 90 days on October 9, 2019. During the first assessment monitoring event, each Impoundment groundwater monitoring network well was sampled and analyzed for Appendix IV constituents.

### **2.5.5 §257.95(c)(3)**

*Demonstration providing the basis for an alternative monitoring frequency for assessment monitoring and certification that it meets the requirements of this section.*

Not applicable because no alternative monitoring frequency for assessment monitoring and certification was pursued.

### **2.5.6 §257.95(d)(1)**

*Within 90 days of obtaining the results [from the initial and subsequent sampling events required in §257.95(B)], and on at least a semiannual basis thereafter, resample all wells that were installed pursuant to the requirements of §257.91, conduct analyses for all parameters in appendix III to this part and for those constituents in appendix IV to this part that are detected in response to §257.95(B), and record their concentrations in the facility operating record.*

The samples collected during the October 1, 2021, assessment monitoring sampling event were analyzed for the full list of Appendix III constituents and for the Appendix IV constituents previously detected during the April 1, 2021, sampling event on a well-specific basis. The samples collected during the April 1, 2022, assessment monitoring sampling event were analyzed for the full list of Appendix III and Appendix IV constituents.

### **2.5.7 §257.95(d)(3)**

*Include the concentrations of Appendix III and detected Appendix IV constituents from the assessment monitoring, the established background concentrations, and the established groundwater protection standards.*

Concentrations of Appendix III and Appendix IV constituents reported during this reporting period and established groundwater protection standards are included in **Appendix B Table**

**B-1.** Concentrations of Appendix III and Appendix IV constituents reported during the previous reporting year (2020-2021) are included in the 2020-2021 Annual Groundwater Monitoring and Corrective Action Report for the Impoundment.

### **2.5.8 §257.95(f)**

*If the concentrations of any constituent in appendices III and IV to this part are above background values, but all concentrations are below the groundwater protection standard established under §257.95(H), using the statistical procedures in §257.93(g), the owner or operator must continue assessment monitoring in accordance with this section.*

The Appendix III and Appendix IV constituents which were detected above background values during this reporting period were below their respective groundwater protection standards using statistical procedures in §257.93(g). Thus, the Impoundment will continue assessment monitoring.

### **2.5.9 §257.95(g)(3)(ii)**

*Demonstration that an alternative source other than the CCR unit caused the contamination, or that the SSI (during assessment monitoring) resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. In addition, certification of the demonstration is to be included in the annual report.*

Not applicable because no such demonstration was warranted.

### **2.5.10 §257.96(a)**

*Demonstration of the need for additional time to complete the assessment of corrective measures due to site-specific conditions or circumstances. In addition, certification of the demonstration is to be included in the annual report.*

Not applicable because an assessment monitoring alternative source demonstration was not required.

## **3.0 GENERAL COMMENTS**

This report has been prepared and reviewed under the direction of a qualified groundwater scientist and qualified professional engineer. The information contained in this report is a reflection of the conditions encountered at the City of Ames Municipal Electric System Inactive CCR Surface Impoundment at the time of fieldwork. This report includes a review and compilation of the required information and does not reflect any variations of the subsurface, which may occur between sampling locations. Actual subsurface conditions may vary and the extent of such variations may not become evident without further investigation.

Conclusions drawn by others from the result of this work should recognize the limitation of the methods used. Please note that SCS Engineers does not warrant the work of regulatory agencies or other third parties supplying information used in the assimilation of this report. This report is prepared in accordance with generally accepted environmental engineering and geological practices, within the constraints of the client's directives. It is intended for the exclusive use of the City of Ames Municipal Electric Systems for specific application to the Inactive CCR Surface Impoundment. No warranties, express or implied, are intended or made.

## Appendix A

Figure 1: Site Map


Figure 2: Potentiometric Surface Map (October 2021)

Figure 3: Potentiometric Surface Map (April 2022)

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N:\City of Ames IA\Projects\27218167.00\AutoCAD\Figure 3 CCR Ground Water Evaluation Wells.dwg Apr 10, 2019 - 9:55am Layout Name: Cross Sections By: 4470daw



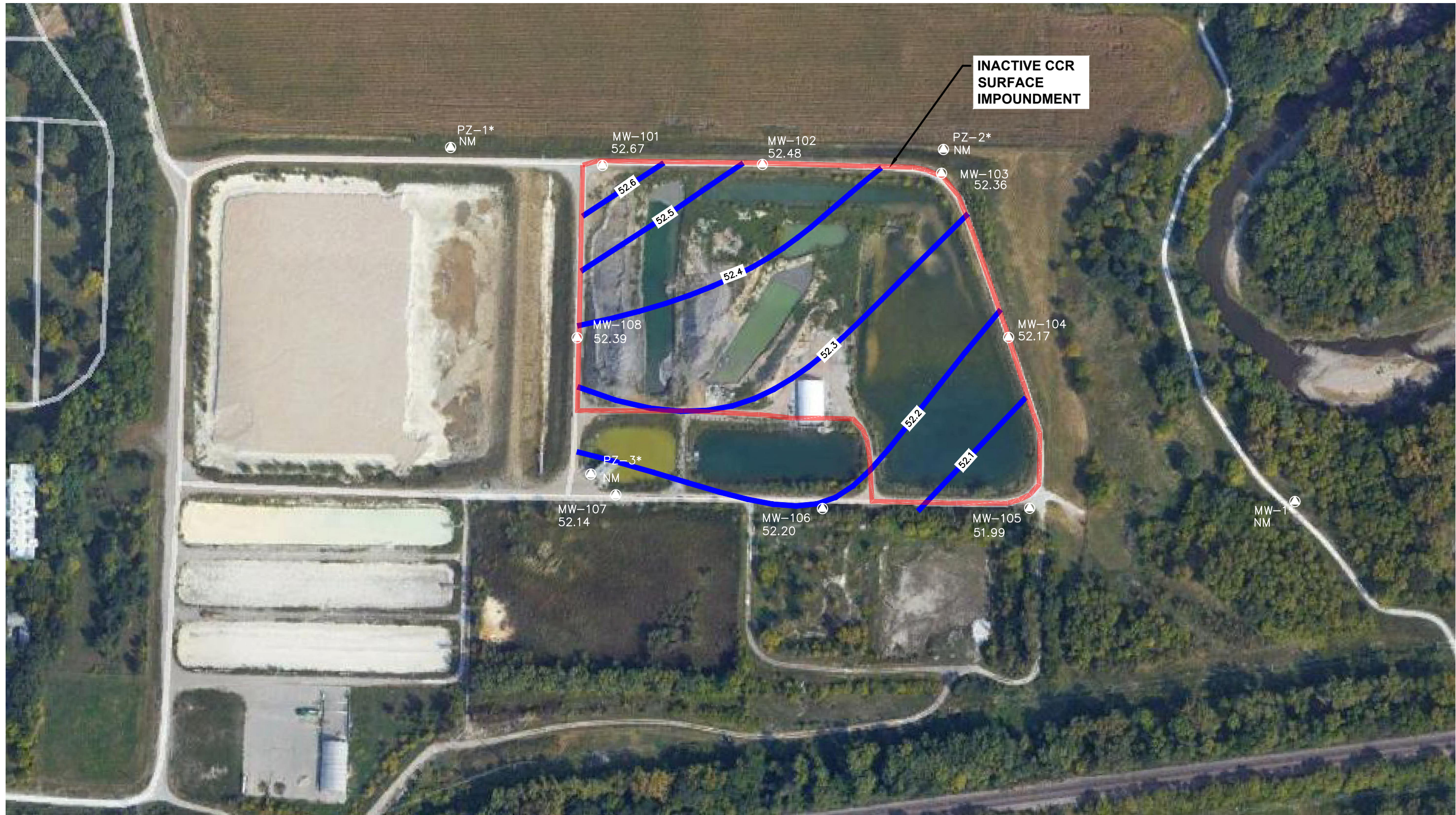
 MONITORING WELL OR PIEZOMETER

NOTE: PZ-1, PZ-2, PZ-3, and MW-1 ARE UTILIZED FOR GROUNDWATER LEVELS ONLY.

<b>SHEET TITLE</b> CCR GROUNDWATER WELLS		CK. BY _____ REV. DATE -
<b>PROJECT TITLE</b> ANNUAL GW MONITORING AND CAR INACTIVE CCR SURFACE IMPOUNDMENT		
<b>CLIENT</b> CITY OF AMES STEAM ELECTRIC PLANT AMES, IOWA		
<b>SCS ENGINEERS</b> 8650 HICKMAN ROAD, SUITE 20 AMES, IOWA 50010 PH. (515) 831-6161		
CADD FILE: FIGURE 3 FOR GROUND WATER EVALUATION WELLS.DWG	DATE: 4/10/19	Q/A R/W BY: JRR DAW BY: JRR O/A BY: JRR PROJ. MGR: JRR
<b>Figure No.</b> <h1 style="text-align: center;">1</h1>		



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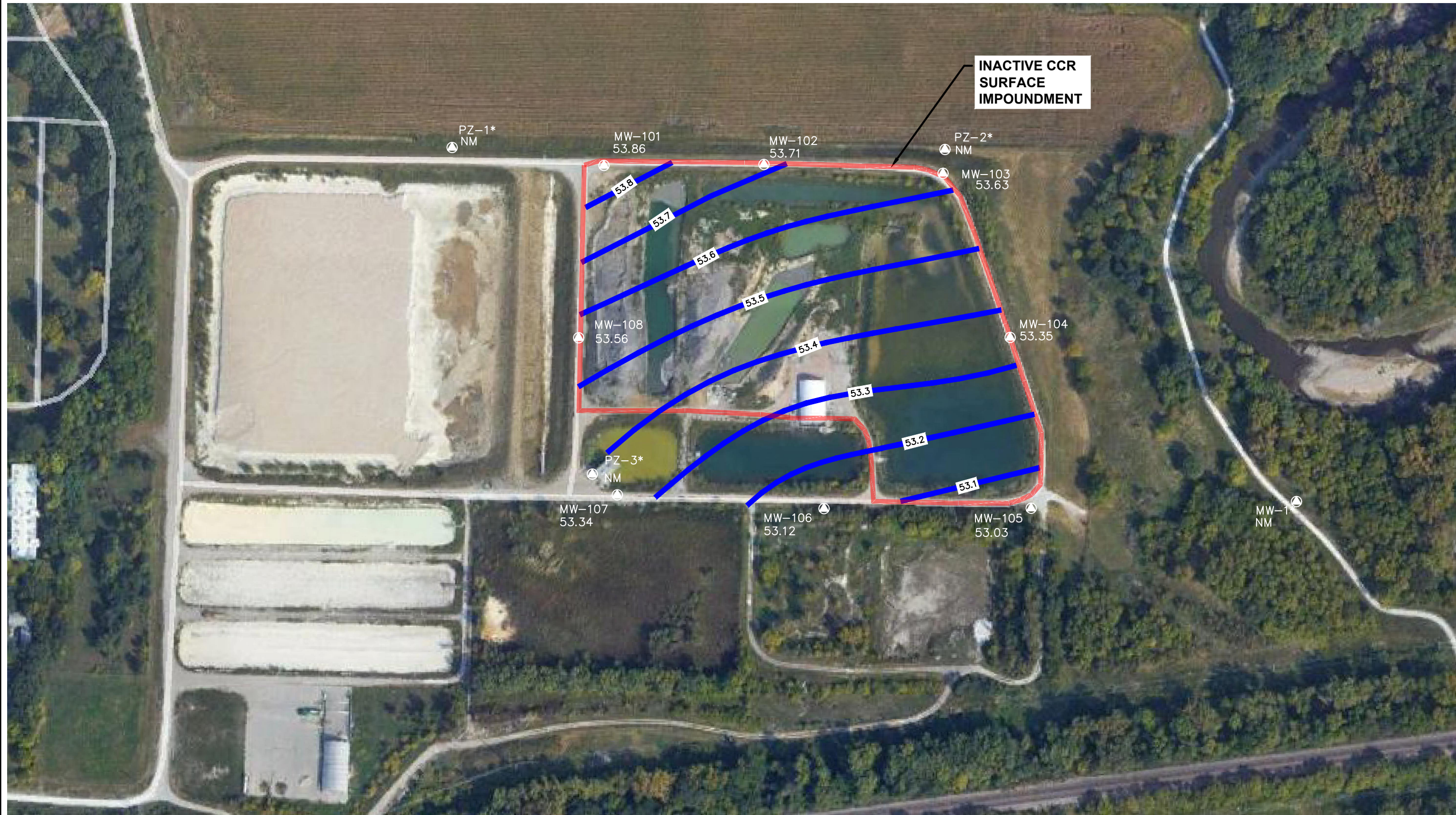
- MW-101 57.34 GROUNDWATER MONITORING WELL
- PZ-1\* NM PIEZOMETER (NOT USED)

**NOTE:**

1. NM - NOT MEASURED
2. GROUNDWATER ELEVATIONS IN RELATION TO THE PLANT DATUM BENCH MARK ON THE BRASS CAP ON TURBINE ROOM FLOOR NEAR UNIT NO 6 STAMPED 108.04. SUBTRACT CITY DATUM OF 832.55 FEET FROM STATE PLANE ELEVATIONS TO DETERMINE ELEVATIONS.

<b>SCS ENGINEERS</b> 8450 HICKMAN ROAD, SUITE 20 CLIVE, IOWA 50320 PH. (515) 631-6161	DWN. BY: ZEM CHK. BY: CLC JRR	Q/A RW BY: JRR PROJ. MGR: JRR	CADD FILE: PIEZOMETRIC SURFACE MAP_2021.10.01.DWG	REV. DATE - - - - -	CK. BY: - - - - -
	PROJ. NO. 27221400.00 DISK BY: JRR	DATE: 7/21/22	SHEET TITLE <b>PIEZOMETRIC SURFACE MAP (OCTOBER 1, 2021)</b>	PROJECT TITLE <b>ANNUAL GW MONITORING AND CAR INACTIVE CCR SURFACE IMPOUNDMENT</b>	CLIENT <b>CITY OF AMES STEAM ELECTRIC PLANT AMES, IOWA</b>

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**LEGEND:**

- MW-101 57.34 GROUNDWATER MONITORING WELL
- PZ-1\* NM PIEZOMETER (NOT USED)

**NOTE:**

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2. GROUNDWATER ELEVATIONS IN RELATION TO THE PLANT DATUM BENCH MARK ON THE BRASS CAP ON TURBINE ROOM FLOOR NEAR UNIT NO 6 STAMPED 108.04. SUBTRACT CITY DATUM OF 832.55 FEET FROM STATE PLANE ELEVATIONS TO DETERMINE ELEVATIONS.

<b>SCS ENGINEERS</b> 8450 HICKMAN ROAD, SUITE 20 CLIVE, IOWA 50320 PH. (515) 631-6161	DWN. BY: ZEM CHK. BY: CLC Q/A RW BY: JRR PROJ. MGR. JRR	CADD FILE: PIEZOMETRIC SURFACE MAP_2022.04.01.DWG	REV. DATE Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ	CK. BY: - DATE: -
	CLIENT <b>CITY OF AMES STEAM ELECTRIC PLANT</b> AMES, IOWA	SHEET TITLE <b>PIEZOMETRIC SURFACE MAP</b> (APRIL 1, 2022)	PROJECT TITLE <b>ANNUAL GW MONITORING AND CAR</b> <b>INACTIVE CCR SURFACE IMPOUNDMENT</b>	Figure No. <b>3</b>



## Appendix B

### Tables

Table B-1: Groundwater Monitoring Analytical Laboratory Results

Table B-2: Groundwater Monitoring Field Measurements





**Table B-2**  
**Inactive CCR Surface Impoundment**  
**Detection and Assessment Monitoring Groundwater Sample Field Measurements**  
**City of Ames Municipal Electric System**

Monitoring Well Number	Sample Date	pH	Specific Conductivity	Temperature	Turbidity	Groundwater Level	Groundwater Elevation
		S.U.	µs/cm	°C	NTU	ft btoc	ft amsl
MW-101	10/1/2021	7.16	717	13.40	1.90	24.32	876.13
	4/1/2022	7.25	695	11.10	5.00	23.13	877.32
MW-102	10/1/2021	7.23	694	12.80	2.60	23.90	875.94
	4/1/2022	7.30	645	10.70	1.00	22.67	877.17
MW-103	10/1/2021	7.25	651	12.40	0.20	24.71	875.82
	4/1/2022	7.33	608	10.80	1.00	23.44	877.09
MW-104	10/1/2021	6.93	2,161	13.60	3.10	24.52	875.63
	4/1/2022	7.01	1,112	11.10	2.00	23.34	876.81
MW-105	10/1/2021	7.36	3,278	13.90	4.00	25.02	875.45
	4/1/2022	7.49	2,422	13.50	3.00	23.98	876.49
MW-106	10/1/2021	6.90	2,892	13.80	0.60	25.32	875.66
	4/1/2022	7.14	2,716	10.50	6.00	24.40	876.58
MW-107	10/1/2021	6.90	1,400	13.90	15.30	24.75	875.60
	4/1/2022	6.98	999	11.50	4.00	23.55	876.80
MW-108	10/1/2021	7.53	960	13.40	1.10	25.56	875.84
	4/1/2022	7.65	538	12.10	2.00	24.39	877.01

Notes:

S.U.: Standard Units

µs/cm: microsiemens per centimeter

°C: degrees Celsius

NTU: nephelometric turbidity units

ft btoc: feet below top of [well] casing

ft amsl: feet above mean sea level

"-" represents no data