Intended for
Illinois Power Generating Company

Date
December 28, 2022

Project No.
1940103307

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN

ASH POND NO. 2
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

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40 C.F.R. § 257 GROUNDWATER MONITORING PLAN COFFEEN POWER PLANT ASH POND NO. 2

Project name	**Coffeen Power Plant Ash Pond No. 2**
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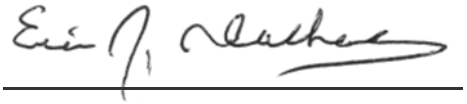

Eric J. Tlachac, PE
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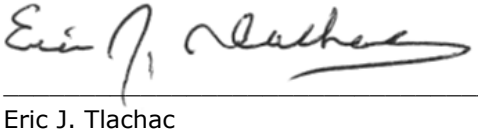
LICENSED PROFESSIONAL CERTIFICATIONS

40 C.F.R. § 257.91(f) Groundwater Monitoring System Certification

In accordance with Title 40 of the Code of Federal Regulations (40 C.F.R.), Part 257, Subpart D, Section (§) 257.91(f) the owner or operator of a coal combustion residuals (CCR) unit must obtain certification from a qualified professional engineer stating that the groundwater monitoring system at the CCR unit has been designed and constructed to meet the requirements of 40 C.F.R. § 257.91. If the groundwater monitoring system includes the minimum number of monitoring wells specified in 40 C.F.R. § 257.91(c)(1), the certification must document the basis supporting use of the minimum number of monitoring wells. Further, in accordance with 40 C.F.R. § 257.91(e)(1), when completing the groundwater monitoring system certification, the qualified professional engineer must be given access to documentation regarding the design, installation, development, and decommissioning of any monitoring wells, piezometers, and other measurement, sampling, and analytical devices.

The groundwater monitoring system designed and constructed for the Coffeen Power Plant (CPP) Ash Pond Number (No.) 2 (AP2) includes more than the minimum number of wells specified in 40 C.F.R. § 257.91(c)(1). The undersigned has been given access to documentation regarding the design, installation, development, and decommissioning of monitoring wells, piezometers and other measurement, sampling, and analytical devices concerning the CPP AP2.

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the groundwater monitoring system at the CPP AP2 has been designed and constructed to meet the requirements of 40 C.F.R. § 257.91.



Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Date: December 28, 2022

I, Brian G. Hennings, a qualified professional geologist in good standing in the State of Illinois, certify that the groundwater monitoring system at the CPP AP2 has been designed and constructed to meet the requirements of 40 C.F.R. § 257.91.

Brian G. Hennings
Professional Geologist
196-001482
Illinois
Date: December 28, 2022

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TABLES (IN TEXT)

TABLES (ATTACHED)

FIGURES (ATTACHED)

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
40 C.F.R.	Title 40 of the Code of Federal Regulations
§	section
AP2	Ash Pond No. 2
ASD	Alternate Source Demonstration
bgs	below ground surface
CCA	compliance commitment agreement
CCR	coal combustion residuals
Closure Plan	*Closure and Post-Closure Care Plan for the Coffeen Ash Pond No. 2*
CMA	Corrective Measures Assessment
CPP	Coffeen Power Plant
GMP	Groundwater Monitoring Plan
GWPS	groundwater protection standard
HBL	health-based level
ID	identification
IEPA	Illinois Environmental Protection Agency
IPGC	Illinois Power Generating Company
LCL	lower confidence limit
LCU	Lower Confining Unit
LPL	lower prediction limit
MCL	maximum contaminant level
NA	not applicable
NID	National Inventory of Dams
No.	number
NRT	Natural Resource Technology, Inc.
NRT/OBG	Natural Resource Technology, an OBG Company
QAPP	Multi-Site Quality Assurance Project Plan
QA/QC	quality assurance/quality control
Ramboll	Ramboll Americas Engineering Solutions, Inc.
RL	reporting limit
SAP	Multi-Site Sampling and Analysis Plan
SI	surface impoundment
SSL	statistically significant level
SSI	statistically significant increase
TDS	total dissolved solids
UA	Uppermost Aquifer
UPL	upper prediction limit
UTL	upper tolerance limit
USEPA	United States Environmental Protection Agency
WLO	water level only

1. INTRODUCTION

1.1 Overview

Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Addendum to the Groundwater Monitoring Plan (GMP) on behalf of CPP (**Figure 1-1**), operated by Illinois Power Generating Company (IPGC) to align the 40 C.F.R. § 257 compliance groundwater monitoring program with the Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845 compliance groundwater monitoring program.

This Addendum applies specifically to the CCR unit referred to as AP2 (CCR unit identification [ID] No. 102, Illinois Environmental Protection Agency [IEPA] ID No. W1350150004-02, and National Inventory of Dams [NID] No. IL50723) (**Figure 1-2**). AP2 is a closed, unlined CCR surface impoundment (SI) that was previously used to manage CCR and non-CCR waste streams at the CPP.

AECOM submitted the *Closure and Post-Closure Care Plan for the Coffeen Ash Pond No. 2* (Closure Plan) dated January 26, 2017, which was approved by the IEPA on January 30, 2018. The Groundwater Monitoring Plan (Natural Resource Technology, Inc. [NRT], 2017) defined groundwater monitoring for AP2 following approval of the Closure Plan. Closure of AP2 was completed on November 17, 2020.

On April 21, 2021, 35 I.A.C. § 845 became effective, and for CCR units closed prior to the effective date the following section was included (35 I.A.C. § 845.100(i)):

> *If a CCR surface impoundment has completed an Agency-approved closure before April 21, 2021, this Part does not require the owner or operator of the CCR surface impoundment to resubmit to the Agency any closure plan, closure report, or closure certification for that completed closure.*

This GMP includes content requirements specific to 40 C.F.R. § 257.91 (Groundwater Monitoring Systems), 40 C.F.R. § 257.93 (Groundwater Sampling and Analysis Requirements), 40 C.F.R. § 257.94 (Detection Monitoring Program), and 40 C.F.R. § 257.95 (Assessment Monitoring Program) for AP2. Specifically, this Addendum expands the 40 C.F.R. § 257 groundwater monitoring network and monitoring program specific to AP2 to align with the monitoring network established for 35 I.A.C. § 845.

1.2 Site Location and Background

The CPP is located approximately two miles south of the city of Coffeen, Illinois and approximately eight miles southeast of the city of Hillsboro, Illinois (**Figure 1-1**). AP2 is located in Montgomery County, in central Illinois, within Section 11, Township 7 North, and Range 7 East. The CPP is located between the two lobes of Coffeen Lake to the west, east, and south, and is bordered by agricultural land to the north. The CPP operated as a coal-fired power plant from 1964 to November 2019 and has five CCR management units. The approximately 1,100-acre Coffeen Lake was built by damming the McDavid Branch of the East Fork of Shoal Creek in 1963 for use as an artificial cooling lake for the CPP. Historically, coal mines were operated at depth in the vicinity of the CPP as well as a US Minerals processing facility located to the north.

Coffeen AP2 (**Figure 1-2**) is a closed (IEPA approved) SI with a surface area of approximately 60 acres and berms 47 feet higher than the surrounding land surface. AP2 was originally removed

from service and capped in the mid 1980's. A clay and soil cap was placed on the surface of the pond with contouring and drainage provided to direct storm water to four engineered revetment down drain structures. Prior to capping, this pond was identified as Outfall 004 in the facility National Pollutant Discharge Elimination System operating permit, IL0000108. Additional closure activities include the construction of a geomembrane cover system that began in July 2019 and was completed on November 17, 2020. The construction was completed in accordance with the Closure and Post Closure Care Plan approved by the IEPA on January 30, 2018.

Figure 1-2 depicts the location of the CCR units and non-CCR units at CPP. The five CCR units consist of the following:

- Ash Pond No. 1 (AP1; CCR unit ID No. 101, IEPA ID No. W1350150004-01, and NID No. IL50722)
- AP2
- Gypsum Management Facility (GMF) Gypsum Stack Pond (GMF GSP; CCR unit ID No. 103, IEPA ID No. W1350150004-03, and NID No. IL50579)
- GMF Recycle Pond (GMF RP; CCR unit ID No. 104, IEPA ID No. W1350150004-04, and NID No. IL50578)
- Landfill (CCR unit ID No. 105)

Information regarding the AP1, GMF GSP, GMF RP, and Landfill CCR units is solely for background information, as this report applies specifically to the AP2 CCR unit, which will hereinafter be referred to as the Site.

1.3 Conceptual Site Model

Multiple site investigations have been completed at the CPP to characterize the geology, hydrogeology, and groundwater quality as required by 40 C.F.R. § 257.91 (Groundwater Monitoring Systems). AP2 has been well characterized and detailed in the Hydrogeologic Site Characterization Reports (HCR), including the most recent HCR for the adjacent GMF RP (Ramboll, 2021) [https://www.luminant.com/ccr/illinois-ccr/?dir=il-ccr%2FCoffeen%2F2021], that was included with the Operating Permit application submitted to the IEPA. The HCR was prepared to comply with the requirements specified in 35 I.A.C. § 845.620 and expands upon the Hydrogeologic Monitoring Plan (Natural Resource Technology, an OBG Company [NRT/OBG], 2017). A conceptual site model (CSM) has been developed and is discussed below.

In addition to the CCR present at AP2, there are five principal layers of unlithified material present above the bedrock, which are categorized into hydrostratigraphic units below (from surface downward) based on stratigraphic relationships and common hydrogeologic characteristics:

- **Upper Confining Unit (UCU):** Composed of the Roxana and Peoria Silts (Loess Unit) and the upper clayey portion of the Hagarstown member which are classified as silts to clayey silts and gravelly clay below the surficial soil. The UCU has been eroded east of AP1, near the Unnamed Tributary.
- **Uppermost Aquifer (UA):** The UA is the Hagarstown Member which is classified as primarily sandy to gravelly silts and clays with thin beds of sands. Similar to the Loess Unit, the Hagarstown is absent in some locations near the Unnamed Tributary.

- **Lower Confining Unit (LCU):** Comprised of the Vandalia Member, Mulberry Grove Member, and Smithboro Member. These units include a sandy to silty till with thin, discontinuous sand lenses, a discontinuous and limited extent sandy silt which has infilled prior erosional features, and silty to clayey diamicton, respectively. This unit has been identified as a potential migration pathway (PMP) because downward vertical gradients indicate that there is the potential for impacts to migrate within this unit.
- **Deep Aquifer (DA):** Sand and sandy silt/clay units of the Yarmouth Soil, which include accretionary deposits of fine sediment and organic materials, typically less than five feet thick and discontinuous across the CPP. This unit is also identified as a PMP, because it is the first permeable unit below the UA.
- **Deep Confining Unit:** Comprised of the Banner Formation, generally consists of clays, silts, and sands. The Lierle Clay Member is the upper layer of the Banner Formation which was encountered at the Site.

In the vicinity of AP2 groundwater generally flows southeast (**Figure 1-3**) through the UA toward the former discharge structure and Unnamed Tributary. Although elevations vary seasonally, the groundwater flow direction in the UA is consistent and likely controlled by the proximity and hydraulic connection to Coffeen Lake.

2. GROUNDWATER MONITORING SYSTEMS

Three monitoring programs specific to AP2 exist, the Closure Plan monitoring program, the 40 C.F.R. § 257 monitoring program, and the 35 I.A.C. § 845 monitoring program. Groundwater monitoring at AP2 is currently being performed in accordance with Section 1.5 of the approved Closure Plan and 40 C.F.R. § 257. This GMP is being provided to expand the 40 C.F.R. § 257 groundwater monitoring network and monitoring program specific to AP2 to align with the monitoring network established for 35 I.A.C. § 845. Monitoring networks and programs that apply to other units are not discussed in this GMP. IPGC entered into a compliance commitment agreement (CCA) with the IEPA on December 28, 2022. Groundwater monitoring in accordance with the CCA and the proposed 35 I.A.C. § 845 groundwater monitoring plan and sampling methodologies provided in the operating permit application for AP2 is scheduled to commence no later than the second quarter of 2023. After AP2 has been issued an approved operating permit, groundwater monitoring shall be conducted in accordance with that operating permit. As specified in the CCA, groundwater sampling requirements that apply to the CCR SI under other existing permit programs will become void upon issuance of an approved operating permit pursuant to 35 I.A.C § 845. In addition, and in accordance with the CCA, once quarterly groundwater monitoring commences, the groundwater monitoring performed under Section 1.5 of the *Groundwater Monitoring Plan* (NRT, 2017) contained in the approved Closure Plan will cease.

2.1 IEPA Closure Plan Monitoring Program

The approved IEPA Closure Plan monitoring well network consists of fourteen groundwater monitoring wells used to monitor the Uppermost Aquifer (UA), including three background wells (G270, G280, and G281) and eleven compliance wells (G154, G279, G401, G402, G403, G404, G405, G406, G407, G410, and G411). These wells are monitored in accordance with Water Pollution Control Permit 2020-EA-65027-1 Special Condition No. 6.

The GMP established a monitoring program that meets the requirements of 35 I.A.C. § 620.410 and groundwater samples are collected quarterly and analyzed for the parameters listed in **Table A** on the following page.

Table A. IEPA Closure Plan Groundwater Monitoring Program Parameters

Field Parameters		
pH	Temperature	Turbidity
Dissolved Oxygen	Oxidation/Reduction Potential	Specific Conductance
Static Water Elevation	Depth of Well	Depth to Water
Elevation of Groundwater Surface		
Inorganics (Total, except Total Dissolved Solids [TDS])		
Chloride	Fluoride	Sulfate
Cyanide	Nitrate-Nitrogen	TDS
Metals (Total)		
Antimony	Cadmium	Lithium
Arsenic	Calcium	Mercury
Barium	Chromium	Molybdenum
Beryllium	Cobalt	Selenium
Boron	Lead	Thallium
Metals (Dissolved)		
Aluminum	Iron	Silver
Arsenic	Lead	Vanadium
Boron	Manganese	Zinc
Copper	Nickel	
Other (Total)		
Radium 226 and 228 combined		

2.2 Existing 40 C.F.R. § 257 Monitoring Program

The 40 C.F.R. § 257 monitoring well network consists of seven of the same groundwater monitoring wells used to monitor the UA, including two background wells (G270 and G281) and five compliance wells (G401, G402, G403, G404, and G405). The 40 C.F.R. § 257 monitoring well network locations are shown on **Figure 2-1**.

Assessment monitoring in accordance with 40 C.F.R. § 257.95 was initiated on April 9, 2018. Details on the procedures and techniques used to fulfill the groundwater sampling and analysis program requirements are found in the Multi-Site Sampling and Analysis Plan (SAP) (Ramboll, 2022a).

Groundwater samples are collected semi-annually and analyzed for the following laboratory and field parameters from Appendix III and Appendix IV of 40 C.F.R. § 257, summarized in **Table B** on the following page.

Table B. 40 C.F.R. § 257 Groundwater Monitoring Program Parameters

Field Parameters[1]			
Groundwater Elevation	pH		
Appendix III Parameters (Total, except TDS)			
Boron	Chloride	Sulfate	
Calcium	Fluoride	TDS	
Appendix IV Parameters (Total)			
Antimony	Cadmium	Lithium	Thallium
Arsenic	Chromium	Mercury	Radium 226 and 228 combined
Barium	Cobalt	Molybdenum	
Beryllium	Lead	Selenium	

[1] Dissolved oxygen, temperature, specific conductance, oxidation/reduction potential, and turbidity are recorded during sample collection.

Results and analysis of groundwater sampling are reported annually by January 31 of the following year and made available on the CCR public website as required by 40 C.F.R. § 257.

2.3 35 I.A.C. § 845 Monitoring Program

The 35 I.A.C. § 845 monitoring well network consists of eleven wells screened in the UA, or the Lower Confining Unit (LCU) where the UA is absent (G270, G280, G281, G401, G402, G403, G404, G405, G406, G407, and G1001). Surface water elevations are monitored at three staff gauges: SG02, monitoring the former discharge flume; SG03, monitoring the eastern lobe of Coffeen Lake; and SG04, monitoring the Unnamed Tributary.

Groundwater samples are collected quarterly and analyzed for the laboratory and field parameters from 35 I.A.C. § 845.600 as summarized in **Table C** on the following page.

The groundwater samples collected from the eleven wells will be used to monitor and evaluate groundwater quality and demonstrate compliance with the groundwater quality standards listed in 35 I.A.C. § 845.600(a).

The current 35 I.A.C. § 845 monitoring well network (**Table 2-1**) consists of three background monitoring wells (G270, G280, and G281) in the UA, seven compliance wells in the UA (G401, G402, G403, G404, G405, G406, and G407), one compliance well in the LCU (G1001), and three temporary water level only surface water staff gages (SG-02, SG-03, and SG-04).

Table C. 35 I.A.C. § 845 Groundwater Monitoring Program Parameters

Field Parameters[1]			
Groundwater Elevation	pH	Turbidity	
Metals (Total)			
Antimony	Boron	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Calcium	Lithium	Thallium
Beryllium	Chromium	Mercury	
Inorganics (Total, except TDS)			
Fluoride	Sulfate	Chloride	TDS
Other (Total)			
Radium 226 and 228 combined			

[1] Dissolved oxygen, temperature, specific conductance, and oxidation/reduction potential were recorded during sample collection.

2.4 Expansion of Existing 40 C.F.R. § 257 Monitoring Program

The existing 40 C.F.R. § 257 network is being expanded to consist of three background monitoring wells (G270, G280, and G281), eight compliance wells (G401, G402, G403, G404, G405, G406, G407, and G1001), and three staff gages (SG02, SG03, and SG04). The proposed network is summarized in **Table D** on the following page and displayed on **Figure 2-2**. Eleven wells (three background and eight compliance) will be used to monitor groundwater concentrations within the UA, or LCU where the UA is absent.

The groundwater samples collected from the eleven wells will be used to monitor and evaluate groundwater quality and demonstrate compliance with the groundwater quality standards included in 40 C.F.R. § 257.94(e) and 40 C.F.R. § 257.95(h). The proposed monitoring wells will yield groundwater samples that accurately represent the quality of background groundwater that has not been affected by leakage from AP2, as well as downgradient groundwater at the waste boundary of AP2 (as required in 40 C.F.R. § 257.91(a)(1) and (2)). Monitoring well depths and construction details are listed in **Table 2-1** and summarized in **Table D** on the following page.

Any future changes to the groundwater monitoring well network as approved by the IEPA under 35 I.A.C. § 845 will also be incorporated into the 40 C.F.R. § 257 network.

Table D. Expanded 40 C.F.R. § 257 Monitoring Well Network

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type[1]
G270	UA	13.1-17.9	Background
G280	UA	12.8-17.6	Background
G281	UA	15.5-20.2	Background
G401	UA	14.4-18.8	Compliance
G402	UA	10-20	Compliance
G403	UA	13.1-17.8	Compliance
G404	UA	6.4-11.2	Compliance
G405	UA	9.0-13.8	Compliance
G406	UA	13.6-18.4	Compliance
G407	UA	13.8-18.6	Compliance
G1001	LCU	6-11	Compliance
SG02	Surface Water	NA	WLO
SG03	Surface Water	NA	WLO
SG04	Surface Water	NA	WLO

[1] Well Type refers to the role of the well in the monitoring network.
bgs = below ground surface
NA = not applicable
WLO = water level only

2.5 Well Abandonment

No wells are currently proposed for abandonment.

2.6 Groundwater Monitoring System Maintenance Plan

Maintenance procedures have been developed in the SAP and will be performed as needed to assure that the monitoring wells provide representative groundwater samples (Ramboll, 2022a).

3. GROUNDWATER MONITORING PLAN

The groundwater monitoring plan will monitor and evaluate groundwater quality to demonstrate compliance with the groundwater quality standards included in 40 C.F.R. § 257.94(e) and 40 C.F.R. § 257.95(h). The groundwater monitoring program will include sampling and analysis procedures that are consistent and provide an accurate representation of groundwater quality at the background and downgradient wells as required by 40 C.F.R. § 257.91. As discussed in **Section 2**, three monitoring programs specific to AP2 exist, the Closure Plan monitoring program, the 40 C.F.R. § 257 monitoring program, and the 35 I.A.C. § 845 monitoring program. As specified in the CCA, groundwater sampling requirements that apply to the CCR SI under other existing permit programs will become void upon issuance of an approved operating permit pursuant to 35 I.A.C § 845. In addition, and in accordance with the CCA, once quarterly groundwater monitoring commences, the groundwater monitoring performed under Section 1.5 of the approved Closure Plan will cease.

3.1 Sampling Schedule

Groundwater sampling for the 40 C.F.R. § 257 monitoring well network was initially performed quarterly between 2015 and 2017 to establish baseline groundwater quality. Detection monitoring began in the first quarter of 2017 with semi-annual sampling. Assessment monitoring began in the second quarter of 2018. AP2 is currently in assessment monitoring and sampling will continue in 2023 according to the schedule summarized in **Table E** on the following page.

Table E. 40 C.F.R. § 257 Sampling Schedule

Frequency	Duration
Quarterly (groundwater quality)	**Baseline** Began: monitoring began in 2015.
	Ended: monitoring was completed in 2017 to establish baseline groundwater quality for existing landfills and SIs.
At least Semi-annually (groundwater quality)	**Detection Monitoring** Begins: monitoring began no later than October 17, 2017, for existing landfills and SIs, following collection of a minimum of eight independent samples for constituents from Appendix III and Appendix IV from each background and downgradient well. At least semi-annual sampling continues for Appendix III constituents throughout the active life of the CCR unit and the post-closure period. For new landfills and SIs, and lateral expansion of existing CCR units, a minimum of eight independent samples from each background well must be collected and analyzed for the constituents in Appendix III and Appendix IV during the first six months of sampling.
	Ends: Following 30-year post-closure care period or statistically significant increase (SSI) determination and unsuccessful Alternate Source Demonstration (ASD) evaluation within 90 days of SSI determination.
	Assessment Monitoring Begins: within 90 days of unsuccessful ASD evaluation for SSIs determined during Detection Monitoring; samples must be collected and analyzed for all constituents listed in Appendix IV. Within 90 days of obtaining the of the initial sample results, and on at least a semi-annual basis thereafter, wells must be resampled for Appendix III and for those constituents in Appendix IV that have been detected during sampling.
	Ends: Following demonstration that concentrations of all constituents in Appendices III and IV are below background values for two consecutive sampling events.

Groundwater monitoring for the 40 C.F.R. § 257 well network will continue to follow a schedule in accordance with the requirements of 40 C.F.R. § 257.94 and 40 C.F.R. § 257.95. Upon United States Environmental Protection Agency (USEPA) approval of 35 I.A.C. § 845 as a State CCR Permit Program, the 40 C.F.R. § 257 monitoring will be discontinued and replaced by the 35 I.A.C. § 845 monitoring.

3.2 Groundwater Sample Collection

Groundwater sampling procedures have been developed in the SAP (Ramboll, 2022a) and the collection of groundwater samples is being implemented to meet the requirements of 40 C.F.R. § 257.93. In addition to groundwater well samples, quality assurance samples will be collected as described in the Multi-Site Quality Assurance Project Plan (QAPP) (Ramboll, 2022b).

3.3 Laboratory Analysis

Laboratory analysis will be performed consistent with the specifications of the QAPP. Laboratory methods may be modified based on laboratory equipment availability or procedures, but the Reporting Limit (RL) for all parameters analyzed, regardless of method, will be lower than the

applicable groundwater quality standard. Data reporting requirements and workflow are provided in the Multi-Site Data Management Plan (Ramboll, 2022c).

3.4 Quality Assurance Program

The QAPP includes procedures and techniques for laboratory quality assurance/quality control (QA/QC). Additionally, the SAP includes requirements for field data collection QA/QC.

3.5 Statistical Analysis

A Multi-Site Statistical Analysis Plan (Ramboll, 2022d) has been developed to describe procedures that will be used to establish background conditions and determine SSIs over background concentrations and statistically significant levels (SSLs) over groundwater protection standards (GWPSs) as required by 40 C.F.R. § 257.94 and 257.95. The Multi-Site Statistical Analysis Plan was prepared in accordance with the requirements of 40 C.F.R. § 257.93(f), with reference to the acceptable statistical procedures provided in *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA*,* 2009). The determination of SSIs over background concentrations and SSLs over GWPSs will be completed at least Semi-annually in accordance with the sampling schedule provided in **Section 3.1**.

3.6 Data Reporting

Data reporting for the 40 C.F.R. § 257 monitoring well network will be consistent with recordkeeping, notification, and internet posting requirements described in 40 C.F.R. § 257.105 through 257.107.

3.7 Compliance with Applicable On-site Groundwater Quality Standards

Compliance with the groundwater quality standards for the detection monitoring program referenced in 40 C.F.R. § 257.94(e) and the assessment monitoring program referenced in 40 C.F.R. § 257.95(h) will be determined as described in the following sections.

3.7.1 SSI Determination in Detection Monitoring

One-sided upper prediction limits (UPL) will be calculated for each Appendix III constituent using the background samples, with the exception of pH, for which both upper and lower prediction limits will be calculated. A tabular summary of UPLs will be provided in the Annual Groundwater Monitoring and Corrective Action Reports. Individual sampling event concentrations for each constituent detected in the downgradient monitoring wells will then be compared to the background UPL. An exceedance of the UPL for any constituent measured at any downgradient well constitutes an SSI. For pH, a measurement above the UPL or below the lower prediction limit (LPL) constitutes an SSI. As required by 40 C.F.R. § 257.93(h)(2), SSI determination will be completed within 90 days of sampling and analysis.

3.7.2 GWPS and SSL Determination in Assessment Monitoring

A GWPS will be established for Appendix IV constituents. The GWPS will be either the USEPA maximum contaminant levels (MCLs) or the health-based levels (HBLs) established in 40 C.F.R. § 257.95(h)(2) for cobalt, lead, lithium, and molybdenum. The exception to this is when the background concentration is greater than the established MCL or HBL. For this exception, background concentrations will be used to define the GWPS. The background will be calculated using a parametric or non-parametric upper tolerance limit (UTL), depending on the data

distribution. A tabular summary of GWPSs will be provided in the Annual Groundwater Monitoring and Corrective Action Reports.

Compliance will be determined by comparing the lower confidence limit (LCL) of the downgradient concentrations to the GWPS. An SSL will be identified when the LCL exceeds the GWPS. The method of calculating the LCL is described in the Multi-Site Statistical Analysis Plan. If there are too few data points to calculate an LCL (a minimum of four data points is required), the most recent data point is compared to the GWPS. If all the downgradient samples for a well constituent pair are non-detect, the most recent RL is compared to the GWPS. Additionally, an SSL will be identified if all previous samples at a downgradient well were not-detect, and the two most recent samples have both detections and GWPS exceedances. SSL determination will be completed within 90 days of sampling and analysis.

3.8 Alternate Source Demonstrations

An ASD may be completed for a unit under the detection monitoring program in 40 C.F.R. § 257.94(e)(2) or assessment monitoring program in 40 C.F.R. § 257.95(g)(3)(ii) to provide lines of evidence that a source other than the monitored unit caused the SSI/SSL or that the SSI/SSL resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The ASD will include information and analysis that supports the conclusions and a certification of accuracy by a qualified professional engineer. ASDs will be completed within 90 days of SSI/SSL determination and be provided in the Annual Groundwater Monitoring and Corrective Action Reports as required by 40 C.F.R. § 257.94(e)(2) and 40 C.F.R. § 257.95(g)(3)(ii).

3.8.1 Detection Monitoring Program

As allowed in 40 C.F.R. § 257.94(e)(2), following the determination of an SSI over background for groundwater constituents listed in Appendix III of 40 C.F.R. § 257, an ASD will be evaluated, and if completed within 90 days of the SSI determination, detection monitoring will continue.

If an ASD has not been successfully completed within 90 days of the SSI determination, Assessment Monitoring in accordance with 40 C.F.R. § 257.95 will be initiated within 90 days and the associated notification will be made to the CCR unit operating record and state director (and/or appropriate tribal authority, if applicable).

3.8.2 Assessment Monitoring Program

As allowed in 40 C.F.R. § 257.95(g)(3)(ii), following the determination of an SSL over the GWPS of constituents listed in Appendix IV of 40 C.F.R. § 257, an ASD will be evaluated and, if completed within 90 days of the SSL determination, assessment monitoring will continue.

If an ASD has not been successfully completed within the 90 days of the SSL determination, a Corrective Measures Assessment (CMA) in accordance with 40 C.F.R. § 257.96 will be initiated and the associated notification will be made to the CCR unit operating record and state director (and/or appropriate tribal authority, if applicable).

3.9 Corrective Action

As described in 40 C.F.R. § 257.96, if the ASD summarized in **Section 3.8** has not been successfully completed, the CMA must be completed within 90 days, unless the owner or

operator demonstrates the need for up to an additional 60 days to complete the CMA due to site-specific conditions of circumstances.

Remedy selection will follow the CMA and be documented in a remedy selection report in accordance 40 C.F.R. § 257.97. A corrective action monitoring plan will be developed to monitor the performance of the selected remedy.

3.10 Annual Report

An Annual Groundwater Monitoring and Corrective Action Report will be completed and placed in the CCR unit operating record by January 31st of the following calendar year. At a minimum, the annual report must contain the following information, to the extent available:

1. 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.
2. 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.
3. In addition to all the monitoring data obtained under 40 C.F.R. §§ 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.
4. 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 an SSI relative to background levels).
5. Other information required to be included in the annual report as specified in 40 C.F.R. §§ 257.90 through 257.98.
6. 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:
    i) 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 40 C.F.R. § 257.95.
    ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in 40 C.F.R. § 257.94 or the assessment monitoring program in 40 C.F.R. § 257.95.
    iii) If it was determined that there was an SSI over background for one or more constituents listed in Appendix III of 40 C.F.R. § 257 pursuant to 40 C.F.R. § 257.94(e):
        A. Identify those constituents listed in Appendix III of 40 C.F.R. § 257 and the names of the monitoring wells associated with such an increase.
        B. Provide the date when the assessment monitoring program was initiated for the CCR unit.

iv) If it was determined that there was an SSL above the groundwater protection standard for one or more constituents listed in Appendix IV of 40 C.F.R. § 257 pursuant to 40 C.F.R. § 257.95(g) include all of the following:

   A. Identify those constituents listed in Appendix IV of 40 C.F.R. § 257 and the names of the monitoring wells associated with such an increase.

   B. Provide the date when the CMA was initiated for the CCR unit.

   C. Provide the date when the public meeting was held for the CMA.

   D. Provide the date when the CMA was completed.

v) Whether a remedy was selected pursuant to 40 C.F.R. § 257.97 during the current annual reporting period, and if so, the date of remedy selection.

vi) Whether remedial activities were initiated or are ongoing pursuant to 40 C.F.R. § 257.98 during the current annual reporting period.

4. REFERENCES

AECOM, 2017. *Closure and Post-Closure Care Plan for the Coffeen Ash Pond No. 2 at Illinois Power Generating Company, Coffeen Power Station, 134 Cips Lane, Coffeen, IL 62107*, January 26, 2017.

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Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2022a. *Multi-Site Sampling and Analysis Plan*. December 28, 2022.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2022b. *Multi-Site Quality Assurance Project Plan*. December 28, 2022

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United States Environmental Protection Agency (USEPA), 2015. *Title 40 of the Code of Federal Regulations, Part 257*.

TABLES

TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
GROUNDWATER MONITORING PLAN
COFFEEN POWER PLANT
ASH POND NO. 2
COFFEEN, ILLINOIS

Well Number	Type	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
G1001	C	UA	04/05/2021	597.61	--	Top of PVC	594.82	6.00	11.00	588.82	583.82	11.00	562.82	5	4	39.063324	-89.391236
G270	B	UA	02/26/2008	--	625.86	Top of Disk	623.73	13.13	17.92	610.60	605.81	18.27	605.50	4.8	2	39.066564	-89.397403
G280	B	UA	02/26/2008	625.35	625.35	Top of Riser	623.11	12.79	17.63	610.32	605.48	17.98	605.10	4.8	2	39.067216	-89.394992
G281	B	UA	09/08/2015	--	626.36	Top of Disk	623.82	15.51	20.16	608.31	603.66	20.30	603.50	4.7	2	39.065405	-89.399322
G401	C	UA	09/14/2015	--	625.57	Top of Disk	623.03	14.36	18.79	608.67	604.24	19.29	603.70	4.4	2	39.060259	-89.395295
G402	C	UA	08/27/2010	--	613.37	Top of Disk	610.36	10.00	20.00	600.36	590.36	20.40	590.00	10	2	39.060207	-89.391712
G403	C	UA	09/11/2015	--	626.47	Top of Disk	623.81	13.11	17.78	610.70	606.03	18.15	605.70	4.7	2	39.063167	-89.398779
G404	C	UA	05/01/2007	--	615.67	Top of Disk	613.57	6.42	11.17	607.15	602.40	11.62	601.60	4.8	2	39.064329	-89.392493
G405	C	UA	05/01/2007	--	623.63	Top of Disk	621.40	9.01	13.76	612.39	607.64	14.21	607.20	4.8	2	39.064345	-89.396234
G406	C	UA	08/19/2016	625.36	625.36	Top of PVC	621.86	13.56	18.37	608.30	603.49	18.75	603.10	4.8	2	39.060309	-89.398508
G407	C	UA	08/16/2016	621.32	621.32	Top of PVC	618.35	13.78	18.61	604.57	599.74	19.04	598.40	4.8	2	39.061574	-89.402004
SG-02	WLO	SW	--	--	605.87	Top of Prot Casing	605.87	--	--	--	--	--	--	--	--	39.059695	-89.391429
SG-03	WLO	SW	--	--	594.94	Top of Prot Casing	594.94	--	--	--	--	--	--	--	--	39.059092	-89.390342
SG-04	WLO	SW	--	--	599.52	Top of Prot Casing	599.52	--	--	--	--	--	--	--	--	39.064146	-89.390504

Notes:
All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A
Type refers to the role of the well in the monitoring network: background (B), compliance (C), or water level measurements only (WLO)
WLO wells are temporary pending implementation of impoundment closure per an approved Construction Permit application
-- = data not available
BGS = below ground surface
ft = foot or feet
HSU = Hydrostratigraphic Unit
PVC = polyvinyl chloride
SW = surface water
UA = uppermost aquifer

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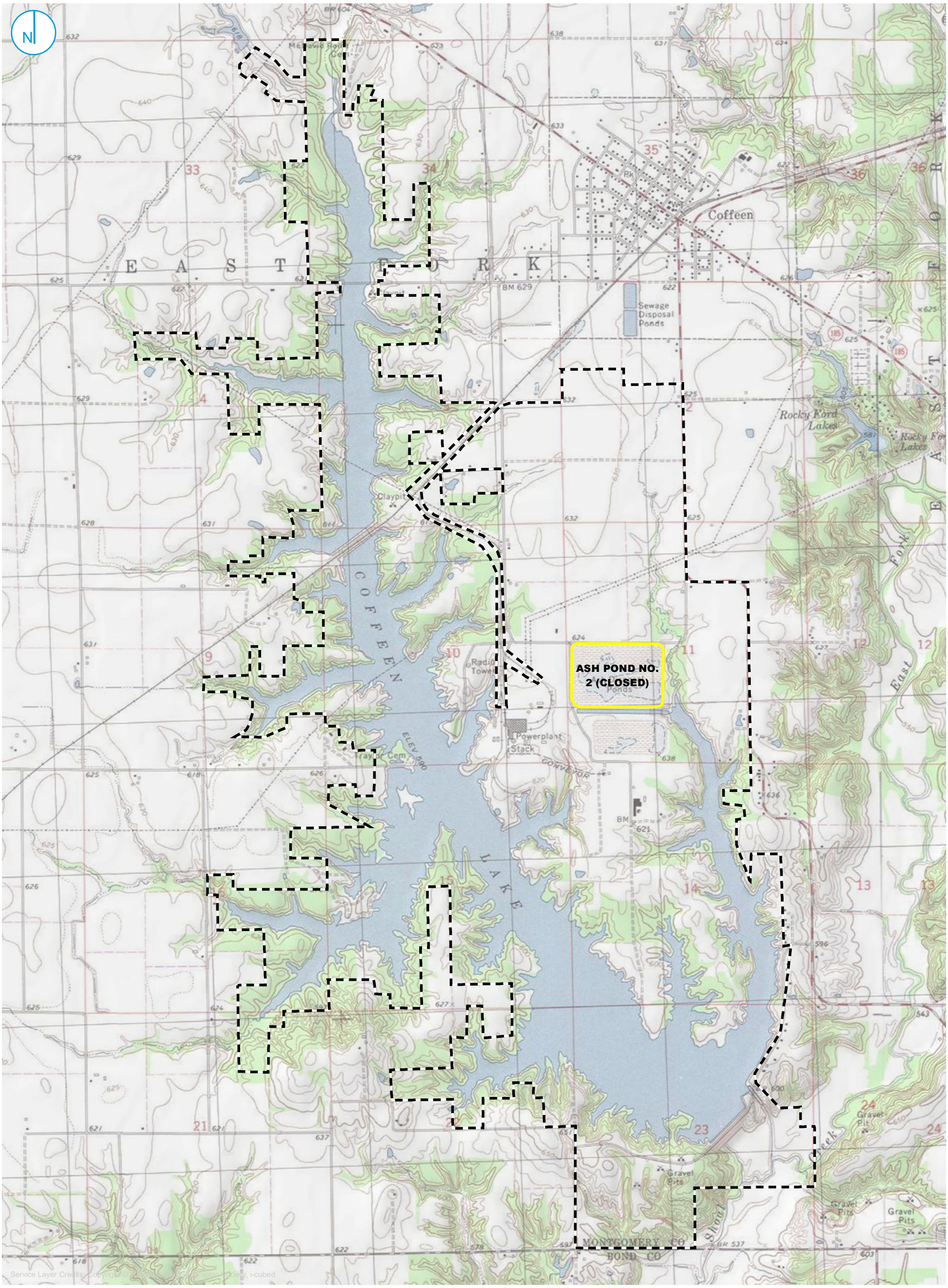
FIGURES



40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)
PROPERTY BOUNDARY

0 1,000 2,000 Feet

SITE LOCATION MAP

FIGURE 1-1

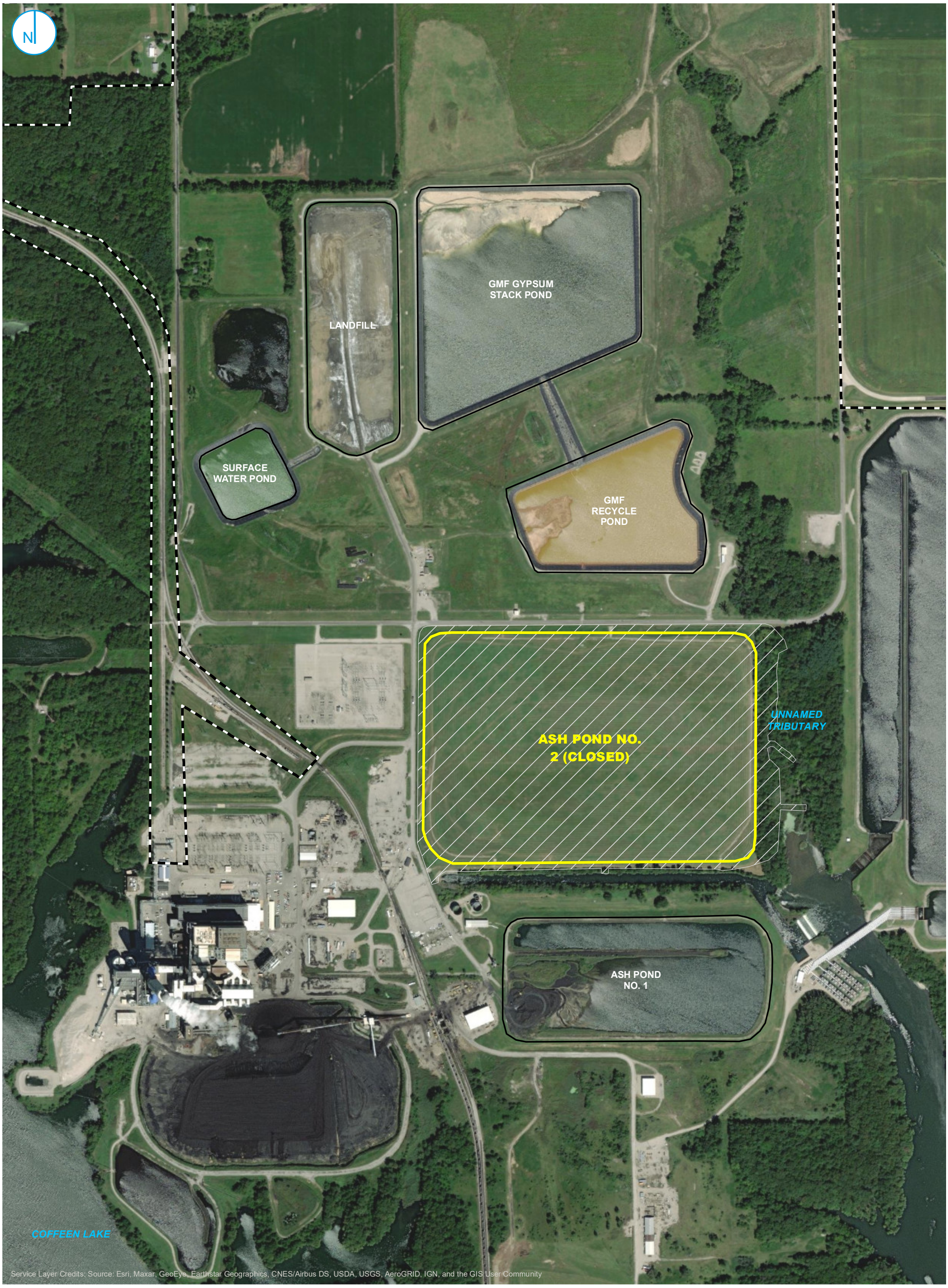
40 C.F.R. § 257 GROUNDWATER MONITORING PLAN
ASH POND NO. 2
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 10/6/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Coffeen\AP2_GMP\Figure 1-2_Site Map AP2.mxd



40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 275 550 Feet

SITE MAP

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN
ASH POND NO. 2
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

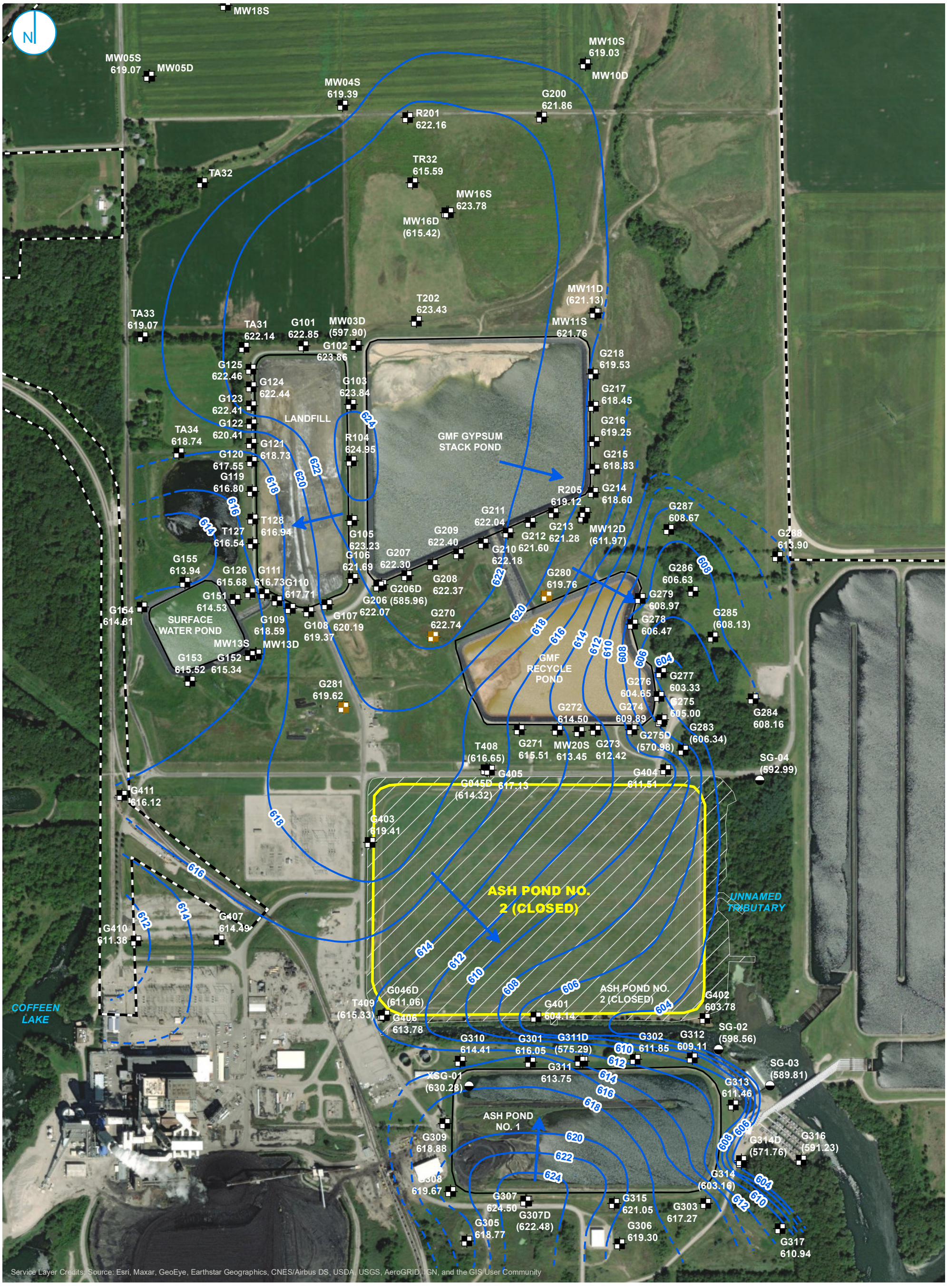
FIGURE 1-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 10/6/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Coffeen\AP2_GMP\Figure 1-3_GWE Contours 20210419 AP2.mxd



BACKGROUND WELL

MONITORING WELL

STAFF GAGE

GROUNDWATER ELEVATION CONTOUR (2-FT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)

SITE FEATURE

LIMITS OF FINAL COVER

PROPERTY BOUNDARY

0 275 550 Feet

NOTE:

ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.

NM = NOT MEASURED

UPPERMOST AQUIFER POTENTIOMETRIC SURFACE MAP APRIL 20, 2021

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN ASH POND NO. 2

COFFEEN POWER PLANT

COFFEEN, ILLINOIS

FIGURE 1-3

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

IEPA MONITORING WELL
MONITORING WELL
40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 200 400 Feet

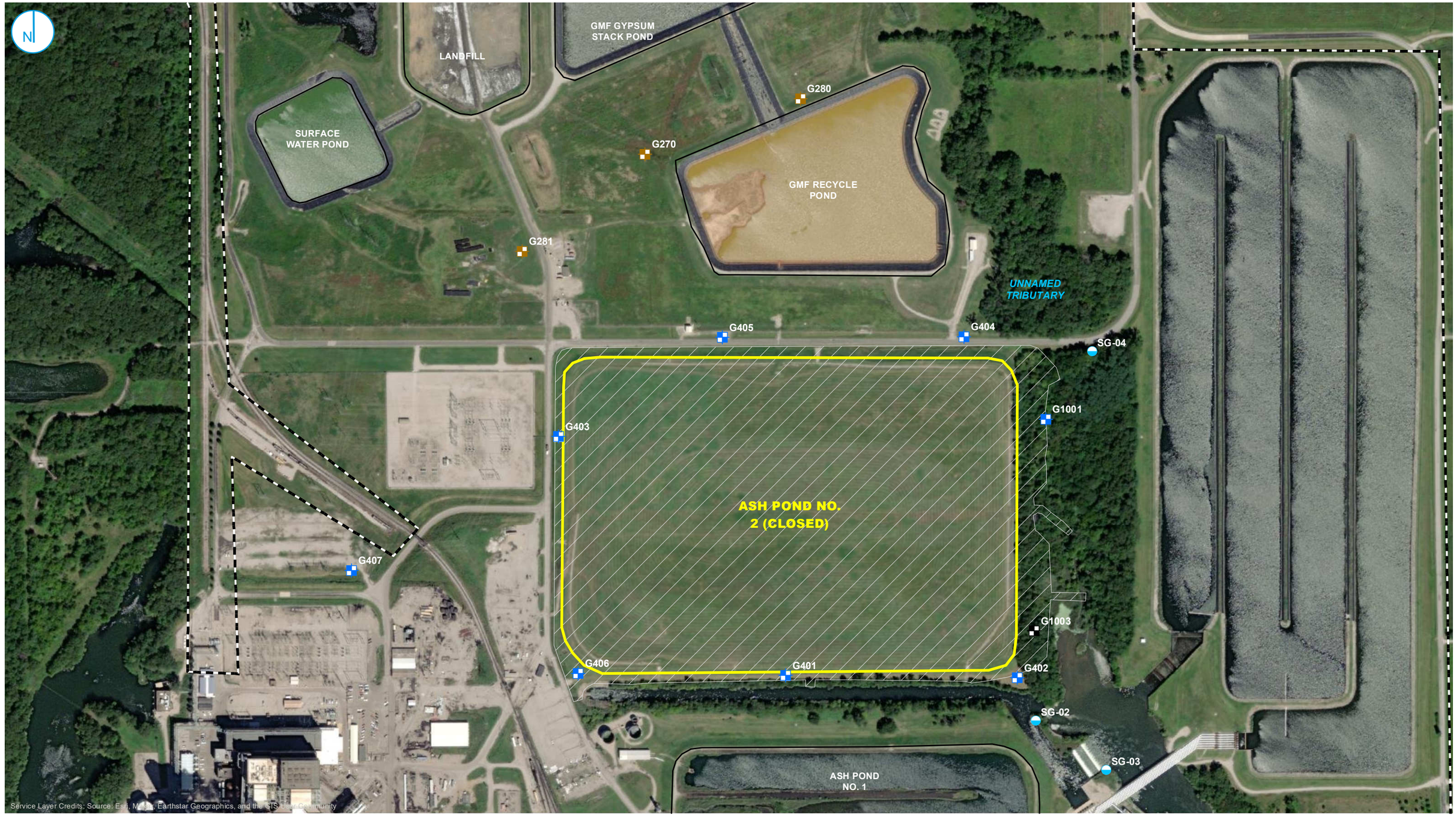
IEPA MONITORING WELL LOCATION MAP

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN
ASH POND NO. 2
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
MONITORING WELL
STAFF GAGE, RIVER

40 C.F.R. § 257 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
LIMITS OF FINAL COVER
PROPERTY BOUNDARY

0 200 400 Feet

EXPANDED 40 C.F.R. § 257 GROUNDWATER MONITORING WELL NETWORK

40 C.F.R. § 257 GROUNDWATER MONITORING PLAN
ASH POND NO.2
COFFEEN POWER PLANT
COFFEEN, ILLINOIS

FIGURE 2-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 1/19/2023 | DESIGNER: galammc

Y:\Mapping\Projects\22\2285\MXD\GMP\Coffeen\AP2_102\Figure 2-2. Expanded Part 257 GW Monitoring Well Network.mxd