

2025 ANNUAL GROUNDWATER MONITORING AND
CORRECTIVE ACTION REPORT FOR
FAR I RESIDUAL SOLID WASTE LANDFILL (LANDFILL)
CARDINAL UPLAND DISPOSAL FACILITY
BRILLIANT, OHIO

by
Haley & Aldrich, Inc.
Cleveland, Ohio

for
Cardinal Operating Company
Brilliant, Ohio

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1. Annual Groundwater Monitoring Report Summary

Haley & Aldrich, Inc. has prepared this 2025 Annual Groundwater Monitoring Report (Report) for the FAR I Residual Solid Waste (RSW) Landfill (Landfill), an existing coal combustion residual (CCR) unit at the Cardinal Upland Disposal Facility in Brilliant, Ohio. This Report was prepared to comply with the United States Environmental Protection Agency (EPA) Hazardous and Solid Waste Management System; Disposal of CCR from Electric Utilities, Title 40 Code of Federal Regulations (CFR) Part 257, Subpart D dated April 17, 2015 (Rule), specifically subsection § 257.90(e)(1) through (6).

This Report summarizes groundwater monitoring activities conducted pursuant to the CCR Rule from January 1 through December 31, 2025.

In accordance with § 257.90(e)(6), an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit is provided below:

- 40 CFR § 257.90(e)(6)(i) and (ii): For the entire calendar year of 2025 (January 1 through December 31, 2025), the FAR I RSW Landfill was operating under the detection monitoring program.
- 40 CFR § 257.90(e)(6)(iii)(A): No statistically significant increases (SSIs) of Appendix III constituents above background levels were identified during statistical evaluation of the October 2024 sampling event.¹
- 40 CFR § 257.90(e)(6)(iii)(A): One SSI above background was identified during statistical evaluation of the April 2025 sampling event for chloride at monitoring well S-20.
 - In accordance with § 257.94(e)(2) of the CCR Rule, an Alternative Source Demonstration (ASD) concluded that the SSI is attributable to sources other than the FAR I RSW Landfill, and the FAR I RSW Landfill can remain in detection monitoring.
- Background levels for the FAR I RSW Landfill were updated in November 2025 to incorporate data collected through April 2025 and will be used for statistical comparisons beginning with the October 2025 monitoring event.
- Statistical evaluation of the October 2025 sampling event is ongoing and will be presented in the 2026 Annual Report.
- No groundwater corrective measures monitoring activities were required to be completed in the annual reporting period in accordance with § 257.98(a)(1).

¹ Data quality review and statistical evaluation of the fall 2024 sampling event were completed in 2025; therefore, results and any statistical exceedances associated with the fall 2024 data are presented in this report.

2. 40 CFR §257.90 – Applicability

To report on the activities conducted during the prior calendar year and document progress complying with the CCR Rule, the specific requirements listed in § 257.90(e)(1) through (5) are provided in the following sections in bold/italic type followed by a short narrative stating how that specific requirement was met.

2.1 40 CFR § 257.90(a) AND (c)

All CCR landfills, CCR surface impoundments, and lateral expansions of CCR units are subject to the groundwater monitoring and corrective action requirements under § 257.90 through § 257.98.

Once a groundwater monitoring system and groundwater monitoring program has been established at the CCR unit as required by this subpart, the owner or operator must conduct groundwater monitoring and, if necessary, corrective action through the active life and post-closure care period of the CCR unit.

The FAR I RSW Landfill is an existing, active landfill disposal facility. As such, it is subject to the groundwater monitoring and corrective action requirements set forth by the EPA in 40 CFR §§ 257.90 through 257.98. This document satisfies the requirement under § 257.90(e), which requires the CCR Unit Owner/Operator to prepare an Annual Groundwater Monitoring and Corrective Action Report.

3. 40 CFR § 257.90(e) Annual Groundwater Monitoring Report

Annual groundwater monitoring and corrective action report. For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. 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).

This Report documents the activities completed in 2025 for the FAR I RSW Landfill as required by the subject regulations. Groundwater sampling and analysis were conducted per the requirements of § 257.93, and the status of the groundwater monitoring program, set forth in § 257.95, provided in this Report.

3.1 STATUS OF THE GROUNDWATER MONITORING PROGRAM

SSIs of Appendix III constituents were not identified at the FAR I RSW Landfill during statistical evaluation of the October 2024 monitoring event. One SSI was identified for chloride at monitoring well S-20 during statistical evaluation of the April 2025 monitoring event. In accordance with § 257.94(e)(2) of the CCR Rule, an ASD concluded that the SSIs are attributable to sources other than the FAR I RSW Landfill, and the FAR I RSW Landfill can remain in detection monitoring.

3.2 KEY ACTIONS COMPLETED

- In 2025, two semiannual groundwater monitoring events were completed:
 - The first semiannual groundwater monitoring event was completed in April 2025 with a resampling event completed in June 2025 to verify sample concentrations in downgradient wells that exceeded background levels in April 2025.
 - Specifically, monitoring well S-20 exhibited elevated chloride levels, and two wells (S-18 and S-GS-1) exhibited elevated pH readings. Resamples were collected in June 2025, as allowed by the FAR I RSW Landfill's Statistical Analysis Plan, and chloride at monitoring well S-20 was elevated in the resample, indicating a potential SSI that was successfully addressed in the spring 2025 ASD (Appendix A).
 - The second semiannual groundwater monitoring event was conducted in October 2025 with a resampling event completed in December 2025 to verify sample concentrations in downgradient wells that exceeded background levels in October 2025. Several upgradient wells (S-02, S-04, S-05, and S-06) and one downgradient well (S-07) were also resampled during the December 2025 resampling event to meet the sampling procedures detailed in the Sampling and Analysis Plan.
 - Specifically, monitoring well S-20 exhibited elevated chloride levels, S-18 exhibited elevated calcium levels, several wells (S-10, S-18, S-GS-1, and S-GS-2) exhibited elevated fluoride, and S-10 and S-GS-2 exhibited elevated pH readings. Resamples were taken in December 2025, as allowed by the FAR I RSW Landfill's Statistical Analysis Plan, indicating potential SSIs for chloride at S-20 (addressed

in the spring 2025 ASD; Attachment A), and fluoride at S-10 and S-18. Other resample results showed constituent concentrations less than background levels. Data quality review and statistical evaluation of this dataset are ongoing and the final outcomes will be presented in the 2026 Annual Report.

- Potentiometric monitoring was conducted during the semiannual sampling events, as detailed in Section 3.6.5.
- Two semiannual statistical evaluations were completed in 2025. These evaluations were conducted for the October 2024 and April 2025 semiannual sampling events. The statistical evaluation of the October 2025 semiannual sampling event is ongoing and will be presented in the 2026 Annual Report.
- An ASD was completed in November 2025 to address a SSI detected for chloride at S-20 during the April 2025 semiannual sampling event (Appendix A).
- Background levels were updated in November 2025 to incorporate data collected through April 2025 and will be used for statistical evaluations starting with the October 2025 monitoring event.

3.3 PROBLEMS ENCOUNTERED

- Monitoring well S-17 was unable to be sampled during the spring and fall 2025 sampling events due to insufficient water in the well.
- Water levels could not be obtained from S-04 during the April 2025 sampling event, and from S-18 and S-19A during the October 2025 sampling event, due to low water levels (below the pump intake).

3.4 ACTIONS TO RESOLVE PROBLEMS

- Samples and water levels will continue to be attempted to be collected at monitoring wells S-04, S-17, S-18, and S-19A during future semiannual sampling events.

3.5 PROJECT KEY ACTIVITIES FOR UPCOMING YEAR

Key activities to be completed in 2026 include the following:

- Prepare the 2025 annual report; place it in the record as required by § 257.105(h)(1); notify the state [§ 257.106(d)]; and post it to the website [§ 257.107(d)].
- Prepare the semiannual statistical report for the second semiannual event of 2025 and prepare an ASD if deemed necessary following statistical reporting.
- Conduct semiannual groundwater monitoring and reporting as required by § 257.95.
- Conduct semiannual statistical analyses in accordance with the FAR I RSW Landfill's Statistical Analysis Plan.

3.6 40 CFR § 257.90(e) – INFORMATION

At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

3.6.1 40 CFR § 257.90(e)(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;

As required by § 257.90(e)(1), a map showing the locations of the FAR I RSW Landfill and associated upgradient and downgradient monitoring wells is presented as Figure 1.

3.6.2 40 CFR § 257.90(e)(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;

There was no change in the monitoring network for FAR I RSW Landfill in 2025.

3.6.3 40 CFR § 257.90(e)(3)

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;

In accordance with § 257.95(b) and § 257.95(d)(1), two independent samples from each background and downgradient monitoring well were collected and analyzed, except for S-17. A summary table, including the sample names, dates of sample collection, reason for sample collection (detection or assessment), and monitoring data obtained for the groundwater monitoring program for the FAR I RSW Landfill is presented in Table 1. A summary of the analytical results is presented in Table 2. Prediction limits used to identify SSIs during statistical evaluations completed in 2025, including for the fall 2024 and spring 2025 sampling events, are presented in Table 3. Updated prediction limits that will be used to identify SSIs during the fall 2025 statistical evaluation are presented in Table 4.

3.6.4 40 CFR § 257.90(e)(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 a statistically significant increase over background levels); and

The FAR I RSW Landfill remained in detection monitoring throughout 2025.

3.6.5 40 CFR § 257.90(e)(5)

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

Other information specified § 257.90 through § 257.98 is discussed in the preceding sections of this Report.

As specified in § 257.93(c), the groundwater flow rates and directions are provided in Figures 2 and 3 and Tables 5 and 6 for each sampling event.

TABLES

TABLE 1
SUMMARY OF 2025 SAMPLES COLLECTED
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Location Name	Type of Well	Sample Date	Constituents Analyzed	Purpose	Sample Type
S-07	Downgradient	04/30/2025	Appendix III	Detection Monitoring	Primary
S-07	Downgradient	10/29/2025	Appendix III	Detection Monitoring	Primary
S-07	Downgradient	12/03/2025	Appendix III	Detection Monitoring	Resample
S-10	Downgradient	04/29/2025	Appendix III	Detection Monitoring	Primary
S-10	Downgradient	10/28/2025	Appendix III	Detection Monitoring	Primary
S-10	Downgradient	12/04/2025	Fluoride & pH, Field	Detection Monitoring	Resample
S-18	Downgradient	04/24/2025	Appendix III	Detection Monitoring	Primary
S-18	Downgradient	06/09/2025	Chloride	Detection Monitoring	Resample
S-18	Downgradient	10/28/2025	Appendix III	Detection Monitoring	Primary
S-18	Downgradient	12/04/2025	Calcium, Fluoride, & pH, Field	Detection Monitoring	Resample
S-20	Downgradient	04/23/2025	Appendix III	Detection Monitoring	Primary
S-20	Downgradient	06/09/2025	Chloride & pH, Field	Detection Monitoring	Resample
S-20	Downgradient	06/09/2025	pH, Field	Detection Monitoring	Resample Duplicate
S-20	Downgradient	10/27/2025	Appendix III	Detection Monitoring	Primary
S-20	Downgradient	12/04/2025	Chloride & pH, Field	Detection Monitoring	Resample
S-GS-1	Downgradient	04/28/2025	Appendix III	Detection Monitoring	Primary
S-GS-1	Downgradient	06/09/2025	pH, Field	Detection Monitoring	Resample
S-GS-1	Downgradient	10/24/2025	Appendix III	Detection Monitoring	Primary
S-GS-1	Downgradient	12/04/2025	Fluoride & pH, Field	Detection Monitoring	Resample
S-GS-2	Downgradient	04/28/2025	Appendix III	Detection Monitoring	Primary
S-GS-2	Downgradient	10/28/2025	Appendix III	Detection Monitoring	Primary
S-GS-2	Downgradient	12/05/2025	Fluoride & pH, Field	Detection Monitoring	Resample
CA-0623A	Upgradient	04/22/2025	Appendix III	Detection Monitoring	Primary
CA-0623A	Upgradient	10/21/2025	Appendix III	Detection Monitoring	Primary
OAE-2005-10-C	Upgradient	04/29/2025	Appendix III	Detection Monitoring	Primary
OAE-2005-10-C	Upgradient	04/29/2025	Appendix III	Detection Monitoring	Primary
OAE-2005-10-C	Upgradient	10/28/2025	Appendix III	Detection Monitoring	Primary
S-02	Upgradient	04/28/2025	Appendix III	Detection Monitoring	Primary
S-02	Upgradient	10/29/2025	Appendix III	Detection Monitoring	Primary
S-02	Upgradient	12/03/2025	Appendix III	Detection Monitoring	Resample
S-04	Upgradient	04/29/2025	Appendix III	Detection Monitoring	Primary
S-04	Upgradient	10/28/2025	Appendix III	Detection Monitoring	Primary
S-04	Upgradient	10/28/2025	Appendix III	Detection Monitoring	Duplicate
S-04	Upgradient	12/03/2025	Appendix III	Detection Monitoring	Resample
S-05	Upgradient	04/30/2025	Appendix III	Detection Monitoring	Primary
S-05	Upgradient	10/28/2025	Appendix III	Detection Monitoring	Primary
S-05	Upgradient	12/03/2025	Appendix III	Detection Monitoring	Resample
S-06	Upgradient	04/30/2025	Appendix III	Detection Monitoring	Primary
S-06	Upgradient	10/29/2025	Appendix III	Detection Monitoring	Primary
S-06	Upgradient	12/03/2025	Appendix III	Detection Monitoring	Resample
S-19A	Upgradient	04/23/2025	Appendix III	Detection Monitoring	Primary
S-19A	Upgradient	10/28/2025	Appendix III	Detection Monitoring	Primary
S-GS-3	Upgradient	04/22/2025	Appendix III	Detection Monitoring	Primary
S-GS-3	Upgradient	10/24/2025	Appendix III	Detection Monitoring	Primary

Notes:

Upgradient monitoring well S-17 was unable to be sampled in 2025 due to insufficient water.

TABLE 2
SUMMARY OF 2025 ANALYTICAL RESULTS
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Location Name	S-07	S-07	S-07	S-10	S-10	S-10	S-18	S-18	S-18	S-18
Sample Name	S-7-04302025	S-7-10292025	S-7-12032025	S-10-04292025	S-10-10282025	S-10-12042025	S-18-04242025	S-18-04242025	S-18-10282025	S-18-12042025
Sample Date	04/30/2025	10/29/2025	12/3/2025	04/29/2025	10/28/2025	12/04/2025	04/24/2025	06/09/2025	10/28/2025	12/04/2025
Sample Type	Primary	Primary	Resample	Primary	Primary	Resample	Primary	Resample	Primary	Resample
Type of Well	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
APPENDIX III CONSTITUENTS (mg/L)										
Boron, Total	1.88	1.66	1.78	0.484	0.421	-	0.513	-	0.591	-
Calcium, Total	258	247	244	269	261	-	207	-	242	119
Chloride	30.8	31.1	29.5	23	18	-	3.4	-	1.2	-
Fluoride	0.14	0.18	0.18	0.25	0.29	0.29	0.36	-	0.44	0.47
Sulfate	1030	1050	1020	886	851	-	810	-	916	-
Total Dissolved Solids (TDS)	1840	1810	1820	1510	1470	-	1500	-	1520	-
pH, Field (pH units)	7.12	6.87	7.39	6.9	6.59	6.88	6.55	7.3	6.7	6.95

Notes and Abbreviations:

mg/L = milligram per liter

< = Not detected at reporting limit

Bold = detected

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TABLE 2
SUMMARY OF 2025 ANALYTICAL RESULTS
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Location Name	S-20	S-20	S-20	S-20	S-20	S-GS-1	S-GS-1	S-GS-1	S-GS-1
Sample Name	S-20-04232025	S-20_06092025	S-20_06092025A	S-20-10272025	S-20-12042025	S-GS-1-04282025	S-GS-1-07092025	S-GS-1-10242025	S-GS-1-12042025
Sample Date	04/23/2025	06/09/2025	06/09/2025	10/27/2025	12/04/2025	04/28/2025	06/09/2025	10/24/2025	12/04/2025
Sample Type	Primary	Resample	Resample Duplicate	Primary	Resample	Primary	Resample	Primary	Resample
Type of Well	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient	Downgradient
APPENDIX III CONSTITUENTS (mg/L)									
Boron, Total	0.243	-	-	0.264	-	0.91	-	0.928	-
Calcium, Total	285	-	-	251	-	105	-	98.2	-
Chloride	7.4	6.3	6.4	4.1	5.2	25.1	-	23.6	-
Fluoride	0.32	-	-	0.35	-	0.72	-	0.83	0.78
Sulfate	772	-	-	845	-	881	-	853	-
Total Dissolved Solids (TDS)	1550	-	-	1590	-	1730	-	1710	-
pH, Field (pH units)	6.4	7.03	-	6.35	6.65	6.64	7.4	6.75	7.05

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TABLE 2
SUMMARY OF 2025 ANALYTICAL RESULTS
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Location Name	S-GS-2	S-GS-2	S-GS-2	CA-0623A	CA-0623A	CA-0623A	OAE-2005-10-C
Sample Name	S-GS-2-04282025	S-GS-2-10282025	S-GS-2-12052025	CA-0623A-04222025	CA-0623A-04222025 LF	CA-0623A-10212025	OAE-2005-10C-04292025
Sample Date	04/28/2025	10/28/2025	12/05/2025	04/22/2025	04/22/2025	10/21/2025	04/29/2025
Sample Type	Primary	Primary	Resample	Primary	Primary	Primary	Primary
Type of Well	Downgradient	Downgradient	Downgradient	Upgradient	Upgradient	Upgradient	Upgradient
APPENDIX III CONSTITUENTS (mg/L)							
Boron, Total	0.473	0.431	-	0.51	0.494	0.469	0.54
Calcium, Total	5.14	7.32	-	1.1	1.09	1.04	6.29
Chloride	49.3	36.4	-	23.9	21.8	21.1	14.2
Fluoride	3.2	3.8	3.6	2.3	2.4	2.4	1.2
Sulfate	35.6	40.2	-	21	21.8	23.1	147
Total Dissolved Solids (TDS)	1400	1330	-	647	616	645	1220
pH, Field (pH units)	7.54	6.9	7.88	8.15	-	7.94	7.12

Notes and Abbreviations:

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TABLE 2
SUMMARY OF 2025 ANALYTICAL RESULTS
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Location Name	OAE-2005-10-C	OAE-2005-10-C	S-02	S-02	S-02	S-04	S-04	S-04	S-04
Sample Name	OAE-2005-10CA-04292025	OAE-2005-10C-10282025	S-2-04282025	S-2-10292025	S-2-12032025	S-4-04292025	S-4-10282025	S-4A-10282025	S-4-12032025
Sample Date	04/29/2025	10/28/2025	04/28/2025	10/29/2025	12/03/2025	04/29/2025	10/28/2025	10/28/2025	12/03/2025
Sample Type	Duplicate	Primary	Primary	Primary	Resample	Primary	Primary	Duplicate	Resample
Type of Well	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient
APPENDIX III CONSTITUENTS (mg/L)									
Boron, Total	0.535	0.603	2.24	2.11	2.21	0.178	0.16	0.163	0.165
Calcium, Total	6.07	5.01	376	409	381	276	284	279	267
Chloride	14.5	7.6	3.9	3.4	4	5.7	6.2	6.2	10.3
Fluoride	1.2	1.3	0.41	0.47	0.32	0.15	0.14	0.14	0.16
Sulfate	145	160	1740	1790	1860	755	797	775	802
Total Dissolved Solids (TDS)	1190	1100	2850	2970	2860	1460	1460	1410	1450
pH, Field (pH units)	-	7.41	6.92	7.12	7.21	6.82	6.81	-	7.66

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TABLE 2
SUMMARY OF 2025 ANALYTICAL RESULTS
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Location Name	S-05	S-05	S-05	S-06	S-06	S-06	S-19A	S-19A	S-GS-3	S-GS-3
Sample Name	S-5-04302025	S-5-10282025	S-5-12032025	S-6-04302025	S-6-10292025	S-6-12032025	S-19A-04232025	S-19A-10282025	S-GS-3-04222025	S-GS-3-10242025
Sample Date	04/30/2025	10/28/2025	12/03/2025	04/30/2025	10/29/2025	12/03/2025	04/23/2025	10/28/2025	04/22/2025	10/24/2025
Sample Type	Primary	Primary	Resample	Primary	Primary	Resample	Primary	Primary	Primary	Primary
Type of Well	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient	Upgradient
APPENDIX III CONSTITUENTS (mg/L)										
Boron, Total	0.192	0.179	0.0266	2.18	2.13	2.05	0.46	0.443	0.34	0.297
Calcium, Total	111	195	287	390	398	373	396	353	5.36	13
Chloride	4.2	6.2	7.9	31.4	30.9	29.9	3.4	3	503	245
Fluoride	1.1	0.51	0.13	0.12	0.15	0.15	0.39	0.59	2.2	1.8
Sulfate	176	276	698	1320	1290	1310	1860	1760	2.6	276
Total Dissolved Solids (TDS)	550	918	1330	2160	2130	2100	2730	2660	1970	1540
pH, Field (pH units)	7.1	7.05	7.31	6.85	7.88	6.83	6.12	6.5	7.72	7.23

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TABLE 3
APPENDIX III PREDICTION LIMITS
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Well ID	Appendix III Constituent	Units	Intrawell Prediction Limits [1]	
			Upper Prediction Limits	Lower Prediction Limits (pH only)
S-07	Boron, Total	mg/L	2.197	-
S-07	Calcium, Total	mg/L	276	-
S-07	Chloride	mg/L	39.4	-
S-07	Fluoride	mg/L	0.24	-
S-07	pH, Field	SU	7.89	6.79
S-07	Sulfate	mg/L	1,155	-
S-07	Total Dissolved Solids	mg/L	1,983	-
S-10	Boron, Total	mg/L	2.039	-
S-10	Calcium, Total	mg/L	340	-
S-10	Chloride	mg/L	30.9	-
S-10	Fluoride	mg/L	0.30	-
S-10	pH, Field	SU	7.56	6.57
S-10	Sulfate	mg/L	1,253	-
S-10	Total Dissolved Solids	mg/L	1,822	-
S-18	Boron, Total	mg/L	0.635	-
S-18	Calcium, Total	mg/L	229	-
S-18	Chloride	mg/L	3.8	-
S-18	Fluoride	mg/L	0.41	-
S-18	pH, Field	SU	7.34	6.66
S-18	Sulfate	mg/L	1,123	-
S-18	Total Dissolved Solids	mg/L	1,907	-
S-20	Boron, Total	mg/L	0.344	-
S-20	Calcium, Total	mg/L	385	-
S-20	Chloride	mg/L	4.1	-
S-20	Fluoride	mg/L	0.35	-
S-20	pH, Field	SU	7.94	6.30
S-20	Sulfate	mg/L	1,253	-
S-20	Total Dissolved Solids	mg/L	2,134	-
S-GS-1	Boron, Total	mg/L	1.053	-
S-GS-1	Calcium, Total	mg/L	131	-
S-GS-1	Chloride	mg/L	25.1	-
S-GS-1	Fluoride	mg/L	0.80	-
S-GS-1	pH, Field	SU	8.86	6.72
S-GS-1	Sulfate	mg/L	1,039	-
S-GS-1	Total Dissolved Solids	mg/L	1,966	-
S-GS-2	Boron, Total	mg/L	0.696	-
S-GS-2	Calcium, Total	mg/L	17.63	-
S-GS-2	Chloride	mg/L	120.1	-
S-GS-2	Fluoride	mg/L	3.58	-
S-GS-2	pH, Field	SU	8.60	7.42
S-GS-2	Sulfate	mg/L	183.9	-
S-GS-2	Total Dissolved Solids	mg/L	2,049	-

Notes and Abbreviations:

[1] Intrawell prediction limits updated in November 2023 by Cox-Colvin to incorporate samples collected through June 2023. These limits were used in statistical evaluations of fall 2024 and spring 2025 monitoring data.

- mg/L = milligrams per liter
- SI = standard unit
- = not applicable

TABLE 4
UPDATED APPENDIX III PREDICTION LIMITS
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Well ID	Appendix III Constituent	Units	Intrawell Prediction Limits [1]	
			Upper Prediction Limits	Lower Prediction Limits (pH only)
S-07	Boron, Total	mg/L	2.10	-
S-07	Calcium, Total	mg/L	269	-
S-07	Chloride	mg/L	37.1	-
S-07	Fluoride	mg/L	0.217	-
S-07	pH, Field	SU	7.76	6.92
S-07	Sulfate	mg/L	1,120	-
S-07	Total Dissolved Solids	mg/L	1,943	-
S-10	Boron, Total	mg/L	1.69	-
S-10	Calcium, Total	mg/L	326	-
S-10	Chloride	mg/L	29.6	-
S-10	Fluoride	mg/L	0.283	-
S-10	pH, Field	SU	7.46	6.72
S-10	Sulfate	mg/L	1,061	-
S-10	Total Dissolved Solids	mg/L	1,769	-
S-18	Boron, Total	mg/L	0.608	-
S-18	Calcium, Total	mg/L	205	-
S-18	Chloride	mg/L	3.46	-
S-18	Fluoride	mg/L	0.389	-
S-18	pH, Field	SU	7.97	6.55
S-18	Sulfate	mg/L	971	-
S-18	Total Dissolved Solids	mg/L	1,697	-
S-20	Boron, Total	mg/L	0.313	-
S-20	Calcium, Total	mg/L	362	-
S-20	Chloride	mg/L	3.63	-
S-20	Fluoride	mg/L	0.366	-
S-20	pH, Field	SU	7.94	6.30
S-20	Sulfate	mg/L	1,192	-
S-20	Total Dissolved Solids	mg/L	2,035	-
S-GS-1	Boron, Total	mg/L	1.01	-
S-GS-1	Calcium, Total	mg/L	125	-
S-GS-1	Chloride	mg/L	24.9	-
S-GS-1	Fluoride	mg/L	0.788	-
S-GS-1	pH, Field	SU	8.04	6.61
S-GS-1	Sulfate	mg/L	1,007	-
S-GS-1	Total Dissolved Solids	mg/L	1,911	-
S-GS-2	Boron, Total	mg/L	0.638	-
S-GS-2	Calcium, Total	mg/L	16.1	-
S-GS-2	Chloride	mg/L	110	-
S-GS-2	Fluoride	mg/L	3.53	-
S-GS-2	pH, Field	SU	8.49	7.57
S-GS-2	Sulfate	mg/L	131	-
S-GS-2	Total Dissolved Solids	mg/L	1,924	-

Notes and Abbreviations:

[1] Intrawell prediction limits updated in November 2025 to incorporate samples collected through April 2025. These limits will be used for the fall 2025 statistical evaluation.

mg/L = milligrams per liter

SI = standard unit

- = not applicable

TABLE 5
GROUNDWATER FLOW CALCULATIONS - APRIL 2025
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Program	Well	Hydraulic Location	Depth to Water (ft)	Potentiometric Elevation (ft)	Gradient ³ (ft/ft)	Hydraulic Conductivity ⁴ (cm/sec)			Effective Porosity	Groundwater Velocity (ft/day)			Well Diameter ⁵ (in)
						Low	Representative	High		Low	Representative	High	
FAR I RSW LANDFILL	CA-0623A	Upgradient	151.07	1011.65	0.011	0.0001	0.05	0.1	0.32	0.0096	4.82	9.64	6
FAR I RSW LANDFILL	OAE-2005-10-C	Upgradient	228.45	1012.4	0.010	0.0001	0.05	0.1	0.32	0.0086	4.29	8.57	6
FAR I RSW LANDFILL	S-2	Upgradient	38.34	1001.11	0.033	0.0001	0.05	0.1	0.32	0.0289	14.47	28.94	3
FAR I RSW LANDFILL	S-4 ⁷	Upgradient	-	-	-	-	-	-	-	-	-	-	-
FAR I RSW LANDFILL	S-5	Upgradient	5.91	996.29	0.006	0.0001	0.05	0.1	0.32	0.0057	2.86	5.71	3
FAR I RSW LANDFILL	S-6	Upgradient	11.68	994.98	0.003	0.0001	0.05	0.1	0.32	0.0026	1.29	2.57	3
FAR I RSW LANDFILL	S-7	Downgradient	45.31	965.3	0.023	0.0001	0.05	0.1	0.32	0.0202	10.11	20.22	3
FAR I RSW LANDFILL	S-10	Downgradient	34.07	971.12	0.013	0.0001	0.05	0.1	0.32	0.0111	5.54	11.09	6
FAR I RSW LANDFILL	S-17	Upgradient	195.46	1002.54	0.009	0.0001	0.05	0.1	0.32	0.0084	4.20	8.40	6
FAR I RSW LANDFILL	S-18	Downgradient	157.79	997.58	0.008	0.0001	0.05	0.1	0.32	0.0072	3.62	7.23	6
FAR I RSW LANDFILL	S-19A	Upgradient	100.92	997.68	0.004	0.0001	0.05	0.1	0.32	0.0033	1.65	3.30	6
FAR I RSW LANDFILL	S-20	Downgradient	45.09	960.79	0.055	0.0001	0.05	0.1	0.32	0.0484	24.22	48.43	6
FAR I RSW LANDFILL	S-GS-1	Downgradient	22.64	991.93	0.004	0.0001	0.05	0.1	0.32	0.0035	1.76	3.53	6
FAR I RSW LANDFILL	S-GS-2	Downgradient	28.66	983.09	0.011	0.0001	0.05	0.1	0.32	0.0098	4.89	9.78	6
FAR I RSW LANDFILL	S-GS-3	Upgradient	65.71	973.71	0.015	0.0001	0.05	0.1	0.32	0.0134	6.72	13.44	6

Notes and Abbreviations:

Measurements and calculations represent conditions on April 21, 2025.

1. Groundwater Monitoring Network Evaluation; Cardinal Site – Former FAR I Residual Solid Waste (RSW) Landfill, Brilliant, Ohio prepared by Geosyntec Consultants in July 2016.

2. Elevations datum is National Geodetic Vertical Datum of 1929 (NGVD29).

3. Hydraulic gradient was calculated from a potentiometric surface from the most recent representative conditions.

4. Low and high conductivity values are from the 2016 Groundwater Monitoring Network Evaluation, with a representative value chosen at the midpoint of this range.

5. Well diameter represents the diameter of the borehole (sandpack).

6. Residence time is an estimation of how long it would take groundwater to travel a distance equivalent to the well diameter at the calculated velocity.

7. -: Measurements not available from this event.

ft = feet

cm/sec = centimeters per second

in = inch

TABLE 5
GROUNDWATER FLOW CALCULATIONS - APRIL 2025
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Program	Well	Hydraulic Location	Residence Time in Well ⁶ (days)		
			Low	Representative	High
FAR I RSW LANDFILL	CA-0623A	Upgradient	0.052	0.104	51.84
FAR I RSW LANDFILL	OAE-2005-10-C	Upgradient	0.058	0.117	58.33
FAR I RSW LANDFILL	S-2	Upgradient	0.009	0.017	8.64
FAR I RSW LANDFILL	S-4 ⁷	Upgradient	-	-	-
FAR I RSW LANDFILL	S-5	Upgradient	0.044	0.088	43.76
FAR I RSW LANDFILL	S-6	Upgradient	0.097	0.194	97.19
FAR I RSW LANDFILL	S-7	Downgradient	0.012	0.025	12.37
FAR I RSW LANDFILL	S-10	Downgradient	0.045	0.090	45.10
FAR I RSW LANDFILL	S-17	Upgradient	0.060	0.119	59.56
FAR I RSW LANDFILL	S-18	Downgradient	0.069	0.138	69.13
FAR I RSW LANDFILL	S-19A	Upgradient	0.152	0.303	151.64
FAR I RSW LANDFILL	S-20	Downgradient	0.010	0.021	10.32
FAR I RSW LANDFILL	S-GS-1	Downgradient	0.142	0.284	141.84
FAR I RSW LANDFILL	S-GS-2	Downgradient	0.051	0.102	51.15
FAR I RSW LANDFILL	S-GS-3	Upgradient	0.037	0.074	37.19

Notes and Abbreviations:

Measurements and calculations represent conditions on April 21, 2025.

1. Groundwater Monitoring Network Evaluation; Cardinal Site – Former FAR I Residual Solid Waste (RSW) Landfill, Brilliant, Ohio prepared by Geosyntec Consultants in July 2016.

2. Elevations datum is National Geodetic Vertical Datum of 1929 (NGVD29).

3. Hydraulic gradient was calculated from a potentiometric surface from the most recent representative conditions.

4. Low and high conductivity values are from the 2016 Groundwater Monitoring Network Evaluation, with a representative value chosen at the midpoint of this range.

5. Well diameter represents the diameter of the borehole (sandpack).

6. Residence time is an estimation of how long it would take groundwater to travel a distance equivalent to the well diameter at the calculated velocity.

7. -: Measurements not available from this event.

ft = feet

cm/sec = centimeters per second

in = inch

TABLE 6
GROUNDWATER FLOW CALCULATIONS - OCTOBER 2025
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Program	Well	Hydraulic Location	Depth to Water (ft)	Potentiometric Elevation (ft)	Gradient ³ (ft/ft)	Hydraulic Conductivity ⁴ (cm/sec)			Effective Porosity	Groundwater Velocity (ft/day)			Well Diameter ⁵ (in)
						Low	Representative	High		Low	Representative	High	
FAR I RSW Landfill	CA-0623A	Upgradient	153.81	1008.91	0.012	0.0001	0.05	0.1	0.32	0.0110	5.50	10.99	6
FAR I RSW Landfill	OAE-2005-10-C	Upgradient	235.87	1004.98	0.004	0.0001	0.05	0.1	0.32	0.0037	1.85	3.70	6
FAR I RSW Landfill	S-2	Upgradient	41.06	998.39	0.052	0.0001	0.05	0.1	0.32	0.0462	23.10	46.20	3
FAR I RSW Landfill	S-4	Upgradient	21.95	995.38	0.002	0.0001	0.05	0.1	0.32	0.0018	0.88	1.75	3
FAR I RSW Landfill	S-5	Upgradient	4.99	997.21	0.013	0.0001	0.05	0.1	0.32	0.0114	5.69	11.38	3
FAR I RSW Landfill	S-6	Upgradient	12.34	994.32	0.004	0.0001	0.05	0.1	0.32	0.0037	1.86	3.72	3
FAR I RSW Landfill	S-7	Downgradient	51.13	959.48	0.057	0.0001	0.05	0.1	0.32	0.0509	25.44	50.88	3
FAR I RSW Landfill	S-10	Downgradient	38.34	966.85	0.050	0.0001	0.05	0.1	0.32	0.0446	22.31	44.62	6
FAR I RSW Landfill	S-17	Upgradient	197.32	1000.68	0.008	0.0001	0.05	0.1	0.32	0.0075	3.76	7.53	6
FAR I RSW Landfill	S-18 ⁷	Downgradient	-	-	-	-	-	-	-	-	-	-	-
FAR I RSW Landfill	S-19A ⁷	Upgradient	-	-	-	-	-	-	-	-	-	-	-
FAR I RSW Landfill	S-20	Downgradient	45.6	960.28	0.003	0.0001	0.05	0.1	0.32	0.0026	1.31	2.61	6
FAR I RSW Landfill	S-GS-1	Downgradient	23.87	990.7	0.004	0.0001	0.05	0.1	0.32	0.0036	1.79	3.58	6
FAR I RSW Landfill	S-GS-2	Downgradient	30.85	980.9	0.016	0.0001	0.05	0.1	0.32	0.0137	6.87	13.75	6
FAR I RSW Landfill	S-GS-3	Upgradient	65.03	974.39	0.004	0.0001	0.05	0.1	0.32	0.0033	1.63	3.26	6

Notes and Abbreviations:

Measurements and calculations represent conditions on October 21, 2025.

1. Groundwater Monitoring Network Evaluation; Cardinal Site – Former FAR I Residual Solid Waste (RSW) Landfill, Brilliant, Ohio prepared by Geosyntec Consultants in July 2016.

2. Elevations datum is National Geodetic Vertical Datum of 1929 (NGVD29).

3. Hydraulic gradient was calculated from a potentiometric surface from the most recent representative conditions.

4. Low and high conductivity values are from the 2016 Groundwater Monitoring Network Evaluation, with a representative value chosen at the midpoint of this range.

5. Well diameter represents the diameter of the borehole (sandpack).

6. Residence time is an estimation of how long it would take groundwater to travel a distance equivalent to the well diameter at the calculated velocity.

7. -: Measurements not available from this event.

ft = feet

cm/sec = centimeters per second

in = inch

TABLE 6
GROUNDWATER FLOW CALCULATIONS - OCTOBER 2025
 FAR I RSW LANDFILL
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

Program	Well	Hydraulic Location	Residence Time in Well ⁶ (days)		
			Low	Representative	High
FAR I RSW Landfill	CA-0623A	Upgradient	0.045	0.091	45.48
FAR I RSW Landfill	OAE-2005-10-C	Upgradient	0.135	0.270	135.22
FAR I RSW Landfill	S-2	Upgradient	0.005	0.011	5.41
FAR I RSW Landfill	S-4	Upgradient	0.143	0.285	142.60
FAR I RSW Landfill	S-5	Upgradient	0.022	0.044	21.96
FAR I RSW Landfill	S-6	Upgradient	0.067	0.134	67.22
FAR I RSW Landfill	S-7	Downgradient	0.005	0.010	4.91
FAR I RSW Landfill	S-10	Downgradient	0.011	0.022	11.21
FAR I RSW Landfill	S-17	Upgradient	0.066	0.133	66.41
FAR I RSW Landfill	S-18 ⁷	Downgradient	-	-	-
FAR I RSW Landfill	S-19A ⁷	Upgradient	-	-	-
FAR I RSW Landfill	S-20	Downgradient	0.192	0.383	191.51
FAR I RSW Landfill	S-GS-1	Downgradient	0.139	0.279	139.50
FAR I RSW Landfill	S-GS-2	Downgradient	0.036	0.073	36.38
FAR I RSW Landfill	S-GS-3	Upgradient	0.154	0.307	153.60

Notes and Abbreviations:

Measurements and calculations represent conditions on October 21, 2025.

1. Groundwater Monitoring Network Evaluation; Cardinal Site – Former FAR I Residual Solid Waste (RSW) Landfill, Brilliant, Ohio prepared by Geosyntec Consultants in July 2016.

2. Elevations datum is National Geodetic Vertical Datum of 1929 (NGVD29).

3. Hydraulic gradient was calculated from a potentiometric surface from the most recent representative conditions.

4. Low and high conductivity values are from the 2016 Groundwater Monitoring Network Evaluation, with a representative value chosen at the midpoint of this range.

5. Well diameter represents the diameter of the borehole (sandpack).

6. Residence time is an estimation of how long it would take groundwater to travel a distance equivalent to the well diameter at the calculated velocity.

7. -: Measurements not available from this event.

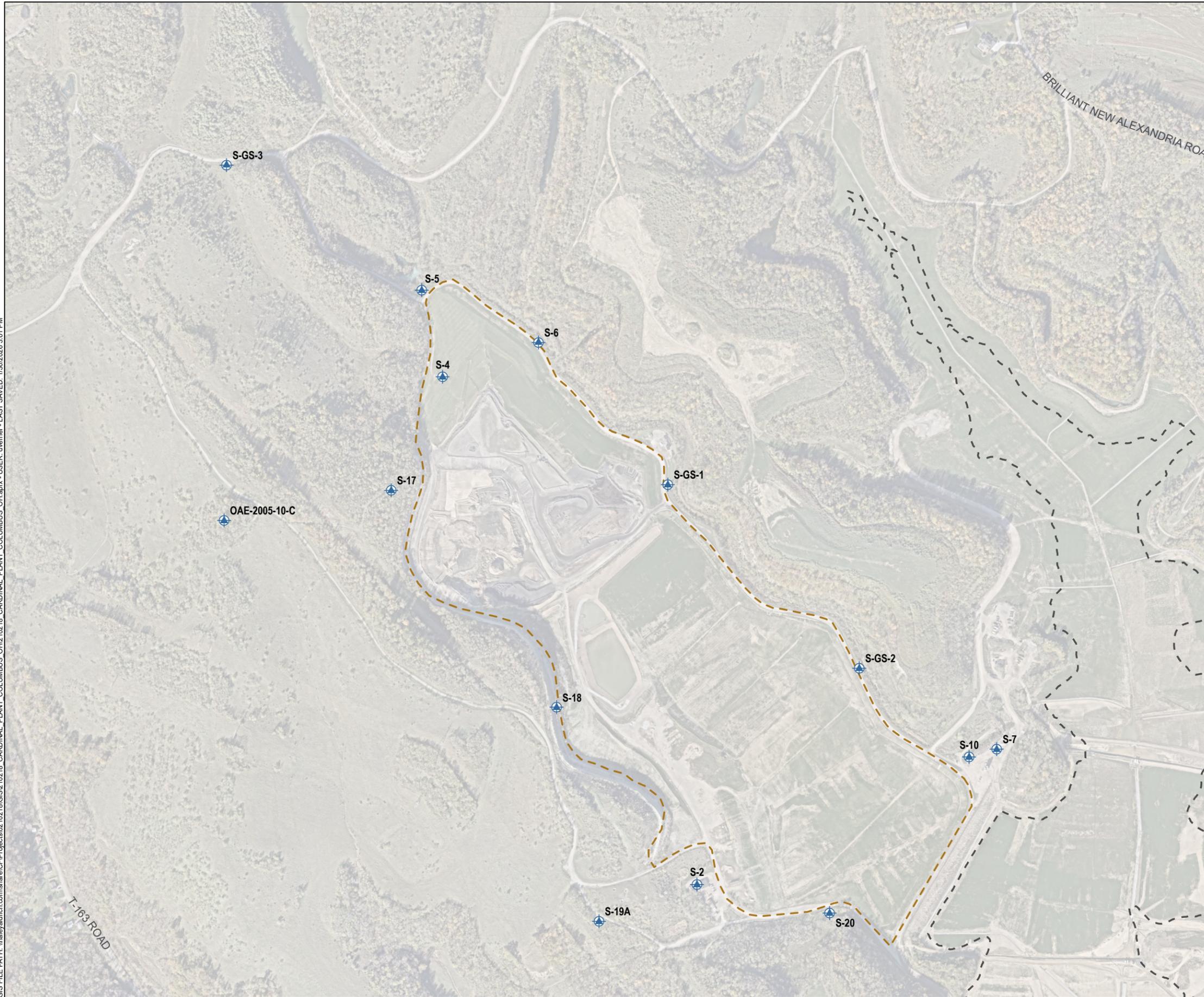
ft = feet

cm/sec = centimeters per second

in = inch

FIGURES

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LEGEND

-  MONITORING WELL
-  FAR I RESIDUAL SOLID WASTE LANDFILL
-  FLY ASH RESERVOIR II (FAR II)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, OCTOBER 27, 2025



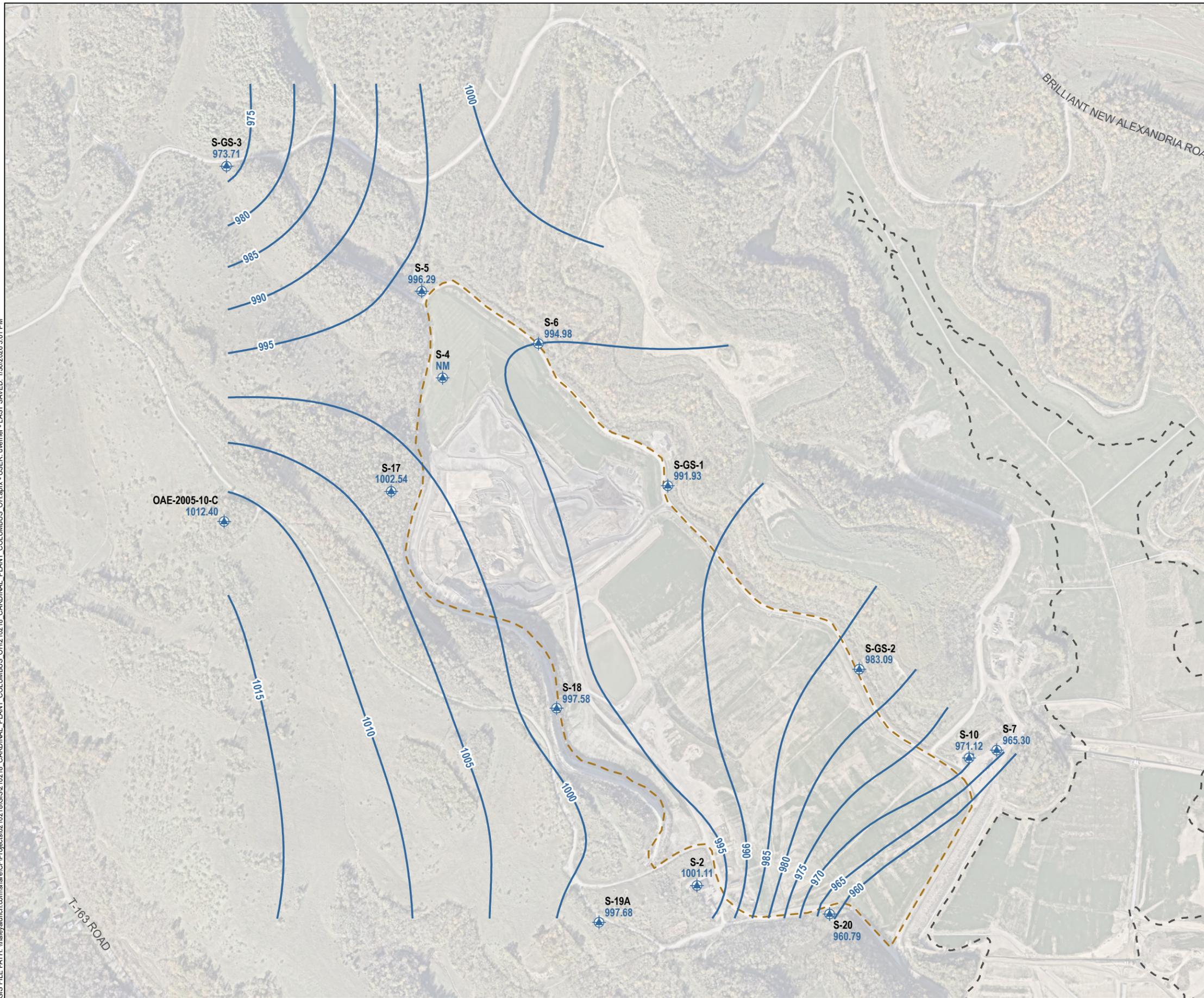
HALEY ALDRICH CARDINAL OPERATING COMPANY
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

**CCR UNIT AND MONITORING WELLS
 FAR I RSW LANDFILL**

JANUARY 2026

FIGURE 1

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LEGEND

-  MONITORING WELL WITH **GROUNDWATER ELEVATION** IN FEET
-  GROUNDWATER ELEVATION CONTOUR, 5-FT INTERVAL (NGVD29)
-  FAR I RESIDUAL SOLID WASTE LANDFILL
-  FLY ASH RESERVOIR II (FAR II)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DEFINITIONS:
 NM = NOT MEASURED
 FT = FOOT
 NGVD29 = NATIONAL GEODETIC VERTICAL DATUM 1929
3. GROUNDWATER ELEVATION MEASURE ON APRIL 21, 2025.
4. ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
5. AERIAL IMAGERY SOURCE: NEARMAP, OCTOBER 27, 2025



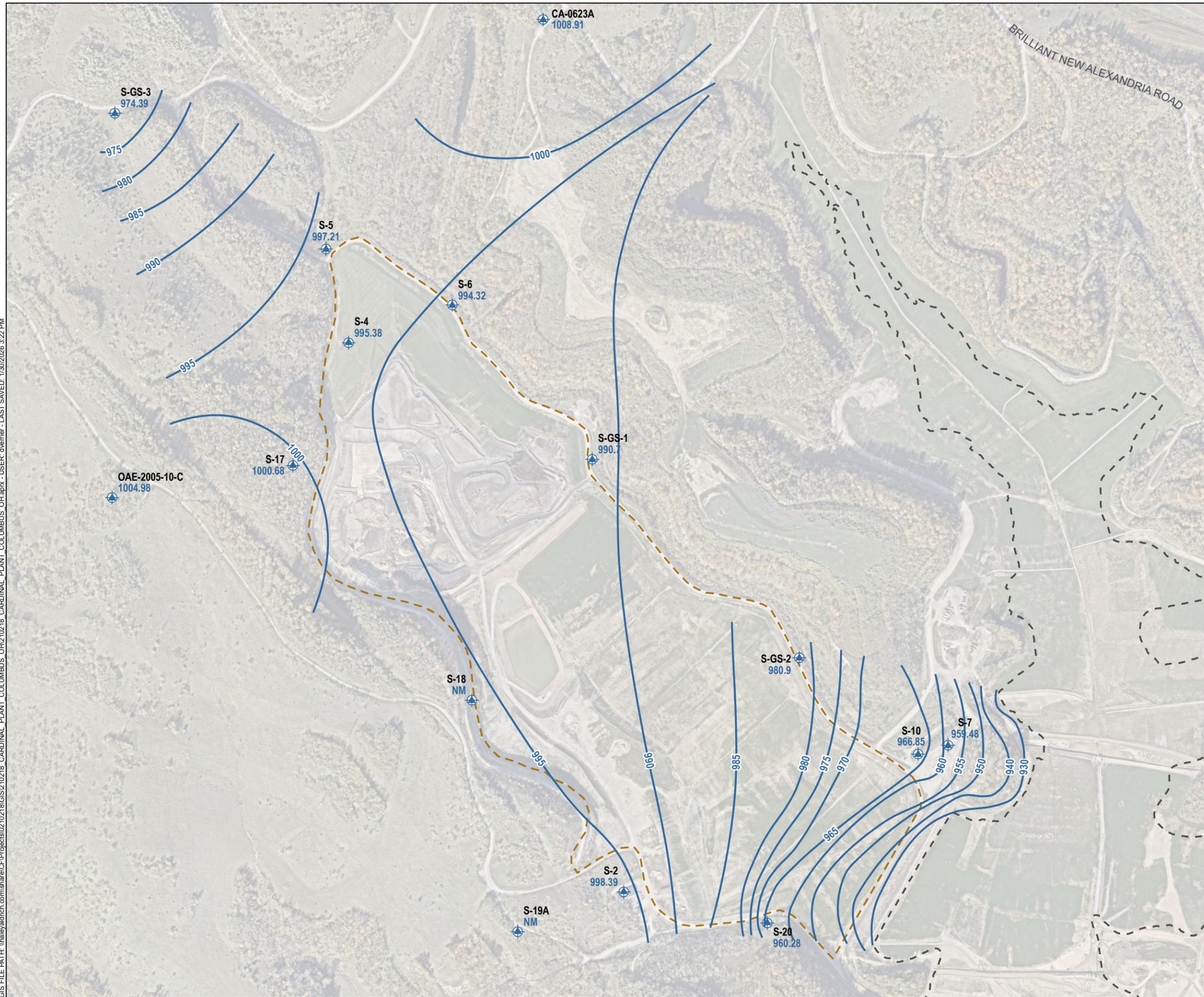
HALEY ALDRICH CARDINAL OPERATING COMPANY
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

**POTENTIOMETRIC SURFACE
 FAR I RSW LANDFILL
 APRIL 2025**

JANUARY 2026

FIGURE 2

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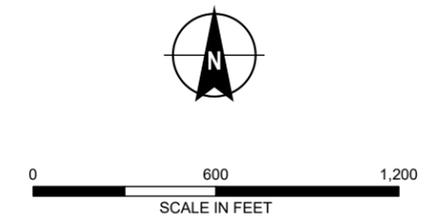


LEGEND

-  MONITORING WELL WITH **GROUNDWATER ELEVATION** IN FEET
-  GROUNDWATER ELEVATION CONTOUR, 5-FT INTERVAL (NGVD29)
-  RESIDUAL SOLID WASTE LANDFILL (FAR I)
-  FLY ASH RESERVOIR (FAR II)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DEFINITIONS:
 NM = NOT MEASURED
 FT = FOOT
 NGVD29 = NATIONAL GEODETIC VERTICAL DATUM 1929
3. GROUNDWATER ELEVATIONS MEASURED OCTOBER 21, 2025.
4. ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
5. AERIAL IMAGERY SOURCE: NEARMAP, OCTOBER 27, 2025



HALEY ALDRICH CARDINAL OPERATING COMPANY
 CARDINAL UPLAND DISPOSAL FACILITY
 BRILLIANT, OHIO

**POTENTIOMETRIC SURFACE
 FAR I RSW LANDFILL
 OCTOBER 2025**

JANUARY 2026

FIGURE 3

APPENDIX A
ASD for the April 2025 Monitoring Event

**REPORT ON
ALTERNATIVE SOURCE DEMONSTRATION
FOR THE FAR I RSW LANDFILL
SPRING 2025 SAMPLING EVENT
CARDINAL UPLAND DISPOSAL FACILITY
BRILLIANT, OHIO**

by
Haley & Aldrich, Inc.
Cleveland, Ohio

for
Cardinal Operating Company
Brilliant, Ohio

File No. 0210218
November 2025



Executive Summary

Haley & Aldrich, Inc. prepared this Alternative Source Demonstration (ASD) for the Cardinal Operating Company to determine if there is an alternate source of Appendix III constituents at the Cardinal Upland Disposal Facility (Site) FAR I RSW Landfill (Landfill) located in Brilliant, Ohio. The evaluation presented herein was prepared in response to statistically significant increases (SSIs) of Appendix III constituents identified during the semiannual groundwater sampling events held in April and June 2025. Detection monitoring results indicated that chloride concentrations in monitoring well S-20 were identified above background concentrations. Through the ASD evaluation, it was determined that based on the groundwater flow direction, distance from the existing FAR I RSW Landfill, and the proximity to the former Fly Ash Reservoir I (FAR I) surface impoundment (underlying the Landfill), the concentrations of chloride are attributable to the former FAR I and not the FAR I RSW Landfill.

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1. Introduction

1.1 INTRODUCTION AND PURPOSE

To maintain compliance with the United States Environmental Protection Agency's (USEPA's) Code of Federal Regulations (CFR) regarding the disposal of coal combustion residuals (CCRs) in landfills and surface impoundments (40 CFR §§257.90 through 257.98, the "CCR Rule"), semiannual groundwater sampling events have been conducted at the Cardinal Operating Company (Cardinal) Upland Disposal Facility FAR I RSW Landfill (Landfill), a regulated CCR unit operated by Cardinal in Brilliant, Ohio (Site). The FAR I RSW Landfill is an existing, active CCR landfill located approximately 1 mile north of the Cardinal Power Plant. It is used for the management and disposal of flue gas desulfurization (FGD) gypsum material, fly ash, bottom ash, and byproducts from the plant's flue gas scrubber system and solids from the wastewater treatment plant. Located in a portion of the Blockhouse Hollow (Blockhouse Run) that was formerly surface-mined for Pittsburgh No. 8 coal, the footprint of the Landfill overlies approximately 75 acres of the formerly surface-mined area and former FAR I surface impoundment. The former FAR I no longer impounds water or receives CCRs.

The CCR Rule provides a process under 40 CFR § 257.94(e)(2) for the owner/operator of a regulated CCR unit to demonstrate that a statistically significant increase (SSI) above background concentrations of Appendix III constituents during the detection monitoring program is from an alternative source via an Alternative Source Demonstration (ASD). The purpose of this report is to document that alternative sources are responsible for the SSIs of constituents above background identified during FAR I RSW Landfill detection monitoring in April and June 2025.

1.2 SITE DESCRIPTION

The Site is located in Jefferson County, approximately 1 mile northwest of Brilliant, Ohio and is operated by Cardinal. The three coal-powered units that comprise the generating station are located immediately west of the Ohio River (Plant), with Units 1 and 2 in operation since 1967 and Unit 3 in operation since 1977. This study focuses on the FAR I RSW Landfill that is located at the Cardinal Upland Disposal Facility, approximately 1 mile north of the Plant, as shown on Figure 1. The FAR I RSW Landfill currently has two cells constructed totaling 44.28 acres for active disposal, with the ability to expand the surface area to 129 acres and a disposal capacity of greater than 18 million cubic yards.

1.3 SITE GEOLOGY AND HYDROGEOLOGY

1.3.1 Geologic Setting

The geologic setting in the vicinity of the FAR I RSW Landfill can be described as sedimentary bedrock overlain by unconsolidated deposits associated with the Ohio River Valley. Cross-sections prepared by GeoSyntec are presented in Appendix A that show the geologic units below the FAR I RSW Landfill. As depicted in the cross-sections, two distinct lithologies are present consisting of the following:

- Unconsolidated Material – a product of previous earthwork in the area for the construction of the former FAR I. Fill materials are approximately 10 to 20 feet thick. This material is also composed of weathered rock and colluvial soils on the valley slopes.

- The bedrock geology consists of nearly horizontal sequences of lower Permian and upper Pennsylvanian System sedimentary rock.
 - The Permian age Dunkard Group occurs only on the tops of some of the ridges above approximately elevation 1,250 feet northwest and west of the Landfill site.
 - The Monongahela Group represents a considerable thickness of shale, sandstone, limestone, coal, and clay, approaching 230 feet thick in Jefferson County. These rocks form much of the slopes above the current level of the former FAR I. The base of the Monongahela Group is the Pittsburgh (No. 8) Coal.
 - Below the Monongahela Group is the Conemaugh Group. These rocks consist of shale, sandstone, limestone, coal, and clay, but contain less coal than the overlying Monongahela Group. The Conemaugh Group contains the Morgantown Sandstone, a thick, conglomeratic sandstone that forms a developed aquifer in the area. The Conemaugh Group in Jefferson County is over 500 feet thick.
 - Beneath the Morgantown Sandstone is a sequence of shale and limestone which is also part of the Conemaugh Group. This stratigraphic sequence, immediately below the Morgantown Sandstone, includes the Elk Lick Limestone, the Skelly Limestone and shale, the Ames Limestone, several thick shale sequences with or without coal (Duquesne and Harlem), and the Cow Run Sandstone.

1.3.2 Hydrogeologic Setting

Groundwater flows within the uppermost aquifer indicate that it is under water table flow conditions and mimics the topography, flowing from the northwest to the southeast toward the Fly Ash Reservoir II (FAR II) area. The upper aquifer system consists of unconsolidated mine waste, in addition to the Connellsville Sandstone, the Summerfield Limestone, and the Bellaire Sandstone above the shale that caps the Morgantown Sandstone. Groundwater flow maps prepared for the Site from December 2018 through August 2025 are presented in Appendix B for the FAR I RSW Landfill.

Hydraulic conductivity in the aquifers range from 1×10^{-2} centimeters per second (cm/sec) to 1×10^{-5} cm/sec. The upper aquitard (separating the uppermost aquifer from the Morgantown Sandstone) is readily distinguished by the very low hydraulic conductivity values, in the 1×10^{-8} to 1×10^{-9} cm/sec range. The lower aquitard below the Morgantown Sandstone exhibits hydraulic conductivity values in the 1×10^{-5} to 1×10^{-6} cm/sec range.

1.4 GROUNDWATER MONITORING SYSTEM

The groundwater monitoring network consists of nine wells located upgradient (OAE 2005 10C, CA-0623A, S-GS-3, S-2, S-4, S-5, S-6, S-17, and S-19A) and seven wells located downgradient (S-GS-1, S-GS-2, S-1, S-7, S-10, S-18, and S-20) of the FAR I RSW Landfill (Figure 2).

This network provides detection monitoring for the uppermost aquifer (Shallow Aquifer). Consistent with 40 CFR §257.91(c), the groundwater monitoring network has a minimum of one upgradient and three downgradient wells that accurately represent the quality of both background groundwater and groundwater passing the waste boundary of the FAR I RSW Landfill.

1.5 APRIL AND JUNE 2025 DETECTION MONITORING STATISTICALLY SIGNIFICANT INCREASES

Water samples were collected in April and June 2025 from the FAR I RSW Landfill monitoring well network for detection monitoring. A detection of one SSI (for chloride) greater than background was identified in both the April and June 2025 samples for S-20 (Table 1, Table 2, and Appendix C). As such, the source of this elevated value was investigated, and the results of that evaluation are presented herein.

1.6 CCR RULE REQUIREMENTS

If the owner or operator of the CCR unit determines there are SSIs of Appendix III constituents, then 40 CFR §257.94(e)(2) states:

“The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority verifying the accuracy of the information in the report. If a successful demonstration is completed within the 90-day period, the owner or operator of the CCR unit may continue with a detection monitoring program under this section. If a successful demonstration is not completed within the 90-day period, the owner or operator of the CCR unit must initiate an assessment monitoring program as required under § 257.95. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority.”

2. Other Potential Sources

Monitoring well S-20 was the only monitoring well in the FAR I RSW Landfill monitoring network that exceeded background SSI values for chloride. The location of S-20 is approximately 2,700 feet downgradient of the active area of the Landfill (Cells 1 and 3). Concentrations in S-20 were previously below the 4.1 milligrams per liter (mg/L) background limit; however, variability has been observed since 2016. The most recent sampling events (April and June 2025) reported concentrations of 7.4 mg/L and 6.3 mg/L, respectively. Additionally, groundwater concentrations within the FAR I RSW Landfill downgradient wells vary from 3.4 mg/L (S-18) to 49.3 mg/L (S-GS-2), indicating variability within the aquifer.

Groundwater flows from northwest to southeast, as presented in Appendix B, placing monitoring well S-20 over 2,700 feet away from the FAR I RSW Landfill active footprint area and less than 60 feet downgradient from the former FAR I. Monitoring wells closer to the current active footprint of the Landfill do not indicate exceedances of background SSI values for chloride based on intrawell statistics (for S-GS-1 and S-GS-2).

The proximity to the current FAR I RSW Landfill, groundwater flow direction, and proximity to the former FAR I surface impoundment suggest that the source of the elevated chloride concentration is not the current FAR I RSW Landfill, but rather the former FAR I underlying the FAR I RSW Landfill. The former FAR I began operations in 1967 and operated until closure activities began in 1990. The reservoir is no longer impounding water or receiving CCRs, and groundwater concentrations are expected to fluctuate as the system moves toward a new steady-state condition. The groundwater concentrations will continue to be monitored during future semiannual groundwater monitoring events.

3. Conclusion

In April and June 2025, detection monitoring of the FAR I RSW Landfill identified SSIs for chloride in monitoring well S-20, a downgradient monitoring well. Through evaluation of the groundwater flow direction, distance from the active portion of the FAR I RSW Landfill, and proximity to the former FAR I, it was determined that the likely source of this concentration is from the former FAR I surface impoundment. The former FAR I is no longer impounding water or receiving CCRs, and the concentrations have shown variability in the past. As such, the FAR I RSW Landfill will remain in detection monitoring in accordance with 40 CFR §257.94.

4. Professional Engineer Certification

Pursuant to 40 CFR §257.94(e)(2), Haley & Aldrich, Inc., on behalf of the Cardinal Operating Company, conducted an Alternative Source Demonstration to substantiate that a source other than the FAR I RSW Landfill caused the statistically significant increase (SSI) identified during detection monitoring. I certify that this report and all attachments were prepared by me or under my direct supervision. I am a professional engineer who is registered in the state of Ohio.

This certification and the underlying data support the conclusion that a source other than the FAR I RSW Landfill is the cause of the SSI for Appendix III constituents identified during detection monitoring of this unit.

The information contained herein is, to the best of my knowledge, true, accurate, and complete.



Steven F. Putrich, P.E.
State of Ohio Professional Engineer
Registration Number 67329

November 21, 2025



References

1. Geosyntec Consultants, 2006. *Hydrogeologic Investigation Report, Permit-To-Install Application*.
2. Geosyntec Consultants, 2016. *Location Restriction Evaluation, Cardinal FAR 1 RSW Landfill*. July.

[https://haleyaldrich.sharepoint.com/sites/CardinalOperatingCompany/Shared Documents/0210218.Cardinal Plant CCR GW/009-FAR I RSW LF ASD \(Spring 2025\)/01_Text/2025-1121_HAI_Cardinal_FAR I ASD_F.docx](https://haleyaldrich.sharepoint.com/sites/CardinalOperatingCompany/Shared Documents/0210218.Cardinal Plant CCR GW/009-FAR I RSW LF ASD (Spring 2025)/01_Text/2025-1121_HAI_Cardinal_FAR I ASD_F.docx)

TABLES

TABLE 1
SUMMARY OF DOWNGRADENT GROUNDWATER MONITORING WELL SAMPLING RESULTS
 CARDINAL POWER PLANT
 BRILLIANT, OHIO

Well Name		S-07	S-10	S-18	S-18	S-20	S-20	S-20
Sample Type		Primary	Primary	Primary	Resample	Primary	Resample	Duplicate
Sample Date		04/30/2025	04/29/2025	04/24/2025	6/9/2025	04/23/2025	6/9/2025	6/9/2025
Laboratory	Units	Pace Analytical	Pace Analytical	Pace Analytical	Field	Pace Analytical	Pace Analytical	Pace Analytical
APPENDIX III CONSTITUENTS								
Boron, Total	mg/L	1.88	0.484	0.513	--	0.243	--	--
Calcium, Total	mg/L	258	269	207	--	285	--	--
Chloride	mg/L	30.8	23	3.4	--	7.4	6.3	6.4
Fluoride	mg/L	0.14	0.25	0.36	--	0.32	--	--
Sulfate	mg/L	1030	886	810	--	772	--	--
Total Dissolved Solids (TDS)	mg/L	1840	1510	1500	--	1550	--	--
pH, Field	SU	7.12	6.9	6.55	7.3	6.4	7.03	--

Well Name		S-GS-1	S-GS-1	S-GS-2
Sample Type		Primary	Resample	Primary
Sample Date		04/28/2025	6/9/2025	04/28/2025
Laboratory	Units	Pace Analytical	Field	Pace Analytical
APPENDIX III CONSTITUENTS				
Boron, Total	mg/L	0.91	--	0.473
Calcium, Total	mg/L	105	--	5.14
Chloride	mg/L	25.1	--	49.3
Fluoride	mg/L	0.72	--	3.2
Sulfate	mg/L	881	--	35.6
Total Dissolved Solids (TDS)	mg/L	1730	--	1400
pH, Field	SU	6.64	7.4	7.54

NOTES:

- < = Not detected at reporting limit
- = Not Analyzed
- mg/L = milligrams per liter
- SU = standard units
- Bold** = detected

TABLE 2
SUMMARY OF UPGRADIENT GROUNDWATER MONITORING WELL SAMPLING RESULTS
 CARDINAL POWER PLANT
 BRILLIANT, OHIO

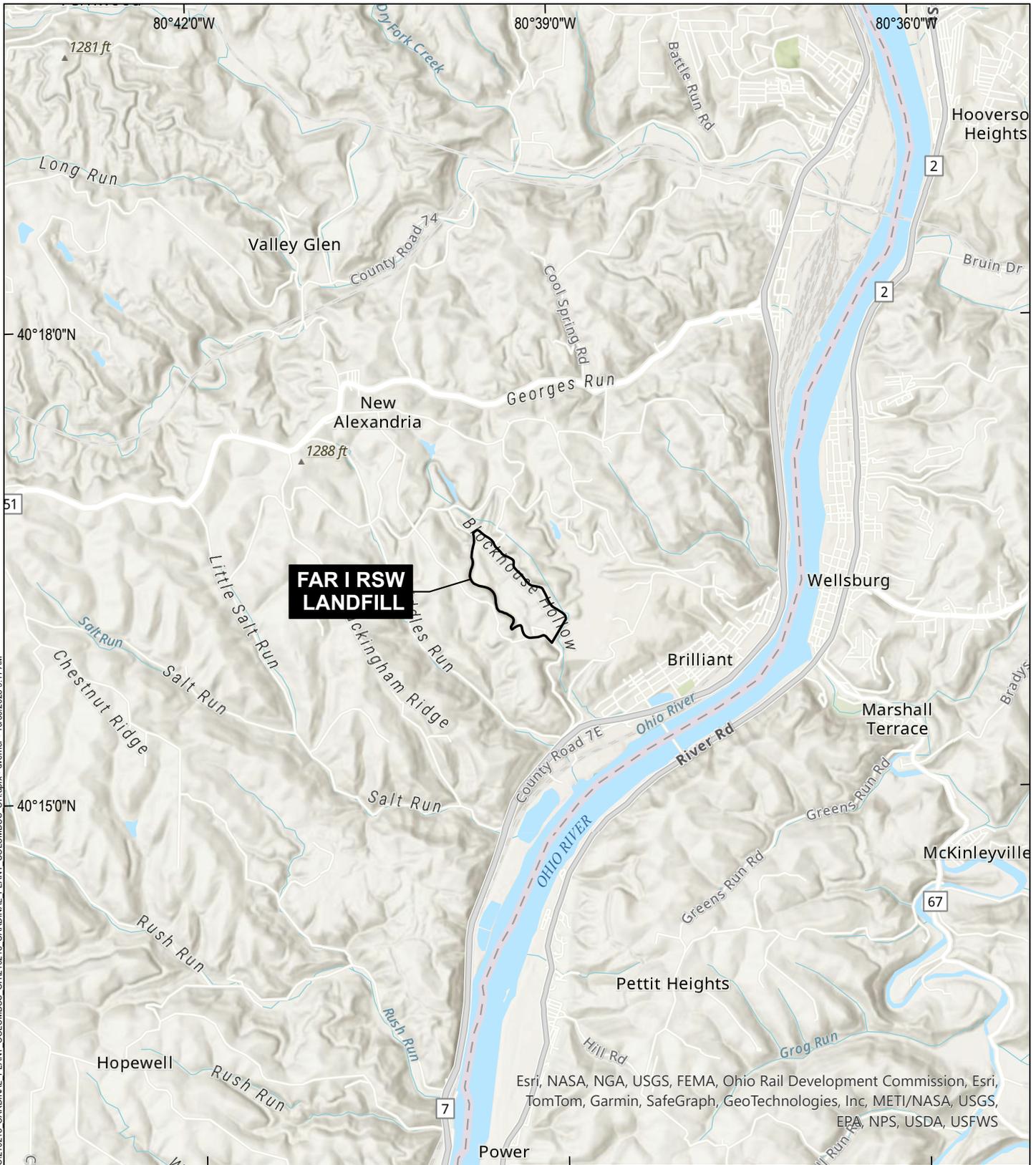
Well Name		CA-0623A	CA-0623A	OAE-2005-10-C	OAE-2005-10-C	S-02	S-04
Sample Type		Primary	Duplicate	Primary	Duplicate	Primary	Primary
Sample Date		04/22/2025	04/22/2025	04/29/2025	04/29/2025	04/28/2025	04/29/2025
Laboratory	Units	Pace Analytical					
APPENDIX III CONSTITUENTS							
Boron, Total	mg/L	0.494	0.51	0.54	0.535	2.24	0.178
Calcium, Total	mg/L	1.09	1.1	6.29	6.07	376	276
Chloride	mg/L	21.8	23.9	14.2	14.5	3.9	5.7
Fluoride	mg/L	2.4	2.3	1.2	1.2	0.41	0.15
Sulfate	mg/L	21.8	21	147	145	1740	755
Total Dissolved Solids (TDS)	mg/L	616	647	1220	1190	2850	1460
pH, Field	SU	8.15	-	7.12	-	6.92	6.82

Well Name		S-05	S-06	S-19A	S-GS-3
Sample Type		Primary	Primary	Primary	Primary
Sample Date		04/30/2025	04/30/2025	04/23/2025	04/22/2025
Laboratory	Units	Pace Analytical	Pace Analytical	Pace Analytical	Pace Analytical
APPENDIX III CONSTITUENTS					
Boron, Total	mg/L	0.192	2.18	0.46	0.34
Calcium, Total	mg/L	111	390	396	5.36
Chloride	mg/L	4.2	31.4	3.4	503
Fluoride	mg/L	1.1	0.12	0.39	2.2
Sulfate	mg/L	176	1320	1860	2.6
Total Dissolved Solids (TDS)	mg/L	550	2160	2730	1970
pH, Field	SU	7.1	6.85	6.12	7.72

NOTES:

- < = Not detected at reporting limit
- = Not Analyzed
- mg/L = milligrams per liter
- SU = standard units
- Bold** = detected

FIGURES



GIS: \\haleyaldrich.com\share\CF\Projects\0210218_GIS\210218_CARDINAL_PLANT_COLUMBUS_OH\210218_CARDINAL_PLANT_COLUMBUS_OH.aprx - dverrier - 10/30/2025 9:17 AM

Esri, NASA, NGA, USGS, FEMA, Ohio Rail Development Commission, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS



MAP SOURCE: ESRI
SITE COORDINATES: 40°16'18"N, 80°39'23"W

**HALEY
ALDRICH**

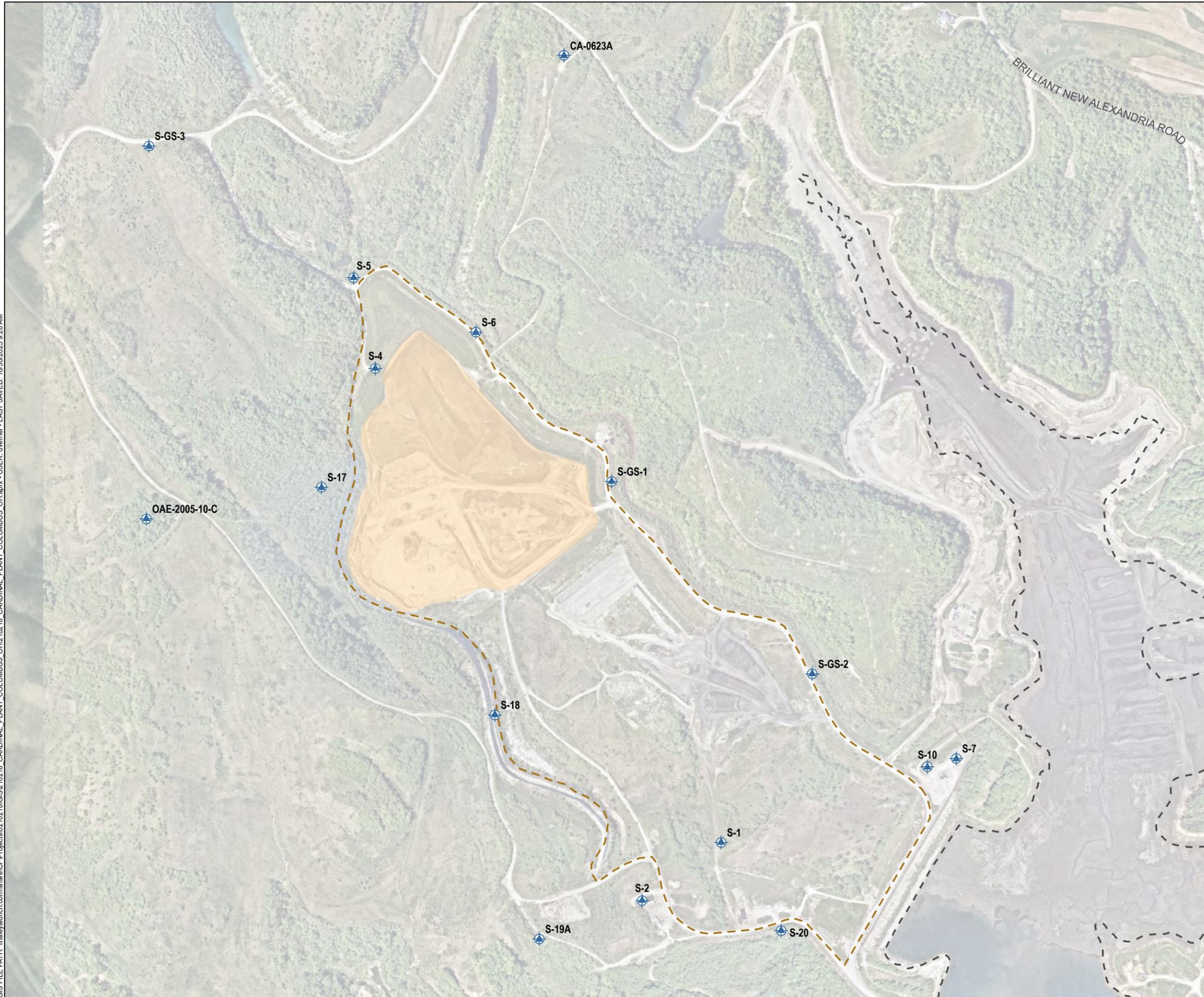
CARDINAL UPLAND DISPOSAL
BRILLIANT, OHIO

**SITE VICINITY
FAR I RSW LANDFILL**

APPROXIMATE SCALE: 1 IN = 1 MI
NOVEMBER 2025

FIGURE 1

C:\GIS\FILE_PATH\haleyaldrich.com\share\CF\Projects\2025\18\GIS\2025\18_CARDINAL_PLANT_COLUMBUS_OH.aprx - USER: dvernier - LAST SAVED: 10/30/2025 9:28 AM



LEGEND

-  MONITORING WELL
-  FAR I RESIDUAL SOLID WASTE LANDFILL
-  FLY ASH RESERVOIR II (FAR II)
-  FAR I RSW LANDFILL - APPROXIMATE ACTIVE FOOTPRINT (CELLS 1 AND 3)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: NEARMAP, MAY 14, 2023



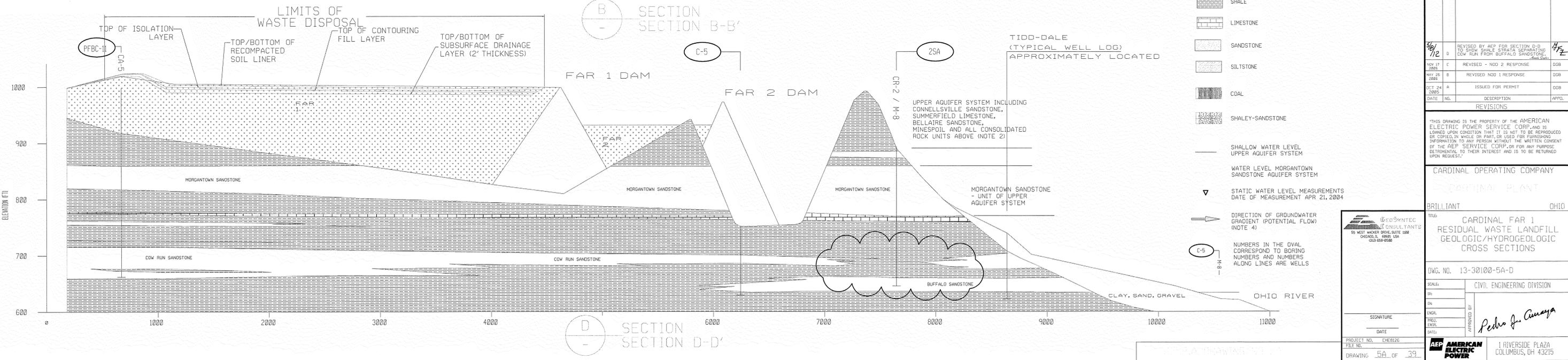
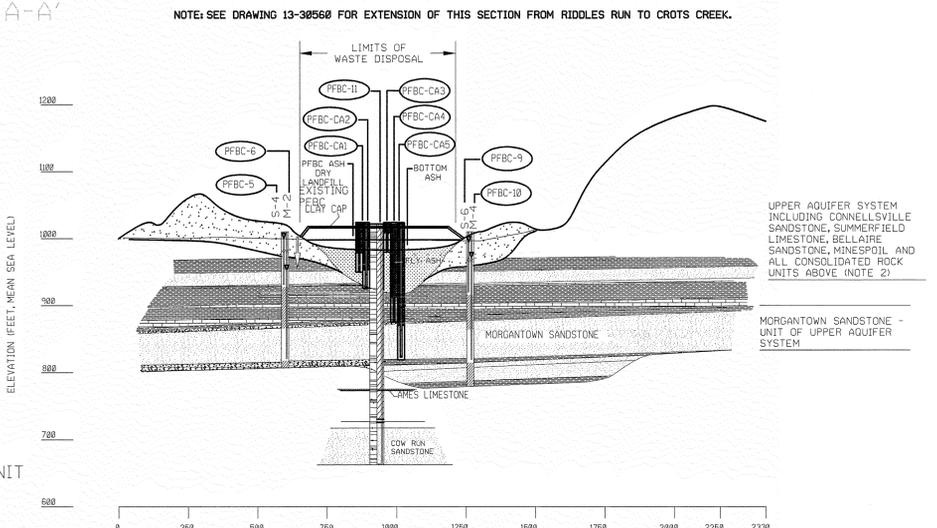
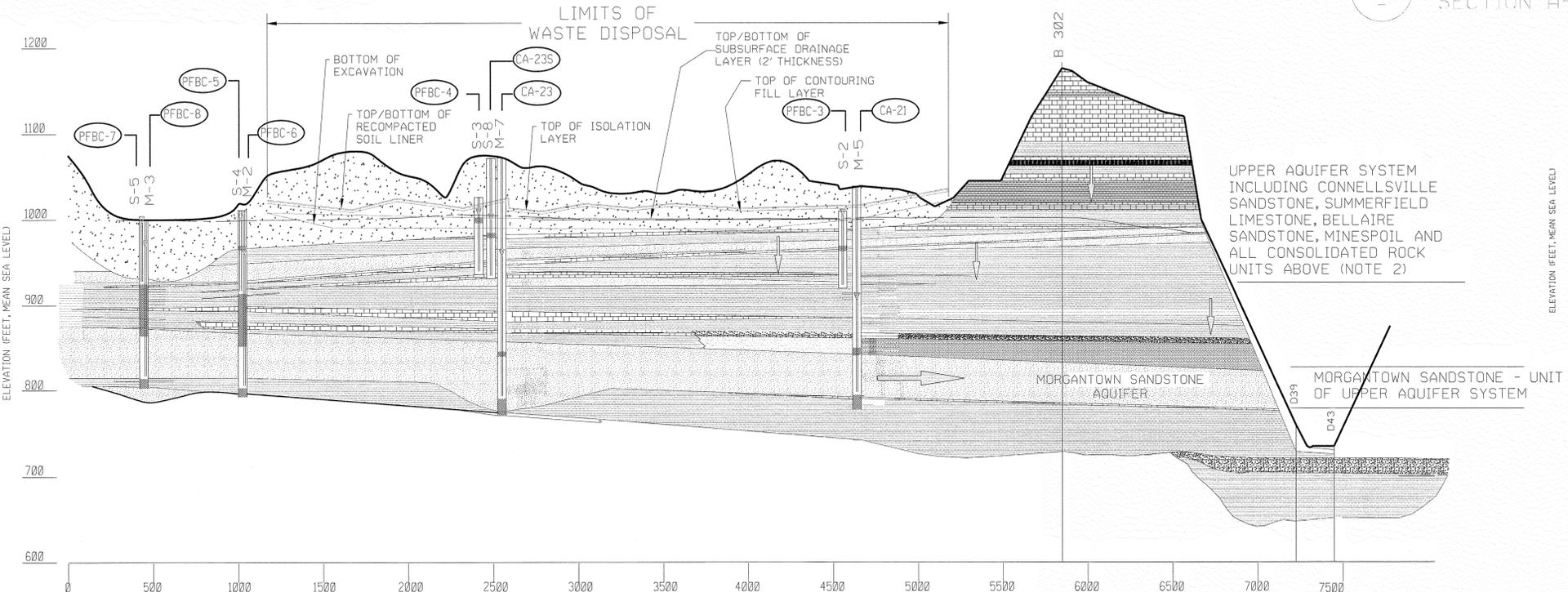
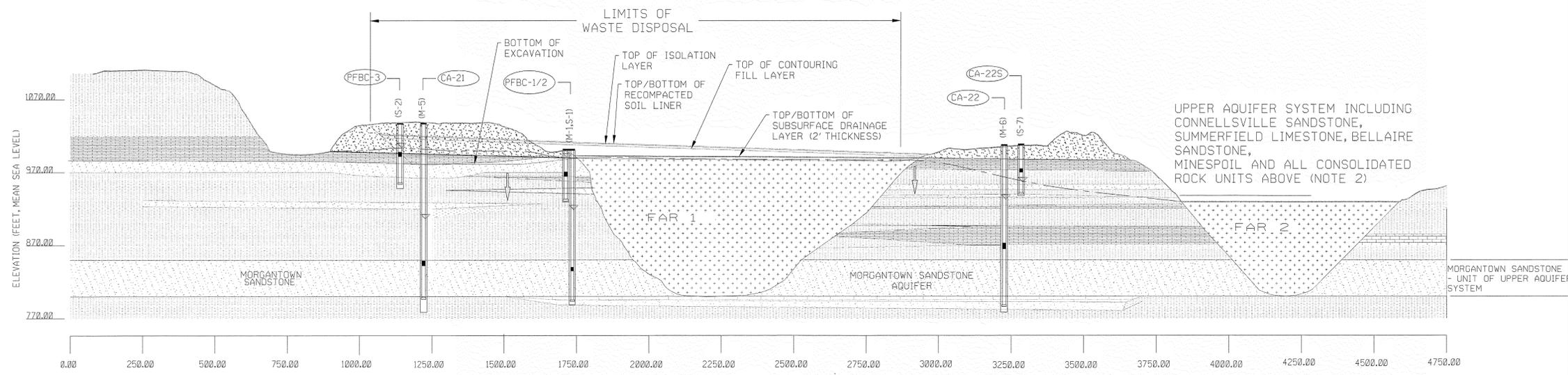
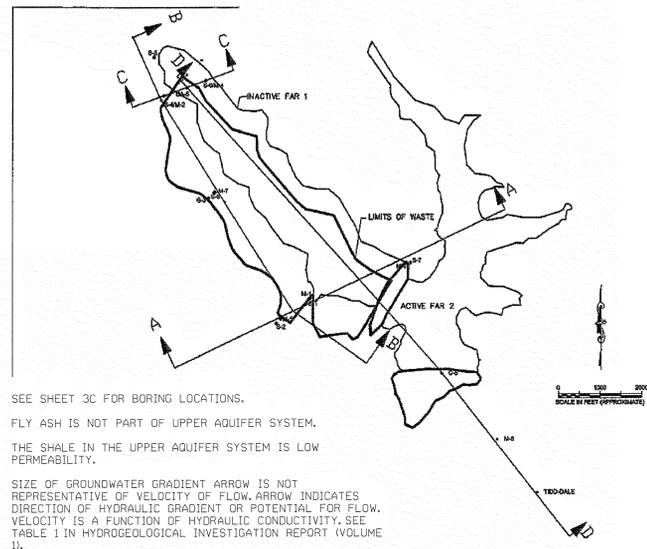
CARDINAL UPLAND DISPOSAL
BRILLIANT, OHIO

**SITE MAP
FAR I RSW LANDFILL**

NOVEMBER 2025

FIGURE 2

APPENDIX A
Geologic Cross-Sections



LEGEND

- FLY ASH
- MINESPOIL
- SHALE
- LIMESTONE
- SANDSTONE
- SILTSTONE
- COAL
- SHALEY-SANDSTONE
- SHALLOW WATER LEVEL UPPER AQUIFER SYSTEM
- WATER LEVEL MORGANTOWN SANDSTONE AQUIFER SYSTEM
- STATIC WATER LEVEL MEASUREMENTS DATE OF MEASUREMENT APR 21, 2004
- DIRECTION OF GROUNDWATER GRADIENT (POTENTIAL FLOW) (NOTE 4)
- NUMBERS IN THE OVAL CORRESPOND TO BORING NUMBERS AND NUMBERS ALONG LINES ARE WELLS

DATE	NO.	DESCRIPTION	APPR.
NOV 17 2003	B	REVISED BY AEP FOR SECTION D-D' TO SHOW SHALE STRATA SEPARATING COW RUN FROM BUFFALO SANDSTONE	4/2
MAY 28 2004	C	REVISED - NOD 2 RESPONSE	DGB
NOV 23 2003	B	REVISED NOD 1 RESPONSE	DGB
NOV 24 2003	A	ISSUED FOR PERMIT	DGB

CARDINAL OPERATING COMPANY
 CARDINAL PLANT
 BRILLIANT OHIO

TITLE: CARDINAL FAR 1 RESIDUAL WASTE LANDFILL GEOLOGIC/HYDROGEOLOGIC CROSS SECTIONS

DWG. NO. 13-30100-5A-D

SCALE: CIVIL ENGINEERING DIVISION

PROJECT NO. CHEBIZIE
 FILE NO.
 DRAWING 5A OF 39

APPROVED BY: Pedro J. Amaya

1 RIVERSIDE PLAZA
 COLUMBUS, OH 43215

APPENDIX B
Potentiometric Surface Maps



- Legend**
- ◆ Groundwater Monitoring Well
 - Groundwater Elevation Contour
 - ➔ Approximate Groundwater Flow Direction

Notes

- Monitoring well coordinates and water level data (collected October 8-16, 2018) provided by Buckeye Power.
- Site features based on information available in Groundwater Monitoring Network Evaluation - Cardinal Site - Former Fly Ash Reservoir I - Residual Solid Waste Landfill (Geosyntec, 2016) provided by Buckeye Power.
- Groundwater elevation units are feet above mean sea level.



**Potentiometric Surface Map - Shallow Water Table
Former Fly Ash Reservoir I RSW Landfill
October 2018**

Buckeye Power, Cardinal Generating Plant
Brilliant, Ohio

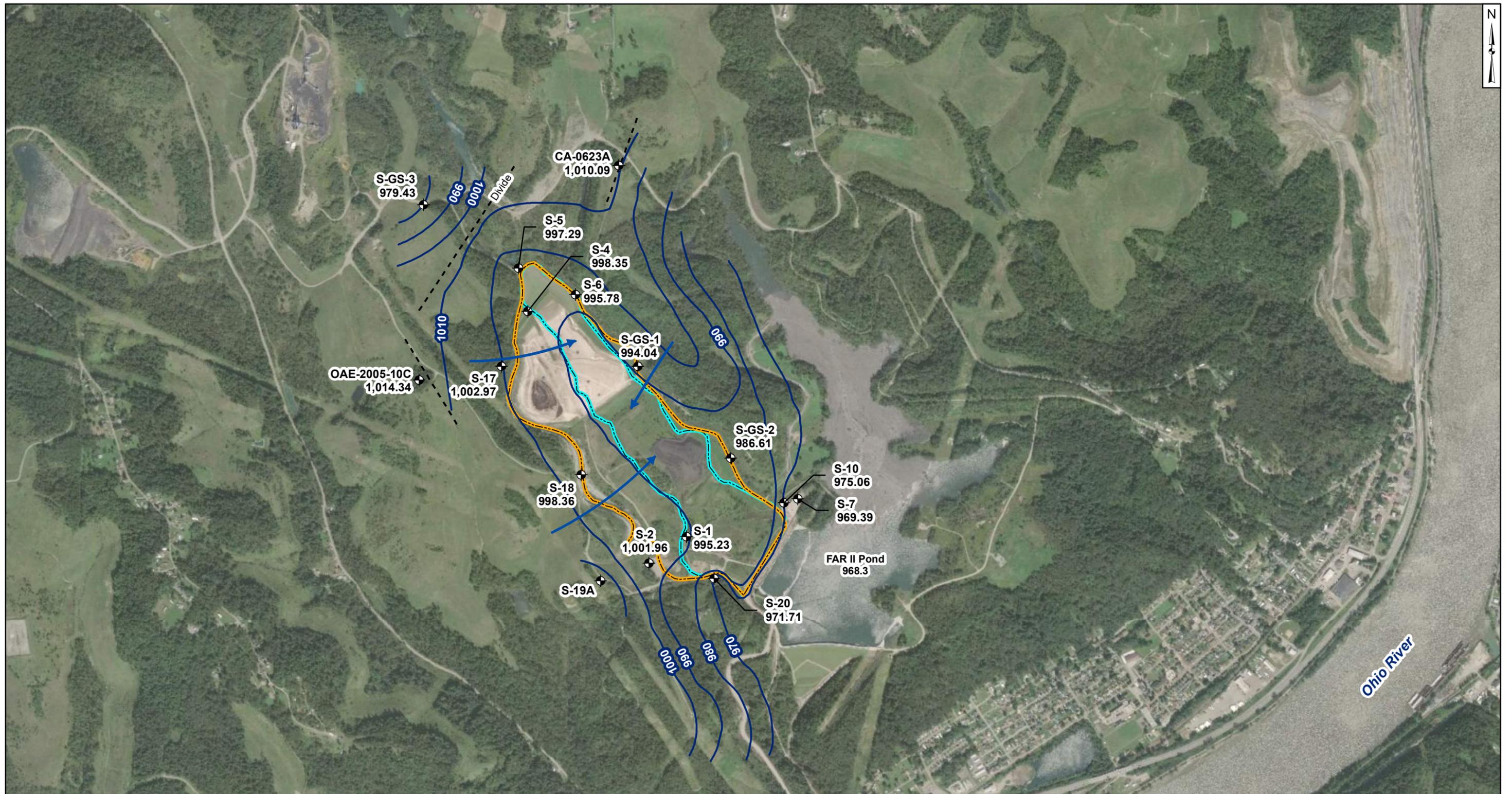
Geosyntec
consultants

Figure

1

Columbus, Ohio

2018/12/24



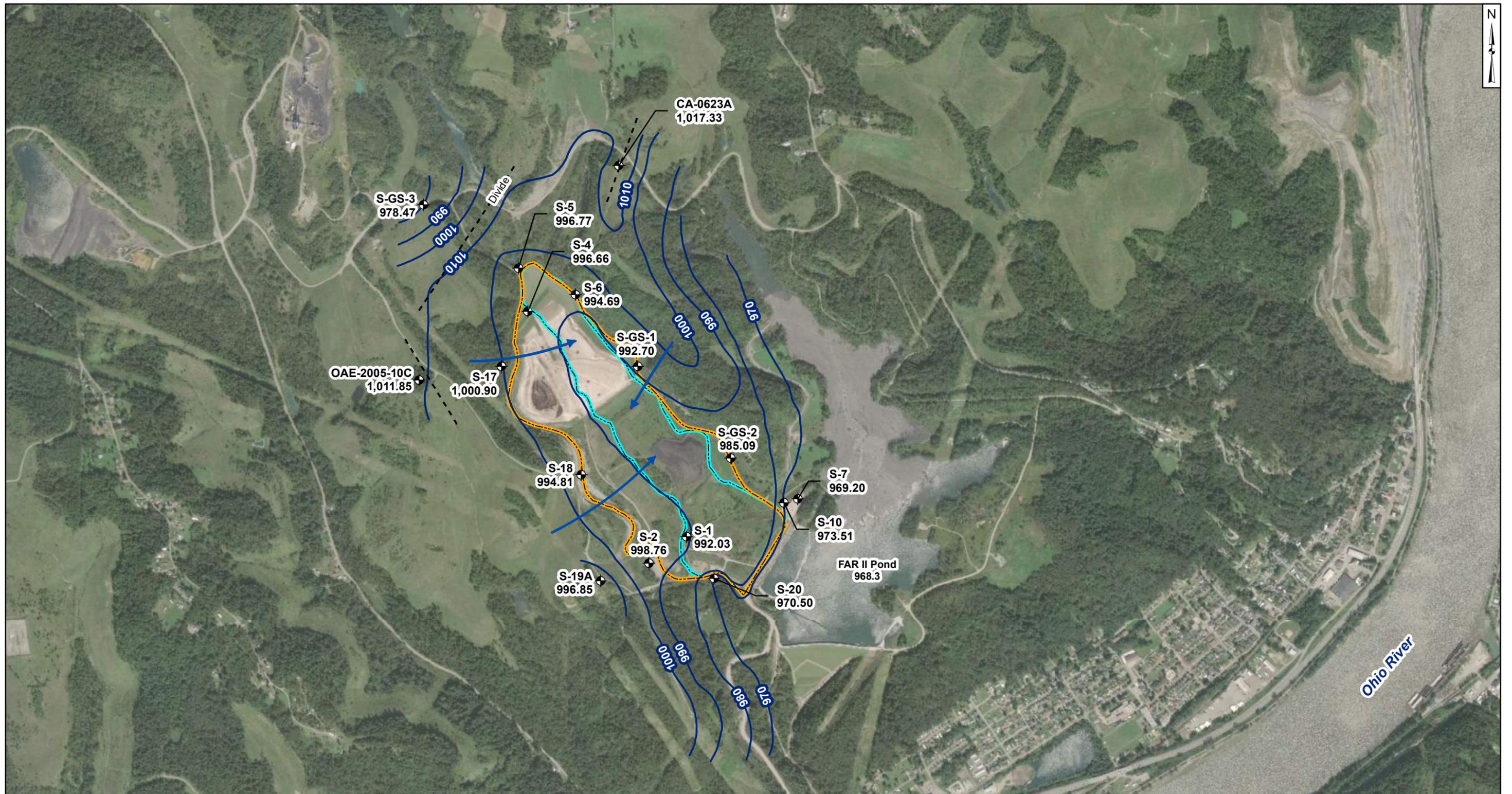
- Legend**
- ⊕ Groundwater Monitoring Well
 - Groundwater Elevation Contour
 - ➔ Approximate Groundwater Flow Direction
 - ▭ Residual Solid Waste (RSW) Landfill
 - ▭ Former Fly Ash Reservoir (FAR) I

Notes

- Monitoring well coordinates and water level data (collected on March 21, 2019) provided by Buckeye Power.
- Site features based on information available in Groundwater Monitoring Network Evaluation - Cardinal Site - Former Fly Ash Reservoir I - Residual Solid Waste Landfill (Geosyntec, 2016) provided by AEP.
- MW-19A was not gauged during March 2019.
- Groundwater elevation units are feet above mean sea level.



<p>Potentiometric Surface Map - Shallow Water Table Former FAR I & RSW Landfill March 2019</p> <p>AEP Cardinal Generating Plant Brilliant, Ohio</p>		<p>Figure 1</p>
<p>Geosyntec consultants</p>		
Columbus, Ohio	2020/01/08	



- Legend**
- ⊕ Groundwater Monitoring Well
 - Groundwater Elevation Contour
 - - - Inferred Groundwater Elevation Contour
 - ➔ Approximate Groundwater Flow Direction
 - ▭ Residual Solid Waste (RSW) Landfill
 - ▭ Former Fly Ash Reservoir (FAR) I

Notes

- Monitoring well coordinates and water level data (collected on October 26, 2019) provided by Buckeye Power.
- Site features based on information available in Groundwater Monitoring Network Evaluation - Cardinal Site - Former Fly Ash Reservoir I - Residual Solid Waste Landfill (Geosyntec, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.



**Potentiometric Surface Map - Shallow Water Table
Former FAR I & RSW Landfill
October 2019**

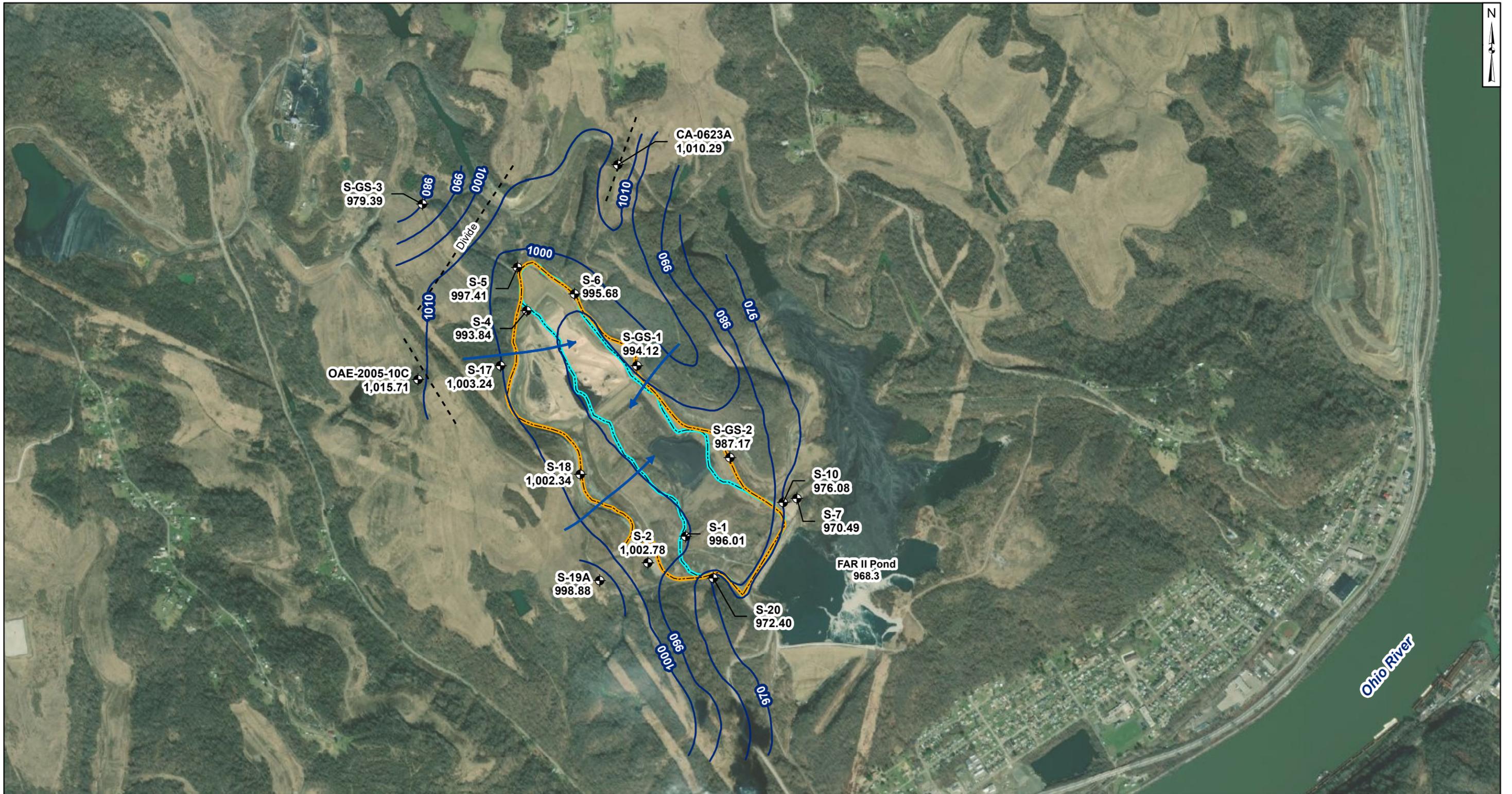
AEP Cardinal Generating Plant
Brilliant, Ohio



Figure
1

Columbus, Ohio

2020/01/08



- Legend**
- ⊕ Groundwater Monitoring Well
 - Groundwater Elevation Contour
 - ➔ Approximate Groundwater Flow Direction
 - ▭ Residual Solid Waste (RSW) Landfill
 - ▭ Former Fly Ash Reservoir (FAR) I

Notes

- Monitoring well coordinates and water level data (collected on April 6 - 7, 2020) provided by Buckeye Power.
- Site features based on information available in Groundwater Monitoring Network Evaluation - Cardinal Site - Former Fly Ash Reservoir I - Residual Solid Waste Landfill (Geosyntec, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.



**Potentiometric Surface Map - Shallow Water Table
RSW Landfill
April 2020**

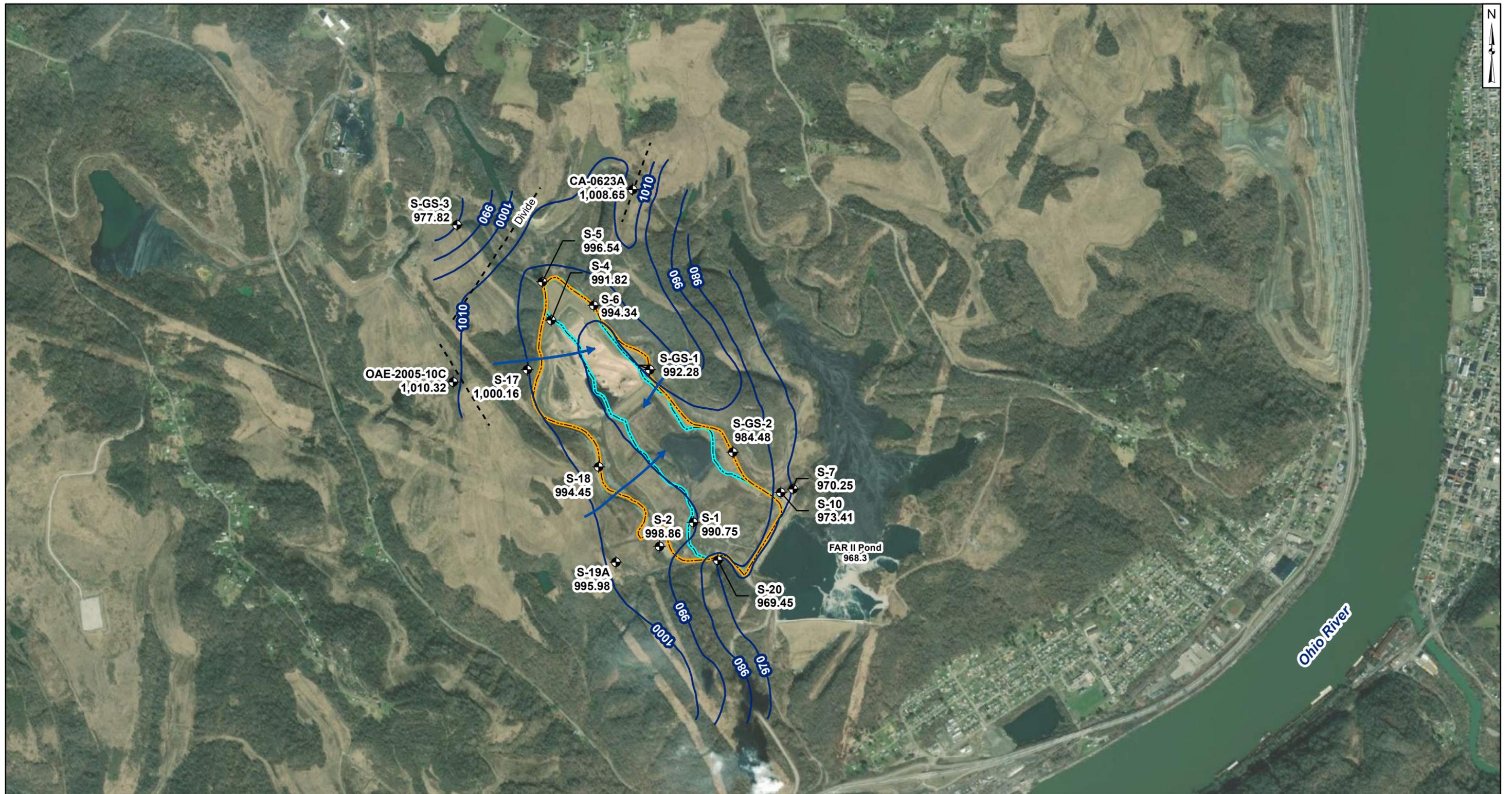
Buckeye Power Cardinal Generating Plant
Brilliant, Ohio



Figure
1

Columbus, Ohio

2021/01/08



- Legend**
- ⊕ Groundwater Monitoring Well
 - Groundwater Elevation Contour
 - ➔ Approximate Groundwater Flow Direction
 - ▭ Residual Solid Waste (RSW) Landfill
 - ▭ Former Fly Ash Reservoir (FAR) I
 - - - Watershed Divide

Notes

- Monitoring well coordinates and water level data (collected on October 1, 2020) provided by Buckeye Power.
- Site features based on information available in Groundwater Monitoring Network Evaluation - Cardinal Site - Former Fly Ash Reservoir I - Residual Solid Waste Landfill (Geosyntec, 2016).
- Groundwater elevation units are feet above mean sea level.



**Potentiometric Surface Map - Shallow Water Table
RSW Landfill
October 2020**

Buckeye Power Cardinal Generating Plant
Brilliant, Ohio

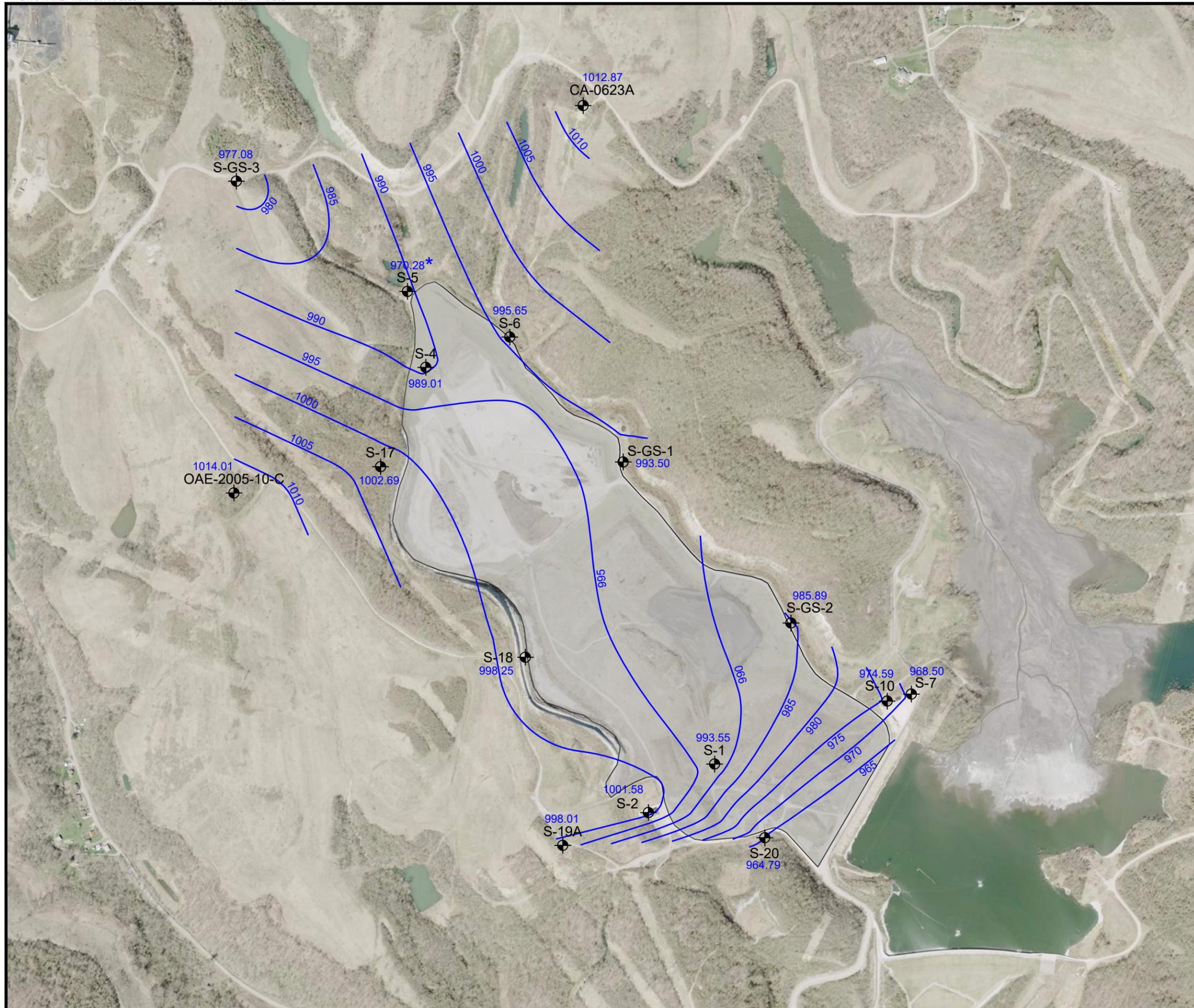


Figure

1

Columbus, Ohio

2020/12/22



Legend

-  FAR I Monitor Well
-  1005 Approximate Groundwater Elevation Contour
- 977.08 Groundwater Elevation on April 10, 2023
-  FAR I RSW Landfill
- * Anomalous groundwater elevation was not used during contouring.

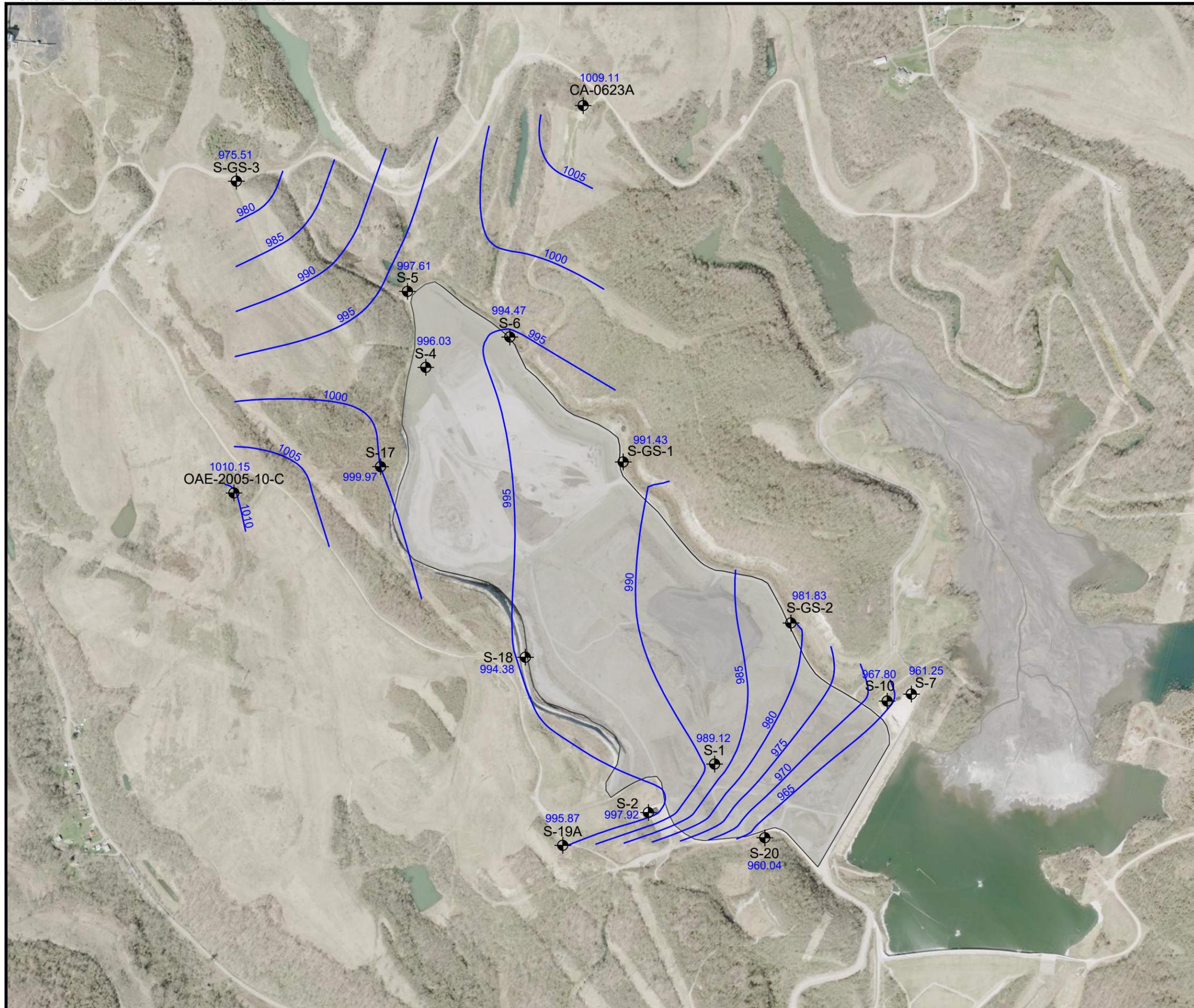
Source of Aerial Photograph: Ohio Statewide Imagery Program, 2020.



Figure

4-1

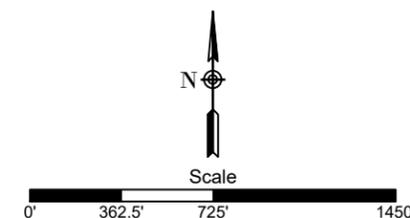
Potentiometric Surface Map - Shallow
Aquifer - April 10, 2023,
Fly Ash Reservoir (FAR) I,
Cardinal Plant,
Brilliant, Ohio



Legend

-  FAR I Monitor Well
-  1005 Approximate Groundwater Elevation Contour
- 975.51 Groundwater Elevation on October 9, 2023
-  FAR I RSW Landfill

Source of Aerial Photograph: Ohio Statewide Imagery Program, 2020.

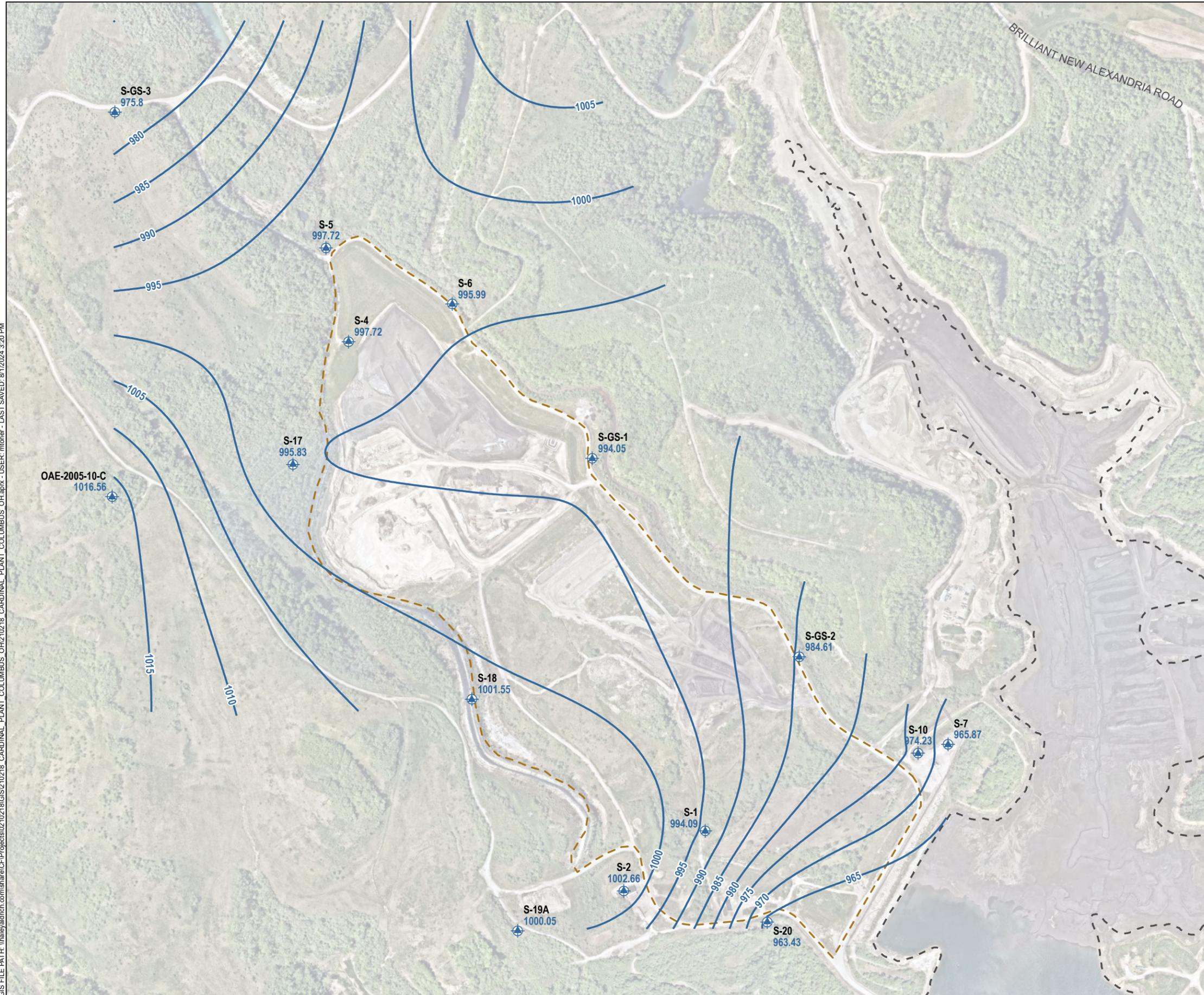


Figure

4-2

Potentiometric Surface Map - Shallow
 Aquifer - October 9, 2023,
 Fly Ash Reservoir (FAR) I,
 Cardinal Plant,
 Brilliant, Ohio

C:\S:\FILE PATH\haleyaldrich.com\share\CFR\Projects\2021\8\GIS\2\0218 CARDINAL PLANT COLUMBUS OH.aprx - USER: mtoner - LAST SAVED: 8/17/2024 3:20 PM



LEGEND

-  MONITORING WELL WITH **GROUNDWATER ELEVATION** IN FEET
-  GROUNDWATER ELEVATION CONTOUR,
10-FT INTERVAL (NGVD29)
-  RESIDUAL SOLID WASTE LANDFILL
-  FLY ASH RESERVOIR (FAR II)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DEFINITIONS:
FT = FOOT
NGVD29 = NATIONAL GEODETIC VERTICAL DATUM 1929
3. GROUNDWATER ELEVATIONS MEASURED 9 APRIL 2024.
4. ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
5. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023



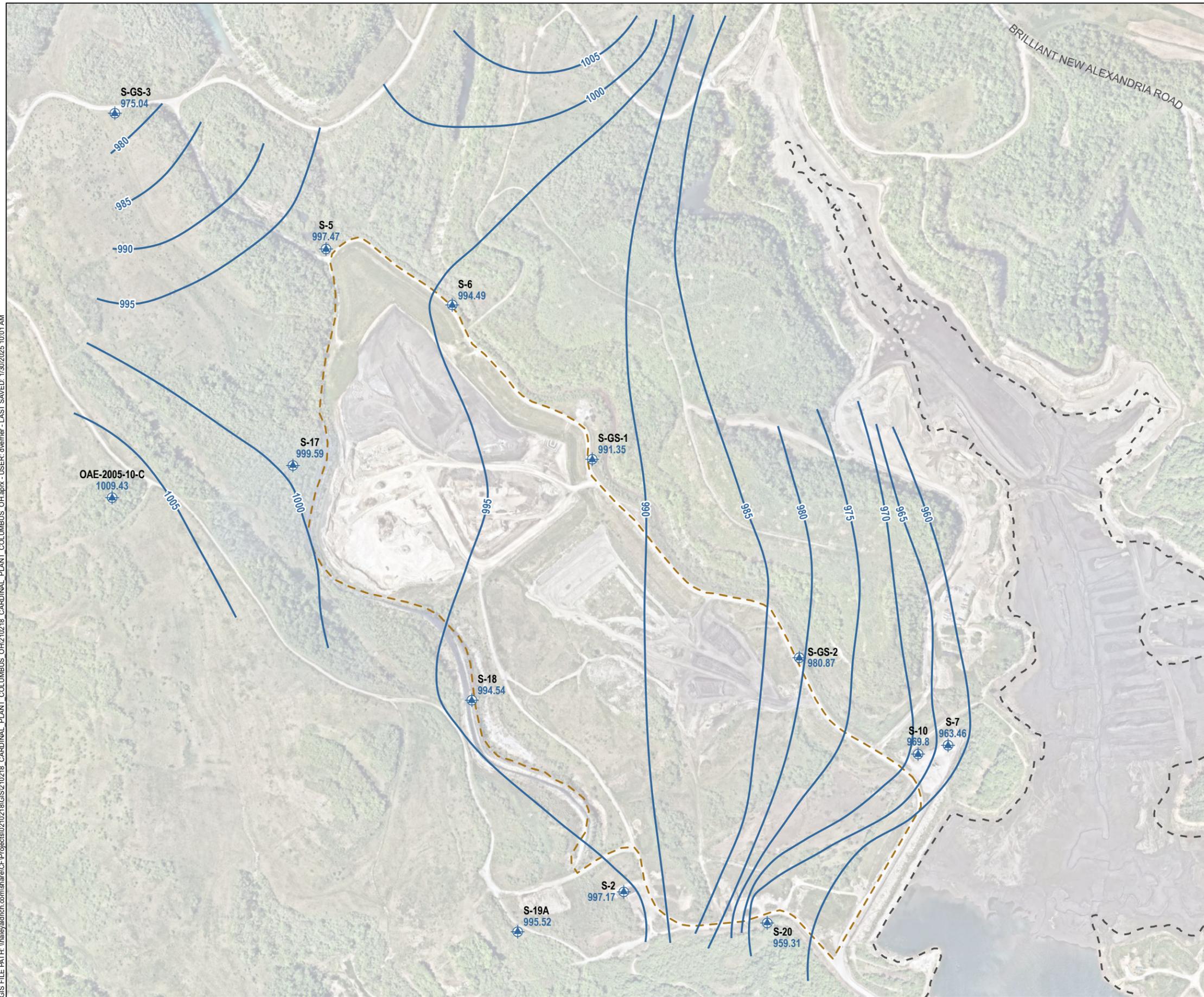
CARDINAL POWER PLANT
BRILLIANT, OHIO

**POTENTIOMETRIC SURFACE
FAR I APRIL 2024**

AUGUST 2024

FIGURE 2

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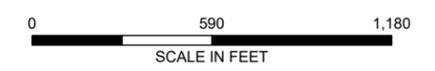


LEGEND

-  MONITORING WELL WITH **GROUNDWATER ELEVATION** IN FEET
-  GROUNDWATER ELEVATION CONTOUR, 5-FT INTERVAL (NGVD29)
-  RESIDUAL SOLID WASTE LANDFILL (FAR I)
-  FLY ASH RESERVOIR (FAR II)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DEFINITIONS:
FT = FOOT
NGVD29 = NATIONAL GEODETIC VERTICAL DATUM 1929
3. GROUNDWATER ELEVATIONS MEASURED 2 DECEMBER 2024.
4. ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
5. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023



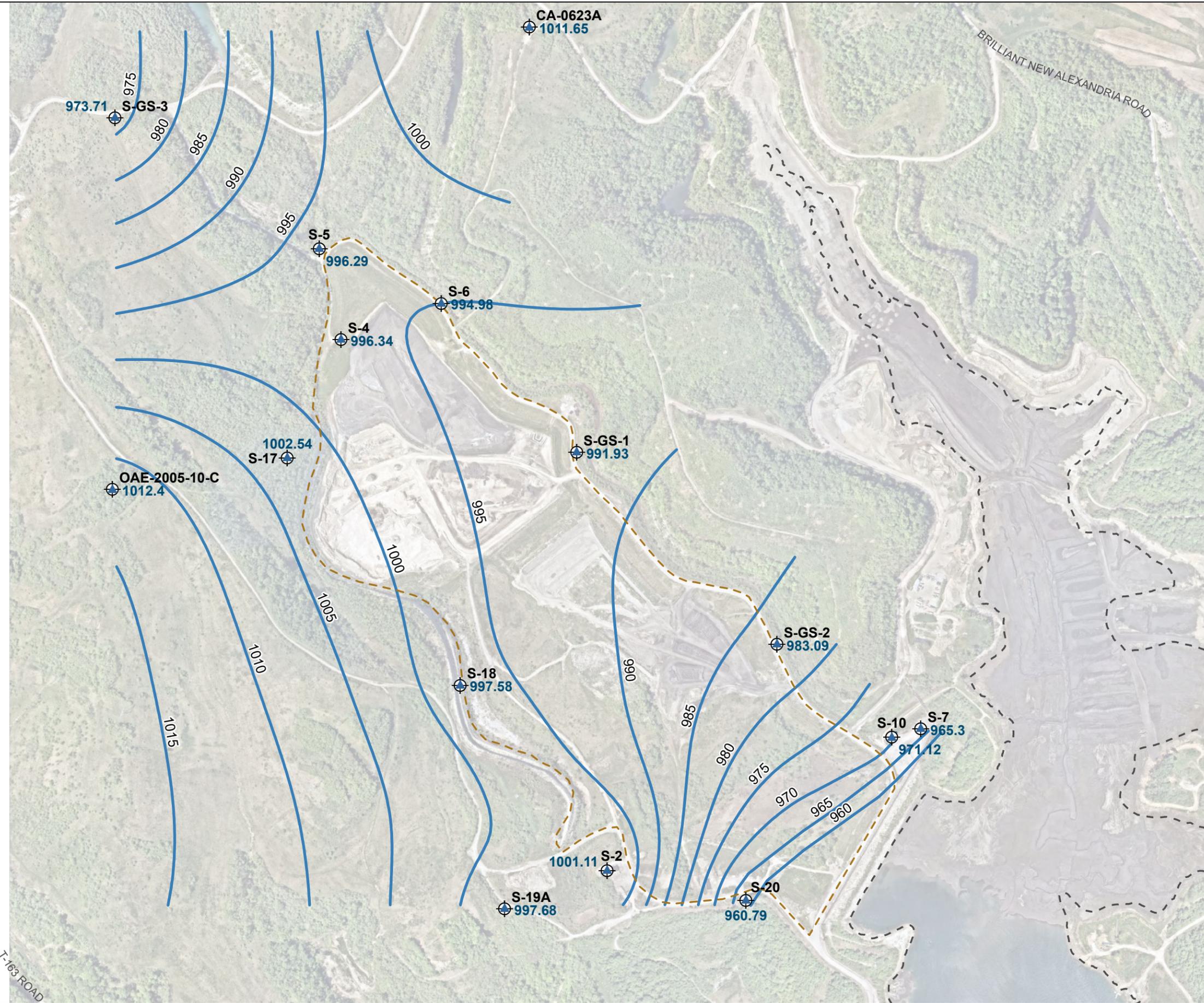
CARDINAL PLANT
BRILLIANT, OHIO

**POTENTIOMETRIC SURFACE
FAR I DECEMBER 2024**

JANUARY 2025

FIGURE 3

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LEGEND

-  MONITORING WELL WITH GROUNDWATER ELEVATION IN FEET
-  GROUNDWATER ELEVATION CONTOUR, 5-FT INTERVAL (NGVD29)
-  FLY ASH RESERVOIR (FAR II)
-  RESIDUAL SOLID WASTE LANDFILL (FAR I)

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. DEFINITIONS:
FT=FOOT
NGVD29=NATIONAL GEODETIC VERTICAL DATUM 1929
3. GROUNDWATER ELEVATIONS MEASURED ON APRIL 21, 2025.
4. ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
5. AERIAL IMAGERY SOURCE: NEARMAP, MAY 14, 2023



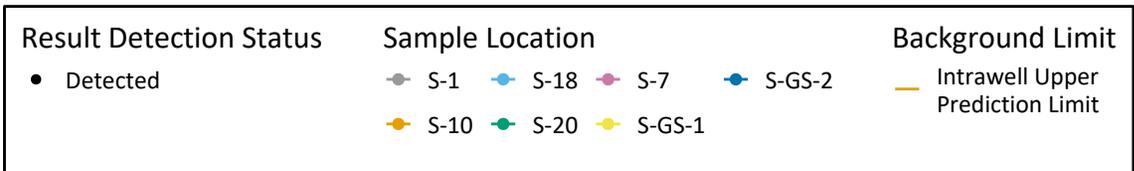
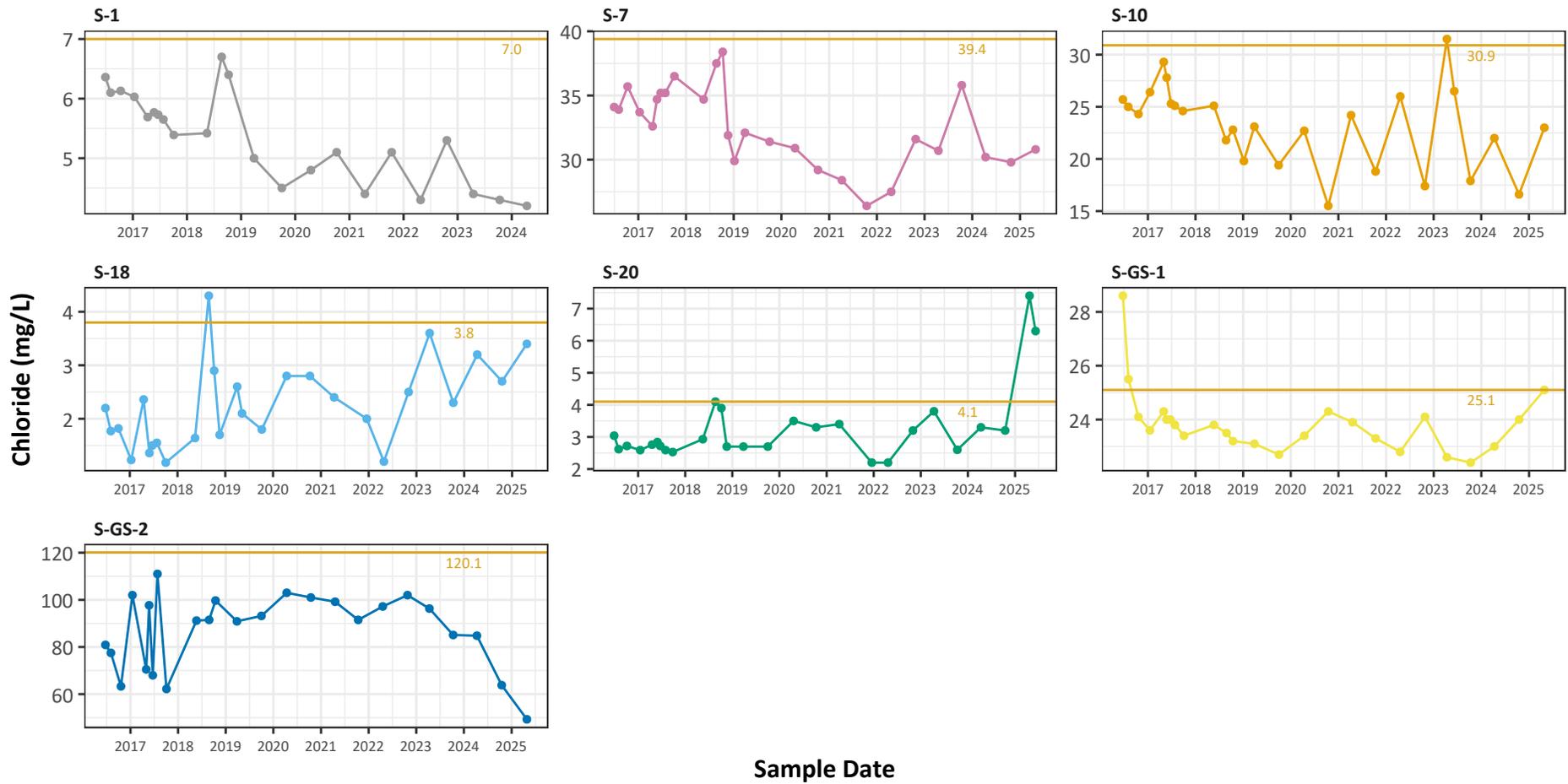
CARDINAL POWER PLANT
BRILLIANT, OHIO

POTENTIOMETRIC SURFACE FAR I
APRIL 2025

AUGUST 2025

FIGURE 2

APPENDIX C
Chloride Concentrations Over Time



NOTES:
 mg/L = milligrams per liter
 Years labeled on the x-axis correspond to January 1st of the respective year.
 Field duplicate sample data are not plotted.



ANNUAL REPORTING
 CARDINAL UPLAND DISPOSAL FACILITY
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TIME SERIES PLOTS - CHLORIDE
 FAR I RSW LANDFILL
 DOWNGRADIENT WELLS