Prepared for

Dynegy Midwest Generation, LLC

Date

January 31, 2021

Project No.

1940074919

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

HENNEPIN LANDFILL, HENNEPIN POWER STATION

RAMBOLL Bright ideas. Sustainable change.

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HENNEPIN LANDFILL, HENNEPIN POWER STATION

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Description	**Annual Report in Support of the CCR Rule Groundwater Monitoring Program**

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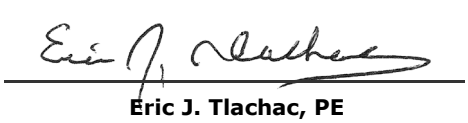

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ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
CCR	Coal Combustion Residuals
CMA	Corrective Measures Assessment
GWPS	Groundwater Protection Standard
LF	Landfill
SAP	Sampling and Analysis Plan
SSI	Statistically Significant Increase
SSL	Statistically Significant Level

EXECUTIVE SUMMARY

This report has been prepared to provide the information required by Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.90(e) for the Hennepin Landfill (LF) located at Hennepin Power Station near Hennepin, Illinois.

Groundwater is being monitored at Hennepin LF in accordance with the Detection Monitoring Program requirements specified in 40 C.F.R. § 257.94.

No changes were made to the monitoring system in 2020 (no wells were installed or decommissioned).

The following Statistically Significant Increases (SSIs) of 40 C.F.R. Part 257 Appendix III parameter concentrations greater than background concentrations were determined in 2020:

- Boron at wells 05DR, 05R, 40S, and 48
- Fluoride at wells 05DR, 05R, 40S, and 48
- pH at wells 05R and 48

Alternate Source Demonstrations (ASDs) were completed for the SSIs referenced above and Hennepin LF remains in the Detection Monitoring Program.

1. INTRODUCTION

This report has been prepared by Ramboll Americas Engineering Solutions, Inc. on behalf of Dynegy Midwest Generation, LLC, to provide the information required by 40 C.F.R. § 257.90(e) for Hennepin LF located at Hennepin Power Station near Hennepin, Illinois.

In accordance with 40 C.F.R. § 257.90(e), the owner or operator of a Coal Combustion Residuals (CCR) unit must prepare an Annual Groundwater Monitoring and Corrective Action Report for the preceding calendar year that documents the status of the Groundwater Monitoring and Corrective Action Program for the CCR unit, summarizes key actions completed, describes any problems encountered, discusses actions to resolve the problems, and projects key activities for the upcoming 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 §§ 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 a SSI relative to background levels).
5. Other information required to be included in the annual report as specified in §§ 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 §257.95.
    ii. At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95.
    iii. If it was determined that there was a SSI over background for one or more constituents listed in Appendix III of §257 pursuant to §257.94(e):
        A. Identify those constituents listed in Appendix III of §257 and the names of the monitoring wells associated with the SSI(s).
        B. Provide the date when the assessment monitoring program was initiated for the CCR unit.

iv. If it was determined that there was a Statistically Significant Level (SSL) above the Groundwater Protection Standard (GWPS) for one or more constituents listed in Appendix IV of §257 pursuant to §257.95(g) include all of the following:

   A. Identify those constituents listed in Appendix IV of §257 and the names of the monitoring wells associated with the SSL(s).

   B. Provide the date when the Corrective Measures Assessment (CMA) was initiated for the CCR unit.

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

   D. Provide the date when the CMA was completed for the CCR unit.

v. Whether a remedy was selected pursuant to §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 §257.98 during the current annual reporting period.

This report provides the required information for Hennepin LF for calendar year 2020.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

No changes have occurred to the monitoring program status in calendar year 2020, and Hennepin LF remains in the Detection Monitoring Program in accordance with 40 C.F.R. § 257.94.

3. KEY ACTIONS COMPLETED IN 2020

The Detection Monitoring Program is summarized in Table A. The groundwater monitoring system, including the CCR unit and all background and downgradient monitoring wells, is presented in Figure 1. No changes were made to the monitoring system in 2020. In general, one groundwater sample was collected from each background and downgradient well during each monitoring event.[1] All samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017a). All monitoring data obtained under 40 C.F.R. §§ 257.90 through 257.98 (as applicable) in 2020, and analytical results for the September 2019 sampling event, are presented in Table 1. Analytical data were evaluated in accordance with the Statistical Analysis Plan (NRT/OBG, 2017b) to determine any SSIs of Appendix III parameters relative to background concentrations.

Statistical background values are provided in Table 2.

Potential alternate sources were evaluated as outlined in the 40 C.F.R. § 257.94(e)(2). ASDs were completed and certified by a qualified professional engineer. The dates the ASDs were completed are provided in Table A. The ASDs are included in Appendix A.

[1] Sampling was limited to 05R, 40S, and 48 during the June 2020 sampling event to confirm Appendix III parameters initially detected at concentrations greater than statistical background values in the preceding sampling event to confirm SSIs, as allowed by the Statistical Analysis Plan.

Table A – 2019–2020 Detection Monitoring Program Summary

Sampling Date	Analytical Data Receipt Date	Parameters Collected	SSI(s)	SSI(s) Determination Date	ASD Completion Date
September 17 - 18, 2019	October 15, 2019	Appendix III	Boron (05DR, 05R, 40S, and 48) Fluoride (05DR, 05R, 40S, and 48)	January 13, 2020	April 13, 2020
March 11 - 12, 2020	April 15, 2020	Appendix III	Boron (05DR, 05R, 40S, and 48) Fluoride (05DR, 05R, 40S, and 48) pH (05R and 48)	July 14, 2020	October 12, 2020
June 3, 2020 [1]	June 15, 2020	Appendix III Greater than Background [2]			
September 3, 2020	October 16, 2020	Appendix III	TBD	TBD	TBD

Notes:

NA: Not Applicable
TBD: To Be Determined
1. Sampling was limited to 05R, 40S, and 48 during the June 2020 sampling event to confirm Appendix III parameters initially detected at concentrations greater than statistical background values in the preceding sampling event to confirm SSIs, as allowed by the Statistical Analysis Plan.
2. To confirm SSIs, as allowed by the Statistical Analysis Plan, groundwater samples were collected and analyzed for Appendix III parameters initially detected at concentrations greater than statistical background values in the preceding sampling event.

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the Groundwater Monitoring Program during 2020. Groundwater samples were collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017a), and all data were accepted.

5. KEY ACTIVITIES PLANNED FOR 2021

The following key activities are planned for 2021:

- Continuation of the Detection Monitoring Program with semi-annual sampling scheduled for the first and third quarters of 2021.
- Complete evaluation of analytical data from the downgradient wells, using background data to determine whether an SSI of Appendix III parameters detected at concentrations greater than background concentrations has occurred.
- If an SSI is identified, potential alternate sources (*i.e.*, a source other than the CCR unit caused the SSI or that that SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated. If an alternate source is demonstrated to be the cause of the SSI, a written demonstration will be completed within 90 days of SSI determination and included in the 2021 Annual Groundwater Monitoring and Corrective Action Report.
- If an alternate source(s) is not identified to be the cause of the SSI, the applicable requirements of 40 C.F.R. §§ 257.94 through 257.98 as may apply in 2021 (*e.g.*, Assessment Monitoring) will be met, including associated recordkeeping/notifications required by 40 C.F.R. §§ 257.105 through 257.108.

6. REFERENCES

Natural Resource Technology, an OBG Company (NRT/OBG), 2017a. Sampling and Analysis Plan, Hennepin Landfill, Hennepin Power Station, Hennepin, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Natural Resource Technology, an OBG Company (NRT/OBG), 2017b. Statistical Analysis Plan, Baldwin Energy Complex, Havana Power Station, Hennepin Power Station, Wood River Power Station, Dynegy Midwest Generation, LLC, October 17, 2017.

TABLES

TABLE 1.
ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HENNEPIN POWER STATION
801 - LANDFILL
HENNEPIN, IL

Well ID	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Depth to Groundwater (ft) 6020A	Groundwater Elevation (ft NAVD88) 6020A	Boron, total (mg/L) 6020A	Calcium, total (mg/L) 6020A	Chloride, total (mg/L) 9251	Fluoride, total (mg/L) 9214	pH (field) (STD) SM4500 H+B	Sulfate, total (mg/L) 9036	Total Dissolved Solids (mg/L) SM 2540C
05R Downgradient	41.305163	-89.305449	9/17/2019	38.53	449.9	0.895	85.6	75	0.15	7.4	73	528
			3/11/2020	39.93	448.5							
			3/12/2020			3.35	95.4	67	0.14	7.6	136	592
			6/3/2020	34.15	454.28	4.31				7.7		
			9/2/2020	39.3	449.13							
			9/3/2020			0.783	84.8	75	0.13	7.7	79	478
05DR Downgradient	41.30516	-89.305471	9/17/2019	38.52	449.85	1.13	89.8	71	0.17	7.3	85	552
			3/11/2020	39.92	448.45							
			3/12/2020			1.17	88.1	71	0.17	7.4	77	540
			9/2/2020	39.31	449.06							
			9/3/2020			1.02	88.3	65	0.16	7.5	81	498
07 Background	41.297986	-89.305712	9/18/2019	64.6	453.67	0.0797	147	33	0.11	6.3	55	666
			3/11/2020	66.15	452.12							
			3/12/2020			0.0788	148	60	0.11	6.7	53	638
			9/2/2020	64.9	453.37							
			9/3/2020			0.0811	146	38	0.1	6.8	67	606
08 Background	41.300698	-89.3044	9/18/2019	50.82	450.56	0.151	242	220	<0.1	6.6	195	1360
			3/11/2020	52.36	449.02							
			3/12/2020			0.106	203	209	0.11	6.7	197	1210
			9/2/2020	51.69	449.69							
			9/3/2020			0.119	202	168	<0.1	6.7	154	1010
08D Background	41.300799	-89.304522	9/18/2019	50.9	450.44	0.117	187	226	0.12	6.7	121	1230
			3/11/2020	52.79	448.55							
			3/12/2020			0.115	182	217	0.12	6.7	142	1110
			9/2/2020	51.62	449.72							
			9/3/2020			0.0942	226	222	0.11	6.7	213	1200
40S Downgradient	41.305292	-89.304363	9/17/2019	37.75	449.92	2.38	90.9	66	0.19	7.5	104	570
			3/11/2020	39.21	448.46	4.3	117	60	0.15	7.5	174	652
			6/3/2020	33.28	454.39	1.36				7.7		

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TABLE 1.
ANALYTICAL RESULTS - GROUNDWATER ELEVATION AND APPENDIX III PARAMETERS
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HENNEPIN POWER STATION
801 - LANDFILL
HENNEPIN, IL

Well ID	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Depth to Groundwater (ft) 6020A	Groundwater Elevation (ft NAVD88) 6020A	Boron, total (mg/L) 6020A	Calcium, total (mg/L) 6020A	Chloride, total (mg/L) 9251	Fluoride, total (mg/L) 9214	pH (field) (STD) SM4500 H+B	Sulfate, total (mg/L) 9036	Total Dissolved Solids (mg/L) SM 2540C
40S Downgradient	41.305292	-89.304363	9/2/2020	38.45	449.22							
			9/3/2020			1.94	90.4	70	0.15	7.7	119	522
48 Downgradient	41.305227	-89.304931	9/17/2019	37.44	450.02	1.47	86.2	69	0.21	7.5	85	558
			3/11/2020	38.91	448.55							
			3/12/2020			1.58	89.2	68	0.21	7.6	86	550
			6/3/2020	33.05	454.41					7.7		
			9/2/2020	38.22	449.24							
			9/3/2020			1.34	86	69	0.19	7.7	93	474

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
ft = foot/feet
mg/L = milligrams per liter
NAVD88 = North American Vertical Datum of 1988
S.U. = Standard Units
< = concentration is less than the concentration shown, which corresponds to the reporting limit for the method; estimated concentrations below the reporting limit and associated qualifiers are not provided since not utilized in statistics to determine Statistically Significant Increases (SSIs) over background.
4-digit numbers below parameter represent SW-846 analytical methods and alpha-numeric values that begin with SM represent Standard Methods for the Examination of Water and Wastewater.

TABLE 2.
STATISTICAL BACKGROUND VALUES
2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
HENNEPIN POWER STATION
801 - LANDFILL
HENNEPIN, ILLINOIS
DETECTION MONITORING PROGRAM

Parameter	Statistical Background Value (UPL)
40 C.F.R. Part 257 Appendix III	
Boron (mg/L)	0.15
Calcium (mg/L)	274
Chloride (mg/L)	384
Fluoride (mg/L)	0.12
pH (S.U.)	6.6 / 7.5
Sulfate (mg/L)	196
Total Dissolved Solids (mg/L)	1493

[O: RAB 12/23/19, C: KLT 12/24/19]

Notes:
40 C.F.R. = Title 40 of the Code of Federal Regulations
mg/L = milligrams per liter
S.U. = Standard Units
UPL = Upper Prediction Limit

FIGURES

BACKGROUND WELL LOCATION
DOWNGRADIENT WELL LOCATION
CCR MONITORED UNIT

0 175 350 Feet

MONITORING WELL LOCATION MAP
HENNEPIN LANDFILL
UNIT ID:801

2020 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
VISTRA CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

FIGURE 1

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ENGINEERING SOLUTIONS, INC.

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APPENDICES

Intended for
Dynegy Midwest Generation, LLC

Date
April 13, 2020

Project No.
74919

40 C.F.R. § 257.94(e)(2): ALTERNATE SOURCE DEMONSTRATION

HENNEPIN LANDFILL

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CERTIFICATIONS

I, Brian G. Hennings, a professional geologist in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Brian G. Hennings
Professional Geologist
196-001482
Illinois
O'Brien & Gere Engineers, Inc., a Ramboll Company
Date: April 13, 2020

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
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O'Brien & Gere Engineers, Inc., a Ramboll Company
Date: April 13, 2020

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ACRONYMS AND ABBREVIATIONS

ASD	Alternate Source Demonstration
Ash Pond No. 2	Hennepin East Ash Pond No. 2
CCR	Coal Combustion Residuals
CCR Rule	40 C.F.R. Part 257
CEC	Civil & Environmental Consultants, Inc.
40 C.F.R.	Title 40, Code of Federal Regulations
cm/s	centimeters per second
East Ash Pond	Hennepin East Ash Pond
HDPE	High-density Polyethylene
IEPA	Illinois Environmental Protection Agency
Landfill	Hennepin Landfill
mg/L	milligrams per liter
msl	mean sea level
NPDES	National Pollutant Discharge Elimination System
NRT/OBG	Natural Resource Technology, an OBG Company
Site	East Ash Pond System (see Sec 1.2)
SSI	Statistically Significant Increase
STD	Standard Units
UPL	Upper Prediction Limit

1. INTRODUCTION

1.1 Overview

Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.94(e)(2) allows the owner or operator of a Coal Combustion Residuals (CCR) unit 90 days from the date of determination of a Statistically Significant Increase (SSI) over background for groundwater constituents listed in Appendix III of 40 C.F.R. Part 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSI(s), or that the SSI(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Alternate Source Demonstration [ASD]).

This ASD has been prepared on behalf of Dynegy Midwest Generation, LLC, by O'Brien & Gere Engineers, Inc., a Ramboll Company (Ramboll), to provide pertinent information pursuant to 40 C.F.R. § 257.95(g)(3)(ii) for the Hennepin Landfill, located near Hennepin, Illinois.

The most recent Detection Monitoring sampling event (D5) was completed on September 17, 2019 through September 18, 2019, and analytical data were received on October 15, 2019. Analytical data from D5 were evaluated in accordance with the Statistical Analysis Plan (NRT/OBG, 2017) to determine any Statistically Significant Increases (SSIs) of Appendix III parameters over background concentrations. That evaluation identified SSIs at downgradient monitoring wells as follows:

- Boron at wells 05R, 05DR, 40S, and 48
- Fluoride at wells 05R, 05DR, 40S, and 48

Pursuant to 40 C.F.R. § 257. 94(e)(2), the following lines of evidence demonstrate that sources other than the Hennepin Landfill were the cause of the boron and fluoride SSLs listed above. This ASD was completed by April 13, 2020, within 90 days of determination of the SSIs (January 17, 2020), as required by 40 C.F.R. § 257.94(e)(2).

1.2 Location

The Hennepin Power Station is located in the northeast quarter of Section 26, Township 33 North, Range 2 West, Putnam County, Illinois and approximately 3 miles north-northeast of the Village of Hennepin. The Hennepin Landfill is located east of the power station and situated less than 200 feet from the south bank of the Illinois River and approximately one mile east of the Big Bend, where the river shifts course from predominantly west to predominantly south.

The Hennepin Landfill is one of four CCR units regulated under 40 C.F.R. Part 257 Subpart D (CCR Rule) at the Hennepin Power Station. Three of these CCR units are located adjacent to or near each other in the eastern portion of the Hennepin Power Station known as Hennepin East. The fourth is located west of the Hennepin Power Station. The three Hennepin East CCR units include the Hennepin Landfill (Landfill), Hennepin East Ash Pond No. 2 (Ash Pond No. 2), and Hennepin East Ash Pond (East Ash Pond). The CCR units at Hennepin East, shown on Figure 1, are also referred to as the East Ash Pond System (Site).

Surrounding areas include industrial properties to the east and south of the Site, agricultural land to the southwest, and the Hennepin Power Station to the west (also shown on Figure 1).

1.3 Groundwater Monitoring

The Landfill groundwater monitoring system for compliance with the CCR Rule consists of three upgradient monitoring wells (07, 08, 08D) and four downgradient monitoring wells (05R, 05DR, 40S, and 48). A map showing the groundwater monitoring system, including the CCR unit and all background and downgradient monitoring wells, is presented in Figure 2.

Groundwater samples are collected and analyzed in accordance with the Sampling and Analysis Plan (NRT/OBG, 2017a) prepared for the Landfill. Statistical evaluation of analytical data is performed in accordance with the Statistical Analysis Plan (NRT/OBG, 2017b).

1.4 Site History

The Hennepin Power Station has two coal-fired generating units constructed in 1953 and 1959 with a total capacity of 210 Megawatts. The coal source has changed several times since the station was constructed. Operations at the station were ceased on or before November 1, 2019. Historical information related to the Hennepin East CCR units shown on Figure 1 includes:

Ash Pond No. 2: Ash Pond No. 2 was used to store and dispose fly ash, bottom ash, and other non-CCR waste streams, including coal pile runoff. The pond originally encompassed the area that currently includes the existing Ash Pond No. 2, the Landfill, and the Leachate Pond (not a CCR unit). It has been inactive since 1996 and currently encompasses approximately 18 acres. It is unlined with a lowermost, but variable, bottom elevation of 451 feet above mean sea level (msl). The approximate dates of construction affecting Ash Pond No. 2 are summarized below (Table A).

Table A. Construction Events Affecting Ash Pond No. 2

Date	Event
1958	Construction of Ash Pond No. 2
1978	Embankment raise of Ash Pond No. 2
1985	Embankment raise of Ash Pond No. 2 to elevation 484 feet above msl
1989	Embankment raise of Ash Pond No. 2 to elevation 494 feet above msl
1996	Pond was removed from service and completely dewatered
2009 to 2010	Eastern portion of Ash Pond No. 2 was removed to facilitate construction of the Leachate Pond
2010/2011	Landfill Phase I cell was constructed in 2010 over placed CCR in Ash Pond No. 2 adjacent to the Leachate Pond. In February 2011, 7,500 cubic yards of bottom ash was placed into the Phase I cell as a post-construction freeze-protection measure to protect the leachate collection system and geomembrane liner. No other material (fly ash or bottom ash) has been placed in the landfill since.
2014	North Embankment tree removal, grading, and vegetation re-establishment adjacent to Ash Pond No. 2

A Modified Closure Work Plan was submitted in 2010 proposing closure of Ash Pond No. 2 by capping with future landfill phases as they were constructed. This Work Plan was approved by the Illinois Environmental Protection Agency (IEPA) in a letter dated March 3, 2010. The Landfill is Phase I of this 2010 closure plan. The formerly proposed Landfill Phases II, III, and IV will no longer be constructed upon Ash Pond No. 2. Therefore, a revised Closure Plan for Ash Pond No. 2

was submitted for IEPA approval in February 2018 (CEC, 2018). Addenda to the Closure Plan were submitted in October 2018, July 2019, and January 2020.

Landfill: The Landfill Phase I cell, covering approximately 4.5 acres, was constructed in 2010 over existing, dewatered CCR in Ash Pond No. 2 as part of the 2010 closure plan for Ash Pond No. 2. The Phase I cell was constructed with a 60-mil high-density polyethylene (HDPE) liner overlying two feet of compacted clay with a leachate collection system that transfers collected precipitation and leachate to the Leachate Pond. Ash fill underlying the Landfill is known to be present to a minimum elevation of 454 feet above msl.

In February 2011, 7,500 cubic yards of bottom ash was placed into the Landfill as a post-construction freeze protection measure to protect the leachate collection system and geomembrane liner. No other material has been placed in the Landfill since then. The Landfill has not yet been placed into service.

Ash Pond No. 4: A former unlined impoundment, now dry, is classified as a closed impoundment (capped or otherwise maintained) and is not regulated under the CCR Rule.

Ash Pond No. 4 will be closed in conjunction with Ash Pond No. 2 as specified in the Closure Work Plan, and addenda, referenced above.

East Ash Pond: The East Ash Pond was used to store and dispose bottom ash, fly ash, and other non-CCR waste and to clarify process water prior to discharge in accordance with the station's National Pollutant Discharge Elimination System (NPDES) permit. The pond was constructed in two phases. The first phase occurred in 1995 when the initial embankment was constructed to a total height of 32 feet with a lowermost, but variable, bottom elevation of the pond at 458 feet. The original pond surface was lined with a 4-foot thick layer of compacted clay with a hydraulic conductivity of 1 x 10^{-7} centimeters per second (cm/s), underlain by a 1-foot thick sand layer (AECOM, 2016). The pond depth behind the original embankment was 15 feet with 5 feet of freeboard. The embankment was raised 12 feet in 2003 to a total impoundment depth of 30 feet with 2 feet of freeboard. The liner system of the embankment raise consisted of (from top to bottom) a 45-mil reinforced polypropylene geomembrane, a 1-foot thick clay layer, and an 8 ounce/square yard (oz/sy) polypropylene geotextile fabric. This pond was used for the treatment of bottom ash transport water, miscellaneous low volume wastewater streams, and storage of unsold fly ash until station operations ceased in November 2019.

Figure 1 also shows two additional ponds that are not subject to CCR Rule requirements including the Polishing Pond (east of the East Ash Pond) and the Leachate Pond (east of the Landfill). The Polishing Pond was constructed in 1995 with a 48-inch-thick compacted clay liner having a vertical hydraulic conductivity of 1 x 10^{-7} cm/s. The Leachate Pond is a 25.5-acre-foot pond constructed with a composite liner consisting of 60 mil HDPE overlying two feet of compacted clay with a vertical hydraulic conductivity of 1 x 10^{-7} cm/s. Construction was completed December 2010.

1.5 Overview of Site Hydrogeology and Stratigraphy

A detailed hydrogeological assessment of the Hennepin East area was completed and submitted as part of the February 2018 closure plan addendum for Ash Pond No. 2 and subsequent addenda (previously referenced). Information pertinent to this ASD is included in this report, however,

more complete information on Site hydrogeology and stratigraphy is available in the 2018 closure plan and addenda.

There are three dominant geomorphic features in the immediate vicinity of the Hennepin Power Station: an upper river terrace at an elevation of about 500 to 550 feet above msl, a lower river terrace at an elevation of about 450 to 460 feet above msl, and the current river valley filled with alluvium to an elevation of about 445 feet above msl. The station, Ash Pond No. 2, and the Landfill were constructed on the original, narrow lower river terrace, between the Illinois River and the upper terrace. The original lower river terrace is approximately 10 to 20 feet above the average river level at the Hennepin Power Station (elevation 443.7 feet above msl) based upon measurements collected between 2003 and 2018 (Ramboll, 2020). The East Ash Pond and Polishing Pond were constructed on the upper river terrace at an elevation of approximately 500 to 505 feet above msl, or 60 to 65 feet above average river level. The lower road on the north side of the Site lies at an elevation of 480 to 485 feet above msl. The upper road along the top of the north berm for Ash Pond No. 2 is at an elevation of approximately 494 to 500 feet above msl. The berm slopes steeply toward the river and its toe is close to the riverbank.

The hydrogeological assessment identified that the stratigraphy within and immediately surrounding the Site consists of fill, unlithified river alluvium, and Pleistocene-age glacial outwash deposits overlying Pennsylvanian-age shale bedrock. Surficial soils at the Site are coal ash fill and manmade berms constructed of a variety of locally available materials, primarily sand, gravel, and coal ash. Where undisturbed or partially excavated, the native surficial soil at the Site is poorly drained, moderately permeable silty clay loam formed in alluvium on floodplains.

There are two hydrogeologic units present at the Site: alluvium and Henry Formation sands and gravels. The river is immediately adjacent to the lower terrace, east of the Site, and there is minimal alluvium between the Site and the river. The highly permeable Henry Formation sands and gravels make up the upper and lower terraces and fill the valley beneath the alluvium. The sands and gravels of the two terraces are indistinguishable, consisting of a heterogeneous mixture of silty-sandy gravel with cobble zones and boulders up to several feet in diameter. The Henry Formation is more than 100 feet thick in the river valley and at least 130 feet thick on the upper terrace.

The Henry Formation and alluvium comprise the Uppermost Aquifer at the Site and extend from the water table to the bedrock. The Uppermost Aquifer extends about 7,000 feet upgradient from the Site, to the south, where clay-rich glacial till is encountered. Glacial tills such as this typically yield little water.

The Pennsylvanian-age bedrock consists of interbedded layers of shale with thin limestone, sandstone, and coal beds. The shale bedrock unit has low hydraulic conductivity and defines the lower boundary of the Uppermost Aquifer.

2. LINES OF EVIDENCE

2.1 Summary

As allowed by 40 C.F.R. § 257.94(e)(2), this ASD demonstrates that sources other than Hennepin Landfill (the CCR unit) caused the SSIs based on the following lines of evidence:

- Landfill Design and Contents: The Hennepin Landfill was constructed in 2010 with a 60-mil HDPE liner overlying two feet of compacted clay. The only material ever placed in the lined landfill is bottom ash that was placed as a post-construction freeze protection measure to protect the leachate collection system and geomembrane liner. Laboratory leachate data available for the bottom ash placed in the landfill does not indicate that the bottom ash is capable of leaching boron in concentrations observed in the downgradient monitoring wells.
- Ash Fill in Ash Pond No. 2 and Underlying the Landfill: The Landfill was constructed upon a portion of the Hennepin Ash Pond No. 2 as Phase I of an IEPA-approved closure plan for the pond. The other portions of the pond are currently exposed, and subject to infiltration of precipitation and generation of CCR leachate. The pond is unlined, potentially allowing CCR leachate to percolate to groundwater. A revised closure plan for these portions of the pond, which includes the construction of a cover designed to minimize surface water infiltration and leachate generation, was developed in 2018 and approved by IEPA on February 26, 2020.
- Upgradient Concentrations of Fluoride: Concentrations of fluoride are higher in areas upgradient of the Landfill than areas downgradient, indicating that the Landfill is not the source of fluoride.

Data and information supporting these ASD lines of evidence are discussed in more detail below.

2.2 Lines of Evidence

2.2.1 Landfill Design and Contents

The Landfill was constructed in 2010 with a 60-mil high density polyethylene (HDPE) geomembrane overlying three feet of compacted clay with hydraulic conductivity of $1x10^{-7}$ cm/sec (CEC, 2010). Precipitation and/or leachate that collects on top of the liner is removed by a leachate collection system and transferred to the Leachate Pond for management. The Leachate Pond is also lined with a 60-mil HDPE liner overlying two feet of compacted clay.

The Illinois Environmental Protection Agency (IEPA)-approved Hennepin Landfill composite liner system exceeds the design criteria for a composite liner for new CCR landfills established by 40 C.F.R. § 257.70(b). The composite liner design criteria were established to help prevent contaminants in CCR from leaking from the CCR unit and impacting groundwater. Therefore, the presence of the composite liner suggests that the Landfill is not the source of the observed SSIs.

The only material that has been placed in the Landfill consists of a layer of coarse bottom ash (7,500 cubic yards or 11,625 tons) to protect the leachate collection system and geomembrane liner from freezing. There has been no activity within the lined area since the bottom ash freeze protection layer was installed and there is no evidence that leakage from the lined landfill has occurred.

Analytical data (Appendix A) from two samples of bottom ash leachate derived in the laboratory (extraction method ASTM D3987, shake extraction with water) identified boron at 0.193 mg/L (2009 sample) and 0.197 mg/L (2008 sample).

The boron concentrations of 0.19-0.20 mg/L in the laboratory leachate samples are close to background concentrations at wells 7, 08 and 08D, which are 0.05-0.17 mg/L and are well below the boron concentrations of downgradient wells as shown in Figure A. Although, the boron concentrations in the leachate derived in the laboratory may not be representative of boron concentrations in leachate from the bottom ash contained in the Hennepin Landfill, they do not appear consistent with the higher concentrations observed in downgradient wells.

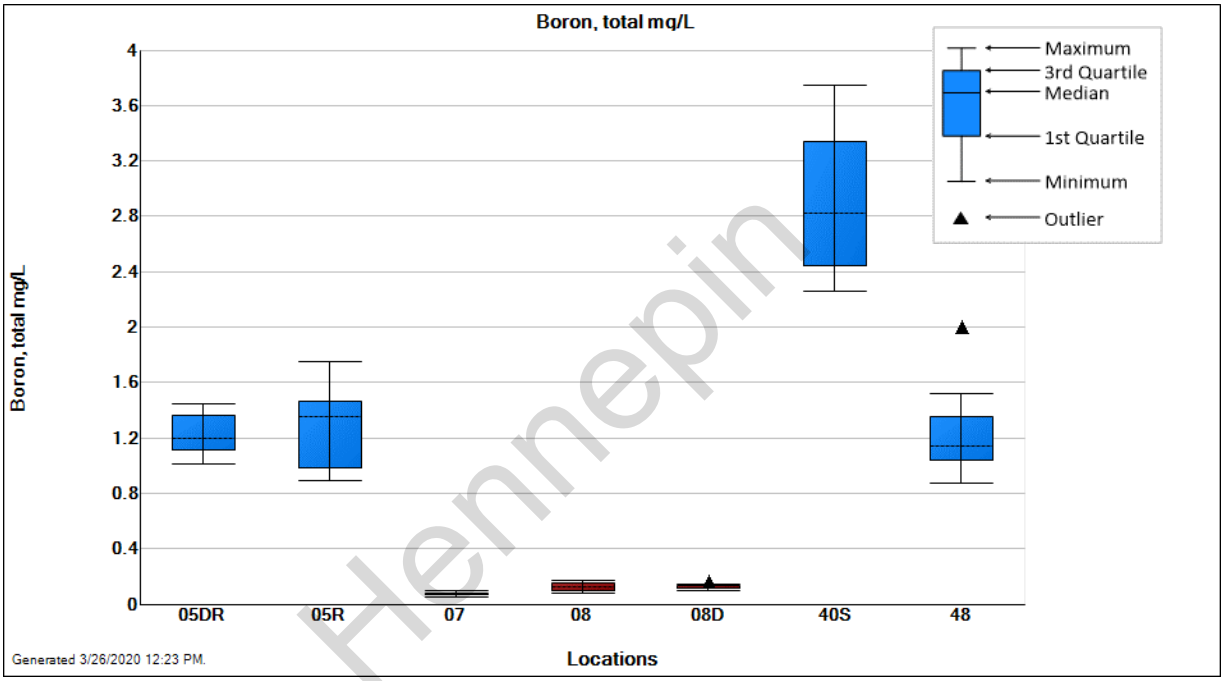


Figure A. Box-Whisker Plot Showing Distribution of Boron.

2.2.2 Ash Fill in Ash Pond No. 2 and Underlying the Landfill

The Landfill was constructed over a portion of Ash Pond No. 2 as Phase I of an IEPA-approved closure plan for the pond. The other portions of the pond are currently exposed, and subject to infiltration of precipitation and generation of CCR leachate. The pond is unlined, potentially allowing CCR leachate to percolate to groundwater. The recently approved Closure Plan for these portions of the pond, which includes the construction of a cover designed to minimize surface water infiltration and leachate generation.

Comparison of groundwater and Illinois River elevation data indicate that natural variation in river elevation related to flood events occasionally causes groundwater flow reversal and increases in groundwater elevations measured in the groundwater monitoring wells. When river elevations rise above 451-454 feet above msl, low-lying ash deposits underlying the Landfill have the potential to become partially saturated for a transient period; and may result in a temporary change to some CCR constituent concentrations at some downgradient locations after groundwater flow direction returns to normal. Explicit simulation of flood events (Closure Plan

Addendum 3, Ramboll 2020) indicate that potential increases in simulated concentration from flooding of the Illinois River are small and transient, such that long-term concentrations will not be significantly affected.

The above demonstrates that Ash Pond No. 2 is an alternate source for CCR parameters observed in groundwater near the Landfill.

2.2.3 Upgradient Concentrations of Fluoride

The groundwater contour maps in Appendix B show a major component of groundwater flow from the east or southeast. A box-whisker plot of dissolved fluoride concentrations collected between 2015-2019 at monitoring wells at the Site is shown below (Figure B). Included on this figure are other wells located along the Illinois River (18D, 18S). Dissolved fluoride is plotted rather than total fluoride due to the greater availability of data.

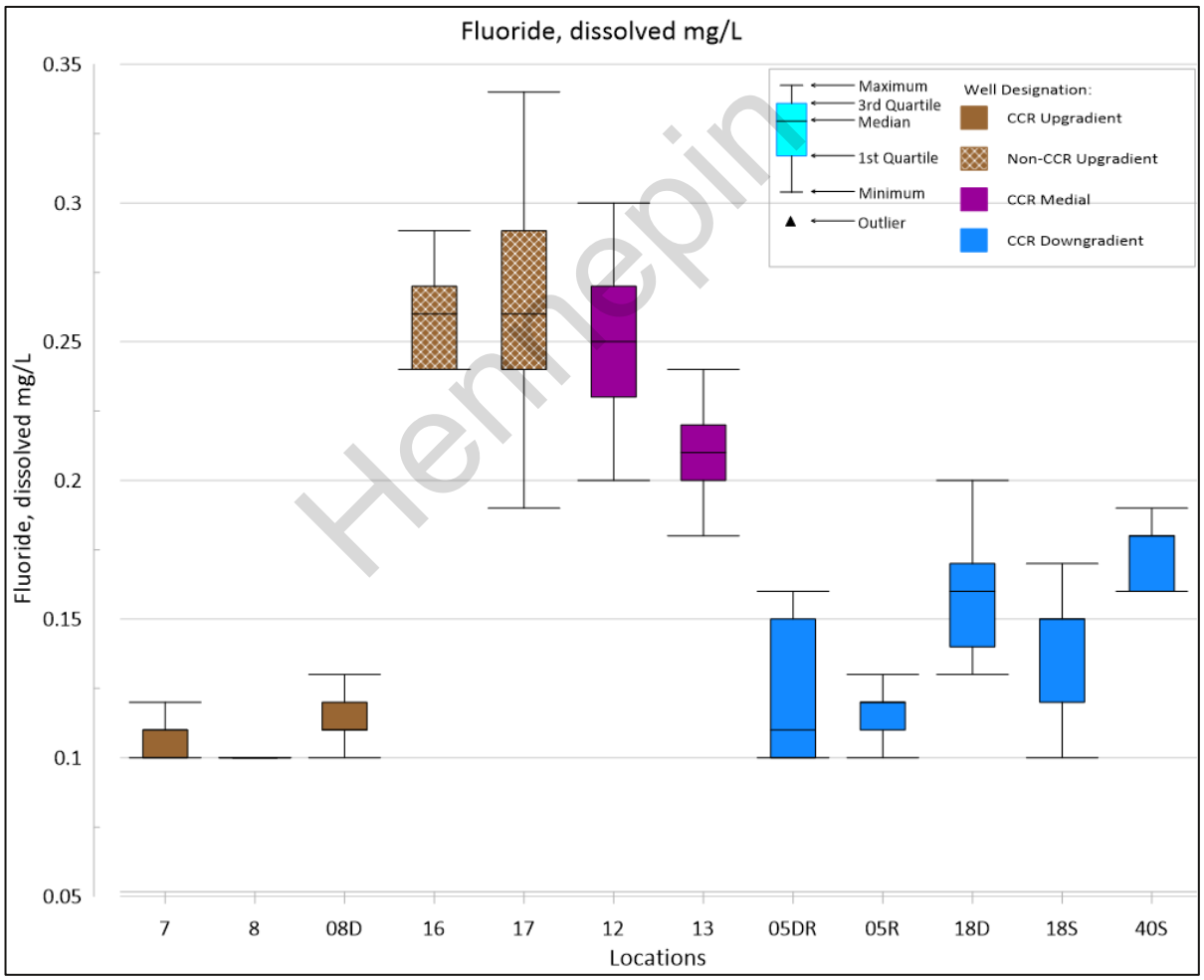


Figure B. Distribution of Dissolved Fluoride Concentrations at Hennepin East Wells.

The box-whisker plot shows three groupings of dissolved fluoride concentrations as follows:

- Lowest Concentrations: The lowest concentrations are at background wells 07, 08, and 08D and downgradient wells 05DR and 05R.
- Moderate Concentrations: The groundwater monitoring wells with moderate fluoride concentrations include wells located along the river and in the vicinity of the Landfill: wells 18D, 18S, and 40S.
- High Concentrations: The highest concentrations of fluoride occur at wells 12, and 13, located upgradient of the Landfill; at non-CCR wells 16 and 17 located upgradient of the East Ash Pond.

The fact that the highest concentrations of fluoride are upgradient of the Landfill demonstrates that the Landfill is not the source of fluoride.

3. CONCLUSIONS

Pursuant to 40 C.F.R. § 257.94(e)(2), the following lines of evidence were presented in this report to demonstrate that the SSIs identified above (Section 2.1) at the Hennepin Landfill are due to alternate sources:

- Landfill Design and Contents
- Ash Fill in Ash Pond No. 2 and Underlying the Landfill
- Upgradient Concentrations of Fluoride

Based on the lines of evidence presented, the following alternate sources are causing the SSIs observed for the Landfill's downgradient wells:

- Boron: SSIs for boron are caused by leachate from exposed ash deposits in Ash Pond No. 2 outside the Landfill boundary. Concentrations return to long-term trends shortly after periodic rainfall infiltration events.
- Fluoride: It is likely that areas upgradient of the Landfill present alternate sources of fluoride based on the fact that concentrations of fluoride are higher upgradient of the landfill than downgradient.

This information serves as the written alternate source demonstration report prepared in accordance with 40 C.F.R. § 257.94(e)(2) that SSIs observed during the detection monitoring program were not caused by the Hennepin Landfill but were from other sources. Therefore, an assessment monitoring program is not required, and the Hennepin Landfill will remain in detection monitoring.

4. REFERENCES

AECOM, Hennepin Power Station – History of Construction, 40 CFR § 257.73(c), October 2016.

Civil & Environmental Consultants, Inc. (CEC) Hennepin CCW Landfill – Phase 1 Construction Completion Report, Hennepin Power Station, Hennepin, Putnam County, Illinois. December 2010.

Civil & Environmental Consultants, Inc. (CEC) Closure and Post-Closure Care Plan for the Hennepin East Ash Pond No. 2. Hennepin Power Station. February 2018.

Kelron, NRT. Initial Facility Report – Hennepin Power Station, New Coal Combustion Waste Landfill. December 10, 2010.

Natural Resource Technology, an OBG Company, 2017a, Sampling and Analysis Plan, Hennepin Landfill, Hennepin Power Station, Hennepin, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Natural Resource Technology, an OBG Company, 2017b, Statistical Analysis Plan, Baldwin Energy Complex, Havana Power Station, Hennepin Power Station, Wood River Power Station, Dynegy Midwest Generation, LLC, October 17, 2017.

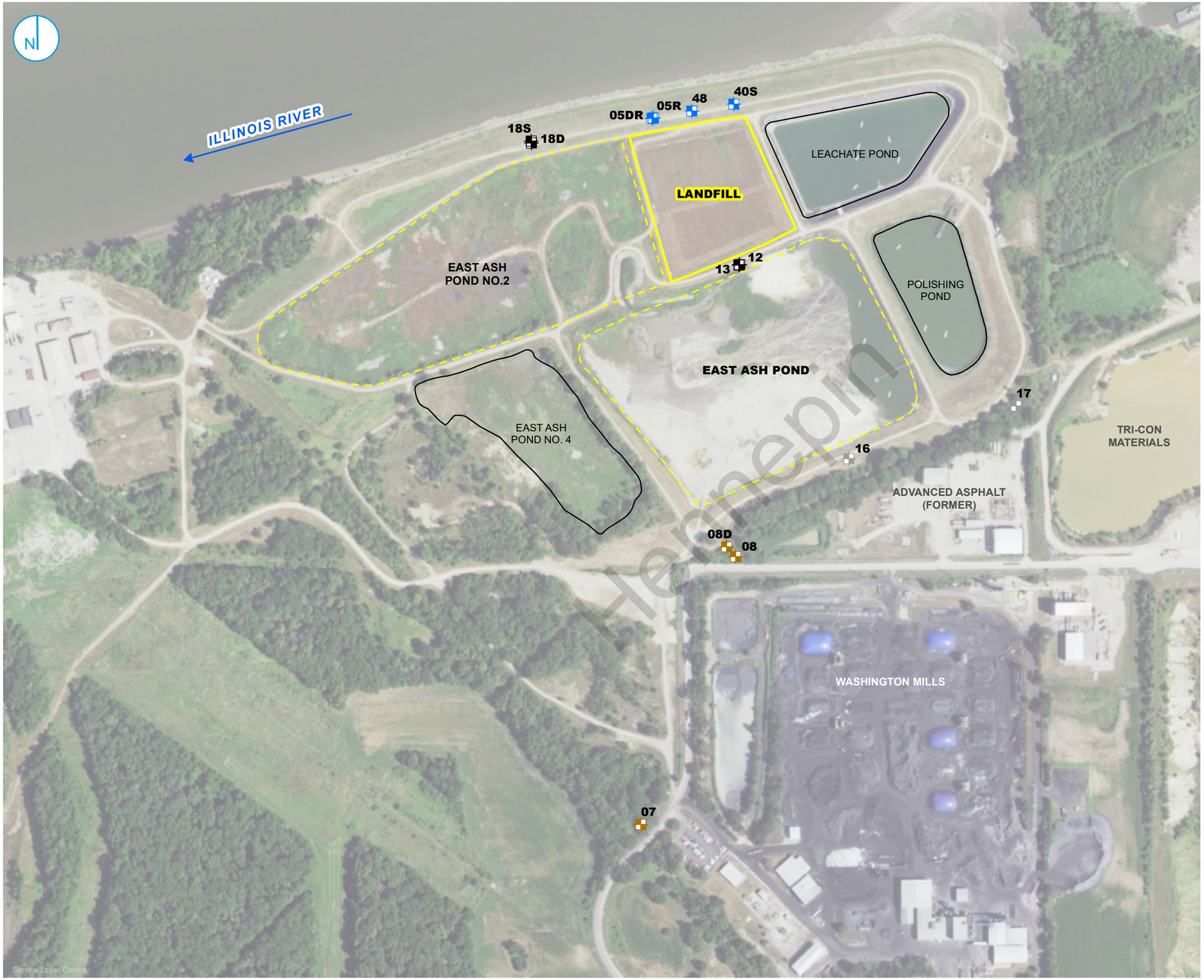
O'Brien & Gere Engineers, Inc. and Civil & Environmental Consultants, Inc. Closure Plan Addendum, Hennepin East Ash Pond No. 2, Hennepin, Illinois. October 25, 2018.

OBG, part of Ramboll, 2019. Response to IEPA Comments – Closure and Post-Closure Care Plan for the Hennepin East Ash Pond No. 2 and Closure Plan Addendum Hennepin East Ash Pond No 2 which includes closure of Ash Pond No. 4. July 22, 2019.

Ramboll, 2020, River Flood Evaluation Report Hennepin East Ash Pond No. 2 and No. 4, Closure Plan Addendum 3. January 15, 2020

40 C.F.R. 257

FIGURES



BACKGROUND MONITORING WELL
DOWNGRADIENT MONITORING WELL
CCR MONITORING WELL
NON-CCR MONITORING WELL
CCR UNIT BOUNDARY, SUBJECT SITE
CCR UNIT BOUNDARY
NON-CCR UNIT

0 175 350
Feet

GROUNDWATER SAMPLING WELL LOCATION MAP

ALTERNATE SOURCE DEMONSTRATION
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

FIGURE 1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Y:\Mapping\Projects\22\2285_Hennepin East\MXD\ASD\Figure 1_GW Sampling Well Location Map_D5.mxd

PROJECT: 1690000XXXX | DATED: 4/10/2020 | DESIGNER: STOLZSD

DOWNGRADIENT WELL LOCATION

UPGRADIENT WELL LOCATION

CCR MONITORED UNIT

0 175 350
Feet

HENNEPIN LANDFILL MONITORING WELL LOCATION MAP
HENNEPIN LANDFILL, UNIT ID: 801

ALTERNATE SOURCE DEMONSTRATION
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

FIGURE 2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Y:\Mapping\Projects\2202285_Hennepin East\MXD\ASD\Figure 2_GWS_WellLoc_HenLF_D5.mxd
PROJECT: 169000XXXX | DATED: 4/10/2020 | DESIGNER: STOLZSD

APPENDIX A
BOTTOM ASH LEACHATE DATA

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

August 03, 2009

John Augspols
Dynegy Midwest Generation
13498 East 800th Street
Hennepin, IL 61327
TEL: (815) 339-9218
FAX:

NELAP Accredited #100226

RE: Hennepin Station Bottom Ash **WorkOrder:** 09070896

Dear John Augspols:

TEKLAB, INC received 1 sample on 7/24/2009 9:00:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. IL ELAP and NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Heather A. White

Heather A. White
Project Manager
(618)344-1004 ex 20

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

Client: Dynegy Midwest Generation
Project: Hennepin Station Bottom Ash
LabOrder: 09070896
Report Date: 03-Aug-09

CASE NARRATIVE

Cooler Receipt Temp: 22.8 °C

State accreditations:

KS: NELAP #E-10347 | KY: UST #0073 | MO: DNR #00930 | AR: ADEQ #70-028-0

Qualifiers

DF - Dilution Factor	**B** - Analyte detected in the associated Method Blank	**C** - Client requested RL below PQL
RL - Reporting Limit	**J** - Analyte detected below reporting limits	**D** - Diluted out of sample
ND - Not Detected at the Reporting Limit	**R** - RPD outside accepted recovery limits	**E** - Value above quantitation range
Surr - Surrogate Standard added by lab	**S** - Spike Recovery outside accepted recovery limits	**H** - Holding time exceeded
TNTC - Too numerous to count (> 200 CFU)	X - Value exceeds Maximum Contaminant Level	**MI** - Matrix interference
Q - QC criteria failed or noncompliant CCV	# - Unknown hydrocarbon	**DNI** - Did not ignite
NELAP - IL ELAP and NELAP Accredited Field of Testing	**IDPH** - IL Dept. of Public Health	

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

LABORATORY RESULTS

Client: Dynegy Midwest Generation
WorkOrder: 09070896
Lab ID: 09070896-001
Report Date: 03-Aug-09

Client Project: Hennepin Station Bottom Ash
Client Sample ID: Hennipin Station Bottom Ash
Collection Date: 7/22/2009 11:00:00 AM
Matrix: SOLID

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Analyst
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Arsenic		0.0250		**< 0.0250**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Barium		0.0050		**0.116**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Beryllium		0.0010		**< 0.0010**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Boron		0.0200		**0.193**	mg/L	1	8/3/2009 10:30:48 AM	LAL
Cadmium		0.0020		**< 0.0020**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Chromium		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Cobalt		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Copper		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Iron		0.0300		**0.0687**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Manganese		0.0050		**< 0.0050**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Nickel		0.0100		**< 0.0100**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Selenium		0.0500		**< 0.0500**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Silver		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Zinc		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
ASTM D3987, SW-846 3020A, METALS IN SHAKE EXTRACT BY GFAA								
Antimony, SHAKE by GFAA	7041	0.0050		**< 0.0050**	mg/L	1	7/29/2009 2:45:16 PM	MEK
Lead, SHAKE by GFAA	7421	0.0020	J	**0.0011**	mg/L	1	7/29/2009 10:18:30 AM	MEK
Thallium, SHAKE by GFAA	7841	0.0020		**< 0.0020**	mg/L	1	7/29/2009 2:41:30 PM	MEK
ASTM D3987, SW-846 7470A IN SHAKE EXTRACT								
Mercury, SHAKE		0.00020		**< 0.00020**	mg/L	1	7/28/2009	ALU

Sample Narrative

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

RECEIVING CHECK LIST

Client: Dynegy Midwest Generation
Project: Hennepin Station Bottom Ash
Lab Order: 09070896
Report Date: 03-Aug-09

Carrier: UPS

Received By: DB

Completed by: Marvin L. Darling II
On: 24-Jul-09
Marvin L. Darling

Reviewed by: Heather A. White
On: 24-Jul-09
Heather A. White

Pages to follow: Chain of custody 1 Extra pages included 2

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 22.8			
Type of thermal preservation?	None ☑	Ice ☐	Blue Ice ☐	Dry Ice ☐			
Chain of custody present?	Yes ☐	No ☑					
Chain of custody signed when relinquished and received?	Yes ☐	No ☑					
Chain of custody agrees with sample labels?	Yes ☑	No ☐					
Samples in proper container/bottle?	Yes ☑	No ☐					
Sample containers intact?	Yes ☑	No ☐					
Sufficient sample volume for indicated test?	Yes ☑	No ☐					
All samples received within holding time?	Yes ☑	No ☐					
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑				
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐					

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	

Any No responses must be detailed below or on the COC.

Sample id and collection date/time obtained from sample container. Per John Augspols, sample ID and collection/date time on the container are correct. Analyze for the same list of parameters as in 2008. EAH 7/27/09

09070896

TEKLAB, INC
5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
TEL: (618) 344-1004
FAX: (618) 344-1005

CHAIN-OF-CUSTODY RECORD

WorkOrder: 09070896

Client:
Dynegy Midwest Generation
13498 East 800th Street
Hennepin, IL 61327

TEL: (815) 339-9218
FAX:
Project: Hennepin Station Bottom As

24-Jul-09

					Requested Tests						
Sample ID	**ClientSampID**	**Matrix**	**Date Collected**	**Bottle**	**D3987/6010B**	**D3987/7000 G**	**D3987/SW7470A**				
09070896-001	Hennipin Station Bottom	Solid	7/22/2009 11:00:00 AM		A	A	A				

Comments:

22.8°C ICE

	Date/Time		**Date/Time**
Relinquished by:		**Received by:** Dan Botly (UPS)	7/24/09 900
Relinquished by:		**Received by:**	
Relinquished by:		**Received by:**	

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

Teklab: 7/22/09

Please find enclosed a bottom ash sample to be run for the same parameters as last year. I enclosed those results with the sample. I would like to pay for this with a credit card. If you have any questions please contact me :

John Augspols

Supv. Environmental and Chemistry

(815) 339-9218

Fax (815) 339 -2772

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

LABORATORY RESULTS

Client: Dynegy Midwest Generation
WorkOrder: 08060909
Lab ID: 08060909-001
Report Date: 02-Jul-08

Client Project: Hennepin Station Bottom Ash
Client Sample ID: Hennipin Station Botton Ash
Collection Date: 6/24/2008 9:00:00 AM
Matrix: SOLID

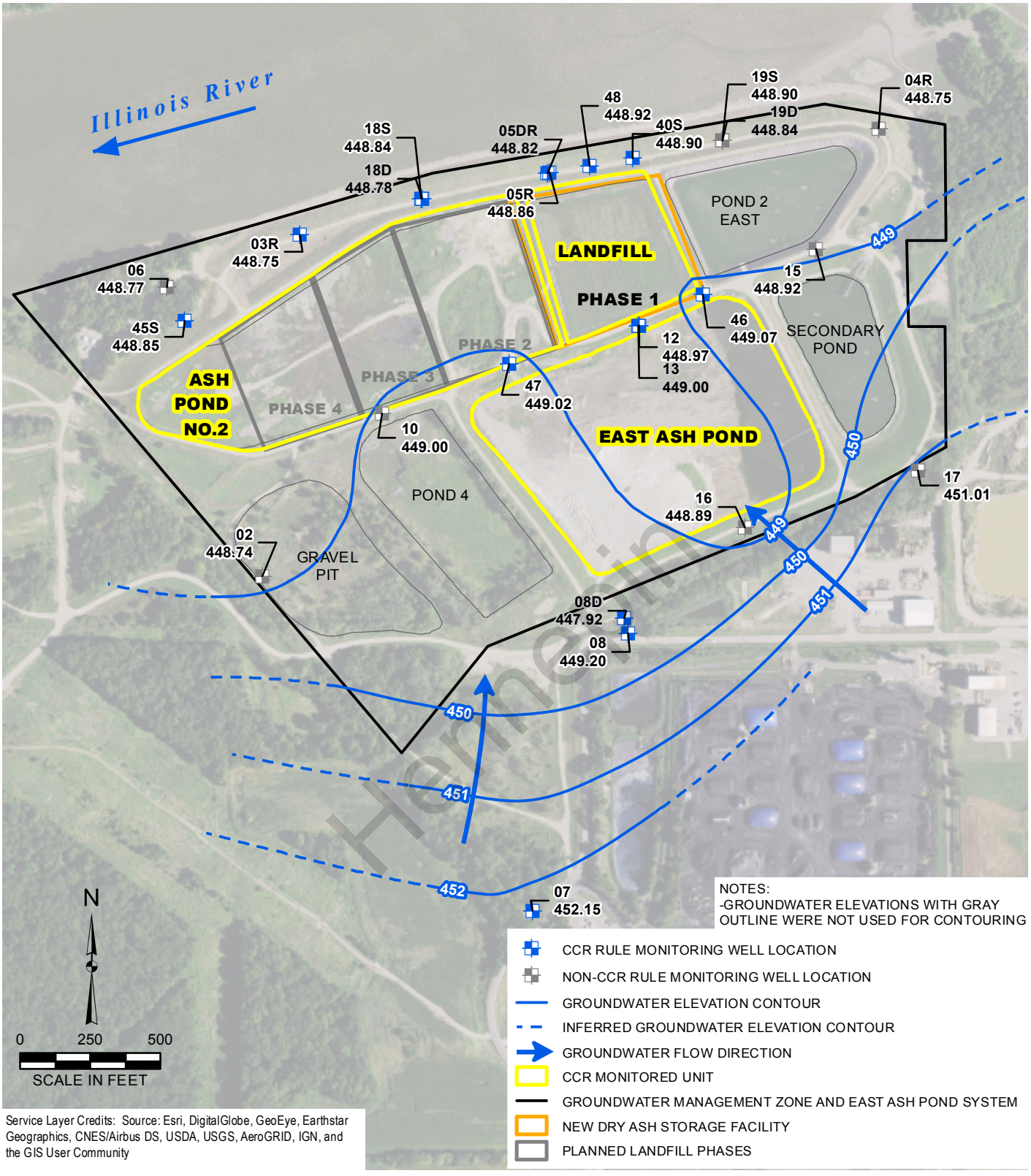
Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Analyst
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Arsenic		0.0250		< 0.0250	mg/L	1	6/30/2008 12:29:55 PM	LAL
Barium		0.0050		0.0699	mg/L	1	6/30/2008 12:29:55 PM	LAL
Beryllium		0.0010		< 0.0010	mg/L	1	6/30/2008 12:29:55 PM	LAL
Boron		0.0200		0.197	mg/L	1	6/30/2008 12:29:55 PM	LAL
Cadmium		0.0020		< 0.0020	mg/L	1	6/30/2008 12:29:55 PM	LAL
Chromium		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Cobalt		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Copper		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Iron		0.0200		0.110	mg/L	1	6/30/2008 12:29:55 PM	LAL
Manganese		0.0050		< 0.0050	mg/L	1	6/30/2008 12:29:55 PM	LAL
Nickel		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Selenium		0.0500		< 0.0500	mg/L	1	6/30/2008 12:29:55 PM	LAL
Silver		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Zinc		0.0100	J	0.0025	mg/L	1	6/30/2008 12:29:55 PM	LAL
ASTM D3987, SW-846 3020A, METALS IN SHAKE EXTRACT BY GFAA								
Antimony, SHAKE by GFAA	7041	0.0050	J	0.0024	mg/L	1	6/30/2008 11:51:48 AM	JMW
Lead, SHAKE by GFAA	7421	0.0020		< 0.0020	mg/L	1	6/30/2008 9:45:10 AM	JMW
Thallium, SHAKE by GFAA	7841	0.0020	S	< 0.0020	mg/L	1	6/30/2008 11:17:06 AM	JMW
ASTM D3987, SW-846 7470A IN SHAKE EXTRACT								
Mercury, SHAKE		0.00020	J	0.00006	mg/L	1	6/30/2008	SRH

Sample Narrative
ASTM D3987, SW-846 3020A, Metals in Shake Extract by GFAA
TI - Matrix interference present in sample.

22-8 notice
DB 7/24/09

900 ~~FeWS~~
DB 7/24/09

APPENDIX B
GROUNDWATER CONTOUR MAPS, 2015-2019



DRAWN BY/DATE:
SDS 1/25/17
REVIEWED BY/DATE:
TBN 1/26/17
APPROVED BY/DATE:
JJW 2/9/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 1: DECEMBER 8, 2015

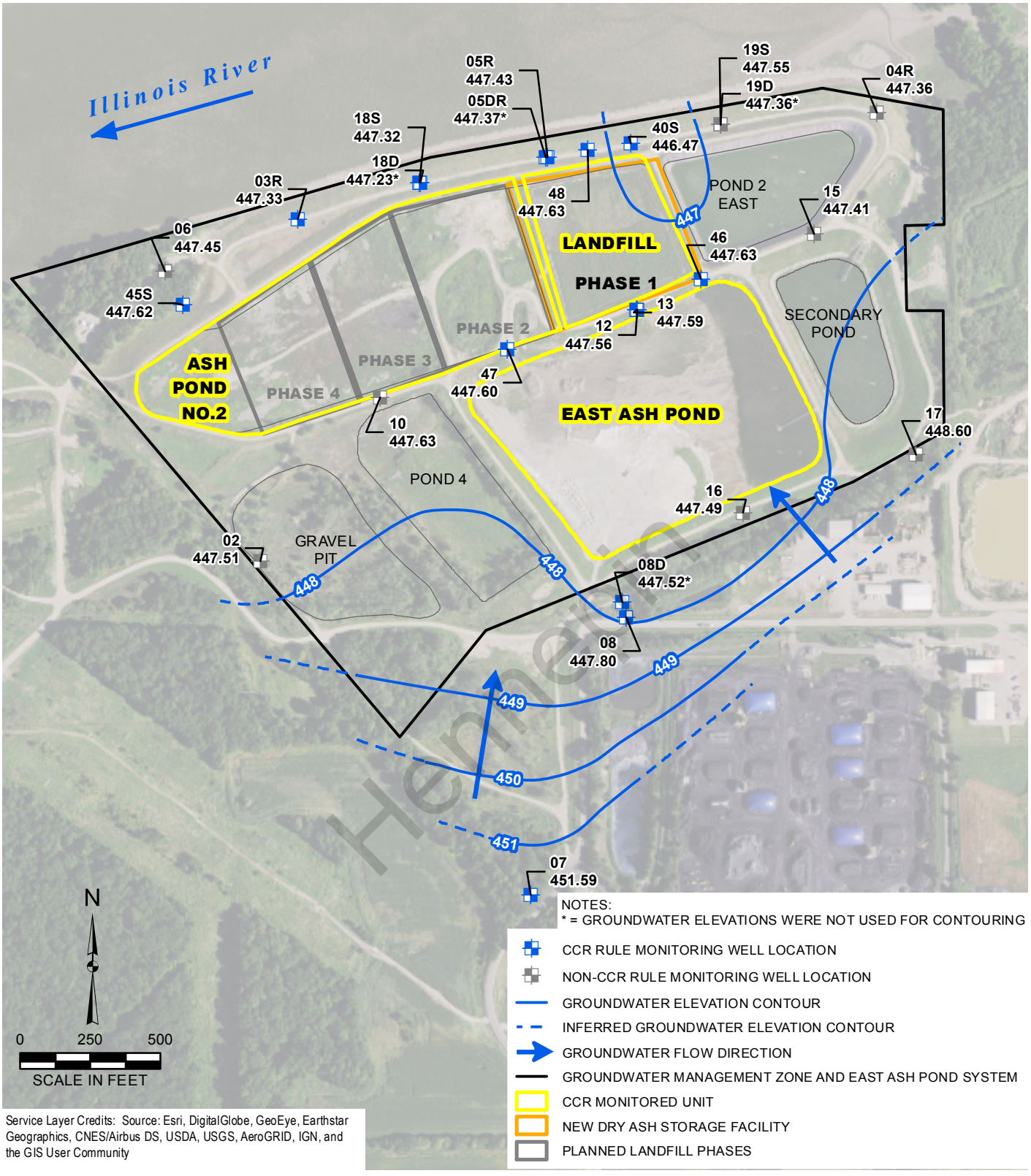
DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

Y:\Mapping\Projects\22\2285MXD\GW_Contours\Round_01\R1_HennepinEast_GW_Contours.mxd Author: sstolz Date/Time: 3/2/2017, 2:55:08 PM



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JJW 2/9/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 2: MARCH 8, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
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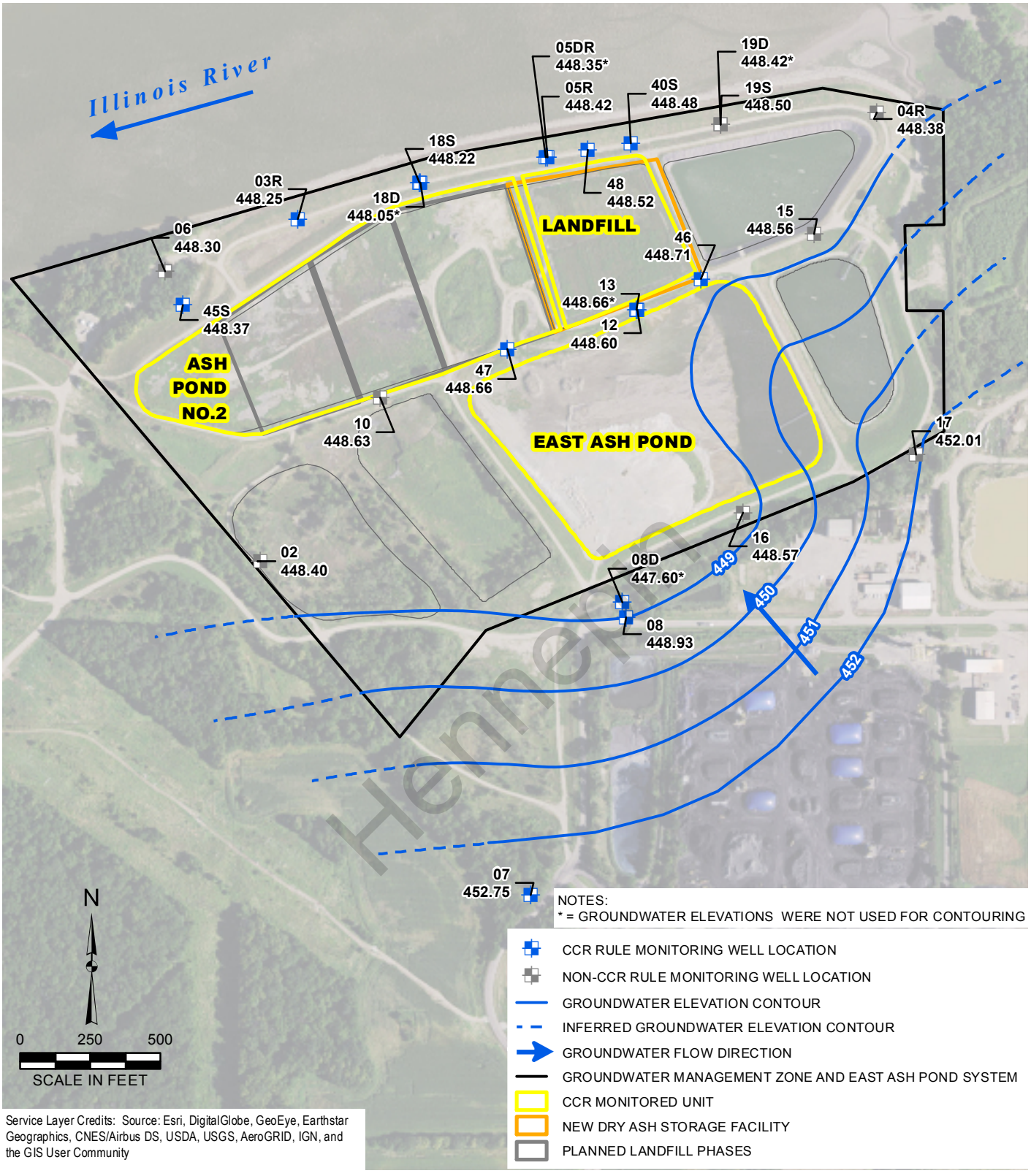

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APPROVED BY/DATE:
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UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 3: JUNE 7, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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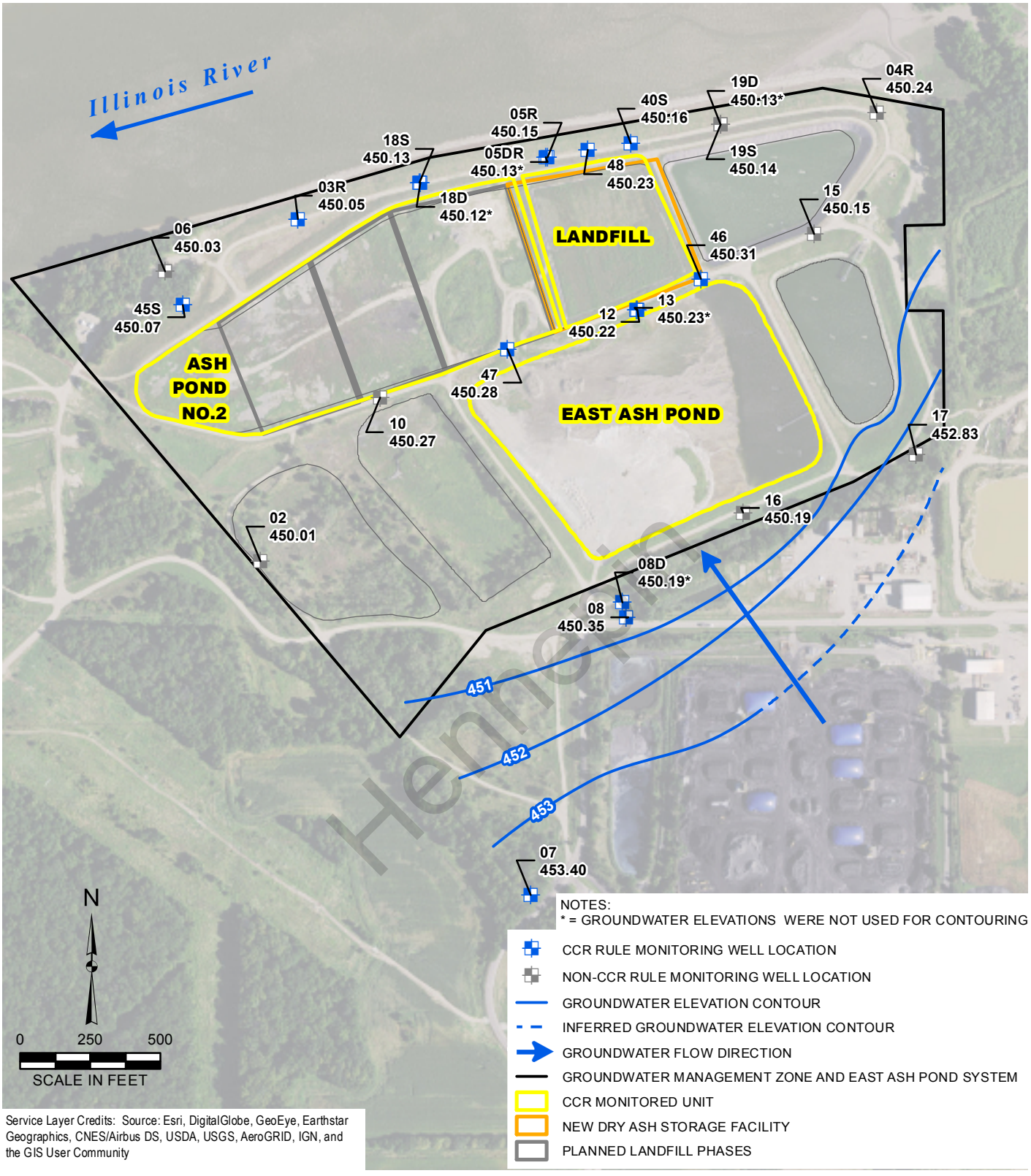

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TBN 1/27/17
APPROVED BY/DATE:
JJW 2/7/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 4: SEPTEMBER 9, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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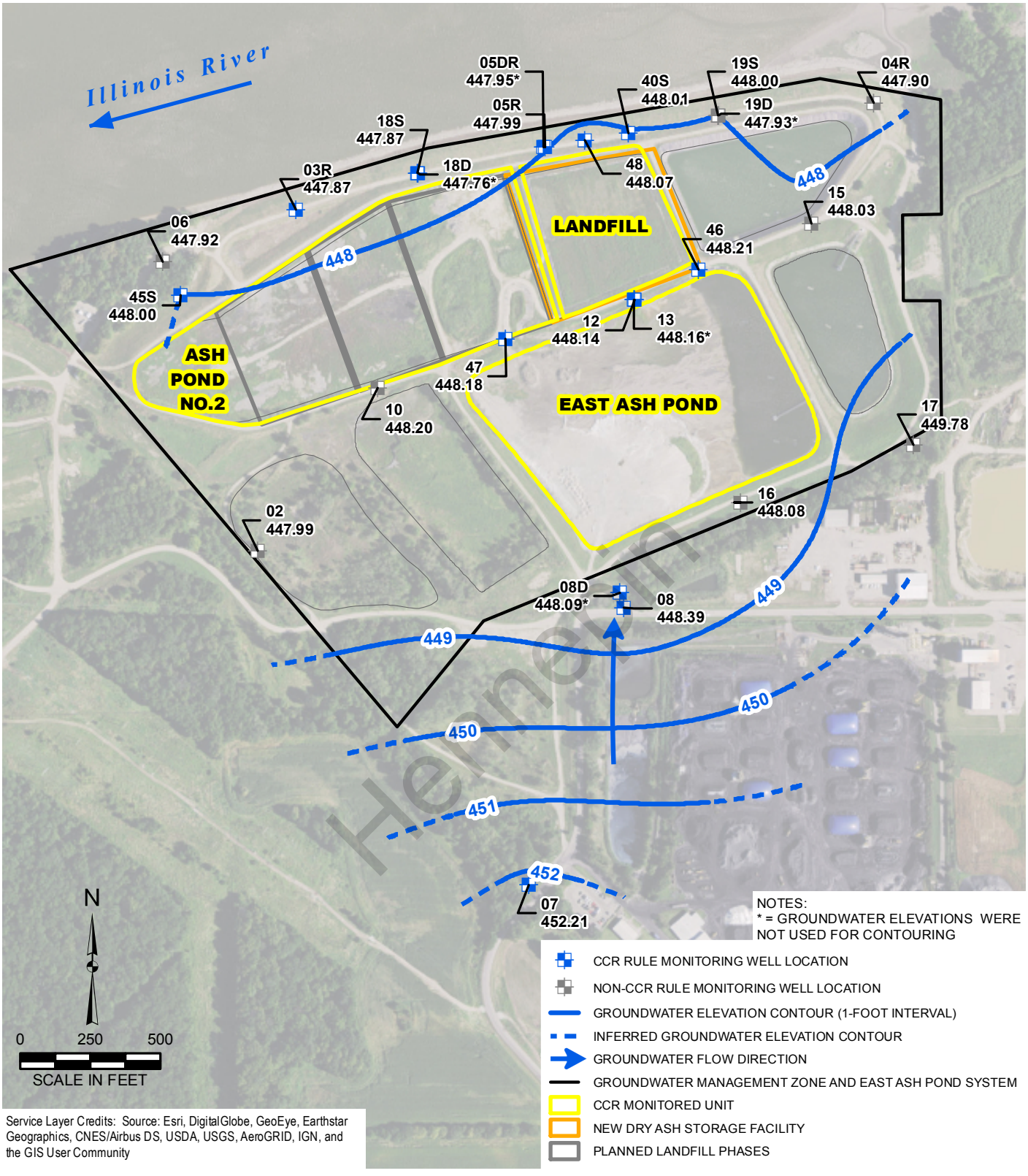

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APPROVED BY/DATE:
JJW 9/1/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 5: DECEMBER 7, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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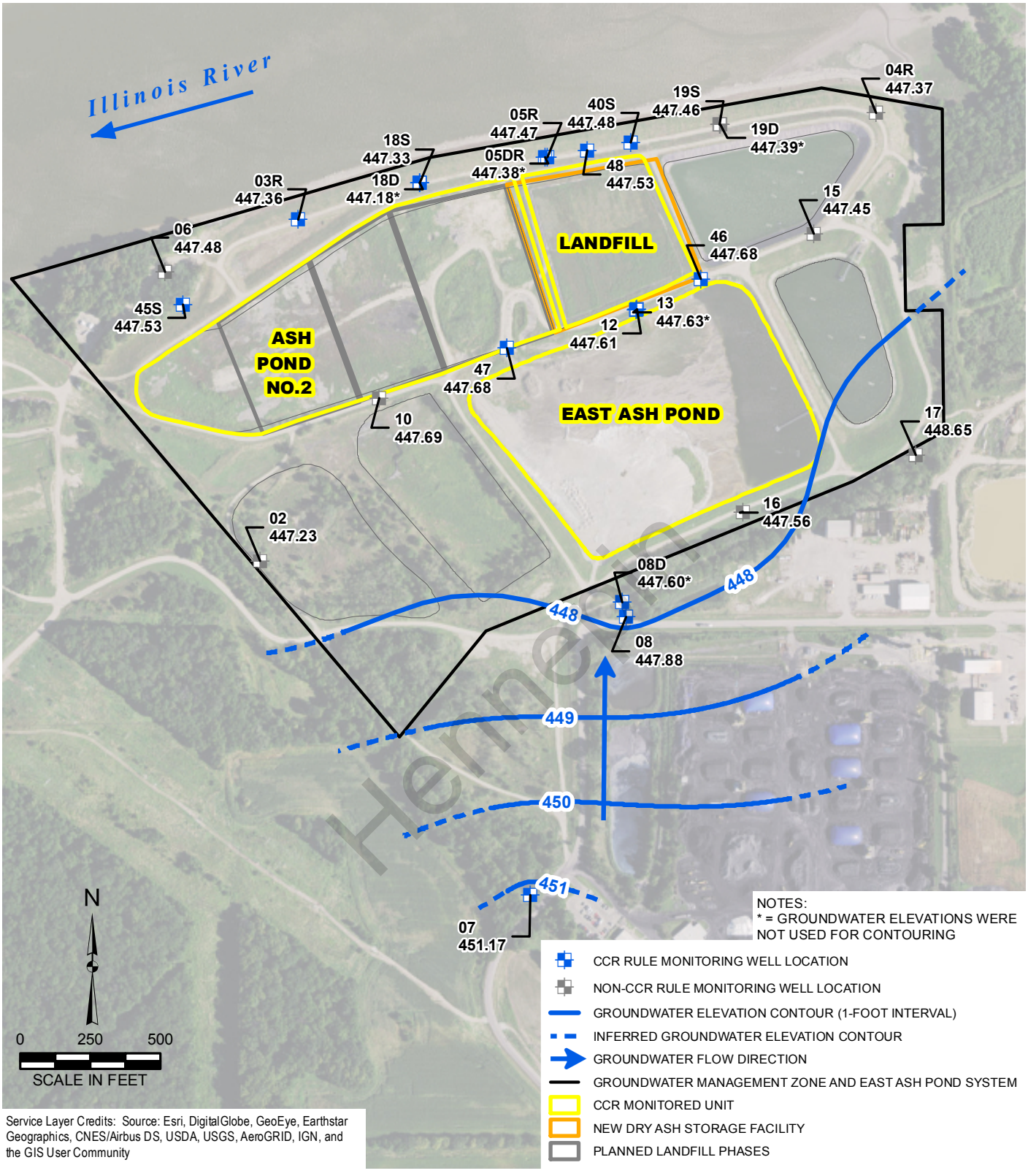

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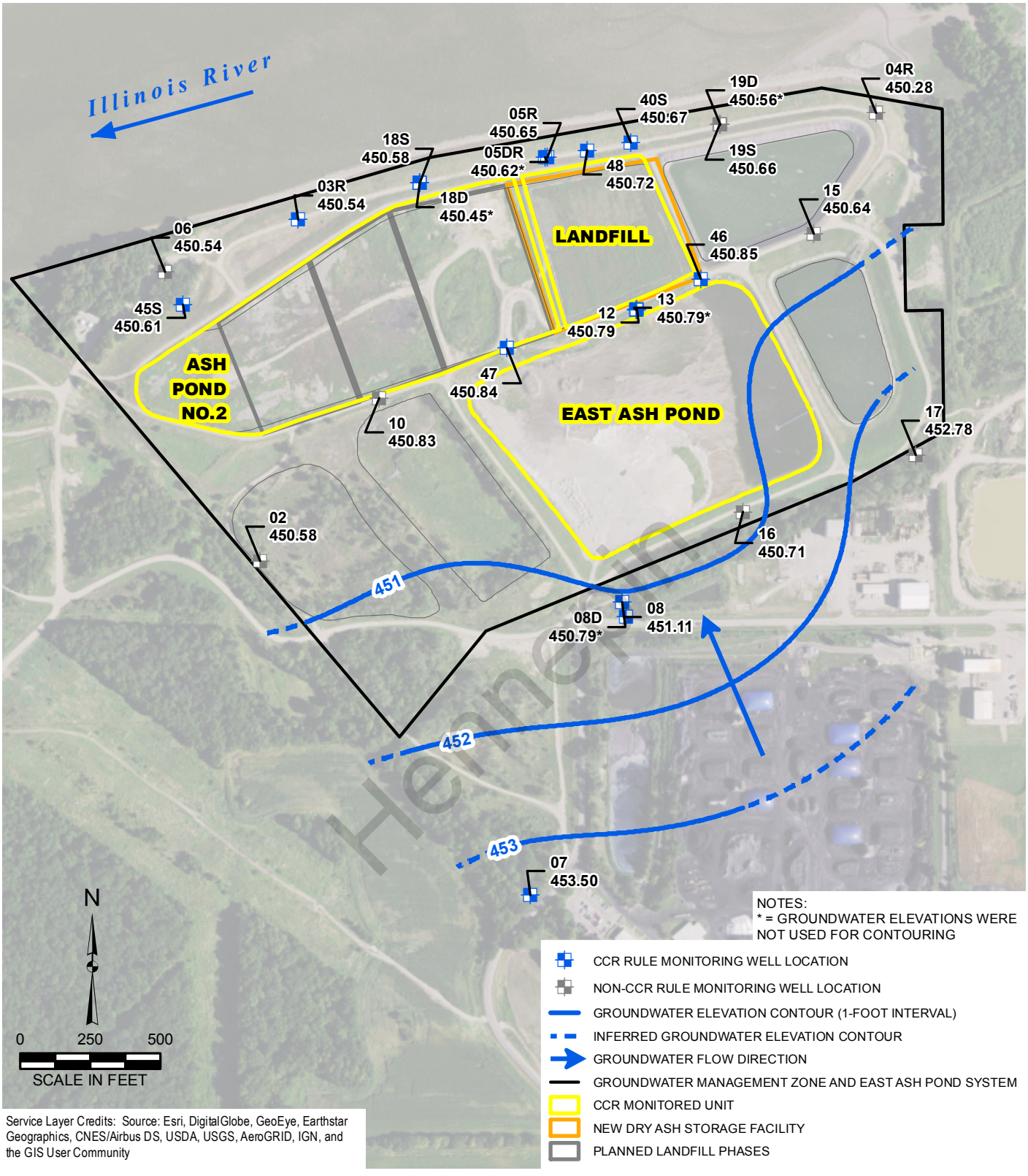
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 6: FEBRUARY 20, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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JJW 9/1/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 7: APRIL 25, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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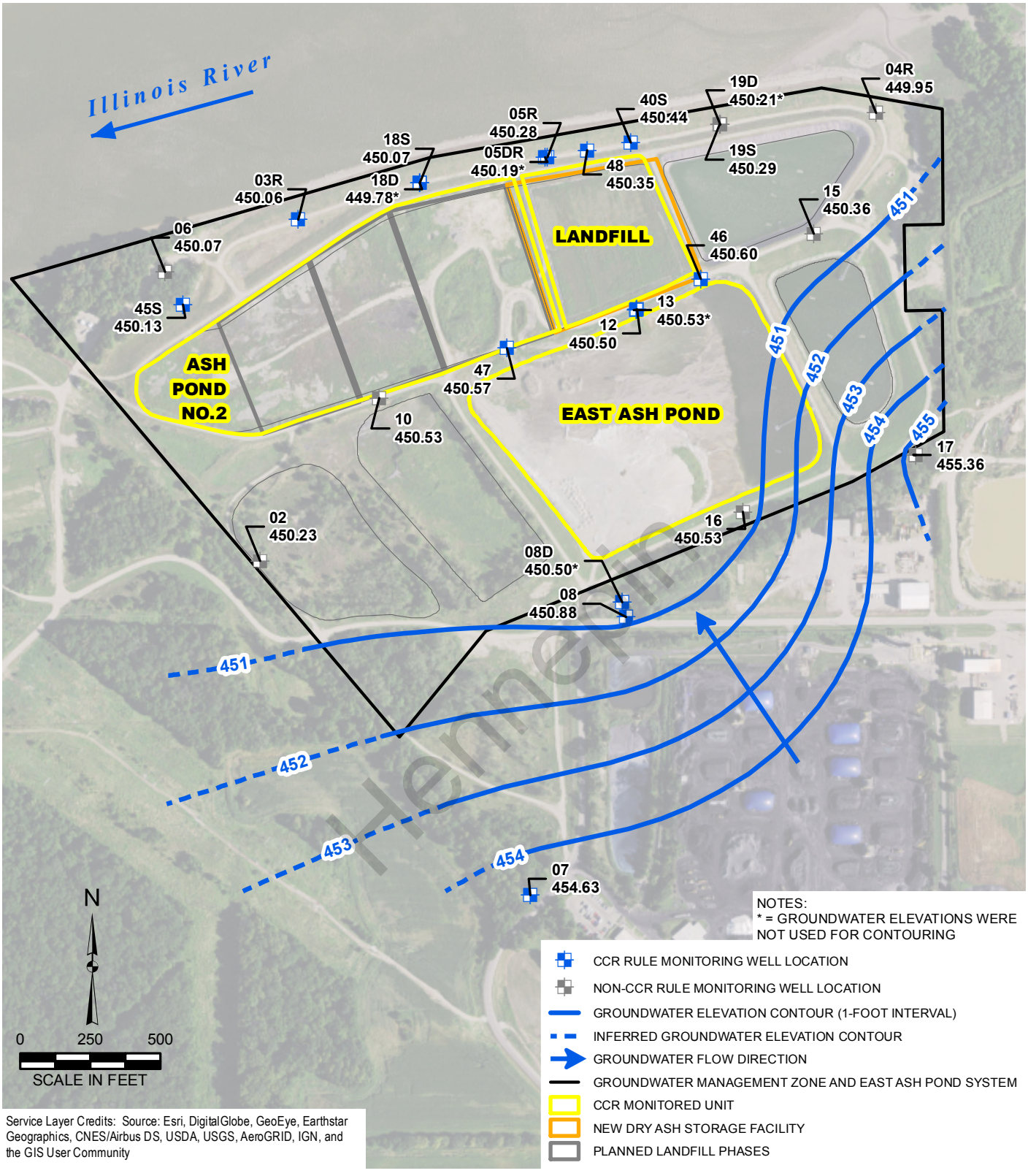

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TBN 7/20/17
APPROVED BY/DATE:
JJW 9/1/17

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UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 8: JUNE 8, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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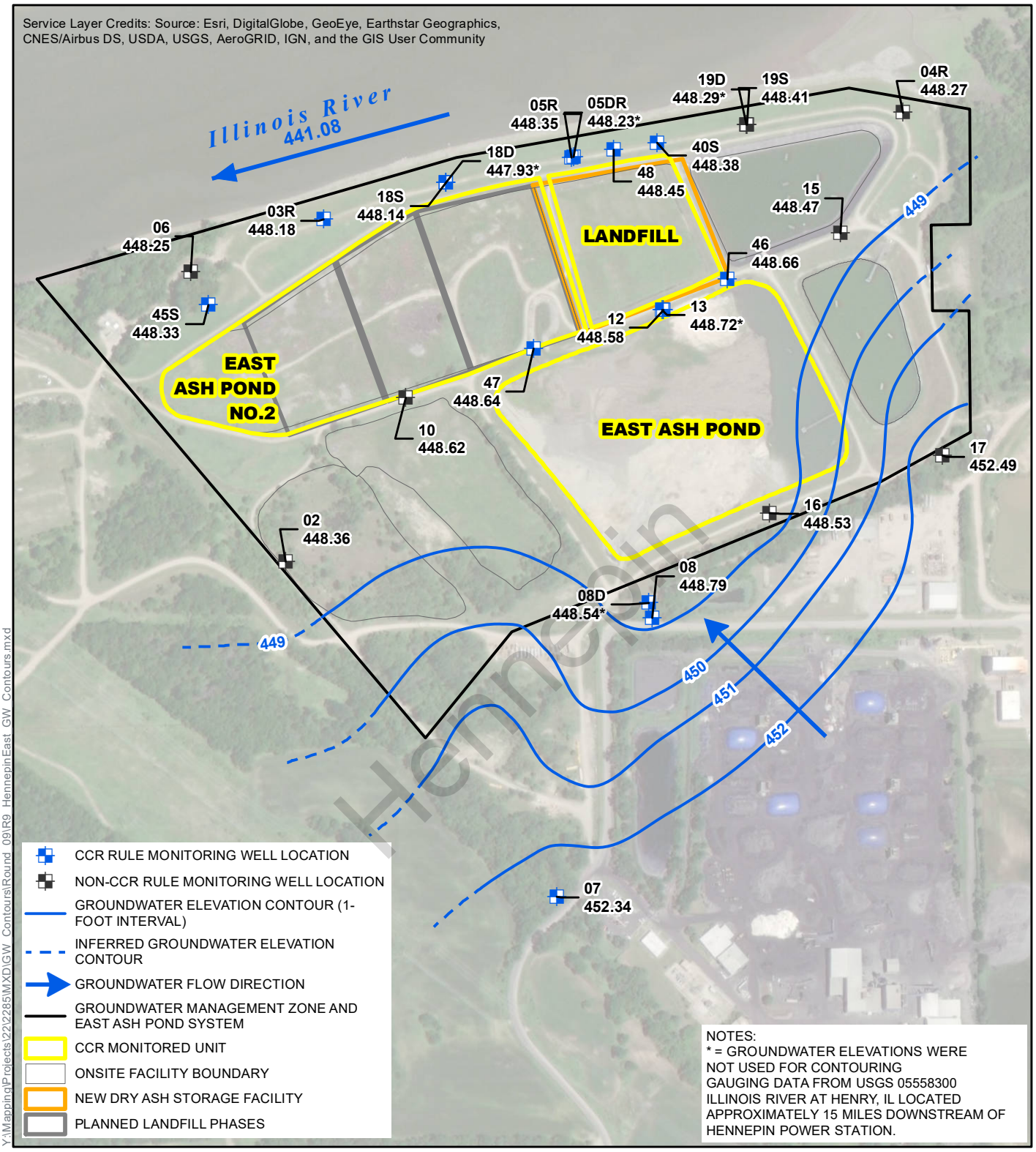


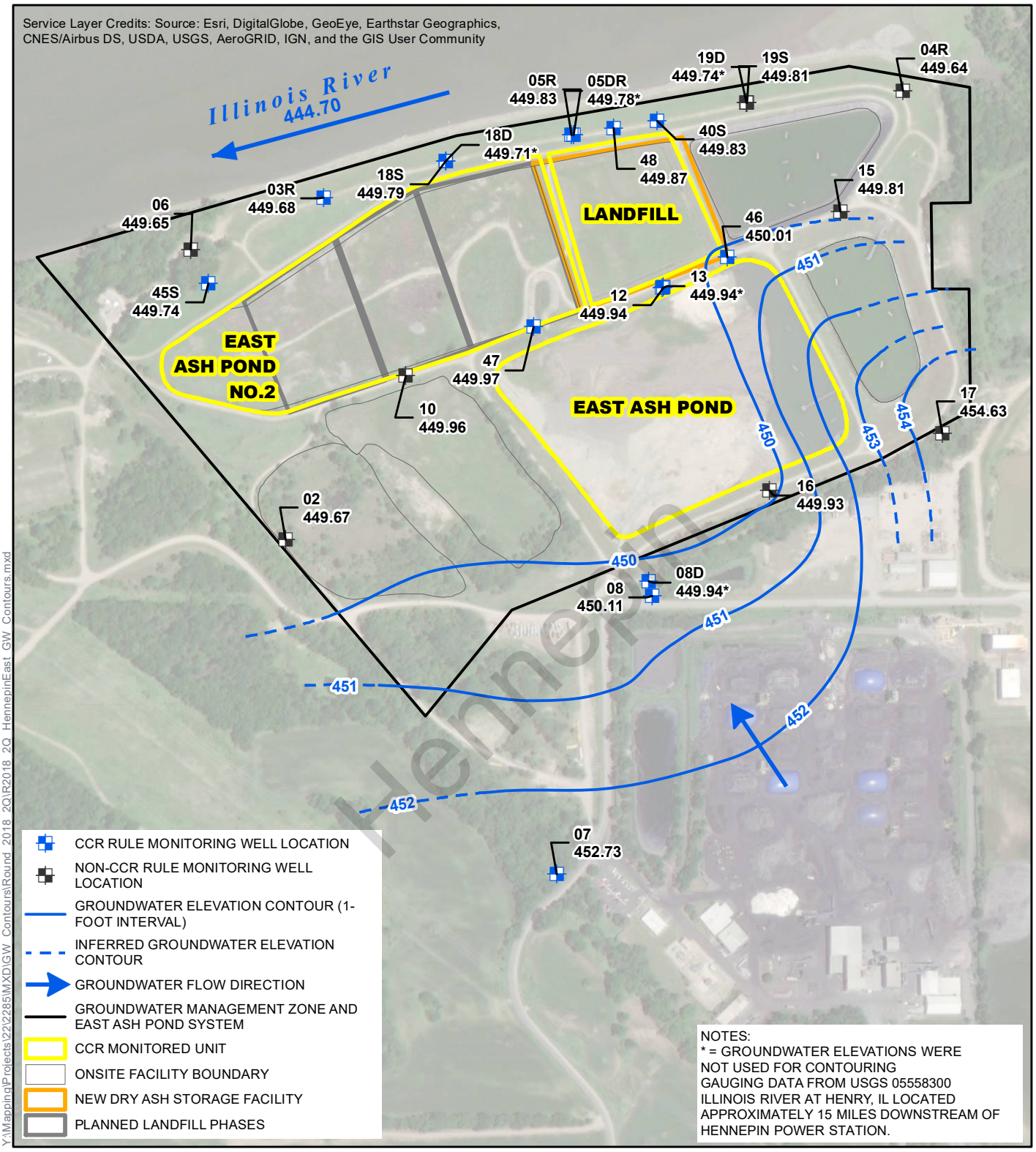
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 15, 2017

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.



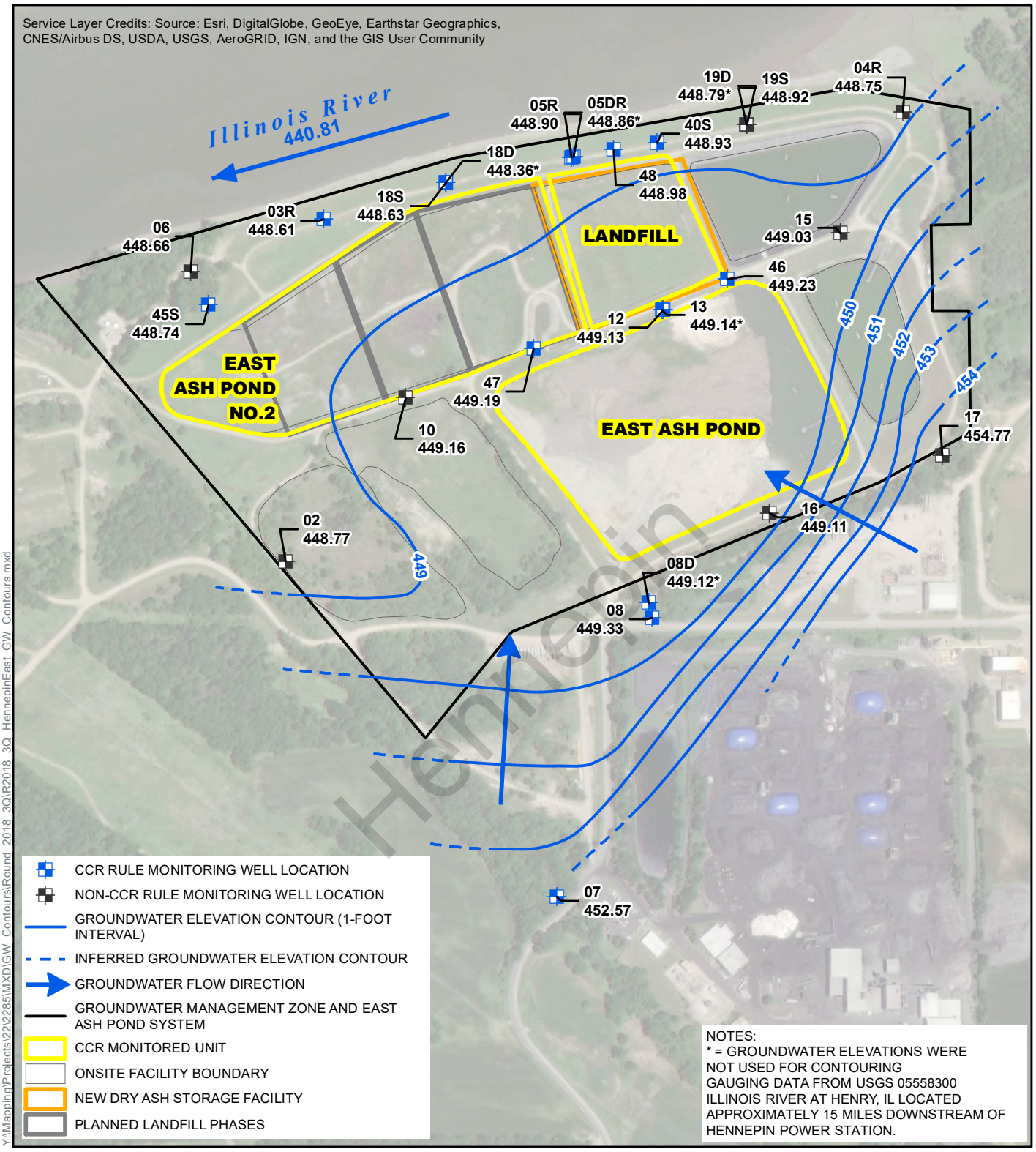
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
JUNE 13, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



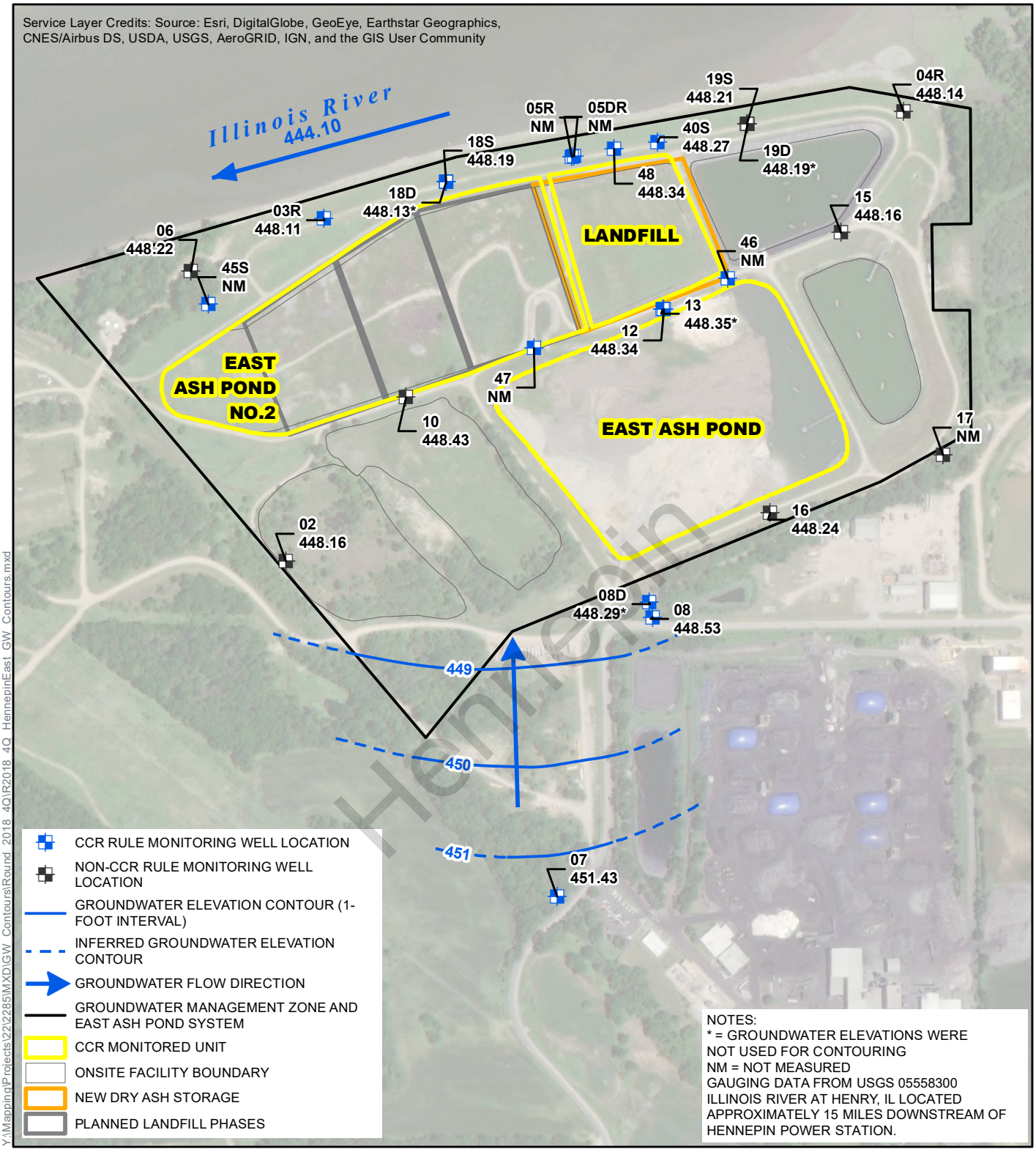
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



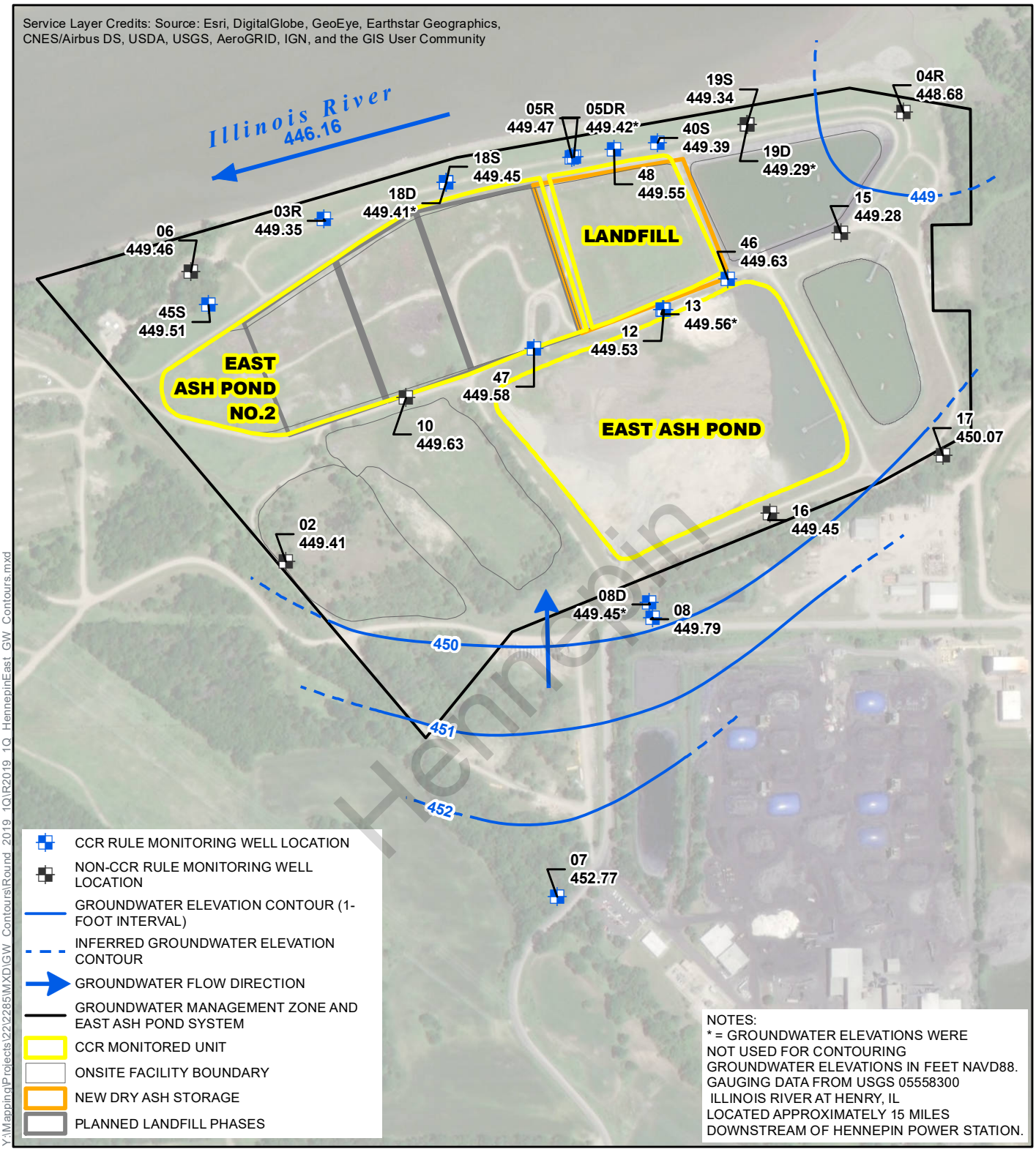
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803) GROUNDWATER ELEVATION CONTOUR MAP DECEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



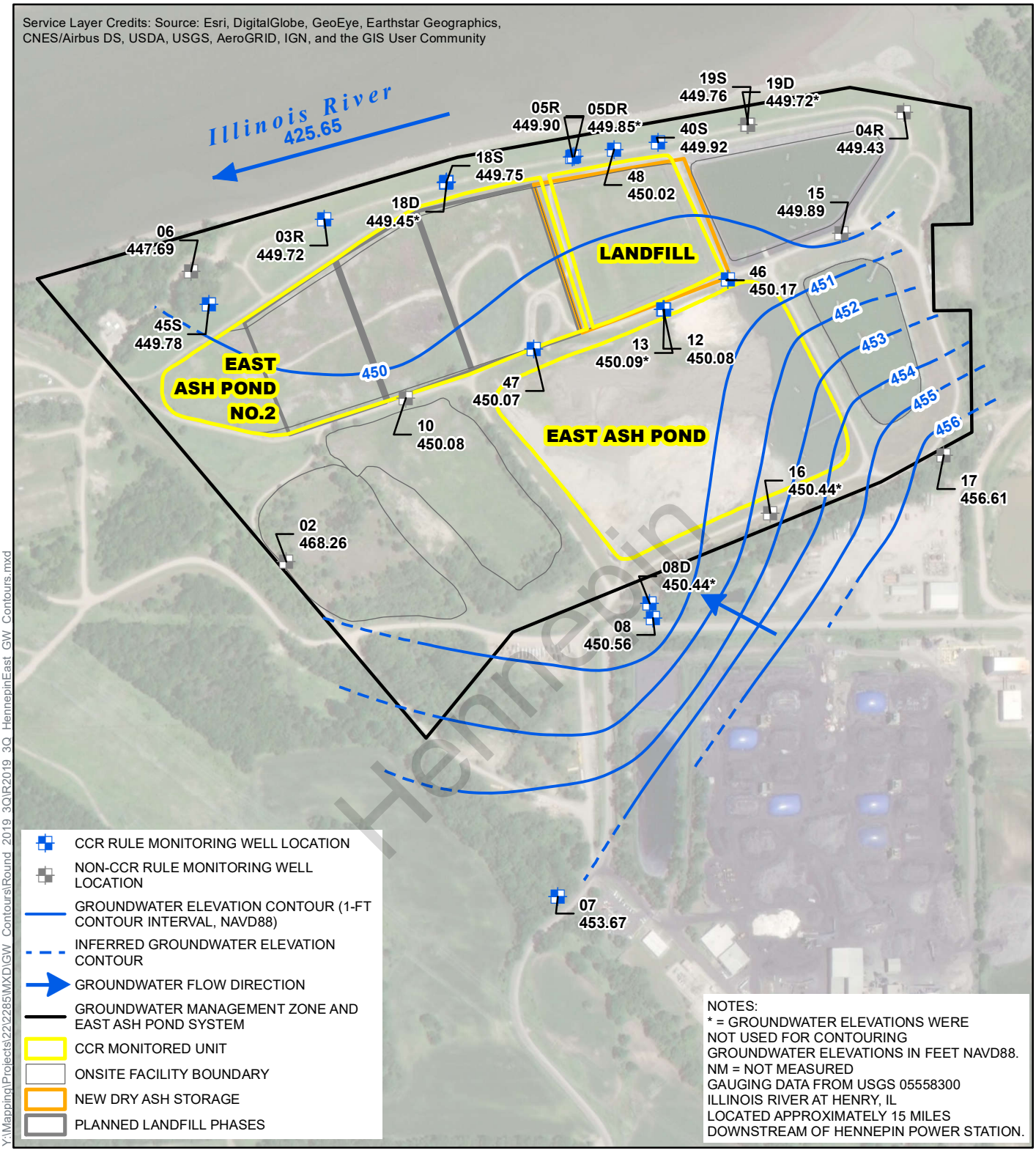
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
MARCH 13, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 17, 2019

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

N

0 125 250 500
Feet

O'BRIEN & GERE ENGINEERS, INC.

Prepared for
Dynegy Midwest Generation, LLC

Date
October 12, 2020

Project No.
1940074919

40 C.F.R. § 257.94(e)(2): ALTERNATE SOURCE DEMONSTRATION

HENNEPIN LANDFILL

RAMBOLL Bright ideas. Sustainable change.

CERTIFICATIONS

I, Brian G. Hennings, a professional geologist in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Brian G. Hennings
Professional Geologist
196-001482
Illinois
Ramboll Americas Engineering Solutions, Inc., f/k/a O'Brien & Gere Engineers, Inc.
Date: October 12, 2020

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used for other than its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Ramboll Americas Engineering Solutions, Inc., f/k/a O'Brien & Gere Engineers, Inc.
Date: October 12, 2020

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CONTENTS

TABLES (IN TEXT)

FIGURES (IN TEXT)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
Ash Pond No. 2	Hennepin East Ash Pond No. 2
CCR	Coal Combustion Residuals
CCR Rule	40 C.F.R. Part 257 Subpart D
CEC	Civil & Environmental Consultants, Inc.
cm/s	centimeters per second
East Ash Pond	Hennepin East Ash Pond
f/k/a	formerly known as
HDPE	High-density Polyethylene
IEPA	Illinois Environmental Protection Agency
Landfill	Hennepin Landfill
LOE	line of evidence
mg/L	milligrams per liter
NAVD88	North American Vertical Datum of 1988
NPDES	National Pollutant Discharge Elimination System
NRT/OBG	Natural Resource Technology, an OBG Company
oz/sy	ounce per square yard
Site	East Ash Pond System
SSI	Statistically Significant Increase

1. INTRODUCTION

Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.94(e)(2) allows the owner or operator of a Coal Combustion Residuals (CCR) unit 90 days from the date of determination of a Statistically Significant Increase (SSI) over background for groundwater constituents listed in Appendix III of 40 C.F.R. Part 257 to complete a written demonstration that a source other than the CCR unit being monitored caused the SSI(s), or that the SSI(s) resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Alternate Source Demonstration [ASD]).

This ASD has been prepared on behalf of Dynegy Midwest Generation, LLC, by Ramboll Americas Engineering Solutions, Inc. (Ramboll), formerly known as (f/k/a) O'Brien & Gere Engineers, Inc., to provide pertinent information pursuant to 40 C.F.R. § 257.95(g)(3)(ii) for the Hennepin Landfill (Landfill), located near Hennepin, Illinois.

The most recent Detection Monitoring sampling event (D6) was completed on March 11-12, 2020, and analytical data were received on April 15, 2020. Analytical data from D6 were evaluated in accordance with the Statistical Analysis Plan (Natural Resource Technology, an OBG Company [NRT/OBG], 2017a) to determine any Statistically Significant Increases (SSIs) of Appendix III parameters over background concentrations. That evaluation identified SSIs at downgradient monitoring wells as follows:

- Boron at wells 05R, 05DR, 40S, and 48
- Fluoride at wells 05R, 05DR, 40S, and 48
- pH at wells 05R and 48

In accordance with the Statistical Analysis Plan, resamples were collected on June 3, 2020 to confirm the SSIs for the following parameters and wells: boron and pH at 05R; boron at 40S; and pH at 48. Following evaluation of analytical data from the resample event, the following SSIs were confirmed:

- Boron at wells 05R, 05DR, 40S, and 48
- Fluoride at wells 05R, 05DR, 40S, and 48
- pH at wells 05R and 48

Pursuant to 40 C.F.R. § 257. 94(e)(2), the lines of evidence (LOEs) described in Section 3 demonstrate that sources other than the Landfill were the cause of the boron, fluoride, and pH SSIs listed above. This ASD was completed by October 12, 2020, within 90 days of determination of the SSIs, as required by 40 C.F.R. § 257.94(e)(2).

2. BACKGROUND

2.1 Site Location and Description

The Hennepin Power Station is located in the northeast quarter of Section 26, Township 33 North, Range 2 West, Putnam County, Illinois and approximately 3 miles north-northeast of the Village of Hennepin. The Landfill is located east of the Hennepin Power Station and situated less than 200 feet from the south bank of the Illinois River and approximately one mile east of the Big Bend, where the river shifts course from predominantly west to predominantly south.

The Landfill is one of four CCR units regulated under 40 C.F.R. Part 257 Subpart D (CCR Rule) at the Hennepin Power Station. One of the CCR units is located west of the Hennepin Power Station. Three of the CCR units are located adjacent to or near each other in the eastern portion of the Hennepin Power Station, and are collectively known as Hennepin East. The three Hennepin East CCR units include the Landfill, Hennepin East Ash Pond No. 2 (Ash Pond No. 2), and Hennepin East Ash Pond (East Ash Pond). The CCR units at Hennepin East, shown on Figure 1, are also referred to as the East Ash Pond System (Site).

Surrounding areas include industrial properties to the east and south of the Site, agricultural land to the southwest, and the Hennepin Power Station to the west (also shown on Figure 1).

2.2 Groundwater Monitoring

The Landfill groundwater monitoring system for compliance with the CCR Rule consists of three upgradient monitoring wells (07, 08, 08D) and four downgradient monitoring wells (05R, 05DR, 40S, and 48). A map showing the groundwater monitoring system, including the CCR unit and all background and downgradient monitoring wells, is presented in Figure 1.

Groundwater samples are collected and analyzed in accordance with the Sampling and Analysis Plan prepared for the Landfill (NRT/OBG, 2017b). Statistical evaluation of analytical data is performed in accordance with the Statistical Analysis Plan.

2.3 Site History

The Hennepin Power Station has two coal-fired generating units constructed in 1953 and 1959 with a total capacity of 210 Megawatts. Operations were ceased in November 2019. The coal source changed several times during the station's operational history. Information related to the Hennepin East CCR units shown on Figure 1 includes:

Ash Pond No. 2: Ash Pond No. 2 was used to store and dispose fly ash, bottom ash, and other non-CCR waste streams, including coal pile runoff. The pond originally encompassed the area that currently includes the existing Ash Pond No. 2, the Landfill, and the Leachate Pond (not a CCR unit). It has been inactive since 1996 and currently encompasses approximately 18 acres. It is unlined with a lowermost, but variable, bottom elevation (referenced to the North American Vertical Datum of 1988 [NAVD88]) of 451 feet. The approximate dates of construction affecting Ash Pond No. 2 are summarized below (Table A).

Table A. Construction Events Affecting Ash Pond No. 2

Date	Event
1958	Construction of Ash Pond No. 2
1978	Embankment raise of Ash Pond No. 2
1985	Embankment raise of Ash Pond No. 2 to elevation 484 feet
1989	Embankment raise of Ash Pond No. 2 to elevation 494 feet
1996	Pond was removed from service and completely dewatered
2009 to 2010	Eastern portion of Ash Pond No. 2 was removed to facilitate construction of the Leachate Pond
2010/2011	Landfill Phase I cell was constructed in 2010 over placed CCR in Ash Pond No. 2 adjacent to the Leachate Pond. In February 2011, 7,500 cubic yards of bottom ash was placed into the Phase I cell as a post-construction freeze-protection measure to protect the leachate collection system and geomembrane liner. No other material (fly ash or bottom ash) has been placed in the Landfill since.
2014	North Embankment tree removal, grading, and vegetation re-establishment adjacent to Ash Pond No. 2

A Modified Closure Work Plan was submitted in 2010 proposing closure of Ash Pond No. 2 by capping with future Landfill phases as they were constructed. This Work Plan was approved by the Illinois Environmental Protection Agency (IEPA) in a letter dated March 3, 2010. The Landfill is Phase I of this 2010 Closure Plan. The formerly proposed Landfill Phases II, III, and IV will no longer be constructed upon Ash Pond No. 2. Therefore, a revised Closure Plan for Ash Pond No. 2 was submitted for IEPA approval in February 2018 (Civil & Environmental Consultants, Inc. [CEC], 2018), with addenda submitted in October 2018, July 2019, and January 2020. IEPA subsequently approved the revised closure plan on February 26, 2020, and closure construction was completed May-September 2020.

Landfill: The Landfill Phase I cell, covering approximately 4.5 acres, was constructed in 2010 over existing, dewatered CCR in Ash Pond No. 2 as part of the 2010 Closure Plan for Ash Pond No. 2. The Phase I cell was constructed with a composite liner (geomembrane over compacted clay) and leachate collection system above the liner that transfers collected precipitation and leachate to the Leachate Pond. Ash fill underlying the Landfill is known to be present to a minimum elevation of 454 feet.

In February 2011, 7,500 cubic yards of bottom ash was placed into the Landfill as a post-construction freeze protection measure to protect the leachate collection system and geomembrane liner.

This bottom ash was subsequently removed from the Landfill in 2020 as part of closure of Ash Pond No. 2.

No other material has been placed in the Landfill since then. The Landfill has not yet been placed into service.

East Ash Pond: The East Ash Pond was used to store and dispose bottom ash, fly ash, and other non-CCR waste and to clarify process water prior to discharge in accordance with the station's National Pollutant Discharge Elimination System (NPDES) permit. The pond was constructed in

two phases. The first phase occurred in 1995 when the initial embankment was constructed to a total height of 32 feet with a lowermost, but variable, bottom elevation of the pond at 458 feet. The original pond bottom was lined with a 4-foot thick layer of compacted clay with a hydraulic conductivity of 1 x 10^{-7} centimeters per second (cm/s), underlain by a 1-foot thick sand layer (AECOM, 2016). The pond depth behind the original embankment was 15 feet with 5 feet of freeboard. The embankment was raised 12 feet in 2003 to a total impoundment depth of 30 feet with 2 feet of freeboard. The liner system of the embankment raise consisted of (from top to bottom) a 45-mil reinforced polypropylene geomembrane, a 1-foot thick clay layer, and an 8 ounce per square yard (oz/sy) polypropylene geotextile fabric. This pond was used for the treatment of bottom ash transport water, miscellaneous low volume wastewater streams, and storage of unsold fly ash until station operations ceased in November 2019.

Figure 1 also shows three additional ponds that are not subject to CCR Rule requirements, including East Ash Pond No. 4 (located south of Ash Pond No. 2), the Polishing Pond (located east of the East Ash Pond) and the Leachate Pond (located east of the Landfill). East Ash Pond No. 4 is an unlined impoundment, now dry, and classified as a closed impoundment (capped or otherwise maintained). It was closed in 2020 in conjunction with Ash Pond No. 2 as specified in the Closure Work Plan and Addenda referenced above. The Polishing Pond was constructed in 1995 with a 48-inch-thick compacted clay liner having a vertical hydraulic conductivity of 1 x 10^{-7} cm/s. The Leachate Pond is a 25.5-acre-foot pond constructed with a composite liner consisting of 60-mil high-density polyethylene (HDPE) overlying two feet of compacted clay with a vertical hydraulic conductivity of 1 x 10^{-7} cm/s. Construction was completed December 2010.

2.4 Site Hydrogeology and Stratigraphy

A detailed hydrogeological assessment of the Hennepin East area was completed and submitted as part of the February 2018 Closure Plan for Ash Pond No. 2 and subsequent Addenda (previously referenced). Information pertinent to this ASD is included in this report, however, more complete information on Site hydrogeology and stratigraphy is available in the 2018 Closure Plan and Addenda.

There are three dominant geomorphic features in the immediate vicinity of the Hennepin Power Station: an upper river terrace at an elevation of about 500 to 550 feet, a lower river terrace at an elevation of about 450 to 460 feet, and the current river valley filled with alluvium to an elevation of about 445 feet. The Hennepin Power Station, Ash Pond No. 2, and the Landfill were constructed on the original, narrow lower river terrace, between the Illinois River and the upper terrace. The original lower river terrace is approximately 10 to 20 feet above the average river level at the Hennepin Power Station (elevation 443.7 feet) based upon measurements collected between 2003 and 2018 (O'Brien & Gere Engineers, Inc., part of Ramboll [Ramboll], 2020). The Ash Pond No. 2 berm slopes steeply toward the river and its toe is close to the riverbank. The East Ash Pond, Polishing Pond, and East Ash Pond No. 4 were constructed on the upper river terrace at an elevation of approximately 500 to 505 feet, or 60 to 65 feet above the average river level.

The hydrogeological assessment identified that the stratigraphy within and immediately surrounding the Site consists of fill, unlithified river alluvium, and Pleistocene-age glacial outwash deposits overlying Pennsylvanian-age shale bedrock. Constructed berms consist of a variety of locally available materials, primarily sand, gravel, and coal ash. Where undisturbed or partially

excavated, the native surficial soil at the Site is poorly drained, moderately permeable silty clay loam formed as alluvium in floodplains.

There are two hydrogeologic units present at the Site: alluvium and Henry Formation sands and gravels. The river is immediately adjacent to the lower terrace, east of the Site, and there is minimal alluvium between the Site and the river. The highly permeable Henry Formation sands and gravels make up the upper and lower terraces and fill the valley beneath the alluvium. The sands and gravels of the two terraces are indistinguishable, consisting of a heterogeneous mixture of silty-sandy gravel with cobble zones and boulders up to several feet in diameter. The Henry Formation is more than 100 feet thick in the river valley and at least 130 feet thick on the upper terrace.

The Henry Formation and alluvium comprise the Uppermost Aquifer at the Site and extend from the water table to the bedrock. The Uppermost Aquifer extends about 7,000 feet upgradient from the Site, to the south, where clay-rich glacial till is encountered. Glacial tills such as this typically yield little water.

The Pennsylvanian-age bedrock consists of interbedded layers of shale with thin limestone, sandstone, and coal beds. The shale bedrock unit has low hydraulic conductivity and defines the lower boundary of the Uppermost Aquifer.

The direction of groundwater flow and hydraulic gradient within the Uppermost Aquifer beneath the Landfill area varies with the elevation of the Illinois River (see select groundwater elevation contour maps in Appendix A). The direction of groundwater flow is most often toward the river to the north and west, but comparison of groundwater and river elevation data indicate reversals in this flow direction during times of high river elevations. The relative duration of these events is short, which leads to the determination of a predominant groundwater flow direction toward the river to the north and west.

Groundwater elevations were obtained from measurements in monitoring wells on March 11, 2020 prior to a sampling event for the four CCR units at Hennepin Power Station. As noted above, groundwater sampling for D6 occurred on March 11-12, 2020. Groundwater elevations for the Hennepin Power Station during the D6 sampling event are shown in Figure 2. Groundwater elevations beneath the Landfill area ranged from approximately 448.45 to 448.55 feet (Figure 2). Groundwater flow was generally towards the Illinois River beneath the CCR units, with groundwater flowing from southeast to northwest beneath the Landfill.

3. ALTERNATE SOURCE DEMONSTRATION: LINES OF EVIDENCE

As allowed by 40 C.F.R. § 257.94(e)(2), this ASD demonstrates that sources other than Hennepin Landfill (the CCR unit) caused the SSIs based on the following LOEs:

- Landfill Liner Design: The Landfill was constructed in 2010 with a composite liner (geomembrane over compacted clay).
- Concentrations of Boron in Landfill Leachate are Lower than Those Observed in Downgradient Groundwater: The only material ever placed in the lined Landfill is bottom ash that was placed as a post-construction freeze protection measure to protect the leachate collection system and geomembrane liner. Analytical data available for laboratory-derived leachate from the bottom ash placed in the Landfill indicates that the bottom ash is not capable of leaching boron in concentrations observed in the downgradient monitoring wells.
- Vertical Infiltration of Surface Water through Ash Fill in Ash Pond No. 2: The Landfill was constructed upon a portion of Ash Pond No. 2 as Phase I of an IEPA-approved Closure Plan for the pond. The other portions of Ash Pond No. 2 were previously exposed, and subject to the infiltration of precipitation and generation of CCR leachate. Ash Pond No. 2 is unlined, potentially allowing CCR leachate to percolate to groundwater. A cover designed to minimize surface water infiltration and leachate generation was constructed over these exposed portions of Ash Pond No 2 in 2020 as part of an amended closure plan approved by IEPA.
- Upgradient Concentrations of Fluoride: Concentrations of fluoride are higher in monitoring wells upgradient of the Landfill than in those downgradient, indicating that the Landfill is not the source of fluoride.
- Upgradient pH Values: pH values are higher in monitoring wells upgradient of the Landfill than in those downgradient, indicating that the Landfill is not the source of elevated pH.

Data and information supporting these ASD LOEs are discussed in more detail below.

3.1 LOE #1: Landfill Liner Design

The Landfill was constructed in 2010 with a 60-mil HDPE geomembrane overlying three feet of compacted clay with hydraulic conductivity of $1x10^{-7}$ cm/sec (CEC, 2010). Precipitation and/or leachate that collects on top of the liner is removed by a leachate collection system and transferred to the Leachate Pond for management. The Leachate Pond is also lined with a 60-mil HDPE liner overlying two feet of compacted clay.

The IEPA-approved Landfill composite liner system exceeds the design criteria for a composite liner for new CCR landfills established by 40 C.F.R. § 257.70(b). The composite liner design criteria were established to help prevent contaminants in CCR from leaking from the CCR unit and impacting groundwater. Therefore, the presence of the composite liner suggests that the Landfill is not the source of the observed SSIs.

3.2 LOE #2: Concentrations of Boron in Landfill Leachate Are Lower than Those Observed in Downgradient Groundwater

The only material that has been placed in the Landfill consists of a layer of coarse bottom ash (7,500 cubic yards or 11,625 tons) to protect the leachate collection system and geomembrane

liner from freezing. There has been no additional CCR landfilling activity within the lined area since the bottom ash freeze protection layer was installed.

Analytical data (Appendix B) from two samples of bottom ash leachate derived in the laboratory (extraction method ASTM D3987, shake extraction with water) identified boron concentrations of 0.193 milligrams per liter (mg/L) (2009 sample) and 0.197 mg/L (2008 sample).

The boron concentrations detected in the leachate samples are below the boron concentrations observed in downgradient wells as shown in Figure A.

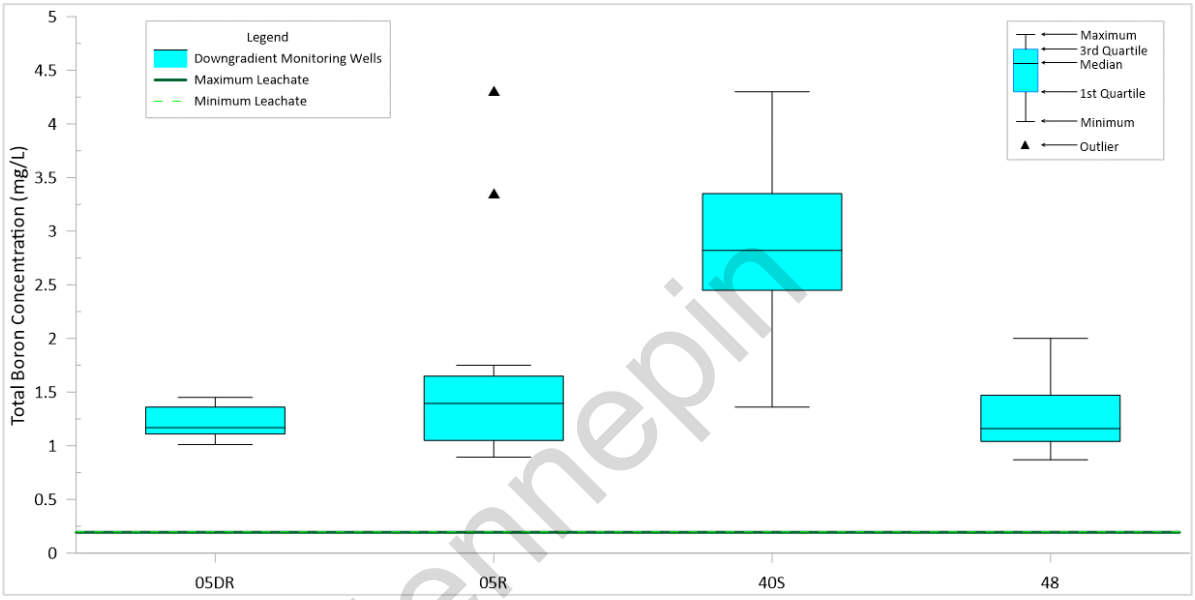

Figure A. Box-Whisker Plot Showing Distribution of Boron.

The bottom ash in the Landfill was subsequently removed in 2020 as part of closure of Ash Pond No. 2.

3.3 LOE #3: Vertical Infiltration of Surface Water through Ash Fill in Ash Pond No. 2

The Landfill was constructed over the eastern portion of Ash Pond No. 2 as Phase I of an IEPA-approved Closure Plan for Ash Pond No. 2. The other portions of Ash Pond No. 2 to the west of the Landfill were previously exposed, and subject to infiltration of precipitation and generation of CCR leachate. The pond is unlined, potentially allowing CCR leachate to percolate to groundwater.

Comparison of groundwater and Illinois River elevation data indicate that natural variation in river elevation related to flood events occasionally causes groundwater flow reversal and increases in groundwater elevations in the Uppermost Aquifer beneath the Landfill. When river elevations rise above 451-454 feet, low-lying ash deposits underlying the Landfill have the potential to become partially saturated for a transient period. The short-term, partial saturation may result in a temporary change to some CCR constituent concentrations at some downgradient locations after the predominant groundwater flow direction is reestablished. Explicit simulation of flood events (Closure Plan Addendum 3 [Ramboll, 2020]) indicates that potential increases in

concentrations from flooding of the Illinois River are small and transient, such that long-term concentrations will not be significantly affected.

The above demonstrates that recharge through the exposed portions of Ash Pond No. 2 outside of the footprint of the Landfill are an alternate source for CCR parameters observed in groundwater near the Landfill. A cover designed to minimize surface water infiltration and leachate generation was constructed over these exposed portions of Ash Pond No 2 in 2020 as part of an amended closure plan for Ash Pond No. 2 approved by IEPA on February 26, 2020.

3.4 LOE #4: Upgradient Concentrations of Fluoride

Select groundwater contour maps in Appendix A show a major component of groundwater flow from the east and southeast. A box-whisker plot of dissolved fluoride concentrations collected between 2015-2020 at monitoring wells at the Landfill is shown below (Figure B). Included on this figure are dissolved fluoride concentrations collected at other wells located upgradient of the Landfill (12, 13, 16, and 17) and along the Illinois River (18D, 18S). Dissolved fluoride is plotted rather than total fluoride due to the greater availability of data; dissolved fluoride data is not available for monitoring well 48. Dissolved fluoride concentrations at the monitoring wells shown in Figure B are similar to total fluoride concentrations detected at these wells.

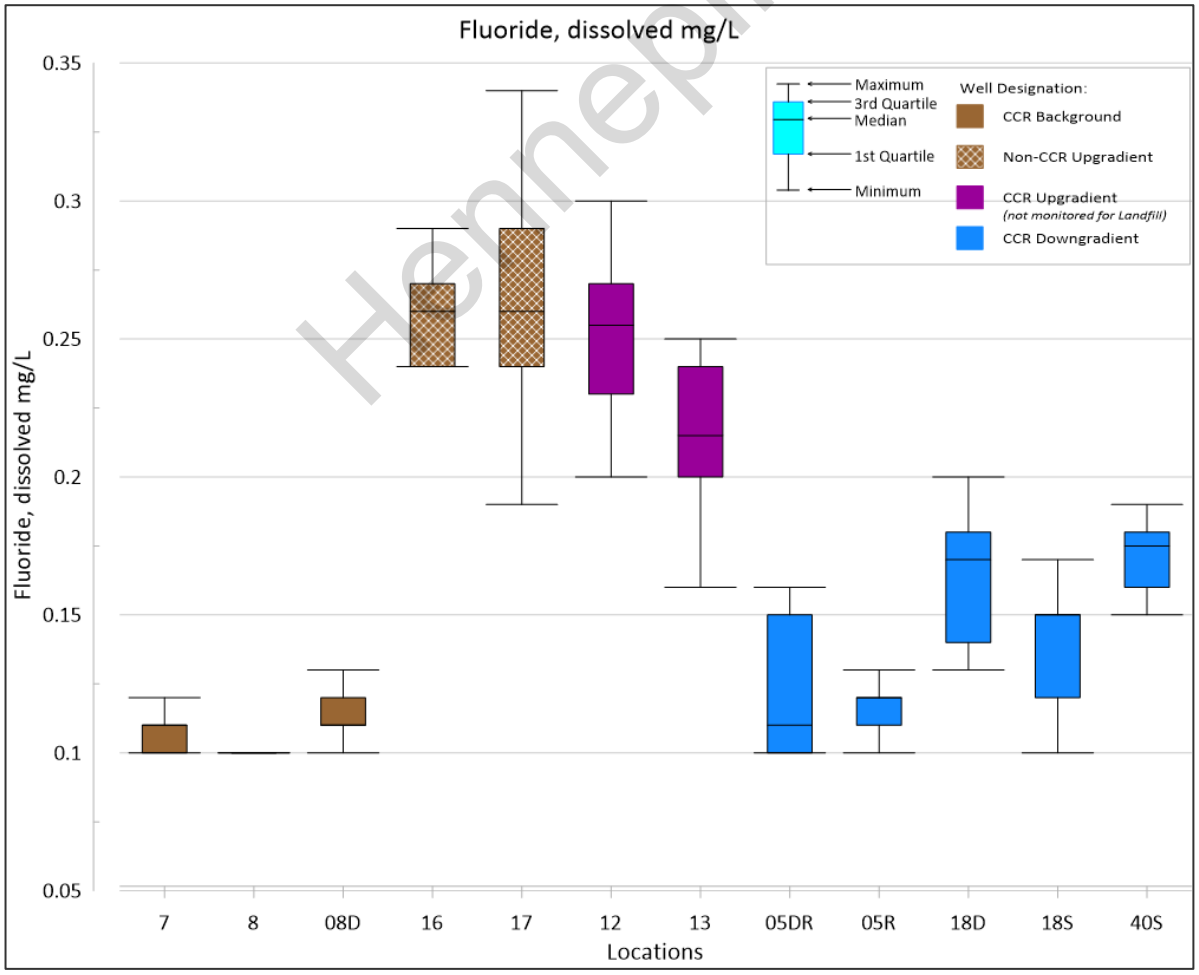

Figure B. Distribution of Dissolved Fluoride Concentrations at Hennepin East Wells.

The box-whisker plot shows two groupings of dissolved fluoride concentrations as follows:

- Low Concentrations: The low concentrations are at background wells 07, 08, and 08D and downgradient wells 05DR, 05R, 18D, 18S, and 40S.
- High Concentrations: The high concentrations of fluoride occur at wells 12 and 13, located upgradient of the Landfill, and at non-CCR wells 16 and 17 located upgradient of the East Ash Pond near the property boundary.

The fact that the higher concentrations of fluoride are located upgradient of the Landfill demonstrates that the Landfill is not the source of fluoride.

3.5 LOE #5: Upgradient pH Values

Select groundwater contour maps in Appendix A show a major component of groundwater flow from the east and southeast. A box-whisker plot of pH values collected between 2015-2020 from monitoring wells at the Landfill is shown below (Figure C). Also included on this figure are pH values collected at other wells located upgradient of the Landfill (12, 13, 16, and 17) and wells located along the Illinois River (18D, 18S).

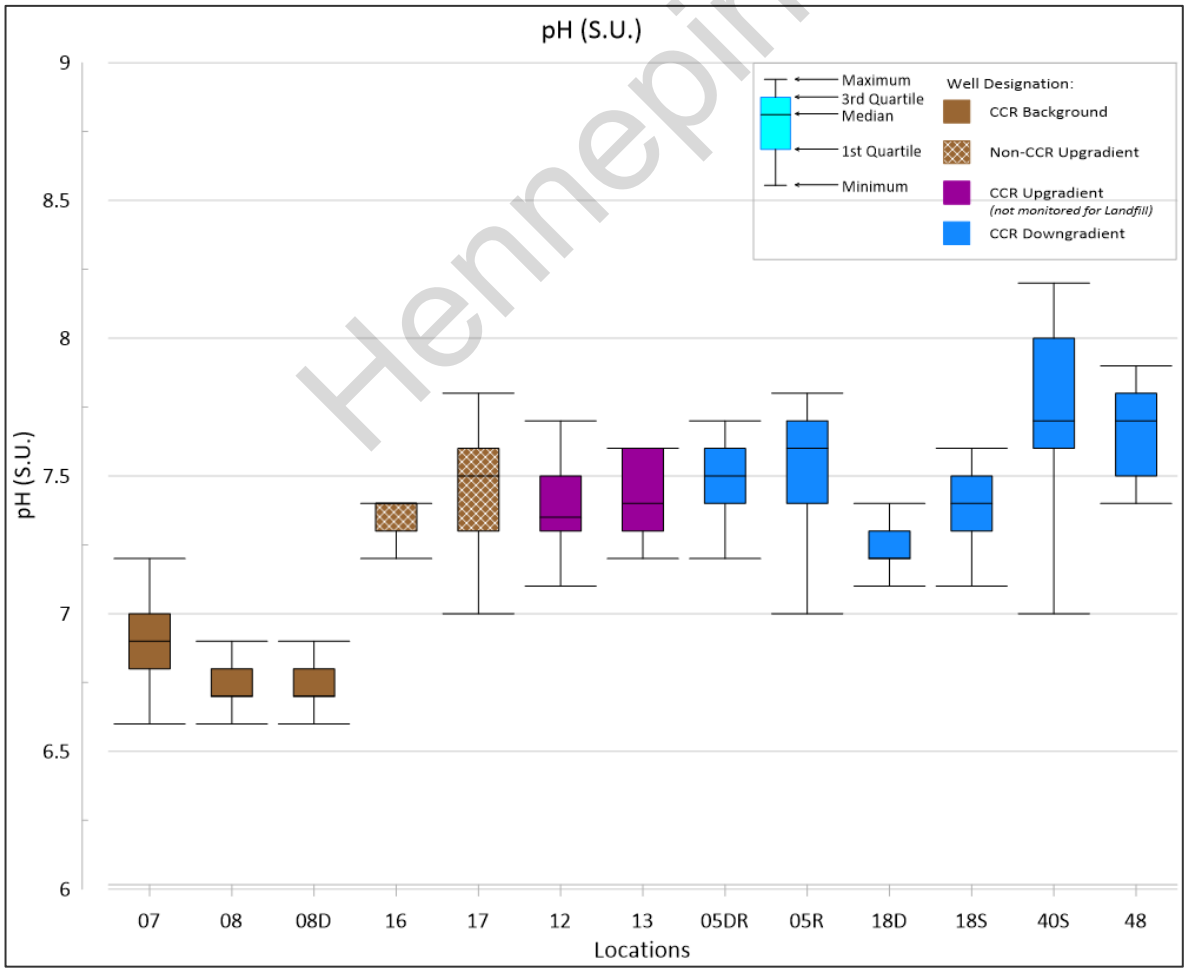

Figure C. Distribution of pH Values at Hennepin East Wells.

The box-whisker plot shows two groupings of pH values as follows:

- Lower pH: The lower pH values relative to all monitoring wells compared are at background monitoring wells 07, 08, and 08D.
- Higher pH: The groundwater monitoring wells with higher pH values relative to all monitoring wells compared include wells located along the river and in the vicinity of the Landfill: wells 05R, 05DR, 18D, 18S, 40S, and 48, as well as non-CCR wells 12 and 13, located upgradient of the Landfill, and at 16 and 17 located upgradient of the East Ash Pond near the property boundary.

The fact that the pH values upgradient of the Landfill are elevated above background pH values and similar to pH values downgradient of the Landfill demonstrates that the Landfill is not the source of elevated pH relative to background. If the Landfill were affecting pH values, those downgradient would be different from those upgradient.

4. CONCLUSIONS

Pursuant to 40 C.F.R. § 257.94(e)(2), the following LOEs were presented in this report to demonstrate that the SSIs identified above (Section 2.1) at the Landfill are due to alternate sources:

- Landfill Liner Design
- Concentrations of Boron in Landfill Leachate are Lower than Those Observed in Downgradient Groundwater
- Vertical Infiltration of Surface Water through Ash Fill in Ash Pond No. 2
- Upgradient Concentrations of Fluoride
- Upgradient pH Values

Based on the LOEs presented, the following alternate sources are causing the SSIs observed in the Landfill's downgradient wells:

- Boron: SSIs for boron are caused by leachate from previously exposed ash deposits in Ash Pond No. 2 outside the Landfill boundary.
- Fluoride: It is likely that areas upgradient of the Landfill present alternate sources of fluoride based on the fact that concentrations of fluoride are higher upgradient of the Landfill than downgradient.
- pH: It is likely that areas upgradient of the Landfill present alternate sources that elevated pH based on the fact that pH values are elevated, above background pH values, upgradient of the Landfill and similar to those observed downgradient of the Landfill.

This information serves as the written ASD report prepared in accordance with 40 C.F.R. § 257.94(e)(2) that SSIs observed during the detection monitoring program were not caused by the Landfill but were from other sources. Therefore, an assessment monitoring program is not required, and the Landfill will remain in detection monitoring.

5. REFERENCES

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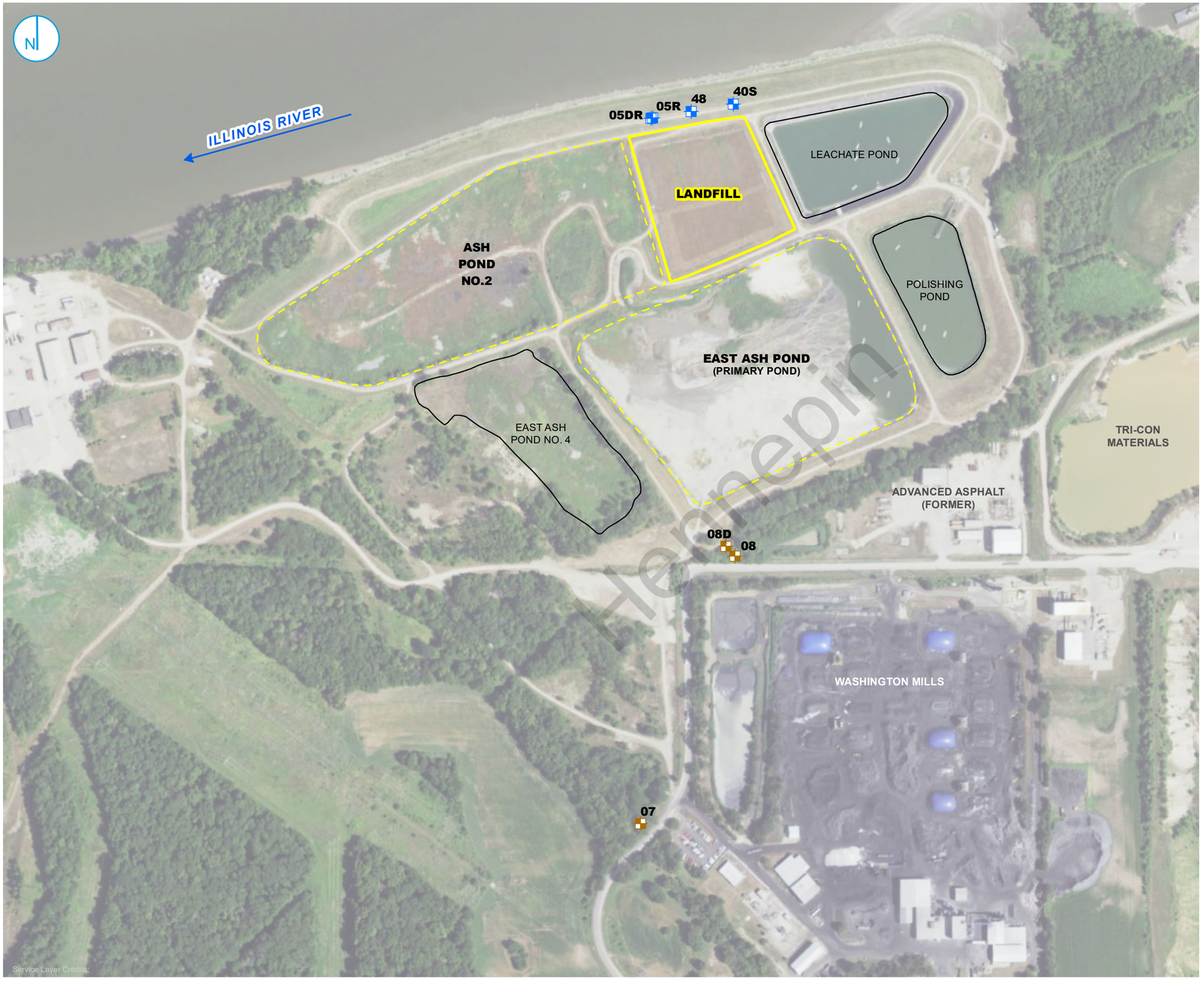
Natural Resource Technology, an OBG Company(NRT/OBG), 2017b, Sampling and Analysis Plan, Hennepin Landfill, Hennepin Power Station, Hennepin, Illinois, Project No. 2285, Revision 0, October 17, 2017.

O'Brien & Gere Engineers, Inc. and Civil & Environmental Consultants, Inc., 2018, Closure Plan Addendum, Hennepin East Ash Pond No. 2, Hennepin, Illinois. October 25, 2018.

O'Brien & Gere Engineers, Inc., part of Ramboll (Ramboll), 2019. Response to IEPA Comments – Closure and Post-Closure Care Plan for the Hennepin East Ash Pond No. 2 and Closure Plan Addendum Hennepin East Ash Pond No 2 which includes closure of Ash Pond No. 4. July 22, 2019.

O'Brien & Gere Engineers, Inc., part of Ramboll (Ramboll), 2020, River Flood Evaluation Report Hennepin East Ash Pond No. 2 and No. 4, Closure Plan Addendum 3. January 15, 2020.

FIGURES



BACKGROUND MONITORING WELL

DOWNGRADIENT MONITORING WELL

CCR UNIT BOUNDARY, SUBJECT SITE

CCR UNIT BOUNDARY

NON-CCR UNIT

0 175 350
Feet

HENNEPIN LANDFILL MONITORING WELL LOCATION MAP
HENNEPIN LANDFILL, UNIT ID: 801

ALTERNATE SOURCE DEMONSTRATION
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

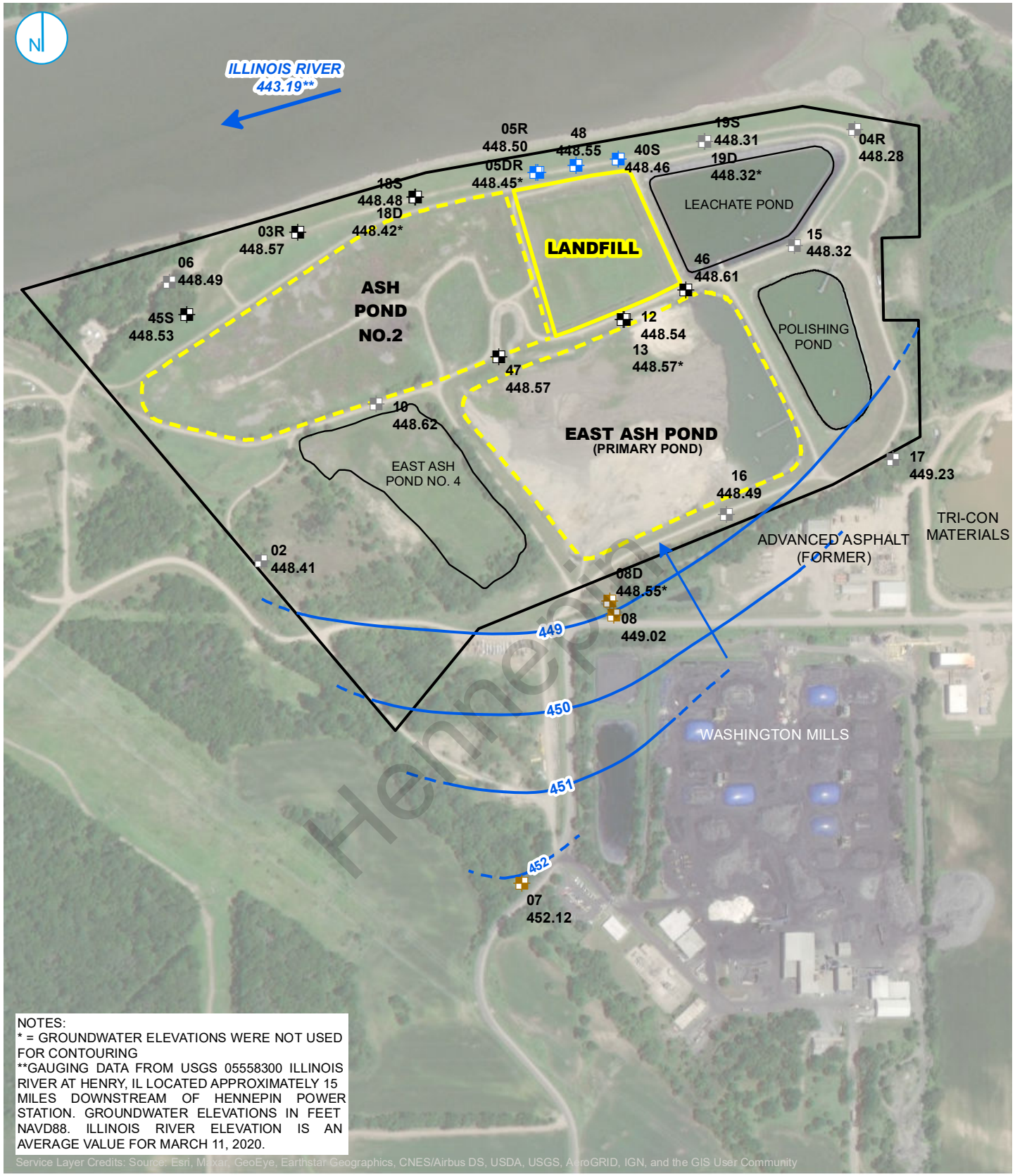
FIGURE 1

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Y:\Mapping\Projects\2212285_Hennepin East\MXD\ASD\Figure 1_HenLF MW Loc Map.mxd

PROJECT: 169000XXXX | DATED: 9/25/2020 | DESIGNER: STOLZSD



NOTES:
* = GROUNDWATER ELEVATIONS WERE NOT USED FOR CONTOURING
**GAUGING DATA FROM USGS 05558300 ILLINOIS RIVER AT HENRY, IL LOCATED APPROXIMATELY 15 MILES DOWNSTREAM OF HENNEPIN POWER STATION. GROUNDWATER ELEVATIONS IN FEET NAVD88. ILLINOIS RIVER ELEVATION IS AN AVERAGE VALUE FOR MARCH 11, 2020.

BACKGROUND MONITORING WELL
DOWNGRADIENT MONITORING WELL
CCR RULE MONITORING WELL
NON-CCR RULE MONITORING WELL
GROUNDWATER MANAGEMENT ZONE AND EAST ASH POND

0 250 500 Feet

GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
CCR MONITORED UNIT, SUBJECT SITE
CCR MONITORED UNIT
NON-CCR UNIT

GROUNDWATER ELEVATION CONTOUR MAP MARCH 11, 2020

ALTERNATE SOURCE DEMONSTRATION
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

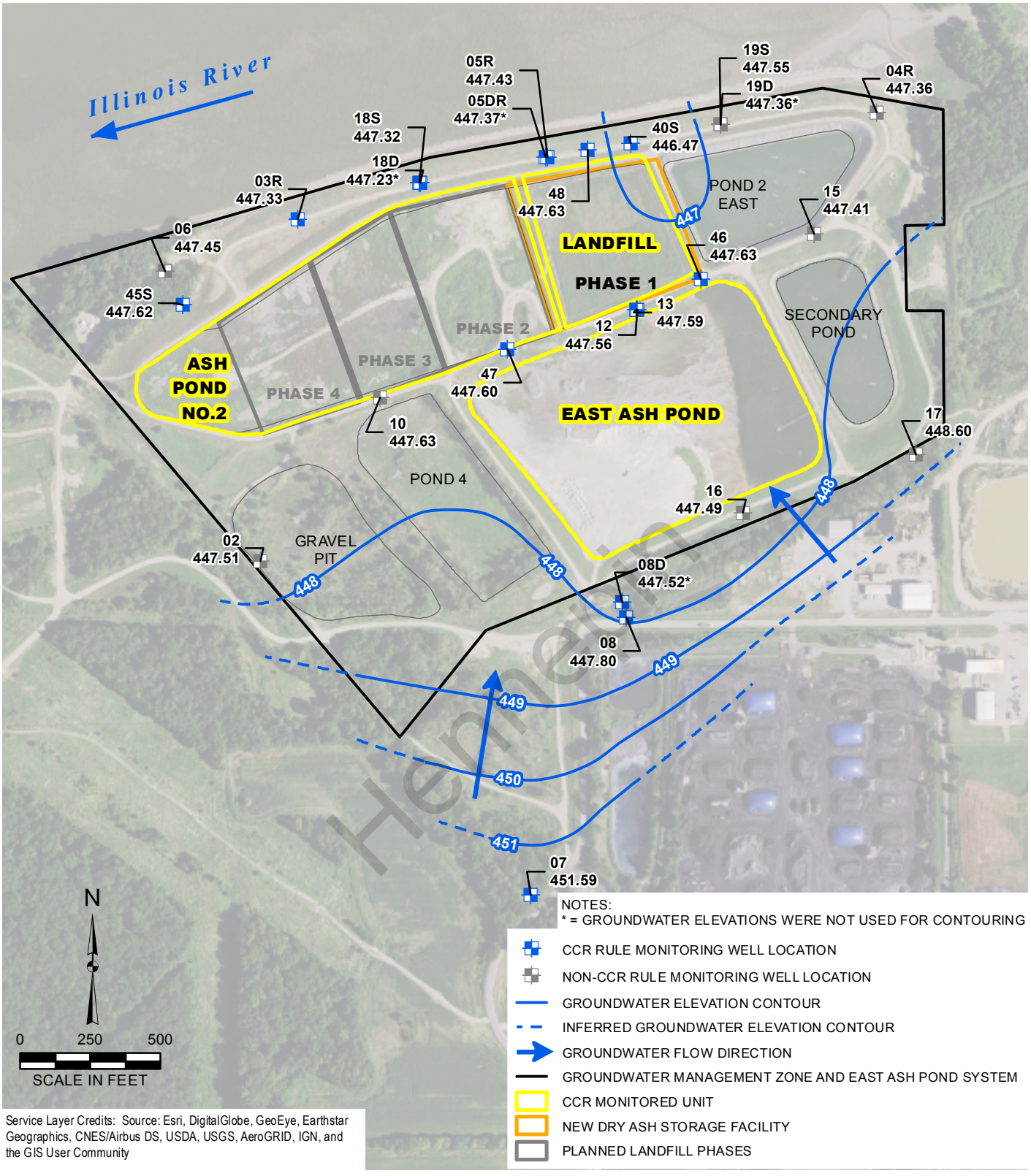
FIGURE 2

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

Y:\Mapping\Projects\22\2285_Hennepin East\MXD\ASD\Figure 2_Groundwater Contour Map_HenLF.mxd
PROJECT: 169000XXXX | DATED: 9/25/2020 | DESIGNER: STOLZSD

APPENDIX A
SELECT GROUNDWATER CONTOUR MAPS



Y:\Mapping\Projects\22\2285MXD\GW_Contours\Round_02\R2_HennepinEast_GW_Contours.mxd Author: sstolz Date/Time: 3/2/2017 4:02:59 PM

DRAWN BY/DATE:
SDS 1/25/17
REVIEWED BY/DATE:
TBN 1/26/17
APPROVED BY/DATE:
JJW 2/9/17

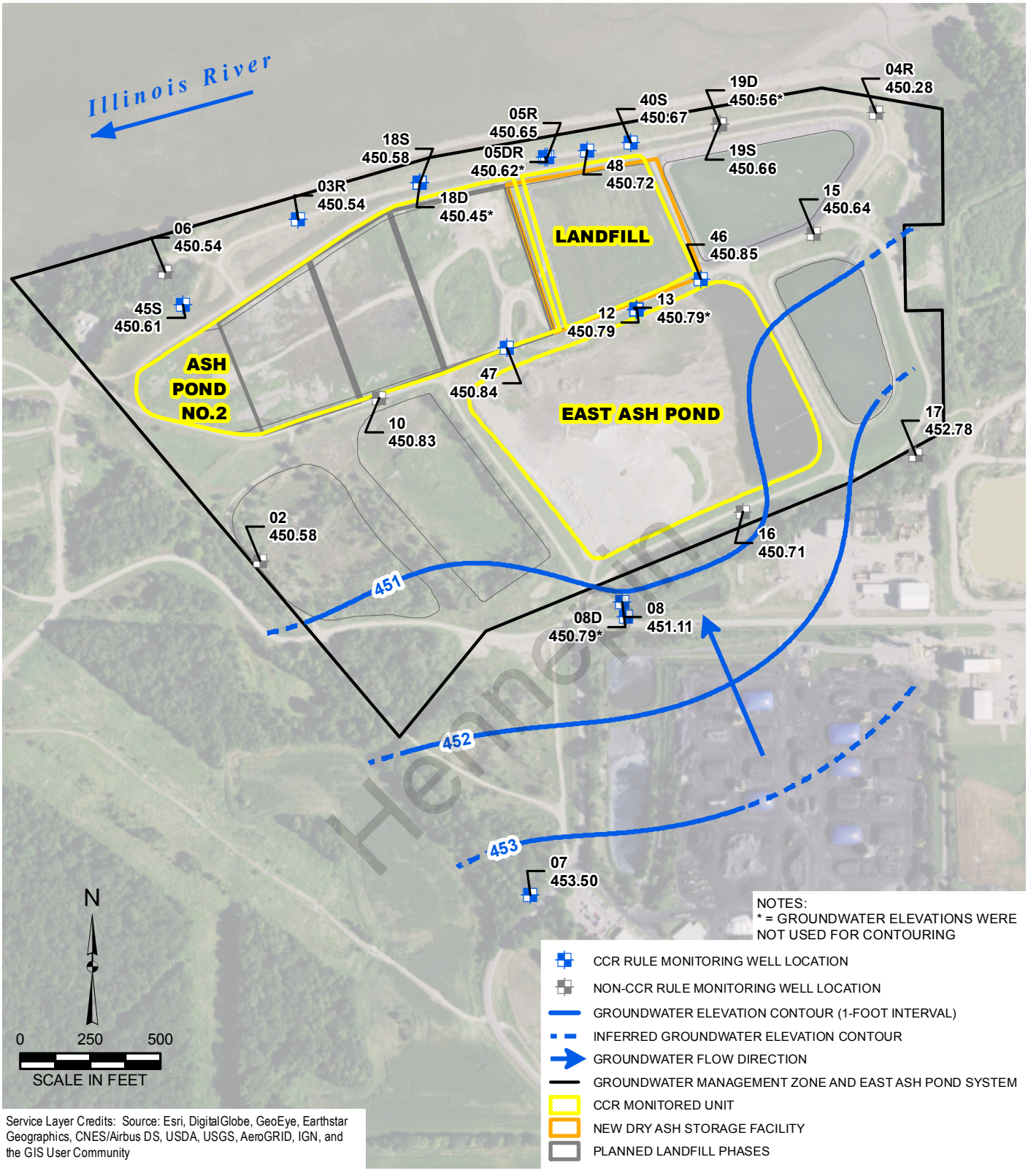
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 2: MARCH 8, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

DRAWN BY/DATE:
SDS 5/25/17
REVIEWED BY/DATE:
TBN 5/25/17
APPROVED BY/DATE:
JJW 9/1/17

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 7: APRIL 25, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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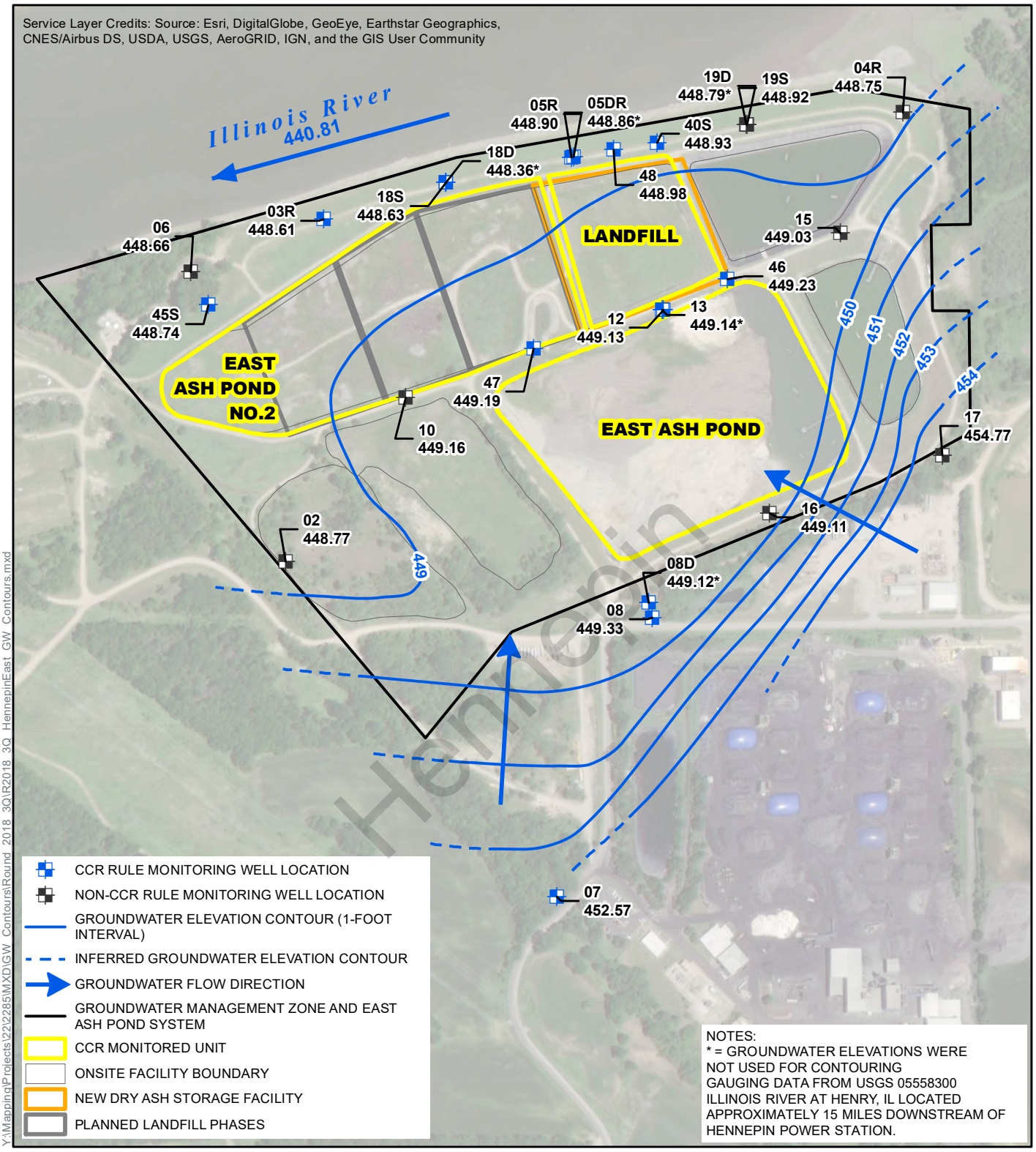


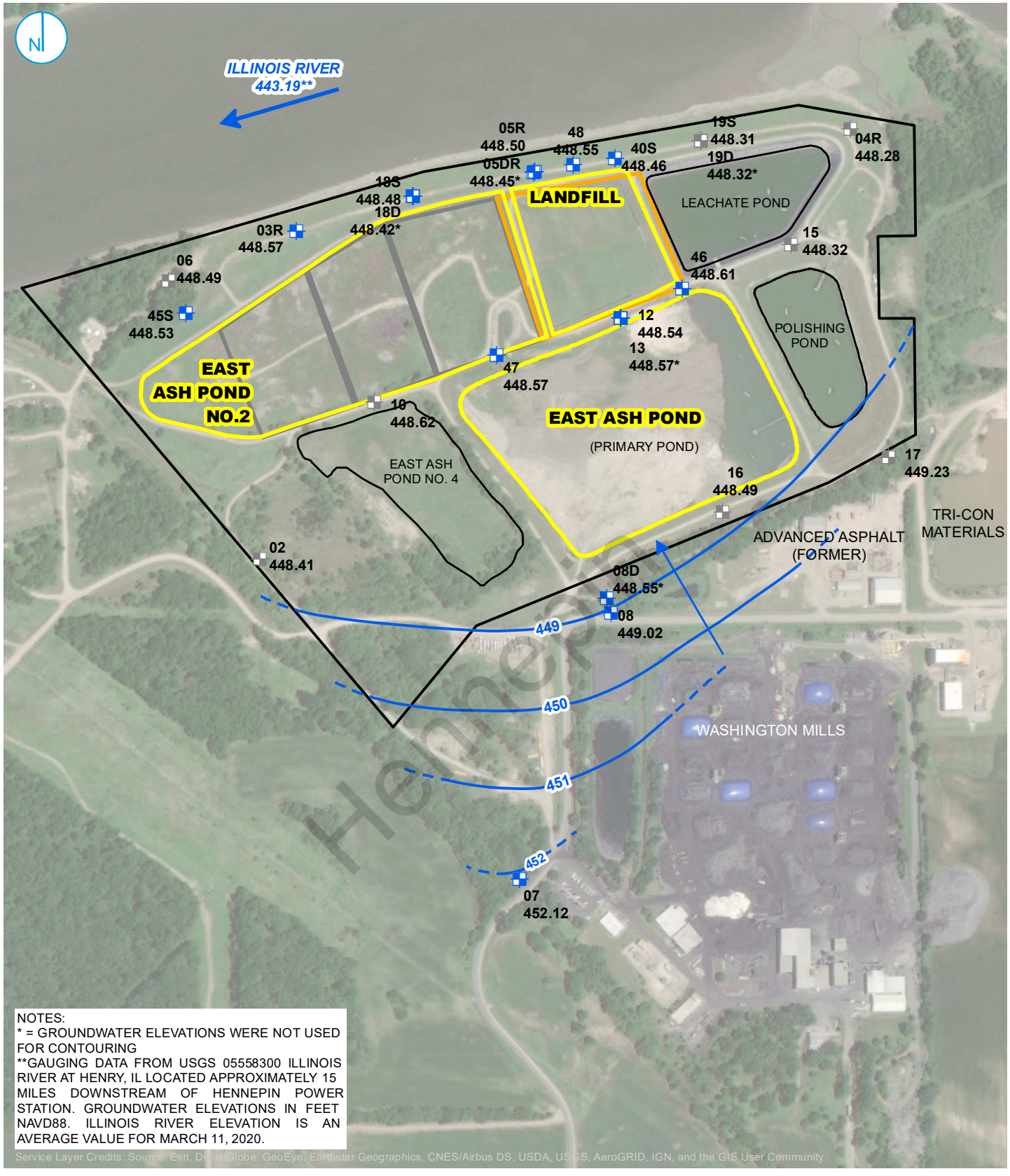
HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
GROUNDWATER ELEVATION CONTOUR MAP
SEPTEMBER 12, 2018

CCR RULE GROUNDWATER MONITORING
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

0 125 250 500
Feet

N

O'BRIEN & GERE ENGINEERS, INC.



NOTES:
* = GROUNDWATER ELEVATIONS WERE NOT USED FOR CONTOURING
**GAUGING DATA FROM USGS 05558300 ILLINOIS RIVER AT HENRY, IL LOCATED APPROXIMATELY 15 MILES DOWNSTREAM OF HENNEPIN POWER STATION. GROUNDWATER ELEVATIONS IN FEET NAVD88. ILLINOIS RIVER ELEVATION IS AN AVERAGE VALUE FOR MARCH 11, 2020.

- CCR MONITORING WELL
- NON-CCR MONITORING WELL
- GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER MANAGEMENT ZONE AND EAST ASH POND SYSTEM
- CCR MONITORED UNIT

0 250 500 Feet

GROUNDWATER ELEVATION CONTOUR MAP MARCH 11, 2020

HENNEPIN LANDFILL (UNIT ID: 801), HENNEPIN ASH POND NO. 2 (UNIT ID: 802), AND HENNEPIN EAST ASH POND (UNIT ID: 803)
VISTRA ENERGY
HENNEPIN POWER STATION
HENNEPIN, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY
RAMBOLL

APPENDIX B
BOTTOM ASH LEACHATE DATA

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

August 03, 2009

John Augspols
Dynegy Midwest Generation
13498 East 800th Street
Hennepin, IL 61327
TEL: (815) 339-9218
FAX:

NELAP Accredited #100226

RE: Hennepin Station Bottom Ash **WorkOrder:** 09070896

Dear John Augspols:

TEKLAB, INC received 1 sample on 7/24/2009 9:00:00 AM for the analysis presented in the following report.

Samples are analyzed on an as received basis unless otherwise requested and documented. The sample results contained in this report relate only to the requested analytes of interest as directed on the chain of custody. IL ELAP and NELAP accredited fields of testing are indicated by the letters NELAP under the Certification column.

All quality control criteria applicable to the test methods employed for this project have been satisfactorily met and are in accordance with NELAP except where noted. The following report shall not be reproduced, except in full, without the written approval of Teklab, Inc.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Heather A. White

Heather A. White
Project Manager
(618)344-1004 ex 20

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

Client: Dynegy Midwest Generation
Project: Hennepin Station Bottom Ash
LabOrder: 09070896
Report Date: 03-Aug-09

CASE NARRATIVE

Cooler Receipt Temp: 22.8 °C

State accreditations:

KS: NELAP #E-10347 | KY: UST #0073 | MO: DNR #00930 | AR: ADEQ #70-028-0

Qualifiers

DF - Dilution Factor	**B** - Analyte detected in the associated Method Blank	**C** - Client requested RL below PQL
RL - Reporting Limit	**J** - Analyte detected below reporting limits	**D** - Diluted out of sample
ND - Not Detected at the Reporting Limit	**R** - RPD outside accepted recovery limits	**E** - Value above quantitation range
Surr - Surrogate Standard added by lab	**S** - Spike Recovery outside accepted recovery limits	**H** - Holding time exceeded
TNTC - Too numerous to count (> 200 CFU)	X - Value exceeds Maximum Contaminant Level	**MI** - Matrix interference
Q - QC criteria failed or noncompliant CCV	# - Unknown hydrocarbon	**DNI** - Did not ignite
NELAP - IL ELAP and NELAP Accredited Field of Testing	**IDPH** - IL Dept. of Public Health	

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

LABORATORY RESULTS

Client: Dynegy Midwest Generation
WorkOrder: 09070896
Lab ID: 09070896-001
Report Date: 03-Aug-09

Client Project: Hennepin Station Bottom Ash
Client Sample ID: Hennipin Station Bottom Ash
Collection Date: 7/22/2009 11:00:00 AM
Matrix: SOLID

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Analyst
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Arsenic		0.0250		**< 0.0250**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Barium		0.0050		**0.116**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Beryllium		0.0010		**< 0.0010**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Boron		0.0200		**0.193**	mg/L	1	8/3/2009 10:30:48 AM	LAL
Cadmium		0.0020		**< 0.0020**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Chromium		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Cobalt		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Copper		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Iron		0.0300		**0.0687**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Manganese		0.0050		**< 0.0050**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Nickel		0.0100		**< 0.0100**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Selenium		0.0500		**< 0.0500**	mg/L	1	7/29/2009 3:49:50 PM	LAL
Silver		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
Zinc		0.0100		**< 0.0100**	mg/L	1	7/29/2009 11:19:44 AM	LAL
ASTM D3987, SW-846 3020A, METALS IN SHAKE EXTRACT BY GFAA								
Antimony, SHAKE by GFAA	7041	0.0050		**< 0.0050**	mg/L	1	7/29/2009 2:45:16 PM	MEK
Lead, SHAKE by GFAA	7421	0.0020	J	**0.0011**	mg/L	1	7/29/2009 10:18:30 AM	MEK
Thallium, SHAKE by GFAA	7841	0.0020		**< 0.0020**	mg/L	1	7/29/2009 2:41:30 PM	MEK
ASTM D3987, SW-846 7470A IN SHAKE EXTRACT								
Mercury, SHAKE		0.00020		**< 0.00020**	mg/L	1	7/28/2009	ALU

Sample Narrative

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

RECEIVING CHECK LIST

Client: Dynegy Midwest Generation
Project: Hennepin Station Bottom Ash
Lab Order: 09070896
Report Date: 03-Aug-09

Carrier: UPS

Received By: DB

Completed by: Marvin L. Darling II
On: 24-Jul-09
Marvin L. Darling

Reviewed by: Heather A. White
On: 24-Jul-09
Heather A. White

Pages to follow: Chain of custody 1 Extra pages included 2

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	Temp °C 22.8			
Type of thermal preservation?	None ☑	Ice ☐	Blue Ice ☐	Dry Ice ☐			
Chain of custody present?	Yes ☐	No ☑					
Chain of custody signed when relinquished and received?	Yes ☐	No ☑					
Chain of custody agrees with sample labels?	Yes ☑	No ☐					
Samples in proper container/bottle?	Yes ☑	No ☐					
Sample containers intact?	Yes ☑	No ☐					
Sufficient sample volume for indicated test?	Yes ☑	No ☐					
All samples received within holding time?	Yes ☑	No ☐					
Reported field parameters measured:	Field ☐	Lab ☐	NA ☑				
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐					

When thermal preservation is required, samples are compliant with a temperature between 0.1°C - 6.0°C, or when samples are received on ice the same day as collected.

Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	

Any No responses must be detailed below or on the COC.

Sample id and collection date/time obtained from sample container. Per John Augspols, sample ID and collection/date time on the container are correct. Analyze for the same list of parameters as in 2008. EAH 7/27/09

09070896

TEKLAB, INC
5445 Horseshoe Lake Road
Collinsville, IL 62234-7425
TEL: (618) 344-1004
FAX: (618) 344-1005

CHAIN-OF-CUSTODY RECORD

WorkOrder: 09070896

Client:
Dynegy Midwest Generation
13498 East 800th Street
Hennepin, IL 61327

TEL: (815) 339-9218
FAX:
Project: Hennepin Station Bottom As

24-Jul-09

					Requested Tests						
Sample ID	**ClientSampID**	**Matrix**	**Date Collected**	**Bottle**	**D3987/6010B**	**D3987/7000 G**	**D3987/SW7470A**				
09070896-001	Hennipin Station Bottom	Solid	7/22/2009 11:00:00 AM		A	A	A				

Comments:

22.8°C ICE

	Date/Time		**Date/Time**
Relinquished by:		**Received by:** 2 Btl (UPS)	7/24/09 900
Relinquished by:		**Received by:**	
Relinquished by:		**Received by:**	

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

Teklab: 7/22/09

Please find enclosed a bottom ash sample to be run for the same parameters as last year. I enclosed those results with the sample. I would like to pay for this with a credit card. If you have any questions please contact me :

John Augspols

Supv. Environmental and Chemistry

(815) 339-9218

Fax (815) 339 -2772

TEKLAB, INC.

5445 HORSESHOE LAKE ROAD
COLLINSVILLE, ILLINOIS 62234

ENVIRONMENTAL TESTING LABORATORY

TEL: 618-344-1004
FAX: 618-344-1005

LABORATORY RESULTS

Client: Dynegy Midwest Generation
WorkOrder: 08060909
Lab ID: 08060909-001
Report Date: 02-Jul-08

Client Project: Hennepin Station Bottom Ash
Client Sample ID: Hennipin Station Botton Ash
Collection Date: 6/24/2008 9:00:00 AM
Matrix: SOLID

Analyses	Certification	RL	Qual	Result	Units	DF	Date Analyzed	Analyst
ASTM D3987, SW-846 3005A, 6010B, METALS IN SHAKE EXTRACT BY ICP								
Arsenic		0.0250		< 0.0250	mg/L	1	6/30/2008 12:29:55 PM	LAL
Barium		0.0050		0.0699	mg/L	1	6/30/2008 12:29:55 PM	LAL
Beryllium		0.0010		< 0.0010	mg/L	1	6/30/2008 12:29:55 PM	LAL
Boron		0.0200		0.197	mg/L	1	6/30/2008 12:29:55 PM	LAL
Cadmium		0.0020		< 0.0020	mg/L	1	6/30/2008 12:29:55 PM	LAL
Chromium		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Cobalt		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Copper		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Iron		0.0200		0.110	mg/L	1	6/30/2008 12:29:55 PM	LAL
Manganese		0.0050		< 0.0050	mg/L	1	6/30/2008 12:29:55 PM	LAL
Nickel		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Selenium		0.0500		< 0.0500	mg/L	1	6/30/2008 12:29:55 PM	LAL
Silver		0.0100		< 0.0100	mg/L	1	6/30/2008 12:29:55 PM	LAL
Zinc		0.0100	J	0.0025	mg/L	1	6/30/2008 12:29:55 PM	LAL
ASTM D3987, SW-846 3020A, METALS IN SHAKE EXTRACT BY GFAA								
Antimony, SHAKE by GFAA	7041	0.0050	J	0.0024	mg/L	1	6/30/2008 11:51:48 AM	JMW
Lead, SHAKE by GFAA	7421	0.0020		< 0.0020	mg/L	1	6/30/2008 9:45:10 AM	JMW
Thallium, SHAKE by GFAA	7841	0.0020	S	< 0.0020	mg/L	1	6/30/2008 11:17:06 AM	JMW
ASTM D3987, SW-846 7470A IN SHAKE EXTRACT								
Mercury, SHAKE		0.00020	J	0.00006	mg/L	1	6/30/2008	SRH

Sample Narrative
ASTM D3987, SW-846 3020A, Metals in Shake Extract by GFAA
TI - Matrix interference present in sample.

22-8 notice
DB 7/24/09

900 ~~FeWS~~
DB 7/24/09