Prepared for
Wisconsin Public Service Corporation

Date
January 31, 2024

Project No.
1940102327

2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

WESTON DISPOSAL SITE NO. 3 LANDFILL

RAMBOLL Bright ideas. Sustainable change.

2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
WESTON DISPOSAL SITE NO. 3 LANDFILL

Project name	**Weston Disposal Site No. 3 Landfill**
Project no.	**1940102327**
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Document type	**Annual Groundwater Monitoring and Corrective Action Report**
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ACRONYMS AND ABBREVIATIONS

§	Section
40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
Ca	calcium
CCR	Coal Combustion Residuals
Cl	chloride
GMP	Groundwater Monitoring Plan
GWPS	groundwater protection standard
mg/L	milligrams per liter
NA	not applicable
No.	number
NRT/OBG	Natural Resource Technology, an OBG Company
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SAP	Sampling and Analysis Plan
SO_4	sulfate
SSI	statistically significant increase
TBD	to be determined
TDS	total dissolved solids
WDS3	Weston Disposal Site No. 3 Landfill

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.) Section (§) 257.90(e) for the Weston Disposal Site Number (No.) 3 (WDS3) Landfill located in the Town of Knowlton, Wisconsin.

Groundwater is being monitored at the WDS3 Landfill 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 2023 (no wells were installed or decommissioned).

In 2023, groundwater analytical data was evaluated for statistically significant increases (SSIs) over background concentrations for 40 C.F.R. § 257.94 Appendix III constituents in groundwater monitoring wells at the WDS3 Landfill. The following constituents and wells had SSIs reported in 2023:

- Calcium (Ca) – LS-100, LS-105, LS-106, and LS-107
- Chloride (Cl) – LS-107
- Sulfate (SO_4) – LS-100, LS-105, and LS-107
- Total Dissolved Solids (TDS) – LS-100, LS-105, LS-106, and LS-107

Alternate Source Demonstrations (ASDs) completed in prior years for these parameters and monitoring locations, with exception of TDS at LS-100, provide lines of evidence that the SSIs observed during the Detection Monitoring Program were not due to a release from the WDS3 Landfill, but were either from naturally occurring conditions (*e.g.,* natural variation in groundwater quality), a result of statistical procedures used to evaluate the results, or potential anthropogenic impacts in the area surrounding the WDS3 Landfill. TDS at LS-100 was addressed in an ASD dated June 5, 2023.

The WDS3 Landfill remains in the Detection Monitoring Program in accordance with 40 C.F.R. § 257.94.

1. INTRODUCTION

This report has been prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll) on behalf of Wisconsin Public Service Corporation, to provide the information required by 40 C.F.R. § 257.90(e) for the WDS3 Landfill located in the Town of Knowlton, Wisconsin.

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 (**Section 2**), summarizes key actions completed (**Section 3**), describes any problems encountered, discusses actions to resolve the problems (**Section 4**), and projects key activities for the upcoming year (**Section 5**). 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 (**Figure 1**).
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 (**Section 3**).
3. In addition to all the monitoring data obtained under §§ 257.90 through 257.98 (**Tables 1 and 2**), 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 (**Section 3 and Table A**).
4. A narrative discussion of any transition between monitoring programs (*e.g.*, the date and circumstances for transitioning from Detection Monitoring to Assessment Monitoring (**Section 2**) in addition to identifying the constituent(s) detected at an SSI relative to background levels) (**Table A**).
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 (**Executive Summary**). 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 an 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 such an increase.

B. Provide the date when the Assessment Monitoring Program was initiated for the CCR unit.

iv. If it was determined that there was a statistically significant level 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 such an increase.

B. Provide the date when the assessment of corrective measures was initiated for the CCR unit.

C. Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit.

D. Provide the date when the assessment of corrective measures 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 the WDS3 Landfill for calendar year 2023.

2. MONITORING AND CORRECTIVE ACTION PROGRAM STATUS

No changes have occurred to the monitoring program status in calendar year 2023 and the WDS3 Landfill remains in the Detection Monitoring Program in accordance with 40 C.F.R. § 257.94.

3. KEY ACTIONS COMPLETED IN 2023

The Detection Monitoring Program is summarized in **Table A** on the following page. The groundwater monitoring system, including the CCR unit and all background (upgradient) and downgradient monitoring wells, is presented in **Figure 1**. No changes were made to the monitoring system in 2023. In general, one groundwater sample was collected from each background and downgradient well during each monitoring event. All samples were collected and analyzed in accordance with the *Sampling and Analysis Plan, Weston Disposal Site No. 3 Landfill* (Natural Resource Technology, an OBG Company [NRT/OBG], 2017). Potentiometric surface maps for the fourth quarter of 2022 and both monitoring events in 2023 are included in **Figures 2 through 4**. Water level data, collected from background and downgradient monitoring wells, are included in **Table 1**. All monitoring data and analytical results obtained under 40 C.F.R. §§ 257.90 through 257.98 (as applicable) in the fourth quarter of 2022 and both monitoring events in 2023 are presented in **Table 2**. Laboratory reports for both 2023 monitoring events are included in **Appendix A**[1].

Analytical data were evaluated in accordance with the *Statistical Analysis Plan, Weston Disposal Site No. 3 Landfill* (NRT/OBG, 2017) to determine any SSIs for Appendix III parameters relative to background concentrations. Statistical background values are provided in **Table 3**. A flow chart showing the statistical methodology for determining background values is included as **Appendix B**.

Statistical evaluation of analytical data, including SSI determinations, from the Detection Monitoring Program for the October 25, 2022 (Detection Monitoring Round 11) and April 27, 2023 (Detection Monitoring Round 12) sampling events were completed in 2023 and within 90 days of receipt of the analytical data. SSIs over background concentrations for Appendix III constituents were identified; SSI parameters and well locations are provided in **Table A**.

An ASD for the SSI determined during Detection Monitoring Round 11, dated June 5, 2023 was prepared within 90 days of the SSI determination and is included in **Appendix C**. The ASD was prepared in accordance with 40 CFR 257.94(e)(2) and provides a description, data, and pertinent information to support that the SSIs observed during Detection Monitoring Round 11 were not due to a release from the WDS3 Landfill but were either errors in sampling, analysis, statistical evaluation, or from naturally occurring conditions (e.g. natural variation in groundwater quality). The ASDs dated April 15, 2018 and July 7, 2021 for the Weston Disposal Site No. 3 Landfill provided a description, data, and pertinent information supporting an alternate source for the wells and parameters with SSIs in Detection Monitoring Rounds 11-12.

[1] Laboratory reports for the fourth quarter of 2022 monitoring event were provided in the 2022 annual report.

Table A. 2022-2023 Detection Monitoring Program Summary

Detection Round	Sampling Date	Analytical Data Receipt Date	Parameters Collected	SSI Wells (Parameters)	SSI(s) Determination Date	ASD Completion Date[1]
11	October 25, 2022	December 5, 2022	Appendix III	LS-100 (Ca, SO_4, TDS) LS-105 (Ca, SO_4, TDS) LS-106 (Ca, TDS) LS-107 (Ca, Cl, SO_4, TDS)	March 5, 2023	June 5, 2023
11R	February 16, 2023	March 1, 2023	Ca, Cl, SO_4, TDS LS-107	NA	NA	NA
12	April 27, 2023	May 23, 2023	Appendix III	LS-105 (Ca, SO_4, TDS) LS-107 (Ca, Cl, SO_4, TDS)	August 21, 2023	NA
13	October 30, 2023	December 1, 2023	Appendix III	TBD	TBD Before February 29, 2023	TBD

Notes:

NA: Not applicable

TBD: To Be Determined

[1] The April 15, 2018, July 7, 2021, and June 5, 2023 ASDs for WDS3 provided a description, data, and pertinent information supporting an alternate source for the wells and parameters with SSIs in Detection Monitoring Rounds 11-12.

4. PROBLEMS ENCOUNTERED AND ACTIONS TO RESOLVE THE PROBLEMS

No problems were encountered with the Groundwater Monitoring Program during 2023. Groundwater samples were collected and analyzed in accordance with the SAP and all data were accepted.

5. KEY ACTIVITIES PLANNED FOR 2024

The following key activities are planned for 2024:

- Continuation of the Detection Monitoring Program with semi-annual sampling scheduled for the second and fourth quarters of 2024.
- 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 the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality) will be evaluated.
  - If an alternate source is identified to be the cause of the SSI, a written demonstration will be completed within 90 days of SSI determination and included in the 2024 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 2024 (*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), 2017. *Sampling and Analysis Plan, Weston Disposal Site No. 3 Landfill, Town of Knowlton, Wisconsin, October 3, 2017.*

Natural Resource Technology, an OBG Company (NRT/OBG), 2017. *Statistical Analysis Plan, Weston Disposal Site No. 3 Landfill, Town of Knowlton, Wisconsin, October 17, 2017.*

TABLES

TABLE 1
GROUNDWATER ELEVATIONS
2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WI

Well ID	Well Type	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Date	Groundwater Elevation (ft NAVD88)
LS-101	Background (Upgradient)	44.72648	-89.63627	10/25/2022	1191.83
				4/27/2023	1197.03
				10/30/2023	1194.58
LS-100	Compliance (Downgradient)	44.72484	-89.63437	10/25/2022	1187.72
				4/27/2023	1192.37
				10/30/2023	1190.55
LS-105	Compliance (Downgradient)	44.72295	-89.63439	10/25/2022	1184.30
				4/27/2023	1186.78
				10/30/2023	1185.78
LS-106	Compliance (Downgradient)	44.72219	-89.63533	10/25/2022	1181.62
				4/27/2023	1182.65
				10/30/2023	1182.59
LS-107	Compliance (Downgradient)	44.72630	-89.63852	10/25/2022	1188.62
				4/27/2023	1189.41
				10/30/2023	1188.7
LS-52	Water Level Only	NA	NA	10/25/2022	1189.14
				4/27/2023	1193.99
				10/30/2023	1190.96

Notes:
ft = foot/feet
NAVD88 = North American Vertical Datum of 1988

Weston Disposal Site #3
Table 2. Analytical Results - Appendix III Parameters

Date Range: 10/20/2022 to 10/30/2022

Lab Methods:

Well Id	Date Sampled	Lab Id	B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	Fluoride, total, mg/L	pH (field), SU	SO4, tot, mg/L
LS-100	10/25/2022	AE63596	0.0204	17.1	2.30	<0.095		15.8
		AE63814					5.1	
LS-101	10/25/2022	AE63597	<0.0173	6.3	0.49	<0.095		2.7
		AE63816					5.4	
LS-105	10/25/2022	AE63598	0.0411	23.2	1.80	<0.095		25.3
		AE63823					5.6	
LS-106	10/25/2022	AE63599	0.0242	17.0	2.50	<0.095	5.6	2.2
LS-107	10/25/2022	AE63600	0.0312	36.2	10.40	<0.095	5.3	89.1

Weston Disposal Site #3
Table 2. Analytical Results - Appendix III Parameters

Date Range: 10/20/2022 to 10/30/2022
Lab Methods:

Well Id	Date Sampled	Lab Id	TDS, mg/L
LS-100	10/25/2022	AE63596	112
LS-101	10/25/2022	AE63597	58
LS-105	10/25/2022	AE63598	160
LS-106	10/25/2022	AE63599	122
LS-107	10/25/2022	AE63600	218

Weston Disposal Site #3
Table 2. Analytical Results - Appendix III Parameters

Date Range: 02/10/2023 to 02/20/2023

Lab Methods:

Well Id	Date Sampled	Lab Id	Ca, tot, mg/L	Cl, tot, mg/L	SO4, tot, mg/L	TDS, mg/L
LS-107	2/16/2023	40258414005	45.7	18.70	80.7	212

Weston Disposal Site #3
Table 2. Analytical Results - Appendix III Parameters

Date Range: 04/26/2023 to 04/27/2023

Lab Methods:

Well Id	Date Sampled	Lab Id	B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	Fluoride, total, mg/L	pH (field), SU	SO4, tot, mg/L
LS-100	4/27/2023	40261489007					5.2	
		40261496001	<0.0173	12.2	1.10	<0.095		11.9
LS-101	4/27/2023	40261489009					5.3	
		40261496002	<0.0173	2.5	0.64	<0.095		1.6
LS-105	4/27/2023	40261489016					5.5	
		40261496003	0.0203	21.4	1.70	<0.095		17.8
LS-106	4/27/2023	40261496004	0.0411	3.6	0.90	<0.095	5.4	1.1
LS-107	4/27/2023	40261496005	0.0208	38.0	38.80	<0.095	5.4	54.8

Weston Disposal Site #3
Table 2. Analytical Results - Appendix III Parameters

Date Range: 04/26/2023 to 04/27/2023
Lab Methods:

Well Id	Date Sampled	Lab Id	TDS, mg/L
LS-100	4/27/2023	40261496001	52
LS-101	4/27/2023	40261496002	26
LS-105	4/27/2023	40261496003	118
LS-106	4/27/2023	40261496004	88
LS-107	4/27/2023	40261496005	212

Weston Disposal Site #3
Table 2. Analytical Results - Appendix III Parameters

Date Range: 10/29/2023 to 11/01/2023

Lab Methods:

Well Id	Date Sampled	Lab Id	B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	Fluoride, total, mg/L	pH (field), SU	SO4, tot, mg/L
LS-100	10/30/2023	40270382001	0.0336	21.3	2.30	<0.095	5.7	57.6
LS-101	10/30/2023	40270382002	0.0179	3.7	<0.59	<0.095	5.8	1.5
LS-105	10/30/2023	40270382003	0.0431	22.6	3.10	<0.480	6.0	28.9
LS-106	10/30/2023	40270382004	0.0382	4.0	<3.00	<0.480	6.2	<2.2
LS-107	10/30/2023	40270382005	0.0385	40.9	35.20	<0.095	5.7	72.0

Weston Disposal Site #3
Table 2. Analytical Results - Appendix III Parameters

Date Range: 10/29/2023 to 11/01/2023

Lab Methods:

Well Id	Date Sampled	Lab Id	TDS, mg/L
LS-100	10/30/2023	40270382001	116
LS-101	10/30/2023	40270382002	50
LS-105	10/30/2023	40270382003	124
LS-106	10/30/2023	40270382004	76
LS-107	10/30/2023	40270382005	238

Notes:

Exceedance of Background

TABLE 3

STATISTICAL BACKGROUND VALUES

2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

WESTON DISPOSAL SITE NO. 3 LANDFILL

TOWN OF KNOWLTON, WISCONSIN

Parameter	Statistical Background Value (LPL / UPL)
40 C.F.R. Part 257 Appendix III	
Boron (mg/L)	0.0430
Calcium (mg/L)	12.9
Chloride (mg/L)	4.26
Fluoride (mg/L)	DQR
pH (field) (SU)	4.9/8.8
Sulfate (mg/L)	13.3
Total Dissolved Solids (mg/L)	100

Notes:

40 C.F.R. = Title 40 of the Code of Federal Regulations

LPL = Lower Prediction Limit (applicable for pH only)

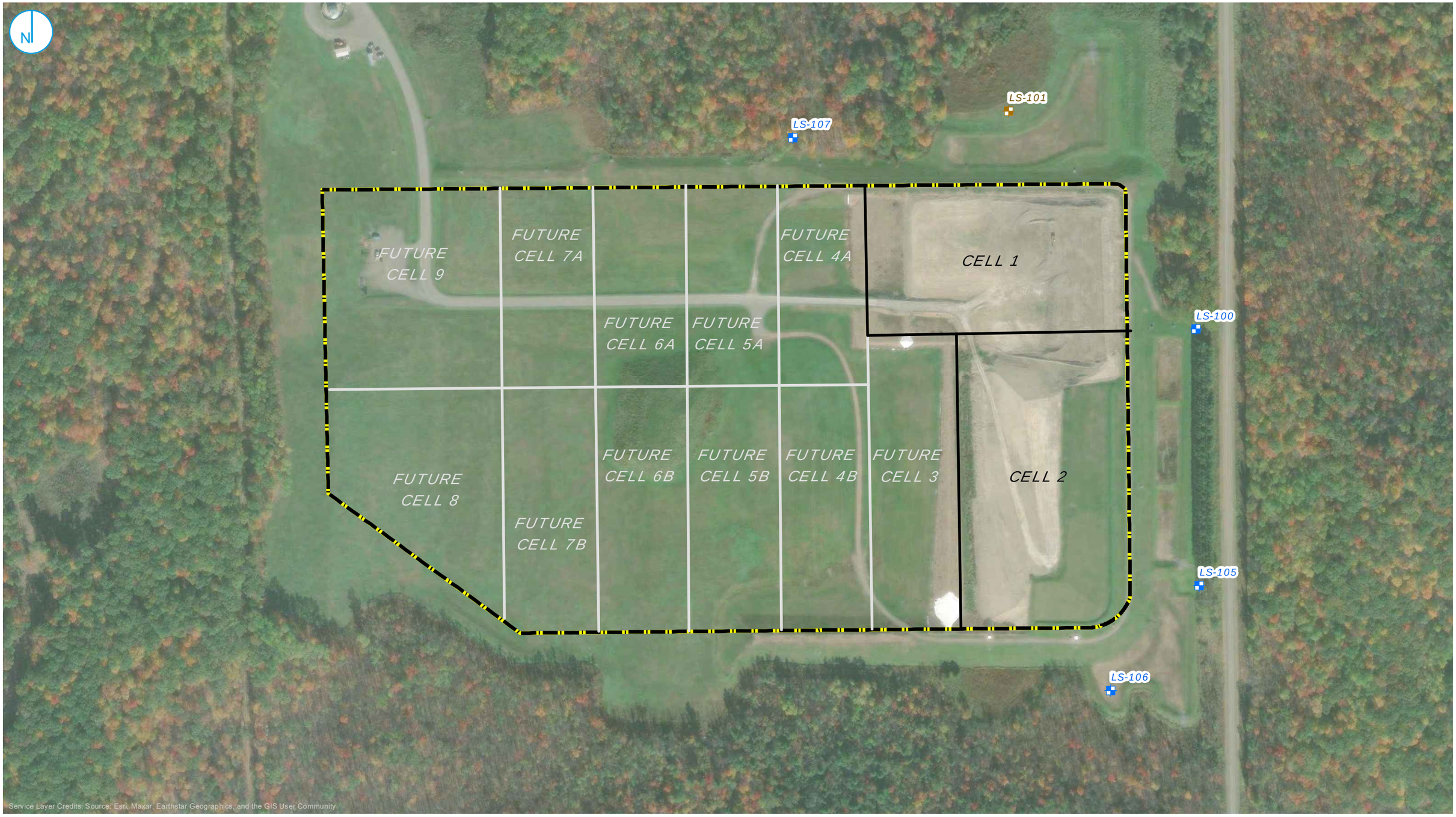
mg/L = milligrams per liter

DQR = Double quantification rule, background data set is non-detect. If parameter is detected in both the sample event and a resample it is considered an exceedance.

SU = Standard Units

UPL = Upper Prediction Limit

FIGURES



CCR RULE DOWNGRADIENT MONITORING WELL LOCATION
CCR RULE UPGRADIENT MONITORING WELL LOCATION
WESTON DISPOSAL SITE NO. 3 LANDFILL

0 125 250 Feet

NOTES
1. IMAGERY DATE = 10/10/2022

MONITORING WELL LOCATION MAP

2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WISCONSIN

FIGURE 1

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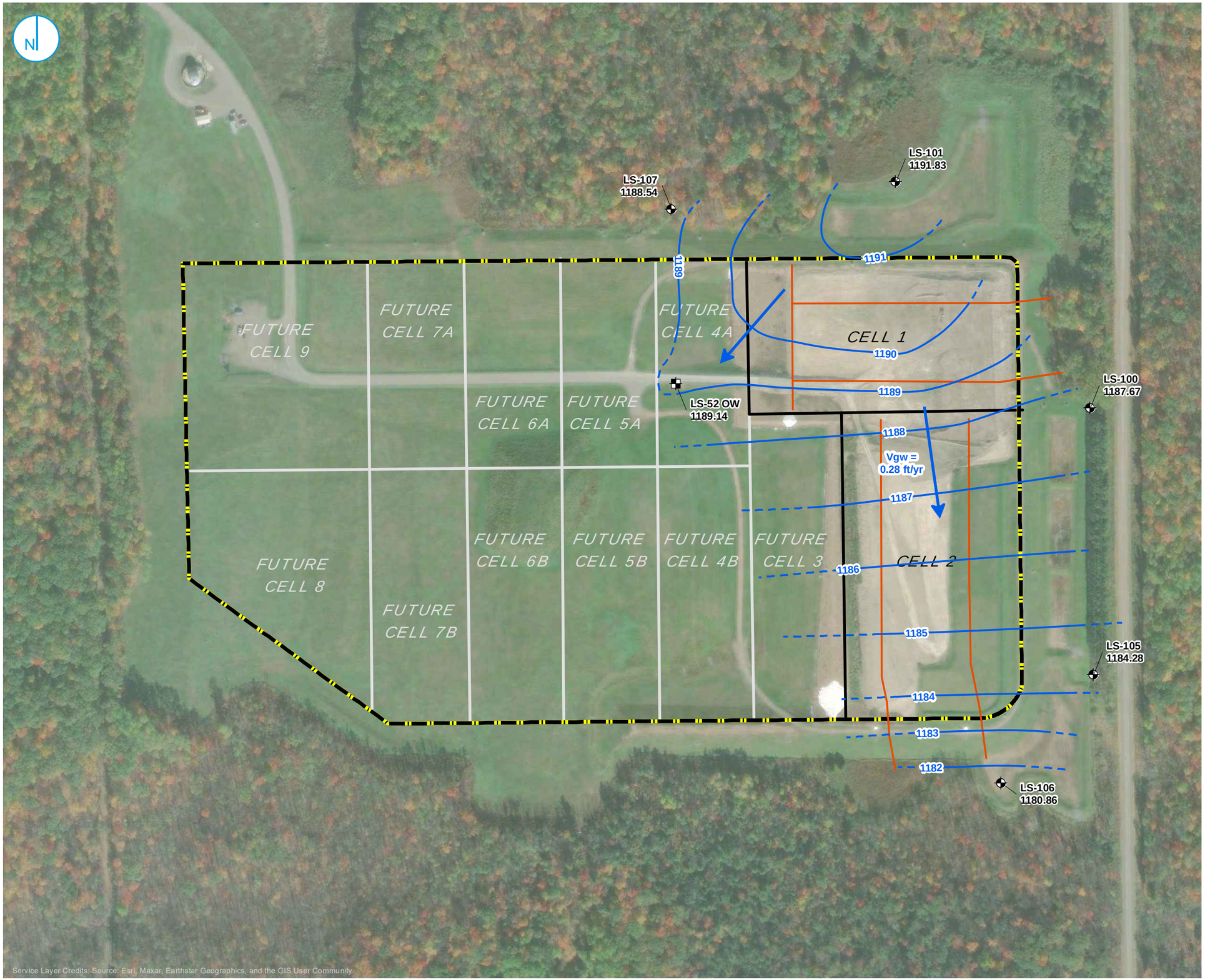

WESTON DISPOSAL SITE NO. 3 LANDFILL

GROUNDWATER GRADIENT CONTROL SYSTEM

CCR RULE MONITORING WELL

MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD 88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

NOTES

1. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
2. Vgw = ESTIMATED FT/YR GROUNDWATER FLOW VELOCITY
3. IMAGERY DATE = 10/10/2022

0 125 250
Feet

POTENTIOMETRIC SURFACE MAP
OCTOBER 25, 2022

2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WISCONSIN

FIGURE 2

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GROUNDWATER AVERAGE LINEAR VELOCITY CALCULATIONS
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WISCONSIN

OCTOBER 2022

UPPERMOST AQUIFER

$V = K\,i\,/\,n_e$

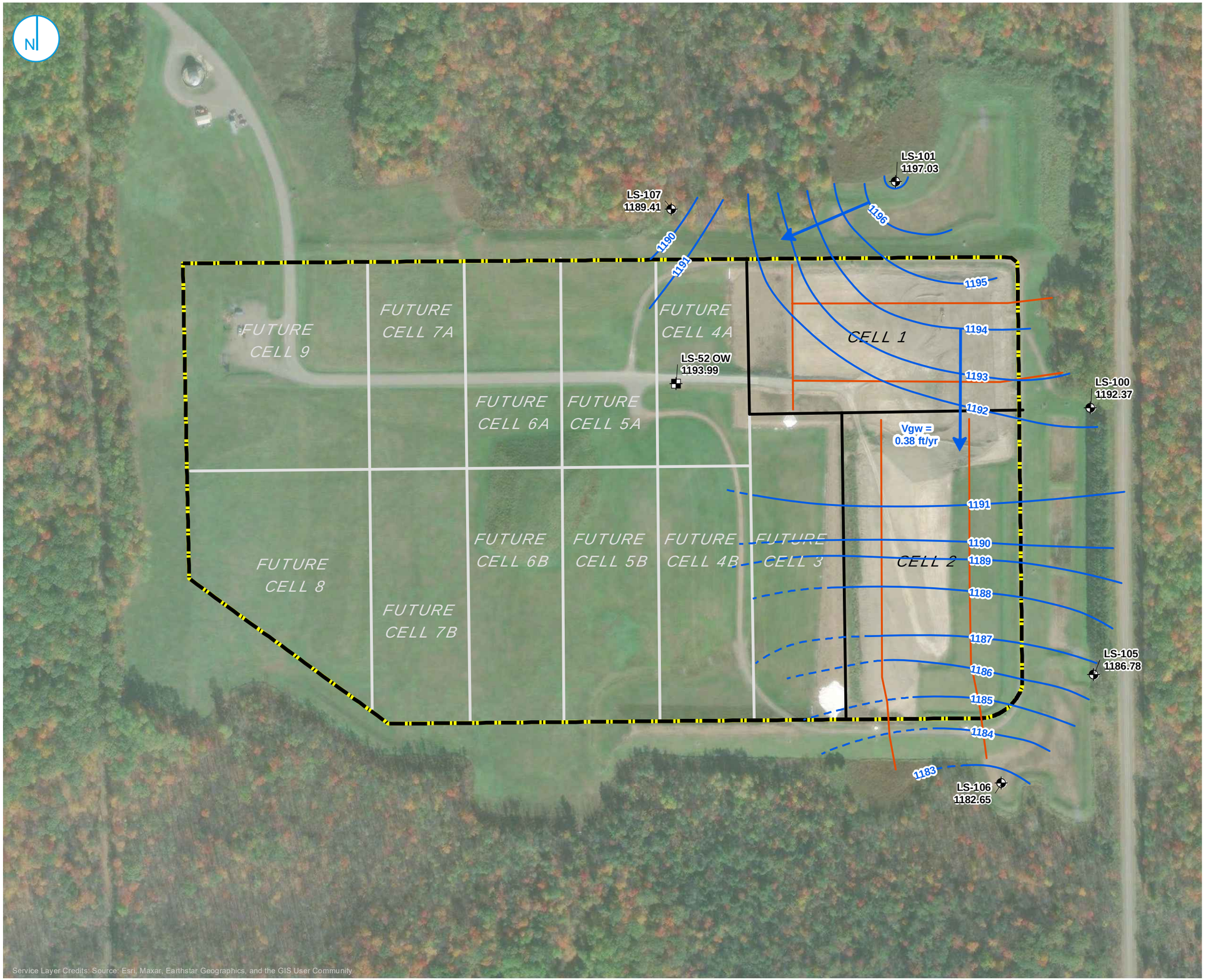
V = Groundwater Velocity
K = Hydraulic Conductivity
i = Hydraulic Gradient (unitless value)
n_e = Effective Porosity

Contours	**1188**	**to**	**1187**	**South Side of Cell 1 / North Side of Cell 2**	Elevation Change (ft)	Distance Change (ft)
K =	1.28E+01	ft/yr	Geometric mean for Landfill 3 (all)			
i =	0.006		between contours identified above		1 /	180 = 0.006
n_e =	25	%				

$$V = \frac{1.28E+01 * 5.56E-03}{0.25}$$

V = 0.28 feet/year

[O: KLT 1/31/2023, C:NMD 1/31/2023]



WESTON DISPOSAL SITE NO. 3 LANDFILL
GROUNDWATER GRADIENT CONTROL SYSTEM
CCR RULE MONITORING WELL
MONITORING WELL LOCATION
GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD 88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

NOTES
1. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
2. Vgw = ESTIMATED FT/YR GROUNDWATER FLOW VELOCITY
3. IMAGERY DATE = 10/10/2022

0 125 250
Feet

POTENTIOMETRIC SURFACE MAP
APRIL 27, 2023

2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WISCONSIN

FIGURE 3

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GROUNDWATER AVERAGE LINEAR VELOCITY CALCULATIONS
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WISCONSIN

APRIL 2023 $V = K i / n_e$

V = Groundwater Velocity
K = Hydraulic Conductivity
i = Hydraulic Gradient (unitless value)
n_e = Effective Porosity

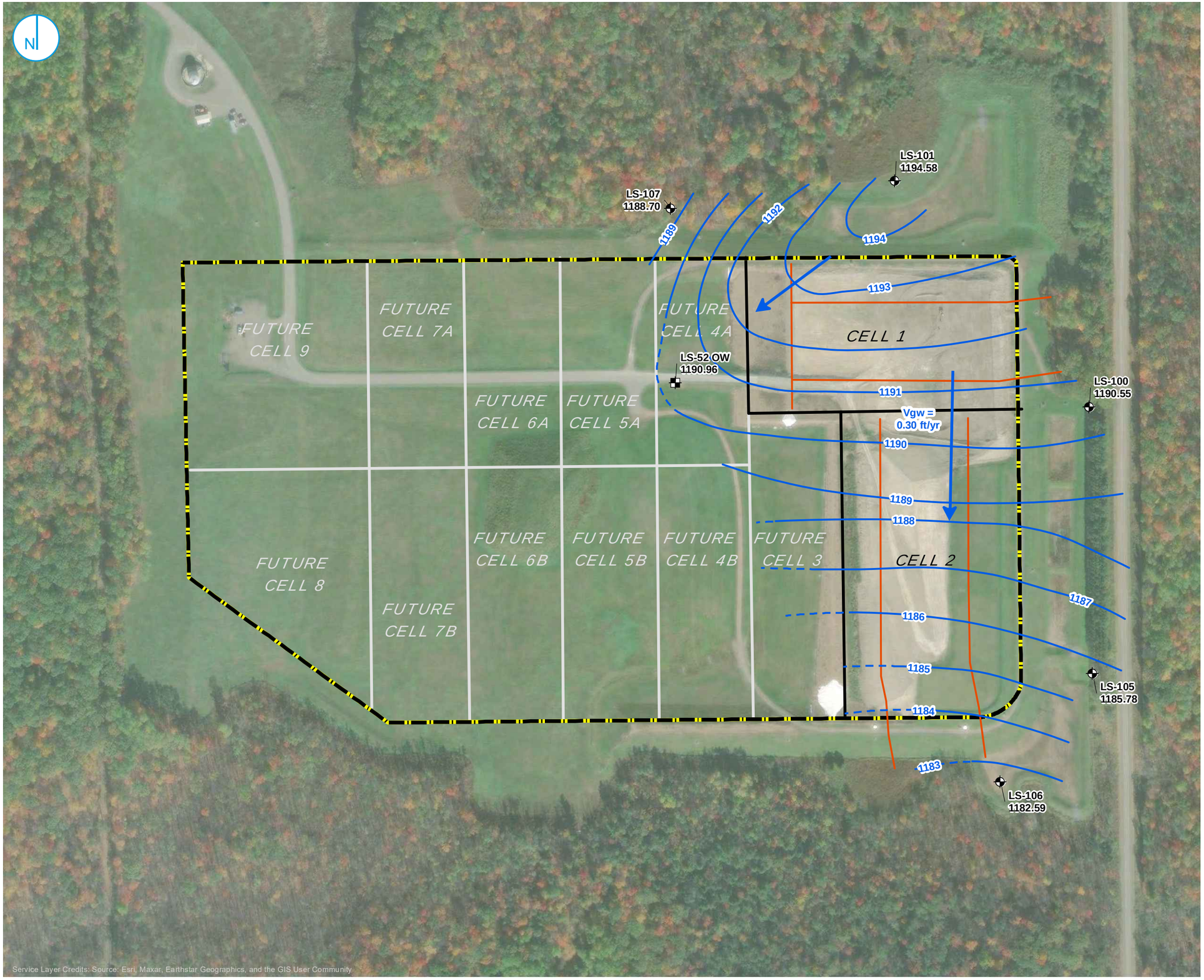
UPPERMOST AQUIFER

Contours	**1193**	**to**	**1191**	**South Side of Cell 1 / North Side of Cell 2**	Elevation Change (ft)		Distance Change (ft)
K =	1.28E+01	ft/yr	Geometric mean for Landfill 3 (all)				
i =	0.007		between contours identified above				
n_e =	25	%			2	/	270 = 0.007

$$V = \frac{1.28E+01 * 7.41E-03}{0.25}$$

V = 0.38 feet/year

[O: KJS 1/29/2024, C:EJT 1/29/2024]



WESTON DISPOSAL SITE NO. 3 LANDFILL

GROUNDWATER GRADIENT CONTROL SYSTEM

CCR RULE MONITORING WELL

MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD 88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

NOTES

1. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
2. Vgw = ESTIMATED FT/YR GROUNDWATER FLOW VELOCITY
3. IMAGERY DATE = 10/10/2022

0 125 250 Feet

POTENTIOMETRIC SURFACE MAP OCTOBER 30, 2023

2023 ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WISCONSIN

FIGURE 4

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GROUNDWATER AVERAGE LINEAR VELOCITY CALCULATIONS
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WISCONSIN

OCTOBER 2023 $V = K i / n_e$

V = Groundwater Velocity
K = Hydraulic Conductivity
i = Hydraulic Gradient (unitless value)
n_e = Effective Porosity

UPPERMOST AQUIFER

Contours	**1192**	**to**	**1190**	**South Side of Cell 1 / North Side of Cell 2**	Elevation Change (ft)		Distance Change (ft)
K =	1.28E+01	ft/yr	Geometric mean for Landfill 3 (all)				
i =	0.006		between contours identified above		2	/	343 = 0.006
n_e =	25	%					

$$V = \frac{1.28E+01 * 5.83E-03}{0.25}$$

V = 0.30 feet/year

[O: KJS 1/29/2024, C:EJT 1/29/2024]

APPENDICES

APPENDIX A
LABORATORY REPORTS

To: Eric Kovatch
PSB Annex A231

From: WEC Business Services
Laboratory Services PSBA-A070
WDNR Cert # 241329000

Report Date: Friday, January 26, 2024

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **LS-107 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71151 Sample Collection Date/Time: 02/16/2023 08:59
Sample Received: 01/26/2024 Sample Collector: R E LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Calcium	45700	114	ug/L	500	1		EPA 200.7	2/21/23	020
Total Chloride	18.7	0.43	mg/L	2.0	1		EPA 300.0	2/27/23	020
Total Sulfate	80.7	2.2	mg/L	10.0	5		EPA 300.0	2/28/23	020
Total Dissolved Solids	212	8.7	mg/L	20.0	1		Std Mtd 2540 C	2/21/23	020

Sample Comments:

LOD and LOQ are adjusted for dilution factor.
'J' Flag, if present indicates an estimated concentration at or above the LOD and below the LOQ.

If there are any questions concerning this report, please contact: Laboratory Services at (414) 221-4595.

To: Bob Meidl
PSB Annex A231

From: WEC Business Services
Laboratory Services PSBA-A070
WDNR Cert # 241329000

Report Date: Monday, January 29, 2024

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **LS-100 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71195 Sample Collection Date/Time: 04/27/2023 11:54
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	6.75	0.05	feet		1		H2OD	4/27/23	C APPLEKAMP
Field Temperature	5.1	0.1	Degrees (		1		TEMP	4/27/23	C APPLEKAMP
Field pH	5.2	0.1	Units	0.1	1		FIELDPH	4/27/23	C APPLEKAMP
Field Conductivity	99	0	umhos		1		FCOND25	4/27/23	C APPLEKAMP
Dissolved Oxygen-Field	10.8	0.1	mg/l		1		FIELDDO	4/27/23	C APPLEKAMP
Turbidity	2.6	0.1	NTU'S		1		EPA 180.1	4/27/23	C APPLEKAMP
Redox Potential	265	1	mV		1		ASTM D1498-93	4/27/23	C APPLEKAMP
Total Boron	Less Than	17.3	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Calcium	12200	114	ug/L	500	1		EPA 200.7	5/3/23	020
Total Copper	Less Than	3.4	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Magnesium	2000	182	ug/L	1000	1		EPA 200.7	5/3/23	020
Total Manganese	Less Than	1.5	ug/L	5.0	1		EPA 200.7	5/3/23	020
Total Silver	Less Than	3.2	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Hardness as CaCO3	38.6	1.0	mg/L	5.4	1		StdMtd 2340B	5/3/23	020
Total Zinc	Less Than	11.6	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Filtered Alkalinity as CaCO3	29.6	5.0	mg/l	10.0	1		Std Mtd 2320 B	5/10/23	020
Total Dissolved Solids	52.0	8.7	mg/L	20.0	1		Std Mtd 2540 C	5/2/23	020
Total Chloride	1.1	0.43	mg/L	2.0	1	J	EPA 300.0	5/3/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1	M0	EPA 300.0	5/3/23	020
Nitrate-Nitrite as N	2.0	0.065	mg/L	0.25	1	H1	EPA 300.0	5/3/23	020
Total Sulfate	11.9	0.44	mg/L	2.0	1	M0	EPA 300.0	5/3/23	020

Sample Comments:

Sample Description: **LS-101 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71196 Sample Collection Date/Time: 04/27/2023 16:30
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	8.48	0.05	feet		1		H2OD	4/27/23	C APPLEKAMP
Field Temperature	5.5	0.1	Degrees (		1		TEMP	4/27/23	C APPLEKAMP
Field pH	5.3	0.1	Units	0.1	1		FIELDPH	4/27/23	C APPLEKAMP
Field Conductivity	31	0	umhos		1		FCOND25	4/27/23	C APPLEKAMP
Dissolved Oxygen-Field	12.3	0.1	mg/l		1		FIELDDO	4/27/23	C APPLEKAMP
Turbidity	7.6	0.1	NTU'S		1		EPA 180.1	4/27/23	C APPLEKAMP
Redox Potential	248	1	mV		1		ASTM D1498-93	4/27/23	C APPLEKAMP

Report Date: Monday, January 29, 2024

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **LS-101 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71196 Sample Collection Date/Time: 04/27/2023 16:30
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Boron	Less Than	17.3	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Calcium	2510	114	ug/L	500	1		EPA 200.7	5/3/23	020
Total Copper	22.4	3.4	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Magnesium	703	182	ug/L	1000	1	J	EPA 200.7	5/3/23	020
Total Manganese	3.3	1.5	ug/L	5.0	1	J	EPA 200.7	5/3/23	020
Total Silver	Less Than	3.2	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Hardness as CaCO3	9.15	1.00	mg/L	5.40	1		StdMtd 2340B	5/3/23	020
Total Zinc	Less Than	11.6	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Filtered Alkalinity as CaCO3	12.1	20	mg/l	10.0	1	H5	Std Mtd 2320 B	5/12/23	020
Total Dissolved Solids	26.0	8.7	mg/L	20.0	1		Std Mtd 2540 C	5/2/23	020
Total Chloride	0.64	0.43	mg/L	2.0	1	J	EPA 300.0	5/3/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	5/3/23	020
Nitrate-Nitrite as N	0.20	0.065	mg/L	0.25	1	J, H1	EPA 300.0	5/3/23	020
Total Sulfate	1.6	0.44	mg/L	2.0	1	J	EPA 300.0	5/3/23	020

Sample Comments:
Alkalinity - Flag H5 - Reanalysis conducted in excess of EPA method hold time.

Sample Description: **LS-105 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71197 Sample Collection Date/Time: 04/27/2023 12:58
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	3.53	0.05	feet		1		H2OD	4/27/23	C APPLEKAMP
Field Temperature	6.6	0.1	Degrees C		1		TEMP	4/27/23	C APPLEKAMP
Field pH	5.5	0.1	Units	0.1	1		FIELDPH	4/27/23	C APPLEKAMP
Field Conductivity	201	0	umhos		1		FCOND25	4/27/23	C APPLEKAMP
Dissolved Oxygen-Field	0.6	0.1	mg/l		1		FIELDDO	4/27/23	C APPLEKAMP
Turbidity	2.3	0.1	NTU'S		1		EPA 180.1	4/27/23	C APPLEKAMP
Redox Potential	87	1	mV		1		ASTM D1498-93	4/27/23	C APPLEKAMP
Total Boron	20.3	17.3	ug/L	40.0	1	J	EPA 200.7	5/3/23	020
Total Calcium	21400	114	ug/L	500	1		EPA 200.7	5/3/23	020
Total Copper	Less Than	3.4	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Magnesium	5140	182	ug/L	1000	1		EPA 200.7	5/3/23	020
Total Manganese	1140	1.5	ug/L	5.0	1		EPA 200.7	5/3/23	020
Total Silver	Less Than	3.2	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Hardness as CaCO3	74.7	1.0	mg/L	5.4	1		StdMtd 2340B	5/3/23	020
Total Zinc	Less Than	11.6	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Filtered Alkalinity as CaCO3	79.1	5.0	mg/l	10.0	1		Std Mtd 2320 B	5/10/23	020
Total Dissolved Solids	118	8.7	mg/L	20.0	1		Std Mtd 2540 C	5/2/23	020
Total Chloride	1.7	0.43	mg/L	2.0	1	J	EPA 300.0	5/3/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	5/3/23	020
Nitrate-Nitrite as N	Less Than	0.065	mg/L	0.25	1	H1	EPA 300.0	5/3/23	020
Total Sulfate	17.8	0.44	mg/L	2.0	1		EPA 300.0	5/3/23	020

Report Date: Monday, January 29, 2024

The following are the analytical results for samples received by Laboratory Services:

Sample Comments:

Sample Description: **LS-106 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71198 Sample Collection Date/Time: 04/27/2023 14:02
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	12.31	0.05	feet		1		H2OD	4/27/23	C APPLEKAMP
Field Temperature	5.6	0.1	Degrees C		1		TEMP	4/27/23	C APPLEKAMP
Field pH	5.4	0.1	Units	0.1	1		FIELDPH	4/27/23	C APPLEKAMP
Field Conductivity	33	0	umhos		1		FCOND25	4/27/23	C APPLEKAMP
Dissolved Oxygen-Field	9.2	0.1	mg/l		1		FIELDDO	4/27/23	C APPLEKAMP
Turbidity	81	0.1	NTU'S		1		EPA 180.1	4/27/23	C APPLEKAMP
Redox Potential	150	1	mV		1		ASTM D1498-93	4/27/23	C APPLEKAMP
Total Boron	41.1	17.3	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Calcium	3550	114	ug/L	500	1		EPA 200.7	5/3/23	020
Total Copper	4.1	3.4	ug/L	10.0	1	J	EPA 200.7	5/3/23	020
Total Magnesium	2110	182	ug/L	1000	1		EPA 200.7	5/3/23	020
Total Manganese	241	1.5	ug/L	5.0	1		EPA 200.7	5/3/23	020
Total Silver	Less Than	3.2	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Hardness as CaCO3	17.5	1.0	mg/L	5.4	1		StdMtd 2340B	5/3/23	020
Total Zinc	Less Than	11.6	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Filtered Alkalinity as CaCO3	12.5	5.0	mg/l	10.0	1	H5	Std Mtd 2320 B	5/12/23	020
Total Dissolved Solids	88.0	8.7	mg/L	20.0	1		Std Mtd 2540 C	5/2/23	020
Total Chloride	0.90	0.43	mg/L	2.0	1	J	EPA 300.0	5/3/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	5/3/23	020
Nitrate-Nitrite as N	0.35	0.065	mg/L	0.25	1	H1	EPA 300.0	5/3/23	020
Total Sulfate	1.1	0.44	mg/L	2.0	1	J	EPA 300.0	5/3/23	020

Sample Comments:
Alkalinity - Flag H5 - Reanalysis conducted in excess of EPA method hold time.

Sample Description: **LS-107 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71199 Sample Collection Date/Time: 04/27/2023 09:55
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	5.2	0.05	feet		1		H2OD	4/27/23	C APPLEKAMP
Field Temperature	6.0	0.1	Degrees C		1		TEMP	4/27/23	C APPLEKAMP
Field pH	5.4	0.1	Units	0.1	1		FIELDPH	4/27/23	C APPLEKAMP
Field Conductivity	319	0	umhos		1		FCOND25	4/27/23	C APPLEKAMP
Dissolved Oxygen-Field	3.4	0.1	mg/l		1		FIELDDO	4/27/23	C APPLEKAMP
Turbidity	-7.0	0.1	NTU'S		1		EPA 180.1	4/27/23	C APPLEKAMP
Redox Potential	242	1	mV		1		ASTM D1498-93	4/27/23	C APPLEKAMP
Total Boron	20.8	17.3	ug/L	40.0	1	J	EPA 200.7	5/3/23	020
Total Calcium	38000	114	ug/L	500	1		EPA 200.7	5/3/23	020
Total Copper	Less Than	3.4	ug/L	10.0	1		EPA 200.7	5/3/23	020

Report Date: Monday, January 29, 2024

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **LS-107 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71199 Sample Collection Date/Time: 04/27/2023 09:55
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Magnesium	8530	182	ug/L	1000	1		EPA 200.7	5/3/23	020
Total Manganese	6.0	1.5	ug/L	5.0	1		EPA 200.7	5/3/23	020
Total Silver	Less Than	3.2	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Hardness as CaCO3	130	1.0	mg/L	5.4	1		StdMtd 2340B	5/3/23	020
Total Zinc	Less Than	11.6	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Filtered Alkalinity as CaCO3	35.0	5.0	mg/l	10.0	1		Std Mtd 2320 B	5/10/23	020
Total Dissolved Solids	212	8.7	mg/L	20.0	1		Std Mtd 2540 C	5/2/23	020
Total Chloride	38.8	0.43	mg/L	2.0	1		EPA 300.0	5/3/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	5/3/23	020
Nitrate-Nitrite as N	1.5	0.065	mg/L	0.25	1	H1	EPA 300.0	5/3/23	020
Total Sulfate	54.8	0.44	mg/L	2.0	1		EPA 300.0	5/3/23	020

Sample Comments:
Field Turbidity - Note on log sheet that 'will re-calibrate zero turbidity after

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Sample Description: **QA/QC1 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71200 Sample Collection Date/Time: 04/27/2023 00:00
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Boron	Less Than	17.3	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Calcium	11600	114	ug/L	500	1		EPA 200.7	5/3/23	020
Total Copper	Less Than	3.4	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Magnesium	1910	182	ug/L	1000	1		EPA 200.7	5/3/23	020
Total Manganese	Less Than	1.5	ug/L	5.0	1		EPA 200.7	5/3/23	020
Total Silver	Less Than	3.2	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Hardness as CaCO3	36.9	1.0	mg/L	5.4	1		StdMtd 2340B	5/3/23	020
Total Zinc	Less Than	11.6	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Filtered Alkalinity as CaCO3	29.0	5.0	mg/l	10.0	1		Std Mtd 2320 B	5/10/23	020
Total Dissolved Solids	66.0	8.7	mg/L	20.0	1		Std Mtd 2540 C	5/2/23	020
Total Chloride	1.0	0.43	mg/L	2.0	1	J	EPA 300.0	5/3/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	5/3/23	020
Nitrate-Nitrite as N	2.0	0.065	mg/L	0.25	1	H1	EPA 300.0	5/3/23	020
Total Sulfate	12.0	0.44	mg/L	0.2.0	1		EPA 300.0	5/3/23	020

Sample Comments:

Sample Description: **EB1 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71201 Sample Collection Date/Time: 04/27/2023 17:30
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Temperature	12.5	0.1	Degrees (		1		TEMP	4/27/23	C APPLEKAMP

Report Date: Monday, January 29, 2024

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **EB1 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71201 Sample Collection Date/Time: 04/27/2023 17:30
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field pH	6.2	0.1	Units	0.1	1		FIELDPH	4/27/23	C APPLEKAMP
Field Conductivity	2.0	0	umhos		1		FCOND25	4/27/23	C APPLEKAMP
Total Boron	Less Than	17.3	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Calcium	Less Than	114	ug/L	500	1		EPA 200.7	5/3/23	020
Total Copper	Less Than	3.4	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Magnesium	Less Than	182	ug/L	1000	1		EPA 200.7	5/3/23	020
Total Manganese	Less Than	1.5	ug/L	5.0	1		EPA 200.7	5/3/23	020
Total Silver	Less Than	3.2	ug/L	10.0	1		EPA 200.7	5/3/23	020
Total Hardness as CaCO3	Less Than	1.00	mg/L	5.40	1		StdMtd 2340B	5/3/23	020
Total Zinc	Less Than	11.6	ug/L	40.0	1		EPA 200.7	5/3/23	020
Total Filtered Alkalinity as CaCO3	Less Than	5.0	mg/l	10.0	1		Std Mtd 2320 B	5/10/23	020
Total Dissolved Solids	Less Than	8.7	mg/L	20.0	1		Std Mtd 2540 C	5/3/23	020
Total Chloride	Less Than	0.43	mg/L	2.0	1		EPA 300.0	5/4/23	020
Total Fluoride	0.22	0.095	mg/L	0.32	1	J	EPA 300.0	5/4/23	020
Nitrate-Nitrite as N	Less Than	0.065	mg/L	0.25	1	H1	EPA 300.0	5/4/23	020
Total Sulfate	Less Than	0.44	mg/L	2.0	1		EPA 300.0	5/4/23	020

Sample Comments:

Sample Description: **LS106 FD Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE71202 Sample Collection Date/Time: 04/27/2023 14:02
Sample Received: 01/29/2024 Sample Collector: C APPLEKAMP

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Dissolved Calcium	2970	114	ug/L	500	1		EPA 200.7	5/4/23	020
Dissolved Magnesium	895	182	ug/L	1000	1	J	EPA 200.7	5/4/23	020
Dissolved Potassium	740	325	ug/L	1000	1	J	EPA 200.7	5/4/23	020
Dissolved Sodium	1270	350	ug/L	500	1		EPA 200.7	5/4/23	020
Total Filtered Alkalinity as CaCO3	12.8	5.0	mg/l	10.0	1	H5	Std Mtd 2320 B	5/12/23	020
Total Dissolved Solids	16.0	8.7	mg/L	20.0	1	J	Std Mtd 2540 C	5/3/23	020
Dissolved Chloride	0.70	0.43	mg/L	2.0	1	J	EPA 300.0	5/15/23	020
Dissolved Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	5/15/23	020
Dissolved Sulfate	0.95	0.44	mg/L	2.0	1	J	EPA 300.0	5/15/23	020

Sample Comments:
Alkalinity - Flag H5 - Reanalysis conducted in excess of EPA method hold time.

LOD and LOQ are adjusted for dilution factor.
'J' Flag, if present indicates an estimated concentration at or above the LOD and below the LOQ.

If there are any questions concerning this report, please contact: Laboratory Services at (414) 221-4595.

To: ERIC KOVATCH
PSB Annex A231

From: WEC Business Services
Laboratory Services PSBA-A070
WDNR Cert # 241329000

Report Date: Tuesday, December 5, 2023

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **LS-100 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70114 Sample Collection Date/Time: 10/30/2023 12:03
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	8.61	0.05	feet		1		H2OD	10/30/23	R.E. LEE
Field Conductivity	181	0	umhos		1		FCOND25	10/30/23	R.E. LEE
Field pH	5.7	0.1	Units	0.1	1		FIELDPH	10/30/23	R.E. LEE
Field Temperature	11.5	0.1	Degrees (		1		TEMP	10/30/23	R.E. LEE
Dissolved Oxygen-Field	7.1	0.1	mg/l		1		FIELDDO	10/30/23	R.E. LEE
Turbidity	3.56	0.1	NTU'S		1		EPA 180.1	10/30/23	R.E. LEE
Redox Potential	227	1	mV		1		ASTM D1498-93	10/30/23	R.E. LEE
Total Dissolved Solids	120	8.7	mg/L	20	1		Std Mtd 2540 C	11/1/23	020
Total Boron	33.6	17.3	ug/L	40	1	J	EPA 200.7	11/3/23	020
Total Calcium	21300	114	ug/L	500	1		EPA 200.7	11/3/23	020
Total Magnesium	3430	182	ug/L	1000	1		EPA 200.7	11/3/23	020
Total Hardness as CaCO3	67.3	1	mg/L		1		Std Mtd 2340B	11/27/23	020
Dissolved Boron	32.6	17.3	ug/L	40	1	J	EPA 200.7	11/7/23	020
Dissolved Calcium	21700	114	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Magnesium	3480	182	ug/L	1000	1		EPA 200.7	11/7/23	020
Dissolved Sodium	3800	350	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Potassium	1420	325	ug/L	1000	1		EPA 200.7	11/7/23	020
Total Hardness as CaCO3	68.6	1.0	mg/L	5.4	1		StdMtd 2340B	11/7/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/13/23	020
Total Chloride	2.3	0.59	mg/L	2.0	1		EPA 300.0	11/13/23	020
Total Sulfate	57.6	0.44	mg/L	2.0	1		EPA 300.0	11/13/23	020
Dissolved Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/14/23	020
Dissolved Chloride	2.3	0.59	mg/L	2.0	1		EPA 300.0	11/14/23	020
Dissolved Sulfate	55.5	0.44	mg/L	2.0	1		EPA 300.0	11/14/23	020
Total Alkalinity as CaCO3	13.9	5.0	mg/L	10.0	1		SM 2320 B-1997	11/13/23	020
Total Filtered Alkalinity as CaCO3	14.2	5.0	mg/l	10.0	1		Std Mtd 2320 B	11/13/23	020
Carbonate Ion	Less Than	5.0	mg/L	10.0	1		CO3	11/13/23	020
Bicarbonate Ion	14.2	5.0	mg/L	10.0	1		HCO3	11/13/23	020

Sample Comments:

Sample Description: **LS-101 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70115 Sample Collection Date/Time: 10/30/2023 11:08
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst

Report Date: Tuesday, December 5, 2023

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **LS-101 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70115 Sample Collection Date/Time: 10/30/2023 11:08
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	11.05	0.05	feet		1		H2OD	10/30/23	R.E. LEE
Field Conductivity	44	0	umhos		1		FCOND25	10/30/23	R.E. LEE
Field pH	5.8	0.1	Units	0.1	1		FIELDPH	10/30/23	R.E. LEE
Field Temperature	10.3	0.1	Degrees C		1		TEMP	10/30/23	R.E. LEE
Dissolved Oxygen-Field	10.5	0.1	mg/l		1		FIELDDO	10/30/23	R.E. LEE
Turbidity	14.0	0.1	NTU'S		1		EPA 180.1	10/30/23	R.E. LEE
Redox Potential	212	1	mV		1		ASTM D1498-93	10/30/23	R.E. LEE
Total Dissolved Solids	50.0	8.7	mg/L	20	1		Std Mtd 2540 C	11/1/23	020
Total Boron	17.9	17.3	ug/L	40	1	J	EPA 200.7	11/3/23	020
Total Calcium	3650	114	ug/L	500	1		EPA 200.7	11/3/23	020
Total Magnesium	1120	182	ug/L	1000	1		EPA 200.7	11/3/23	020
Total Hardness as CaCO3	13.7	1.0	mg/L	5.4	1		Std Mtd 2340B	11/6/23	020
Dissolved Boron	Less Than	17.3	ug/L	40	1		EPA 200.7	11/7/23	020
Dissolved Calcium	3500	114	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Magnesium	930	182	ug/L	1000	1	J	EPA 200.7	11/7/23	020
Dissolved Sodium	2860	350	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Potassium	1160	325	ug/L	1000	1		EPA 200.7	11/7/23	020
Total Hardness as CaCO3	12.6	1.0	mg/L	5.4	1		StdMtd 2340B	11/7/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/13/23	020
Total Chloride	Less Than	0.59	mg/L	2.0	1		EPA 300.0	11/13/23	020
Total Sulfate	1.5	0.44	mg/L	2.0	1	J	EPA 300.0	11/13/23	020
Dissolved Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/14/23	020
Dissolved Chloride	0.60	0.59	mg/L	2.0	1	J	EPA 300.0	11/14/23	020
Dissolved Sulfate	1.6	0.44	mg/L	2.0	1	J	EPA 300.0	11/14/23	020
Total Alkalinity as CaCO3	14.5	5.0	mg/L	10.0	1		SM 2320 B-1997	11/13/23	020
Total Filtered Alkalinity as CaCO3	16.5	5	mg/l	10	1		Std Mtd 2320 B	11/13/23	020
Carbonate Ion	Less Than	5.0	mg/L	10.0	1		CO3	11/13/23	020
Bicarbonate Ion	16.5	5.0	mg/L	10.0	1		HCO3	11/13/23	020

Sample Comments:

Sample Description: **LS-105 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70116 Sample Collection Date/Time: 10/30/2023 12:52
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	4.56	0.05	feet		1		H2OD	10/30/23	R.E. LEE
Field Conductivity	212	0	umhos		1		FCOND25	10/30/23	R.E. LEE
Field pH	6.0	0.1	Units	0.1	1		FIELDPH	10/30/23	R.E. LEE
Field Temperature	10.8	0.1	Degrees C		1		TEMP	10/30/23	R.E. LEE
Dissolved Oxygen-Field	0.5	0.1	mg/l		1		FIELDDO	10/30/23	R.E. LEE
Turbidity	3.8	0.1	NTU'S		1		EPA 180.1	10/30/23	R.E. LEE
Redox Potential	4.2	1	mV		1		ASTM D1498-93	10/30/23	R.E. LEE
Total Dissolved Solids	124	8.7	mg/L	20	1		Std Mtd 2540 C	11/1/23	020

Report Date: Tuesday, December 5, 2023

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **LS-105 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70116 Sample Collection Date/Time: 10/30/2023 12:52
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Boron	43.1	17.3	ug/L	40	1		EPA 200.7	11/3/23	020
Total Calcium	22600	114	ug/L	500	1		EPA 200.7	11/3/23	020
Total Magnesium	5670	182	ug/L	1000	1		EPA 200.7	11/3/23	020
Total Hardness as CaCO3	75	1	mg/L		1		Std Mtd 2340B	11/27/23	020
Dissolved Boron	41.0	17.3	ug/L	40	1		EPA 200.7	11/7/23	020
Dissolved Calcium	21500	114	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Magnesium	5060	182	ug/L	1000	1		EPA 200.7	11/7/23	020
Dissolved Sodium	5280	350	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Potassium	1240	325	ug/L	1000	1		EPA 200.7	11/7/23	020
Total Hardness as CaCO3	74.5	1.0	mg/L	5.4	1		StdMtd 2340B	11/7/23	020
Total Fluoride	Less Than	0.48	mg/L	1.6	5		EPA 300.0	11/13/23	020
Total Chloride	3.1	3.0	mg/L	10	5	J	EPA 300.0	11/13/23	020
Total Sulfate	28.9	2.2	mg/L	10.0	5		EPA 300.0	11/13/23	020
Dissolved Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/14/23	020
Dissolved Chloride	1.7	0.59	mg/L	2.0	1	J	EPA 300.0	11/14/23	020
Dissolved Sulfate	34.5	0.44	mg/L	2.0	1		EPA 300.0	11/14/23	020
Total Alkalinity as CaCO3	60.1	5.0	mg/L	10.0	1		SM 2320 B-1997	11/9/23	020
Total Filtered Alkalinity as CaCO3	65.1	5.0	mg/l	10.0	1		Std Mtd 2320 B	11/12/23	020
Carbonate Ion	Less Than	5.0	mg/L	10.0	1		CO3	11/12/23	020
Bicarbonate Ion	65.1	5.0	mg/L	10.0	1		HCO3	11/12/23	020

Sample Comments:

Sample Description: **LS-106 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70117 Sample Collection Date/Time: 10/30/2023 13:54
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	11.85	0.05	feet		1		H2OD	10/30/23	R.E. LEE
Field Conductivity	44	0	umhos		1		FCOND25	10/30/23	R.E. LEE
Field pH	6.2	0.1	Units	0.1	1		FIELDPH	10/30/23	R.E. LEE
Field Temperature	11.9	0.1	Degrees C		1		TEMP	10/30/23	R.E. LEE
Dissolved Oxygen-Field	7.3	0.1	mg/l		1		FIELDDO	10/30/23	R.E. LEE
Turbidity	42.6	0.1	NTU'S		1		EPA 180.1	10/30/23	R.E. LEE
Redox Potential	90	1	mV		1		ASTM D1498-93	10/30/23	R.E. LEE
Total Dissolved Solids	76.0	8.7	mg/L	20	1		Std Mtd 2540 C	11/1/23	020
Total Boron	38.2	17.3	ug/L	40	1	J	EPA 200.7	11/3/23	020
Total Calcium	3970	114	ug/L	500	1		EPA 200.7	11/3/23	020
Total Magnesium	1930	182	ug/L	1000	1		EPA 200.7	11/3/23	020
Total Hardness as CaCO3	17.9	1.0	mg/L	5.4	1		Std Mtd 2340B	11/27/23	020
Dissolved Boron	Less Than	17.3	ug/L	40	1		EPA 200.7	11/7/23	020
Dissolved Calcium	3760	114	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Magnesium	1140	182	ug/L	1000	1		EPA 200.7	11/7/23	020
Dissolved Sodium	1530	350	ug/L	500	1		EPA 200.7	11/7/23	020

Report Date: Tuesday, December 5, 2023

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **LS-106 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70117 Sample Collection Date/Time: 10/30/2023 13:54
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Dissolved Potassium	776	325	ug/L	1000	1	J	EPA 200.7	11/7/23	020
Total Hardness as CaCO3	14.1	1.0	mg/L	5.4	1		StdMtd 2340B	11/7/23	020
Total Fluoride	Less Than	0.48	mg/L	1.6	5		EPA 300.0	11/13/23	020
Total Chloride	Less Than	3.0	mg/L	10.0	5		EPA 300.0	11/13/23	020
Total Sulfate	Less Than	2.2	mg/L	10	5		EPA 300.0	11/13/23	020
Dissolved Fluoride	0.11	0.095	mg/L	0.32	1	J	EPA 300.0	11/14/23	020
Dissolved Chloride	0.77	0.59	mg/L	2.0	1	J	EPA 300.0	11/14/23	020
Dissolved Sulfate	1.7	0.44	mg/L	2.0	1	J	EPA 300.0	11/14/23	020
Total Alkalinity as CaCO3	12.6	5.0	mg/L	10.0	1		SM 2320 B-1997	11/13/23	020
Total Filtered Alkalinity as CaCO3	12.4	5.0	mg/l	10.0	1		Std Mtd 2320 B	11/13/23	020
Carbonate Ion	Less Than	5.0	mg/L	10.0	1		CO3	11/13/23	020
Bicarbonate Ion	12.4	5.0	mg/L	10.0	1		HCO3	11/13/23	020

Sample Comments:

Sample Description: **LS-107 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70118 Sample Collection Date/Time: 10/30/2023 09:27
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Field Water Level	6.00	0.05	feet		1		H2OD	10/30/23	R.E. LEE
Field Conductivity	359	0	umhos		1		FCOND25	10/30/23	R.E. LEE
Field pH	5.7	0.1	Units	0.1	1		FIELDPH	10/30/23	R.E. LEE
Field Temperature	11.2	0.1	Degrees C		1		TEMP	10/30/23	R.E. LEE
Dissolved Oxygen-Field	1.5	0.1	mg/l		1		FIELDDO	10/30/23	R.E. LEE
Turbidity	2.8	0.1	NTU'S		1		EPA 180.1	10/30/23	R.E. LEE
Redox Potential	197	1	mV		1		ASTM D1498-93	10/30/23	R.E. LEE
Total Dissolved Solids	238	8.7	mg/L	20	1		Std Mtd 2540 C	11/1/23	020
Total Boron	38.5	17.3	ug/L	40	1	J	EPA 200.7	11/3/23	020
Total Calcium	40900	114	ug/L	500	1		EPA 200.7	11/3/23	020
Total Magnesium	9240	182	ug/L	1000	1		EPA 200.7	11/3/23	020
Total Hardness as CaCO3	140	1	mg/L		1		Std Mtd 2340B	11/3/23	020
Dissolved Boron	38.1	17.3	ug/L	40.0	1	J	EPA 200.7	11/7/23	020
Dissolved Calcium	40600	114	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Magnesium	9040	182	ug/L	1000	1		EPA 200.7	11/7/23	020
Dissolved Sodium	10000	350	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Potassium	1900	325	ug/L	1000	1		EPA 200.7	11/7/23	020
Total Hardness as CaCO3	139	1.0	mg/L	5.4	1		StdMtd 2340B	11/7/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/13/23	020
Total Chloride	35.2	0.59	mg/L	2.0	1		EPA 300.0	11/13/23	020
Total Sulfate	72.0	2.2	mg/L	10	5		EPA 300.0	11/14/23	020
Dissolved Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/14/23	020
Dissolved Chloride	35.4	0.59	mg/L	2.0	1		EPA 300.0	11/14/23	020
Dissolved Sulfate	70.2	2.2	mg/L	10	5		EPA 300.0	11/14/23	020

Report Date: Tuesday, December 5, 2023

The following are the analytical results for samples received by Laboratory Services:

Sample Description: **LS-107 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70118 Sample Collection Date/Time: 10/30/2023 09:27
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Alkalinity as CaCO3	43.2	5.0	mg/L	10.0	1		SM 2320 B-1997	11/9/23	020
Total Filtered Alkalinity as CaCO3	42.6	5.0	mg/l	10.0	1		Std Mtd 2320 B	11/13/23	020
Carbonate Ion	Less Than	5.0	mg/L	10.0	1		CO3	11/13/23	020
Bicarbonate Ion	42.6	5.0	mg/L	10.0	1		HCO3	11/13/23	020

Sample Comments:

Sample Description: **QC-3 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70119 Sample Collection Date/Time: 10/30/2023 00:00
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Dissolved Solids	126	8.7	mg/L	20	1		Std Mtd 2540 C	11/2/23	020
Total Boron	35.0	17.3	ug/L	40	1	J	EPA 200.7	11/3/23	020
Total Calcium	21900	114	ug/L	500	1		EPA 200.7	11/3/23	020
Total Magnesium	3620	182	ug/L	1000	1		EPA 200.7	11/3/23	020
Total Hardness as CaCO3	69.7	1.0	mg/L	5.4	1		Std Mtd 2340B	11/3/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/13/23	020
Total Chloride	2.3	0.59	mg/L	2.0	1		EPA 300.0	11/13/23	020
Total Sulfate	57.0	0.44	mg/L	2.0	1		EPA 300.0	11/13/23	020
Total Alkalinity as CaCO3	14.0	5.0	mg/L	10.0	1		SM 2320 B-1997	11/13/23	020

Sample Comments:

Sample Description: **EB2 Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70120 Sample Collection Date/Time: 10/30/2023 16:30
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Dissolved Solids	12.0	8.7	mg/L	20	1	J	Std Mtd 2540 C	11/2/23	020
Total Boron	Less Than	17.3	ug/L	40	1		EPA 200.7	11/3/23	020
Total Calcium	Less Than	114	ug/L	500	1		EPA 200.7	11/3/23	020
Total Magnesium	Less Than	182	ug/L	1000	1		EPA 200.7	11/3/23	020
Total Hardness as CaCO3	Less Than	1.0	mg/L	5.4	1		Std Mtd 2340B	11/3/23	020
Total Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/13/23	020
Total Chloride	Less Than	0.59	mg/L	2	1		EPA 300.0	11/13/23	020
Total Sulfate	Less Than	0.44	mg/L	2.0	1		EPA 300.0	11/13/23	020
Total Alkalinity as CaCO3	Less Than	5	mg/L	10	1		SM 2320 B-1997	11/9/23	020

Report Date: Tuesday, December 5, 2023

The following are the analytical results for samples received by Laboratory Services:

Sample Comments:

Sample Description: **LS-106 TURB Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70121 Sample Collection Date/Time: 10/30/2023 13:54
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Dissolved Solids	44	8.7	mg/L	20	1		Std Mtd 2540 C	11/2/23	020
Dissolved Boron	Less Than	17.3	ug/L	40	1		EPA 200.7	11/7/23	020
Dissolved Calcium	3700	114	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Magnesium	1100	182	ug/L	1000	1		EPA 200.7	11/7/23	020
Dissolved Sodium	1580	350	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Potassium	689	325	ug/L	1000	1	J	EPA 200.7	11/7/23	020
Total Hardness as CaCO3	13.8	1.0	mg/L	5.4	1		StdMtd 2340B	11/7/23	020
Dissolved Fluoride	0.11	0.095	mg/L	0.32	1	J	EPA 300.0	11/14/23	020
Dissolved Chloride	0.77	0.59	mg/L	2.0	1	J	EPA 300.0	11/14/23	020
Dissolved Sulfate	1.7	0.44	mg/L	2.0	1	J	EPA 300.0	11/14/23	020
Total Filtered Alkalinity as CaCO3	12.1	5.0	mg/l	10.0	1		Std Mtd 2320 B	11/13/23	020
Carbonate Ion	Less Than	5.0	mg/L	10.0	1		CO3	11/13/23	020
Bicarbonate Ion	12.1	5.0	mg/L	10.0	1		HCO3	11/13/23	020

Sample Comments:

Sample Description: **LS-101 TURB Weston Disposal Site #3 - Ash Landfill CCR Well**
Sample ID: AE70122 Sample Collection Date/Time: 10/30/2023 11:08
Sample Received: 11/20/2023 Sample Collector: RE LEE

Parameter	Result	LOD	Units	LOQ	DIL	Result Flag	Analysis Method	Analysis Date	Analyst
Total Dissolved Solids	44	8.7	mg/L	20	1		Std Mtd 2540 C	11/2/23	020
Dissolved Boron	Less Than	17.3	ug/L	40	1		EPA 200.7	11/7/23	020
Dissolved Calcium	3560	114	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Magnesium	964	182	ug/L	1000	1	J	EPA 200.7	11/7/23	020
Dissolved Sodium	2980	350	ug/L	500	1		EPA 200.7	11/7/23	020
Dissolved Potassium	1060	325	ug/L	1000	1		EPA 200.7	11/7/23	020
Total Hardness as CaCO3	12.9	1000	mg/L	5400	1		StdMtd 2340B	11/7/23	020
Dissolved Fluoride	Less Than	0.095	mg/L	0.32	1		EPA 300.0	11/14/23	020
Dissolved Chloride	0.60	0.59	mg/L	2.0	1	J	EPA 300.0	11/14/23	020
Dissolved Sulfate	1.7	0.44	mg/L	2.0	1		EPA 300.0	11/14/23	020
Total Filtered Alkalinity as CaCO3	14.4	5.0	mg/l	10.0	1		Std Mtd 2320 B	11/13/23	020
Carbonate Ion	Less Than	5.0	mg/L	10.0	1		CO3	11/13/23	020
Bicarbonate Ion	14.4	5.0	mg/L	10.0	1		HCO3	11/13/23	020

Sample Comments:

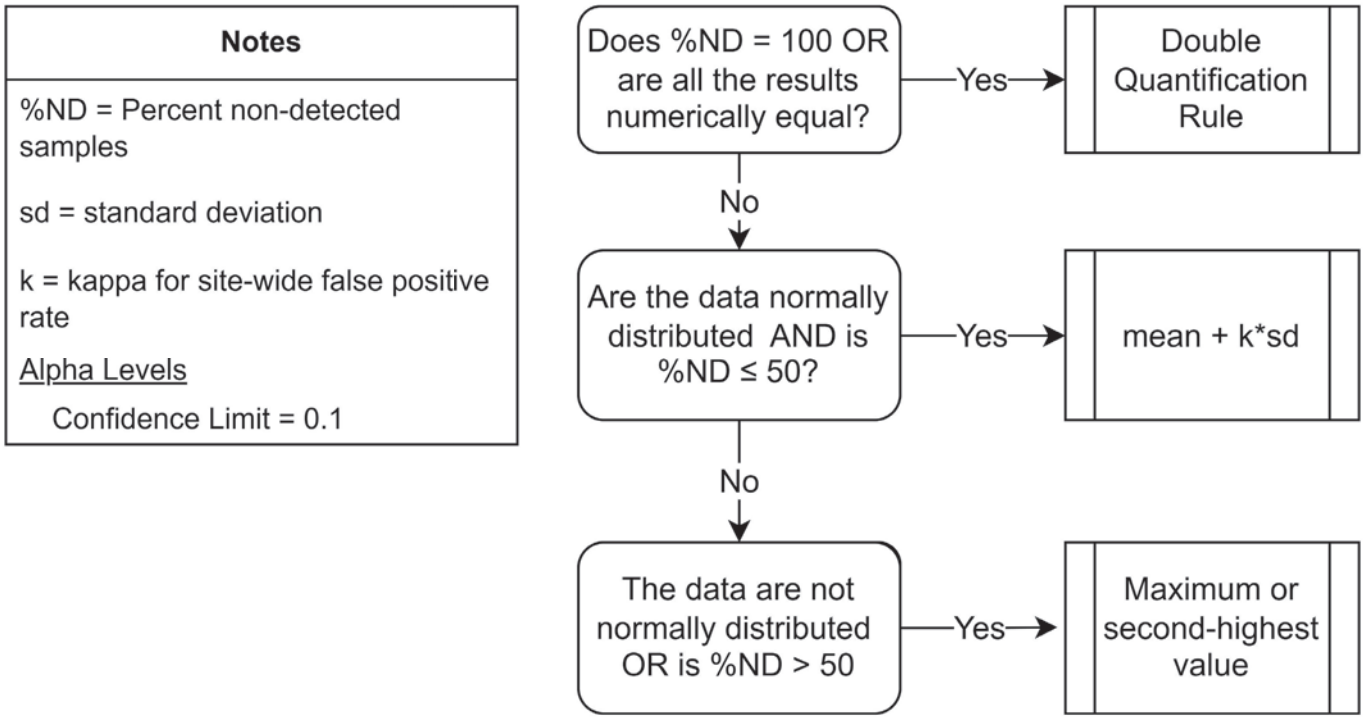
Report Date: Tuesday, December 5, 2023

The following are the analytical results for samples received by Laboratory Services:

LOD and LOQ are adjusted for dilution factor.
'J' Flag, if present indicates an estimated concentration at or above the LOD and below the LOQ.

If there are any questions concerning this report, please contact: Laboratory Services at (414) 221-4595.

APPENDIX B
STATISTICAL METHODOLOGY FOR DETERMINATION OF BACKGROUND VALUES



When data are not normally distributed or %ND > 50, the maximum value is used if the background sample size is < 60. Where the background sample size is ≥ 60, the achievable per-constituent false positive rates for the maximum and second-highest background values will be compared, and the background value with the achievable per-constituent false positive rate that is closest to, but does not exceed, the target per-constituent false positive rate of 0.015% is used.

APPENDIX C
ALTERNATE SOURCE DEMONSTRATION

Prepared for
Wisconsin Public Service Corporation

Date
June 5, 2023

Project No.
1940102327

40 C.F.R. § 257.94(E)(2) ALTERNATE SOURCE DEMONSTRATION DETECTION MONITORING ROUND 11

WESTON DISPOSAL SITE NO. 3 LANDFILL

RAMBOLL Bright ideas. Sustainable change.

CERTIFICATIONS

I, Nathaniel R. Keller, a qualified professional geologist, certify that the enclosed information 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.

Nathaniel R. Keller, PG
Senior Hydrogeologist
Professional Geologist No. 1283-013
State of Wisconsin
Ramboll Americas Engineering Solutions, Inc.
Date: June 5, 2023

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Wisconsin, certify that enclosed information 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, PE
Senior Managing Engineer
Professional Engineer No. 36088-6
State of Wisconsin
Ramboll Americas Engineering Solutions, Inc.
Date: June 5, 2023

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ACRONYMS AND ABBREVIATIONS

§	Section
40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
CCR	coal combustion residuals
CCR Rule	40 C.F.R. Part 257 Subpart D
D11	eleventh semi-annual detection monitoring event
HDPE	high density polyethylene
mg/L	milligrams per liter
NRT/OBG	Natural Resource Technology, an OBG Company
Ramboll	Ramboll Americas Engineering Solutions, Inc.
SSI	statistically significant increase
STD	standard units
TDS	total dissolved solids
WAC	Wisconsin Administrative Code
WDNR	Wisconsin Department of Natural Resources
WDS3	Weston Disposal Site No. 3

1. INTRODUCTION

This document has been prepared on behalf of Wisconsin Public Service Corporation (WPSC) by Ramboll Americas Engineering Solutions, Inc. (Ramboll) to provide pertinent information for an alternate source demonstration (ASD) as allowed by Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257.94(e)(2) for the Weston Disposal Site No. 3 (WDS3) Landfill located in the Town of Knowlton, Wisconsin.

Initial baseline groundwater monitoring, consisting of a minimum of eight samples as required under 40 C.F.R. § 257.94(b), was initiated in February 2016 and completed prior to October 17, 2017. The eleventh semi-annual detection monitoring event (D11) samples were collected on October 25, 2022 and analytical data were received on December 5, 2022. Analytical data obtained under 40 C.F.R. §§ 257.90 - 257.98 (as applicable) are presented in **Table 1**. Analysis of the data for statistically significant increases (SSIs) of 40 C.F.R. Part 257 Appendix III parameters over background concentrations was completed within 90 days of receipt of sample results (March 5, 2023) in accordance with the *Statistical Analysis Plan* (Natural Resource Technology, an OBG Company, 2017). That statistical determination identified the following SSIs at uppermost aquifer downgradient monitoring wells:

- Calcium at wells LS-100, LS-105, LS-106, and LS-107
- Chloride at well LS-107
- Sulfate at wells LS-100, LS-105, and LS-107
- Total dissolved solids (TDS) at wells LS-100, LS-105, LS-106, and LS-107

40 C.F.R. § 257.94(e)(2) allows the owner or operator 90 days from the date of determination to demonstrate that a source other than the coal combustion residuals (CCR) unit caused the SSI, or that the SSI resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Pursuant to 40 C.F.R. § 257.94(e)(2), the following demonstrates that sources other than the WDS3 landfill were the cause of the SSIs listed above. This ASD was completed within 90 days of determination of the SSIs (March 5, 2023) as required by 40 C.F.R. § 257.94(e)(2).

2. BACKGROUND

2.1 Site Location and Description

The WDS3 Landfill is located in the E 1/2 of the NW 1/4 and W 1/2 of the NE 1/4, Section 23, Township 26 North, Range 7 East, Town of Knowlton, Marathon County, Wisconsin, approximately 12 miles southeast of WPSC's Weston Power Plant. The site was formerly inactive agricultural land that is bordered by forested uplands and wetlands.

The original landfill was issued a Conditional Plan of Operation Approval by the Wisconsin Department of Natural Resources (WDNR) on October 20, 1986. The facility was licensed and approved for 8 cells covering 35 acres with a total design capacity of 873,000 cubic yards. Former Cell 1 was constructed and placed into operation with the construction documentation approval on December 18, 1990. Former Cell 1 was partially filled, temporarily capped in 1992, and remained dormant because WPSC's beneficial use program consumed all of the CCR produced at the Weston Power Plant.

In 2011, WPSC began a permitting effort to expand the WDS3 Landfill from 35 acres and 873,000 cubic yards to 57.6 acres and 4,075,500 cubic yards. As part of that permitting effort, the geologic and hydrogeologic investigation program defined the geologic conditions, groundwater quality, and groundwater flow regimes for the site. This information was included in the *Feasibility Report, Proposed Weston Disposal Site No. 3 Expansion* (AECOM, 2012).

The new expanded landfill was issued a Conditional Plan of Operation Approval by WDNR on December 11, 2014. Construction of new Cells 1 and 2 and a new leachate force main, storage tank, and load-out system were completed in late December 2015. All CCR from the former Cell 1 was removed and disposed off-site at a licensed municipal solid waste landfill during construction of new Cells 1 and 2 (TRC, 2016).

2.2 Geology and Hydrogeology

Pleistocene deposits of the unlithified glacial tills of the Marathon Formation (undifferentiated) are found at ground surface throughout Marathon County. The Marathon Formation overlies Precambrian bedrock, which commonly outcrops in central Marathon County. The Marathon Formation may reach thicknesses of up to 45 feet; however, it is typically less than 6 feet thick throughout central Marathon County. Where present, the overlying Marathon Formation gradually transitions to weathered bedrock. Typically, it is difficult to differentiate the till from the weathered bedrock. The Marathon Formation (undifferentiated) tends to exhibit some degree of sorting, with no relict textures of the parent bedrock.

In the absence of the Marathon Formation, a thin layer of topsoil sharply transitions to weathered bedrock. The weathered bedrock is predominately a silty sand (SM) derived from the bedrock directly beneath it. Fragments of gravel- to cobble-sized competent pieces of the parent rock are found in-place throughout this silty sand. Residuals of the parent material can be observed. The underlying Precambrian bedrock consists of granite, quartz diorite, and/or amphibole (Attig and Muldoon, 1989; LaBerge and Myers, 1983).

Site geology consists of a relatively thin, discontinuous unit of glacial till and weathered bedrock identified as the Marathon Formation (undifferentiated) that is 0.5 to 20.0 feet thick. The contact with the underlying competent bedrock is generally abrupt. Three types of rock were encountered

on site: amphibolite, granite, and quartz diorite (AECOM, 2012). Borings advanced on site indicate there is a bedrock high on the west side of the landfill near LS-16 OW and the bedrock surface slopes away radially. A smaller bedrock high was identified near the northeast corner of the site, southwest of background well LS-101 – beneath the northwest corner of Cell 1. Both bedrock highs lie at elevations of approximately 1,200 feet North American Vertical Datum of 1988 (NAVD88) (**Appendix A**).

Based on field testing for the AECOM 2012 Feasibility Report, the unconsolidated glacial till deposit was reported to have a saturated hydraulic conductivity of 1.1×10^{-4} centimeters per second (cm/s). Hydraulic conductivities for the granitic bedrock were lower, ranging from approximately 2.1×10^{-5} to 9.0×10^{-7} cm/s. Detailed boring lithologies, with corresponding field and laboratory calculated horizontal and vertical hydraulic conductivities, are provided on the cross-sections included in **Attachment A**.

The WDS3 Landfill is located along a regional bedrock high between Johnson Creek, 0.6 miles east of the site, and Peplin Creek, 1.25 miles west of the site, that is an area of groundwater recharge.

Groundwater flow (**Figure 2**) mimics the surface topography and, consequently, the bedrock surface. A groundwater mound roughly centered near well LS-16 OW generally flows to the northwest, southwest, and southeast away from the bedrock high and off the site. This is also observed at the smaller bedrock high near LS-101, with groundwater flowing generally to the southeast and northwest. Groundwater elevations along the bedrock highs can be four or more feet higher than groundwater elevations along lower elevation bedrock (and topographic) areas, reflecting areas of recharge proximate to Cell 1 to the north and the west-central part of the WDS3 Landfill (future Cells 7 to 9).

There is an observed southwest to northeast trending groundwater divide beneath the WDS3 Landfill, with components of groundwater flow to the northwest and southeast. Most of Cell 1, all of Cell 2 and future Cell 3, and the southern portions of future Cells 4 and 5 are predominantly east and south of the groundwater flow divide, so monitoring wells southeast of Cells 1 and 2 and future Cells 3 to 5 are downgradient. For the west half of the property and future Cells 6-9 the groundwater flow is south to southwest and northwest to northeast.

Groundwater elevations were obtained from measurements in monitoring wells on October 25, 2022 prior to a combined sampling event for State and Federal groundwater monitoring (**Table 2**). Groundwater elevations (referenced to NAVD88) ranged from about 1,173 to 1,194 feet. The groundwater elevations and flow directions for the WDS3 Landfill during D11 sampling event are shown in **Figure 2**, and generally follow the flow patterns established by the groundwater divide beneath the CCR unit. The groundwater flow beneath the northeast corner of the WDS3 Landfill was to the south across Cell 2 and the eastern side of Cell 1 and southwest to west across the western side of Cell 1.

2.3 Groundwater Monitoring

Baseline groundwater sampling required by 40 C.F.R. § 257.94(b) was initiated in February 2016, with the final round of baseline groundwater samples collected in October 2017. Groundwater is also sampled to meet the requirements of a WDNR monitoring program and groundwater samples have been collected on other portions of the site since the late 1980s. The 40 C.F.R. Part 257 Subpart D (CCR Rule) monitoring system for the landfill includes background well LS-101

and downgradient monitoring wells LS-100, LS-105, LS-106, and LS-107. A map showing the groundwater monitoring system, including the WDNR program and CCR Rule monitoring wells, is presented on **Figure 1**. **Table 3** summarizes the hydraulic position and screened elevations of the CCR groundwater monitoring wells.

3. ALTERNATE SOURCE DEMONSTRATION

As allowed by 40 C.F.R. § 257.94(e)(2), this ASD demonstrates that sources other than the WDS3 Landfill caused the SSIs or that the SSIs were a result of natural variation in groundwater quality. Lines of Evidence (LOEs) supporting this ASD include the following:

1. Landfill composite liner design.
2. Downgradient concentrations of CCR indicator parameter boron do not exceed background limits.
3. The ionic composition of leachate is different from the ionic composition of groundwater.

These LOEs are described and supported in greater detail below.

3.1 LOE #1: Landfill Composite Liner Design

The former Cell 1 (now removed) was constructed in the late 1980's and included the following components:

- A 5-foot-thick clay liner.
- A leachate collection system.

A revised design was approved in 2015 during an expansion request. The current CCR unit (WDS3 Landfill) was constructed with the following components:

- A composite 60-mil high density polyethylene (HDPE)
- Geosynthetic clay liner with a hydraulic conductivity of 5 x 10^{-9} cm/s
- 2-foot-thick compacted clay with a saturated hydraulic conductivity of 1 x 10^{-7} cm/s or less.
- A leachate collection system.
- A groundwater gradient control system.

Precipitation and/or leachate that collects on top of the HDPE liner is removed by the leachate collection system and managed in accordance with the landfill's operating permit. Leachate levels are monitored within the landfill and the system is flushed annually as part of regular operations and maintenance. System monitoring and reporting indicate that the leachate collection system is functioning as designed. In the unlikely event that leachate was not captured by the collection system and migrated through the liner, the CCR unit and liner system overlie a groundwater gradient control system, which would also collect leachate and direct it south of the landfill.

The WDNR-approved landfill liner exceeds the design criteria for a composite liner for new CCR landfills established by 40 C.F.R. § 257.70. The composite liner design criteria were established to help prevent contaminants in CCR from leaking from the CCR unit and impacting groundwater. The liner creates a barrier to groundwater, suggesting that the landfill is not the source of the SSIs.

3.2 LOE #2: Downgradient Concentrations of CCR Indicator Parameter Boron Do Not Exceed Background Limits

Boron is a key indicator of CCR impacts to groundwater because it is typically present in CCR leachate, not a common anthropogenic contaminant, and non-reactive and mobile in most hydrogeological environments (EPRI, 2012). If the groundwater downgradient of the WDS3 landfill had been impacted by CCR from the unit, boron concentrations would be expected to be elevated above background Upper Prediction Limit (UPL). The UPL is an upper bound on background concentrations calculated for comparing downgradient measurements to background.

In downgradient monitoring wells LS-100, LS-105, and LS-107, concentrations of boron are below the UPL (0.043 mg/L), indicating that these wells have not been affected by CCR. Therefore, the WDS3 landfill is not the source of the SSIs.

3.3 LOE #3: The Ionic Composition of Leachate is Different from the Ionic Composition of Groundwater

The Stiff diagrams on the following page (**Figure A**) show ionic composition of samples of WDS3 Landfill background (brown) and downgradient (blue) groundwater and leachate (orange). Dominant anions in the WDS3 Landfill leachate are chloride and sulfate and the dominant cation is calcium. The resulting Stiff diagram for WDS3 leachate is different in both overall shape and size from the groundwater Stiff diagrams, due to the pronounced presence of chloride in the leachate, which is absent in all groundwater diagrams. The Stiff diagrams indicate that the ionic composition of groundwater is not influenced by the WDS3 Landfill.

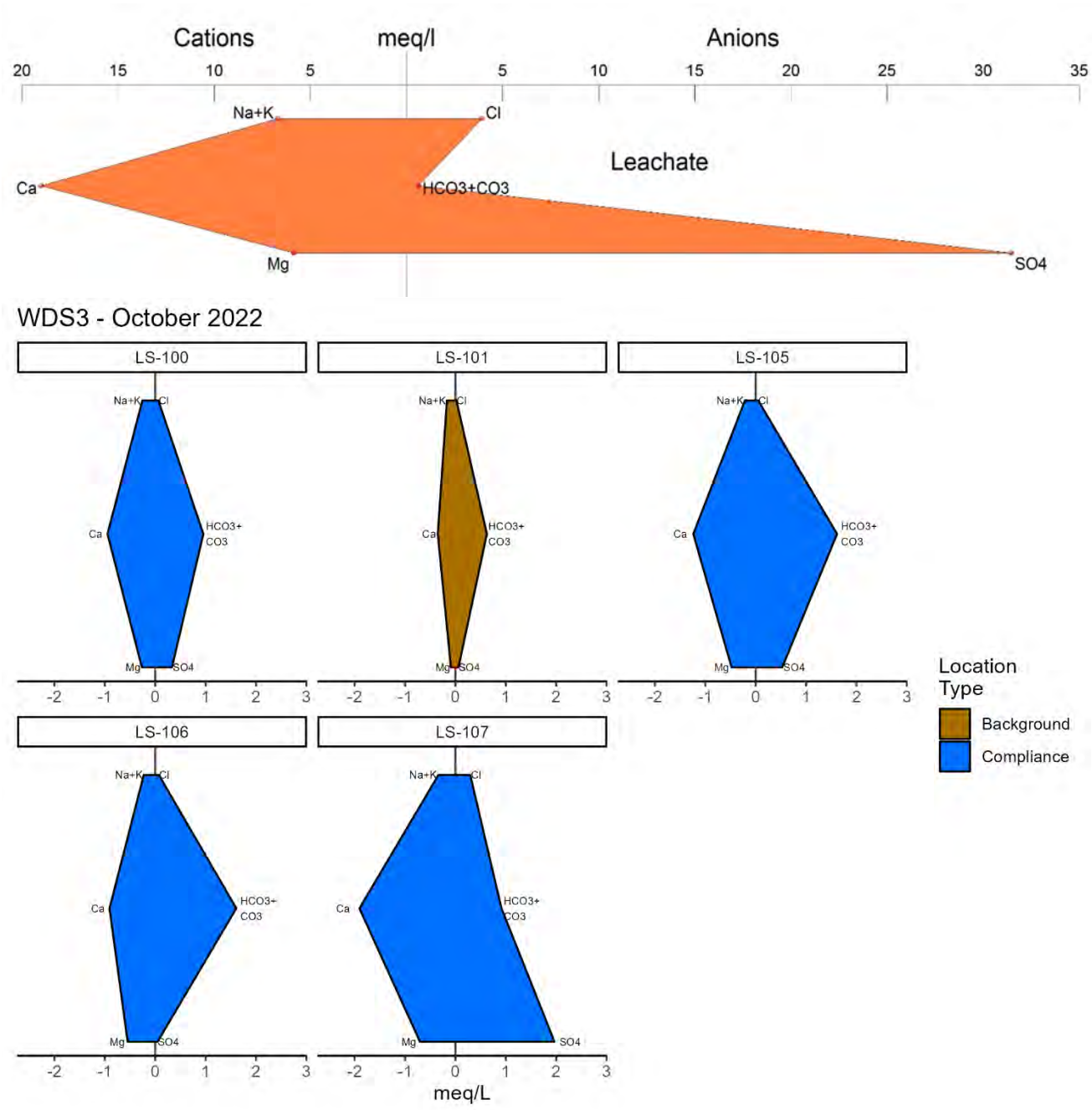

Figure A. Stiff Diagram of WDS3 Landfill Leachate and Groundwater

4. CONCLUSIONS

The following LOEs demonstrate that the SSIs observed during D11 are due to alternate sources as follows:

1. Landfill composite liner design.
2. Downgradient concentrations of CCR indicator parameter boron do not exceed background limits.
3. The ionic composition of leachate is different from the ionic composition of groundwater.

The preceding information serves as the ASD prepared in accordance with 40 C.F.R. §257.94(e)(2) and supports the position that the SSIs observed during the D11 detection monitoring event are not due to a release from the CCR unit but were from naturally occurring conditions and/or anthropogenic impacts in the area of WDS3 Landfill. Therefore, no further action (i.e., assessment monitoring) is warranted and the WDS3 Landfill will remain in detection monitoring.

5. REFERENCES

AECOM, 2012. *Feasibility Report, Proposed Weston Disposal Site No. 3 Expansion*.

Attig, John W. and Maureen A Muldoon, 1989. *Pleistocene Geology of Marathon County, Wisconsin.* Wisconsin Geological and Natural History Survey. Information Circular No. 65.

Electric Power Research Institute [EPRI], (2012). Groundwater Quality Signatures for Assessing Potential Impacts from Coal Combustion Product Leachate, Report 1017923. October 2012.

LaBerge, Gene L. and Paul E. Myers, 1983. *Precambrian Geology of Marathon County, Wisconsin*. Wisconsin Geological and Natural History Survey. Information Circular No. 45.

Natural Resource Technology, an OBG Company, 2017. *Statistical Analysis Plan, Weston Disposal Site No. 3, Rothschild, Wisconsin*. October 17, 2017.

TRC, 2016. *Phase 1 Closure Report*. Included as Appendix C of the Construction Documentation Report.

TABLES

Weston Disposal Site #3 CCR
Table 1. Appendix III Analytical Results

Date Range: 02/18/2016 to 02/16/2023

Lab Methods:

Well Id	Date Sampled	Lab Id	B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
LS-100	2/18/2016	40128408001	0.0480	13.900	4.000	<0.200		12.500
	4/5/2016	40130257002	0.0120	27.300	4.300	<0.200	6.5	16.600
	6/15/2016	40133877003	0.0350	22.500	3.600	<0.200	6.5	13.100
	8/10/2016	40136543003	0.0410	28.200	4.900	<0.200	6.6	20.700
	10/5/2016	40139741002	0.1000	56.800	0.970	<0.100	6.6	4.500
	12/21/2016	40143755003	0.0980	75.200	21.000	<0.100	7.1	202.000
	3/10/2017	40146662002	0.0290	17.900	3.600	<0.100	8.4	30.000
	6/2/2017	40151013002	0.1100	13.100	1.600	<0.100	8.0	31.500
	10/11/2017	40158568002	0.0559	11.000	0.860	<0.100	6.3	15.700
	4/26/2018	40168127002	0.0292	6.550	0.720	<0.100	7.0	13.100
	10/25/2018	AE31422	0.0250	11.000	0.290	0.066	6.3	17.000
	4/24/2019	AE36960	0.0180	8.300	0.530	0.040	5.9	13.000
	10/24/2019	AE41530	0.0230	9.600	0.510	<0.070	5.5	18.000
	4/14/2020	AE45278	0.0140	11.000	0.540	0.013	5.9	14.000
	9/1/2020	AE48236				0.015	5.9	
	10/14/2020	AE49163	0.0373	10.200	0.610	0.030	5.8	20.000
	4/21/2021	AE52823	0.0276	11.500	1.300	<0.095	5.7	27.200
	10/26/2021	AE56950	0.0352	15.700	1.600	<0.095	5.6	21.100
	4/12/2022	AE60080	0.0205	17.000	1.700	<0.095	5.6	36.500
	10/25/2022	AE63596	0.0204	17.100	2.300	<0.095	5.1	15.800
LS-101	2/18/2016	40128408002	0.0086	5.200	2.900	<0.200		5.600
	4/5/2016	40130257003	0.0096	3.400	2.300	<0.200	6.2	5.600
	6/15/2016	40133877002	0.0097	4.700	2.600	<0.200	6.3	4.800
	8/10/2016	40136543002	0.0140	11.600	2.400	<0.200	6.4	4.100
	10/5/2016	40139741003	0.0120	6.800	2.000	<0.100	6.8	13.300

Weston Disposal Site #3 CCR
Table 1. Appendix III Analytical Results

Date Range: 02/18/2016 to 02/16/2023

Lab Methods:

			B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
LS-101	12/21/2016	40143755002	0.0120	6.900	0.820	<0.100	7.0	4.300
	3/10/2017	40146662003	0.0092	3.300	<0.500	<0.100	7.5	4.400
	6/2/2017	40151013003	0.0430	2.500	0.720	<0.100	7.8	4.100
	10/11/2017	40158568003	0.0138	11.400	0.760	<0.100	5.8	5.900
	4/26/2018	40168127003	<0.0067	4.180	0.540	<0.100	6.5	4.100
	10/25/2018	AE31423	0.0140	3.000	0.400	0.061	6.1	3.100
	4/24/2019	AE36961	0.0081	4.200	0.620	<0.040	5.7	2.600
	10/24/2019	AE41531	0.0120	3.100	0.280	<0.070	5.3	2.600
	4/14/2020	AE45279	0.0080	2.400	0.170	0.022	6.0	2.600
	9/1/2020	AE48237				0.009	5.9	
	10/14/2020	AE49164	<0.0173	7.780	0.400	0.030	5.8	3.900
	4/21/2021	AE52824	<0.0173	2.750	0.570	<0.095	5.9	2.300
	10/26/2021	AE56951	<0.0173	5.420	2.500	<0.095	5.7	2.600
	4/12/2022	AE60081	0.0092	2.700	0.590	<0.095	5.7	2.100
	10/25/2022	AE63597	<0.0173	6.300	0.490	<0.095	5.4	2.700
LS-105	2/18/2016	40128408003	0.0140	17.300	4.200	<0.200		9.200
	4/5/2016	40130257004	0.0140	14.200	3.500	<0.200	6.5	10.000
	6/15/2016	40133877004	0.0130	14.300	3.500	<0.200	6.5	9.100
	8/10/2016	40136543004	0.0200	20.100	2.900	<0.200	6.7	4.800
	10/5/2016	40139741004	0.0300	31.400	12.400	<1.000	7.1	67.800
	12/21/2016	40143755005	0.0300	34.000	10.600	<0.500	7.5	58.600
	3/10/2017	40146662004	0.0260	32.300	7.200	<0.100	7.8	50.400
	6/2/2017	40151013004	0.0330	14.200	2.600	<0.100	7.9	26.500
	10/11/2017	40158568004	0.0452	18.800	3.600	<0.500	7.2	31.000
	4/26/2018	40168127004	0.0161	18.700	2.600	<0.500	7.4	15.900

Weston Disposal Site #3 CCR
Table 1. Appendix III Analytical Results

Date Range: 02/18/2016 to 02/16/2023

Lab Methods:

			B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
LS-105	10/25/2018	AE31424	0.0300	20.000	0.740	0.085	6.5	16.000
	4/24/2019	AE36962	0.0180	2.100	1.200	0.057	5.9	19.000
	10/24/2019	AE41532	0.0260	18.000	0.540	0.073	5.5	16.000
	4/14/2020	AE45280	0.0170	17.000	0.820	0.039	6.1	14.000
	9/1/2020	AE48238				0.055	6.1	
	10/14/2020	AE49165	0.0399	17.500	0.600	0.065	5.7	17.000
	3/1/2021	AE51791				0.051	6.3	
	4/21/2021	AE52825	0.0224	13.800	1.100	<0.095	6.0	19.700
	10/26/2021	AE56952	0.0396	23.100	2.100	<0.095	5.9	25.200
	4/12/2022	AE60082	0.0241	22.000	1.900	<0.095	5.9	20.900
	10/25/2022	AE63598	0.0411	23.200	1.800	<0.095	5.6	25.300
LS-106	2/18/2016	40128408004	0.0150	9.200	4.200	<0.200		6.700
	4/5/2016	40130257005	0.0890	7.700	3.200	<0.200	6.7	6.600
	6/15/2016	40133877005	0.0540	7.600	3.200	<0.200	6.5	5.500
	8/10/2016	40136543005	0.0630	10.100	<10.000	<1.000	6.6	<10.000
	10/5/2016	40139741005	0.3600	10.700	2.800	<0.500	7.0	<5.000
	12/21/2016	40143755006	0.1200	12.300	<2.500	<0.500	7.5	5.700
	3/10/2017	40146662005	0.4500	9.900	<2.500	<0.500	8.1	5.200
	6/2/2017	40151013005	0.0910	9.400	4.100	<0.500	8.0	11.800
	10/11/2017	40158568005	0.1060	15.500	3.600	<0.500	6.6	11.400
	4/26/2018	40168127005	0.0544	6.160	<2.500	<0.500	7.5	<5.000
	10/25/2018	AE31425	0.0540	6.000	0.470	0.066	6.4	3.200
	4/24/2019	AE36963	0.0250	6.600	8.400	0.053	6.1	6.300
	9/13/2019	AE40532			11.000		6.0	
	10/24/2019	AE41533	0.2600	22.000	8.400	<0.070	5.6	6.500
	3/2/2020	AE44199	0.0790	14.000			6.4	

Weston Disposal Site #3 CCR
Table 1. Appendix III Analytical Results

Date Range: 02/18/2016 to 02/16/2023

Lab Methods:

			B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
LS-106	4/14/2020	AE45281	0.0690	4.800	1.300	0.049	6.4	4.300
	9/1/2020	AE48239				0.035	6.2	
	10/14/2020	AE49166	0.1850	15.300	1.300	0.120	5.9	3.100
	3/1/2021	AE51792				0.057	6.5	
	4/21/2021	AE52826	0.0594	4.310	2.300	<0.480	6.2	3.000
	10/26/2021	AE56953	0.0226	12.500	2.400	<0.095	5.9	4.800
	4/12/2022	AE60083	0.0370	4.240	0.990	<0.095	5.7	2.100
	10/25/2022	AE63599	0.0242	17.000	2.500	<0.095	5.6	2.200
LS-107	2/18/2016	40128408005	0.0100	17.000	9.400	<0.200		9.000
	4/5/2016	40130257006	0.0097	18.200	7.400	<0.200	6.2	9.200
	6/15/2016	40133877001	0.0089	19.100	7.900	<0.200	6.5	10.800
	8/10/2016	40136543001	0.0120	21.000	6.900	<0.200	6.7	10.000
	10/5/2016	40139741006	0.0120	22.000	5.400	<0.100	6.8	10.000
	12/20/2016	40143755001	0.0140	25.900	4.700	<0.100	7.2	12.500
	3/10/2017	40146662006	0.0110	25.700	3.800	<0.100	7.4	15.200
	6/2/2017	40151013006	0.0310	21.900	5.400	<0.100	7.6	19.900
	10/11/2017	40158568006	0.0143	26.000	6.200	<0.100	6.1	25.500
	4/26/2018	40168127006	0.0097	20.100	3.000	<0.100	6.9	17.500
	10/25/2018	AE31426	0.0170	21.000	2.700	0.065	6.0	26.000
	4/24/2019	AE36964	0.0091	18.000	1.800	0.040	5.7	21.000
	10/24/2019	AE41534	0.0180	19.000	1.800	<0.070	5.5	24.000
	4/14/2020	AE45282	0.0140	18.000	2.100	0.029	5.8	27.000
	9/1/2020	AE48240				0.013	5.8	
	10/14/2020	AE49167	0.0213	27.400	9.200	0.029	5.6	42.000
	3/1/2021	AE51793		28.200	6.500		5.9	

Weston Disposal Site #3 CCR
Table 1. Appendix III Analytical Results

Date Range: 02/18/2016 to 02/16/2023

Lab Methods:

			B, tot, mg/L	Ca, tot, mg/L	Cl, tot, mg/L	F, tot, mg/L	pH (field), STD	SO4, tot, mg/L
LS-107	4/21/2021	AE52827	0.0184	27.000	6.100	<0.095	5.7	36.000
	10/26/2021	AE56954	0.0224	26.400	5.700	<0.095	5.7	42.000
	4/12/2022	AE60084	0.0215	24.600	5.100	<0.095	5.6	42.000
	10/25/2022	AE63600	0.0312	36.200	10.400	<0.095	5.3	89.100
	2/16/2023	40258414005		45.700	18.700			80.700

Weston Disposal Site #3 CCR
Table 1. Appendix III Analytical Results

Date Range: 02/18/2016 to 02/16/2023

Lab Methods:

Well Id	Date Sampled	Lab Id	TDS, mg/L
LS-100	2/18/2016	40128408001	122.000
	4/5/2016	40130257002	150.000
	6/15/2016	40133877003	148.000
	8/10/2016	40136543003	182.000
	10/5/2016	40139741002	306.000
	12/21/2016	40143755003	360.000
	3/10/2017	40146662002	98.000
	6/2/2017	40151013002	94.000
	10/11/2017	40158568002	80.000
	4/26/2018	40168127002	82.000
	10/25/2018	AE31422	50.000
	4/24/2019	AE36960	30.000
	10/24/2019	AE41530	50.000
	4/14/2020	AE45278	42.000
	10/14/2020	AE49163	56.000
	4/21/2021	AE52823	44.000
	10/26/2021	AE56950	90.000
	4/12/2022	AE60080	94.000
	10/25/2022	AE63596	112.000
LS-101	2/18/2016	40128408002	50.000
	4/5/2016	40130257003	52.000
	6/15/2016	40133877002	44.000
	8/10/2016	40136543002	84.000
	10/5/2016	40139741003	70.000
	12/21/2016	40143755002	60.000

Weston Disposal Site #3 CCR
Table 1. Appendix III Analytical Results

Date Range: 02/18/2016 to 02/16/2023

Lab Methods:

			TDS, mg/L
LS-101	3/10/2017	40146662003	28.000
	6/2/2017	40151013003	30.000
	10/11/2017	40158568003	62.000
	4/26/2018	40168127003	58.000
	10/25/2018	AE31423	44.000
	4/24/2019	AE36961	<20.000
	10/24/2019	AE41531	27.000
	4/14/2020	AE45279	24.000
	10/14/2020	AE49164	120.000
	4/21/2021	AE52824	12.000
	10/26/2021	AE56951	40.000
	4/12/2022	AE60081	38.000
	10/25/2022	AE63597	58.000
LS-105	2/18/2016	40128408003	98.000
	4/5/2016	40130257004	94.000
	6/15/2016	40133877004	80.000
	8/10/2016	40136543004	148.000
	10/5/2016	40139741004	204.000
	12/21/2016	40143755005	196.000
	3/10/2017	40146662004	178.000
	6/2/2017	40151013004	96.000
	10/11/2017	40158568004	100.000
	4/26/2018	40168127004	118.000
	10/25/2018	AE31424	110.000
	4/24/2019	AE36962	110.000

Weston Disposal Site #3 CCR
Table 1. Appendix III Analytical Results

Date Range: 02/18/2016 to 02/16/2023

Lab Methods:

			TDS, mg/L
LS-105	10/24/2019	AE41532	86.000
	4/14/2020	AE45280	62.000
	10/14/2020	AE49165	110.000
	4/21/2021	AE52825	36.000
	10/26/2021	AE56952	132.000
	4/12/2022	AE60082	118.000
	10/25/2022	AE63598	160.000
LS-106	2/18/2016	40128408004	70.000
	4/5/2016	40130257005	94.000
	6/15/2016	40133877005	110.000
	8/10/2016	40136543005	94.000
	10/5/2016	40139741005	228.000
	12/21/2016	40143755006	186.000
	3/10/2017	40146662005	544.000
	6/2/2017	40151013005	72.000
	10/11/2017	40158568005	108.000
	4/26/2018	40168127005	88.000
	10/25/2018	AE31425	58.000
	4/24/2019	AE36963	52.000
	10/24/2019	AE41533	130.000
	4/14/2020	AE45281	20.000
	10/14/2020	AE49166	160.000
	4/21/2021	AE52826	30.000
	10/26/2021	AE56953	70.000
	4/12/2022	AE60083	76.000
	10/25/2022	AE63599	122.000

Weston Disposal Site #3 CCR
Table 1. Appendix III Analytical Results

Date Range: 02/18/2016 to 02/16/2023

Lab Methods:

			TDS, mg/L
LS-107	2/18/2016	40128408005	88.000
	4/5/2016	40130257006	94.000
	6/15/2016	40133877001	112.000
	8/10/2016	40136543001	118.000
	10/5/2016	40139741006	118.000
	12/20/2016	40143755001	72.000
	3/10/2017	40146662006	134.000
	6/2/2017	40151013006	110.000
	10/11/2017	40158568006	134.000
	4/26/2018	40168127006	128.000
	10/25/2018	AE31426	120.000
	4/24/2019	AE36964	86.000
	10/24/2019	AE41534	76.000
	4/14/2020	AE45282	82.000
	10/14/2020	AE49167	160.000
	4/21/2021	AE52827	94.000
	10/26/2021	AE56954	134.000
	4/12/2022	AE60084	132.000
	10/25/2022	AE63600	218.000
	2/16/2023	40258414005	212.000

Table 2. Groundwater Elevations - October 25, 2022
Weston Disposal Site No. 3
Wisconsin Public Service Corporation
Town of Knowlton, WI

Location ID	Screened Unit	Groundwater Elevation (ft NAVD88)
LS-10	Weathered Bedrock	1191.19
LS-16	Weathered Bedrock	1193.51
LS-16P	Competent Bedrock	1193.62
LS-24	Weathered Bedrock	1190.46
LS-24P	Competent Bedrock	1190.30
LS-40	Weathered Bedrock	1190.44
LS-40P	Competent Bedrock	1189.96
LS-48P	Competent Bedrock	1174.29
LS-48R	Weathered Bedrock	1173.39
LS-49R	Weathered Bedrock	1190.76
LS-50	Weathered Bedrock	1190.91
LS-51	Weathered Bedrock	1191.59
LS-52	Weathered Bedrock	1189.14
LS-52P	Competent Bedrock	1190.39
LS-54	Weathered Bedrock	1182.10
LS-54P	Competent Bedrock	1182.48
LS-55	Weathered Bedrock	1188.06

Table 2. Groundwater Elevations - October 25, 2022
Weston Disposal Site No. 3
Wisconsin Public Service Corporation
Town of Knowlton, WI

Location ID	Screened Unit	Groundwater Elevation (ft NAVD88)
LS-55P	Competent Bedrock	1188.13
LS-100	Weathered Bedrock	1187.67
LS-100P	Competent Bedrock	1187.16
LS-101	Weathered Bedrock	1191.83
LS-101P	Competent Bedrock	1191.53
LS-102	Weathered Bedrock	1188.61
LS-102P	Competent Bedrock	1188.80
LS-103	Weathered Bedrock	1173.97
LS-103P	Competent Bedrock	1173.73
LS-104	Weathered Bedrock	1189.01
LS-105	Weathered Bedrock	1184.28
LS-105P	Competent Bedrock	1184.25
LS-106	Weathered Bedrock	1180.86
LS-107	Weathered Bedrock	1188.54

Notes:
CCR Monitoring Well
ft = feet
NAVD88 = North American Vertical Datum of 1988

Table 3. CCR Rule Groundwater Monitoring Well Information
Weston Disposal Site No. 3
Wisconsin Public Service Corporation
Town of Knowlton, WI

Location ID	Wisconsin Unique Well Number	Date Well Installed	Drilling Subcontractor	Drilling Method	Gradient Position	State Plane Northing [1] (ft)	State Plane Easting [1] (ft)	Latitude (DD)	Longitude (DD)	Ground Surface Elevation [2] (ft NAVD88)	Top of Protective Cover Pipe Elevation [2] (ft NAVD88)
LS-100	VU955	8/23/2011	Badger State Drilling	Air Rotary and Hollow Stem Auger	Downgradient	325,223	2,063,529	44.72484	-89.63437	1196.90	1199.26
LS-101	VU952	7/13/2011	Badger State Drilling	Air Rotary and Hollow Stem Auger	Upgradient	325,816	2,063,032	44.72648	-89.63627	1203.10	1205.58
LS-105	VU953	7/14/2011	Badger State Drilling	Air Rotary and Hollow Stem Auger	Downgradient	324,533	2,063,527	44.72295	-89.63439	1187.90	1190.42
LS-106	--	2/5/2016	Coleman Engineering Company	Hollow Stem Auger	Downgradient	324,253	2,063,283	44.72219	-89.63533	1190.50	1193.26
LS-107	--	2/5/2016	Coleman Engineering Company	Air Rotary	Downgradient	325,749	2,062,448	44.72630	-89.63852	1191.50	1194.50

Notes:
1. Horizontal Datum is referenced to Wisconsin State Plane Coordinate System, Central Zone, North America Datum (NAD 83/2007), US Survey Feet.
2. Ground surface, top of protective cover pipe, and top of well riser elevations for wells obtained from well construction forms and tabulated summary provided by GEI Consultants.
3. All wells constructed with 2-inch nominal size schedule 40 PVC with 5-foot to 10-foot long 10-slot screens.

-- = information not available
bgs = below ground surface
DD = decimal degrees
ft = feet
NAVD88 = North American Vertical Datum of 1988
NE = Not Encountered
PVC = polyvinyl chloride

Table 3. CCR Rule Groundwater Monitoring Well Information
Weston Disposal Site No. 3
Wisconsin Public Service Corporation
Town of Knowlton, WI

Location ID	Top of Well Riser Elevation [2] (ft NAVD88)	Borehole Drilled Depth (ft bgs)	Borehole Bottom Elevation (ft NAVD88)	Depth to Top of Well Screen (ft bgs)	Depth to Well Bottom (ft bgs)	Top of Screen Elevation (ft NAVD88)	Well Bottom Elevation (ft NAVD88)	Top of Bedrock Elevation (ft NAVD88)
LS-100	1199.04	14.5	1182.4	3.9	13.9	1193.0	1183.0	1186.6
LS-101	1205.41	16.5	1186.6	5.0	15.0	1198.1	1188.1	1197.2
LS-105	1190.28	9.3	1178.6	2.8	7.8	1185.1	1180.1	1181.7
LS-106	1193.24	15.5	1175.0	5.0	15.0	1185.5	1175.5	NE
LS-107	1194.40	15.5	1176.0	5.0	15.0	1186.5	1176.5	1181.0

Notes:
1. Horizontal Datum is referenced to Wisconsin State Plane Coordinate System, Central Zone, North America Datum (NAD 83/2007), US Survey Feet.
2. Ground surface, top of protective cover pipe, and top of well riser elevations for wells obtained from well construction forms and tabulated summary provided by GEI Consultants.
3. All wells constructed with 2-inch nominal size schedule 40 PVC with 5-foot to 10-foot long 10-slot screens.

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DD = decimal degrees
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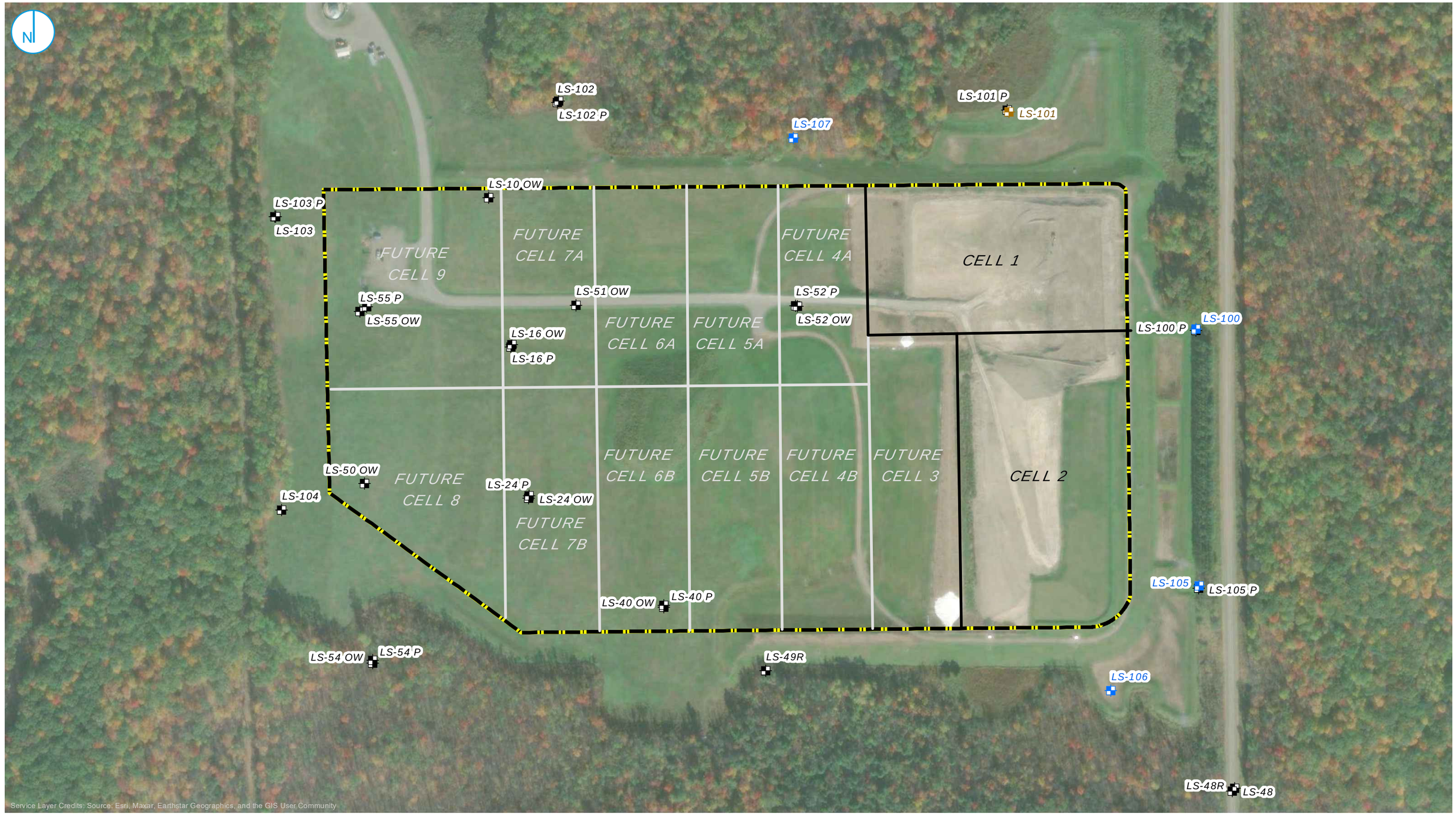
NAVD88 = North American Vertical Datum of 1988
NE = Not Encountered
PVC = polyvinyl chloride

FIGURES



CCR RULE DOWNGRADIENT MONITORING WELL LOCATION
CCR RULE UPGRADIENT MONITORING WELL LOCATION
NON-CCR RULE MONITORING WELL OR PIEZOMETER LOCATION
WESTON DISPOSAL SITE NO. 3 LANDFILL
CELL BOUNDARY

0 125 250 Feet

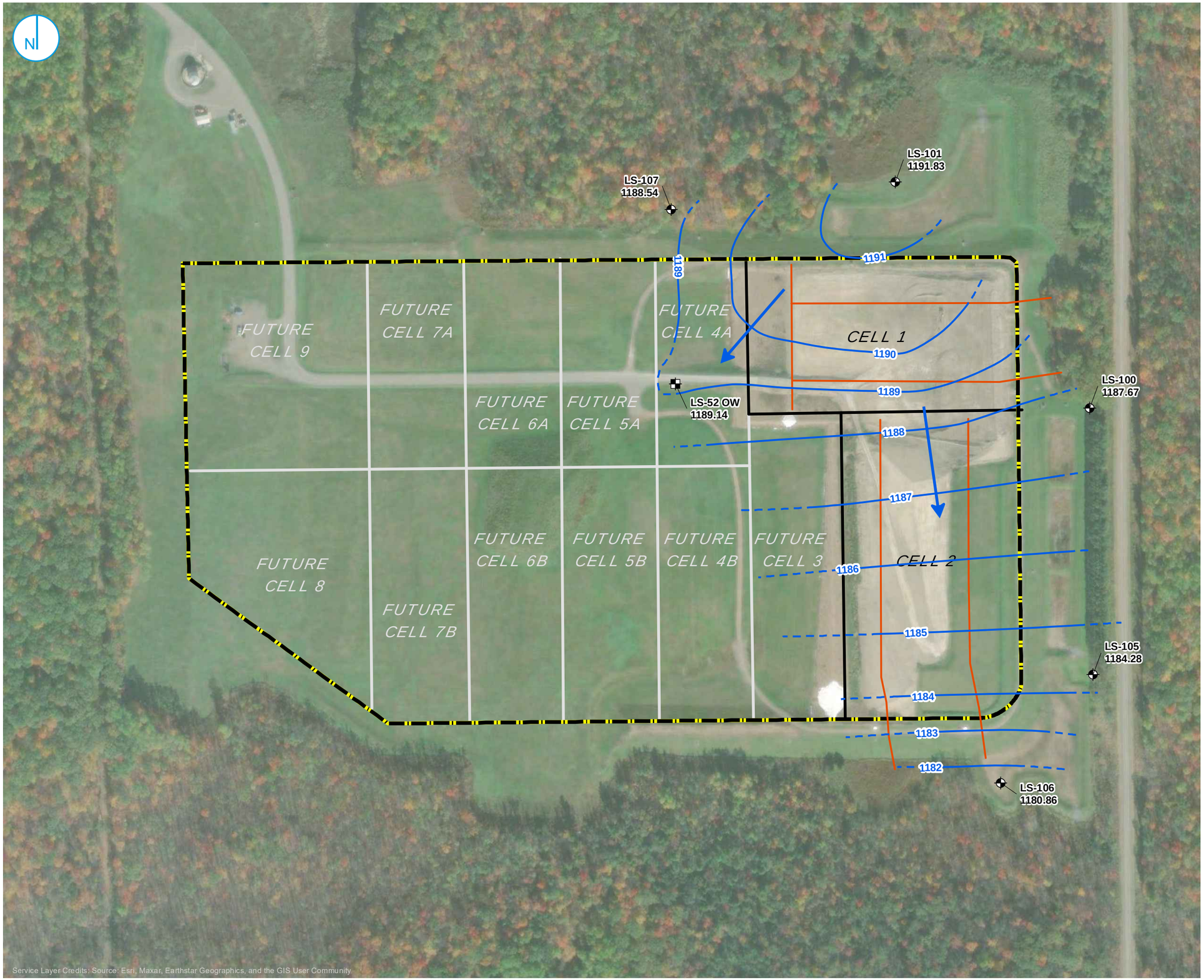
MONITORING WELL LOCATION MAP

40 C.F.R. § 257.94(e(2) ALTERNATE SOURCE DEMONSTRATION
DETECTION MONITORING ROUND 11
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WISCONSIN

FIGURE 1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL



WESTON DISPOSAL SITE NO. 3 LANDFILL
CELL BOUNDARY
GROUNDWATER GRADIENT CONTROL SYSTEM
CCR RULE MONITORING WELL
MONITORING WELL LOCATION
GROUNDWATER ELEVATION CONTOUR (1-FT CONTOUR INTERVAL, NAVD 88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION

NOTES

1. ALL ELEVATIONS REPORTED IN FEET IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

0 125 250
Feet

WESTON DISPOSAL SITE NO. 3
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
DETECTION MONITORING ROUND 11:
OCTOBER 25, 2022

40 C.F.R. § 257.94(e)(2) ALTERNATE SOURCE DEMONSTRATION
DETECTION MONITORING ROUND 11
WESTON DISPOSAL SITE NO. 3 LANDFILL
TOWN OF KNOWLTON, WISCONSIN

FIGURE 2

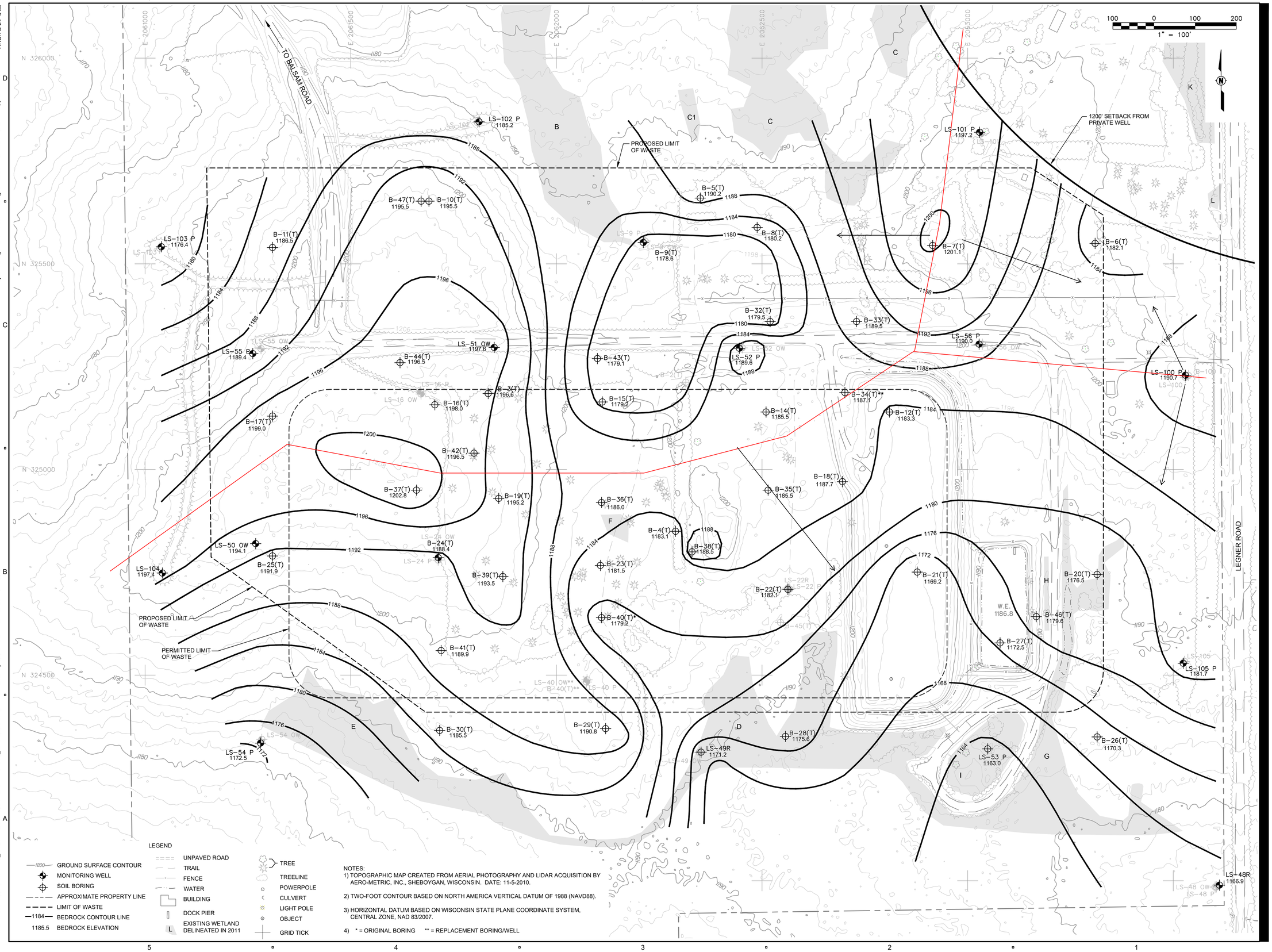
RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\GIS\Projects\16\1660\Weston_Power_Plant\MXD\ASD\Round_11\Figure 2_GW Contours 20221025.mxd

PROJECT: 169000XXXX | DATED: 5/26/2023 | DESIGNER: GALARNMC

APPENDIX A
SELECT CROSS-SECTIONS AND DRAWINGS FROM PREVIOUS REPORTS



LEGEND

- GROUND SURFACE CONTOUR (1200)
- MONITORING WELL
- SOIL BORING
- APPROXIMATE PROPERTY LINE
- LIMIT OF WASTE
- BEDROCK CONTOUR LINE (1184)
- BEDROCK ELEVATION (1185.5)
- UNPAVED ROAD
- TRAIL
- FENCE
- WATER
- BUILDING
- DOCK PIER
- EXISTING WETLAND DELINEATED IN 2011 (L)
- TREE
- TREELINE
- POWERPOLE
- CULVERT
- LIGHT POLE
- OBJECT
- GRID TICK

NOTES:
1) TOPOGRAPHIC MAP CREATED FROM AERIAL PHOTOGRAPHY AND LIDAR ACQUISITION BY AERO-METRIC, INC., SHEBOYGAN, WISCONSIN. DATE: 11-5-2010.

2) TWO-FOOT CONTOUR BASED ON NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD88).

3) HORIZONTAL DATUM BASED ON WISCONSIN STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83/2007.

4) * = ORIGINAL BORING ** = REPLACEMENT BORING/WELL

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AECOM

PROJECT

Feasibility Report Weston Disposal Site No. 3 Expansion

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Town of Knowlton, Marathon County, WI

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REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	AUGUST 2012	Issued for Regulatory Review

KEY PLAN

PROJECT NUMBER

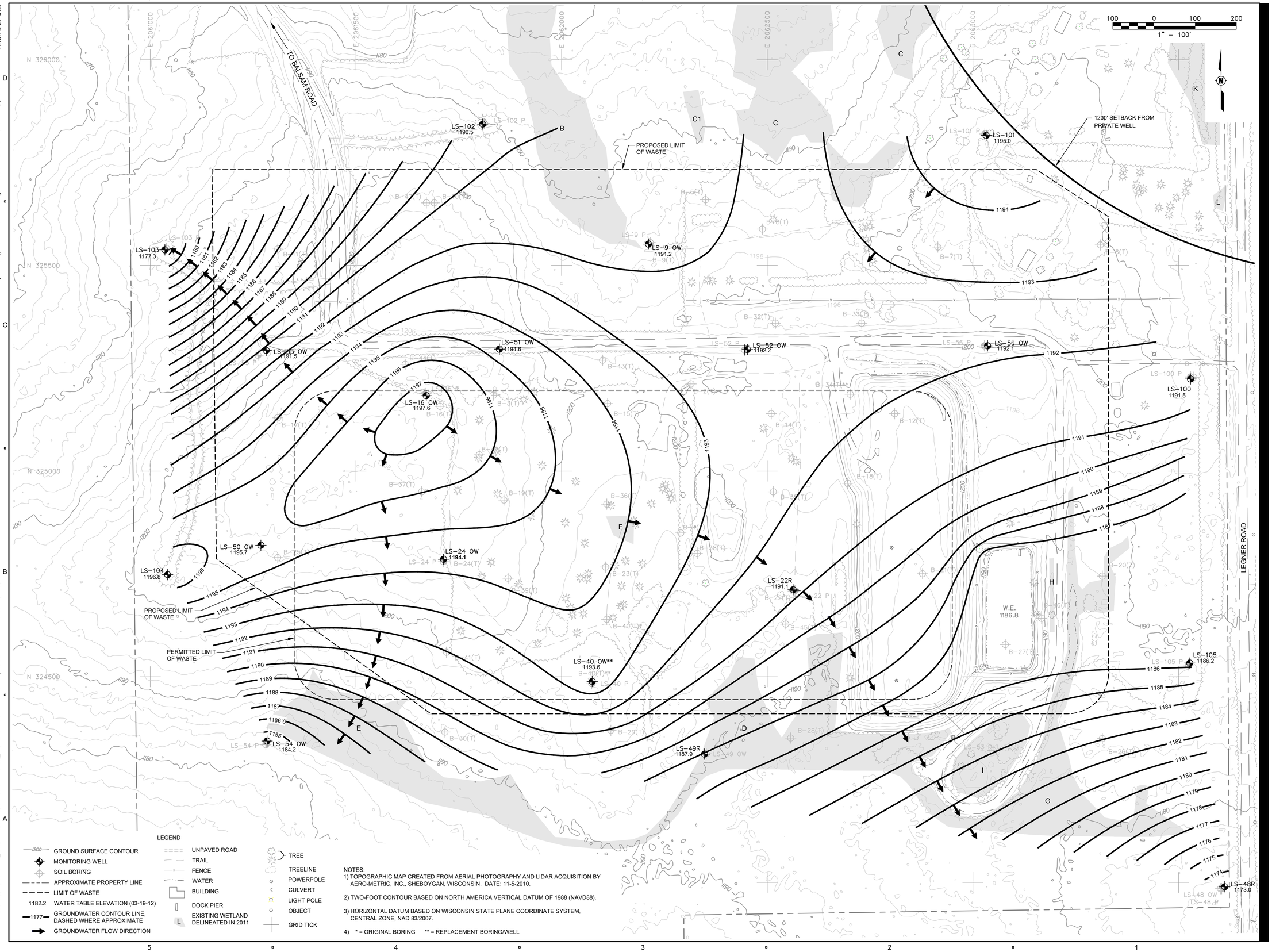
60186058

SHEET TITLE

BEDROCK SURFACE CONTOUR MAP

SHEET NUMBER

FR-25



LEGEND

- GROUND SURFACE CONTOUR
- MONITORING WELL
- SOIL BORING
- APPROXIMATE PROPERTY LINE
- LIMIT OF WASTE
- 1182.2 WATER TABLE ELEVATION (03-19-12)
- 1177 GROUNDWATER CONTOUR LINE, DASHED WHERE APPROXIMATE
- GROUNDWATER FLOW DIRECTION
- UNPAVED ROAD
- TRAIL
- FENCE
- WATER
- BUILDING
- DOCK PIER
- L EXISTING WETLAND DELINEATED IN 2011
- TREE
- TREELINE
- POWERPOLE
- CULVERT
- LIGHT POLE
- OBJECT
- GRID TICK

NOTES:
1) TOPOGRAPHIC MAP CREATED FROM AERIAL PHOTOGRAPHY AND LIDAR ACQUISITION BY AERO-METRIC, INC., SHEBOYGAN, WISCONSIN. DATE: 11-5-2010.

2) TWO-FOOT CONTOUR BASED ON NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD88).

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4) * = ORIGINAL BORING ** = REPLACEMENT BORING/WELL

Project Management Initials: Designer: SRK Checked: JRM Approved: MJV ARCH D 24" x 36"

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PROJECT

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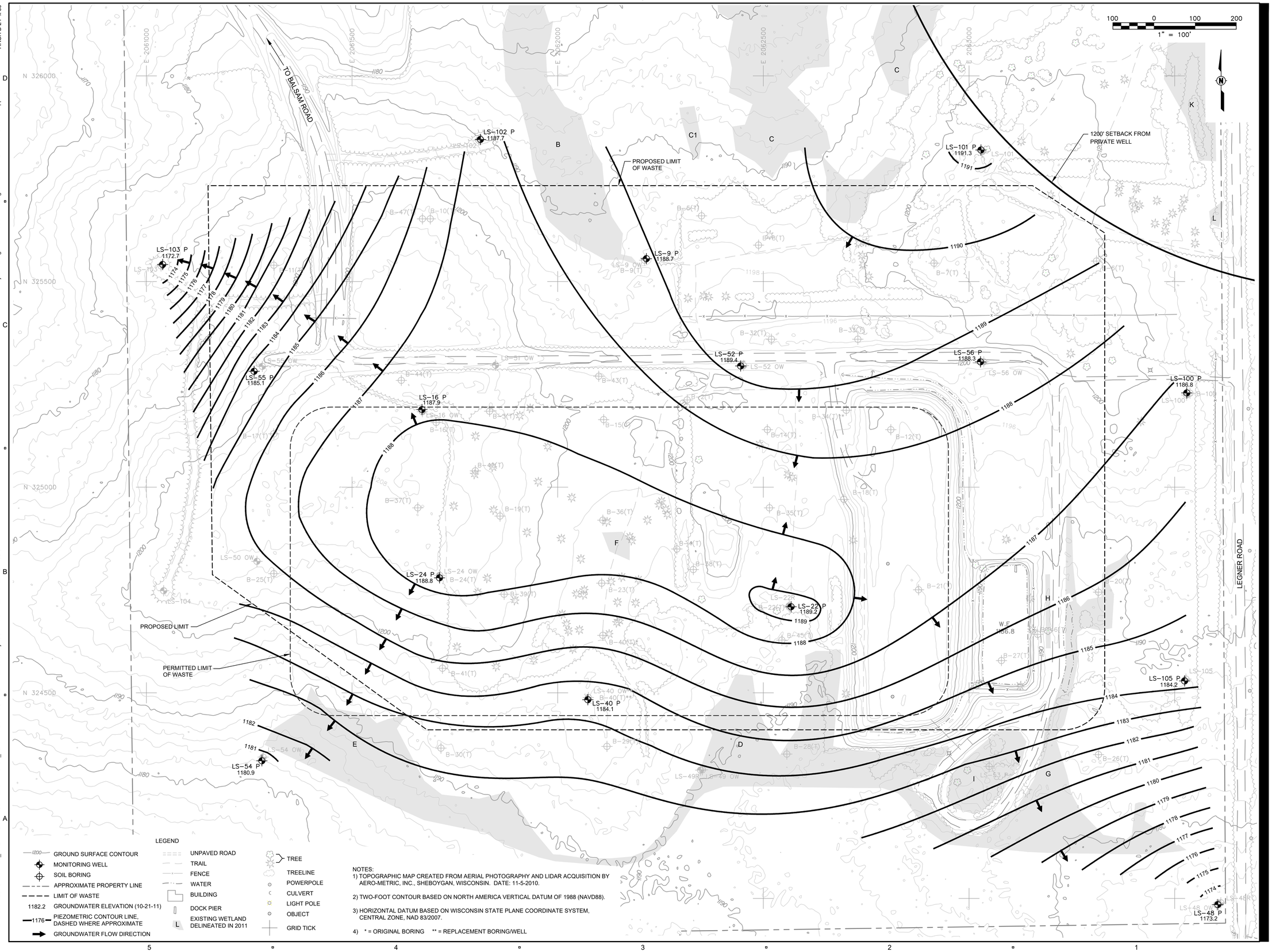
SHEET TITLE

HIGH WATER TABLE MAP
CONTOUR MAP
MARCH 19, 2012

SHEET NUMBER

FR-6



LEGEND

- 1200 GROUND SURFACE CONTOUR
- MONITORING WELL
- SOIL BORING
- APPROXIMATE PROPERTY LINE
- LIMIT OF WASTE
- 1182.2 GROUNDWATER ELEVATION (10-21-11)
- 1176 PIEZOMETRIC CONTOUR LINE, DASHED WHERE APPROXIMATE
- GROUNDWATER FLOW DIRECTION
- UNPAVED ROAD
- TRAIL
- FENCE
- WATER
- BUILDING
- DOCK PIER
- L EXISTING WETLAND DELINEATED IN 2011
- TREE
- TREELINE
- POWERPOLE
- CULVERT
- LIGHT POLE
- OBJECT
- GRID TICK

NOTES:
1) TOPOGRAPHIC MAP CREATED FROM AERIAL PHOTOGRAPHY AND LIDAR ACQUISITION BY AERO-METRIC, INC., SHEBOYGAN, WISCONSIN. DATE: 11-5-2010.

2) TWO-FOOT CONTOUR BASED ON NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD88).

3) HORIZONTAL DATUM BASED ON WISCONSIN STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, NAD 83/2007.

4) * = ORIGINAL BORING ** = REPLACEMENT BORING/WELL

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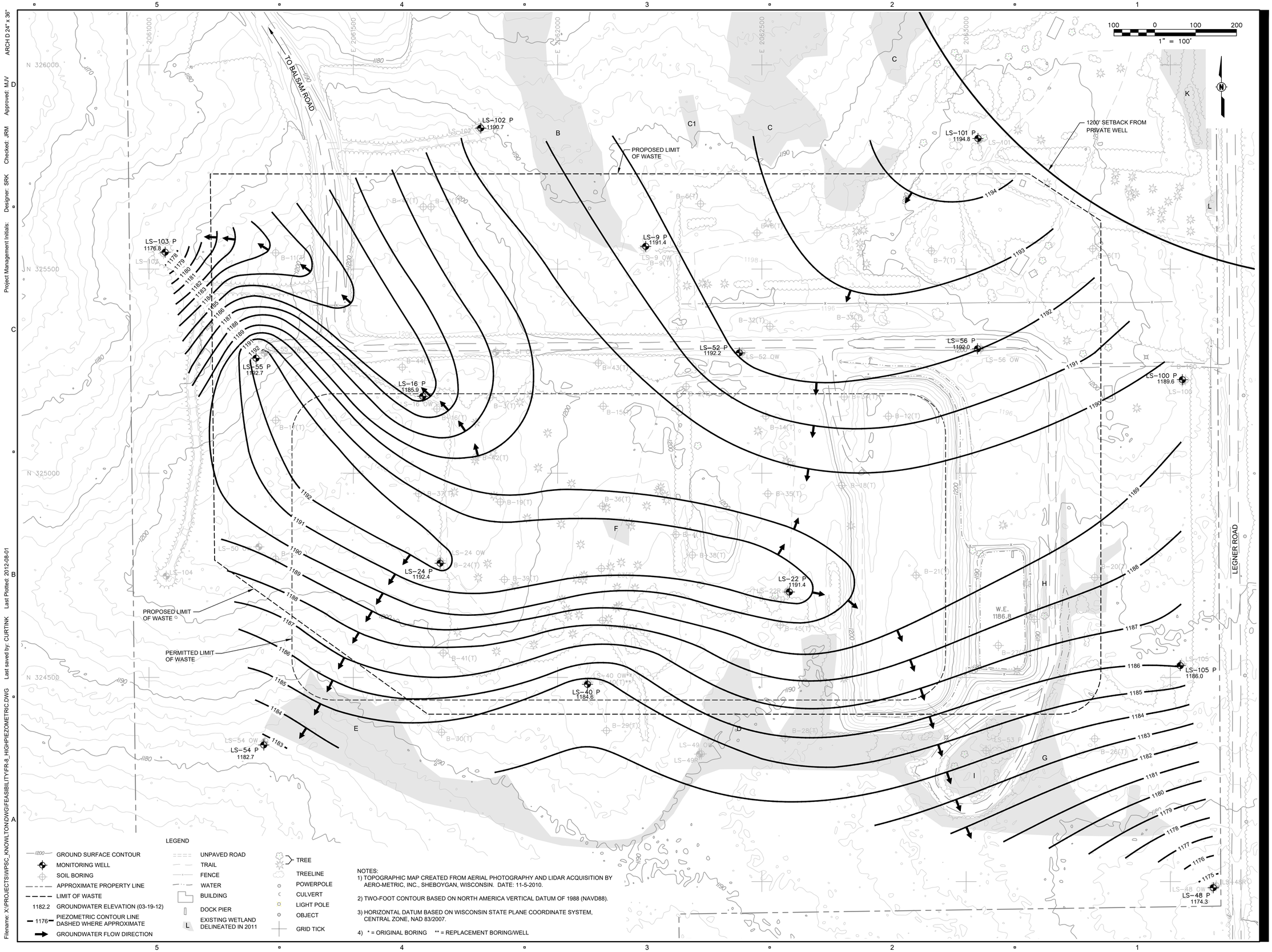
60186058

SHEET TITLE

LOW PIEZOMETRIC SURFACE MAP
OCTOBER 21, 2011

SHEET NUMBER

FR-7



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Feasibility Report Weston Disposal Site No. 3 Expansion

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Town of Knowlton, Marathon County, WI

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PROJECT NUMBER

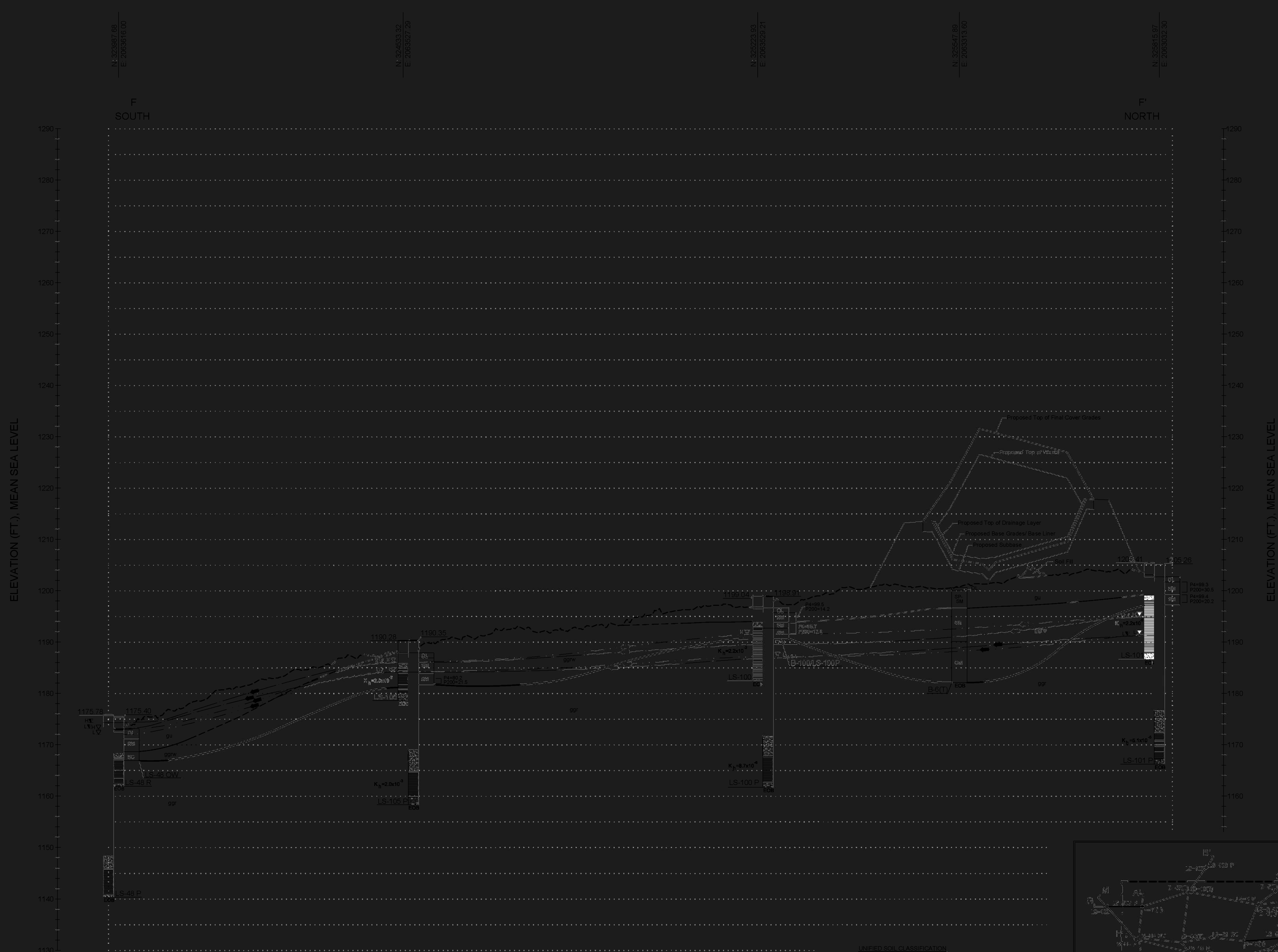
60186058

SHEET TITLE

HIGH PIEZOMETRIC SURFACE MAP
MARCH 19, 2012

SHEET NUMBER

FR-8



GEOLOGIC CROSS-SECTION F-F'

SCALE: 1"=100' HORIZ. & 1"=10' VERT.
10X VERTICAL EXAGGERATION

LEGEND

- EXISTING GROUND SURFACE
- LITHOSTRATIGRAPHIC UNIT (DASHED WHERE APPROXIMATE)
- COMPETENT BEDROCK SURFACE (DASHED WHERE APPROXIMATE)
- HIGH TABLE SURFACE - SHOWING FLOW DIRECTION; HIGH WATER TABLE (H) 3-19-12, LOW WATER TABLE (L) 10-21-11
- PIEZOMETRIC SURFACE - SHOWING FLOW DIRECTION; HIGH PIEZOMETRIC SURFACE (H) 3-19-12, LOW PIEZOMETRIC SURFACE (L) 10-21-11

- TOP OF PVC ELEVATION
- ANNULAR SPACE SEAL
- SOIL CLASSIFICATION (USCS)
- SAMPLE INTERVAL WITH LABORATORY (VERTICAL) HYDRAULIC CONDUCTIVITY (CENTIMETERS/SECOND) (K_V), % PASSING No. 4 SIEVE (P4), AND % PASSING No. 200 (P200)
- LITHOSTRATIGRAPHIC CONTACT (DASHED WHERE APPROXIMATE)
- BENTONITE SEAL
- SAND FILTER PACK
- WELL SCREEN
- FIELD (HORIZONTAL) HYDRAULIC CONDUCTIVITY (K_h) (CENTIMETERS/SECOND)
- SOIL BORING/MONITORING WELL DESIGNATION: * - ORIGINAL BORING; ** - REPLACEMENT BORING
- NATURAL CAVE IN OR SAND FILL
- EOB: END OF BORING

STRATIGRAPHIC UNIT

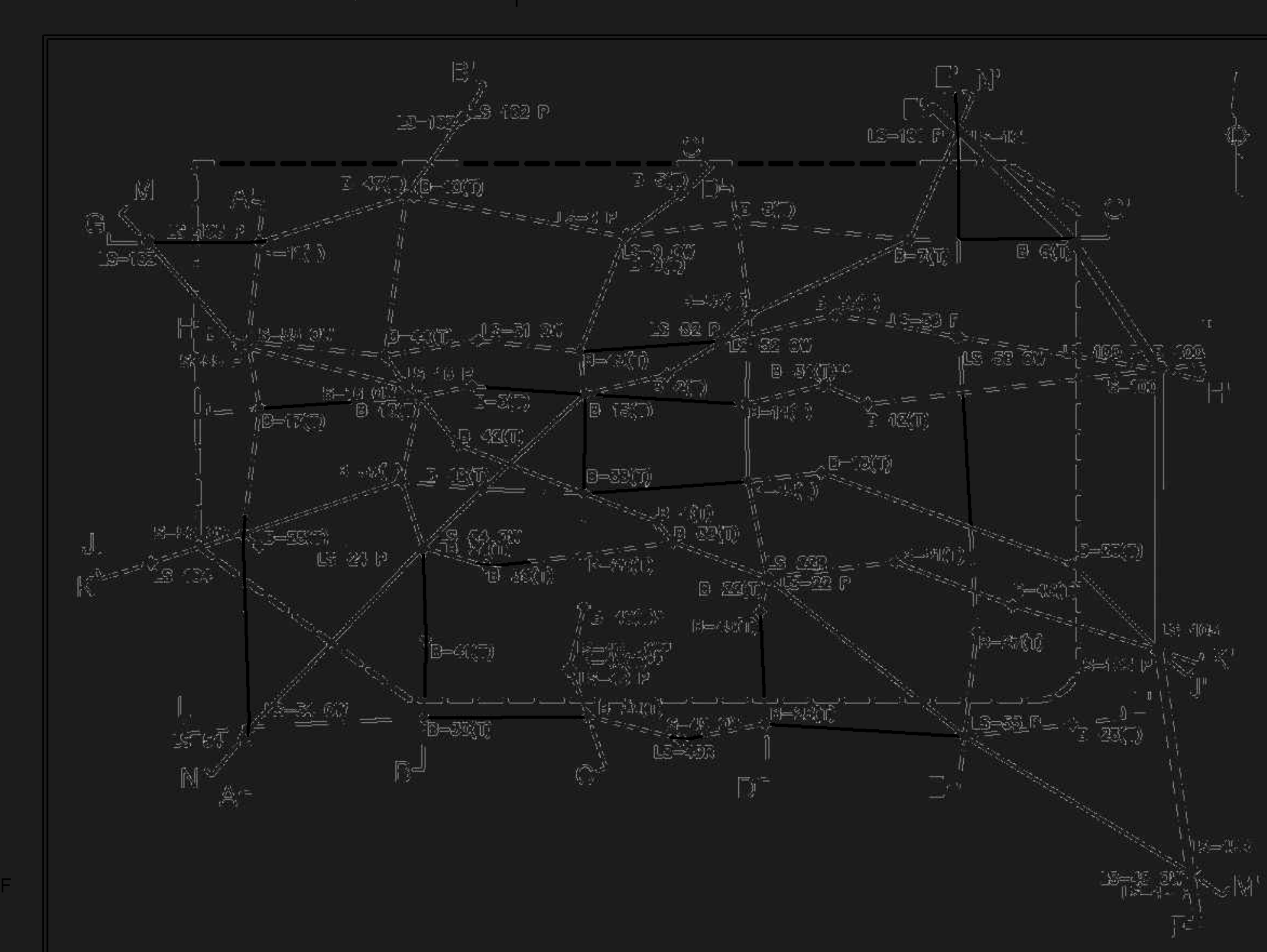
PLEISTOCENE	gu - MARATHON FORMATION, UNDIFFERENTIATED (Attig and Muldoon, 1989) BROWN TO DARK BROWN SAND TO SILTY SAND DERIVED FROM TILL, RESIDUUM, OR HILLSLOPE SEDIMENT ggrw - WEATHERED BEDROCK. YELLOWISH BROWN TO DARK BROWN SILTY SAND DERIVED FROM LOWER PROTEROZOIC BEDROCK (ggr).
LOWER PROTEROZOIC	ggr - GNEISSIC GRANITE (LaBerge and Myers, 1983) LIGHT GREY TO PINK QUARTZ DIORITE AND RED TO PINK GRANITE, WITH TRACE BLACK AMPHIBOLITE

UNIFIED SOIL CLASSIFICATION

GW	WELL GRADED GRAVELS & GRAVEL WITH SAND
GP	POORLY GRADED GRAVELS & GRAVEL WITH SAND
GM	SILTY GRAVELS, SILTY GRAVELS WITH SAND
GC	CLAYEY GRAVELS, CLAYEY GRAVEL WITH SAND
SW	WELL GRADED SANDS & SAND WITH GRAVEL
SP	POORLY GRADED SANDS & SANDS WITH GRAVEL
SP-SM	POORLY GRADED SAND WITH SILT, SAND WITH SILT & GRAVEL
SM	SILTY SANDS, SILTY SAND WITH GRAVEL
SC	CLAYEY SANDS, CLAYEY SANDS WITH GRAVEL
CH	HIGH PLASTICITY CLAY
CL-ML	SILTY CLAY TO CLAYEY SILT
CL	LOW PLASTICITY CLAY, GRAVELLY-SANDY CLAYS
ML	SILT, GRAVELLY-SANDY SILT
OL	ORGANIC CLAY, SANDY-GRAVELLY ORGANIC SOIL
OH	ORGANIC, HIGH PLASTICITY, SILTY CLAY
PT	PEAT, MUCK, ORGANIC SOILS

NOTES

1) SOIL FILL - DISTURBED SOIL OR SOIL THAT HAS BEEN PLACED FOR CONSTRUCTION OF ROADS AND BERMS ASSOCIATED WITH THE EXISTING LANDFILL
2) FILL - COAL COMBUSTION RESIDUALS
3) WATER TABLE, PIEZOMETRIC, AND COMPETENT BEDROCK SURFACE LINES WERE DRAWN BETWEEN BORINGS IN THE CROSS SECTION AND WERE NOT PRODUCED FROM THE SURFACES PRESENTED IN FR-5 THROUGH FR-8 AND FR-25



CROSS-SECTION INDEX
NOT TO SCALE

AECOM

PROJECT

Feasibility Report
Weston Disposal Site
No. 3 Expansion
Legner Road
Town of Knowlton, Marathon County, WI

CLIENT

Wisconsin Public Service Corporation
700 North Adams St., P.O. Box 19001
Green Bay, WI 54307-9001
920-433-1780 tel
www.wisconsinpublicservice.com

CONSULTANT

AECOM Technical Services, Inc.
1035 Kepler Drive
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www.aecom.com

REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	AUGUST 2012	Issued for Regulatory Review

KEY PLAN

PROJECT NUMBER

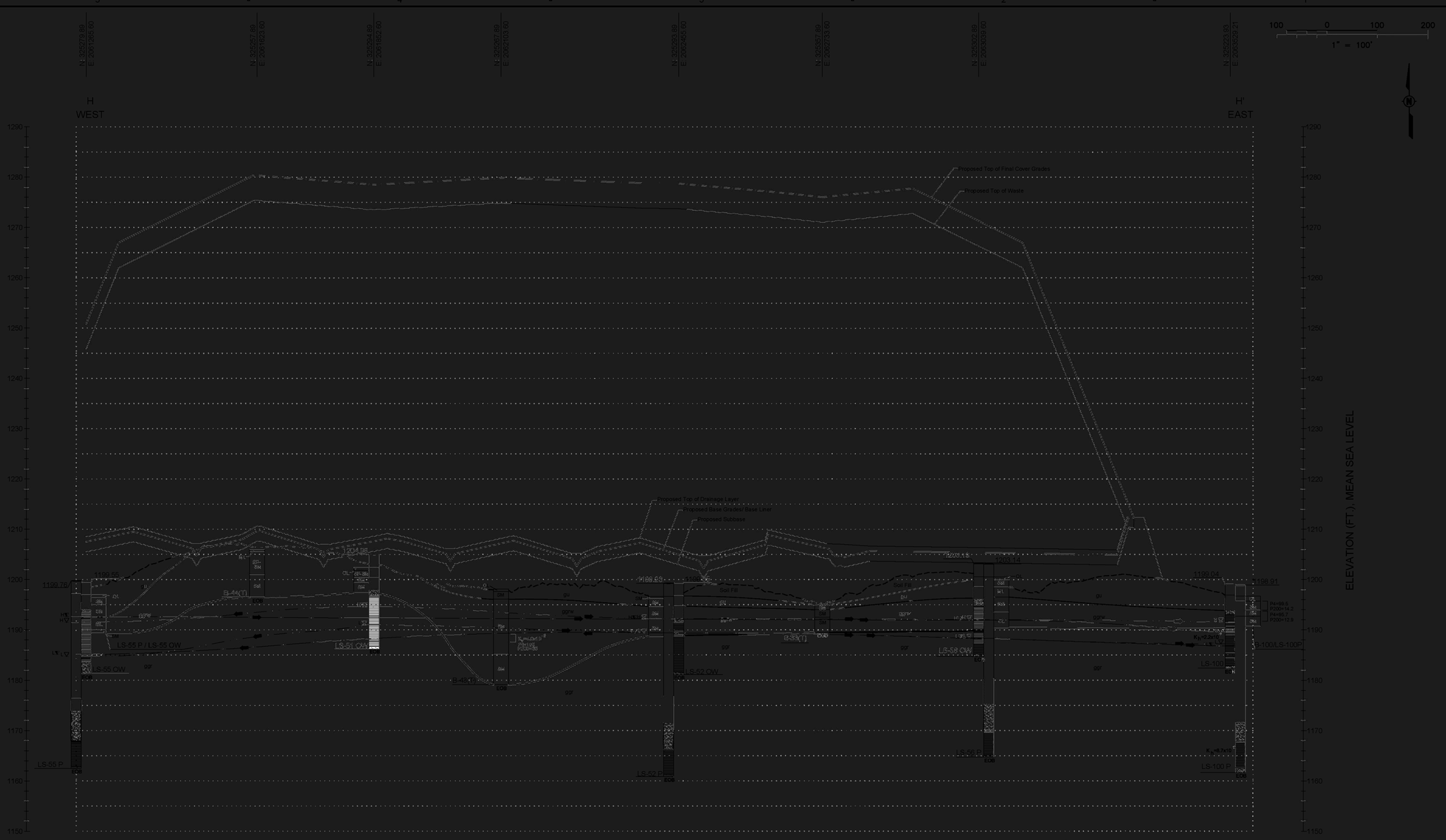
60186058

SHEET TITLE

GEOLOGIC CROSS-SECTION F-F'

SHEET NUMBER

FR-15

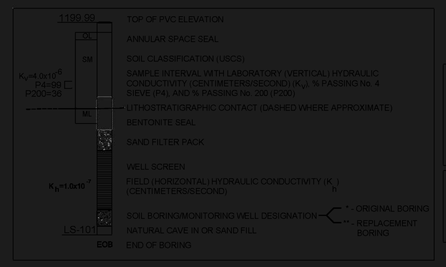


GEOLOGIC CROSS-SECTION H-H'

SCALE: 1"=100' HORIZ. & 1"=10' VERT.
10X VERTICAL EXAGGERATION

LEGEND

- EXISTING GROUND SURFACE
- LITHOSTRATIGRAPHIC UNIT (DASHED WHERE APPROXIMATE)
- COMPETENT BEDROCK SURFACE (DASHED WHERE APPROXIMATE)
- HIGH TABLE SURFACE - SHOWING FLOW DIRECTION
  HIGH WATER TABLE (H) 3-19-12
  LOW WATER TABLE (L) 10-21-11
- PIEZOMETRIC SURFACE - SHOWING FLOW DIRECTION
  HIGH PIEZOMETRIC SURFACE (H) 3-19-12
  LOW PIEZOMETRIC SURFACE (L) 10-21-11



STRATIGRAPHIC UNIT

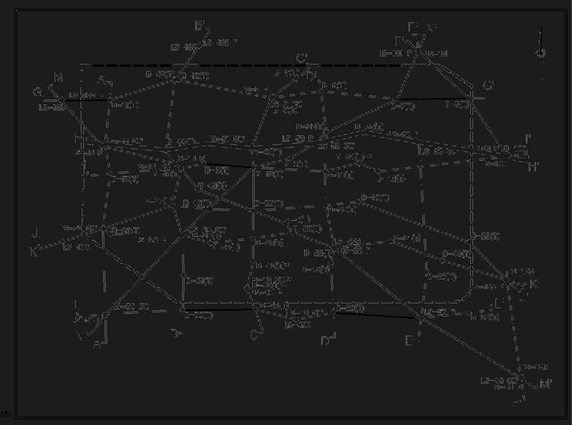
PLEISTOCENE	gu	MARATHON FORMATION, UNDIFFERENTIATED (Attig and Muldoon, 1989) BROWN TO DARK BROWN SAND TO SILTY SAND DERIVED FROM TILL, RESIDUUM, OR HILLSLOPE SEDIMENT
	ggrw	WEATHERED BEDROCK YELLOWISH BROWN TO DARK BROWN SILTY SAND DERIVED FROM LOWER PROTEROZOIC BEDROCK (ggr)
LOWER PROTEROZOIC	ggr	GNEISSIC GRANITE (LaBerge and Myers, 1983) LIGHT GREY TO PINK QUARTZ DIORITE AND RED TO PINK GRANITE, WITH TRACE BLACK AMPHIBOLITE

UNIFIED SOIL CLASSIFICATION

GW	WELL GRADED GRAVELS & GRAVEL WITH SAND
GP	POORLY GRADED GRAVELS & GRAVEL WITH SAND
GM	SILTY GRAVELS, SILTY GRAVELS WITH SAND
GC	CLAYEY GRAVELS, CLAYEY GRAVEL WITH SAND
SW	WELL GRADED SANDS & SAND WITH GRAVEL
SP	POORLY GRADED SANDS & SANDS WITH GRAVEL
SP-SM	POORLY GRADED SAND WITH SILT, SAND WITH SILT & GRAVEL
SM	SILTY SANDS, SILTY SAND WITH GRAVEL
SC	CLAYEY SANDS, CLAYEY SANDS WITH GRAVEL
CH	HIGH PLASTICITY CLAY
CL-ML	SILTY CLAY TO CLAYEY SILT
CL	LOW-PLASTICITY CLAY, GRAVELLY-SANDY CLAYS
ML	SILT, GRAVELLY-SANDY SILT
OL	ORGANIC CLAY, SANDY-GRAVELLY ORGANIC SOIL
OH	ORGANIC, HIGH PLASTICITY, SILTY CLAY
PT	PEAT, MUCK, ORGANIC SOILS

NOTES:

1) SOIL FILL - DISTURBED SOIL OR SOIL THAT HAS BEEN PLACED FOR CONSTRUCTION OF ROADS AND BERMS ASSOCIATED WITH THE EXISTING LANDFILL
2) FILL - COAL COMBUSTION RESIDUALS
3) WATER TABLE, PIEZOMETRIC, AND COMPETENT BEDROCK SURFACE LINES WERE DRAWN BETWEEN BORINGS IN THE CROSS SECTION AND WERE NOT PRODUCED FROM THE SURFACES PRESENTED IN FR-5 THROUGH FR-8 AND FR-25



CROSS-SECTION INDEX
NOT TO SCALE

AECOM

PROJECT

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REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	AUGUST 2012	Issued for Regulatory Review

KEY PLAN

PROJECT NUMBER

60186058

SHEET TITLE

GEOLOGIC CROSS-SECTION H-H'

SHEET NUMBER

FR-17

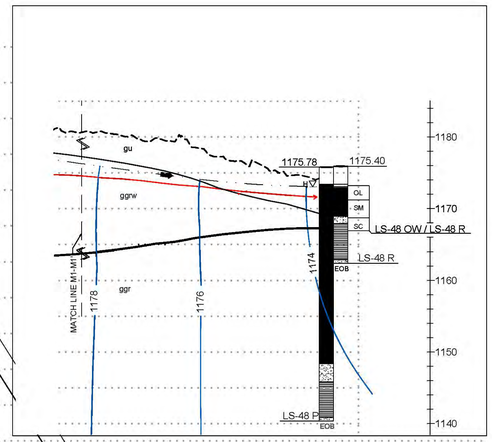
N: 325537.89 E: 2061035.51 | N: 325279.89 E: 2061265.60 | N: 325181.69 E: 2061674.70 | N: 325155.59 E: 2061708.30 | N: 325037.89 E: 2061803.60 | N: 324917.89 E: 2062113.60 | N: 324847.89 E: 2062253.60 | N: 324797.89 E: 2062333.60 | N: 324709.69 E: 2062566.70 | N: 324318.89 E: 2063032.60

100 0 100 200
1" = 100'

M NORTHWEST — M' SOUTHEAST

ELEVATION (FT.), MEAN SEA LEVEL

Proposed Top of Final Cover Grades
Proposed Top of Waste
Proposed Top of Drainage Layer
Proposed Base Grades/ Base Liner
Proposed Subbase
Existing Landfill
Fill
Soil Fill
LS-103 P
LS-103
LS-55 P / LS-55 OW
LS-55 OW
LS-55 P
LS-16 OW
LS-16 P
LS-22 P
LS-22 R
LS-53 P
B-16(T)
B-42(T)
B-36(T)
B-4(T)
B-38(T)
B-22(T)
1188.98
1189.35
1199.76
1199.55
1208.33
1208.90
1195.22
1195.70
MATCH LINE M1-M1'

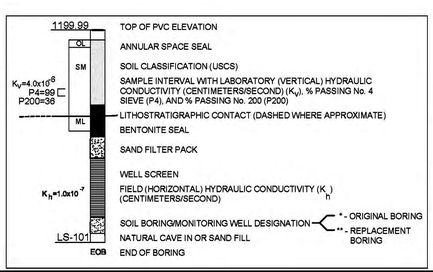


FLOW NET CROSS-SECTION M-M'

SCALE: 1"=100' HORIZ. & 1"=10' VERT.
10X VERTICAL EXAGGERATION

LEGEND

- EXISTING GROUND SURFACE
- LITHOSTRATIGRAPHIC UNIT (DASHED WHERE APPROXIMATE)
- COMPETENT BEDROCK SURFACE (DASHED WHERE APPROXIMATE)
- HIGH TABLE SURFACE - SHOWING FLOW DIRECTION
  HIGH WATER TABLE (H) 3-19-12,
  LOW WATER TABLE (L) 10-21-11
- PIEZOMETRIC SURFACE - SHOWING FLOW DIRECTION
  HIGH PIEZOMETRIC SURFACE (H) 3-19-12,
  LOW PIEZOMETRIC SURFACE (L) 10-21-11
- 1190 — EQUIPOTENTIAL CONTOUR LINES
- GROUNDWATER FLOW LINES



STRATIGRAPHIC UNIT

PLEISTOCENE	gu -	MARATHON FORMATION, UNDIFFERENTIATED (Attig and Muldoon, 1989) BROWN TO DARK BROWN SAND TO SILTY SAND DERIVED FROM TILL, RESIDUUM, OR HILLSLOPE SEDIMENT
	ggrw -	WEATHERED BEDROCK. YELLOWISH BROWN TO DARK BROWN SILTY SAND DERIVED FROM LOWER PROTEROZOIC BEDROCK (ggr).
LOWER PROTEROZOIC	ggr -	GNEISSIC GRANITE (LaBerge and Myers, 1983) LIGHT GREY TO PINK QUARTZ DIORITE AND RED TO PINK GRANITE, WITH TRACE BLACK AMPHIBOLITE

UNIFIED SOIL CLASSIFICATION

GW	WELL GRADED GRAVELS & GRAVEL WITH SAND
GP	POORLY GRADED GRAVELS & GRAVEL WITH SAND
GM	SILTY GRAVELS, SILTY GRAVELS WITH SAND
GC	CLAYEY GRAVELS, CLAYEY GRAVEL WITH SAND
SW	WELL GRADED SANDS & SAND WITH GRAVEL
SP	POORLY GRADED SANDS & SANDS WITH GRAVEL
SP-SM	POORLY GRADED SAND WITH SILT, SAND WITH SILT & GRAVEL
SM	SILTY SANDS, SILTY SAND WITH GRAVEL
SC	CLAYEY SANDS, CLAYEY SANDS WITH GRAVEL
CH	HIGH PLASTICITY CLAY
CL-ML	SILTY CLAY TO CLAYEY SILT
CL	LOW PLASTICITY CLAY, GRAVELLY-SANDY CLAYS
ML	SILT, GRAVELLY-SANDY SILT
OL	ORGANIC CLAY, SANDY-GRAVELLY ORGANIC SOIL
OH	ORGANIC, HIGH PLASTICITY, SILTY CLAY
PT	PEAT, MUCK, ORGANIC SOILS

NOTES

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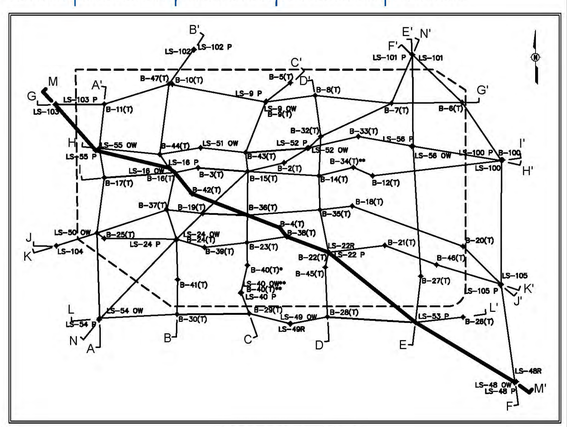
3) WATER TABLE, PIEZOMETRIC, AND COMPETENT BEDROCK SURFACE LINES WERE DRAWN BETWEEN BORINGS IN THE CROSS SECTION AND WERE NOT PRODUCED FROM THE SURFACES PRESENTED IN FR-5 THROUGH FR-8 AND FR-25



CROSS-SECTION INDEX
NOT TO SCALE

AECOM

PROJECT

Feasibility Report Weston Disposal Site No. 3 Expansion

Legner Road
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REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	AUGUST 2012	Issued for Regulatory Review

KEY PLAN

PROJECT NUMBER

60186058

SHEET TITLE

FLOW NET

SHEET NUMBER

FR-24

CROSS SECTION 324,700N (LOOKING NORTH)

NOTES

1. THE CORRELATION LINES ARE BASED ON INTERPOLATION BETWEEN BORINGS AND MAY NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS.
2. HORIZONTAL DISTANCES ARE MEASURED AND WATER TABLE DATA ARE PLOTTED WITH RESPECT TO THE CENTER OF EACH SOIL BORING LOCATION. WELL CONSTRUCTION SCHEMATICS ARE OFFSET FOR CLARITY.
3. THE EXISTING GROUND SURFACE/SUBBASE GRADES/BASEGRADES/FINAL GRADES ARE BASED ON THE INFORMATION PRESENTED ON PLAN SHEETS 3, 4, 5, AND 15 RESPECTIVELY.
4. ELEVATIONS ARE SHOWN IN REFERENCE TO USGS MEAN SEA LEVEL (MSL) DATUM.
5. HIGH WATER TABLE BASED ON SURFACE PRESENTED ON HIGH WATER TABLE MAP FR-6 (REV. 1) THAT WAS SUBMITTED WITHIN ADDENDUM NO. 2 OF THE FEASIBILITY REPORT, DATED JULY 18, 2013. THE WATER TABLE SURFACE IS BASED UPON DEPTH TO WATER MEASUREMENTS RECORDED ON APRIL 22, 2013 (FOR EXISTING MONITORING WELLS INSTALLED PRIOR TO 2011) AND WATER DEPTH TO WATER MEASUREMENTS RECORDED ON MAY 13, 2013 (FOR THE 100 - SERIES MONITORING WELLS).
6. TOP OF BEDROCK SURFACE IS BASED ON A DIGITAL TERRAIN MODEL (DTM) PREPARED WITH THE TOP OF BEDROCK ELEVATIONS AT EACH SOIL BORING LOCATION.
7. FOR DETAILED LITHOLOGICAL DESCRIPTIONS, REFER TO WELL CONSTRUCTION DETAILS AND THE SOILS LABORATORY TEST RESULTS IN THE FEASIBILITY REPORT.
8. THE DEVELOPMENT/PROGRESSION OF EACH CELL MAY VARY BASED UPON WASTE DISPOSAL SCHEDULE, BENEFICIAL REUSE PROJECT OPPORTUNITIES, AND THE NUMBER/SIZE OF BULK-HAULING EVENTS FROM EACH OF THE POWER PLANTS.

LEGEND

- EXISTING GROUND SURFACE
- LITHOSTRATIGRAPHIC UNIT (DASHED WHERE APPROXIMATE)
- COMPETENT BEDROCK SURFACE (DASHED WHERE APPROXIMATE)
- HIGH TABLE SURFACE - (REFER TO NOTE NO. 5 BELOW)

HIGH WATER ELEVATION (1198.12)
1199.99 TOP OF PVC ELEVATION
ANNULAR SPACE SEAL
SOIL CLASSIFICATION (USCS)
$K_V=4.0x10^{-6}$ P4=99 P200=36 SAMPLE INTERVAL WITH LABORATORY (VERTICAL) HYDRAULIC CONDUCTIVITY (CENTIMETERS/SECOND) (K_V), % PASSING No. 4 SIEVE (P4), AND % PASSING No. 200 (P200)
LITHOSTRATIGRAPHIC CONTACT (DASHED WHERE APPROXIMATE)
BENTONITE SEAL
SAND FILTER PACK
WELL SCREEN
$K_h=1.0x10^{-7}$ FIELD (HORIZONTAL) HYDRAULIC CONDUCTIVITY (K_h) (CENTIMETERS/SECOND)
LS-101 SOIL BORING/MONITORING WELL DESIGNATION — * - ORIGINAL BORING; ** - REPLACEMENT BORING
NATURAL CAVE IN OR SAND FILL
EOB END OF BORING

STRATIGRAPHIC UNIT

PLEISTOCENE	gu - MARATHON FORMATION, UNDIFFERENTIATED (Attig and Muldoon, 1989) BROWN TO DARK BROWN SAND TO SILTY SAND DERIVED FROM TILL, RESIDUUM, OR HILLSLOPE SEDIMENT ggrw - WEATHERED BEDROCK. YELLOWISH BROWN TO DARK BROWN SILTY SAND DERIVED FROM LOWER PROTEROZOIC BEDROCK (ggr).
LOWER PROTEROZOIC	ggr - GNEISSIC GRANITE (LaBerge and Myers, 1983) LIGHT GREY TO PINK QUARTZ DIORITE AND RED TO PINK GRANITE, WITH TRACE BLACK AMPHIBOLITE

UNIFIED SOIL CLASSIFICATION

GW	WELL GRADED GRAVELS & GRAVEL WITH SAND
GP	POORLY GRADED GRAVELS & GRAVEL WITH SAND
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GC	CLAYEY GRAVELS, CLAYEY GRAVEL WITH SAND
SW	WELL GRADED SANDS & SAND WITH GRAVEL
SP	POORLY GRADED SANDS & SANDS WITH GRAVEL
SP-SM	POORLY GRADED SAND WITH SILT, SAND WITH SILT & GRAVEL
SM	SILTY SANDS, SILTY SAND WITH GRAVEL
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CL-ML	SILTY CLAY TO CLAYEY SILT
CL	LOW PLASTICITY CLAY, GRAVELLY-SANDY CLAYS
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OL	ORGANIC CLAY, SANDY-GRAVELLY ORGANIC SOIL
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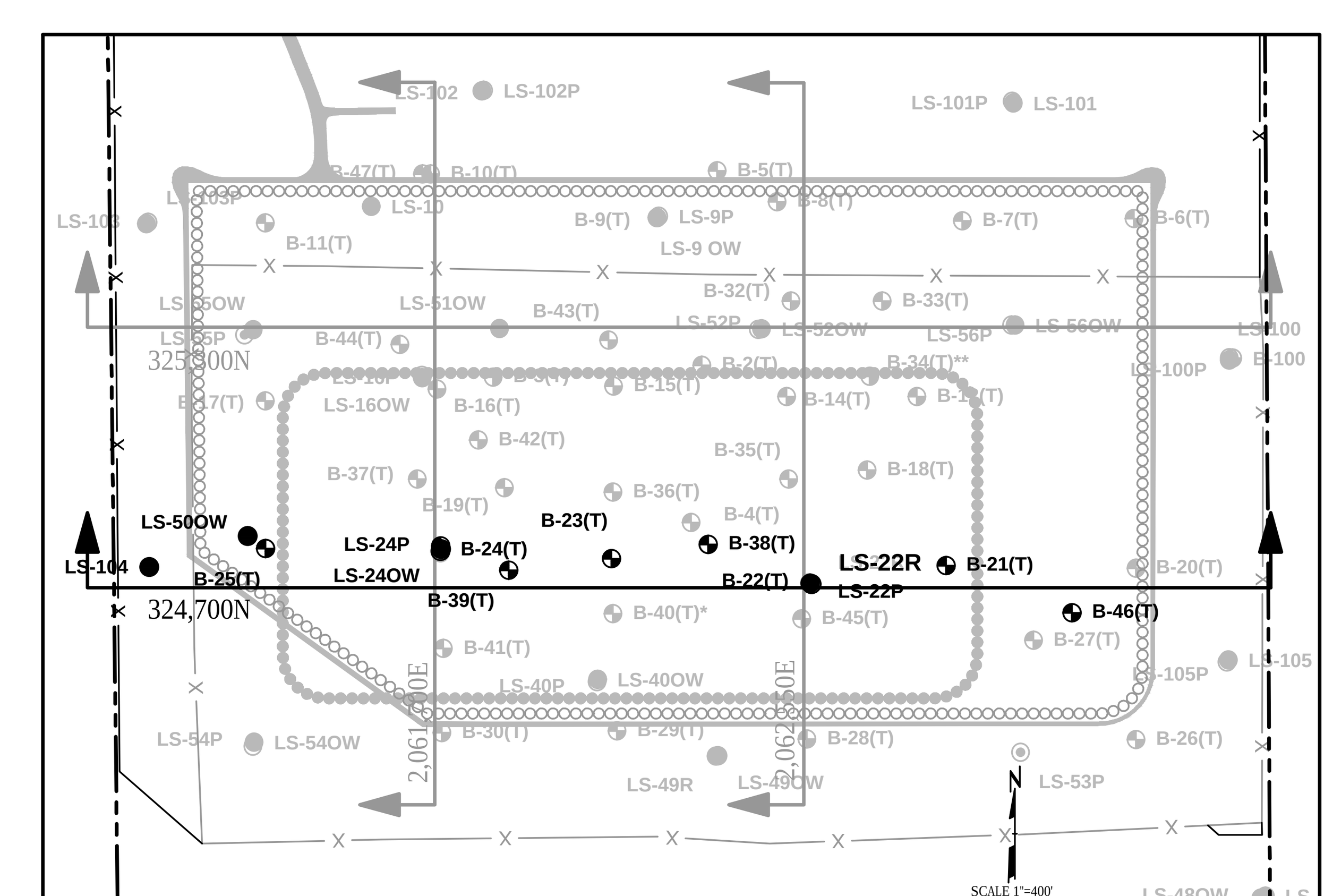
PT	PEAT, MUCK, ORGANIC SOILS



CROSS SECTION LOCATOR MAP

VERTICAL SCALE 0 10
HORIZONTAL SCALE 0 100 200

VERTICAL EXAGGERATION = 10X

NOTE: THESE PLANS ARE ACCOMPANIED BY A REPORT OF THE SAME TITLE. THESE DOCUMENTS ARE INTERRELATED AND INTENDED TO BE USED AND REVIEWED TOGETHER. THESE DOCUMENTS ARE INTENDED TO BE USED FOR REGULATORY PURPOSES ONLY.

NOT FOR CONSTRUCTION

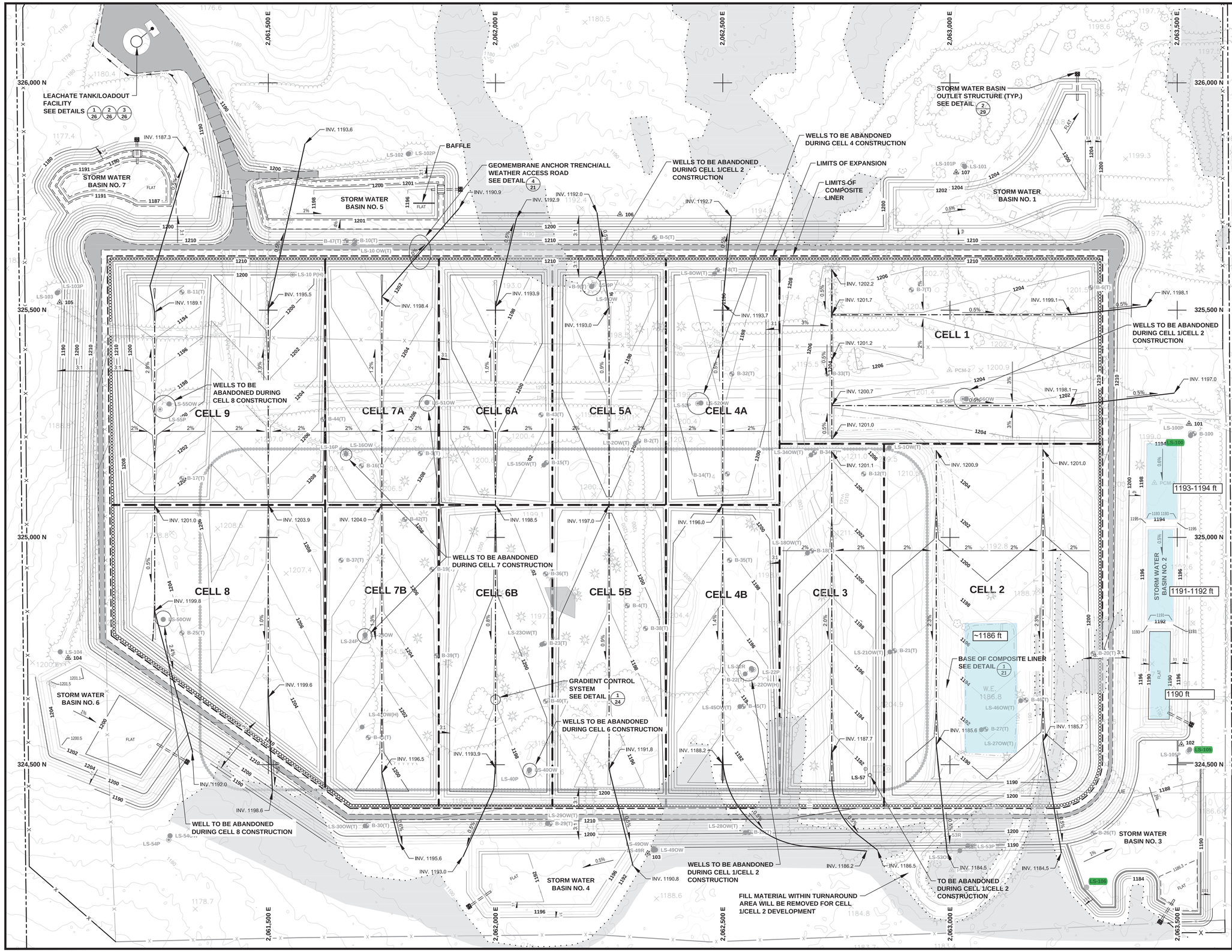
NO.	BY	DATE	REVISION	APP'D.
3.				
2.				
1.				

PROJECT: **WISCONSIN PUBLIC SERVICE CORPORATION WESTON DISPOSAL SITE NO. 3 EXPANSION PLAN OF OPERATION**

SHEET TITLE: **ENGINEERING CROSS SECTION 324,700N**

DRAWN BY: LSTORMER	SCALE: AS SHOWN	PROJ. NO. 196089.0003	
CHECKED BY: TDH		FILE NO. 196089.0003.SHT17-20-XS.dwg	
APPROVED BY: CDM	DATE PRINTED:	SHEET 19 OF 29	
DATE: MARCH 2014			

TRC
708 Heartland Trail
Suite 3000
Madison, WI 53717
Phone: 608.826.3600



NOTES

1. REFER TO PLAN SHEET 2 OF THE PLAN SET FOR LEGEND AND BASE MAP NOTES.
2. CONTOURS PRESENTED ON THIS PLAN SHEET REPRESENT THE BASE OF THE CLAY LINER (WITHIN THE LIMITS OF THE COMPOSITE LINER) AND THE FINISHED GRADES BEYOND THE LIMITS OF COMPOSITE LINER (EXCEPT AS SHOWN ON DETAIL 4 OF 21).
3. STRAW BALE DITCH CHECKS, EROSION LOGS OR EROSION CONTROL FENCE MAY BE INSTALLED DURING CONSTRUCTION AND/OR OPERATIONS AS REQUIRED.
4. THE 12-INCH THICK GRADIENT CONTROL SYSTEM WILL BE INSTALLED ONE FOOT BELOW THE SUBBASE GRADES AS SHOWN ON DETAIL 1 ON PLAN SHEET 21. THE GRADIENT CONTROL SYSTEM WILL BE CONSTRUCTED WITHIN THE LIMITS OF THE TOE OF SLOPE OF THE EXTERIOR PERIMETER BERM AND WILL EXTEND OUT 25 FEET BEYOND THE LEACHATE COLLECTION PIPE IN EITHER DIRECTION.
5. BASIN OUTLET PIPES TO MAINTAIN MINIMUM 0.5% SLOPE.
6. A TEMPORARY JOB TRAILER ALONG WITH VISITOR PARKING AREA ON AN ALL-WEATHER ACCESS PAD WILL BE PROVIDED FOR EACH CONSTRUCTION EVENT. THE LOCATION MAY VARY FOR EACH CONSTRUCTION EVENT.

Figure revised by O' Brien and Gere Engineers, Inc. to indicate potential areas and elevations for interaction with water on April 12, 2018

Potential Areas and Elevations for Interaction with Water

0 100 200 300 400
SCALE IN FEET

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NOT FOR CONSTRUCTION

NO.	BY	DATE	REVISION	APP'D.
3.				
2.				
1.				

PROJECT: WISCONSIN PUBLIC SERVICE CORPORATION
WESTON DISPOSAL SITE NO. 3 EXPANSION
PLAN OF OPERATION

SHEET TITLE: SUBBASE GRADES

DRAWN BY:	LSTORMER	SCALE:	PROJ. NO. 196089.0003
CHECKED BY:	TDH	1"=100'	FILE NO. 196089.0003.SHT04-SG.dwg
APPROVED BY:	CDM	DATE PRINTED:	SHEET 4 OF 29
DATE:	MARCH 2014		

TRC
708 Heartland Trail
Suite 3000
Madison, WI 53717
Phone: 608.826.3600

File Location: J:\WPS\Weston Disposal Site\196089\0003 **File Name:** 196089.0003.SHT04-SG **Layout Name:** SHEET 4
Plot Information: NONE STORMER, LARRY ---- ANSI A (8.50 X 11.00 INCHES) March 13, 2014 0.3869 K:\AUTOCAD_CONFIG\PLOTTERS\PLOT STYLES\RMT COLOR.CTB