



July 14, 2025

Mr. Timothy Long, P.G.  
Pennsylvania Department of Environmental Protection  
909 Elmerton Avenue  
Harrisburg, Pennsylvania 17110

**Re: Second Quarter 2025 Environmental Monitoring Report  
Waste Management Lancaster Landfill, Facility ID# 101559  
Mount Joy Township, Lancaster County, Pennsylvania**

Dear Mr. Long:

The 2<sup>nd</sup> Quarter 2025 Environmental Monitoring Report for Lancaster Landfill is attached. Included with this submittal is a narrative summarizing the quarterly sampling and analytical results, the completed Pennsylvania Department of Environmental Protection forms, and an electronic data deliverable in the format you requested. Sampling and analysis were performed by Geochemical Testing, Inc. Langan Engineering and Environmental Services, LLC has reviewed the quarterly data and prepared the enclosed report.

Should you have any questions or require any additional information, please contact me at (215) 783-2216.

Regards,

A handwritten signature in blue ink that reads 'Jarod Freese'.

Jarod Freese  
Waste Management  
Environmental Protection Manager

Enclosure

cc: Troy Wink (Lancaster Landfill)

---

# SECOND QUARTER 2025 ENVIRONMENTAL MONITORING REPORT

for

**Lancaster Landfill  
Mount Joy Townships  
Lancaster County, Pennsylvania  
PADEP ID No. 101559**

*Prepared for:*

**Lancaster Landfill  
2487 Cloverleaf Road  
Elizabeth, Pennsylvania 17022**

*Prepared by:*

**Langan Engineering and Environmental Services, LLC  
2400 Ansys Drive, Suite 403  
Canonsburg, Pennsylvania 15317**

**Submitted: July 2025  
Langan Project No.: 250243901**

## **LANGAN**

## TABLE OF CONTENTS

<b>1.</b>	<b>INTRODUCTION</b>	<b>1</b>
<b>2.</b>	<b>SITE GEOLOGY AND HYDROGEOLOGY</b>	<b>2</b>
2.1	REGIONAL PHYSIOGRAPHY AND LOCAL GEOLOGY	2
2.2	HYDROGEOLOGY	2
<b>3.</b>	<b>ENVIRONMENTAL MONITORING NETWORK</b>	<b>3</b>
3.1	GROUNDWATER, SURFACE WATER, AND UNDERDRAIN MONITORING NETWORKS	3
3.2	LEACHATE COLLECTION AND DETECTION ZONE NETWORKS	4
3.3	PERIMETER METHANE GAS MONITORING PROBES	4
3.4	DUST FALL MONITORING NETWORK	4
<b>4.</b>	<b>QUARTERLY MONITORING RESULTS</b>	<b>5</b>
4.1	SAMPLING ACTIVITIES	5
4.2	GROUNDWATER RESULTS	6
4.3	SURFACE WATER RESULTS	6
4.4	LEACHATE RESULTS	6
4.5	PERIMETER METHANE GAS MONITORING PROBE RESULTS	7
4.6	DUST FALL MONITORING RESULTS	7
<b>5.</b>	<b>DISCUSSION AND CONCLUSIONS</b>	<b>8</b>
<b>6.</b>	<b>CERTIFICATION</b>	<b>9</b>
<b>7.</b>	<b>REFERENCES</b>	<b>10</b>

## TABLES

Table 1	Field Sampling Summary
Table 2	Laboratory Analytical Results

## **FIGURES**

- Figure 1 Site Location Map
- Figure 2 Water Quality Monitoring Plan
- Figure 3 New Oxford Formation Potentiometric Map, May 5, 2025
- Figure 4 New Oxford Formation Time Series

## **APPENDICES**

- Appendix A PADEP Form 21 for Groundwater, Surface Water, and Underdrains
- Appendix B Laboratory Files and PADEP Electronic Data Deliverable
- Appendix C PADEP Form 50 for Leachate
- Appendix D Perimeter Methane Gas Monitoring Probes
- Appendix E Dust Fall Results

## 1. INTRODUCTION

Langan Engineering and Environmental Services, LLC (Langan) completed a review of the results of the 2<sup>nd</sup> Quarter 2025 environmental monitoring activities at Lancaster Landfill (the “site” or “facility”) in Mount Joy Township, Lancaster County, Pennsylvania (Figure 1). Lancaster Landfill is operated by WM under Pennsylvania Department of Environmental Protection (PADEP) Solid Waste Permit No. 101559 (the “permit”). The sampling and analytical services were provided by Geochemical Testing, Inc. (Geochemical Testing) under a separate contract to WM, and Langan reviewed the quarterly data and prepared this report.

The sampling event was performed by Geochemical Testing on May 5, 2025. In accordance with the permit, the environmental monitoring program at the site provides environmental protection during and after landfill development. Field work, sampling methodologies, data evaluation, data quality assurance and quality control (QA/QC), chemical analysis, and time series analysis were conducted in general accordance with the permit. Deviations, if encountered, are described below.

Lancaster Landfill is a construction and demolition solid waste facility which operates under PADEP Solid Waste Permit No. 101559. The permit was initially issued on June 2, 1992, it was most recently renewed on September 1, 2021, and extended to December 31, 2031. The facility consists of an approximately 135-acre parcel of land, of which approximately 58.81 acres are permitted for waste disposal.

## **2. SITE GEOLOGY AND HYDROGEOLOGY**

The information presented in this section was included in the 2007 Major Permit Modification Application (Major Mod) for the Phase I and II Landfill Expansion, which was prepared by Blazosky Associates, Inc (BAI). The Major Mod was approved by the PADEP on March 18, 2011.

### **2.1 Regional Physiography and Local Geology**

Lancaster Landfill is located in the southwestern portion of the Narrow Neck sub-basin of the Gettysburg-Newark Basin Complex. The Gettysburg- Newark Basin Complex lies between the Great Valley and Piedmont Physiographic Provinces and contains Triassic and Jurassic un-metamorphosed, sedimentary, and mafic igneous rocks.

Lancaster Landfill is underlain by conglomerate, sandstone, siltstone, and shale of the New Oxford Formation. The sedimentary units in the vicinity of Lancaster Landfill generally strike east-northeast to west-southwest (approximately N60°E) and dip approximately 50 degrees to the north-northwest.

### **2.2 Hydrogeology**

Groundwater beneath Lancaster Landfill is present within the New Oxford Formation which is characterized by a series of interbedded sandstones, siltstones, and shales. Groundwater movement within this unit is typical of fractured bedrock formations and flows primarily through secondary porosity.

#### *2.2.1 Hydrogeologic Properties of the New Oxford Formation*

Pumping testing performed during the Major Mod permitting process indicate that the New Oxford Hydrostratigraphic Unit has an average hydraulic conductivity of 24 to 98 feet per day (ft/day). The storage coefficient is estimated to be  $4.1 \times 10^{-4}$  to  $5.47 \times 10^{-3}$  (unitless) and effective porosity is estimated to be 25 percent.

### 3. ENVIRONMENTAL MONITORING NETWORK

The environmental monitoring network includes groundwater and surface water monitoring locations, underdrain sampling points, leachate collection and detection zone monitoring points, a network of perimeter methane gas monitoring probes, and a network of dust fall monitoring locations (Figure 2).

#### 3.1 Groundwater, Surface Water, and Underdrain Monitoring Networks

The groundwater, surface water, and underdrain monitoring networks at Lancaster Landfill includes quarterly sampling at groundwater wells completed within the New Oxford Formation, surface water monitoring locations around the landfill, and underdrain monitoring points from beneath the landfill. These monitoring networks have been established to meet the requirements of the permit. The monitoring well network targets the preferential flow path for the facility as described in the 2018 Groundwater Monitoring Plan, prepared by Civil & Environmental Consultants, Inc. (CEC) and is designed as an early detection monitoring system.

Form 21 Groundwater Monitoring Network				
Upgradient Wells	MW-101U			
Downgradient Wells	MW-104D	MW-105DR	MW-106DR	MW-107DR
	MW-108DR	MW-109DR	MW-110DR	MW-111DR

Form 21 Surface Water Monitoring Network				
MGSU01	MGSD02	MGSU03	MGSD04	MGSD05
MGSU06	MGSU07	MGSU07		

Form 21 Underdrain Monitoring Network				
U-C2	U-C5	U-C6A	U-C6B	U-C8A
U-C9B	U-C9C	U-C10A	U-C10B	U-C10C
U-C10D				

Several underdrains were first sampled in 2021. Four of these (U-C10A, U-C10B, U-C10C, and U-C10D) were found and first sampled during the 1<sup>st</sup> Quarter 2022. During the process to locate and identify the underdrains, the on-site contractor and ARM Group (who prepared the certification report) confirmed that U-C9A was never installed because it was determined to be unnecessary during construction. All other underdrains have been located and are sampled quarterly when flowing.

During the 1<sup>st</sup> Quarter 2022, MW-105DR and MW-106DR were installed to replace MW-105D and MW-106D at their approved locations to accommodate Cell 11 construction. In accordance with the permit, all four wells were sampled concurrently during the 1<sup>st</sup> and 2<sup>nd</sup> Quarters of 2022. The results from both sets of concurrent samples indicated that the groundwater quality in the replacement wells is generally comparable to the original wells. MW-105D and MW-106D were decommissioned in the spring of 2022.

Finally, it should be noted that additional monthly sampling occurred from February 2024 through January 2025 at several wells and leachate monitoring points to monitor groundwater quality from an unintentional disposal of mercury-impacted waste. A Sampling and Analysis Plan was submitted by CEC on January 17, 2024, and approved by the PADEP on February 21, 2024. The results of this additional sampling were included in a report submitted by CEC on March 24, 2025. As indicated in that report, mercury was not detected at any sampling location during the monitoring period.

### **3.2 Leachate Collection and Detection Zone Networks**

The leachate collection zone (LCZ) and leachate detection zone (LDZ) monitoring networks includes one LCZ, which is a commingled sample for the sitewide leachate. Eleven LDZs are monitored across the site: LDZ-1 through LDZ-11.

### **3.3 Perimeter Methane Gas Monitoring Probes**

Methane migration is monitored by a network of 4 perimeter gas monitoring probes installed around the perimeter of Lancaster Landfill. The current network includes probes P001 through P004.

### **3.4 Dust Fall Monitoring Network**

Finally, dust migration is monitored by a network of 4 dust fall monitoring points installed around the perimeter of Lancaster Landfill. The current network includes Location A through Location D.

## 4. QUARTERLY MONITORING RESULTS

The following sections present a summary of the quarterly monitoring results and a discussion for each monitoring network.

### 4.1 Sampling Activities

Field sampling activities for the 2<sup>nd</sup> Quarter 2025 were conducted on May 5, 2025 (Table 1). Monitoring well purging and sampling activities were implemented in accordance with the Groundwater Monitoring Plan (CEC, 2018) and site permit.

In accordance with the Groundwater Monitoring Plan (CEC, 2018), groundwater monitoring wells, surface water monitoring points, and the underdrains at the site are analyzed for specific parameters based on the requirements of the permit. Refer to Table 1 of the Groundwater Monitoring Plan (CEC, 2018) for complete details.

All water samples collected at the site were delivered to Geochemical Testing for chemical analysis. Geochemical Testing is certified in the Commonwealth of Pennsylvania for performing chemical analysis of the reported parameters. The PADEP Form 21s are included in Appendix A and B. The laboratory reports, laboratory quality control report, and field forms are included in Appendix B.

#### 4.1.1 Visual Well Inspection

During each quarterly sampling event, the groundwater monitoring wells are visually inspected by Geochemical Testing for integrity, any physical damage and/or changes that may have occurred to the well or surrounding area, or signs of distressed vegetation surrounding the well. Any variation from previous sampling events is noted on the Field Information Form or the Well Condition Inspection Forms (both of which are provided in Appendix B), and Geochemical Testing discusses issues that need to be addressed with the facility. Well casing stickup length, well casing diameter, and material of construction is also recorded on the Field Information Form.

#### 4.1.2 Groundwater Elevation Measurements

Prior to groundwater purging and sampling activities, depth to water and water level elevation [feet above mean sea level (ft amsl)] were recorded to the nearest hundredth of a foot. The water level measurements are used to prepare groundwater contours to determine groundwater hydraulic gradient and flow direction and velocity at the site. Groundwater elevations for the 2<sup>nd</sup> Quarter 2025 sampling event were generally comparable to historical groundwater elevation measurements, except for MW-111DR where the groundwater elevation was measured to be approximately 27 feet less than last quarter. Langan will continue to observe this well for any further changes in groundwater elevation.

#### 4.1.3 Groundwater Flow Velocity

The horizontal groundwater seepage velocities were estimated using the following equation:

$$v = \frac{(K_h i)}{n_s}$$

Where “ $v$ ” is the average groundwater velocity; “ $K_h$ ” is the horizontal conductivity, “ $i$ ” is the average hydraulic gradient, and “ $n_e$ ” is the effective porosity.

The potentiometric surface map of the New Oxford Formation Hydrostratigraphic Unit indicates that the horizontal gradient is to the northwest at 0.0302 ft/ft (Figure 3). Horizontal groundwater velocity is 11.9 ft/day (4,344 ft/year), based upon an average hydraulic conductivity of 98 ft/day and an effective porosity of 25 percent (BAI, 2007).

## 4.2 Groundwater Results

Nine groundwater wells were sampled during the 2<sup>nd</sup> Quarter 2025. Groundwater sample analysis was completed without any difficulties and the results are representative of groundwater at the site.

The PADEP permit requires Lancaster Landfill to submit quarterly sampling results for Form 21 parameters. Cumberland County Landfill is providing a quarterly review of the time-series analysis for five select leachate indicator parameters.

### 4.2.1 Time Series Analysis

A 5-year time series analysis was completed for five leachate indicator parameters [ammonia nitrogen, alkalinity, total dissolved solids (TDS), chloride, and sodium]. Specifically, the graphs were analyzed for significant trends, unexpected geochemical signatures, and anomalously high results

#### 4.2.1.1 New Oxford Formation Hydrostratigraphic Unit

Figure 4 presents the time-series graphs for the monitoring wells installed around the site. No historically significant upward trends were observed, except for alkalinity at MW-109DR. However, the remaining leachate indicator parameters did not exhibit increasing trends. This well will continue to be monitored to determine if further increasing trends develop.

## 4.3 Surface Water Results

Seven surface water locations were sampled during the 2<sup>nd</sup> Quarter 2025. The concentration of metals and general chemistry constituents were generally consistent with historical results. Surface water at the site does not appear to be influenced by leachate.

## 4.4 Leachate Results

During the 2<sup>nd</sup> Quarter 2025, a grab sample was collected from the composite LCZ, and LDZ-10 was also sampled. The PADEP Form 50s are included in Appendix C.

The average daily LCZ flow from the entire landfill during the quarter was 478.8 gallons per acre per day (g/a/d). This flow is generally comparable with historic results. Based on recommendations from the PADEP, the flows were calculated using data collected from the entire calendar quarter. The average daily LDZ flows from the landfill were:

- 0 g/a/d from LDZ-1;
- 0 g/a/d from LDZ-2;

- 0 g/a/d from LDZ-3;
- 0.3 g/a/d from LDZ-4;
- 1.2 g/a/d from LDZ-5;
- 15.2 g/a/d from LDZ-6;
- 0.6 g/a/d from LDZ-7;
- 13.3 g/a/d from LDZ-10; and
- 10.5 g/a/d from LDZ-11.

Based on current and historical analytical and flow data from the LDZs as well as the requirements of the PADEP Form 50, the LDZ sampling and analysis schedule is as follows. LDZ-1, LDZ-2, LDZ-3, LDZ-4, LDZ-5, and LDZ-10 do not appear to be influenced by leachate. Therefore, they should be sampled once per year (during the 4th quarter) for the PADEP Form 50 indicator parameters, assuming flows remain less than 10 g/a/d. LDZ-6, LDZ-7, and LDZ-11 appear to be influenced by leachate. Therefore, they should be sampled once per year (during the 4<sup>th</sup> quarter) for the full PADEP Form 50 list of parameters, regardless of flow.

Based on this discussion, LDZ-10 is scheduled to be sampled during the 3<sup>rd</sup> Quarter 2025 for PADEP Form 50 indicator parameters because flows were greater than 10 g/a/d during the 2<sup>nd</sup> Quarter 2025.

#### **4.5 Perimeter Methane Gas Monitoring Probe Results**

Field readings were collected from the perimeter methane gas monitoring probes during the quarter. For reference, 5% methane equals the lower explosive limit (LEL). Methane was not detected at or above the lower explosive limit in any probe during the 2<sup>nd</sup> Quarter 2025 (Appendix D).

#### **4.6 Dust Fall Monitoring Results**

In accordance with the permit, dust fall monitoring is completed monthly at four locations around the site. Each month, the samples are submitted to Geochemical Testing for analyses via methods American Society for Testing and Materials (ASTM) D 1739-82 MOD and D 1739-98 MOD. It should be noted that ASTM D 1739-98 MOD is a conservative analysis because it includes organic matter that would otherwise be removed for via Method ASTM D 1739-82 MOD.

The 2<sup>nd</sup> Quarter 2025 dust fall results indicate that no sample exceeded the maximum dust fall of 1.5 mg/cm<sup>2</sup>/month as specified in PA 25 §131.3 and referenced in PA 25 §273.217 (Appendix E), except for Locations B and C during the month of June. A review of the laboratory case narratives indicates the exceedances do not appear to be entirely reflective of dust emissions generated from landfill operations; however, due to organic matter (insects, leaves, etc.) which is commonly present in the samples. During the month of June, Locations B and C were noted as containing brown water with dirt, insects, and leaves.

## 5. DISCUSSION AND CONCLUSIONS

Groundwater, surface water, underdrain, and leachate samples were collected and analyzed by Geochemical Testing according to appropriate sampling and analytical procedures and Lancaster Landfill's permit. The following observations are noted for the 2<sup>nd</sup> Quarter 2025 sampling event:

- The sampling event was completed on May 5, 2025.
- During the quarter, the New Oxford Formation Hydrostratigraphic Unit was calculated to have a horizontal gradient to the north at 0.0302 ft/ft and a horizontal velocity of 11.9 ft/day (4,344 ft/year) (Figure 3).
- Time-series analysis of select leachate indicator parameters shows no significant upward trends in these constituents through time, except for alkalinity at MW-109DR. However, these trends do not appear to be influenced by leachate because the remaining leachate indicator parameters were generally stable, and VOCs were not detected in these wells. Additionally, geochemical fingerprinting indicates that the groundwater at these locations is chemically dissimilar to leachate.
- The concentration of metals and general chemistry constituents in the surface water samples were generally consistent with historical results.
- Field readings were collected from the perimeter methane gas monitoring probes during the quarter. Methane was not detected at or above the lower explosive limit in any probe during the 2<sup>nd</sup> Quarter 2025
- The 2nd Quarter 2025 dust fall results indicate that no sample exceeded the maximum dust fall of 1.5 mg/cm<sup>2</sup>/month, except for Locations B and C during the month of June. A review of the laboratory case narratives indicates the exceedances do not appear to be entirely reflective of dust emissions generated from landfill operations; however, due to organic matter (insects, leaves, etc.) which is commonly present in the samples. During the month of June, Locations B and C were noted as containing brown water with dirt, insects, and leaves.

Overall, the conclusions of this report are:

- Continued landfilling activities do not appear to be altering the existing groundwater, surface water, or private water supply conditions.
- The groundwater, surface water, and underdrain monitoring networks can monitor the hydrostratigraphic unit and the surface water bodies at Lancaster Landfill.
- The frequency of sampling and the constituents analyzed are appropriate for determining if a release has occurred.

## 6. CERTIFICATION

By affixing my seal to this, I do hereby certify to the best of my knowledge, information, and belief that the information contained in this report is true and correct. I further certify I am licensed to practice in the Commonwealth of Pennsylvania and that it is within my professional expertise to verify the correctness of the information. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Name Thomas E. Antonacci, P.G.

Signature 

Date 7/14/25

[seal]



## 7. REFERENCES

- Blazosky Associates, Inc (BAI, 2007). PADEP Form 6 Geologic Information. Veolia ES Lancaster, LLC; Veolia ES Lancaster Landfill; Phase I & II Landfill Expansion Application for Major Permit Modification. June 2007.
- Blazosky Associates, Inc (BAI, 2007). PADEP Form 7 Hydrogeologic Information. Veolia ES Lancaster, LLC; Veolia ES Lancaster Landfill; Phase I & II Landfill Expansion Application for Major Permit Modification. June 2007.
- Civil & Environmental Consultants, Inc., 2018. "Lancaster Landfill Groundwater and Surface Water Sampling and Analysis Plan." Submitted September 2018.

## **TABLES**

**TABLE 1  
FIELD SAMPLING SUMMARY  
SECOND QUARTER 2025  
LANCASTER LANDFILL**

SAMPLE LOCATION	SAMPLE DATE	SAMPLE TIME	WATER LEVEL <sup>(1)</sup> (ft)	WELL DEPTH <sup>(1)</sup> (ft)	MEASURING POINT ELEV. <sup>(2)</sup> (ft amsl)	GROUNDWATER ELEV. <sup>(1)</sup> (ft amsl)	FIELD PARAMETERS					COMMENTS	
							pH	COND. (µS/cm)	TEMP. (deg C)	TURB. (NTU)	D.O. (mg/L)		STREAM FLOW RATE (gpm)
<b>Groundwater</b>													
MW-101U	05/05/25	9:36	16.97	54.00	495.93	478.96	5.67	235	12.3	0.0	4.3		
MW-104D	05/05/25	12:15	40.07	76.50	418.32	378.25	6.66	475	13.9	26.5	1.3		
MW-105DR	05/05/25	11:26	33.28	60.00	410.93	377.65	5.97	564	13.4	10.4	1.8		
MW-106DR	05/05/25	9:49	39.06	103.50	427.53	388.47	6.92	252	13.4	0.00	1.7		
MW-107DR	05/05/25	12:15	25.37	50.50	466.85	441.48	6.03	930	14.9	23.0	12.5		
MW-108DR	05/05/25	10:38	47.82	80.00	471.40	423.58	6.78	419	14.9	10.6	1.1		
MW-109DR	05/05/25	11:49	56.78	101.70	435.00	378.22	5.08	499	14.1	0.0	5.5		
MW-110DR	05/05/25	10:34	7.92	32.00	428.00	420.08	6.22	708	12.2	0.0	1.6		
MW-111DR	05/05/25	13:05	57.23	120.15	486.65	429.42	6.08	257	12.8	21.5	6.8		
<b>Surface Water</b>													
MGSU01	05/05/25	11:30					7.13	336	20.4	0.0	7.5	337	
MGSD02	05/05/25	10:45					7.02	544	19.9	0.0	5.8	224	
MGSU03	05/05/25	10:20					7.19	294	19.6	11.6	9	10099	
MGSD04	05/05/25	12:45					7.58	395	19.8	6.7	6.4	1122	
MGSD05	05/05/25	13:00					7.17	305	20.0	4.3	6.1	11521	
MGSU06	05/05/25	9:45					7.17	343	15.2	0.0	92.0	5386	
MGSU07	05/05/25	9:30					7.21	293	15.3	15.4	8.8	6733	
<b>Underdrain</b>													
U-C2	05/05/25	12:00					7.42	396	20.6	0.0	7.8	0.5	
U-C5													No sample
U-C6A													No sample
U-C6B													No sample
U-C8A													No sample
U-C9B													No sample
U-C9C													No sample
U-C10A													No sample
U-C10B													No sample
U-C10C													No sample
U-C10D													No sample
<b>Leachate</b>													
Leachate Storage Tank	05/05/25	12:45					8.15	4550	19.3				
LDZ-1													
LDZ-2													
LDZ-3													
LDZ-4													
LDZ-5													
LDZ-6													
LDZ-7													
LDZ-10	05/05/25	11:10					6.78	1223	22.6				
LDZ-11													

Notes:

<sup>(1)</sup> Measured from top of the inner casing.

<sup>(2)</sup> Elevation of the top of the inner casing from field forms.

**TABLE 2  
LABORATORY ANALYTICAL RESULTS  
SECOND QUARTER 2025  
LANCASTER LANDFILL**

Chemical Constituent	Unit	Analytical	MCL/SWHS	GROUNDWATER								
				MW-101U	MW-104D	MW-105DR	MW-106DR	MW-107DR	MW-108DR	MW-109DR	MW-110DR	MW-111DR
<b>Inorganics</b>												
Chemical Oxygen Demand	mg/L	EPA 8260	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloride	mg/L	EPA 8260	250 <sup>(2)</sup>	6.0	5.1	38.1	< 1.0	142	7.9	19.7	9.6	13.2
Iron	mg/L	EPA 8260	0.3 <sup>(2)</sup>	0.08	0.29	< 0.05	0.25	0.70	< 0.05	0.11	< 0.05	1.64
Iron, dissolved	mg/L	EPA 8260	0.3 <sup>(2)</sup>	< 0.05	< 0.05	< 0.05	0.11	< 0.05	< 0.05	< 0.05	< 0.05	0.87
pH (Field)	S.U.	EPA 8260	6.5 - 8.5 <sup>(2)</sup>	5.67	6.66	5.97	6.92	6.03	6.78	5.08	6.22	6.08
Lab pH	S.U.	EPA 8260	6.5 - 8.5 <sup>(2)</sup>	6.24 H	7.32 H	6.78 H	7.69 H	7.19 H	7.68 H	6.11 H	6.87 H	6.70 H
Sodium	mg/L	EPA 8260	--	6.7	12.7	22.6	14.4	18.4	9.3	13.9	4.4	18.2
Sodium, dissolved	mg/L	EPA 8260	--	6.7	12.7	20.3	15.2	18.0	10.2	14.4	4.7	14.1
Specific Conductance (Field)	µmhos/cm	EPA 8260	--	235	475	564	252	930	419	499	708	257
Specific Conductance	µmhos/cm	EPA 8260	--	224	461	549	253	890	405	472	665	254
Sulfate	mg/L	EPA 8260	250 <sup>(2)</sup>	19.3	34.3	76.4	< 10	21.1	36.2	134	67.1	50.0
Total Organic Carbon	mg/L	EPA 8260	--	1.2	< 1.0	1.4	< 1.0	< 1.0	< 1.0	1.6	2.7	< 1.0
Total Organic Halogen	µg/L	EPA 8260	--	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
<b>Other Inorganics</b>												
Alkalinity to pH 4.5	mg/L	ASTM D 1067-11	--	52	198	118	124	245	151	67	260	51
Ammonia Nitrogen	mg/L	EPA 350.1	--	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Arsenic	µg/L	EPA 200.8	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Arsenic, dissolved	µg/L	EPA 200.8	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Barium	mg/L	EPA 200.7	2	0.18	0.11	0.10	0.18	0.77	0.23	0.02	0.19	0.12
Barium, dissolved	mg/L	EPA 200.7	2	0.17	0.10	0.10	0.17	0.68	0.21	0.02	0.19	0.11
Calcium	mg/L	EPA 200.7	--	22.2	61.2	57.5	28.6	114	55.5	49.6	112	15.6
Calcium, dissolved	mg/L	EPA 200.7	--	21.7	59.6	58.5	25.8	111	46.6	50.2	114	15.9
Chromium	mg/L	EPA 200.7	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chromium, dissolved	mg/L	EPA 200.7	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Lead	µg/L	EPA 200.8	15	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	7.5	< 5.0	< 5.0
Lead, dissolved	µg/L	EPA 200.8	15	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	6.5	< 5.0	< 5.0
Magnesium	mg/L	EPA 200.7	--	6.8	14.7	18.9	6.8	31.6	12.7	16.6	13.1	11.6
Magnesium, dissolved	mg/L	EPA 200.7	--	6.7	14.5	19.2	6.8	30.6	10.9	16.7	13.2	11.5
Manganese	mg/L	EPA 200.7	0.05 <sup>(2)</sup>	< 0.01	0.05	0.09	0.28	0.05	< 0.01	0.99	< 0.01	1.37
Manganese, dissolved	mg/L	EPA 200.7	0.05 <sup>(2)</sup>	< 0.01	0.03	0.08	0.18	< 0.01	0.05	0.99	< 0.01	1.29
Nickel	mg/L	EPA 200.7	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Nickel, dissolved	mg/L	EPA 200.7	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Phenolics	µg/L	EPA 420.4	2000 <sup>(1)</sup>	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
Potassium	mg/L	EPA 200.7	--	2.0	2.3	3.2	1.3	2.5	2.2	3.6	1.1	2.1
Potassium, dissolved	mg/L	EPA 200.7	--	2.0	2.2	2.9	1.2	2.2	1.8	3.7	1.2	1.6
Total dissolved solids	mg/L	SM 2540 C	500 <sup>(2)</sup>	108	230	266	122	466	206	246	352	148

MCL/SWHS

Federal MCLs are shown, where promulgated.

(1) PADEP Statewide Health Standards (SWHS) are shown in the when a federal MCL has not been promulgated

(2) Secondary MCL.

**TABLE 2  
LABORATORY ANALYTICAL RESULTS  
SECOND QUARTER 2025  
LANCASTER LANDFILL**

Chemical Constituent	Unit	Analytical	MCL/SWHS	SURFACE WATER						
				MGSU01	MGSD02	MGSU03	MGSD04	MGSD05	MGSU06	MGSU07
<b>Inorganics</b>										
Chemical Oxygen Demand	mg/L	EPA 8260	--	< 10	15	31	14	29	21	29
Chloride	mg/L	EPA 8260	250 <sup>(2)</sup>	22.2	56.1	34.0	31.4	34.6	26.6	35.9
Iron	mg/L	EPA 8260	0.3 <sup>(2)</sup>	0.18	0.45	0.45	0.66	0.63	0.24	0.82
Iron, dissolved	mg/L	EPA 8260	0.3 <sup>(2)</sup>	< 0.05	0.20	0.13	< 0.05	0.10	0.12	0.14
pH (Field)	S.U.	EPA 8260	6.5 - 8.5 <sup>(2)</sup>	7.13	7.02	7.19	7.58	7.17	7.17	7.21
Lab pH	S.U.	EPA 8260	6.5 - 8.5 <sup>(2)</sup>	7.53 H	7.57 H	7.58 H	7.77 H	7.55 H	7.61 H	7.49 H
Sodium	mg/L	EPA 8260	--	12.1	26.6	19.5	17.5	21.8	19.0	21.5
Sodium, dissolved	mg/L	EPA 8260	--	14.7	27.5	20.2	18.0	20.3	19.5	20.6
Specific Conductance (Field)	µmhos/cm	EPA 8260	--	336	544	294	395	305	343	293
Specific Conductance	µmhos/cm	EPA 8260	--	337	569	303	418	312	359	291
Sulfate	mg/L	EPA 8260	250 <sup>(2)</sup>	19.3	47.8	14.5	35.0	15.8	21.1	12.7
Total Organic Carbon	mg/L	EPA 8260	--	2.9	4.5	9.2	4.2	8.4	7.3	9.2
Total Organic Halogen	µg/L	EPA 8260	--							
<b>Other Inorganics</b>										
Alkalinity to pH 4.5	mg/L	ASTM D 1067-11	--	63	136	63	90	65	98	57
Ammonia Nitrogen	mg/L	EPA 350.1	--	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Arsenic	µg/L	EPA 200.8	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Arsenic, dissolved	µg/L	EPA 200.8	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Barium	mg/L	EPA 200.7	2	0.13	0.12	0.07	0.12	0.08	0.07	0.07
Barium, dissolved	mg/L	EPA 200.7	2	0.13	0.12	0.06	0.10	0.07	0.06	0.05
Calcium	mg/L	EPA 200.7	--	28.5	56.3	22.8	40.2	25.4	33.7	21.5
Calcium, dissolved	mg/L	EPA 200.7	--	31.8	57.3	24.5	40.9	26.6	34.1	20.1
Chromium	mg/L	EPA 200.7	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chromium, dissolved	mg/L	EPA 200.7	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Lead	µg/L	EPA 200.8	15	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Lead, dissolved	µg/L	EPA 200.8	15	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Magnesium	mg/L	EPA 200.7	--	9.2	13.9	7.0	11.2	7.7	8.4	7.1
Magnesium, dissolved	mg/L	EPA 200.7	--	9.9	14.2	7.3	11.3	8.0	8.6	6.5
Manganese	mg/L	EPA 200.7	0.05 <sup>(2)</sup>	0.05	0.41	0.07	0.05	0.14	0.19	0.10
Manganese, dissolved	mg/L	EPA 200.7	0.05 <sup>(2)</sup>	0.05	0.37	0.06	0.03	0.06	0.18	0.05
Nickel	mg/L	EPA 200.7	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Nickel, dissolved	mg/L	EPA 200.7	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Phenolics	µg/L	EPA 420.4	2000 <sup>(1)</sup>	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
Potassium	mg/L	EPA 200.7	--	3.1	2.9	2.8	3.2	3.0	3.4	2.6
Potassium, dissolved	mg/L	EPA 200.7	--	3.4	3.0	2.9	3.3	2.8	3.4	2.4
Total dissolved solids	mg/L	SM 2540 C	500 <sup>(2)</sup>	180	282	160	208	154	180	170

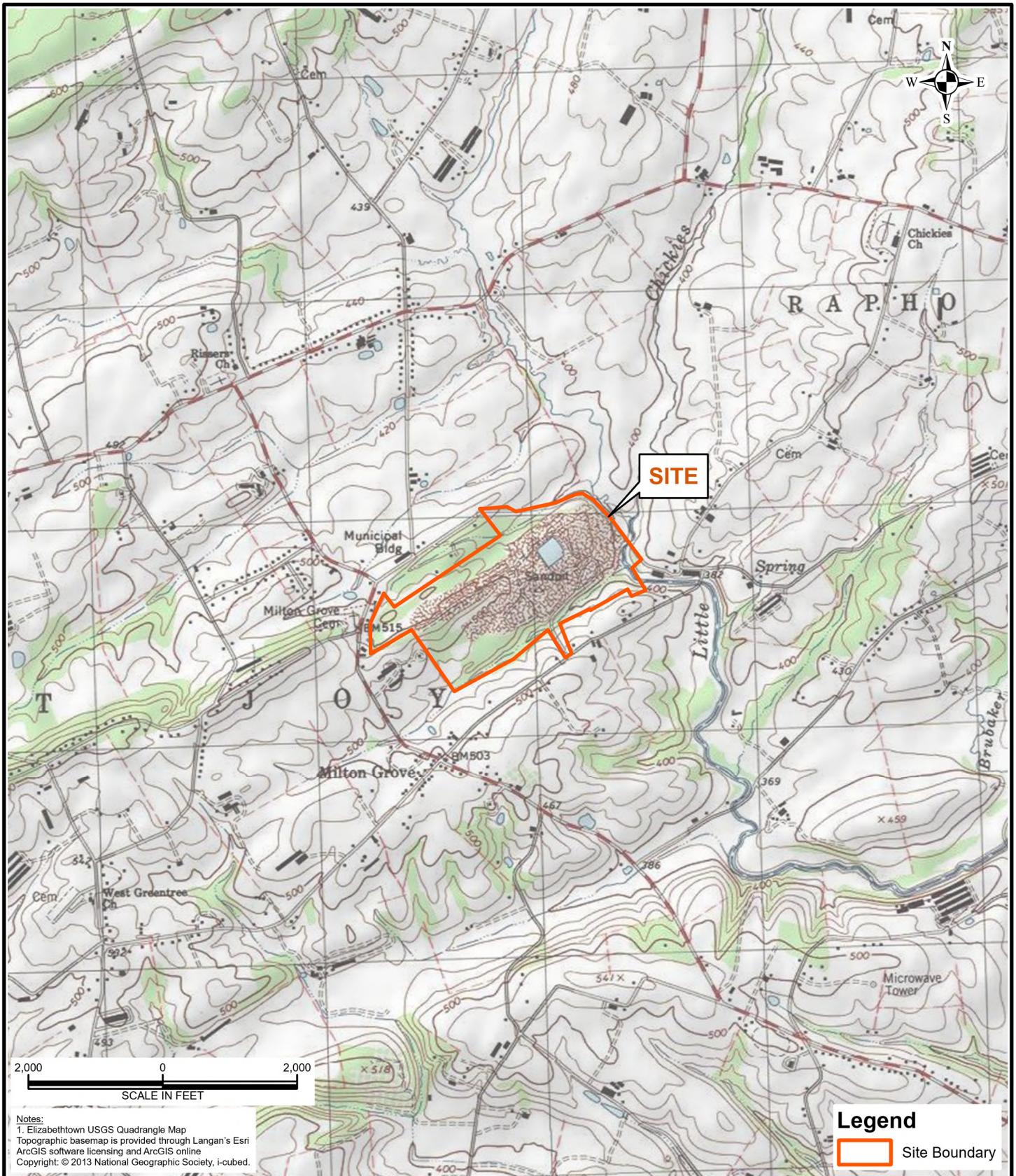
MCL/SWHS

Federal MCLs are shown, where promulgated.

(1) PADEP Statewide Health Standards (SWHS) are shown in the when a federal MCL has not been promulgated


(2) Secondary MCL.

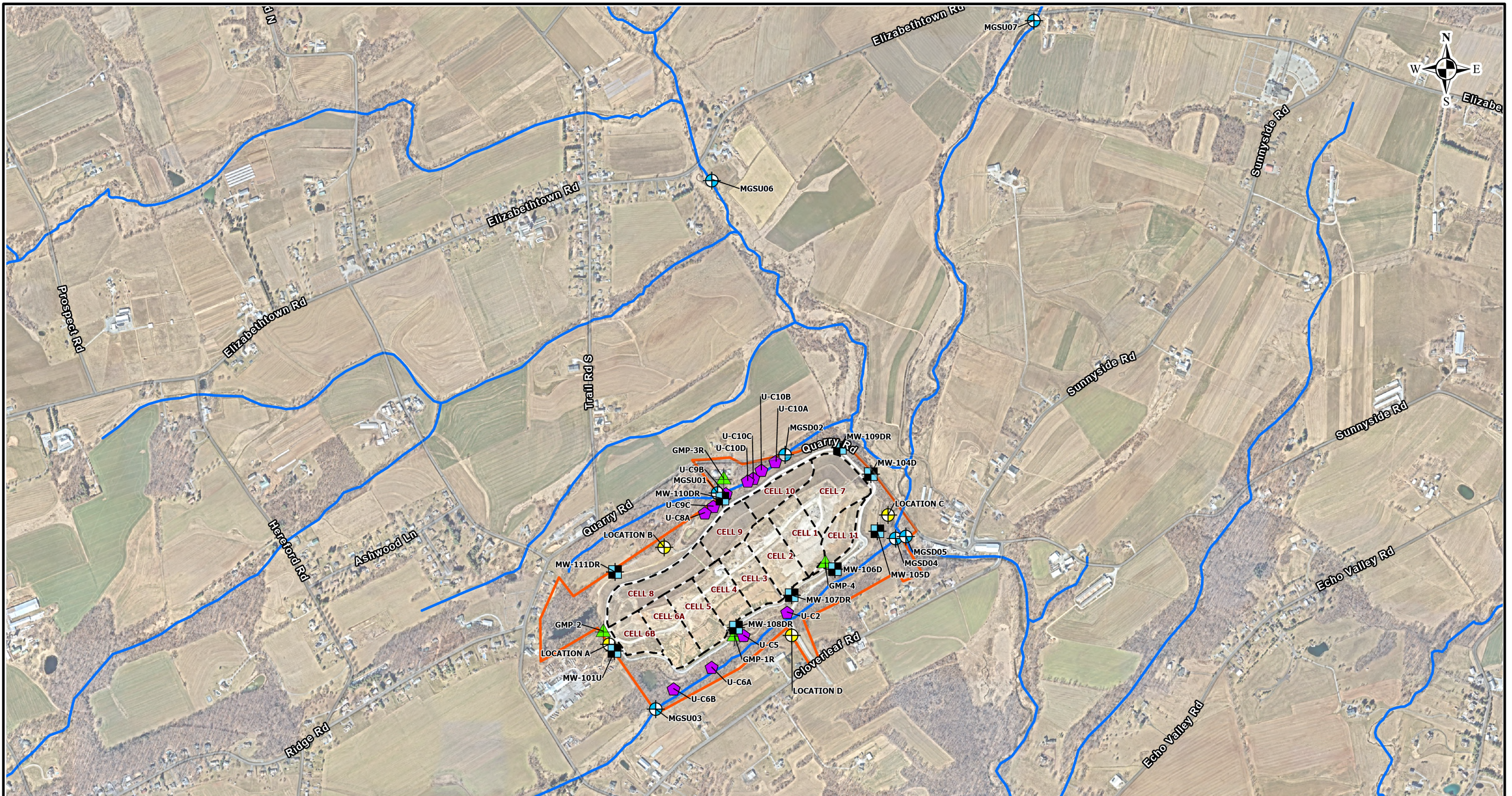
## FIGURES



Notes:  
 1. Elizabethtown USGS Quadrangle Map  
 Topographic basemap is provided through Langan's Esri  
 ArcGIS software licensing and ArcGIS online  
 Copyright: © 2013 National Geographic Society, I-cubed.

**Legend**  
 Site Boundary

 Langan Engineering and Environmental Services, LLC 2400 Ansys Drive, Suite 403 Canonsburg, PA 15317 T: 724.514.5100 F: 724.514.5101 www.langan.com	Project	Figure Title	Project No.	Figure	
	<b>LANCASTER          LANDFILL</b>  MOUNT JOY TOWNSHIP  LANCASTER COUNTY PA	<b>SITE          LOCATION          MAP</b>	250243901	<b>1</b>	
			Date		4/7/2025
			Scale		1" = 2,000 feet
			Drawn By	LB	



- Legend**
- Groundwater Monitoring Wells
  - Surface Water Points
  - Underdrain Points
  - Gas Monitoring Probes
  - Dust Fall Monitoring Points
  - PADEP 305B Stream
  - Approximate Cell Location
  - Site Boundary



Notes:  
1. Imagery provided through Langan's subscription to Nearmap.com. Flown on 3/9/2025.

**LANGAN**

Langan Engineering and Environmental Services, LLC  
2400 Ansys Drive, Suite 403  
Canonsburg, PA 15317

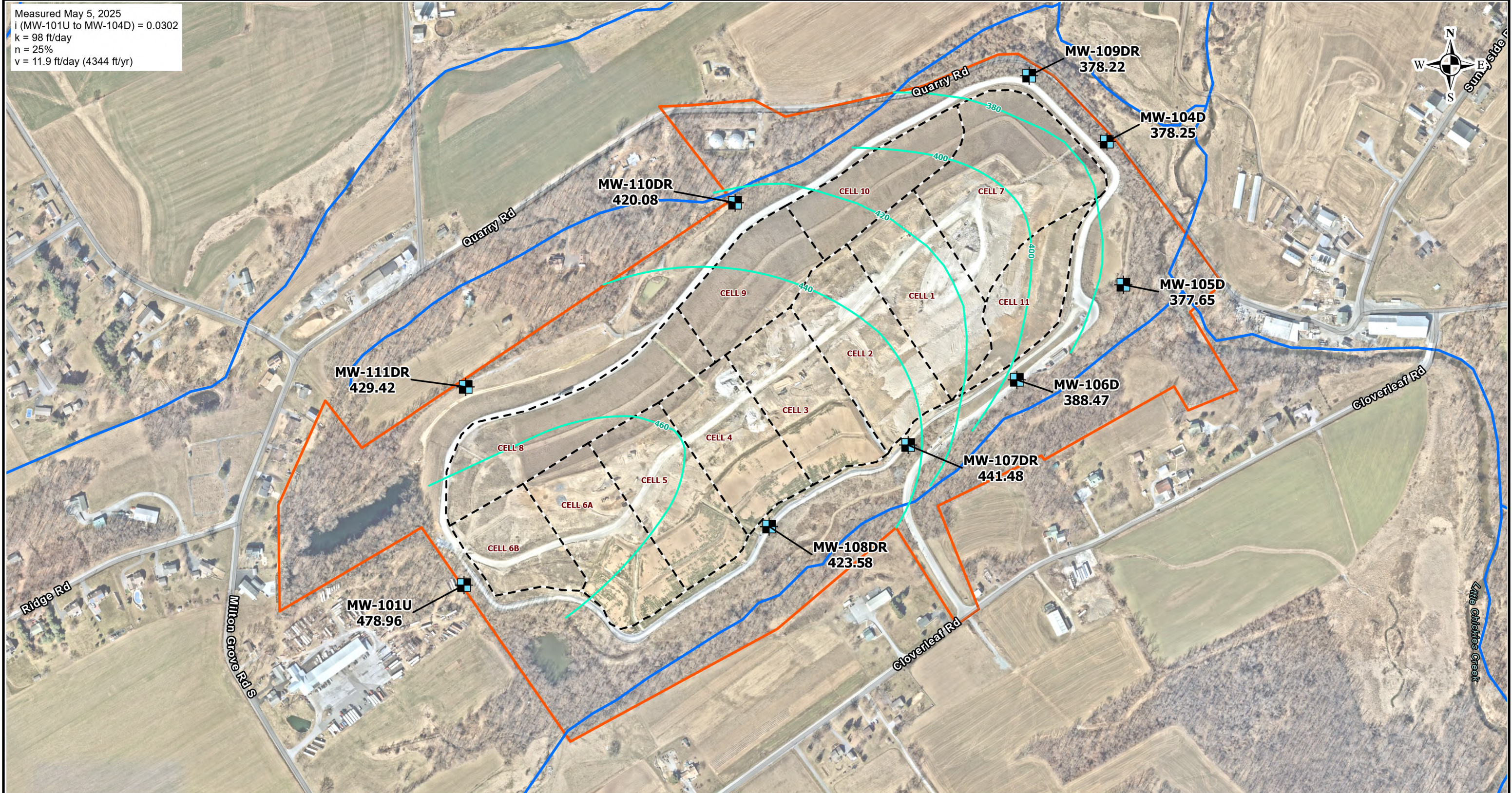
T: 724.514.5100 F: 724.514.5101  
www.langan.com

Project  
**LANCASTER LANDFILL**  
MOUNT JOY TOWNSHIP  
LANCASTER COUNTY PA

Drawing Title  
**SAMPLE LOCATION MAP**

Project No. 250243901	<b>2</b>
Date 4/8/2025	
Scale 1" = 1,000 feet	
Drawn By LB	

Measured May 5, 2025  
 $i$  (MW-101U to MW-104D) = 0.0302  
 $k$  = 98 ft/day  
 $n$  = 25%  
 $v$  = 11.9 ft/day (4344 ft/yr)



**Legend**

- Groundwater Monitoring Wells
- Approximate Groundwater Elevation Contour
- PADEP 305B Stream
- Approximate Cell Location
- Site Boundary



**Notes:**  
 1. Imagery provided through Langan's subscription to Nearmap.com. Flown on 3/9/2025.  
 2. The groundwater elevation at MW-108DR and MW-111DR has been omitted from the contour calculations due to anomalous readings.

**LANGAN**  
 Langan Engineering and Environmental Services, LLC  
 2400 Ansys Drive, Suite 403  
 Canonsburg, PA 15317  
 T: 724.514.5100 F: 724.514.5101  
 www.langan.com

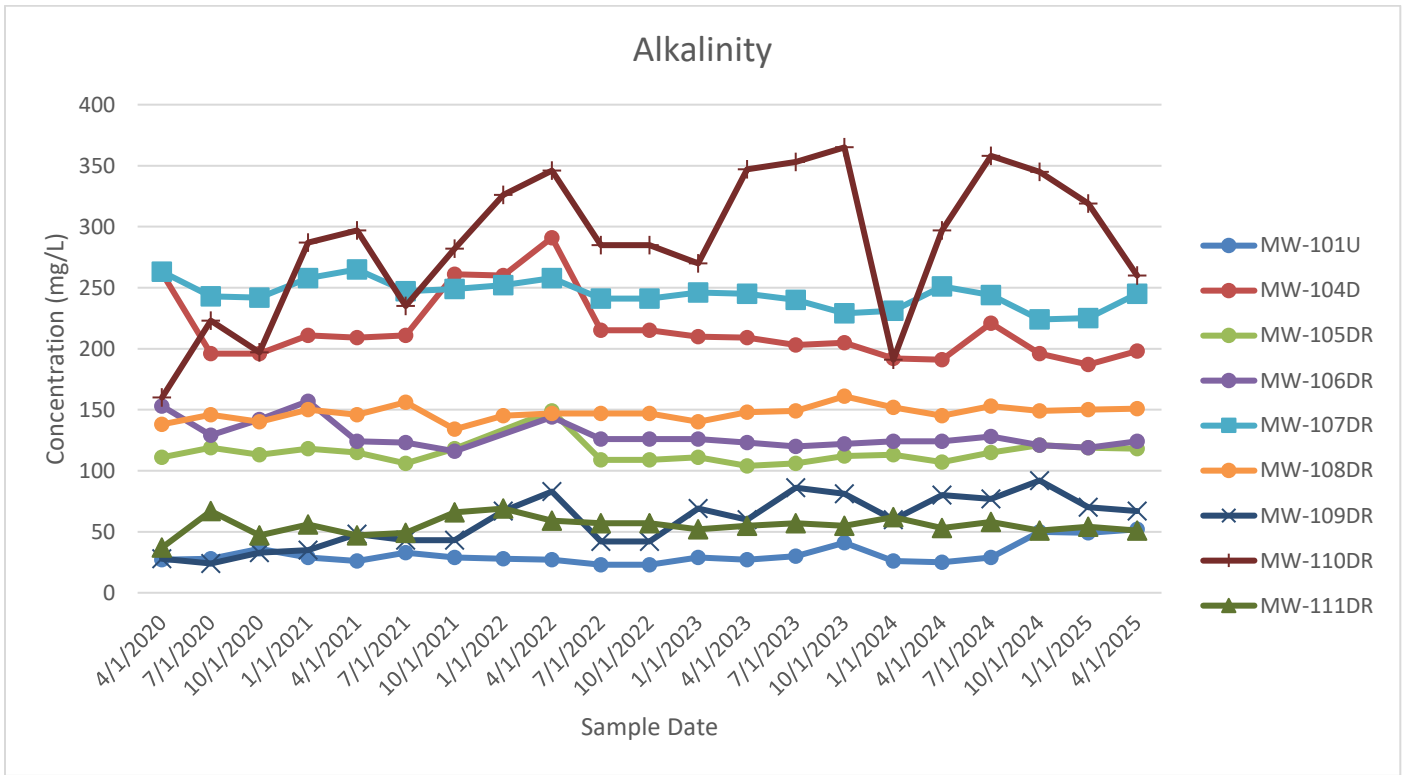
Project  
**LANCASTER LANDFILL**  
 MOUNT JOY TOWNSHIP  
 LANCASTER COUNTY PA

Drawing Title  
**NEW OXFORD FORMATION POTENTIOMETRIC SURFACE MAP**

Project No.	250243901	<b>3</b>
Date	7/8/2025	
Scale	1" = 400 feet	
Drawn By	LB	

FIGURE 4

NEW OXFORD FORMATION  
TIME SERIES PLOTS



Note: MW-105DR and MW-106DR were first sampled 1<sup>st</sup> Quarter 2022; prior results shown are from MW-105D and MW-106D.

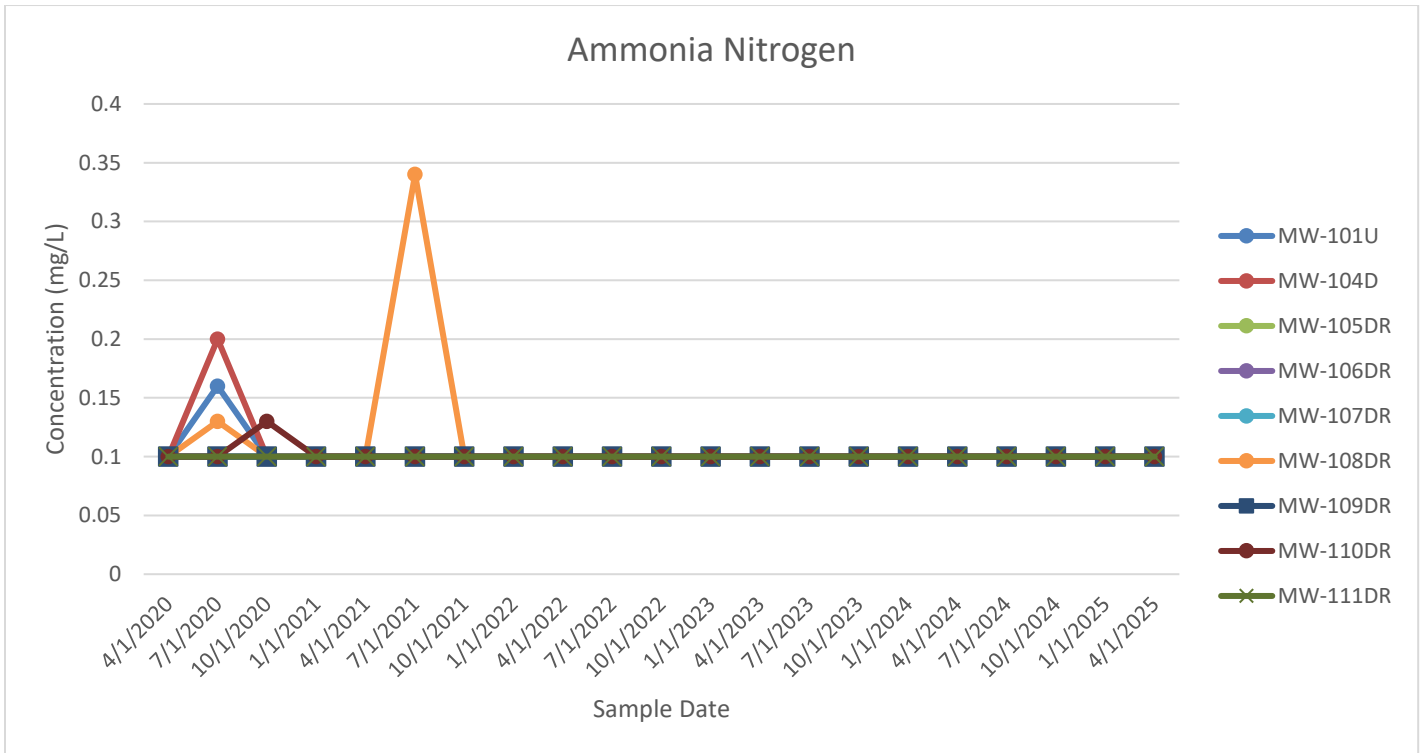


FIGURE 4

NEW OXFORD FORMATION  
TIME SERIES PLOTS

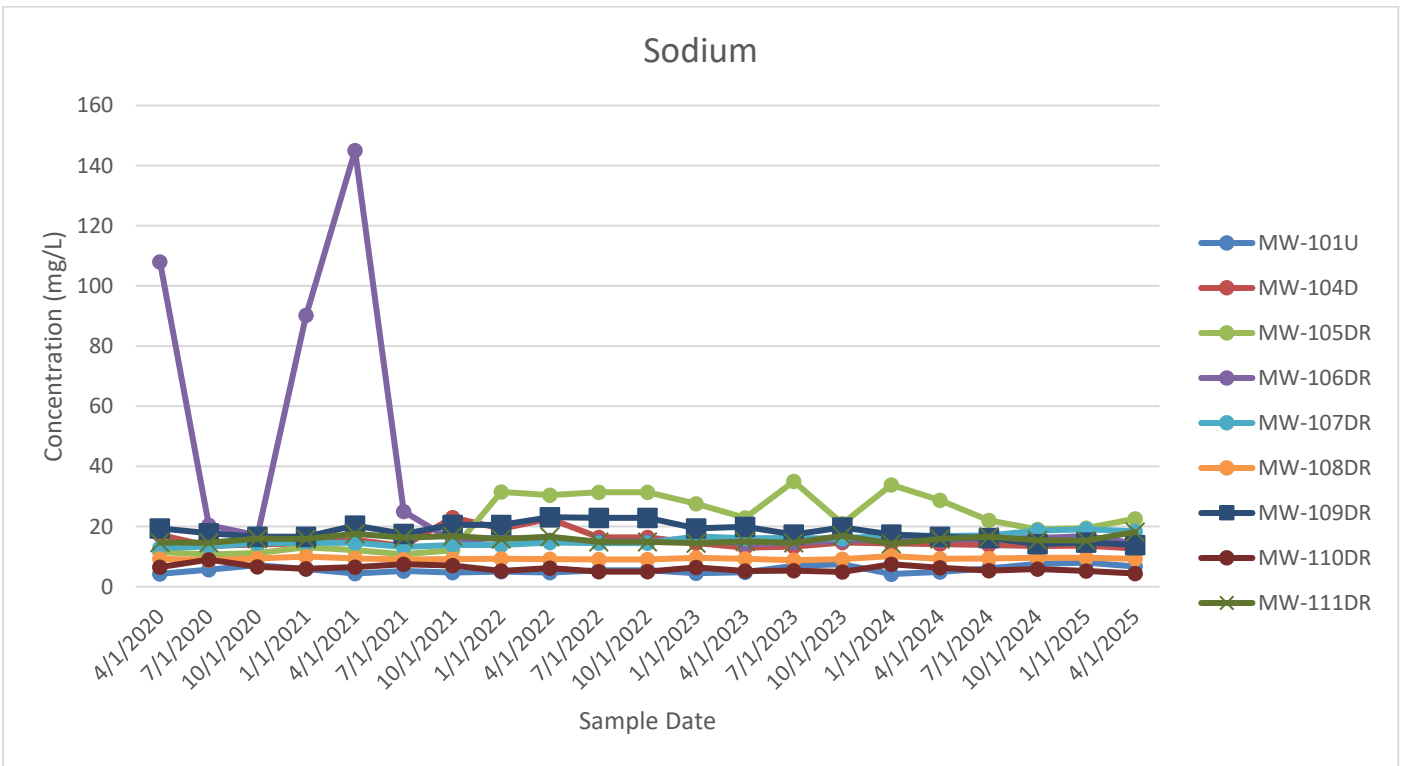
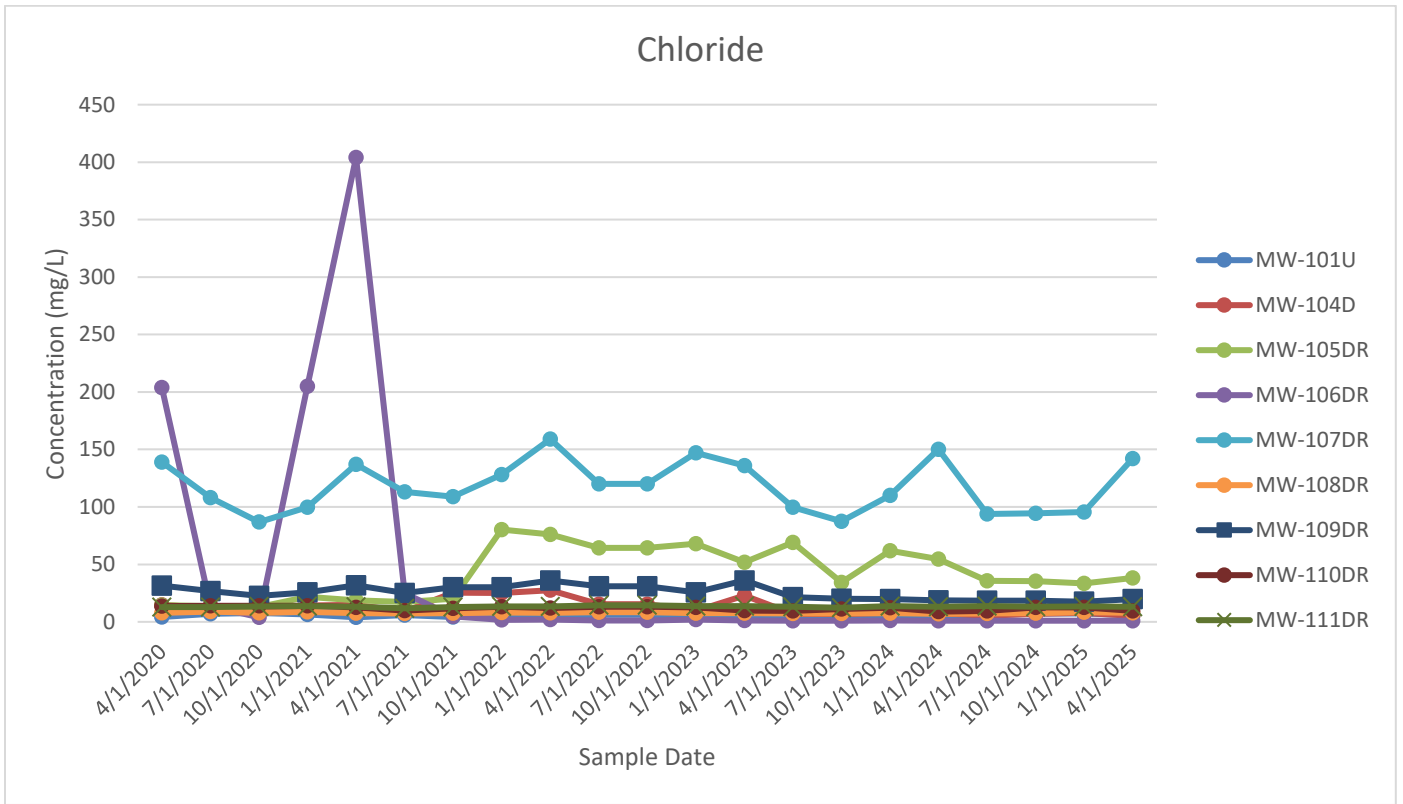
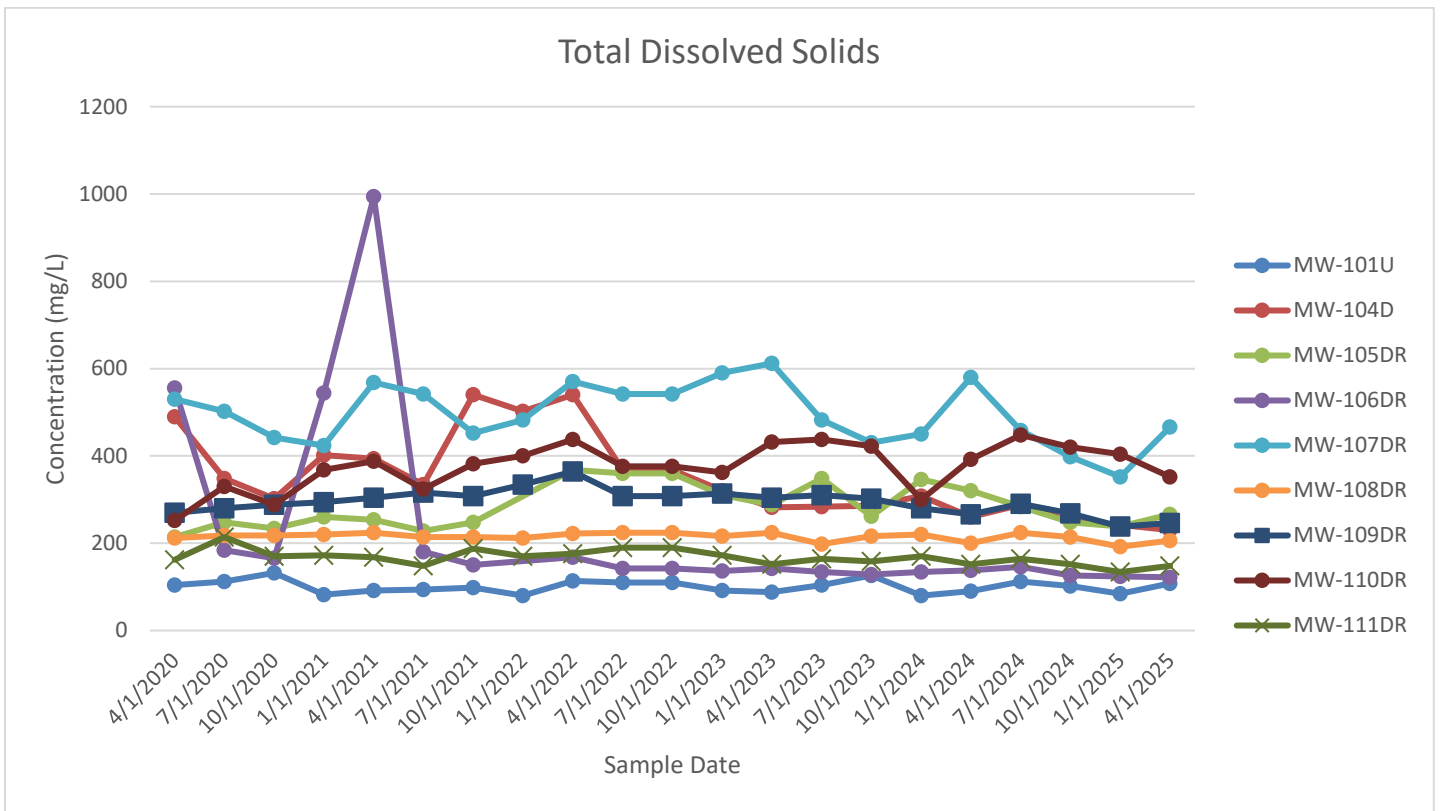


FIGURE 4

NEW OXFORD FORMATION  
TIME SERIES PLOTS



## **APPENDICES (on CD)**

- Appendix A PADEP Form 21 for Groundwater, Surface Water, and Underdrains
- Appendix B Laboratory Files and PADEP Electronic Data Deliverable
- Appendix C PADEP Form 50 for Leachate
- Appendix D Perimeter Methane Gas Monitoring Probes
- Appendix E Dust Fall Results